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

16-TF-0052

MAY 18 2016

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EDMC

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-59321, *TANK 241-AY-102 MONTHLY MONITORING REPORT MARCH 2016,* REV. 01, 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 requires a number of documents and actions regarding Tank 241-AY-102, including the following item 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 March 2016 to the Washington State Department of Ecology.

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If you have any questions, please contact Thomas W. Fletcher, Assistant Manager for Tank Farms, Office of River Protection, at (509) 376-3434, or Jessica Joyner, Environmental Protection, Washington River Protection Solutions LLC, at (509) 376-7533.

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

Kevin W. Smith, Manager
Office of River Protection

Attachment

cc w/attach:
N.M. Menard, Ecology
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S.B Cherry, WRPS
N.R. Davis, WRPS
R.E. Gregory, WRPS
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S.P. Guillot, WRPS
J.A. Joyner, WRPS
M.F. Tavelli, WRPS
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R.B. McPherson, WRPS
R.J. Sams, WRPS
D.K. Smith, WRPS
D.W. Strasser, WRPS
T.R. Williams, WRPS
Administrative Record
Environmental Portal, LMSI
WRPS Correspondence Control

ATTACHMENT

16-TF-0052

TANK 241-AY-102 MARCH 2016

MONTHLY MONITORING REPORT

DOCUMENT RELEASE AND CHANGE FORM

Prepared For the U.S. Department of Energy, Assistant Secretary for Environmental Management
By Washington River Protection Solutions, LLC., PO Box 850, Richland, WA 99352
Contractor For U.S. Department of Energy, Office of River Protection, under Contract DE-AC27-08RV14800

Release Stamp

DATE: May 17, 2016 HANFORD RELEASE

1. **Doc No:** RPP-RPT-59321 **Rev.** 01

2. **Title:**
Tank 241-AY-102 Monthly Monitoring Report March 2016

3. **Project Number:** ☐ N/A
T1P97

4. **Design Verification Required:**
☐ Yes ☒ No

5. **USQ Number:** ☒ N/A
RPP-27195

6. **PrHA Number** **Rev.** ☒ N/A

Clearance Review Restriction Type:
public

7. **Approvals**

Title	Name	Signature	Date
Clearance Review	WASHINGTON, MARGUERITE	*WASHINGTON, MARGUERITE*	05/17/2016
Document Control Approval	WASHINGTON, MARGUERITE	*WASHINGTON, MARGUERITE*	05/17/2016
Originator	WILLIAMS, TANYA R	*WILLIAMS, TANYA R*	05/17/2016
Responsible Manager	JOYNER, JESSICA A	*JOYNER, JESSICA A*	05/17/2016

8. **Description of Change and Justification**

March 2016 Monthly Monitoring Report submittal for Tank 241-AY-102 Settlement Agreement II.B.13 (PCHB No. 14-041c)

9. **TBDs or Holds** ☒ N/A

10. **Related Structures, Systems, and Components**

a. **Related Building/Facilities** ☐ N/A	b. **Related Systems** ☐ N/A	c. **Related Equipment ID Nos. (EIN)** ☐ N/A
241-AY	241-TMAC	AY102-WSTA-CAM-102
241-AY-102	241-VT	AY102-WSTA-LDT-151
241-AY-102A	241-VTA	AY102-WSTA-LDT-152
	241-VTP	AY102-WSTA-LDT-153
	241-WST	AY102-WST-LIT-101
	241-WSTA	

11. **Impacted Documents – Engineering** ☒ N/A

Document Number	Rev.	Title

12. **Impacted Documents (Outside SPF):**

13. **Related Documents** ☐ N/A

Document Number	Rev.	Title
RPP-PLAN-60074	04	TANK 241-AY-102 Monitoring Plan
RPP-PLAN-60610	02	Tank 241-AY-102 Contingency Plan - Operations Phase
RPP-RPT-59258	00	Tank 241-AY-102 Monthly Monitoring Report February 2016

14. **Distribution**

Name	Organization
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HANSON, CARL E	AY-102 RETRIEVAL ENGRNG
JOYNER, JESSICA A	ENVIRONMENTAL PROTECTION
KLAGES, DEANNA L	ENVIRONMENTAL PROTECTION
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SAMS, REBECCA J	CONTRACT CHANGES & ADMIN
SMITH, DONALD (KENT)	PRODUCTION OPERATIONS
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TAVELLI, MARK F	ENGINEERING
VOOGD, JEFFRY A	BASE OPS ENV COMPLIANCE
WILLIAMS, TANYA R	

RPP-RPT-59321, Rev. 01

Tank 241-AY-102 Monthly Monitoring Report March 2016

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U.S. Department of Energy Contract DE-AC27-08RV14800

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Cost Center:	N/A	Charge Code:	N/A
B&R Code:	N/A	Total Pages:	19

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

Abstract: March 2016 Monthly Monitoring Report submittal for Tank 241-AY-102 Settlement Agreement Section II.B.13 (PCHB No. 14-041c)

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ABBREVIATIONS AND ACRONYMS

CAM	continuous air monitor
Enraf	Enraf-Nonius Series 854
Ecology	Washington State Department of Ecology
Settlement Agreement	*Settlement Agreement and Stipulated Order of Dismissal*
TOC	Tank Operations Contractor

1.0 INTRODUCTION

1.1 PURPOSE

The March 2016 monthly monitoring report for Tank 241-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 March 2016 monthly monitoring report contained herein, applies only to AY-102. This report for March 2016 covers the time period from March 1 through March 31, 2016, including results from the February - March 2016 every two months video inspections.

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, CAM readings, Enraf 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 during tank pumping operations, as required in RPP-PLAN-60074, are also provided in this document due to the commencement of tank pumping operations in March 2016. A summary of the visual and video annulus inspections is provided in Section 2.0, monitoring readings, calibration, and ventilation performance are provided in Section 3.0, leak detection pit monitoring is provided in Section 4.0, and tank pumping operations equipment status is provided in Section 5.0.

2.0 ANNULUS VISUAL AND VIDEO INSPECTIONS

Visual and video inspections of the AY-102 annulus for the March 2016 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.*

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 March 2016 monthly monitoring report includes the results for the video inspections performed every two weeks during March 2016 and the results for the video inspections performed every two months for the February - March 2016 inspection period, in accordance with the Settlement Agreement.

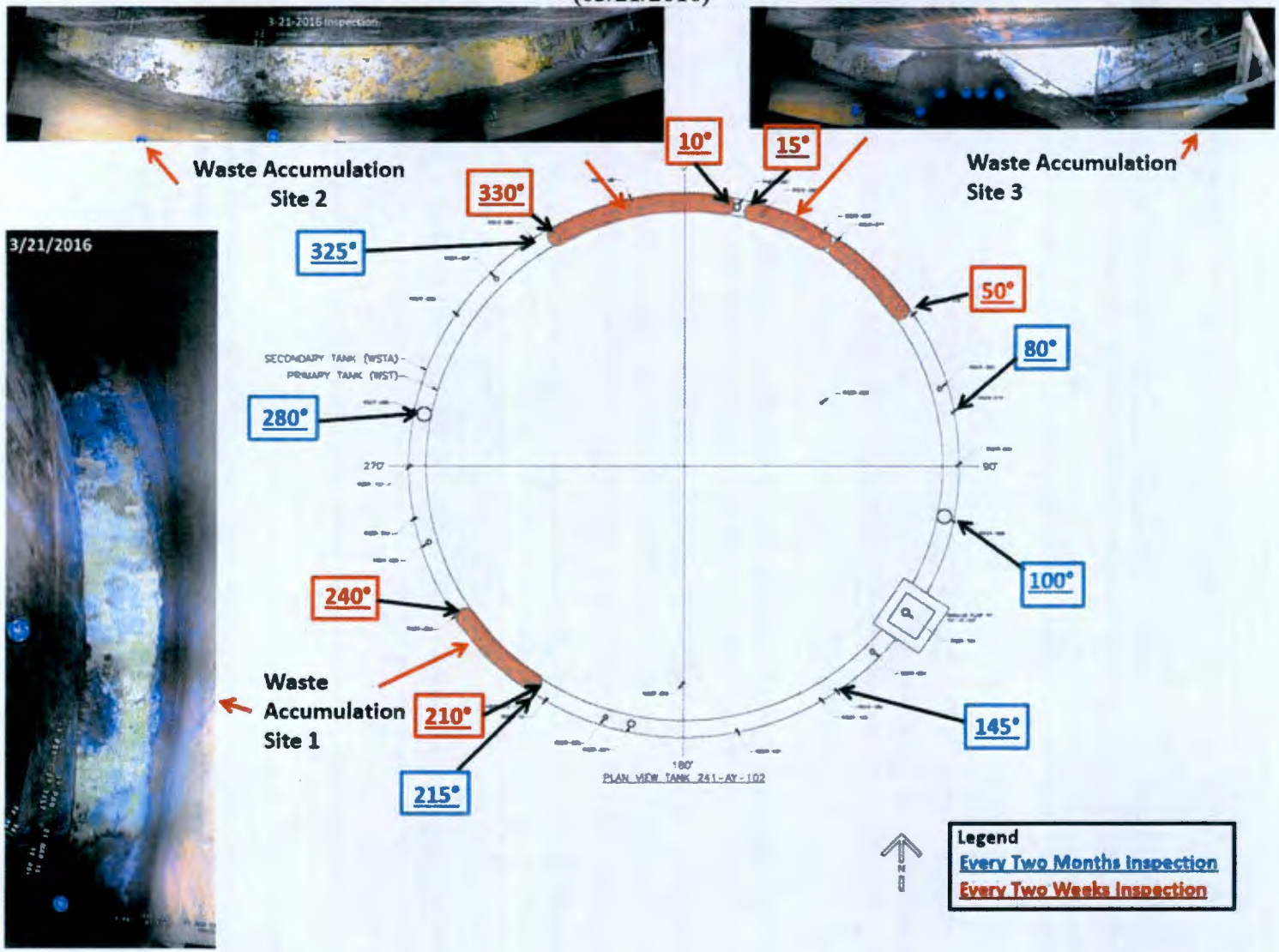
Table 1 provides information regarding the waste accumulation sites and their locations on Figure 1. Locations noted in Figure 1 are used to estimate material volume in the annulus. Locations identified in blue are inspected every two months, and locations identified in red are inspected every two weeks. Figure 1 also provides pictures of the annulus from the three known waste accumulation sites. Dates of inspection for each location are provided in Tables 3 and 4.

Table 1. Waste Accumulation Sites

Waste Accumulation Site	Waste Span*
1	210° to 240°
2	330° to 10°
3	15° to 50°

*Waste span locations are estimates based on visual inspections.

Figure 1. AY-102 Dome Penetration Location with Composite Views of the Waste Accumulation Sites (03/21/2016)



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 2. During the March 2016 annulus video inspections, no conditions were identified that indicate worsening leak rates from the primary tank (Table 2).

Table 2. Contingency Plan Evaluation of Conditions Indicating a Potential Worsening Leak Rate from the Primary Tank

Condition	Every Two Weeks Inspection #1 March 7, 2016	Every Two Weeks Inspection #2 March 21, 2016
Video Evidence of a Change in Condition within the Viewable Ventilation Channels	No change observed.	No change observed.
Video Evidence of Significant Waste Accumulation Rate Increase[1]	No change observed.	No change observed.
Video Evidence of "Active Flow"	No change observed.	No change observed.

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

Table 3. AY-102 Annulus Visually Observable Volumes

Location (refer to Figure 1)	2/23/2016 Material Volume	Every Two Weeks Inspection #1		Every Two Weeks Inspection #2		3/21/2016 Material Volume
		Date	New Material Volume[a]	Date	New Material Volume[a]	
1 (210° to 240°)	~ 8 gallons	3/7/2016	~ 0 gallons	3/21/2016	~ 0 gallons	~ 8 gallons
2 (330° to 10°)	~ 40 gallons	3/7/2016	~ 0 gallons	3/21/2016	~ 0 gallons	~ 40 gallons
3 (15° to 50°)	~ 13 gallons	3/7/2016	~ 0 gallons	3/21/2016	~ 0 gallons	~13 gallons
Total Annulus	< 65 gallons[b]	~ 0 gallons		~ 0 gallons		< 65 gallons[b]

[a]New material volume is reported to the nearest gallon.
[b]Due to the inherent limitations of visual estimations, the total volume is reported to the nearest 5 gallon increment.

Table 4. AY-102 Annulus Every Two Months Visually Observable Volumes

Location (refer to Figure 1)	Previous Material Volume		Every Two Months Inspection		March 2016 Material Volume
	Date	Material Volume	Date	New Material Volume	
80°	12/15/2015	0 gallons	2/16/2016	0 gallons	0 gallons
100°	12/15/2015	0 gallons	2/28/2016	0 gallons	0 gallons
145°	12/15/2015	0 gallons	2/16/2016	0 gallons	0 gallons
215°	12/15/2015	0 gallons	2/16/2016	0 gallons	0 gallons
280°	12/15/2015	0 gallons	2/28/2016	0 gallons	0 gallons
325°	12/15/2015	0 gallons	2/16/2016	0 gallons	0 gallons
Total Annulus	0 gallons		0 gallons		0 gallons

The previous monthly reporting period, February 1 through 29, 2016, estimated an increase of less than 5 gallons of material volume in the three known waste accumulation sites in the annulus. The current monthly reporting period, March 1 through 31, 2016, estimates an increase of less than 5 gallons of material volume in the three known waste accumulation sites in the annulus and 0 gallons in the areas of the annulus inspected every two months. This is not considered a significant waste accumulation rate increase (see Table 2).

The total estimated material volume in the annulus at the end of March 2016 is less than 65 gallons (Tables 3 and 4). Pictures of the video inspections performed every two weeks in March 2016 for each known waste accumulation site are provided in Figures 2 through 4. Pictures of the video inspections performed every two months for the February - March 2016 inspection period are provided in Figures 5 through 10. Pictures are included of the previous month's last inspection for comparison purposes only.

Figure 2. Waste Accumulation Site 1 - Composite View of Annulus Floor (Comparison between 2/23/2016, 3/7/2016, and 3/21/2016)

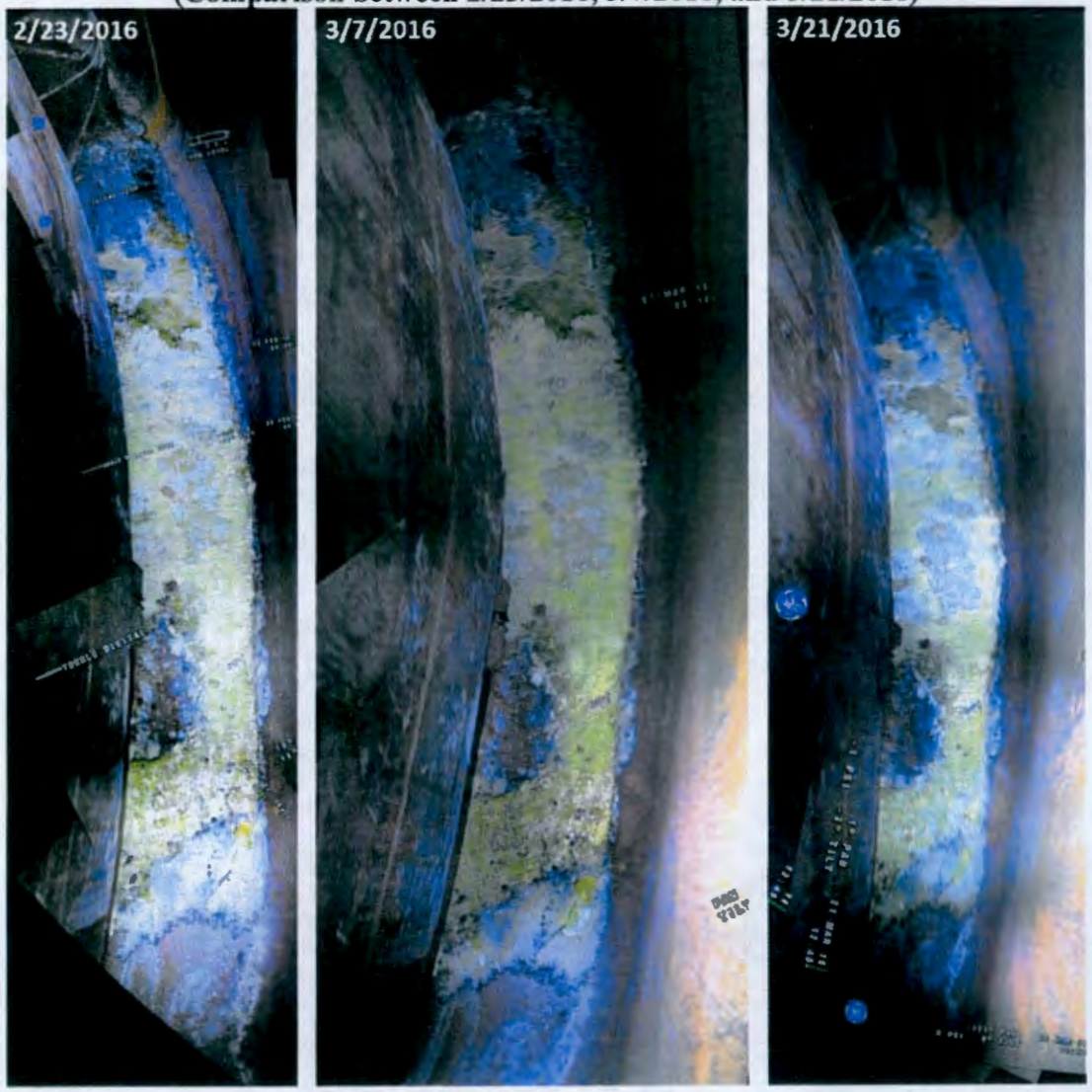


Figure 3. Waste Accumulation Site 2 - Composite View of Annulus Floor (Comparison between 2/23/2016, 3/7/2016, and 3/21/2016)

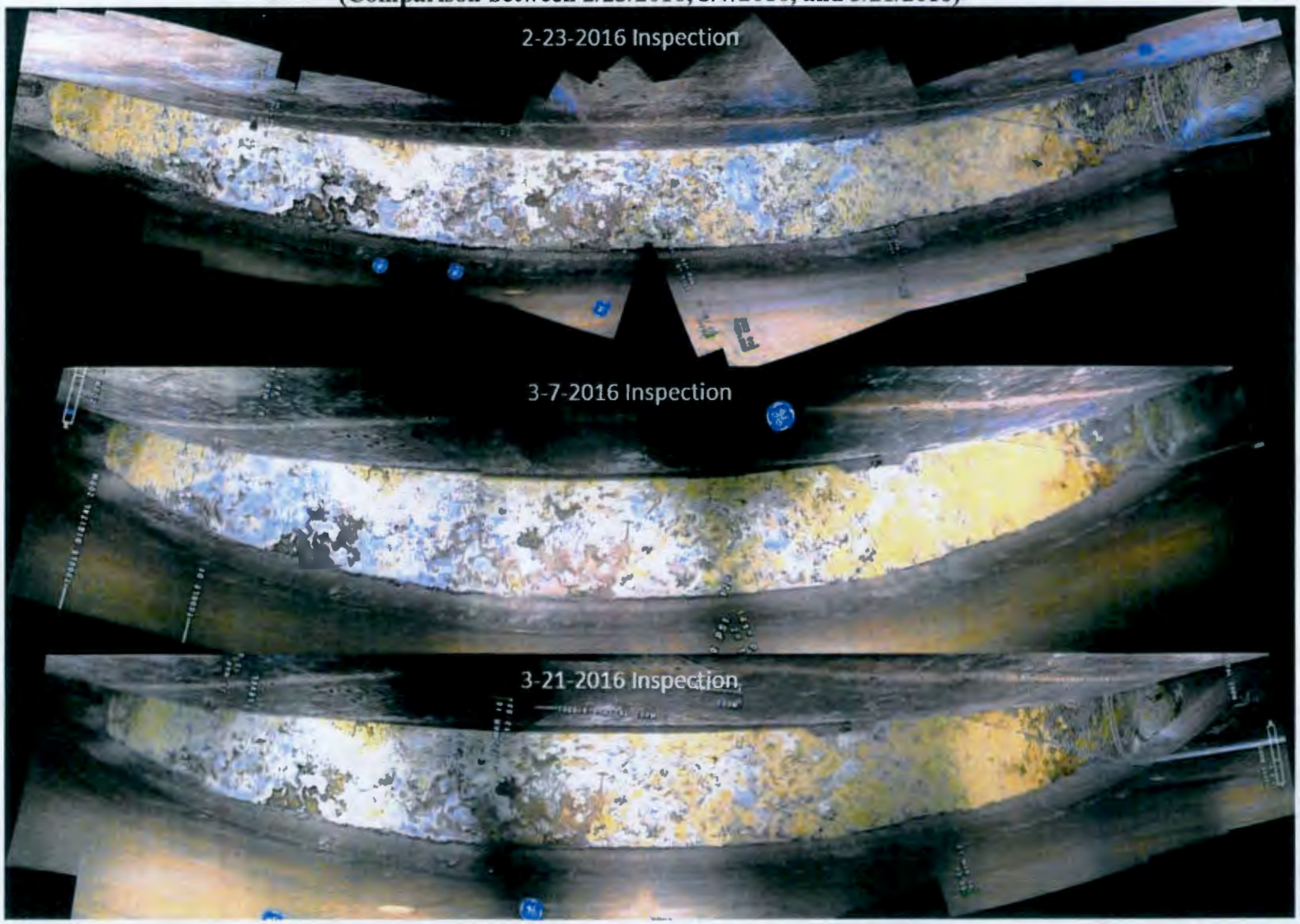


Figure 4. Waste Accumulation Site 3 - Composite View of Annulus Floor (Comparison between 2/23/2016, 3/7/2016, and 3/21/2016)

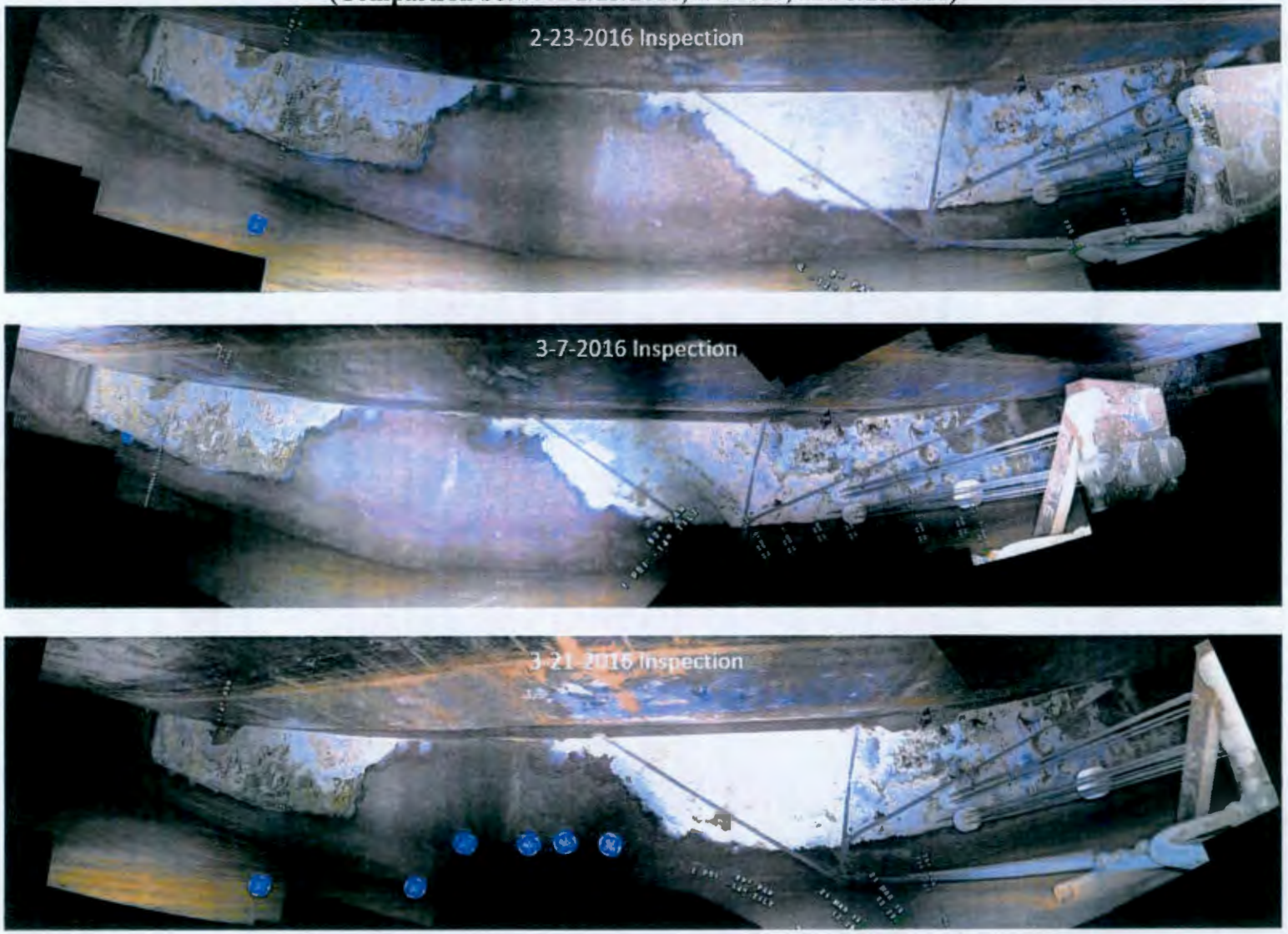


Figure 5. General Condition of the Annulus Floor on 2/16/2016 at 80° Looking Left (A) and Looking Right Showing Waste Accumulation Site 3 (B)

Figure 6. General Condition of the Annulus Floor on 2/28/2016 at 100° Looking Left (A) and Looking Right (B)

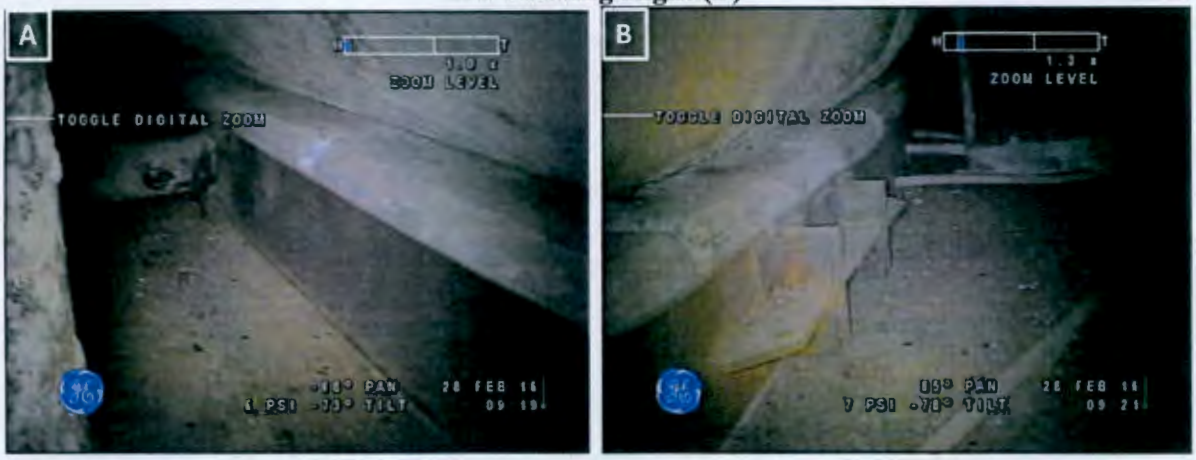


Figure 7. General Condition of the Annulus Floor on 2/16/2016 at 145° Looking Left (A) and Looking Right (B)

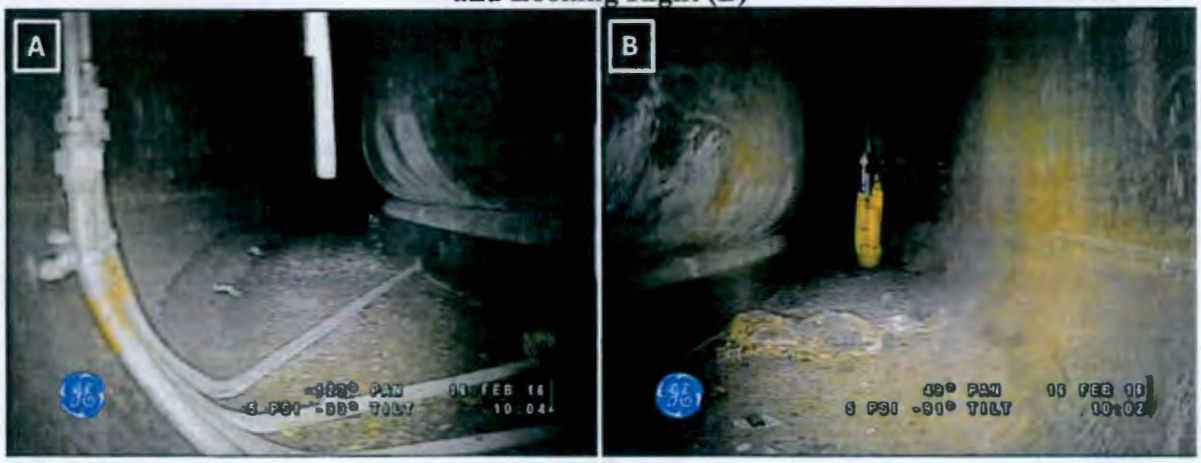


Figure 8. General Condition of the Annulus Floor on 2/16/2016 at 215° Looking Left Showing Waste Accumulation Site 1 (A) and Looking Right (B)

Figure 9. General Condition of the Annulus Floor on 2/28/2016 at 280° Looking Left (A) and Looking Right (B)

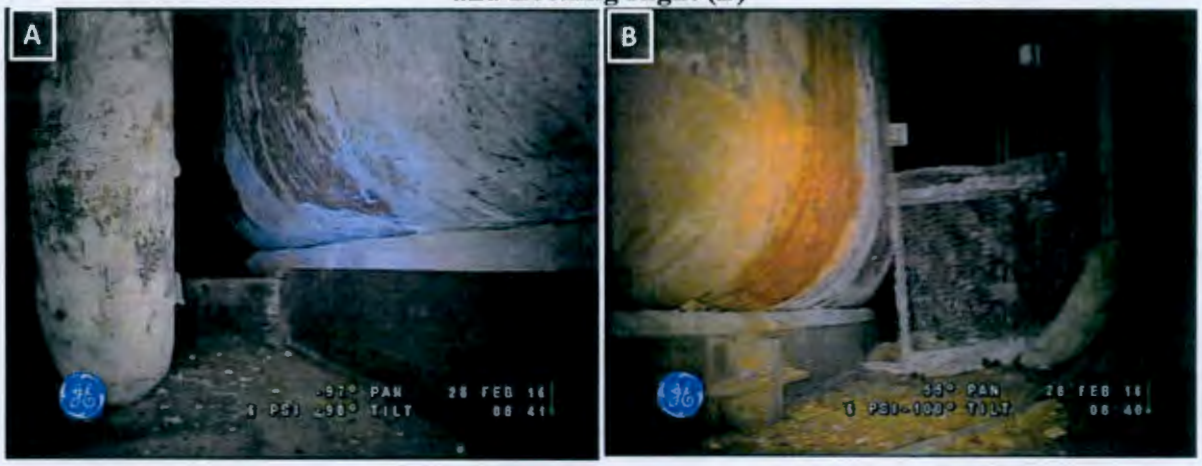
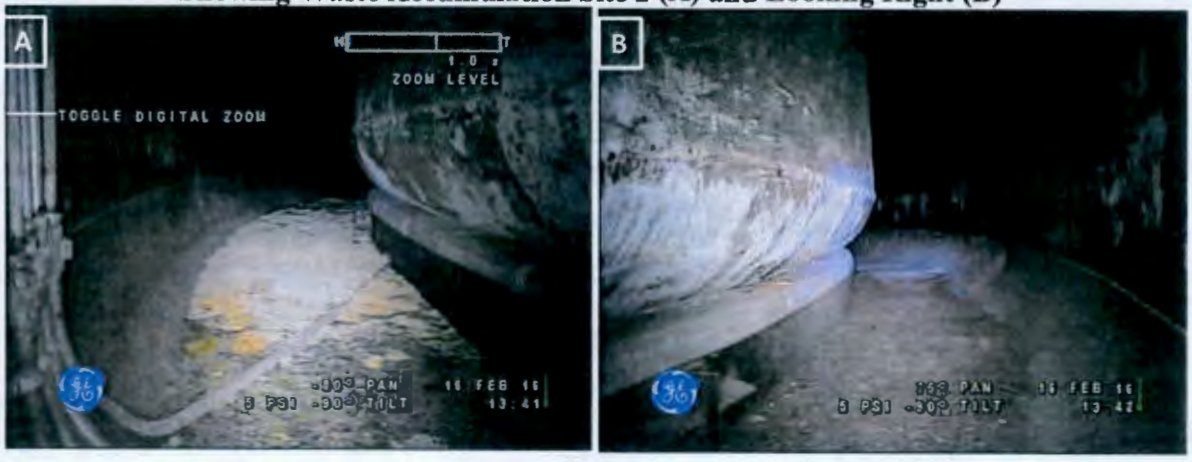
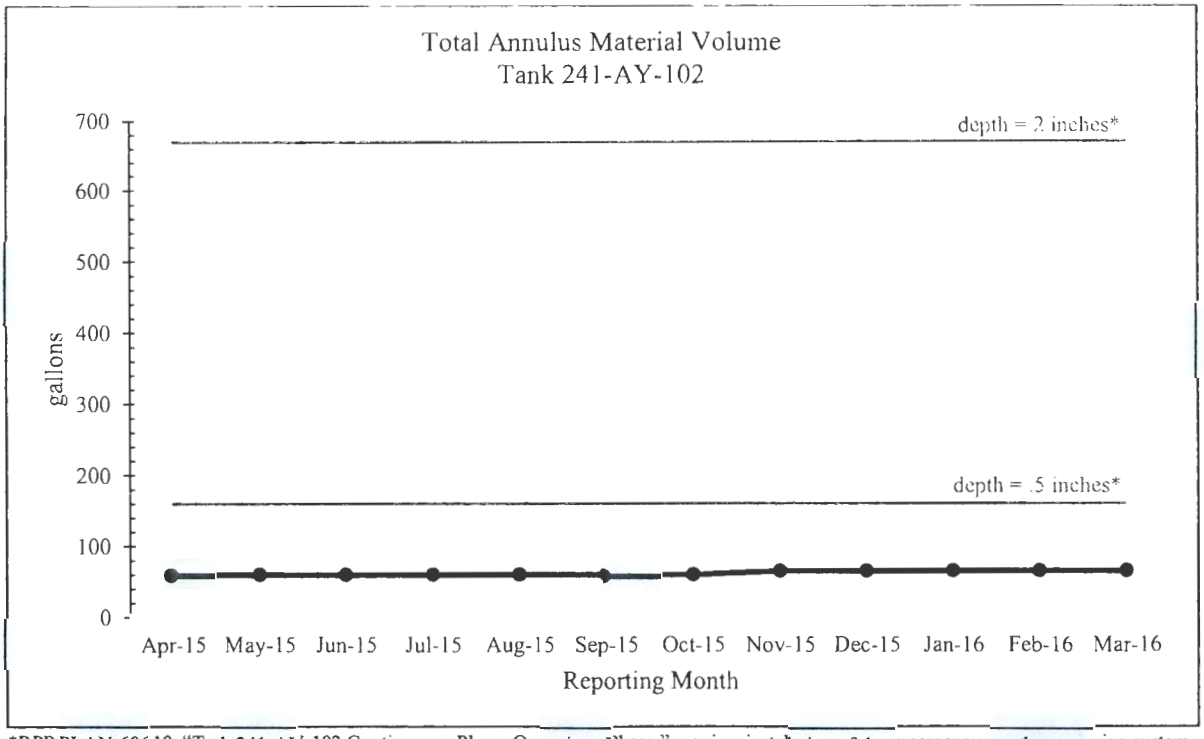


Figure 10. General Condition of the Annulus Floor on 2/16/2016 at 325° Looking Left Showing Waste Accumulation Site 2 (A) and Looking Right (B)



The volumes of accumulated tank wastes reported are those noted in the visually observable areas of the annulus. The range of total waste reported in RPP-RPT-53793, "Tank 241-AY-102 Leak Assessment Report," November 7, 2012, bounds the current volume in the annulus even with the small (less than 5 gallons) changes in volume noted in this report. Figure 11 shows the total annulus material volume over time for each of the reporting months.

Figure 11. Total Annulus Material Volume



*RPP-PLAN-60610, "Tank 241-AY-102 Contingency Plan – Operations Phase," requires installation of the emergency annulus pumping system at annulus Enraf measurements of ≥ 0.5 inches depth. Removal of primary tank supernatant is required at annulus Enraf measurements of ≥ 2 inches depth.

3.0 MONITORING

Table 5 provides AY-102 annulus and primary ventilation performance and status, CAM readings, Enraf readings, CAM and Enraf calibration results, waste temperature monitoring results, dates of operation, and interpretations and conclusions based on the monitoring results for March 2016.

Table 5. Summary of March 2016 Monitoring and Calibration for AY-102

Description	Data Source	Instrument(s)	Calibration Results	Dates of Operation[1]	Interpretations and Conclusions
Primary Tank Surface Level	TMACS	Enraf (Riser 39) AY102-WST-LIT-101	Last: 12/10/15 Next: 11/4/16	3/1 - 3/11 3/15 - 3/17 3/24 - 3/31	Primary Tank Surface Level decrease for March is 215.95" (270.59" on 3/3/16 and 54.64" on 3/31/16). This is a result of the start of tank pumping operations.
Annulus Surface Level	TMACS	Enraf (Riser 88) AY102-WSTA-LDT-151	Last: 5/28/15 Next: 4/22/16	3/1 - 3/31	Level Readings for March between 0.13" and 0.15." Data is within the upper/lower approved limits.
		Enraf (Riser 89) AY102-WSTA-LDT-152	Last: 7/9/15 Next: 6/3/16		Level Readings for March between 0.14" and 0.14." Data is within the upper/lower approved limits.
		Enraf (Riser 91) AY102-WSTA-LDT-153	Last: 7/9/15 Next: 6/3/16		Level Readings for March between 0.16" and 0.18." Data is within the upper/lower approved limits.
Primary Tank Waste Temperatures[2]	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	3/1 - 3/31	Average Solid/Sludge Temperature change for March is + 5.8°F (from 107.4 to 113.2°F). The sludge temperature increase is an anticipated result of the intentional shut downs of the annulus ventilation system. 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: 7/29/16	3/1 - 3/10 3/21 - 3/24 3/29 – 3/30	Annulus CAM (RAD) Readings for March between 196 cpm and 466 cpm. Data is less than the upper alarm limit of 2000 cpm.

Description	Percent Operated	Interpretations and Conclusions
Primary Tank Ventilation	100%	Dates of Operation: 3/1 - 3/31
Annulus Tank Ventilation	49%	Dates of Operation: 3/1 - 3/10, 3/21 - 3/24, 3/29 - 3/30 (See Table 7 for details)

[1]Equipment is inspected daily in order to maintain operability, including days when equipment is not in operation.
[2]Waste 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.

4.0 LEAK DETECTION PIT PH AND LIQUID LEVEL RESULTS

The AY-102 leak detection pit liquid level is taken on a weekly basis. Results of the first and last readings of the month are given in Table 6. The AY-102 leak detection pit pH is taken monthly and provided in Table 6.

Table 6. Leak Detection Pit pH and Liquid Level Readings for March 2016

pH		Liquid Level		Interpretations and Conclusions
Date	Reading	First	Last	
03-28-16	6.0	3-7-16	3-28-16	Values are within acceptable range.
		5.10	4.90	

5.0 TANK PUMPING OPERATIONS

Table 7 provides the environmental notifications announcing the changes in equipment status during the March 2016 tank pumping operations. Dates of operation for all monitoring equipment is provided in Table 5.

Table 7. Tank Pumping Operations Environmental Notifications

Environmental Notification	Date	Equipment Status
TOC-ENV-NOT-2016-4212	March 10, 2016	Annulus ventilation system and CAM turned off on March 10, 2016, at 0734 for planned waste retrieval. Primary tank ENRAF was raised at 1458 hours on March 10, 2016.
TOC-ENV-NOT-2016-4216	March 17, 2016	Primary tank ENRAF was raised at 1440 hours on March 17, 2016 for planned sludge retrieval.
TOC-ENV-NOT-2016-4217	March 22, 2016	Annulus ventilation system and CAM were restarted on March 21, 2016.
TOC-ENV-NOT-2016-4223	March 24, 2016	Annulus ventilation system and CAM turned off on March 24, 2016, at 1458 for planned sludge retrieval.
TOC-ENV-NOT-2016-4227	March 29, 2016	Annulus ventilation system and CAM were restarted on March 29, 2016, at 1008 hours.
TOC-ENV-NOT-2016-4229	March 31, 2016	Annulus ventilation system and CAM turned off on March 30, 2016, at 0846 for sludge retrieval.

6.0 REFERENCES

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

RPP-ASMT-53793, 2012, *Tank 241-AY-102 Leak Assessment Report*, Rev. 0, 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. 04, U.S. Department of Energy, Office of River Protection, Washington River Protection Solutions, 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.