AY-102 Recovery Project Update

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Retrieval Process Engineering

8/9/2017

washington river protection solutions

RETRIEVAL OVERVIEW

- **Tank Contents (pre-retrieval)**
  - 593,000 gallons of supernate (~216 inches)
  - 151,000 gallons of sludge/interstitial liquid (~55 inches)
- **Supernate removal to AW-105 on March 3, 2016 (550,000 gal)**
- **Sluice Cannon Retrieval**
  - Initiated March 25 and concluded April 30, 2016
  - Removed remaining supernate and 112,000 gallons of sludge
  - 41,000 gallons total waste remaining (primary and annulus)
- **Extended Reach Sluicer System Retrieval**
  - Initiated December 10, 2016 and concluded February 15, 2017
  - Removed 25,000 gallons of sludge
  - ~19,000 gallons of total waste remained in February

JANUARY 2016 INSPECTION SUMMARY

INITIAL ANNULUS LEVEL INCREASE

- **Observations**
  - Annulus level increase was greatest when operating Sluicer 1 in the vicinity below the AY-02B pit
  - Annulus level increases were minimized when directing Sluicer 1 away from AY-02B pit
  - Leak rate was significantly reduced when operating Sluicer 2
  - No indication that waste leaked to environment

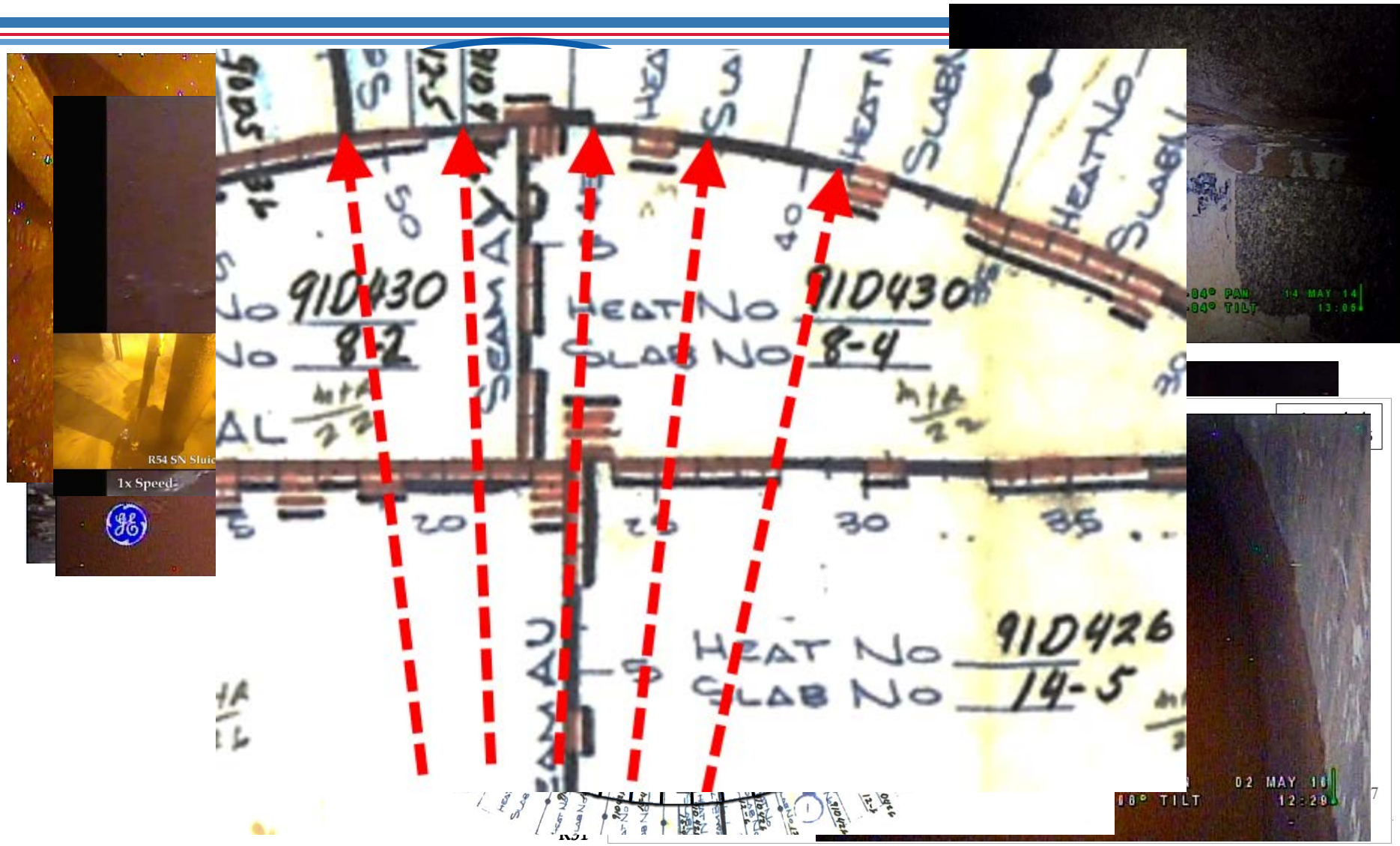
April 2016

Operation of Sluicer 1 on 4/1 (view from R54 – North Side)

ERSS OBSERVATIONS

- **Similar annulus level behavior**
  - Sluicing near suspected leak site resulted in annulus level rise
  - Indication of leakage from one location
- **Residual primary tank solids are mobile**
  - ERSS effective at mobilizing the solids
  - Pump incapable of removing remaining solids
- **Leak Site Cleaning**
  - Last shift focused on clearing solids from suspected leak site
  - High-pressure water, followed by supernate sluicing

PRIMARY TANK LEAK BEHAVIOR

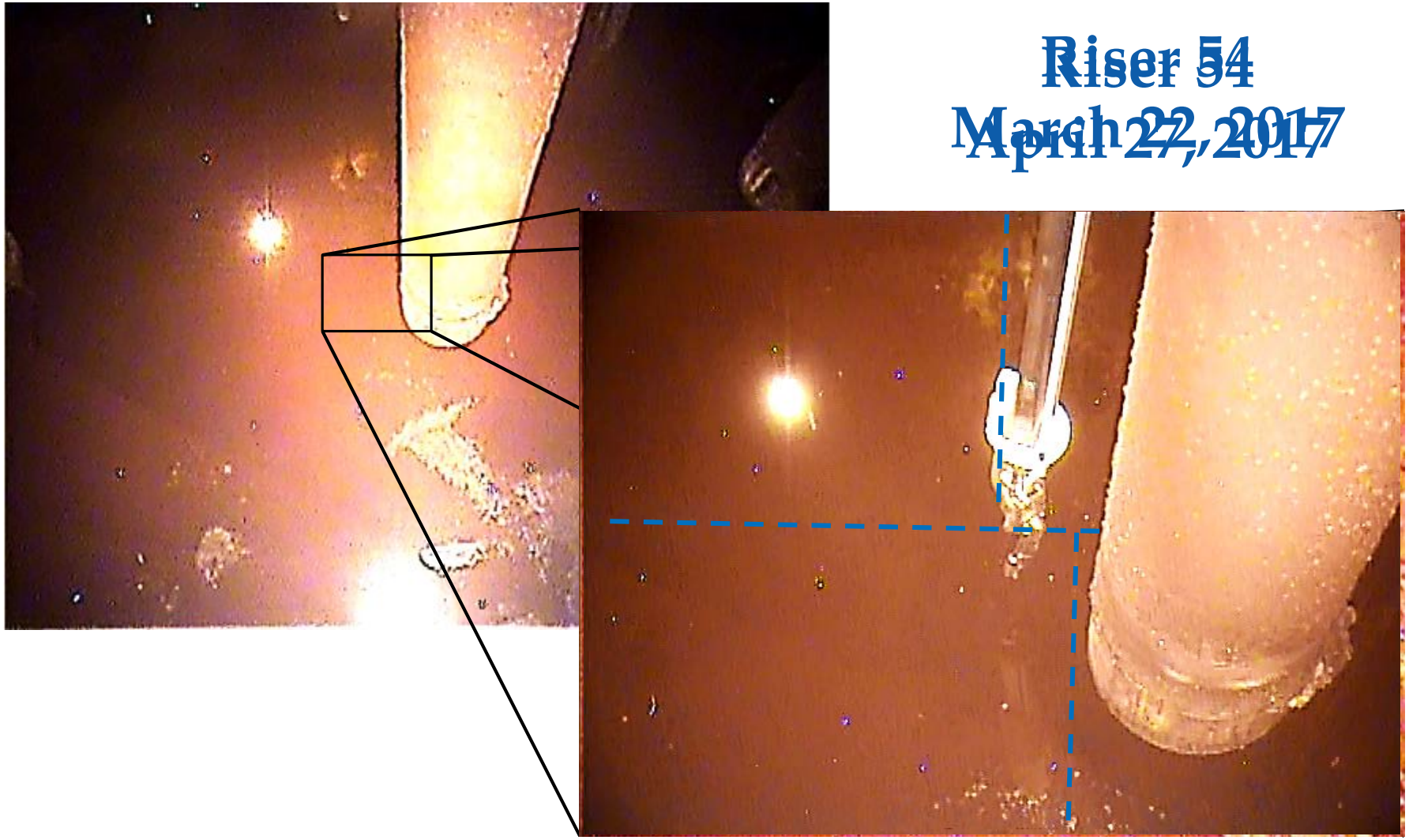


RISER 63 POST-RETRIEVAL SCAN

INSPECTION PHASE – PATH FORWARD

- **Project retrieval scope completed February 2017**
- **Key Settlement Agreement decision made:**
  - The post-retrieval conditions determined to allow for inspection (some "cleaning" still needed)
  - Additional retrieval of waste from the primary tank determined not to be necessary to facilitate inspection
- **Initial Approach: Visual Inspection**
  - High-definition camera in the primary tank to evaluate failure type
  - Collecting visual data to assist USDOE in making determination on whether to pursue tank repair or closure

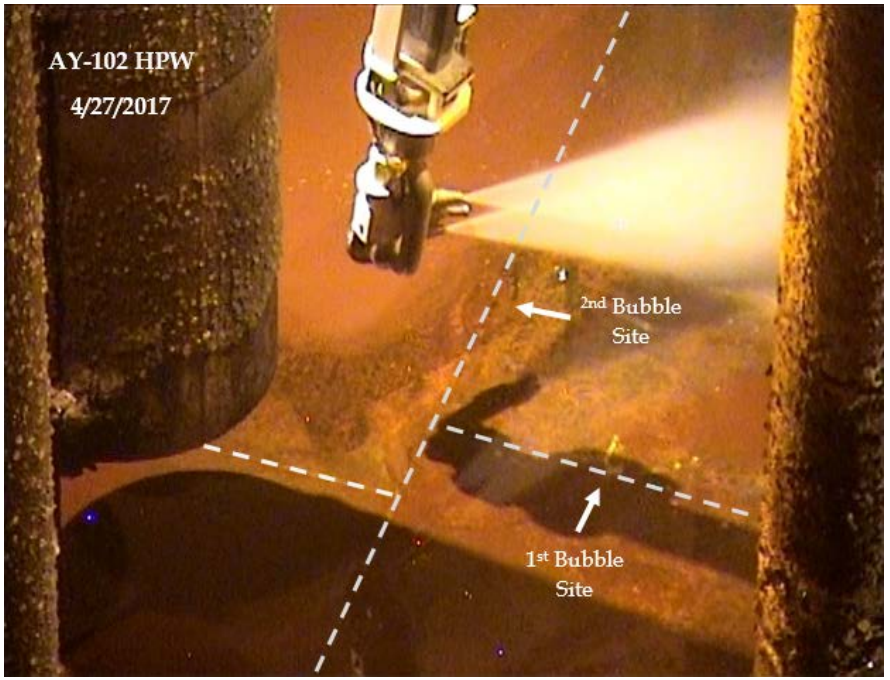
INSPECTION PREPARATION



Riser 54
March 22, 2017
April 27, 2017

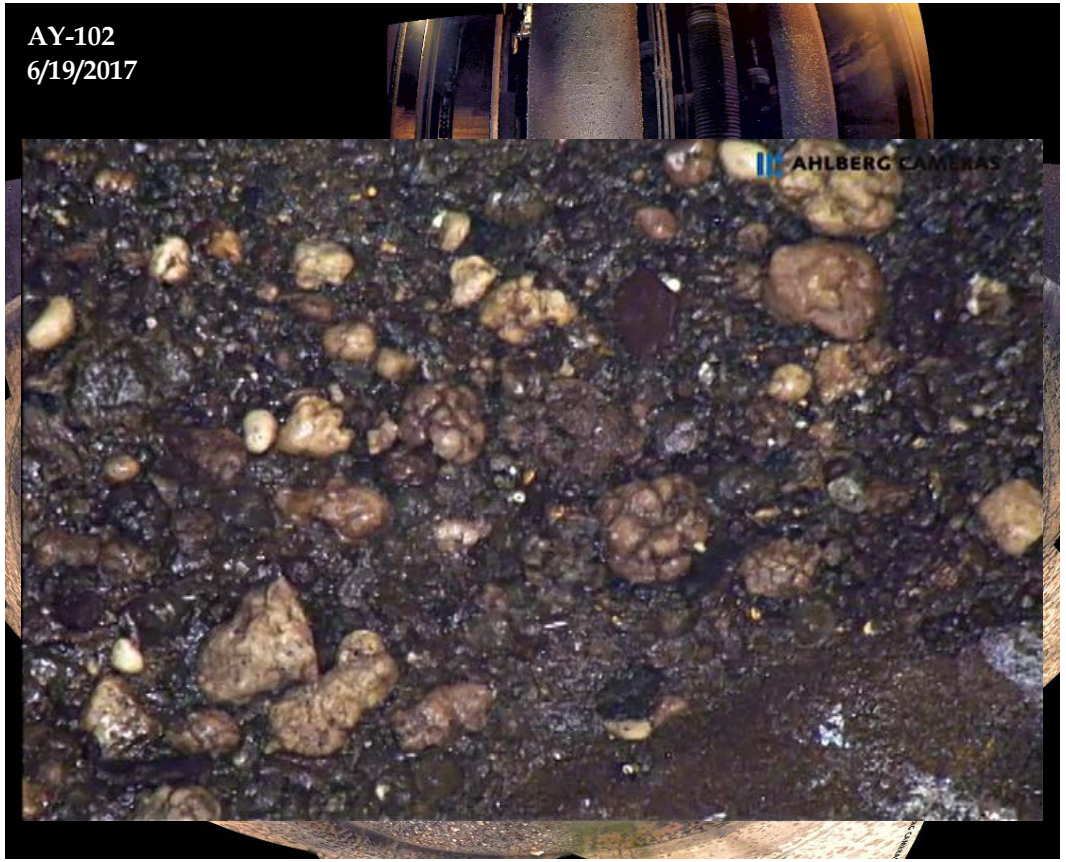
HIGH-PRESSURE WATER OPERATIONS VIDEO

- Applied high-pressure water to the suspected leak site area to further clear residual settled solids in preparation for visual examination
- ~10 gpm at ~5,000 psi discharge pressure
- Nozzle ~1 foot above surface
- Bubbles observed at two sites near perpendicular weld seams
- Provided confirmation of two primary tank failure points



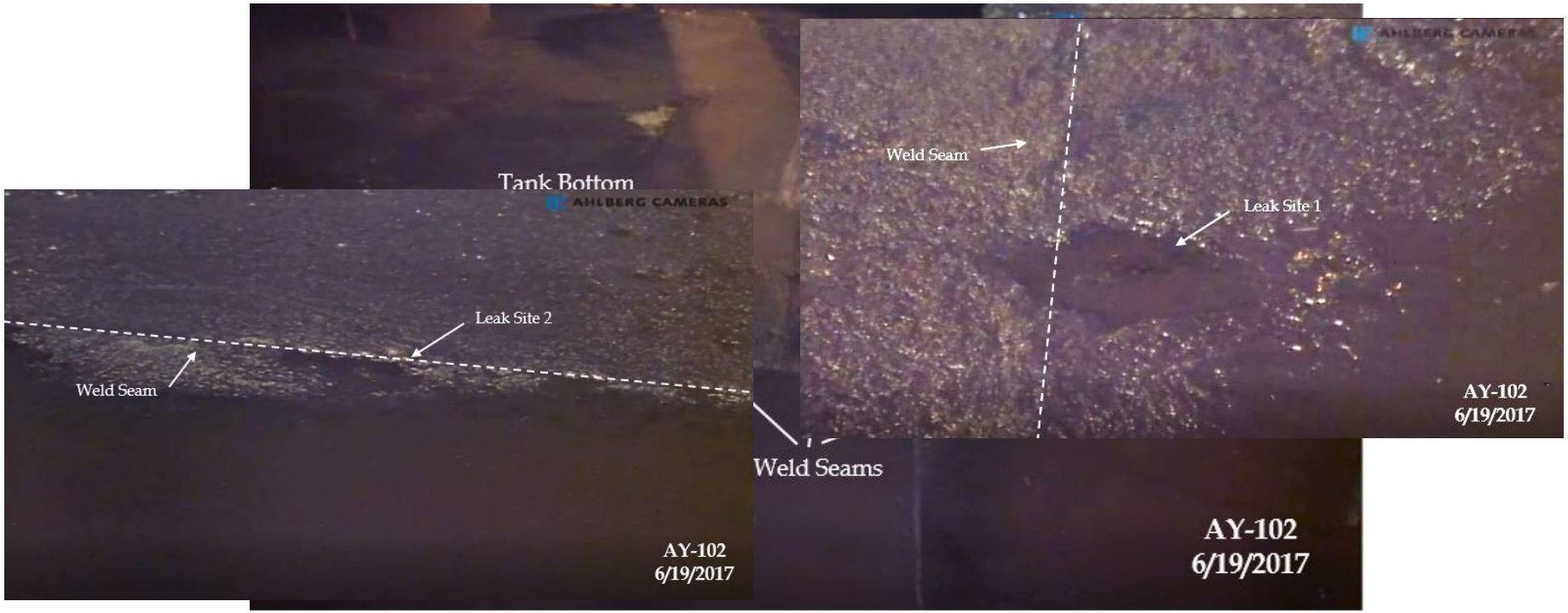
HIGH-DEFINITION CAMERA OPERATION

- High-definition video camera installed on 6/8/2017
- Repositioned in-tank lights and performed initial examination on 6/19/2017
- Enhanced imagery of the residual waste and the two confirmed primary tank leak sites
- Weld seams visible
- Shallow liquid layer remained



HIGH-DEFINITION VIDEO

- **Confirmed leak sites (bubble sites) located within discontinuities along weld seams, appearing as depressions**
  - Leak Site 1 appears to be within a ~2-inch-wide area
  - Leak Site 2 appears to be within a ~4-inch-wide area



THEORIZED FAILURE MECHANISM

- **Panel of external experts in the field of corrosion (Tank Integrity Expert Panel) reviewed the information to-date.**
- **Based on tank operational history and post-retrieval examinations, the following opinions were put forth:**
  - The metallurgical leak cause appears to be internal pitting corrosion coincident with welds.
  - Corrosion testing of AY-102 early-life waste simulants indicates pitting as a likely degradation mechanism
  - Pitting corrosion due to early-life waste composition would not be localized
  - External corrosion cannot be eliminated as a contributing factor without additional inspection.
  - The inspection to-date does not assure that all leak sites have been identified.

PATH FORWARD

- **Primary objective is to fulfill the requirements of the Settlement Agreement with State of Washington, including:**
  - Completing an inspection to determine the cause of the leak
  - Inspection results will aid in a decision to repair or close the tank
- **Waste tank sample planned to assess the residual concentration of species contributing to groundwater risk**
- **Additional HD video is anticipated with enhancement to the lighting conditions and following further evaporation**
- **Implementing field changes to allow residual annulus waste to be pumped to an alternate DST**

QUESTIONS?