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Comment Resolution Form

Document Number: DOE/OR/01-2664&D4	Document Title: Focused Feasibility Study for Water Management for the Disposal of CERCLA Waste on the Oak Ridge Reservation, Oak Ridge, Tennessee		
Name of Reviewer: Randy Young	**Organization:** TDEC	**Date Comments are Due:**	**Date Comments Transmitted:** 6/29/2022

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1	Page iv	a. The *Contents* lists an Appendix N, but no such appendix is provided. A complete appendix must be included. b. Appendix N is titled " ... Agreement." There were multiple EIT Agreements. Please include all agreements in this appendix for the administrative record.	a. Agree b. Agree. The Mercury Management Approach for Discharges to Bear Creek—EMDF ROD and the EIT-Developed Adaptive Approach for EMDF Wastewater Management are included in Appendix N.
2	Page x, last bullet	The tri-parties must ensure these EMWMF implementation documents are completed in a timely manner considering the remaining operational life of the landfill.	No response is required.
3	Page 46 next to last paragraph	Please update this language to reflect approval of the ROD amendment in 2016.	Agree. Text was updated.
4	Appendix E general	Given the obvious concerns with the amount of mercury-contaminated waste planned to be generated from UEFPC remediation projects, the state does not support the use of manganese as a surrogate for mercury to calculate a site-specific leaching factor. Per a discussion among the tri-parties on June 23, 2022, the state understands this approach will no longer be used and the methodology employed in the previous FFS versions (D1- D3) will replace Appendix E in a D4/R1 version of the FFS to be submitted in mid-July. In consideration of this, the state is not providing specific comments on the FFS D4 version of Appendix E. Per the agreement discussed June 23, 2022, TDEC also understands DOE will continue efforts to refine the Kd value of mercury.	Agree. Per the 6/23/22 discussion and agreement among the FFA parties, Appendix E was replaced with the version provided in the D1, D2 and D3 versions of the FFS. Text was added to Appendix E describing the continuing efforts to refine the mercury concentrations in the landfill wastewater (leachate and contact water) as follows: **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

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			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..
5	Page K.1-11 Tables K.1.6 through K.1.9	To understand why certain POEs were considered more heavily for risk than others and directly compare BCK 0.7 to the reference site please provide the total weight of the fish.	Agree. Total weight of the fish ~~were~~was provided.
6	Page K.1-13 Tables K.1.11 and K-1.12	Please clarify how the fish catch rate per trip value was calculated by providing a comment on the associated rows explaining how those percentages were derived. Additionally, the text in this section identifies the site-specific fish consumption rate as 11 meals per year but then presents a table showing fish meals calculated for BCK 0.5 (19.3 meals) and BCK 3.3 (11 meals). Explain how these two combine to a site-specific fish ingestion rate of 11 fish meals.	Agree. Notes have been added to explain the derivation of the catch rate per trip. The note for the 11 fish meals in the table explains that it is the average for the entire reach of Bear Creek (BCK 0.5 to BCK 3.3)
7	Page K.1-14 Table K.1.11	The values in the "Edible grams caught" row are carried over from Table K.1.1 O The values should be "49.6 x .43 x 30."	Clarification provided. The value in the 2nd to last row (edible grams caught) under BCK 3.3 equals 49.6 × 0.43 × 30.
8	Page K.1-14 Sect. K.1.3.1.2	Identify the specific default value used in PRG calculation. It is stated the default assumption is 6387 g/year. In Section K.1.7.1.1 the default ingestion rate is defined as 34, 8oz (227g) meals per year, which equates to 7718 g/yr. Please address this discrepancy here and throughout the document.	The default ingestion rate used was 17.5 g/meal × 365 meals/year = 6387 g/year. Section K.1.5.3.1 has “The recreational fisher was evaluated for the consumption of 227 g (8 oz) fish meals. The number of potential meals using the default scenario is 34 per year. The number of potential meals using site-specific assumptions are 30 meals at BFK, and 11 meals at BCK 0.5 - 3.3.”

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9	Page K.1-15 Table K.1.12	While detail is provided in Appendix B, please include a brief summary of the maximum concentrations. A comparison of counts alone between the sample sites negates the levels detected.	Agree. Added new table. Table K.1.13. Summary Statistics for Radionuclides in Fish Fillet Samples from 2021 Spring and Fall Sampling Events. Table is included at the end of the RTCs.
10	Page K.1-16 Sect.K.1.4.2	There appears to be a typo in the definition of SFi, "(pCi- 1)." Is this picocuries per liter (pCi/L) or picocuries raised to the exponent -1? Also, please clarify whether the Exposure Duration of 26 years is based on years of exposure during adult life or the operational period of EMDF.	Agree. The SFi has been corrected to read pCi^{-1} and the ED has now been defined as (26 years—20 years as an adult and 6 years as a child)
11	Page K.1-26 Sect. K.1.4.3.3	A lack of detection in recent fish samples does not necessarily indicate there is no bioaccumulation occurring. It is unknown whether rad was not detected in fish tissue was because no bioaccumulation occurred or because rad was not present in the water column during the lifetime of the fish that were sampled. Please add language clarify this point.	Agree. The last sentence of the paragraph 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."
12	K.1-27 Cesium-137	Cs-137 was infrequently detected in EMWMF discharges and has not been a major contributor to EMWMF waste streams, so it is not surprising there were no detections of Cs-137 in fish tissue from the POEs. However, there have been periodic Cs-137 detections in game fish at the confluence of Poplar Creek and the Clinch River in the last several years, which is downstream of landfill discharges. It is difficult to know from these limited data if the detections at the confluence of Poplar Creek and Clinch River are a result of higher Cs-137 concentrations in surface water in that area or not, but it is indicative that Cs-137 does bioaccumulate in fish in waterbodies associated with the ORR. Given that Cs-137 is considered a major dose contributor at EMDF, please edit the text to discuss the possibility of bioaccumulation with additions of Cs-137 into the EMDF waste stream.	Agree. The following sentences have been added to the end of the second paragraph of this section: Cs-137 has been detected in fish tissue samples collected adjacent to the ORR at the confluence of Poplar Creek and the Clinch River, primarily near the White Oak Dam. Monitoring will be conducted to determine if releases of Cs-137 from EMDF waste streams could result in detections of Cs-137 in Bear Creek fish tissue.
13	Page K.1-28 Plutonium-238 and -239	Despite limited inventory in EMWMF and low mobility of Pu, Pu was still detected in about 0.5% of EMWMF's discharges, and the inventory of Pu in EMDF is likely to be greater (estimated to be	Agree. The following sentence has been added to the end of the second paragraph of this section: "Monitoring will be conducted to determine if releases

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		about 1.7% of the radiological inventory) than what is known in EMWMF. Please address the fact that a larger plutonium inventory for EMDF may result in more plutonium discharges, and thus a greater degree of bioaccumulation in the future.	of Pu-238 from EMDF waste streams could result in detections of Pu-238 in Bear Creek fish tissue.”~~”~~ Similarly, the following sentence has been added to the end of the second paragraph of this section: “Monitoring will be conducted to determine if releases of Pu-239 from EMDF waste streams could result in detections of Pu-239 in Bear Creek fish tissue.”
14	Page K.1-29 Sect. K.1.4.4, first paragraph	Please identify the criteria used to make the determination that levels of radioactivity observed in Bear Creek fish tissue samples present no significant risk to a hypothetical angler.	Agree. The term “significant” has been replaced with “unacceptable” and “(see Sect. K.1.5.8)” has been added to the end of the paragraph.
15	Page K.1-31 Sect. K.1.5.3.1	Add “per year” after “meals” in the third sentence and change “BCK 5 - 3.3” to “BCK 0.5 - 3.3.”	Agree. The suggested changes have been made.
16	Page K.1-33 Table K.1.17	Please add site-specific parameters for East Fork Poplar Creek.	Clarification provided. “Site-specific” parameters were not used at East Fork Poplar Creek, only default parameters.
17	Page K.1-34 Table K.1.19	Please explain why fish numbers were extrapolated to 500m for BCK 0.7 and 1.2km for BCK 3.3 rather than the same length of stream when the actual reaches sampled, 95m and 84m, were similar in length. As currently shown, it appears the expected number of fish at BCK 0.7 is artificially low since numbers were only extrapolated to less than half the stream length as used for BCK 3.3.	Agree. The following text was added as a footnote: “Fish counts were extrapolated from the length of the reach sampled to the length of the POE. BCK 0.7 has limited access and stretches from BCK 0.0 to BCK 0.5 (500m) whereas the BCK POE has greater access and stretches from BCK 3.3 to BCK 4.5 (i.e., 1.2 km).”
18	Page K.1-35 Sect. K.1.5.9	Please define "RGs."	~~Agree.~~Clarification provided.~~-~~ The first use of RG was in Sect. K.1.1, 3rd sentence in the first paragraph, and the acronym is listed on the Acronym Page.~~s has been modified to read “remediation goals (RGs).”~~
19	Page K.2-6 second bullet	Since a limit of mercury at AWQC could appear contrary to the anti-degradation regulations, the document should note that anti-	Agree. The second bullet of section K.2.1.1 was modified to state:

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		degradation compliance is being met through the EIT agreement that will be attached in Appendix N.	• The recreational AWQC of 0.051 µg/L will be applied at the point of discharge (no assimilative capacity will be credited). Anti-degradation requirements for the EMDF will be met through the tri-party mercury agreement attached in Appendix N.
20	Page K.2-8 Sect. K.2.1.3, second paragraph	a. As the EMDF is a new discharge, anti-degradation regulations are applicable to PCBs and a method for compliance with these regulations must be addressed. b. Please elaborate in the last sentence concerning "additional controls" and how this will comply with anti-degradation requirements. c. A PCB sampling method must be employed to ensure detection below AWQC in compliance with anti-degradation.	a, b, and c. Agree. The following text was added following the second paragraph. "As described in the EMDF Record of Decision (ROD), because the EMDF is a new discharge, the U.S. Department of Energy (DOE) will ensure applicable and relevant and appropriate requirements are met (or waived consistent with terms of any waivers). PCB levels in Bear Creek from EMWMF are currently below reported detection limits. Since DOE anticipates significantly less PCB disposal at EMDF than EMWMF, DOE does not anticipate additional loading of PCBs.~~As described in the EMDF ROD, because the EMDF is a new discharge DOE will ensure ARARs are met (or waived consistent with terms of any waivers). PCB levels in Bear Creek from EMWMF are currently below reported detection limits. Since DOE anticipates significantly less PCB disposal at EMDF than EMWMF, DOE does not anticipate additional loading of PCBs.~~ DOE will continue PCB monitoring efforts, utilizing sufficiently sensitive analytical test methods approved under 40 CFR Part 136 that are capable of detecting and measuring the pollutants at, or below, the applicable water quality criteria limits. In the event PCBs are detected in EMDF effluent at the applicable

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			AWQC, a compliance program and schedule will be implemented.”
21	Page K.2-8 Sect.K.2.1.4, last sentence	Does cadmium not require additional controls because it is not expected in the waste inventory? If so, please state this.	Agree. Additional clarifying text was added.
22	Page K.2-9 Sect.K.2.2, fourth paragraph	Delete the first sentence. This is not part of any EIT agreement and standard practice is the application of monthly limits. See Tenn. Comp. R. & Regs. § 0400-40-05-.08(1).	Clarification provided. The text was revised to state: “Compliance with these non-radiological discharge limits will be determined by the average discharge over a specific time period.” The phrase “expected to be six months” was deleted~~.”~~, but longer periods of averaging were discussed within the project team.
23	Page K.2-10 last sentence	Change "lowest" to "most stringent."	Agree. Text revised as suggested.

Table K.1.13. Summary statistics for radionuclides in fish filet samples from 2021 spring and fall sampling events

Chemical	Units	Freq. of Detection	Detected			Freq. of Detection	Detected			Freq. of Detection	Detected		
			Min	Mean	Max		Min	Mean	Max		Min	Mean	Max
		BFK 7.6				*BCK 0.5 and BCK 3.3*				*EFK 0.0*			
Americium-241	pCi/g	1/19	0.042	0.042	0.042	1/37	0.042	0.042	0.042	0/20	--	--	--
Carbon-14	pCi/g	1/19	5.08	5.08	5.08	1/37	4.88	4.88	4.88	5/20	5.21	9.7	23.2
Chlorine-36	pCi/g	0/19	--	--	--	2/37	0.382	0.583	0.784	0/20	--	--	--
Lead-210	pCi/g	2/19	0.081	0.086	0.091	5/37	0.078	0.194	0.483	3/20	0.138	0.315	0.449
Plutonium-238	pCi/g	0/19	--	--	--	1/37	0.005	0.005	0.005	0/20	--	--	--
Radium-226	pCi/g	3/19	0.131	0.211	0.294	9/37	0.042	0.296	1.89	10/20	0.045	0.114	0.277
Radium-228	pCi/g	5/19	0.172	0.392	0.677	12/37	0.103	0.252	0.625	5/20	0.117	0.389	1.3
Strontium-90	pCi/g	4/19	0.204	0.295	0.348	3/37	0.33	0.354	0.372	2/20	0.14	0.179	0.218
Thorium-228	pCi/g	0/19	--	--	--	0/37	--	--	--	1/20	0.035	0.035	0.035
Thorium-230	pCi/g	6/19	0.056	0.083	0.12	4/37	0.068	0.093	0.115	10/20	0.027	0.059	0.163
Tritium	pCi/g	0/19	--	--	--	2/37	1.65	2.34	3.02	0/20	--	--	--