Hanford Double-Shell Tank
Tank Integrity Program Update

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Agenda

• Program overview
• Tank Integrity Expert Panel (TIEP)
• Corrosion control program implementation
• Inspections
  o Results
    o Undertank inspection development
• Repair technology development
• Summary and path forward
Double-Shell Tank Integrity Program

• Maintain double-shell tanks (DST) structural integrity to support waste processing operations while maintaining safe storage
• Meet regulatory requirements
• Program elements
  o Corrosion Control
  o Inspections
  o Structural analyses and studies
  o Repair technology development
• TIEP provides independent expert guidance and feedback
• The TIEP endorsed the key focus areas of the tank integrity program during its 2019 review
  o Revised chemistry control program to include halide-induced pitting factors
  o Core sampling and specific laboratory studies to respond to potential vertical stratification of chemistry
  o Under-tank visual and volumetric inspection development and deployment has been “excellent”
  o Encouraged the development of repair technologies
Tank Internal Corrosion Control Program Changes

• Proactive program implemented new corrosion control envelope
• Includes a pitting factor as a function of halides (ratio of inhibitor to aggressive species)
• Implemented into operating specification documents

• Core sampling performed on Tanks AY-101 and AN-107
• Corrosion testing on Tank AY-101 sample demonstrated corrosion inhibition
Primary Tank Ultrasonic Inspections

• Primary tanks inspected during fiscal year 2019 showed no evidence of consequential corrosion

• Minimal localized thinning has been found in the annulus floor of some tanks

• Tank AP-102 annulus floor reinspected to determine secondary floor corrosion
Tank AP-102 Annulus Floor Inspection

- Reinspected at half the normal frequency to evaluate the secondary liner condition
- Examined Tank AP-102 secondary liner floor beneath four risers (Risers 30, 31, 60, and 61)
- Deepest measured pitting locations from Riser 31 in 2014 haven’t changed, given the fidelity of the inspection

<table>
<thead>
<tr>
<th>Riser</th>
<th>2019 Area Scanned</th>
<th>2019 Minimum</th>
<th>2014 Minimum</th>
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</thead>
<tbody>
<tr>
<td>30</td>
<td>~33 ft²</td>
<td>0.459” (8.2%)</td>
<td>0.486” (2.8%)</td>
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<tr>
<td>31</td>
<td>~25 ft²</td>
<td>0.142” (71.6%)</td>
<td>0.149” (70.2%)</td>
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<td>60</td>
<td>~23 ft²</td>
<td>0.451” (9.8%)</td>
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<tr>
<td>61</td>
<td>~13 ft²</td>
<td>0.415” (17%)</td>
<td>N/A</td>
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Under-Tank Visual Inspections

- Tank bottom visual inspection has been incorporated as a programmatic practice since initial demonstration at Tank AP-107
- Has been deployed in Tanks AP-107, AP-108, AN-102, AP-106, AP-102, and AW-102 with great success
- As expected, results show intact metal with evidence of superficial spotty humid air corrosion

Push-Pull arm system attached to existing inspection crawler platform deploys rigid tethered inspection camera with pan/tilt functionality
Tank-Bottom Volumetric Inspection Developments

• Development of several tank-bottom volumetric examination sensors and robotic systems has been ongoing to allow further characterization of visual inspection findings.

• These inspection sensors and their deployment platforms will be tested and available for field deployment in mid-fiscal year 2020 to early fiscal year 2021.
Tank Repair Feasibility Study

- Feasibility study in progress to support the selection of applicable technologies for further development (if necessary) and implementation
- Evaluates technology repair approaches for common failures
- Evaluates viability of technologies based on flaw location
- Eleven types of technologies being evaluated
Summary and Path Forward

• The tank integrity program is proactive and robust
• Significant progress has been made in corrosion control, inspections, and repair technology development
• The TIEP has endorsed the progress and continues to guide the program
• The program is dynamic and poised to support the waste processing mission