UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
61 FORSYTH STREET
ATLANTA, GEORGIA 30303-8960

July 31, 2015

CERTIFIED MAIL
RETURN RECEIPT REQUESTED
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Mr. John Michael Japp
Federal Facility Agreement Manager
Department of Energy
Oak Ridge Office of Environmental Management
P.O. Box 2001
Oak Ridge, Tennessee 37831

SUBJ: D1 Focused Feasibility Study for Water Management for the Disposal of CERCLA Waste
(DOE/OR/OR/01-2664&D1; April 2015)
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.G of the Federal Facility Agreement (FFA). Pursuant to Section XXI.G.5 of the FFA, the Department of Energy (DOE) should coordinate efforts to respond to comments and revise the D1 document. The EPA will participate in comment resolution meetings to support efforts to develop a D2 document that is the product of consensus to the maximum extent possible. A response to the enclosed comments and a revised D2 Primary Document is due within sixty (60) days of the receipt of the EPA and State comments.

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

Sincerely,

Jeffrey L. Crane
FFA Project Manager
Restoration & DOE Coordination Section
Superfund Division

Enclosure

cc: Randy Young, TDEC
Pat Halsey, DOE ORR
SSAB

EPA Review of
DOE ORR's D1 Focused Feasibility Study (FFS)
for Water Management from CERCLA Landfills
(DOE/OR/01-2664&D1; April 2015)

GENERAL COMMENTS:

1. The FFS does not adequately address the management of landfill generated water (contact water and leachate) with respect to radiological contamination. For example, Section 1.7, EMWMF and EMDF Landfill Water Quality, does not discuss radionuclides. While Section 1.7 discusses hazardous waste related constituents with respect to ambient water quality criteria (AWQC), radionuclides do not have AWQC and therefore other discharge criteria are needed for these constituents. Identifying the discharge criteria for all contaminants of concern (COCs) is necessary in determining the appropriate remedy for water management and demonstrating attainment of the remedy selection threshold criteria. Where ARARs do not exist for the Table 2 Key COCs (i.e., U metal and radionuclides), describe and include release limits based on risk protection. EPA has previously informed DOE on this matter during several scoping sessions that discharges of radionuclides must be shown to be protective of human health and the environment. The document disregarded any of these scoping discussions and does not include any consideration of developing risk-based discharge requirements, or other discharge limits.

   To address the threshold requirement for evaluation of remedial alternatives in this FFS, EPA request DOE use the EPA Headquarters radiation risk assessment calculators that are found at: http://www.epa.gov/superfund/health/contaminants/radiation/radrisk.htm

   These radiation risk assessment tools are developed with assistance from the Oak Ridge National Laboratory. These tools will guide the risk assessor to generating a site-specific risk-based treatment/discharge level for exposure to radionuclide contaminants. Specifically, the "Preliminary Remediation Goals (PRGs) for Radionuclides Calculator should be used to tailor the PRG for the site-specific exposure scenarios (e.g, surface water) for this FFS. The FFS can then evaluate alternatives consistent with the National Contingency Plan to consider the best balance of trade offs of the nine criteria for a range of alternatives that use final risk-based radionuclide contaminant concentrations at various risk-based levels that are protective within Superfund the risk range (i.e., 10^{-6} to 10^{-4}). These protective risk-based levels for discharge in the detailed analysis of alternatives will support a final risk management decision for establishing final remediation goals (i.e., radionuclide discharge level to surface water) in the Record of Decision.

   Finally, the website referenced above also includes a general Q&A discussion pertaining to radiation risk assessment for Superfund. Although dose-based ARARs have not been identified, the website also includes tools for assessing dose-based radionuclide exposure. However, as described in the website, EPA recommends that dose assessments should only be conducted under CERCLA where necessary to demonstrate ARAR compliance.

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It should also be noted that EPA R4 and DOE PGDP have held discussions regarding the best approach for determining protective discharge limits, either by developing release limits based on risk protection or identifying the CWA and its implementing regulations as relevant and appropriate requirements and developing discharge limits using CWA methodology.

2. The FFS does not describe the proposed treatment methods for hexavalent chromium. Section 1.6, EMWMF and EMDF Landfill Water Management Operations, describes the current process at the EMWMF by stating, *"If the discharge limits are not met due to elevated concentrations of hexavalent chromium, the contact water is conditioned to meet the discharge limits (for hexavalent chrome) or transferred by tanker truck to the Process Water Treatment Complex (PWTC) at ORNL [Oak Ridge National Laboratory] for treatment and disposal."* However, the FFS does not propose hexavalent chromium as a Key COC and as such, it is not clear if hexavalent chromium would be treated. While Appendix C, Explanation of How the Key COCs were Developed, indicates that hexavalent chromium analysis is not required to prove compliance with the PWTC waste acceptance criteria, this does not appear to eliminate hexavalent chromium as a potential COC. Include hexavalent chromium as a Key COC and address its current pre-treatment and any treatment under the alternatives as part of this FFS.

3. The FFS evaluates the alternatives based on the premise that primary contaminants potentially requiring treatment are mercury and cadmium; however, the basis for selection of only these two chemicals does not appear adequate. For example, as stated in Appendix C, Explanation of How the Key Contaminants of Concern were Developed, Section C.5, Summary, additional COCs have historically required treatment at EMWMF including copper, cyanide, lead, Sr-90, U-238 and as such, it is not clear why they are not included as COCs in the treatment alternatives. Based on the reasons for selection of Key COCs and the recognition for future treatment needs and adaptability, all Key COCs should be considered for treatment as part of the alternatives under consideration, even if some Key COCs are treated as contingencies. Revise the FFS to include these additional COCs or provide a basis for excluding them.

4. Sections 1.6 and Appendix C.1indicates that two years of data were used to select the current Key COCs; however, the basis for using a two-year timeframe is not presented or justified. In Section 1.7 the text in the 1st Paragraph on Page 10 states the contamination in the EMWMF landfill water has varied over time and that specific contaminants have appeared for a short time, but are not currently in the landfill water. The text further states it is expected that this situation will continue in the future so that the contaminants in the landfill water will vary over time and for varying periods of time. As such, it is not clear if the selected Key COCs are appropriate. Revise the FFS to provide a basis for using a two-year data set to evaluate COCs.

5. The remedial action objectives (RAOs) presented in the FFS lack sufficient detail. Section 4.1.2.1 (Development and Screening of Alternatives) of the Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA (EPA/540/G-89/004), (OSWER Directive 9355.3-01), dated October 1988 (RI/FS Guidance) states that RAOs should specify the contaminants and media of interest, exposure pathways, and preliminary

remediation goals that permit a range of treatment and containment alternatives to be developed. However, the RAO presented in Section 2.2, Remedial Action Objectives, only states, "meet AWQC" and does not specify the COCs, media of interest, exposure pathways or preliminary remediation goals that permit a range of treatment and containment alternatives to be developed. Revise the FFS to provide more clearly-defined RAOs that specify the COCs, media of interest, and exposure pathways in accordance with the RI/FS guidance.

6. The evaluation of technologies/process options in Table 4, Evaluation of process options, is not complete. For example, constructed wetlands is not retained; however, the basis for not retaining this process option is not described in the last column of the table and the effectiveness, implementability and cost columns of Table 4 are somewhat ambiguous for this process option. For clarity, it appears the final column of the Table 4 should briefly describe why process options were not retained. Revise the final column in Table 4 to include a conclusion on why certain process options were not retained.

7. Based on review of the FFS, it appears that Alternative 2 (Managed Discharge) is not a viable alternative. Section 4.3.2, Alternative 2: Managed Discharge, states that Alternative 2 *"will comply with all chemical-specific, location-specific, and action-specific ARARs [applicable or relevant and appropriate requirements], unless and until the AWQC for mercury or other key COCs is exceeded in landfill water."* Also, Section 4.3.2, Alternative 2: Managed Discharge, states, *"If the mercury concentration in the proposed EMDF [Environmental Management Disposal Facility] leachate exceeds AWQC, managed discharge will not be protective of human health and the environment and cannot be performed."* Based on these statements, it appears that Alternative 2 does not meet the NCP threshold criteria and must be met by any alternative in order for it to be eligible for selection. While it is understood that the preferred alternative presented in the FFS includes a combination Alternative 2 and Alternative 3 (Treat at EMWMF/EMDF), it appears that as presented in the FFS, Alternative 2 is more applicable as a process option. As such, alternatives which includes both managed discharge and treatment may be more appropriate. Revise the FFS to remove Alternative 2 as a stand-alone alternative since it does not achieve the threshold criteria.

8. The basis for retaining the ORNL PWTC and Y-12 WETF process options in Table 4, Evaluation of process options, is not clear. For example:
   a. Section 3.3.6.1 Common Components, describing West End Treatment Facility (WETF), states *"additional treatment capacity will be required at this location, identical to the EMWMF-/EMDF-based treatment system described in Alternative 3 because the complexity and cost of modifying WETF for the additional flow will be cost prohibitive. Therefore, a separate treatment system will be built at a location in the WETF proximity."* This section also states, *"The selected area [WETF] has not been thoroughly evaluated and may not be suitable."* As such, the effectiveness and cost of WETF do not appear adequate to make it through the screening process in Table 4.
   b. Section 4.3.4, Alternative 4: Treat at PWTC, indicates that Process Water Treatment Complex (PWTC) does currently accept uranium. In addition, Section 3.3.5.1, Common Components, states, *"Since the concentration of mercury in EMDF landfill*

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water is estimated and uncertain, the actual concentration may exceed the ability of the PWTC to reduce it sufficiently to meet the discharge permit limits." As such, the effectiveness and cost of PWTC do not appear adequate to make it through the screening process in Table 4.

While it appears appropriate to screen these process options in Table 4, revise the FFS to remove Alternatives 4 and 5 or provide additional detail to support their inclusion after the screening process in Table 4.

9. The FFS is not clear on whether managed discharge will be operated on a continuous or batch basis. For example, Section 3.3.3, Alternative 2: Managed Discharge, states, *"This process can be operated on either a batch or continuous basis."* However, the next sentence in this section states, *"Sample will collected from a continuous, flow proportional sampler during release,"* which implies that the landfill water will be discharged continuously. Further, Section 3.3.3, on page 28 states that managed discharge for cadmium will operate on a batch basis. Section 4.3.2, Alternative 2: Managed Discharge, also states, *"To meet AWQC, the release of EMWMF landfill water must be performed on a batch basis only."* These conflicting statements make it unclear if managed water will be discharged on a continuous or batch basis. Finally, a discussion should be included to address when frequent batch releases essentially constitute a continuous release that should be monitored for compliance with CCC standards. Revise the FFS to address this issue.

10. The source of and/or basis for each of the costs presented in the cost estimates (Appendix I, Basis of Cost Estimates, Table I.1, Basis of estimates summary) are not presented. In addition, the majority of the costs are presented on a lump sum basis. As such, it is unclear if the remedial alternatives were appropriately scoped and costed so as to reflect a -30%/+50% margin as allowed for during the FS process. The cost estimates should be revised to present the costs in the format specified in A Guide to Developing and Documenting Cost Estimates During the Feasibility Study, EPA 540-R-00-002, dated July 2000, and to provide sufficient detail to independently verify the units and costs such that the cost estimates can be verified. Revise the costs to provide sufficient detail to support the cost estimates, ensuring that a line-item breakdown of costs is provided for each alternative.

11. Appendix I, Basis of Cost Estimates, Table I.1, Basis of estimates summary, presents the same lump sum cost for line item, *Construct Treatment Plant at EMWMF to Remove Hg and C* for treatment Alternatives 3 (On-Site Treatment), 4 (LGWO Treatment) and 5 (WETF Treatment); however, Alternatives 4 and 5 include treatment at already existing treatment plants. As such, it is not clear why costs for construction of a new treatment plant are included in Alternatives 4 and 5. If the existing treatments plants require replacement or upgrades for Alternatives 4 and 5, then these costs should be included separately. Revise Table I.1 to address these issues.

12. The FFS discusses several components, or potential components of the alternatives, but does not include costs for these items in Appendix I, Basis of Cost Estimates, Table I.1, Basis of estimates summary. For example:

a. Section 3.3.5.1, Common Components, states, *"Elevated levels of mercury above the current PWTC will require additional pretreatment prior to treatment at the PWTC;"* however, pretreatment costs are not included in Table I.1.
b. Section 3.3.5.1, Common Components, states, *"If radiological treatment of the landfill water were required, pretreatment at EMWMF/EMDF will be required;"* however, pretreatment costs are not included in Table I.1.
c. Section 3.3.5.1, Common Components, states *"Longer-term treatment of mercury-containing landfill water will require a NPDES permit modification;"* however, National Pollutant Discharge Elimination System (NPDES) permit modification costs are not included in Table I.1.
d. Section 3.3.5.2, Alternative 4a: Pipeline Transport to PWTC, states *"An environmental survey of the pipeline route will be required;"* however, environmental survey costs are not included in Table I.1.
e. Section 3.3.5.3, Alternative 4b: Truck transport to PWTC, indicates that a second, accessible tanker unloading station or bay will be required at the PWTC; however, costs for this station is not included in Table I.1.
f. Section 4.3.4, Alternative 4: Treat at PWTC, discusses the age of PWTC and the possibility of its replacement; however, replacement costs are not included in Table I.1.
g. Section 4.3.6, Alternative 6: Treat at Outfall 200 MTF, indicates Outfall 200 Mercury Treatment Facility (MTF) is not currently designed to handle radionuclides; however, costs for modifications to the system or on-site treatment to address radionuclides are not included in Table I.1.

Revise Table I.1 to include these costs or alternatively explain in the text of the FFS why these costs do not need to be included.

13. The FFS adds a separate criterion, Adaptability, to the evaluation criteria in the FFS; however, it appears that the existing nine criterion in the CERCLA process are adequate to evaluate the alternatives, and that the adaptability can be assessed under the effectiveness and/or implementability criteria. Revise the FFS to address this issue.

14. The FFS does not assess the environmental effects of the proposed remedial alternatives in accordance with Green Remediation: Incorporating Sustainable Environmental Practices into Remediation of Contaminated Sites (EPA 542-R-08-002), dated April 2008 (EPA Green Remediation Guidance) or Methodology for Understanding and Reducing a Project's Environmental Footprint (EPA 542-R-12-002), dated February 2012 (EPA Environmental Footprint Guidance). For example, energy consumption, greenhouse gas emissions (carbon dioxide, methane, and nitrous oxides), pollutant emissions (carbon monoxide, oxides of sulfur, oxides of nitrogen, and particulate matter), water consumption, ecological impacts/change in resource use, resource consumption, and worker safety are not used to evaluate the environmental footprint of the remedial action alternatives. Revise the FFS to meet the level of detail specified in the EPA Green Remediation Guidance and EPA Environmental Footprint Guidance.

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15. The subsections of Section 4.4, Comparative Analysis of Alternatives, do not always include a comparison against Alternative 1, No Action. For completeness, revise these subsections to ensure the comparison is made to Alternative 1.

16. Table 7, Comparative analysis of alternatives, under the Reduction of Toxicity, Mobility, or Volume Through Treatment criteria includes a higher rating for Alternative 3 than Alternative 4 and 5; however, neither Table 7, nor Section 4.4.3.2, Reduction of Toxicity, Mobility, or Volume Through Treatment, describes the basis for the higher rating for Alternative 3. Revise Table 7 and/or Section 4.4.3.2 to address this issue.

17. The basis for the cost ratings in Table 7, Comparative analysis of alternatives, is not clear. For example, it is not clear if the ratings are based on the present value, capital costs, or combination of both. Revise Table 7 to clarify the ratings for costs.

18. Section 5 of the FFS recommends selection of a combination of Alternative 2 and Alternative 3 as the water management remedy at EMWMF/EMDF; however, presentation and documentation of a recommended remedy is inappropriate at this time as this is performed during the Proposed Plan stage. As specified in the National Contingency Plan (NCP) and RI/FS Guidance, the FS documents the development and analysis of alternatives only. In addition, modifying criteria (i.e., State and community acceptance) have not yet been addressed. Revise the FFS to remove all language which discusses Alternative 2/3 as the recommended remedy. Also, see General Comment 7 above, which advises that only Alternatives that are independently viable should be retained in the FS as alternatives. That is, they should not be "combined" in order to gain viability (i.e., meet the two CERCLA threshold criteria).

19. Appendix A, Bear Creek Burial Grounds Evaluation, concludes that the additional equipment and operating costs to treat Bear Creek Burial Grounds (BCBG) wastewater in combination with EMWMF/EMDF wastewater are projected to be much greater than the cost of processing BCBG wastewater at the Y-12 Groundwater Treatment Facility (GWTF); however, Appendix A does not quantify these additional costs. As such, it is difficult to determine if BCBG wastewater should be treated separately. Revise Appendix A to provide some quantification of the additional costs of treating at EMWMF/EMDF to support conclusions of the study.

20. Appendix C, Explanation of How the Key Contaminants of Concern were Developed, Section C.3, Data Evaluation, indicates that analytes were reviewed to evaluate abundance in the waste lots disposed at EMWMF, the contaminant mobility in water, the regulatory concern and/or risk, and other factors; however, CFR 264.98 (a) (2) indicates that the stability and persistence of constituents should also be evaluated. Revise Appendix C to evaluate stability and persistence or provide a rationale for not addressing these factors.

21. Appendix C, Explanation of How the Key Contaminants of Concern were Developed, Section C.3.3, Regulatory Concern/Risk, does not provide an adequate basis for the regulatory concern ranking. As such, it is not clear if the rankings are appropriate. For example, the ranking of "Low" for vinyl chloride does not appear to be appropriate. Revise

this section to provide a reference or explanation for determining regulatory concern ranking of analytes.

22. The text in Section 2.1, Anticipated Future Land Use, on Page 17 states the EMWMF and EMDF are located in the Bear Creek watershed, entirely within the ORR, where public access is restricted and additional security and access limitations apply. The text further indicates the area in which the EMWMF is located and the area where EMDF is proposed by DOE to be located is an area designated for waste management. While this section states that access restrictions will be applied and the land use is limited, the text does not state what the human exposure restrictions (e.g., industrial use) are anticipated for the future land use. Revise the FFS to address this issue to ensure the selected remedy is consistent with the anticipated future land use and human exposure restrictions.

23. Alternative 4 (PWTC) appears to not be suitable for onsite treatment. See Specific Comment 23 which raises questions about implementing this alternative. Similar concerns in this specific comment may also be relevant for Alternative 5 (WETF). Clarify these matters and revise the FFS for both alternatives.

24. Section 1.5 and Appendix A conclude that the EMWMF/EMDF would not be suitable for uncontrolled releases entering NT-8 from the Bear Creek Burial Grounds. Key reasons listed include differing COCs, wastewater transport, implications of listed waste and capital cost. These issues are part of the analysis of alternatives retained for detailed analysis in Section 4 and adaptability was argued as a key factor in addressing many of these issues. Describe why adaptability cannot address different COCs, wastewater transport and why capital costs and increased complexity of treatment cannot support NT-8 uncontrolled releases.

    Although issues remain open for adaptation and eventually treating NT-8 uncontrolled discharges impacting Bear Creek with EMWMF/EMDF wastewater, EPA concurs with conclusions in Section 1.5 and Appendix A that a CERCLA response action evaluation leading to an NT-8 response action is necessary and that one of these alternatives to address the NT-8 contamination may include the preferred solution DOE ORR describes in Appendix A:

    > *"A preferred solution would involve constructing an additional trench to BCBG to intercept contaminated groundwater entering NT-8 and transfer it to the existing LSF. The flow of the collected water would be within the existing capacity of the GWTF that currently process leachate collected at the LSF."*

    A past FFA milestone for this project was removed from the FFA due to DOE ORR's position on funding limitations and other priorities. A CERCLA evaluation of this DOE ORR preferred solution along with other alternatives (e.g., manage with EMWMF/EMDF waste water) should be prioritized with milestones added back into the FFA Appendix E and/or early in Appendix A and a transparent commitment to pursue funding for his response action should be included in DOE ORR's Dynamic Planning Model.

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25. Section 1.6 and Appendix F should thoroughly discuss why listed wastes cannot be accepted in a RCRA Subtitle C compliant hazardous waste landfill. This discussion should also discuss why precluding listed wastes in the EMWMF/EMDF is not detrimental to cleanup of DOE ORR CERCLA wastes. As discussed in General Comment 23, the listed waste implications appears to be the primary constraint for not considering adaptability for EMWMF/EMDF combined wastewater management of RCRA listed wastes from the BCBG leachate. In the response to this comment, and in the revised FFS, specifically address:
    a. Discuss the implication of a RCRA Hazardous Waste Determinations for rain water that accumulates in the landfill but is managed as contact water or leachate;
    b. The EMDF may consider a design where no Contact Water is generated and all rain water is funneled into the leachate collection system (See Section 1.6, p. 9, last paragraph Note - revise this page to replace "low" with "high" in the second sentence of this page);
    c. Discuss why wastewater management is the only constraint for EMWMF/EMDF receipt of listed wastes;
    d. Why adaptability cannot be used to address listed wastes in EMWMF/EMDF wastewater management as is argued a key factor in adaptability (p. 65); and,
    e. Include a discussion of which CERCLA OUs include listed wastes (e.g., BCBGs), the estimated volume of these listed wastes, and how the inability to adapt for listed wastewater management of RCRA listed wastes will be managed.

26. Alternative 2 is a managed discharge alternative that will allow discharge of untreated landfill leachate unless the AWQC for mercury or other key constituents is exceeded. The state standards for ambient water quality include the use designation for the water body. Meeting water quality standards is more than simply meeting the numerical criteria. Regular monitoring of the benthic community composition and fish community at a downstream monitoring station is recommended to ensure that Bear Creek is meeting its designated uses. The remedy should include monitoring the biological communities. If biological communities are observed to degrade, this information should factor into the decision to treat the landfill water.

27. Uranium lacks a state standard for surface water. Uranium flux in Bear Creek currently exceeds its ROD goal. The proposed landfill will contribute to the uranium flux. Surface water in Bear Creek is currently at elevated concentrations of uranium. The literature should be reviewed to determine a protective concentration of uranium in surface water to trigger treatment of the landfill water prior to discharge to Bear Creek. Articles to review include: Horemans et al. 2015 and Goulet et al. 2015 and Sheppard et al. 2005.

28. Cadmium concentrations are currently above the AWQC in surface water of Bear Creek at sampling stations NT-01 and BCK 12.34. The concentration that will trigger treatment of the landfill water should take into account the fact that the receiving water body has extremely limited capacity to dilute additional influxes of cadmium.

29. The ambient water quality criterion of 0.77 µg/L for mercury in surface water will prevent toxicity to fish but is not sufficiently protective to prevent bioaccumulation of mercury to concentrations in fish tissue that exceed the EPA-recommended fish tissue concentration

(i.e., 0.3 μg/g). Concentrations of mercury in rockbass tissue from Bear Creek currently exceed the 0.3 μg/g. A lower criterion for mercury concentrations in the landfill effluents (e.g., 51 ppt) is required to allow recovery of the resource.

30. The human health mercury limit of 51 ppt (and similarly for other contaminants) should be imposed as a daily maximum limit because the water body is already impaired for this pollutant. "Criterion continuous concentration (CCC) is the EPA national water quality criteria recommendation for the highest in stream concentration of a toxicant or an effluent to which organisms can be exposed indefinitely without causing unacceptable effect." The use of CCC is typically applied in NPDES permit as a chronic limit for non-intermittent discharges to non-impaired water bodies. However, it can be applied to any duration of discharge that goes to an impaired water body, such as in the case of discharges from the landfill contact water and leachate. Revise the FFS to use CCC AWQC limits for batch discharges and not to exceed daily maximum limits for the treatment plant effluent discharges.

SPECIFIC COMMENTS:

1. Executive Summary, Page ix – The second paragraph, first sentence, describes "approved" discharge limits. Please note that limits currently being utilized, based upon fish and aquatic life, are not the appropriate limits for Bear Creek. Bear Creek is categorized for recreational use and criteria based on this use are the legally-required limits. EPA, TDEC and DOE have agreed that DOE could use the CERCLA process (as it is herein) as a compliance schedule to bring the discharge of contact water into compliance with the Clean Water Act.

2. Executive Summary, Page ix - The Executive Summary indicates that the preferred alternative includes treatment at the EMWMF/EMDF and states, "when the need for treatment arises, the location of the treatment facility will be determined based upon the conditions at that time;" which implies the treatment facility will be built at some undetermined later date. As such, it is not clear how the preferred alternative will meet the remedial action objective (i.e., meet AWQC) and be protective of human health and the environment if leachate and contact water exceed AWQC, or other appropriate discharge criteria, prior to construction and use of the treatment facility. Revise the Executive Summary to clarify how leachate and contact water exceeding AWQC will be handled prior to completion of construction of the treatment facility. Only alternatives that meet both CERCLA threshold criteria – protection of human health and the environment and meeting ARARs – can be considered viable and, as such, included in the Feasibility Study. Alternative 2 is not a viable alternative (it does not meet ARARs under all facts as presented), and should be removed as a stand-alone alternative. Given this comment, Alternative 2 plus Alternative 3 are not appropriate as separate alternatives.

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3. Section 1.6 , p. 8. At the end of the first paragraph, please add the following statement, "Stormwater will be addressed in the Remedial Investigation/Feasibility Study for EMDF." Please substitute the correct document name for "EMDF" in that statement.

4. Section 1.6, p. 8 - The middle paragraph should replace CrVI "conditioning" with "treatment. Please clarify whether this is the only contaminant that is evaluated in order to determine proper disposition of contact water.

5. Section 1.7, page 10. In the third full paragraph, there is a statement that presence of pesticides is a result of their use for their intended purposes and not from the disposal of waste products at DOE. While this may be a factual statement, the question under CERCLA is whether the release of a hazardous substance poses an unacceptable risk, or in the case of a landfill waters, whether the presence of such substance in the contact water or leachate is at levels above those that are identified as protective of the receiving surface water. Whether they were from application or disposal does not change the number that is protective of the receiving water.

6. Section 1.7, page 11. In the last paragraph, add "thus far" after "are shown."

7. Table 2, page 12. While concentrations that are considered protective have not been promulgated as Ambient Water Quality Criteria (AWQC) under the Clean Water Act, protective discharge levels must be developed for radionuclides. See General Comment 1.

8. Figure 7 and Section 1.10 - Expand the discussion and the figure to describe how this FFS will fold into both EMWMF and EMDF Operations. The selected remedy should not wait for EMDF operations of the FFS should be revised to evaluate the cost of implementing managed/discharge with transport/treatment at other DOE ORR treatment facilities prior to EMWMF/EMDF treatment. Unless the alternatives from this FFS can be "wrapped into" the alternatives for the EMDF remedial action, the EMDF alternatives will not be able to demonstrate that they meet the two threshold criteria, will not be considered viable, and will have to be removed from the EMDF FS.

9. Section 1.11, p. 15 - Revise the third bullet to address potential treatment for all Key COCs.

10. Section 2.1 - Any references to EMDF should include potential or proposed. The second paragraph should refer to the End Use Work Group Recommendations for future land use. References to FFA document numbers here and throughout the FFS should also include an abbreviated document title.

11. Section 2.3, p. 18 - The third paragraph discussed DOE ORR's position that shipment and treatment at other treatment facilities on the ORR be considered a part of the CERCLA onsite response actions. EPA acknowledges this approach can be used in lieu of the offsite rule. However, all onsite response actions, including those at permitted facilities, must be documented in FFA Primary Documents consistent with the remedy evaluation, selection and implementation requirements of the NCP.

12. Section 2.3, page 19. In the first partial paragraph, please delete the word "preliminary". It is too limiting of the use of TBCs, since TBCs can be used to determine final remediation goals, not merely preliminary ones.

13. Section 2.3, p. 19 - The second paragraph states DOE Orders cannot be TBCs, as a general matter. Explain why DOE ORR has used DOE Orders in other RODs and why this position has changed. The *CERCLA Compliance with Other Laws Manual* notes that TBCs are non-promulgated Federal or State advisories or guidance that are non-binding and do not have the status of potential ARARs. TBCs may, however, be used in determining the level of cleanup or how to achieve protectiveness for CERCLA response actions. ". . . if no ARARs address a particular situation, or if existing ARARs do not ensure protectiveness, to-be-considered advisories, criteria or guidelines should be used to set cleanup targets." (p. 1-76). While not all parts of DOE Orders are necessarily TBCs, parts of guidance or advisories that help determine protectiveness of a remedy, those parts can be identified as a TBC. Clarify why DOE ORR has used DOE Orders in other RODs and why this position has changed.

14. Section 2.3, page 19. In the fourth full paragraph, DOE explains why the TDEC-equivalent NRC rule is not relevant and appropriate, citing language from the NCP preamble as the basis. Please note that EPA does not agree with DOE's interpretation of its rule and advises DOE that nothing in the NCP preamble would preclude the TDEC rule from being considered a relevant and appropriate requirement. DOE suggests that because the DOE Order is binding on DOE, this precludes identifying the TDEC rule as relevant and appropriate. There are at least a couple of oddities in this position. First, the only thing that is precluded in this CERCLA action to design how to safely dispose of radiological waste, is identifying the TDEC rule as applicable, which our agencies agree it is not. But whether it may be relevant and appropriate is determined by looking at the rule itself, not by the existence of DOE guidance, however binding it may be outside the CERCLA context. Second, and perhaps most odd, is that DOE wants to rely on the existence of the DOE Order to preclude identifying the Rule as relevant and appropriate while at the same time saying that the Order cannot be identified as a CERCLA TBC (see Comment 14). To the degree that TDEC regulations assist in designing a safe radiological waste disposal unit, they can be identified as relevant and appropriate requirements.

15. Section 2.3, page 19. The citation to TDEC 0400-45-01-.04(55) of the definition of "locational running annual average" is misapplied and should be removed. This citation is from the regulations on public water systems and appears to conflict with those that are applicable to the discharge of waters from water treatment systems at TDEC 0400-40-05-.08 and -.10. Further, the discussion of EPA guidance, which DOE uses to justify this averaging, is from a guidance on developing ambient water quality criteria, and appears to be, likewise, misapplied.

16. Section 3.1, Purpose, Page 21 - This section states, *"The primary problem addressed in this study is ensuring that the landfill water discharge meets ARARs. Existing land use controls are effective in preventing unacceptable risks to current receptors, and EMWMF and EMDF are expected to remain under DOE control in perpetuity. Therefore, land use*

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controls are expected to be useful tools to be used in conjunction with other technology options, for consideration in the technology screening." First, add the words "on-site human" prior to the first occurrence of "receptors". In addition, this statement implies there are secondary problems (i.e., unacceptable risk to current receptors) that are addressed by the FFS (i.e., via land use controls). As such, it appears that a land use control related RAO may be appropriate for the FFS that is based on the outcome of a risk assessment. Revise the FFS to address this issue.

17. Table 4, p. 24 - Under the "technology type" column and bottom row, revise to read "Treat onsite on ORR under the scope of this remedy." On p. 25, under the same column, revise "Off-site" to "Off-site under the Off-site Rule."

18. Section 3.2, p. 26 - The final sentence of this section implies the Table 5 Process Options are available for determining post ROD. These are the alternatives under considerations and are not Process Options. General Response actions are not simply where waste waters are managed. Revise the FS and follow the FS guidance.

19. Section 3.3.3, p. 27 - As stated in the Summary, *"water will not be expected to meet AWQC at all times."* This alternative should then be screened out for not meeting the threshold criteria. This alternative of managed discharge could include transport and treatment at the DOE ORR treatment facilities for those discharges exceeding discharge standards. Eliminate the alternative or include treatment.

20. Section 3.3.3, Alternative 2: Managed Discharge, Page 27 - This section states, *"In accordance with TDEC [Tennessee Department of Environment and Conservation] regulations and EPA guidance, a running annual average is appropriate;"* however, the references to TDEC regulations and EPA guidance are not provided. While references to ARARs are not included in this section, an appropriate citation would appear to be to TN 0400-40-05-.08(1)(m) for continuous discharges (specifies the use of daily maximum and monthly average) or TN 0400-40-05-.08(1)(n) for non-continuous discharges (all effluent limitations shall be limited in terms of frequency, total mass, maximum rate of discharge and mass or concentrations of specified pollutants) (see comment 9 for request for clarification of whether continuous or non-continuous discharge is intended). Further, the proposed approach of using a running annual average does not address radiological constituents. As discussed in other comments, revise the FFS to address the appropriate legal requirements for compliance monitoring.

21. Section 3.3.3, p. 28 - Include the following in the bullets at the top of the page. A bullet stating "AWQCs are not available for radionuclides and U metal." A bullet discussing Lead and Cyanide.

22. Section 3.3.3, Alternative 2: Managed Discharge, Page 28 - This section states, one sample will be collected per week for indicator contaminants; a sample will be collected every two years for the full suite of COCs; and, once a final cover is placed on EMWMF, sampling frequency will be reduced to once a month. However, the basis for these sampling frequencies is not presented. As such, it is not clear if sampling frequencies are

appropriate. Similar statements are included in other sections describing the other alternatives. Revise the FFS to include a basis for all proposed sampling frequencies.

23. Section 3.3.3, Alternative 2: Managed Discharge, Page 29 - This section states, *"The nutrient loading, total suspended solids, and/or total dissolved solids sample results may require additional management controls to reduce these to acceptable levels;"* however, it is not clear if costs are included in the FFS for these management controls. If these controls are reasonably anticipated based on past EMWMF detections, it appears appropriate to include these costs to ensure that the FFS costs reflect a -30%/+50% margin as allowed for during the FS process.

24. Section 3.3.4, p. 33 - In the time frame discussion, there is no reason why this alternative should be delayed whereas Alternative 2 implemented immediately. This alternative is required for the EMWMF and should not be placed as a lower priority tied only to the EMDF operations. While there has been some general agreement that the CERCLA process may be used as part of a "schedule of compliance" to bring EMWMF discharges into compliance with the Clean Water Act, an indefinite time frame (or trigger) for the implementation of this alternative is unsatisfactory.

25. Section 3.3.5.1, p. 35 and Section 3.3.6, p. 45 - The background discussion for the PWTC does not mention compliance with ARARs whereas it does in the discussion for the WETF. All onsite response actions must meet ARARs. Explain the discrepancy and revise the FFA accordingly. The WETF ARARs should also be listed as should the ARARs for other onsite treatment actions.

26. Section 3.3.5.1, p. 35 - The final sentence of the background discussion states: *"Only the upgrades needed to process landfill water are included in this alternative."* This statement appears to indicate that the current use of the PWTC is not a part of the EMWMF response action. This statement is unclear and needs to be revised to be consistent with the full scope of onsite response actions, both current operations and future upgrades.

27. Section 3.3.5.1, p. 36 - The second to last paragraph refers to pretreatment but does not specify any pretreatment as part of this response action. Clarify and revise the FFS.

28. Table 6, Footnote C - Explain under what authority is the treatment system being modified. Is this modification necessary for CERCLA onsite response actions? Clarify and revise the FFS accordingly.

29. Section 3.3.5.1, p. 38 and 40 - The treatment system describes different influents and treatments based on rad and non-rad. Describe how the system hands mixed rad/non-rad. The final paragraph describes discharges under an NPDES permit. Describe how the permit establishes requirements for the rad portion of the system and its discharge limits. The summary description states mercury can be accepted under limited situations. How does the permit or onsite response actions justify and document the limited situations? Clarify and revise the FFS.

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30. Section 3.3.5.1, p. 40 - The discussion on monitoring does not include PWTC discharge monitoring. As part of the onsite remedy, include onsite discharge monitoring.

31. Section 3.3.5.1, p. 41 - There are several aspect of this alternative that are not clear. U cannot be treated. The facility appears to require significant design changes and new systems that raise questions about whether this alternative should be screened out. Additionally, these questions raise significant issues about DOE ORR's proposal to delay implementation of a treatment alternative that is necessary for EMWMF operations. The following statement raises considerable questions about the implementation of this remedy:

    "While it is assumed that PWTC will bear the costs of any required replacements or upgrades, this is an area of uncertainty."

    EPA agrees this funding statement and other aspects of this alternative represent major uncertainties that should be considered for screening out this alternative. This FFS is the appropriate part of the CERCLA process to evaluate alternatives against the two threshold and seven other criteria. If unknowns remain at the time of the FFS that would impact whether an alternative met the two threshold criteria, it should be removed from the FFS as an alternative. See General Comment 7.

32. Section 3.3.5.1, p. 41 - The discussion of documents indicates a remedial action workplan/remedial design report will be required. Clarify if this is already a part of the EMWMF ROD whether these documents already exist and would be modified and explain why if not available for modification.

33. Section 3.3.5.1, p. 57 - The distance for piping is the same as the WETF. This appears incorrect. Also, DOE ORR is considering to move the OF 200 MTF further away from the landfills.

34. Section 4.3.1, p. 65 - It is incorrect that the No Action alternative will result in EMDF water flowing freely. This FFS is part of the EMDF FS; no EMDF action, no water. In contrast, to the degree that this FFS is intended to address water at the EMWMF, a no action alternative would result in EMWMF water being sent to the PWTC for treatment. A no action alternative does not condone further direct discharge of EMWMF water to Bear Creek in excess of legal limits

35. Section 4.3.2, ps. 66-68 - The final sentence under Protection of HH&E states this alternative will be protective when AWQC batch discharges are met. Explain when they are not met. LTE&P and Short-term E implies discharges of only AWQC compliant batches and then is silent when not AWQC is not met. The adaptability discussion on p. 68 sums why this alternative alone should be screened out. If there remains a question whether this alternative meets the two threshold criteria under CERCLA and the NCP, it should be eliminated from the FFS as an alternative.

36. Section 4.3.3, p. 70 - Adaptability emphasizes rapid implementation of new treatment systems. Describe what happens in the interim. Also, describe why rapid implementation of any treatment system is appropriate to be delayed to await opening the EMDF.

37. Section 4.3.4, p. 71 - The first paragraph under Protection of HH&E states *"If the landfill water becomes radiologically contaminated with constituents other than those currently treated at PWTC, the complexity and cost of retrofitting PWTC radiological treatment system will be significant."* Discuss why this is not an issue for the current EMWMF landfill operations that uses both managed discharge of contact water and leachate treatment at the PWTC. Clarify whether the PWTC rad constituents that can be effectively treated has been established in any FFA Primary document. While beyond the scope of this FFS, if these limits have not been established under CERCLA or included as part of the PWTC's permit, this must be addressed on a schedule milestoend in Appendix E.

38. Section 4.3.4, ps. 72 and 74 - In the compliance with ARARs, it is mentioned that pretreatment for mercury will be effective. Pretreatment needs to be a part of the alternative. The statement on page 74 that WAC revision or waiver will be needed. This kind of uncertainty raises more questions about the viability of this alternative, and as stated in other comments, if the alternative is not viable, it must be screened out.

39. Section 4.3.4, p. 74 - The cost must include mercury pretreatment and system upgrades. Clarify and revise the FFS.

40. Section 4.3.6 and Table 7 - Revise this section to be consistent with the OF 200 Formal Dispute Resolution Agreement pertaining to the AWQC discharge standard not being waived. As the dispute has been resolved, the mercury discharge limits are not being negotiated, and no action-specific ARAR waiver is being considered.

41. Section 4.4.2.3 - The first sentence states that Alternatives 2-6 will meet AWQC standards but numerous other portions of the FFS raises questions about this matter. Clarify and revise the FFS accordingly per all related comments on this matter.

42. Appendix C, Explanation of the How Key Contaminants of Concern were Developed, Section C.4.1, Additional Analysis, Page C-13 -The text under the section Chromium (total) states *"Total Chromium has not been detected above either AWQC."* However, the graph presenting the EMWMF Total Chromium Concentrations in Contact Water over time shows that the Criterion Continuous Concentration (CCC) AWQC of 81 micrograms per liter (µg/L) was exceeded in 2011. Revise the FFS to address this issue.

43. Appendix C, Contact Water Data and Leachate Data - The tables in Appendix C include project quantification limits. Section 0400-40-03-.05 part (8) provides required reporting levels. Appendix C is probably reporting what was observed in the past rather than specifying reporting limits to be used for future monitoring of landfill waters. However, some reporting levels required by the Tennessee Department of Environmental Conservation are lower than those currently used and might result in increased frequency of detections. Please discuss the reporting levels in the appropriate section of the document.

44. Table D.2, Numerical Ambient Water Quality Criteria - Clarify why beta-BHC is on Table D.2 and not alpha-BHC. Nitrogen, ammonia compounds and pH should be considered for addition to Table D.2.

45. Appendix D, Page D-18 - For the second citation (TDEC 0400-40-07-.04(7)), please add the following text under "Prerequisite": "If an applicant proposes an activity that would result in an appreciable permanent loss of resource value of a state water – **applicable.**"

46. Appendix D, Page D-20 - In the first set of citations (TDEC 1200-3-8-.01(1) and the three following), please confirm that this is the current citation. Further, please revise the "Prerequisite" to read, "Use, construction, alteration, repair or demolition of a building, or appurtenances or a road or the handling transport or storage of material – **applicable.**"

47. Appendix D, Page D-25 - This begins a series of ARARs that identified as "Additional ARARs for Alternatives 3 and 5." Please clarify why the ARARs on pages D-25 and the following page regarding the action "Construction of new outfall structure for discharge of wastewater" is not applicable to Alternative 2.

48. Appendix D - Given the comment above that Alternative 2 is not a viable alternative and must be combined with treatment in order to meet ARARs, the structure and organization of the table should be revised to reflect that.

49. Appendix D - No ARARs have been identified for Alternative 4. As mentioned above, an alternative may be identified as "on-site" for purposes of conducting remedial action and any permits would not be required, per CERCLA §121(e). All ARARs must be identified in the RI/FS and the ROD for any "on-site" alternatives (and in the ROD, for the selected remedy). If, on the other hand, DOE would not want to identify an alternative as "on-site", then it will need to obtain a determination of Offsite Acceptability, per 40 CFR 300.440, before completing the RI/FS and ROD.

50. Appendix D, Page D-31 to D-33 - The in-stream requirements are chemical-specific ARARs that would apply to all alternatives that impact surface waters. Please move it to the front of the table and identify as Chemical-Specific ARARs. Since the last part of the table intends to be reserved certain alternatives/actions, once the Chemical-Specific ARARs are moved, it will remove the confusion for the requirements that currently follow them in the table, which are Action-Specific Requirements.

51. Appendix D, Page D-33 - Please clarify why the citation to TDEC 0400-40-05-.09(1)(b) is applicable and how it works - and whether it is consistent - with the requirements in TDEC 0400-40-05-.08.

52. Appendix D, Page D-34 - Please note that the requirement that describes "Non-continuous batch discharges" may not be appropriate. EPA is not recommending removing it at this time, until further information about how the leachate and contact water will be discharged. It appears, however, that the discharge of the "batches" may well be so nearly continuous

as to be considered continuous discharge and to use the continuous discharges requirements, which follow. Other requirements may be added if it is determined that non-continuous discharge standards should apply.

53. Appendix D, Page D-34 - Please add the following citations to the Action-Specific ARARs:

Discharge of treated water	Shall receive, prior to discharge, the degree of treatment or effluent reduction necessary to comply with water quality standard and, where appropriate, will comply with the standard of performance as required by the Tennessee Water Quality Control Act of 1977 at *TCA 69-3-103(3)* For continuous discharges, all effluent limitations, standards, and prohibitions shall be expressed as maximum daily, and month average, unless impracticable.	Point-source discharge(s) of pollutants into surface waters of the state as defined in TCA 69-3-103(33) - **applicable**	TDEC 0400-40-05-.08 40 CFR 122.44 TDEC 0400-40-05-.08(m)

54. Appendix D - Please add the citations found in the Outfall 200 FFS, pages A-12 and A-13, that address (1) the release to surface water of water containing radioactivity and (2) radionuclides in the environment.

55. Appendix D - Please add the citations found in the Outfall 200 FFS, page A-22 through A-27, that address the characterization, temporary storage, storage, packaging, management and disposal of LLW and PCB waste (or combination).

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