

Non-Destructive Tests Performed

Evaluation and Testing Method	Equipment	Procedures
Low Frequency Electromagnetic Technique (LFET)	Falcon 2000 Mark II	Tank wall and component scanning for wall thickness and back side corrosion with UT prove up as needed for actual wall conditions or weld quality.
Balanced Field Electromagnetic Technique (BFET)	Hawkeye 2000	Weld Inspection for surface and slightly subsurface indications; Evaluates accessible tank welds for surface and toe cracks.
Ultrasonic longitudinal and shearwave inspection (UT)	Krautkramer Ultrasonic Shearwave / Thickness Meter	Component integrity and wall thickness; Used as prove up to other techniques; Shearwave applied to the first 6 inches of intersection weld between the plates of course 1, just above the cover plates.
Magnetic Particle Inspection (MT)	Prod Technique; Dry powder, color contrast method Yoke technique, dry powder method	Used for for surface and slight subsurface indications for prove up as needed; MT used on welds of the lower dome/floor interface in place of shearwave technique because the intersection welds were <u>concealed by cover plates.</u>
Liquid Penetrant Testing	Dye Penetrant: Magnaflux Spotcheck SKL-SP1 or Sherwin Dubl-Chek DP-40/DP-51 Cleaner: Magnaflux Spotcheck SKC-S or Sherwin Dubl-Chek DR-60 Developer: Magnaflux Spotcheck SKD-S2 or Sherwin Dubl-Chek D-100	Visibly dye solvent removable method; Detects weld discontinuities open to the surface such as cracks, seams, laps, cold shuts, laminations, surface porosity, and lack of fusion.
Hydrostatic Pressure Testing	Hydro tree (proprietary); test boundary ANSI flange blinds (18"); proprietary test boundary flange blinds (32"); Diaphragm pump; MadgeTech dataloggers; MadgeTech thermocouple Temperature Recorder; MadgeTech Four Channel Thermocouple Recorder; GPI 10 GPM flow meter; GPI 5-50 GPM flow meter; Crystal Engineering 5000 psi Pressure Gauge;	Point in-time, pressure decay combination strength / stress / leak test. test pressure: 162 psig Procedures in conformance (in part) with UFC3-460-03F, California State Fire Marshal Pressure Testing Requirements for Hazardous Liquid Pipelines, ASME B31.3 Process Piping, ASME B31.4: Pipeline Transportation Systems for Liquid Hydrocarbons and Other Liquids, Section 3.4 of API RP 1110 Pressure Testing of Liquid Petroleum Pipelines.
Vacuum Box Testing	Proprietary vacuum box tester	Vacuum: 7 psig in Hg