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Tank Inspection NDE Results for Fiscal Year 2014, Waste Tanks 26, 27, 28 and 33

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REVIEWS AND APPROVALS

EXECUTIVE SUMMARY

Ultrasonic nondestructive examinations (NDE) were performed on waste storage tanks 26, 27, 28 and 33 at the Savannah River Site as a part of the "In-Service Inspection (ISI) Program for High Level Waste Tanks." No reportable conditions were identified during these inspections. The results indicate that the implemented corrosion control program continues to effectively mitigate corrosion in the SRS waste tanks.

Ultrasonic inspection (UT) is used to detect general wall thinning, pitting and interface attack, as well as vertically oriented cracks through inspection of an 8.5 inch wide strip extending over the accessible height of the primary tank wall and accessible knuckle regions. Welds were also inspected in tanks 27, 28 and 33 with no reportable indications.

In a Type III/IIIA primary tank, a complete vertical strip includes scans of five plates (including knuckles) so five "plate/strips" would be completed at each vertical strip location. In FY 2014, a combined total of 79 plate/strips were examined for thickness mapping and crack detection, equating to over 45,000 square inches of area inspected on the primary tank wall. Of the 79 plate/strips examined in FY 2014 all but three have average thicknesses that remain at or above the construction minimum thickness which is nominal thickness minus 0.010 inches. There were no service induced reportable thicknesses or cracking encountered.

A total of 2 pits were documented in 2014 with the deepest being 0.032 inches deep. One pit was detected in Tank 27 and one in Tank 33. No pitting was identified in Tanks 26 or 28. The maximum depth of any pit encountered in FY 2014 is 5% of nominal thickness, which is less than the minimum reportable criteria of 25% through-wall for pitting.

In Tank 26 two vertical strips were inspected, as required by the ISI Program, due to tank conditions being outside normal chemistry controls for more than 3 months.

Tank 28 had an area of localized thinning on the exterior wall of the secondary tank noted during the initial inspections in 2005. That area was inspected again in 2014 and found to be larger and slightly deeper. The deepest area of thinning in the secondary wall is less than 20% wall loss. The maximum length of thinning is less than 24 inches and does not impact structural or leak integrity per WSRC-TR-2002-00063.

Inspection results were presented to the In-service Inspection Review Committee (ISIRC) where it was determined that no additional data was required to complete these inspections.

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1 Introduction

In-service inspection is an essential element of a comprehensive structural integrity program for the carbon steel waste tanks at the Savannah River Site. Inspection confirms the effectiveness of corrosion controls used to preclude localized and general corrosion of the tanks. Ultrasonic inspection (UT) is used to detect general wall thinning, pitting and interface attack, as well as vertically oriented cracks through inspection of an 8.5 inch wide strip extending over the accessible height of the primary tank wall and accessible knuckle regions. Selected welds are also inspected for cracking parallel or perpendicular to the weld.

Ultrasonic (UT) nondestructive examinations (NDE) were performed on waste storage tanks 26, 27, 28 and 33 at the Savannah River Site as a part of the "In-Service Inspection (ISI) Program for High Level Waste Tanks." [1] No reportable conditions were identified during these inspections. The results indicate that the implemented corrosion control program continues to effectively mitigate corrosion in the SRS waste tanks. The inspections were performed from the annular space of the Type III/ IIIA, 1.3 million gallon waste storage tanks. The ISI Program calls for thickness mapping and crack detection scans on specified areas of the tank covering all present and historic interface levels and selected welds with particular emphasis on the highest stress region of the tank.

Tank 26 was not scheduled to be inspected as part of the ISI program this year as it received a full inspection in 2011. Two vertical strips were inspected in Tank 26, as required by the ISI Program, due to tank conditions being outside normal chemistry controls for more than 3 months.

2 NDE Inspection Requirements

Results of the previous round of thickness mapping inspections utilizing continuous P-scan techniques on the tanks inspected this year are documented in the following reports:

- Tank 26 – SRNL-STI-2011-00495 [2]
- Tank 27 and Tank 33 - WSRC-TR-2006-00002 [3]
- Tank 28 - WSRC-TR-2005-00039 [4]

The current revision of the ISI Program (C-ESR-G-00006, Rev. 4) includes a randomly selected vertical strip in each quadrant of the tank to further address the issue of circumferential uniformity and statistical evaluation of the program. Up to four random strips are examined in each tank. In addition to the random strips a baseline strip is completed to evaluate corrosion from the previous inspection.

The current revision of the ISI Program calls for the following regions of a tank to be inspected:

- Liquid vapor interfaces for thinning, pitting and cracking
- Liquid sludge interfaces for thinning, pitting and cracking
- Upper weld of lower knuckle of primary tank (5% of accessible circumference) for cracking
- Lower knuckle base material for cracking
- External surface of primary tank (includes vapor space) for thinning, pitting and cracking
- Random vertical strips for thinning and pitting
- Air channel/bottom plate of the tank for thinning and pitting
- Vertical weld for cracking
- Secondary tank for thinning and pitting
- High stress areas of primary tank for cracking

A tank specific scan plan describing the inspections required this year was issued for each tank. These inspection details are listed in Section 4.

3 NDE TECHNIQUES

NDE inspections included remote automated ultrasonic (AUT) inspection utilizing longitudinal waves for thickness mapping and pit detection and shear waves for crack detection.

4 NDE DATA COLLECTION AND ANALYSIS

4.1 Tank Design and Service History

All Type III/IIIA tanks are 1.3 million gallon capacity, double shell tanks with an annular space and were fabricated to ASME BPV Section VIII from carbon steel as detailed in Table 1. After all fabrication work was completed, the primary tank was stress relieved. Access to the annular space and the exterior surface of the primary tank is through 8 inch diameter, vertical, carbon steel risers that are four feet six inches long. Figure 1 provides a side view of a typical Type III/IIIA tank while Figure 2 shows the riser layout for Tank 26.

Figure 1: Side View of a Typical Type III/IIIA Tank

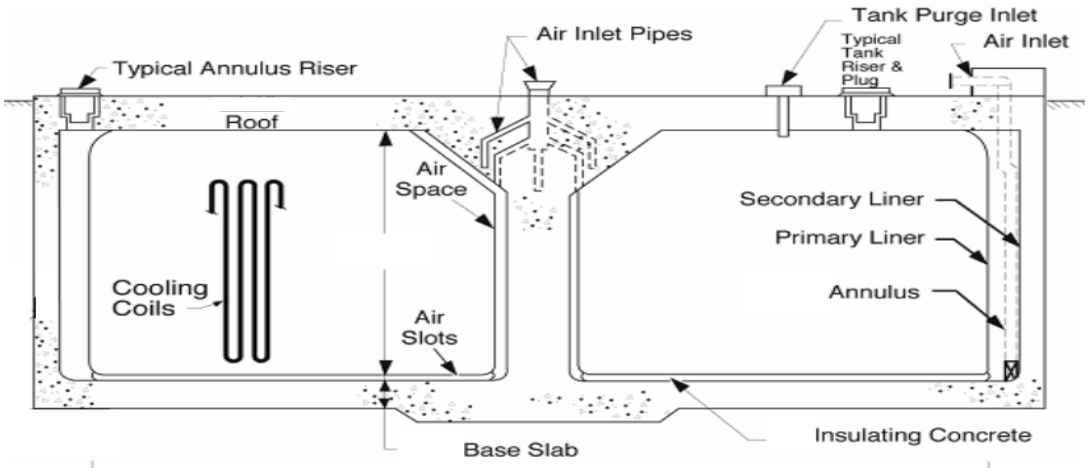


Figure 2: Typical Type III/IIIA Waste Tank Riser Layout – Tank 26

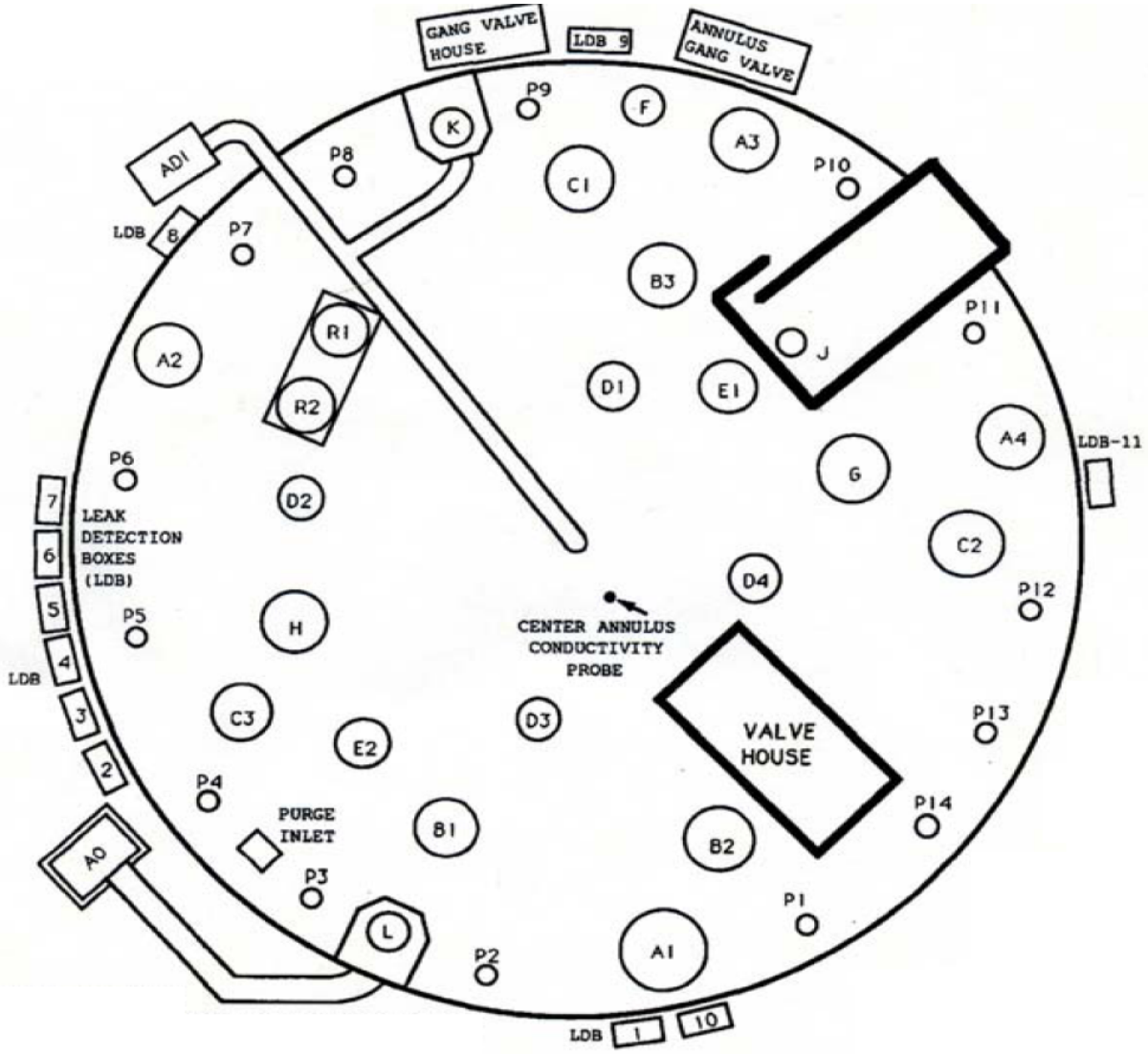


Table 1 Tank Fabrication, Service and Inspection Summary

Tank #	Tank 26 (1)	Tank 27	Tank 28	Tank 33
Tank Farm	F-Area/FTF	F-Area/FTF	F-Area/FTF	F-Area/FTF
Entered Radioactive Service	1980 (34 years service at time of inspection)	1980 (34 years service at time of inspection)	1980 (34 years service at time of inspection)	1969 (44 years service at time of inspection)
Top Knuckle Design Thickness	0.500”	0.500”	0.500”	0.500”
Top Plate Design Thickness	0.500”	0.500”	0.500”	0.500”
Middle Plate Design Thickness	0.625”	0.625”	0.625”	0.625”
Lower Plate Design Thickness	0.875”	0.875”	0.875”	0.750”
Bottom Knuckle Design Thickness	0.875”	0.875”	0.875”	0.875”
Secondary Tank Wall and Floor Design Thickness	0.375”	0.375”	0.375”	0.375”
Inspections Performed in FY14	2 Vertical strips on Primary (1)	5 Vertical strips and 2 weld sections on Primary plus Secondary (2)	5 Vertical strips and 2 weld sections on Primary plus Secondary (2)	5 Vertical strips and 2 weld sections on Primary plus Secondary(2)
Scan Plan	SRR-LWE-2014-00066	SRR-LWE-2013-00190	SRR-LWE-2013-00135	SRR-LWE-2014-00081
Job Number	F20140388	F20140242	F20140066	F20140389

(1) Tank 26 was inspected due to corrosion control compliance issues during FY2013.

(2) Current routine inspection includes one vertical strip examination (a repeat of a previous vertical strip), up to four high speed thickness mapping vertical strips (randomly selected one per quadrant), one vertical weld on lower plate section and five percent of the circumference of the top weld of the lower knuckle. Thickness mapping on the secondary wall and floor also included.

4.2 Personnel

Nondestructive examination data was collected and analyzed by certified NDE personnel from the SRNL Materials Science and Technology Directorate. Data collection was performed by James B. Elder, an American Society for Nondestructive Testing, ASNT Central Certification Program Level III UT & VT and Rodney W. Vande Kamp, Level II UT & VT. All data analysis was performed by J. B. Elder and reviewed by R. W. Vande Kamp.

4.3 Data and Record Storage

NDE data and calibration sheets, P-scan data files are stored by the MNDE&C group under the following job numbers. Data sheets are referenced in the ISIRC reports for each tank as listed below:

- Tank 26 - NDE Job numbers F20140388 and ISIRC Report # SRR-LWE-2014-00134
- Tank 27 - NDE Job numbers F20140242 and ISIRC Report # SRR-LWE-2014-00135
- Tank 28 - NDE Job numbers F20140066 and ISIRC Report # SRR-LWE-2014-00136
- Tank 33 - NDE Job numbers F20140389 and ISIRC Report # SRR-LWE-2014-00137

4.4 Field Conditions

Inspections were performed from the annular space of the waste tanks. The wall crawler and cameras were installed in the annulus and operated from the NDE control trailer (see Figure 3) which was up to 100 feet from the riser. Access to the annulus was through inspection ports or risers (see Figure 4). A remote pan & tilt camera was also inserted into the annulus to monitor crawler movement. These annuli are radiologically clean and therefore contamination control huts were not required.

Figure 3: NDE Control Trailer and Generator

Figure 4: Typical Inspection Port / P-Riser

4.5 Scan Plans and Inspection Areas

A tank specific scan plan describing prescribed inspections was issued for each tank. A summary of the inspections prescribed in the scan plans is listed below. Any deviation from the initially prescribed inspections or locations due to field conditions are documented in a revision to the scan plan after the inspections.

4.5.1 Tank 26 Examinations

Scan Plan SRR-LWE-2014-00066 [5]:
The scan plan called for the following specific inspections:

One 8.5 inch wide vertical strip beneath P-05 was selected. The vertical strip was along the accessible height of the tank and looked for thinning, pitting and stress corrosion cracking. The UT resolution was comparable to previous inspections (approximately 50 mil pixel size).

One 8.5 inch wide vertical strip was inspected at a randomly selected area. This inspection had a UT pixel size of 100 mils. The vertical strip was along the accessible height of the tank and looked for thinning and pitting. The following area was randomly selected and location from access riser is as follows: The distance is based on 1° = 0.74'.

- a. QI - 47° = 9 feet counter clockwise from P04 or 4 feet clockwise from P03.

Figure 5 shows a face map for illustration purposes. This sketch indicates the approximate locations for the scans.

4.5.2 Tank 27 Examinations

Scan Plan SRR-LWE-2013-00190 [6]:
The scan plan called for the following specific inspections:

One 8.5 inch wide vertical strip beneath P-06 was selected. The vertical strip was along the accessible height of the tank and looked for thinning, pitting and stress corrosion cracking. The UT resolution was comparable to previous inspections (approximately 50 mil pixel size).

A two square foot area on plates 1, 2, 3 and 4 of the secondary liner was scanned for thinning and pitting beneath the P-06 riser.

A vertical weld on the bottom plate and 5% of the bottom girth weld was scanned for cracking. A vertical weld is located ~2 feet counter clockwise from P-09 and ~ 1-2 feet clockwise from P-8.

A 10 inch wide strip on the annulus floor between the refractory pad and ventilation duct that is accessible was inspected. The location and riser will be based on observations and selected in the field. An area beneath P-06 was selected and examined.

Up to four 8.5 inch wide vertical strips were inspected at randomly selected areas, one in each quadrant of the tank. These inspections had a UT pixel size of 100 mils. The vertical strips were along the accessible height of the tank and will look for thinning, pitting and stress corrosion cracking. The following areas were randomly selected and location from access riser is as follows: The distance is based on 1° = 0.74'.

- QI - 70° = 3 feet counter clockwise from P-05 (change from 72°)
- QII- 180° = 4.5 feet clockwise from P-09 (change from 168°)
- QIII - 216° = .5 feet clockwise from P-10 or 13 feet counter clockwise from P11 (note 206° was originally randomly selected but due to interference from the thermocouple lead 216° is the nearest location available without interference)
- QIV - 339° = 4 feet clockwise from A01

Figure 6 shows a face map for illustration purposes. This sketch indicates the approximate locations for the scans.

4.5.3 Tank 28 Examinations

Scan Plan SRR-LWE-2013-00135 [7]:
The scan plan called for the following specific inspections:

One 8.5 inch wide vertical strip beneath P-06 was selected. The vertical strip was along the accessible height of the tank and looked for thinning, pitting and stress corrosion cracking. The UT resolution was comparable to previous inspections (approximately 50 mil pixel size).

A two square foot area on plates 1, 2, 3 and 4 of the secondary liner was scanned for thinning and pitting beneath the P-06 riser. Localized thinning was observed in plate 1 (top plate) in 2005 and was reexamined.

A vertical weld on the lower plate and 5% of the bottom girth weld was scanned for cracking. A vertical weld is located ~ 3-4 feet clockwise from P05 (17' counter clockwise from P06).

A 10 inch wide strip on the annulus floor between the refractory pad and ventilation duct that is accessible was inspected. The location and riser was based on observations and selected in the field. An area beneath P-06 was selected and examined.

Up to four 8.5 inch wide vertical strips were inspected at randomly selected areas, one in each quadrant of the tank. These inspections had a UT pixel size of 100 mils. The vertical strips were along the accessible height of the tank and will look for thinning, pitting and stress corrosion cracking. The following areas were randomly selected and location from access riser is as follows: The distance is based on 1° = 0.74'.

- QI - 48° = 8 feet counter clockwise from P-04 (change from 23°)
- QII- 152° = 2 feet counter clockwise from P-08
- QIII - 225° = 7.5 feet clockwise from P10 or 7.5 feet counter clockwise from P11
- QIV - 315° = 1.5 feet clockwise from P14

Figure 7 shows a face map for illustration purposes. This sketch indicates the approximate locations for the scans.

4.5.4 Tank 33 Examinations

Scan Plan SRR-LWE-2014-00081 [8]:
The scan plan called for the following specific inspections:

One 8.5 inch wide vertical strip beneath P-10 was selected (area under P11 was used to complete scan as in 2005). The vertical strip was along the accessible height of the tank and looked for thinning, pitting and stress corrosion cracking. The UT resolution was comparable to previous inspections (approximately 50 mil pixel size).

A two square foot area on plates 1, 2, 3 and 4 of the secondary liner was scanned for thinning and pitting beneath the P-12 riser.

Accessible portions of the vertical weld on the lower plate and the bottom girth weld were scanned for cracking. The vertical weld is located ~2 feet clockwise from P09. The portion of vertical weld beneath the strap was limited to a one sided examination due to obstructions from the strap and magnets. Due to the obstructions from the strap and support magnets, the bottom girth weld was limited to a one sided examination (from the knuckle side) and only 117 inches (3.65%) was accessible.

A 10 inch wide strip on the annulus floor between the refractory pad and ventilation duct that is accessible was inspected. The location and riser was based on observations and selected in the field. An area beneath P-12 was selected and examined.

Up to four 8.5 inch wide vertical strips were inspected at randomly selected areas, one in each quadrant of the tank. These inspections had a UT pixel size of 100 mils. The vertical strips were along the accessible height of the tank and will look for thinning, pitting and stress corrosion cracking. The following areas were randomly selected and location from access riser is as follows: The distance is based on 1° = 0.74'.

- QI - 80° = 1 foot clockwise from P12 or 15 feet counter clockwise from P13
- QII- 137° = 15 feet clockwise from P-14 or 9.5 feet counter clockwise from P15
- QIII - 255° = 1.5 feet clockwise from P04 or 18.5 feet counter clockwise from P05
- QIV – 353° = 13.5 feet clockwise from P-07 or 1.5 feet counter clockwise from P08

Figure 8 shows a face map for illustration purposes. This sketch indicates the approximate locations for the scans.

Figure 5: Scan Locations Tank 26

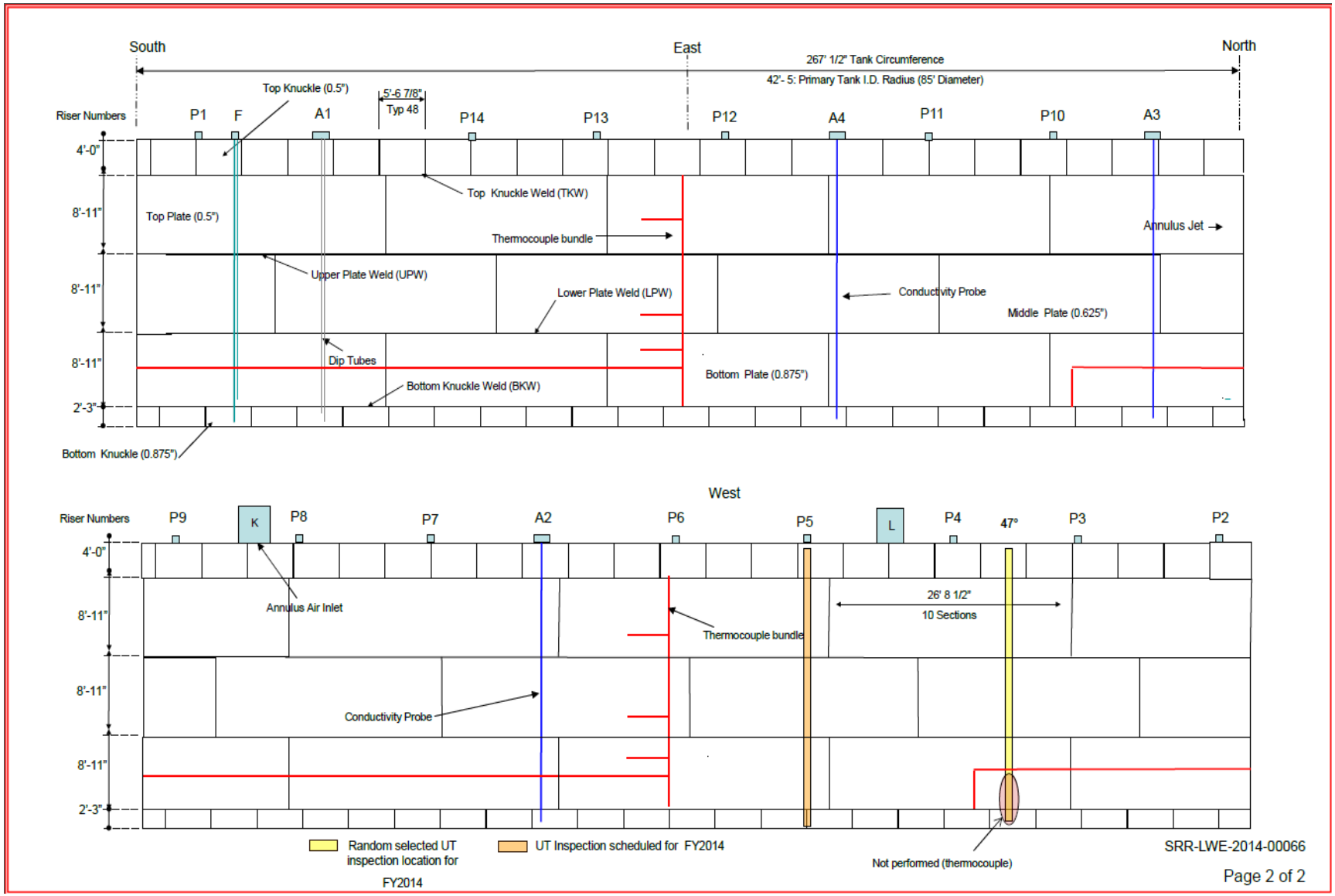


Figure 6: Scan Locations Tank 27

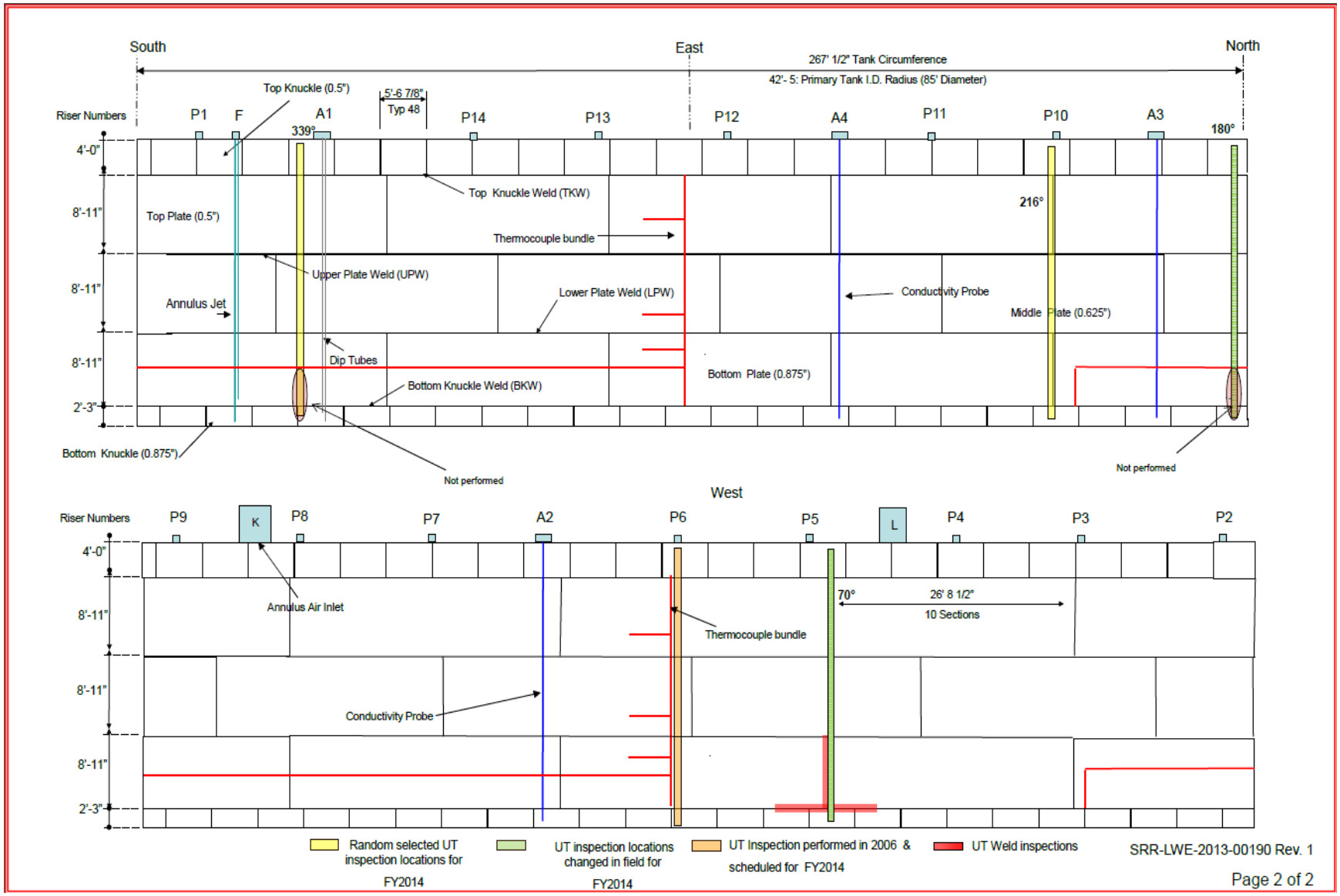


Figure 7: Scan Locations Tank 28

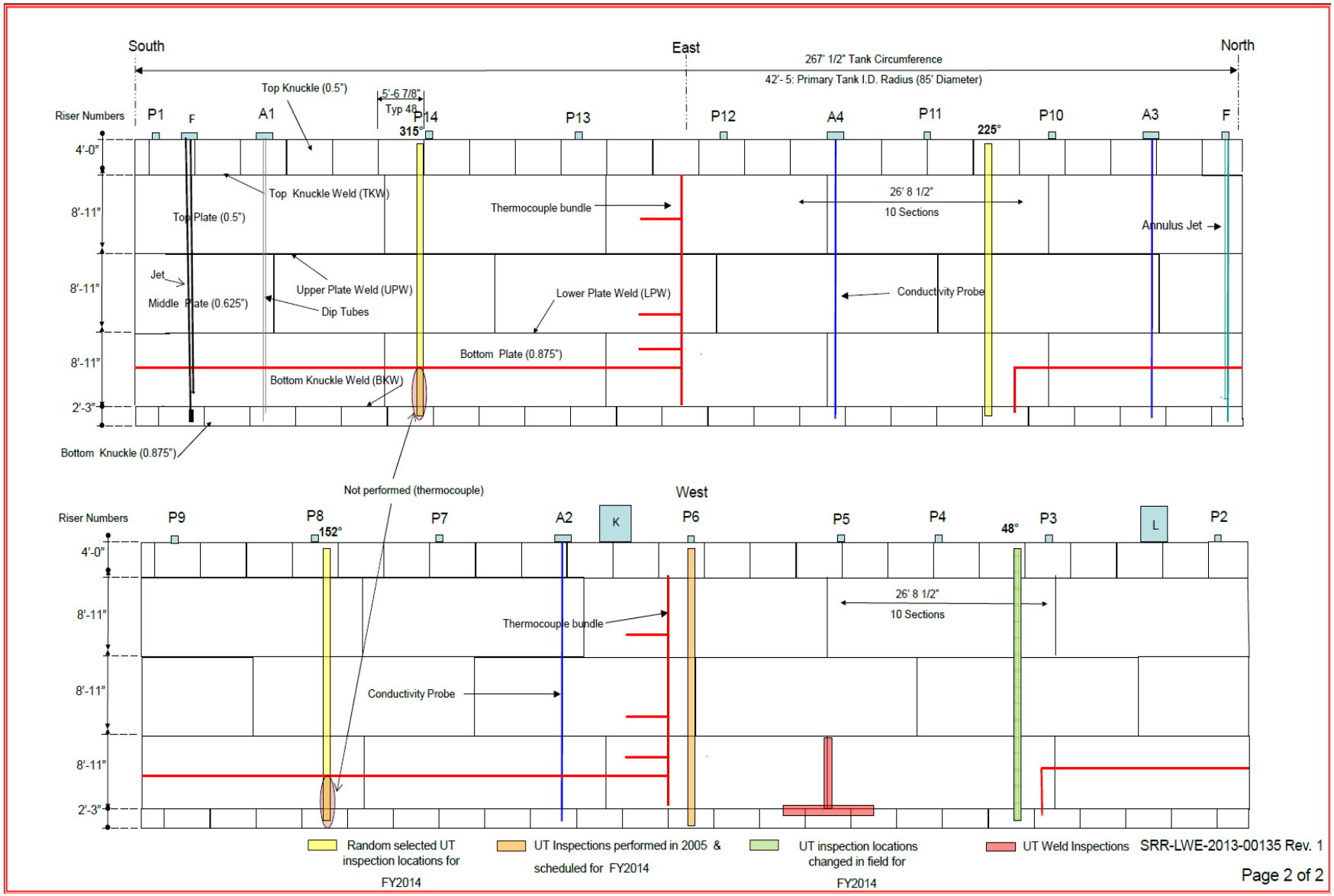
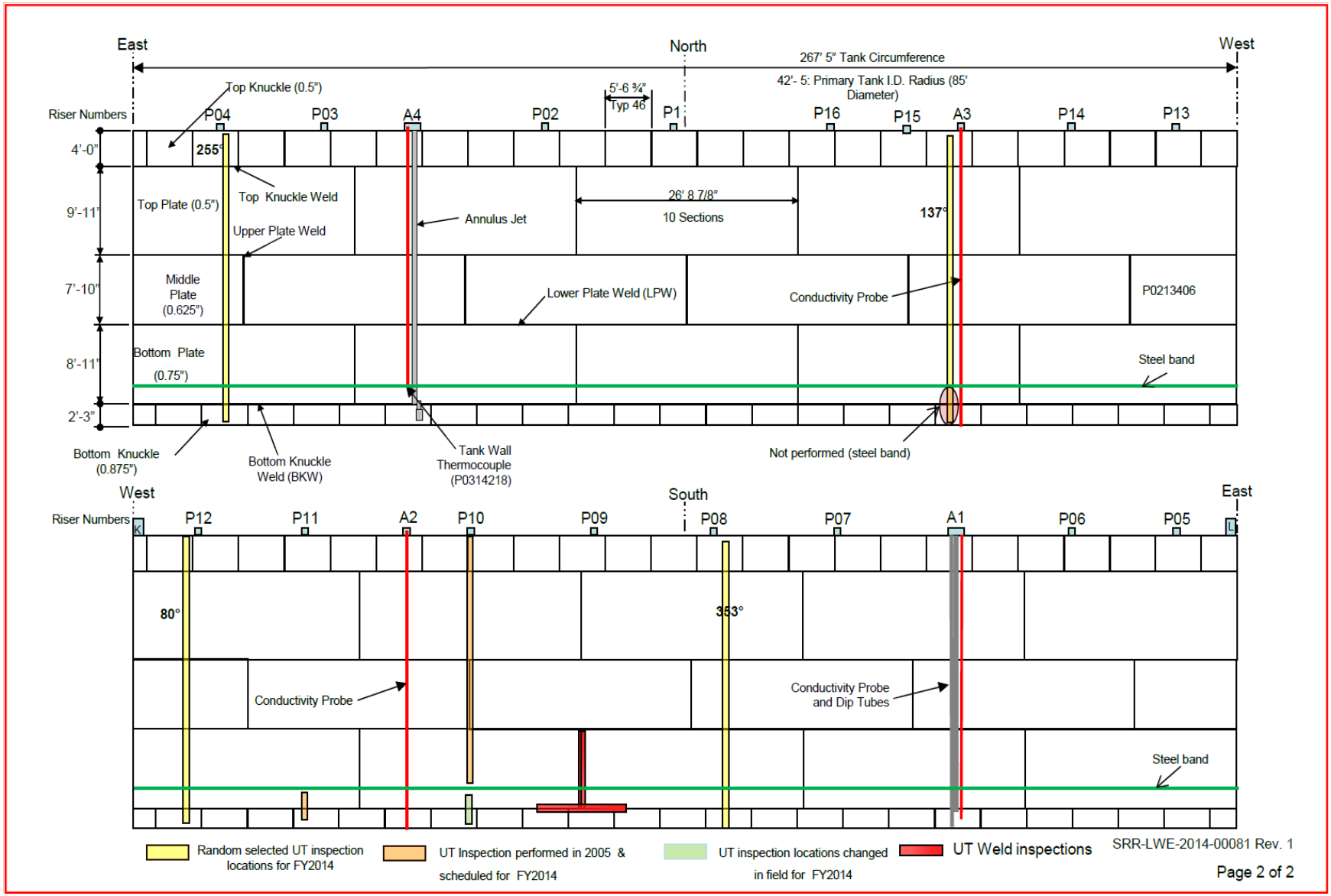


Figure 8: Scan Locations Tank 33



4.6 Data Review and Acceptance

4.6.1 Data Analysis and Review

Inspection data was analyzed by certified ASNT, NDE Level III personnel, reviewed by certified personnel then presented to the ISI Review Committee (ISIRC) for acceptance. The ISIRC meeting was attended by representatives from Liquid Waste Structural Authority and Inspection Engineering, SRNL/Materials Science and Technology and DOE. The function of the ISIRC was to review the data and determine if any additional data was required. ISI Review Committee reports were completed by the ISIRC chairman. The committee concluded that sufficient data was collected and that no additional data collection was required.

4.7 Acceptance Criteria

Acceptance criteria for the primary tank are referenced within the ISI Program, but detailed in WSRC-TR-2002-00063. [9] Applicable sections and the first reporting threshold are summarized below:

4.7.1 Indications Within the Weld and Geometric Reflectors

Any UT signal that is interpreted as a lamination or as a reflector due to weld geometry or a discontinuity that is embedded entirely within the weld, and does not penetrate the tank wall inside or outside surface and is shorter than 9 inches in length is acceptable.

4.7.2 General and Local Thinning

Local thinning is an area 2 inches to 24 inches in the maximum direction. General thinning areas have a major dimension greater than 2 feet. Indications where there is a reduction from nominal plate thickness ≥ 10% are subject to the acceptance criteria.

4.7.3 Pitting

Pitting in the carbon steel waste tanks is exhibited as broad, shallow depressions up to 2 inches in diameter. Pitting indications where there is a reduction from nominal plate thickness ≥ 25% are subject to the acceptance criteria.

4.7.4 Service Induced Flaws (cracks)

A flaw with a depth that is ≥25% of the nominal plate thickness or ≥20% of the nominal plate thickness and six inches long are subject to the acceptance criteria.

5 NDE RESULTS

5.1 Summary

The inspections were performed from the annular space of the waste storage tanks. Two shallow, non-reportable pits were detected in primary tank walls as well as two areas in the secondary wall of Tank 28. The repeat measurements showed good correlation between the data collected in 2014 and the previous data.

In a Type III/IIIA primary tank, a complete vertical strip includes scans of five plates (including knuckles) so five "plate/strips" would be completed at each vertical strip location. In FY 2014, a combined total of 79 plate/strips were examined for thickness mapping and crack detection, equating to over 45,000 square inches of area inspected on the primary tank wall. Of the 79 plate/strips examined in FY 2014 all but three have average thicknesses that remain at or above the construction minimum thickness which is nominal thickness minus 0.010 inches. There were no reportable, service induced, thinning, pitting or cracking detected in any of the areas examined this year.

5.1.1 Thickness Mapping

Five vertical strips for the entire accessible height of the tank were scheduled to be examined in Tank 27, 28 and 33. Two strips were scheduled in Tank 26. These examinations were completed as prescribed to the extent possible as indicated in figures 5 through 8. In addition to the vertical strips on the primary tank walls, areas of the secondary wall were also examined as prescribed in Tank 27, 28 and 33. In a Type III/IIIA primary tank, a complete vertical strip includes scans of five plates (including knuckles) so five "plate/strips" would be completed at each vertical strip location. In FY 2014, a total of 79 plate/strips were completed. Of the 79 plate/strips examined in FY 2014, all but three have average thicknesses that remain at or above the construction minimum thickness of nominal minus 0.010 inches. There were no service induced reportable thicknesses encountered.

The thicknesses measured on the secondary wall and floor all have average thicknesses that remain at or above the construction minimum thickness of nominal minus 0.010 inches.

5.1.2 Thickness Mapping - Pitting

There was no reportable pitting detected and no indication of measureable pit growth of the pit detected in the baseline strip. Thickness mapping was performed in a manner to provide for optimum pitting detection and comparison with any previous pitting data. In the primary tank walls, a total of 2 pits in excess of 0.015 inches deep were documented in FY 2014. The deepest pit being 0.032 inches deep (4% of nominal) in a bottom knuckle of Tank 33. A 0.025 inch deep (5% of nominal) pit was detected in an upper plate of Tank 27. No pitting was identified in the primary walls of Tank 26 or 28. The maximum through wall percentage of any pit encountered in FY 2014 is 5% of the nominal thickness, which is less than the minimum reportable criteria of 25% through-wall for pitting.

5.1.3 Cracking

No cracking was detected in any of the examinations performed. Examinations were performed as required to detect cracking in the repeat vertical strips in each tank. Crack detection was also performed on a lower plate vertical weld and the bottom horizontal weld in Tanks 27, 28 and 33.

5.2 Tank 26 Results

Tank 26 was not scheduled for a routine inspection as part of the ISI program this year as it received a full inspection in 2011. In 2014, the previous inspections under riser P-5 were repeated and one randomly selected thickness mapping vertical strip was also collected as required by the ISI Program, due to tank conditions being outside normal chemistry control for greater than 3 months within the past year. All of the average thicknesses are above the minimum design thickness. There were no reportable thickness areas detected. No reportable, service induced thinning or pitting was detected in the areas scanned. No crack-like indications were detected.

The vertical strip beneath Riser P-5 was re-examined in 2014. The average thickness values reported in 2014 are within plus / minus 0.002 inches of the 2011 data on all plates except the bottom knuckle where the 2014 data reads within plus 0.005 inches of the 2011 data. Skate readings were not taken in the same riser. Figure 9 provides a plot of this data.

Figure 10 provides a thickness plot of the 2014 average thickness data while Table 2 provides average and minimum thickness values for all vertical strips collected on the primary wall of Tank 26 in 2014.

No pitting or cracking was noted in any of the areas examined.

Figure 9: Tank 26 Thickness Data Comparison over 35 Years

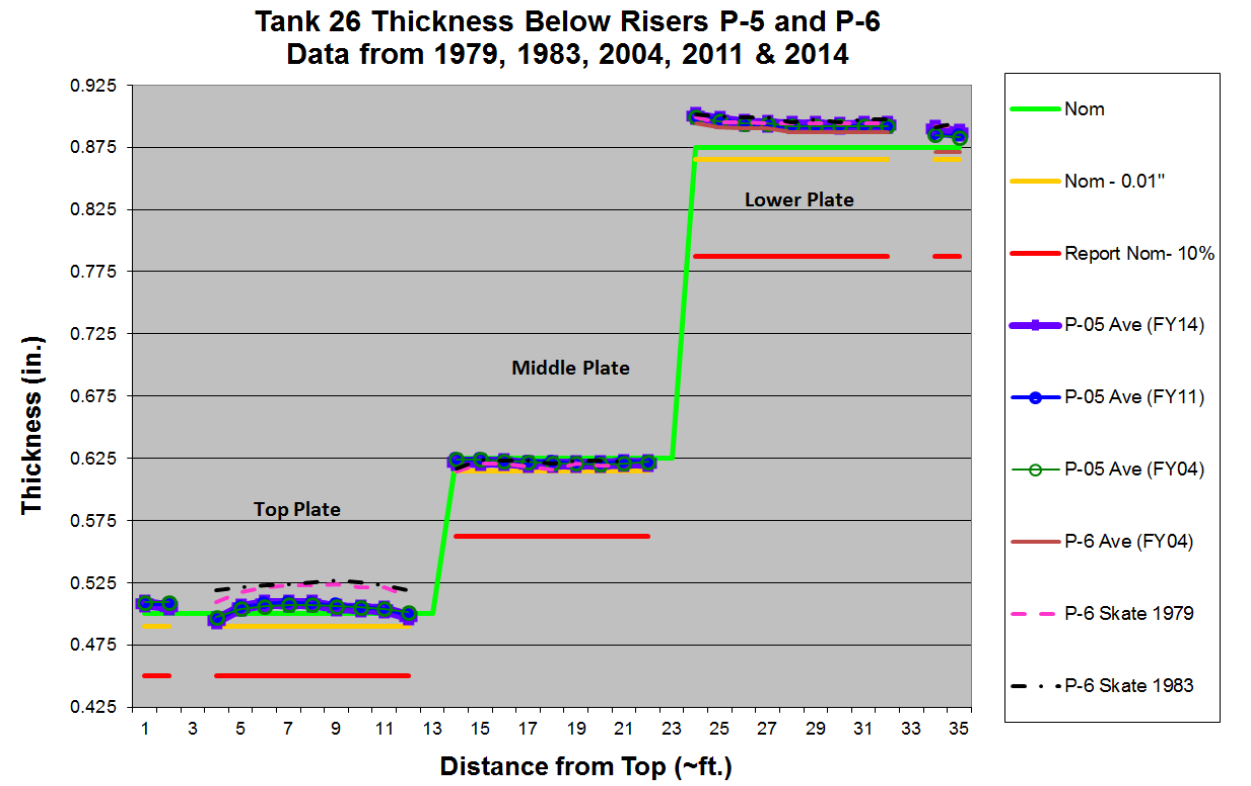


Figure 10: Tank 26 Average Thickness Data FY 2014

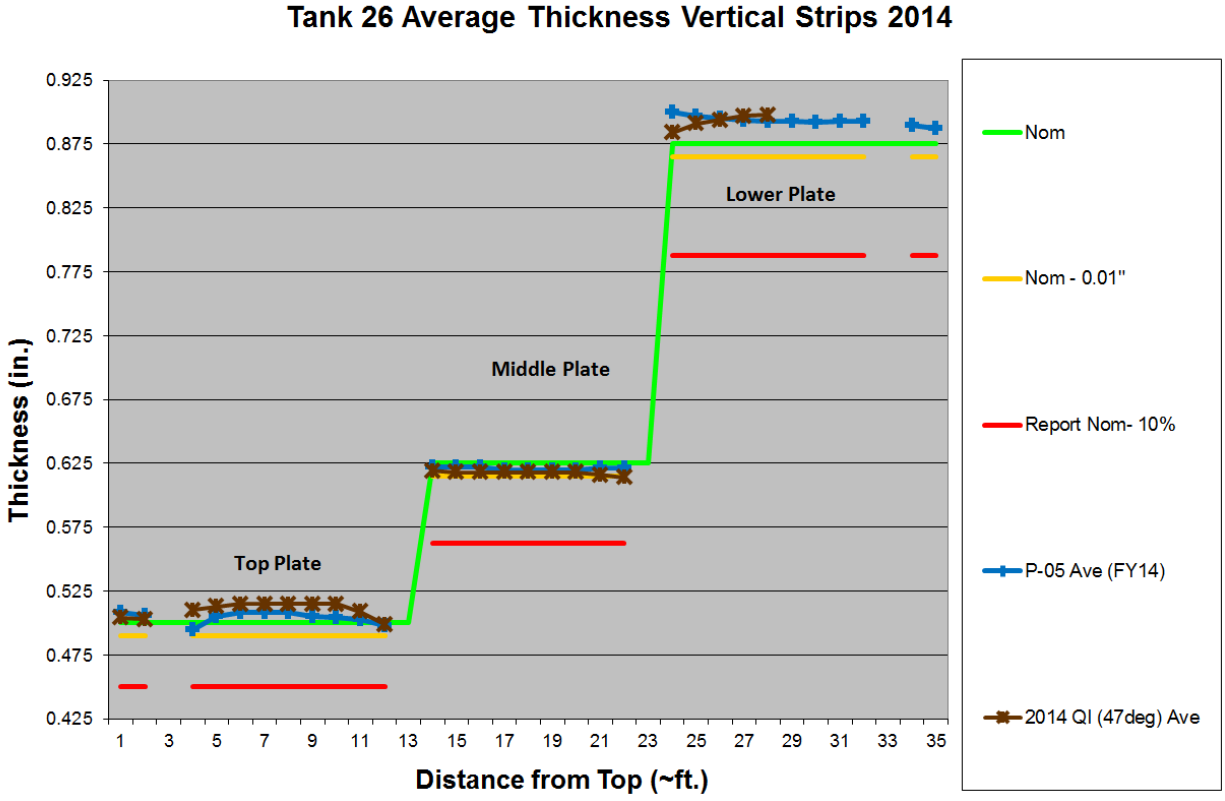


Table 2 Tank 26 Thickness Mapping Results FY 2014 with FY11 and FY04 data for comparison

Tank 26		Nominal	Nom - 0.01"	Reportable (Nom -10%)	2014 QI (47deg) Ave	2014 QI (47deg) Min	P-05 Ave (FY14)	P-05 Min (FY14)	P-05 Ave (FY11)	P-05 Min (FY11)	P-05 Ave (FY04)
Top Knuckle	1	0.500	0.490	0.450	0.504	0.469	0.508	0.464	0.508	0.464	0.509
	2	0.500	0.490	0.450	0.503	0.472	0.506	0.467	0.508	0.473	0.509
Top Plate	1	0.500	0.490	0.450	0.510	0.486	0.495	0.455	0.495	0.456	0.497
	2	0.500	0.490	0.450	0.513	0.504	0.505	0.486	0.505	0.490	0.504
	3	0.500	0.490	0.450	0.515	0.496	0.508	0.496	0.508	0.489	0.506
	4	0.500	0.490	0.450	0.515	0.498	0.508	0.496	0.509	0.500	0.507
	5	0.500	0.490	0.450	0.515	0.509	0.508	0.486	0.508	0.489	0.507
	6	0.500	0.490	0.450	0.515	0.512	0.505	0.492	0.507	0.493	0.506
	7	0.500	0.490	0.450	0.515	0.496	0.504	0.490	0.505	0.489	0.505
	8	0.500	0.490	0.450	0.509	0.484	0.503	0.486	0.504	0.479	0.504
	9	0.500	0.490	0.450	0.499	0.482	0.498	0.484	0.499	0.479	0.501
Middle Plate	1	0.625	0.615	0.563	0.619	0.578	0.622	0.611	0.624	0.615	0.624
	2	0.625	0.615	0.563	0.618	0.599	0.622	0.609	0.624	0.604	0.624
	3	0.625	0.615	0.563	0.618	0.600	0.622	0.616	0.623	0.613	0.623
	4	0.625	0.615	0.563	0.618	0.607	0.620	0.611	0.622	0.609	0.622
	5	0.625	0.615	0.563	0.618	0.607	0.620	0.598	0.622	0.612	0.621
	6	0.625	0.615	0.563	0.618	0.604	0.620	0.604	0.621	0.614	0.621
	7	0.625	0.615	0.563	0.618	0.601	0.620	0.615	0.621	0.610	0.620
	8	0.625	0.615	0.563	0.616	0.604	0.621	0.603	0.622	0.597	0.621
	9	0.625	0.615	0.563	0.614	0.601	0.621	0.585	0.622	0.600	0.622
Lower Plate	1	0.875	0.865	0.788	0.884	0.871	0.900	0.890	0.899	0.882	0.899
	2	0.875	0.865	0.788	0.891	0.870	0.897	0.891	0.897	0.879	0.896
	3	0.875	0.865	0.788	0.894	0.885	0.895	0.874	0.894	0.875	0.894
	4	0.875	0.865	0.788	0.897	0.887	0.894	0.881	0.893	0.875	0.894
	5	0.875	0.865	0.788	0.898	0.857	0.893	0.883	0.892	0.875	0.892
	6	0.875	0.865	0.788	N/A	N/A	0.893	0.878	0.891	0.876	0.892
	7	0.875	0.865	0.788	N/A	N/A	0.892	0.880	0.892	0.876	0.892
	8	0.875	0.865	0.788	N/A	N/A	0.893	0.883	0.892	0.845	0.892
	9	0.875	0.865	0.788	N/A	N/A	0.893	0.883	0.891	0.865	0.892
Bottom Knuckle	1	0.875	0.865	0.788	N/A	N/A	0.890	0.871	0.885	0.862	0.885
	2	0.875	0.865	0.788	N/A	N/A	0.887	0.881	0.884	0.866	0.883

Access to some locations on the lower plate and bottom knuckle were obstructed by thermocouple leads on the primary tank wall.

5.3 Tank 27 Results

In 2014, the previous inspections under riser P-6 were repeated. Four high speed thickness mapping vertical strips were also collected in Tank 27. In the primary tank, all but one of the plate/strips examined have average thicknesses that remain at or above the construction minimum thickness which is nominal thickness minus 0.010 inches. There were no reportable thickness areas detected. No reportable, service induced thinning or pitting was detected in the areas scanned. No crack-like indications were detected.

The vertical strip beneath Riser P-6 was re-examined in 2014. The average thickness values reported in 2014 are within plus 0.002 and minus 0.004 inches of the 2006 data. Figure 11 provides a plot of this data.

Figure 12 provides a thickness plot of the 2014 average thickness data while Table 3 provides average and minimum thickness values for all vertical strips collected on the primary wall of Tank 27 in 2014.

No reportable pitting was noted in any of the areas examined, but one pit was greater than the 0.015 inch criteria. A 0.025 inch deep pit (5% through wall) was noted in the top plate during the repeat scan under P-6. This pit was evident in the 2006 data but not reported because it only measured 0.0013 inches deep in the primary pitting evaluation method of the 2006 data. Comparison of the indication with a different evaluation method shows the pit to measure 0.024 inches in 2014 and 0.022 in 2006, so there is no measureable increase in pit depth.

A vertical weld on the lower plate and 5% of the bottom girth weld were scanned for cracking beneath P-5 in Tank 27. No crack-like indications were detected in any of the welds or base metal examined.

The secondary wall thickness data is provided in Table 4. The average thickness measured in all of the areas inspected on the secondary wall was above the construction minimum thickness.

Figure 11: Tank 27 Thickness Data Comparison Over 35 Years

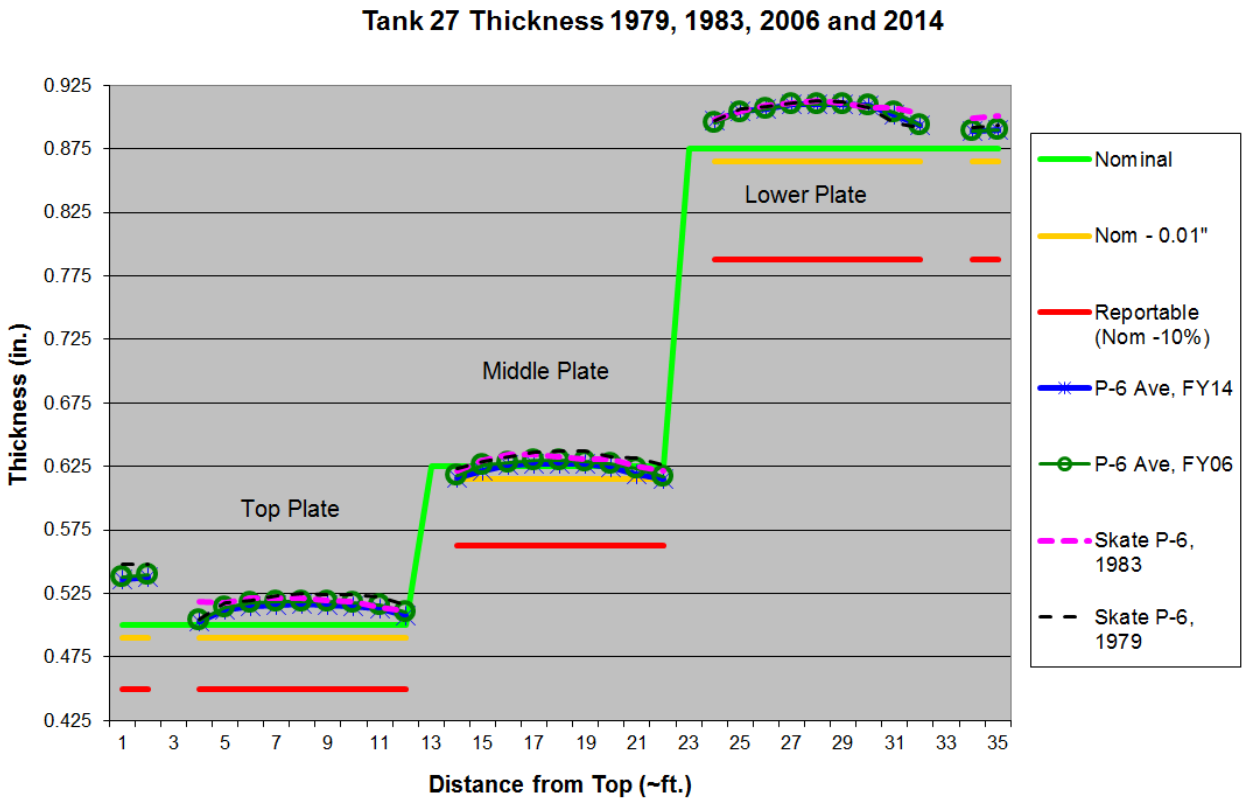


Figure 12: Tank 27 Average Thickness Data FY 2014

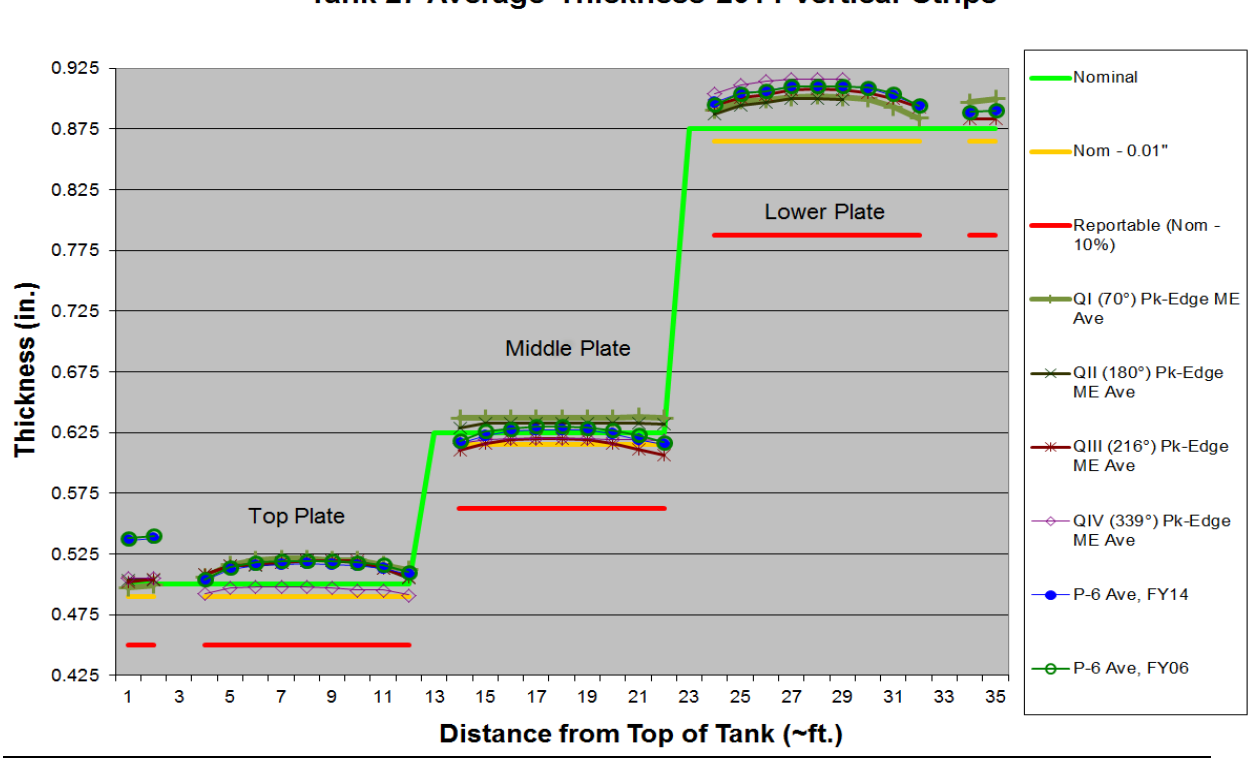


Table 3 Tank 27 Thickness Mapping Results FY 2014

Tank 27	Nominal	Nom - 0.01"	Reportable (Nom -10%)	P-6 Ave, FY14	P-6 Min, FY14	QI (70°) Pk-Edge ME Ave	QI (70°) Pk-Edge ME Min	QII (180°) Pk-Edge ME Ave	QII (180°) Pk-Edge ME Min	QIII (216°) Pk-Edge ME Ave	QIII (216°) Pk-Edge ME Min	QIV (339°) Pk-Edge ME Ave	QIV (339°) Pk-Edge ME Min
Top Knuckle 1	0.500	0.490	0.450	0.536	0.512	0.497	0.469	0.503	0.472	0.502	0.482	0.505	0.484
2	0.500	0.490	0.450	0.538	0.513	0.499	0.469	0.503	0.498	0.504	0.487	0.505	0.485
Top Plate 1	0.500	0.490	0.450	0.503	0.458	0.506	0.460	0.508	0.469	0.508	0.458	0.492	0.459
2	0.500	0.490	0.450	0.512	0.486	0.516	0.464	0.515	0.485	0.515	0.496	0.497	0.467
3	0.500	0.490	0.450	0.515	0.507	0.520	0.474	0.515	0.500	0.516	0.495	0.498	0.466
4	0.500	0.490	0.450	0.516	0.504	0.521	0.496	0.518	0.500	0.518	0.496	0.498	0.471
5	0.500	0.490	0.450	0.517	0.511	0.521	0.486	0.519	0.503	0.519	0.496	0.498	0.479
6	0.500	0.490	0.450	0.516	0.506	0.520	0.502	0.519	0.505	0.519	0.484	0.497	0.480
7	0.500	0.490	0.450	0.515	0.498	0.520	0.498	0.518	0.506	0.519	0.501	0.495	0.464
8	0.500	0.490	0.450	0.513	0.496	0.516	0.482	0.513	0.499	0.513	0.487	0.495	0.463
9	0.500	0.490	0.450	0.508	0.486	0.512	0.481	0.505	0.491	0.506	0.477	0.491	0.462
Middle Plate 1	0.625	0.615	0.563	0.616	0.592	0.637	0.616	0.629	0.617	0.610	0.586	0.616	0.553
2	0.625	0.615	0.563	0.622	0.605	0.637	0.607	0.633	0.620	0.616	0.604	0.619	0.600
3	0.625	0.615	0.563	0.626	0.611	0.637	0.607	0.633	0.621	0.619	0.607	0.620	0.603
4	0.625	0.615	0.563	0.627	0.611	0.637	0.617	0.633	0.624	0.620	0.601	0.620	0.599
5	0.625	0.615	0.563	0.627	0.611	0.637	0.614	0.633	0.623	0.620	0.599	0.620	0.599
6	0.625	0.615	0.563	0.627	0.611	0.637	0.612	0.633	0.621	0.619	0.603	0.620	0.591
7	0.625	0.615	0.563	0.624	0.607	0.637	0.588	0.633	0.619	0.616	0.600	0.619	0.604
8	0.625	0.615	0.563	0.619	0.599	0.638	0.615	0.633	0.621	0.611	0.592	0.619	0.588
9	0.625	0.615	0.563	0.615	0.596	0.637	0.599	0.632	0.621	0.606	0.588	0.618	0.612
Lower Plate 1	0.875	0.865	0.788	0.897	0.879	0.890	0.881	0.887	0.874	0.894	0.878	0.904	0.877
2	0.875	0.865	0.788	0.905	0.890	0.898	0.891	0.894	0.881	0.901	0.888	0.911	0.904
3	0.875	0.865	0.788	0.906	0.893	0.899	0.891	0.897	0.883	0.903	0.894	0.914	0.911
4	0.875	0.865	0.788	0.910	0.896	0.901	0.895	0.900	0.886	0.907	0.895	0.916	0.912
5	0.875	0.865	0.788	0.910	0.899	0.902	0.866	0.900	0.886	0.908	0.873	0.916	0.906
6	0.875	0.865	0.788	0.910	0.883	0.901	0.891	0.899	0.886	0.907	0.878	0.916	0.904
7	0.875	0.865	0.788	0.909	0.891	0.900	0.883	N/A	N/A	0.905	0.894	N/A	N/A
8	0.875	0.865	0.788	0.902	0.886	0.893	0.882	N/A	N/A	0.900	0.888	N/A	N/A
9	0.875	0.865	0.788	0.894	0.878	0.884	0.871	N/A	N/A	0.893	0.880	N/A	N/A
Bottom Knuckle 1	0.875	0.865	0.788	0.889	0.851	0.897	0.876	N/A	N/A	0.883	0.836	N/A	N/A
2	0.875	0.865	0.788	0.890	0.853	0.900	0.880	N/A	N/A	0.883	0.867	N/A	N/A

Access to some locations on the lower plate and bottom knuckle were obstructed by thermocouple leads on the primary tank wall

5.3.1 Tank 27 Secondary Wall

A summary of the thickness mapping results is included in Table 4. No thinning patterns were noted in the secondary wall scans. The average thickness measured in all of the areas inspected on the secondary wall was above the construction minimum thickness.

Table 4 Tank 27 Secondary Wall Thickness Mapping Results FY 2014

	Nominal Thickness (in.)	Nominal - 0.01" *	P-6 Ave	P-6 Min
Plate 1 / 1	0.375	0.365	0.381	0.358
2	0.375	0.365	0.381	0.374
3	0.375	0.365	0.381	0.374
Plate 2 / 1	0.375	0.365	0.378	0.341
2	0.375	0.365	0.378	0.334
3	0.375	0.365	0.378	0.342
Plate 3 / 1	0.375	0.365	0.384	0.378
2	0.375	0.365	0.383	0.38
3	0.375	0.365	0.383	0.368
Plate 4 / 1	0.375	0.365	0.385	0.365
2	0.375	0.365	0.386	0.364
3	0.375	0.365	0.387	0.368
Secondary Floor	0.375	0.365	0.373	0.339

* Construction minimum thickness

5.4 Tank 28 Results

In 2014, the previous inspections under riser P-6 were repeated. Four high speed thickness mapping vertical strips were also collected in Tank 28. In the primary tank, all but one of the plate/strips examined have average thicknesses that remain at or above the construction minimum thickness which is nominal thickness minus 0.010 inches. There were no reportable thickness areas detected. No reportable, service induced thinning or pitting was detected in the areas scanned. No crack-like indications were detected.

The vertical strip beneath Riser P-6 was re-examined in 2014. The average thickness values reported in 2014 are within 0.0 to minus 0.003 inches of the 2005 data and within 0.0 to minus 0.011 inches of the 1979 Skate data.

Figure 13 provides a plot of this data.

Figure 14 provides a thickness plot of the 2014 average thickness data while Table 5 provides average and minimum thickness values for all vertical strips collected on the primary wall of Tank 28 in 2014.

No pitting was noted in any of the primary wall plates examined.

A vertical weld on the lower plate and 5% of the bottom girth weld were scanned for cracking in Tank 28. A vertical weld and the horizontal weld were examined beneath P-5. No crack-like indications were detected.

The secondary wall thickness data is provided in Table 6. The average thickness measured in all of the areas inspected on the secondary wall was above the construction minimum thickness. A previously reported area of localized thinning was evaluated in Plate 1 and a thinning area was detected in the floor scan.

Figure 13: Tank 28 Thickness Data Comparison Over 35 Years

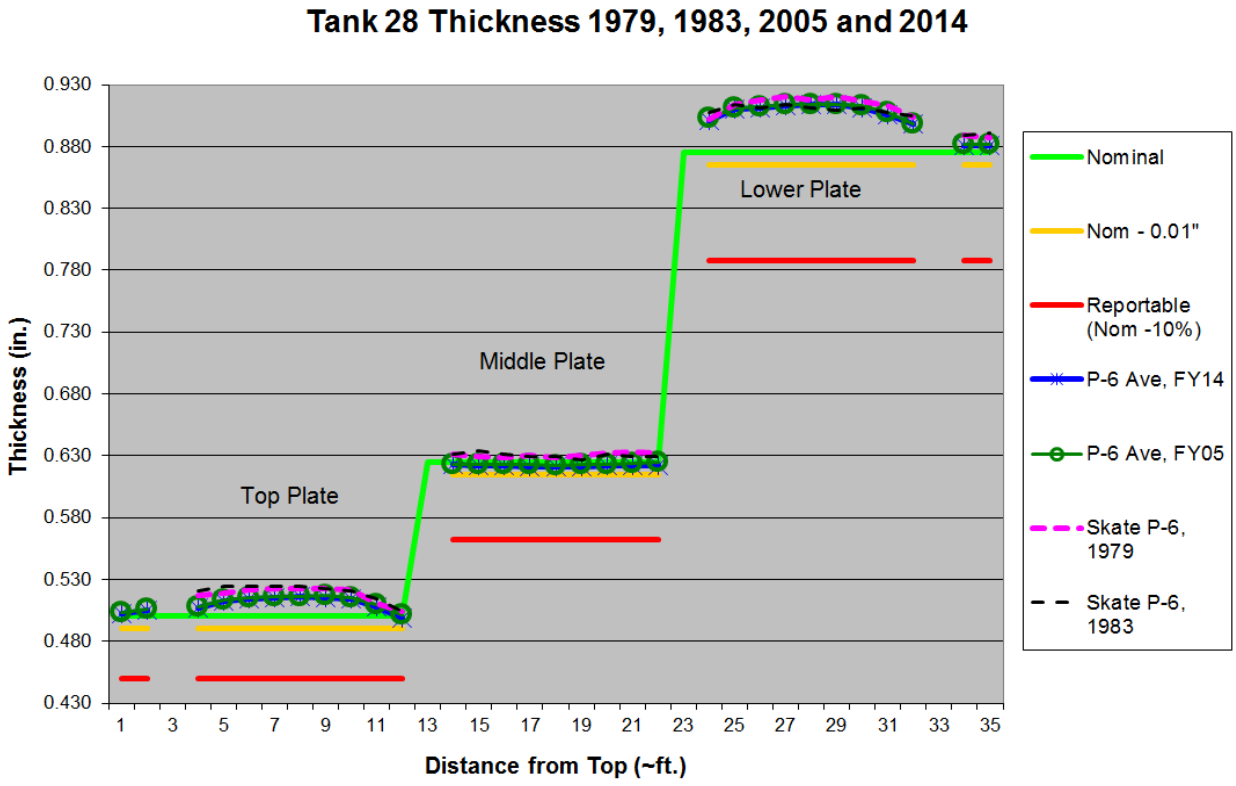


Figure 14: Tank 28 Average Thickness Data FY 2014

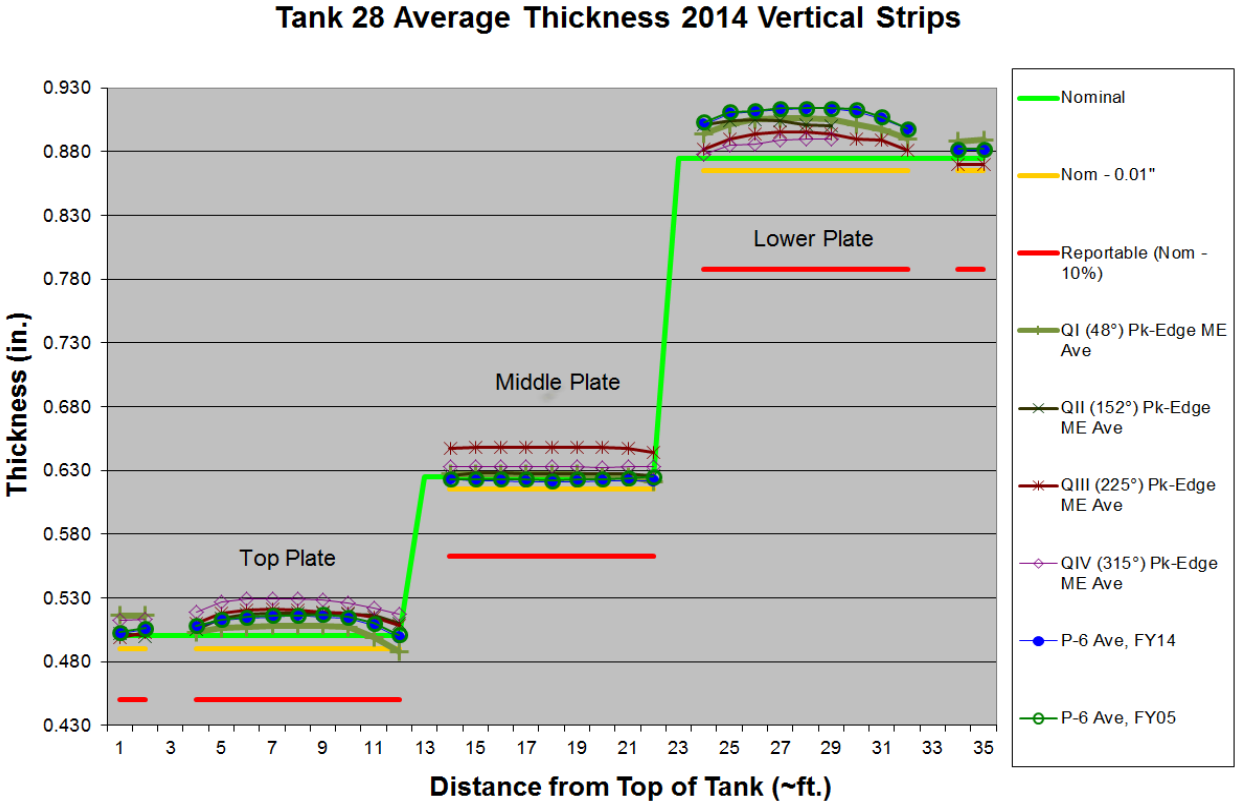


Table 5 Tank 28 Thickness Mapping Results FY 2014

Tank 28	Nominal	Nom - 0.01"	Reportable (Nom - 10%)	P-6 Ave, FY14	P-6 Min, FY14	QI (48°) Pk-Edge ME Ave	QI (48°) Pk-Edge ME Min	QII (152°) Pk-Edge ME Ave	QII (152°) Pk-Edge ME Min	QIII (225°) Pk-Edge ME Ave	QIII (225°) Pk-Edge ME Min	QIV (315°) Pk-Edge ME Ave	QIV (315°) Pk-Edge ME Min
Top Knuckle 1	0.500	0.490	0.450	0.502	0.488	0.516	0.505	0.502	0.469	0.499	0.471	0.512	0.483
2	0.500	0.490	0.450	0.505	0.472	0.516	0.486	0.500	0.468	0.503	0.479	0.513	0.486
Top Plate 1	0.500	0.490	0.450	0.507	0.460	0.503	0.455	0.505	0.472	0.510	0.475	0.519	0.487
2	0.500	0.490	0.450	0.512	0.495	0.506	0.493	0.514	0.500	0.518	0.503	0.527	0.507
3	0.500	0.490	0.450	0.514	0.498	0.507	0.503	0.517	0.497	0.520	0.478	0.529	0.516
4	0.500	0.490	0.450	0.515	0.494	0.508	0.492	0.518	0.500	0.521	0.504	0.529	0.516
5	0.500	0.490	0.450	0.516	0.501	0.508	0.495	0.518	0.490	0.520	0.501	0.529	0.517
6	0.500	0.490	0.450	0.515	0.509	0.508	0.504	0.518	0.493	0.519	0.496	0.528	0.513
7	0.500	0.490	0.450	0.514	0.509	0.507	0.486	0.517	0.493	0.518	0.498	0.526	0.508
8	0.500	0.490	0.450	0.508	0.494	0.499	0.484	0.516	0.489	0.515	0.491	0.522	0.504
9	0.500	0.490	0.450	0.499	0.489	0.488	0.471	0.510	0.476	0.508	0.480	0.517	0.490
Middle Plate 1	0.625	0.615	0.563	0.623	0.593	0.627	0.616	0.626	0.603	0.647	0.628	0.633	0.620
2	0.625	0.615	0.563	0.622	0.601	0.627	0.617	0.628	0.606	0.648	0.627	0.633	0.617
3	0.625	0.615	0.563	0.622	0.612	0.627	0.620	0.628	0.619	0.648	0.620	0.633	0.629
4	0.625	0.615	0.563	0.621	0.607	0.627	0.615	0.627	0.609	0.648	0.614	0.633	0.628
5	0.625	0.615	0.563	0.621	0.604	0.627	0.607	0.627	0.606	0.648	0.615	0.633	0.620
6	0.625	0.615	0.563	0.621	0.609	0.627	0.615	0.627	0.607	0.648	0.624	0.633	0.623
7	0.625	0.615	0.563	0.622	0.612	0.625	0.617	0.627	0.604	0.648	0.601	0.632	0.616
8	0.625	0.615	0.563	0.622	0.616	0.625	0.616	0.627	0.604	0.647	0.614	0.633	0.615
9	0.625	0.615	0.563	0.622	0.611	0.621	0.612	0.626	0.601	0.644	0.616	0.633	0.621
Lower Plate 1	0.875	0.865	0.788	0.901	0.877	0.894	0.878	0.901	0.882	0.882	0.850	0.878	0.845
2	0.875	0.865	0.788	0.910	0.898	0.901	0.898	0.904	0.885	0.890	0.859	0.885	0.865
3	0.875	0.865	0.788	0.911	0.900	0.905	0.901	0.905	0.890	0.894	0.861	0.886	0.870
4	0.875	0.865	0.788	0.913	0.899	0.906	0.903	0.904	0.883	0.895	0.859	0.889	0.873
5	0.875	0.865	0.788	0.914	0.891	0.906	0.901	0.901	0.877	0.895	0.856	0.890	0.866
6	0.875	0.865	0.788	0.914	0.900	0.905	0.900	0.900	0.879	0.894	0.863	0.890	0.873
7	0.875	0.865	0.788	0.911	0.898	0.901	0.898	N/A	N/A	0.890	0.862	N/A	N/A
8	0.875	0.865	0.788	0.906	0.878	0.897	0.890	N/A	N/A	0.889	0.870	N/A	N/A
9	0.875	0.865	0.788	0.898	0.881	0.890	0.873	N/A	N/A	0.881	0.852	N/A	N/A
Bottom Knuckle 1	0.875	0.865	0.788	0.881	0.867	0.888	0.864	N/A	N/A	0.870	0.857	N/A	N/A
2	0.875	0.865	0.788	0.881	0.856	0.889	0.878	N/A	N/A	0.870	0.857	N/A	N/A

Access to some locations on the lower plate and bottom knuckle were obstructed by thermocouple leads on the primary tank wall

5.4.1 Tank 28 Secondary Wall

Inspections of Tank 28 also included performing thickness mapping on the secondary wall of the double shell waste tank. A summary of the thickness mapping results is included in Table 6. The average thickness measured in all of the areas inspected on the secondary wall was above the construction minimum thickness. An area of localized thinning reported in Plate 1 in 2005 is discussed below.

Table 6 Tank 28 Secondary Wall Thickness Mapping Results FY 2014

	Nominal	Nominal - 0.01" *	P-6 Ave, FY14	P-6 Min, FY14	P-6 Ave, FY05
Plate 1 / 1	0.375	0.365	0.391	0.333	0.393
2	0.375	0.365	0.394	0.388	0.396
3	0.375	0.365	0.394	0.390	0.395
Plate 2 / 1	0.375	0.365	0.377	0.341	0.377
2	0.375	0.365	0.377	0.359	0.377
3	0.375	0.365	0.376	0.354	0.377
Plate 3 / 1	0.375	0.365	0.366	0.354	0.369
2	0.375	0.365	0.366	0.344	0.369
3	0.375	0.365	0.366	0.357	0.369
Plate 4 / 1	0.375	0.365	0.393	0.352	0.394
2	0.375	0.365	0.393	0.373	0.394
3	0.375	0.365	0.393	0.341	0.394
Secondary Floor	0.375	0.365	0.377	0.311	Not done

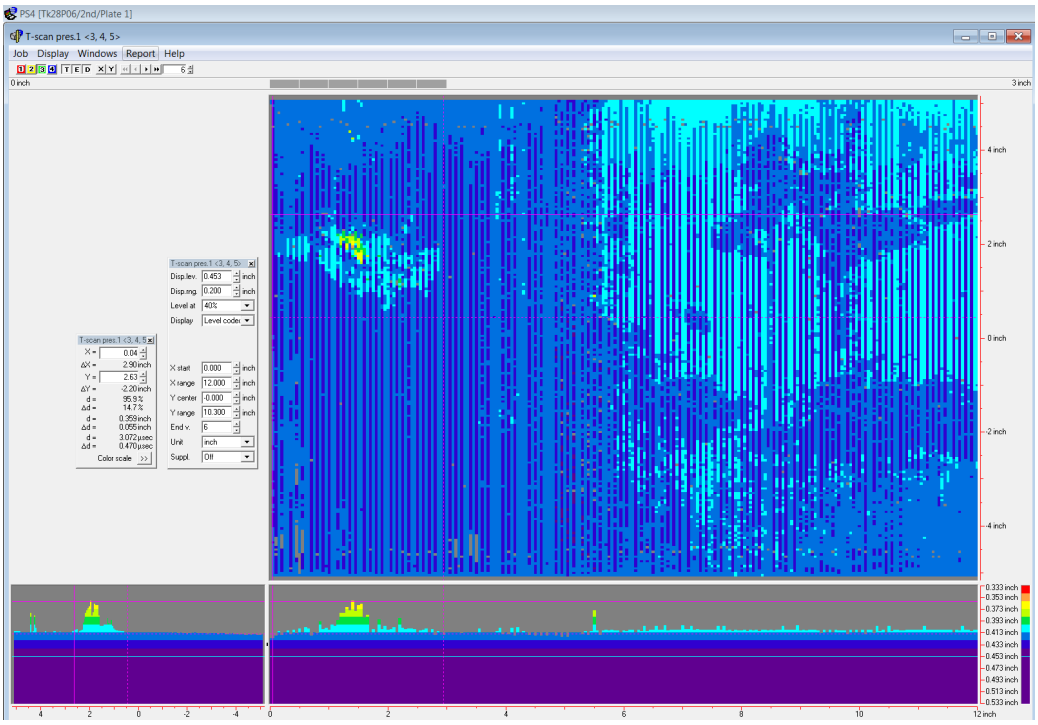
* Construction minimum thickness

STAR 2005-CTS-008509 Action 003 was issued to track the Tank 28 secondary wall localized thinning. It reads "Perform Ultrasonic Testing (augmented scope) for Tank 28. Inspection should include the area of localized wall thinning on the secondary liner of Tank 28 to ensure that corrosion mechanism has stopped."

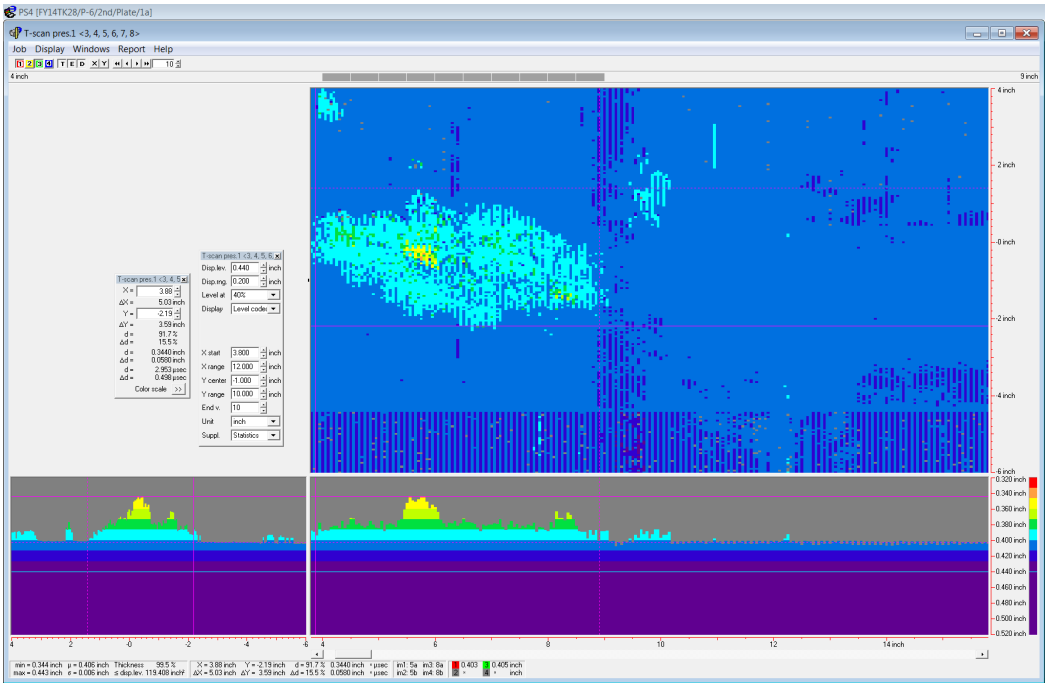
In 2005, a two square foot area was examined on each of the 4 vertical wall plates of the secondary wall in Tank 28, beneath riser P-6. The secondary floor was not inspected in 2005. A localized thinning area was reported in Plate 1 (upper plate). In the initial inspection, the area measured 0.055 inches deep with a remaining wall thickness of 0.338 inches. The area measured 2.9 inches long by 2.2 inches vertically. This same area was examined in 2014. The maximum depth now measures slightly deeper and there is an increase in the size of the area thinning. Although there is not much metal loss, the area now measures 5.9 inches by 3.4 inches vertically. The maximum depth measures 0.061 inches for a minimum thickness of 0.333 inches remaining metal which equates to 15% loss from the local measured average thickness of 0.394 inches. The maximum length of thinning is less than 24 inches and does not impact structural or leak integrity per WSRC-TR-2002-00063. This area will be reinspected during the next routine inspection. Figure 15 provides screen shots of the area in 2005 and 2014.

The secondary floor was examined in 2014, but not examined in 2005. There was an area of external wall loss detected in the area of floor examined with a wall loss of 0.063 inches for a minimum remaining thickness of 0.311 inches remaining metal which equates to 17% loss from the local measured average thickness of 0.375 inches. The maximum length of thinning is less than 24 inches and does not impact structural or leak integrity per WSRC-TR-2002-00063. This area will be reinspected during the next routine inspection.

Figure 15: Tank 28 Secondary Wall Plate 1 Indication Comparison 2005 – 2014



The top section shows the indication in 2005 and the lower image shows the same area in 2014.



5.5 Tank 33 Results

In 2014, the previous inspections under riser P-10 were repeated. Four high speed thickness mapping vertical strips were also collected in Tank 33. In the primary tank, all of the average thicknesses are above the minimum design thickness. There were no reportable service induced thickness areas detected. An internal grinding area on the top knuckle measured 0.448 inches which is below the 10% threshold. No reportable, service induced thinning or pitting was detected in the areas scanned. No crack-like indications were detected.

The vertical strip beneath Riser P-10 was re-examined in 2014. The average thickness values reported in 2014 are within plus / minus 0.002 inches of the 2006 data. Figure 16 provides a plot of this data.

Figure 17 provides a thickness plot of the 2014 average thickness data while Table 7 provides average and minimum thickness values for all vertical strips collected on the primary wall of Tank 33 in 2014.

No reportable pitting was noted in any of the areas examined, but one pit greater than the 0.015 inch criteria was noted. The pit was in the bottom knuckle in the random strip QI and measured 0.032 inches deep or 4% through wall.

Accessible portions of a vertical weld on the lower plate and the bottom girth weld were scanned for cracking in Tank 33. Due to the metal strap that goes around the entire circumference of the tank and the magnets that hold it on, accessibility to the lower portions of the tank is limited. The portion of vertical weld beneath the strap was limited to a one sided examination and the bottom girth weld was limited to a one sided examination (from the knuckle side) and only 117 inches (3.65%) was accessible. No crack-like indications were detected in any of the welds or base metal examined.

The secondary wall thickness data is provided in Table 8. The average thickness measured in all of the areas inspected on the secondary wall was above the construction minimum thickness.

Figure 16: Tank 33 Thickness Data Comparison Over 8 Years

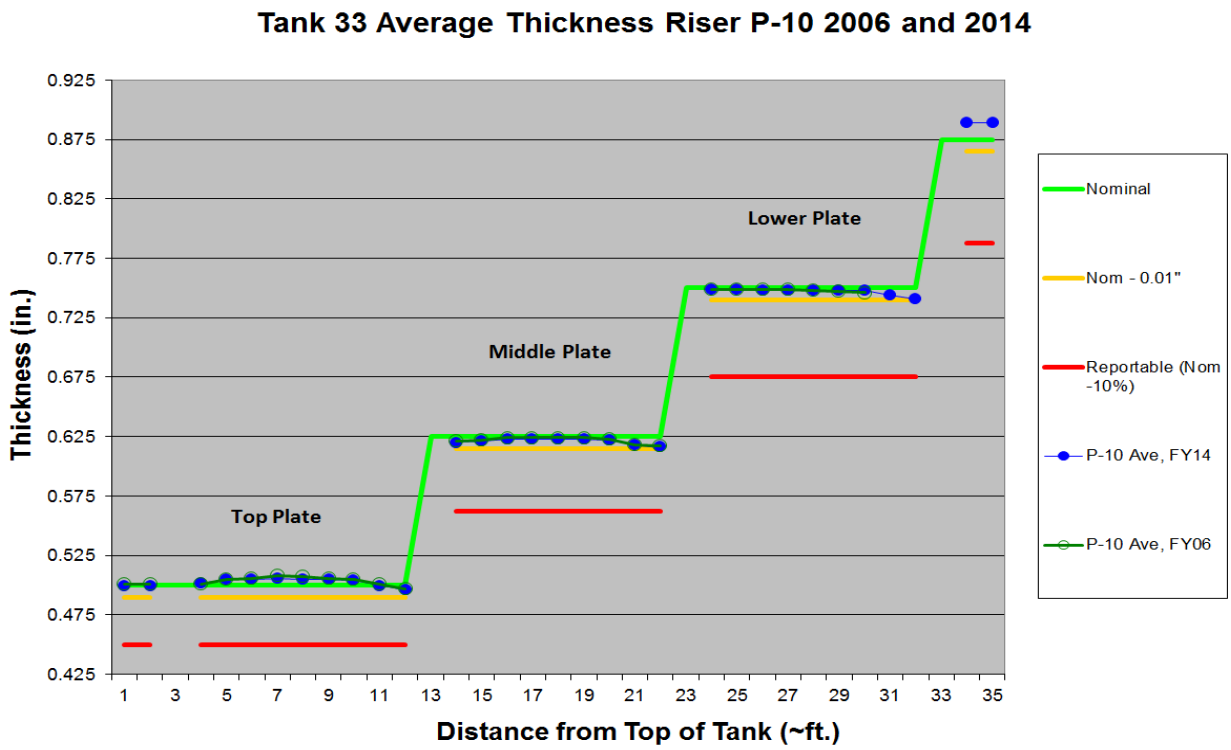


Figure 17: Tank 33 Average Thickness Data FY 2014

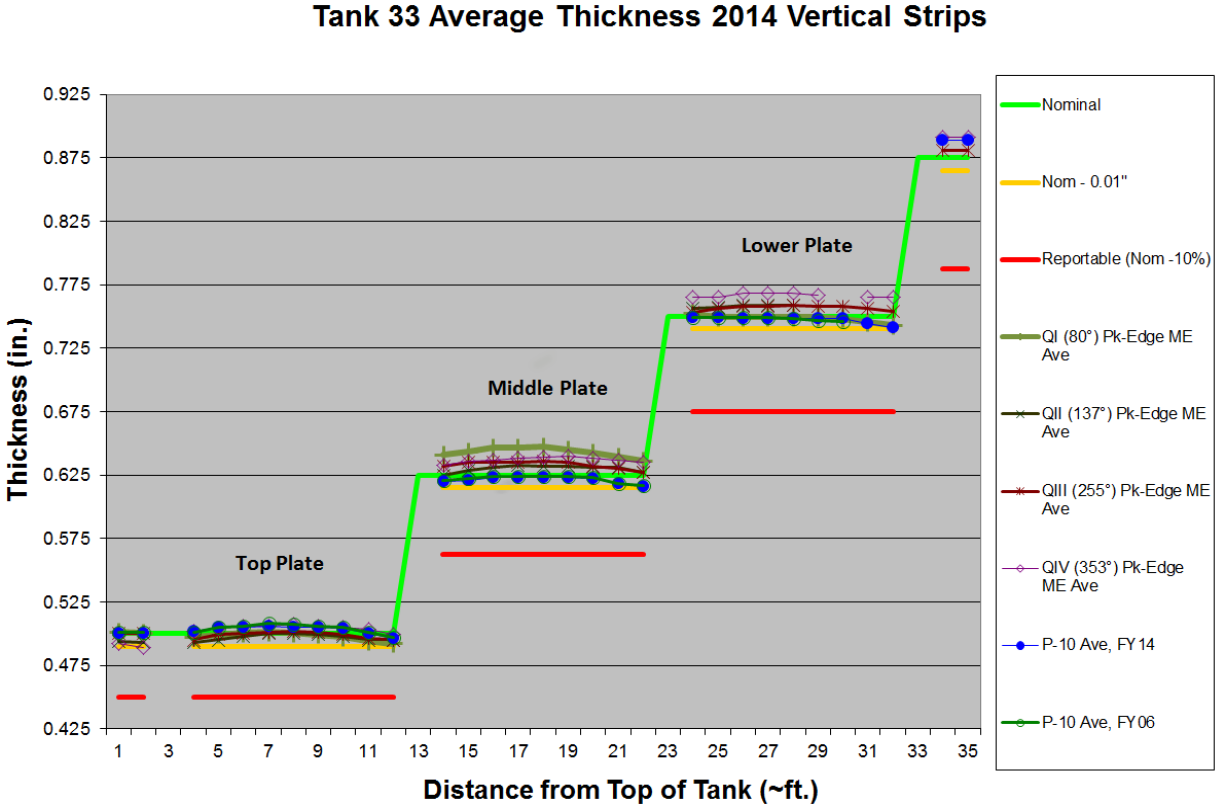


Table 7 Tank 33 Thickness Mapping Results FY 2014

Tank 33		Nominal	Nom - 0.01"	Reportable (Nom -10%)	P-10 Ave, FY14	P-10 Min, FY14	QI (80°) Pk-Edge ME Ave	QI (80°) Pk-Edge ME Min	QII (137°) Pk-Edge ME Ave	QII (137°) Pk-Edge ME Min	QIII (255°) Pk-Edge ME Ave	QIII (255°) Pk-Edge ME Min	QIV (353°) Pk-Edge ME Ave	QIV (353°) Pk-Edge ME Min
Top Knuckle	1	0.500	0.490	0.450	0.500	0.455	0.501	0.472	0.494	0.471	0.500	0.484	0.492	0.465
	2	0.500	0.490	0.450	0.500	0.474	0.500	0.448	0.493	0.468	0.500	0.478	0.489	0.457
Top Plate	1	0.500	0.490	0.450	0.502	0.479	0.497	0.453	0.493	0.455	0.495	0.467	0.502	0.484
	2	0.500	0.490	0.450	0.505	0.472	0.499	0.465	0.495	0.484	0.499	0.468	0.504	0.488
	3	0.500	0.490	0.450	0.505	0.489	0.500	0.464	0.498	0.485	0.500	0.471	0.506	0.487
	4	0.500	0.490	0.450	0.506	0.490	0.501	0.476	0.500	0.496	0.501	0.473	0.506	0.501
	5	0.500	0.490	0.450	0.505	0.490	0.500	0.469	0.500	0.496	0.502	0.472	0.507	0.490
	6	0.500	0.490	0.450	0.505	0.490	0.499	0.474	0.499	0.490	0.501	0.464	0.506	0.492
	7	0.500	0.490	0.450	0.504	0.489	0.497	0.476	0.498	0.483	0.499	0.476	0.505	0.486
	8	0.500	0.490	0.450	0.500	0.484	0.494	0.472	0.495	0.475	0.496	0.477	0.503	0.474
	9	0.500	0.490	0.450	0.496	0.474	0.492	0.473	0.495	0.475	0.495	0.460	0.499	0.482
Middle Plate	1	0.625	0.615	0.563	0.620	0.589	0.641	0.623	0.625	0.587	0.632	0.601	0.633	0.612
	2	0.625	0.615	0.563	0.621	0.607	0.643	0.618	0.629	0.620	0.635	0.615	0.636	0.612
	3	0.625	0.615	0.563	0.623	0.601	0.646	0.627	0.631	0.615	0.635	0.615	0.637	0.619
	4	0.625	0.615	0.563	0.623	0.609	0.646	0.633	0.633	0.625	0.635	0.618	0.638	0.616
	5	0.625	0.615	0.563	0.623	0.607	0.647	0.626	0.632	0.619	0.636	0.615	0.639	0.619
	6	0.625	0.615	0.563	0.623	0.610	0.645	0.620	0.632	0.624	0.635	0.604	0.640	0.619
	7	0.625	0.615	0.563	0.622	0.591	0.642	0.618	0.631	0.623	0.632	0.606	0.638	0.626
	8	0.625	0.615	0.563	0.618	0.582	0.639	0.612	0.631	0.617	0.630	0.607	0.637	0.622
	9	0.625	0.615	0.563	0.616	0.582	0.636	0.607	0.627	0.611	0.627	0.610	0.635	0.616
Lower Plate	1	0.750	0.740	0.675	0.749	0.727	0.752	0.730	0.756	0.740	0.753	0.725	0.765	0.758
	2	0.750	0.740	0.675	0.749	0.728	0.749	0.729	0.757	0.747	0.756	0.747	0.765	0.758
	3	0.750	0.740	0.675	0.748	0.732	0.749	0.720	0.759	0.749	0.758	0.746	0.768	0.755
	4	0.750	0.740	0.675	0.748	0.726	0.749	0.737	0.759	0.747	0.758	0.744	0.768	0.755
	5	0.750	0.740	0.675	0.748	0.731	0.749	0.735	0.759	0.739	0.759	0.734	0.768	0.755
	6	0.750	0.740	0.675	0.748	0.729	0.749	0.736	N/A	N/A	0.758	0.736	0.767	0.757
	7	0.750	0.740	0.675	0.748	0.729	0.748	0.732	N/A	N/A	0.758	0.738	N/A	N/A
	8	0.750	0.740	0.675	0.744	0.723	0.745	0.728	N/A	N/A	0.756	0.741	0.765	0.758
	9	0.750	0.740	0.675	0.741	0.722	0.743	0.718	N/A	N/A	0.754	0.732	0.765	0.739
Bottom Knuckle	1	0.875	0.865	0.788	0.889	0.849	0.950	0.900	N/A	N/A	0.881	0.852	0.891	0.873
	2	0.875	0.865	0.788	0.889	0.849	0.952	0.891	N/A	N/A	0.881	0.852	0.891	0.873

Access to some locations on the lower plate and bottom knuckle were obstructed by thermocouple leads on the primary tank wall.

5.5.1 Tank 33 Secondary Wall

Inspections of Tank 33 also included performing thickness mapping on the secondary wall of the double shell waste tank. A summary of the thickness mapping results is included in Table 8. The average thickness measured in all of the areas inspected on the secondary wall was above the construction minimum thickness.

Table 8 Tank 33 Secondary Wall Thickness Mapping Results FY 2013

	Nominal	Nominal - 0.01" *	P-12 Ave 2014	P-12 Min 2014
Plate 1 / 1	0.375	0.365	0.378	0.343
2	0.375	0.365	0.377	0.342
3	0.375	0.365	0.377	0.342
Plate 2 / 1	0.375	0.365	0.375	0.337
2	0.375	0.365	0.377	0.343
3	0.375	0.365	0.378	0.358
Plate 3 / 1	0.375	0.365	0.385	0.364
2	0.375	0.365	0.385	0.382
3	0.375	0.365	0.383	0.341
Plate 4 / 1	0.375	0.365	0.367	0.353
2	0.375	0.365	0.367	0.345
3	0.375	0.365	0.369	0.349
Secondary Floor	0.375	0.365	0.386	0.352

* Construction minimum thickness

5.6 Conclusions

In 2014, Savannah River Site waste Tanks 26, 27 28 and 33 were inspected as part of the ISI Program. A combined total of 79 plate/strips were examined for thickness mapping and crack detection, equating to over 45,000 square inches of area inspected on the primary walls in FY 2014. Previous examinations were repeated with very comparable results.

All but three of the 79 plate/strips examined in FY 2014 have average thicknesses that remain at or above the construction minimum thickness which is nominal thickness minus 0.010 inches. There were no service induced reportable thicknesses encountered.

A vertical weld and a section of horizontal weld in the highest stress location were also inspected for cracking in Tanks 27, 28 and 33. No cracking was detected in any of the scans performed.

All of the areas prescribed to be inspected in the LWE tank specific scan plans for FY 2014 were completed except for the exceptions noted in figures 5 through 8.

Incipient pitting that has been identified is effectively negligible. The maximum depth of any pit encountered in FY 2014 is 0.032 inches deep.

A localized thinning area was reported in 2005 in Plate 1 (upper plate) of the secondary wall of Tank 28 measures slightly deeper and there is an increase in the size of the area thinning. The maximum depth measures 0.061 inches for a minimum thickness of 0.333 inches remaining metal which equates to 15% loss from the local measured average thickness of 0.394 inches. The maximum length of thinning is less than 24 inches and does not impact structural or leak integrity per WSRC-TR-2002-00063. This area will be reinspected during the next routine inspection.

The secondary floor was examined in 2014, but not examined in 2005. There was an area of external wall loss detected in the area of floor examined with a wall loss of 0.063 inches for a minimum remaining thickness of 0.311 inches remaining metal which equates to 17% loss from the local measured average thickness of 0.375 inches. The maximum length of thinning is less than 24 inches and does not impact structural or leak integrity per WSRC-TR-2002-00063. This area will be reinspected during the next routine inspection.

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