

DOE-13-0066

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

January 25, 2013

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. John Michael Japp
Federal Facility Agreement Manager
Department of Energy
Oak Ridge Operations Office
P.O. Box 2001
Oak Ridge, Tennessee 37831

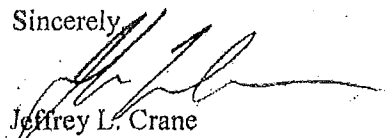
SUBJ: Remedial Investigation/Feasibility Study for
DOE ORR CERCLA Waste Disposal
(DOE/OR/01-2535&D1; September 2012)
(UCOR-4267; August 2012)
DOE Oak Ridge Reservation
Oak Ridge, Tennessee

Dear Mr. Japp:

The Environmental Protection Agency (EPA) completed its review of the subject document and is enclosing our comments in accordance with Section XXI of the Federal Facility Agreement (FFA). Pursuant to Section XXI of the FFA, the Department of Energy (DOE) must provide a response to the enclosed comments and a revised D2 document within sixty (60) days of the receipt of these comments.

If you have any questions regarding this matter, please call me at (404) 562-8546.

Sincerely,


Jeffrey L. Crane
FFA Project Manager
Federal Facilities Branch
Superfund Division

Enclosure

cc: Curt Myers, TDEC
Jason Darby, DOE ORR
SSAB

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DOE

**EPA Comments on the
RI/FS for CERCLA ORR Waste Disposal
(DOE/OR/01-2535&D1; September 2012)
DOE Oak Ridge Reservation
Oak Ridge, Tennessee**

GENERAL COMMENTS

1. A thorough evaluation of volume reduction has been presented in Appendix B. Section 6.2.2.8 includes volume reduction via mechanical debris size reduction as a \$38 M Process Modification that could save up to \$72 M in the final cost of the response action. Section 9 "Conclusions and Recommendations" of Appendix B states, "This study indicates substantial benefits are possible if VR efforts are pursued." Including VR process options as process modifications in this FS is not appropriate. Revise Section 6.2 and Section 7 to include a detailed analysis of two on-site and two off-site disposal alternatives, the current alternatives and the current alternatives that include waste treatment via on-site mechanical size reduction. The alternatives that include VR can consider VR process options in the detailed analysis. This will enable a thorough evaluation of volume size reduction, as a treatment component of the alternatives against the nine criteria. This will enable a definitive remedial decision on whether to select VR as a component of the selected remedy, rather than the current approach to consider VR as a process option that may or may not be deployed as part of the remedy.
2. The Y-12 permitted landfills are considered by DOE ORR to be a portion of its onsite remedial actions for the on-site disposal of CERCLA waste as specified in various decision documents. The Y-12 permitted landfills have not been requested by DOE to be evaluated under the Off-Site Rule for acceptability. To date, it does not appear that a ROD has specifically selected the Y-12 landfills as part of the on-site remedy. Rather, the RODs simply state that disposal will occur at "another suitable facility" (e.g., BV ROD, Section 1.4, p. 1-8). Furthermore, the on-site disposal at "another suitable facility" is not documented in much greater detail in post-ROD documentation and has not yet been documented in an annual Remedial Effectiveness Report or a Five Year Review.

The current lack of documentation regarding the use of the Y-12 landfills as a component of on-site remedial and removal actions may be in part due to its use in a programmatic nature and not as a specific portion of any operable unit decision. Since DOE has not requested an Off-Site Rule acceptability determination for the Y-12 landfills, DOE should consider including the Y-12 landfills in this programmatic on-site /off-site waste disposition remedial evaluation/remedy selection process.

3. It appears the applicable or relevant and appropriate requirements (ARARs) for groundwater monitoring programs for the On-site Disposal Alternative are not complete and implied to only be applicable after operations and during post closure. Appendix E does not address RCRA Subpart F requirements in Section 6.5 of Appendix E and Table E-3 includes RCRA Subpart F under the Post Closure subheading. RCRA groundwater monitoring program regulatory requirements are applicable during the landfill's active operational period.

Further; it is not clear why certain portions of 40 CFR 264 Subpart F and Subpart N are not included as ARARs. In addition to other Specific Comments below, the following ARARs should be added:

- a. 40 CFR 264.97(h), (i) and (j)
 - b. 40 CFR 264.100
 - c. 40 CFR 264.302
 - d. 40 CFR 264.316
 - e. 40 CFR 264.317
4. Explain why the EMWMF required a Preliminary Waste Acceptance Criteria (WAC) and the process for finalizing/documenting the final EMWMF WAC. Explain why the final EMWMF WAC is insufficient for the EMDF WAC and what significant changes are likely in the EMDF PWAC and final WAC.
5. Provide a summary description in Section 6.2 of the lessons learned from the EMWMF design, construction and operations. Include a summary of the following topics:
 - a. Underdrain Retrofitting and Underdrain monitoring
 - b. Primary line protective soil layer's design permeability affect on decreasing leachate collection and increasing contact storm water collection
 - c. Post-ROD decision to design for Contact Storm Water handling, monitoring and treatment
 - d. Leachate storage and shipment to permitted facilities on the ORR in lieu of this remedy's plan for construction of an on-site water treatment plant
 - e. Action Leakage Rate
 - f. Operations decision to preclude RCRA Listed Waste even though the remedy was based disposal of listed wastes
 - g. Other
6. ARARs for discharge of wastewaters for the On-site Disposal alternative discussed as part of Appendix E, do not include the discharge requirements set forth in 40 CFR Part 445 Subpart A (RCRA Subtitle C Hazardous Waste Landfill). These are applicable to wastewater discharged during the landfill's active operational period and relevant and appropriate during the closure/post-closure period. Revise the RI/FS to include these Clean Water Act requirements.
7. The executive summary states, "The advantages and disadvantages of On-site and Off-site Disposal Alternatives are highlighted by five key criteria: (1) long-term effectiveness, (2) short-term transportation risk, (3) availability of services and materials, (4) land use, and (5) cost." This discussion is expanded on in Section 7 (Detailed Analysis of Alternatives), which identifies the criteria listed above as the "Primary Balancing Criteria" (identified as "key criteria" in the Executive Summary) and adds two Threshold Criteria and two Modifying Criteria. The RI/FS should consistently apply the nine criteria set forth in The Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA (EPA/540/G-89/004), dated October 1988 (RI/FS Guidance) to evaluate the remedial alternatives. Revise the RI/FS to evaluate the remedial alternatives against the nine criteria included in the NCP and RI/FS Guidance. All discussions of the evaluation criteria should address all nine

criteria, and the names used for the three categories of criteria should be consistently applied to avoid confusion.

8. Two of the remedial action objectives (RAOs) included in the RI/FS are as follows:
 - a. Prevent exposure to future-generated CERCLA waste that exceeds a human health risk of 1×10^{-5} Excess Lifetime Cancer Risk (ELCR) or Hazard Index (HI) of 1.
 - b. Prevent releases of future-generated CERCLA waste or waste constituents that exceed a human health risk of 1×10^{-5} ELCR or an HI of 1, or ARARs for environmental media.

The basis for the 1×10^{-5} ELCR as point of departure is not clear and does not appear to be consistent with the EPA's stated point of departure as presented in the National Contingency Plan (NCP), 40 CFR 300 and Preamble at 55 FR 8866 (Preamble). The Preamble indicates remediation goals should be set for total risk due to carcinogens that represent an excess upper bound lifetime cancer risk to an individual between 1×10^{-4} to 1×10^{-6} and that a cancer risk of 1×10^{-6} should serve as the point of departure for these remediation goals. Further, factors related to exposure, uncertainty and technical limitations may justify modification of initial cleanup levels that are based on the 1×10^{-6} risk level or risk management decisions, but that the ultimate decision of the appropriate level of protection depends on the selected remedy and the results of the associated FS screening process. Revise the RI/FS to clarify that the risk point of departure is 1×10^{-6} or, alternatively, provide additional justification for the proposed 1×10^{-5} value.

9. Describe how the RAOs apply to discharges from cell operations, including contact water and leachate.
10. The last paragraph of Section 4.1.2.1 (Development and Screening of Alternatives) of the RI/FS Guidance states that a comparative assessment of assembled alternatives should be conducted based on effectiveness, implementability, and cost before conducting the detailed analysis of alternatives based on the nine NCP evaluation criteria. While this comparative assessment is referenced in Section 5.1 (Identification, Screening, and Selection of Technologies and Process Options), which states, "In the following step, the retained process options for each general response action and technology type are evaluated based on effectiveness, implementability, and relative cost to select final representative process options," the RI/FS does not clearly indicate whether or not the comparative assessment was completed or discuss the results. Revise the feasibility study (FS) to provide an initial comparative assessment of assembled alternatives by screening assembled alternatives on only short- and long-term aspects of three criteria (i.e., effectiveness, implementability, and cost), prior to performing a detailed assessment of the assembled alternatives against the nine screening criteria.
11. Revise Section 6.2.2 to include action and chemical specific ARARs related to each of the design components in the remainder of the subsections.

12. The environmental conditions at the selected site for the Environmental Management Disposal Facility (EMDF) are unclear. For example, Section 6.2.2.6 (EMDF Conceptual Design Approach) indicates that the site is located in a historical waste management (brownfield) area; however, Section 7.2.2.8 [NEPA Considerations (On-site)] indicates that the proposed EMDF location is forested and undeveloped and adjacent to brownfields. Revise the RI/FS to clarify the existing environmental conditions at the site selected for the EMDF.

13. The summary of the comparative analysis presented in Table 7-2 (Comparative Analysis Summary for Disposal of ORR CERCLA Waste) does not include a rating system used to rank the alternatives. Without any ranking system, the RI/FS does not allow for development of discriminating factors to aid in the selection of a preferred alternative. Page 55 FR 8719 of the Preamble, Section 300.430(e)(9), Detailed analysis of alternatives, states:

The purpose of the detailed analysis is to objectively assess the alternatives with respect to nine evaluation criteria that encompass statutory requirements and include other gauges of the overall feasibility and acceptability of remedial alternatives (53 FR 51428). This analysis is comprised of an individual assessment of the alternatives against each criterion and a comparative analysis designed to determine the relative performance of the alternatives and identify major trade-offs (i.e., relative advantages and disadvantages) among them. The decision-maker uses information assembled and evaluated during the detailed analysis in selecting a remedial action.

Section 6.2.5 (Comparative Analysis of Alternatives) in the RI/FS Guidance states, “[a]n effective way of organizing this section is, under each individual criterion, to discuss the alternative(s) that performs the best overall in that category, with other alternatives discussed in the relative order in which they perform [emphasis added] . . . the presentation of differences among alternatives can be measured either qualitatively or quantitatively, as appropriate, and should identify substantive differences.” Further discrimination between factors is needed to make this process transparent to the public and Regulatory Agencies. Revise the FS to provide a system of rating using a ranking scale that allows for differentiation (i.e., use a range of terminology and identify the differentiating features) so that a straightforward determination of the relative performance of the alternatives and identification of major trade-offs can be made. Ensure the assessment clearly indicates the alternative(s) that rank highest overall in each category.

14. Appendix F, Section 5.2 (Pathrae Model Output and Risk/Dose Calculations) on page F-48 states “PATHRAE calculations were performed to determine the equivalent annual water consumption per year for the creek (defined as the Equivalent Uptake [EU])”. The use of the term ‘equivalent uptake’ is confusing since radiological dose is calculated by determining the uptake of a radiological constituent that occurs as a result of ingestion or ‘intake’; that is, when referring to radiological exposure and dose, intake does not necessarily result in an ‘uptake’ as some radiological constituents will be eliminated from the body without resulting in a dose. Provide a response and/or text revisions which explain the intended meaning of ‘uptake’ relative to intake or consumption, or provide alternative terminology which more clearly explains the intended meaning for EU.

15. Appendix F Section 5.2 (Pathrae Model Output and Risk/Dose Calculations) states that the PATHRAE-RAD and PATHRAE-HAZ models were used to calculate the arrival and peak time for the radioactive constituents and toxicological constituents at the surface water receptor location. However, the text does not explain whether a composite analysis which considered all potential source terms was completed to determine potential peak contaminant concentrations in the surface water originating from both the EMWMF and the EMDF or other potential on-site sources, or whether modeling was conducted only for constituents projected to leach from the EMDF. Provide a response and/or text revision to address this concern.
16. The components and assumptions provided in Tables G – 3 (Summary Cost Estimate for the On-site Disposal Alternative) and G – 6 (Summary Cost Estimate for the Off-site Disposal Alternative) in Appendix G (Cost Estimates for On-Site and Off-Site Disposal Alternatives) are insufficient to demonstrate an understanding of the level of effort necessary to implement each of the alternatives. For example, Table G – 3 on Page G-12 indicates that the construction will cost a lump sum value of \$147 million; however, this line item aggregates the construction costs associated with the cells, interim capping, and leachate/contact water treatment facility without providing the estimated costs for the individual activities. As such, it is unclear if remedial alternatives were appropriately scoped and costed to reflect a -30%/+50% margin as allowed for in the FS process. Given the lack of costing details, the FS does not demonstrate an understanding of the level of rigor that would be necessary to design and implement the remedial alternatives evaluated. Revise the FS to include the detail and specificity requested in order to demonstrate an understanding of the complexity of the proposed remedial alternatives. Further, provide vendor quotes and engineer's estimates of the costs for individual activities.
17. No contingencies were added to either the On-site or Off-site Disposal Alternative cost estimates included in Appendix G (Cost Estimates for On-Site and Off-Site Disposal Alternatives). According to A Guide to Developing and Documenting Cost Estimates During the Feasibility Study, EPA 540-R-00-002, dated July 2000, scope contingency typically ranges from 10 to 25 percent and bid contingency typically ranges from 10 to 20 percent. Revise the RI/FS to provide a detailed justification for not adding a contingency into the cost estimates for the On-site and Off-site Disposal Alternatives.
18. It is unclear whether the cost estimates included in Appendix G (Cost Estimates for On-Site and Off-Site Disposal Alternatives) for the future construction of the On-site Disposal alternative have been properly reported since construction begins in 2020, but costs are reported in 2012 dollars. Revise the RI/FS to include a more detailed explanation of construction costs and include present and future cost calculations/considerations.
19. It is unclear how the cost of the new leachate/contact water facility has been estimated. Specifically, an assumption in Section 4.1 (On-site Disposal Alternative Cost-estimate Assumptions) of Appendix G (Cost Estimates for On-Site and Off-Site Disposal Alternatives) states that, "Operations costs (except for treatment plant operations are based on actual EMWMF [Environmental Management Waste Management Facility] operations

data;" however, the leachate/contact water facility does not already exist. As such, it is unclear how the cost estimates for this facility have been estimated. Revise the RI/FS to include justification for the cost estimate of the new leachate/contact water facility for the on-site disposal alternative.

SPECIFIC COMMENTS

1. Executive Summary, Page ES-5 Under the heading, Differentiating Criteria, and the subheading, No Action Alternative, the Executive Summary states, "The No Action Alternative may not support the RAO of facilitating the timely cleanup or release of portions of ORR [Oak Ridge Reservation] and associated facilities for beneficial use." The release of portions of ORR and associated facilities for beneficial use is not included as a RAO in this RI/FS; therefore, it is not clear why this is discussed as a differentiating criterion for comparing the alternatives. Revise the Executive Summary to address this issue and evaluate this alternative against overall protection of human health and environment in accordance with the RAOs.
2. Section 1.1, Page 1-3, final paragraph Include the original waste-only volume estimate for the EMWMF at the time of the ROD, and the projected total waste volume estimates in the closed EMWMF and the remaining left to be closed in the new EMDF at this time. These waste-only volumes will clearly show the history and projections in the context of this summary for both on-site CERCLA landfill operations.
3. Section 1.2, Purpose, Page 1-3 Section 1.2 indicates the purpose of the RI/FS is to evaluate alternatives for disposal of low-level waste (LLW), hazardous wastes regulated under RCRA, mixed waste, and certain classified waste. In contrast, the Executive Summary (Page ES-1) and Section 2.1.2 (Page 2-3) appear to indicate only LLW, mixed waste, and classified waste will be considered for disposal at the Environmental Management Disposal Facility (EMDF). Revise the RI/FS to address this apparent discrepancy and clearly indicate whether or not RCRA hazardous waste that does not include a radiological component will be considered for disposal at the EMDF.
4. Section 2.1.1, Exclusions, Page 2-3 Section 2.1.1 summarizes several wastes types that will be excluded from consideration in the RI/FS; however, a discussion of the waste types specifically prohibited by the Waste Acceptance Criteria (WAC) (i.e. neutron moderators such as graphite) is not provided. Revise the RI/FS to provide a comprehensive discussion of all wastes that will not be considered for disposal at the proposed EMDF based on guidelines set forth in the Administrative WAC. Include a discussion of RCRA listed wastes to confirm whether such wastes will include design features for leachate treatment and discharge.
5. Section 2.1.2, Page 2-3; Table 2-3 The discussion states "mixed waste" is LLW mixed with TSCA or RCRA waste. Table 2-3 refers to "mixed waste" as LLW mixed with RCRA.

6. Section 2.2, Page 2-5 and 2-6 This introduction to the capacity needs for the EMDF should state up front the clean fill aspect of as-disposed waste volume (i.e., where contaminated fill cannot fill voids and clean fill is required) as well as the clean fill necessary for operations.
7. Section 2.2.1, As-generated Waste Volume Estimate, Pages 2-5 – 2-7 Figure 2-1 (As-generated Waste Volume Estimate) projects highly variable annual as-generated waste volumes over the next 30 years. Section 2.2.1 does not clearly indicate the reason(s) for this high degree of variability or include a discussion of how the uncertainty associated with the projected annual volumes will be managed. Revise the RI/FS to address these concerns. Specifically, include a discussion of the possible effects higher than anticipated annual waste volumes over the next five years might have on the construction and implementation of the remedial actions assessed in the RI/FS (i.e., if the EMWMF reaches capacity sooner than anticipated).
8. Section 2.2.2, As-disposed Waste Volume Estimate, Pages 2-7 – 2-9 Section 2.2.2 summarizes the approach used to estimate the as-disposed waste volumes used in the RI/FS.; however, the discussion provides insufficient detail regarding the specifics of these calculations. Revise the RI/FS to provide a detailed discussion of the calculations used to determine the as-disposed waste volumes so that the approach as well as the results can be easily assessed. Specifically, provide example calculations which include the density conversion factors used for the various waste material types and refer to the Section in the CARAR where this is described in detail.
9. Tables 2-2 and 2-3 Include in the table headings “with uncertainty” and “without uncertainty”, respectively. Table 2-3 includes uncertainty in the total column whereas all columns include uncertainty. Include a brief discussion why uncertainty estimates include only an increase in volume.
10. Section 2.2, Pages 2-8 and 2-9 Many volume types and uncertainties are described and the final summary on page 2-9 should provide a clear summary of the previous discussions. It would be helpful if the final paragraph of this section clearly discusses the total EMDF volume needs based on the following specific assumptions, including uncertainty and operations experience. A suggested summary paragraph could be structured as follows to assist the reader in understanding how estimates are determined and adjusted for a final EMDF volume estimate:
 - a) Current estimate of as-generated WGF volume needs for both soil and debris after EMWMF termination of waste receipt (EMDF WGF);
 - i) Contingency EMDF as-generated WGF uncertainty/contingency correction in the WGF (an increase of x% based on...) [Explain if this contingency built into WGF as-generated volumes]
 - b) EMDF waste placement and operations corrections to the EMDF volume capacity estimate in a) i) above:
 - i) As-disposed WGF volume adjusted for waste placement debris and soil compaction (a decrease of x% due to compaction)
 - ii) As-disposed WGF volume adjusted for waste placement contaminated soil used as void space fill (a decrease of x% due to debris void space fill with contaminated fill)

- iii) As-placed clean fill necessary for void spaces due to unavailability of waste fill (an increase of x% based on debris/soil project sequencing)
 - iv) As-placed clean fill necessary for cell operations (an increase of x% based on EMWF experience)
 - c) Final corrected total EMDF volume a) above and adjustments in b) above. Use the same units for all. It appears the correction factors above have been combined into a 28% increase. This should be clarified.
11. Figure 2-2 Excess Waste Fill and Uncertainty cannot be differentiated. Excess waste fill should not be within the uncertainty band. Rather, excess clean fill should be represented as an uncertainty affecting the total volume.
 12. Table 2-5, Estimate of CERCLA Waste Disposal Capacity Needed Post-EMWMF with 28% Uncertainty, Page 2-11 See Specific Comment 10. It would be helpful if the tables focus solely on volumes and adjustment factors based on the expected post EMWF WGF.
 13. Section 2.3, Page 2-11, Table 2-6 Explain why chemical risk is not a relevant transportation or natural phenomenon risk.
 14. Section 2.3, RI/FS Waste Characterization, Pages 2-12 – 2-13 Radionuclide concentration data derived from waste lots (WLs) disposed of at the EMWMF were used to develop the data set for risk evaluation presented in the RI/FS. The average activity per unit mass (pCi/g) for each radionuclide included in this data set is presented in Table 2-6. Several transuranic (TRU) isotopes are included in the data set with mass-weighted concentrations greater than 100 nanocuries per gram (100 nCi/g), indicating that TRU waste may be disposed of at the EMDF even though the RI/FS indicates that TRU waste will not be disposed of at the EMDF. Revise the RI/FS to clarify why these TRU waste data values were included in Table 2-6. If these data are inappropriate for use in the RI/FS risk evaluation, they should be removed and all related risk calculations revised.
 15. Table 3-1, Page 3-6 The BCV Burial Grounds future ROD is missing.
 16. Section 6.2.1.1 The site characteristics are not based on site specific data within the footprint of expected construction. DOE should consider a small scale pre-ROD investigation to confirm lack of contamination that could complicate performance monitoring and the lack of elevated bedrock which could significantly increase cost of any cut operations. Alternatively, the potential groundwater contamination and costly site preparation activities due to elevated bedrock should be described as critical uncertainties and contingency plans discussed.
 17. Sections 6.2.1.1 and 6.2.2.2, Pages 6-4, 6-7 and 6-8 Page 6-4 states there are no known endangered species. Page 6-7 states that a field survey of endangered species would be performed. Page 6-8 states that field surveys of endangered species would be performed as necessary. Together these statements are ambiguous.

18. Section 6.2.2, Page 6-8 The subheading *Construct New Groundwater Monitoring Wells and Surface Water Weirs* indicates that new groundwater monitoring wells and surface water weirs will be installed as part of the EMDF; however, the number of wells or weirs is not identified. It appears that given the knowledge of the existing EMWMF, the number of wells and weirs could be estimated for the RI/FS. In addition, it is not clear how the cost estimates for monitoring included as Appendix G (Cost Estimates for On-Site and Off-Site Disposal Alternatives) were developed without this information. Revise the RI/FS to include an estimated number of groundwater monitoring wells and weirs and include these as part of the cost estimate for the On-site Disposal alternative.
19. Figure 6-3, Page 6-11 Is the figure to scale or does it include vertical exaggeration? Upon observation of this figure, the risk of clean fill dike toe failure or excessive pressure and liner slip failure on the upslope liner system is a concern. The FS should address potential for any significant failure scenarios.
20. Figure 6-5, Page 6-13 The thick crusher run gravel layer is likely not 6 feet.
21. Section 6.2.2.4, Page 6-14 It states in the Protective Soil Layer that lower permeability soils is desirable to maximize contact water. Lessons learned from current landfill operations has identified significant issues that should be the basis of an exact opposite design standard to that contact time of rainwater and waste minimized. One of the objectives of the construction of an on-site waste water treatment plant is to minimize contact water that may then be discharged without treatment and maximize leachate that will be capable of effective and efficient on-site treatment.
22. Section 6.2.2.4, Page 6-15 The conceptual design discussion appears to be missing a discussion of the structural fill component. Refer to Figure 6-12 in this discussion.
23. Section 6.2.2.4, Page 6-15 Include Footnote 13 as an ARAR.
24. Section 6.2.2.4, Page 6-17 Include "daily cover" and "enhanced operations cover" as part of the Interim Cover discussion.
25. Section 6.2.2.4, Page 6-18 The final cover discussion includes benching. Consider showing this feature in a cross-section schematic.
26. Section 6.2.2.4, Page 6-18 The final sentence of the first paragraph should consider starting "from the top of the temporary liner" rather than the "top of waste."
27. Section 6.2.2.4, Page 6-18 Identify in the bullets which layer represents the gas collection layer.
28. Section 6.2.2.5, Page 6-19 The list of new support facilities does not include the waste water treatment plant.

29. Section 6.2.2.6, EMDF Conceptual Design Approach, Page 6-26 The subheading *Layout Approach* indicates there will be a 200 foot buffer between the waste and NT-2; however, it is not clear how this buffer distance was determined. Revise the RI/FS to clarify how this distance was determined and whether it is appropriate to protect human health and the environment.
30. Section 6.2.2.7, Page 6-28 The first sentence is ambiguous. Confirm that the waste water treatment is part of the alternative.
31. Section 6.2.2.7, Leachate/Contact Water, Page 6-28 Include a new subsection for site stormwater that does not come into contact with waste.
32. Section 6.2.2.7, Leachate/Contact Water Treatment Facility, Page 6-28 Section 6.2.2.7 states, "The portion of precipitation that falls within an open, active cell potentially coming in contact with the waste materials and collecting on the floor of the cell (referred to as "contact water") would be pumped out of the active cells and stored temporarily in lined basins located near the landfill." There does not appear to be an ARAR (e.g., RCRA) definition of "contact water"; rather, it appears most of the "contact water" would meet the RCRA definition of leachate, since it percolates through some of the waste. As such, it is not clear why all wastewater is not classified as leachate. Revise the RI/FS to address this issue.
33. Section 6.2.2.7, Leachate/Contact Water Treatment Facility, Page 6-28 Section 6.2.2.7 states, "If the results of the analytical tests indicate the contact water is free of contamination, it would be released to the stormwater detention basin." The RI/FS does not appear to clearly indicate the criteria that would be used to determine whether or not the contact water is free of contamination. Revise the RI/FS to clearly indicate what criteria will be used to determine whether or not the contact water is contaminated.
34. Section 6.2.2.7, Treatment Facility Conceptual Design, Page 6-28 The 100 mrem per year standard cited is not protective of human health and the environment. Release standards must be set in compliance with ARARs and not be inconsistent with EPA OSWER Directive 9200.4-18, August 22 1997. The chemical specific ARAR cited in Table E-1, "TDEC 1200-2-11-16(2)" is not protective. Release standards must be demonstrated to be within the risk range. It is noted that the PWAC is based on use of the risk range where sufficiently protective chemical -specific ARARs do not exist. A similar approach should be taken for the releases of wastewater from cell operations and closure/post-closure.
35. Section 6.2.2.7, Page 6-29 The final sentence of this section "...to an appropriate facility on the ORR" is ambiguous and inappropriate. If waste remains on-site it must be addressed in this ROD (e.g., ARARs, design, implementation, construction, RER, FYR). If waste is sent off-site, the Off-Site Rule must be followed.
36. Section 6.2.2.8, Process Modification, Volume Reduction Processing, Page 6-30 Project sequencing is discussed in the context of a process modification that could save \$65.4 M in total costs. The final sentence states, "The planning of EMDF disposal capacity assumes that this effective sequencing of projects will occur." If it will occur, then this is a part of the

remedy and should be factored into the remedy conceptual design, implementation and cost (i.e, not a process modification or cost savings) for the detailed analysis.

37. Section 6.2.2.8, Process Modification, Volume Reduction Processing, Page 6-30 The discussion on Waste Segregation as a process modification is vague. Under what conditions would waste segregation as a process modification be deployed or not deployed? What are the estimated efficiencies for this process and resulting impacts on total cost? See General Comment 2 above regarding appropriate documentation for use of the Y-12 landfills.
38. Section 6.2.2.8, Process Modification, Volume Reduction Processing, Page 6-30 The final sentence includes changing limits for the Subtitle D landfills. The discussion of this action is vague and not clear as to how it supports the evaluation of the three alternatives.
39. Section 6.2.4, Construction Activities and Schedule, Page 6-31 This section references Figure 6-9 for the conceptual sequence of design, construction, operations and closure; however, it appear the correct reference is Figure 6-13. Revise the RI/FS to address this issue.
40. Section 6.2.7, Page 6-37 Specify in this section that decisions to manage waste that do not meet the remedial action criteria for on-site disposal under this ROD will be documented and managed in project specific schedules and documentation.
41. Section 6.2.8, Closure, Page 6-38 This section indicates that deed restrictions would be implemented as part of the On-site Disposal alternative; however, Appendix G (Cost Estimates for On-Site and Off-Site Disposal Alternatives) does not discuss these deed restrictions and therefore it is unclear if these costs have been captured as part of the cost estimate for the On-site Disposal alternative. Revise the RI/FS to include these costs or alternatively revise Appendix G to include a description of these costs.
42. Section 6.2.9, Page 6-38 Briefly state in this subsection how indefinite period action costs were determined.
43. Section 6.3, Page 6-39 This section should discuss CERCLA Section 121 bias against off-site disposal of untreated wastes.
44. Section 6.3.1, Table 6-2, Page 6-40 Consistent with earlier comments on WGF as-generated and as-disposed uncertainty, these waste volumes include the same uncertainty inflation of waste volumes. It appears for off-site, the only WGF uncertainty is whether the forecast is likely to forecast too low or too high. This same WGF uncertainty should apply for both on and off-site. Clarify the WGF uncertainty.
45. Section 7.2.2.3, Page 7-8 The discussion on engineering controls provides specific expectations for design life for certain components and then includes ambiguous statements like "effective for the period of active institutional controls" and "at least their design live." Clarify these statements.

46. Section 7.2.2.3, Page 7-8 The discussion on sinkhole challenges should be tied to specific sections in this FS and the Appendices that affirm this site and its underlying formations are not prone to development of karst features that could impact the long-term integrity of the landfill.
47. Section 7.2.2.6, Page 7-15 Delete the discussion regarding implementability challenges in the remedial evaluation and decision process and limit the discussion to implementability of the response action if selected.
48. Section 7.2.2.6, Page 7-15 The discussion on DOE Order 435.1 does not clearly state whether this applies as a TBC. Explain this and the “LFROG” as appropriate.
49. Section 7.2.2.7, Pages 7-16 The discussion of institutional controls in Section 7.2.2.3 states “Active institutional controls would continue for an indefinite period.” This discussion should briefly summarize how costs were determined for the indefinite period of active controls.
50. Table 7-2, Long-term Effectiveness The final sentence for the On-site alternative states that loss of habitat may be partially offset by cleanup at contaminated sites. Cleanup will be performed at other sites. Include a sentence explaining or clarifying how this benefit will be realized at the other cleanup sites by selecting this alternative.
51. Section 7.3.3 This section should include a discussion of future costs that may be incurred for waste remaining on-site. If there is a reasonable expectation that any major component of the on-site disposal facility may fail, Section 7.3.7 should address this future cost possibility.
52. Section 7.3.3 There is no discussion of sensitivity analyses for cost factors that may be highly uncertain. Explain whether any sensitive cost parameters vary between the EMDF and the off-site facility and if these parameters are sufficiently certain and thereby do not warrant cost sensitivity analyses.
53. Appendix B, Section 5.2.2, Page B-15 This section does not clearly provide an overview of Scenarios A and B. Paragraph two should explain why the two scenarios were developed and the key differences between the scenarios.
54. Appendix B, Section 5.2.3, Page B-17 The second to the last paragraph is not clearly written. It would help if the information for each scenario were described in summary bullets or a summary table.
55. Appendix B, Section 5.4 The body of the FS implies that project sequencing to use all waste as fill is assumed. Clarify the purpose of this section in support of the FS (See Section 6 specific comments).
56. Appendix E, Section 4.1 In addition to compliance with this ARAR, confirm that chemical specific action levels (e.g., surface water discharges, groundwater modeling) will be protective of human health and the environment and consistent with EPA OSWER Directive

9200.4-18, August 22 1997. Include a statement that all radionuclide release standards will be demonstrated to be within the NCP risk range and reference the policy.

57. Appendix E, Section 2, Page E-3 The final sentence of the first paragraph should state "For purposes of not requiring a permit for the EMDF and the identification of ARARs..."
58. Appendix E, Section 5.1, Page E-5 It is stated that compensatory mitigation for wetlands may be required however it appears to be known and described in other portions of the FS, including the final sentence of Section 5.1, that some wetlands damages will occur. Is compensation known to be required and if not, what site conditions may require compensation and this will be determined.
59. Appendix E, Section 6.4, Page E-9 The final sentence of this section identifies an aspect of the alternative for onsite disposal that suggest wastewater after cell construction and during waste disposal operations will be generated and shipped to another on-site wastewater treatment plant. This raises two issues:
- a) First, why would the EMDF wastewater treatment plant not be constructed prior to generation of EMDF leachate? All components of the remedy must be constructed, including the waste water treatment plant, before initiation of cell disposal operations.
 - b) Second, the vague reference to some other on-site aspect of this remedy is not sufficient. All on-site actions required for this operable unit must be included in this FS.
60. Appendix E, Section 6.5, Page E-9 The second paragraph of this section states that some ARARs are for administrative requirements that are necessary to meet substantive requirements. Clarify this statement.
61. Appendix E, Section 6.5, Page E-10 The RCRA requirements do not include a summary discussion of 40 CFR Subpart F during cell operations.
62. Appendix E, Sections 6.5, 6.6, and 6.7 Include a summary discussion of wastewater requirements during cell operations, closure and post closure.
63. Appendix E, Table E-1 The following comments are added directly to the table in the form of redline / strikeout text.

See Attachment 1 to Specific Comments

64. Appendix E, Table E-2 The following comments are added directly to the table in the form of redline / strikeout text.

See Attachment 1 to Specific Comments

65. Appendix E, Table E-3 The following comments are added directly to the table in the form of redline / strikeout text.

See Attachment 1 to Specific Comments

66. Appendix E, Tables E-1, E-2 and E-3 The following table was generated from the EMWMF draft ARARs Compliance Matrix that will be included in the EMWMF annual remediation report. This table lists EMWMF ARARs that are missing or not cited consistently in the EMDF ARARs. Describe why these EMWMF ARARs differ from the EMDF ARARs and include or correct discrepancies.

EMWMF Index	Medium / Action	Requirements	Prerequisite	EMWMF Citation	EMDF ARAR
6		Design or modify selected alternatives to minimize harm to or within floodplains and restore and preserve floodplain values		10 CFR 1022.5(b)	No
8		Take action, to extent practicable, to minimize destruction, loss or degradation of wetlands, and to preserve, restore, and enhance the natural and beneficial values of wetlands		10 CFR 1022.3(b)	No
10	Within an area potentially impacting "waters of the State" as defined in TCA 69-3-103(33)	Must comply with the substantive requirements of the ARAP for erosion and sediment control to prevent pollution	Action potentially altering the properties of any "waters of the State" - applicable	TDEC 1200-4-10-.05(6)(n)	No TCA 69-3-108 (b)(1)(j)
24	Presence of Tennessee-listed endangered or rare plant species as listed in TDEC 0400-6-2-.04	May not knowingly uproot, dig, take, remove, damage or destroy, possess or otherwise disturb for any purposes any endangered species	Action impacting rare plant species including but not limited to federally listed endangered species - relevant and appropriate	TCA 70-8-309(a)	Similar ["(a)" specified] TWRCP 94-16(11)(1)(a); TWRCP 94-17(11)
29/30	Activities causing radionuclide emissions	Exposures to the public from all radiation sources released into atmosphere from DOE facility shall not cause EDE > 10 mrem (0.1 mSv) per year	Radionuclide emissions from point sources at a DOE facility - applicable	40 CFR 61.92 TDEC 1200-3-11.08(3)	Same No TDEC Chap. 1200-3-11-.08(6)
31/32	Activities causing stormwater runoff	Implement good construction management techniques, sediment and erosion, structural, and vegetative controls to ensure stormwater discharge:	Stormwater discharges associated with construction activities at industrial sites - disturbance of ≥ 5 acres total - applicable; < 5 acres - relevant and	40 CFR 122 TDEC 1200-4-10-.05(6)	No No TCA 69-3-108(j) TDEC 1200-4-10-.03(2)(a)

			appropriate		
33		• does not contain distinctly visible floating scum, oil, or other matter;		TDEC 1200-4-10-.05(6)(n)	No TN General Permit No. TNR10-0000 Section [Various Sections]
34		• does not cause an objectionable color contrast in the receiving stream;		TDEC 1200-4-10-.05(6)(o)	No TN General Permit No. TNR10-0000 Section [Various Sections]
35		• results in no materials in concentrations sufficient to be hazardous or otherwise detrimental to humans, livestock, wildlife, plant life, or fish and aquatic life in the receiving stream		TDEC 1200-4-10-.05(6)(p)	No TN General Permit No. TNR10-0000 Section [Various Sections]
		The following conditions apply to all land disturbance work:			
36		• clearing and grubbing must be held to the minimum necessary for grading and equipment operation;		TDEC 1200-4-10-.05(6)(a)	No TN General Permit No. TNR10-0000 Section [Various Sections]
37		• construction must be sequenced to minimize the exposure time of cleared surface area;		TDEC 1200-4-10-.05(6)(b)	No TN General Permit No. TNR10-0000 Section [Various Sections]
38		• construction must be staged or phased for large projects, areas of one phase must be stabilized before another can be initiated; stabilization shall be accomplished by temporarily or permanently protecting the disturbed soil surface from rainfall impacts and runoff;		TDEC 1200-4-10-.05(6)(c)	No TN General Permit No. TNR10-0000 Section [Various Sections]
39		• erosion and sediment control measures must be in place and functional before earth moving operations begin, and must be constructed and maintained throughout the construction		TDEC 1200-4-10-.05(6)(d)	No TN General Permit No. TNR10-0000 Section [Various Sections]

		period;			
40		<ul style="list-style-type: none"> • all control measures shall be checked, and repaired as necessary, weekly in dry periods and within 24 hr after any rainfall of 0.5 inches with a 24-hr period, during prolonged rainfall, daily checking and repairing is necessary; 		TDEC 1200-4-10-.05(6)(e)	No TN General Permit No. TNR10-0000 Section [Various Sections]
41		<ul style="list-style-type: none"> • pre-construction vegetative ground cover shall not be destroyed, removed, or disturbed more than 20 calendar days prior to grading or earth moving; 		TDEC 1200-4-10-.05(6)(g)	No TN General Permit No. TNR10-0000 Section [Various Sections]
42		<ul style="list-style-type: none"> • appropriate cover (e.g., grass, sod, straw, mulch, fabric mats) shall be applied within seven days on areas that will remain unfinished for more than 30 calendar days; 		TDEC 1200-4-10-.05(6)(h)	No TN General Permit No. TNR10-0000 Section [Various Sections]
43		<ul style="list-style-type: none"> • permanent soil stabilization with perennial vegetation shall be applied as soon as practicable after final grading; 		TDEC 1200-4-10-.05(6)(i)	No TN General Permit No. TNR10-0000 Section [Various Sections]
44		<ul style="list-style-type: none"> • all surface water flowing toward the construction area shall be diverted by using berms, channels, or sediment traps, as necessary; 		TDEC 1200-4-10-.05(6)(j)	No TN General Permit No. TNR10-0000 Section [Various Sections]
45		<ul style="list-style-type: none"> • erosion and sediment control measures shall be designed according to the size and slope of disturbed or drainage areas, to detain runoff and trap sediment; 		TDEC 1200-4-10-.05(6)(k)	No TN General Permit No. TNR10-0000 Section [Various Sections]
46		<ul style="list-style-type: none"> • discharges from sediment basins and traps must be through a pipe or lined channel so that the discharge does not cause erosion; and 		TDEC 1200-4-10-.05(6)(l)	No TN General Permit No. TNR10-0000 Section [Various Sections]
47		<ul style="list-style-type: none"> • muddy water to be pumped from excavation and work areas must be held in settling basins or treated by filtration prior to its discharge into surface waters and water must be discharged through a pipe or lined channel so that the discharge does not cause 		TDEC 1200-4-10-.05(6)(m)	No TN General Permit No. TNR10-0000 Section [Various Sections]

		erosion and sedimentation			
48		Shall develop and implement stormwater management controls to minimize the discharge of pollutants and to ensure the discharge:	Stormwater discharges associated with industrial activity from a landfill - applicable	TDEC 1200-4-10-.04(5)(b)	No TN General Permit No. TNR10-0000 Section [Various Sections]
49		• does not contain distinctly visible floating scum, oil, or other matter;		TDEC 1200-4-10-.04(8)(a)	No TN General Permit No. TNR10-0000 Section [Various Sections]
50		• results in no materials in concentrations sufficient to be hazardous or otherwise detrimental to humans, livestock, wildlife, plant life, or fish and aquatic life in the receiving stream; and		TDEC 1200-4-10-.04(8)(b)	No TN General Permit No. TNR10-0000 Section [Various Sections]
51		• does not cause an objectionable color contrast in the receiving stream		TDEC 1200-4-10-.04(8)(d)	No TN General Permit No. TNR10-0000 Section [Various Sections]
52		Shall develop and maintain a stormwater pollution prevention/control plan which includes a description of potential pollutant sources and paths to outfalls and otherwise contains information required under this section		TDEC 1200-4-10-.04(5)(a)	No TN General Permit No. TNR10-0000 Section [Various Sections]
53		Shall monitor at least semiannually the identified stormwater outfalls for the parameters specified in 1200-4-10-.04(7)(b)(1) and (2)(iv)		TDEC 1200-4-10-.04(7)(a)	No TN General Permit No. TNR10-0000 Section [Various Sections]
54		Shall address runoff in a monitoring plan as required in 1200-4-10-.04(5)(i), indicating sampling locations, parameters and monitoring procedures		TDEC 1200-4-10-.04(7)(b)(2)(iv)	No TN General Permit No. TNR10-0000 Section [Various Sections]
63/64		Must determine if the waste is restricted from land disposal under 40 CFR 268 <i>et seq.</i> by testing in accordance with prescribed methods or use of generator knowledge of waste		40 CFR 268.7 TDEC 1200-1-11-.10(1)(g)	Same Similar - (g)(1)(i)

larger regional flow model. However, several inconsistencies were observed between the tables and figures in Section 4.2. These are presented below:

- a) Table F-4 [UBCV Groundwater Model Parameter Summary (Future Condition)], Page F-30, indicates in the last row of the “Grid Information” section that there are 78.67% inactive cells in the model domain. Considering the number of total cells and total active cells presented in the two previous rows, it would appear that the 78.67% refers to the percentage of active cells in the model instead of inactive cells. The table should be corrected accordingly.
- b) Table F-4 [UBCV Groundwater Model Parameter Summary (Future Condition)], Page F-31, indicates in the first row of the “Recharge” section that the recharge rate for the Closed Landfill/Paved Park Area is $2.28\text{E-}04$ feet per day (ft/day). However, Figure F-9 (Model Recharge Distribution), Page F-28, indicates that the recharge rate in these areas is $2.28\text{E-}03$ ft/day. The table or figure should be corrected accordingly.
- c) Table F-4 [UBCV Groundwater Model Parameter Summary (Future Condition)], Page F-31, indicates in the second row of the “Recharge” section that the recharge rate for the Rome formation is $2.00\text{E-}03$ ft/day. However, Figure F-9 (Model Recharge Distribution), Page F-28, indicates that the recharge rate for the Rome formation is $5.00\text{E-}03$ ft/day. The table or figure should be corrected accordingly.

68. Appendix F, Section 4.2.4, Hydraulic Conductivity Field, Page F-28 The text in the first paragraph states that anisotropy ratios of five to one (for the weathered bedrock zone) and ten to one (for the fractured bedrock zone) were used to represent the preferred fracture/bedding orientation of the natural units. The text should discuss if hydraulic conductivity anisotropy ratios of this magnitude have been measured in the weathered bedrock and fractured bedrock zones in the field. If these values have not been physically measured in the field, the text should indicate how these values were derived for the modeling simulations (e.g., previous calibration of the regional groundwater flow model).
69. Appendix G, Section 4.2.3.4, Table G – 2, Page G-9 This table provides the breakdown of the 28% indirect markup prior to compounding; however, the sum of the markups in Table G – 2 only adds up to 26% (10% overhead, 10% profit, 1% bond, and 5% general contractor’s markup for work performed by subcontractors). Revise the RI/FS to report the same percentage of markup in the table as in the text.
70. Appendix G, Section 5.2, Table G – 5, Page G-17 This table reports the Treatment/Disposal Costs of Nevada National Security Site (NNSS) disposal access fee rate as \$14.51 per cubic foot (ft^3); whereas, the Treatment/Disposal Costs for treatment and disposal of LLW/RCRA (mixed waste) (macroencapsulation) and surcharge of 4% on waste received during winter months (Dec – Feb) are reported in dollars per yd^3 . Revise the RI/FS to use consistent units in Table G – 5.

		point of compliance; and			
		• allows for the detection of contamination when the hazardous waste or constituents have migrated from the waste management area to the uppermost aquifer			
390	Control and stabilization	Control and stabilization features shall be designed to:	Long-term management of uranium, thorium, and their decay products - TBC	DOE Order 5400.5(IV)(6)(d)(1)(a)	No
		• provide to the extent reasonably achievable an effective life of 1000 years with a minimum of at least 200 years			
391		• Limit Rn-222 emanation to the atmosphere from the wastes to less than an annual average release rate of 20 pCi/m ² /s and prevent increase in the annual average RN-222 concentration at or above any location outside the boundary of the contaminated area by more than 0.5 pCi/L		DOE Order 5400.5(IV)(6)(d)(1)(b)	No
393	Uranium- and thorium-bearing LLW left in place	Access to a property and use of material should be controlled through appropriate administrative and physical controls, designed to be effective to the extent reasonable for at least 200 years	On-site material contaminated by residual radioactive material (uranium and thorium) - TBC	DOE Order 5400.5(IV)(6)(d)(1)(c)	No
399/400		Must comply with the requirements of 40 CFR 263.11-263.31	Transportation of hazardous waste within the United States requiring a manifest	40 CFR 263.10(a) TDEC 1200-1-11-.04(1)(a)(1)(6)(iii)	Same Similar ["(6)(iii)" not specified]
		A transporter who meets all applicable requirements of 49 CFR 171-179 and the requirements of 40 CFR 263.11 and 263.31 will be deemed in compliance with 40 CFR 263		No citation	49 CFR 171,172,173,174,177,178,179

67. Appendix F, Section 4.2, Pages F-20 to F-46 The approach used in modeling groundwater flow and contaminant transport at the proposed EMDF appears reasonable and appropriate considering the geology and structural setting in Bear Creek Valley, as well as the fact that the modeled domain is a smaller, sub-area of the larger Bear Creek regional groundwater flow model with boundary conditions established through telescopic mesh refinement of the

		and			
221/222		• a composite bottom liner consisting of at least two components:		40 CFR 264.301(c)(1)(i)(B) TDEC 1200-1-11-.06(14)(b)(3)(i)(I)II	No Same
		— upper component must be designed and constructed of materials to prevent migration of hazardous constituents into this component during the active life and post closure period; and			
		— lower component designed and construction of materials to minimize the migration of hazardous constituents if a breach in the upper component were to occur;			
		— constructed of at least 3 ft of compacted soil material with a hydraulic conductivity of no more than 1×10^{-7} cm/second			
223/224		• liners must comply with paragraphs (a)(1)(i), (ii), and (iii) of this section		40 CFR 264.301(c)(1)(ii) TDEC 1200-1-11-.06(14)(b)(3)(i)(I)II	No Same
284/285		Must assess the source and amounts of the liquids by source;	Leak and/or remediation determinations required - applicable	40 CFR 264.304(c)(1)(i) TDEC 1200-1-11-.06(14)(e)(3)(i)(I)	Similar ["(i)" not specified] Similar ["(I)" not specified]
286/287		Conduct analysis of the liquids to identify sources and possible location of the leaks; and		40 CFR 264.304(c)(1)(ii) TDEC 1200-1-11-.06(14)(e)(3)(i)(II)	No No
288/289		Assess seriousness of leaks in terms of potential for escaping into the environment; or		40 CFR 264.304(c)(1)(iii) TDEC 1200-1-11-.06(14)(e)(3)(i)(III)	No No
359/360	General groundwater monitoring requirements	The groundwater monitoring system must consist of a sufficient number of wells, installed at appropriate locations and depths to yield samples from the uppermost aquifer that:	Operation of a detection monitoring program under 40 CFR 264.98 - applicable	40 CFR 264.97(a) TDEC 1200-1-11-.06(6)(h)(1)	Same Similar ["(1)" not specified]
		• represent the quality of background groundwater;			
		• represent the quality of groundwater passing the			

76/77	Temporary storage of hazardous waste in containers (e.g., PPE, rags, etc.)	A generator may accumulate hazardous waste at the facility provided that:	Accumulation of RCRA hazardous waste on site as defined in 40 CFR 260.10 - applicable	40 CFR 262.34(a) TDEC 1200-1-11-.03(4)(e)	Similar 40 CFR 262.34(a)(1)(i) 40 CFR 262.34(a)(2) 40 CFR 262.34(a)(3) Similar TDEC 1200-1-11-.03(4)(e)(2)(i)(i) TDEC 1200-1-11-.03(4)(e)(2)(ii) TDEC 1200-1-11-.03(4)(e)(2)(iv)
		• waste is placed in containers that comply with 40 CFR 265.171-173 (Subpart I); and			
		• container is marked with the words "hazardous waste" or;			
123/124	Disposal of RCRA/TSCA waste at an off-site commercial facility	Meet authorized limits established in accordance with basic dose limits and consistent with guidelines contained in DOE-EH guidance prior to release	Release of hazardous wastes potentially containing residual radioactive material throughout the volume - TBC	DOE Order 5400.5(11)(5)(c)(6) and 5400.5(1V)(5)(a)	No
		Authorized limits shall be consistent with limits and guidelines established by other applicable Federal and State laws			
159	Treatment of uranium and thorium bearing LLW	Such wastes shall be properly conditioned so that the generation and escape of biogenic wastes will not cause exceedance of Rn-222 emission limits of DOE Order 5400.5(1V)(6)(d)(1)(b) and will not result in premature structure failure of the facility	Placement of potentially biodegradable contaminated wastes in a long-term management facility - TBC	DOE Order 5400.5(1V)(6)(d)(1)(c)	No
		Bulk liquids not exceeding 500 ppm PCBs may be disposed of provided such waste is pretreated and/or stabilized (e.g., chemically fixed, evaporated, mixed with dry inert absorbent) to reduce its liquid content or increase its solid content so that a non-flowing consistency is achieved to eliminate the presence of free liquids prior to final disposal			No
219/220		• a top liner, designed and constructed of materials (e.g., geomembrane) to prevent the migration of hazardous constituents into the liner during active life and the post closure period;		40 CFR 264.301(c)(1)(i)(A) TDEC 1200-1-11-.06(14)(b)(3)(i)(1)I	Similar ["(A)" not specified]

Attachment 1 - EPA Comments on Tables E-1, E-2, E-3 of the D1 RI/FS for CERCLA ORR Waste Disposal (DOE/OR/01-2535&D1; September 2012)

Table E-1. Chemical-specific ARARs and TBC Guidance for the On-site Disposal Alternative

Medium/Action	Requirements	Prerequisite/Condition	Citation(s)
Releases of radionuclides in the environment	Exposure to individual members of the public from radiation shall not exceed a total EDE of 0.1 rem/year (100 mrem/year), exclusive of the dose contributions from background radiation, any medical administration the individual has received, or voluntary participation in medical/research programs.	Activities causing direct exposure to radiation or the release of radionuclides into the environment -- relevant and appropriate	10 CFR 20.1301(a)(1)
	Shall use, to the extent practicable, procedures and engineering controls based on sound radiation protection principles to achieve occupational doses and doses to members of the public that are ALARA.		10 CFR 20.1101(b)
	Concentrations of radioactive material which may be released to the general environment in groundwater, surface water, air, soil, plants or animals must not result in an annual dose exceeding an equivalent of 25 mrem to the whole body, 75 mrem to the thyroid, and 25 mrem to any other organ. Reasonable effort shall be made to maintain releases of radioactivity in effluents to the general environment ALARA.		TDEC 4200-2-11-16(2) 0400-20-11-16(2) 10 CFR 61.41

ALARA = as low as reasonably achievable

ARAR = applicable or relevant and appropriate requirement

CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act of 1980

CFR = Code of Federal Regulations

EDE = effective dose equivalent

mrem = millirem

TBC = to be considered

TDEC = Tennessee Department of Environment and Conservation

Table E-2. Location-specific ARARs and TBC Guidance for the On-site Disposal Alternative

Location Characteristic(s)	Requirements	Prerequisite	Citation(s)
<i>Floodplains/Wetlands</i>			
Presence of floodplain as defined in 10 <i>CFR</i> 1022.4(i) or within "lowland and relatively flat areas adjoining inland and coastal waters and other flood-prone areas such as offshore islands, including at a minimum, that area subject to a one percent or greater chance of flooding in a given year" (EO 11988, Sect. 6(c), and TDEC 1200-1-7).	<p>Action shall be taken to reduce the risk of flood loss; minimize the impact of floods on human safety, health, and welfare; and restore and preserve the natural and beneficial values of floodplains. Measures to mitigate adverse effects of actions in a floodplain include, but are not limited to: minimum grading requirements, runoff controls, design and construction constraints, and protection of ecology-sensitive areas as provided in 10 <i>CFR</i> 1022.12(a)(3).</p> <p>The potential effects of actions in floodplains shall be evaluated and consideration of flood hazards and floodplain management ensured.</p> <p>If action is taken in floodplains, alternatives that avoid adverse effects and incompatible development and minimize potential harms shall be considered.</p>	<p>Federal actions potentially impacting or taking place within floodplains that involve:</p> <ul style="list-style-type: none"> • acquiring, managing, and disposing of lands and facilities; • providing federally undertaken, financed, or assisted construction and improvements; and • conducting federal activities and programs affecting land use <p>- applicable TBC.</p>	<p>EO 11988 (May 24, 1977):</p> <p>10 <i>CFR</i> 1022</p>
Presence of wetlands as defined 10 <i>CFR</i> 1022.4(v), and TDEC 1200-01-07-010400-11-01-01(2)	<p>Avoid or minimize adverse impacts on wetlands and act to preserve and enhance their natural and beneficial values. Measures to mitigate adverse effects of actions in a wetland include, but are not limited to: minimum grading requirements, runoff controls, design and construction constraints, and protection of ecology-sensitive areas as provided in 10 <i>CFR</i> 1022.13(a)(3). New construction in wetlands areas should be particularly avoided unless there are no practicable alternatives.</p> <p>Wetlands protection considerations shall be incorporated into planning, regulating, and decision-making processes.</p>	<p>Federal actions potentially impacting or taking place within wetlands that involve:</p> <ul style="list-style-type: none"> • acquiring, managing, and disposing of lands and facilities; • providing federally undertaken, financed, or assisted construction and improvements; and • conducting federal activities and programs affecting land use - applicable 	<p>10 <i>CFR</i> 1022.3(a);</p> <p>10 <i>CFR</i> 1022.4;</p> <p>TDEC 1200-01-07-01</p>

Table E-2. Location-specific ARARs and TBC Guidance for the On-site Disposal Alternative (Continued)

Location Characteristic(s)	Requirements	Prerequisite	Citation(s)
	Potential effects of any new construction in wetlands that are not in a floodplain shall be evaluated. Identify, evaluate, and, as appropriate, implement alternative actions that may avoid or mitigate adverse impacts on wetlands.		10 CFR 1022.3(c); 10 CFR 1022.3(d)
Presence of jurisdictional wetlands as defined in 40 CFR 230.3(t) and 33 CFR 328.3(b)	Action to avoid degradation or destruction of wetlands must be taken to the extent possible. Discharges for which there is a practicable alternative with less adverse impacts or those which would cause or contribute to significant degradation are prohibited. If adverse impacts are unavoidable, action must be taken to enhance, restore or create alternative wetlands.	Action involving discharge of dredge or fill material into wetlands – applicable	Clean Water Act (33 USC 1251 et seq.); Section 404; 40 CFR 230.10(d)
Aquatic Resources			
Within an area encompassing or affecting "waters of the State" as defined in TCA 69-3-103(33)	Must comply with the substantive requirements of the ARAP for erosion and sediment control to prevent pollution and protect sensitive resources and downstream waters. Discharge of "substances" that "will result or will likely result in harm, potential harm or detriment to the health of animals, birds, fish, or aquatic life" is prohibited.	Action involving the discharge of any pollutants; altering properties of any waters of the state as defined in TCA 69-3-103(33), including alteration of wet weather conveyances, bank stabilization, debris removal, and sand and gravel dredging; – applicable	TCA 69-3-108 (b)(1)(j)
Action potentially altering the properties of any "Waters of the State"	Erosion and sediment control requirements include, but are not limited to the following. <ul style="list-style-type: none"> • Limit clearing, grubbing, and other disturbances in areas in or immediately adjacent to Waters of the State to the minimum necessary to accomplish the proposed activity. • Unnecessary vegetation removal is prohibited and all disturbed areas must be properly stabilized and revegetated as soon as practicable. • Limit excavation, dredging, bank reshaping, or grading to the minimum necessary to install 	Action potentially altering the properties of any "waters of the State" – applicable	TDEC Aquatic Resource Alteration General Permit Program Requirements

Table E-2. Location-specific ARARs and TBC Guidance for the On-site Disposal Alternative (Continued)

Location Characteristic(s)	Requirements	Prerequisite	Citation(s)
	<p>authorized structures, accommodate stabilization, or prepare banks for revegetation.</p> <ul style="list-style-type: none"> • Maintain the erosion and sedimentation control measures throughout the construction period. • Upon achievement of final grade, stabilize and revegetate, within 30 days, all disturbed areas by sodding, seeding, or mulching, or using appropriate native riparian species. 		
Within area impacting stream or any other body of water – and presence of wildlife resources (e.g., fish)	The effects of water-related projects on fish and wildlife resources and their habitat should be considered with a view to the conservation of fish and wildlife resources by preventing loss of and damage to such resources.	Action that impounds, modifies, diverts, or controls waters, including navigation and drainage activities – relevant and appropriate	Fish and Wildlife Coordination Act (16 USC 661 et seq.)
Location encompassing aquatic ecosystem with dependent fish, wildlife, other aquatic life, or habitat or as defined in 40 CFR 230.3(c)	<p>Degradation or destruction of aquatic ecosystems must be avoided to the extent possible. Discharges that cause or contribute to significant degradation of the water of such ecosystems are prohibited.</p> <p>Except as provided under Section 404(b)(2) of the CWA, no discharge of dredged or fill material into an aquatic ecosystem is permitted if there is a practicable alternative that would have less adverse impact.</p> <p>No discharge of dredged or fill material shall be permitted unless appropriate and practicable steps per 40 CFR 230.70 et seq. are taken to minimize potential adverse impacts of the discharge on the aquatic ecosystem.</p>	<p>Action involving the discharge of dredge or fill material into aquatic ecosystem – applicable</p> <p>Action that involves the discharge of dredged or fill material into “waters of the U.S.”, including jurisdictional wetlands – applicable</p>	<p>Clean Water Act (33 USC 1251 et seq.), Section 404, 40 CFR 230</p> <p>40 CFR 230.10(a)</p> <p>40 CFR 230.10(d)</p>

Comment [EU1]: Removed this row because the actual requirements are contained at an appropriate level of detail in the following rows.

Comment [EU2]: 264.302

Comment [EU3]: 1 Water quality 122.44 and the state 1200.-.04

Table E-2. Location-specific ARARs and TBC Guidance for the On-site Disposal Alternative (Continued)

Location Characteristic(s)	Requirements	Prerequisite	Citation(s)	
<i>Endangered, Threatened, or Rare Species</i>				
Presence of Tennessee state-listed endangered or threatened animal species as created and amended pursuant to TCA 70-8-105 and listed in TWRCP 94-17	No person may take, harass, or destroy wildlife listed as threatened or endangered or otherwise violate the terms of TCA 70-8-105(c) or destroy knowingly the habitat of such species without due consideration of alternatives for the welfare of state-listed or federally-listed endangered species.	Action impacting such species – applicable	Tennessee Nongame and Endangered or Threatened Wildlife Species Conservation Act (TCA 70-8-104 et seq.); TWRCP 94-17(104)(b)	<p>Comment [E04]: This entire row looks redundant and should likely be struck.</p> <p>Formatted: Highlight</p>
Presence of Tennessee-listed endangered or rare plant species as listed in TDEC 0400-6-2-.04	Protected species may not be uprooted, dug, taken, removed, damaged or destroyed, possessed, or otherwise disturbed for any purpose.	Action impacting plant species determined by the Commissioner (of TDEC) to be in jeopardy, including, but not limited to, "endangered species" pursuant to the federal Endangered Species Act – relevant and appropriate	Tennessee Rare Plant Protection and Conservation Act of 1985 TCA 70-8-309(a) TWRCP 94-16(II)(U)(a) TWRCP 94-17(II)	<p>Comment [E05]: Would like clarification from state</p> <p>Formatted: Highlight</p> <p>Formatted: Highlight</p> <p>Formatted: Highlight</p>
Presence of Tennessee state-listed wildlife species "in need of management" as listed in TWRCP 94-16	No person may knowingly destroy the habitat of such species. Certain exceptions may be allowed for reasons such as education, science, etc., or where necessary to alleviate property damage or protect human health or safety.	Action impacting such species – applicable	TCA 70-8-104(b); TWRCP 94-16	Formatted: Highlight
Presence of Tennessee nongame species (Tennessee deer) as defined in TCA 70-8-103	May not take (i.e., harass, hunt, capture, kill or attempt to kill), possess, transport, export, or process nongame wildlife species.	Action impacting Tennessee nongame species, including wildlife species which are "in need of management" (as listed in TWRCP 94-16 and 94-17) – applicable	TCA 70-8-104(c)	Formatted: Highlight
	May not knowingly destroy the habitat of such wildlife species.		TWRCP 94-16(II)(1)(a) and TWRCP 94-17(II)	
	Upon good cause shown and where necessary to protect human health or safety, endangered or threatened species may be removed, captured, or destroyed.		TCA 70-8-106(c) TWRCP 94-16(II)(1)(c)	

Table E-2. Location-specific ARARs and TBC Guidance for the On-site Disposal Alternative (Continued)

Location Characteristic(s)	Requirements	Prerequisite	Citation(s)
Presence of federally endangered or threatened species, as designated in 50 CFR 17.11 and 17.12 or critical habitat of such species	Actions that jeopardize the existence of a listed species or results in the destruction or adverse modification of critical habitat must be avoided or reasonable and prudent mitigation measures take.	Action impacting such species – applicable	16 U.S.C. §1536(a)(2)–Sect. 7(a)(2)
<i>Cultural Resources</i>			
Presence of archaeological resources on public land	Steps must be taken to consider the historical, architectural, or archaeological significance of sites, structures, and objects and to consult with the State Historic Preservation Officer Steps must be taken to protect archaeological resources and sites.	Action that would impact any resource discovered during remedial activities – applicable	National Historic Preservation Act Sections 106 and 110 (16 USC 470 et seq.) 50 USC 2666-2668 Archaeological Resources Protection Act (16 USC 470aa-11), 43 CFR 7.8 and 7.9) 43 CFR 7.5(b)(1)
Presence of archaeological or historic resources	A survey of affected areas for resources and data must be conducted and steps taken to recover, protect, and preserve data or request DOI do so. The state archaeologist and secretary of interior must be advised of the presence of the data.	Action involving alteration of terrain that might cause irreparable loss or destruction of any discovered significant scientific, prehistoric, historic, or archaeological resources – applicable	Archaeological and Historic Preservation Act (16 USC 469 et seq.)
Presence of archaeological resources	May not excavate, remove, damage, or otherwise alter or deface such resource unless by permit or exception.	Action that would impact archaeological resources on public land – applicable	43 CFR 7.4(a)

Comment [EUS]: The deleted citations are a too general a level. The citation(s) that remain are at the appropriate level of detail to describe the requirement.

Comment [EU7]: The deleted citations are a too general a level. The citation(s) that remain are at the appropriate level of detail to describe the requirement.

Table E-2. Location-specific ARARs and TBC Guidance for the On-site Disposal Alternative (Continued)

Location Characteristic(s)	Requirements	Prerequisite	Citation(s)
Presence of human remains, funerary objects, sacred objects, or objects of cultural patrimony for Native Americans	If an inadvertent discovery is made in connection with an on-going activity, activity must stop in the area of the discovery and reasonable effort be made to secure and protect the objects discovered.	Objects that are in federal possession or control or that are excavated intentionally or discovered inadvertently on federal lands or under federal control – applicable	Native American Graves Protection and Repatriation Act (25 USC 3001-3012); 43 CFR 10.4(c)
	Notification and consultation procedures are required for off-site activities and recommended for on-site activities.		43 CFR 10.2, 10.4, and 10.6
	Disposition of all inadvertently discovered items must be carried out in prescribed procedures.		
	Must consult with Indian tribe likely to be affiliated with the objects to determine further disposition per 10.5(b).		43 CFR 10.5(a)(1).

Comment [EUS]: The deleted citations are a too general a level. The citation(s) that remain are at the appropriate level of detail to describe the requirement.

Comment [EUS]: Citation corrected.

ARAP = Aquatic Resource Alteration Permit
 ARAR = applicable or relevant and appropriate requirement
 CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act of 1980
 CFR = Code of Federal Regulations
 CWA = Clean Water Act of 1972
 NPDES = National Pollution Discharge Elimination System
 ORR = Oak Ridge Reservation
 ROD = Record of Decision

TBC = to be considered
 TCA = Tennessee Code Annotated
 TDEC = Tennessee Department of Environment and Conservation
 TWRCF = Tennessee Wildlife Resources Commission Proclamation
 USC = United States Code

Table E-3. Action-specific ARARs and TBC Guidance for the On-site Disposal Alternative

Action	Requirements	Prerequisite	Citation(s)
<i>General Construction Standards—Site Preparation, Excavation Activities, etc.</i>			
Activities causing fugitive dust emissions	<p>Shall take reasonable precautions to prevent particulate matter from becoming airborne; reasonable precautions shall include, but are not limited to, the following:</p> <ul style="list-style-type: none"> • use, where possible, of water or chemicals for control of dust from construction operation, grading of roads, or the clearing of land; and • application of asphalt, oil, water, or suitable chemicals on dirt roads, materials stockpiles, and other surfaces that can create airborne dusts. <p>Shall not cause or allow fugitive dust to be emitted in such a manner as to exceed 5 min/h or 20 min/d beyond property boundary lines on which emission originates.</p>	Fugitive emissions from land-disturbing activities (e.g., demolition of existing buildings or structures, construction operations, grading of roads, or clearing of land) – applicable	TDEC Chap. 1200-3-8-.01(1)
			TDEC Chap. 1200-3-8-.01(1)(a)
			TDEC Chap. 1200-3-8-.01(1)(b)
			TDEC Chap. 1200-3-8-.01(2)
Activities causing radionuclide emissions	Exposures to the public from all radiation sources released into atmosphere from DOE facility shall not cause EDE > 10 mrem (0.1 mSv) per year.	Radionuclide emissions from point sources, as well as diffuse or fugitive emissions, at a DOE facility – applicable	40 CFR 61.92; TDEC Chap. 1200-3-11-.08(6)

Table E-3. Action-specific ARARs and TBC Guidance for the On-site Disposal Alternative (Continued)

Action	Requirements	Prerequisite	Citation(s)
Activities causing storm water runoff	Implement good construction management techniques (including sediment and erosion controls, vegetative controls, and structural controls) in accordance with the substantive requirements of <i>General Permit No. TNR10-0000, Appendix F</i> to ensure water discharge:	Storm water runoff discharges from land disturbed by construction activity—disturbance of ≥4.5 acres total — applicable	TCA 69-3-108(j) TDEC 1200-4-10-.03(2)(a)
	• does not violate water quality criteria as stated in TDEC 1200-4-3, including but not limited to prevention of discharges that cause a condition in which visible solids, bottom deposits, or turbidity impairs the usefulness of water of the state for any of the uses designated for that water body by TDEC 1200-4-4, and		<i>Tennessee General Permit No. TNR10-0000</i> Section 4.3.2(a)
	• does not violate other conditions detailed in <i>General Permit No. TNR10-0000</i> .		
	• does not contain distinctly visible floating scum, oil, or other matter.		<i>Tennessee General Permit No. TNR10-0000</i> Section 4.3.2(b)
Activities causing storm water runoff	• does not cause an objectionable color contrast in the receiving stream.	Storm water discharges from construction activities — applicable	<i>Tennessee General Permit No. TNR10-0000</i> Section 4.3.2(c)
	• muddy water to be pumped from excavation and work areas must be held in settling basins or filtered or chemically treated prior to its discharge into surface waters. Water must be discharged through a pipe, well-grassed or lined channel or other equivalent means so that the discharge does not cause erosion and sedimentation.		<i>Tennessee General Permit No. TNR10-0000</i> Section 3.5.3(b)

Comment [EU10]: Why are we not citing the regulatory requirement. If the general permit applies and has been written to satisfy a regulatory requirement, it is that requirement and not the instrument written to satisfy it that should be cited.

EPA recognizes that TN 1200-4-10-.04 and .05 were repealed, but there should be a citation to law that can be inserted. Please advise. This comment applies to all references to the TN General Permit.

In addition, please provide a copy of the TN General Permit.

Comment [EU11]: Same as above, except that citation to requirement has been provided by EPA comment.

Comment [EU12]: Same as above, except that citation to requirement has been provided by EPA comment.

Comment [EU13]: Same as above, except that citation to requirement has been provided by EPA comment.

Table E-3. Action-specific ARARs and TBC Guidance for the On-site Disposal Alternative (Continued)

Action	Requirements	Prerequisite	Citation(s)	
	Shall develop and maintain a site-specific storm water pollution prevention plan (SWPPP) or equivalent document which includes a description of all potential sources of pollution, describe practices to be used to reduce pollutants in storm water discharges and assure compliance with substantive requirements of General Permit No. TNR10-0000.	Storm water discharges associated with industrial activities at a landfill — applicable	Tennessee General Permit No. TNR10-0000 Section 1.4.2 Tennessee Erosion and Sediment Control Handbook (guidance)	Comment [EU14]: Requirement inserted below with other related requirements.
	<ul style="list-style-type: none"> Results in no materials in concentrations sufficient to be hazardous or otherwise detrimental to humans, livestock, wildlife, plant life, or fish and aquatic life in the receiving stream. 		Tennessee General Permit No. TNR10-0000 Section 4.3.2(d)	Formatted: Font: 10 pt Formatted: List Paragraph, Bulleted + Level: 1 + Aligned at: 0.25" + Indent at: 0.5" Comment [MB15]: Why are we citing to General permit? Comment [MB16]: Repealed, but is there a regulatory replacement?
	The following conditions apply to all land disturbance work: <ul style="list-style-type: none"> Sediment should be removed from sediment traps, silt fences, sedimentation ponds, and other sediment controls as necessary, and must be removed when design capacity has been reduced by 50%. clearing and grubbing must be held to the minimum necessary for grading and equipment operation. construction must be sequenced to minimize the exposure time of graded or denuded areas. 	Storm water discharges from construction activities — applicable	TDEC 1200-4-10-04(T)(b)(2)(v) Tennessee General Permit No. TNR10-0000 Section 3.5.3.1(c) Tennessee General Permit No. TNR10-0000 Section 3.5.3.1(d) Tennessee General Permit No. TNR10-0000 Section 3.5.3.1(e)	Comment [MB17]: Why are citing to General Permit? Comment [MB18]: Why are citing to General Permit? Comment [MB19]: Why are citing to General Permit?

Table E-3. Action-specific ARARs and TBC Guidance for the On-site Disposal Alternative (Continued)

Action	Requirements	Prerequisite	Citation(s)
Activities causing storm water runoff	<ul style="list-style-type: none"> construction must be phased for projects in which over 50 acres of soil will be disturbed. Areas of the completed phase must be stabilized within 15 days (in accordance with Section 3.5.3.2 <i>Tennessee General Permit No. TNR10-0000</i>). No more than 50 acres of active soil disturbance is allowed at any time during the construction project. 	Storm water discharges from construction activities — applicable	<i>Tennessee General Permit No. TNR10-0000</i> Section 3.5.3.1(k)
	<ul style="list-style-type: none"> <u>construction must be staged or phased for large project; areas of one phase must be stabilized before another can be initiated; stabilization shall be accomplished by temporarily or permanently protecting the disturbed soil surface from rainfall impacts and runoff</u> 		
	<ul style="list-style-type: none"> erosion prevention and sediment control measures must be in place and functional before earth moving operations begin, and must be constructed and maintained throughout the construction period. 		<i>Tennessee General Permit No. TNR10-0000</i> Section 3.5.3.1(i)
	<ul style="list-style-type: none"> pre-construction vegetative ground cover shall not be destroyed, removed or disturbed more than 10 days prior to grading or earth moving unless the area is seeded and/or mulched or other temporary cover is installed. 		<i>Tennessee General Permit No. TNR10-0000</i> Section 3.5.3.1(h)
	<ul style="list-style-type: none"> permanent stabilization with perennial vegetation (using native herbaceous and woody plants where practicable) or other permanently stable, non eroding surface shall replace any temporary measures as soon as practicable. 		<i>Tennessee General Permit No. TNR10-0000</i> Section 3.5.3.2

Comment [MB20]: Why are citing to General Permit?

Comment [MB21]: Why are citing to General Permit?

Comment [MB22]: Why are citing to General Permit?

Comment [MB23]: Why are citing to General Permit?

Table E-3. Action-specific ARARs and TBC Guidance for the On-site Disposal Alternative (Continued)

Action	Requirements	Prerequisite	Citation(s)
	<ul style="list-style-type: none"> all surface water flowing toward the construction area shall be diverted by using berms, channels, or sediment traps, as necessary. 		
	<ul style="list-style-type: none"> erosion prevention and sediment control measures shall be designed according to the size and slope of disturbed drainage areas with the goal of detaining runoff and trapping sediment. 		Tennessee General Permit No. TNR10-0000 Section 3.5.3.3
	<ul style="list-style-type: none"> discharges from sediment basins and traps must be through a pipe, well-grassed or lined channel or other equivalent means so that the discharge does not cause erosion and sedimentation. 		Tennessee General Permit No. TNR10-0000 Section 3.5.3.3
Waste Management			
Characterization of solid waste (all primary and secondary wastes)	<p>Must determine if that waste is hazardous waste or if waste is excluded under 40 CFR 261.4(b); and</p> <p>Must determine if waste is listed under 40 CFR Part 261, or</p>	Generation of solid waste as defined in 40 CFR 261.2 and which is not excluded under 40 CFR 261.4(a) – applicable	<p>40 CFR 262.11(a)</p> <p>TDEC 1200-1-11-0400-12-01-.03(1)(b)(1)</p> <p>40 CFR 262.11(b)</p> <p>TDEC 1200-1-11-0400-12-01-.03(1)(b)(2)</p>
	<p>Must characterize waste by using prescribed testing methods or applying generator knowledge based on information regarding material or processes used. If waste is determined to be hazardous, it must be managed in accordance with pertinent provisions of 40 CFR 261-268.</p>		<p>40 CFR 262.11(c) and (d)</p> <p>TDEC 0400-12-01-1200-1-11-.03(1)(b)(3)</p>

Comment [MB24]: Why are citing to General Permit?

Comment [MB25]: Why are citing to General Permit?

Table E-3. Action-specific ARARs and TBC Guidance for the On-site Disposal Alternative (Continued)

Action	Requirements	Prerequisite	Citation(s)
	Must refer to Parts 261, 262, 264, 265, 266, 268, and 273 of Title 40 for possible exclusions or restrictions pertaining to management of the specific waste.	Generation of solid waste which is determined to be hazardous – applicable	40 CFR 262.11(d); TDEC Chap. 0400-12-01+200-1-11 .03(1)(b)(4)
Characterization of hazardous waste (all primary and secondary wastes)	Must obtain a detailed chemical and physical analysis of a representative sample of the waste(s) which at a minimum contains all the information which must be known to treat, store, or dispose of the waste in accordance with pertinent sections of 40 CFR 264 to 268.	Generation of RCRA hazardous waste (including RCRA characteristic hazardous waste that is not D001 non-wastewater treated by CMBST, RORGS, or POLYM of Sect. 268.42, Table 1) for storage, treatment or disposal – applicable	40 CFR 264.13(a)(1) TDEC 0400-12-01+200-1-11 .06(2)(d)(1)
	Must determine the underlying hazardous constituents (as defined in 40 CFR 268.2(i)) in the waste.		40 CFR 268.9(a); TDEC Chap. 0400-12-01+200-1-11 .10(1)(i)(1)
	Must determine if the waste is restricted from land disposal under 40 CFR 268 et seq. by testing in accordance with prescribed methods or use of generator knowledge of waste.		40 CFR 268.7 TDEC 0400-12-01+200-1-11 .10(1)(g)(1)(i)
	Must determine each EPA Hazardous Waste Number (Waste Code) to determine the applicable treatment standards under 40 CFR 268.40 et seq.		40 CFR 268.9(a); TDEC Chap. 0400-12-01+200-1-11 .10(1)(i)(1)
Characterization of LLW (e.g., contaminated PPE, equipment, wastewater)	Shall be characterized using direct or indirect methods and the characterization documented in sufficient detail to ensure safe management and compliance with the WAC of the receiving facility.	Generation of LLW for storage or disposal at a DOE facility – TBC	DOE M 435.1-1 (IV)(1)
	Characterization data shall, at a minimum, include the following information relevant to the management of the waste:		DOE M 435.1-1(IV)(1)(2)
	• physical and chemical characteristics;		DOE M 435.1-1(IV)(1)(2)(a)

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Comment [EU26]: A requirement? Perhaps. -mb

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Table E-3. Action-specific ARARs and TBC Guidance for the On-site Disposal Alternative (Continued)

Action	Requirements	Prerequisite	Citation(s)
	<ul style="list-style-type: none"> • volume, including the waste and any stabilization or absorbent media; • weight of the container and contents; • identities, activities, and concentrations of major radionuclides; • characterization date; • generating source; and • any other information that might be needed to prepare and maintain the disposal facility performance assessment or demonstrate compliance with performance objectives. 		DOE M 435.1-1(IV)(1)(2)(b)
			DOE M 435.1-1(IV)(1)(2)(c)
			DOE M 435.1-1(IV)(1)(2)(d)
			DOE M 435.1-1(IV)(1)(2)(e)
			DOE M 435.1-1(IV)(1)(2)(f)
			DOE M 435.1-1(IV)(1)(2)(g)
Temporary storage of hazardous waste in containers (e.g., PPE, rags, etc.)	A generator may accumulate hazardous waste at the facility provided that:	Accumulation of RCRA hazardous waste on site as defined in 40 CFR 260.10 – applicable	40 CFR 262.34(e) DEC 1300-1-11-03(4)(e)

Comment [MB27]: The higher level citation is not necessary as the citation to the specific requirements is listed following.

Table E-3. Action-specific ARARs and TBC Guidance for the On-site Disposal Alternative (Continued)

Action	Requirements	Prerequisite	Citation(s)
	<ul style="list-style-type: none"> waste is placed in containers that comply with 40 CFR 265.171-173 (Subpart 1); and the date upon which accumulation begins is clearly marked and visible for inspection on each container; container is marked with the words "hazardous waste," and 		40 CFR 262.34(a)(1)(i) TDEC 1200-1-11-03(4)(e)(2)(i)(i) TDEC 0400-12-01-03(4)(e)(2)(i)(i) 40 CFR 262.34(a)(2) TDEC 1200-1-11-03(4)(e)(2)(ii) TDEC 0400-12-01-03(4)(e)(2)(ii) 40 CFR 262.34(a)(3) TDEC 1200-1-11-03(4)(e)(2)(iii) TDEC 0400-12-01-03(4)(e)(2)(iv)
	<ul style="list-style-type: none"> container may be marked with other words that identify the contents. 	Accumulation of 55 gal or less the contents of RCRA hazardous waste at or near any point of generation – applicable	40 CFR 262.34(c)(1) TDEC 1200-1-11-03(4)(e)(5) TDEC 0400-12-01-03(4)(e)(5)
Use and management of hazardous waste in containers	If container is not in good condition (e.g. severe rusting, structural defects) or if it begins to leak, must transfer waste into container in good condition.	Storage of RCRA hazardous waste in containers – applicable	40 CFR 264.171 TDEC 1200-1-11-05(9)(b) TDEC 0400-12-01-06(9)(b)
	Use container made or lined with materials compatible with waste to be stored so that the ability of the container is not impaired;		40 CFR 264.172 TDEC 1200-1-11-05(9)(c) TDEC 0400-12-01-06(9)(c)
	Keep containers closed during storage, except to add/remove waste;		40 CFR 264.173(a) TDEC 1200-1-11-05(9)(d)(1) 0400-12-1-06(9)(d)(1)
	Open, handle and store containers in a manner that will not cause containers to rupture or leak.		40 CFR 264.173(b) TDEC 1200-1-11-05(9)(d)(2) 0400-12-1-06(9)(d)(2)

Comment [MB28]: These and following were repealed and renumbered.

Comment [MB29]: Repealed and renumbered. 5 was changed to 6 because 5 contains the interim Status requirements; 6 is the appropriate citation.

Table E-3. Action-specific ARARs and TBC Guidance for the On-site Disposal Alternative (Continued)

Action	Requirements	Prerequisite	Citation(s)
Design and operation of a RCRA container storage area	Area must be sloped or otherwise designed and operated to drain liquid from precipitation, or containers must be elevated or otherwise protected from contact with accumulated liquid.	Storage of RCRA hazardous waste in containers that do not contain free liquids – applicable	40 <i>CFR</i> 264.175(c) TDEC 1200-1-11-.06(9)(f)(2) TDEC 0400-12-01-.06(9)(f)(3)
	Area must have a containment system designed and operated as follows:	Storage of RCRA hazardous waste with free liquids or F020, F021, F022, F023, F026 and F027 in containers – applicable	40 <i>CFR</i> 264.175(a); TDEC 1200-1-11-.06(9)(f) TDEC 0400-12-01-.06(9)(f)
	• a base must underlie the containers which is free of cracks or gaps and is sufficiently impervious to contain leaks, spills and accumulated precipitation until the collected material is detected and removed;		40 <i>CFR</i> 264.175(b)(1) TDEC 1200-1-11-.06(9)(f)(2)(i) TDEC 0400-12-01-.06(9)(f)(2)(i)
	• base must be sloped or the containment system must be otherwise designed and operated to drain and remove liquids resulting from leaks spills or precipitation, unless the containers are elevated or are otherwise protected from contact with accumulated liquids;		40 <i>CFR</i> 264.175(b)(2) TDEC 1200-1-11-.06(9)(f)(2)(ii) TDEC 0400-12-01-.06(9)(f)(2)(ii)
	• must have sufficient capacity to contain 10% of the volume of containers or the volume of the largest container, whichever is greater;		40 <i>CFR</i> 264.175(b)(3) TDEC 0400-12-01+200-1-11-.06(9)(f)(2)(iii) TDEC 0400-12-01-.06(9)(f)(2)(iii)
	• run-on into the system must be prevented unless the collection system has sufficient capacity to contain along with volume required for containers; and		40 <i>CFR</i> 264.175(b)(4) TDEC 1200-1-11-.06(9)(f)(2)(iv) TDEC 0400-12-01-.06(9)(f)(2)(iv)
	• spilled or leaked waste and accumulated precipitation must be removed from the sump or collection area in a timely manner as or necessary to prevent overflow.		40 <i>CFR</i> 264.175(b)(5) TDEC 1200-1-11-.06(9)(f)(2)(v) TDEC 0400-12-01-.06(9)(f)(2)(v)

Table E-3. Action-specific ARARs and TBC Guidance for the On-site Disposal Alternative (Continued)

Action	Requirements	Prerequisite	Citation(s)
Temporary storage of LLW (e.g., contaminated PPE, scrap metal, soil)	Ensure that radioactive waste is stored in a manner that protects the public, workers, and the environment and that the integrity of waste storage is maintained for the expected time of storage.	Management of LLW at a DOE Facility – TBC	DOE M 435.1-1 (IV)(N)(1)
	LLW shall not be readily capable of detonation, explosive decomposition, reaction at anticipated pressures and temperatures, or explosive reaction with water.		DOE M 435.1-1 (IV)(N)(1)
	LLW shall be stored in a location and manner that protects the integrity of waste for the expected time of storage.	Management of LLW at a DOE Facility – TBC	DOE M 435.1-1 (IV)(N)(3)
	LLW shall be managed to identify and segregate LLW from mixed waste.		DOE M 435.1-1 (IV)(N)(6)
	<u>LLW shall be packaged in a manner that provides containment and protection for the duration of the anticipated storage period and until disposal is achieved or until the waste has been removed from the container.</u>	<u>Storage of LLW in containers at a DOE facility – TBC</u>	<u>DOE M 435.1-1 (IV)(L)(1)(ii)</u>
	<u>Vents or other measures shall be provided if the potential exists for pressurizing or generating flammable or explosive concentrations of gases within the waste container.</u>		<u>DOE M 435.1-1 (IV)(L)(1)(b)</u>
	<u>Containers shall be marked such that their contents can be identified.</u>		<u>DOE M 435.1-1 (IV)(L)(1)(c)</u>
Temporary storage of PCB waste (e.g., PPE, rags) in a container(s)	Container(s) shall be marked as illustrated in 40 CFR 761.45(a).	Storage of PCBs and PCB Items at concentrations ≥ 50 ppm for disposal – applicable	40 CFR 761.40(a)(1)
	Storage area must be properly marked as required by 40 CFR 761.40(a)(10).		40 CFR 761.65(c)(3)

Comment [EU30]: Moved from Treatment/Disposal section

Table E-3. Action-specific ARARs and TBC Guidance for the On-site Disposal Alternative (Continued)

Action	Requirements	Prerequisite	Citation(s)
	Any leaking PCB items and their contents shall be transferred immediately to a properly marked non-leaking container(s).		40 <i>CFR</i> 761.65(c)(5)
	Container(s) shall be in accordance with requirements set forth in DOT HMR at 49 <i>CFR</i> 171-180.		40 <i>CFR</i> 761.65(c)(6)
	The date shall be recorded when PCB items are removed from service, and the storage shall be managed such that PCB items can be located by this date. (<i>Note:</i> Date should be marked on the container.)	PCB items (includes PCB wastes) removed from service for disposal – applicable	40 <i>CFR</i> 761.65(c)(8)
Storage of PCB waste and/or PCB/radioactive waste in a RCRA-regulated container storage area	PCB storage does not have to meet storage unit requirements in 40 <i>CFR</i> 761.65(b)(1) provided that the unit:	Storage of PCBs and PCB items designated for disposal – applicable	40 <i>CFR</i> 761.65(b)(2)
	• is permitted by EPA under RCRA §3004, or		40 <i>CFR</i> 761.65(b)(2)(i)
	• qualifies for interim status under RCRA §3005; or		40 <i>CFR</i> 761.65(b)(2)(ii)
	• is permitted by an authorized state under RCRA §3006 and,		40 <i>CFR</i> 761.65(b)(2)(iii)
	• PCB spills cleaned up in accordance with subpart G of 40 <i>CFR</i> 761		40 <i>CFR</i> 761.65(c)(1)(iv)

Table E-3. Action-specific ARARs and TBC Guidance for the On-site Disposal Alternative (Continued)

Action	Requirements	Prerequisite	Citation(s)
Storage of PCB/radioactive waste in containers	For liquid wastes, containers must be nonleaking	I.1 Storage of PCB/radioactive waste in containers other than those meeting DOE HMR performance standards - applicable	40 CFR 761.65(c)(6)(i)(A)
	For nonliquid wastes, containers must be designed to prevent buildup of liquids if such containers are stored in a area meeting the containment requirements of 40 CFR 761.65(b)(1)(ii); and		40 CFR 761.65(c)(6)(i)(B)
	For both liquid and nonliquid wastes, containers must meet all regulations and requirements pertaining to nuclear criticality safety.		40 CFR 761.65(c)(6)(i)(C)
Management of PCB waste (e.g., contaminated PPE, scrap metal, soil, debris, equipment, wastewater)	Any person storing or disposing of PCB waste must do so in accordance with 40 CFR 761, Subpart D.	Generation of waste containing PCBs at concentrations ≥ 50 ppm - applicable	40 CFR 761.50(a)
	Any person cleaning up and disposing of PCBs shall do so based on the concentration at which PCBs are found.	Generation of PCB remediation waste as defined in 40 CFR 761.3 - applicable	40 CFR 761.61
Management of PCB/radioactive waste (e.g., contaminated PPE, scrap metal, soil, debris)	Any person storing such waste must do so taking into account both its PCB concentration and radioactive properties, except as provided in 40 CFR 761.65(a)(1), (b)(1)(ii) and (c)(6)(i).	Generation for disposal of PCB/radioactive waste with ≥ 50 ppm PCBs - applicable	40 CFR 761.50(b)(7)(i)
Management of TSCA PCB wastes	Other wastes that are not compatible with PCBs shall be segregated from the PCBs throughout the handling and disposal process.	Management, storage of PCBs or PCB items - applicable	40 CFR 761.75(b)(8)(i)
Storage of	For liquid wastes, containers must be non-leaking	Storage of PCB/radioactive waste in	40 CFR 761.65(c)(6)(i)(A)

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Comment [MB31]: Moved from Treatment/Disposal

Comment [EU32]: Just moved up to be next to other storage.

Table E-3. Action-specific ARARs and TBC Guidance for the On-site Disposal Alternative (Continued)

Action	Requirements	Prerequisite	Citation(s)
PCB/radioactive waste in containers	For non-liquid wastes, containers must be designed to prevent buildup of liquids if such containers are stored in an area meeting the containment requirements of 40 CFR 761.65(a)(1)(ii); and	containers other than those meeting DOT HMR performance standards—applicable	40 CFR 761.65(e)(6)(i)(B)
	Both liquid and non-liquid wastes containers must meet all regulations and requirements pertaining to nuclear criticality safety.		40 CFR 761.65(e)(6)(i)(C)
1.3 Treatment/Disposal			
Packaging of LLW for disposal (e.g., contaminated PPE, scrap metal, debris, rags)	LLW must not be packaged for disposal in cardboard or fiberboard boxes.	Generation of LLW for disposal at a LLW disposal facility – relevant and appropriate	TDEC 1200-2-11-.17(7)(a)(1)
	LLW must be solidified or packaged in sufficient absorbent material to absorb twice the volume of liquid.	Generation of liquid LLW for disposal at a LLW disposal facility – relevant and appropriate	TDEC 1200-2-11-.17(7)(a)(2)
	LLW shall contain as little free standing and noncorrosive liquid as is reasonably achievable, but in no case shall the liquid exceed 1% of the volume.	Generation of solid LLW containing liquid for disposal at a LLW disposal facility – relevant and appropriate	TDEC 1200-2-11-.17(7)(a)(3)
	LLW must not be capable of detonation or of explosive decomposition or reaction at normal pressures and temperatures or of explosive reaction with water.	Generation of LLW for disposal at a LLW disposal facility – relevant and appropriate	TDEC 1200-2-11-.17(7)(a)(4)
	LLW must not contain, or be capable of generating, quantities of toxic gases, vapor, or fumes.		TDEC 1200-2-11-.17(7)(a)(5)
	LLW must not be pyrophoric.		TDEC 1200-2-11-.17(7)(a)(6)
	LLW must have structural stability either by processing the waste or placing the waste in a container or structure that provides stability after disposal.		TDEC 1200-2-11-.17(7)(b)(1)

Comment [EU33]: New Heading Inserted

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Table E-3. Action-specific ARARs and TBC Guidance for the On-site Disposal Alternative (Continued)

Action	Requirements	Prerequisite	Citation(s)
	LLW must be converted into a form that contains as little free standing and noncorrosive liquid as is reasonably achievable, but in no case shall the liquid exceed 1 percent of the volume of the waste when the waste is in a disposal container designed to ensure stability, or 0.5% of the volume of the waste for waste processed to a stable form.	Generation of liquid LLW or LLW containing liquids for disposal at a LLW disposal facility – relevant and appropriate	TDEC 1200-2-11-17(7)(b)(2)
	Void spaces within the waste and between the waste and its package must be reduced to the extent practicable.	Generation of LLW for disposal at a LLW disposal facility – relevant and appropriate	TDEC 1200-2-11-17(7)(b)(3)
	LLW shall be packaged in a manner that provides containment and protection for the duration of the anticipated storage period and until disposal is achieved or until the waste has been removed from the container.	Storage of LLW in containers at a DOE facility – TBC	DOE M 435.1-1 (IV)(L)(1)(a)
	Vents or other measures shall be provided if the potential exists for pressurizing or generating flammable or explosive concentrations of gases within the waste container.		DOE M 435.1-1 (IV)(L)(1)(b)
	Containers shall be marked such that their contents can be identified.		DOE M 435.1-1 (IV)(L)(1)(c)
Treatment of LLW	Treatment to provide more stable waste forms and to improve the long-term performance of a LLW disposal facility shall be implemented as necessary to meet the performance objectives of the disposal facility.	Generation of LLW for disposal at a DOE facility – TBC	DOE M 435.1-1(IV)(O)
Treatment of uranium and thorium bearing LLW	Potentially biodegradable uranium and thorium bearing LLW shall be properly conditioned so that the generation and escape of biogenic gases will not cause the emission or dose limits in DOE O 458.1 paragraph 4.b.(1) to be exceeded and that biodegradation within the facility will not result in premature structural failure.	Placement of potentially biodegradable contaminated wastes in a long-term management facility – TBC	DOE O 458.1(4)(b)(1)(d)(3) DOE 5400.5(IV)(6)(d)(1)(e)

Comment [EU34]: Moved up to Storage

Comment [M835]: EBMWF

Table E-3. Action-specific ARARs and TBC Guidance for the On-site Disposal Alternative (Continued)

Action	Requirements	Prerequisite	Citation(s)
Disposal of LLW (e.g., debris, scrap metal, soil)	LLW shall be certified as meeting waste acceptance requirements before it is transferred to the receiving facility.	Generation of LLW for disposal – TBC	DOE M 435.1-1(IV)(J)(2)
Exposure to any member of the public from the disposal of LLW	Assure that exposure to any member of the public to radioactive waste from the handling, transportation, and disposal of LLW does not exceed an EDE of 25 mrem/year from all pathways		DOE O 435.1 Chap. 4
Exposure from the disposal of LLW	Not cause radon-222 flux rates to exceed 20 pCi (0.7 Bq) m ⁻² sec ⁻¹ averaged over the surface area overlaying waste, including the covering or other confinement structures, wherever radium-226 wastes are accepted for storage or disposal		DOE O 458.1(4)(f)(2)
Disposal of RCRA hazardous waste in a land-based unit	RCRA-restricted waste may be land disposed only if it meets the requirements in the table "Treatment Standards for Hazardous Waste" at 40 CFR 268.40 before land disposal.	Land disposal, as defined in 40 CFR 268.2, of RCRA restricted waste – applicable	40 CFR 268.40(a) TDEC 0400-12-01+200-1-1-1.10(3)(a)
	Hazardous waste must be treated in accordance with the alternative treatment standards of 40 CFR 268.49(c), or according to the Universal Treatment Standards specified in 40 CFR 268.48 applicable to the listed and/or characteristic waste contaminating the soil, prior to land disposal.	Land disposal, as defined in 40 CFR 268.2, of restricted hazardous soil – applicable	40 CFR 268.49(b) TDEC 0400-12-01+200-1-1-1.10(3)(j)(2)
	Hazardous waste may be land disposed if it meets the requirements in the table "Alternative Treatment Standards for Hazardous Debris" at 40 CFR 268.45 before land disposal or the debris is treated to the waste-specific treatment standard provided in 40 CFR 268.40 for the waste contaminating the debris.	Land disposal, as defined in 40 CFR 268.2, of restricted RCRA hazardous debris – applicable	40 CFR 268.45(a) TDEC 0400-12-01+200-1-1-1.06(10)(3)(f)(1)

Comment [EJ36]: Citation too general. Perhaps it means 458.1(4)(c)(1)(a)(3) – but then the wording may need to be revised.

Comment [ME37]: More specificity needed

Table E-3. Action-specific ARARs and TBC Guidance for the On-site Disposal Alternative (Continued)

Action	Requirements	Prerequisite	Citation(s)
	Disposal of hazardous waste is not prohibited if the wastes no longer exhibit a characteristic at the point of land disposal, unless the wastes are subject to a specified method of treatment other than DEACT in 40 <i>CFR</i> 268.40 or are D003 reactive cyanide.	Land disposal, as defined in 40 <i>CFR</i> 268.2, or restricted RCRA characteristically hazardous waste – applicable	40 <i>CFR</i> 268.1(c)(4)(iv) TDEC 0400-12-01-200-1-11 .06(10)(1)(3)(iv)(1V)
Disposal requirements for particular RCRA waste forms and types	Ignitable or reactive RCRA waste must not be placed in a landfill unless the waste and the landfill meet applicable provisions of 40 <i>CFR</i> Part 268; and <ul style="list-style-type: none"> the resulting waste, mixture or dissolution of material no longer is reactive or ignitable; and 40 <i>CFR</i> 264.17(b) is complied with (see below). 	Disposal of ignitable or reactive RCRA waste – applicable	40 <i>CFR</i> 264.312(a) TDEC 0400-12-01-200-1-11 .06(14)(m)(1)
	Ignitable or reactive RCRA waste may be landfilled without meeting 40 <i>CFR</i> 264.312(a), provided wastes are disposed of in such a way that they are protected from any materials or conditions which may cause them to ignite;	Disposal of ignitable or reactive RCRA waste (except for prohibited wastes which remain subject to treatment standards in 40 <i>CFR</i> 268.40 <i>et seq.</i>) – applicable	40 <i>CFR</i> 264.312(b) TDEC 0400-12-01-200-1-11 .06(14)(m)(2)
	Must be disposed of in non-leaking containers which are carefully handled and placed so as to avoid heat, sparks, rupture, or any other condition that might cause ignition of the wastes;		
	Must be covered daily with soil or other non-combustible material to minimize the potential of ignition;		
	Must not be disposed of in cells that contain or will contain other wastes which may generate heat sufficient to cause ignition of the waste.		
	Incompatible wastes must not be placed into a RCRA landfill cell unless 40 <i>CFR</i> 264.17(b) is complied with (see below).	Disposal of incompatible wastes in a RCRA landfill – applicable	40 <i>CFR</i> 264.313 TDEC 0400-12-01-200-1-11 .06(14)(n)

Table E-3. Action-specific ARARs and TBC Guidance for the On-site Disposal Alternative (Continued)

Action	Requirements	Prerequisite	Citation(s)
Treatment and Disposal of ignitable, reactive, or incompatible RCRA wastes	Must take precautions to prevent reactions which: <ul style="list-style-type: none"> • generate extreme heat, pressure, fire or explosion, or produce uncontrolled fumes or gases which pose a risk of fire or explosion; • produce uncontrolled toxic fumes or gases which threaten human health or the environment; • damage the structural integrity of the device or facility. 	Operation of a RCRA facility that treats, stores, or disposes of ignitable, reactive, or incompatible wastes – applicable	40 CFR 264.17(b) TDEC 0400-12-01+200-1-11 .06(2)(h)(2)
Disposal of bulk or non-containerized liquids in a RCRA landfill	May not dispose of bulk or non-containerized liquid hazardous waste or hazardous waste containing free liquids in any landfill.	Placement of bulk or non-containerized RCRA hazardous waste – applicable	40 CFR 264.314(b) TDEC 0400-12-01+200-1-11 .06(14)(o)(4)
Disposal of containers in RCRA landfill	May not place containers holding free liquid in a landfill unless the liquid is mixed with an absorbent, solidified, removed, or otherwise eliminated.	Placement of containers containing RCRA hazardous waste in a landfill – applicable	40 CFR 264.314(d) TDEC +200-1-11 0400-12-01-.06(14)(o)(4)
	Sorbents used to treat free liquids to be disposed of in landfills must be non-biodegradable as described in 264.315(e)(1).		40 CFR 264.314(e) TDEC 0400-12-01+200-1-11 .06(14)(o)(5)
	Unless they are very small, containers must be either at least 90% full when placed in the landfill, or crushed, shredded, or similarly reduced in volume to the maximum practical extent before burial in the landfill.		40 CFR 264.315 TDEC 0400-12-01+200-1-11 .06(14)(p)
Disposal of PCB/radioactive waste	Any person disposing of such waste must do so taking into account both its PCB concentration and its radioactive properties.	Disposal of PCB/ radioactive waste (e.g., contaminated PPE, scrap metal, soil, debris) with ≥ 50 ppm PCBs – applicable	40 CFR 761.50(b)(7)(ii)

Table E-3. Action-specific ARARs and TBC Guidance for the On-site Disposal Alternative (Continued)

Action	Requirements	Prerequisite	Citation(s)
	If, after taking into account only the PCB properties in the waste, it meets requirements for disposal in a facility permitted, licensed, or registered by a state as a municipal or non-municipal nonhazardous waste landfill, the person may dispose of such waste without regard to the PCBs, based on its radioactive properties alone, in accordance with applicable requirements.		
Disposal of bulk PCB remediation waste	<p>Bulk PCB remediation waste shall be disposed of:</p> <ul style="list-style-type: none"> • in a hazardous waste landfill permitted by EPA under §3004 of RCRA, • in a hazardous waste landfill permitted by a State authorized under §3006 of RCRA, or • in a PCB disposal facility approved under 40 <i>CFR</i> 761.60. 	Bulk PCB remediation waste (as defined in 40 <i>CFR</i> 761.3) which has been de-watered and with a PCB concentration ≥ 50 ppm – applicable	40 <i>CFR</i> 761.61(a)(5)(i)(B)(2)(iii)
Performance-based disposal of PCB remediation waste	May dispose of non-liquid PCB remediation waste by one of the following methods:	Disposal of non-liquid PCB remediation waste as defined in 40 <i>CFR</i> 761.3 – applicable	40 <i>CFR</i> 761.61(b)(2)
	<ul style="list-style-type: none"> • in a high-temperature incinerator approved under Section 761.70(b), 		40 <i>CFR</i> 761.61(b)(2)(i)
	<ul style="list-style-type: none"> • by an alternate disposal method approved under Section 761.60(e), 		
	<ul style="list-style-type: none"> • in a chemical waste landfill approved under Section 761.75, 		

Table E-3. Action-specific ARARs and TBC Guidance for the On-site Disposal Alternative (Continued)

Action	Requirements	Prerequisite	Citation(s)
	<ul style="list-style-type: none"> in a facility with a coordinated approval issued under Section 761.77, or 		
	<ul style="list-style-type: none"> through decontamination in accordance with Section 761.79. 		40 <i>CFR</i> 761.61(b)(2)(ii)
Disposal of PCB cleanup wastes (PPE, rags, non-liquid cleaning materials)	<p>Non-liquid PCB cleanup waste shall be disposed of either:</p> <ul style="list-style-type: none"> in a facility permitted, licensed or registered by a State to manage municipal solid waste under 40 <i>CFR</i> 258 or non-municipal, nonhazardous waste subject to 40 <i>CFR</i> 257.5 thru 257.30; or in a RCRA Subtitle C landfill permitted by a State to accept PCB waste, or in an approved PCB disposal facility, or through decontamination under 40 <i>CFR</i> 761.79(b) or (c). 	Generation of non-liquid PCBs at any concentration during and from the cleanup of PCB remediation waste – applicable	40 <i>CFR</i> 761.61 (a)(5)(v)(A)
Disposal of PCB cleaning solvents abrasives, and equipment	PCB cleaning solvents abrasives and equipment may be reused after decontamination in accordance with 40 <i>CFR</i> 761.79.	Generation of PCB wastes from the cleanup of PCB remediation waste – applicable	40 <i>CFR</i> 761.61 (a)(5)(v)(B)
Disposal of PCB bulk product waste (e.g., debris or scrap metal with PCB painted surfaces)	<p>May dispose of PCB bulk product waste by one of the following methods:</p> <ul style="list-style-type: none"> in an incinerator approved under Section 761.70; in a chemical waste landfill approved under Section 761.75; in a hazardous waste landfill permitted by EPA under 3004 of RCRA or by authorized state under 3006 of RCRA; 	Disposal of PCB bulk product waste as defined in 40 <i>CFR</i> 761.3 – applicable	40 <i>CFR</i> 761.62(a) 40 <i>CFR</i> 761.62(a)(1) 40 <i>CFR</i> 761.62(a)(2) 40 <i>CFR</i> 761.62(a)(3)

Table E-3. Action-specific ARARs and TBC Guidance for the On-site Disposal Alternative (Continued)

Action	Requirements	Prerequisite	Citation(s)
	<ul style="list-style-type: none"> under alternate disposal approved under section 761.60(e); 		40 CFR 761.62(a)(4)
	<ul style="list-style-type: none"> in accordance with decontamination provisions of 761.79; 		40 CFR 761.62(a)(5)
	<ul style="list-style-type: none"> in accordance with thermal decontamination provisions of 761.79(e)(6) for metal surfaces in contact with PCBs. 		40 CFR 761.62(a)(6)
Disposal of TSCA PCB wastes	<p>PCBs and PCB items shall be placed in a manner that will prevent damage to containers or articles.</p> <p>Other wastes that are not compatible with PCBs shall be segregated from the PCBs throughout the handling and disposal process.</p>	Disposal of PCBs or PCB items in chemical waste landfill – applicable	40 CFR 761.75(b)(8)(i)
Disposal of PCB liquids (e.g., from drained electrical equipment)	<p>Bulk liquids not exceeding 500 ppm PCBs may be disposed of provided such waste is pretreated and/or stabilized (e.g., chemically fixed, evaporated, mixed with dry inert absorbent) to reduce its liquid content or increase its solid content so that a non-flowing consistency is achieved to eliminate the presence of free liquids prior to final disposal.</p> <p>May be disposed of if container is surrounded by an amount of inert sorbent material capable of absorbing all of the liquid contents of the container.</p>	Disposal of PCB container with liquid PCB between 50 ppm and 500 ppm – applicable	40 CFR 761.75(b)(8)(ii)

Table E-3. Action-specific ARARs and TBC Guidance for the On-site Disposal Alternative (Continued)

Action	Requirements	Prerequisite	Citation(s)
<i>Disposal Site Suitability Requirements</i>			
Siting of a RCRA landfill	A facility located in a 100 year floodplain (as defined in 40 CFR 264.18 [b](2)) must be designed, constructed, operated and maintained to prevent washout of any hazardous waste, unless can demonstrated that procedures are in effect which will cause the waste to be removed safely, before flood waters can reach the facility.	Construction of a RCRA hazardous waste landfill – applicable	40 CFR 264.18(b)(1) TDEC 0400-12-01+200-1-11-.06(2)(i)
	A new facility where treatment, storage, or disposal of hazardous waste will be conducted must not be located within 200 ft of a fault which has had displacement in Holocene time.		40 CFR 264.18(a)(1)
Siting of a TSCA landfill	The bottom of the landfill shall be above the historical high groundwater table as provided below. Floodplains, shorelands, and groundwater recharge areas shall be avoided. There shall be no hydraulic connection between the site and standing or flowing surface water. The site shall have monitoring wells and leachate collection. The bottom of the landfill liner system or natural in-place soil barrier shall be at least 50 ft from the historical high water table.	Construction of a TSCA chemical waste landfill – applicable	40 CFR 761.75(b)(3)
	There shall be no hydraulic connection between the site and standing or flowing surface water	Construction of a TSCA chemical waste landfill – applicable	
	Floodplains, shore lands and groundwater recharge areas shall be avoided.		
	A TSCA landfill shall provide diversion structures capable of diverting all surface water runoff from a 24-hr, 25-year storm.	Construction of a TSCA chemical waste landfill (above the 100-year floodwater elevation) – applicable	40 CFR 761.75(b)(4)(ii)
	The landfill site shall be located in an area of low to moderate relief to minimize erosion and to help prevent landslides or slumping.	Construction of a TSCA chemical waste landfill – applicable	40 CFR 761.75(b)(5)

Table E-3. Action-specific ARARs and TBC Guidance for the On-site Disposal Alternative (Continued)

Action	Requirements	Prerequisite	Citation(s)
Siting of a LLW disposal facility	LLW disposal sites shall be capable of being characterized, modeled, analyzed, and monitored.	Land disposal of LLW – relevant and appropriate	TDEC 1200-2-11-.17(1)(b)
	LLW disposal sites should be selected so that projected population growth and future developments are not likely to affect the ability of the disposal facility to meet performance objectives.		TDEC 1200-2-11-.17(1)(c)
	Areas must be avoided having known natural resources which, if exploited, would result in failure of the cell to meet performance objectives.		TDEC 1200-2-11-.17(1)(d)
	Disposal site must be generally well drained and free of areas of flooding and frequent ponding.		TDEC 1200-2-11-.17(1)(e)
	Waste disposal shall not take place in a 100-year floodplain or wetland.		
	Upstream drainage areas must be minimized to decrease the amount of runoff which could erode or inundate the disposal unit.		TDEC 1200-2-11-.17(1)(f)
	The disposal site must provide sufficient depth to the water table that groundwater intrusion, perennial or otherwise, into the waste will not occur.		TDEC 1200-2-11-.17(1)(g)
Siting of a LLW disposal facility	If it can be conclusively shown that disposal site characteristics will result in molecular diffusion being the predominant means of radionuclide movement and the rate of movement will result in the performance objectives of Rules of the TDEC 1200-2-11-.16 being met, wastes may be disposed of below the water table. In no case will waste disposal be permitted in the zone of fluctuation of the water table.	Land disposal of LLW – relevant and appropriate	

Table E-3. Action-specific ARARs and TBC Guidance for the On-site Disposal Alternative (Continued)

Action	Requirements	Prerequisite	Citation(s)
	The hydrogeologic unit used for disposal shall not discharge groundwater to the surface within the disposal site.		TDEC 1200-2-11-.17(1)(h)
	Areas must be avoided where tectonic processes such as faulting, folding, seismic activity may occur with such frequency to affect the ability of the site to meet the performance objectives.		TDEC 1200-2-11-.17(1)(i)
	Areas must be avoided where surface geologic processes such as mass wasting, erosion, slumping, landslides, or weathering may occur with such frequency and extent to affect the ability of the disposal site to meet performance objectives or preclude defensible modeling and prediction of long-term impacts.		TDEC 1200-2-11-.17(1)(j)
	The disposal site must not be located where nearby activities or facilities could impact the site's ability to meet performance objectives or mask environmental monitoring.		TDEC 1200-2-11-.17(1)(k)
	A preoperational monitoring program must be conducted to provide basic environmental data on the disposal site characteristics.		TDEC 1200-2-11-.17(4)(a)

Table E-3. Action-specific ARARs and TBC Guidance for the On-site Disposal Alternative (Continued)

Action	Requirements	Prerequisite	Citation(s)
<i>Wastewater Treatment Facility Operation and Discharge</i>			
Point source discharge of radionuclides into the air from a DOE facility	Emissions of radionuclides to the ambient air shall not exceed those amounts that would cause any member of the public to receive in any year an EDE of 10 mrem/yr.	Radionuclide emissions from point sources, as well as diffuse or fugitive emissions, at a DOE facility – applicable	40 CFR 61.92; TDEC 1200-03-11-.08(6)
	Radionuclide emission measurements shall be made at all release points which have a potential to discharge radionuclides into the air in quantities which could cause an effective dose equivalent in excess of 1% of the standard. All radionuclides which could contribute greater than 10% of the potential effective dose equivalent for a release point shall be measured.		40 CFR 61.93(b)(4)(i)
<u>Monitoring and Response Program</u>	<u>All applicable units must comply with the requirements of §§264.91 through 264.100 for purposes of detecting, characterizing and responding to releases to the uppermost aquifer.</u>	<u>A surface impoundment, waste pile or land treatment unit or landfill that receives waste after July 26, 1982, per 40 CFR 264.90(a)(1).</u>	<u>40 CFR 264.90(a)(2)</u>
	<u>Owners and operators must conduct a monitoring program under 263.99.</u>	<u>Whenever hazardous constituents (must specify the list of haz constituents here?) from a regulated unit are detected at a compliance point under 40 CFR 264.98.</u>	<u>40 CFR 264.91(a)(1)</u>
	<u>Owners and operators must institute a corrective action program under 264.100.</u>	<u>Whenever the groundwater protection standard under §264.92 is exceeded.</u>	<u>40 CFR 264.91(a)(2)</u>

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Table E-3. Action-specific ARARs and TBC Guidance for the On-site Disposal Alternative (Continued)

Action	Requirements	Prerequisite	Citation(s)
	<p><u>Owners and operator must comply with the following requirements for any groundwater monitoring program:</u></p> <p><u>Groundwater monitoring system must consist of a sufficient number of wells, installed at appropriate locations and edepth to yield groundwater samples from the uppermost aquifer that</u></p> <ul style="list-style-type: none"> <u>Represent the quality of background groundwater that has not been affected by leakage from a regulated unit</u> <u>Represent the quality of groundwater passing the point of compliance</u> <u>Allow for the detection of contamination when hazardous constituents have migrated from the waste management area to the uppermost aquifer</u> <p><u>All monitoring wells must be cased in a manner that maintains the integrity of the monitoring-well bore hole. Casing must be screend or perforated and packed with gravel or sand, where necessary, to enable collection of groundwater samples. The annular space above the sampling depth must be sealed to prevent contamination of samples and groundwater.</u></p> <p><u>Groundwater monitoring program must include consistent sampling and analysis procedures that are designed to ensure monitoring results that provide a reliable indication of groundwater quality below the waste management area. At a minimum,</u></p>	<p><u>Operation of aAll surface impoundment, waste pile or land treatment unit or landfill that receives waste after July 26, 1982, per 40 CFR 264.90(a)(1)</u></p>	<p><u>40 CFR 264.97</u></p> <p><u>40 CFR 264.97(a)</u></p> <p><u>40 CFR 264.97(a)(1)</u></p> <p><u>40 CFR 264.97(a)(2)</u></p> <p><u>40 CFR 264.97(a)(3)</u></p> <p><u>40 CFR 264.97(c)</u></p>

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Table E-3. Action-specific ARARs and TBC Guidance for the On-site Disposal Alternative (Continued)

Action	Requirements	Prerequisite	Citation(s)
	<p><u>Groundwater monitoring program must include consistent sampling and analysis procedures that are designed to ensure monitoring results that provide a reliable indication of groundwater quality below the waste management area. At a minimum the program must include procedures and techniques for:</u></p> <ul style="list-style-type: none"> • <u>Sample collection</u> • <u>Sample preservation and shipment</u> • <u>Analytical procedures</u> • <u>Chain of custody control</u> • <u>Elevation</u> 		<p><u>40 CFR 264.97(d)</u></p> <p><u>40 CFR 264.97(f)</u></p>
Transport to wastewater treatment facility	<u>All tank systems, conveyance systems, and ancillary equipment used to store or transport waste to an on-site NPDES-permitted wastewater treatment facility are exempt from the requirements of RCRA Subtitle C standards.</u>	<u>On-site wastewater treatment units that are subject to regulation under Sect. 402 or Sect. 307(b) of CWA (NPDES-permitted) — applicable</u>	<p><u>40 CFR 260.1(c)(2)(v)</u></p> <p><u>TDEC Chap. 1200-1-11-07(1)(b)(4)(iv)</u></p>
Treatment of collected leachate	Are not prohibited from land disposal if such wastes are managed in a treatment system that subsequently discharges to waters of the United States pursuant to a permit issued under Sect. 402 of the CWA, unless the wastes are subject to a specified method of treatment other than DEACT in 40 CFR 268.40 or are D003 reactive cyanide.	Restricted RCRA characteristically hazardous waste intended for disposal — applicable	<p>40 CFR 268.1(c)(4)(i):</p> <p>TDEC Chap. <u>0400-12-01+200-1-11-10(1)(a)(3)(iv)(B)</u></p>
<u>In-stream general water quality criteria</u>	<u>Dissolved oxygen shall not be less than 5.0 mg/l. Substantial and/or frequent variations in dissolved oxygen levels, including diurnal fluctuations, are undesirable if caused by man-induced conditions. Diurnal fluctuations shall not be substantially different than the fluctuations noted in reference streams in the region.</u>	<u>Discharge to surface water</u>	<p><u>TDEC 1200-04-03-03(3)(a)</u></p>

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Comment [EU38]: ARARs not needed for actions that are not alternatives.

Comment [EU39]: Davido — Do we need this?

Comment [MB40]: Applicable because this discharging to surface water in a remedial action conducted entirely onsite. No permit necessary under CERCLA 121(e), but must then be built into the ARARs. Criteria included are those for fishable/swimmable. If the stream is also classified as "Recreation" then those standards that are more stringent should be inserted in lieu thereof for any "Fish and Aquatic Life" standards that are less stringent. The recreation standards are found at TDEC 1200-04-03-03(4).