Savannah River Remediation
AECOM | BECHTEL | CH2M HILL | B&W | AREVA

INTEROFFICE MEMORANDUM

SRR-LWE-2014-00162, Rev. 0
RSM Tracking: 10080

February 12, 2015

Title: Video Inspection Plan for Tank 12 During Tank Grouting Activities

Purpose:
Tank 12 and its associated installed equipment (to be abandoned in place) will be filled with grout. This inspection plan covers the monitoring with an in-tank video camera system during this process.

Background:
High Level Waste Tank 12 is undergoing closure and is required to be filled with grout for the purpose of chemically stabilizing residual material, filling the tank void space, and discouraging future intrusion.

The bulk fill grout will be placed through primary tank risers 1, 3, 5, 8, and Annulus risers West and East. Successful placements of the bulk fill grout using multiple pour points are expected to mitigate potential grout flow interference. Grout will be supplied from concrete trucks in nominal eight cubic yard batches. The concrete trucks will empty into a hopper integral to a portable diesel driven grout pump(s). The pump(s) will push the grout through slicklines to the pour locations identified in the Tank 12 Grout Strategy [2]. Risers 1, 3, 5, 8, and Annulus risers West and East will be prepared to allow addition of the grout utilizing a slickline connected to a flexible tremie. A tremie is a pipe used to place freshly mixed concrete or grout in a specific location. The tremie is inserted through a riser access port(s) to allow introduction of the bulk fill grout into the tank. The tremie length is such that the anticipated free fall height of the grout will prevent segregation of grout constituents. Various types of equipment from waste tank operations, bulk waste removal, and heel removal campaigns remain in the waste tank. The plan is to grout the retired equipment in place or entomb the equipment. The tank grout filling progress will be monitored by an in-tank video camera system. To determine the grout level in the tank, both the quantity of grout added and visual reference markings in the tank will be used.

The use of four video cameras to monitor annulus grouting will not provide 100% coverage of the annulus. However, there are no obstructions large enough in the tank annulus that would stop the flow of grout around the annulus circumference. Based on Closure Engineering review of the Tanks 5 and 6 grouting of the annulus, the grout flow from the two riser locations on the tanks provided adequate grout flow in areas outside the field of view.

Tank Information:
Tank 12 is a Type I tank in the H-Area Tank Farm, grouped with Tanks 9 through 12.

Tank 12
Following the final waste removal operations, residual material mapping of the Tank 12 volume concluded the residual inventory of the tank was approximately 1,500 gallons in the primary, 400 gallons of coating on the cooling coils, and approximately 30 gallons in the annulus [1].

Tank 12 Characteristics
- Type I
- 750,000 gallons (nominal capacity)
- 24.5 feet (294 inches) – Primary Tank Liner Height
- 149.25 inches "typical" – Riser Height above Tank Roof
- 75 feet – Tank Diameter including annulus

Tank 12 installed equipment to be grouted in place -See Ref [2]:
- Riser 6 – Abandoned Transfer Jet
- Riser 7 –Submersible Transfer Pump
- Center Riser – Abandoned Dewatering Pump
- Near Riser 4 and West Wall of Valve House -Robotic Sampling Crawler
- North Riser – Annulus Jet

Tank and Annulus Baseline Inspection (Data) Prior to Grouting:

Perform a detailed inspection of Tank 12 to verify and document equipment remaining in the primary tank and annulus. This inspection is to be performed within 30 days of grout initiation. This record will be a recorded video and will be used to verify assumptions in the "Equipment to Remain in Tank 12" per the SCDHEC/EPA approved Industrial Wastewater Closure Module for the Liquid Waste Tank 12 [4] which was developed based on the Tank 12 grout strategy [2]. A DVD copy of this inspection is to be provided to Closure Engineering and Regulatory Management and Administration (RM&A). It is anticipated this will require one camera, moved from riser to riser as required to obtain a sufficient unobstructed view of each riser to adequately confirm the presence or absence of in-tank equipment.

Inspection Type:

The "Inspection Type" is Video.

Recording Criteria/Quality:

A title describing Tank 12, camera location, and date time stamp to be included on all recordings. Quality of the recording shall be "standard".

Tank Baseline Inspection

- Number of Cameras – minimum one (1)
- Range of Height: Inspection coverage will be from tank bottom through top of tank.
- Range of Reach: Center Riser out to walls,
- Perform a detailed inspection of Tank 12 to verify and document equipment remaining in tank.

Annulus Baseline Inspection

- Number of cameras – minimum one (1)
- Range of height – Grade level through top of tank. See Ref. [3]
- Perform a detailed inspection of Tank 12 to verify and document equipment remaining in the annulus.

Inspections During Grouting:

Inspection Type:
For Tank 12 the "Inspection Type" is Video.

Recording Criteria/Quality:
A title, camera location, and date time stamp to be included on all recordings. Quality of the recording shall be "standard".

Tank 12 Primary Tank Grouting Coverage:

- Range of Height: Inspection coverage will be from tank bottom through top of tank.
- Range of Reach: Center Riser out to walls, with attention to the grout/tank wall interface.
- Monitor grout being discharged from the tremie and the grout flow to the tank walls.
- Monitor grout fill of abandoned equipment.
- Monitor tank level based on landmarks and/or abandoned equipment.
- Verify discharge of line clearing "pig".
- Tremie monitoring (during operation and disconnection)
- Number of Cameras: minimum four (4). Located in Risers 1, 3, 5 and 8. (See Attachment 2).
- Auxiliary Lighting: As required to adequately light the tank.

Tank 12 Annulus Grouting Coverage

- Range of Height: Inspection coverage will be from tank bottom through top of annulus.
- Range of Reach: Primary tank wall out to outer vault wall, with attention to the grout/annulus wall interface.
- Monitor grout being discharged from the tremie(s) and the grout flow in the annular space.
- Monitor annulus level (where possible) based on landmarks and/or abandoned equipment.
- Verify discharge of line clearing "pig".
- Tremie monitoring (during operation and disconnection)
- Number of Cameras: minimum two (2). Located in East, and West risers. (See Attachment 2).
- Auxiliary Lighting: As required to adequately light the annulus. Lighting suggestions are in Attachment 2.

Tank 12 Frequency:
Monday through Friday, Day Shift (10 hour – expected hours are 7 a.m. to 5 p.m.)

Inspections – Inspections shall be performed, at a minimum, at the initial, middle, and end of the shift. These inspections are to look for grout anomalies and to verify no voids are visible (requirement from RM&A). Additional recordings may be requested throughout the grouting process. Copies of these inspections (either DVD or Hard-drive) shall be available upon request.

Video Monitoring – The video monitoring will be continuous during the shift. This especially becomes important during line clearing operations. All line clearing operations should be monitored by Construction to verify discharge of line clearing "pig". All video monitoring shall be recorded and maintained as a permanent record. Method of recording shall be DVD. The date and time will be recorded on the video. The Person-In-Charge (PIC) will be responsible for entering grout activity information in a log with the date and time that correlates back to the date and time on the video. An example of a log entry is "Initial inspection inside Tank 12. No voids observed. 0500-0600, 10/20/15."

Tank 12 Monitoring Requirements:
Provide two (2) monitoring locations (one in the camera van and one in a Command Center). See Attachment 1 for proposed monitoring locations.

Miscellaneous:
It is not required that all primary tank and annulus cameras be operational simultaneously. It is anticipated cameras will be rotated between the primary tank and annulus, during grouting of the primary tank or annulus respectively.

Monitoring During Grouting:

I&M to provide camera coverage of:

- Cement mix truck unloading area including the TK-70 grout pump hoppers.
- General camera coverage of the service road southeast of Tanks 9-12.
- Primary and/or Annulus Riser being grouted.

Responsibilities:

I&M

- Perform inspections in accordance with applicable qualified inspection procedures and plans.
- File recordings.
- If required, replace all failed cameras prior to next inspection day.

Closure Engineering/RM&A

- Provide I&M with inspection requests for scheduling.

Procedures:

SW11.1-INSPECTION (I&M)

References:

[1] U-ESR-H-00125, Revision 0, "Tank 12 Final Residual Solids Determination and Uncertainty Estimate," J. Clark, 10/2014.
[2] SRR-LWE-2014-00147, Revision 0, "Tank 12H Grout Strategy," C. Walters, 1/28/2015.
[3] W146593, Revision 49, "Dehumidification System Heating And Ventilation (U), 1/2000.
[4] SRR-CWDA-2014-00086, Revision A, "Industrial Wastewater Closure Module for the Liquid Waste Tank 12H H-Area Tank Farm Savannah River Site", TBD

Attachments:

Attachment 1 - Proposed Tank 12 Monitoring Locations

Attachment 2 - Tank 12 Riser Proposed Camera/Light Locations

Attachment 3 - Riser Covers

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Management Approval By:

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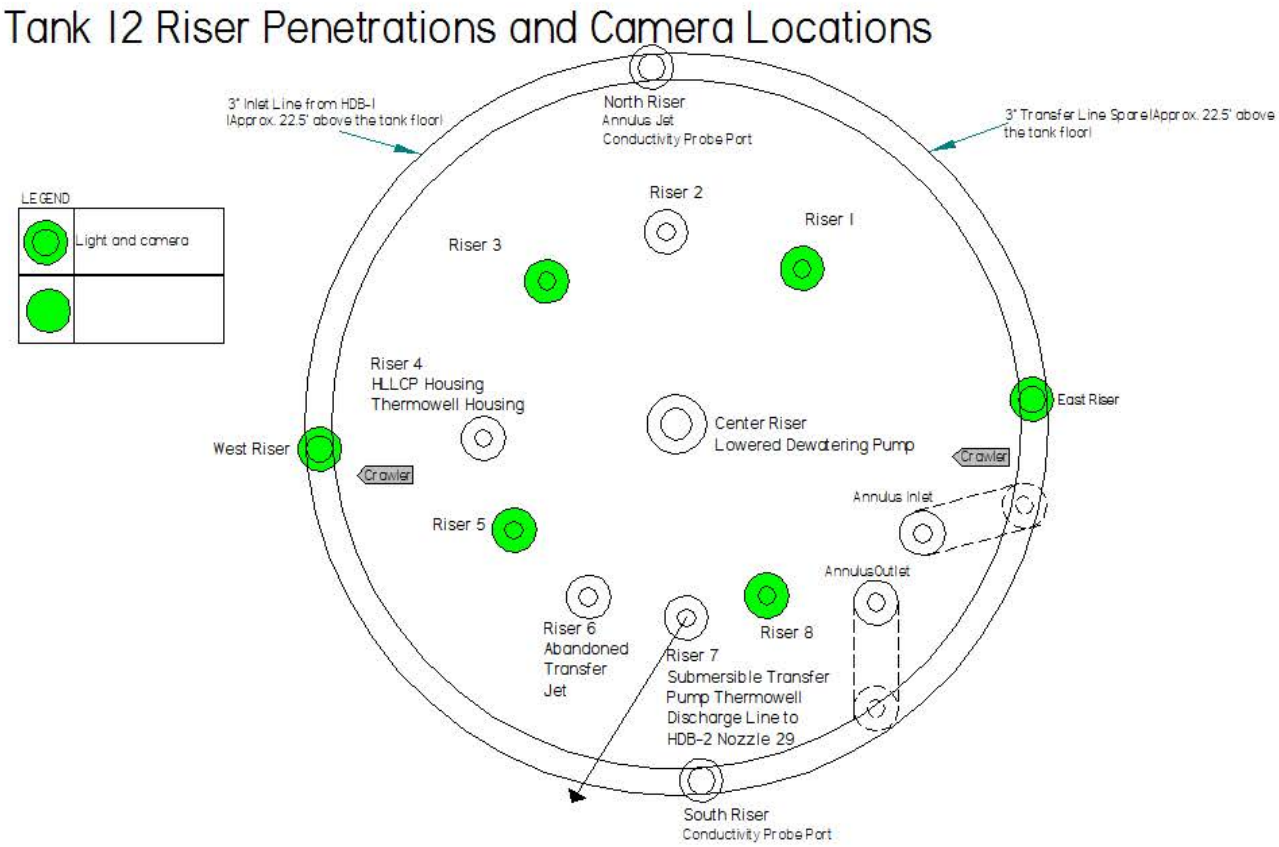
Proposed Camera Van Location

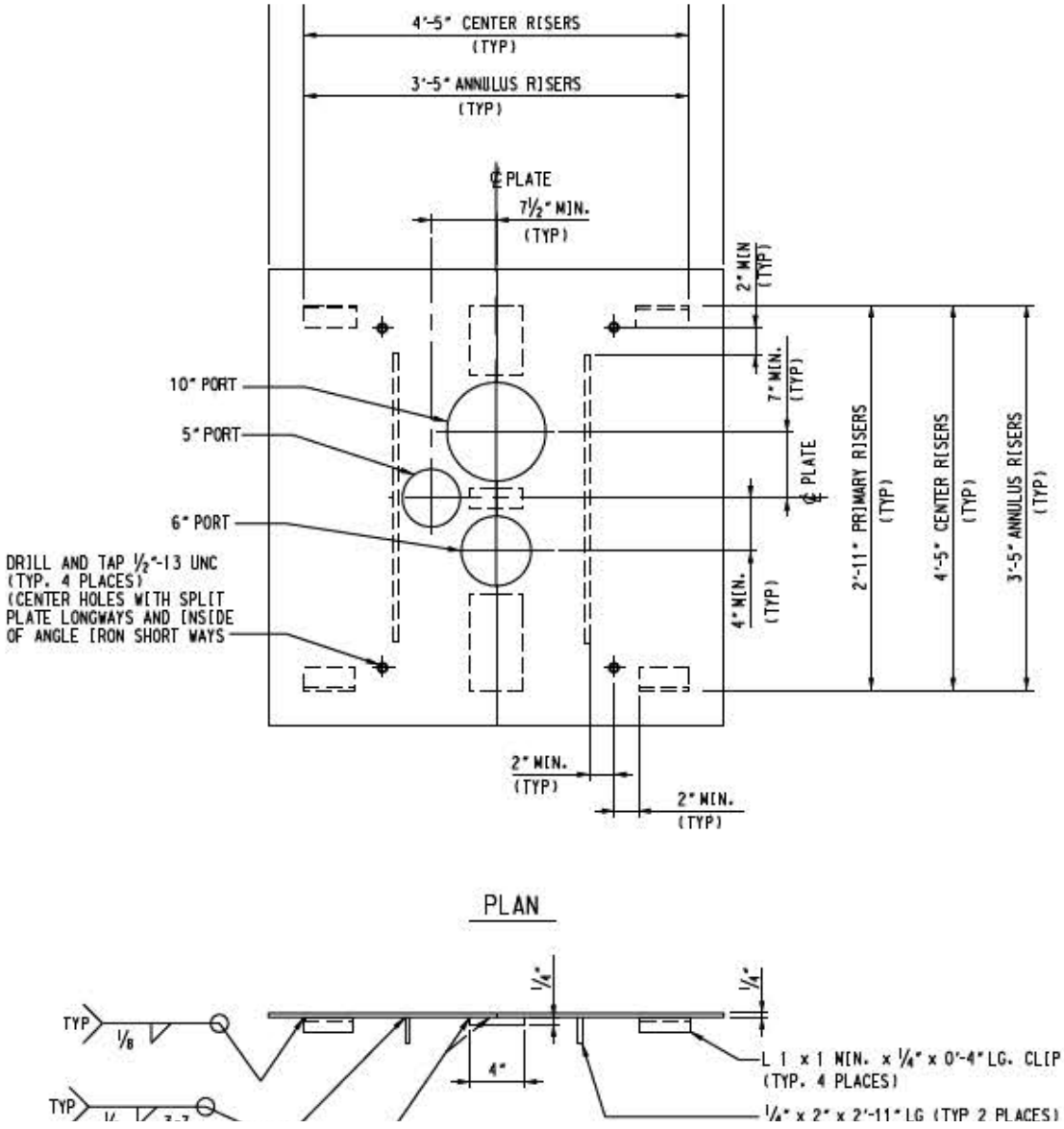
Proposed Command Center Location

<u>Attachment 2</u>: Tank 12 Riser Proposed Camera/Light Locations



<u>Attachment 3</u>: Riser Covers

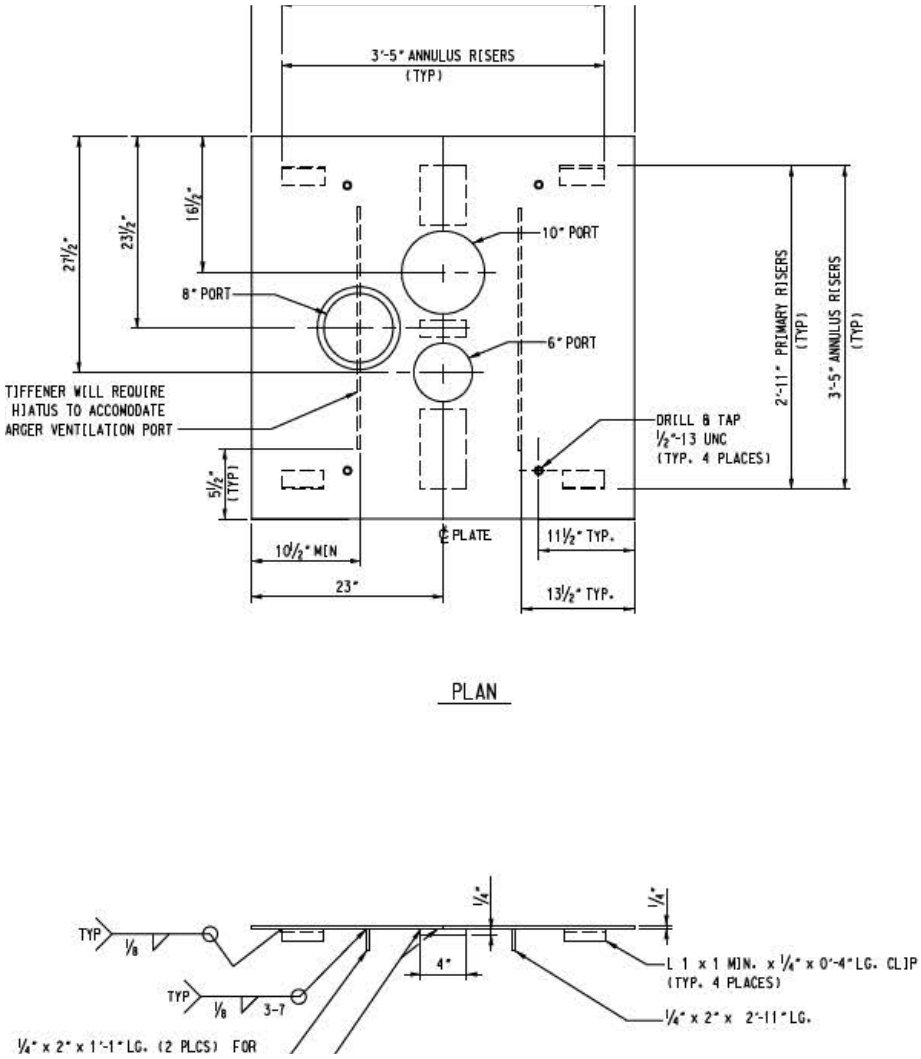
Risers 1, 3, 5, and 8 - Grout Plate - P-PM-F-00326



Three potential openings are available on each riser (1 – ten [10] inch diameter, 1 – six [6] inch diameter and 1 – five [5] inch diameter). Construction will use the 10 inch opening to install grout addition line. Remaining openings can be used to provide camera and lighting access.

East and West Riser: P-PM-F-00326

East and West Riser



Three potential openings are available on each riser (1 – ten [10] inch diameter, 1 – eight [8] inch diameter and 1 – six [6] inch diameter). Construction will use the 10 inch opening to install grout addition line. Remaining openings can be used to provide camera and lighting access.