STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
*3100 Port of Benton Blvd • Richland, WA 99354 • (509) 372-7950*
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April 3, 2013 13-NWP-036

Mr. Kevin W. Smith, Manager
Office of River Protection
United States Department of Energy
PO Box 450, MSIN: H6-60
Richland, Washington 99352

Re: Department of Ecology (Ecology) Assessment Report for Field Monitoring Activities of the Waste Material near Riser 83 of the 241-AY-102 Double Shell Tank (DST)

Dear Mr. Smith:

On March 14, 2013, Ecology visited the 241-AY Farm to witness the weekly visual inspection of the waste material found near Riser 83 of the 241-AY-102 DST. Ecology's Assessment Report and photographs are enclosed. Ecology observed that:

- The area within the annulus that waste occupies has increased approximately 25 percent since Ecology's visit on December 27, 2012. This area increased vertically and horizontally where it extends outward in "finger channels" and near the smaller piece of what appears to be orange insulation foam.
- The edges of the waste material are very wet and are changing color. The waste material that was white (indicates dry waste) is now yellow or light green.
- The "salt streaks" past the waste in the annular floor space has changed size. The "salt streaks" horizontal extent from the primary tank's outer wall out to the inner wall of the secondary containment is now extended past the center of the secondary containment floor space.

Ecology strongly encourages the United States Department of Energy to remove the contents of 241-AY-102 DST as soon as it is practicable.

If there are any questions, please contact me at Michelle.Hendrickson@ecy.wa.gov or (509) 372-7970.

Sincerely,

Michelle L. Hendrickson

Michelle L. Hendrickson, CHMM, PE
Tank System Operations and Closure Engineer
Nuclear Waste Program

tkb
Enclosures (2)

cc: See page 2

cc electronic w/enc:

Dennis Faulk, EPA
Lisa Domnoske-Rauch, USDOE
Tom Fletcher, USDOE
Jeremy Johnson, USDOE
Derek Wright, USDOE
Randall Robinson, DNFSB
Jason Engeman, WRPS
Steve Killoy, WRPS
Jeff Voogd, WRPS
Dennis Washenfelder, WRPS
Alex Nazarali, CTUIR
David Bernhard, NPT
Dirk Dunning, ODOE
Ken Niles, ODOE
John Martell, WDOH
John Schmidt, WDOH
USDOE-ORP Correspondence Control

cc w/enc:

Steve Hudson, HAB
Administrative Record:
DST/TWS/241-AY-102/S-2-3
Environmental Portal
WRPS Correspondence Control

cc w/o enc:

Stuart Harris, CTUIR
Gabriel Bohnee, NPT
Russell Jim, YN

# ASSESSMENT REPORT

## Field Monitoring Activities

### A. GENERAL INFORMATION

| | | | |
|---|---|---|---|
| Project: | 241-AY-102 Field Monitoring, Riser 83 Video | | |
| Project Contact: | Jeremy Johnson (ORP) | Phone: | (509) 376-1866 |
| Review Date: | 3/14/2013 | | |
| Reviewer: | Michelle Hendrickson, CHMM, PE | | |
| USDOE Project: | US Department of Energy-Office of River Protection (USDOE-ORP) | | |
| USDOE Contact:: | Tom Fletcher/Jeremy Johnson | | |
| Prime Contractor: | Washington River Protection Solutions (WRPS) | | |
| Project Manager: | Michael Hardesty | Phone: | (509) 373-4573 |
| Location: | 241-AY-102, 200 East Area, Hanford | | |
| Scheduled Start Date: | 3/14/2013 | Actual Start Date: 3/14/2013 | Completion Date: 3/14/2013 |
| Contract Amount: | Approximately $75,000 for 4 Riser Visual Inspections | | |
| Sub-Contractor: | N/A | | |
| Location: | 200 East Area, Hanford Nuclear Reservation, Richland, WA | | |

PROJECT DESCRIPTION:

- On an 8/8/12 visual inspection, material was found in the Annulus Space at AY-102. On 10/23/2012, USDOE-ORP reported that the DST was leaking and more material was accumulating in the Annulus Space.
- To monitor the slow leak, WRPS is conducting weekly and often twice weekly video inspections of the material through the AY-102 Tank's Riser #83.
- As the leak in question has remained very slow, the Integrated Project Team (IPT) has provided guidance that the visual inspections at the AY-102 Tank could be reduced to once a week.
- The visual inspection scheduled for 2/19/13 was canceled as the primary and annulus exhausters serving AY and AZ Farms were down due to the AZ-301 condensate pump being inoperable. The pump was fixed and the system was brought back online the following day per an email provided by Jeremy Johnson. However, the same email indicated that both primary exhausters have been down since 2/28/13. CAM and record sampler cabinet were found wired incorrectly. This is a safety issue. With the exception of the short durations of operation, in support of riser 83 videos, this fan has effectively been out of service since 2/19/13. The outlets feeding record sampler and CAM vacuum pumps were successfully rewired prior to the 3/14/2013 Visual Inspection.
- There are no backup exhausters available as the CAM and record sampler are single point failure for the primary fans in AY/AZ.
- There is no back up exhauster for 102-AY annulus fan.

The Pre-job meeting was conducted at 7:45 AM, including the conditions of RWP WTO0399, Rev. 3.

We entered the farm at approximately 8:30 AM. The ventilation exhauster was running and throttled down in the annulus from -14 inch to a -1 inch vacuum. The Visual Inspection effort conducted 3/8/13 required personnel to be on supplied air as the exhauster was not in operation. The job in the field consisted of:

1. The ventilation vacuum was lessened as the air currents generated by the vacuum create air currents which cool the sludge. However, these currents also impede the collection of a flammable gas sample and cause the camera to swing, making camera manipulation within the annular space very difficult.

2. A flammable gas sampled was collected and indicated that the annulus space was less than 25% lower flammability limit.

3. The camera was in a plastic bag and wire attached in a sleeve. The sleeve was carefully inspected and then the camera was removed from the bag and lowered into the annulus space. The camera was lowered to the 55-foot mark for the video/photographs. The camera completed a 360-degree scan and was raised and tilted. Also, a zoom of 10-times was used for close-up observation of the waste. Close-ups of the material along the entire area of waste deposition were viewed. The "landmarks" within the tank (black dot or rock, two white pebbles, and ventilation slots) were specifically viewed.

4. Once all of the views were captured, the camera was raised and re-bagged.

5. We surveyed out of the 241-AY Farm.

## B. RECORDS AND PROCEDURES

1. Personnel Contacted During Assessment

| | Name | Title or Duties/Organization | Phone |
|---|---|---|---|
| a. | Steve Stamper | Camera Operator - WRPS | 509-392-3977 |
| b. | Michael Hardesty | Field Work Supervisor - WRPS | 509-373-4573 |
| c. | Roger Hammer | Camera Operator - WRPS | 509-373-3355 |
| d. | Greg Sullivan | Camera Operator- WRPS | 509-438-0603- |

2. Progress

a. Scheduled Percentage 100 %

| | Yes | No | NA | See Remarks |
|---|---|---|---|---|
| 3. Stockpiled equipment or materials | | | | |
| a. Records adequate? | X | ☐ | ☐ | ☐ |
| b. Protected? | X | ☐ | ☐ | ☐ |
| 4. Monitoring Procedures up to date? | X | ☐ | ☐ | ☐ |
| 5. Work Packages up to date? | X | ☐ | ☐ | ☐ |
| 6. Adequate involvement in changes? | X | ☐ | ☐ | ☐ |
| 7. Change of monitoring procedures appropriate and submitted to Ecology? | ☐ | ☐ | X | ☐ |
| 8. Instrument(s) Calibrated adequately? | X | ☐ | ☐ | ☐ |
| 9. Permit No/TPA Requirement.: DST System Unit RCRA Permit | | | | |

## C. FIELD MONITORING

- The weather reported at the Pre-job meeting was cloudy and low winds with temperatures around 50 °F. According to the Hanford Meteorological Station, http://www.hanford.gov/c.cfm/HMS/monthSummary.cfm , the area had received approximately trace amounts of precipitation on 3/12/2013 and additional moisture earlier in the month.
- The video taken of the waste material was near Riser 83 of the 241-AY-102 Annulus Space.
- The video was viewed and camera manipulated in the AY-801 Building.
- As the camera descended to the bottom of the annular space, a thermocouple became visible. The camera zoomed in and the off-riser sampler/crawler's tracks were no longer visible.
- All witnessing the inspection noted that the color of the waste appeared to be

changing. In the bottom portion of the leak, the dark green was changing to a lighter green in some locations. The lighter green was becoming a dark yellow. The darker yellow was changing to a lighter yellow. The lighter yellow was turning to a white color along the waste perimeter.

- However, Ecology also noted that the upper portion of the leak had expanded horizontally and vertically. And the waste material that was white in color was now yellow or light green.
- The camera viewed the waste in respect to the different in-annular space "landmarks" including the black dot or rock, two white pebbles, orange pieces of insulation/foam, and ventilation slots. It was noted by all witnessing the video that the area of the waste material did appear to have increased in size, near the upper portion of the leak. Ecology approximated that the increase was approximately 25% since late December 2012.
- Vertical and horizontal increase of the size of the leak was discovered where the waste material extends outward in "finger channels" and near the smaller piece of orange insulation/foam. The edges of the waste in this location appeared to be very wet. Further past the waste were salt streaks. It appeared that the horizontal extent was now past the center of the annulus for the salt streaks.
- Ecology did not note a change in the size or condition of the waste material in the ventilation slot during this visual inspection. The top of the material appeared to have dried where it contacted the concrete. However, moisture streaks on either side of the waste material within the ventilation slot were again visible.
- During the visual inspection, it was noted that the camera was lowered further into the annulus. As a result, Ecology and the Operators noted an anomaly on the concrete/refractory pedestal just to the left of the ventilation slot, near the primary tank. This anomaly is not quite a concrete or foam color. Upon follow-up conversations with Jason Engeman, WRPS Engineer reviewing and compiling the weekly visual inspections, this anomaly was present upon the first inspection into Rise 83 (2012) and has shown no change in appearance. The color and shape of the anomaly is not consistent with tank waste and is most likely a construction artifact.
- Ecology could not visually distinguish if any visual damage indicators such as staining, cracking, pitting, etc. of the 6 inch wide carbon steel refractory ring, annulus floor, primary tank liner, or the refractory/concrete material where the waste was in direct contact with the tank structures. This lack of visual assessment is due to the increased growth of crystals, especially in the lower 2/3rds of the leak area and increased amount of deposition of mineralization around the perimeter of the leak area within the annulus. It is unknown at this time what influence the waste will have that is contacting the annulus floor and refractory/concrete pedestal.

| | Yes | No | NA | See Remarks |
|---|---|---|---|---|
| 1. Comply with Procedures and QA/QC Specifications? | X | ☐ | ☐ | ☐ |
| 2. Field Test Being Accomplished? | X | ☐ | ☐ | ☐ |
| 3. Satisfactory Contractor Quality Control? | X | ☐ | ☐ | ☐ |
| 4. Inspection Documentation Satisfactory? | X | ☐ | ☐ | ☐ |
| 5. Site Condition | | | | |
| a. Orderly? | X | ☐ | ☐ | ☐ |
| b. Control room interface adequate? | X | ☐ | ☐ | ☐ |
| c. Equipment set-up adequate? | X | ☐ | ☐ | ☐ |
| 6. Monitoring bypassing satisfactory? | ☐ | ☐ | X | ☐ |
| 7. Unsafe Conditions/Health Hazards Observed? | ☐ | X | ☐ | ☐ |
| 8. Is Project on Schedule? | X | ☐ | ☐ | ☐ |
| 9. Is the Operations and Maintenance Documentation on Schedule? | ☐ | ☐ | X | ☐ |
| 10. Is the Maintenance Management System on Schedule? | ☐ | ☐ | X | ☐ |
| 11. Traffic control and traffic safety? | ☐ | ☐ | X | ☐ |

REMARKS:

Photographs from this field monitoring event are attached.

During this visual inspection effort, other field crews were present in the 241-AY Farm. These crews were performing ground scans to determine appropriate locations to run wire conduits to provide permanent power to the ENRAF that had been relocated from Riser 90 to Riser 89. Currently this ENRAF is supplied with temporary power and is in service. During follow-up conversations and emails with WRPS, Ecology learned that this ENRAF had been moved in August so that the Off-Riser Sampler could collect samples from Riser 90.

Also, Instrument Technicians were performing pressure calibrations.

It was noted that the vacuum pump would need to be replaced with a ¾ horsepower pump as ½ horsepower pumps are no longer available.

Ecology also noted activity in the 241-AW Farm after exiting the 241-AY Farm. Mr. Dave McMahon, the WRPS Tank Farm Project Supervisor explained that the AW Farm effort consisted of removing a jumper from the 241-AW-B pit. This modification of pit configuration was needed to support the hydrostatic and pneumatic testing of SL-167 and its encasement, respectively. After testing the line, the jumper will be replaced and leak tested prior to use. SL-167 is a slurry line from the 242-A Evaporator to the 241-AW-B valve pit. The line has not been in "Active" service according to WRPS policy and procedures and will be tested prior to use (e.g. routing waste from 242-A Evaporator after a single or double pass campaign back to the 241-AW Farm. This is a compliant liner per the DST System Dangerous Waste permit.

Ecology asked when the testing would occur. Mr. McMahon noted that the hydrostatic and pneumatic tests would occur after the 242-A bridge crane was repaired and available to move jumpers in the 242-A Evaporator. Ecology asked if an IQRPE or representative would be notified prior to the testing to witness the test. Mr. McMahon stated an IQRPE or representative may be present. WRPS Environmental personnel noted that if an IQRPE or representative is not present, the test results will be provided, along with other data, at a later date as part of the periodic DST Integrity Assessment program. Ecology asked if the coating in the pit would be inspected by an IQRPE or representative after the testing and replacement of the jumper. Mr. McMahon noted that the coating of the pit would be inspected.

*Assessment Completed:*

Michele D. Henderson — 4/3/13

*Project Engineer's Signature* — *Date*