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'A' level TQ #1179-RW-08 IP Red Seal #J-22-97373 Business Licence #00013034

This report is on the condition of the elevated water tank on Savary Island for the Savary Shores Improvement District.

Scope: Conduct an Ultrasonic test (UT) to determine the integrity of the elevated water holding tank located on Savary Island. Due to limited access and working at heights professional climber Chris Clark assisted with the rigging setup and acted as a guide and safety watch during the procedure. A pre-site inspection was performed days in advance to determine a safe plan to execute the task.

The Ultrasonic Thickness Gauge I used to perform the test is a Reed Instruments model TM-8811 and has pre-programmed sound velocities for various materials and defaults to steel when powered up. Upon commencing the inspection, I verified that the unit was indeed set to measure steel, I also conducted a calibration of the unit using the known calibrating puck on the device which measures 0.197". The calibration test showed 0.197" so a green light to go. I conducted 2 more tests before commencing with the actual task. The transducer, which is the earbud sized part of the device couldn't take measurements through the paint on the exterior of the tank therefore requiring me to remove the paint from test locations. Before ascending the tower, I did 4 measurements of the lower tank to check that the device was reading accurately. Small patches of paint were removed and the test was performed on a known thickness to visually see that the device was working properly. Once the calibration was completed and the results verified the actual test was performed.

The tests were conducted in a series of points around the perimeter of the tank. The base point datum of reference is the ladder to the top of the tank, which for mapping purposes was deemed 6 o'clock. The testing was performed in a clockwise manner from 6, so all reference points are clockwise from the datum, in other words the measurements were conducted at the 9, 12, 3, and 6 o'clock points around the tank. Lid measurements also use this clocked reference. The testing point numbers start from the bottom of the tank and ascend upwards in 24 inch increments.

Data point 6 (at the ladder)

1-0.278" 2-0.278" 3-0.278" 4-0.278" 5-0.278" 6-0.278" 7-0.278" 8-0.278"

Data point 9

1-0.257" 2-0.252" 3-0.268" 4-0.268"

Data point 12

1-0.257" 2-0.257" 3-0.266" 4-0.266"

Data point 3

1-0.273" 2-0.273" 3-0.273" 4-0.278"

Top lid panel – 6 locations were tested, 2@ the 9 o'clock position – 0.193" and 0.198", 2@ the 3 o'clock position – 0.193" and 0.198", under the vent tube in the center – 0.198", and a single test was done @6 o'clock in line with the ladder – 0.198"

Bottom

A test was done on the flange that protrudes from the joint where the sides meet the bottom plate. This location is adjacent to the catwalk and is a 'visible' preliminary test point, verifying the thickness of the base plate – 0.257". 2 tests were conducted on the bottom from underneath and both measured 0.247"

Measuring of the bottom thickness was halted due to extreme rust corrosion, observed as pervasive on the majority of the surface. There was no point in measuring steel that is already degraded and in need of replacement. Pits were observed to be present along the toes of the seam welds, as well as closer to the edge of the tank. Without measuring the depth of the pitting, I estimated that the pitting was between 25%-50% of the total bottom plate thickness.

This corrosion damage will limit the remaining lifespan of the tank, however measures can be taken to mitigate further corrosion and extend the usability. The pits cannot be repaired from the outside properly using welding to fill them in. Wire brushing to remove the corrosion scale from the affected areas and then application of a rust converter product such as Loctite SF 7625 Rust Treatment is my recommendation. The converter will stop further corrosion and can be painted over. A PM schedule to visually survey the bottom once or twice a year would be a good idea to monitor the condition of the bottom.

Conclusion

The elevated tank is in excellent shape with the exception of the external corrosion on the bottom. All visible welds and seams are in good condition, the average material thickness is on par with 'as manufactured'. When repair or replacement time comes, I see no reason as to why the tank bottom couldn't be replaced, the tank re-lined internally, and put back into use. This would have to be done off site and most likely at a certified tank or vessel shop under ASME. This repair would be dictated by seismic and other current regulations regarding elevated water storage tanks.