# Hanford Single-Shell Tanks 241-T-203 and 241-T-204 Validation of Level Decrease Evaluation - 15343

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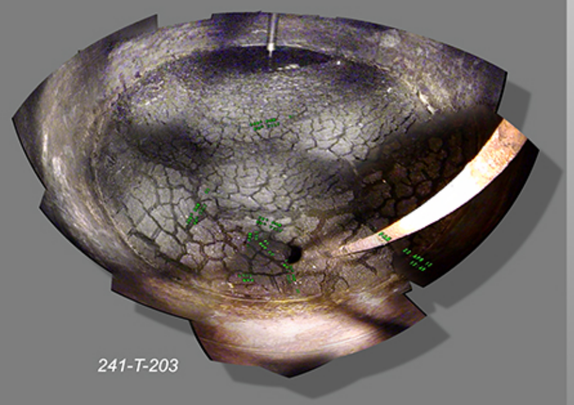
**Hanford single-shell tanks (SSTs) 241-T-203 (T-203) and 242-T-204 (T-204) were two tanks that showed decreasing waste surface level trends. All factors that could impact each tank's level change rate were evaluated with the conclusion being the level decreases could be explained by evaporation. The evaporation estimates contained several assumptions, so a test was performed to determine if the estimates could be supported by data. The breather filter valves on these two tanks were closed for one year in order to shut off the primary means of tank air exchange with the atmosphere. The results for tank T-203 showed the net level change for the year was zero, which supported the evaporation rate estimate and provided evidence that the tank was not leaking. The data for tank T-204 were very erratic and prevented conclusive results, but the waste level showed a significant reduction in the level decrease rate and supported the tank evaporation rate estimate.**



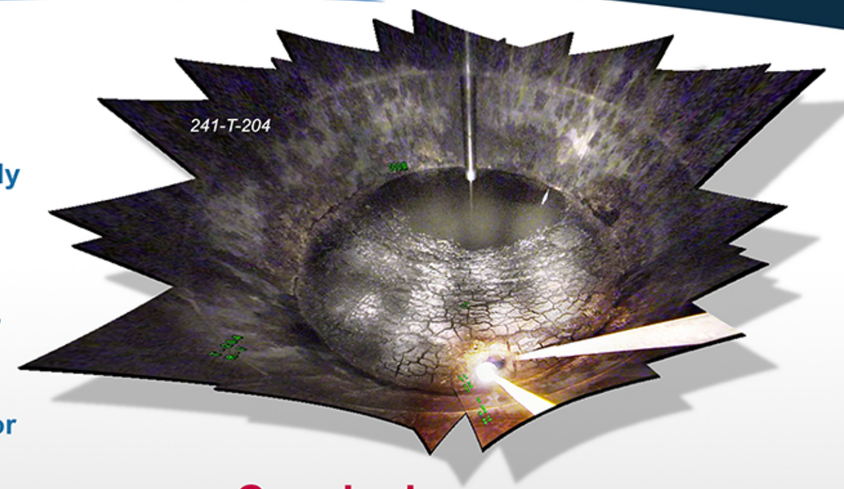
*241-T-203*

## Introduction

A liquid level decrease in a Hanford single-shell tank could indicate that a tank is leaking; however, level decreases can result from a variety of other factors, namely evaporation or changes in the waste structure.

Tanks T-203 and T-204 had shown small waste level decreases of 0.087 and 0.071 in./yr, respectively, for many years. Because of the long-term decreasing level trends, these tanks were evaluated to determine what was causing the decreases.

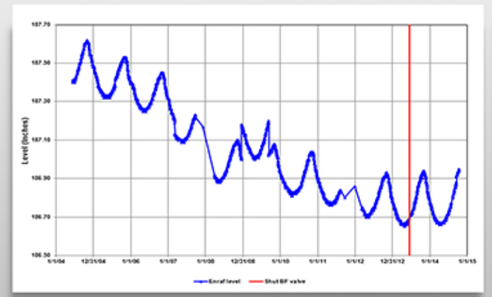
The evaluation concluded that evaporation could explain the liquid loss in T-203 and T-204. In order to support the validity of this claim, the breather filter inlet valves were closed on tanks T-203 and T-204 in June 2013 and remained closed for a full year. During that year, tank liquid waste levels were monitored for changes.



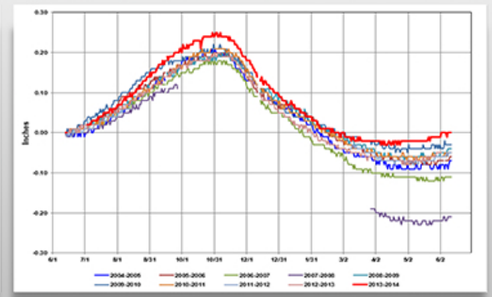

## Results

### Tank T-203

Chart showing annual liquid level fluctuations. Red line shows the date when the breather filter valve was shut. The year from June 2013 to June 2014 showed no net level change.



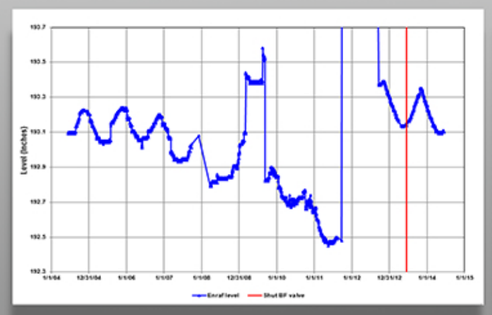

*Comparison of annual surface level change*



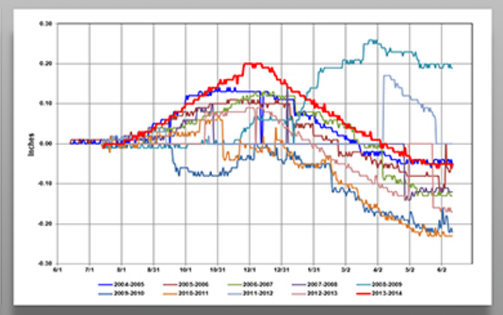

*Net surface level change*

### Tank T-204

Chart showing annual liquid level fluctuations. Red line shows the date when the breather filter valve was shut. Instrument problems caused erratic surface level readings and made the data difficult to analyze, but the level change was significantly decreased in the year from June 2013 to June 2014




*Comparison of annual surface level change*




*Net surface level change*

## Conclusions

**Closing the breather filter inlet valves resulted in an annual surface level change of 0.0 in. for T-203 and a significantly smaller annual surface level change for T-204. This exercise proved to be a useful way to confirm that evaporation estimates were reasonable for the 20 ft. diameter tanks evaluated. A better understanding of the contribution of evaporation to level change in the tanks will be useful in evaluations of other tanks with decreasing level trends.**

***Important considerations:***

*Flammable gas measurements were taken more frequently to ensure that the flammable gas levels were safe. Over the year when breather filter valves were closed, the flammable gas readings in both tanks never registered above 0% of LFL.*

References:

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2. J. S. SCHOFIELD, RPP-RPT-56294, "Evaluation of Tanks 241-T-203 and 241-T-204 Level Data and In-Tank Video Inspections," Revision 0, Washington River Protection Solutions LLC, Richland, Washington (2013).
3. TANK AND PIPELINE INTEGRITY, PMI-13-004, "Closing Breather Filter Inlet Valves on 241-T-203 and 241-T-204," Washington River Protection Solutions LLC, Richland, Washington (2013).
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5. L. J. KRIPPS, HNF-SD-WM-TSR-006, "Tank Farms Technical Safety Requirements," Revision 7-P, Washington River Protection Solutions LLC, Richland, Washington (2013).
6. TF-AOP-005, "Response to Unexpected Tank Temperature, Level or Flammable Gas Increase," Revision E-0, Washington River Protection Solutions LLC, Richland, Washington (2013).
7. R. J. WASHBOUGH, RPP-5626, "Steady-State Flammable Gas Release Rate Calculation and Lower Flammability Level Evaluation for Hanford Tank Waste," Revision 13, Washington River Protection Solutions LLC, Richland, Washington (2013).