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Tank 12 Internal Equipment Evaluation

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1.0 Purpose

This report documents the total remaining volume of residual material left in the Tank 12 equipment after all cleaning operations. The scope of this evaluation is limited to equipment that will remain in the tank and ultimately be grouted in-place as the tanks are closed.

2.0 Evaluation

Equipment to remain in the primary and annulus of Tank 12 is included in this evaluation and shown in Table 4.1-1 and 4.1-2 of reference 4.1.

As part of this evaluation, ancillary equipment which never contacted the waste (e.g. radar cone, High Liquid Level Conductivity Probe (HLLCP), downcomers, etc.) is classified as containing no residual waste. Equipment that will be grouted in place that is a straight pipe (e.g, Thermowells) capped on the bottom is classified as containing no residual waste. Various abandoned probes and cabling inside the waste tank contain no significant void space (4.4). Additionally, the void space associated with the abandoned center riser dewatering pump is insignificant. The film on the cooling coils, heating and ventilation (HV) riser, support columns, tank wall, and tank floor is not considered in this evaluation.

The only potential for waste deposit/film would be in the equipment's void space and the area outside of the equipment that once contacted the waste. The film remaining on the outside of the equipment is far less than the calculated hold-up volume. Therefore, the hold-up volume remains the most conservative estimate of waste on Tank equipment. The internal void space from each piece of equipment will be measured using its cross sectional area and height.

The calculated hold-up volume (4.3) (Residual material that is assumed to be held inside the equipment, such as material left at low points, will be considered hold-up volume. Hold up volume can also be void space inside the equipment that does not contain grout) in the equipment. The estimated amount of material held up is calculated using the internal void space volume exposed.

Calculated Hold-Up Volume:

Tank 12 contains several pieces of equipment (see Table 1);

1. Additional equipment was introduced into the tank for sampling purposes. This equipment includes the use of two crawlers similar to the Tanks 5 and 6 crawlers. One crawler is abandoned near Riser 6 while the other is abandoned northeast of the center column. Per reference 4.3 the crawlers will not contain residual waste (either internal or film).

2. Tank 12 Riser 6 contains an abandoned transfer jet. P-DCP-H-04009 relocated the Tank 12 Riser 7 transfer jet to Tank 12 Riser 6. Riser 6 has two riser plates, an upper riser plate that rest atop the 36'' square riser opening, and a lower riser plate that rest on the lower 23'' riser opening. The upper riser plate has two access ports, one available for access and the other containing the remains of a conductivity probe. The lower riser plate supports the transfer jet and has one open (plug not installed) access port. Due to ALARA and exposure concerns, the transfer pump (Detail W of 4.5) will remain in the tank and grout filled to the best extent practical. The transfer pump has an open 3'' discharge line and a taped 1'' supply line. The transfer jet also contains a 3/8'' spray ring (Detail V of Reference 4.5) under the lower riser. Grout is not expected to flow into the spray ring and due to the spray ring size; the amount of hold-up volume is insignificant. The tape on the 1'' supply line will be removed. Grout will be poured through the upper riser access ports to fill the entire riser and subsequently flow into the transfer pump lines to the extent practical. A 3'' jacket pipe on a 1'' core pipe exists on the bottom leg of the transfer pump. This area will be considered void space and is documented in Table 1.
3. Tank 12 Riser 7 contains a Standard Transfer Pump (STP) and a caisson with thermowell (4.6, 4.7, and 4.8). A similar pump (Tank 18 Northeast Riser & Tank 6 Riser 6) was estimated to have 995 cubic inches or 4.3 gallons of internal volume. (4.3)
4. Tank 12 North riser contains a Annulus Transfer Jet. M-DCF-H-12724 (4.10) will isolate the annulus jet. Grout fill connections will be installed on the inlet and outlet of the annulus jet for grout fill. The fill connections will include the pipe jacket. The conductivity probe will be electrically cut and lowered. The remaining housing will be grout filled. The transfer jet screen shown on Detail U of reference 4.9 could contain holdup volume and is conservatively modeled as a 1ft by 1ft by 3 inch cube. The suction leg on Detail T of reference 4.9 could contain holdup volume and is conservatively modeled as a 72'' long 2'' diameter schedule 40 pipe.

Table 1: Estimated Hold-Up Internal Volume of Tank 12 Equipment

Riser	Equipment	Wet End Dia. (inches)	Wet End Height (inches)	Wet End Volume (inches ³)	Gallons
Riser 6	Abandoned Transfer Jet	[ID of Outer Pipe-OD of Inner Pipe] 3.068-1.315	200.5	1210	5.24
Riser 7	Submersible Transfer Pump	13	7.5	995	4.3

Near Riser 4 and West Wall of Valve House	Two Crawlers	N/A	N/A	N/A	0
North Riser	Annulus Jet	3 2.067	12 72	432 213	1.87 0.92

Summary:

- 9.54 gallons is the total estimated residual waste on equipment in the primary tank.
- 2.79 gallons is the total estimated residual waste on equipment in Tank 16 Annulus.

3.0 Conclusion

The equipment remaining in Tank 12 contains no significant inventory. The tank contains an abandoned transfer jet, submersible transfer pump, two crawlers, and an annulus jet. The maximum remaining void space treated as maximum residual waste volume is 12.3 gallons.

4.0 References

- 4.1 SRR-LWE-2014-00147, Revision 0, "Tank 12H Grout Strategy," C. D. Walters, January 2015.
- 4.2 CBU-SHP-2006-00009, Revision 0, "Recommended Radioactive Material Buildup and Decontamination factor for the MCU facility (U)", D. Thames, July 2006.
- 4.3 SRR-LWE-2012-00102, Revision 0, "Tanks 5 and 6 Internal Equipment Evaluation," R. Voegtlen, June 2012.
- 4.4 SRR-CWDA-2013-00079, Revision 0, "Cabling and Probe Abandonment within H Tank Farm Waste Tanks," M.H. Layton, June 2013.
- 4.5 S5-2-3512, Revision 12, "Waste Store Tanks 11 & 12 Supernate Transfer Jet Section & Details (U)," March 2005.

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- 4.6 P-PA-H-8959, Revision 0, "Waste Removal Processing Facilities Tank 12 Transfer Pump Installation Details" September 2006.
 - 4.7 P-PA-H-8960, Revision 0, "Waste Removal Processing Facilities Tank 12 Transfer Pump Installation Details" September 2006.
 - 4.8 P-PA-H-8961, Revision 0, "Waste Removal Processing Facilities Tank 12 Transfer Pump Installation Details" September 2006.
 - 4.9 S5-2-6654. Revision 15, "Waste Storage Tanks No. 1 Thru 12 Annulus Transfer Jet Details," September 1982.
 - 4.10 M-DCF-H-12724, Revision 0, "Tank 12 Riser # 2 D&R and Install Grout Plate" October 2014.