Hanford Single-Shell Tank and Double-Shell Tank Integrity Programs

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ABSTRACT

Waste at Hanford is stored in 149 single-shell tanks and 28 double-shell tanks. Concerns related to aging radioactive waste storage facilities throughout the DOE complex led to Brookhaven National Laboratory (BNL) developing guidelines for structural integrity programs for tank systems [1]. The committee of experts who developed these guidelines is commonly known as the Tank Structural Integrity Panel (TSIP). The DOE has subsequently adopted these guidelines, and requires site operators to have a program consistent with them [2].

The Double-Shell Tank (DST) integrity is maintained with a variety of activities such as ultrasonic and visual inspections, chemistry controls, corrosion monitoring and structural analyses methods [3]. In October 2012, Washington River Protection Solutions, LLC (WRPS) determined that the primary tank of 241-AY-102 was leaking. WRPS contracted a panel of experts from industry and academia to provide advice and recommendations for the DST Integrity Program.

The panel focused on three concerns:

- No Early warning – Determine why the existing DST Integrity Program did not predict a primary tank failure or provide early warning of the pending failure.
- Program improvements – Recommend activities to either predict a primary tank failure or increase the probability of early warning.
- Forensic recommendations – The panel provided additional recommendations regarding forensic assessment of Tank 241-AY-102 (AY-102) to facilitate a conclusion on why the leak occurred.

WRPS has prepared a response to the concerns of the panel coupled with recommendations for project action to strengthen the DST Integrity Program [4]. The purpose of this DST Integrity Improvement Plan is to translate the recommendations to specific project activities that are technically and practically responsive.

To improve the understanding of the Single-Shell Tank (SST) integrity, WRPS, the Department of Energy-Office of River Protection tank operations contractor, developed an enhanced Single-Shell Tank Integrity Project (SSTIP) in 2009. An expert panel on SST integrity, consisting of various subject matter experts in

industry and academia, was created to provide recommendations supporting the development of the project. This panel developed 33 recommendations in four main areas of interest: structural integrity, liner degradation, leak integrity and prevention, and mitigation of contamination migration. In late 2010, seventeen of these recommendations were used to develop the basis for the M-45-10-1 Change Package for the Hanford Federal Agreement and Compliance Order, also known as the Tri-Party Agreement.

The change package identified two phases of work for SST integrity. The initial phase, which was completed in 2015, was focused on efforts to envelope the integrity of the tanks. It was divided into two primary areas of investigation: structural integrity and leak integrity. If necessary, based on the outcome from the initial work, a second phase would be focused on further definition of the integrity of the tanks and liners. The two combined phases are designed to support the formal integrity assessment of the Hanford SSTs in 2018 by an Independent Qualified Registered Professional Engineer.

This paper will summarize the current status of the DST and SST Integrity Programs and discuss the ongoing efforts to improve these programs.

DOUBLE-SHELL TANK DESCRIPTION

Construction of the first DST tank farm was started in 1968 and completion of the last DST tank farm occurred in 1986. Each DST consists of a primary carbon steel tank, ~23 meters (75 feet) in diameter, inside of a secondary carbon steel liner, which is surrounded by a reinforced-concrete shell. Both the primary tank and secondary liner are constructed in four courses. The primary steel tank rests atop a 229-mm (8-inch) insulating concrete slab (also called refractory), separating it from the secondary steel liner, and providing channels for air circulation/leak detection under the primary tank bottom plate. An annular space of 0.8 meters (2.5 feet) exists in between the secondary liner and primary tank. This space allows for visual examination of the tank wall and secondary liner annular surfaces, as well as ultrasonic volumetric inspections of the primary tank walls and secondary liners, along with other activities. See Figure 1 for a simplified depiction.

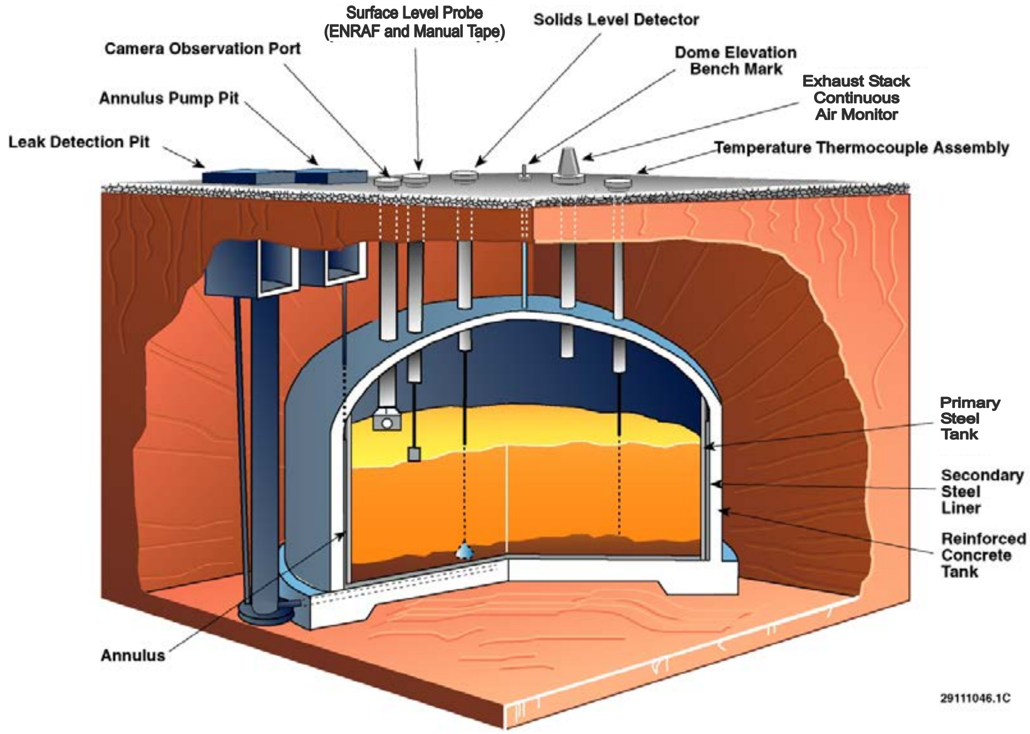
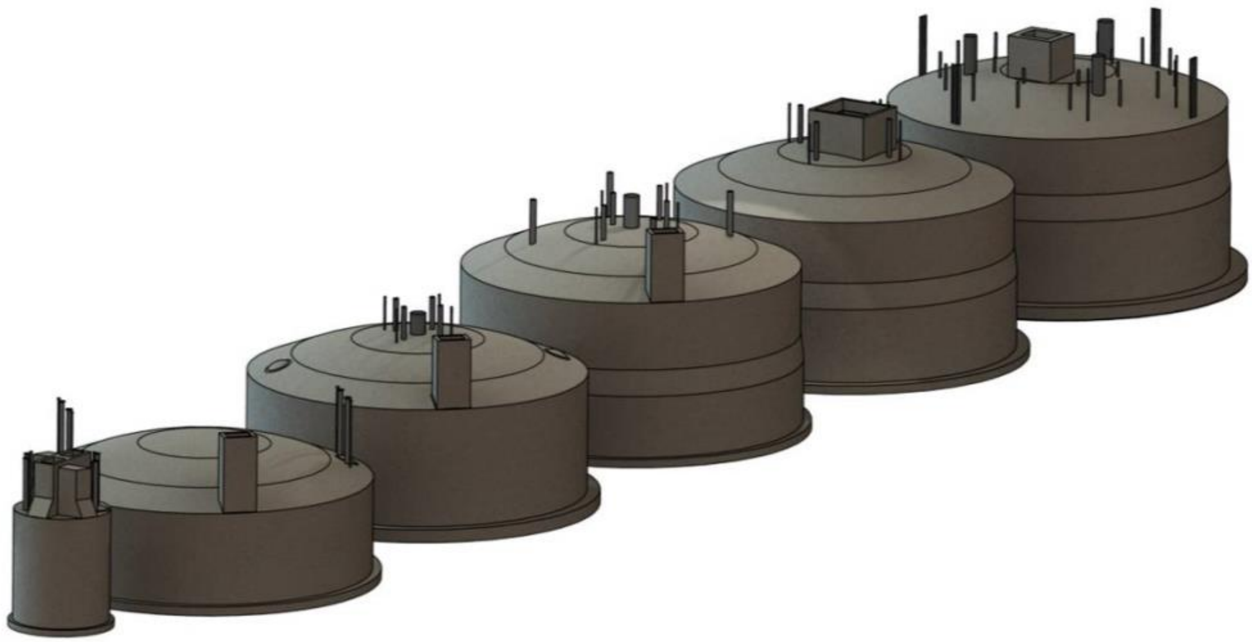


Fig. 1. Double-Shell Tank Design.

SINGLE-SHELL TANK DESCRIPTION

Construction of the first SST tank farm was started in late 1943 and completion of that last SST tank farm occurred in 1964. There are six different types of carbon steel SSTs that were built of varying sizes, as shown in Figure 2. In total, 149 SSTs, in 12 farms, were built for the storage of radioactive wastes at the Hanford Site.



TYPE I	TYPE II	TYPE III	TYPE IVA	TYPE IVB	TYPE IVC
55 KGAL	530 KGAL	750 KGAL	1 M GAL	1 M GAL	1 M GAL
241-B 241-C 241-T 241-U	241-B 241-BX 241-C 241-T 241-U	241-BY 241-S 241-TX 241-TY	241-SX	241-A	241-AX
16 TANKS	60 TANKS	48 TANKS	15 TANKS	6 TANKS	4 TANKS

Fig. 2. Types, Sizes and Nominal Volumes of the Single-Shell Tanks.

DOUBLE-SHELL TANK INTEGRITY PROJECT

Washington River Protection Solutions, LLC (WRPS) has created through the Tank Farm Projects organization a dedicated team to address tank integrity. The Double-Shell Tank Integrity Project (DSTIP) implements controls and inspections that ensure DST System integrity is maintained throughout the River Protection Project mission. The project plan for the DSTIP identifies all the activities conducted to ensure tank integrity. The plan ensures compliance with regulations, DOE Orders, and national consensus codes for the continued storage of dangerous High-Level Waste.

The work scope covered under DSTIP includes the following principal elements:

- DST integrity assessments (e.g., ultrasonic and video examinations) and documentation of results for use in periodic re-inspections.
- DST waste chemistry sampling and adjustments for corrosion mitigation, to ensure compliance with corrosion control specifications.
- DST waste chemistry corrosion optimization studies to quantify the optimal waste chemistry parameters to minimize DST corrosion.
- Development and installation of in-tank corrosion probes for DSTs with new or revised corrosion control limits.
- DST structural analysis and studies for thermal, operating, and seismic loads.
- Periodic testing, evaluation, and certification of DST ancillary equipment (valve pits, transfer piping, etc.) that support the operation of the DST system.
- Periodic testing and certification of the 242-A Evaporator Facility.

The second round of UT inspection was completed in fiscal year (FY) 2015; a fourth round of visual inspection will be completed in FY 2016; and all transfer lines necessary to support ongoing operation have been inspected. In FY 2006, the DSTIP completed the field work and documented the integrity assessment of the DST system per Resource Conservation and Recovery Act (RCRA) regulations and a similar assessment of the 242-A Evaporator was conducted in FY 2008. These assessments are conducted by an Independent Qualified Registered Professional Engineer. An assessment to re-certify the tank system is due in FY 2016 and FY 2018 for the evaporator.

As a comprehensive program to ensure the continued viability of the DSTs to support the Hanford mission, the DSTIP activities also include facilitating Expert Panel workshops on all technical aspects of DST use and life extension, and providing guidance for modeling of DST waste and operational characteristics. To ensure continued improvement of the technical bases, the DSTIP receives programmatic steering and advice from expert panels.

As a result of the leak from tank AY-102, the DSTIP conducted an extent of condition (EOC) review, which included an assessment of the construction practices for the DSTs. From the EOC review, the project prepared an improvement plan for tank integrity. Following the recommendations of an expert panel, this plan focuses on inspection of the tank bottoms. The improvement plan also provides additional scope to address the technical bases for the project and increased inspections of the tank system. The funding and scope for this plan have not been finalized.

Inspection of Double-Shell Tanks

The DSTs are examined visually for conditions indicating structural and leak integrity deterioration on the annulus surfaces of the primary tank and secondary liner using remote video equipment. As demonstrated by the first and only leaking

DST, tank AY-102, annulus visual examinations were the primary leak detection system. As a result, in 2013, the inspection frequency and visual inspection coverage in the annulus were increased significantly.

The current visual inspection program performs an inspection every three years for each DST. The annulus is accessed via 10 to 12 risers to provide enough coverage (greater than 95 percent by area) of the annulus floor. Prior to 2013, inspections were performed once every 5 to 7 years for each DST and only approximately 50 percent coverage of the annulus floor was observed (via four risers).

Video camera units are deployed by hand and dangled from the end of a tether. Each video inspection requires an average of 8 to 10 personnel to enter the tank farm and nominally record an hour of video. Camera stability throughout the inspection limits the quality and makes post processing of the video a time-consuming process. The benefits of a permanently mounted automated annulus riser camera system have been recognized, and a recommendation to pursue a solution was made in Section 4.2.1 of [4].

From 2013 to September 2015, annulus inspections have been performed in 20 DSTs and no evidence of a primary tank leak were observed. The remaining DSTs will be visually inspected for FY 2016.

Ultrasonic examinations of the 28 DSTs are carried out as follows and as depicted in Figure 3:

- Entrance to the annulus is made through two risers, and the same two risers are revisited every cycle to allow comparison and accurate wall loss estimates.
- Four 15-in. wide vertical scans of the primary tank wall are performed for all DSTs.
- A 20-ft length of circumferential weld joining the primary tank vertical wall to the lower knuckle is scanned, along with the adjacent Heat Affected Zone (HAZ) for all DSTs.
- A 20-ft length of vertical weld joining shell plate courses of the primary tank is scanned, extended as necessary to include at least 1-ft of vertical weld in the nominally thinnest wall plate and adjacent HAZs for all DSTs.
- A 20-ft long circumferential scan is performed at a location in the vertical portion of the primary tank wall corresponding to a static liquid/vapor interface level that existed for any 5-year period, extending at least 1-ft above that liquid/vapor interface for six DSTs.
- A 20-ft long circumferential scan is performed of the predicted maximum stress region of the primary tank lower knuckle for six DSTs.

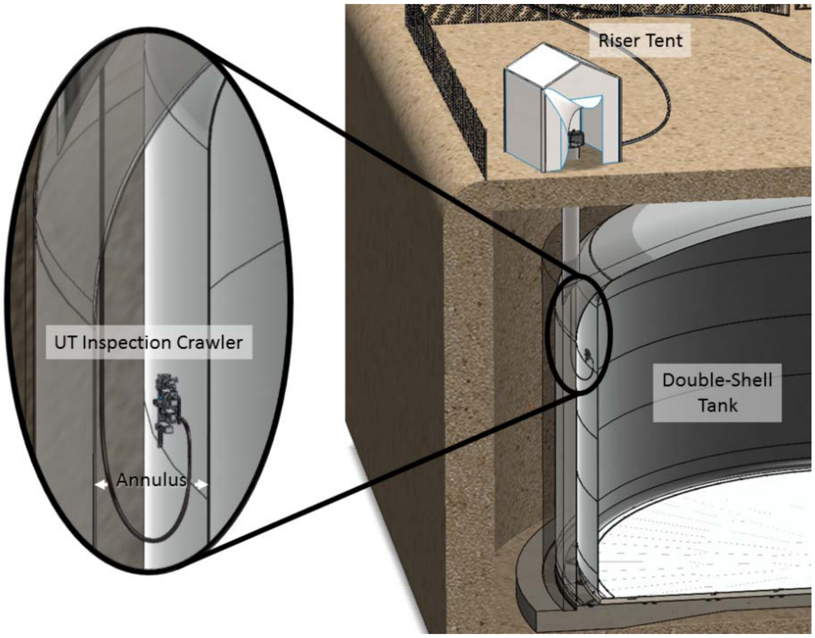


Fig. 3. Typical Hanford Ultrasonic Testing Operations

The guideline criteria for thinning, pitting, and cracking, and DSTIP reporting criteria are provided in Table 1.

Table 1. Ultrasonic Testing Evaluation Guidelines and Reportable Values

Parameter	Department of Energy Acceptance Criteria	DST Integrity Project Reportable Value
Thinning	20% thickness	10% thickness
Pitting	50% thickness	25% thickness
Cracking	>12 in. 20% of thickness ≤12 in. 50% of thickness	Any linear indication greater than 6 in. in length and 0.1 in. in depth

In 2015, WRPS completed the second round of UT for the DSTs. Overall, the UT data for the primary tank walls show no significant loss of wall thickness and the walls are more than adequate to support their structural function. In addition, none of the tanks have pits that exceed 25 percent of the wall thickness, and there are no reportable linear indications (or cracking).

Tandem-Synthetic Aperture Focusing Technique (T-SAFT)

Structural analysis indicates that the most highly stressed region of the lower knuckle, which would be most susceptible to stress corrosion cracking, is from the middle to lower part of the knuckle. The Tri-Party Agreement Milestone M-48-02 series required the development of technology for examining the lower knuckle. The flexible extended arm for the AWS-5d crawler was selected, tested, and was deployed in FY 2002. Also, during FY 2003, technology development was completed for the tandem-synthetic aperture focusing technique (T-SAFT) for lower knuckle examination. The T-SAFT was successfully deployed and was used for knuckle examination starting in December 2002. The performance demonstration test was completed for this system using the Y-arm adapter for the crawler.

The T-SAFT performance demonstration test [5] showed that Level II NDE technician could dimension linear indication in the knuckle region with a high confidence level to a depth of 180 mil. This inspection technique enables full inspection of the lower primary tank knuckle and partial inspection of the primary tank bottom. Further evaluations of this technology are currently planned which support improvements to the DSTIP non-destructive examination program.

Corrosion Control

The DST Integrity Program controls corrosion by inhibiting the amount of aggressive species within the waste and altering the chemistry of the waste when necessary. An operating specification identifies the amount of hydroxide and nitrite necessary to inhibit corrosion based on the amount of nitrate present, and the chemistries of the tanks are checked periodically to confirm that they remain within specification. Corrosion control is continually improved and monitored through corrosion testing and in-tank monitoring.

Corrosion Testing

Corrosion testing focuses on three topics: stress corrosion cracking (SCC), pitting corrosion, and leak detection pit (LDP) testing. Stress corrosion cracking testing began in 2007 by using slow strain rate tests to evaluate the risk of SCC for various waste chemistries. Results of this testing implied that most waste chemistries pose no significant risk for SCC except at low pH, high temperature, high electropotential, and high strain environments - environments that are prevented by corrosion control specifications. In 2014 additional crack growth rate tests were added to the testing arsenal to assist in determining whether SCC is a practical concern. The SCC testing is ongoing.

The majority of pitting corrosion testing began around 2006, but work since 2013 strengthened the assessment of pitting threats within various waste types and defined a pitting protocol to standardize the procedure for testing across multiple laboratories. Cyclic potentiodynamic polarization (CPP) tests are used as a screening tool for waste chemistries. If the CPP test results in pitting or the test is inconclusive, a Tsujikawa-Hisamatsu Electrochemical test is performed. This test is a way to determine the pitting repassivation potential and whether pitting is a realistic threat. After testing numerous existing and bounding DST waste simulants, there is no evidence of a pitting threat at current tank compositions and temperatures. Pitting tests are continually performed for new or anticipated waste chemistries.

Leak Detection Pit testing refers to a set of tests intended to mimic a recent phenomenon observed in a number of DSTs. The LDP system was constructed such that it would drain the concrete foundation in the event of a secondary liner breach;

however many LDPs have historically experienced slow liquid accumulations from ingress of soil moisture. If moisture is present in the LDP, it means that the secondary liner may be subjected to that same moisture. Long-term testing using simulants and actual samples of LDP water and ground water were conducted to assess the propensity for corrosion in the liquid, liquid-air interface, and vapor space. The results indicated a propensity for corrosion and highlight that liner exposure to moisture is the biggest threat to secondary liner integrity.

In-tank Monitoring

In addition to testing waste chemistries in a laboratory, waste chemistries are also evaluated in-situ. Corrosion probes are used to evaluate the corrosion threat in DSTs. Seven tanks contain corrosion probes that are equipped with reference electrodes for potential measurements. Five of those corrosion probes also contain electrical resistance (ER) sensors to measure corrosion rates and weight loss coupons for future forensic examination. No tanks are at risk for SCC and the ER sensors show <<1 mil per year (mpy) corrosion. Weight loss coupons removed from three tanks showed minimal general corrosion and minimal to minor pitting corrosion.

Tank Integrity Expert Panel

As a result of the first leaking DST in 2012, tank AY-102, WRPS contracted a panel of experts from industry and academia to provide advice and recommendations for the DST Integrity Program.

The initial expert panel meeting was in September 2013, and discussed the tank AY-102 leak assessment. The second meeting was in April 2014, and discussed the extent of condition reviews from the leak assessment along with an overall program review. In the August 2014 meeting, the expert panel provided additional recommendations regarding post-retrieval forensic assessment of tank AY-102 to facilitate a conclusion on why the leak occurred. The panel focused on three concerns [6-8]:

- No Early warning – Determine why the existing DST Integrity Program did not predict a primary tank failure or provide early warning of the pending failure.
- Program improvements – Recommend activities to either predict a primary tank failure or increase the probability of early warning.
- Forensic recommendations – The panel provided additional recommendations regarding forensic assessment of tank AY-102 to facilitate a conclusion on why the leak occurred.

As a result of these three meetings, a number of tasks were identified to implement the expert panel recommendations which were developed at a pre-conceptual level for execution beginning in FY 2016. A prioritization and path forward for each of these tasks is summarized in Figure 4.

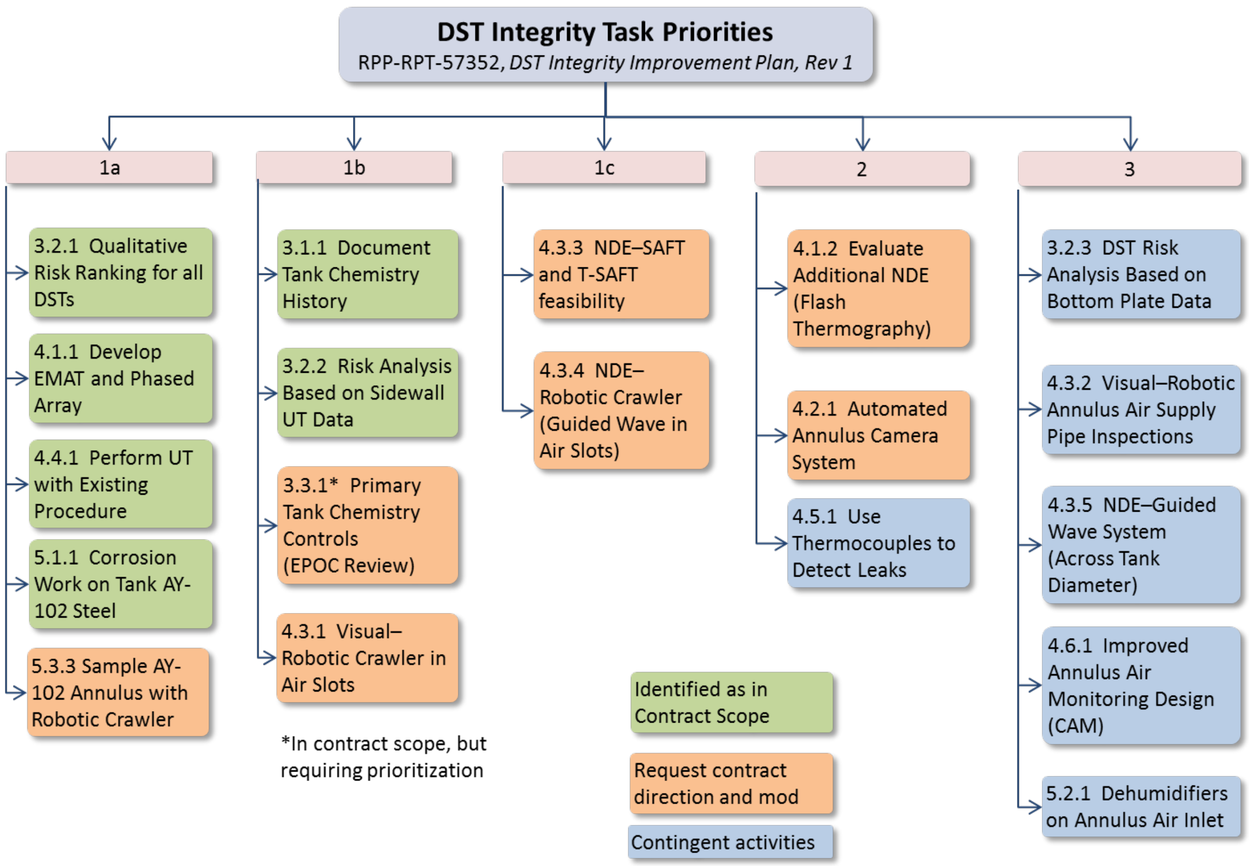


Fig. 4. Double-Shell Tank Integrity Task Priorities

In 2015, all previous tank integrity expert panels were merged into the Tank Integrity Expert Panel (TIEP) to oversee the DSTIP and the Single-Shell Tank Integrity Project (SSTIP).

TIEP members were selected to ensure representation from all necessary disciplines (e.g., structural and seismic analysis, electrochemistry, DOE policy, nondestructive evaluation, corrosion, stress corrosion cracking, materials, and waste chemistry).

The Chair and Vice Chair are responsible for logistics and facilitation associated with the TIEP and subgroups (e.g., organizing and facilitating meetings, teleconferences, agendas, etc.). Additionally, the Chair and Vice Chair are responsible for facilitating TIEP consensus findings and recommendations and communicating those to the TOC on behalf of the TIEP. The initial TIEP membership consists of a chair and vice chair who are supported by experts in the areas of corrosion, materials, chemistry, structural analysis, and nondestructive evaluation.

The TIEP work will occur primarily through the subgroups. An initial list of subgroups is included below. The workflow associated with developing and executing TIEP scope is summarized in Figure 5. The Chair and Vice Chair will serve as de facto members of all TIEP subgroups. Each subgroup will include a TIEP member of the appropriate discipline to serve as a liaison between the TIEP and the subgroup. Subject Matter Experts will be selected by the TIEP (in discussion with the TOC) based on the skill set required to respond to the TOC's request.

- **Corrosion Subgroup:** This subgroup will guide planning and execution of corrosion testing and monitoring as well as development and validation of chemistry control specifications.
- **Structural Subgroup:** This subgroup will provide input on fitness-for-service topics related to structural analysis and control of loads.
- **Materials Subgroup:** This subgroup will provide input on materials (including non-metallic) and degradation mechanisms other than corrosion.
- **Inspection Subgroup:** This subgroup will provide input on identifying, developing and deploying technologies used to assess tank conditions.
- **Programmatic Execution Subgroup:** This subgroup will provide input on the effectiveness and efficiency of the overall integrity program.

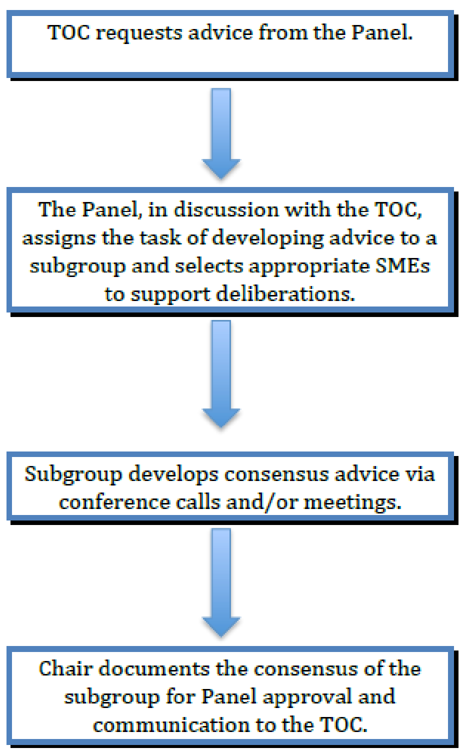


Fig. 5. Development and Execution of the Tank Integrity Expert Panel (TIEP) Work

The initial TIEP meeting took place July 2015 to give panel members an overview of the DSTIP and SSTIP [9]. As an outcome to this meeting, recommendations were made by the TIEP concerning the following two high priority challenges highlighted at the meeting:

- Continuing current and planned DST corrosion testing and monitoring

- Developing an in-service inspection plan for DST liner bottoms that includes obtaining nondestructive evaluation techniques to inspect DST liners.

DSTIP Path Forward

WRPS has adopted a multi-prong approach to implement the goals of the TIEP. This approach uses the DOE Grand Challenge initiative, hosting a session at the American Society of Non-Destructive Evaluation Testing (ASNT) conference, identification of needs as part of the technology development roadmap for WRPS, and inclusion of scope in the proposal for FY 2017 and 2018.

Grand Challenge Initiative

The goal of this initiative is to refine the first generation prototype robot to begin inspection of the 40 percent of the DST primary tank structure that cannot be inspected at the present time. A 1973 study by E. I. du Pont de Nemours & Company noted that most steel tanks fail within 50 to 60 years regardless of service. The inspections will allow sensible contingency planning within the capital plant.

The existing inspection robot has been demonstrated at bench scale by the Florida International University Applied Research Center (FIU-ARC). However, additional video and remote operation refinement is required, as well as a delivery system to launch the robot 55-feet below grade in the annulus of the DSTs. The FIU-ARC experience will be supplemented by two companies with extensive robotic and remote inspection experience: IHI Southwest Technologies Inc., the company that performed the successful tank AY-102 Leak Detection Pit inspection, and SA Robotics, which has developed an advanced concept for delivering a camera beneath the primary tank. Additionally, a nationally recognized non-destructive examination (NDE) expert from Southwest Research Institute will advise the development team and ensure that capabilities for future delivery of NDE instrumentation are incorporated.

It is proposed that in 2017 a full-scale demonstration of a DST bottom inspection will be performed. The robot will visually baseline each of the 27 sound DSTs for comparison with tank AY-102 bottom condition. The work will allow realistic DST End-of-Life projections, and pinpoint where scarce DST space should be allocated. The increased life certainty will allow emphasis of Treatment and Disposal rather than Storage, and the incentive for premature DST replacement construction will be reduced.

American Society of Non-Destructive Evaluation Testing Session on Nuclear Waste Double Shell Tank Bottom Inspection, Overview and Potentially Available NDE Technologies

To explore technologies used in the commercial and nuclear setting, WRPS has written an expression of interest for evaluating tank bottom inspection for the integrity program that would add the capability to inspect the primary tank bottom of double-shell tanks. Inspection access to the primary tank bottom is limited to channels in an insulating concrete pad that the tanks rests on for support. This expression of interest was conducted in conjunction with a session at the 2015 ASNT Conference to meet with potential suppliers.

Access through these refractory channels would provide data about the bottom of the primary tank from the exterior surface. Regarding access to the annulus space and air slot layout, the configuration does vary slightly among the twenty eight tanks. Each double-shell tank has risers of various diameter that provide access to the annulus space from grade, the largest of which are 24-in. The annulus space is 30-in between the primary tank and secondary liner sidewalls. Figure 6 depicts a basic DST design with the primary tank shown as transparent, highlighting the refractory and air slot pattern underneath. There are two refractory air slot patterns, shown in Figure 7.

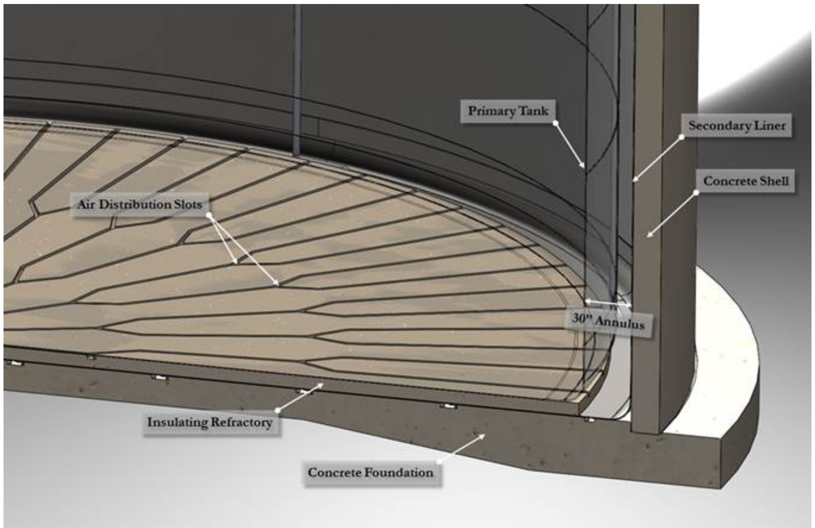


Fig. 6. Hanford Double-Shell Tank Annulus and Refractory Detail

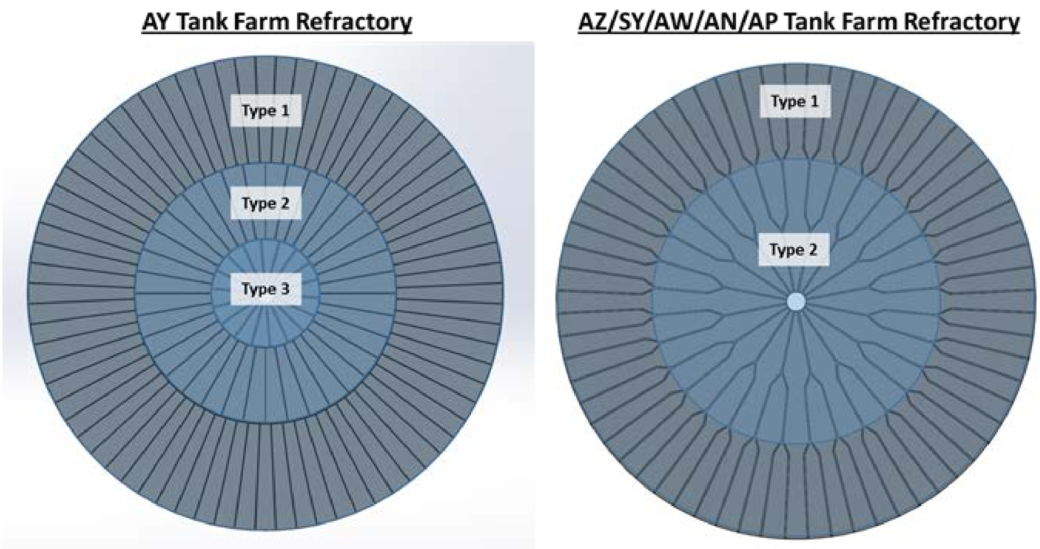


Fig. 7. Hanford Refractory Air Slot Pattern Variation

The two tanks in the AY Farm share a different refractory pattern from the remaining 26 DSTs. As depicted, the cross-sectional dimensions for these slots vary within each pattern, identified by types above. Further detail of these types are shown in Figures 8 and 9.

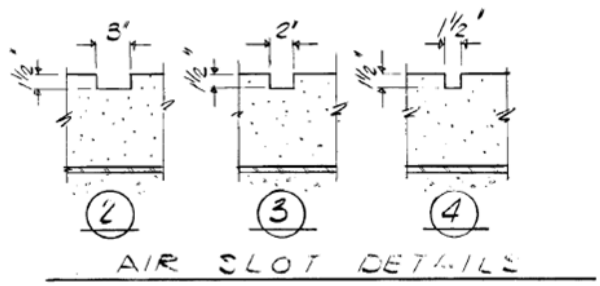


Fig. 8. 241-AY Tank Farm Air Slot Cross Sectional Detail
Type 1 = Detail 4 Type 2 = Detail 3 Type 3 = Detail 2

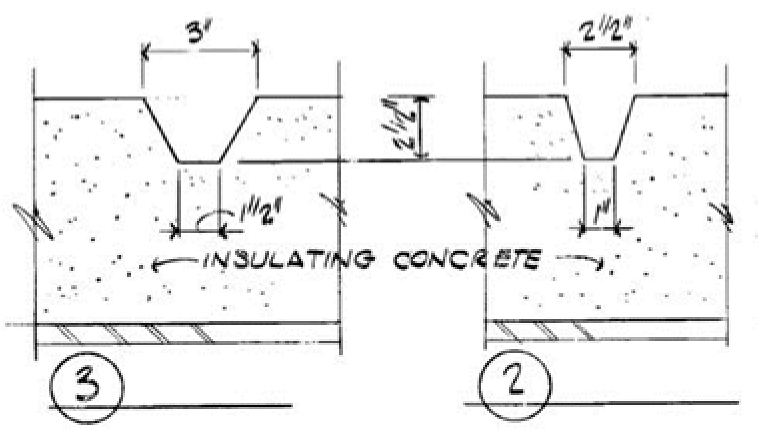


Fig. 9. 241-AZ/SY/AW/AN/AP Tank Farm Air Slot Cross Sectional Detail
Type 1 = Detail 2 Type 2 = Detail 3

The smallest and most limiting case is 1.5-in. x 1.5-in. on the Type 1 slots of the tanks in AY Farm (see Figure 9); however, this is present on only two of the 28 DSTs at Hanford.

<u>Technology Development Plan</u>

The needs for tank integrity were identified in [10]. The purpose of this technology development (TD) roadmap is to present a comprehensive, integrated assessment of the advances needed to ensure successful completion of the tank waste cleanup mission. The TD roadmap focuses on connecting technology needs to major technical flowsheet areas and identifies high-level decisions/risks that have major technology development impacts on the overall mission as a function of timeframe. Although many of the risks and uncertainties identified are programmatic, the TD roadmap focuses on the challenges that have a significant technology component.

SINGLE-SHELL TANK INTEGRITY PROJECT

To improve the understanding of the single-shell tanks (SSTs) integrity, WRPS developed an enhanced Single-Shell Tank Integrity Project (SSTIP) in 2009. Guided by an expert panel, consisting of various subject matters experts in industry and academia, the Implementation Plan for the SSTIP [11] focused recommendations into two primary areas, SST structural integrity and SST liner integrity.

In 2010, the project implementation plan was used to develop the basis for the M-45-10-1 Change Package for the Hanford Federal Agreement and Compliance Order, also known as the Tri-Party Agreement. The change package was divided into two primary areas of new investigation: structural integrity and leak integrity. If necessary, based on the outcomes from these initial milestones, a second phase could be developed. The initial phase of the SSTIP completed in mid-CY2015. All integrity program milestones and targets have been completed ahead of schedule and have been accepted by the regulator. By mutual agreement, no additional SSTIP milestones are currently envisioned. After 2015 only the final milestone, a formal integrity assessment of the Hanford SSTs by an Independent Qualified Registered Professional Engineer in 2018, will remain. The data obtained from work performed in this initial phase of the project will be a major contribution to the SST integrity assessment.

Work completed in in the initial phase to further define the DOE's understanding of the structural integrity SSTs includes:

- Preparation of modern structural Analysis of Record (AOR) using finite element analysis for all tank types, which show each of the tank designs meet current American Concrete Institute code requirements for Nuclear Safety Related Concrete Structures (ACI-349).
- Regular annual visual inspection of the SST tank interiors, which will continue at a rate of about 12 tanks/year.
- Continuation of the SST dome deflection biennial surveys, which show none of the tanks exceed reporting requirements.
- Collection of concrete core samples from the tanks, including a full height tank sidewall core from the tank with the worst thermal history, tank A-106, which show current concrete mechanics properties exceed design and show minimal degradation.

Work completed to improve understanding of SST leak integrity includes:

- Analysis of the leak cause, location and leak rate for the 25 SSTs with known liner failures.
- An analysis of the common cause/failure analysis to look for trends in the past causes of failure.
- Corrosion testing to examine the propensity for corrosion in select SSTs with aggressive waste layers shows no threat of stress corrosion cracking and little threat of pitting or localized corrosion.

In response to Expert Panel concerns, investigations into SST level change have confirmed water intrusion in 15 SSTs to date. Intrusion investigations are on-going, incorporated into annual SST visual inspection routines. Deployment of an exhauster to mitigate water intrusion was started in tank T-111 in FY 2015, see Figure 10. Initial results show this approach effective at reducing surface liquids with evaporation rates of 25-30 gallon per day reported. Plans are to expand this use of exhausters to other SSTs that have confirmed water intrusion or other visual liquid accumulations.

Fig. 10. Exhauster and ducting deployed on Tank T-111.

Going forward, SSTIP activities are reaching a “steady-state” with ongoing activities expected to continue. These activities are:

- Continuing SST dome deflection monitoring by periodic surveying. Currently tank farms with surface barriers or those undergoing active retrieval are re-surveyed every two years. All other tank farms are resurveyed every three years.
- Routine SST visual inspection at nominal rate of 12 tanks per year, with emphasis placed on the condition of dome concrete and structural integrity, steel liner condition and examination of the waste surface to provide insight into water intrusion investigation.
- Ongoing improvements to SST level change evaluations to improve the routine monitoring of SST surface levels and interstitial liquid levels.
- Performance of formal SST leak assessments per the TFC-ENG-STD-CHEM-D42 procedure for tanks classified as “assumed leaker” and which little evidence of actual leak exists. To date these assessments have been driven by near term retrieval decisions. Going forward a more detailed prioritization strategy has been proposed to address concerns beyond retrieval technology selection.

With reduced need for specific expert panel input on SST issues, the various subject matter expert roles from the SST expert panel have been integrated into the TIEP and the corresponding supporting subgroups.

CONCLUSIONS

The DOE has developed a robust DSTIP and SSTIP over the past two decades. Guided by nationally and internationally recognized experts the project continues to seek improvements in its integrity activities and technology. The leak from DST AY-102 has led to a set of new recommendations to improve tank integrity that ORP and WRPS are pursuing.

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