



STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

Richland Field Office

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May 16, 2025

25-NWP-069

Ricky Bang, Acting Assistant Manager
Tank Waste Operations
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 *Tank 241-T-101 Intrusion Investigation and Intrusion Response Work Plan*, RPP-RPT-65278, Revision 0

References: See page 2

Dear Ricky Bang:

The Department of Ecology (Ecology) is transmitting comments for the *Tank 241-T-101 Intrusion Investigation and Intrusion Response Work Plan*, RPP-RPT-65278, Revision 0 (Reference 1). Ecology reviewed RPP-RPT-65278 in accordance with the requirements set forth in the Addendum to Agreed Order Docket No. 21304 V.B.1.

Ecology needed additional time to complete our review and transmitted letters regarding our continued review of RPP-RPT-65278 (Reference 2 and 3). Ecology stated we would provide the United States Department of Energy with our comments by May 20, 2025 (Reference 3).

Enclosed is the RCR with Ecology's comments. We appreciate your review of these comments and look forward to resolving them at your earliest convenience.

If you have any questions, contact Luissa Johnston, Tank System Operations and Closure Coordinator, at 509-975-1285 or luissa.johnston@ecy.wa.gov.

Sincerely,

Digitally signed by
Rochette, Beth (ECY)
Date: 2025.05.16 13:21:25
-07'00'

Elizabeth A. Rochette
Cleanup Section Manager
Nuclear Waste Program

lj/bp
Enclosure

cc: See page 2

References:

1. Letter 25-TWO-0002, dated January 16, 2025, "Submittal of RPP-RPT-65278, 'Tank 241-T-101 Intrusion Investigation and Intrusion Response Work Plan,' Revision 0"
2. Letter 25-NWP-023, dated February 5, 2025, "Extension of the Department of Ecology's Comment Review Period for *Tank 241-T-101 Active Ventilation Practicability Evaluation*, RPP-RPT-65234, Rev. 0, and *Tank 241-T-101 Intrusion Investigation and Intrusion Response Work Plan*, RPP-RPT-65278, Rev. 0"
3. Letter 25-NWP-059, dated April 16, 2025, "Additional Extension of the Department of Ecology's Comment Review Period for *Tank 241-T-101 Active Ventilation Practicability Evaluation*, RPP-RPT-65234, Rev. 0, and *Tank 241-T-101 Intrusion Investigation and Intrusion Response Work Plan*, RPP-RPT-65278, Rev. 0"

cc electronic w/enc:

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Thomas Beam, H2C	Susan Coleman, HAB
Shawn Campbell, H2C	David Reeploeg, Hanford Communities
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Mark Knight, H2C	Luissa Johnston, Ecology
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Review Comment Record

Washington State Department of Ecology Nuclear Waste Program

Date: 1/16/2025

Page 1 of 9

-Document Title(s)/Number(s):

Ecology Comments on T-101 Intrusion Investigation – Primary Document

Document Manager	Telephone Number	Project Manager	Telephone Number	Facility Site ID	Cleanup Site ID
Luissa Johnston		Jeff Lyon (retired); unknown		WA7890008967	

Item No.	Pg. # Sec. # Para./Sent.	Comment or Question	Modification Needed	Basis/Justification	Permittee Response	Ecology Response	Open/Close	Reviewer Initials
1.	Page 1 Section 1.0 Paragraph 1 Sentence 1	The text states “Addendum do Agreed Order, Docket Number 21304 (Agreed Order)...”.	Administrative suggestion: should be changed to “Addendum “[to]” Agreed Order...	Needs to have correct text.				JR, CDG
2.	Page 1 Section 1.0 Paragraph 3 Sentence 2	The text states that “Water may intrude from connected transfer lines, diversion boxes, valve pits, flush pits, atmospheric precipitation, as well as other potential sources” What other potential sources are known to have the possibility to encourage intrusion into tanks? Are there other sources of intrusion historically documented in tank 241-T-101 itself?	Clarification. Add detail or historical known information about other potential sources of intrusion and/or specific to tank 241-T-101.	Clarification.				JR
3.	Page 2 Section 1.1 Paragraph 2 Sentence 2	The text states that foam and topcoat pit covers were commonly installed upon the completion of saltwell pumping and the tanks were “planned to be isolated”. What does this mean?	Please clarify what the planning was for isolation? Did it occur? When did it occur? How? What specific measures have been undertaken at tank 241-T-101 to isolate the tank from associated ancillary equipment?	Clarification.				JR
4.	Page 2 Section 1.1 Paragraph 4	The text describes foam being repaired based on inspection results of walkdowns. If a compliance inspection by Ecology were to note damage or bad condition of a foam cover, would a work package be developed to repair the cover and would the results of the repair be documented in the corrective action system (CAS)?	Please clarify if there are other reasons (other than DOE facility walkdowns) that would trigger repair of a foam cover, such as an Ecology Compliance Inspection.	Clarification.				JR
5.	Pg. 4 Sec. 2.2 First Paragraph and	The paragraph discusses how foam degrades over time. There is no clear indication of when these structures were first foamed. It states inspections were	Include approximate lifespan of foam covers. If the lifespan passes, what are the steps for replacing/repairing the foam covers in the	The table below this section (Table 2-1) includes many foam covers that are unsatisfactory in condition				LJ

Review Comment Record

Washington State Department of Ecology Nuclear Waste Program

Date: 1/16/2025

Page 2 of 9

Item No.	Pg. # Sec. # Para./Sent.	Comment or Question	Modification Needed	Basis/Justification	Permittee Response	Ecology Response	Open/Close	Reviewer Initials
	Table 2-1	ongoing since at least 2006. Can a lifespan be provided for these covers?	interim. If no plans are in progress for replacing/repairing the foam covers, a justification as to why is needed.	with a comment of “refoam and coat” since 2018. If the foam covers were taken care of appropriately prior to a intrusion, it may have helped prevent one. More effort should be made to at least “refoam and coat” deteriorated covers before intrusion occurs, not after.				
6.	Page 4 Sec. 2.2 First Paragraph Sentence 2 And Table 2-1	Sentence states that “Degraded foam and topcoat potentially provide more opportunities for water to intrude into the tank”. If intrusion is occurring due to degradation, would that result in accelerated replacement/repair?	Include how intrusion would affect the timeline for interim replacement/repair of the covers.	The table below this section (Table 2-1) includes many foam covers that are unsatisfactory in condition with a comment of “refoam and coat” since 2018. If the foam covers were taken care of appropriately prior to a intrusion, it may have helped prevent one. More effort should be made to at least “refoam and coat” deteriorated covers before intrusion occurs, not after.				LJ
7.	Page 4 Section 2.2 Table 2-1 and Paragraph 2 Sentence 2	Table 2-1 indicates that unsatisfactory pit foam conditions as having significant damage and unsatisfactory conditions dating back to 2016 and the text in the 2 nd sentence of the 2 nd paragraph states “The most recent foam inspection was completed on 10/31/2023 and considered the condition of some of the foamed Tank 241-T-101 structures unsatisfactory.” However, there is no indication that any repairs were made to the foam covers.	Identify what corrective measures were taken since the “significant damage” and “unsatisfactory conditions” were identified from 2016 thru 2023.	Clarification of actions to reduce infiltrations which is one of the primary purposes of the foam covers.				CDG
8.	Page 4 Section 2.2 Table 2-1 and Page 18 Section 3.0, Paragraph 7	<u>Table 2-1</u> The table shows that since 2016 there was significant damage to the foam structures, or that they were otherwise considered to be in unsatisfactory condition. <u>Page 18, Section 3, Paragraph 7</u> In the seventh paragraph of Section 3.0 the text reads “some fraction of the tank	Explain why the foam covers were not repaired sooner.	Clarification.				JR

Review Comment Record

Washington State Department of Ecology Nuclear Waste Program

Date: 1/16/2025

Page 3 of 9

Item No.	Pg. # Sec. # Para./Sent.	Comment or Question	Modification Needed	Basis/Justification	Permittee Response	Ecology Response	Open/Close	Reviewer Initials
		241-T-101 foam was judged to be in unsatisfactory condition since 2016. Why were the foam structures and covers not repaired sooner?						
9.	Page 5 First Paragraph	The paragraph below Figure 2.2 states that a few T-101 structures had standing water accumulation. As it has been determined that this tank has intrusion, it would counter the statement made in the FY2023 Interim Surface Barrier Annual Report that claimed that the interim barriers worked.	Covers modifications are needed for foam tops to prevent standing water if they are being used.	It is evident that via either degradation or poor design, intrusion is occurring in tanks with foam tops. It seems prudent to address other tanks with foam tops where standing water has been observed to at least provide interim repairs.				LJ
10.	Page 9 Section 2.3 Paragraph 2 Last Sentence	The text reads that “the intrusion rate was estimated to be between 10 and 50 gallons per year...” Over the time period from 1993 to 2014 (21 years) there is an order of magnitude difference between 10 gal/yr and 50 gal/yr. How was the assumed evaporate rate calculated?	Provide a calculation of the assumed evaporation rate or otherwise explain how it was calculated.	Clarification.				JR
11.	Page 12 Section 2.4 Paragraph 1 and Figures 2-15 and 2-16	The text describes the Enraf and liquid observation well as both measuring the same contiguous liquid pool in 2024 and says that the level values should be similar and trend together. A plot/graph is shown for the Enraf data, but a graph of the LOW data is not provided; nor is a discussion provided on the values used to derive the liquid levels. Why is a plot of the LOW data not included in the document and why is there no further discussion of the values used to derive the levels?	Include a plot of the LOW data that measured the same contiguous liquid pool in 2024. Add an explanation or discussion of the values used to derive the liquid levels for both Enraf and LOW.	Clarification.				JR
12.	Page 15 Section 2.4.1 Table 2-2 and Section 2.4.2	Table 2-2 addresses “Average Precipitation” for 2005-2012, 2014-2014, and 2014-2024 compared to increase/decrease in surface level within the tank.	Revise precipitation, infiltration, and intrusion analysis to use daily infiltration data and percolation time-lag analysis and not averages over broad time periods to correctly assess the correlation from individual storm events and potential changes in in-tank surface levels.	Provide correct correlation of daily/storm event precipitation, infiltration time-lag, and surface levels.				CDG

Review Comment Record

Washington State Department of Ecology Nuclear Waste Program

Date: 1/16/2025

Page 4 of 9

Item No.	Pg. # Sec. # Para./Sent.	Comment or Question	Modification Needed	Basis/Justification	Permittee Response	Ecology Response	Open/Close	Reviewer Initials
		<p>However, the potential for infiltration into the subsurface soils and vadose zone from any given precipitation event is a function of the duration of a storm event and the precipitation rate or combinations with snow load and snow melt. These singular events are primary to assessing timeframes for potential infiltration compared to precipitation “average over years” which includes periods of rainfall, dry weather periods, and periods of drought. Utilization of “average over years” for a precipitation and potential infiltration/intrusion analysis is not appropriate correspondences.</p> <p>Any precipitation and infiltration analysis must also include the time-lag for rainfall to occur and percolation thru the soils to the tank dome to then correctly correspond with potential in-tank surface level changes.</p>						
13.	Page 16 Figure 2-18	<p>The graph shows tank 241-T-101 interstitial liquid level data.</p> <p>Each increase in a data point from the previous data point seems to suggest that intrusion possible/or can occur. From this standpoint, it would be important to 1) ensure that surface barriers are effective and 2) retrieve ageing tanks as soon as practicable.</p> <p>How does this document fit within the scope of retrieval of tank 241-T-101?</p>	Explain how the intrusion investigation and intrusion response for tank 241-T-101 fits in with the eventual retrieval and scope of retrieval of tank 241-T-101.	Clarification.				JR
14.	Page 16 Figure 2.18 and Paragraph 2 First Sentence	Is it possible to include a line with precipitation on the same graph?	Modify the graph to show both interstitial liquid level and precipitation	It is hard to use this data to justify the sentence below that claims the interstitial liquid level is not useful for assessing intrusion. Having precipitation on the graph for comparison would help justify this statement.				LJ
15.	Page 16 Section 2.4.2 Paragraph 4	The text reads “Enraf data is measuring the same surface and offers a more	Include the location inside the tank where Enraf data was collected to make figures 2-15 and 2-16.	Clarification.				JR

Review Comment Record

Washington State Department of Ecology Nuclear Waste Program

Date: 1/16/2025

Page 5 of 9

Item No.	Pg. # Sec. # Para./Sent.	Comment or Question	Modification Needed	Basis/Justification	Permittee Response	Ecology Response	Open/Close	Reviewer Initials
	Last Sentence	complete understanding of the conditions”. What is the location within the tank where the Enraf data was collected and shown in figures 2-15 and 2-16 compared to the location of the ILL data within the tank?	Explain the location of the ILL data within the tank.					
16.	Section 3.0 General comment	What is the difference in terminology between “active” and “ongoing” in the context of this document?	Clarification.	Clarification.				JR
17.	Page 18 Section 3.0 Paragraph 2 Sentence 3	The sentence states that “degraded foam is less effective at preventing intrusion” Is there a plan to replace/repair degraded foam site-wide?	Clarify if there is a plan to replace/repair other damaged foam covers site-wide	If degraded foam is less effective at preventing intrusion, it seems logical that the next step would be to repair/replace foam tops that have significant degradation at least.				LJ
18.	Page 17-18 Section 3.0 Paragraph 6 Sentence 4 and Sentence 6	Text on Page 17 reads “Comparisons were made for relative increases, decreases, and amounts of precipitation received.” Text on Page 18 reads “There was no obvious correlation between the level trends and precipitation.” The potential for infiltration into the subsurface soils and vadose zone from any given precipitation event is a function of the duration of a storm event and the precipitation rate or combinations with snow load and snow melt. These singular events are primary to assessing timeframes for potential infiltration compared to precipitation “average over years” which includes periods of rainfall, dry weather periods, and periods of drought. Utilization of “average over years” for a precipitation and potential infiltration/intrusion It is unclear if the precipitation/infiltration analysis used direct 1:1 correlation of time/amount of precipitation for infiltration analysis or	Revise precipitation, infiltration, and intrusion analysis to use daily infiltration data and percolation time-lag analysis and not averages over broad time periods to correctly assess the correlation from individual storm events and potential changes in in-tank surface levels. Provide specifics on data/evidence correlation for time/amount of precipitation and an associated lag/delay to allow moisture to infiltrate the backfill soils to the top of the tank dome and riser connections.	Provide correct correlation of daily/storm event precipitation, infiltration time-lag, and surface levels.				CDG

Review Comment Record

Washington State Department of Ecology Nuclear Waste Program

Date: 1/16/2025

Page 6 of 9

Item No.	Pg. # Sec. # Para./Sent.	Comment or Question	Modification Needed	Basis/Justification	Permittee Response	Ecology Response	Open/Close	Reviewer Initials
		used a time-lag factor considering that there would be a lag/delay from the time of precipitation to the time that the infiltrated moisture could reach the top of the tank dome and riser connections.						
19.	Page 17 Section 3 Paragraph 5	Text reads: "It is difficult to determine if observed droplets are due to intrusion or condensation as both may be occurring simultaneously." Isotope ratios could distinguish rainwater from tank water. Analysis is possible with extremely small sample sizes swabbed from surfaces.	Discuss decision not to sample.	Clarification of analysis and conclusion				JHD
20.	Page 18 Section 3.0 Paragraph 3	Text reads "The available information does not conclusively determine if there is an active or ongoing intrusion occurring in Tank 241-T-101. However, based on the localized nature of droplets on the northwest hatchway, apparent change in stains emanating from Risers 6 and 9, and the magnitude of the average surface level increases after 2014, intrusion has likely occurred since the previous visual inspection in 2014." Conclusion stated in 1 st sentence citing inconclusive determination of intrusion seems to conflict with remainder of paragraph which cites intrusion has likely been occurring since 2014.	If the data, as stated, indicates that intrusion has likely been occurring since 2014 the conclusion of "inconclusive determination of intrusion" is conflicting and potentially inaccurate. Revise text and provide clear content citing how both evidence of intrusion supports the stated conclusion that intrusion can not be confirmed.	Clarification of findings.				CDG
21.	Page 18 Section 3.0 Paragraph 5 "Proposed determination"	Text reads "Evidence supporting an active intrusion into Tank 241-T-101 is not conclusive but does suggest that intrusion is occurring." If there is strong enough evidence to conclude that the data "suggests that intrusion is occurring" how can this then be classified as "not conclusive"?	Provide clarification addressing that there is strong enough evidence to conclude that the data "suggests that intrusion is occurring" and yet the conclusion is that the data/findings are "not conclusive"?	Clarification of assumptions, findings, and conclusions.				CDG
22.	Page 19 Section 4.1 Paragraph 2	Text reads "The primary limiter for applying the foam and acrylic topcoat is the required temperature, and it may take up to 9 months for favorable conditions depending on when the pit or structure is first identified as needing to be foamed." Followed by "Applying foam and	There does not appear to be any designated or specified timeframe for tank farm personnel to repair foam and acrylic topcoats as there are apparent "priority considerations" (which are identified as potentially taking up to 12 months), need to incorporate the repair into an existing or new work package (unspecified	Reassess and reprioritize the urgency to reduce the intrusion abatement for foam and acrylic topcoat degradation/damage.				CDG

Review Comment Record

Washington State Department of Ecology Nuclear Waste Program

Date: 1/16/2025

Page 7 of 9

Item No.	Pg. # Sec. # Para./Sent.	Comment or Question	Modification Needed	Basis/Justification	Permittee Response	Ecology Response	Open/Close	Reviewer Initials
		topcoat to high priority pits or structures could take up to 12 months based on the required planning, weather conditions, and competing foaming priorities.”	time for this action), and finally weather conditions which could allow/preclude repairs after these previous hurdles are completed. A 12-month estimated timeline for a “high priority” pit or structure foam or topcoat repair seems extraordinary for “high priority” work.					
23.	Page 21 Section 5.1 Paragraph 2 First Sentence	Text reads “Section V.D of the Agreed Order requires that an interim surface barrier fully covering the 241-T tank farm be designed and installed.” However, the design for T-Farm does not “fully cover” the 241-T tank farm but is restricted to specific limits beyond the extent of the tanks.	Clarification that the ISB does not “fully cover” the 241-T tank farm but has extent limitations within the defined limits of the tank farm.	Revise text to be correct and accurate.				CDG
24.	Page 21 Section 5.1 Paragraph 2 Sentence 2	Text reads “Interim surface barriers are utilized to prevent the migration of subsurface contamination towards the groundwater.” RPP-5002 Rev. 1 Engineering Report Single-Shell Tank Farms Interim Measures to Limit Infiltration Through the Vadose Zone states that the purpose of the ISBs is to “limit infiltration through the vadose zone” not to “prevent the migration of subsurface contamination” as there are limitations to the lateral and vertical extent of the influence of the ISB for each tank farm.	ISBs are not visioned, designed, or constructed to “prevent the migration of subsurface contamination towards the groundwater” at any SST tank farm and at best “limit infiltration” directly beneath the extent of the ISB noting that there are “edge effects” and “depth limits” to the effectiveness of the ISB. Revise text to correct statement that ISBs “are utilized to prevent the migration of subsurface contamination towards the groundwater” to more correctly reflect that they are to “limit infiltration through the vadose zone”.	Revise text to be correct and accurate.				CDG
25.	Page 21 Section 5.1 Paragraph 2 Sentence 4	Sentence states that other intrusion response actions will not be necessary if the interim surface barrier proposed is installed over the associated structures.	Clarify how the area will be monitored for leaks and intrusions including the justification for/against in-tank or ex-tank monitoring.	Request for clarification.				LJ
26.	Page 21 Section 5.1.1 Paragraph 1 Sentence 4-5 and Page 22 Section 5.1.3 Paragraph 1 Sentence 3-4	Photos taken after an inspection indicate repairs had been made in 2024. Is there no documentation to confirm this is true?	Indicate why there is not documentation of an inspection where repairs had been made.	Section 3.4.1 of RPP-9937 rev 5D indicates that there should be documentation of inspections.				LJ
27.	Page 22 Section 5.2	Text states “The intrusion response actions described in Sections 5.1.1, 5.1.2,	Revise text to continue an intrusion monitoring program and an intrusion response plan until	RPP-9937 and Agreed Order, Docket Number 21304				CDG

Review Comment Record

Washington State Department of Ecology Nuclear Waste Program

Date: 1/16/2025

Page 8 of 9

Item No.	Pg. # Sec. # Para./Sent.	Comment or Question	Modification Needed	Basis/Justification	Permittee Response	Ecology Response	Open/Close	Reviewer Initials
	Paragraph 1 Last Sentence	and 5.1.3 are not necessary if the barrier material is installed over the associated structure.” However, the ISB is limited to the lateral extent of the SSTs and does not completely cover all potential routes of intrusion – as such intrusion monitoring should continue until such time that there is direct consistent evidence that any and all potential infiltration into the vadose zone has been eliminated. If such assurance can not be provided then intrusion monitoring and an intrusion response plan remains a valid requirement.	such time that there is direct consistent evidence that any and all potential infiltration into the vadose zone has been eliminated.					
28.	Page 22 Section 5.2.1 First Paragraph	This paragraph indicates that the tasks suggested in the work plan are to be initiated after barrier installation. How long would these deteriorated structures be left unrepaired/unreplaced?	Clarify how long these deteriorated structures would be left as is and why waiting for the barrier installation is an acceptable approach.	The period of time between approval of barrier design and implementation could potentially be long enough where the risk of intrusion is still high.				LJ
29.	Page 24 Section 5.2.5 Paragraph 1 First Sentence And Paragraph 3 First Sentence	First paragraph states “In accordance with Agreed Order section V.B.2.ii, a final report will be submitted to Ecology that describes the investigation of potential intrusions into Tank 241-T-101 and the response actions implemented.” Third paragraph states “As described in Section 5.2, no response actions are required per this Intrusion Response Work Plan in the event that the interim surface barrier is installed over the identified structures.” Text conflicts with known intrusion conditions and the limitations of the ISBs to prevent infiltration of precipitation and snow melt into the vadose zone.	Revise text to continue an intrusion monitoring program and an intrusion response plan until such time that there is direct consistent evidence that any and all potential infiltration into the vadose zone has been eliminated.	RPP-9937 and Agreed Order, Docket Number 21304				CDG
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Review Comment Record**Washington State Department of Ecology
Nuclear Waste Program**

Date: 1/16/2025

Page 9 of 9

Item No.	Pg. # Sec. # Para./Sent.	Comment or Question	Modification Needed	Basis/Justification	Permittee Response	Ecology Response	Open/Close	Reviewer Initials
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