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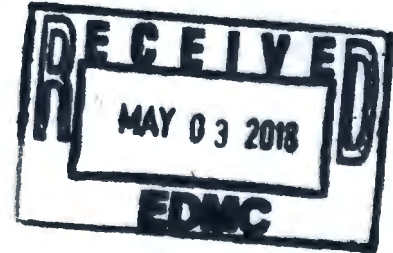
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OFFICE OF RIVER PROTECTION
P.O. Box 450, MSIN H6-60
Richland, Washington 99352

MAY 01 2018

18-TF-0030

Ms. Alexandra K. Smith, Program Manager
Nuclear Waste Program
Washington State Department of Ecology
3100 Port of Benton Blvd.
Richland, Washington 99354



Ms. Smith:

THE U.S. DEPARTMENT OF ENERGY, OFFICE OF RIVER PROTECTION
TRANSMITTAL OF RPP-RPT-60649, *TANK 241-AY-102 MONTHLY MONITORING REPORT
JANUARY 2018*, REV. 00, IN RESPONSE TO SECTION II.B.13 OF THE 241-AY-102
SETTLEMENT AGREEMENT

Reference: Pollution Control Hearings Board, State of Washington, 241-AY-102 Settlement Agreement, PCHB No. 14-041c, signed and submitted September 29, 2014, effective October 2, 2014.

The 241-AY-102 Settlement Agreement (Reference) signed by the parties and submitted to the Pollution Control Hearings Board (Board), became effective upon issuance of the Board's Order dismissing the appeal. The Settlement Agreement required a number of documents and actions regarding Tank 241-AY-102, including the following provision in Section II.B.13:

Monthly: Provide written reports to Ecology on all Tank 241-AY-102 annulus inspection and monitoring results conducted according to the Monitoring Plan (provided under requirement B.7 above) and the SY Settlement Agreement. These documents shall include reporting on annulus ventilation performance and status, images of the annulus, CAM readings, ENRAF readings, CAM and ENRAF calibration results, sample analysis results, waste heat monitoring results, including any interpretations and conclusions based on the results.

The purpose of this letter is to transmit the Tank 241-AY-102 Monthly Monitoring Report for January 2018 to the Washington State Department of Ecology.

Please note that Ecology's January 17, 2018, response (18-NWP-007) to the *Leak Inspection Report for Tank AY-102*, RPP-RPT-60320, acknowledges the satisfactory completion of all applicable requirements of the Settlement Agreement. Therefore, pursuant to Section II.L, the

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Ms. Alexandra K. Smith
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Settlement Agreement has concluded. This January 2018 report will constitute the final monthly report submitted to Ecology.

If you have any questions, please contact Glyn Trenchard, Assistant Manager for Tank Farms, Office of River Protection, at (509) 373-4016, or Jessica Joyner, Environmental Protection, Washington River Protection Solutions LLC, at (509) 376-7533.



Mark A. Lindholm,
President and Project Manager
Washington River Protection Solutions LLC



Brian T. Vance, Manager
Office of River Protection

TF:RLE

Attachment

cc w/attach:

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J.A. Joyner, WRPS
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Administrative Record

Environmental Portal, LMSI
WRPS Correspondence Control

cc w/out attach:

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ATTACHMENT

18-TF-0030

TANK 241-AY-102 January 2018

MONTHLY MONITORING REPORT

RPP-RPT-60713, Rev. 00

Tank 241-AY-102 Monthly Monitoring Report January 2018

Deanna L. Klages

Richland, WA 99352
U.S. Department of Energy Contract DE-AC27-08RV14800

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Key Words: Tank, monthly monitoring report, AY-102, Settlement Agreement PCHB No. 14-041c

Abstract: January 2018 Monthly Monitoring Report submittal for Tank 241-AY-102 Settlement Agreement Section II.B.13 (PCHB No. 14-041c)

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APPROVED
By Janis D. Aerdal at 10:43 am, Apr 12, 2018

Release Approval

Date



Release Stamp

Approved For Public Release

RPP-RPT-60713, Rev. 00

EXECUTIVE SUMMARY

Monthly monitoring reports are generated for Tank 241-AY-102 pursuant to Section II.B.13 of the Settlement Agreement in *Washington River Protection Solutions and U.S. Department of Energy, Office of River Protection v. State of Washington, Department of Ecology* PCHB No. 14-041c, effective on October 2, 2014.

Tank 241-AY-102 tank waste retrieval was shut down on April 30, 2016, so that an additional retrieval technology could be installed. AY-102 retrieval using extended reach sluicers was completed in February 2017.

Environmental Notifications that related to Tank 241-AY-102 operations during the month of January 2018 are detailed in Section 6.0.

Please note that Ecology's January 17, 2018 response (18-NWP-007) to the *Leak Inspection Report for Tank AY-102*, RPP-RPT-60320, acknowledged the timely and satisfactory completion of all applicable requirements of the Settlement Agreement. Therefore, pursuant to section II.L, the Settlement Agreement has concluded. Accordingly, this January 2018 report, will constitute the final monthly report submitted to Ecology.

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ABBREVIATIONS AND ACRONYMS

AY-102	Tank 241-AY-102
CAM	continuous air monitor
Enraf	Enraf-Nonius Series 854
Ecology	Washington State Department of Ecology
Settlement Agreement	<i>Settlement Agreement and Stipulated Order of Dismissal</i>
TOC	Tank Operations Contractor

1.0 INTRODUCTION

1.1 PURPOSE

The January 2018 monthly monitoring report for Tank 241-AY-102 (AY-102) is submitted pursuant to Section II.B.13 of the Settlement Agreement in *Washington River Protection Solutions and U.S. Department of Energy, Office of River Protection v. State of Washington, Department of Ecology* (Ecology) PCHB No. 14-041c, effective on October 2, 2014. This provision states as follows:

Monthly: Provide written reports to Ecology on all Tank 241-AY-102 annulus inspection and monitoring results conducted according to the Monitoring Plan (provided under requirement B.7 above) and the SY Settlement Agreement. These documents shall include reporting on annulus ventilation performance and status, images of the annulus, CAM readings, ENRAF readings, CAM and ENRAF calibration results, sample analysis results, waste heat monitoring results, including any interpretations and conclusions based on the results.

The January 2018 monthly monitoring report contained herein, applies only to AY-102. This report for January 2018 covers the time period from January 1 through 31, 2018. Please note that Ecology's January 17, 2018 response (18-NWP-007) to the *Leak Inspection Report for Tank AY-102*, RPP-RPT-60320, acknowledged the timely and satisfactory completion of all applicable requirements of the Settlement Agreement. Therefore, pursuant to section II.L, the Settlement Agreement has concluded. Accordingly, this January 2018 report, will constitute the final monthly report submitted to Ecology.

1.2 SUMMARY

As described in RPP-PLAN-60074, "Tank 241-AY-102 Monitoring Plan," this document provides the results of visual and video annulus inspections, primary and annulus ventilation performance and status, continuous air monitor (CAM) readings, Enraf¹ readings, CAM and Enraf calibration results, leak detection pit pH and liquid level results, waste temperature monitoring results, and including any interpretations and conclusions based on the results. Monitoring activities during tank pumping operations, as detailed in RPP-PLAN-60074, are also provided in this document. A summary of the visual and video annulus inspections is in Section 2.0, monitoring readings, calibration, and ventilation performance are in Section 3.0, estimate of annulus material volume is in Section 4.0, leak detection pit monitoring is in Section 5.0, and tank pumping operations equipment status is in Section 6.0.

2.0 ANNULUS VISUAL AND VIDEO INSPECTIONS

Visual and video inspections of the AY-102 annulus for the January 2018 reporting period are summarized below.

¹Enraf 854 XTG is a registered trademark of Enraf B.V., Delft, Netherlands.

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Sections II.B.12.a and b of the Settlement Agreement state:

- a. *Every two months: Conduct video inspections of the entire annulus or at least 95 percent of the annulus space.*
- b. *Every two weeks: Conduct video inspections of all currently known waste accumulations in the Tank AY-102 annulus and, as they are discovered, all newly discovered waste accumulations.*

The January 2018 monthly monitoring report includes the results for the video inspections performed every two weeks during January 2018 and the results for the video inspections performed every two months for the December 2017 – January 2018 inspection period.

On June 16, 2016, letter 16-NWP-123, “Department of Ecology Response to Letter 16-TF-0064, Proposed Update to *Tank 241-AY-102 Monitoring Plan*, Rev. 4, RPP-PLAN-60074,” (A.K. Smith, 2016), approved changes to the every two weeks video inspection sites. Operations have transitioned to monitoring only Riser 87 every two weeks. Riser 77 and Riser 83 are now being monitored every two months.

Figure 1 provides riser locations and inspection frequencies. Dates of inspection are provided in Table 1. Pictures of the video inspections performed in December 2017 – January 2018 are provided in Figures 2 through 9.

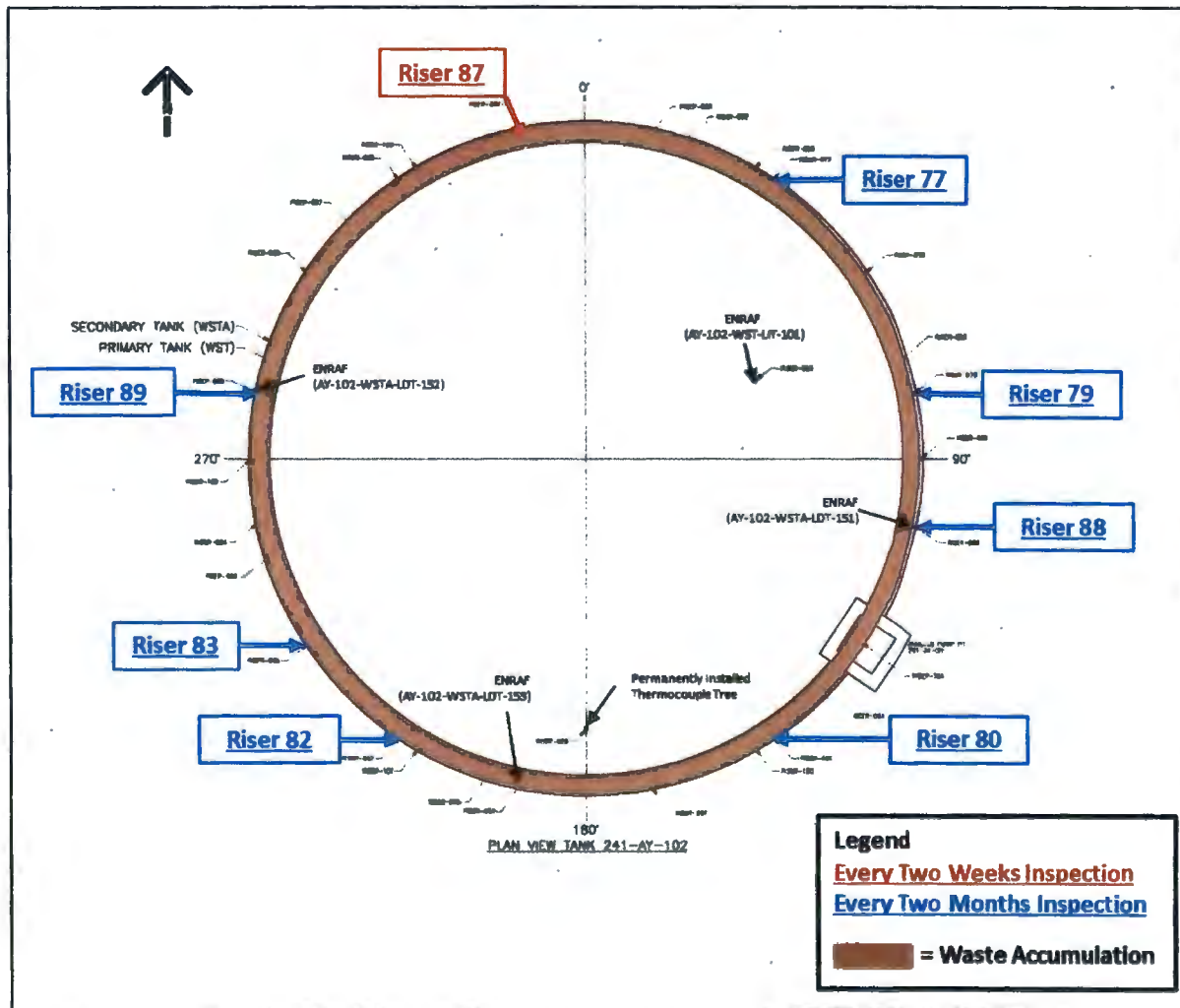
As stated in RPP-PLAN-60610, “Tank 241-AY-102 Contingency Plan – Operations Phase,” three conditions indicating a potential worsening leak rate from the primary tank will be observable through video inspections. The three conditions are evaluated during each video inspection and results are provided in Table 1.

Table 1. Visual Inspection Evaluation of Conditions Indicating a Potential Worsening Leak Rate from the Primary Tank

Condition	Inspection #1 January 8, 2018	Inspection #2 January 22, 2018
Video Evidence of a Change in Condition within the Viewable Ventilation Channels	Ventilation channels were not visible during the video inspection.	Ventilation channels were not visible during the video inspection.
Video Evidence of Significant Waste Accumulation Rate Increase ¹	The average annulus Enraf measurement was 8.45 inches. Slow decrease in level noted due to evaporation and refractory absorption.	The average annulus Enraf measurement was 8.13 inches. Slow decrease in level noted due to evaporation and refractory absorption.
Video Evidence of “Active Flow”	Ventilation channels were not visible during the video inspection. Waste now flows readily through the tank bottom to the annulus.	Ventilation channels were not visible during the video inspection. Waste now flows readily through the tank bottom to the annulus.

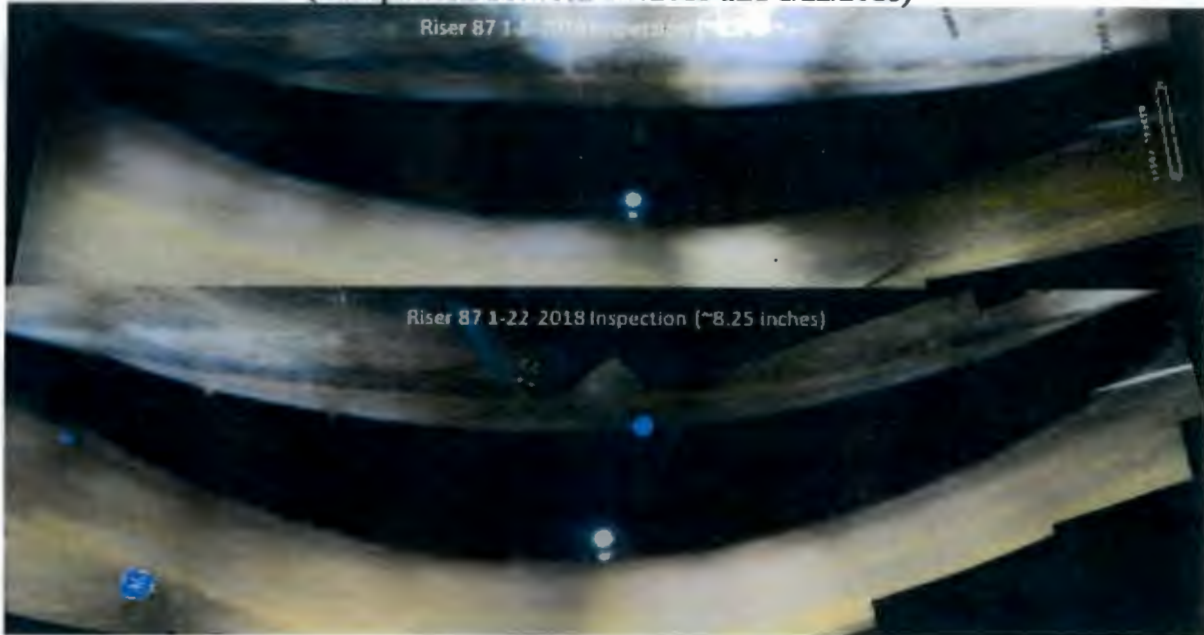
¹ A significant leak rate increase would constitute an order of magnitude volume change between inspection reports, based on video surveillance.

Figure 1. AY-102 Dome Penetration Diagram Showing Inspection Locations

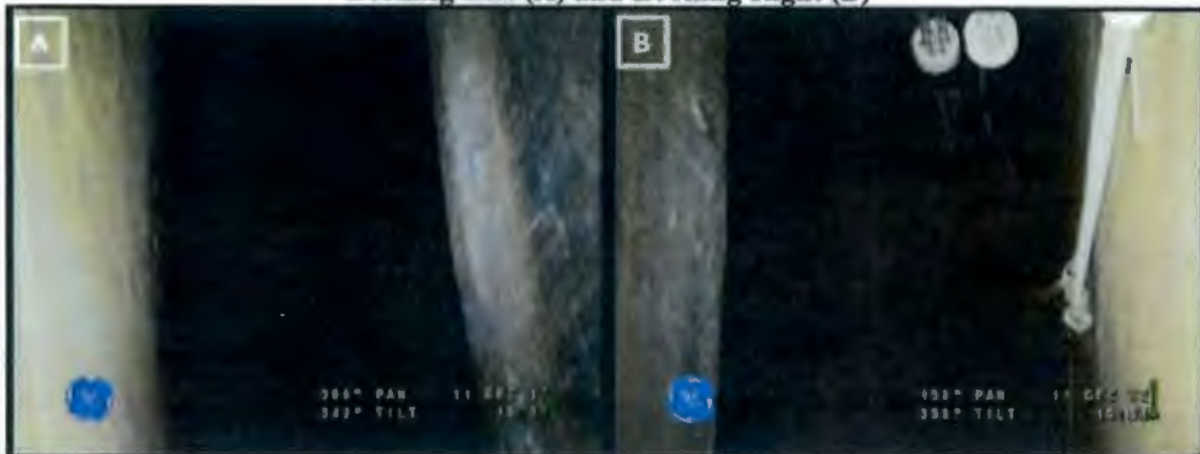


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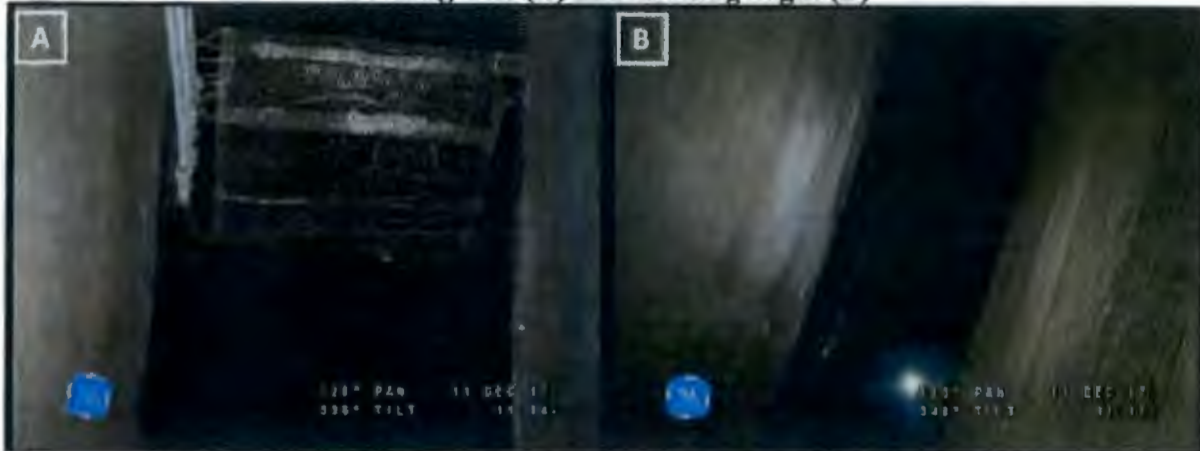
**Figure 2. Waste Accumulation Monitoring through Riser 87
(Comparison between 1/8/2018 and 1/22/2018)**



**Figure 3. General Condition of the Annulus Floor on 12/11/2017 from Riser 77
Looking Left (A) and Looking Right (B)**



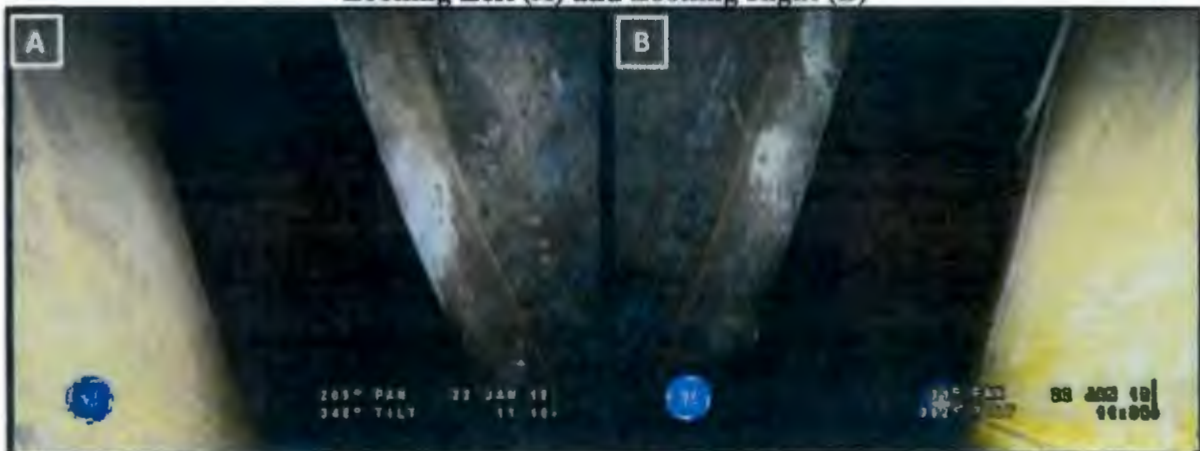
**Figure 4. General Condition of the Annulus Floor on 12/11/2017 from Riser 79
Looking Left (A) and Looking Right (B)**



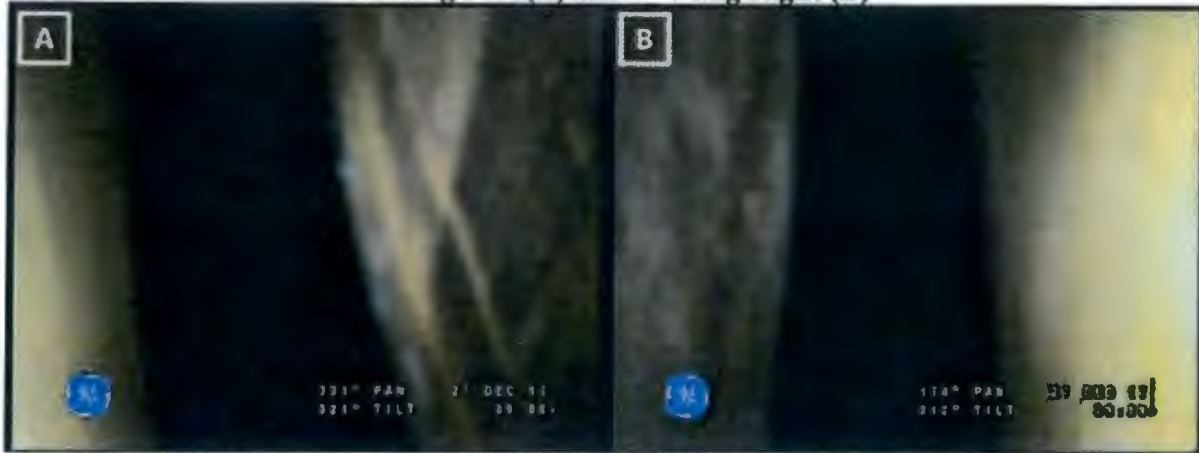
**Figure 5. General Condition of the Annulus Floor on 1/8/2018 from Riser 80
Looking Left (A) and Looking Right (B)**



**Figure 6. General Condition of the Annulus Floor on 1/22/2018 from Riser 82
Looking Left (A) and Looking Right (B)**



**Figure 7. General Condition of the Annulus Floor on 12/27/2017 from Riser 83
Looking Left (A) and Looking Right (B)**



**Figure 8. General Condition of the Annulus Floor on 1/8/2018 from Riser 88
Looking Left (A) and Looking Right (B)**



**Figure 9. General Condition of the Annulus Floor on 1/22/2018 from Riser 89
Looking Left (A) and Looking Right (B)**



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3.0 MONITORING

Table 2 provides AY-102 annulus and primary ventilation performance and status, CAM readings, Enraf readings, CAM and Enraf calibration results, waste heat monitoring results, and interpretations and conclusions based on the monitoring results for January 2018.

Table 2. Summary of January 2018 Monitoring and Calibration for AY-102

Description	Data Source	Instrument(s)	Calibration Results	In Service Dates ²	Interpretations and Conclusions
Primary Tank Surface Level	TMACS	Enraf (Riser 39) AY102-WST-LIT-101	Last: 10/12/17 Next: 9/17/18 Note 1.	1/1-31/18	Level Readings for January ranged between 7.18" and 7.28". The primary surface level was 7.19" on 1/31/18.
Annulus Surface Level	TMACS	Enraf (Riser 88) AY102-WSTA-LDT-151	Last: 9/28/17 Next: 8/24/18 Note 1.	1/1-31/18	Level Readings for January ranged between 8.06" and 8.54". The annulus level was 8.54" on 1/31/18.
		Enraf (Riser 89) AY102-WSTA-LDT-152	Last: 9/7/17 Next: 8/4/18 Note 1.	1/1-5/18 and 1/25-31/18	Level Readings for January ranged between 7.79" and 7.94". The annulus level was 7.79" on 1/31/18. This Enraf was out of service from 1/5/2018 to 1/25/2018 due to a power issue.
		Enraf (Riser 91) AY102-WSTA-LDT-153	Last: 12/21/17 Next: 12/22/19 Note 2.	1/1-31/18	Level Readings for January ranged between 7.90" and 8.39". The annulus level was 7.91" on 1/31/18. Note 3.
Primary Tank Waste Temperatures Note 4.	MCS	Thermocouples at 4" height TE-047 (ALC) TE-074—R 70 TC1 TE-073—R 72 TC1 TE-071—R 40 TC1 TE-062—R 41 TC1 TE-065—R 42 TC1 TE-068—R 43 TC1	Note 1.	1/1-31/18	Average Solid/Sludge Temperature change for January 2018 was -1.5°F (from 66.35 to 67.6°F). The temperatures do not exceed the DST waste temperatures as documented in HNF-IP-1266.
Annulus Leak Detection (CAM)	SACS	Continuous Air Monitor (CAM) AY102-WSTA-CAM-102	Last: 9/3/15 Next: On demand	Not in service.	No readings. CAM was not operated during the month of January. The annulus exhaust is now routed through the AY/AZ primary exhauster. Annulus air no longer is routed past the annulus CAM air inlet.
Description		Percent Operated²	Interpretations and Conclusions		
Primary Tank Ventilation		100%	Dates of Operation: 1/1-31/18.		
Annulus Tank Ventilation		0%	Dates of Operation: Not in service. Note 5.		

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¹Supplemental manual readings taken by calibrated M&TE.

²Equipment is inspected daily in order to maintain operability, including days when equipment is not in service.

³All annulus leak detector alarm settings will be reset due to liquid level drops.

⁴Temperature monitoring is a Technical Safety Requirement Administrative Control Key Element to ensure that waste temperatures do not increase to temperatures greater than that assumed in the Tank Farms DST Time to Lower Flammability Limit analysis.

⁵The annulus exhaust is now routed through the AY/AZ primary exhauster.

4.0 ESTIMATE OF ANNULUS MATERIAL VOLUME

The previous monthly reporting period, December 1 through 31, 2017, estimated approximately 3260 gallons of waste in the annulus at the end of the month. The total estimated material volume in the annulus at the end of the current monthly reporting period, January 1 through 31, 2018, is approximately 3000 gallons as defined in Table 3. Figure 10 shows the total estimated annulus material volume over the last twelve reporting months.

During January 2018, the amount of waste in the annulus remained relatively stagnant as primary tank retrieval has been completed. No annulus pump out events occurred, but a slow level decline is observable and attributed to evaporation and refractory absorption behavior. Annulus level behavior for the month of January 2018 is provided in Figure 11.

Table 3. AY-102 Annulus Enraf Measurements and Estimated Material Volume

Annulus ENRAF Measurements ^a	1/1/2018	Inspection #1	Inspection #2	1/31/2018
		1/8/2018	1/22/2018	
Riser 88 (Inches)	8.56	8.53	8.21	8.05
Riser 89 (Inches)	8.35	OOS	OOS	7.78
Riser 91 (Inches)	8.41	8.37	8.05	7.89
Average Measurement (Inches)	8.44	8.45	8.13	7.91
Estimated Annulus Volume (Gallons)	3250	3250	3120	3000

^aAnnulus Enraf Measurements are obtained from the Surveillance Data Display System.

OOS = Out of Service

Figure 10. Total Annulus Material Volume

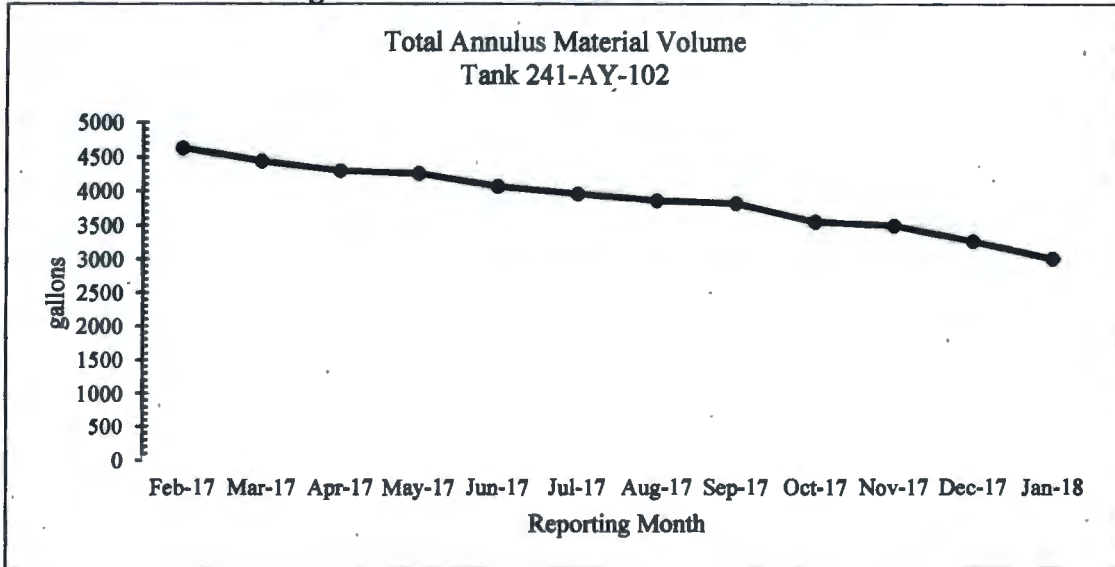
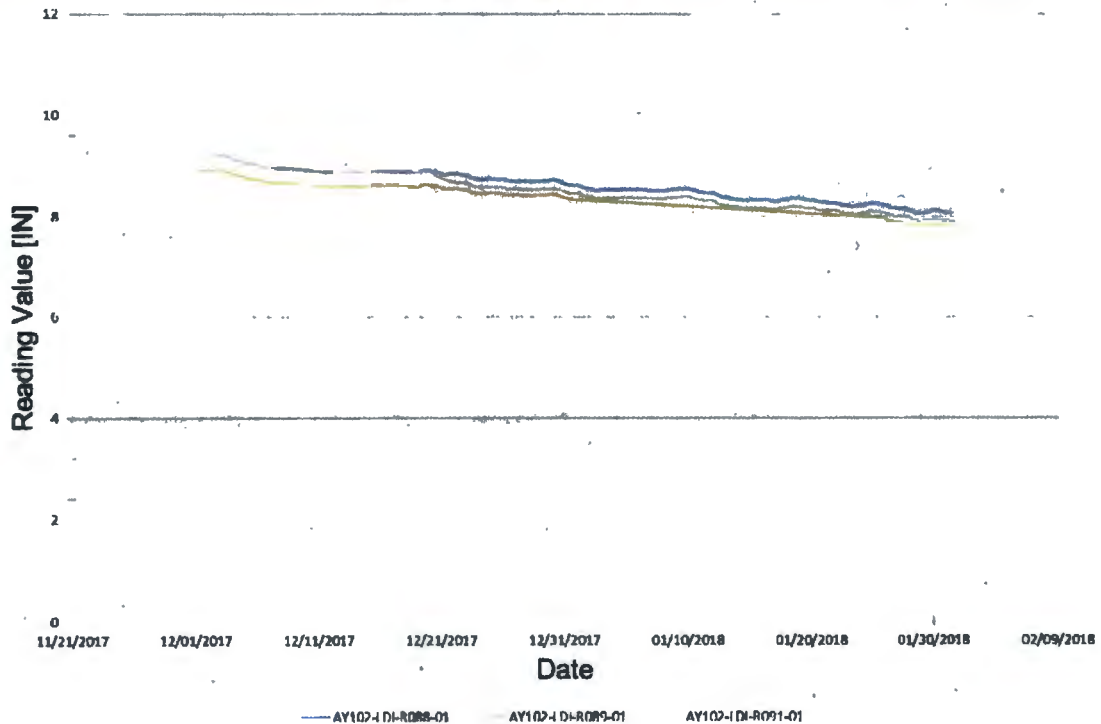


Figure 11. AY-102 Annulus Enraf Liquid Level Readings December 2017 - January 2018
Reading History for AY102



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5.0 LEAK DETECTION PIT PH AND LIQUID LEVEL RESULTS

The AY-102 leak detection pit pH is taken at least monthly and the AY-102 leak detection pit liquid level is taken at least weekly. Results of the first and last readings of the month are given in Table 4.

Table 4. Leak Detection Pit pH and Liquid Level Readings for January 2018

Monitoring	Date	Reading	Interpretations and Conclusions
pH	1-8-2018	5.5	pH is within acceptable range.
Liquid Level	1-2-2018	5.25 in.	Liquid level is within acceptable range. Leak detection pit level readings are obtained weekly using the DRUCK® pressure measuring device using the weight factor dip tubes.
	1-29-2018	5.24 in.	

® DRUCK is a trademark of General Electric.

6.0 TANK PUMPING OPERATIONS

Table 5 provides the environmental notifications announcing the changes in equipment status in January 2018. In service dates for all monitoring equipment is provided in Table 2.

Table 5. Tank Pumping Operations Environmental Notifications

Environmental Notification*	Date	Equipment Status
TOC-ENV-NOT-2018-4459	1-6-2018	On 1-5-2018 at 1405 hours AY-102 Enraf (Riser 89) AY102-WSTA-LDT-152 was not operable. The other two Enrafs were reporting normally and there was no level rise observed. Operation was restored on 1-25-18.

*Waste retrieval was completed in February 2017.

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7.0 REFERENCES

- HNF-IP-1266, "Tank Farm Operations Administrative Controls," as amended, Washington River Protection Solutions, LLC, Richland, Washington.
- Letter, 17-TF-0119, dated December 19, 2017, "The U.S. Department of Energy, Office of River Protection Transmittal of RPP-RPT-60320, *Leak Inspection Report for Tank 241-AY-102*, Rev. 00, in Response to Section II.B.5.c of the 241-AY-102 Settlement Agreement."
- Letter, 18-NWP-007, dated January 17, 2018 "The State of Washington, Department of Ecology, Response to the *Leak Inspection Report for Tank AY-102*, RPP-RPT-60320, Rev. 00."
- RPP-PLAN-60610, 2016, "Tank 241-AY-102 Contingency Plan – Operations Phase," Rev. 02, U.S. Department of Energy, Office of River Protection, Washington River Protection Solutions, Richland, Washington.
- RPP-PLAN-60074, 2016, "Tank 241-AY-102 Monitoring Plan," Rev. 05, U.S. Department of Energy, Office of River Protection, Washington River Protection Solutions, Richland, Washington.
- Smith, A.K., 2016, "Department of Ecology Response to Letter 16-TF-0064, Proposed Update to *Tank 241-AY-102 Monitoring Plan*, Rev. 4, RPP-PLAN-60074," (letter 16-NWP-123 to Lindholm, M.A. and K.W. Smith, U.S. Department of Energy, Office of River Protection, and Washington River Protection Solutions, LLC, June 16, 2016), State of Washington, Department of Ecology, Richland, Washington.