Responses to EPA informal Comments on Focused Feasibility Study for Water Management
for the Disposal of CERCLA Waste on the Oak Ridge Reservation,
Oak Ridge, Tennessee
DOE/OR/01-2664&D4

First Set - EPA informal comments on the D4 FFS sent as an email from Carl Froede on 6/28/2022

APPENDIX C

Attachment 1. EMWMF summary statistics and comparison to AWQC for Unfiltered Surface Water from EMW-VWEIR 2005-2021

- The frequency of exceedance above the TDEC Chapter 0400-40-03 fish and aquatic life Criterion Continuous Concentration (Fish CCC) general water quality criteria does not seem to take into account those samples with elevated non-detect detection limits above the Fish CCC.

  Response: Clarification provided. EMWMF does not discharge continuously. Therefore, analytical methods are not set to detect to the Fish CCC concentrations.

- The last two columns of the table present the 24% Derived Concentration Guideline (DCG) values for radionuclides and frequency of samples above the 24% DCGs. It is unclear why DOE's adjusted 24% DCG criteria (in lieu of the standard DCGs) are being presented in the AWQC comparison table.

  Response: Clarification provided. EMWMF currently discharges to ensure that on a rolling annual average basis, 24% of the DCGs is met to demonstrate compliance with the 25 mrem dose limit ARAR.

- No surface water criteria was provided for gross alpha and gross beta. Note that the reference standards for gross alpha (15 pCi/L) and gross beta (50 pCi/L) are in the National Primary Drinking Water Regulations (40 CFR 141).

  Response: Clarification provided. The more precise individual isotope values are used as described in the EMWMF SAP/QAPP. The gross alpha and gross beta results are only used at the EMWMF if the individual isotopes are not analyzed.

- The maximum detection limit for total PCBs in surface water is more than 100-times above the recommended organisms only criteria yet this is not reflected in the frequency of exceedance calculation. It is recommended that a more sensitive analytical PCB method such as PCB congener analysis be used in lieu of the aroclor method. This would achieve significantly lower detection limits necessary to achieve the reference standard for PCBs.

  Response: Clarification provided. The detection limit for PCBs reflects what was agreed upon in the current version of the SAP/QAPP, which was based upon the TDEC-required reporting limits.

Attachment 2. EMWMF summary statistics and comparison to AWQC for Unfiltered Contact Water 2005-2021

- The maximum detection limit for total PCBs in surface water is approximately 281-times above the recommended organisms only criteria yet this is not reflected in the frequency of exceedance calculation. It is recommended that a more sensitive analytical PCB method (e.g., PCB congener analysis) be used in lieu of the aroclor method. This would achieve significantly

lower detection limits necessary to achieve the reference standard for PCBs. Additionally, the range of detection limits for cadmium and several pesticides (DDT, chlordane, dieldrin, endrin, heptachlor, heptachlor epoxide, methoxyclor) exceed the Fish CCC yet these exceedances are not reflected in the frequency of exceedance.

Response: Clarification provided. The detection limit for PCBs reflects what was agreed upon in the current version of the SAP/QAPP, which was based upon the TDEC-required reporting limits. In addition, EMWMF does not discharge continuously. Therefore, analytical methods are not set to detect to the Fish CCC concentrations.

- The last two columns of the table present the 96% Derived Concentration Guideline (DCG) values for radionuclides and frequency of samples above the 96% DCGs. It is unclear why DOE's adjusted 96%% DCG criteria (in lieu of the standard DCGs) are being presented in the AWQC comparison table.

  Response: Clarification provided. The use of 96% of the DCGs is based on an agreement between the FFA parties in the distant past.

- See Attachment 1 comment on PCBs, gross alpha, and gross beta.

Response: See responses above.

<u>Attachment 3. EMWMF summary statistics and comparison to AWQC for Unfiltered Leachate 2005-2021</u>

- See Attachment 2 comments.

  Response: See responses above.

<u>Attachment 4. Winnowing Table</u>

- Most inorganics listed in the table are described as having low mobility based on geologic setting. Without leachate partitioning analysis, varied geologic setting based on distance from surface water body, and geochemical and biological factors that may directly affect leaching to groundwater, these comments seems premature and unsupported.

  Response: Clarification provided. The presence of a reducing environment in EMWMF is based on empirical information. This was discussed in previous FFS meetings and has been unchanged since the initial versions of the FFS.

<u>APPENDIX D</u>

<u>Table D.2. Numeric AWQC that are potential chemical-specific ARARs/TBCs for key COCs in EMWMF/EMDF landfill wastewater</u>

- Table note [b] states "A 10-5 risk level is used for setting TDEC recreational criteria for all carcinogenic pollutants. Recreational criteria for noncarcinogenic chemicals are set using a 10-6 risk level." However, noncarcinogenic chemicals are assessed using a hazard quotient for

individual noncarcinogenic chemicals or hazard index for multiple noncarcinogens. Please revise table note [b] to reflect a hazard quotient of 1.

Response: Disagree. Final discharge limits will be determined in a post-ROD document. This level of detail is not necessary in the FFS.

APPENDIX E (previous D3 version)

- Introductory paragraph, Page E-3 – This section states, "Due to the short time that debris will be exposed prior to microencapsulation, it is assumed this resulting contaminated leachate will be addressed similarly to leachate resulting from non-treated mercury waste…". While this assumption may be true, it is unclear what is meant by a short time. Please elaborate on what constitutes a short period of time for exposed wastes. It would be helpful to provide a conservative estimated amount of time that waste is expected to be exposed along with the microencapsulation timeframe based on the volume of waste expected to be disposed in EMDF. Additionally, please include the date for the *Treatability Study Report for Y-12 Site Mercury Contaminated Soil* (i.e., 2013).

  Response: Clarification provided. The text in this appendix was written prior to the agreement that no mercury hazardous waste will be disposed in EMDF. Therefore, macroencapsulation will not be performed at EMDF. The following text was added to Appendix E per agreement with the FFA parties to address this change.

  Path Forward

  The mercury concentrations estimated in this appendix are based on very simple, bounding assumptions. In addition, as noted in the summary, the mercury estimates in this appendix assumed waste with mercury above RCRA characteristic levels would be disposed in the EMDF. As per the agreement in Appendix N, that is no longer a valid assumption.

  These estimates are sufficient for use in the comparison of alternatives developed for this Focused Feasibility Study, but will continue to be refined as part of the remedial design report process to ensure the landfill wastewater treatment system is appropriately configured and sized to effectively treat landfill wastewater to the discharge limit of 51 ppt.

- Table E.2. Detected mercury samples meeting TCLP mercury RCRA limit (Table 24 from DOE/OR/01-2540&D2) – The table note acknowledges that more data are needed to bring the percentage of samples below 0.2 mg/L to below 87%. It is unclear why 87% was selected as the suitable limit or threshold for samples below the RCRA limit of 0.2 mg/L. This sentence should be removed the table notes.

  Response: See response above.

- Table E.3. Summary statistics for Alpha-5 (Bldg. 9201-5) total mercury – Please include the range of detection limits (minimum and maximum) for non-detected Alpha 5 total mercury concentrations. It is also unclear if full value detection limits are reflected in Figure 2.6 "Mercury use areas and mercury soil concentrations at Y-12". Please elaborate on how non-detect values were treated in the development of the color-coded figure.

  Response: See response above.

APPENDIX K: EPA comments and responses

- Table K.1.11 Calculated number of fish meals, Page K.1-14 – Note that the edible grams caught should be based on the edible weight of each fish multiplied by the product of the total fishing trips and fish catch rate per trip. The edible weight of each fish was calculated as 49.6 grams of filet yet 341.2 grams of filet was listed. Note that 341.2 grams of filet would yield an edible grams caught value of 4,401.48 grams, which is incorrect. Please change the 341.2 grams to 49.6 grams of filet as was calculated for BCK 3.3 and shown in the table. The corrected value would yield an edible grams caught value of 639.84 grams.

  Response: Disagree. As agreed upon by the DRAT using the spreadsheet "Finalization of Bear Creek 11 Fish Meals Rev 2.xlsx," the total weight of fish greater than 30 grams is the sum of the products of the number of fish per species times the average weight of the species (682.4 grams). The edible grams of fish are ½ of 682.4 (341.2 grams). Therefore, the values in the table are correct.

- Section K.1.3.1.2 Number of fish meals per year, Page K.1-14 – This section states, "The inclusion of this site-specific information and calculation illustrates the conservatism in the default assumption of 6387 g/year." Please clarify that this value is based on a TDEC-recommended fish ingestion rate of 17.5 grams/year. value appears to be based on 170 g/meal (i.e., 6-oz fish meal) instead of EPA's recommended 227 g/meal (8-oz fish meal). Please revise the default assumption from 6,387 to 7,718 grams/year.

  Response: As per the follow-on comments received on 7/13/2022, this comment has been disregarded. However, the text has been modified to indicate that the TDEC default fish ingestion rate (17.5 grams/day) was used in the PRG calculation.

- Section K.1.7.1.1, The default fish ingestion rate is listed as 34 8-oz (227 grams) meals per year. Please note that the number of fish meals associated with the 17.5 g/day default assumption is 28 (not 34) 8-oz fish meals.

  Response: Agree. The section callouts in Sect. K.1.3.1.2 have been corrected to K.1.5.3.1, which is the correct section for this comment (There is no Section K.1.7.1.1 in the current version of the document). The 34 meals/year is the default value agreed upon by the DRAT for the purpose of the risk assessment.

- Table K.1.14 PRG Calculator Inputs, Page K.1-24 – This table lists an exposure frequency of 365 days/year for the calculation of the recreational surface water PRGs. However, the exposure frequency used to derive the fish tissue PRGs for the fish ingestion pathway is listed as 350 days/year in Table K.2.3. The exposure frequency should be consistent between surface water and biota. Therefore, please update the fish tissue PRGs to account for an exposure frequency of 365 days/year.

  Response: Clarification provided. The un-highlighted values (second column) are the PRG Calculator Default values. The values in the Orange highlighted column are the site-specific values used in the PRG calculations. No change required.

- Section K.1.4.3.3 Uncertainty concerning certain BCFs, Page K.1-26 – This section states, "…radionuclides were not found in high concentrations in the fish tissue samples collected, even considering ongoing discharges from EMWMF and releases from the legacy contamination sites in Bear Creek Valley. This indicates that there are other, possibly site-specific factors that reduce the bioaccumulation of these radionuclides." This statement is unsupported and should be omitted as the sampling events conducted were insufficient to draw meaningful conclusions about the uptake of radionuclides in fish. The sampling inadequacy issue was conveyed by EPA and TDEC during various technical meetings and in multiple correspondence. The bioaccumulation of radionuclides in fish could be informed through the collection of additional fish tissue data. The results from the limited (two rounds) fish tissue radionuclide evaluation does not outweigh the number of studied reflected in the default bioconcentration factors used in the PRG calculations.

  Response: Agree. Based on a similar comment from TDEC, the last sentence of the first paragraph of this section has been modified to read: "This indicates that there are other, possibly site-specific, factors that reduce the bioaccumulation of these radionuclides or that the radionuclide was not present in the water column during the lifetime of the fish.

- Table K.1.19 Extrapolated Number of Fish in POE, Page K.1-34 – During the dispute resolution technical discussions, DOE indicated that the electrofishing technique scanned all areas multiple times without any limitations to the surveyed areas. However, this table presents scaled-back species-specific fish counts that are described as an extrapolated number of fish in 500 m (BCK 0.7) and 1.2 Km (BCK 3.3). If the number of fish being reported are based on a limited surveyed area, the fish counts may not represent the actual total fish counts in Bear Creek. Please elaborate on the length of reach sampled and the total length of the two points of exposure. Note that this potentially adds uncertainty to the estimated average number of fish meals for Bear Creek.

  Response: Agree. There is considerable uncertainty associated with the estimated average of the number of fish present and therefore, the number of fish meals available in Bear Creek.
  Table K.1.18 displays the area sampled (m^2) and the length of the reach (m). Because the reach sampled represents a small portion of the exposure reach (e.g., BCK 3.3 reach length sampled is 84 m, whereas the BCK 3.3 POE is assumed to be 1.2 km), the number of fish available must be extrapolated from the sample reach to the exposure reach. The extrapolation calculation is presented under the header for Table K.1.19.

- App. K - Attachments and App. K.2 "Non-Radiological Discharge Limits" – No comments.

And…

1. Sec. K.1.4.3.3, p.K1-26 – Although no radionuclides were found in this one sampling event, many more than one fish sampling event would be needed to calculate a site-specific BCF. It was noted that both RESRAD and PRG BCF values were deemed 'too conservative' for DOE in this calculation. So we agree a site-specific study would probably produce much more reasonable BCFs, but judgements based on one sampling event should not be used to draw this conclusion of these well, peer-reviewed BCFs from many past year reliable studies.

> **Response:** Agree. The last sentence of the first paragraph of this section has been changed to read: "This indicates that there are other, possibly site-specific, factors that reduce the bioaccumulation of these radionuclides or that the radionuclide was not present in the water column during the lifetime of the fish."

Second Set - EPA informal comments on the D4 FFS sent as an email from Carl Froede on 7/13/2022

Comment 1. Appendix D – ARARs. DOE has removed text from the D3 that appears to provide a meaningful context for how the state's water quality standards are identified, apply to discharges and protect water quality as required by the CWA and TN statute.[1] Unless DOE believes that the text is incorrect, please restore this and other language to the introductory discussion in D3 FFS Appendix D. Below is one example of such informative and helpful text that was in the D2 but removed from the D3. Please restore this and other deleted text.

> Surface water bodies in Tennessee are assigned use classifications by the Tennessee Water Quality Control Board. Those use classifications are not assigned based on surrounding land uses, and may have no relationship to how the surface water is currently being used. Tennessee surface water use classifications are listed in TDEC 0400-40-04. Bear Creek, near the EMWMF and the proposed EMDF, is classified by the state for Fish and Aquatic Life (FAL), Recreation (REC), Irrigation (IRR), and Livestock Watering and Wildlife (LWW) uses. All other named and unnamed surface waters in the Clinch River Basin, with the exception of wet weather conveyances, which have not been specifically treated, are classified for FAL, REC, LWW, and IRR uses per TDEC 0400-40-04-.09. Each of the use classifications has water quality standards set under TDEC 0400-40-03, although only the FAL and REC uses have specific numeric AWQC set for particular compounds. The REC AWQC are human health criteria and the FAL criteria are set for the protection of aquatic life. Although all of these criteria, both numeric and narrative, are all potential ARARs for any effluent discharges to Bear Creek, the specific criteria that would be applied and enforced as final limits at a point source outfall, should the selected remedy include an on-site water treatment facility at the EMWMF/EMDF, would be negotiated and set in the final decision document for this action and could include any subset of these criteria, as determined by the regulatory

[1] Water Quality Control Act of 1977, TCA 69-3 Part 1.

authorities. A preliminary subset of key contaminants of concern in the leachate/contact water has been identified and agreed to by the Federal Facility Agreement (FFA) parties; this subset has been used during the development and screening of remedial alternatives under this FFS. AWQC for this subset of contaminants of concern are listed in Table D.2. Other narrative water quality standards are included in Table D.1 as potential chemical-specific ARARs.

Per TDEC 0400-40-05-.10(4), effluent discharges are required to meet the anti-degradation requirements of TDEC 0400-40-03-.06 to ensure that new or increased discharges do not cause measurable degradation of any parameter that is "unavailable." Unavailable parameters exist where water quality is at, or fails to meet, the levels specified as water quality criteria in TDEC 0400-40-03-.03.

Response: Agree. These two paragraphs were added to the introduction.

Comment 2. Appendix D, Table D-1, pages D-5 through D-7. The table does not identify the state narrative water quality criteria for Recreation use as relevant and appropriate to radionuclides. Please add the following notation to the "Prerequisite" column, for all the narrative water quality criteria: "Release of wastewater or effluents into surface water **– relevant and appropriate** as instream criteria for radionuclides." As with pollutants, this notation can be added in the first row only (but applies to all the similar citations below). In addition, please add the following note for the applicable requirement, "NOTE: under TDEC 0400-40-03-.05 INTERPRETATION OF CRITERIA, mixing zones shall not apply to the discharge of bioaccumulative pollutants to waters of the state where the risk-based factors in Rule 0400-40-03-.03(4)(l) are exceeded for the pollutant group."

Response: Agree. Text was added.

Comment 3. Appendix K, Section 1.4.1 PRG Development. The text describes a use scenario and PRG inputs that are inconsistent with a methodology used for calculating the fish tissue and surface water PRGs. The PRGs are based on the state use classification for Bear Creek (i.e. recreational and other) and the fish consumption rate in the TN WQS (17.5 g/d). Yet the text implies something different. For example, the first paragraph ends with…" This scenario was used to develop the PRGs for surface water and fish" and (3rd paragraph) "…the working group established a conservative estimate for input into the PRG calculator…" The text should be updated to reflect the way the PRGs were calculated.

Response: Clarification provided. The scenario mentioned in the last sentence of the first paragraph of Section K.1.4.1 is a recreational fisherman at a point of reasonable maximum exposure. The point of reasonable maximum exposure is described in the second paragraph of this section as the stretch of Bear Creek along from BCK 4.5 to the confluence of Bear Creek with East Fork Poplar Creek. This is consistent with the EPA Administrator's Dispute Decision letter of December 30, 2020.

1. **Executive Summary, p. x**. In the second full paragraph, first bullet, "The selection and approval of a landfill wastewater management alternative was originally intended to be included in the proposed plan. However, due to the length of time for resolution of the formal dispute on the D2 FFS, the FFA

parties agreed to issue the EMDF Proposed Plan for public comment in September 2018 without a recommendation for landfill wastewater management." Please add a new third sentence in lieu of the existing third sentence (which should be deleted). This new sentence is intended to describe the public comment taken on the *Water Quality Protection for Bear Creek* Fact Sheet (and since the D3 FFS was written prior to the decision to issue Fact Sheets for public comment): "In May, 2022, DOE issued a *Water Quality Protection for Bear Creek* Fact Sheet for public comment, of which significant comments and responses to those comments will be documented in the Responsiveness Summary of the ROD."

Response: Clarification provided. The bullet was revised as follows: "…In May 2022, DOE issued a Water Quality Protection for Bear Creek Fact Sheet for additional public comment. Public comments and responses to those comments will be documented in the Responsiveness Summary of the ROD. The EMDF ROD will document acceptance of the selected remedy. …""

2. **Section 1.3, p. 3.** New text clarifies that Bear Creek is on the CWA 303(d) list for mercury, cadmium, PCBs, and nutrients (nitrates and nitrites). Please note that as unavailable parameters as described under TDEC 0400-40-03-.06(2), limits for these parameters must be developed consistent with this regulation. First, while the FFA parties have developed a process for addressing the mercury in the Bear Creek Valley watershed, the "Mercury Management Approach" (MMA) is not addressed in the FFS, yet DOE proposes it in the ROD. The FFS must be updated to describe the MMA component of the remedy, otherwise there is nothing in the Administrative Record to support selecting this MMA. In addition, the FFS and ROD should also address the other parameters besides mercury, including developing a level in the waste water that will not cause "measurable degradation" or add "additional loadings" (the latter, only if bioaccumulative).

   Response: Agree. The mercury management approach was added to the FFS in the new Appendix N.

3. **Section 1.6, p. 10.** New text was added to the last paragraph that states that the ROD for EMDF describes how landfill waste water will be treated prior to release. In this section and throughout the ROD, please remove references to the ROD, since under CERCLA, the FFS is the document that provides the basis for the decisions made in the ROD, not the other way round.[2] Please revise the text to describe how the waste water will be treated prior to release, without reference to or reliance upon the ROD.

   Response: Clarification provided. Throughout the FFS, references to the ROD will be revised to reflect that the ROD follows the FFS, such as "the ROD will document acceptance", or "the ROD will contain", etc.

4. **Appendix K, Section K.1.3.1.2, p. K. 1-14.** Last paragraph, suggested edit: "Instead, the default fish ingestion rate (***TN WQS***) was ~~agreed to be~~ used."

[2] 55 Fed. Reg. 8712, March 8, 1990. ("The primary objective of the FS is to ensure that appropriate remedial alternatives are developed and evaluated such that relevant information concerning the waste management options can be presented to a decision-maker and an appropriate remedy selected.")

Response: Agree.

5. Appendix K, K.1.4.2, p. K. 1-17. This section (or elsewhere in the FFS) also does not explain the use of 17.5 g/day as the fish consumption rate (although in section K.1.4.4, and perhaps elsewhere, the text refers to this as a "default" FCR). The EPA is aware that this is the FCR that TN used to calculate its AWQCs, based on the current Tennessee Fish Consumption Rate at the time the TN WQS were established.,

Response: Agree. The next to last sentence of Section K.1.3.1.2 has been modified to read: "Instead, the TDEC WQS default fish ingestion rate (17.5 grams/day) was used."

6. Appendix K, K.1.4.4, p. K. 1-29. Suggested edit: "Site-specific, protective radiological effluent limits for discharges from EMWMF and EMDF ***will be based on the fish tissue and surface water PRGs***, and in accordance with applicable or relevant and appropriate requirements and CERCLA."

Response: Agree. The suggested text has been incorporated.

7. Section 3.3.3. The proposed location of the EMDF, 7c, is erroneously referred to as West Bear Creek, rather than Central Bear Creek. This occurs at least twice in the text.

Response: Agree. The suggested change was made throughout document.

8. Section 3.3.3. The terminology used in multiple places in this section "screening level discharge limit" should be updated to be consistent with Appendix K. "Preliminary Remediation Goals for fish tissue and surface water", or "water quality-based PRGs for fish tissue and surface water," are recommended and consistent with Appendix K.

Response: Agree. The suggested change was made throughout document.

9. Please ensure that the final WW-FFS Appendix E is consistent with the Mercury Management approach developed by the FFA parties.

Response: The agreed upon version of Appendix E from the D3 is now provided in the D4/R1 FFS.

11. A previously issued EPA comment (email on June 28th) on Appendix K (second bulleted item) beginning with "Section K .1.3.1.2" should be ignored.

Response: Comment will be disregarded.