STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
Richland Field Office
3100 Port of Benton Blvd., Richland, WA 99354 • 509-372-7950

October 23, 2025 25-NWP-175

Anders J. Wiborg, Director
Tank Farms Program Division
Hanford Field Office
United States Department of Energy
PO Box 550
Richland, Washington 99352

Re: Transmittal of the Department of Ecology's Review Comment Record (RCR) for the *Waste Management Area A-AX Performance Assessment Maintenance Plan*, RPP-PLAN-66963, Rev. 0

Reference: See page 2

Dear Anders J. Wiborg:

The Department of Ecology (Ecology) is transmitting comments for the *Waste Management Area A-AX Performance Assessment Maintenance Plan*, RPP-PLAN-66963, Rev. 0 (Reference 1).

Ecology is required to review and comment (if needed) on any primary or secondary documents submitted for the Tri-Party Agreement. We appreciate your review of the enclosed RCR comments and look forward to resolving them at your earliest convenience.

If you have any questions, please contact George Peck, Cleanup Section Toxicologist, at george.peck@ecy.wa.gov or 509-392-1558 or Luissa Johnston, Tank System Operations and Closure Coordinator, at luissa.johnston@ecy.wa.gov or 509-975-1285.

Sincerely,

Amie Green
Digitally signed by amgr461@ecy.wa.gov
Date: 2025.10.23 15:03:47 -07'00'

Amie Green
Tank Systems Operation and Closure Project Manager
Nuclear Waste Program

lj/bp
Enclosure

cc: See page 2

Reference: Letter 25-TWO-0102, dated September 8, 2025, “The U.S. Department of Energy, Hanford Field Office Transmittal of RPP-PLAN-66963, ‘Waste Management Area A-AX Performance Assessment Maintenance Plan,’ Rev. 0, to Meet Hanford Federal Facility Agreement and Consent Order Interim Milestone M-045-102”

cc electronic w/ enc:

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Environmental Portal
Hanford Administrative Record
Hanford Facility Operating Record
H2C Correspondence Control
HAB Correspondence Control
HMIS Correspondence Control
USDOE Correspondence Control

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Document Manager	Telephone Number	Project Manager	Telephone Number	Facility Site ID	Cleanup Site ID
Luissa Johnston	509-975-1285	Amie Green	(509) 316-6873		

Item No.	Pg. # Sec. # Para./Sent.	Comment or Question	Modification Needed	Basis/Justification	Permittee Response	Ecology Response	Open/Close	Reviewer Initials
1.	Page 1-1 Section 1.0 Introduction Paragraph 1	Text states: "…Hanford Field Office (HFO) will be conducting performance assessment (PA) maintenance activities for Waste Management Area (WMA) A-AX PA, RPP-ENV-64037, *Waste Management Area A-AX Performance Assessment for Closure: Volume 4 – Post-Closure Analysis of Waste Residuals: Radionuclides*." Why is the scope of HFO PA Maintenance Activities for WMA A-AX limited to Post-Closure Analysis of Waste Residuals: Radionuclides (RPP-ENV-64037 Volume 4)? ECY would like a PA Maintenance Plan that covers all pathways and contaminants of concern, both radiological and non-radiological. The HFFACO, Appendix I, requires this broad coverage.	An explanation why the current PA Maintenance Plan does not cover all pathways and contaminants of concern, both radiological and non-radiological. In other words, ECY would like an explanation why the current PA Maintenance Plan lacks the requirements set forth in the HFFACO, Appendix I, requiring that the SST system closure plan performance assessments ***will be protective of human health and the environment for all contaminants of concern, both radiological and non-radiological***.	**Appendix I, Section 2.5 Performance Assessment**. Ecology, as the lead agency for SST system closure, EPA, and DOE have elected to develop and maintain as part of the SST system closure plan one performance assessment for the purposes of evaluating whether SST system closure conditions are protective of human health and the environment for all contaminants of concern, both radiological and non-radiological. DOE intends that this performance assessment (PA) will document by reference relevant performance requirements defined by RCRA, HWMA, Clean Water Act, Safe Drinking Water Act, and the Atomic Energy Act of 1954 (AEA) and any other performance requirements that might be ARARs under CERCLA. The PA is of larger scope than a risk assessment required solely for non-radiological contaminants. The PA is expected to provide a single source of information that DOE can use to satisfy potentially duplicative functional and/or documentation requirements.				
2.	Page 1-2 Section 1.0 Introduction	Text states: "The volumes associated with landfill closure requirements under DOE O 435.1, DOE M 435.1-1, and DOE-STD-5002-2017 are Volumes 1 and 4." Why are DOE O 435.1, DOE M 435.1-1, and DOE-STD-5002-2017 being used	DOE O 435.1, DOE M 435.1-1, and DOE-STD-5002-2017 do not directly address landfill closure requirements. Modify text to address "clean closure" as primary closure pathway keeping landfill closure as an alternate path.	DOE O 435.1 does not address landfill closure requirements (the word "landfill" does not appear in this document). DOE M 435.1-1 does not address landfill closure requirements (the word "landfill" does not appear in this document). DOE-STD-5002-2017 does not address landfill closure requirements ("landfill" in key word search shows up only incidentally and not with any reference to landfill closure).				

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		as examples for landfill closure? The WMA A-AX does not currently have a "landfill closure" designation. NOTE: "landfill" occurs three times in the document (pages 1-2, 2-1, and 2-5)						
3.	Page 1-4 Section 1.1 Background	Text states "Under the closure configuration, the tanks will be filled with grout, and an engineered closure cap (Modified RCRA Subtitle C Barrier) will be emplaced over the WMA." Are the DOE models discussed here incorporating the time interval before a barrier and grouting are installed during closure in 2074?	DOE models do not consider current un-grouted tanks and lack of a barrier to precipitation and how the interval of time between now and when tanks are finally grouted and a barrier is installed in 2074.	The most recent milestones for closure dates [**M-045-00** Complete the closure of all Single Shell Tank Farms. 01/31/2043] for barriers and grout suggest that they will not be in place for decades, with the final closure barrier to be constructed in 2074. That means that infiltration of precipitation will continue unabated through the graveled surface of the A-AX tank farms (estimated at 10 cm/yr), and water intrusion into un-grouted tanks will continue until the time of closure. Are the DOE models discussed here incorporating the time interval for a barrier and grouting before closure in 2074? Until a barrier is applied, the high infiltration rates will result in additional transport of contaminants in the subsurface.				
4.	Page 1-4 Last Paragraph	Text reads "The final closure barrier is expected to also cover adjacent DSTs supporting Hanford's tank waste treatment mission and is therefore not expected to be constructed until the Hanford tank waste treatment mission is completed in approximately 2074"	Clarify term "final closure barrier" to address if this is the "landfill closure" or a final barrier placed after clean closure for WMA A-AX is achieved.	Clarification of term.				
5.	Page 1-7 Closure/Post-Closure Activities	Second bullet states "Construct the final closure barrier over the WMA".	Clarify term "final closure barrier" to address if this is the a final barrier placed after clean closure for WMA A-AX is achieved or	Clarification of term.				

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			a barrier constructed after "landfill closure" is achieved (if permitted).					
6.	Page 1-9 Section 2.0 Key Assumptions Paragraph 1	Text states "The tank closure PA for WMA A-AX makes a number of assumptions about the evolution of the engineered and natural system after closure." What type of closure is being assumed here? The regulatory standards, assumptions, models, model results, etc. are different when clean closure (unrestricted land use) vs. landfill closure is assumed.	State explicitly the context for the assumptions being considered.	Clear and complete expression of language that gives full transparency of intention.				
7.	Page 1-9 Section 2.0 Key Assumptions Paragraph 2	Key assumptions, evolution of safety functions, "Expected Grout Performance Reference Case" and "pessimistic bias" Invoking optimistic vs pessimistic (dichotomous) descriptions clouds the logic of the narrative with emotionally charged language. Scientific documents should be free of appeal to emotion, whether intentional or unintentional. Adding emotional language distracts from the theoretical underpinnings of the situation as well as the data and its interpretability. There are a spectrum of outcomes depending on future events and are getting	ECY does not support the use of the term "pessimistic bias" that is used in DOE-STD-5002-2017. A more open and holistic approach to models, with discussions to include model over fitting vs under fitting should be the approach.	Alignment with global trends in model generation and analysis is needed.				

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		increasingly difficult to predict, even with probabilistic models.						
8.	Page 2-2 Section 2.1.1 and Section 2.1.2	Assumptions in the WMA A-AX PA model do not address the new changes in waste volumes post-retrieval operations and the PA needs to be re-evaluated with current known waste volumes and constituents.	PA needs to be re-evaluated with current known waste volumes and constituents.	Update Information for analysis and risk assessment.				
9.	Page 2-2 Section 2.1 Assumptions that must be protected	Section 2.1.1 Residual Waste Volume. The key assumption here is that the residual waste volume for unretrieved SSTs in the WMA A-AX PA model "assumed that retrieval would achieve a residual waste volume equal to 360 ft^3 or less." Section 2.1.2 Residual Waste Inventory. The key assumption here is that "…the post-retrieval concentrations of each constituent in the residual waste was equal to the pre-retrieval concentration estimate, which may be derived from collected samples from the tank, collected samples from tanks containing similar waste, or estimated using process knowledge and process history." Section 2.1.3 Long-Term Climate. This key	Each section needs to explicitly state what the key assumption being protected is.	Documents written using language that is clear, lucid, and to the point, and free of burdensome or extraneous narrative.				

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		assumption is "…that long-term climate can be estimated using historical trends in regional climate." This is a poor assumption. Climate may behave in a non-linear way as more heat trapping gases are introduced into the atmosphere. Non-linear dynamics may evolve into a system that can be described as chaotic. E.g., chaotic systems seem deterministic in principle, but the outcomes of their long-term evolution are impossible to predict (years to decades). Section 2.1.4 Engineered Barrier Design and Performance. It is unclear what the key assumption is. Is it that the final barrier will last at least 500 yrs? Is it that the net infiltration through the barrier will increase as a step function? Is it that "… the final barrier design for WMA A-AX closure will meet the design requirements and that the designed barrier is properly constructed to at least achieve the performance specification."? Section 2.1.5 Closure Grout Design and Performance. Is the key assumption here that "… the grout added to large voids in the SSTs and ancillary equipment may not						

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		be robust enough to mitigate against an inadvertent intrusion into the waste for 500 years,"? It is not clear what key assumption is being protected. Section 2.1.6 Duration of Institutional Controls and Intruder Protections. Is the key assumption here that "… the Hanford Site Central Plateau will be maintained under an Industrial Exclusive land use indefinitely."? Is it "… the WMA A-AX PA inadvertent intruder analysis assumes that institutional controls will prevent a member of the public from drilling into un-grouted source terms in WMA A-AX until calendar year 2278."? Is it that "… a well driller would recognize the presence of non-native material for a period of at least 500 years after closure and would stop to investigate the discovery of non-native material in the drill cuttings."?						
10.	Page 2-2 Section 2.1.4 Engineered Barrier Design and Performance	Section 2.1.4 Engineered Barrier Design and Performance. Paragraph 2 states "The barrier design was also assumed to render the residual tank waste at least 15 ft below present-day ground surface, eliminating a residential excavation scenario and a construction	Add needed details for more complete understanding of Section 2.1.4.					

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		excavation scenario from the inadvertent intruder analysis." This statement needs more details to be understood. What does "render" mean in this context? How does the barrier design "render" residual tank waste at or below 15 bgs?						
11.	Page 2-7 Section 2.2.2 Solubility Constraints in the Residual Waste Pore Water	Text states "Solubility limits for chromium and uranium were determined by laboratory studies on samples of waste from WMA C SSTs." What document is being referenced for these solubility studies?	Cite in text the document that reports on the WMA C SST solubility studies.					
12.	Page 2-7 Section 2.2.3 Equivalent Homogeneous Media	The soils beneath WMA A-AX are not equivalent to those beneath WMA C. Text states that the assumption of equivalent homogeneous media had a "small impact" on simulated groundwater concentrations. How small was the impact?	Give evidence backing up the contention that soils beneath WMA A-AX are the same as those beneath WMA C. Cite a reference or report explaining why the assumption that a homogeneous vadose zone flow and transport is equivalent to the heterogeneous case. Address the "small impact" comment by giving specifics.	Needed details to evaluate arguments in text.				

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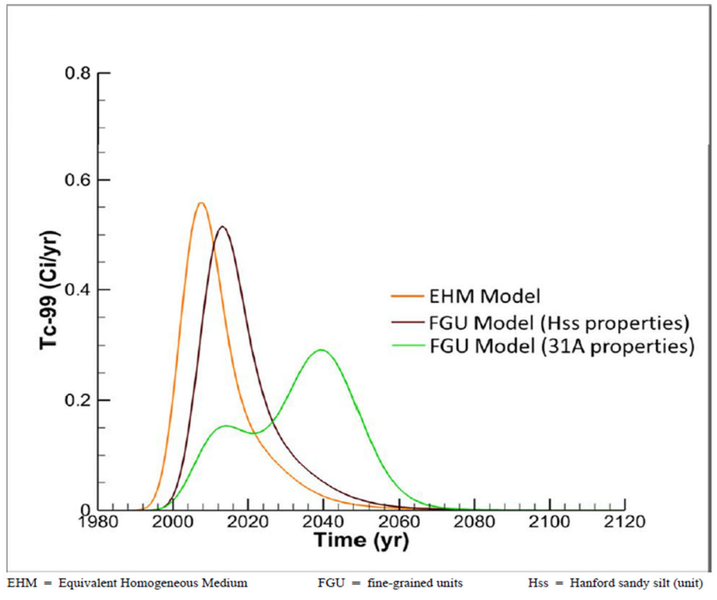
13.	Page 2-7	The vadose zone beneath WMA C and A/AX are not equivalent.	Perform sensitivity and uncertainty analysis on WMA A/AX/	Heterogeneity was not evaluated in the PA study because results at WMA-C showed concentrations to be less conservative. The assessment should evaluate heterogeneity at A-AX via sensitivity or uncertainty analysis, given its differing vadose zone geology, unless a justification can be provided. **Figure 7-5. Mass Flux Arriving at the Water Table Showing the Effect of Hss and 31A Hydraulic Properties Used for the Fine-Grained Units.**  EHM = Equivalent Homogeneous Medium FGU = fine-grained units Hss = Hanford sandy silt (unit) RPP 27195 Sunil Mehta modeling report				
14.	Page 2-7 Section 2.2.4 Vadose Zone Hydraulic Properties	Text states “It is assumed that the hydraulic properties collected for the soil samples at the Integrated Disposal Facility are applicable to similar soil types below WMA A-AX.” What evidence makes this assumption plausible?	Add details to support the assumption.	Added evidence to support argument that soil below IDF is similar to soil below WMA A-AX.				

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15.	Section 3.0	Section does not include any subsurface vadose zone monitoring utilizing drywells and gamma logs.	Include subsurface vadose zone monitoring utilizing drywells and gamma logs.	Revise monitoring plan.				
16.	Page 3-2 Paragraph 4 Sentence 1	Well 299-E25-251 is not included here. Update text per latest groundwater monitoring plan	Update text with recently installed wells	Interim Status CN 1, RCRA-CN-01_DOE/RL-2023-36 Rev 0 includes most recently drilled and accepted wells.				
17.	Page 4-1 Section 4.0 Research and Development	In footnote 8, the text states "Due to the similarity in location and waste type, R&D supporting closure of WMA C, which has a PA reviewed by the LFRG and a Waste Incidental to Reprocessing evaluation reviewed by DOE Headquarters and the U.S. Nuclear Regulatory Commission (NRC), is typically also relevant to the WMA A-AX PA." How similar are WMA C and WMA A-AX?	Somewhere in the document there needs to be a quantitative comparison, parameter by parameter, physical property by physical property, and characteristics by characteristic that shows clearly why this comparison is true. A table comparing the two WMAs with relevant documents referenced would be a good starting point.	Adding details to document that support assertions made within the document.				
18.	Page 4-3 Paragraph 2 Last Sentence	The sentence states: "the closed WMA still complies with all requirements when pessimistic biases for many release processes are simulated."	Reference the logic and documentation supporting this statement.					
19.	Page 5-2 Section 5.2.1 Key Issues and Footnote 12	Text states that "Inventory uncertainty derived from standard deviations reported in the inventory database." Footnote 12 mentions the "Tank Waste Data (BBI)"	The term "standard deviation" is misleading when it is based on the statistical methods used to determine uncertainty estimates for the Best Basis Inventory (BBI, RPP-6924	ECY has ongoing open comments on the mathematical and statistical methodologies underpinning the BBI and its calculations.				

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			Rev.1, 2010, Statistical Methods for Estimating the Uncertainty in BBIs). It would help with reader understanding if a revision included a worked example, following the methods outlined in RPP-6924, to increase reader confidence in the mathematical and statistical methods used to calculate 'standard deviations'.					
20.	Page 6-4 Paragraph 3 Sentence 2	Why is fly ash no longer available?	Give reference.					