

impact an area of the water table of 150,000 square feet before being intercepted at RHMW02 at Tank 6. For these reasons, it is clear that every effort must be made to ensure that these releases do not occur, and this will be accomplished by instituting a rigorous maintenance schedule, and continuing the effort to identify and implement state of the art release detection procedures.

3.1 Tank Maintenance and Repair Program

3.1.1 Tank Maintenance and Repair Histories

Data from modified API 653 Inspection Reports and existing written site histories (see Appendix B) are summarized here. In addition to actual leaks from the tanks, it should be noted that in some cases, reported leaks in histories were leaks into the tell-tale system piping itself (which are internal to the tank) and were not external tank leaks.

Dates	Tank 1 Activity
August 1953	Leak found on tell-tale no. 7 and crack found in tank during cleaning; no indication given of leakage rates.
8/64 to 9/67	Various leaks from tell-tale; unknown quantity of leakage.
8/70 to 4/72	Unexplained fuel drops amounting to 31,294 gallons.
5/75 to 8/78	Unexplained fuel drops amounting to 32,765 gallons.
10/81	Tank modernization repair project starts.
7/82 to 1/83	Leak tests result in fuel drops amounting to 5517 gallons.
9/99	End of history.
Dates	Tank 2 Activity
10/47	Tell-tale leak noted, unknown amount; tank emptied.
12/81	Tank removed from service for repair and lining.
4/83	End of history.
Dates	Tank 3 Activity
3/53 to 12/81	No leaks reported.
Dates	Tank 4 Activity
1/53 to 4/83	No leaks reported.

Dates	Tank 5 Activity
3/65	Tell-tale leak at 1 gallon per 1.25 hours; tank worked on intermittently for 6 months but no leak found; suspect leak in tell-tale system.
2/72	Tell-tale leak at 2 quarts per day; response uncertain.
4/83	End of history.
Dates	Tank 6 Activity
6/63	Problems with tell-tale system; no clear indication of external leaks.
3/83	End of history.
Dates	Tank 7 Activity
11/73	Tell-tale leakage, tank emptied; leak may have been internal only.
5/78	Significant tell-tale leakage, tank emptied.
2/80	After filling leak rates measured and approx. 6505 gallons leakage measured until rate dropped to < 13 gallons per day (gpd) below 207' fill level.
4-5/81	Tank removed from service for repairs and put back in service; end of history.
Dates	Tank 8 Activity
3/52 to 4/83	No leaks reported.
Dates	Tank 9 Activity
4/58 to 5/58	Approximately 1500 gallons leaked from tell-tale.
4/96	Report of a hole found under middle pipe support for 18" line; no details provided.
7/78 to 2/81	Tank repair project and installation of telemetering system; leak test rates after project range from 4.5 to 17.9 gpd; no documentation of any actions
Dates	Tank 10 Activity
1/73	Suspected leak; tank emptied.
4/76	Tell-tale leak; tank emptied and removed from service.
10/78 to 4/80	Tank repair project and installation of telemetering system.
1/81	During refill a severe leak detected somewhere near top of tank; fuel ran out on concrete near first platform on stairway to top of dome; tank emptied.
10/81	Started refilling tank after repair.
4/83	End of history.

Dates	Tank 11 Activity
8-9/80	Leak testing after repair and upgrade; rates from 165 to 2412 gpd over 1 month; based on these valued estimated fuel loss between 10,000 and 20,000 gallons.
9/80	Tank emptied and repaired.
1/81	End of history.
Dates	Tank 12 Activity
1/64	Reported that there is a known leak in the dome section; no other information
3/73	Tank emptied, suspected leak; no additional information given.
2/81	Leak testing after repair and upgrade showed leak rate of 1,400 gpd; Unknown amount of leakage.
5/81	Tank was removed from service for a second time for leak repairs; end of history.
Dates	Tank 13 Activity
5/76	Leak reported, no details.
9/81	Tank returned to service after lining and repairs; leaks found above 188 foot level; repaired.
2/82	End of history.
Dates	Tank 14 Activity
3/49 to 2/82	No leaks reported.
Dates	Tank 15 Activity
7/81	Tank leaked badly upon refilling after tank repair and lining, no details.
8/81 to 10/81	Removed from service, repaired; leak test still showed leak and repaired again.
1/82	End of history.
Dates	Tank 16 Activity
7/48	Leak reported, no details; emptied tank.
7/49	Tell-tale leak, lost 2.25" in 11 days (approx. 11,000 gallons); no additional information.
12/49	Tank refilled, lost 3.63" in 4 days (approx. 18,000 gallons); no information on when leakage was stopped.
5/73	Tell-tale leakage at 1 drop per 20 seconds; no additional information.
1/75	Emptied tank.

Dates	Tank 16 Activity (continued)
10/81	Tank refilled after repairs and lining and found to leak badly.
11/81	Tank removed from service.
12/81	Tank reworked and returned to service; end of history.
Dates	Tank 17 Activity
6/69	Leak reported by gauger; tell-tale leaking at 1 gallon per 1.5 minutes; fuel transferred.
1/75	Tell-tale started leaking; no additional information.
5/79	End of history.
Dates	Tank 18 Activity
12/50 to 9/75	No leaks reported.
Dates	Tank 19 Activity
6/64	Leak discovered around weld in tank bottom, 5 mL per hour (mL/hr); other small holes discovered during inspection; rewelded.
1998	“Back seepage” was observed from holes in steel liner during a tank maintenance project.
Dates	Tank 20 Activity
8/60 to 3/79	No leaks reported.

Based on various types of leak tests conducted since 1997, other releases may have occurred that are not reflected in the histories above. However, the accuracies of these tests are not known and in some cases leakage through gate valves has been determined as the cause of unexplained changes in fuel levels. In 2004, gate valves on fuel lines were replaced with twin seal plug valves (double block bleed valves). These replacements are believed to have eliminated leaky valves as a factor to explain unexpected changes in fuel levels.

3.1.2 Tank Inspections and Repairs

To date, five tanks (Tanks 7, 8, 10, 15 and 16) have been inspected and repaired in accordance with a modified protocol for USTs based on the API 653. API 653, *Tank Inspection, Repair, Alteration and Reconstruction*, is a maintenance and inspection program developed by the API to provide for an ongoing assessment of a facility’s above ground storage tanks. This protocol was modified to be appropriate for USTs. API 653 provides minimum requirements for maintaining the integrity of welded steel storage tanks. It applies specifically to aboveground tanks, but the principles also apply to field-constructed underground tanks. Tanks 7, 8, and 10 underwent the