Tank AY-102 Status

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Summary

Routine periodic visual monitoring (via camera) of the AY-102 annulus found material that was never before seen. Inspection of the annulus to date have noted the following:

- Material found in three locations (risers 83 & 90) – source unknown
  - Dark brown mound (approximately 2 ft. x 3 ft. x 8 inches) – riser 90
  - White material on both the refractory (tank sits on refractory) and annulus floor – riser 90
  - Unknown material adjacent to ring – riser 83
- Material is dry (i.e., no standing water or indications of moisture)
- Leak Detection and Continuous Air Monitor (CAM) operable in annulus (real time monitoring)
- Camera equipment removed from annulus without incident (i.e., no contamination on equipment)
- Contamination present when annulus floor sample was taken from riser 90
AY-102 Annulus Inspections
Inspection Photographs from Riser 90 – August 10, 2012

- White material on floor
- White material on top of refractory & along edge of curb
- Mound on floor of annulus
- Ventilation slot (filled)
- Ventilation slot (open)
- White material on floor
Overview of Region Viewed from Riser 83 – August 29, 2012

- Stiffener Ring
- Stiffener Ring
- Fastened Joint
- Primary Tank
- Refractory Slots
- Unknown Material
AY-102 Background

• Double-Shell Tank (DST) AY-102 built in 1970 and placed into service in 1971 as an aging waste spare tank and received waste in 1977

• Annulus ventilation used to remove tank residual heat

• Liner provides secondary containment of waste

• Primary waste types are B Plant evaporated waste and Sludge from single-shell tank (SST) C-106 Sluicing

• No other Hanford waste tank closely approximates this composition of sludge
  – High H₂ Generation
  – Sludge contains solution low in Nitrate, Nitrite, and pH < 12
  – High heat generation

• Current volume 857,000 gallons of sludge and supernatant

• No unexplained primary tank level changes
DST Integrity Monitoring

Two elements make-up the DST Integrity Monitoring Program – Inspections and Tank Waste Chemistry Control

Inspections

• Annulus videos are performed on a nominal 5 year cycle, not to exceed 7 years
  – AY-102 last performed in 2006
    » No indications of material in annulus
• Ultrasonic (UT) wall thickness testing is performed on the primary tank wall from the annulus on an 8 to 10 year cycle
  – WRPS averages completing 3 to 4 tank UT scans each year
  – AY-102 UT last performed in 2007 (no abnormalities noted)

Tank Waste Chemistry Control

• Corrosion monitoring probes are installed in many DSTs with removal and analysis of the probe every 3 years
  – AY-102 corrosion probe installed in 2009
• Tank waste samples are taken on a nominal 5 year cycle for chemistry control, or more frequently when transfers are being made into or out of a tank (e.g., SST retrievals)
# Ongoing Investigatory Actions

<table>
<thead>
<tr>
<th>Action</th>
<th>Status</th>
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<tbody>
<tr>
<td>• Initiate camera installation in Riser 90</td>
<td>COMPLETE</td>
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<td>– Monitoring twice per week per monitoring plan</td>
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<td>• Increased level monitoring of Annulus</td>
<td>COMPLETE</td>
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<td>– Monitor each Shift</td>
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<tr>
<td>• Perform bi-weekly monitoring of CAM</td>
<td>COMPLETE</td>
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<td>• Initiate activities to obtain samples of materials</td>
<td>IN PROGRESS</td>
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<td>– Data Quality Objective (DQO) and Sample Plan under development</td>
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<td>– Obtain annulus samples mid to late September (on schedule)</td>
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<tr>
<td>• Initiate Tank Assessment Process</td>
<td>IN PROGRESS</td>
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<tr>
<td>– Use Tank Leak Assessment Process</td>
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<td>– Complete assessment about 1 week after sample results are reported</td>
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<tr>
<td>• Document near term and long term actions in Engineering</td>
<td>IN PROGRESS</td>
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<td>Path Forward</td>
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Near Term Actions

• **Initiate tank annulus inspection (accessible areas)**
  - Develop list of accessible risers – Complete
  - Develop Work Package and Inspection Criteria – Complete
  - Annulus inspection initiated week of August 27, 2012 – Complete
  - Inspection scheduled for completion mid-September

• **Develop contingency plan to transfer AY-102 contents**
  - Developing transfer procedure – In Progress
  - Developing work packages to verify transfer system components are operational (motors, valves, piping) – In Progress
  - Task Ready to Transfer – draft schedules prepared

• **Sample & pump tertiary leak detection pit  (Confirms secondary liner integrity)**
  - Review procedure and issue sample request – Complete
  - Ready to sample by September 7
  - Prepare to pump contents by mid-September
Long Term Actions

• **Determine Extent of Condition (i.e., applicability to other tanks)**
  – Developing list of tanks for accelerated inspection (up to 7 tanks)
    » Similar tank construction and operating history
    » Similar process history

• **Initiate planning to inspect ventilation piping and adjacent ventilation slots to assess cause**
  – Determining feasibility to perform inspection of ventilation piping
  – Developing work package to inspect ventilation slots
    » Evaluating ability to perform concurrent with annulus inspection

• **Explore means for removing material from annulus**
  – Initiated discussions with robotic crawler vendors
Conclusion

- Tank is stable with enhanced monitoring in place.
- Investigation in progress to determine source of dried solids on floor of annulus and material condition of tank components.
- Extent of Condition Evaluation initiated.
- Actions underway to mitigate hazard should conditions within the annulus change.
- Tank Waste mission essential to mitigate risk associated with aging waste tanks.