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APR 18 2018

18-TF-0023

Ms. Alexandra K. Smith, Program Manager  
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Department of Ecology  
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Ms. Smith:

THE U.S. DEPARTMENT OF ENERGY, OFFICE OF RIVER PROTECTION  
TRANSMITTAL OF RPP-RPT-60649, *TANK 241-AY-102 MONTHLY MONITORING REPORT  
DECEMBER 2017*, 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 December 2017 to the Washington State Department of Ecology.

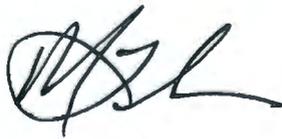
Please note that Ecology's January 17, 2018, response (18-NWP-007) to the *Leak Inspection Report for Tank AY-102*, RPP-RPT-60320, acknowledges the satisfactory completion of all applicable requirements of the Settlement Agreement. Therefore, pursuant to Section II.L, the Settlement Agreement has concluded. However, the U.S. Department of Energy, Office of River Protection and Washington River Protection Solutions LLC will continue to transmit the

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remaining Monthly Monitoring Reports for which the monitoring data and results have already been obtained during the time period preceding the completion of the Settlement Agreement. Accordingly, the 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  
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TF:RLE

Attachment

cc w/attach:

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J.A. Joyner, WRPS  
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M.A. Lindholm, WRPS  
R.B. McPherson, WRPS  
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**Administrative Record**

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**ATTACHMENT**

**18-TF-0023**

**TANK 241-AY-102 December 2017**

**MONTHLY MONITORING REPORT**

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# Tank 241-AY-102 Monthly Monitoring Report December 2017

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

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Abstract: December 2017 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 Mary P. Curry at 2:10 pm, Apr 05, 2018

Release Approval

Date



Release Stamp

**Approved For Public Release**

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## 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.

Tank 241-AY-102 Environmental Notifications during the month of December 2017 are detailed in Table 5.

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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 December 2017 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 December 2017 monthly monitoring report contained herein, applies only to AY-102. This report for December 2017 covers the time period from December 1 through 31, 2017.

### 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, Enraf<sup>1</sup> 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 December 2017 reporting period are summarized below.

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.*

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<sup>1</sup> Enraf 854 XTG is a registered trademark of Enraf B.V., Delft, Netherlands.

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- 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 December 2017 monthly monitoring report includes only the results for the video inspections performed every two weeks in accordance with the Settlement Agreement. The results for the video inspections performed every two months during the December 2017 – January 2018 inspection period will be provided in the January 2018 monthly monitoring report.

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 are provided in Figure 2.

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.

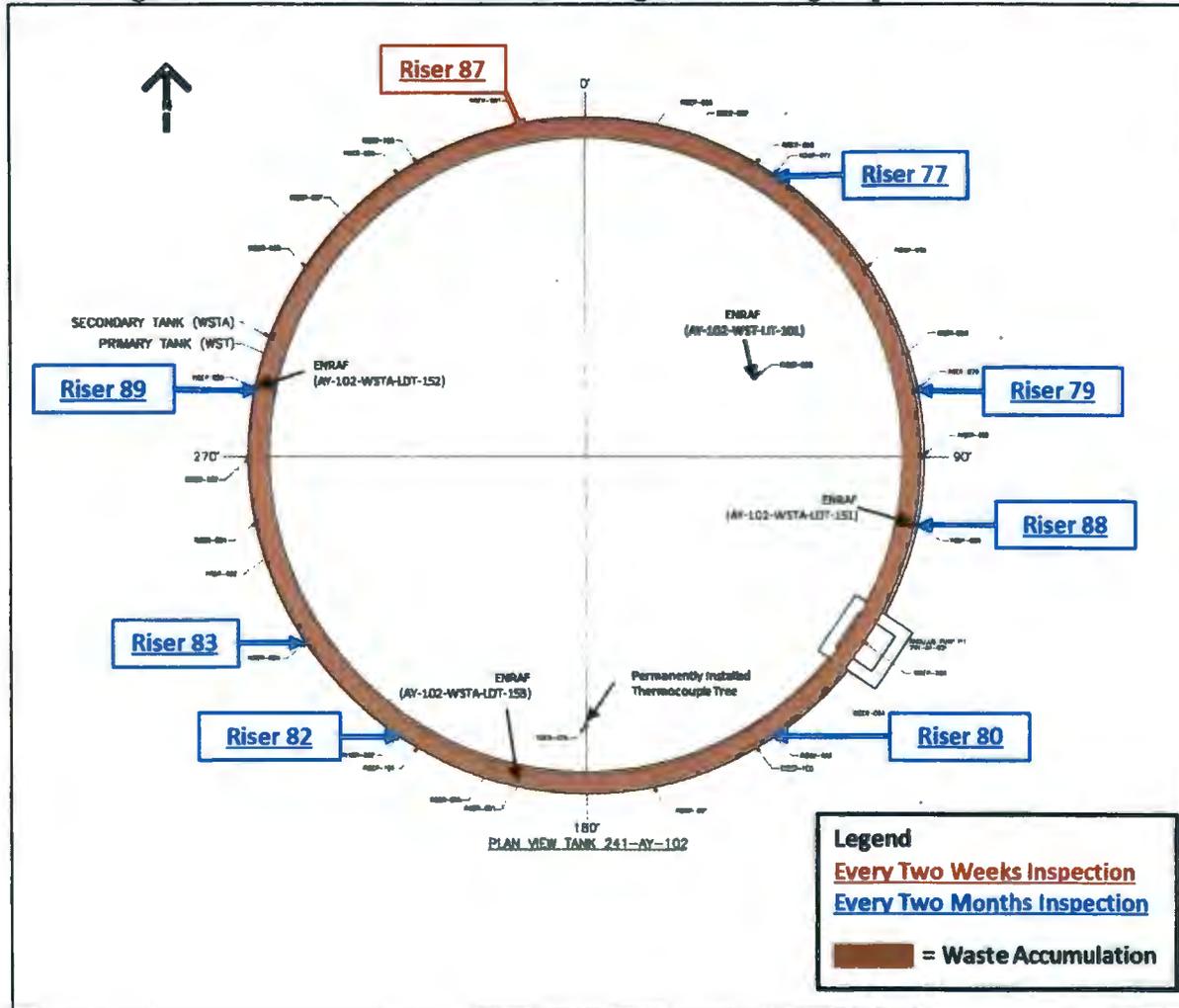
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**Table 1. Visual Inspection Evaluation of Conditions Indicating a Potential Worsening Leak Rate from the Primary Tank**

Condition	Inspection #1 12/11/2017	Inspection #2 12/27/2017
Video Evidence of a Change in Condition within the Viewable Ventilation Channels	Ventilation channels were submerged below annulus waste level during inspection.	Ventilation channels were submerged below annulus waste level during inspection.
Video Evidence of Significant Waste Accumulation Rate Increase <sup>1</sup>	The average annulus ENRAF measurement was 8.74 inches. Slow decrease in level noted due to evaporation and refractory absorption.	The average annulus ENRAF measurement was 8.55 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.

<sup>1</sup>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 12/11/2017 and 12/27/2017)**



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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 December 2017.

**Table 2. Summary of December 2017 Monitoring and Calibration for AY-102**

Description	Data Source	Instrument(s)	Calibration Results	In Service Dates <sup>2</sup>	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.	12/1-31/17	Level Readings for December ranged between 7.15" and 7.26". The primary surface level was 7.26" on 12/31/17.
Annulus Surface Level	TMACS	Enraf (Riser 88) AY102-WSTA-LDT-151	Last: 9/28/17 Next: 8/24/18	12/1-31/17	Level Readings for December were between 8.64" and 9.21". The annulus level was 8.64" on 12/31/17.
		Enraf (Riser 89) AY102-WSTA-LDT-152	Last: 9/7/17 Next: 8/4/18	12/1-31/17	Level Readings for December were between 8.36" and 8.93". The annulus level was 8.36" on 12/31/17.
		Enraf (Riser 91) AY102-WSTA-LDT-153	Last: 12/21/17 Next: 12/21/19  Note 2.	12/22-31/17	Annulus Leak Detector AY102-WSTA-LDT-153 was declared out of service on 8/27/17 due to a loss of electrical power to the ENRAF because of a power outage. The unit was returned to service on 12/22/17. Level readings for December were between 8.49" and 8.68". The annulus level was 8.49" on 12/31/17.
Primary Tank Waste Temperatures Note 3.	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	Supplemental manual readings taken by calibrated M&TE	12/1-31/17	Average Solid/Sludge Temperature change for December 2017 is -1.1° F (from 72.03 to 70.91° 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 <sup>2</sup>	Not in service.	No readings. CAM was not operated during the month of December. The annulus exhaust is now routed through the AY/AZ primary exhauster. Annulus air no longer is routed past the annulus CAM air inlet.
<b>Description</b>	<b>Percent Operated</b>		<b>Interpretations and Conclusions</b>		
Primary Tank Ventilation	93%		Dates of Operation: 12/1-12/17 and 12/13-12/31/17		
Annulus Tank Ventilation	0%		Dates of Operation: Not in Service. Note 4.		

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<sup>1</sup>Supplemental manual readings taken by calibrated M&TE.

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

<sup>3</sup>Temperature 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.

<sup>4</sup>The annulus exhaust is now routed through the AY/AZ primary exhauster.

#### 4.0 ESTIMATE OF ANNULUS MATERIAL VOLUME

The previous monthly reporting period, November 1 through 30, 2017, estimated approximately 3490 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, December 1 through 31, 2017, is approximately 3260 gallons, as defined in Table 3. Figure 3 shows the total estimated annulus material volume over the last twelve reporting months.

Annulus level behavior for the month of December 2017 is provided in Figure 4.

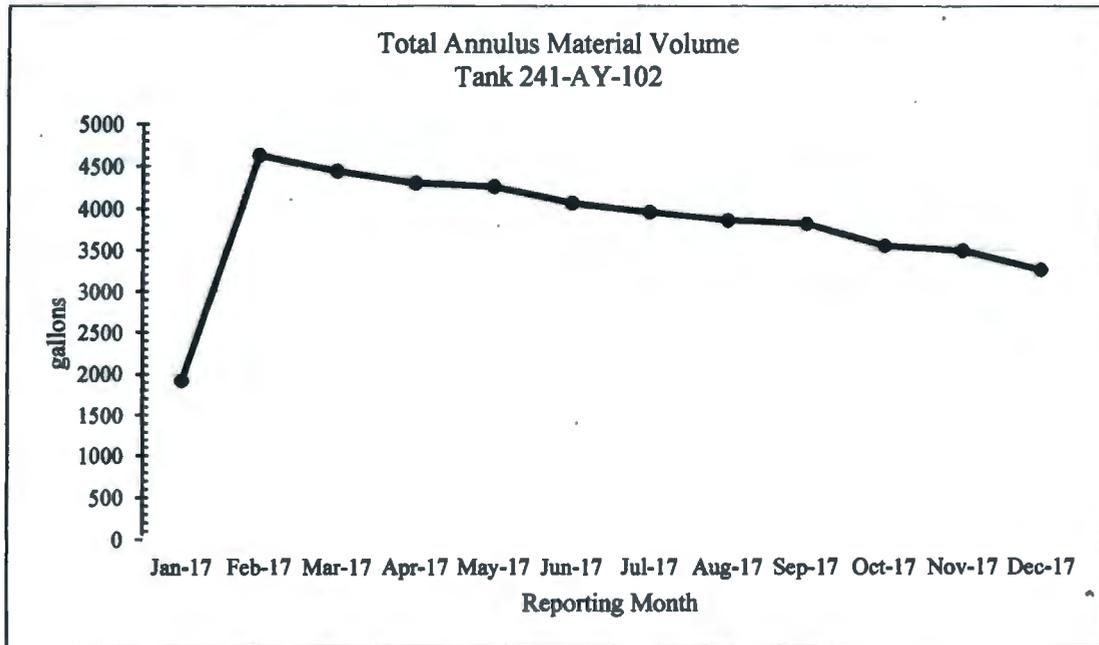
**Table 3. AY-102 Annulus Enraf Measurements and Estimated Waste Volume**

Annulus Enraf Measurements* (inches)	12/1/2017	Inspection #1	Inspection #2	12/31/2017
		12/11/2017	12/27/2017	
Riser 88 (Inches)	9.20	8.88	8.70	8.61
Riser 89 (Inches)	8.93	8.59	8.41	8.34
Riser 91 (Inches)	OOS	OOS	8.54	8.46
Average Measurement (Inches)	9.07	8.74	8.55	8.47
Estimated Annulus Volume (Gallons)	3490	3370	3300	3260

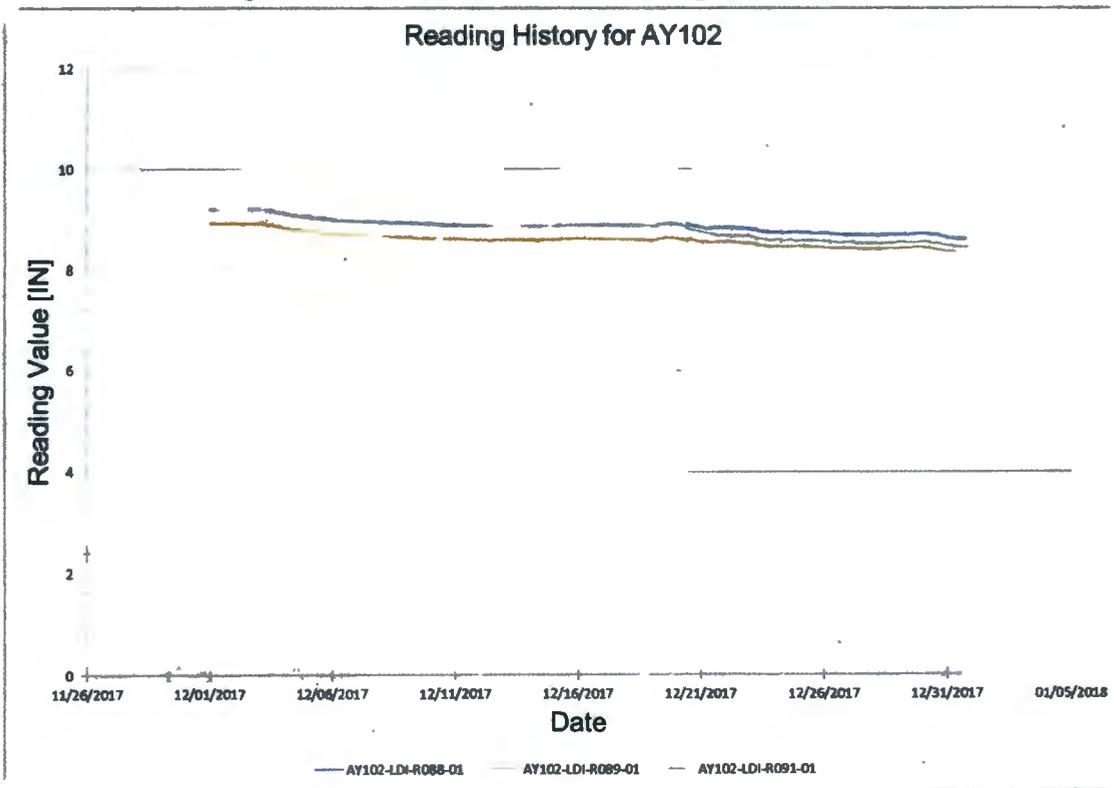
\*Annulus Enraf Measurements are obtained from the Surveillance Data Display System.

OOS = Out of Service

**Figure 3. Total Annulus Material Volume**



**Figure 4. AY-102 Annulus Enraf Liquid Level Readings**



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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 December 2017**

Monitoring	Date	Reading	Interpretations and Conclusions
pH	12-11-2017	6-6.5	pH is within acceptable range.
Liquid Level	12-4-2017	5.61 in.	Liquid level is within acceptable range.
	12-18-2017	5.5 in.	

## 6.0 TANK PUMPING OPERATIONS

Table 5 provides the environmental notifications announcing the changes in equipment status in December of 2017. In-service dates for all monitoring equipment is provided in Table 2.

**Table 5. Tank Pumping Operations Environmental Notifications**

Environmental Notification	Date	Equipment Status
None*	N/A	N/A

\*Waste retrieval was completed in February 2017.

## 7.0 REFERENCES

HNF-IP-1266, "Tank Farm Operations Administrative Controls," as amended, Washington River Protection Solutions, LLC, Richland, Washington.

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.