

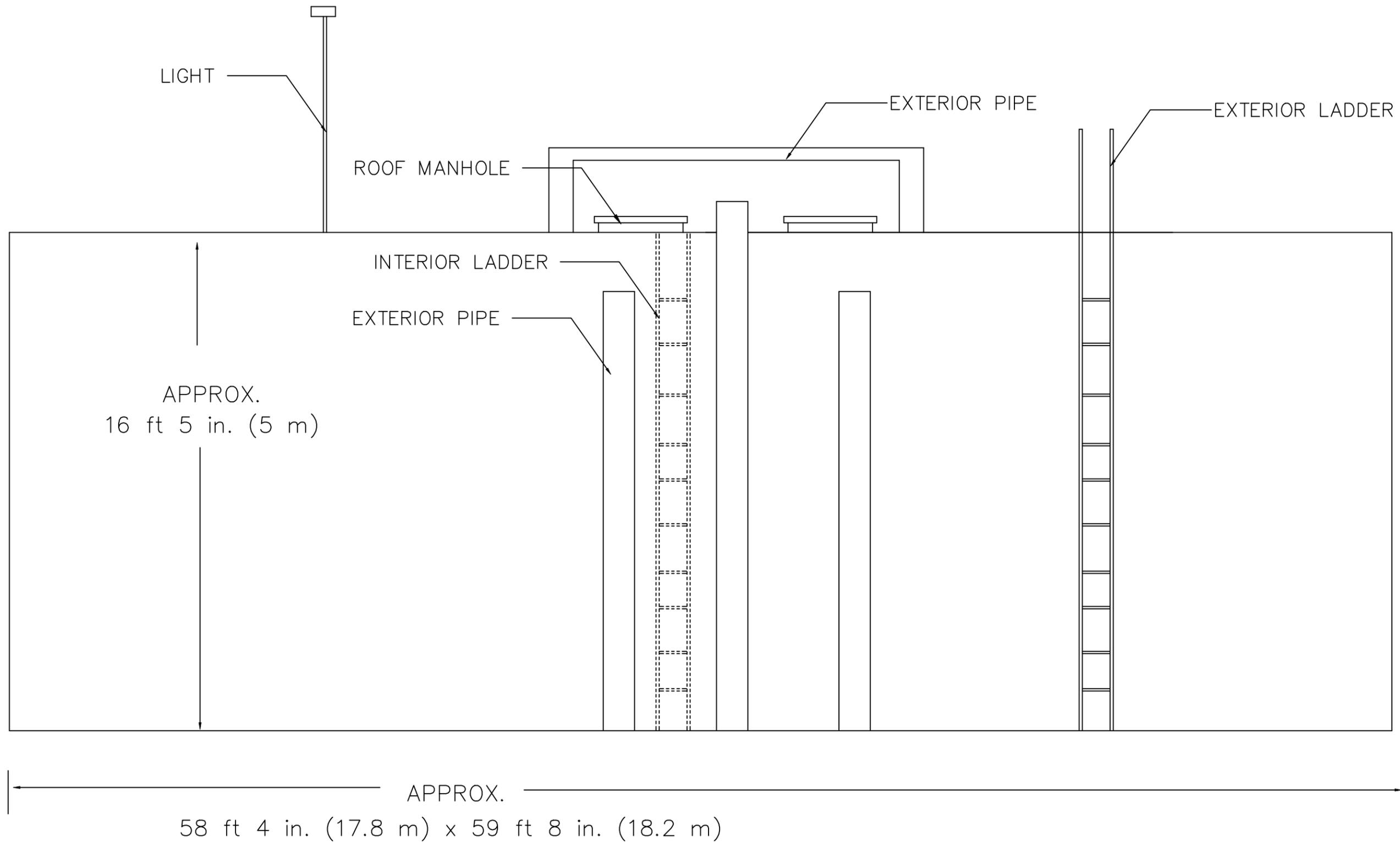
3.10 TANK 425

Tank 425 stores nonpotable water for the Naval Air Station in Sigonella, Italy.

3.10.1 Description of the Facility

Tank 425 is a two-chamber concrete tank which is partially located below grade and stores 200,000 gallons of nonpotable water. Measurements taken at the field evaluation indicated the tank projected from approximately 9 ft 6 in. (2.9 m) to 11 ft (3.4 m). The exterior of the tank measured approximately 58 ft 4 in. (17.8 m) x 59 ft 8 in. (18.2 m), and the interior height was approximately 16 ft 5 in. (5 m). (See Figure 3.10-1)

TANK 425, NOMENCLATURE



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GRAPHIC SCALE	DATE	 Contract Number N62583-10-D-0340	NAVAL FACILITIES ENGINEERING SERVICE CENTER EAST COAST DETACHMENT WASHINGTON, DC	FIG. NO.
NOT TO SCALE	November 2012		NAVAL AIR STATION SIGONELLA, ITALY NOMENCLATURE	3.10-1

3.10.2 Observed Conditions

Tank 425 is located at the Naval Air Station in Sigonella, Italy (See photos 3.10-1 through 3.10-3). Soccer fields and a high voltage area are located to the west and a secured, fenced area is located to the south. Piping extends from a pump house north of the tank and penetrates the shell (See photo 3.10-4). A conduit extends from the site to the roof and to the light mounted on the roof (See photo 3.10-14).

Two uncovered valve vaults are located to the north of the tank, and a pipe extends from each vault to the tank (See photos 3.10-5 through 3.10-8). The piping in the vault is in generally condition with a minimal amount of corrosion. Each of the vaults has a drain and includes access rungs. Wiring is exposed in the east vault (See photo 3.10-9). OSHA and safety-related deficiencies include: (1) the 11 in. (279 mm) rung width does not meet the required 16 in. minimum, (2) the 5-1/4 in. (133 mm) toe room does not meet the required 7 in. (178 mm) minimum, and (3) wiring in the east vault is exposed (See photo 3.10-9).

The concrete shell appears to be in generally good condition. There are some horizontal cracks located near the top of the shell, but there are no other significant areas of deterioration. Mildew is located on the exterior surface of the shell.

Two overflow pipes project from the south side of the shell (See photos 3.10-10 and 3.10-11). The pipes do not include visible air breaks and do not have brackets. No significant areas of corrosion are located on the piping.

The inlet pipe extends from below grade up the south side of the shell and penetrates the roof (See photo 3.10-12). The inlet pipe has a flat bar bracket (See photo 3.10-13). At the roof, the inlet pipe splits into four pipes each of which has a valve wheel above its penetration through the roof (See photos 3.10-25 through 3.10-28). A pipe extends from each vault and penetrates the north side of the shell. Two pipes extend from the adjacent pump house and also penetrate the north side of the shell, and one of these pipes also has a conduit running with it (See photo 3.10-17). There is corrosion on the pump house pipes (See photos 3.10-15, 3.10-16, 3.10-18, and 3.10-19).

A ladder extends from the ground to the roof of the tank which has terminals at the roof (See photos 3.10-20, 3.10-21, and 3.10-24). The ladder is equipped with two sets of brackets although only the top brackets are bolted to the tank (See photos 3.10-22 and 3.10-23). The ladder does not have a safe-climbing device. A ladder-gate vandal deterrent is located at the base of the ladder although it does not have a lock (See photos 3.10-20 and 3.10-21). OSHA and safety-related deficiencies include: (1) the 11-1/8 in. (283 mm) ladder width does not meet the minimum required 16 in. (406 mm), (2) the 1-3/4 in. (45 mm) x 3/8 in. (9 mm) side rails do not meet the required 2-1/2 in. (61 mm) x 3/8 in. (9 mm) minimum, and (3) the vandal deterrent is not locked.

The exterior of the concrete roof is in good overall condition as there are only a few minor cracks (See photo 3.10-18). Water was standing in two large areas located on the northeast and northwest sides of the roof (See photos 3.10-35 through 3.5-37). A light and associated equipment are mounted to the roof of the tank (See photo 3.10-39). There is no safety railing at the roof access and adjacent to the roof manholes which is a safety-related and OSHA deficiency. Ponding water may lead to infiltration through the roof which is potential operational deficiencies.

A target gage float is located beneath a flat-cover access opening in the roof, and it appears the target gage is capable of operating properly (See photos 3.10-33 and 3.10-34).

The roof has a hinged cover manhole above each of the two chambers, but the manholes are not locked (See photos 3.10-25, 3.10-26, 3.10-28, 3.10-29, and 3.10-31). The roof manholes have a gasket material which is cracked in one of the manholes (See photo 3.10-30). There is deterioration in the interior concrete surfaces of one of the manholes (See photo 3.10-32).

Most of the interior concrete surfaces are in good condition except for a few areas of corrosion at exposed steel and efflorescence located on the shell (See photos 3.10-40 and 3.10-44 through 3.10-49). A sealant material which is located in some of the corners appears intact (See photo 3.10-50). A layer of silt restricts the evaluation of the floors, and what appears to be a few small pieces of concrete are located in the silt (See photos 3.10-60 and 3.10-65). What appears to be a metal sheet is lying on the floor and covered with silt (See photos 3.10-62 through 3.10-64). The purpose of the metal sheet could not be determined at the time of the field evaluation.

A ladder is located in each chamber beneath the roof manhole, and the ladders are welded to brackets which are cast into the concrete shell. There are corrosion and rust tubercles on ladder surfaces beneath the roof manholes (See photos 3.10-52 through 3.10-56). The ladders do not have safe-climbing devices. OSHA and safety-related deficiencies include: (1) the 2 in. (51 mm) x 3/8 in. (9 mm) ladder side rails do not meet the required 2-1/2 in. (64 mm) x 3/8 in. (9 mm) minimum, and (2) the rust tubercles could injure the climber (See photos 3.10-53 through 3.10-57).

Open pipes for the overflows are flush mounted with the wall, and there is corrosion on the visible interior surfaces of the overflow pipes and rust staining beneath one of the pipes (See photos 3.10-41 through 3.10-43). A float for the target gage is located in the interior (See photo 3.10-51). A pipe penetrates the lower shell and elbows downward before ending. This pipe has an anti-vortex assembly and is covered with corrosion and rust tubercles (See photos 3.10-57 through 3.10-59). Two pipe openings are flush mounted near the top of the shell (See photos 3.10-60 and 3.10-61).



PHOTO 3.10-1 Tank 425 and site.



PHOTO 3.10-2 Tank 425.



PHOTO 3.10-3 Tank 425 and site.



PHOTO 3.10-4 Tank 425 and site.



PHOTO 3.10-5 Valve vault.



PHOTO 3.10-6 Valve vault.



PHOTO 3.10-7 Valve vault piping.

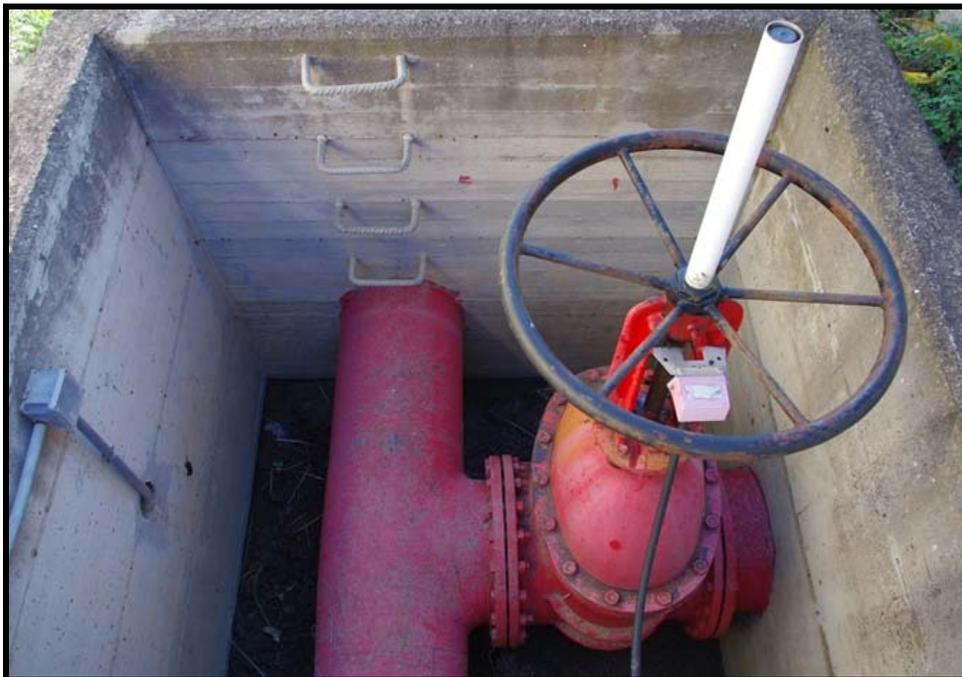


PHOTO 3.10-8 Valve vault.



PHOTO 3.10-9 Exposed wiring in valve vault.



PHOTO 3.10-10 Overflow pipe.



PHOTO 3.10-11 Overflow pipe.



PHOTO 3.10-12 Inlet pipe.



PHOTO 3.10-13 Inlet pipe and bracket.



PHOTO 3.10-14 Conduit extending to tank.



PHOTO 3.10-15 Corrosion on exterior piping.



PHOTO 3.10-16 Corrosion on exterior piping.



PHOTO 3.10-17 Exterior piping and conduit.



PHOTO 3.10-18 Corrosion on exterior piping.



PHOTO 3.10-19 Corrosion on exterior piping.



PHOTO 3.10-20 Exterior ladder and vandal deterrent.



PHOTO 3.10-21 Exterior ladder and vandal deterrent.

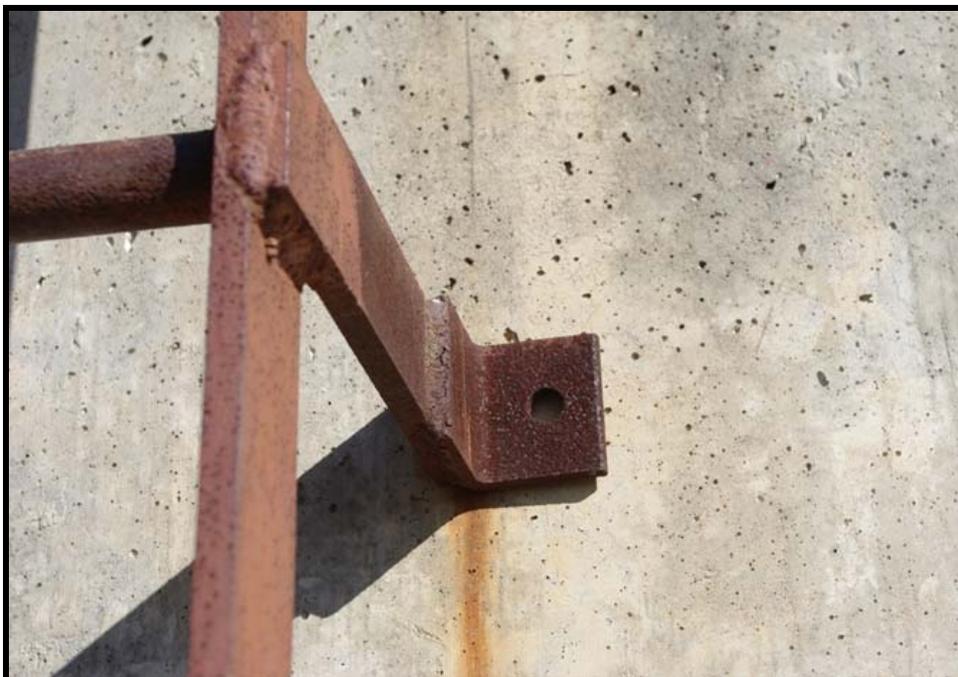


PHOTO 3.10-22 Corrosion on exterior ladder and bracket. Note open bolt hole.



PHOTO 3.10-23 Corrosion on exterior ladder bracket at roof.



PHOTO 3.10-24 Roof access.



PHOTO 3.10-25 Roof manholes and piping.



PHOTO 3.10-26 Roof manholes and piping.

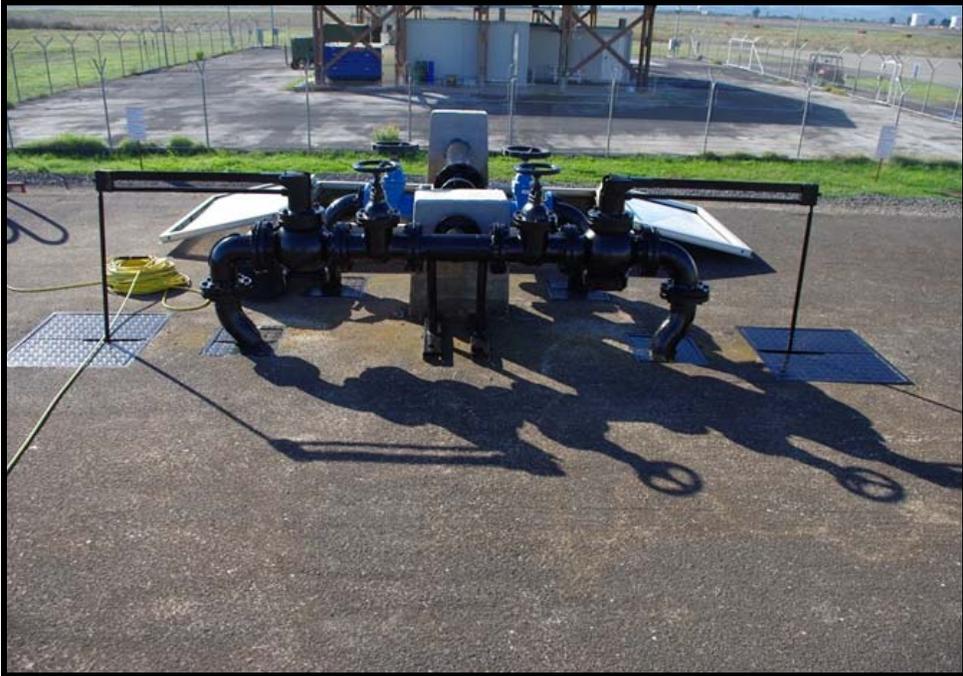


PHOTO 3.10-27 Roof piping.



PHOTO 3.10-28 Roof manholes and piping.



PHOTO 3.10-29 Roof manhole.



PHOTO 3.10-30 Cracked gasket in roof manhole.



PHOTO 3.10-31 Roof manhole.



PHOTO 3.10-32 Deterioration in roof manhole neck.



PHOTO 3.10-33 Target gage equipment.



PHOTO 3.10-34 Target gage equipment.



PHOTO 3.10-35 Roof exterior. Note standing water.



PHOTO 3.10-36 Roof exterior. Note standing water.



PHOTO 3.10-37 Roof exterior. Note standing water.



PHOTO 3.10-38 Roof exterior.



PHOTO 3.10-39 Equipment mounted above roof.



PHOTO 3.10-40 Roof interior.



PHOTO 3.10-41 Pipe opening near top of shell.



PHOTO 3.10-42 Pipe opening near top of shell.



PHOTO 3.10-43 Rust staining beneath shell pipe opening.



PHOTO 3.10-44 Corrosion on at exposed steel on shell.



PHOTO 3.10-45 Efflorescence on shell.

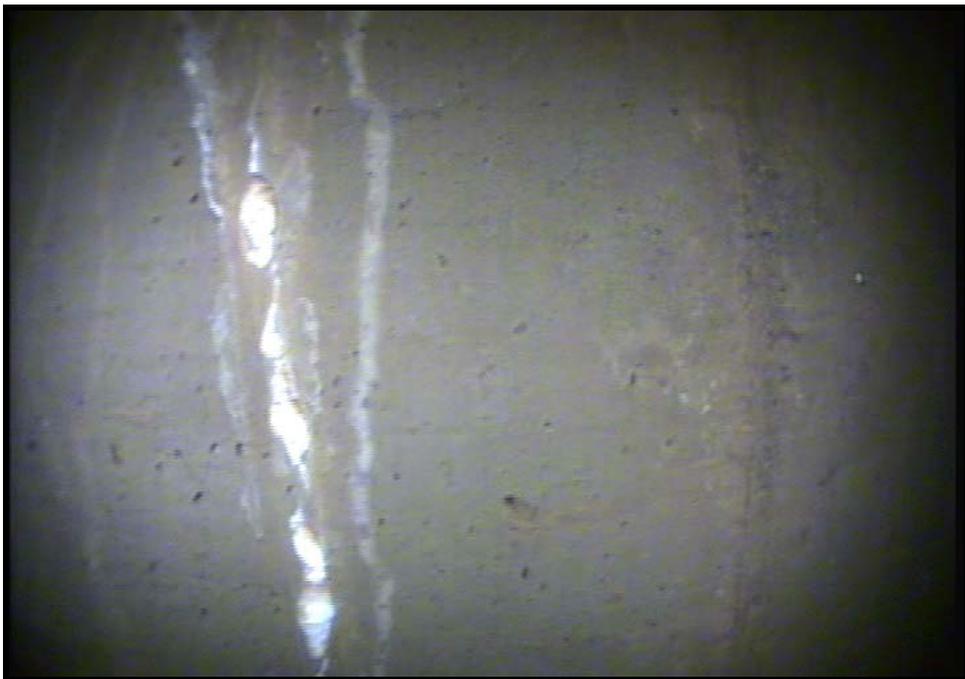


PHOTO 3.10-46 Efflorescence on shell.



PHOTO 3.10-47 Efflorescence at corner.



PHOTO 3.10-48 Efflorescence at corner.



PHOTO 3.10-49 Efflorescence on shell.



PHOTO 3.10-50 Sealant material in corner.

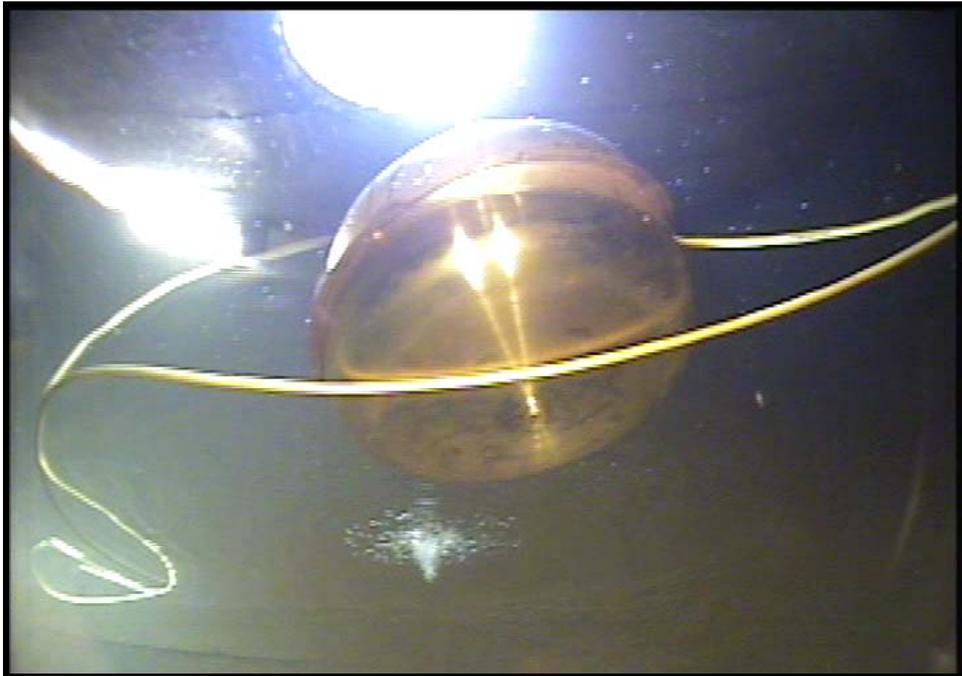


PHOTO 3.10-51 Target gage float.



PHOTO 3.10-52 Corrosion and rust tubercles on interior ladder.



PHOTO 3.10-53 Corrosion and rust tubercles on interior ladder.



PHOTO 3.10-54 Corrosion and rust tubercles on interior ladder.



PHOTO 3.10-55 Corrosion and rust tubercles on interior ladder.



PHOTO 3.10-56 Corrosion and rust tubercles on interior ladder.



PHOTO 3.10-57 Corrosion and rust tubercles on interior piping.



PHOTO 3.10-58 Corrosion and rust tubercles on interior piping.



PHOTO 3.10-59 Corrosion and rust tubercles on interior piping.



PHOTO 3.10-60 Pipe opening in shell and silt on floor.



PHOTO 3.10-61 Pipe opening in shell.

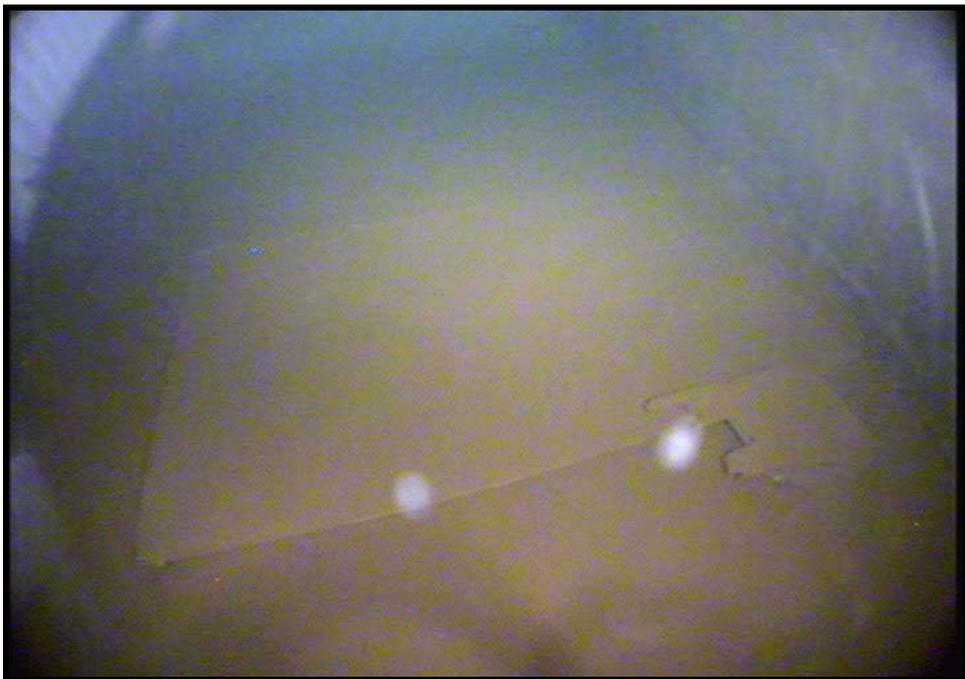


PHOTO 3.10-62 Debris and silt on floor.



PHOTO 3.10-63 Debris and silt on floor.



PHOTO 3.10-64 Debris and silt on floor.



PHOTO 3.10-65 Debris and silt on floor.

3.10.3 Comparison of Previous Inspection Results

No previous evaluation reports were provided for this tank.

3.10.4 Structural Condition Assessment

The conditions reported herein reflect the condition of the tank as observed on the date of the evaluation, using reasonable care in making the observations, and safety in gaining access to the tank. Should latent defects be discovered during the cleaning of the structure, they should be brought to the attention of the Navy and the Engineer.

This tank is located in a seismically active region. This evaluation and reported condition do not verify the tank's original design compliance for seismic or coastal wind loading in accordance with current design requirements, as it was outside the scope of this report. Likewise, recommendations for this tank do not include modifications that may be required for compliance with present structural codes. It is possible the tank was erected in compliance with pre-existing industry standards which have since been replaced by more restrictive standards.

3.10.5 Recommendations

Site:

Site Maintenance: The site should be maintained so that proper drainage away from the tank continues.

Valve Vaults: The access rungs should be replaced with ladders which meet current requirements. When the exterior is rehabilitated, the piping and valves located in the valve vaults should be cleaned and painted. The concrete surfaces should be cleaned to the equivalent of a brush-off blast cleaning and painted with a concrete sealer. The exposed wiring should be covered.

Exterior Surfaces:

Exterior Concrete: The exterior concrete surfaces were in generally good overall condition as no significant cracking and spalling were noted. The exterior surfaces should be re-evaluated in 4 to 5 years to determine if repairs are required at that time. When cracks develop, they should be prepared according to the specifications of the concrete crack repair material manufacturer. These areas to be repaired should be prepared by wet blast cleaning to remove dust, laitance, grease, or other bond inhibiting materials and blown off with high-pressure air. The cracks in the concrete should then be repaired by routing out the crack to a minimum depth of 1 in. (25 mm, with a minimum 90° angle from the surface) and repairing with a cement-based patching compound. The sequence and performance of these concrete repairs shall be such that the structural integrity of the tank area is not compromised.

Rehabilitation Schedule: To obtain the lowest possible prices for the work outlined in the recommendations, the Navy should have the specifications prepared and the work bid in the fall, with the work scheduled to start in the winter.

Shell Manholes: It is recommended that the Navy classify this tank as a confined space, and initiate the appropriate confined space access measures whenever anyone is going to access the tank interior.

Clog-Resistant Vents: This tank does not have a dedicated means of ventilation or a clog-resistant vent. The AWWA D100 Standard (applicable for steel tanks) recommends that all vents with screening against insects be designed to ensure "fail-safe" operation if the insect screens become occluded. However, AWWA D110 does not require a clog-resistant vent, and a concrete roof is typically capable of withstanding more pressure or vacuum than a steel roof. Therefore, a vent should be installed.

Exterior Ladder: The exterior ladder should be replaced with a new ladder which meets current OSHA requirements and has its brackets sufficiently bolted into the concrete. The vandal deterrent should be locked.

Roof Safety Railing: Safety railing which meets current dimensional requirements should be installed at the roof access and adjacent to the roof manholes.

Roof Manholes: The broken gasket on one of the manhole covers should be replaced.

Interior Surfaces:

Interior Concrete: The interior concrete surfaces appeared to be in adequate condition as no significant cracking and chipping were observed. The interior surfaces should be re-evaluated in 3 to 4 years to determine if repairs are required at that time.

Interior Piping: The interior piping should be cleaned to the equivalent of an SSPC-SP 10, Near-White Blast Cleaning and an epoxy coating system applied. This should be performed within the next year.

Interior Ladders: Interior ladders are susceptible to accelerated rates of corrosion. If the Navy decides to keep an interior ladder, the existing ladders should be replaced with new ladders which meet current OSHA requirements.

3.11 TANK 707

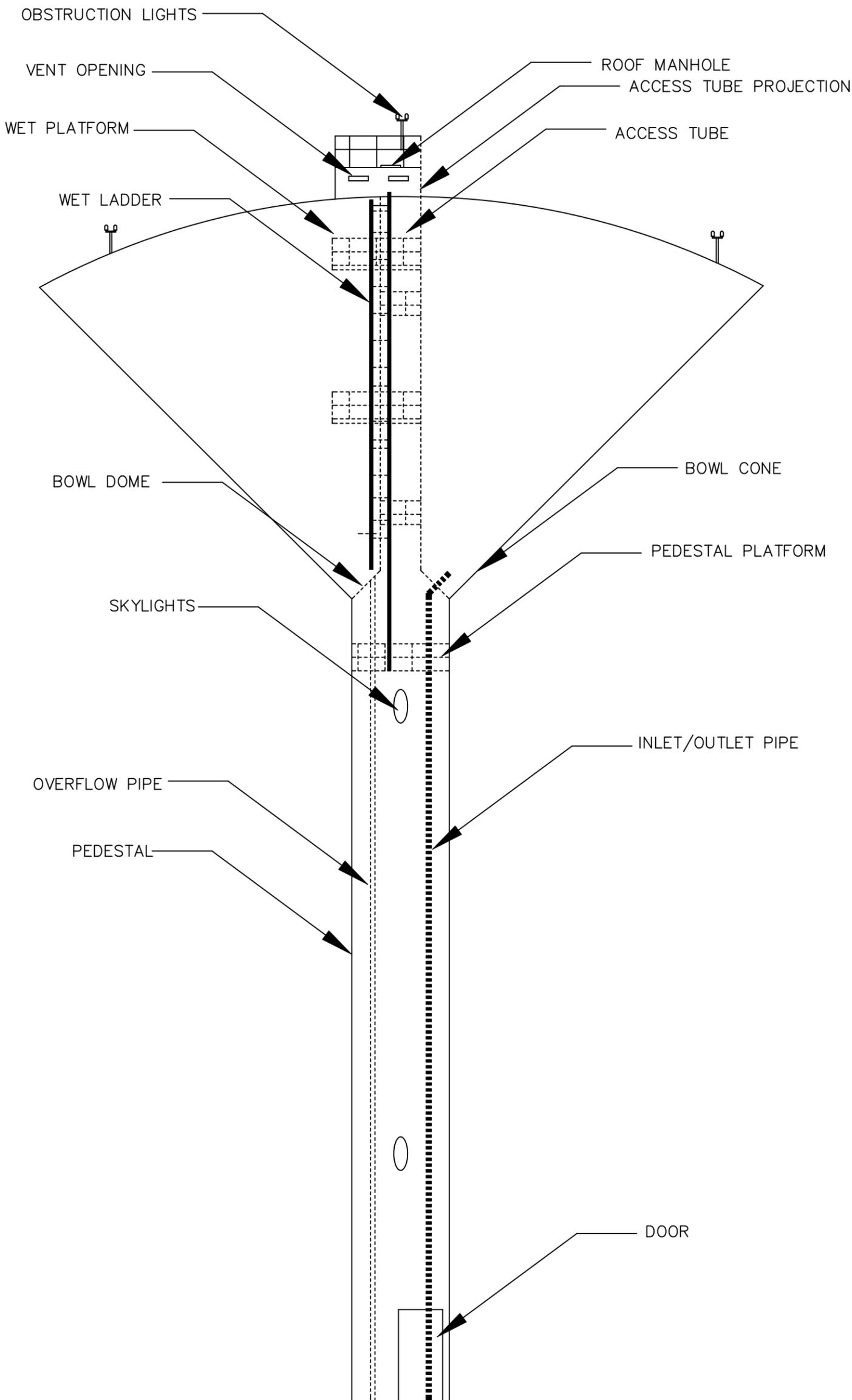
Tank 707 stores potable water for the Naval Air Station II in Sigonella, Italy.

3.11.1 Description of the Facility

Tank 707 is an elevated single-pedestal tank constructed of concrete with a capacity of 288,000 gallons of potable water. (See Figure 3.11-1).

NOMENCLATURE, TANK 707

(CUTAWAY VIEW)



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GRAPHIC SCALE	DATE	 Contract Number N62583-10-D-0340	NAVAL FACILITIES ENGINEERING SERVICE CENTER EAST COAST DETACHMENT WASHINGTON, DC	
NOT TO SCALE	November 2012		NAVAL AIR STATION NOMENCLATURE	SIGONELLA, ITALY FIG. NO. 3.11-1

3.11.2 Observed Conditions

Tank 707 is located at the Naval Air Station II in Sigonella, Italy (See photos 3.11-1 and 3.11-2). The site is covered with asphalt, and a concrete apron surrounds the base of the pedestal (See photos 3.11-5 and 3.11-6).

The overflow pipe discharges within a drain basin located southeast of the tank on the site (See photos 3.11-3 and 3.11-4). The overflow pipe does not have an above grade air break which is a sanitary deficiency (See photo 3.11-4).

The concrete pedestal appears to be in generally good condition as there is no significant deterioration. A locked personnel-sized door is located near the base of the pedestal, and conduits extend up the pedestal to cabinets mounted above the door (See photo 3.11-7). Two warning signs, the tank number, and another cabinet are mounted near the base of the pedestal (See photos 3.11-6, 3.11-8, and 3.11-9). Three single-globe obstruction lights are mounted near the middle of the pedestal on the east, southwest, and northwest sides of the tank (See photos 3.11-11 and 3.11-12). There are skylights for passive lighting located in the pedestal (See photos 3.11-10 and 3.11-11).

The concrete bowl is painted with the FAA obstruction lighting checkerboard. The visible coating is in good condition, and the visible concrete is also in good condition (See photos 3.11-13 and 3.11-14).

The concrete roof surfaces are covered with a fabric-type coating (See photo 3.11-16). The coating has peeled and chipped in areas, and there are several cracks in the coating (See photos 3.11-17 through 3.11-24). Due to the thickness of the coating, it is difficult to determine if the roof surface is cracking as well. Grounding cables and conduits extend across the roof, and there are three hooks on the roof (See photos 3.11-18 through 3.11-21 and 3.11-23). Note: the hooks should not be used for rigging purposes.

The access tube projects above the roof, and there is safety railing located around its perimeter (See photos 3.11-28 through 3.11-30). The safety railing is constructed of galvanized pipe, flat bar, and channel members. An access opening in the railing has a latch secured-gate (See photo 3.11-31). A clear-covered manhole is

located in the top of the access tube (See photos 3.11-29, 3.11-32, and 3.11-33). The manhole cover is hinged but is not locked. The cover has a gasket but it is cracked (See photo 3.11-34). Three hooks are located on the top of the projection (See photo 3.11-27). There are vent openings in the side of the access tube projection which are shielded from wind-driven dust and debris (See photos 3.11-25 and 3.11-26). The screening is intact. Note: the hooks should not be used for rigging purposes. Safety-related, OSHA, AWWA, and sanitary deficiencies include: (1) the 40 in. (1016 mm) handrail height does not meet the minimum required 42 in. (1067 mm) minimum, (2) the 1 in. (25 mm) x 5/16 in. (8 mm) mid-rails do not meet the required 2 in. (51 mm) x 2 in. (51 mm) x 3/8 in. (9 mm) minimum, (3) the 2 in. (51 mm) wide gaps between the toe bar and top of the access tube exceed the maximum allowed 1/4 in. (6 mm), (4) the roof has only one manhole, (5) the manhole cover has cracked, and (6) the roof manhole is not locked.

Three single-globe obstruction lights are mounted to the northeast, northwest, and south sides of the roof (See photo 3.11-15). A single-globe fixture is also mounted to the roof safety railing (See photos 3.11-28 and 3.11-35). The fixtures were not illuminated at the time of the field evaluation. Photoelectric cells for the lights were not found at the time of the field evaluation.

The unpainted, interior concrete surfaces of the pedestal and access tube are in good condition as there is no significant tank deterioration (See photos 3.11-36, 3.11-41, 3.11-42, and 3.11-47 through 3.11-49). Equipment for the obstruction lights is located behind bolted plate covers beneath three of the pedestal manhole openings (See photos 3.11-50 and 3.11-51).

Light fixtures are located in the dry part of the tank such that one is in the pedestal, one is at the transition cone, and three are in the access tube. Except for the pedestal fixture, the lights are operational.

The inlet/outlet pipe and overflow pipe project from the concrete pedestal floor (See photos 3.11-36, 3.11-41, and 3.11-42). A drain pipe projects from the bowl which has a valve wheel. The pipes are flat bar banded to beam brackets which extend across the diameter of the pedestal with their ends bolted into the concrete pedestal (See photos 3.11-43 through 3.11-45, 3.11-55, and 3.11-56). Each of the pipes has an expansion joint just below the projection through the concrete (See photos 3.11-57,

3.11-58, 3.11-61, and 3.11-62). The pipes and brackets appear to be in good condition with no significant corrosion noted.

The interior dry pedestal has a spiral staircase which extends from the floor to the platform near the top of the pedestal (See photos 3.11-37, 3.11-38, 3.11-41, and 3.11-42). The stairs have safety railing constructed of bolted pipe members (See photos 3.11-39 and 3.11-40). The stairs and their safety railing are in good condition as only a few minor chips are located in the stairs. A few solid concrete platforms are located within the stairs which have safety railing with the same configuration as that located along the stairs (See photos 3.11-46, 3.11-48, and 3.11-52 through 3.11-54)

A four-section ladder extends from the platform near the top of the pedestal through the access tube to the roof manhole (See photos 3.11-63 through 3.11-69, 3.11-76, and 3.11-77). The ladder sections have welded and bolted brackets. The ladder sections do not have safe-climbing devices, but the lower three sections have safety cages constructed of welded flat bar members. OSHA and safety-related deficiencies include: (1) the 2 in. (51 mm) x 1 in. (25 mm) side rails do not meet the minimum required 2-1/2 in. (64 mm) x 3/8 in. (9 mm) minimum, (2) the 20 in. (508 mm) minimum head clearances does not meet the minimum required 30 in. (762 mm), (3) the 22 in. (559 mm) safety cage depth does not meet the minimum required 27 in. (686 mm), (4) the 25-1/2 in. (648 mm) ladder safety cage width does not meet the minimum required 27 in. (686 mm), and (5) the 14-1/2 in. (368 mm) spacing between vertical bars on the safety cage exceeds the maximum allowed 9-1/2 in. (241 mm).

There are three platforms in the access tube which have steel grate floors and safety railing constructed of pipe, tube, and channel members (See photos 3.11-63 through 3.11-66). No significant areas of corrosion are located noted on the platforms and safety railing. Safety-related and OSHA deficiencies include: (1) the 40-3/4 in. (1035 mm) and 41-3/4 in. (1061 mm) handrail heights do not precisely meet the minimum required 42 in. (1067 mm), (2) the 3/4 in. (19 mm) diameter mid-rails do not meet the minimum required 1-1/2 in. (38 mm) diameter, (3) the 1-1/8 in. (29 mm) diameter handrails and uprights do not meet the required 1-1/2 in. (38 mm) minimum, (4) the gaps between the toe bars and each of the lower two platforms exceed the maximum allowed 1/4 in. (6 mm) gap width, (5) the top platform does not have a 4 in. (102 mm) high toe bar, and (6) the access openings do not have closure chains (See photos 3.11-67 through 3.11-69).

The access tube top platform provides access to a door which extends into the wet container (See photos 3.11-72 through 3.11-74). The door has a broken latch. A rectangular vent opening is located near the top of the interior dry of the access tube, and a mechanical vent is located on the wet side of the opening (See photo 3.11-71). Electrical equipment is mounted near the top of the interior of the access tube (See photos 3.11-70 and 3.11-71).

Most of the uncoated concrete surfaces of the interior wet container are in good condition (See photos 3.11-79, 3.11-82 through 3.11-85, and 3.11-104 through 3.11-106). Some minor rust staining is located at the ends of tie wires visible near the center of the roof and in one area on the bowl cone (See photos 3.11-81 and 3.11-107). Sensor equipment is mounted near the center of the roof (See photo 3.11-80). The evaluation of the bowl dome and lower cone are restricted by the layer of silt.

The access tube appears to be in good condition (See photos 3.11-93, 3.11-96, 3.11-97, 3.11-99, and 3.11-100). The overflow inlet, platforms, interior container ladder, and inlet/outlet pipe are located on the access tube (See photos 3.11-91 and 3.11-92). A mechanical vent is located on the access tube just below the roof (See photo 3.11-78).

Platforms are located in the container on the access tube (See photos 3.11-91 through 3.11-94 and 3.11-96). The platforms have solid floors and safety railing constructed of pipe and flat bar members (See photo 3.11-87). Sensor equipment is mounted to the safety railing which extends to near the bowl (See photo 3.11-88). The top platform access opening has a closable cover (See photos 3.11-89 and 3.11-90). Safety-related, OSHA, and sanitary deficiencies include: (1) the access opening through the lower platform floor is not equipped with a closable cover, (2) the 1-1/2 in. (28 mm) curbs around the access openings through both platforms do not meet the required 4 in. (102 mm) minimum, (3) the 1 in. (25 mm) x 1/4 in. (6 mm) mid-rails do not meet the required 2 in. (51 mm) x 2 in. (51 mm) x 3/8 in. (9 mm) minimum, and (4) the gap between the toe bar and the lower platform is more than the maximum allowed 1/4 in. (6 mm) wide (See photo 3.11-95).

A ladder extends down the wet container surfaces of the access tube from the platform near the top of the access tube to the bowl (See photos 3.11-90 through 3.11-93 and 3.11-98 through 3.11-100). The ladder has welded and bolted brackets. The

ladder has a safety cage which is constructed of flat bar members but does not have a safe-climbing device. OSHA and safety-related deficiencies include: (1) the 15-3/4 in. (400 mm) width does not precisely meet the minimum required 16 in. (406 mm), (2) the 1-1/2 in. (38 mm) x 3/4 in. (19 mm) ladder side rails do not meet the required 2-1/2 in. (64 mm) x 3/8 in. (9 mm) minimum, (3) the 5-3/4 in. (146 mm) toe room does not meet the minimum required 7 in. (178 mm), (4) the 23-1/4 in. (591 mm) safety cage depth does not meet the required 27 in. (686 mm) minimum, and (5) the 23-1/4 in. (591 mm) safety cage width does not meet the required 27 in. (686 mm) minimum.

The overflow inlet consists of a funnel which projects from the access tube. The inlet is located beneath the top of the cone (See photo 3.11-86).

The inlet/outlet pipe projects from near the base of the access tube and is covered with corrosion (See photos 3.11-101 and 3.11-102). A drain pipe opening is located adjacent to the access tube penetration through the bowl dome (See photo 3.11-103).



PHOTO 3.11-1 Tank 707 and site.



PHOTO 3.11-2 Tank 707.



PHOTO 3.11-3 Drain basin exterior.



PHOTO 3.11-4 Drain basin interior.



PHOTO 3.11-5 Concrete apron.



PHOTO 3.11-6 Base of pedestal.



PHOTO 3.11-7 Pedestal door and electrical equipment.



PHOTO 3.11-8 Pedestal equipment, warning sign, and tank number.



PHOTO 3.11-9 Warning sign.



PHOTO 3.11-10 Skylight in pedestal.



PHOTO 3.11-11 Pedestal manhole and obstruction light.



PHOTO 3.11-12 Obstruction light.



PHOTO 3.11-13 Bowl cone.

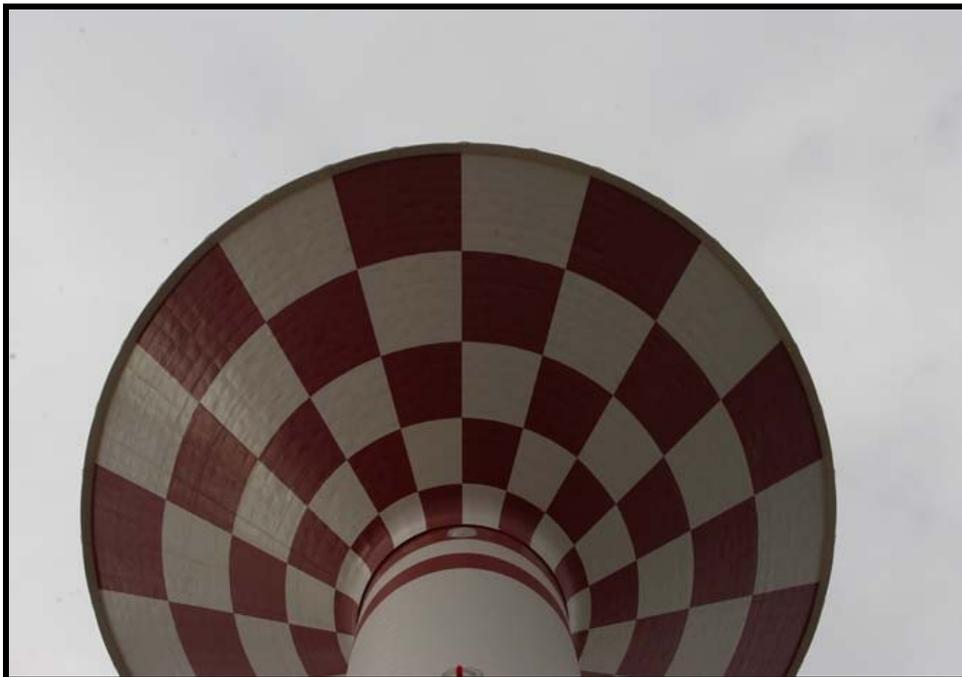


PHOTO 3.11-14 Bowl cone.



PHOTO 3.11-15 Obstruction light on roof.



PHOTO 3.11-16 Roof exterior.



PHOTO 3.11-17 Cracks in roof, and grounding cables on roof.



PHOTO 3.11-18 Unused lug, cracks in roof, and grounding cable on roof.



PHOTO 3.11-19 Cracks in coating and roof, and conduit on roof.



PHOTO 3.11-20 Grounding cable, conduit, and cracks in coating and roof.



PHOTO 3.11-21 Peeled coating and conduit on roof.

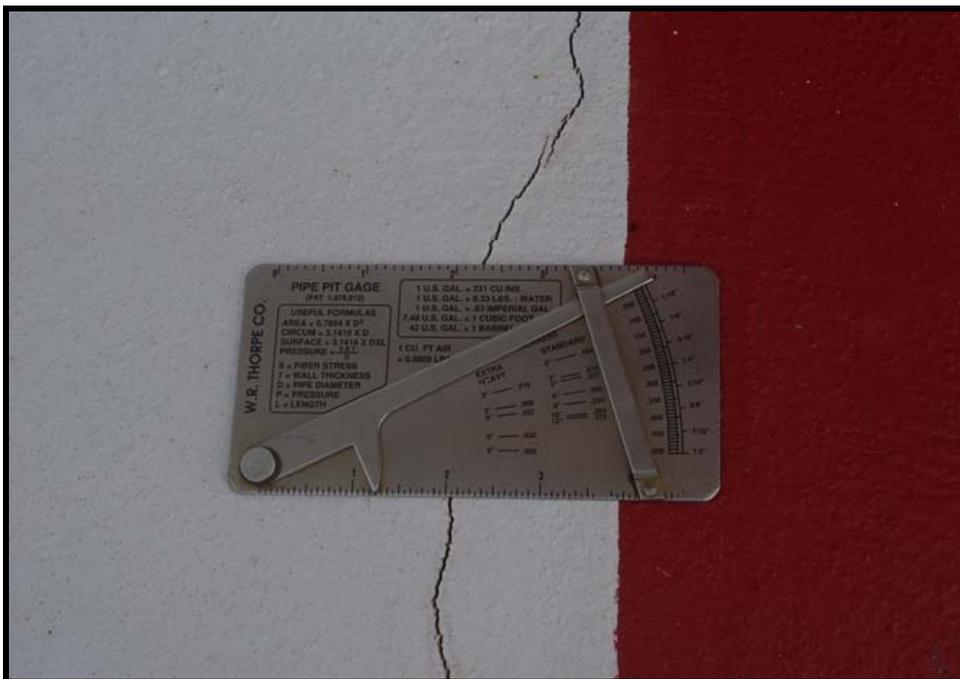


PHOTO 3.11-22 Crack in roof.



PHOTO 3.11-23 Grounding cable and cracks in roof.



PHOTO 3.11-24 Faded coating on roof.



PHOTO 3.11-25 Shielded vent and electrical equipment on access tube projection.



PHOTO 3.11-26 Shielded vent on access tube projection.



PHOTO 3.11-27 Lug on access tube projection.



PHOTO 3.11-28 Obstruction lights and safety railing on access tube projection.



PHOTO 3.11-29 Safety railing and roof manhole cover on access tube projection.



PHOTO 3.11-30 Gap between toe bar and top of access tube projection.



PHOTO 3.11-31 Safety railing on access tube projection.

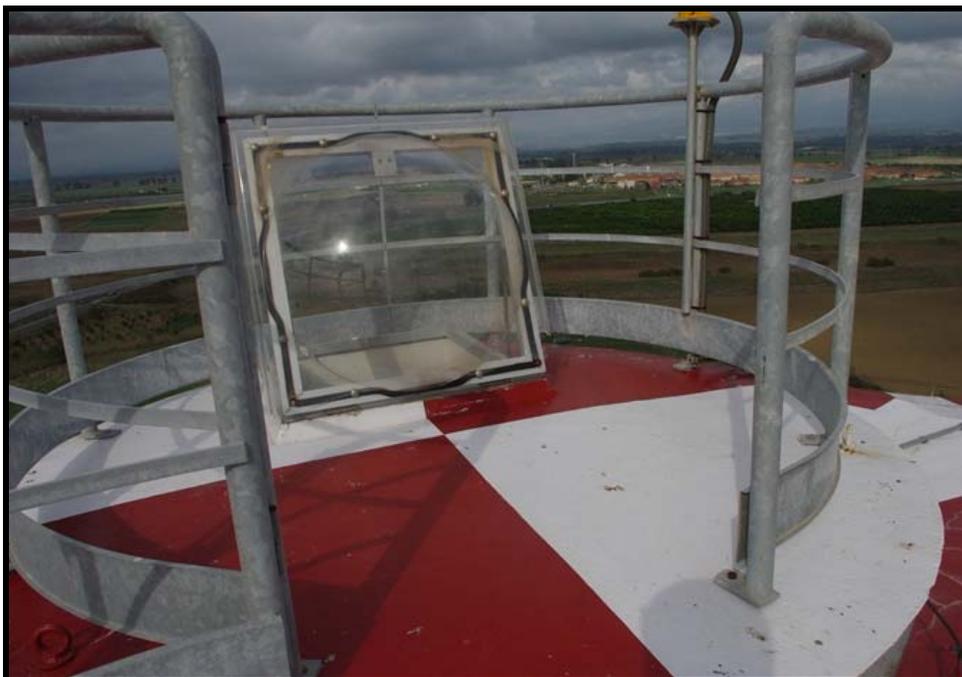


PHOTO 3.11-32 Safety railing and roof manhole on access tube projection.



PHOTO 3.11-33 Roof manhole.



PHOTO 3.11-34 Broken cover on roof manhole.



PHOTO 3.11-35 Obstruction lights.



PHOTO 3.11-36 Dry pedestal floor and piping.



PHOTO 3.11-37 Stairs in dry pedestal.



PHOTO 3.11-38 Stairs in dry pedestal.



PHOTO 3.11-39 Stairs and safety railing.



PHOTO 3.11-40 Stair and safety railing upright.



PHOTO 3.11-41 Dry pedestal interior.



PHOTO 3.11-42 Dry pedestal interior.



PHOTO 3.11-43 Interior dry piping and brackets.



PHOTO 3.11-44 Interior dry piping and brackets.



PHOTO 3.11-45 Interior dry piping bracket attachment to pedestal.



PHOTO 3.11-46 Platform between stair sections.



PHOTO 3.11-47 Concrete pedestal interior.



PHOTO 3.11-48 Platform, safety railing, and skylight.



PHOTO 3.11-49 Skylight in pedestal.



PHOTO 3.11-50 Platform, safety railing, pedestal manhole, and electrical equipment.



PHOTO 3.11-51 Electrical equipment in pedestal.



PHOTO 3.11-52 Underside of platform.



PHOTO 3.11-53 Platform and safety railing.

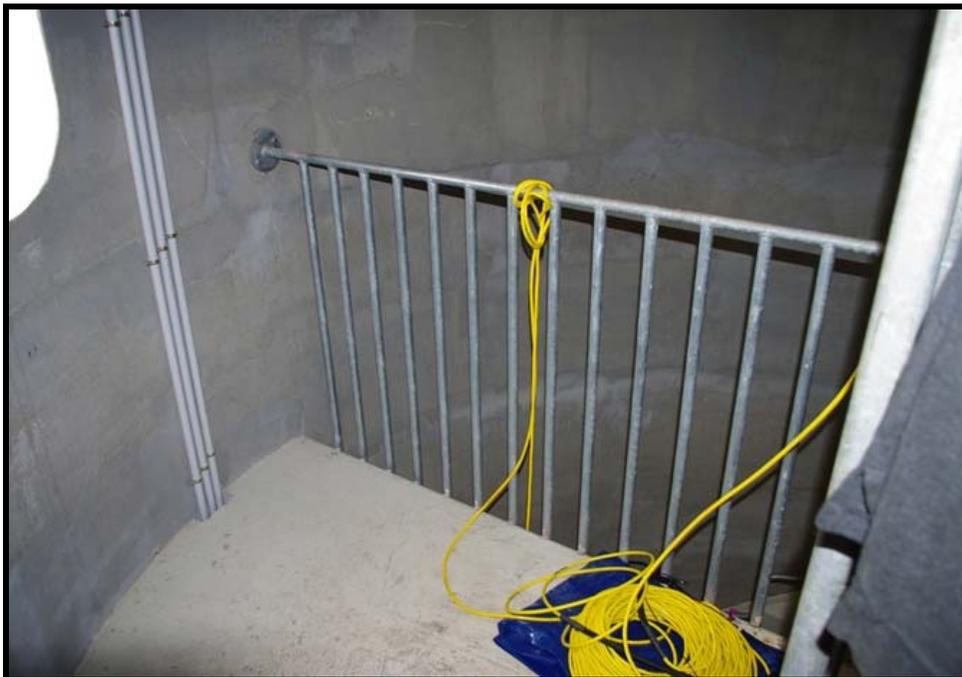


PHOTO 3.11-54 Platform and safety railing.



PHOTO 3.11-55 Interior dry piping.



PHOTO 3.11-56 Interior dry piping bracket and bowl cone.



PHOTO 3.11-57 Expansion joint in interior dry piping.



PHOTO 3.11-58 Expansion joint in interior dry piping.



PHOTO 3.11-59 Interior dry piping.



PHOTO 3.11-60 Interior dry piping.



PHOTO 3.11-61 Expansion joint in interior dry piping.



PHOTO 3.11-62 Expansion joint in interior dry piping.



PHOTO 3.11-63 Access tube, ladder, safety cage, piping, and platform.



PHOTO 3.11-64 Access tube, ladder, safety cage, piping, and platform.



PHOTO 3.11-65 Access tube, ladder, safety cage, piping, and platform.



PHOTO 3.11-66 Access tube, ladder, safety cage, and platform.



PHOTO 3.11-67 Access tube, ladder, piping, and platform.



PHOTO 3.11-68 Access tube, ladder, and safety cage.

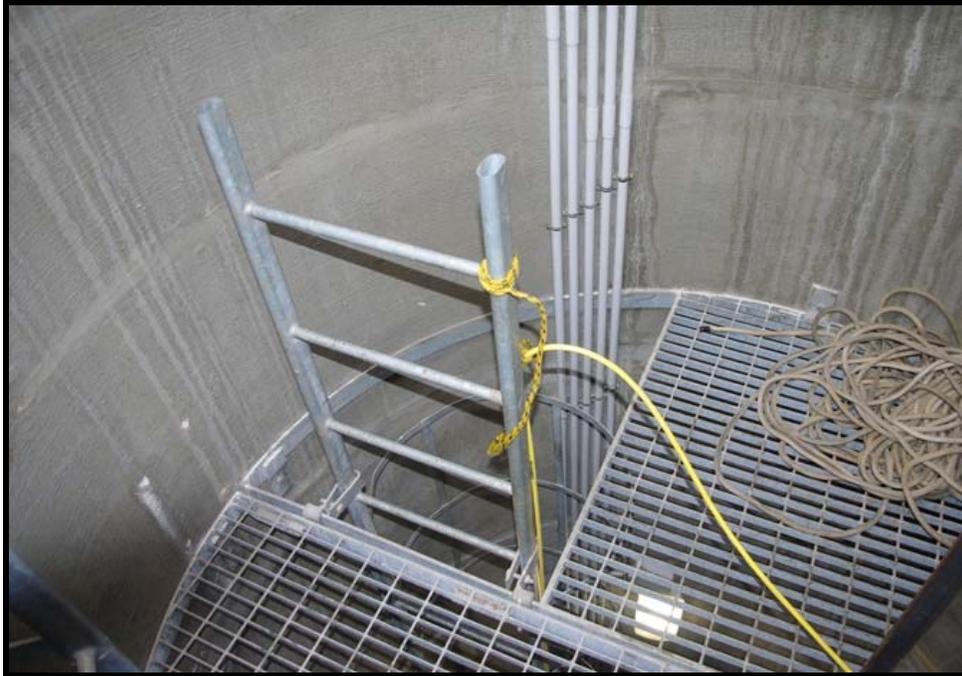


PHOTO 3.11-69 Access tube, ladder, platform, and conduits.



PHOTO 3.11-70 Electrical equipment in access tube.



PHOTO 3.11-71 Electrical equipment and vent opening to container.



PHOTO 3.11-72 Gasket material around access door to wet container.



PHOTO 3.11-73 Access door to wet container.



PHOTO 3.11-74 Access door and platform to wet container.



PHOTO 3.11-75 Vent opening near top of access tube.



PHOTO 3.11-76 Access tube, manhole, and ladder.



PHOTO 3.11-77 Access tube, manhole, and ladder.



PHOTO 3.11-78 Vent from access tube interior in container.



PHOTO 3.11-79 Interior container roof.



PHOTO 3.11-80 Sensor equipment on interior container roof.



PHOTO 3.11-81 Rust staining on interior container roof.



PHOTO 3.11-82 Interior container roof and stiffeners.



PHOTO 3.11-83 Interior container roof and stiffeners.



PHOTO 3.11-84 Interior container roof, stiffeners, and upper bowl cone.



PHOTO 3.11-85 Interior container roof, stiffeners, and upper bowl cone.



PHOTO 3.11-86 Overflow inlet funnel.



PHOTO 3.11-87 Platform in interior container.



PHOTO 3.11-88 Apparent sensor equipment extending into container.



PHOTO 3.11-89 Access opening through container platform.



PHOTO 3.11-90 Access opening through container platform.



PHOTO 3.11-91 Access tube, interior container ladder, and platform.



PHOTO 3.11-92 Access tube, interior container ladder, and platform.



PHOTO 3.11-93 Access tube, interior container ladder, and platform.



PHOTO 3.11-94 Access tube and platform.

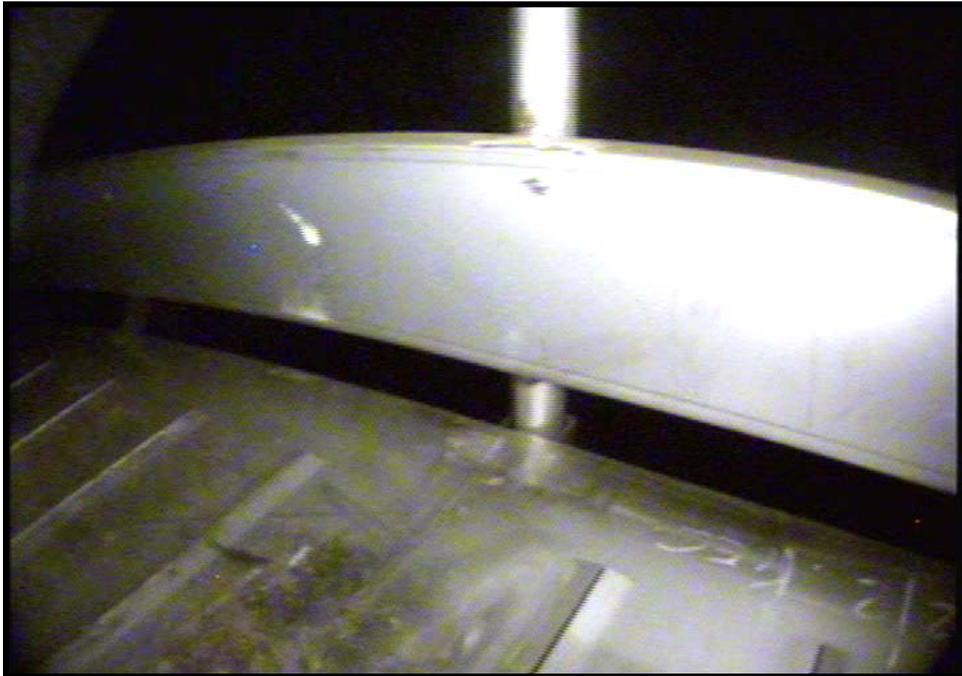


PHOTO 3.11-95 Gap between platform and toe bar.



PHOTO 3.11-96 Access tube and platform.



PHOTO 3.11-97 Underside of platform.

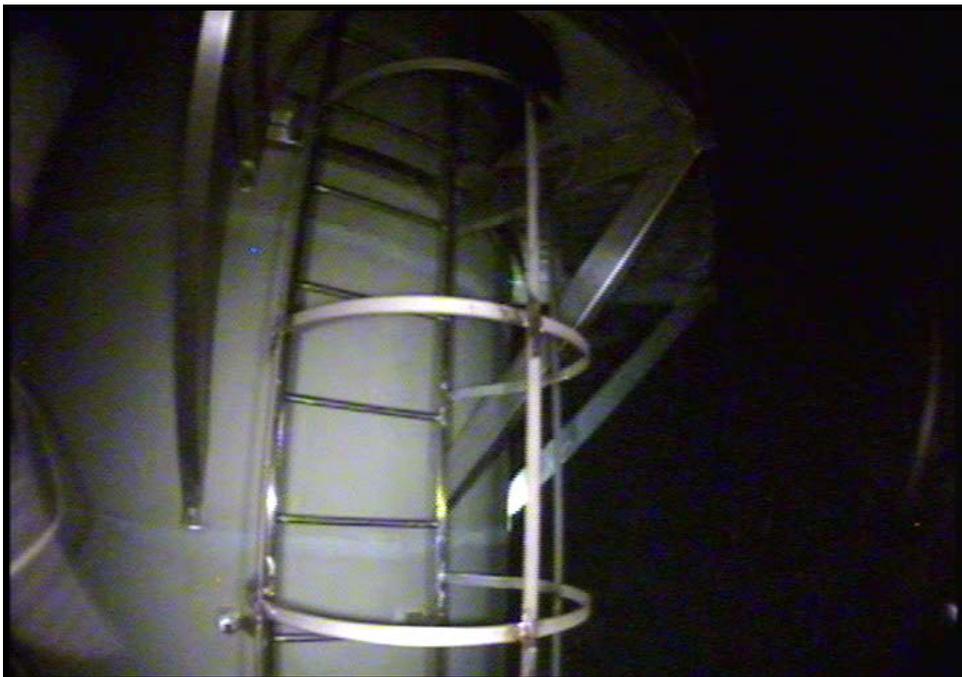


PHOTO 3.11-98 Interior container ladder and safety cage.



PHOTO 3.11-99 Access tube and interior container ladder.



PHOTO 3.11-100 Access tube and interior container ladder.



PHOTO 3.11-101 Corrosion on pipe projection.



PHOTO 3.11-102 Corrosion on pipe projection.



PHOTO 3.11-103 Pipe opening.

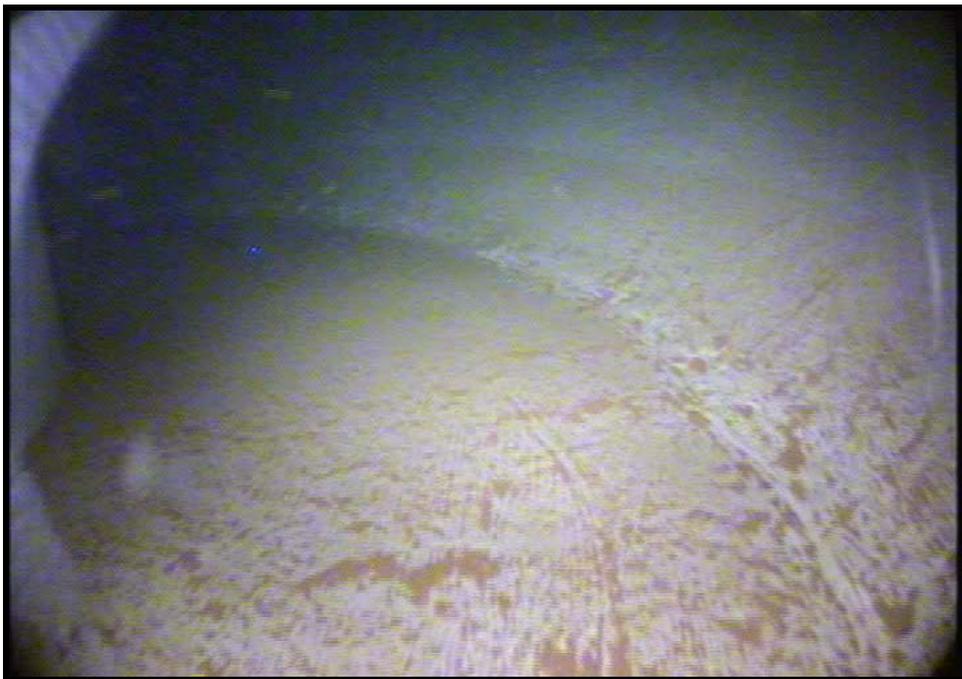


PHOTO 3.11-104 Bowl dome and cone.



PHOTO 3.11-105 Bowl dome and cone.



PHOTO 3.11-106 Bowl cone.



PHOTO 3.11-107 Rust staining on bowl cone.

3.11.3 Comparison of Previous Inspection Results

No previous evaluation reports were provided for this tank.

3.11.4 Structural Condition Assessment

The conditions reported herein reflect the condition of the tank as observed on the date of the evaluation, using reasonable care in making the observations, and safety in gaining access to the tank. Should latent defects be discovered during the cleaning of the structure, they should be brought to the attention of the Navy and the Engineer.

This tank is located in a seismically active region. This evaluation and reported condition do not verify the tank's original design compliance for seismic or coastal wind loading in accordance with current design requirements, as it was outside the scope of this report. Likewise, recommendations for this tank do not include modifications that may be required for compliance with present structural codes. It is possible the tank was erected in compliance with pre-existing industry standards which have since been replaced by more restrictive standards.

3.11.5 Recommendations

Site:

Site Maintenance: The site should be maintained so that proper drainage away from the tank continues.

Exterior Surfaces:

Exterior Concrete: The exterior concrete surfaces were in generally good overall condition as no significant cracking and spalling were noted. However, due to the thickness of the roof coating, it could not be determined if the cracks observed at the roof extended to the concrete. The exterior surfaces should be re-evaluated in 4 to 5 years to determine if repairs are required at that time. When cracks develop, they should be prepared according to the specifications of the concrete crack repair material manufacturer. These areas to be repaired should be prepared by wet blast cleaning to remove dust, laitance, grease, or other bond inhibiting materials and blown off with high-pressure air. The cracks in the concrete should then be repaired by routing out the crack to a minimum depth of 1 in. (25 mm, with a minimum 90° angle from the surface) and repairing with a cement-based patching compound. The sequence and performance of these concrete repairs shall be such that the structural integrity of the tank area is not compromised. Prior to exterior repairs, the roof coating should be removed, and the concrete should be carefully evaluated.

Rehabilitation Schedule: To obtain the lowest possible prices for the work outlined in the recommendations, the Navy should have the specifications prepared and the work bid in the fall, with the work scheduled to start in the winter.

Overflow Pipe: An air break should be installed in the existing overflow pipe to prevent a risk of a cross-connection. The air break should be equipped with a new screened, counter-weighted flap gate or elastomeric check valve to prevent the ingress of birds, small animals and insects into the tank. The air break should be adequately sized to allow the proper functioning of a new flap gate. The air break could be located above a funnel included in the existing overflow pipe so that the effluent continues below grade to the drain basin on the site.

Clog-Resistant Vent: The tank does not have a clog-resistant vent. The AWWA D100 Standard (applicable for steel tanks) recommends that all vents with screening against insects be designed to ensure "fail-safe" operation if the insect screens become occluded (clog-resistant). However, AWWA D110 does not require a clog-resistant vent, and a concrete roof is typically capable of withstanding more pressure or vacuum than a steel roof.

Roof Safety Railing: The handrail located on the safety railing around the top of the access tube projection should be raised to be at least 42 in. (1067 mm) tall, and the toe bar should be lowered so the gap between it and the top of the projection is less than 1/4 in. (6 mm) wide. The mid-rails should be replaced with mid-rails which meets current dimensional requirements.

Roof Manhole: The broken cover on roof manhole should be replaced, and the cover should be equipped with a lock.

Obstruction Lights: The presence of a photoelectric cell within the obstruction lighting system should be verified. The fixtures should be regularly maintained.

Interior Dry Surfaces:

Interior Dry Concrete: The interior dry concrete surfaces appeared to be in adequate condition as no significant deterioration was observed. The interior surfaces should be re-evaluated in 3 to 4 years to determine if repairs are required at that time.

Interior Dry Lights: The interior dry light fixtures should be regularly maintained. The burnt out bulb in the pedestal fixture should be replaced.

Access Tube Ladder: The existing access tube ladder sections should be replaced with new ladder sections which meet current dimensional requirements and allow adequate head clearance. In addition, the safety cage is not required on ladders with safe-climbing devices. Because the existing safety cages are not OSHA compliant, Tank Industry Consultants recommends that the safety cages be removed and safe-climbing devices be installed. The ladder does not include slip-resistant rungs. Slip-resistant rungs are required for all ladders constructed after March 1991 by the OSHA

Construction standards. However, slip-resistant rungs are not required by the OSHA General Industry standards for ladders or by the AWWA standards.

Pedestal and Access Tube Platforms: The access openings through the platforms should be equipped with closure chains. The mid-rails on the platforms should be replaced with mid-rails which meet current OSHA requirements and have a handrail at least 42 in. (1067 mm) tall. The platforms should all have toe bars which are 4 in. (102 mm) tall and have gaps between the toe bars and platforms of less than 1/4 in. (6 mm) wide.

Interior Wet Surfaces:

Interior Wet Concrete: The interior wet concrete surfaces appeared to be in adequate condition as no significant deterioration was observed. The interior surfaces should be re-evaluated in 3 to 4 years to determine if repairs are required at that time.

Interior Wet Piping: The interior piping should be cleaned to the equivalent of an SSPC-SP 10, Near-White Blast Cleaning and an epoxy coating system applied. This should be performed within the next 3 years.

Interior Wet Ladder: Interior wet container ladders are susceptible to accelerated rates of corrosion. If the Navy decides to keep an interior container wet ladder, the existing access ladders should be replaced with a new ladder which meets current OSHA requirements. In addition, a safety cage is not required on a ladder with a safe-climbing device. Because the existing safety cage is not OSHA compliant, Tank Industry Consultants recommends that it be removed and a safe-climbing device be installed. The ladder does not include slip-resistant rungs. Slip-resistant rungs are required for all ladders constructed after March 1991 by the OSHA Construction standards. However, slip-resistant rungs are not required by the OSHA General Industry standards for ladders or by the AWWA standards

Interior Wet Platforms: Interior wet platforms are also susceptible to accelerated rates of corrosion. If the Navy decides to keep the platforms, the new access openings should both have closable covers and 4 in. (102 mm) high curbs. The mid-rails on the platforms should be replaced with mid-rails which meet current OSHA requirements.

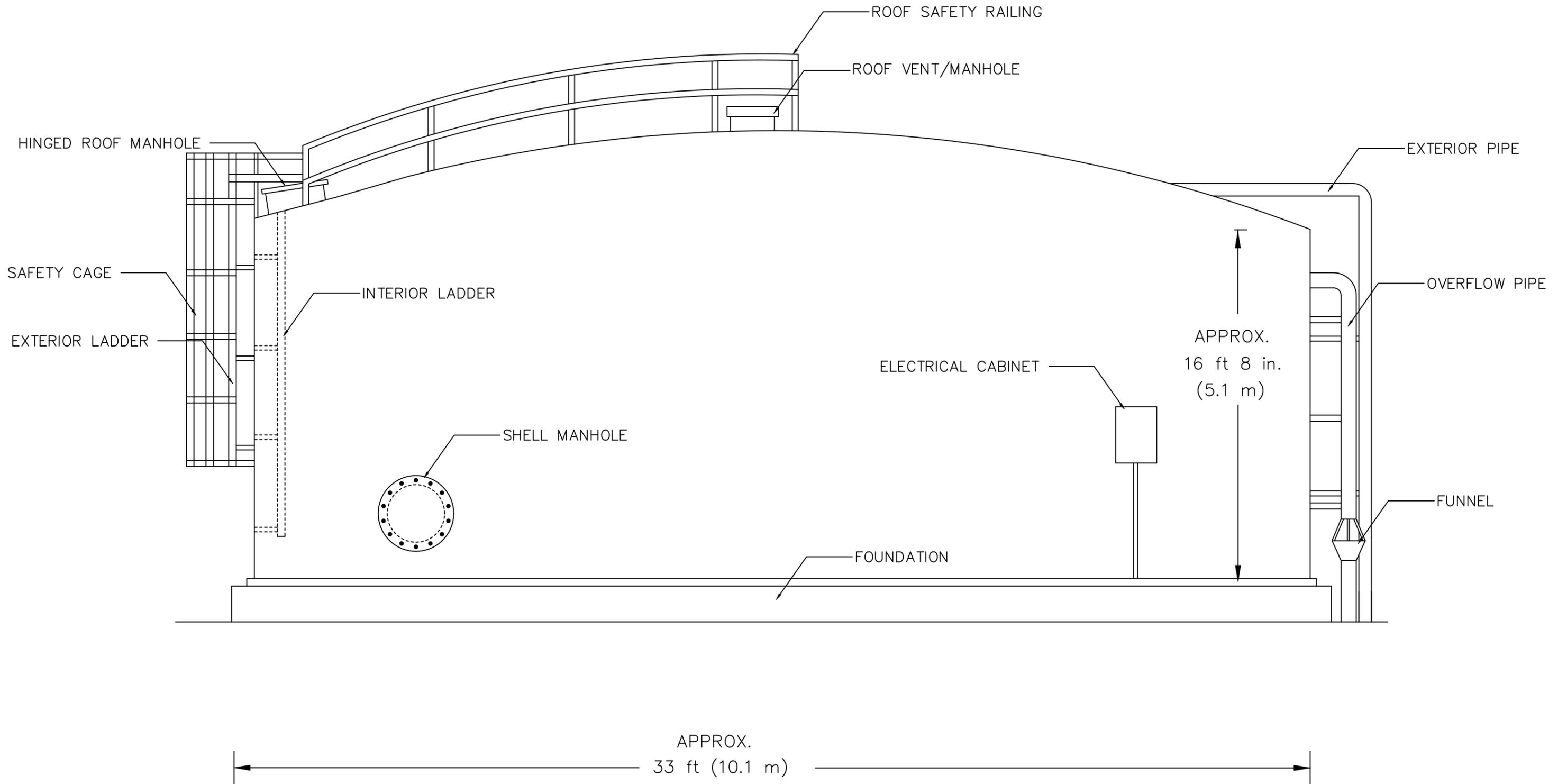
3.12 TANK 1011

Tank 1011 provides nonpotable water for the Naval Air Station in Sigonella, Italy.

3.12.1 Description of the Facility

Tank 1011 is a 200,000 gallon welded steel water storage tank with a dome roof. Measurements taken at the field evaluation indicated the tank is approximately 33 ft (10.1 m) in diameter with a shell height of approximately 16 ft 8 in. (5.1 m) (See Figure 3.12-1).

NOMENCLATURE, TANK 1011



Distribution authorized to U.S. Government agencies and their contractors for administrative/operational purposes; November 2012. Other requests shall be referred to NAVFAC-EXWC (or sponsor). This drawing is intended only for illustration of report nomenclature and is not for design purposes. Some features have been eliminated, simplified, relocated, etc., for the sake of clarification and, therefore, do not reflect the actual configuration.

GRAPHIC SCALE	DATE	 Contract Number N62583-10-D-0340	NAVAL FACILITIES ENGINEERING SERVICE CENTER EAST COAST DETACHMENT WASHINGTON, DC	
NOT TO SCALE	November 2012		NAVAL AIR STATION SIGONELLA, ITALY	FIG. NO. 3.12-1

3.12.2 Observed Conditions

Tank 1011 is located at the Naval Air Station in Sigonella, Italy (See photos 3.12-1 and 3.12-2). The site is located in a largely undeveloped area except for a pump house to the north and another building to the northeast (See photo 3.12-3). A pipe extends from the pump house along the site to the tank, and this pipe is U-bolted to rusty brackets that are located on the site (See photos 3.12-4 and 3.12-12 through 3.12-15). The valve wheel for a mostly buried pipe is located immediately adjacent to the tank, and the valve wheel is rusty (See photo 3.12-11). A drain basin is located on the site which contains the overflow funnel pipe discharge (See photos 3.12-4 and 3.12-5).

The concrete foundation does not project the AWWA recommended 6 in. (152 mm) to 12 in. (305 mm) above grade in all areas. The foundation is in good condition as there is no significant cracking or deterioration (See photo 3.12-6). No grout is visible at the bottom plate-to-foundation interface although a hard, rubber-type sealant is located in this area. However, voids in this sealant material have created gaps up to 5/8 in. (16 mm) between the bottom plate and foundation (See photo 3.12-8).

There is corrosion along the edge of the bottom plate projection (See photo 3.12-7). The tank has ten anchor bolts which each have two gusset side plates (See photo 3.12-9). Grounding cables extend to three of the gussets (See photo 3.12-10).

The shell coating was in good condition at the time of the field evaluation as there are no significant areas of corrosion or coating failure (See photo 3.12-21). A cabinet is mounted on the shell, and conduit extends from the cabinet to the adjacent pipe (See photos 3.12-15, 3.12-18, and 3.12-19).

The tank has one circular flanged and bolted manhole located on the west side of the shell (See photo 3.12-20). The shell plate the manhole has a reinforcing plate, and the manhole cover is hinged. As the tank does not have at least two manholes, this is a safety-related and AWWA deficiency.

The overflow pipe exits through the top shell ring and extends down the shell before discharging above a funnel pipe that extends below grade (See photos 3.12-15 through 3.12-17). The discharge end of the overflow pipe is not screened or equipped with a flap gate. The pipe appears to be in its original structural condition.

The exterior ladder has bolted and welded brackets, and the ladder and brackets are in nearly their original structural condition (See photo 3.12-24). The exterior ladder has a safety cage which is constructed of welded flat bar members (See photos 3.12-22 and 3.12-23). The exterior ladder does not have a vandal deterrent or a safe-climbing device. Safety-related and OSHA deficiencies include: (1) the 5-1/8 in. (130 mm) toe room does not meet the required 7 in. (178 mm) minimum, (2) the 12 in. (305 mm) spacing between vertical bars on the ladder safety cage exceeds the maximum allowed 9-1/2 in. (241 mm), (3) the 52-1/2 in. (1334 mm) spacing between horizontal bars on the ladder safety cage exceeds the maximum allowed 48 in. (1219 mm), and (4) the base of the safety cage is not flared.

Safety railing is located adjacent to the roof access and roof manhole, from the roof manhole to the manhole/vent, and around the manhole/vent (See photos 3.12-26, 3.12-32, and 3.12-33). The safety railing is constructed of welded pipe, flat bar, and angle members, and there are some areas of corrosion on the safety railing (See photo 3.12-28). The toe bar is bent in areas (See photo 3.12-34). OSHA and safety-related deficiencies include: (1) the access opening is not equipped with closure chains, (2) the gaps between the roof and toe bar are more than maximum allowed 1/4 in. (6 mm) wide, and (3) the toe bar is bent in areas.

The roof coating has chalked slightly, but there are no significant areas of corrosion (See photo 3.12-30). Debris is located on the roof, and there is weld spatter along the roof seams (See photos 3.12-29 and 3.12-31). The pipe which extends from the adjacent pump house to the tank penetrates near the edge of the roof (See photo 3.12-25).

A hinged cover manhole is located at the roof access, and a hinged cover manhole/vent is located near the center of the roof (See photos 3.12-26, 3.12-27, 3.12-32, and 3.12-33). The manholes are not locked and are welded on the exterior only. Sensor equipment penetrates the cover of the roof manhole which is located adjacent to the roof access (See photos 3.12-26 and 3.12-27). Debris had accumulated on the horizontally oriented screening of the manhole/vent, but the debris was removed at the field evaluation (See photos 3.12-35 and 3.12-36). There are gaps up to 1-1/2 in. (38 mm) wide located between the vent neck and cover. Operational deficiencies include: (1) the roof vent is not clog-resistant, and (2) the debris on the screening could prevent the tank from venting (See photo 3.12-36).

The coating on the interior roof plates is in good overall condition although there is some light rust staining along the roof support members (See photos 3.12-38, 3.12-39, 3.12-41, and 3.12-42). The roof support structure includes radial rafters, purlins, and circumferential stiffeners located around the roof cap plate and around the roof perimeter (See photo 3.12-40). Some rust staining has streaked onto the upper shell from the perimeter stiffener (See photo 3.12-45).

The interior shell coating is in good condition as there are no significant areas of corrosion (See photo 3.12-50). A welded stiffener is located around the middle of the shell (See photos 3.12-48 and 3.12-49). A layer of silt restricted the evaluation of the floor (See photos 3.12-53 and 3.12-54). What appears to be an unused gasket is located on the floor (See photo 3.12-55).

The interior ladder is welded to brackets which are welded to the shell, and the ladder and brackets appear to be in nearly their original structural condition (See photos 3.12-46 and 3.12-47). The interior ladder does not have a safe-climbing device. The 22-1/2 in. (572 mm) minimum head clearance does not meet the required 30 in. (762 mm) minimum.

The overflow has a funnel-type inlet which is located such that the top capacity level is below the shell-to-roof connection (See photo 3.12-43). The inlet pipe is flush with the roof (See photo 3.12-44). A pipe projects from the lower shell and elbows downward. The end of this pipe has an anti-vortex assembly (See photos 3.12-51 and 3.12-52). A pipe opening is flush with the floor (See photos 3.12-53 and 3.12-54).



PHOTO 3.12-1 Tank 1011 and site.



PHOTO 3.12-2 Tank 1011 and site.



PHOTO 3.12-3 Piping extending to tank.



PHOTO 3.12-4 Overflow pipe, exterior piping, and drain basin.



PHOTO 3.12-5 Drain basin interior.



PHOTO 3.12-6 Tank foundation and bottom plate.



PHOTO 3.12-7 Corrosion along edge and weld spatter on top surface of bottom plate.



PHOTO 3.12-8 Gap between foundation and bottom plate.



PHOTO 3.12-9 Anchor bolt and gussets.



PHOTO 3.12-10 Anchor bolt, gussets, and grounding cable.



PHOTO 3.12-11 Corrosion on valve for exterior piping.



PHOTO 3.12-12 Piping extending to tank.



PHOTO 3.12-13 Pipe U-bolted to bracket.



PHOTO 3.12-14 Piping extending from building to tank.



PHOTO 3.12-15 Control cabinet, exterior piping, and overflow pipe.



PHOTO 3.12-16 Air break in overflow pipe.



PHOTO 3.12-17 Overflow pipe.



PHOTO 3.12-18 Control cabinet and exterior piping.



PHOTO 3.12-19 Valve and equipment in exterior piping.

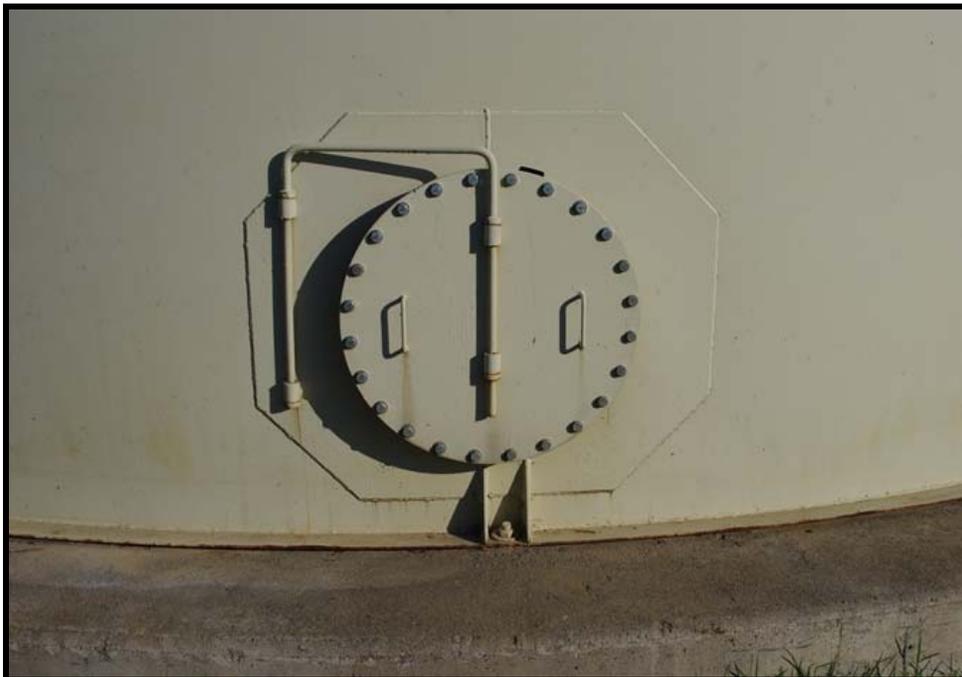


PHOTO 3.12-20 Shell manhole.

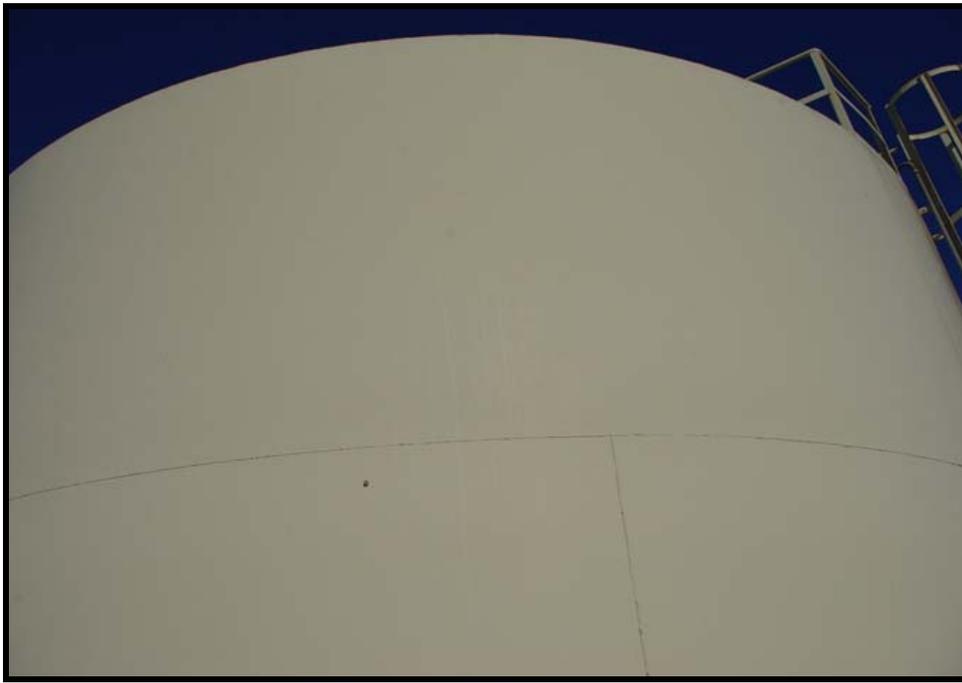


PHOTO 3.12-21 Shell exterior.



PHOTO 3.12-22 Exterior ladder and safety cage.



PHOTO 3.12-23 Exterior ladder and safety cage.



PHOTO 3.12-24 Exterior ladder and bracket.



PHOTO 3.12-25 Exterior piping.

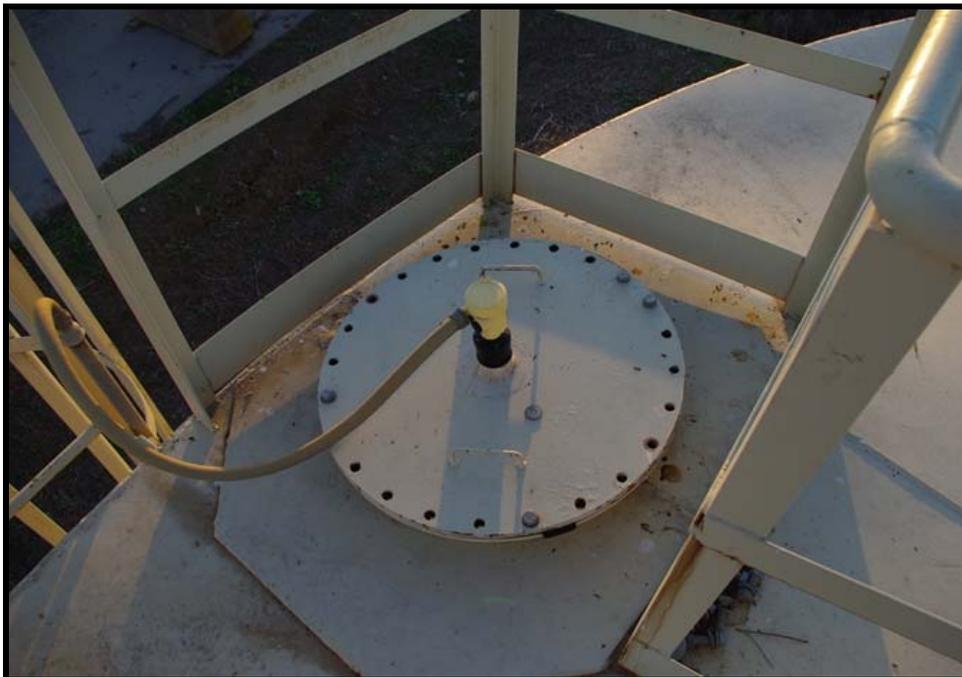


PHOTO 3.12-26 Equipment penetrating roof manhole cover.



PHOTO 3.12-27 Roof manhole.



PHOTO 3.12-28 Corrosion on roof safety railing.



PHOTO 3.12-29 Debris on roof.



PHOTO 3.12-30 Roof exterior.



PHOTO 3.12-31 Weld spatter on roof.



PHOTO 3.12-32 Roof safety railing and roof manhole/vent.



PHOTO 3.12-33 Roof safety railing and roof manhole/vent.



PHOTO 3.12-34 Bent toe bar.



PHOTO 3.12-35 Debris on screening prior to removal.



PHOTO 3.12-36 Roof manhole/vent interior.



PHOTO 3.12-37 Roof vent opening.



PHOTO 3.12-38 Rust staining along roof stiffener.



PHOTO 3.12-39 Rust staining along roof stiffener.



PHOTO 3.12-40 Roof rafters.



PHOTO 3.12-41 Rust staining along roof stiffeners.



PHOTO 3.12-42 Rust staining along roof stiffeners.



PHOTO 3.12-43 Overflow inlet funnel.



PHOTO 3.12-44 Pipe opening in roof.



PHOTO 3.12-45 Rust staining on upper shell.

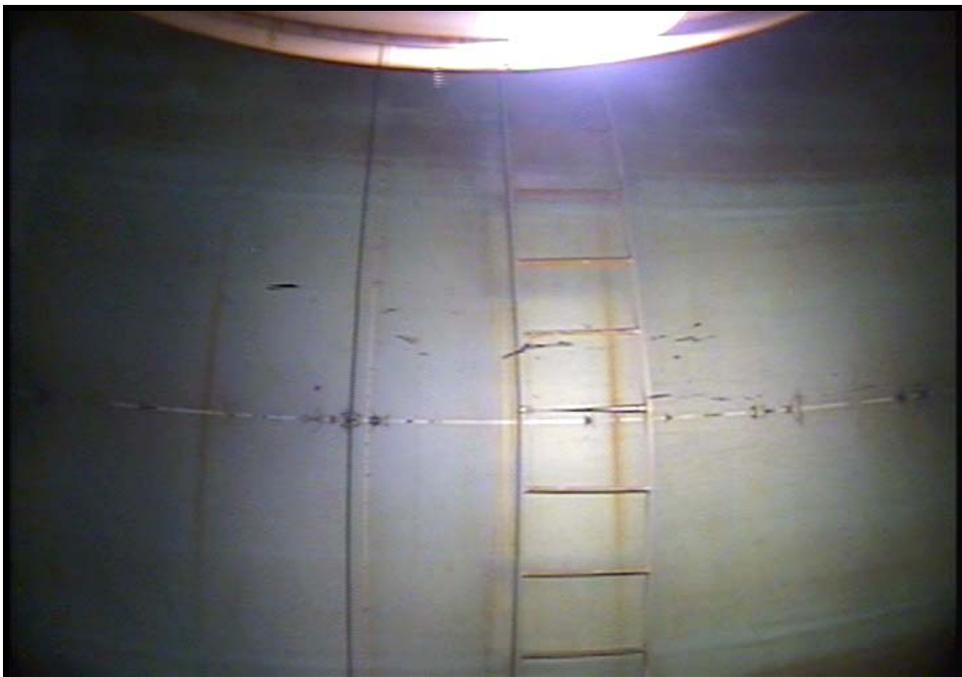


PHOTO 3.12-46 Interior ladder.



PHOTO 3.12-47 Interior ladder.



PHOTO 3.12-48 Shell stiffener.



PHOTO 3.12-49 Shell stiffener.



PHOTO 3.12-50 Shell manhole interior.



PHOTO 3.12-51 Interior piping.



PHOTO 3.12-52 Interior piping.



PHOTO 3.12-53 Pipe opening and silt on floor.



PHOTO 3.12-54 Pipe opening and silt on floor.



PHOTO 3.12-55 Unused gasket and silt on floor.

3.12.3 Comparison of Previous Inspection Results

No previous evaluation reports were provided for this tank.

3.12.4 Structural Condition Assessment

The conditions reported herein reflect the condition of the tank as observed on the date of the evaluation, using reasonable care in making the observations, and safety in gaining access to the tank. Should latent defects be discovered during the cleaning of the structure, they should be brought to the attention of the Navy and the Engineer.

This tank is located in a seismically active region. This evaluation and reported condition do not verify the tank's original design compliance for seismic or coastal wind loading in accordance with current design requirements, as it was outside the scope of this report. Likewise, recommendations for this tank do not include modifications that may be required for compliance with present structural codes. It is possible the tank was erected in compliance with pre-existing industry standards which have since been replaced by more restrictive standards.

3.12.5 Recommendations

Foundation and Site:

Site Maintenance: The site should be regraded so that the top of the foundation continues to project a minimum of 6 in. (152 mm) to a maximum of 12 in. (305 mm) above grade and so that proper drainage away from the foundation continues. Site maintenance should be performed with the mower discharge directed away from the base of the tank to prevent rock chips in the coating and the accumulation of grass on the bottom plate.

Foundation: When the exterior is repainted, any unsound concrete should be chipped to sound material and the concrete should be brush-off blasted. Any deteriorated areas or voids found should have a bonding agent and a vinyl emollient modified concrete patching mortar applied to build up the surface to its original contour. (This repair did not appear to be necessary at the time of the field evaluation). The concrete should then be painted with a concrete sealer.

Sealant Maintenance: When the exterior repainting is performed, the existing sealant located between the bottom plate and the foundation should be removed and replaced with a flexible polyurethane sealant.

Exterior Surfaces:

Life of the Exterior Coating: The coating on the exterior surfaces appeared to be in good condition as there were not significant areas of corrosion noted. The exterior should not need to be repainted within the next 7 to 8 years from a corrosion standpoint. However, the exterior should be re-evaluated in 3 to 4 years to determine if repainting and repairs are necessary at that time.

Coating Testing: Prior to preparation of specifications for the cleaning and coating of the exterior of the tank, samples of the exterior coating system should be subjected to laboratory analysis to test for ingredients which may at that time be subject to regulations concerning their handling and disposal.

Cleaning: When the exterior is to be cleaned, all varieties of containment should be investigated. Containment of the wind-blown debris will be required.

Rehabilitation Schedule: To obtain the lowest possible prices for the work outlined in the recommendations, the Navy should have the specifications prepared and the work bid in the fall, with the work scheduled to start in early winter.

Other Systems: Alternative coating systems with lower volatile organic compounds (VOCs) may become available which would be viable options for this tank. The Navy should review the available systems prior to preparing specifications for the recoating project.

Coating Curing: It would be more economical to paint the tank exterior at the same time the interior is painted, since the tank must be drained while the exterior is painted, and the applied coatings cure. This will also reduce mobilization and observation costs.

Grinding and Bracket Removal: Any unused brackets or erection lugs should be removed prior to the exterior repainting. Any weld burrs, weld spatter, or erection scars should be ground off to provide a smooth surface for the application of the coating.

Existing Shell Manhole: At the time of recoating and repairs, the gasket for the shell manhole should be replaced.

Additional Shell Manhole: Tank Industry Consultants interprets OSHA standards as defining a water storage tank as a confined space, and as such, a second means of emergency egress and ventilation during cleaning and coating operations is required. AWWA Standard D100 also requires a second shell manhole. Therefore, the tank should be equipped with a second hinged shell manhole. The additional manhole and cover should be 30 in. in diameter, should be designed in accordance with current industry and safety standards, should be hinged, and should be located approximately 180 degrees from the existing shell manhole.

Exterior Ladders: Safety cages are not required on ladders that are less than 20 ft (6.1 m) long. To reduce cleaning and painting costs and future maintenance costs and because the existing safety cage was not OSHA compliant, Tank Industry

Consultants recommends that the safety cage be removed. The exterior ladder did not include slip-resistant rungs. Slip-resistant rungs are required for all ladders constructed after March 1991 by the OSHA Construction standards. However, slip-resistant rungs are not required by the OSHA General Industry standards for ladders or by the AWWA D100.

Roof Safety Railing: The toe bar should be modified so the gap between it and the roof is less than 1/4 in. (6 mm) wide, and the bent part of the toe bar should be repaired or replaced. Closure chains should be installed at the roof access.

Clog-Resistant Vent: AWWA D100 recommends that all vents with screening against insects be designed to ensure "fail-safe" operation if the insect screens become occluded. Therefore, it is recommended that the existing vent be replaced with a new, clog-resistant vent. Until such time as the existing vent is replaced, it should be modified to eliminate the gap and so that debris does not accumulated on the screening.

Interior Surfaces:

Life of the Interior Coating: The interior coating system appeared to be in good condition and providing adequate corrosion protection. A cathodic protection system should be installed within the next 2 years in order to extend the life of the coating.

Coating Testing: Prior to preparation of specifications for the cleaning and coating of the interior of the tank, samples of the interior coating system should be subjected to laboratory analysis to test for ingredients which may at that time be subject to regulations concerning their handling and disposal.

Cathodic Protection: To prevent corrosion and metal loss at areas of coating failure that develop below the top capacity level, a cathodic protection system should be installed. A cathodic protection system which features long-life anodes, automatic potential and current control should be specified. If the cathodic protection system is installed prior to complete cleaning and repainting the tank interior, the system should be removed and protected prior to cleaning and painting. After the interior is completely cleaned and recoated, the cathodic protection system should not be energized until after the First Anniversary Evaluation. The Navy should conduct washouts and

evaluations approximately every 3 years to monitor the need for cathodic protection. As the interior coating begins to show signs of failure, the cathodic protection system should be energized to aid in minimizing corrosion below the top capacity level. Cathodic protection, if used and maintained properly, will control active corrosion below the water level and extend the useful life of a coating system. It should be noted that maintenance as recommended by the cathodic protection manufacturer is required for the cathodic protection system to work properly. Without proper monitoring, the cathodic protection system may operate too low and not adequately protect the exposed steel surfaces.

Interior Ladder: Interior ladders may be susceptible to accelerated rates of corrosion. If the Navy decides to keep the interior ladder, the ladder should be modified to allow adequate head clearance. Additionally, the interior ladder did not include slip-resistant rungs. Slip-resistant rungs are required for all ladders constructed after March 1991 by the OSHA Construction standards. However, slip-resistant rungs are not required by the OSHA General Industry standards for ladders or by the AWWA D100.

Gasket Material: The abandoned gasket material lying on the floor should be removed.

3.13 CLOSURE:

The recommended work should be performed by a competent bonded contractor, chosen from competitive bids taken on complete and concise specifications. The coatings used should be furnished by an experienced water tank coating manufacturer to supply the field service required for application of technical coatings.

All work performed and coatings applied should be in accordance with NACE, ANSI/NSF Standard 61, ACI, the manufacturer's recommendation, AWWA D100 and D102 (latest revisions); and the SSPC: The Society for Protective Coatings.

Observation of the work in progress by experienced personnel will offer additional assurance of quality protective coating application. Observations can be performed on a continuous basis or be intermittent, capturing critical phases. The actual cost of observation may be less using intermittent as opposed to continuous observation; however, with intermittent observation it is often necessary for work to be redone to comply with the specifications. This negatively impacts the quality of the finished product, lengthens the job, and is frequently a cause of conflict between the contractor, Navy, and field technician. Continuous observation minimizes the amount of "rework" performed which improves schedule and overall business relationships.

An anniversary evaluation should be conducted prior to the end of a one year bonded guarantee. Washouts and coating, structural, sanitary, safety, and corrosion evaluations should be conducted not less than every three years.

If the recommended work is not performed within the next two years, the structures should be reevaluated prior to the preparation of specifications and solicitation of bids.

The recommendations in this report are not intended to be specifications on which a contractor can bid. Complete bidding documents must include general and special conditions, detailed technical specifications, and other information necessary for the competitive bidding process. To properly protect the interests of the Navy, Contractor, and Engineer; the initial evaluation, the

technical specifications, legal portions of the contract documents, and the observation should be performed by the same firm or with close coordination of all parties involved.

It should be taken into consideration that Federal, state, and local environmental agencies have placed strict controls on the removal of lead-based and other heavy-metal based coatings from steel structures by the use of conventional abrasive blasting techniques. The paint and blast residue may be considered hazardous waste depending on the concentration of lead or other particles in residue.

APPENDIX A
KEY PERSONNEL

KEY PERSONNEL

Point of Contacts (POC):

SCAN	ATTN RYAN BOUDREAU SPECIALTY CENTER ACQUISITIONS, NAVFAC CONTRACTS CORE CODE AQ03 1100 23 RD AVE., BLDG. 1110 PORT HUENEME, CA 93043
EXWC	ATTN MARTY GAFFEY, P.E. NAVFAC EXWC 720 KENNON ST. SE, BLDG. 36, SUITE 333 WASHINGTON NAVY YARD, DC WASHINGTON DC 20374-5135 TELEPHONE: (202)433-5170
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APPENDIX B
INSPECTION PROCEDURES

INSPECTION PROCEDURES

PREBID EVALUATION:

The first step of a tank maintenance program is an outlined engineering evaluation of the condition of the tank. The tank evaluations herein consisted of a study of the tanks' interiors, exteriors, foundations (visible), and accessories. The evaluations included on-site field measurements and observations, evaluations of the structural members of the tanks, coatings evaluations, safety evaluations, and sanitary evaluations. The result of the engineering evaluation is the submittal of a certified engineering report outlining our observations and recommendations for rehabilitation and maintenance.

FIELD EVALUATION:

During the field evaluation, technicians accessed the interior and exterior tank surfaces to identify sanitary, safety, and structural deficiencies. The technicians looked for tank irregularities to be analyzed by professional tank engineers. Ultrasonic steel thickness measurements were taken on the tanks to enable a Structural Engineer to analyze deviations from original steel thicknesses and assess structural deficiencies if deemed necessary.

Various tests were performed and samples taken to provide information which was vital in determining recommendations for the painting and rehabilitation of the tank. These included:

- Measurements of the tank members
- Measurements of the tank accessories
- Measurements of metal loss
- Coating samples (to determine lead, cadmium, and chromium contents) if not sampled at the previous evaluation
- Coating adhesion
- Coating thickness
- Ultrasonic steel thickness
- Noting of irregularities or unusual circumstances
- Photographic documentation

COATING EVALUATION:

Coating samples were taken during the field evaluation and were tested to determine their lead, chromium, and cadmium content. Coating thickness and adhesion tests were performed during the coating evaluation to offer insight into the "topcoat-ability" of the existing coating.

STRUCTURAL EVALUATION:

Included in this evaluation and report is the identification of observed structural deficiencies and/or damage which may have occurred since the tanks were erected. These observed deficiencies could be deviations from the original design and construction and/or deterioration which may have occurred since the construction of the tank. This evaluation and the reporting of the condition do not warrant the original structural condition or any original design for seismic loadings. Likewise, recommendations for these tanks do not include modifications which may be required for compliance with present structural codes.

ADHESION TESTS:

Adhesion tests were performed in accordance with ASTM D3359. The results are reported herein using the ASTM scale. The ASTM scale is a relative scale to rate adhesion from 0 to 5 with 5 being the best. A table of adhesion test results classification is included in this Appendix.

Classification of Adhesion Test Results

Method A – X Cut Tape Test Approx. 1.5 in. long cuts at 30 deg. to 45 deg. apart.	Surface	Classification
No peeling or removal.		5
Trace peeling or removal along incisions.		4
Jagged removal along incisions up to 1/16 in. (1.6mm) on either side.		3
Jagged removal along most of incisions up to 1/8 in. (3.2mm) on either side.		2
Removal from most of the area of the X under the tape.		1
Removal beyond the area of the X.		0

Method B – Lattice Cut Tape Test Six parallel cuts at 2mm apart.	Surface	Classification
The edges of the cuts are completely smooth; none of the squares of the lattice are detached.	No Failure	5
Small flakes of the coating are detached at intersections; less than 5% of the lattice is affected.		4
Small flakes of the coating are detached along edges and at intersections of cuts. The area affected is 5% to 15% of the lattice.		3
The coating has flaked along the edges and on parts of the squares. The area affected is 15% to 35% of the lattice.		2
The coating has flaked along the edges of cuts in large ribbons and whole squares have detached. The area affected is 35% to 65% of the lattice.		1
Flaking and detachment worse than grade 1.		0

ASTM 3359 Standard Test Methods for Measuring Adhesion by Tape Test

Tank Industry Consultants

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Indianapolis, Indiana 46214

Telephone – 317/271-3100
FAX – 317/271-3300

APPENDIX C
STRUCTURAL DATA

TANK 238

SITE:

Size: approx. 150 ft (45.7 m) x 300 ft (91.5 m)

Fence:

Type: chain link topped w/ 3 strands of barbed wire

Height: 6 ft 8 in. (2 m)

Gate:

Location: east side of site

Width: 13 ft (4 m)

Locked: yes

Nearest Structures:

Type: pump house

Direction: south

Distance: attached to tank

Type: high voltage cabinets

Direction: south

Distance: approx. 3 ft (0.9 m)

Type: warehouse

Direction: east

Distance: approx. 75 ft (22.9 m)

Type: residence

Direction: northwest

Distance: approx. 80 ft (24.4 m)

Nearest Overhead Power Lines: none visible

Concrete Apron: 5 ft (1.5 m) wide

EXTERIOR:

DESCRIPTION:

Construction: concrete

Chambers: 3

Shell Projection:

North: 3 ft (0.9 m) to 5 ft 4 in. (1.6 m)

South: approx. 9 ft (2.7 m) to 18 ft (5.5 m)

East: 3 ft (0.9 m) to 9 ft (2.7 m)

West: 3 ft (0.9 m) to 16 ft 4 in. (5 m)

Size: approx. 65 ft 8 in. (20 m) x 115 ft (35.1 m)

Interior Height: 19 ft (5.8 m)

Concrete Thickness:

Shell: 16 in. (407 mm)

Roof: 10 in. (254 mm)

TANK 238

SHELL MANHOLES: none

PIPE FITTINGS:

Number: 6

Size: 8 in. (203 mm) diameter

Air Breaks: yes

Screening: perforated plates w/ 3/16 in. (13 mm) diameter holes

PIPING:

Inlet Pipe: 8 in. (203 mm) diameter

Outlet Pipes:

Number: 3

Size: 8 in. (203 mm) diameter

ROOF SAFETY RAILING: none

ROOF FENCE:

Type: chain link

Height: 6 ft 9 in. (2.1 m)

Gate:

Location: north side of roof

Width: 2 ft 8 in. (0.8 m)

ROOF MANHOLES:

Number: 3

Size: 39 in. (991 mm) square

Neck: 8 in. (203 mm) x 4 in. (102 mm) x 1/2 (13 mm), angle

Cover Overlap: 1-3/4 in. (44 mm)

Locked: yes

INTERIOR:

INTERIOR LADDERS:

Number of Ladders: 3

Width: 15 in. (381 mm)

Rung Size: 7/8 in. (22 mm) diameter

Toe Room: 6-3/4 in. (172 mm)

Rung Spacing: 11-5/8 in. (295 mm)

Head Clearance: 32-1/2 in. (826 mm)

Brackets:

Size: 5-3/4 in. (146 mm) x 3/8 in. (9 mm), flat bar x 8 in. (203 mm)
to 4 in. (102 mm) long

Construction: bolted

Spacing: 4 ft (1.2 m)

Safe-Climbing Device: none

TANK 238 EVALUATION OF CONCRETE GROUND TANKS
TABLE C.1-1

FOUNDATION AND SITE-RELATED CONDITION RATING	
<p style="text-align: center;">Site drainage</p> 0- Deep depressions and water around foundations and/ or site saturated long after rain 1- Mild depressions around foundations and/or water ponds adjacent to tank 2- Water flows toward foundation 3- Water ponds on site, but not adjacent to foundation 4- Flat site 5- Ground well sloped away from foundations	5
<p style="text-align: center;">Foundation Projection and Settlement</p> 0- Concrete foundation tops buried 1- Concrete foundation tops even with ground and covered with vegetation and debris 2- Concrete foundation tops even with ground and clean 3- Concrete foundation tops with 1 in. to 2 in. projection 4- Concrete foundation tops with 2 in. to 6 in. or 12 in. to 24 in. projection 5- Concrete foundation tops with 6 in. to 12 in. projection	5
<p style="text-align: center;">Concrete Condition</p> 0- Concrete soft, crumbling and/or easily removed and/or hollow sound when tapped Exposed rebar that is corroded 1- Same as 0 except foundation still has basic original shape and/or Exposed rebar with minor surface corrosion and/or open cracks up 1/4" wide 2- Surface crumbling, but can be chipped to sound concrete, open cracks up to 1/8" wide 3- Some surface spalling, but solid sounding and/or deep cracks up to 1/16" wide Hollow sounding areas 4- Minor surface cracks or deficiencies. 5- Smooth surface with no cracks or deteriorations.	5
<p style="text-align: center;">Grout Condition / Sealant</p> 0- Grout greater than 40% gone 2- Grout 20 to 40% gone 3- Grout 5 to 20% gone 4- Some pieces can be removed and/or grout less than 5% gone 5- Cracks and minor chips, but intact	5

TANK 238
TABLE C.1-1 (Cont'd)

SHELL LADDER CONDITION RATING	
<p style="text-align: center;">Steel Condition</p> <p>0- Metal loss on rung, side rail, or bracket of over 40% T Ladder distorted or bent 3 in. or more from original position</p> <p>1- Metal loss of 25% to 40% T Missing attachment bolts or cracked welds General instability</p> <p>2- Metal loss of 10% to 25% T Loose bolts</p> <p>3- Metal loss of 5% to 10% T</p> <p>4- Metal loss of less than 5% T, or surface rust</p> <p>5- No deterioration or no shell ladder</p>	5
<p style="text-align: center;">Safety Device</p> <p>0- Device improperly attached and/or in danger of coming loose No safety device present or device inoperable</p> <p>2- Present safety device works rough</p> <p>5- Safety device installed properly and in good condition No shell ladder</p>	5
<p style="text-align: center;">Dimensions</p> <p>0- 13 in. or less clear distance between side rails Rungs greater than 12 in. center-to-center Lacks non-slip rungs, 7 in. toe clearance or 30 in. head clearance</p> <p>3- 13 in. to 15 in. clear distance between side rails Side rails less than 2 in. x 3/8 in.</p> <p>4- Side rails less than 2-1/2 in. x 3/8 in.</p> <p>5- 16 in. or greater clear distance between side rails No shell ladder</p>	5
<p style="text-align: center;">Ease of Climbing</p> <p>0- Major obstructions limiting climbing surface</p> <p>1- Difficult transition to balcony (i.e. must climb over handrail)</p> <p>2- Improper or erratic rung spacing</p> <p>3- Minor obstructions connected to side rails</p> <p>5- Ladder clear of obstructions and easy to climb No shell ladder</p>	5

TANK 238
TABLE C.1-1 (Cont'd)

SHELL CONDITION RATING	
<p style="text-align: center;">Coating Condition</p> <p>2 - Sound concrete surfaces exposed over 50% of area 3 - Sound concrete surfaces exposed 25% to 50% of area 4 - Sound concrete surfaces exposed 0% to less than 25% of area 5 - No problems noted for coating No coating present</p>	5
<p style="text-align: center;">Concrete Condition</p> <p>0- Major spalling of concrete surface, large pop-outs, crumbling of concrete Water leaking or flowing from cracks in wall Water leaks at the shell-to-bottom joint 1- Spalling of concrete surface, pop-outs of concrete Rust streaks at cracks in wall Exposed rebar with minor surface corrosion Open cracks up to 1/4 in. wide Failure of previous concrete surface repairs 2- Minor spalling of concrete Open cracks up to 1/8 in. wide Water efflorescence on surface 3- Wall cracks that have "self-healed" Open cracks up to 1/16 in. wide 4- Minor temperature or shrinkage cracks Tight, non-open cracks Minor, widely scattered honeycombs 5- No cracking or honeycombing problems noted</p>	5
<p style="text-align: center;">Shell Manhole</p> <p>0- Manhole leaking water 1- Only one manhole less than 20 in. diameter 2- Only one manhole with dimensions not less than 20 in. diameter 3- Two or more shell manholes but none 30 in. diameter or larger Missing or parts 5- Two or more shell manholes (one 30 in. diameter and others not less than 20 in. diameter)</p>	1
<p style="text-align: center;">Overflow</p> <p>0- More than 1/3 of the support brackets broken Pipe clogged or broken Holes of greater than 1 in. diameter in pipe 1- Less than 1/3 of the brackets broken Holes smaller than 1 in. diameter in pipe Overflow does not have a weir box or anti-vortex plate 2- Ineffective protective screen No screen or flap gate on discharge end of pipe Pipe does not extended to grade Overflow discharges through perimeter roof vent No visible air break 3- No splash block below overflow discharge 4- Rust on overflow pipe 5- No rust or deterioration</p>	1

TANK 238
TABLE C.1-1 (Cont'd)

ROOF CONDITION RATING	
<p style="text-align: center;">Coating Condition</p> <p>2 - Sound concrete surfaces exposed over 50% of area 3 - Sound concrete surfaces exposed 25% to 50% of area 4 - Sound concrete surfaces exposed 0% to less than 25% of area 5 - No problems noted for coating No coating present No roof (open top tank)</p>	5
<p style="text-align: center;">Concrete Condition</p> <p>0- Major spalling of concrete surface, large pop-outs, crumbling of concrete Water leaking or flowing from cracks in wall 1- Spalling of concrete surface, pop-outs of concrete Rust streaks at cracks in wall Exposed rebar with minor surface corrosion Open cracks up to 1/4 in. wide Failure of previous concrete surface repairs 2- Minor spalling of concrete Open cracks up to 1/8 in. wide Water efflorescence on surface 3- Wall cracks that have "self-healed" Open cracks up to 1/16 in. wide 4- Minor temperature or shrinkage cracks Tight, non-open cracks Minor, widely scattered honeycombs 5- No cracking or honeycombing problems noted No roof (open top tank)</p>	5
<p style="text-align: center;">Roof-to-Vent Connection</p> <p>0- Connection failed, vent no longer connected Wide cracks in concrete Evidence of water entry into tank 1- Spalling of concrete 2- Vent mounting bolts missing 3- Minor or tight concrete cracks 4- Previous concrete repairs intact 5- No deterioration at connection No roof (open top tank)</p>	5
<p style="text-align: center;">Roof Vent and Roof Opening</p> <p>0- No vent present Vent clogged or inoperative Screen missing, torn, or improperly placed 1- Vent deteriorated or damaged 2- Vent covered with rust Bolts or parts missing or loose 4- Minor rust on vent 5- No rust or deterioration No roof (open top tank)</p>	5
<p style="text-align: center;">Roof Manway</p> <p>0- Manway without locking features or lock missing 1- Allows water into tank from roof 3- Any dimension less than 24 in. diameter, 4 in. curb or 2 in. overlap 5- Manway locked and water tight All dimensions equal or greater than 24 in. diameter, 4 in. curb or 2 in. overlap No roof (open top tank)</p>	5

TANK 238
TABLE C.1-1 (Cont'd)

ROOF LADDER CONDITION RATING	
<p style="text-align: center;">Steel Condition</p> <p>0- Metal loss on rung, side rail, or bracket of over 40% T Ladder distorted or bent 3 in. or more from original position</p> <p>1- Metal loss of 25% to 40% T Missing attachment bolts or cracked welds General instability</p> <p>2- Metal loss of 10% to 25% T Loose bolts</p> <p>3- Metal loss of 5% to 10% T</p> <p>4- Metal loss of less than 5% T, or surface rust</p> <p>5- No deterioration No roof ladder</p>	5
<p style="text-align: center;">Safety Device</p> <p>0- Device improperly attached and/or in danger of coming loose No safety device present or device inoperable</p> <p>2- Present safety device works rough</p> <p>5- Safety device installed properly and in good condition No roof ladder</p>	5
<p style="text-align: center;">Dimensions</p> <p>0- 13 in. or less clear distance between side rails Rungs greater than 12 in. center-to-center Lacks non-slip rungs, 7 in. toe clearance or 30 in. head clearance</p> <p>3- 13 in. to 15 in. clear distance between side rails Side rails less than 2 in. x 3/8 in.</p> <p>4- Side rails less than 2-1/2 in. x 3/8 in.</p> <p>5- 16 in. or greater clear distance between side rails No roof ladder</p>	5
<p style="text-align: center;">Ease of Climbing</p> <p>0- Major obstructions limiting climbing surface</p> <p>1- Revolving ladder</p> <p>2- Improper or erratic rung spacing</p> <p>3- Minor obstructions connected to side rails</p> <p>5- Ladder clear of obstructions and easy to climb No roof ladder</p>	5

TANK 238
TABLE C.1-1 (Cont'd)

TANK BOTTOM CONDITION RATING	
<p style="text-align: center;">Coating Condition</p> <ul style="list-style-type: none"> 2- Concrete surfaces exposed over 40% of area 3- Concrete surfaces exposed over 25% to 40% of area Top coat failure over 50% of area 4- Concrete surfaces exposed over 10% to 25% of area Top coat failure over 25% to 50% of area 5- Concrete surfaces exposed up to 10% of area Top coat failure up to 25% of area No coating present 	5
<p style="text-align: center;">Concrete Condition</p> <ul style="list-style-type: none"> 0- Major spalling of concrete surface, large pop-outs, crumbling of concrete Exposed reinforcing steel Wide cracks or evidence of water leaking through bottom 1- Spalling of concrete surface, pop-outs of concrete Rust streaks at cracks in bottom Open cracks up to 1/8 in. wide Failure of previous concrete surface repairs 2- Minor spalling of concrete Open cracks up to 1/16 in. wide Water efflorescence on surface 3- Bottom cracks that have "self-healed" 4- Minor temperature or shrinkage cracks Tight, non-open cracks Minor, widely scattered honeycombs 5- No cracking or honeycombing problems noted 	5

TANK 238
TABLE C.1-1 (Cont'd)

INTERIOR SHELL CONDITION RATING	
<p style="text-align: center;">Coating Condition</p> <p>2- Concrete surfaces exposed over 40% of area 3- Concrete surfaces exposed over 25% to 40% of area Top coat failure over 50% of area 4- Concrete surfaces exposed over 10% to 25% of area Top coat failure over 25% to 50% of area 5- Concrete surfaces exposed up to 10% of area Top coat failure up to 25% of area No coating present</p>	5
<p style="text-align: center;">Concrete Condition</p> <p>0- Major spalling of concrete surface, large pop-outs, crumbling of concrete Exposed reinforcing steel Wide cracks or evidence of water leaking through bottom 1- Spalling of concrete surface, pop-outs of concrete Rust streaks at cracks Open cracks up to 1/8 in. wide Failure of previous concrete surface repairs 2- Minor spalling of concrete Open cracks up to 1/16 in. wide Water efflorescence on surface 3- Bottom cracks that have "self-healed" 4- Minor temperature or shrinkage cracks Tight, non-open cracks Minor, widely scattered honeycombs 5- No cracking or honeycombing problems noted</p>	5

TANK 238
TABLE C.1-1 (Cont'd)

INTERIOR ROOF CONDITION RATING	
<p style="text-align: center;">Coating Condition</p> <p>2- Concrete surfaces exposed over 40% of area 3- Concrete surfaces exposed over 25% to 40% of area Top coat failure over 50% of area 4- Concrete surfaces exposed over 10% to 25% of area Top coat failure over 25% to 50% of area 5- Concrete surfaces exposed up to 10% of area Top coat failure up to 25% of area No coating present Aluminum dome roof</p>	5
<p style="text-align: center;">Concrete Condition</p> <p>0- Major spalling of concrete surface, large pop-outs, crumbling of concrete Exposed reinforcing steel Wide cracks or evidence of water leaking 1- Spalling of concrete surface, pop-outs of concrete Rust streaks at cracks Open cracks up to 1/8 in. wide Failure of previous concrete surface repairs 2- Minor spalling of concrete Open cracks up to 1/16 in. wide Water efflorescence on surface 3- Bottom cracks that have "self-healed" 4- Minor temperature or shrinkage cracks Tight, non-open cracks Minor, widely scattered honeycombs 5- No cracking or honeycombing problems noted</p>	5

TANK 238
TABLE C.1-1 (Cont'd)

INTERIOR LADDER CONDITION RATING	
<p style="text-align: center;">Steel Condition</p> <p>0- Metal loss on rung, side rail, or bracket of over 40% T Ladder distorted or bent 3 in. or more from original position</p> <p>1- Metal loss of 25% to 40% T Missing attachment bolts or cracked welds General instability</p> <p>2- Metal loss of 10% to 25% T Loose bolts</p> <p>3- Metal loss of 5% to 10% T</p> <p>4- Metal loss of less than 5% T, or surface rust</p> <p>5- No deterioration No ladder</p>	5
<p style="text-align: center;">Safety Device</p> <p>0- Device improperly attached and/or in danger of coming loose No safety device present or device inoperable</p> <p>2- Present safety device works rough</p> <p>5- Safety device installed properly and in good condition No ladder</p>	5
<p style="text-align: center;">Dimensions</p> <p>0- 13 in. or less clear distance between side rails Rungs greater than 12 in. center-to-center Lacks non-slip rungs, 7 in. toe clearance or 30 in. head clearance</p> <p>3- 13 in. to 15 in. clear distance between side rails Side rails less than 2 in. x 3/8 in.</p> <p>4- Side rails less than 2-1/2 in. x 3/8 in.</p> <p>5- 16 in. or greater clear distance between side rails No ladder</p>	3
<p style="text-align: center;">Ease of Climbing</p> <p>0- Major obstructions limiting climbing surface</p> <p>1- Difficult transition to balcony (i.e. must climb over handrail)</p> <p>2- Improper or erratic rung spacing</p> <p>3- Minor obstructions connected to side rails</p> <p>5- Ladder clear of obstructions and easy to climb No ladder</p>	5

TANK 238
TABLE C.1-1 (Cont'd)

PAINTING SCHEDULES CONDITION RATING	
Exterior Surface Schedule 1- 0 to 1 years 2- 2 to 4 years 3- 5 or more years	3
Interior Surface Schedule 1- 0 to 1 years 2- 2 to 4 years 3- 5 or more years	3

**TANK 238 SUMMARY CONDITION EVALUATION STANDARDS
TABLE C.1-2**

External Summary Concrete Ground Water Tank

Foundations

1. Site drainage	<u>5</u>
2. Foundation projection	<u>5</u>
3. Concrete condition	<u>5</u>
4. Grout condition	<u>5</u>

Base of Tower - N/A

5. Steel condition	<u>6</u>
6. Base plate/ring	<u>6</u>
7. Anchor bolts	<u>6</u>
8. Anchor bolt chairs	<u>6</u>

Columns - N/A

9. Alignment	<u>6</u>
10. Coating condition	<u>6</u>
11. Steel condition	<u>6</u>

Riser - N/A

12. Alignment	<u>6</u>
13. Coating condition	<u>6</u>
14. Steel Condition	<u>6</u>
15. Riser Manhole	<u>6</u>

Shell Ladder

16. Steel condition	<u>5</u>
17. Safety device	<u>5</u>
18. Dimensions	<u>5</u>
19. Ease of climbing	<u>5</u>

Diagonal Bracing - N/A

20. Steel condition	<u>6</u>
21. Connections	<u>6</u>
22. Adjustment	<u>6</u>
23. Alignment	<u>6</u>
24. Coating condition	<u>6</u>

Truck Door/Man Door - N/A

1. Steel condition	<u>N/A</u>
2. Connections	<u>N/A</u>
3. Truck door	<u>N/A</u>
4. Man door	<u>N/A</u>
5. Coating condition	<u>N/A</u>

Riser Rods - N/A

25. Steel condition	<u>6</u>
26. Connections	<u>6</u>
27. Adjustment	<u>6</u>
28. Alignment	<u>6</u>
29. Coating condition	<u>6</u>

Struts - N/A

30. Coating condition	<u>6</u>
31. Steel condition	<u>6</u>
32. Connection to column	<u>6</u>

Balcony - N/A

33. Coating condition	<u>6</u>
34. Steel condition	<u>6</u>
35. Drainage	<u>6</u>
36. Handrail	<u>6</u>

Tank Bowl - N/A

37. Coating condition	<u>6</u>
38. Steel condition	<u>6</u>

Shell Condition

39. Coating condition	<u>5</u>
40. Concrete condition	<u>5</u>
41. Container manhole	<u>1</u>
42. Overflow	<u>1</u>

Roof Condition

43. Coating condition	<u>5</u>
44. Concrete condition	<u>5</u>
45. Roof-to-vent	<u>5</u>
46. Roof vent/opening	<u>5</u>
47. Roof manway	<u>5</u>

Roof Ladder

48. Steel condition	<u>5</u>
49. Safety device	<u>5</u>
50. Dimensions	<u>5</u>
51. Ease of Climbing	<u>5</u>

Internal Summary Concrete Ground Water Tank

Tank Bottom

52. Coating condition	<u>5</u>
53. Concrete condition	<u>5</u>

Interior Shell

54. Coating condition	<u>5</u>
55. Concrete condition	<u>5</u>

Interior Roof

56. Coating condition	<u>5</u>
57. Concrete condition	<u>5</u>

Riser - N/A

58. Coating condition	<u>6</u>
59. Steel condition	<u>6</u>
60. Safety Grating	<u>6</u>

Interior Ladders

61. Structural condition	<u>5</u>
62. Safety device	<u>5</u>
63. Dimensions	<u>3</u>
64. Ease of climbing	<u>5</u>

Painting Schedules

65. Exterior	<u>3</u>
66. Interior	<u>3</u>

Condition Evaluation Ratings

Safety Rating	97
Structural Rating	100
*Exterior PM Rating	100
*Interior PM Rating	100
Overall Rating	99

*PM = Painting Maintenance

TANK 823

SITE:

Fence:

Type: chain link topped w/ 3 strands of barbed wire
Height: 6 ft 8 in. (2 m)

Gate:

Location: east side of site
Width: 13 ft (4 m)
Locked: yes

Nearest Structures:

Type: Building 833
Direction: south
Distance: 30 in. (762 mm)

Type: building
Direction: south
Distance: approx. 45 ft (13.7 m)

VALVE VAULT:

Location: attached to south side of tank

Access:

Size: 31-1/4 in. (794 mm) x 91-1/2 in. (2324 mm)
Locked: yes

Stairs:

Size: 8 in. (203 mm) x 30 in. (762 mm)
Rise: 9 in. (229 mm)
Stringer: 3-3/8 in. (86 mm) x 9-1/2 in. (241 mm), channel
Handrail:
Size: 1-5/8 in. (41 mm) diameter
Height: approx. 53 in. (1346 mm)
Mid-Rail: 1-5/8 in. (41 mm) diameter

EXTERIOR:

DESCRIPTION:

Construction: concrete

Shell Projection:

North: 28 in. (711 mm) to 40 in. (1016 mm)
South: 24 in. (610 mm) to 38 in. (965 mm)
East: 25 in. (635 mm) to 31 in. (787 mm)
West: 38 in. (965 mm) to 46 in. (1168 mm)

Exterior Size: approx. 68 ft (20.7 m) x 100 ft 6 in. (30.6 m)

Interior Height: 16 ft 8 in. (5.1 m) to 18 ft (5.5 m)

Concrete Thickness: 12 in. (305 mm)

Roof Overhang: 5-1/2 in. (140 mm) to 6-1/2 in. (165 mm)

TANK 823

SHELL MANHOLES: none

OVERFLOW PIPES:

Number: 2

Location: west side of shell

Size: 10 in. (254 mm) diameter

Protective Screening: perforated plate w/ 3/16 in. (5 mm) diameter holes

Basin: 32 in. (813 mm) x 40 in. (1016 mm)

EXTERIOR LADDER:

Number of Rungs: 2

Side Rails: 2-3/8 in. (60 mm) x 3/8 in. (9 mm), flat bar

Width: 15 in. (381 mm)

Rung Size: 3/4 in. (19 mm) diameter

Rung Spacing: 12 in. (305 mm) on center

Toe Room: 6-3/4 in. (172 mm) and 13-1/4 in. (337 mm)

Brackets:

Size: 2-3/8 in. (60 mm) x 3/8 in. (9 mm), flat bar x 5-1/2 in. (140 mm) to 3 in. (76 mm) long

Construction: bolted to tank, welded to ladder

Terminals: 23-3/4 in. (603 mm) tall

ROOF SAFETY RAILING:

Handrail:

Height: 41-1/2 in. (1054 mm)

Size: 1-7/8 in. (48 mm) diameter

Uprights: 1-7/8 in. (48 mm) diameter

Mid-Rail: 1-7/8 in. (48 mm) diameter

Toe Bar:

Size: 5 in. (127 mm) x 1/4 in. (6 mm), flat bar

Height: 7 in. (178 mm), typical

Access Opening:

Width: 30-3/4 in. (781 mm)

Closure Chains: no

ROOF MANHOLES:

Number: 2

Size: 31-1/2 in. (800 mm) square

Neck: 5-1/2 in. (140 mm) to 6 in. (152 mm)

Overlap: 2 in. (51 mm)

Locked: no

TANK 823

ROOF VENTS:

Number: 2

Type: gooseneck

Neck Size: 24 in. (610 mm) square x 12 in. (305 mm) tall

Vent Size: 10 in. diameter (254 mm) x 4 ft (1.2 m) tall

Protective Screening: perforated plate w/ 3/16 in. (5 mm) diameter holes

INTERIOR:

COLUMNS:

Number: 15

Size: 16 in. (406 mm) square

INTERIOR LADDERS:

Number: 2

Location: beneath each roof manhole

Number of Rungs: 18 and 19

Width: 15 in. (381 mm)

Rung Size: 7/8 in. (22 mm) diameter

Toe Room: 6-3/4 in. (172 mm)

Head Clearance: 25 in. (635 mm) minimum

Safe-Climbing Device: none

OVERFLOW INLETS: weir box

TANK 823 EVALUATION OF CONCRETE GROUND TANKS
TABLE C.2-1

FOUNDATION AND SITE-RELATED CONDITION RATING	
<p style="text-align: center;">Site drainage</p> 0- Deep depressions and water around foundations and/ or site saturated long after rain 1- Mild depressions around foundations and/or water ponds adjacent to tank 2- Water flows toward foundation 3- Water ponds on site, but not adjacent to foundation 4- Flat site 5- Ground well sloped away from foundations	5
<p style="text-align: center;">Foundation Projection and Settlement</p> 0- Concrete foundation tops buried 1- Concrete foundation tops even with ground and covered with vegetation and debris 2- Concrete foundation tops even with ground and clean 3- Concrete foundation tops with 1 in. to 2 in. projection 4- Concrete foundation tops with 2 in. to 6 in. or 12 in. to 24 in. projection 5- Concrete foundation tops with 6 in. to 12 in. projection	5
<p style="text-align: center;">Concrete Condition</p> 0- Concrete soft, crumbling and/or easily removed and/or hollow sound when tapped Exposed rebar that is corroded 1- Same as 0 except foundation still has basic original shape and/or Exposed rebar with minor surface corrosion and/or open cracks up 1/4" wide 2- Surface crumbling, but can be chipped to sound concrete, open cracks up to 1/8" wide 3- Some surface spalling, but solid sounding and/or deep cracks up to 1/16" wide Hollow sounding areas 4- Minor surface cracks or deficiencies. 5- Smooth surface with no cracks or deteriorations.	5
<p style="text-align: center;">Grout Condition / Sealant</p> 0- Grout greater than 40% gone 2- Grout 20 to 40% gone 3- Grout 5 to 20% gone 4- Some pieces can be removed and/or grout less than 5% gone 5- Cracks and minor chips, but intact	5

TANK 823
TABLE C.2-1 (Cont'd)

SHELL LADDER CONDITION RATING	
<p style="text-align: center;">Steel Condition</p> <p>0- Metal loss on rung, side rail, or bracket of over 40% T Ladder distorted or bent 3 in. or more from original position</p> <p>1- Metal loss of 25% to 40% T Missing attachment bolts or cracked welds General instability</p> <p>2- Metal loss of 10% to 25% T Loose bolts</p> <p>3- Metal loss of 5% to 10% T</p> <p>4- Metal loss of less than 5% T, or surface rust</p> <p>5- No deterioration or no shell ladder</p>	5
<p style="text-align: center;">Safety Device</p> <p>0- Device improperly attached and/or in danger of coming loose No safety device present or device inoperable</p> <p>2- Present safety device works rough</p> <p>5- Safety device installed properly and in good condition No shell ladder</p>	5
<p style="text-align: center;">Dimensions</p> <p>0- 13 in. or less clear distance between side rails Rungs greater than 12 in. center-to-center Lacks non-slip rungs, 7 in. toe clearance or 30 in. head clearance</p> <p>3- 13 in. to 15 in. clear distance between side rails Side rails less than 2 in. x 3/8 in.</p> <p>4- Side rails less than 2-1/2 in. x 3/8 in.</p> <p>5- 16 in. or greater clear distance between side rails No shell ladder</p>	5
<p style="text-align: center;">Ease of Climbing</p> <p>0- Major obstructions limiting climbing surface</p> <p>1- Difficult transition to balcony (i.e. must climb over handrail)</p> <p>2- Improper or erratic rung spacing</p> <p>3- Minor obstructions connected to side rails</p> <p>5- Ladder clear of obstructions and easy to climb No shell ladder</p>	5

TANK 823
TABLE C.2-1 (Cont'd)

SHELL CONDITION RATING	
<p style="text-align: center;">Coating Condition</p> <p>2 - Sound concrete surfaces exposed over 50% of area 3 - Sound concrete surfaces exposed 25% to 50% of area 4 - Sound concrete surfaces exposed 0% to less than 25% of area 5 - No problems noted for coating No coating present</p>	5
<p style="text-align: center;">Concrete Condition</p> <p>0- Major spalling of concrete surface, large pop-outs, crumbling of concrete Water leaking or flowing from cracks in wall Water leaks at the shell-to-bottom joint 1- Spalling of concrete surface, pop-outs of concrete Rust streaks at cracks in wall Exposed rebar with minor surface corrosion Open cracks up to 1/4 in. wide Failure of previous concrete surface repairs 2- Minor spalling of concrete Open cracks up to 1/8 in. wide Water efflorescence on surface 3- Wall cracks that have "self-healed" Open cracks up to 1/16 in. wide 4- Minor temperature or shrinkage cracks Tight, non-open cracks Minor, widely scattered honeycombs 5- No cracking or honeycombing problems noted</p>	5
<p style="text-align: center;">Shell Manhole</p> <p>0- Manhole leaking water 1- Only one manhole less than 20 in. diameter 2- Only one manhole with dimensions not less than 20 in. diameter 3- Two or more shell manholes but none 30 in. diameter or larger Missing or parts 5- Two or more shell manholes (one 30 in. diameter and others not less than 20 in. diameter)</p>	1
<p style="text-align: center;">Overflow</p> <p>0- More than 1/3 of the support brackets broken Pipe clogged or broken Holes of greater than 1 in. diameter in pipe 1- Less than 1/3 of the brackets broken Holes smaller than 1 in. diameter in pipe Overflow does not have a weir box or anti-vortex plate 2- Ineffective protective screen No screen or flap gate on discharge end of pipe Pipe does not extended to grade Overflow discharges through perimeter roof vent No visible air break 3- No splash block below overflow discharge 4- Rust on overflow pipe 5- No rust or deterioration</p>	2

TANK 823
TABLE C.2-1 (Cont'd)

ROOF CONDITION RATING	
<p style="text-align: center;">Coating Condition</p> <p>2 - Sound concrete surfaces exposed over 50% of area 3 - Sound concrete surfaces exposed 25% to 50% of area 4 - Sound concrete surfaces exposed 0% to less than 25% of area 5 - No problems noted for coating No coating present No roof (open top tank)</p>	5
<p style="text-align: center;">Concrete Condition</p> <p>0- Major spalling of concrete surface, large pop-outs, crumbling of concrete Water leaking or flowing from cracks in wall 1- Spalling of concrete surface, pop-outs of concrete Rust streaks at cracks in wall Exposed rebar with minor surface corrosion Open cracks up to 1/4 in. wide Failure of previous concrete surface repairs 2- Minor spalling of concrete Open cracks up to 1/8 in. wide Water efflorescence on surface 3- Wall cracks that have "self-healed" Open cracks up to 1/16 in. wide 4- Minor temperature or shrinkage cracks Tight, non-open cracks Minor, widely scattered honeycombs 5- No cracking or honeycombing problems noted No roof (open top tank)</p>	5
<p style="text-align: center;">Roof-to-Vent Connection</p> <p>0- Connection failed, vent no longer connected Wide cracks in concrete Evidence of water entry into tank 1- Spalling of concrete 2- Vent mounting bolts missing 3- Minor or tight concrete cracks 4- Previous concrete repairs intact 5- No deterioration at connection No roof (open top tank)</p>	5
<p style="text-align: center;">Roof Vent and Roof Opening</p> <p>0- No vent present Vent clogged or inoperative Screen missing, torn, or improperly placed 1- Vent deteriorated or damaged 2- Vent covered with rust Bolts or parts missing or loose 4- Minor rust on vent 5- No rust or deterioration No roof (open top tank)</p>	2
<p style="text-align: center;">Roof Manway</p> <p>0- Manway without locking features or lock missing 1- Allows water into tank from roof 3- Any dimension less than 24 in. diameter, 4 in. curb or 2 in. overlap 5- Manway locked and water tight All dimensions equal or greater than 24 in. diameter, 4 in. curb or 2 in. overlap No roof (open top tank)</p>	0

TANK 823
TABLE C.2-1 (Cont'd)

ROOF LADDER CONDITION RATING	
<p style="text-align: center;">Steel Condition</p> <p>0- Metal loss on rung, side rail, or bracket of over 40% T Ladder distorted or bent 3 in. or more from original position</p> <p>1- Metal loss of 25% to 40% T Missing attachment bolts or cracked welds General instability</p> <p>2- Metal loss of 10% to 25% T Loose bolts</p> <p>3- Metal loss of 5% to 10% T</p> <p>4- Metal loss of less than 5% T, or surface rust</p> <p>5- No deterioration No roof ladder</p>	5
<p style="text-align: center;">Safety Device</p> <p>0- Device improperly attached and/or in danger of coming loose No safety device present or device inoperable</p> <p>2- Present safety device works rough</p> <p>5- Safety device installed properly and in good condition No roof ladder</p>	5
<p style="text-align: center;">Dimensions</p> <p>0- 13 in. or less clear distance between side rails Rungs greater than 12 in. center-to-center Lacks non-slip rungs, 7 in. toe clearance or 30 in. head clearance</p> <p>3- 13 in. to 15 in. clear distance between side rails Side rails less than 2 in. x 3/8 in.</p> <p>4- Side rails less than 2-1/2 in. x 3/8 in.</p> <p>5- 16 in. or greater clear distance between side rails No roof ladder</p>	5
<p style="text-align: center;">Ease of Climbing</p> <p>0- Major obstructions limiting climbing surface</p> <p>1- Revolving ladder</p> <p>2- Improper or erratic rung spacing</p> <p>3- Minor obstructions connected to side rails</p> <p>5- Ladder clear of obstructions and easy to climb No roof ladder</p>	5

TANK 823
TABLE C.2-1 (Cont'd)

TANK BOTTOM CONDITION RATING	
<p style="text-align: center;">Coating Condition</p> <p>2- Concrete surfaces exposed over 40% of area 3- Concrete surfaces exposed over 25% to 40% of area Top coat failure over 50% of area 4- Concrete surfaces exposed over 10% to 25% of area Top coat failure over 25% to 50% of area 5- Concrete surfaces exposed up to 10% of area Top coat failure up to 25% of area No coating present</p>	5
<p style="text-align: center;">Concrete Condition</p> <p>0- Major spalling of concrete surface, large pop-outs, crumbling of concrete Exposed reinforcing steel Wide cracks or evidence of water leaking through bottom 1- Spalling of concrete surface, pop-outs of concrete Rust streaks at cracks in bottom Open cracks up to 1/8 in. wide Failure of previous concrete surface repairs 2- Minor spalling of concrete Open cracks up to 1/16 in. wide Water efflorescence on surface 3- Bottom cracks that have "self-healed" 4- Minor temperature or shrinkage cracks Tight, non-open cracks Minor, widely scattered honeycombs 5- No cracking or honeycombing problems noted</p>	5

TANK 823
TABLE C.2-1 (Cont'd)

INTERIOR SHELL CONDITION RATING	
<p style="text-align: center;">Coating Condition</p> <p>2- Concrete surfaces exposed over 40% of area 3- Concrete surfaces exposed over 25% to 40% of area Top coat failure over 50% of area 4- Concrete surfaces exposed over 10% to 25% of area Top coat failure over 25% to 50% of area 5- Concrete surfaces exposed up to 10% of area Top coat failure up to 25% of area No coating present</p>	5
<p style="text-align: center;">Concrete Condition</p> <p>0- Major spalling of concrete surface, large pop-outs, crumbling of concrete Exposed reinforcing steel Wide cracks or evidence of water leaking through bottom 1- Spalling of concrete surface, pop-outs of concrete Rust streaks at cracks Open cracks up to 1/8 in. wide Failure of previous concrete surface repairs 2- Minor spalling of concrete Open cracks up to 1/16 in. wide Water efflorescence on surface 3- Bottom cracks that have "self-healed" 4- Minor temperature or shrinkage cracks Tight, non-open cracks Minor, widely scattered honeycombs 5- No cracking or honeycombing problems noted</p>	5

TANK 823
TABLE C.2-1 (Cont'd)

INTERIOR ROOF CONDITION RATING	
<p style="text-align: center;">Coating Condition</p> <p>2- Concrete surfaces exposed over 40% of area 3- Concrete surfaces exposed over 25% to 40% of area Top coat failure over 50% of area 4- Concrete surfaces exposed over 10% to 25% of area Top coat failure over 25% to 50% of area 5- Concrete surfaces exposed up to 10% of area Top coat failure up to 25% of area No coating present Aluminum dome roof</p>	5
<p style="text-align: center;">Concrete Condition</p> <p>0- Major spalling of concrete surface, large pop-outs, crumbling of concrete Exposed reinforcing steel Wide cracks or evidence of water leaking 1- Spalling of concrete surface, pop-outs of concrete Rust streaks at cracks Open cracks up to 1/8 in. wide Failure of previous concrete surface repairs 2- Minor spalling of concrete Open cracks up to 1/16 in. wide Water efflorescence on surface 3- Bottom cracks that have "self-healed" 4- Minor temperature or shrinkage cracks Tight, non-open cracks Minor, widely scattered honeycombs 5- No cracking or honeycombing problems noted</p>	5

TANK 823
TABLE C.2-1 (Cont'd)

INTERIOR LADDER CONDITION RATING	
<p style="text-align: center;">Steel Condition</p> <p>0- Metal loss on rung, side rail, or bracket of over 40% T Ladder distorted or bent 3 in. or more from original position</p> <p>1- Metal loss of 25% to 40% T Missing attachment bolts or cracked welds General instability</p> <p>2- Metal loss of 10% to 25% T Loose bolts</p> <p>3- Metal loss of 5% to 10% T</p> <p>4- Metal loss of less than 5% T, or surface rust</p> <p>5- No deterioration No ladder</p>	5
<p style="text-align: center;">Safety Device</p> <p>0- Device improperly attached and/or in danger of coming loose No safety device present or device inoperable</p> <p>2- Present safety device works rough</p> <p>5- Safety device installed properly and in good condition No ladder</p>	5
<p style="text-align: center;">Dimensions</p> <p>0- 13 in. or less clear distance between side rails Rungs greater than 12 in. center-to-center Lacks non-slip rungs, 7 in. toe clearance or 30 in. head clearance</p> <p>3- 13 in. to 15 in. clear distance between side rails Side rails less than 2 in. x 3/8 in.</p> <p>4- Side rails less than 2-1/2 in. x 3/8 in.</p> <p>5- 16 in. or greater clear distance between side rails No ladder</p>	0
<p style="text-align: center;">Ease of Climbing</p> <p>0- Major obstructions limiting climbing surface</p> <p>1- Difficult transition to balcony (i.e. must climb over handrail)</p> <p>2- Improper or erratic rung spacing</p> <p>3- Minor obstructions connected to side rails</p> <p>5- Ladder clear of obstructions and easy to climb No ladder</p>	5

TANK 823
TABLE C.2-1 (Cont'd)

PAINTING SCHEDULES CONDITION RATING	
Exterior Surface Schedule 1- 0 to 1 years 2- 2 to 4 years 3- 5 or more years	3
Interior Surface Schedule 1- 0 to 1 years 2- 2 to 4 years 3- 5 or more years	3

**TANK 823 SUMMARY CONDITION EVALUATION STANDARDS
TABLE C.2-2**

External Summary Concrete Ground Water Tank

Foundations

1. Site drainage	<u>5</u>
2. Foundation projection	<u>5</u>
3. Concrete condition	<u>5</u>
4. Grout condition	<u>5</u>

Base of Tower - N/A

5. Steel condition	<u>6</u>
6. Base plate/ring	<u>6</u>
7. Anchor bolts	<u>6</u>
8. Anchor bolt chairs	<u>6</u>

Columns - N/A

9. Alignment	<u>6</u>
10. Coating condition	<u>6</u>
11. Steel condition	<u>6</u>

Riser - N/A

12. Alignment	<u>6</u>
13. Coating condition	<u>6</u>
14. Steel Condition	<u>6</u>
15. Riser Manhole	<u>6</u>

Shell Ladder

16. Steel condition	<u>5</u>
17. Safety device	<u>5</u>
18. Dimensions	<u>5</u>
19. Ease of climbing	<u>5</u>

Diagonal Bracing - N/A

20. Steel condition	<u>6</u>
21. Connections	<u>6</u>
22. Adjustment	<u>6</u>
23. Alignment	<u>6</u>
24. Coating condition	<u>6</u>

Truck Door/Man Door - N/A

1. Steel condition	<u>N/A</u>
2. Connections	<u>N/A</u>
3. Truck door	<u>N/A</u>
4. Man door	<u>N/A</u>
5. Coating condition	<u>N/A</u>

Riser Rods - N/A

25. Steel condition	<u>6</u>
26. Connections	<u>6</u>
27. Adjustment	<u>6</u>
28. Alignment	<u>6</u>
29. Coating condition	<u>6</u>

Struts - N/A

30. Coating condition	<u>6</u>
31. Steel condition	<u>6</u>
32. Connection to column	<u>6</u>

Balcony - N/A

33. Coating condition	<u>6</u>
34. Steel condition	<u>6</u>
35. Drainage	<u>6</u>
36. Handrail	<u>6</u>

Tank Bowl - N/A

37. Coating condition	<u>6</u>
38. Steel condition	<u>6</u>

Shell Condition

39. Coating condition	<u>5</u>
40. Concrete condition	<u>5</u>
41. Container manhole	<u>1</u>
42. Overflow	<u>2</u>

Roof Condition

43. Coating condition	<u>5</u>
44. Concrete condition	<u>5</u>
45. Roof-to-vent	<u>5</u>
46. Roof vent/opening	<u>2</u>
47. Roof manway	<u>0</u> not locked

Roof Ladder

48. Steel condition	<u>5</u>
49. Safety device	<u>5</u>
50. Dimensions	<u>5</u>
51. Ease of Climbing	<u>5</u>

Internal Summary Concrete Ground Water Tank

Tank Bottom

52. Coating condition	<u>5</u>
53. Concrete condition	<u>5</u>

Interior Shell

54. Coating condition	<u>5</u>
55. Concrete condition	<u>5</u>

Interior Roof

56. Coating condition	<u>5</u>
57. Concrete condition	<u>5</u>

Riser - N/A

58. Coating condition	<u>6</u>
59. Steel condition	<u>6</u>
60. Safety Grating	<u>6</u>

Condition Evaluation Ratings

Safety Rating	87
Structural Rating	100
*Exterior PM Rating	100
*Interior PM Rating	100
Overall Rating	97

*PM = Painting Maintenance

Interior Ladders

61. Structural condition	<u>5</u>
62. Safety device	<u>5</u>
63. Dimensions	<u>0</u> head clearance <30 in.
64. Ease of climbing	<u>5</u>

Painting Schedules

65. Exterior	<u>3</u>
66. Interior	<u>3</u>

TANK 535

SITE:

Nearest Structures:

Type: drain
Direction: east
Distance: approx. 1 ft 3 in. (0.4 m)

Type: filters and shed
Direction: north
Distance: approx. 6 ft 2 in. (1.9 m)

Type: Tank 492
Direction: west
Distance: approx. 17 ft 3 in. (5.3 m)

Type: Tank 612
Direction: northwest
Distance: approx. 20 ft (6 m)

Nearest Overhead Power Lines: none visible

VALVE VAULTS:

Number: 2

Attached South Vault:

Access:

Size: 2 ft 7 in. (0.8 m) square

Locked: yes

Size: 12 ft 3 in. (3.7 m) x 21 ft 8 in. (6.6 m)

Depth: 9 ft 3 in. (2.8 m) to 10 ft (3 m)

Ladder:

Number of Rungs: 11

Rung Size: 5/8 in. (16 mm) diameter

Width: 19-3/4 in. (502 mm)

Side Rails: 2 in. (51 mm) x 3/8 in. (9 mm), flat bar

Toe Room: 7 in. (178 mm)

Spacing: 11-1/2 in. (292 mm)

Head Clearance: 24-1/2 in. (622 mm)

Brackets: 2 in. (51 mm) x 3/8 in. (9 mm), flat bar

Southwest Vault:

Access:

Size: 5 ft (1.5 m) square

Locked: yes

Size: 5 ft (1.5 m) square

TANK 535

EXTERIOR:

DESCRIPTION:

Construction: concrete
Shell Projection: 8 ft 3 in. (2.5 m) to 10 ft 3 in. (3.1 m) above grade
Size: 48 ft 9 in. (14.9 m) x 49 ft 1 in. (15 m)
Interior Height: 15 ft 2 in. (4.6 m)
Roof Overhang:
 Projection: 6 in. (152 mm)
 Thickness: 6-1/4 in. (159 mm)

SHELL MANHOLES: none

OVERFLOW PIPE:

Size: 8 in. (203 mm) reducing to 6 in. (152 mm) diameter
Air Break: 6 ft 7 in. (1.8 m)
Protective Screening: perforated plate

EXTERIOR LADDER:

Distance above Ground: 10-1/2 in. (267 mm)
Number of Rungs: 8
Rung Size: 5/8 in. (16 mm) diameter
Width: 19-3/4 in. (502 mm)
Side Rails: 2 in. (51 mm) x 3/8 in. (9 mm), flat bar
Toe Room: 9 in. (229 mm)
Spacing: 11-3/4 in. (299 mm)
Brackets:
 Size: 2 in. (51 mm) x 3/8 in. (9 mm), flat bar
 Spacing: 2 ft 5-1/2 in. (0.8 m)
Safe-Climbing Device: none
Terminals:
 Height: 46-1/2 in. (1181 mm)
 Access Opening: 28 in. (711 mm)
 Closure Chains: none

ROOF SAFETY RAILING:

Location: around roof perimeter
Handrail:
 Height: 43-1/2 in. (1105 mm)
 Size: 2-3/8 in. (60 mm) diameter
Uprights: 2-3/8 in. (60 mm) diameter
Mid-Rail: 2-3/8 in. (60 mm) diameter
Toe Bar: 4-3/4 in. tall

TANK 535

ROOF OPENINGS:

Manhole #1:

Size: 30 in. (762 mm) x 31 in. (787 mm)
Neck: 5-1/2 in. (140 mm) to 6-1/2 in. (165 mm)
Cover Overlap: 2 in. (51 mm)
Locked: yes

Manhole #2:

Size: 31-3/8 in. (797 mm) square
Neck: 6 in. (152 mm)
Cover Overlap: 2 in. (51 mm)
Locked: yes

Roof Vents:

Number: 2
Type: gooseneck
Neck Height: 5 ft (1.5 m) above roof
Neck Diameter: 10 in. (254 mm)
Screening: perforated plate w/ 3/16 in. (5 mm) diameter holes

INTERIOR:

INTERIOR LADDERS:

Side Rails: 2-3/8 in. (60 mm) x 3/8 in. (9 mm), flat bar
Rung Size: 7/8 in. (22 mm) diameter
Rung Spacing: 11-1/2 in. (292 mm) on centers
Toe Room: approx. 7 in. (178 mm)
Head Clearance: 24-1/4 in. (616 mm)

Brackets:

Size: 5-7/8 in. (149 mm) x 3/8 in. (9 mm), flat bar x 4 in.
(102 mm) and 7-3/4 in. (197 mm) Long
Spacing: 46 in. (1168 mm)

Safe-Climbing Device: none

Safety Cage: none

TANK 535 EVALUATION OF CONCRETE GROUND TANKS
TABLE C.3-1

FOUNDATION AND SITE-RELATED CONDITION RATING	
<p style="text-align: center;">Site drainage</p> 0- Deep depressions and water around foundations and/ or site saturated long after rain 1- Mild depressions around foundations and/or water ponds adjacent to tank 2- Water flows toward foundation 3- Water ponds on site, but not adjacent to foundation 4- Flat site 5- Ground well sloped away from foundations	5
<p style="text-align: center;">Foundation Projection and Settlement</p> 0- Concrete foundation tops buried 1- Concrete foundation tops even with ground and covered with vegetation and debris 2- Concrete foundation tops even with ground and clean 3- Concrete foundation tops with 1 in. to 2 in. projection 4- Concrete foundation tops with 2 in. to 6 in. or 12 in. to 24 in. projection 5- Concrete foundation tops with 6 in. to 12 in. projection	5
<p style="text-align: center;">Concrete Condition</p> 0- Concrete soft, crumbling and/or easily removed and/or hollow sound when tapped Exposed rebar that is corroded 1- Same as 0 except foundation still has basic original shape and/or Exposed rebar with minor surface corrosion and/or open cracks up 1/4" wide 2- Surface crumbling, but can be chipped to sound concrete, open cracks up to 1/8" wide 3- Some surface spalling, but solid sounding and/or deep cracks up to 1/16" wide Hollow sounding areas 4- Minor surface cracks or deficiencies. 5- Smooth surface with no cracks or deteriorations.	5
<p style="text-align: center;">Grout Condition / Sealant</p> 0- Grout greater than 40% gone 2- Grout 20 to 40% gone 3- Grout 5 to 20% gone 4- Some pieces can be removed and/or grout less than 5% gone 5- Cracks and minor chips, but intact	5

TANK 535
TABLE C.3-1 (Cont'd)

SHELL LADDER CONDITION RATING	
<p style="text-align: center;">Steel Condition</p> <p>0- Metal loss on rung, side rail, or bracket of over 40% T Ladder distorted or bent 3 in. or more from original position</p> <p>1- Metal loss of 25% to 40% T Missing attachment bolts or cracked welds General instability</p> <p>2- Metal loss of 10% to 25% T Loose bolts</p> <p>3- Metal loss of 5% to 10% T</p> <p>4- Metal loss of less than 5% T, or surface rust</p> <p>5- No deterioration or no shell ladder</p>	5
<p style="text-align: center;">Safety Device</p> <p>0- Device improperly attached and/or in danger of coming loose No safety device present or device inoperable</p> <p>2- Present safety device works rough</p> <p>5- Safety device installed properly and in good condition No shell ladder</p>	5
<p style="text-align: center;">Dimensions</p> <p>0- 13 in. or less clear distance between side rails Rungs greater than 12 in. center-to-center Lacks non-slip rungs, 7 in. toe clearance or 30 in. head clearance</p> <p>3- 13 in. to 15 in. clear distance between side rails Side rails less than 2 in. x 3/8 in.</p> <p>4- Side rails less than 2-1/2 in. x 3/8 in.</p> <p>5- 16 in. or greater clear distance between side rails No shell ladder</p>	5
<p style="text-align: center;">Ease of Climbing</p> <p>0- Major obstructions limiting climbing surface</p> <p>1- Difficult transition to balcony (i.e. must climb over handrail)</p> <p>2- Improper or erratic rung spacing</p> <p>3- Minor obstructions connected to side rails</p> <p>5- Ladder clear of obstructions and easy to climb No shell ladder</p>	5

TANK 535
TABLE C.3-1 (Cont'd)

SHELL CONDITION RATING	
<p style="text-align: center;">Coating Condition</p> <p>2 - Sound concrete surfaces exposed over 50% of area 3 - Sound concrete surfaces exposed 25% to 50% of area 4 - Sound concrete surfaces exposed 0% to less than 25% of area 5 - No problems noted for coating No coating present</p>	5
<p style="text-align: center;">Concrete Condition</p> <p>0- Major spalling of concrete surface, large pop-outs, crumbling of concrete Water leaking or flowing from cracks in wall Water leaks at the shell-to-bottom joint 1- Spalling of concrete surface, pop-outs of concrete Rust streaks at cracks in wall Exposed rebar with minor surface corrosion Open cracks up to 1/4 in. wide Failure of previous concrete surface repairs 2- Minor spalling of concrete Open cracks up to 1/8 in. wide Water efflorescence on surface 3- Wall cracks that have "self-healed" Open cracks up to 1/16 in. wide 4- Minor temperature or shrinkage cracks Tight, non-open cracks Minor, widely scattered honeycombs 5- No cracking or honeycombing problems noted</p>	0
<p style="text-align: center;">Shell Manhole</p> <p>0- Manhole leaking water 1- Only one manhole less than 20 in. diameter 2- Only one manhole with dimensions not less than 20 in. diameter 3- Two or more shell manholes but none 30 in. diameter or larger Missing or parts 5- Two or more shell manholes (one 30 in. diameter and others not less than 20 in. diameter)</p>	1
<p style="text-align: center;">Overflow</p> <p>0- More than 1/3 of the support brackets broken Pipe clogged or broken Holes of greater than 1 in. diameter in pipe 1- Less than 1/3 of the brackets broken Holes smaller than 1 in. diameter in pipe Overflow does not have a weir box or anti-vortex plate 2- Ineffective protective screen No screen or flap gate on discharge end of pipe Pipe does not extended to grade Overflow discharges through perimeter roof vent No visible air break 3- No splash block below overflow discharge 4- Rust on overflow pipe 5- No rust or deterioration</p>	2

TANK 535
TABLE C.3-1 (Cont'd)

ROOF CONDITION RATING	
<p style="text-align: center;">Coating Condition</p> <p>2 - Sound concrete surfaces exposed over 50% of area 3 - Sound concrete surfaces exposed 25% to 50% of area 4 - Sound concrete surfaces exposed 0% to less than 25% of area 5 - No problems noted for coating No coating present No roof (open top tank)</p>	5
<p style="text-align: center;">Concrete Condition</p> <p>0- Major spalling of concrete surface, large pop-outs, crumbling of concrete Water leaking or flowing from cracks in wall 1- Spalling of concrete surface, pop-outs of concrete Rust streaks at cracks in wall Exposed rebar with minor surface corrosion Open cracks up to 1/4 in. wide Failure of previous concrete surface repairs 2- Minor spalling of concrete Open cracks up to 1/8 in. wide Water efflorescence on surface 3- Wall cracks that have "self-healed" Open cracks up to 1/16 in. wide 4- Minor temperature or shrinkage cracks Tight, non-open cracks Minor, widely scattered honeycombs 5- No cracking or honeycombing problems noted No roof (open top tank)</p>	5
<p style="text-align: center;">Roof-to-Vent Connection</p> <p>0- Connection failed, vent no longer connected Wide cracks in concrete Evidence of water entry into tank 1- Spalling of concrete 2- Vent mounting bolts missing 3- Minor or tight concrete cracks 4- Previous concrete repairs intact 5- No deterioration at connection No roof (open top tank)</p>	5
<p style="text-align: center;">Roof Vent and Roof Opening</p> <p>0- No vent present Vent clogged or inoperative Screen missing, torn, or improperly placed 1- Vent deteriorated or damaged 2- Vent covered with rust Bolts or parts missing or loose 4- Minor rust on vent 5- No rust or deterioration No roof (open top tank)</p>	2
<p style="text-align: center;">Roof Manway</p> <p>0- Manway without locking features or lock missing 1- Allows water into tank from roof 3- Any dimension less than 24 in. diameter, 4 in. curb or 2 in. overlap 5- Manway locked and water tight All dimensions equal or greater than 24 in. diameter, 4 in. curb or 2 in. overlap No roof (open top tank)</p>	0

TANK 535
TABLE C.3-1 (Cont'd)

ROOF LADDER CONDITION RATING	
<p style="text-align: center;">Steel Condition</p> <p>0- Metal loss on rung, side rail, or bracket of over 40% T Ladder distorted or bent 3 in. or more from original position</p> <p>1- Metal loss of 25% to 40% T Missing attachment bolts or cracked welds General instability</p> <p>2- Metal loss of 10% to 25% T Loose bolts</p> <p>3- Metal loss of 5% to 10% T</p> <p>4- Metal loss of less than 5% T, or surface rust</p> <p>5- No deterioration No roof ladder</p>	5
<p style="text-align: center;">Safety Device</p> <p>0- Device improperly attached and/or in danger of coming loose No safety device present or device inoperable</p> <p>2- Present safety device works rough</p> <p>5- Safety device installed properly and in good condition No roof ladder</p>	5
<p style="text-align: center;">Dimensions</p> <p>0- 13 in. or less clear distance between side rails Rungs greater than 12 in. center-to-center Lacks non-slip rungs, 7 in. toe clearance or 30 in. head clearance</p> <p>3- 13 in. to 15 in. clear distance between side rails Side rails less than 2 in. x 3/8 in.</p> <p>4- Side rails less than 2-1/2 in. x 3/8 in.</p> <p>5- 16 in. or greater clear distance between side rails No roof ladder</p>	5
<p style="text-align: center;">Ease of Climbing</p> <p>0- Major obstructions limiting climbing surface</p> <p>1- Revolving ladder</p> <p>2- Improper or erratic rung spacing</p> <p>3- Minor obstructions connected to side rails</p> <p>5- Ladder clear of obstructions and easy to climb No roof ladder</p>	5

TANK 535
TABLE C.3-1 (Cont'd)

TANK BOTTOM CONDITION RATING	
<p style="text-align: center;">Coating Condition</p> <p>2- Concrete surfaces exposed over 40% of area 3- Concrete surfaces exposed over 25% to 40% of area Top coat failure over 50% of area 4- Concrete surfaces exposed over 10% to 25% of area Top coat failure over 25% to 50% of area 5- Concrete surfaces exposed up to 10% of area Top coat failure up to 25% of area No coating present</p>	5
<p style="text-align: center;">Concrete Condition</p> <p>0- Major spalling of concrete surface, large pop-outs, crumbling of concrete Exposed reinforcing steel Wide cracks or evidence of water leaking through bottom 1- Spalling of concrete surface, pop-outs of concrete Rust streaks at cracks in bottom Open cracks up to 1/8 in. wide Failure of previous concrete surface repairs 2- Minor spalling of concrete Open cracks up to 1/16 in. wide Water efflorescence on surface 3- Bottom cracks that have "self-healed" 4- Minor temperature or shrinkage cracks Tight, non-open cracks Minor, widely scattered honeycombs 5- No cracking or honeycombing problems noted</p>	5

TANK 535
TABLE C.3-1 (Cont'd)

INTERIOR SHELL CONDITION RATING	
<p style="text-align: center;">Coating Condition</p> <p>2- Concrete surfaces exposed over 40% of area 3- Concrete surfaces exposed over 25% to 40% of area Top coat failure over 50% of area 4- Concrete surfaces exposed over 10% to 25% of area Top coat failure over 25% to 50% of area 5- Concrete surfaces exposed up to 10% of area Top coat failure up to 25% of area No coating present</p>	5
<p style="text-align: center;">Concrete Condition</p> <p>0- Major spalling of concrete surface, large pop-outs, crumbling of concrete Exposed reinforcing steel Wide cracks or evidence of water leaking through bottom 1- Spalling of concrete surface, pop-outs of concrete Rust streaks at cracks Open cracks up to 1/8 in. wide Failure of previous concrete surface repairs 2- Minor spalling of concrete Open cracks up to 1/16 in. wide Water efflorescence on surface 3- Bottom cracks that have "self-healed" 4- Minor temperature or shrinkage cracks Tight, non-open cracks Minor, widely scattered honeycombs 5- No cracking or honeycombing problems noted</p>	5

TANK 535
TABLE C.3-1 (Cont'd)

INTERIOR ROOF CONDITION RATING	
<p style="text-align: center;">Coating Condition</p> <p>2- Concrete surfaces exposed over 40% of area 3- Concrete surfaces exposed over 25% to 40% of area Top coat failure over 50% of area 4- Concrete surfaces exposed over 10% to 25% of area Top coat failure over 25% to 50% of area 5- Concrete surfaces exposed up to 10% of area Top coat failure up to 25% of area No coating present Aluminum dome roof</p>	5
<p style="text-align: center;">Concrete Condition</p> <p>0- Major spalling of concrete surface, large pop-outs, crumbling of concrete Exposed reinforcing steel Wide cracks or evidence of water leaking 1- Spalling of concrete surface, pop-outs of concrete Rust streaks at cracks Open cracks up to 1/8 in. wide Failure of previous concrete surface repairs 2- Minor spalling of concrete Open cracks up to 1/16 in. wide Water efflorescence on surface 3- Bottom cracks that have "self-healed" 4- Minor temperature or shrinkage cracks Tight, non-open cracks Minor, widely scattered honeycombs 5- No cracking or honeycombing problems noted</p>	5

TANK 535
TABLE C.3-1 (Cont'd)

INTERIOR LADDER CONDITION RATING	
<p style="text-align: center;">Steel Condition</p> <p>0- Metal loss on rung, side rail, or bracket of over 40% T Ladder distorted or bent 3 in. or more from original position</p> <p>1- Metal loss of 25% to 40% T Missing attachment bolts or cracked welds General instability</p> <p>2- Metal loss of 10% to 25% T Loose bolts</p> <p>3- Metal loss of 5% to 10% T</p> <p>4- Metal loss of less than 5% T, or surface rust</p> <p>5- No deterioration No ladder</p>	5
<p style="text-align: center;">Safety Device</p> <p>0- Device improperly attached and/or in danger of coming loose No safety device present or device inoperable</p> <p>2- Present safety device works rough</p> <p>5- Safety device installed properly and in good condition No ladder</p>	5
<p style="text-align: center;">Dimensions</p> <p>0- 13 in. or less clear distance between side rails Rungs greater than 12 in. center-to-center Lacks non-slip rungs, 7 in. toe clearance or 30 in. head clearance</p> <p>3- 13 in. to 15 in. clear distance between side rails Side rails less than 2 in. x 3/8 in.</p> <p>4- Side rails less than 2-1/2 in. x 3/8 in.</p> <p>5- 16 in. or greater clear distance between side rails No ladder</p>	5
<p style="text-align: center;">Ease of Climbing</p> <p>0- Major obstructions limiting climbing surface</p> <p>1- Difficult transition to balcony (i.e. must climb over handrail)</p> <p>2- Improper or erratic rung spacing</p> <p>3- Minor obstructions connected to side rails</p> <p>5- Ladder clear of obstructions and easy to climb No ladder</p>	5

TANK 535
TABLE C.3-1 (Cont'd)

PAINTING SCHEDULES CONDITION RATING	
Exterior Surface Schedule 1- 0 to 1 years 2- 2 to 4 years 3- 5 or more years	1
Interior Surface Schedule 1- 0 to 1 years 2- 2 to 4 years 3- 5 or more years	3

**TANK 535 SUMMARY CONDITION EVALUATION STANDARDS
TABLE C.3-2**

External Summary Concrete Ground Water Tank

Foundations

1. Site drainage	<u>5</u>
2. Foundation projection	<u>5</u>
3. Concrete condition	<u>5</u>
4. Grout condition	<u>5</u>

Base of Tower - N/A

5. Steel condition	<u>6</u>
6. Base plate/ring	<u>6</u>
7. Anchor bolts	<u>6</u>
8. Anchor bolt chairs	<u>6</u>

Columns - N/A

9. Alignment	<u>6</u>
10. Coating condition	<u>6</u>
11. Steel condition	<u>6</u>

Riser - N/A

12. Alignment	<u>6</u>
13. Coating condition	<u>6</u>
14. Steel Condition	<u>6</u>
15. Riser Manhole	<u>6</u>

Shell Ladder

16. Steel condition	<u>5</u>
17. Safety device	<u>5</u>
18. Dimensions	<u>5</u>
19. Ease of climbing	<u>5</u>

Diagonal Bracing - N/A

20. Steel condition	<u>6</u>
21. Connections	<u>6</u>
22. Adjustment	<u>6</u>
23. Alignment	<u>6</u>
24. Coating condition	<u>6</u>

Truck Door/Man Door - N/A

1. Steel condition	<u>N/A</u>
2. Connections	<u>N/A</u>
3. Truck door	<u>N/A</u>
4. Man door	<u>N/A</u>
5. Coating condition	<u>N/A</u>

Riser Rods - N/A

25. Steel condition	<u>6</u>
26. Connections	<u>6</u>
27. Adjustment	<u>6</u>
28. Alignment	<u>6</u>
29. Coating condition	<u>6</u>

Struts - N/A

30. Coating condition	<u>6</u>
31. Steel condition	<u>6</u>
32. Connection to column	<u>6</u>

Balcony - N/A

33. Coating condition	<u>6</u>
34. Steel condition	<u>6</u>
35. Drainage	<u>6</u>
36. Handrail	<u>6</u>

Tank Bowl - N/A

37. Coating condition	<u>6</u>
38. Steel condition	<u>6</u>

Shell Condition

39. Coating condition	<u>5</u>
40. Concrete condition	<u>0</u> leak in shell
41. Container manhole	<u>1</u>
42. Overflow	<u>2</u>

Roof Condition

43. Coating condition	<u>5</u>
44. Concrete condition	<u>5</u>
45. Roof-to-vent	<u>5</u>
46. Roof vent/opening	<u>2</u>
47. Roof manway	<u>0</u> not locked

Roof Ladder

48. Steel condition	<u>5</u>
49. Safety device	<u>5</u>
50. Dimensions	<u>5</u>
51. Ease of Climbing	<u>5</u>

Internal Summary Concrete Ground Water Tank

Tank Bottom

52. Coating condition	<u>5</u>
53. Concrete condition	<u>5</u>

Interior Shell

54. Coating condition	<u>5</u>
55. Concrete condition	<u>5</u>

Interior Roof

56. Coating condition	<u>5</u>
57. Concrete condition	<u>5</u>

Riser - N/A

58. Coating condition	<u>6</u>
59. Steel condition	<u>6</u>
60. Safety Grating	<u>6</u>

Condition Evaluation Ratings

Safety Rating	92
Sanitary Rating	45
Structural Rating	100
*Exterior PM Rating	100
*Interior PM Rating	100
Overall Rating	87

*PM = Painting Maintenance

Interior Ladders

61. Structural condition	<u>5</u>
62. Safety device	<u>5</u>
63. Dimensions	<u>0</u> head clearance <30 in.
64. Ease of climbing	<u>5</u>

Painting Schedules

65. Exterior	<u>1</u>
66. Interior	<u>3</u>

TANK 492

SITE:

Nearest Structures:

Type: drain
Direction: east
Distance: approx. 1 ft 3 in. (381 mm)

Type: filters and shed
Direction: north
Distance: approx. 6 ft 2 in. (1.9 m)

Type: Tank 535
Direction: east
Distance: approx. 17 ft 3 in. (5.3 m)

Type: Tank 612
Direction: northwest
Distance: approx. 20 ft (6 m)

VALVE VAULT:

Location: south of tank

Access:

Size: 2 ft (0.6 m) square

Locked: yes, but not secured

Size: approx. 9 ft (2.7 m) x 13 ft 6 in. (4.1 m) x 11 ft (3.5 m), deep

Ladder:

Number of Rungs: 10

Rung Size: 3/4 in. (19 mm) diameter

Width: 11 in. (279 mm)

Side Rails: 2 in. (51 mm) x 3/8 in. (9 mm), flat bar

Toe Room: 7-1/4 in. (184 mm)

Spacing: 11-3/4 in. (298 mm)

Head Clearance: 24 in. (610 mm)

Brackets:

Size: 5/8 in. (16 mm) diameter

Spacing: 30-1/2 in. (775 mm)

STAIRS:

Number: 12

Width: 31-1/2 in. (800 mm)

Rise: 7-3/4 in. (197 mm)

Safety Railing:

Handrail:

Height: 39 in. (991 mm) to 40-3/4 in. (1035 mm)

Size: 5 in. (127 mm) x 2 in. (51 mm), channel

Uprights: 1-7/8 in. (48 mm) diameter

TANK 492

Platforms:

Number: 2

Size: 31-1/4 in. (794 mm) x 40-1/4 in. (1022 mm)

Safety Railing:

Handrail:

Height: 43-1/2 in. (1105 mm) to 43-3/4 in. (1111 mm)

Size: 2-3/8 in. (61 mm) diameter

Uprights: 2-3/8 in. (61 mm) diameter

Mid-Rail: 2-3/8 in. (61 mm) diameter

EXTERIOR:

DESCRIPTION:

Construction: concrete

Shell Projection: approx. 8 ft (2.4 m) above grade

Exterior Size: approx. 63 ft 8 in. (19.4 m) x 70 ft 3 in. (21.4 m)

Interior Height: 16 ft 6 in. (5 m)

Roof Overhang:

Projection: 6 in. (152 mm)

Thickness: 6 in. (152 mm)

SHELL MANHOLES: none

OVERFLOW PIPES:

Number: 2

Size: 8 in. (203 mm) reducing to 6 in. (152 mm) diameter

Air Break: 6 ft 7 in. (1.8 m)

Protective Screening: 2 mesh and 3 mesh

SHELL PIPES:

East Pipes:

Number: 2

Size: 12 in. (305 mm) diameter

Southwest Pipe: 8 in. (203 mm)

EXTERIOR LADDER: none

ROOF SAFETY RAILING:

Handrail:

Height: 43-1/2 in. (1105 mm) to 43-3/4 in. (1111 mm)

Size: 2-3/8 in. (61 mm) diameter

Uprights: 2-3/8 in. (61 mm) diameter

Mid-Rail: 2-3/8 in. (61 mm) diameter

Toe Bar: yes

TANK 492

ROOF OPENINGS:

Manhole #1:

Size: 31-1/2 in. (800 mm) x 33-1/2 in. (851 mm)

Cover: 32 in. (813 mm) x 46-3/4 in. (1187 mm)

Neck: 6-1/4 in. (159 mm)

Locked: yes

Manhole #2:

Size: 31-1/4 in. (795 mm) x 33-1/4 in. (845 mm)

Cover: 31-1/2 in. (800 mm) x 46-3/8 in. (1178 mm)

Neck: 6-1/4 in. (159 mm)

Locked: yes

Roof Vents:

Number: 1 per chamber

Type: gooseneck

Neck: 26-1/2 in. (673 mm) square x 15 in. (381 mm) tall

Height: 27-3/4 in. (705 mm)

Diameter: 4 in. (102 mm)

Screening: 2 mesh

INTERIOR:

INTERIOR LADDER:

Number of Rungs: 17

Side Rails: 2-3/8 in. (61 mm) x 3/8 in. (9 mm), flat bar

Width: 15 in. (381 mm)

Rung Size: 7/8 in. (22 mm) diameter

Toe Room: 7 in. (178 mm)

Rung Spacing: 11-3/4 in. (299 mm)

Head Clearance: 26 in. (660 mm)

Brackets:

Size: 5-7/8 in. (150 mm) x 3/8 in. (9 mm), flat bar x 8 in. (203 mm)
to 4 in. (102 mm) long

Bolts: 3/4 in. (19 mm) diameter

Spacing: 41 in. (1194 mm)

Safe-Climbing Device: none

Safety Cage: none

TANK 492 EVALUATION OF CONCRETE GROUND TANKS
TABLE C.4-1

FOUNDATION AND SITE-RELATED CONDITION RATING	
<p style="text-align: center;">Site drainage</p> 0- Deep depressions and water around foundations and/ or site saturated long after rain 1- Mild depressions around foundations and/or water ponds adjacent to tank 2- Water flows toward foundation 3- Water ponds on site, but not adjacent to foundation 4- Flat site 5- Ground well sloped away from foundations	5
<p style="text-align: center;">Foundation Projection and Settlement</p> 0- Concrete foundation tops buried 1- Concrete foundation tops even with ground and covered with vegetation and debris 2- Concrete foundation tops even with ground and clean 3- Concrete foundation tops with 1 in. to 2 in. projection 4- Concrete foundation tops with 2 in. to 6 in. or 12 in. to 24 in. projection 5- Concrete foundation tops with 6 in. to 12 in. projection	5
<p style="text-align: center;">Concrete Condition</p> 0- Concrete soft, crumbling and/or easily removed and/or hollow sound when tapped Exposed rebar that is corroded 1- Same as 0 except foundation still has basic original shape and/or Exposed rebar with minor surface corrosion and/or open cracks up 1/4" wide 2- Surface crumbling, but can be chipped to sound concrete, open cracks up to 1/8" wide 3- Some surface spalling, but solid sounding and/or deep cracks up to 1/16" wide Hollow sounding areas 4- Minor surface cracks or deficiencies. 5- Smooth surface with no cracks or deteriorations.	5
<p style="text-align: center;">Grout Condition / Sealant</p> 0- Grout greater than 40% gone 2- Grout 20 to 40% gone 3- Grout 5 to 20% gone 4- Some pieces can be removed and/or grout less than 5% gone 5- Cracks and minor chips, but intact	5

TANK 492
TABLE C.4-1 (Cont'd)

SHELL LADDER CONDITION RATING	
<p style="text-align: center;">Steel Condition</p> <p>0- Metal loss on rung, side rail, or bracket of over 40% T Ladder distorted or bent 3 in. or more from original position</p> <p>1- Metal loss of 25% to 40% T Missing attachment bolts or cracked welds General instability</p> <p>2- Metal loss of 10% to 25% T Loose bolts</p> <p>3- Metal loss of 5% to 10% T</p> <p>4- Metal loss of less than 5% T, or surface rust</p> <p>5- No deterioration or no shell ladder</p>	5
<p style="text-align: center;">Safety Device</p> <p>0- Device improperly attached and/or in danger of coming loose No safety device present or device inoperable</p> <p>2- Present safety device works rough</p> <p>5- Safety device installed properly and in good condition No shell ladder</p>	5
<p style="text-align: center;">Dimensions</p> <p>0- 13 in. or less clear distance between side rails Rungs greater than 12 in. center-to-center Lacks non-slip rungs, 7 in. toe clearance or 30 in. head clearance</p> <p>3- 13 in. to 15 in. clear distance between side rails Side rails less than 2 in. x 3/8 in.</p> <p>4- Side rails less than 2-1/2 in. x 3/8 in.</p> <p>5- 16 in. or greater clear distance between side rails No shell ladder</p>	5
<p style="text-align: center;">Ease of Climbing</p> <p>0- Major obstructions limiting climbing surface</p> <p>1- Difficult transition to balcony (i.e. must climb over handrail)</p> <p>2- Improper or erratic rung spacing</p> <p>3- Minor obstructions connected to side rails</p> <p>5- Ladder clear of obstructions and easy to climb No shell ladder</p>	5

TANK 492
TABLE C.4-1 (Cont'd)

SHELL CONDITION RATING	
<p style="text-align: center;">Coating Condition</p> <p>2 - Sound concrete surfaces exposed over 50% of area 3 - Sound concrete surfaces exposed 25% to 50% of area 4 - Sound concrete surfaces exposed 0% to less than 25% of area 5 - No problems noted for coating No coating present</p>	5
<p style="text-align: center;">Concrete Condition</p> <p>0- Major spalling of concrete surface, large pop-outs, crumbling of concrete Water leaking or flowing from cracks in wall Water leaks at the shell-to-bottom joint 1- Spalling of concrete surface, pop-outs of concrete Rust streaks at cracks in wall Exposed rebar with minor surface corrosion Open cracks up to 1/4 in. wide Failure of previous concrete surface repairs 2- Minor spalling of concrete Open cracks up to 1/8 in. wide Water efflorescence on surface 3- Wall cracks that have "self-healed" Open cracks up to 1/16 in. wide 4- Minor temperature or shrinkage cracks Tight, non-open cracks Minor, widely scattered honeycombs 5- No cracking or honeycombing problems noted</p>	5
<p style="text-align: center;">Shell Manhole</p> <p>0- Manhole leaking water 1- Only one manhole less than 20 in. diameter 2- Only one manhole with dimensions not less than 20 in. diameter 3- Two or more shell manholes but none 30 in. diameter or larger Missing or parts 5- Two or more shell manholes (one 30 in. diameter and others not less than 20 in. diameter)</p>	1
<p style="text-align: center;">Overflow</p> <p>0- More than 1/3 of the support brackets broken Pipe clogged or broken Holes of greater than 1 in. diameter in pipe 1- Less than 1/3 of the brackets broken Holes smaller than 1 in. diameter in pipe Overflow does not have a weir box or anti-vortex plate 2- Ineffective protective screen No screen or flap gate on discharge end of pipe Pipe does not extended to grade Overflow discharges through perimeter roof vent No visible air break 3- No splash block below overflow discharge 4- Rust on overflow pipe 5- No rust or deterioration</p>	2

TANK 492
TABLE C.4-1 (Cont'd)

ROOF CONDITION RATING	
<p style="text-align: center;">Coating Condition</p> <p>2 - Sound concrete surfaces exposed over 50% of area 3 - Sound concrete surfaces exposed 25% to 50% of area 4 - Sound concrete surfaces exposed 0% to less than 25% of area 5 - No problems noted for coating No coating present No roof (open top tank)</p>	5
<p style="text-align: center;">Concrete Condition</p> <p>0- Major spalling of concrete surface, large pop-outs, crumbling of concrete Water leaking or flowing from cracks in wall 1- Spalling of concrete surface, pop-outs of concrete Rust streaks at cracks in wall Exposed rebar with minor surface corrosion Open cracks up to 1/4 in. wide Failure of previous concrete surface repairs 2- Minor spalling of concrete Open cracks up to 1/8 in. wide Water efflorescence on surface 3- Wall cracks that have "self-healed" Open cracks up to 1/16 in. wide 4- Minor temperature or shrinkage cracks Tight, non-open cracks Minor, widely scattered honeycombs 5- No cracking or honeycombing problems noted No roof (open top tank)</p>	5
<p style="text-align: center;">Roof-to-Vent Connection</p> <p>0- Connection failed, vent no longer connected Wide cracks in concrete Evidence of water entry into tank 1- Spalling of concrete 2- Vent mounting bolts missing 3- Minor or tight concrete cracks 4- Previous concrete repairs intact 5- No deterioration at connection No roof (open top tank)</p>	5
<p style="text-align: center;">Roof Vent and Roof Opening</p> <p>0- No vent present Vent clogged or inoperative Screen missing, torn, or improperly placed 1- Vent deteriorated or damaged 2- Vent covered with rust Bolts or parts missing or loose 4- Minor rust on vent 5- No rust or deterioration No roof (open top tank)</p>	2
<p style="text-align: center;">Roof Manway</p> <p>0- Manway without locking features or lock missing 1- Allows water into tank from roof 3- Any dimension less than 24 in. diameter, 4 in. curb or 2 in. overlap 5- Manway locked and water tight All dimensions equal or greater than 24 in. diameter, 4 in. curb or 2 in. overlap No roof (open top tank)</p>	5

TANK 492
TABLE C.4-1 (Cont'd)

ROOF LADDER CONDITION RATING	
<p style="text-align: center;">Steel Condition</p> <p>0- Metal loss on rung, side rail, or bracket of over 40% T Ladder distorted or bent 3 in. or more from original position</p> <p>1- Metal loss of 25% to 40% T Missing attachment bolts or cracked welds General instability</p> <p>2- Metal loss of 10% to 25% T Loose bolts</p> <p>3- Metal loss of 5% to 10% T</p> <p>4- Metal loss of less than 5% T, or surface rust</p> <p>5- No deterioration No roof ladder</p>	5
<p style="text-align: center;">Safety Device</p> <p>0- Device improperly attached and/or in danger of coming loose No safety device present or device inoperable</p> <p>2- Present safety device works rough</p> <p>5- Safety device installed properly and in good condition No roof ladder</p>	5
<p style="text-align: center;">Dimensions</p> <p>0- 13 in. or less clear distance between side rails Rungs greater than 12 in. center-to-center Lacks non-slip rungs, 7 in. toe clearance or 30 in. head clearance</p> <p>3- 13 in. to 15 in. clear distance between side rails Side rails less than 2 in. x 3/8 in.</p> <p>4- Side rails less than 2-1/2 in. x 3/8 in.</p> <p>5- 16 in. or greater clear distance between side rails No roof ladder</p>	5
<p style="text-align: center;">Ease of Climbing</p> <p>0- Major obstructions limiting climbing surface</p> <p>1- Revolving ladder</p> <p>2- Improper or erratic rung spacing</p> <p>3- Minor obstructions connected to side rails</p> <p>5- Ladder clear of obstructions and easy to climb No roof ladder</p>	5

TANK 492
TABLE C.4-1 (Cont'd)

TANK BOTTOM CONDITION RATING	
<p style="text-align: center;">Coating Condition</p> <p>2- Concrete surfaces exposed over 40% of area 3- Concrete surfaces exposed over 25% to 40% of area Top coat failure over 50% of area 4- Concrete surfaces exposed over 10% to 25% of area Top coat failure over 25% to 50% of area 5- Concrete surfaces exposed up to 10% of area Top coat failure up to 25% of area No coating present</p>	5
<p style="text-align: center;">Concrete Condition</p> <p>0- Major spalling of concrete surface, large pop-outs, crumbling of concrete Exposed reinforcing steel Wide cracks or evidence of water leaking through bottom 1- Spalling of concrete surface, pop-outs of concrete Rust streaks at cracks in bottom Open cracks up to 1/8 in. wide Failure of previous concrete surface repairs 2- Minor spalling of concrete Open cracks up to 1/16 in. wide Water efflorescence on surface 3- Bottom cracks that have "self-healed" 4- Minor temperature or shrinkage cracks Tight, non-open cracks Minor, widely scattered honeycombs 5- No cracking or honeycombing problems noted</p>	5

TANK 492
TABLE C.4-1 (Cont'd)

INTERIOR SHELL CONDITION RATING	
<p style="text-align: center;">Coating Condition</p> <p>2- Concrete surfaces exposed over 40% of area 3- Concrete surfaces exposed over 25% to 40% of area Top coat failure over 50% of area 4- Concrete surfaces exposed over 10% to 25% of area Top coat failure over 25% to 50% of area 5- Concrete surfaces exposed up to 10% of area Top coat failure up to 25% of area No coating present</p>	5
<p style="text-align: center;">Concrete Condition</p> <p>0- Major spalling of concrete surface, large pop-outs, crumbling of concrete Exposed reinforcing steel Wide cracks or evidence of water leaking through bottom 1- Spalling of concrete surface, pop-outs of concrete Rust streaks at cracks Open cracks up to 1/8 in. wide Failure of previous concrete surface repairs 2- Minor spalling of concrete Open cracks up to 1/16 in. wide Water efflorescence on surface 3- Bottom cracks that have "self-healed" 4- Minor temperature or shrinkage cracks Tight, non-open cracks Minor, widely scattered honeycombs 5- No cracking or honeycombing problems noted</p>	5

TANK 492
TABLE C.4-1 (Cont'd)

INTERIOR ROOF CONDITION RATING	
<p style="text-align: center;">Coating Condition</p> <p>2- Concrete surfaces exposed over 40% of area 3- Concrete surfaces exposed over 25% to 40% of area Top coat failure over 50% of area 4- Concrete surfaces exposed over 10% to 25% of area Top coat failure over 25% to 50% of area 5- Concrete surfaces exposed up to 10% of area Top coat failure up to 25% of area No coating present Aluminum dome roof</p>	5
<p style="text-align: center;">Concrete Condition</p> <p>0- Major spalling of concrete surface, large pop-outs, crumbling of concrete Exposed reinforcing steel Wide cracks or evidence of water leaking 1- Spalling of concrete surface, pop-outs of concrete Rust streaks at cracks Open cracks up to 1/8 in. wide Failure of previous concrete surface repairs 2- Minor spalling of concrete Open cracks up to 1/16 in. wide Water efflorescence on surface 3- Bottom cracks that have "self-healed" 4- Minor temperature or shrinkage cracks Tight, non-open cracks Minor, widely scattered honeycombs 5- No cracking or honeycombing problems noted</p>	5

TANK 492
TABLE C.4-1 (Cont'd)

INTERIOR LADDER CONDITION RATING	
<p style="text-align: center;">Steel Condition</p> <p>0- Metal loss on rung, side rail, or bracket of over 40% T Ladder distorted or bent 3 in. or more from original position</p> <p>1- Metal loss of 25% to 40% T Missing attachment bolts or cracked welds General instability</p> <p>2- Metal loss of 10% to 25% T Loose bolts</p> <p>3- Metal loss of 5% to 10% T</p> <p>4- Metal loss of less than 5% T, or surface rust</p> <p>5- No deterioration No ladder</p>	3
<p style="text-align: center;">Safety Device</p> <p>0- Device improperly attached and/or in danger of coming loose No safety device present or device inoperable</p> <p>2- Present safety device works rough</p> <p>5- Safety device installed properly and in good condition No ladder</p>	5
<p style="text-align: center;">Dimensions</p> <p>0- 13 in. or less clear distance between side rails Rungs greater than 12 in. center-to-center Lacks non-slip rungs, 7 in. toe clearance or 30 in. head clearance</p> <p>3- 13 in. to 15 in. clear distance between side rails Side rails less than 2 in. x 3/8 in.</p> <p>4- Side rails less than 2-1/2 in. x 3/8 in.</p> <p>5- 16 in. or greater clear distance between side rails No ladder</p>	3
<p style="text-align: center;">Ease of Climbing</p> <p>0- Major obstructions limiting climbing surface</p> <p>1- Difficult transition to balcony (i.e. must climb over handrail)</p> <p>2- Improper or erratic rung spacing</p> <p>3- Minor obstructions connected to side rails</p> <p>5- Ladder clear of obstructions and easy to climb No ladder</p>	3

TANK 492
TABLE C.4-1 (Cont'd)

PAINTING SCHEDULES CONDITION RATING	
Exterior Surface Schedule 1- 0 to 1 years 2- 2 to 4 years 3- 5 or more years	3
Interior Surface Schedule 1- 0 to 1 years 2- 2 to 4 years 3- 5 or more years	3

**TANK 492 SUMMARY CONDITION EVALUATION STANDARDS
TABLE C.4-2**

External Summary Concrete Ground Water Tank

Foundations

1. Site drainage	<u>5</u>
2. Foundation projection	<u>5</u>
3. Concrete condition	<u>5</u>
4. Grout condition	<u>5</u>

Base of Tower - N/A

5. Steel condition	<u>6</u>
6. Base plate/ring	<u>6</u>
7. Anchor bolts	<u>6</u>
8. Anchor bolt chairs	<u>6</u>

Columns - N/A

9. Alignment	<u>6</u>
10. Coating condition	<u>6</u>
11. Steel condition	<u>6</u>

Riser - N/A

12. Alignment	<u>6</u>
13. Coating condition	<u>6</u>
14. Steel Condition	<u>6</u>
15. Riser Manhole	<u>6</u>

Shell Ladder

16. Steel condition	<u>5</u>
17. Safety device	<u>5</u>
18. Dimensions	<u>5</u>
19. Ease of climbing	<u>5</u>

Diagonal Bracing - N/A

20. Steel condition	<u>6</u>
21. Connections	<u>6</u>
22. Adjustment	<u>6</u>
23. Alignment	<u>6</u>
24. Coating condition	<u>6</u>

Truck Door/Man Door - N/A

1. Steel condition	<u>N/A</u>
2. Connections	<u>N/A</u>
3. Truck door	<u>N/A</u>
4. Man door	<u>N/A</u>
5. Coating condition	<u>N/A</u>

Riser Rods - N/A

25. Steel condition	<u>6</u>
26. Connections	<u>6</u>
27. Adjustment	<u>6</u>
28. Alignment	<u>6</u>
29. Coating condition	<u>6</u>

Struts - N/A

30. Coating condition	<u>6</u>
31. Steel condition	<u>6</u>
32. Connection to column	<u>6</u>

Balcony - N/A

33. Coating condition	<u>6</u>
34. Steel condition	<u>6</u>
35. Drainage	<u>6</u>
36. Handrail	<u>6</u>

Tank Bowl - N/A

37. Coating condition	<u>6</u>
38. Steel condition	<u>6</u>

Shell Condition

39. Coating condition	<u>5</u>
40. Concrete condition	<u>5</u>
41. Container manhole	<u>1</u>
42. Overflow	<u>2</u>

Roof Condition

43. Coating condition	<u>5</u>
44. Concrete condition	<u>5</u>
45. Roof-to-vent	<u>5</u>
46. Roof vent/opening	<u>2</u>
47. Roof manway	<u>5</u>

Roof Ladder

48. Steel condition	<u>5</u>
49. Safety device	<u>5</u>
50. Dimensions	<u>5</u>
51. Ease of Climbing	<u>5</u>

Internal Summary Concrete Ground Water Tank

Tank Bottom

52. Coating condition	<u>5</u>
53. Concrete condition	<u>5</u>

Interior Shell

54. Coating condition	<u>5</u>
55. Concrete condition	<u>5</u>

Interior Roof

56. Coating condition	<u>5</u>
57. Concrete condition	<u>5</u>

Riser - N/A

58. Coating condition	<u>6</u>
59. Steel condition	<u>6</u>
60. Safety Grating	<u>6</u>

Interior Ladders

61. Structural condition	<u>3</u>
62. Safety device	<u>5</u>
63. Dimensions	<u>3</u>
64. Ease of climbing	<u>3</u>

Painting Schedules

65. Exterior	<u>3</u>
66. Interior	<u>3</u>

Condition Evaluation Ratings

Safety Rating	90
Sanitary Rating	70
Structural Rating	100
*Exterior PM Rating	100
*Interior PM Rating	100
Overall Rating	92

*PM = Painting Maintenance

TANK 612

SITE:

Nearest Structures:

Type: filters and shed
Direction: east
Distance: approx. 15 ft (4.6 m)

Type: Tank 492
Direction: west
Distance: approx. 16 ft 3 in. (5 m)

Type: Tank 535
Direction: northwest
Distance: approx. 20 ft (6.1 m)

Nearest Overhead Power Lines: none visible

EXTERIOR:

DESCRIPTION:

Construction: concrete
Shell Projection: approx. 12 ft 6 in. (3.8 m) above grade
Exterior Size: approx. 65 ft 6 in. (20 mm) x 86 ft 8 in. (26.4 m)
Interior Height: approx. 12 ft 3 in. (3.7 m)

SHELL MANHOLES: none

PIPE FITTINGS:

Number: 6
Size: 8 in. (203 mm) diameter
Air Break: approx. 9 ft (2.7 m) to 9 ft 7 in. (2.9 m)
Screening: perforated plate

STAIRS:

Number: 18
Channels: 3-3/4 in. (95 mm) x 11-1/4 in. (286 mm)
Size: 10 in. (254 mm) x 28-1/2 in. (724 mm)
Rise: 7-1/4 in. (184 mm)
Safety Railing:
Handrail:
Height: 43 in. (1092 mm)
Type: pipe
Mid-Rail: pipe
Uprights: pipe

TANK 612

ROOF SAFETY RAILING:

Location: around roof perimeter

Handrail:

Height: 40-3/4 in. (1035 mm)

Size: 1-3/4 in. (45 mm) diameter

Uprights: 1-3/4 in. (45 mm) diameter

Mid-Rail: 1-3/4 in. (45 mm) diameter

Toe Bar: flat bar

ROOF MANHOLES:

Number: 3

Size: 55-1/2 in. (1410 mm) square

Neck: 10 in. (254 mm)

Cover: 3 ft (0.9 m) x 6 ft (1.8 m), double-doors

Locked: yes

INTERIOR:

INTERIOR LADDERS:

Number: 3

Side Rails: 2-3/8 in. (60 mm) x 3/8 in. (9 mm), flat bar

Width: 15 in. (381 mm)

Rung Size: 7/8 in. (22 mm) diameter

Rung Spacing: 12 in. (305 mm) on center

Toe Room: 7 in. (178 mm)

Head Clearance: greater than 30 in. (762 mm)

Brackets:

Size: 5-3/4 in. (146 mm) x 3/8 in. (9 mm), flat bar x 8 in. (203 mm)

4 in. (102 mm) long

Construction: welded to ladder, bolted to shell

Safe-Climbing Device: none

TANK 612 EVALUATION OF CONCRETE GROUND TANKS
TABLE C.5-1

FOUNDATION AND SITE-RELATED CONDITION RATING	
<p style="text-align: center;">Site drainage</p> 0- Deep depressions and water around foundations and/ or site saturated long after rain 1- Mild depressions around foundations and/or water ponds adjacent to tank 2- Water flows toward foundation 3- Water ponds on site, but not adjacent to foundation 4- Flat site 5- Ground well sloped away from foundations	5
<p style="text-align: center;">Foundation Projection and Settlement</p> 0- Concrete foundation tops buried 1- Concrete foundation tops even with ground and covered with vegetation and debris 2- Concrete foundation tops even with ground and clean 3- Concrete foundation tops with 1 in. to 2 in. projection 4- Concrete foundation tops with 2 in. to 6 in. or 12 in. to 24 in. projection 5- Concrete foundation tops with 6 in. to 12 in. projection	5
<p style="text-align: center;">Concrete Condition</p> 0- Concrete soft, crumbling and/or easily removed and/or hollow sound when tapped Exposed rebar that is corroded 1- Same as 0 except foundation still has basic original shape and/or Exposed rebar with minor surface corrosion and/or open cracks up 1/4" wide 2- Surface crumbling, but can be chipped to sound concrete, open cracks up to 1/8" wide 3- Some surface spalling, but solid sounding and/or deep cracks up to 1/16" wide Hollow sounding areas 4- Minor surface cracks or deficiencies. 5- Smooth surface with no cracks or deteriorations.	5
<p style="text-align: center;">Grout Condition / Sealant</p> 0- Grout greater than 40% gone 2- Grout 20 to 40% gone 3- Grout 5 to 20% gone 4- Some pieces can be removed and/or grout less than 5% gone 5- Cracks and minor chips, but intact	5

TANK 612
TABLE C.5-1 (Cont'd)

SHELL LADDER CONDITION RATING	
<p style="text-align: center;">Steel Condition</p> <p>0- Metal loss on rung, side rail, or bracket of over 40% T Ladder distorted or bent 3 in. or more from original position</p> <p>1- Metal loss of 25% to 40% T Missing attachment bolts or cracked welds General instability</p> <p>2- Metal loss of 10% to 25% T Loose bolts</p> <p>3- Metal loss of 5% to 10% T</p> <p>4- Metal loss of less than 5% T, or surface rust</p> <p>5- No deterioration or no shell ladder</p>	5
<p style="text-align: center;">Safety Device</p> <p>0- Device improperly attached and/or in danger of coming loose No safety device present or device inoperable</p> <p>2- Present safety device works rough</p> <p>5- Safety device installed properly and in good condition No shell ladder</p>	5
<p style="text-align: center;">Dimensions</p> <p>0- 13 in. or less clear distance between side rails Rungs greater than 12 in. center-to-center Lacks non-slip rungs, 7 in. toe clearance or 30 in. head clearance</p> <p>3- 13 in. to 15 in. clear distance between side rails Side rails less than 2 in. x 3/8 in.</p> <p>4- Side rails less than 2-1/2 in. x 3/8 in.</p> <p>5- 16 in. or greater clear distance between side rails No shell ladder</p>	5
<p style="text-align: center;">Ease of Climbing</p> <p>0- Major obstructions limiting climbing surface</p> <p>1- Difficult transition to balcony (i.e. must climb over handrail)</p> <p>2- Improper or erratic rung spacing</p> <p>3- Minor obstructions connected to side rails</p> <p>5- Ladder clear of obstructions and easy to climb No shell ladder</p>	5

TANK 612
TABLE C.5-1 (Cont'd)

SHELL CONDITION RATING	
<p style="text-align: center;">Coating Condition</p> <p>2 - Sound concrete surfaces exposed over 50% of area 3 - Sound concrete surfaces exposed 25% to 50% of area 4 - Sound concrete surfaces exposed 0% to less than 25% of area 5 - No problems noted for coating No coating present</p>	5
<p style="text-align: center;">Concrete Condition</p> <p>0- Major spalling of concrete surface, large pop-outs, crumbling of concrete Water leaking or flowing from cracks in wall Water leaks at the shell-to-bottom joint 1- Spalling of concrete surface, pop-outs of concrete Rust streaks at cracks in wall Exposed rebar with minor surface corrosion Open cracks up to 1/4 in. wide Failure of previous concrete surface repairs 2- Minor spalling of concrete Open cracks up to 1/8 in. wide Water efflorescence on surface 3- Wall cracks that have "self-healed" Open cracks up to 1/16 in. wide 4- Minor temperature or shrinkage cracks Tight, non-open cracks Minor, widely scattered honeycombs 5- No cracking or honeycombing problems noted</p>	5
<p style="text-align: center;">Shell Manhole</p> <p>0- Manhole leaking water 1- Only one manhole less than 20 in. diameter 2- Only one manhole with dimensions not less than 20 in. diameter 3- Two or more shell manholes but none 30 in. diameter or larger Missing or parts 5- Two or more shell manholes (one 30 in. diameter and others not less than 20 in. diameter)</p>	1
<p style="text-align: center;">Overflow</p> <p>0- More than 1/3 of the support brackets broken Pipe clogged or broken Holes of greater than 1 in. diameter in pipe 1- Less than 1/3 of the brackets broken Holes smaller than 1 in. diameter in pipe Overflow does not have a weir box or anti-vortex plate 2- Ineffective protective screen No screen or flap gate on discharge end of pipe Pipe does not extended to grade Overflow discharges through perimeter roof vent No visible air break 3- No splash block below overflow discharge 4- Rust on overflow pipe 5- No rust or deterioration</p>	1

TANK 612
TABLE C.5-1 (Cont'd)

ROOF CONDITION RATING	
<p style="text-align: center;">Coating Condition</p> <p>2 - Sound concrete surfaces exposed over 50% of area 3 - Sound concrete surfaces exposed 25% to 50% of area 4 - Sound concrete surfaces exposed 0% to less than 25% of area 5 - No problems noted for coating No coating present No roof (open top tank)</p>	5
<p style="text-align: center;">Concrete Condition</p> <p>0- Major spalling of concrete surface, large pop-outs, crumbling of concrete Water leaking or flowing from cracks in wall 1- Spalling of concrete surface, pop-outs of concrete Rust streaks at cracks in wall Exposed rebar with minor surface corrosion Open cracks up to 1/4 in. wide Failure of previous concrete surface repairs 2- Minor spalling of concrete Open cracks up to 1/8 in. wide Water efflorescence on surface 3- Wall cracks that have "self-healed" Open cracks up to 1/16 in. wide 4- Minor temperature or shrinkage cracks Tight, non-open cracks Minor, widely scattered honeycombs 5- No cracking or honeycombing problems noted No roof (open top tank)</p>	5
<p style="text-align: center;">Roof-to-Vent Connection</p> <p>0- Connection failed, vent no longer connected Wide cracks in concrete Evidence of water entry into tank 1- Spalling of concrete 2- Vent mounting bolts missing 3- Minor or tight concrete cracks 4- Previous concrete repairs intact 5- No deterioration at connection No roof (open top tank)</p>	5
<p style="text-align: center;">Roof Vent and Roof Opening</p> <p>0- No vent present Vent clogged or inoperative Screen missing, torn, or improperly placed 1- Vent deteriorated or damaged 2- Vent covered with rust Bolts or parts missing or loose 4- Minor rust on vent 5- No rust or deterioration No roof (open top tank)</p>	5
<p style="text-align: center;">Roof Manway</p> <p>0- Manway without locking features or lock missing 1- Allows water into tank from roof 3- Any dimension less than 24 in. diameter, 4 in. curb or 2 in. overlap 5- Manway locked and water tight All dimensions equal or greater than 24 in. diameter, 4 in. curb or 2 in. overlap No roof (open top tank)</p>	5

TANK 612
TABLE C.5-1 (Cont'd)

ROOF LADDER CONDITION RATING	
<p style="text-align: center;">Steel Condition</p> <p>0- Metal loss on rung, side rail, or bracket of over 40% T Ladder distorted or bent 3 in. or more from original position</p> <p>1- Metal loss of 25% to 40% T Missing attachment bolts or cracked welds General instability</p> <p>2- Metal loss of 10% to 25% T Loose bolts</p> <p>3- Metal loss of 5% to 10% T</p> <p>4- Metal loss of less than 5% T, or surface rust</p> <p>5- No deterioration No roof ladder</p>	5
<p style="text-align: center;">Safety Device</p> <p>0- Device improperly attached and/or in danger of coming loose No safety device present or device inoperable</p> <p>2- Present safety device works rough</p> <p>5- Safety device installed properly and in good condition No roof ladder</p>	5
<p style="text-align: center;">Dimensions</p> <p>0- 13 in. or less clear distance between side rails Rungs greater than 12 in. center-to-center Lacks non-slip rungs, 7 in. toe clearance or 30 in. head clearance</p> <p>3- 13 in. to 15 in. clear distance between side rails Side rails less than 2 in. x 3/8 in.</p> <p>4- Side rails less than 2-1/2 in. x 3/8 in.</p> <p>5- 16 in. or greater clear distance between side rails No roof ladder</p>	5
<p style="text-align: center;">Ease of Climbing</p> <p>0- Major obstructions limiting climbing surface</p> <p>1- Revolving ladder</p> <p>2- Improper or erratic rung spacing</p> <p>3- Minor obstructions connected to side rails</p> <p>5- Ladder clear of obstructions and easy to climb No roof ladder</p>	5

TANK 612
TABLE C.5-1 (Cont'd)

TANK BOTTOM CONDITION RATING	
<p style="text-align: center;">Coating Condition</p> <p>2- Concrete surfaces exposed over 40% of area 3- Concrete surfaces exposed over 25% to 40% of area Top coat failure over 50% of area 4- Concrete surfaces exposed over 10% to 25% of area Top coat failure over 25% to 50% of area 5- Concrete surfaces exposed up to 10% of area Top coat failure up to 25% of area No coating present</p>	5
<p style="text-align: center;">Concrete Condition</p> <p>0- Major spalling of concrete surface, large pop-outs, crumbling of concrete Exposed reinforcing steel Wide cracks or evidence of water leaking through bottom 1- Spalling of concrete surface, pop-outs of concrete Rust streaks at cracks in bottom Open cracks up to 1/8 in. wide Failure of previous concrete surface repairs 2- Minor spalling of concrete Open cracks up to 1/16 in. wide Water efflorescence on surface 3- Bottom cracks that have "self-healed" 4- Minor temperature or shrinkage cracks Tight, non-open cracks Minor, widely scattered honeycombs 5- No cracking or honeycombing problems noted</p>	5

TANK 612
TABLE C.5-1 (Cont'd)

INTERIOR SHELL CONDITION RATING	
<p style="text-align: center;">Coating Condition</p> <p>2- Concrete surfaces exposed over 40% of area 3- Concrete surfaces exposed over 25% to 40% of area Top coat failure over 50% of area 4- Concrete surfaces exposed over 10% to 25% of area Top coat failure over 25% to 50% of area 5- Concrete surfaces exposed up to 10% of area Top coat failure up to 25% of area No coating present</p>	5
<p style="text-align: center;">Concrete Condition</p> <p>0- Major spalling of concrete surface, large pop-outs, crumbling of concrete Exposed reinforcing steel Wide cracks or evidence of water leaking through bottom 1- Spalling of concrete surface, pop-outs of concrete Rust streaks at cracks Open cracks up to 1/8 in. wide Failure of previous concrete surface repairs 2- Minor spalling of concrete Open cracks up to 1/16 in. wide Water efflorescence on surface 3- Bottom cracks that have "self-healed" 4- Minor temperature or shrinkage cracks Tight, non-open cracks Minor, widely scattered honeycombs 5- No cracking or honeycombing problems noted</p>	5

TANK 612
TABLE C.5-1 (Cont'd)

INTERIOR ROOF CONDITION RATING	
<p style="text-align: center;">Coating Condition</p> <p>2- Concrete surfaces exposed over 40% of area 3- Concrete surfaces exposed over 25% to 40% of area Top coat failure over 50% of area 4- Concrete surfaces exposed over 10% to 25% of area Top coat failure over 25% to 50% of area 5- Concrete surfaces exposed up to 10% of area Top coat failure up to 25% of area No coating present Aluminum dome roof</p>	5
<p style="text-align: center;">Concrete Condition</p> <p>0- Major spalling of concrete surface, large pop-outs, crumbling of concrete Exposed reinforcing steel Wide cracks or evidence of water leaking 1- Spalling of concrete surface, pop-outs of concrete Rust streaks at cracks Open cracks up to 1/8 in. wide Failure of previous concrete surface repairs 2- Minor spalling of concrete Open cracks up to 1/16 in. wide Water efflorescence on surface 3- Bottom cracks that have "self-healed" 4- Minor temperature or shrinkage cracks Tight, non-open cracks Minor, widely scattered honeycombs 5- No cracking or honeycombing problems noted</p>	5

TANK 612
TABLE C.5-1 (Cont'd)

INTERIOR LADDER CONDITION RATING	
<p style="text-align: center;">Steel Condition</p> <p>0- Metal loss on rung, side rail, or bracket of over 40% T Ladder distorted or bent 3 in. or more from original position</p> <p>1- Metal loss of 25% to 40% T Missing attachment bolts or cracked welds General instability</p> <p>2- Metal loss of 10% to 25% T Loose bolts</p> <p>3- Metal loss of 5% to 10% T</p> <p>4- Metal loss of less than 5% T, or surface rust</p> <p>5- No deterioration No ladder</p>	5
<p style="text-align: center;">Safety Device</p> <p>0- Device improperly attached and/or in danger of coming loose No safety device present or device inoperable</p> <p>2- Present safety device works rough</p> <p>5- Safety device installed properly and in good condition No ladder</p>	5
<p style="text-align: center;">Dimensions</p> <p>0- 13 in. or less clear distance between side rails Rungs greater than 12 in. center-to-center Lacks non-slip rungs, 7 in. toe clearance or 30 in. head clearance</p> <p>3- 13 in. to 15 in. clear distance between side rails Side rails less than 2 in. x 3/8 in.</p> <p>4- Side rails less than 2-1/2 in. x 3/8 in.</p> <p>5- 16 in. or greater clear distance between side rails No ladder</p>	3
<p style="text-align: center;">Ease of Climbing</p> <p>0- Major obstructions limiting climbing surface</p> <p>1- Difficult transition to balcony (i.e. must climb over handrail)</p> <p>2- Improper or erratic rung spacing</p> <p>3- Minor obstructions connected to side rails</p> <p>5- Ladder clear of obstructions and easy to climb No ladder</p>	3

TANK 612
TABLE C.5-1 (Cont'd)

PAINTING SCHEDULES CONDITION RATING	
Exterior Surface Schedule 1- 0 to 1 years 2- 2 to 4 years 3- 5 or more years	3
Interior Surface Schedule 1- 0 to 1 years 2- 2 to 4 years 3- 5 or more years	3

**TANK 612 SUMMARY CONDITION EVALUATION STANDARDS
TABLE C.5-2**

External Summary Concrete Ground Water Tank

Foundations

1. Site drainage	<u>5</u>
2. Foundation projection	<u>5</u>
3. Concrete condition	<u>5</u>
4. Grout condition	<u>5</u>

Base of Tower - N/A

5. Steel condition	<u>6</u>
6. Base plate/ring	<u>6</u>
7. Anchor bolts	<u>6</u>
8. Anchor bolt chairs	<u>6</u>

Columns - N/A

9. Alignment	<u>6</u>
10. Coating condition	<u>6</u>
11. Steel condition	<u>6</u>

Riser - N/A

12. Alignment	<u>6</u>
13. Coating condition	<u>6</u>
14. Steel Condition	<u>6</u>
15. Riser Manhole	<u>6</u>

Shell Ladder

16. Steel condition	<u>5</u>
17. Safety device	<u>5</u>
18. Dimensions	<u>5</u>
19. Ease of climbing	<u>5</u>

Diagonal Bracing - N/A

20. Steel condition	<u>6</u>
21. Connections	<u>6</u>
22. Adjustment	<u>6</u>
23. Alignment	<u>6</u>
24. Coating condition	<u>6</u>

Truck Door/Man Door - N/A

1. Steel condition	<u>N/A</u>
2. Connections	<u>N/A</u>
3. Truck door	<u>N/A</u>
4. Man door	<u>N/A</u>
5. Coating condition	<u>N/A</u>

Riser Rods - N/A

25. Steel condition	<u>6</u>
26. Connections	<u>6</u>
27. Adjustment	<u>6</u>
28. Alignment	<u>6</u>
29. Coating condition	<u>6</u>

Struts - N/A

30. Coating condition	<u>6</u>
31. Steel condition	<u>6</u>
32. Connection to column	<u>6</u>

Balcony - N/A

33. Coating condition	<u>6</u>
34. Steel condition	<u>6</u>
35. Drainage	<u>6</u>
36. Handrail	<u>6</u>

Tank Bowl - N/A

37. Coating condition	<u>6</u>
38. Steel condition	<u>6</u>

Shell Condition

39. Coating condition	<u>5</u>
40. Concrete condition	<u>5</u>
41. Container manhole	<u>1</u>
42. Overflow	<u>1</u>

Roof Condition

43. Coating condition	<u>5</u>
44. Concrete condition	<u>5</u>
45. Roof-to-vent	<u>5</u>
46. Roof vent/opening	<u>5</u>
47. Roof manway	<u>5</u>

Roof Ladder

48. Steel condition	<u>5</u>
49. Safety device	<u>5</u>
50. Dimensions	<u>5</u>
51. Ease of Climbing	<u>5</u>

Internal Summary Concrete Ground Water Tank

Tank Bottom

52. Coating condition	<u>5</u>
53. Concrete condition	<u>5</u>

Interior Shell

54. Coating condition	<u>5</u>
55. Concrete condition	<u>5</u>

Interior Roof

56. Coating condition	<u>5</u>
57. Concrete condition	<u>5</u>

Riser - N/A

58. Coating condition	<u>6</u>
59. Steel condition	<u>6</u>
60. Safety Grating	<u>6</u>

Interior Ladders

61. Structural condition	<u>5</u>
62. Safety device	<u>5</u>
63. Dimensions	<u>3</u>
64. Ease of climbing	<u>3</u>

Painting Schedules

65. Exterior	<u>3</u>
66. Interior	<u>3</u>

Condition Evaluation Ratings

Safety Rating	93
Structural Rating	100
*Exterior PM Rating	100
*Interior PM Rating	100
Overall Rating	98

*PM = Painting Maintenance

TANK 307

ULTRASONIC THICKNESS MEASUREMENTS: (all readings were taken through coating)

Roof:		
Cap:	0.248 in. to 0.251 in. (6.4 mm)	
Knuckle:	0.212 in. to 0.216 in. (5.4 mm)	
Shell:		
Top Ring:	0.198 in. to 0.201 in. (5.1 mm)	
Middle Ring:	0.229 in. to 0.231 in. (5.8 mm)	
Bottom Ring:	0.271 in. to 0.281 in. (7 mm)	
Bowl:		
Fingers:	0.386 in. to 0.388 in. (9.8 mm)	
Knuckle:	0.363 in. to 0.368 in. (9.3 mm)	
Riser:	0.304 in. to 0.306 in. (7.7 mm)	
Column:		
Post Head:	0.196 in. to 0.198 in. (5 mm)	
Bottom Ring:	0.219 in. to 0.224 in. (5.6 mm)	

FOUNDATIONS AND SITE:

SITE:

Size: approx. 45 ft (13.7 m) x 75 ft (23 m)

Fence:

Type: chain link

Height: 6 ft (1.8 m)

Gates:

Number: 2

Location: north side of site

Width: 4 ft (1.2 m) and 9 ft 9 in. (3 m)

Locked: yes

Nearest Structures:

Type: shed

Direction: northwest

Distance: approx. 4 ft (1.2 m)

Type: pressure tank building

Direction: south

Distance: approx. 5 (1.5 m)

Type: pump house

Direction: north

Distance: approx. 13 ft (4 m)

Nearest Overhead Power Lines: attached to strut between columns #6 and #7

TANK 307

FOUNDATIONS:

Number: 8 columns, 1 riser

Size:

Columns: 30 in. (762 mm) x 32 in. (813 mm)

Riser: 6 ft (2 m) diameter

Grout: none visible

Sealant: none visible

Column Number:

Projection above Grade:

1	below grade to 2 in. (51 mm) above
2	below grade to 1-1/2 in. (38 mm) above
3	1 in. (25 mm) to 3 in. (76 mm)
4	1 in. (25 mm) to 2 in. (51 mm)
5	2 in. (51 mm) to 3 in. (76 mm)
6	1 in. (25 mm)
7	2 in. (51 mm) to 4 in. (102 mm)
8	4 in. (102 mm) to 5 in. (127 mm)
Riser:	6 in. (152 mm) to 8 in. (203 mm)

VALVE VAULT:

Location: 11 ft (3.4 m) east

Size: 6 ft 5 in. (2 m) x 6 ft 6 in. (2 m) x 5 ft 3 in. (1.6 m), deep

Access:

Size: 23-1/4 in. (591 mm) diameter

Locked: no

EXTERIOR TOWER AND CONTAINER:

DESCRIPTION:

Construction: welded steel

Columns: 8

Tower: 5 bays

Bowl: radial girder

Shell:

Diameter: approx. 26 ft (6.3 m)

Shell Height: approx. 10 ft (3.2 m)

Roof: ellipsoidal

COLUMNS:

Type: welded tubular

Size: 1 ft (0.2 m) diameter

Base Plates: none visible

Anchor Bolts: none visible

TANK 307

RISER:

Size: approx. 4 ft (1.2 m) diameter
Base Plate Projection: none visible
Anchor Bolts: none visible

RISER MANHOLE:

Type: flanged and bolted
Size: 24 in. (610 mm) diameter
Cover:
 Size: 30-7/8 in. (784 mm) diameter x 3/4 in. (19 mm) thick
 Hinged: no
Bolts:
 Number: 20
 Size: 1/2 in. (12 mm) diameter x 2-3/4 in. (70 mm) long

INLET PIPE: 4 in. (102 mm) diameter

DIAGONAL BRACING:

Number of Levels: 5
Rod Diameter: 1-3/8 in. (35 mm)
Wing Plate:
 Ground Level: 7-1/2 in. (191 mm) wide x 5/8 in. (17 mm), thick
 Bottom Level: 6-3/4 in. (172 mm) to 8-1/2 in. (216 mm) x 37-1/4 in. (946 mm) x 5/8 in. (17 mm), thick
 Second Level: 6-3/4 in. (172 mm) to 8-1/2 in. (216 mm) x 37-1/4 in. (946 mm) x 5/8 in. (15 mm), thick
 Third Level: 38-1/2 in. (978 mm) x 7 in. (178 mm) x 15 mm, thick
 Third Level: 40-7/8 in. (1038 mm) x 7 in. (178 mm) x 15 mm, thick
 Fifth Level: 51-1/4 in. (1302 mm) x 7 in. (178 mm) x 15 mm, thick
Rod Pin Size: 1 in. (25 mm) diameter x 2-3/4 in. (70 mm) long

STRUTS:

Number of Levels: 4
Type: 4 in. (102 mm) diameter pipe
Rod Pin: 1 in. (24 mm) diameter x 3 in. (75 mm) long
Clevis: 9-3/4 in. (248 mm) x 5-5/8 in. (143 mm) x 3/8 in. (9 mm), thick

OVERFLOW PIPE:

Size: 8 in. (203 mm) diameter
Visible Air Break: none
Brackets:
 Size: 5-1/2 in. (140 mm) long
 Bands: 1-1/2 in. (40 mm) x 1/4 in. (6 mm)

TANK 307

TOWER LADDER:

Number of Rungs: 97

Distance from Ground to Bottom Rung: approx. 1 ft (0.3 m)

Width: 12-3/4 in. (324 mm)

Side Rails: 2 in. (50 mm) x 1-3/16 in. (30 mm) x 1/4 in. (6 mm), angle

Rung Size: 3/4 in. (19 mm) diameter

Spacing: 11 in. (281 mm) on center

Toe Room: open

Head Clearance: 18 in. (457 mm) minimum

Brackets:

Construction: welded and bolted

Size: 8-1/4 in. (210 mm) x 3-3/16 in. (81 mm), flat bar and 1-1/2 in. (40 mm) x 3/8 in. (10 mm), flat bar clamps

Bolts: 5/8 in. (15 mm) diameter x 1-1/2 in. (40 mm) long

Spacing: approx. 16 ft (4.8 m)

Safe-Climbing Device: none

Safety Cage:

Depth: 21-5/8 in. (549 mm)

Width: 23 in. (584 mm)

Vertical Bars:

Size: 1-3/16 in. (30 mm) x 3/16 in. (5 mm), flat bar

Spacing: 8-3/4 in. (222 mm)

Horizontal Bars:

Size: 1-3/16 in. (30 mm) x 3/16 in. (5 mm), flat bar

Spacing: 4 ft (1.2 m)

Vandal Deterrent:

Type: hinged door at base of safety cage

Locked: yes

PLATFORMS:

Number: 2

Locations: strut levels #2 and #4

Width: 22-7/8 in. (581 mm) x 28-3/4 in. (730 mm)

Handrail:

Height: 39-1/4 in. (997 mm)

Size: 2 in. (50 mm) x 2 in. (50 mm) x 3/16 in. (5 mm), angle

Uprights: 2 in. (50 mm) x 2 in. (50 mm) x 3/16 in. (5 mm), angle

Mid-Rail: 1-1/2 in. (40 mm) x 1-1/2 in. (40 mm) x 3/16 in. (5 mm), angle

Toe Bar:

Size: 4 in. (102 mm) x 2-1/2 in. (65 mm) x 3/8 in. (10 mm), angle

Height above Floor: 2-1/4 in. (57 mm)

Access Opening:

Width: 19-3/4 in. (502 mm)

Closure Chains: no

TANK 307

BOWL GIRDERS: 4 in. (102 mm) x 2-1/4 in. (57 mm), I-beams and 8-5/8 in. (219 mm) x 8-5/8 in. (219 mm), I-beams

BALCONY:

Width: 25-1/4 (641 mm)

Handrail:

Height: 39-3/4 in. (1010 mm)

Size: 2 in. (50 mm) x 2 in. (50 mm) x 1/4 in. (6 mm), angle

Uprights: 2 in. (50 mm) x 2 in. (50 mm) x 1/4 in. (6 mm), angle

Mid-Rail: 1-1/2 in. (40 mm) x 1-1/2 in. (40 mm) x 1/4 in. (6 mm), angle

Toe Bar Height: 3-1/4 in. (83 mm)

Access Opening:

Width: approx. 2 ft (0.6 m)

Closure Chains: no

SHELL LADDER:

Number of Rungs: 25

Side Rails: 1-1/2 in. (40 mm) x 1-1/2 in. (40 mm) x 3/16 in. (5 mm), angle

Width: 11-5/8 in. (295 mm)

Rung Size: 3/4 in. (20 mm) diameter

Spacing: 12 in. (305 mm) on center

Toe Room: 6-1/2 in. (165 mm)

Brackets:

Construction: welded

Size: 4-3/4 in. (120 mm) x 5/16 (8 mm), flat bar x 7-1/2 in. (191 mm) long

Spacing: approx. 8 ft (2.4 m)

Safe-Climbing Device: none

Safety Cage:

Depth: 20-5/8 in. (524 mm)

Width: 23-1/2 in. (597 mm)

Vertical Bars:

Size: 1-3/16 in. (20 mm) x 3/16 in. (4 mm), flat bar

Spacing: 9 in. (229 mm)

Horizontal Bars:

Size: 1-3/16 in. (20 mm) x 3/16 in. (4 mm), flat bar

Spacing: 43-1/2 in. (1105 mm)

TANK 307

ROOF PLATFORM:

Size: approx. 2 ft x 11 ft 6 in.

Type: steel grate

Handrail:

Height: 39-3/4 in. (1067 mm)

Size: 2 in. (51 mm) x 2 in. (51 mm) x 1/4 in. (6 mm), angle

Uprights: 2 in. (51 mm) x 2 in. (51 mm) x 1/4 in. (6 mm), angle

Mid-Rail: 1-1/2 in. (51 mm) x 1-1/2 in. (51 mm) x 3/16 in. (5 mm), angle

Toe Bar:

Size: 4-3/4 in. (120 mm) x 3-1/8 in. (80 mm) x 3/8 in. (9 mm), angle

Height: 3-1/4 in. (85 mm)

ROOF OPENINGS:

Manhole:

Type: flanged

Size: 16 in. (406 mm) diameter

Gasket: none

Welded: exterior and interior

Locked: no

Roof Vent:

Type: gooseneck

Neck Diameter: 6 in. (152 mm)

Screen: expanded metal

OBSTRUCTION LIGHTS:

Type: single-globe

Location: end of roof platform, adjacent to vent

Manufacturer: Palazzoli

Model Number: 8617

Photoelectric Cell: none found

TANK 307

**TABLE C.6-1
Tank 307 Exterior Coating and Metal Condition**

	Coating Thickness		Approx. % Failure to		Adhesion	Metal Loss	
	Range	Typical	Primer	Rust		Typical	Deepest
Columns	7.5 mils to 12.5 mils (191 μm to 319 μm)	10 mils (255 μm)	Neg.	< 1/2%	0 T	Neg.	Neg.
Riser	8.5 mils to 17 mils (217 μm to 434 μm)	11 mils (281 μm)	Neg.	< 1/2%	0 T	Neg.	Neg.
Diagonal Bracing	5 mils to 14 mils (127 μm to 357 μm)	9 mils (229 μm)	Neg.	Neg.	0 T	Neg.	Neg.
Struts	7 mils to 17 mils (179 μm to 434 μm)	-	Neg.	Neg.	1 S	Neg.	Neg.
Bowl	8.5 mils to 13 mils (217 μm to 332 μm)	-	Neg.	Neg.	1 S	Neg.	Neg.
Balcony	5 mils to 10 mils (127 μm to 255 μm)	-	Neg.	Neg.	1 T	Neg.	Neg.
Shell	7.5 mils to 12.5 mils (191 μm to 319 μm)	9 mils (229 μm)	Neg.	Neg.	2 S	Neg.	Neg.
Roof	8 mils to 14 mils (204 μm to 357 μm)	3.5 mils (89 μm)	Neg.	<1/2%	3 T	Neg.	Neg.

Key to Table

Adhesion 5 (very good)
 4 (good)
 3 (fair)
 2 (poor)
 1 (very poor)
 0 (very poor)

T = Topcoat to Underlying Coating
S = Primer to Steel

Neg. = negligible

INTERIOR:

ROOF SUPPORT STRUCTURE:

Stiffeners:

 Main:

 Number: 10

 Size: 5 in. (127 mm) x 2-1/2 in. (64 mm), I-beams

 Secondary:

 Number: 20

 Size: 2-1/2 in. (64 mm) x 2-1/2 in. (64 mm) x 1/4 in., (6 mm), angle

Purlins: 2-1/2 in. (64 mm) x 2-1/2 in. (64 mm) x 1/4 in., (6 mm), angle

Center Hub: 26 in. (660 mm) diameter

Center Column: 6 in. (162 mm) diameter pipe

OVERFLOW INLET:

 Type: open pipe

 Location: approx. 4 in. (102 mm) above knuckle-to-cap seam

TANK 307

CATHODIC PROTECTION SYSTEM:

Anodes:
 Type: suspended wire
 Number: 10
 Manufacturer: Industrial Cathodic Protection
 Model Number: TY624BS
 Serial Number: 84364
 Reference Electrode: adjacent to bowl

RISER PROJECTION:

Size: 26 in. (660 mm) diameter
 Inlet/Outlet Pipe Openings: 7 in. (178 mm) diameter

SENSOR PIPE:

Size: 2 in. (51 mm) diameter
 Brackets: 2 in. (51 mm) x 2 in. (51 mm) x 1/4 in. (6 mm), angle

**TABLE C.6-2
 Tank 307 Interior Coating and Metal Condition**

	Coating Thickness		Approx. % Failure to		Adhesion	Metal Loss	
	Range	Typical	Primer	Rust		Typical	Deepest
Roof	3.5 mils to 9 mils (89 μm to 229 μm)	4 mils (102 μm)	Neg.	5%	0 S	Neg.	Neg.
Shell	-	-	Neg.	50%	-	Neg.	Neg.
Bowl	-	-	Neg.	1%	-	Neg.	Neg.

Key to Table

Adhesion 5 (very good)
 4 (good)
 3 (fair)
 2 (poor)
 1 (very poor)
 0 (very poor)

T = Topcoat to Underlying Coating
 S = Primer to Steel

Neg. = negligible

TANK 307
TABLE C.6-3 EVALUATION OF ELEVATED WATER TANKS

FOUNDATION AND SITE-RELATED CONDITION RATING	
<p style="text-align: center;">Site drainage</p> 0- Deep depressions and water around foundations and or site saturated long after rain 1- Mild depressions around foundations and/or water ponds adjacent to tank 2- Water flows toward foundation 3- Water ponds on site, but not adjacent to foundation 4- Flat site 5- Ground well sloped away from foundations	5
<p style="text-align: center;">Foundation Projection and Settlement</p> 0- Concrete foundation tops buried 1- Concrete foundation tops even with ground and covered with vegetation and debris 2- Concrete foundation tops even with ground and clean 3- Concrete foundation tops with 1 in. to 2 in. projection 4- Concrete foundation tops with 2 in. to 6 in. or 12 in. to 24 in. projection 5- Concrete foundation tops with 6 in. to 12 in. projection	1
<p style="text-align: center;">Concrete Condition</p> 0- Concrete soft, crumbling and/or easily removed and/or hollow sound when tapped Exposed rebar that is corroded 1- Same as 0 except foundation still has basic original shape and/or Exposed rebar with minor surface corrosion and/or open cracks up 1/4 in. wide 2- Surface crumbling, but can be chipped to sound concrete, open cracks up to 1/8 in. wide 3- Some surface spalling, but solid sounding and/or deep cracks up to 1/16 in. wide Hollow sounding areas 4- Minor surface cracks or deficiencies 5- Smooth surface with no cracks or deteriorations	5
<p style="text-align: center;">Grout Condition / Sealant</p> 0- Grout greater than 40% gone 2- Grout 20 to 40% gone 3- Grout 5 to 20% gone 4- Some pieces can be removed and/or grout less than 5% gone 5- Cracks and minor chips, but intact	5

TANK 307
TABLE C.6-3 (Cont'd)

BASE OF TOWER CONDITION RATING	
<p style="text-align: center;">Steel Condition at Base</p> <p>0- General metal loss exceeding 75% T and/or holes in steel Evidence of water in tubular column or bases of structural columns.</p> <p>1- General metal loss of 50% to 75% T and/or spot pitting of greater than 75% T</p> <p>2- General metal loss of 25% to 50% T and/or spot pitting of 50% to 75% T</p> <p>3- General metal loss of 10% to 25% T and/or spot pitting of 25% T to 50% T Debris in base, poor drainage</p> <p>4- General metal loss or pitting not exceeding 10% T and/or surface rust Poor drainage</p> <p>5- No visible deterioration</p>	5
<p style="text-align: center;">Base Plate/Base Ring</p> <p>0- Metal loss greater than 50% T and/or holes in steel and/or bent plate</p> <p>1- Metal loss of 25% to 50% T</p> <p>4- Metal loss not exceeding 25% T and/or deteriorated edges of plate</p> <p>5- No visible deterioration</p>	5
<p style="text-align: center;">Anchor Bolts</p> <p>0- Missing nuts Metal loss of greater than 1/3 original diameter</p> <p>1- Metal loss on nuts of 1/4 T or greater and/or metal loss on bolts of 1/4 T to 1/3 original diameter</p> <p>2- Metal loss on nut less than 1/4 T and/or metal loss on bolt of 1/8 to 1/4 original Diameter</p> <p>3- Loose nuts or scaled rust on bolts</p> <p>4- Paint failure and minor surface rust on bolt</p> <p>5- No visible deterioration</p>	5
<p style="text-align: center;">Anchor Bolt Chairs or Gussets</p> <p>0- Missing or cracked welds Missing or corroded rivets greater than 50%</p> <p>1- Bent top plate</p> <p>3- Corrosion and/or debris inside chairs</p> <p>5- Chairs clean and well painted No chairs or gussets</p>	5

TANK 307
TABLE C.6-3 (Cont'd)

COLUMNS CONDITION RATING	
<p style="text-align: center;">Alignment</p> <p>0- Visible twists or bows greater than 0.1% between lateral supports Dents deeper than 3 T and larger than 6 in. in diameter</p> <p>3- Visible bends or bows Dents no deeper than 3 T up to 12 in. long</p> <p>5- Material is straight with no visible dents or bows</p>	5
<p style="text-align: center;">Coating Condition</p> <p>0- Exposed steel over more than 40% of area</p> <p>1- Exposed steel over 20% to 40% of area</p> <p>2- Exposed steel over 10% to 19% of area</p> <p>3- Exposed steel over 5% to 10% of area Exposed underlying coats over more than 40% Poor coating appearance</p> <p>4- Exposed steel over 1% to 5% Exposed underlying coats over 5% to 40%</p> <p>5- Exposed steel up to 1% Exposed underlying coats less than 5%</p>	5
<p style="text-align: center;">Steel Condition</p> <p>0- Spot pitting over 50% T and/or rust over 75% or more of the surface Metal loss exceeding 25% T in any dimension exceeding 4 in.</p> <p>1- Spot pitting of 25% T to 50% T and/or rust over 50% to 75% of surface Metal loss more 10% T in any dimension exceeding 8 in.</p> <p>2- Spot pitting less than 25% T and/or rust over 25% to 50% of surface</p> <p>3- Rust over 10% to 25% of surface</p> <p>4- Rust over 1% to 10% of surface</p> <p>5- Rust up to 1% of surface</p>	5

TANK 307
TABLE C.6-3 (Cont'd)

RISER CONDITION RATING	
Alignment	
0- Visible twist Dents deeper than 4 T and larger than 6 in. diameter 3- Visible bends Small dents 5- Riser straight	5
Coating Condition	
0- Exposed steel over more than 50% of area 1- Exposed steel over 25% to 50% of area 2- Exposed steel over 10% to 24% of area 3- Exposed steel over 5% to 9% of area Exposed underlying coats over more than 50% Poor coating appearance 4- Exposed steel over 1% to 5% Exposed underlying coats over 5% to 50% 5- Exposed steel up to 1% Exposed underlying coats up to 5%	5
Steel Condition	
0- Spot pitting over 50% T and/or rust over 75% or more of the surface Metal loss exceeding 25% T in any dimension exceeding 4 in. Wet riser (36 in. diameter or smaller) thickness less than 1/8 in. Leak 1- Spot pitting of 25% to 50% T and/or rust over 50% to 75% of surface Metal loss exceeding 10% T in any dimension exceeding 8 in. 2- Spot pitting less than 25% T and/or rust over 25% to 50% of surface 3- Rust over 10% to 25% of surface 4- Rust over 1% to 10% of surface 5- Rust over less than 1% of surface	0
Riser Manhole	
0- Manhole leaking water No manhole, if riser is greater than 36 in. diameter 1- Any dimension less than 12 in. x 18 in. 3- Missing or broken parts 5- Any dimension 12 in. x 18 in. or larger No manhole, if riser is less than 36 in. diameter	5

TANK 307
TABLE C.6-3 (Cont'd)

TOWER LADDER CONDITION RATING	
<p style="text-align: center;">Steel Condition</p> <p>0- Metal loss on rung, side rail, or bracket of over 40% T Ladder distorted or bent 3 in. or more from original position.</p> <p>1- Metal loss of 25% to 40% T Missing attachment bolts or cracked welds General instability</p> <p>2- Metal loss of 10% to 25% T Loose bolts</p> <p>3- Metal loss of 5% to 10% T</p> <p>4- Metal loss of less than 5% T, and/or surface rust</p> <p>5- No deterioration</p>	5
<p style="text-align: center;">Safety Device</p> <p>0- Device improperly attached and/or in danger of coming loose No safety device present or device inoperable</p> <p>2- Present safety device works rough</p> <p>5- Safety device installed properly and in good condition</p>	5
<p style="text-align: center;">Dimensions</p> <p>0- 13 in. or less clear distance between side rails Rungs greater than 12 in. center-to-center Lacks non-slip rungs, 7 in. toe clearance and/or 30 in. head clearance</p> <p>3- 13 in. to 15 in. clear distance between side rails Side rails less than 2 in. x 3/8 in.</p> <p>4- Side rails less than 2-1/2 in. x 3/8 in.</p> <p>5- 16 in. or greater clear distance between side rails</p>	0
<p style="text-align: center;">Ease of Climbing</p> <p>0- Major obstructions limiting climbing surface</p> <p>1- Difficult transition to balcony (i.e. must climb over handrail)</p> <p>2- Improper or erratic rung spacing</p> <p>3- Minor obstructions connected to side rails</p> <p>5- Ladder clear of obstructions and easy to climb</p>	5

TANK 307
TABLE C.6-3 (Cont'd)

DIAGONAL BRACING CONDITION RATING	
<p style="text-align: center;">Steel Condition</p> <p>0- Metal loss of exceeding 30% of original cross-sectional area Missing, bent or broken bracing</p> <p>1- Metal loss of up to 30% of the original cross-sectional area Corrosion or details with sharp-edged discontinuities</p> <p>2- Metal loss of up to 20% of the original cross-sectional area</p> <p>3- Metal loss of up to 10% of the original cross-sectional area Surface rust on more than 50%</p> <p>4- Surface rust on less than 50%</p> <p>5- No rust or metal loss</p>	5
<p style="text-align: center;">Connections</p> <p>0- Thick rust, or metal loss Missing nuts or cotter pins and/or missing or cracked welds Rod pins not properly engaged</p> <p>1- Cotter pins not properly spread (if present)</p> <p>3- Debris or water trapped in connection</p> <p>4- Rust stain streaking from pin</p> <p>5- No rust or deterioration</p>	5
<p style="text-align: center;">Adjustment</p> <p>0- Bracing sags more than $(40"/L(H)) \times \text{Size}$</p> <p>2- Bracing vibrates easily when shook Paint scraped away more than 10 in. at intersection</p> <p>5- Bracing vibrates with difficulty</p>	5
<p style="text-align: center;">Alignment</p> <p>0- Sharp bends or kinks</p> <p>2- Gradual bends</p> <p>5- Bracing straight</p>	5
<p style="text-align: center;">Coating Condition</p> <p>0- Exposed steel over more than 40% of area</p> <p>1- Exposed steel over 20% to 40% of area</p> <p>2- Exposed steel over 10% to 20% of area</p> <p>3- Exposed steel over 5% to 10% of area Exposed underlying coats over more than 40% Poor coating appearance</p> <p>4- Exposed steel over 1% to 5% Exposed underlying coats over 5% to 40%</p> <p>5- Exposed steel on less than 1% Exposed underlying coats on less than 5%</p>	5

TANK 307
TABLE C.6-3 (Cont'd)

RISER RODS CONDITION RATING	
<p style="text-align: center;">Steel Condition</p> <p>0- Metal loss of greater than 30% of original bracing cross-sectional area Missing or broken bracing</p> <p>1- Metal loss of up to 30% of original bracing cross-sectional area Corrosion or details with sharp-edged discontinuities</p> <p>2- Metal loss of up to 20% of the original bracing cross-sectional area</p> <p>3- Metal loss of up to 10% of the original bracing cross-sectional area Surface rust on more than 50% of the bracing</p> <p>4- Surface rust on less than 50% of the bracing</p> <p>5- No rust or metal loss</p>	5
<p style="text-align: center;">Connections</p> <p>0- Thick rust or metal loss Cracked welds, missing nuts or cotter pins Rod pins not properly engaged More than one-third of riser line supports ineffective (broken, loose, missing)</p> <p>1- Cotter pins not properly spread (if present)</p> <p>3- Debris or water trapped in connection</p> <p>4- Rust stain streaking from pin</p> <p>5- No rust or deterioration</p>	5
<p style="text-align: center;">Adjustment</p> <p>2- Visible difference in sag between bracing at same level Loose bolts or U-bolts at riser line supports</p> <p>5- Uniform sag of bracing at same level and all riser line supports are fully effective</p>	5
<p style="text-align: center;">Alignment</p> <p>0- Sharp bends or kinks</p> <p>2- Gradual bends</p> <p>5- Bracing straight No riser bracing</p>	5
<p style="text-align: center;">Coating Condition</p> <p>0- Exposed steel over more than 40% of the area</p> <p>1- Exposed steel over 20% to 40% of area</p> <p>2- Exposed steel over 10% to 24% of area</p> <p>3- Exposed steel over 5% to 9% Exposed underlying coats over more than 40% Poor coating appearance</p> <p>4- Exposed steel over 1% to 5% Exposed underlying coats over 5% to 40%</p> <p>5- Exposed steel on less than 1% Exposed underlying coats on less than 5%</p>	5

TANK 307
TABLE C.6-3 (Cont'd)

STRUTS CONDITION RATING	
<p style="text-align: center;">Coating Condition</p> <ul style="list-style-type: none"> 0- Exposed steel over more than 40% of area 1- Exposed steel over 20% to 40% of area 2- Exposed steel over 10% to 19% of area 3- Exposed steel over 5% to 10% Exposed underlying coats over more than 40% Poor coating appearance 4- Exposed steel over 1% to 5% Exposed underlying coats over 5% to 40% 5- Exposed steel on less than 1% Exposed underlying coats on less than 5% 	5
<p style="text-align: center;">Steel Condition</p> <ul style="list-style-type: none"> 0- Spot pitting over 50% T and/or rust over 75% or more of the surface Visible distortions or twist Ends and/or flanges bent Cross-sectional area of strut less than 2 times area of adjacent diagonal rod 1- Spot pitting of 25% to 50% T and/or rust over 50% to 75% of surface 2- Spot pitting less than 25% T and/or rust over 25% to 50% of surface 3- Rust over 10% to 25% of surface 4- Rust over 1% to 10% of surface 5- Rust over less than 1% 	5
<p style="text-align: center;">Connection to Column</p> <ul style="list-style-type: none"> 0- Metal loss over 40% T Missing bolts or cracked welds 1- Loose bolts 2- Metal loss of 20% to 40% T 3- Metal loss of 10% to 20% T 4- Surface rust present or metal loss less than 10% T 5- No rust or metal loss 	5

TANK 307
TABLE C.6-3 (Cont'd)

BALCONY CONDITION RATING	
<p style="text-align: center;">Coating Condition</p> <p>0- Exposed steel over more than 50% of the area 1- Exposed steel over 20% to 50% of area 2- Exposed steel over 10% to 20% of area 3- Exposed steel over 5% to 10% Exposed underlying coats over more than 50% Poor coating appearance 4- Exposed steel over 1% to 5% Exposed underlying coats over 5% to 50% 5- Exposed steel on less than 1% Exposed underlying coats on less than 5%</p>	5
<p style="text-align: center;">Steel Condition</p> <p>0- Holes through floor Metal loss at platform-to-tank joint of more than 30% T or cracked welds Cracked welds other than floor-to-tank joint 1- Metal loss at floor-to-shell junction over 20% T to 30% T Metal loss of 50% T or greater in floor plate 2- Metal loss at platform-to-tank joint over 10% T to 20%T Metal loss over 25% T to 50% T in platform floor plates 3- Metal loss at platform-to-tank joint of less than 10% Metal loss over 10% T to 25% T in balcony floor plates 4- Minor surface rust on balcony floor plates 5- No metal loss or deterioration</p>	5
<p style="text-align: center;">Drainage</p> <p>2- No provisions for drainage or holes clogged 3- Visible widespread ponding of water 4- Scattered puddles of water 5- Proper drainage</p>	5
<p style="text-align: center;">Handrail</p> <p>0- Broken or missing members All bolts missing from any connection Safety railing height less than 42 in. above floor Missing mid-rail or toe bar 1- Metal loss of 75% T or greater Half or more bolts missing from any connection 2- Metal loss of 50% to 75% T 3- Metal loss of 25% to 50% T Less than half the bolts missing from any connection 4- Minor metal loss 5- No rust or deterioration</p>	0

TANK 307
TABLE C.6-3 (Cont'd)

TANK BOWL CONDITION RATING	
<p style="text-align: center;">Coating Condition</p> <p>0- Exposed steel over more than 40% of area 1- Exposed steel over 20% to 40% of area 2- Exposed steel over 10% to 20% of area 3- Exposed steel over 5% to 10% Exposed underlying coats over more than 40% Poor coating appearance 4- Exposed steel over 1% to 5% Exposed underlying coats over 5% to 40% 5- Exposed steel on less than 1% Exposed underlying coats on less than 5%</p>	5
<p style="text-align: center;">Steel Condition</p> <p>0- Spot pitting over 50% T and/or rust over 75% or more of the surface Steel thickness less than 1/8 in. General metal loss over 3 in. in diameter and larger of 10% T General metal loss 8 in. and longer of 10% T Suspect repairs if plate exceeds 1/2 in. (square corner doors, lap patches) Nozzles greater than 4 in. in diameter without repads 1- Spot pitting of 25% to 50% T and/or rust over 50% to 75% of surface Weld spacing around nozzles less than 3 in. 2- Spot pitting less than 25% T and/or rust over 25% to 50% of surface 3- Rust over 10% to 25% of surface 4- Rust over 1% to 10% of surface 5- Rust over less than 1% of surface</p>	0

TANK 307
TABLE C.6-3 (Cont'd)

SHELL CONDITION RATING	
<p style="text-align: center;">Coating Condition</p> <p>0- Exposed steel over more than 40% of area 1- Exposed steel over 20% to 40% of area 2- Exposed steel over 10% to 20% of area 3- Exposed steel over 5% to 10% Exposed underlying coats over more than 40% Poor coating appearance 4- Exposed steel over 1% to 5% Exposed underlying coats over 5% to 40% 5- Exposed steel over 20% to 40% of area</p>	5
<p style="text-align: center;">Steel Condition</p> <p>0- Spot pitting over 50% T and/or rust over 75% or more of the surface Steel thickness less than 1/8 in. General metal loss over 3 in. in diameter and larger of 10% T General metal loss 8 in. and longer of 10% T Suspect repairs if plate exceeds 1/2 in. (square corner doors, lap patches) Nozzles greater than 4 in. in diameter without repads 1- Spot pitting of 25% to 50% T and/or rust over 50% to 75% of surface Weld spacing around nozzles less than 3 in. 2- Spot pitting less than 25% T and/or rust over 25% to 50% of surface 3- Rust over 10% to 25% of surface 4- Rust over 1% to 10% of surface 5- Rust over less than 1% of surface</p>	5
<p style="text-align: center;">Container Manhole</p> <p>0- Manhole leaking water 2- Manhole with any dimension less than 18 in. x 22 in. or 24 in. diameter 3- Missing or broken parts 5- Manhole with dimensions less than 18 in. x 22 in. or 24 in. diameter No manhole (multi-column tank only)</p>	5
<p style="text-align: center;">Overflow</p> <p>0- More than 1/3 of the support brackets broken Pipe clogged or broken Holes of greater than 1 in. diameter in pipe Stub overflow discharges above balcony level 1- Less than 1/3 of the brackets broken Holes smaller than 1 in. diameter in pipe Overflow does not have a weir box or anti-vortex plate 2- Ineffective protective screen No screen or flap gate on discharge end of pipe Pipe does not extended to grade No visible air break 3- No splash block below overflow discharge 4- Rust on overflow pipe 5- No rust or deterioration</p>	5

TANK 307
TABLE C.6-3 (Cont'd)

ROOF CONDITION RATING	
<p style="text-align: center;">Coating Condition</p> <p>0- Exposed steel area more than 40%</p> <p>1- Exposed steel area 20 to 40%</p> <p>2- Exposed steel area 10 to 20%</p> <p>3- Exposed steel area 5 to 10%</p> <p style="padding-left: 20px;">Exposed underlying coat area more than 40</p> <p style="padding-left: 20px;">Poor coating appearance</p> <p>4- Exposed steel area 1 to 5%</p> <p style="padding-left: 20px;">Exposed underlying coat area 5 to 40%</p> <p>5- Exposed steel area less than 1%</p> <p style="padding-left: 20px;">Exposed underlying coat area less than 5%</p>	5
<p style="text-align: center;">Steel Condition</p> <p>0- Spot pitting over 50% T or holes in roof and/or rust over 75% or more of the surface</p> <p style="padding-left: 20px;">Hole/leak</p> <p style="padding-left: 20px;">Steel thickness less than 1/8 in. over a 10 in. x 10 in. area</p> <p style="padding-left: 20px;">Significant roof distortions over large area</p> <p>1- Spot pitting of 25% to 50% T and/or rust over 50% to 75% of surface</p> <p>2- Spot pitting less than 25% T and/or rust over 25% to 50% of surface</p> <p style="padding-left: 20px;">Minor roof distortion</p> <p>3- Rust over 10% to 25% of surface</p> <p>4- Rust over 1% to 10% of surface</p> <p>5- Rust over less than 1% of surface</p>	5
<p style="text-align: center;">Roof-to-Vent Connection</p> <p>0- Finial or vent connection failed and/or disconnected</p> <p style="padding-left: 20px;">Holes greater than 1 in. diameter</p> <p style="padding-left: 20px;">Cathodic protection hand holes open or covers missing</p> <p style="padding-left: 20px;">Evidence of water entry into tank</p> <p>1- Holes around finial or vent less than 1 in. diameter</p> <p>2- Metal loss around vent or finial of 50% T or greater</p> <p style="padding-left: 20px;">Missing bolts or cracked welds</p> <p>3- Rust and/or metal loss of less than 50% T</p> <p>4- Minor corrosion at connection</p> <p>5- No rust or deterioration</p>	5
<p style="text-align: center;">Roof Vent and Roof Opening</p> <p>0- No vent or vent clogged and/or inoperative</p> <p style="padding-left: 20px;">Screen missing, torn, or improperly placed</p> <p style="padding-left: 20px;">Vent not of clog-resistant design</p> <p>1- Vent deteriorated</p> <p>2- Vent covered with rust</p> <p style="padding-left: 20px;">Bolts or parts missing</p> <p>3- No roof opening of 20 in. or larger</p> <p style="padding-left: 20px;">Vent not mounted on roof opening of 20 in. diameter or larger</p> <p>4- Minor rust on vent</p> <p>5- No rust or deterioration</p> <p style="padding-left: 20px;">Removable vent mounted on roof opening of 20 in. or larger</p> <p style="padding-left: 20px;">Roof opening of 20 in. or larger provided w/ vent mounted separately</p>	0
<p style="text-align: center;">Roof Manway</p> <p>0- Manway without locking features or lock missing</p> <p>1- Allows water into tank from roof</p> <p>3- Any dimension less than 24 in. diameter, 4 in. curb or 2 in. overlap</p> <p>5- Manway locked and water tight</p> <p style="padding-left: 20px;">All dimensions equal or greater than 24 in. diameter, 4 in. curb or 2 in. overlap</p>	0

TANK 307
TABLE C.6-3 (Cont'd)

SHELL/ROOF LADDER CONDITION RATING	
<p style="text-align: center;">Steel Condition</p> <p>0- Metal loss on rung, side rail, or bracket of over 40% T Ladder distorted or bent 3 in. or more from original position</p> <p>1- Metal loss of 25% to 40% T Missing attachment bolts or cracked welds General instability</p> <p>2- Metal loss of 10% to 25% T Loose bolts</p> <p>3- Metal loss of 5% to 10% T</p> <p>4- Metal loss of less than 5% T, or surface rust</p> <p>5- No deterioration</p>	5
<p style="text-align: center;">Safety Device</p> <p>0- Device improperly attached and/or in danger of coming loose No safety device present or device inoperable</p> <p>2- Present safety device works rough</p> <p>5- Safety device installed properly and in good condition</p>	5
<p style="text-align: center;">Dimensions</p> <p>0- 13 in. or less clear distance between side rails Rungs greater than 12 in. center-to-center Lacks non-slip rungs, 7 in. toe clearance and/or 30 in. head clearance</p> <p>3- 13 in. to 15 in. clear distance between side rails Side rails less than 2 in. x 3/8 in.</p> <p>4- Side rails less than 2-1/2 in. x 3/8 in.</p> <p>5- 16 in. or greater clear distance between side rails</p>	0
<p style="text-align: center;">Ease of Climbing</p> <p>0- Major obstructions limiting climbing surface</p> <p>1- Revolving ladder</p> <p>2- Improper or erratic rung spacing</p> <p>3- Minor obstructions connected to side rails</p> <p>5- Ladder clear of obstructions and easy to climb</p>	5

TANK 307
TABLE C.6-3 (Cont'd)

INTERIOR BOWL CONDITION RATING	
<p style="text-align: center;">Coating Condition</p> <p>0- Exposed steel over greater than 40% of the area Blistering to steel over 50% of the area</p> <p>1- Exposed steel over 20% to 40% of the area Blistering to steel over 25% to 50% of the area</p> <p>2- Exposed steel over 10% to 20% of the area Blistering to steel over 20% to 25% of the area Exposed primer over greater than 40%</p> <p>3- Exposed steel over 5% to 10% of the area Blistering to steel over 10% to 20% of the area Exposed primer over 25% to 40%</p> <p>4- Exposed steel on less than 5% of the area Blistering to steel on less than 10% of the area Exposed primer over 10% to 25%</p> <p>5- Exposed primer on less than 10% of the surface</p>	1
<p style="text-align: center;">Steel Condition</p> <p>0- Holes in steel or cracked welds Evidence of leakage Steel thickness less than 1/8 in. Metal loss exceeding 3 in. diameter or 6 in. long, exceeding 10%T deep Rivet heads with 50% deterioration</p> <p>1- Isolated pitting over 1 in. diameter exceeding 50% T Groove-type pitting exceeding 9 in. long or 25% to 50% T General metal loss exceeding 3 ft x 3 ft area exceeding 25% T General metal loss over the entire bowl exceeding 10% T Rivet heads with 25% deterioration</p> <p>2- Widely scattered pitting (less than 3 per square foot) exceeding 50% T Scattered groove-type pitting exceeding 9" long of 25% to 50%T</p> <p>3- Widely scattered pitting (less than 3 per square ft) of 25% to 50% T Scattered groove-type pitting not exceeding 25% T</p> <p>4- Widely scattered pitting not exceeding 25% T</p> <p>5- Scattered metal loss not exceeding 10% T</p>	0

TANK 307
TABLE C.6-3 (Cont'd)

INTERIOR SHELL CONDITION RATING	
<p style="text-align: center;">Coating Condition</p> <p>0- Exposed steel over greater than 40% of the area Blistering to steel over 50% of the area</p> <p>1- Exposed steel over 20% to 40% of the area Blistering to steel over 25% to 50% of the area</p> <p>2- Exposed steel over 10% to 20% of the area Blistering to steel over 20% to 25% of the area Exposed primer over greater than 40%</p> <p>3- Exposed steel over 5% to 10% of the area Blistering to steel over 10% to 20% of the area Exposed primer over 25% to 40%</p> <p>4- Exposed steel on less than 5% of the area Blistering to steel on less than 10% of the area Exposed primer over 10% to 25%</p> <p>5- Exposed primer on less than 10% of the surface</p>	1
<p style="text-align: center;">Steel Condition</p> <p>0- Holes in steel or cracked welds Evidence of leakage Steel thickness less than 1/8 in. Metal loss exceeding 3 in. diameter or 6 in. long, exceeding 10% T deep Rivet heads with 50% deterioration</p> <p>1- Isolated pitting over 1 in. diameter exceeding 50% T Groove-type pitting exceeding 9 in. long or 25% to 50% T General metal loss exceeding 3 ft x 3 ft area exceeding 25% T General metal loss over the entire shell exceeding 10% T Rivet heads with 25% deterioration</p> <p>2- Widely scattered pitting (less than 3 per square foot) exceeding 50% T Scattered groove-type pitting exceeding 9" long of 25% to 50% T</p> <p>3- Widely scattered pitting (less than 3 per square ft) of 25% to 50% T Scattered groove-type pitting not exceeding 25% T</p> <p>4- Widely scattered pitting not exceeding 25% T</p> <p>5- Scattered metal loss not exceeding 10% T</p>	1

TANK 307
TABLE C.6-3 (Cont'd)

INTERIOR ROOF CONDITION RATING	
<p style="text-align: center;">Coating Condition</p> <p>0- Exposed steel over greater than 40% of the area Blistering to steel over 50% of the area</p> <p>1- Exposed steel over 20% to 40% of the area Blistering to steel over 25% to 50% of the area</p> <p>2- Exposed steel over 10% to 20% of the area Blistering to steel over 20% to 25% of the area Exposed primer over greater than 40%</p> <p>3- Exposed steel over 5% to 10% of the area Blistering to steel over 10% to 20% of the area Exposed primer over 25% to 40%</p> <p>4- Exposed steel on less than 5% of the area Blistering to steel on less than 10% of the area Exposed primer over 10% to 25%</p> <p>5- Exposed primer on less than 10% of the surface</p>	1
<p style="text-align: center;">Steel Condition</p> <p>0- Spot pitting over 50% T or holes in roof Steel thickness less than 1/8 in. over a 10 in. x 10 in. area Rivet heads 50% deteriorated Cracked welds Rafters missing or ineffective Visible distortion of girders or bowing of columns Bolts missing or severely corroded, welds cracked</p> <p>1- Spot pitting over 25% T and over 1 in. diameter Groove-type pitting exceeding 8 in. long and 25% to 50% T Rivet heads 25% deteriorated General metal loss of 25% T in any 3 ft x 3 ft area Column base plates welded to tank bottom</p> <p>2- Widely scattered pitting (less than 3 per square foot) over 50% T Scattered groove-type pitting exceeding 8" long and 25% to 50% T Columns visibly out-of-plumb</p> <p>3- Widely scattered pitting (less than 3 per square ft) of 25% to 50% T Scattered groove-type pitting not exceeding 25% T</p> <p>4- Widely scattered pitting not exceeding 25% T</p> <p>5- Scattered metal loss not exceeding 10% T</p>	0

TANK 307
TABLE C.6-3 (Cont'd)

INTERIOR RISER CONDITION RATING	
<p style="text-align: center;">Coating Condition</p> <p>0- Exposed steel over greater than 40% of the area Blistering to steel over 50% of the area</p> <p>1- Exposed steel over 20% to 40% of the area Blistering to steel over 25% to 50% of the area</p> <p>2- Exposed steel over 10% to 20% of the area Blistering to steel over 20% to 25% of the area Exposed primer over greater than 40%</p> <p>3- Exposed steel over 5% to 10% of the area Blistering to steel over 10% to 20% of the area Exposed primer over 25% to 40%</p> <p>4- Exposed steel on less than 5% of the area Blistering to steel on less than 10% of the area Exposed primer over 10% to 25%</p> <p>5- Exposed primer on less than 10% of the surface</p>	5
<p style="text-align: center;">Steel Condition</p> <p>0- Holes in steel Upper shell steel thickness less than 1/8 in. General metal loss exceeding 3 in. diameter and 10% T General metal loss exceeding 8 in. long and 10% T General metal loss exceeding 8 in. long and 5% T Rivet heads 50% deteriorated Cracked or missing welds</p> <p>1- Isolated pitting over 1 in. diameter, exceeding 50% T Groove-type pitting exceeding 8 in. long and 25% to 50% T Rivet heads 25% deteriorated General metal loss of 25% T in any 3 ft x 3 ft area General metal loss of 10% T over large areas (or the entire riser)</p> <p>2- Widely scattered pitting (less than 3 per square foot) exceeding 50% T Scattered groove-type pitting exceeding 9" long of 25% to 50% T</p> <p>3- Widely scattered pitting (less than 3 per square ft) of 25% to 50% T Scattered groove-type pitting not exceeding 25% T</p> <p>4- Widely scattered pitting not exceeding 25% T</p> <p>5- Scattered metal loss not exceeding 10% T</p>	5
<p style="text-align: center;">Safety Grating</p> <p>0- No grating on riser or improperly located Damaged to extent that it would not prevent an individual from falling into riser</p> <p>1- Grate easily moved</p> <p>2- Unable to move or open gate</p> <p>4- Metal loss and/or rust on grate</p> <p>5- No rust or deterioration No riser present (tank equipped with inlet/outlet line)</p>	5

TANK 307
TABLE C.6-3 (Cont'd)

INTERIOR LADDER CONDITION RATING	
<p style="text-align: center;">Steel Condition</p> <p>0- Metal loss on rung, side rail, or bracket of over 40% T Ladder distorted or bent 3 in. or more from original position</p> <p>1- Metal loss of 25% to 40% T Missing attachment bolts or cracked welds General instability</p> <p>2- Metal loss of 10% to 25% T Loose bolts</p> <p>3- Metal loss of 5% to 10% T</p> <p>4- Metal loss of less than 5% T, and/or surface rust</p> <p>5- No deterioration</p>	5
<p style="text-align: center;">Safety Device</p> <p>0- Device improperly attached and/or in danger of coming loose No safety device present or device inoperable</p> <p>2- Present safety device works rough</p> <p>5- Safety device installed properly and in good condition</p>	5
<p style="text-align: center;">Dimensions</p> <p>0- 13 in. or less clear distance between side rails Rungs greater than 12 in. center-to-center Lacks non-slip rungs, 7 in. toe clearance and/or 30 in. head clearance</p> <p>3- 13 in. to 15 in. clear distance between side rails Side rails less than 2 in. x 3/8 in.</p> <p>4- Side rails less than 2-1/2 in. x 3/8 in.</p> <p>5- 16 in. or greater clear distance between side rails</p>	5
<p style="text-align: center;">Ease of Climbing</p> <p>0- Major obstructions limiting climbing surface</p> <p>1- Difficult transition to bowl and/or other ladders</p> <p>2- Improper or erratic rung spacing</p> <p>3- Minor obstructions connected to side rails</p> <p>5- Ladder clear of obstructions and easy to climb</p>	5

TANK 307
TABLE C.6-3 (Cont'd)

PAINTING SCHEDULES CONDITION RATING	
Exterior Surface Schedule 1- 0 to 1 years 2- 2 to 4 years 3- 5 or more years	3
Interior Surface Schedule 1- 0 to 1 years 2- 2 to 4 years 3- 5 or more years	1

**TANK 307 SUMMARY CONDITION EVALUATION STANDARDS
TABLE C.6-4**

External Summary Elevated Steel Water Tank

Foundations

1. Site drainage	<u>5</u>
2. Foundation projection	<u>1</u>
3. Concrete condition	<u>5</u>
4. Grout condition	<u>5</u>

Base of Tower

5. Steel condition	<u>5</u>
6. Base plate/ring	<u>5</u>
7. Anchor bolts	<u>5</u>
8. Anchor bolt chairs	<u>5</u>

Columns

9. Alignment	<u>5</u>
10. Coating condition	<u>5</u>
11. Steel condition	<u>5</u>

Riser

12. Alignment	<u>5</u>
13. Coating condition	<u>5</u>
14. Steel Condition	<u>0</u> metal loss at bowl
15. Riser Manhole	<u>5</u>

Tower Ladder

16. Steel condition	<u>5</u>
17. Safety device	<u>5</u>
18. Dimensions	<u>0</u> width only 12-5/8 in.
19. Ease of climbing	<u>5</u>

Diagonal Bracing

20. Steel condition	<u>5</u>
21. Connections	<u>5</u>
22. Adjustment	<u>5</u>
23. Alignment	<u>5</u>
24. Coating condition	<u>5</u>

Truck Door/Man Door - N/A

1. Steel condition	<u>N/A</u>
2. Connections	<u>N/A</u>
3. Truck door	<u>N/A</u>
4. Man door	<u>N/A</u>
5. Coating condition	<u>N/A</u>

Riser Rods

25. Steel condition	<u>5</u>
26. Connections	<u>5</u>
27. Adjustment	<u>5</u>
28. Alignment	<u>5</u>
29. Coating condition	<u>5</u>

Struts

30. Coating condition	<u>5</u>
31. Steel condition	<u>5</u>
32. Connection to column	<u>5</u>

Balcony

33. Coating condition	<u>5</u>
34. Steel condition	<u>5</u>
35. Drainage	<u>5</u>
36. Handrail	<u>0</u> handrail <42 in. tall

Tank Bowl

37. Coating condition	<u>5</u>
38. Steel condition	<u>0</u> metal loss at riser

Shell Condition

39. Coating condition	<u>5</u>
40. Steel condition	<u>5</u>
41. Container manhole	<u>5</u>
42. Overflow	<u>5</u>

Roof Condition

43. Coating condition	<u>5</u>
44. Steel condition	<u>5</u>
45. Roof-to-vent	<u>5</u>
46. Roof vent/opening	<u>0</u> not clog-resistant
47. Roof manway	<u>0</u> not locked

Shell Ladder

48. Steel condition	<u>5</u>
49. Safety device	<u>5</u>
50. Dimensions	<u>0</u> 11-5/8 in. wide
51. Ease of Climbing	<u>5</u>

Internal Summary Elevated Steel Water Tank

Tank Bottom

52. Coating condition	<u>1</u>
53. Steel condition	<u>0</u> extensive metal loss

Interior Shell

54. Coating condition	<u>1</u>
55. Steel condition	<u>1</u>

Interior Roof

56. Coating condition	<u>1</u>
57. Steel condition	<u>0</u> extensive metal loss

Interior Riser

58. Coating condition	<u>5</u>
59. Steel condition	<u>5</u>
60. Safety Grating	<u>5</u>

Interior Ladders

61. Structural condition	<u>5</u>
62. Safety device	<u>5</u>
63. Dimensions	<u>5</u>
64. Ease of climbing	<u>5</u>

Painting Schedules

65. Exterior	<u>3</u>
66. Interior	<u>1</u>

Condition Evaluation Ratings

Safety Rating	80
Sanitary Rating	50
Structural Rating	68
*Exterior PCM Rating	95
*Interior PCM Rating	13
Overall Rating	61

*PCM = Painting, Corrosion, and Maintenance

TANK 214

SITE:

Nearest Structures:

Type: play area
Location: above tank

Type: play area
Direction: southwest

Type: pump house
Direction: east
Distance: approx. 16 ft (4.9 m)

Pump House Piping:

Number: 2
Sizes: 10 in. (254 mm) and 12 in. (305 mm)

Nearest Overhead Power Lines: none visible

EXTERIOR:

DESCRIPTION:

Construction: concrete
Number of Chambers: 4
Distance Between Roof Manholes: approx. 42 ft (12.8 m)
Interior Chamber Width: approx. 19 ft 8 in. (6 m)
Interior Chamber Length: approx. 80 ft (24.4 m)
Interior Height: 11 ft (3.4 m)
Concrete Thickness: 14 in. (356 mm)

SHELL MANHOLES: none

ROOF MANHOLES:

Number: 4 sets of 2 manholes
Exterior Size: 4 ft 3 in. (1.3 m) x 8 ft 5 in. (2.6 m)
Access Opening: 37-1/4 in. (946 mm) diameter
Neck: 13 in. (330 mm) to 17 in. (432 mm)
Cover: 41 in. (1041 mm) diameter
Locked: yes

VENTS:

Number: 4
Type: gooseneck
Vent Diameter: 8 in. (203 mm)
Distance Screening and Grade: 23 in. (584 mm)
Screening: perforated plate w/ 3/16 in. (5 mm) diameter holes

TANK 214

INTERIOR:

INTERIOR LADDERS:

Number of Rungs: 20 per ladder

Side Rails: 2-3/8 in. (60 mm) x 3/8 in. (9 mm), flat bar

Width: 17-3/8 in. (441 mm)

Rung Size: 3/4 in. (19 mm) diameter

Toe Room: 8-3/4 in. (222 mm)

Rung Spacing: 9-1/2 in. (241 mm)

Head Clearance: 27 in. (686 mm)

Brackets:

Size: 10-3/4 in. (273 mm) x 4 in. (102 mm) x 3/8 in. (9 mm), angle

Construction: bolted

Spacing: 6 ft 4 in. (1.9 m)

Safe-Climbing Device: none

TANK 214 EVALUATION OF CONCRETE GROUND TANKS
TABLE C.7-1

FOUNDATION AND SITE-RELATED CONDITION RATING	
<p style="text-align: center;">Site drainage</p> 0- Deep depressions and water around foundations and/ or site saturated long after rain 1- Mild depressions around foundations and/or water ponds adjacent to tank 2- Water flows toward foundation 3- Water ponds on site, but not adjacent to foundation 4- Flat site 5- Ground well sloped away from foundations	5
<p style="text-align: center;">Foundation Projection and Settlement</p> 0- Concrete foundation tops buried 1- Concrete foundation tops even with ground and covered with vegetation and debris 2- Concrete foundation tops even with ground and clean 3- Concrete foundation tops with 1 in. to 2 in. projection 4- Concrete foundation tops with 2 in. to 6 in. or 12 in. to 24 in. projection 5- Concrete foundation tops with 6 in. to 12 in. projection	5
<p style="text-align: center;">Concrete Condition</p> 0- Concrete soft, crumbling and/or easily removed and/or hollow sound when tapped Exposed rebar that is corroded 1- Same as 0 except foundation still has basic original shape and/or Exposed rebar with minor surface corrosion and/or open cracks up 1/4" wide 2- Surface crumbling, but can be chipped to sound concrete, open cracks up to 1/8" wide 3- Some surface spalling, but solid sounding and/or deep cracks up to 1/16" wide Hollow sounding areas 4- Minor surface cracks or deficiencies. 5- Smooth surface with no cracks or deteriorations.	5
<p style="text-align: center;">Grout Condition / Sealant</p> 0- Grout greater than 40% gone 2- Grout 20 to 40% gone 3- Grout 5 to 20% gone 4- Some pieces can be removed and/or grout less than 5% gone 5- Cracks and minor chips, but intact	5

TANK 214
TABLE C.7-1 (Cont'd)

SHELL LADDER CONDITION RATING	
<p style="text-align: center;">Steel Condition</p> <p>0- Metal loss on rung, side rail, or bracket of over 40% T Ladder distorted or bent 3 in. or more from original position</p> <p>1- Metal loss of 25% to 40% T Missing attachment bolts or cracked welds General instability</p> <p>2- Metal loss of 10% to 25% T Loose bolts</p> <p>3- Metal loss of 5% to 10% T</p> <p>4- Metal loss of less than 5% T, or surface rust</p> <p>5- No deterioration or no shell ladder</p>	5
<p style="text-align: center;">Safety Device</p> <p>0- Device improperly attached and/or in danger of coming loose No safety device present or device inoperable</p> <p>2- Present safety device works rough</p> <p>5- Safety device installed properly and in good condition No shell ladder</p>	5
<p style="text-align: center;">Dimensions</p> <p>0- 13 in. or less clear distance between side rails Rungs greater than 12 in. center-to-center Lacks non-slip rungs, 7 in. toe clearance or 30 in. head clearance</p> <p>3- 13 in. to 15 in. clear distance between side rails Side rails less than 2 in. x 3/8 in.</p> <p>4- Side rails less than 2-1/2 in. x 3/8 in.</p> <p>5- 16 in. or greater clear distance between side rails No shell ladder</p>	5
<p style="text-align: center;">Ease of Climbing</p> <p>0- Major obstructions limiting climbing surface</p> <p>1- Difficult transition to balcony (i.e. must climb over handrail)</p> <p>2- Improper or erratic rung spacing</p> <p>3- Minor obstructions connected to side rails</p> <p>5- Ladder clear of obstructions and easy to climb No shell ladder</p>	5

TANK 214
TABLE C.7-1 (Cont'd)

SHELL CONDITION RATING	
<p style="text-align: center;">Coating Condition</p> <p>2 - Sound concrete surfaces exposed over 50% of area 3 - Sound concrete surfaces exposed 25% to 50% of area 4 - Sound concrete surfaces exposed 0% to less than 25% of area 5 - No problems noted for coating No coating present</p>	5
<p style="text-align: center;">Concrete Condition</p> <p>0- Major spalling of concrete surface, large pop-outs, crumbling of concrete Water leaking or flowing from cracks in wall Water leaks at the shell-to-bottom joint 1- Spalling of concrete surface, pop-outs of concrete Rust streaks at cracks in wall Exposed rebar with minor surface corrosion Open cracks up to 1/4 in. wide Failure of previous concrete surface repairs 2- Minor spalling of concrete Open cracks up to 1/8 in. wide Water efflorescence on surface 3- Wall cracks that have "self-healed" Open cracks up to 1/16 in. wide 4- Minor temperature or shrinkage cracks Tight, non-open cracks Minor, widely scattered honeycombs 5- No cracking or honeycombing problems noted</p>	5
<p style="text-align: center;">Shell Manhole</p> <p>0- Manhole leaking water 1- Only one manhole less than 20 in. diameter 2- Only one manhole with dimensions not less than 20 in. diameter 3- Two or more shell manholes but none 30 in. diameter or larger Missing or parts 5- Two or more shell manholes (one 30 in. diameter and others not less than 20 in. diameter)</p>	1
<p style="text-align: center;">Overflow</p> <p>0- More than 1/3 of the support brackets broken Pipe clogged or broken Holes of greater than 1 in. diameter in pipe 1- Less than 1/3 of the brackets broken Holes smaller than 1 in. diameter in pipe Overflow does not have a weir box or anti-vortex plate 2- Ineffective protective screen No screen or flap gate on discharge end of pipe Pipe does not extended to grade Overflow discharges through perimeter roof vent No visible air break 3- No splash block below overflow discharge 4- Rust on overflow pipe 5- No rust or deterioration</p>	0

TANK 214
TABLE C.7-1 (Cont'd)

ROOF CONDITION RATING	
<p style="text-align: center;">Coating Condition</p> <p>2 - Sound concrete surfaces exposed over 50% of area 3 - Sound concrete surfaces exposed 25% to 50% of area 4 - Sound concrete surfaces exposed 0% to less than 25% of area 5 - No problems noted for coating No coating present No roof (open top tank)</p>	5
<p style="text-align: center;">Concrete Condition</p> <p>0- Major spalling of concrete surface, large pop-outs, crumbling of concrete Water leaking or flowing from cracks in wall 1- Spalling of concrete surface, pop-outs of concrete Rust streaks at cracks in wall Exposed rebar with minor surface corrosion Open cracks up to 1/4 in. wide Failure of previous concrete surface repairs 2- Minor spalling of concrete Open cracks up to 1/8 in. wide Water efflorescence on surface 3- Wall cracks that have "self-healed" Open cracks up to 1/16 in. wide 4- Minor temperature or shrinkage cracks Tight, non-open cracks Minor, widely scattered honeycombs 5- No cracking or honeycombing problems noted No roof (open top tank)</p>	5
<p style="text-align: center;">Roof-to-Vent Connection</p> <p>0- Connection failed, vent no longer connected Wide cracks in concrete Evidence of water entry into tank 1- Spalling of concrete 2- Vent mounting bolts missing 3- Minor or tight concrete cracks 4- Previous concrete repairs intact 5- No deterioration at connection No roof (open top tank)</p>	5
<p style="text-align: center;">Roof Vent and Roof Opening</p> <p>0- No vent present Vent clogged or inoperative Screen missing, torn, or improperly placed 1- Vent deteriorated or damaged 2- Vent covered with rust Bolts or parts missing or loose 4- Minor rust on vent 5- No rust or deterioration No roof (open top tank)</p>	5
<p style="text-align: center;">Roof Manway</p> <p>0- Manway without locking features or lock missing 1- Allows water into tank from roof 3- Any dimension less than 24 in. diameter, 4 in. curb or 2 in. overlap 5- Manway locked and water tight All dimensions equal or greater than 24 in. diameter, 4 in. curb or 2 in. overlap No roof (open top tank)</p>	5

TANK 214
TABLE C.7-1 (Cont'd)

ROOF LADDER CONDITION RATING	
<p style="text-align: center;">Steel Condition</p> <p>0- Metal loss on rung, side rail, or bracket of over 40% T Ladder distorted or bent 3 in. or more from original position</p> <p>1- Metal loss of 25% to 40% T Missing attachment bolts or cracked welds General instability</p> <p>2- Metal loss of 10% to 25% T Loose bolts</p> <p>3- Metal loss of 5% to 10% T</p> <p>4- Metal loss of less than 5% T, or surface rust</p> <p>5- No deterioration No roof ladder</p>	5
<p style="text-align: center;">Safety Device</p> <p>0- Device improperly attached and/or in danger of coming loose No safety device present or device inoperable</p> <p>2- Present safety device works rough</p> <p>5- Safety device installed properly and in good condition No roof ladder</p>	5
<p style="text-align: center;">Dimensions</p> <p>0- 13 in. or less clear distance between side rails Rungs greater than 12 in. center-to-center Lacks non-slip rungs, 7 in. toe clearance or 30 in. head clearance</p> <p>3- 13 in. to 15 in. clear distance between side rails Side rails less than 2 in. x 3/8 in.</p> <p>4- Side rails less than 2-1/2 in. x 3/8 in.</p> <p>5- 16 in. or greater clear distance between side rails No roof ladder</p>	5
<p style="text-align: center;">Ease of Climbing</p> <p>0- Major obstructions limiting climbing surface</p> <p>1- Revolving ladder</p> <p>2- Improper or erratic rung spacing</p> <p>3- Minor obstructions connected to side rails</p> <p>5- Ladder clear of obstructions and easy to climb No roof ladder</p>	5

TANK 214
TABLE C.7-1 (Cont'd)

TANK BOTTOM CONDITION RATING	
<p style="text-align: center;">Coating Condition</p> <p>2- Concrete surfaces exposed over 40% of area</p> <p>3- Concrete surfaces exposed over 25% to 40% of area Top coat failure over 50% of area</p> <p>4- Concrete surfaces exposed over 10% to 25% of area Top coat failure over 25% to 50% of area</p> <p>5- Concrete surfaces exposed up to 10% of area Top coat failure up to 25% of area</p> <p>No coating present</p>	5
<p style="text-align: center;">Concrete Condition</p> <p>0- Major spalling of concrete surface, large pop-outs, crumbling of concrete Exposed reinforcing steel Wide cracks or evidence of water leaking through bottom</p> <p>1- Spalling of concrete surface, pop-outs of concrete Rust streaks at cracks in bottom Open cracks up to 1/8 in. wide Failure of previous concrete surface repairs</p> <p>2- Minor spalling of concrete Open cracks up to 1/16 in. wide Water efflorescence on surface</p> <p>3- Bottom cracks that have "self-healed"</p> <p>4- Minor temperature or shrinkage cracks Tight, non-open cracks Minor, widely scattered honeycombs</p> <p>5- No cracking or honeycombing problems noted</p>	5

TANK 214
TABLE C.7-1 (Cont'd)

INTERIOR SHELL CONDITION RATING	
<p style="text-align: center;">Coating Condition</p> <p>2- Concrete surfaces exposed over 40% of area 3- Concrete surfaces exposed over 25% to 40% of area Top coat failure over 50% of area 4- Concrete surfaces exposed over 10% to 25% of area Top coat failure over 25% to 50% of area 5- Concrete surfaces exposed up to 10% of area Top coat failure up to 25% of area No coating present</p>	5
<p style="text-align: center;">Concrete Condition</p> <p>0- Major spalling of concrete surface, large pop-outs, crumbling of concrete Exposed reinforcing steel Wide cracks or evidence of water leaking through bottom 1- Spalling of concrete surface, pop-outs of concrete Rust streaks at cracks Open cracks up to 1/8 in. wide Failure of previous concrete surface repairs 2- Minor spalling of concrete Open cracks up to 1/16 in. wide Water efflorescence on surface 3- Bottom cracks that have "self-healed" 4- Minor temperature or shrinkage cracks Tight, non-open cracks Minor, widely scattered honeycombs 5- No cracking or honeycombing problems noted</p>	5

TANK 214
TABLE C.7-1 (Cont'd)

INTERIOR ROOF CONDITION RATING	
<p style="text-align: center;">Coating Condition</p> <p>2- Concrete surfaces exposed over 40% of area 3- Concrete surfaces exposed over 25% to 40% of area Top coat failure over 50% of area 4- Concrete surfaces exposed over 10% to 25% of area Top coat failure over 25% to 50% of area 5- Concrete surfaces exposed up to 10% of area Top coat failure up to 25% of area No coating present Aluminum dome roof</p>	5
<p style="text-align: center;">Concrete Condition</p> <p>0- Major spalling of concrete surface, large pop-outs, crumbling of concrete Exposed reinforcing steel Wide cracks or evidence of water leaking 1- Spalling of concrete surface, pop-outs of concrete Rust streaks at cracks Open cracks up to 1/8 in. wide Failure of previous concrete surface repairs 2- Minor spalling of concrete Open cracks up to 1/16 in. wide Water efflorescence on surface 3- Bottom cracks that have "self-healed" 4- Minor temperature or shrinkage cracks Tight, non-open cracks Minor, widely scattered honeycombs 5- No cracking or honeycombing problems noted</p>	5

TANK 214
TABLE C.7-1 (Cont'd)

INTERIOR LADDER CONDITION RATING	
<p style="text-align: center;">Steel Condition</p> <p>0- Metal loss on rung, side rail, or bracket of over 40% T Ladder distorted or bent 3 in. or more from original position</p> <p>1- Metal loss of 25% to 40% T Missing attachment bolts or cracked welds General instability</p> <p>2- Metal loss of 10% to 25% T Loose bolts</p> <p>3- Metal loss of 5% to 10% T</p> <p>4- Metal loss of less than 5% T, or surface rust</p> <p>5- No deterioration No ladder</p>	3
<p style="text-align: center;">Safety Device</p> <p>0- Device improperly attached and/or in danger of coming loose No safety device present or device inoperable</p> <p>2- Present safety device works rough</p> <p>5- Safety device installed properly and in good condition No ladder</p>	0
<p style="text-align: center;">Dimensions</p> <p>0- 13 in. or less clear distance between side rails Rungs greater than 12 in. center-to-center Lacks non-slip rungs, 7 in. toe clearance or 30 in. head clearance</p> <p>3- 13 in. to 15 in. clear distance between side rails Side rails less than 2 in. x 3/8 in.</p> <p>4- Side rails less than 2-1/2 in. x 3/8 in.</p> <p>5- 16 in. or greater clear distance between side rails No ladder</p>	0
<p style="text-align: center;">Ease of Climbing</p> <p>0- Major obstructions limiting climbing surface</p> <p>1- Difficult transition to balcony (i.e. must climb over handrail)</p> <p>2- Improper or erratic rung spacing</p> <p>3- Minor obstructions connected to side rails</p> <p>5- Ladder clear of obstructions and easy to climb No ladder</p>	3

TANK 214
TABLE C.7-1 (Cont'd)

PAINTING SCHEDULES CONDITION RATING	
Exterior Surface Schedule 1- 0 to 1 years 2- 2 to 4 years 3- 5 or more years	3
Interior Surface Schedule 1- 0 to 1 years 2- 2 to 4 years 3- 5 or more years	3

**TANK 214 SUMMARY CONDITION EVALUATION STANDARDS
TABLE C.7-2**

External Summary Concrete Ground Water Tank

Foundations

1. Site drainage	<u>5</u>
2. Foundation projection	<u>5</u>
3. Concrete condition	<u>5</u>
4. Grout condition	<u>5</u>

Base of Tower - N/A

5. Steel condition	<u>6</u>
6. Base plate/ring	<u>6</u>
7. Anchor bolts	<u>6</u>
8. Anchor bolt chairs	<u>6</u>

Columns - N/A

9. Alignment	<u>6</u>
10. Coating condition	<u>6</u>
11. Steel condition	<u>6</u>

Riser - N/A

12. Alignment	<u>6</u>
13. Coating condition	<u>6</u>
14. Steel Condition	<u>6</u>
15. Riser Manhole	<u>6</u>

Shell Ladder

16. Steel condition	<u>5</u>
17. Safety device	<u>5</u>
18. Dimensions	<u>5</u>
19. Ease of climbing	<u>5</u>

Diagonal Bracing - N/A

20. Steel condition	<u>6</u>
21. Connections	<u>6</u>
22. Adjustment	<u>6</u>
23. Alignment	<u>6</u>
24. Coating condition	<u>6</u>

Truck Door/Man Door - N/A

1. Steel condition	<u>N/A</u>
2. Connections	<u>N/A</u>
3. Truck door	<u>N/A</u>
4. Man door	<u>N/A</u>
5. Coating condition	<u>N/A</u>

Riser Rods - N/A

25. Steel condition	<u>6</u>
26. Connections	<u>6</u>
27. Adjustment	<u>6</u>
28. Alignment	<u>6</u>
29. Coating condition	<u>6</u>

Struts - N/A

30. Coating condition	<u>6</u>
31. Steel condition	<u>6</u>
32. Connection to column	<u>6</u>

Balcony - N/A

33. Coating condition	<u>6</u>
34. Steel condition	<u>6</u>
35. Drainage	<u>6</u>
36. Handrail	<u>6</u>

Tank Bowl - N/A

37. Coating condition	<u>6</u>
38. Steel condition	<u>6</u>

Shell Condition

39. Coating condition	<u>5</u>
40. Concrete condition	<u>5</u>
41. Container manhole	<u>1</u>
42. Overflow	<u>0</u> no dedicated overflow

Roof Condition

43. Coating condition	<u>5</u>
44. Concrete condition	<u>5</u>
45. Roof-to-vent	<u>5</u>
46. Roof vent/opening	<u>5</u>
47. Roof manway	<u>5</u>

Roof Ladder

48. Steel condition	<u>5</u>
49. Safety device	<u>5</u>
50. Dimensions	<u>5</u>
51. Ease of Climbing	<u>5</u>

Internal Summary Concrete Ground Water Tank

Tank Bottom

52. Coating condition	<u>5</u>
53. Concrete condition	<u>5</u>

Interior Shell

54. Coating condition	<u>5</u>
55. Concrete condition	<u>5</u>

Interior Roof

56. Coating condition	<u>5</u>
57. Concrete condition	<u>5</u>

Riser - N/A

58. Coating condition	<u>6</u>
59. Steel condition	<u>6</u>
60. Safety Grating	<u>6</u>

Condition Evaluation Ratings

Safety Rating	77
Sanitary Rating	75
Structural Rating	100
*Exterior PM Rating	100
*Interior PM Rating	100
Overall Rating	90

*PM = Painting Maintenance

Interior Ladders

61. Structural condition	<u>3</u>
62. Safety device	<u>0</u> no safe-climbing device
63. Dimensions	<u>0</u> head clearance < 30 in.
64. Ease of climbing	<u>3</u>

Painting Schedules

65. Exterior	<u>3</u>
66. Interior	<u>3</u>

TANK 2105

SITE:

Nearest Structures:

Type: light pole
Direction: northwest

Type: Tank 2106
Direction: north
Distance: 8 ft 1 in. (2.4 m)

Type: pump house
Direction: south
Distance: approx. 36 ft 7 in. (11.1 m)

Nearest Overhead Power Lines: none visible

VALVE VAULT:

Location: between tanks

Access:

Size: 31-1/2 in. (800 mm) square

Locked: yes

Size: 5 ft 4 in. (1.6 m) x 8 ft 4 in. (2.5 m) x 6 ft 7 in. (2 m), deep

EXTERIOR:

DESCRIPTION:

Construction: concrete

Shell Projection: approx. 6 ft 5 in. (2 m) to 7 ft (2.1 m) above grade

Exterior Size: approx. 18 ft (5.5 m) x 35 ft 6 in. (10.8 m)

Interior Height: 12 ft 8 in. (3.9 m)

Concrete Thickness: 6 in. (152 mm)

Roof Overhang: 12 in. (305 mm)

SHELL MANHOLES: none

OVERFLOW PIPE:

Location: north side of shell, west side of vault

Size: 3 in. (76 mm) diameter

Funnel: 6 in. (152 mm) diameter

Air Break: 2 in. (51 mm)

Screening: perforated plate w/ 3/16 in. (5 mm) diameter holes

TANK 2105

EXTERIOR PIPES:

North Pipe: 8 in. (203 mm) diameter

South Pipe:

Size: 2 in. (51 mm) diameter

Sleeve: 3 in. (76 mm) diameter

EXTERIOR LADDER:

Number of Rungs: 6

Distance From Ground: 16-1/2 in. (419 mm)

Side Rails: 2 in. (51 mm) x 3/8 in. (9 mm), flat bar

Width: 14-7/8 in. (378 mm)

Rung Size: 5/8 in. (16 mm) diameter

Toe Room: 6-1/4 in. (159 mm)

Rung Spacing: 12-1/2 in. (318 mm)

Brackets:

Size: 2 in. (51 mm) x 3/8 in. (9 mm), flat bar x 7 in. (178 mm) long

Construction: bolted

Spacing: 5 ft (1.5 m)

Safe-Climbing Device: none

Terminals:

Access Opening: 14-1/2 in. (368 mm)

Height: 32-1/2 in. (826 mm)

ROOF SAFETY RAILING:

Location: around roof perimeter

Handrail:

Height: 41-1/2 in. (1054 mm)

Size: 1-7/8 in. (48 mm) diameter

Mid-Rail: 1-7/8 in. (48 mm) diameter

Uprights: 1-7/8 in. (48 mm) diameter

Toe Bar: 4-3/4 in. (121 mm) x 3/32 in. (2 mm), flat bar

Access Opening:

Width: 35 in. (889 mm)

Closure Chains: none

ROOF MANHOLES:

Number: 2

Size: 31-1/2 in. (800 mm) x 39-1/2 in. (1003.3 mm)

Neck: 7 in. (178 mm)

Cover Frame: 1-1/4 in. (32 mm) x 1-1/4 in. (32 mm) x 1/8 in. (3 mm), thick

Locked: no

TANK 2105

ROOF VENTS:

Number: 2
Type: gooseneck
Diameter: 2 in. (51 mm)
Height: 42 in. (1067 mm)
Screening: none

INTERIOR:

INTERIOR LADDERS:

Number of Rungs: 11 per ladder
Side Rails: 2-1/4 in. (57 mm) x 3/8 in. (9 mm), flat bar
Width: 15 in. (381 mm)
Rung Size: 7/8 in. (22 mm) diameter
Toe Room: 6-3/4 in. (171 mm)
Rung Spacing: 12-1/2 in. (318 mm)
Head Clearance: 34 in. (864 mm)
Brackets:
 Size: 5-7/8 in. (149 mm) x 3/8 in. (9 mm), flat bar x 8-3/4 in.
 (222 mm) to 4 in. (102 mm) long
 Construction: bolted
 Spacing: 4 ft (1.3 m)
Safe-Climbing Device: none

TANK 2105 EVALUATION OF CONCRETE GROUND TANKS
TABLE C.8-1

FOUNDATION AND SITE-RELATED CONDITION RATING	
<p style="text-align: center;">Site drainage</p> 0- Deep depressions and water around foundations and/ or site saturated long after rain 1- Mild depressions around foundations and/or water ponds adjacent to tank 2- Water flows toward foundation 3- Water ponds on site, but not adjacent to foundation 4- Flat site 5- Ground well sloped away from foundations	5
<p style="text-align: center;">Foundation Projection and Settlement</p> 0- Concrete foundation tops buried 1- Concrete foundation tops even with ground and covered with vegetation and debris 2- Concrete foundation tops even with ground and clean 3- Concrete foundation tops with 1 in. to 2 in. projection 4- Concrete foundation tops with 2 in. to 6 in. or 12 in. to 24 in. projection 5- Concrete foundation tops with 6 in. to 12 in. projection	5
<p style="text-align: center;">Concrete Condition</p> 0- Concrete soft, crumbling and/or easily removed and/or hollow sound when tapped Exposed rebar that is corroded 1- Same as 0 except foundation still has basic original shape and/or Exposed rebar with minor surface corrosion and/or open cracks up 1/4" wide 2- Surface crumbling, but can be chipped to sound concrete, open cracks up to 1/8" wide 3- Some surface spalling, but solid sounding and/or deep cracks up to 1/16" wide Hollow sounding areas 4- Minor surface cracks or deficiencies. 5- Smooth surface with no cracks or deteriorations.	5
<p style="text-align: center;">Grout Condition / Sealant</p> 0- Grout greater than 40% gone 2- Grout 20 to 40% gone 3- Grout 5 to 20% gone 4- Some pieces can be removed and/or grout less than 5% gone 5- Cracks and minor chips, but intact	5

TANK 2105
TABLE C.8-1 (Cont'd)

SHELL LADDER CONDITION RATING	
<p style="text-align: center;">Steel Condition</p> <p>0- Metal loss on rung, side rail, or bracket of over 40% T Ladder distorted or bent 3 in. or more from original position</p> <p>1- Metal loss of 25% to 40% T Missing attachment bolts or cracked welds General instability</p> <p>2- Metal loss of 10% to 25% T Loose bolts</p> <p>3- Metal loss of 5% to 10% T</p> <p>4- Metal loss of less than 5% T, or surface rust</p> <p>5- No deterioration or no shell ladder</p>	5
<p style="text-align: center;">Safety Device</p> <p>0- Device improperly attached and/or in danger of coming loose No safety device present or device inoperable</p> <p>2- Present safety device works rough</p> <p>5- Safety device installed properly and in good condition No shell ladder</p>	5
<p style="text-align: center;">Dimensions</p> <p>0- 13 in. or less clear distance between side rails Rungs greater than 12 in. center-to-center Lacks non-slip rungs, 7 in. toe clearance or 30 in. head clearance</p> <p>3- 13 in. to 15 in. clear distance between side rails Side rails less than 2 in. x 3/8 in.</p> <p>4- Side rails less than 2-1/2 in. x 3/8 in.</p> <p>5- 16 in. or greater clear distance between side rails No shell ladder</p>	0
<p style="text-align: center;">Ease of Climbing</p> <p>0- Major obstructions limiting climbing surface</p> <p>1- Difficult transition to balcony (i.e. must climb over handrail)</p> <p>2- Improper or erratic rung spacing</p> <p>3- Minor obstructions connected to side rails</p> <p>5- Ladder clear of obstructions and easy to climb No shell ladder</p>	5

TANK 2105
TABLE C.8-1 (Cont'd)

SHELL CONDITION RATING	
<p style="text-align: center;">Coating Condition</p> <p>2 - Sound concrete surfaces exposed over 50% of area 3 - Sound concrete surfaces exposed 25% to 50% of area 4 - Sound concrete surfaces exposed 0% to less than 25% of area 5 - No problems noted for coating No coating present</p>	5
<p style="text-align: center;">Concrete Condition</p> <p>0- Major spalling of concrete surface, large pop-outs, crumbling of concrete Water leaking or flowing from cracks in wall Water leaks at the shell-to-bottom joint 1- Spalling of concrete surface, pop-outs of concrete Rust streaks at cracks in wall Exposed rebar with minor surface corrosion Open cracks up to 1/4 in. wide Failure of previous concrete surface repairs 2- Minor spalling of concrete Open cracks up to 1/8 in. wide Water efflorescence on surface 3- Wall cracks that have "self-healed" Open cracks up to 1/16 in. wide 4- Minor temperature or shrinkage cracks Tight, non-open cracks Minor, widely scattered honeycombs 5- No cracking or honeycombing problems noted</p>	5
<p style="text-align: center;">Shell Manhole</p> <p>0- Manhole leaking water 1- Only one manhole less than 20 in. diameter 2- Only one manhole with dimensions not less than 20 in. diameter 3- Two or more shell manholes but none 30 in. diameter or larger Missing or parts 5- Two or more shell manholes (one 30 in. diameter and others not less than 20 in. diameter)</p>	1
<p style="text-align: center;">Overflow</p> <p>0- More than 1/3 of the support brackets broken Pipe clogged or broken Holes of greater than 1 in. diameter in pipe 1- Less than 1/3 of the brackets broken Holes smaller than 1 in. diameter in pipe Overflow does not have a weir box or anti-vortex plate 2- Ineffective protective screen No screen or flap gate on discharge end of pipe Pipe does not extended to grade Overflow discharges through perimeter roof vent No visible air break 3- No splash block below overflow discharge 4- Rust on overflow pipe 5- No rust or deterioration</p>	2

TANK 2105
TABLE C.8-1 (Cont'd)

ROOF CONDITION RATING	
<p style="text-align: center;">Coating Condition</p> <p>2 - Sound concrete surfaces exposed over 50% of area 3 - Sound concrete surfaces exposed 25% to 50% of area 4 - Sound concrete surfaces exposed 0% to less than 25% of area 5 - No problems noted for coating No coating present No roof (open top tank)</p>	5
<p style="text-align: center;">Concrete Condition</p> <p>0- Major spalling of concrete surface, large pop-outs, crumbling of concrete Water leaking or flowing from cracks in wall 1- Spalling of concrete surface, pop-outs of concrete Rust streaks at cracks in wall Exposed rebar with minor surface corrosion Open cracks up to 1/4 in. wide Failure of previous concrete surface repairs 2- Minor spalling of concrete Open cracks up to 1/8 in. wide Water efflorescence on surface 3- Wall cracks that have "self-healed" Open cracks up to 1/16 in. wide 4- Minor temperature or shrinkage cracks Tight, non-open cracks Minor, widely scattered honeycombs 5- No cracking or honeycombing problems noted No roof (open top tank)</p>	5
<p style="text-align: center;">Roof-to-Vent Connection</p> <p>0- Connection failed, vent no longer connected Wide cracks in concrete Evidence of water entry into tank 1- Spalling of concrete 2- Vent mounting bolts missing 3- Minor or tight concrete cracks 4- Previous concrete repairs intact 5- No deterioration at connection No roof (open top tank)</p>	5
<p style="text-align: center;">Roof Vent and Roof Opening</p> <p>0- No vent present Vent clogged or inoperative Screen missing, torn, or improperly placed 1- Vent deteriorated or damaged 2- Vent covered with rust Bolts or parts missing or loose 4- Minor rust on vent 5- No rust or deterioration No roof (open top tank)</p>	0
<p style="text-align: center;">Roof Manway</p> <p>0- Manway without locking features or lock missing 1- Allows water into tank from roof 3- Any dimension less than 24 in. diameter, 4 in. curb or 2 in. overlap 5- Manway locked and water tight All dimensions equal or greater than 24 in. diameter, 4 in. curb or 2 in. overlap No roof (open top tank)</p>	0

TANK 2105
TABLE C.8-1 (Cont'd)

ROOF LADDER CONDITION RATING	
<p style="text-align: center;">Steel Condition</p> <p>0- Metal loss on rung, side rail, or bracket of over 40% T Ladder distorted or bent 3 in. or more from original position</p> <p>1- Metal loss of 25% to 40% T Missing attachment bolts or cracked welds General instability</p> <p>2- Metal loss of 10% to 25% T Loose bolts</p> <p>3- Metal loss of 5% to 10% T</p> <p>4- Metal loss of less than 5% T, or surface rust</p> <p>5- No deterioration No roof ladder</p>	5
<p style="text-align: center;">Safety Device</p> <p>0- Device improperly attached and/or in danger of coming loose No safety device present or device inoperable</p> <p>2- Present safety device works rough</p> <p>5- Safety device installed properly and in good condition No roof ladder</p>	5
<p style="text-align: center;">Dimensions</p> <p>0- 13 in. or less clear distance between side rails Rungs greater than 12 in. center-to-center Lacks non-slip rungs, 7 in. toe clearance or 30 in. head clearance</p> <p>3- 13 in. to 15 in. clear distance between side rails Side rails less than 2 in. x 3/8 in.</p> <p>4- Side rails less than 2-1/2 in. x 3/8 in.</p> <p>5- 16 in. or greater clear distance between side rails No roof ladder</p>	5
<p style="text-align: center;">Ease of Climbing</p> <p>0- Major obstructions limiting climbing surface</p> <p>1- Revolving ladder</p> <p>2- Improper or erratic rung spacing</p> <p>3- Minor obstructions connected to side rails</p> <p>5- Ladder clear of obstructions and easy to climb No roof ladder</p>	5

TANK 2105
TABLE C.8-1 (Cont'd)

TANK BOTTOM CONDITION RATING	
<p style="text-align: center;">Coating Condition</p> <ul style="list-style-type: none"> 2- Concrete surfaces exposed over 40% of area 3- Concrete surfaces exposed over 25% to 40% of area Top coat failure over 50% of area 4- Concrete surfaces exposed over 10% to 25% of area Top coat failure over 25% to 50% of area 5- Concrete surfaces exposed up to 10% of area Top coat failure up to 25% of area No coating present 	5
<p style="text-align: center;">Concrete Condition</p> <ul style="list-style-type: none"> 0- Major spalling of concrete surface, large pop-outs, crumbling of concrete Exposed reinforcing steel Wide cracks or evidence of water leaking through bottom 1- Spalling of concrete surface, pop-outs of concrete Rust streaks at cracks in bottom Open cracks up to 1/8 in. wide Failure of previous concrete surface repairs 2- Minor spalling of concrete Open cracks up to 1/16 in. wide Water efflorescence on surface 3- Bottom cracks that have "self-healed" 4- Minor temperature or shrinkage cracks Tight, non-open cracks Minor, widely scattered honeycombs 5- No cracking or honeycombing problems noted 	5

TANK 2105
TABLE C.8-1 (Cont'd)

INTERIOR SHELL CONDITION RATING	
<p style="text-align: center;">Coating Condition</p> <p>2- Concrete surfaces exposed over 40% of area 3- Concrete surfaces exposed over 25% to 40% of area Top coat failure over 50% of area 4- Concrete surfaces exposed over 10% to 25% of area Top coat failure over 25% to 50% of area 5- Concrete surfaces exposed up to 10% of area Top coat failure up to 25% of area No coating present</p>	5
<p style="text-align: center;">Concrete Condition</p> <p>0- Major spalling of concrete surface, large pop-outs, crumbling of concrete Exposed reinforcing steel Wide cracks or evidence of water leaking through bottom 1- Spalling of concrete surface, pop-outs of concrete Rust streaks at cracks Open cracks up to 1/8 in. wide Failure of previous concrete surface repairs 2- Minor spalling of concrete Open cracks up to 1/16 in. wide Water efflorescence on surface 3- Bottom cracks that have "self-healed" 4- Minor temperature or shrinkage cracks Tight, non-open cracks Minor, widely scattered honeycombs 5- No cracking or honeycombing problems noted</p>	5

TANK 2105
TABLE C.8-1 (Cont'd)

INTERIOR ROOF CONDITION RATING	
<p style="text-align: center;">Coating Condition</p> <p>2- Concrete surfaces exposed over 40% of area 3- Concrete surfaces exposed over 25% to 40% of area Top coat failure over 50% of area 4- Concrete surfaces exposed over 10% to 25% of area Top coat failure over 25% to 50% of area 5- Concrete surfaces exposed up to 10% of area Top coat failure up to 25% of area No coating present Aluminum dome roof</p>	5
<p style="text-align: center;">Concrete Condition</p> <p>0- Major spalling of concrete surface, large pop-outs, crumbling of concrete Exposed reinforcing steel Wide cracks or evidence of water leaking 1- Spalling of concrete surface, pop-outs of concrete Rust streaks at cracks Open cracks up to 1/8 in. wide Failure of previous concrete surface repairs 2- Minor spalling of concrete Open cracks up to 1/16 in. wide Water efflorescence on surface 3- Bottom cracks that have "self-healed" 4- Minor temperature or shrinkage cracks Tight, non-open cracks Minor, widely scattered honeycombs 5- No cracking or honeycombing problems noted</p>	5

TANK 2105
TABLE C.8-1 (Cont'd)

INTERIOR LADDER CONDITION RATING	
<p style="text-align: center;">Steel Condition</p> <p>0- Metal loss on rung, side rail, or bracket of over 40% T Ladder distorted or bent 3 in. or more from original position</p> <p>1- Metal loss of 25% to 40% T Missing attachment bolts or cracked welds General instability</p> <p>2- Metal loss of 10% to 25% T Loose bolts</p> <p>3- Metal loss of 5% to 10% T</p> <p>4- Metal loss of less than 5% T, or surface rust</p> <p>5- No deterioration No ladder</p>	5
<p style="text-align: center;">Safety Device</p> <p>0- Device improperly attached and/or in danger of coming loose No safety device present or device inoperable</p> <p>2- Present safety device works rough</p> <p>5- Safety device installed properly and in good condition No ladder</p>	5
<p style="text-align: center;">Dimensions</p> <p>0- 13 in. or less clear distance between side rails Rungs greater than 12 in. center-to-center Lacks non-slip rungs, 7 in. toe clearance or 30 in. head clearance</p> <p>3- 13 in. to 15 in. clear distance between side rails Side rails less than 2 in. x 3/8 in.</p> <p>4- Side rails less than 2-1/2 in. x 3/8 in.</p> <p>5- 16 in. or greater clear distance between side rails No ladder</p>	3
<p style="text-align: center;">Ease of Climbing</p> <p>0- Major obstructions limiting climbing surface</p> <p>1- Difficult transition to balcony (i.e. must climb over handrail)</p> <p>2- Improper or erratic rung spacing</p> <p>3- Minor obstructions connected to side rails</p> <p>5- Ladder clear of obstructions and easy to climb No ladder</p>	2

TANK 2105
TABLE C.8-1 (Cont'd)

PAINTING SCHEDULES CONDITION RATING	
Exterior Surface Schedule 1- 0 to 1 years 2- 2 to 4 years 3- 5 or more years	3
Interior Surface Schedule 1- 0 to 1 years 2- 2 to 4 years 3- 5 or more years	3

**TANK 2105 SUMMARY CONDITION EVALUATION STANDARDS
TABLE C.8-2**

External Summary Concrete Ground Water Tank

Foundations

1. Site drainage	<u>5</u>
2. Foundation projection	<u>5</u>
3. Concrete condition	<u>5</u>
4. Grout condition	<u>5</u>

Base of Tower - N/A

5. Steel condition	<u>6</u>
6. Base plate/ring	<u>6</u>
7. Anchor bolts	<u>6</u>
8. Anchor bolt chairs	<u>6</u>

Columns - N/A

9. Alignment	<u>6</u>
10. Coating condition	<u>6</u>
11. Steel condition	<u>6</u>

Riser - N/A

12. Alignment	<u>6</u>
13. Coating condition	<u>6</u>
14. Steel Condition	<u>6</u>
15. Riser Manhole	<u>6</u>

Shell Ladder

16. Steel condition	<u>5</u>
17. Safety device	<u>5</u>
18. Dimensions	<u>0</u> toe room < 7in.
19. Ease of climbing	<u>5</u>

Diagonal Bracing - N/A

20. Steel condition	<u>6</u>
21. Connections	<u>6</u>
22. Adjustment	<u>6</u>
23. Alignment	<u>6</u>
24. Coating condition	<u>6</u>

Truck Door/Man Door - N/A

1. Steel condition	N/A
2. Connections	N/A
3. Truck door	N/A
4. Man door	N/A
5. Coating condition	N/A

Riser Rods - N/A

25. Steel condition	<u>6</u>
26. Connections	<u>6</u>
27. Adjustment	<u>6</u>
28. Alignment	<u>6</u>
29. Coating condition	<u>6</u>

Struts - N/A

30. Coating condition	<u>6</u>
31. Steel condition	<u>6</u>
32. Connection to column	<u>6</u>

Balcony - N/A

33. Coating condition	<u>6</u>
34. Steel condition	<u>6</u>
35. Drainage	<u>6</u>
36. Handrail	<u>6</u>

Tank Bowl - N/A

37. Coating condition	<u>6</u>
38. Steel condition	<u>6</u>

Shell Condition

39. Coating condition	<u>5</u>
40. Concrete condition	<u>5</u>
41. Container manhole	<u>1</u>
42. Overflow	<u>2</u>

Roof Condition

43. Coating condition	<u>5</u>
44. Concrete condition	<u>5</u>
45. Roof-to-vent	<u>5</u>
46. Roof vent/opening	<u>0</u> unscreened
47. Roof manway	<u>0</u> not locked

Roof Ladder

48. Steel condition	<u>5</u>
49. Safety device	<u>5</u>
50. Dimensions	<u>5</u>
51. Ease of Climbing	<u>5</u>

Internal Summary Concrete Ground Water Tank

Tank Bottom

52. Coating condition	<u>5</u>
53. Concrete condition	<u>5</u>

Interior Shell

54. Coating condition	<u>5</u>
55. Concrete condition	<u>5</u>

Interior Roof

56. Coating condition	<u>5</u>
57. Concrete condition	<u>5</u>

Riser - N/A

58. Coating condition	<u>6</u>
59. Steel condition	<u>6</u>
60. Safety Grating	<u>6</u>

Condition Evaluation Ratings

Safety Rating	83
Structural Rating	100
*Exterior PM Rating	100
*Interior PM Rating	100
Overall Rating	96

*PM = Painting Maintenance

Interior Ladders

61. Structural condition	<u>5</u>
62. Safety device	<u>5</u>
63. Dimensions	<u>3</u>
64. Ease of climbing	<u>2</u>

Painting Schedules

65. Exterior	<u>3</u>
66. Interior	<u>3</u>

TANK 2106

SITE:

Nearest Structures:

Type: light pole
Direction: southwest
Distance: adjacent to tank

Type: Tank 2105
Direction: south
Distance: 8 ft 1 in. (2.4 m)

Type: fence
Direction: north
Distance: approx. 18 ft (5.5 m)

Type: pump house
Direction: south
Distance: approx. 54 ft 7 in. (16.6 m)

Nearest Overhead Power Lines: none visible

VALVE VAULT:

Location: between tanks

Access:

Size: 31-1/2 in. (800 mm) square

Locked: yes

Size: 5 ft 4 in. (1.6 m) x 8 ft 4 in. (2.5 m) x 6 ft 7 in. (2 m), deep

EXTERIOR:

DESCRIPTION:

Construction: concrete

Shell Projection: approx. 7 ft (2.1 m) above grade

Exterior Size: approx. 18 ft (5.5 m) x 35 ft 6 in. (10.8 m)

Interior Height: 12 ft 8 in. (3.9 m)

Concrete Thickness: 8 in. (203.4 mm)

SHELL MANHOLES: none

OVERFLOW PIPE:

Location: southeast side of tank

Size: 2 in. (51 mm) diameter

Funnel: 6 in. (152 mm) diameter

Air Break: 2 in. (51 mm)

Screening: perforated plate w/ 3/16 in. (5 mm) diameter holes

TANK 2106

EXTERIOR PIPING:

West Pipe: 8 in. (203 mm) diameter

North Pipe:

Size: 2 in. (51 mm) diameter

Sleeve: 3 in. (76 mm) diameter

EXTERIOR LADDER:

Number of Rungs: 6

Distance From Ground: 20 in. (508 mm)

Side Rails: 2 in. (51 mm) x 3/8 in. (9 mm), flat bar

Width: 15 in. (381 mm)

Rung Size: 5/8 in. (16 mm) diameter

Toe Room: 6-1/4 in. (159 mm)

Rung Spacing: 12-1/2 in. (318 mm)

Brackets:

Size: 2 in. (51 mm) x 3/8 in. (9 mm), flat bar x 7-1/4 in. (184 mm)
long

Construction: bolted

Spacing: 5 ft (1.5 m)

Safe-Climbing Device: none

Terminals:

Access Opening: 15 in. (381 mm)

Height: 34-1/4 in. (870 mm)

ROOF SAFETY RAILING:

Location: around roof perimeter

Handrail:

Height: 41-1/2 in. (1054 mm)

Size: 1-7/8 in. (48 mm) diameter

Mid-Rail: 1-7/8 in. (48 mm) diameter

Uprights: 1-7/8 in. (48 mm) diameter

Toe Bar: 4-3/4 in. (121 mm) x 3/32 in. (2 mm), flat bar

Access Opening:

Width: 35 in. (889 mm)

Closure Chains: none

ROOF MANHOLES:

Number: 2

Size: 31-1/2 in. (800 mm) x 39-1/2 in. (1003 mm)

Neck: 7-1/2 in. (191 mm)

Cover Frame: 1-1/4 in. (32 mm) x 1-1/4 in. (32 mm) x 1/8 in. (3 mm), thick

Locked: no

TANK 2106

ROOF VENTS:

Number: 2

Type: gooseneck

Vent Diameter: 2 in. (51 mm)

Vent Height: 43 in. (1092 mm)

Screening: none

INTERIOR:

INTERIOR LADDERS:

Number of Rungs: 11 per ladder

Side Rails: 2-1/4 in. (57 mm) x 3/8 in. (9 mm), flat bar

Width: 15 in. (381 mm)

Rung Size: 7/8 in. (22 mm) diameter

Toe Room: 7 in. (178 mm)

Rung Spacing: 12-1/2 in. (318 mm)

Head Clearance: 32-1/2 in. (826 mm)

Brackets:

Size: 5-7/8 in. (149 mm) x 3/8 in. (9 mm), flat bar x 7-3/4 in.
(197 mm) to 4 in. (102 mm) long

Construction: bolted and welded

Spacing: 4 ft (1.3 m)

Safe-Climbing Device: none

TANK 2106 EVALUATION OF CONCRETE GROUND TANKS
TABLE C.9-1

FOUNDATION AND SITE-RELATED CONDITION RATING	
<p style="text-align: center;">Site drainage</p> 0- Deep depressions and water around foundations and/ or site saturated long after rain 1- Mild depressions around foundations and/or water ponds adjacent to tank 2- Water flows toward foundation 3- Water ponds on site, but not adjacent to foundation 4- Flat site 5- Ground well sloped away from foundations	5
<p style="text-align: center;">Foundation Projection and Settlement</p> 0- Concrete foundation tops buried 1- Concrete foundation tops even with ground and covered with vegetation and debris 2- Concrete foundation tops even with ground and clean 3- Concrete foundation tops with 1 in. to 2 in. projection 4- Concrete foundation tops with 2 in. to 6 in. or 12 in. to 24 in. projection 5- Concrete foundation tops with 6 in. to 12 in. projection	5
<p style="text-align: center;">Concrete Condition</p> 0- Concrete soft, crumbling and/or easily removed and/or hollow sound when tapped Exposed rebar that is corroded 1- Same as 0 except foundation still has basic original shape and/or Exposed rebar with minor surface corrosion and/or open cracks up 1/4" wide 2- Surface crumbling, but can be chipped to sound concrete, open cracks up to 1/8" wide 3- Some surface spalling, but solid sounding and/or deep cracks up to 1/16" wide Hollow sounding areas 4- Minor surface cracks or deficiencies. 5- Smooth surface with no cracks or deteriorations.	5
<p style="text-align: center;">Grout Condition / Sealant</p> 0- Grout greater than 40% gone 2- Grout 20 to 40% gone 3- Grout 5 to 20% gone 4- Some pieces can be removed and/or grout less than 5% gone 5- Cracks and minor chips, but intact	5

TANK 2106
TABLE C.9-1 (Cont'd)

SHELL LADDER CONDITION RATING	
<p style="text-align: center;">Steel Condition</p> <p>0- Metal loss on rung, side rail, or bracket of over 40% T Ladder distorted or bent 3 in. or more from original position</p> <p>1- Metal loss of 25% to 40% T Missing attachment bolts or cracked welds General instability</p> <p>2- Metal loss of 10% to 25% T Loose bolts</p> <p>3- Metal loss of 5% to 10% T</p> <p>4- Metal loss of less than 5% T, or surface rust</p> <p>5- No deterioration or no shell ladder</p>	5
<p style="text-align: center;">Safety Device</p> <p>0- Device improperly attached and/or in danger of coming loose No safety device present or device inoperable</p> <p>2- Present safety device works rough</p> <p>5- Safety device installed properly and in good condition No shell ladder</p>	5
<p style="text-align: center;">Dimensions</p> <p>0- 13 in. or less clear distance between side rails Rungs greater than 12 in. center-to-center Lacks non-slip rungs, 7 in. toe clearance or 30 in. head clearance</p> <p>3- 13 in. to 15 in. clear distance between side rails Side rails less than 2 in. x 3/8 in.</p> <p>4- Side rails less than 2-1/2 in. x 3/8 in.</p> <p>5- 16 in. or greater clear distance between side rails No shell ladder</p>	0
<p style="text-align: center;">Ease of Climbing</p> <p>0- Major obstructions limiting climbing surface</p> <p>1- Difficult transition to balcony (i.e. must climb over handrail)</p> <p>2- Improper or erratic rung spacing</p> <p>3- Minor obstructions connected to side rails</p> <p>5- Ladder clear of obstructions and easy to climb No shell ladder</p>	5

TANK 2106
TABLE C.9-1 (Cont'd)

SHELL CONDITION RATING	
<p style="text-align: center;">Coating Condition</p> <p>2 - Sound concrete surfaces exposed over 50% of area 3 - Sound concrete surfaces exposed 25% to 50% of area 4 - Sound concrete surfaces exposed 0% to less than 25% of area 5 - No problems noted for coating No coating present</p>	5
<p style="text-align: center;">Concrete Condition</p> <p>0- Major spalling of concrete surface, large pop-outs, crumbling of concrete Water leaking or flowing from cracks in wall Water leaks at the shell-to-bottom joint 1- Spalling of concrete surface, pop-outs of concrete Rust streaks at cracks in wall Exposed rebar with minor surface corrosion Open cracks up to 1/4 in. wide Failure of previous concrete surface repairs 2- Minor spalling of concrete Open cracks up to 1/8 in. wide Water efflorescence on surface 3- Wall cracks that have "self-healed" Open cracks up to 1/16 in. wide 4- Minor temperature or shrinkage cracks Tight, non-open cracks Minor, widely scattered honeycombs 5- No cracking or honeycombing problems noted</p>	0
<p style="text-align: center;">Shell Manhole</p> <p>0- Manhole leaking water 1- Only one manhole less than 20 in. diameter 2- Only one manhole with dimensions not less than 20 in. diameter 3- Two or more shell manholes but none 30 in. diameter or larger Missing or parts 5- Two or more shell manholes (one 30 in. diameter and others not less than 20 in. diameter)</p>	1
<p style="text-align: center;">Overflow</p> <p>0- More than 1/3 of the support brackets broken Pipe clogged or broken Holes of greater than 1 in. diameter in pipe 1- Less than 1/3 of the brackets broken Holes smaller than 1 in. diameter in pipe Overflow does not have a weir box or anti-vortex plate 2- Ineffective protective screen No screen or flap gate on discharge end of pipe Pipe does not extended to grade Overflow discharges through perimeter roof vent No visible air break 3- No splash block below overflow discharge 4- Rust on overflow pipe 5- No rust or deterioration</p>	2

TANK 2106
TABLE C.9-1 (Cont'd)

ROOF CONDITION RATING	
<p style="text-align: center;">Coating Condition</p> <p>2 - Sound concrete surfaces exposed over 50% of area 3 - Sound concrete surfaces exposed 25% to 50% of area 4 - Sound concrete surfaces exposed 0% to less than 25% of area 5 - No problems noted for coating No coating present No roof (open top tank)</p>	5
<p style="text-align: center;">Concrete Condition</p> <p>0- Major spalling of concrete surface, large pop-outs, crumbling of concrete Water leaking or flowing from cracks in wall 1- Spalling of concrete surface, pop-outs of concrete Rust streaks at cracks in wall Exposed rebar with minor surface corrosion Open cracks up to 1/4 in. wide Failure of previous concrete surface repairs 2- Minor spalling of concrete Open cracks up to 1/8 in. wide Water efflorescence on surface 3- Wall cracks that have "self-healed" Open cracks up to 1/16 in. wide 4- Minor temperature or shrinkage cracks Tight, non-open cracks Minor, widely scattered honeycombs 5- No cracking or honeycombing problems noted No roof (open top tank)</p>	1
<p style="text-align: center;">Roof-to-Vent Connection</p> <p>0- Connection failed, vent no longer connected Wide cracks in concrete Evidence of water entry into tank 1- Spalling of concrete 2- Vent mounting bolts missing 3- Minor or tight concrete cracks 4- Previous concrete repairs intact 5- No deterioration at connection No roof (open top tank)</p>	5
<p style="text-align: center;">Roof Vent and Roof Opening</p> <p>0- No vent present Vent clogged or inoperative Screen missing, torn, or improperly placed 1- Vent deteriorated or damaged 2- Vent covered with rust Bolts or parts missing or loose 4- Minor rust on vent 5- No rust or deterioration No roof (open top tank)</p>	0
<p style="text-align: center;">Roof Manway</p> <p>0- Manway without locking features or lock missing 1- Allows water into tank from roof 3- Any dimension less than 24 in. diameter, 4 in. curb or 2 in. overlap 5- Manway locked and water tight All dimensions equal or greater than 24 in. diameter, 4 in. curb or 2 in. overlap No roof (open top tank)</p>	0

TANK 2106
TABLE C.9-1 (Cont'd)

ROOF LADDER CONDITION RATING	
<p style="text-align: center;">Steel Condition</p> <p>0- Metal loss on rung, side rail, or bracket of over 40% T Ladder distorted or bent 3 in. or more from original position</p> <p>1- Metal loss of 25% to 40% T Missing attachment bolts or cracked welds General instability</p> <p>2- Metal loss of 10% to 25% T Loose bolts</p> <p>3- Metal loss of 5% to 10% T</p> <p>4- Metal loss of less than 5% T, or surface rust</p> <p>5- No deterioration No roof ladder</p>	5
<p style="text-align: center;">Safety Device</p> <p>0- Device improperly attached and/or in danger of coming loose No safety device present or device inoperable</p> <p>2- Present safety device works rough</p> <p>5- Safety device installed properly and in good condition No roof ladder</p>	5
<p style="text-align: center;">Dimensions</p> <p>0- 13 in. or less clear distance between side rails Rungs greater than 12 in. center-to-center Lacks non-slip rungs, 7 in. toe clearance or 30 in. head clearance</p> <p>3- 13 in. to 15 in. clear distance between side rails Side rails less than 2 in. x 3/8 in.</p> <p>4- Side rails less than 2-1/2 in. x 3/8 in.</p> <p>5- 16 in. or greater clear distance between side rails No roof ladder</p>	5
<p style="text-align: center;">Ease of Climbing</p> <p>0- Major obstructions limiting climbing surface</p> <p>1- Revolving ladder</p> <p>2- Improper or erratic rung spacing</p> <p>3- Minor obstructions connected to side rails</p> <p>5- Ladder clear of obstructions and easy to climb No roof ladder</p>	5

TANK 2106
TABLE C.9-1 (Cont'd)

TANK BOTTOM CONDITION RATING	
<p style="text-align: center;">Coating Condition</p> <p>2- Concrete surfaces exposed over 40% of area 3- Concrete surfaces exposed over 25% to 40% of area Top coat failure over 50% of area 4- Concrete surfaces exposed over 10% to 25% of area Top coat failure over 25% to 50% of area 5- Concrete surfaces exposed up to 10% of area Top coat failure up to 25% of area No coating present</p>	5
<p style="text-align: center;">Concrete Condition</p> <p>0- Major spalling of concrete surface, large pop-outs, crumbling of concrete Exposed reinforcing steel Wide cracks or evidence of water leaking through bottom 1- Spalling of concrete surface, pop-outs of concrete Rust streaks at cracks in bottom Open cracks up to 1/8 in. wide Failure of previous concrete surface repairs 2- Minor spalling of concrete Open cracks up to 1/16 in. wide Water efflorescence on surface 3- Bottom cracks that have "self-healed" 4- Minor temperature or shrinkage cracks Tight, non-open cracks Minor, widely scattered honeycombs 5- No cracking or honeycombing problems noted</p>	5

TANK 2106
TABLE C.9-1 (Cont'd)

INTERIOR SHELL CONDITION RATING	
<p style="text-align: center;">Coating Condition</p> <p>2- Concrete surfaces exposed over 40% of area 3- Concrete surfaces exposed over 25% to 40% of area Top coat failure over 50% of area 4- Concrete surfaces exposed over 10% to 25% of area Top coat failure over 25% to 50% of area 5- Concrete surfaces exposed up to 10% of area Top coat failure up to 25% of area No coating present</p>	5
<p style="text-align: center;">Concrete Condition</p> <p>0- Major spalling of concrete surface, large pop-outs, crumbling of concrete Exposed reinforcing steel Wide cracks or evidence of water leaking through bottom 1- Spalling of concrete surface, pop-outs of concrete Rust streaks at cracks Open cracks up to 1/8 in. wide Failure of previous concrete surface repairs 2- Minor spalling of concrete Open cracks up to 1/16 in. wide Water efflorescence on surface 3- Bottom cracks that have "self-healed" 4- Minor temperature or shrinkage cracks Tight, non-open cracks Minor, widely scattered honeycombs 5- No cracking or honeycombing problems noted</p>	5

TANK 2106
TABLE C.9-1 (Cont'd)

INTERIOR ROOF CONDITION RATING	
<p style="text-align: center;">Coating Condition</p> <p>2- Concrete surfaces exposed over 40% of area 3- Concrete surfaces exposed over 25% to 40% of area Top coat failure over 50% of area 4- Concrete surfaces exposed over 10% to 25% of area Top coat failure over 25% to 50% of area 5- Concrete surfaces exposed up to 10% of area Top coat failure up to 25% of area No coating present Aluminum dome roof</p>	5
<p style="text-align: center;">Concrete Condition</p> <p>0- Major spalling of concrete surface, large pop-outs, crumbling of concrete Exposed reinforcing steel Wide cracks or evidence of water leaking 1- Spalling of concrete surface, pop-outs of concrete Rust streaks at cracks Open cracks up to 1/8 in. wide Failure of previous concrete surface repairs 2- Minor spalling of concrete Open cracks up to 1/16 in. wide Water efflorescence on surface 3- Bottom cracks that have "self-healed" 4- Minor temperature or shrinkage cracks Tight, non-open cracks Minor, widely scattered honeycombs 5- No cracking or honeycombing problems noted</p>	5

TANK 2106
TABLE C.9-1 (Cont'd)

INTERIOR LADDER CONDITION RATING	
<p style="text-align: center;">Steel Condition</p> <p>0- Metal loss on rung, side rail, or bracket of over 40% T Ladder distorted or bent 3 in. or more from original position</p> <p>1- Metal loss of 25% to 40% T Missing attachment bolts or cracked welds General instability</p> <p>2- Metal loss of 10% to 25% T Loose bolts</p> <p>3- Metal loss of 5% to 10% T</p> <p>4- Metal loss of less than 5% T, or surface rust</p> <p>5- No deterioration No ladder</p>	5
<p style="text-align: center;">Safety Device</p> <p>0- Device improperly attached and/or in danger of coming loose No safety device present or device inoperable</p> <p>2- Present safety device works rough</p> <p>5- Safety device installed properly and in good condition No ladder</p>	5
<p style="text-align: center;">Dimensions</p> <p>0- 13 in. or less clear distance between side rails Rungs greater than 12 in. center-to-center Lacks non-slip rungs, 7 in. toe clearance or 30 in. head clearance</p> <p>3- 13 in. to 15 in. clear distance between side rails Side rails less than 2 in. x 3/8 in.</p> <p>4- Side rails less than 2-1/2 in. x 3/8 in.</p> <p>5- 16 in. or greater clear distance between side rails No ladder</p>	3
<p style="text-align: center;">Ease of Climbing</p> <p>0- Major obstructions limiting climbing surface</p> <p>1- Difficult transition to balcony (i.e. must climb over handrail)</p> <p>2- Improper or erratic rung spacing</p> <p>3- Minor obstructions connected to side rails</p> <p>5- Ladder clear of obstructions and easy to climb No ladder</p>	2

TANK 2106
TABLE C.9-1 (Cont'd)

PAINTING SCHEDULES CONDITION RATING	
Exterior Surface Schedule	1
1- 0 to 1 years 2- 2 to 4 years 3- 5 or more years	
Interior Surface Schedule	3
1- 0 to 1 years 2- 2 to 4 years 3- 5 or more years	

**TANK 2106 SUMMARY CONDITION EVALUATION STANDARDS
TABLE C.9-2**

External Summary Concrete Ground Water Tank

Foundations

1. Site drainage	<u>5</u>
2. Foundation projection	<u>5</u>
3. Concrete condition	<u>5</u>
4. Grout condition	<u>5</u>

Base of Tower - N/A

5. Steel condition	<u>6</u>
6. Base plate/ring	<u>6</u>
7. Anchor bolts	<u>6</u>
8. Anchor bolt chairs	<u>6</u>

Columns - N/A

9. Alignment	<u>6</u>
10. Coating condition	<u>6</u>
11. Steel condition	<u>6</u>

Riser - N/A

12. Alignment	<u>6</u>
13. Coating condition	<u>6</u>
14. Steel Condition	<u>6</u>
15. Riser Manhole	<u>6</u>

Shell Ladder

16. Steel condition	<u>5</u>
17. Safety device	<u>5</u>
18. Dimensions	<u>0</u> toe room < 7in.
19. Ease of climbing	<u>5</u>

Diagonal Bracing - N/A

20. Steel condition	<u>6</u>
21. Connections	<u>6</u>
22. Adjustment	<u>6</u>
23. Alignment	<u>6</u>
24. Coating condition	<u>6</u>

Truck Door/Man Door - N/A

1. Steel condition	<u>N/A</u>
2. Connections	<u>N/A</u>
3. Truck door	<u>N/A</u>
4. Man door	<u>N/A</u>
5. Coating condition	<u>N/A</u>

Riser Rods - N/A

25. Steel condition	<u>6</u>
26. Connections	<u>6</u>
27. Adjustment	<u>6</u>
28. Alignment	<u>6</u>
29. Coating condition	<u>6</u>

Struts - N/A

30. Coating condition	<u>6</u>
31. Steel condition	<u>6</u>
32. Connection to column	<u>6</u>

Balcony - N/A

33. Coating condition	<u>6</u>
34. Steel condition	<u>6</u>
35. Drainage	<u>6</u>
36. Handrail	<u>6</u>

Tank Bowl - N/A

37. Coating condition	<u>6</u>
38. Steel condition	<u>6</u>

Shell Condition

39. Coating condition	<u>5</u>
40. Concrete condition	<u>0</u> leak in shell
41. Container manhole	<u>1</u>
42. Overflow	<u>2</u>

Roof Condition

43. Coating condition	<u>5</u>
44. Concrete condition	<u>1</u>
45. Roof-to-vent	<u>5</u>
46. Roof vent/opening	<u>0</u> unscreened
47. Roof manway	<u>0</u> not locked

Roof Ladder

48. Steel condition	<u>5</u>
49. Safety device	<u>5</u>
50. Dimensions	<u>5</u>
51. Ease of Climbing	<u>5</u>

Internal Summary Concrete Ground Water Tank

Tank Bottom

52. Coating condition	<u>5</u>
53. Concrete condition	<u>5</u>

Interior Shell

54. Coating condition	<u>5</u>
55. Concrete condition	<u>5</u>

Interior Roof

56. Coating condition	<u>5</u>
57. Concrete condition	<u>5</u>

Riser - N/A

58. Coating condition	<u>6</u>
59. Steel condition	<u>6</u>
60. Safety Grating	<u>6</u>

Condition Evaluation Ratings

Safety Rating	83
Structural Rating	88
*Exterior PM Rating	33
*Interior PM Rating	100
Overall Rating	76

*PM = Painting Maintenance

Interior Ladders

61. Structural condition	<u>5</u>
62. Safety device	<u>5</u>
63. Dimensions	<u>3</u>
64. Ease of climbing	<u>2</u>

Painting Schedules

65. Exterior	<u>1</u>
66. Interior	<u>3</u>

TANK 425

SITE:

Size: approx. 100 ft (30.5 m) x 150 ft (45.7 m)

Nearest Structures:

Type: Building 419 (pump house)
Direction: north
Distance: approx. 16 ft (4.9 m)

Type: Area 404
Direction: south
Distance: approx. 50 ft (15.2 m)

Type: Building 416 (high voltage shed)
Direction: west
Distance: approx. 50 ft (15.2 m)

Nearest Overhead Power Lines: none visible

VALVE VAULTS:

Number: 2
Location: 2 ft (0.6 m) north of tank
Size: 6 ft 6 in. (2 m) square x 6 ft 8 in. (2 m) deep
Access Rungs:
Number: 4
Size: 1 in. (25 mm) diameter
Width: 11 in. (279 mm)
Spacing: 12 in. (305 mm)
Toe Room: 5-1/4 in. (133 mm)

EXTERIOR:

DESCRIPTION:

Construction: concrete
Shell Projection: approx. 9 ft 6 in. (2.9 m) to 11 ft (3.4 m)
Exterior Size: approx. 58 ft 4 in. (17.8 m) x 59 ft 8 in. (18.2 m)
Interior Height: approx. 16 ft 5 in. (5 m)

SHELL MANHOLES: none

OVERFLOW:

Number: 2
Size: 10 in. (254 mm) diameter
Visible Air Break: none

TANK 425

EXTERIOR PIPING:

Inlet Pipe:

Location: up south wall to roof

Size: 6 in. (152 mm) diameter

Bracket: 1-3/4 in. (45 mm) x 3/16 in. (5 mm), flat bar

Pump House Pipes:

Number: 2

Size: 12 in. (305 mm) diameter

Valve Vault: 20 in. (508 mm) diameter

EXTERIOR LADDER:

Number of Rungs: 9

Width: 11-1/8 in. (283 mm)

Side Rails: 1-3/4 in. (45 mm) x 3/8 in. (9 mm), flat bar

Rung Size: 1 in. (25 mm) diameter

Rung Spacing: 12 in. (305 mm)

Toe Room: 7-1/4 in. (184 mm)

Brackets:

Size: 1-3/4 in. (45 mm) x 3/8 in. (9 mm), flat bar x 8 in. (203 mm)
long and 2 in. (51 mm) x 2 in. (51 mm) x 1/4 in. (6 mm),
angle x 2 in. (51 mm) long

Construction: bolted

Safe-Climbing Device: none

Vandal Deterrent:

Type: expanded steel ladder gate

Size: 11-3/8 in. (289 mm) wide x 118 in. (2997 mm) tall

Locked: no

Terminals:

Size: 2 in. (51 mm) x 3/16 in. (5 mm), flat bar

Height: 39-1/2 in. (1003 mm) tall

Access: 11-1/2 in. (292 mm) wide

ROOF SAFETY RAILING: none

ROOF MANHOLES:

Number: 2

Size: 31-1/2 in. (800 mm) x 43-1/4 in. (1099 mm)

Neck: 6 in. (152 mm)

Gasket: yes

Locked: no

TANK 425

INTERIOR:

INTERIOR LADDERS:

Side Rails: 2 in. (51 mm) x 3/8 in. (9 mm), flat bar

Width: 16 in. (406 mm)

Rung Size: 3/4 in. (19 mm) diameter

Rung Spacing: 12 in. (305 mm) on center

Toe Room: 12 in. (305 mm)

Head Clearance: greater than 30 in. (762 mm)

Brackets:

Size: 2-1/2 in. (63 mm) x 2-1/2 (63 mm) x 1/4 in. (6 mm) 12-1/2 in.
(318 mm) long

Construction: welded

Safe-Climbing Device: none

OVERFLOW INLET:

Type: open pipe

Location: 15 in. (381 mm) to 16 in. (406 mm) below roof

TANK 425 EVALUATION OF CONCRETE GROUND TANKS
TABLE C.10-1

FOUNDATION AND SITE-RELATED CONDITION RATING	
<p style="text-align: center;">Site drainage</p> 0- Deep depressions and water around foundations and/ or site saturated long after rain 1- Mild depressions around foundations and/or water ponds adjacent to tank 2- Water flows toward foundation 3- Water ponds on site, but not adjacent to foundation 4- Flat site 5- Ground well sloped away from foundations	5
<p style="text-align: center;">Foundation Projection and Settlement</p> 0- Concrete foundation tops buried 1- Concrete foundation tops even with ground and covered with vegetation and debris 2- Concrete foundation tops even with ground and clean 3- Concrete foundation tops with 1 in. to 2 in. projection 4- Concrete foundation tops with 2 in. to 6 in. or 12 in. to 24 in. projection 5- Concrete foundation tops with 6 in. to 12 in. projection	5
<p style="text-align: center;">Concrete Condition</p> 0- Concrete soft, crumbling and/or easily removed and/or hollow sound when tapped Exposed rebar that is corroded 1- Same as 0 except foundation still has basic original shape and/or Exposed rebar with minor surface corrosion and/or open cracks up 1/4" wide 2- Surface crumbling, but can be chipped to sound concrete, open cracks up to 1/8" wide 3- Some surface spalling, but solid sounding and/or deep cracks up to 1/16" wide Hollow sounding areas 4- Minor surface cracks or deficiencies. 5- Smooth surface with no cracks or deteriorations.	5
<p style="text-align: center;">Grout Condition / Sealant</p> 0- Grout greater than 40% gone 2- Grout 20 to 40% gone 3- Grout 5 to 20% gone 4- Some pieces can be removed and/or grout less than 5% gone 5- Cracks and minor chips, but intact	5

TANK 425
TABLE C.10-1 (Cont'd)

SHELL LADDER CONDITION RATING	
<p style="text-align: center;">Steel Condition</p> <p>0- Metal loss on rung, side rail, or bracket of over 40% T Ladder distorted or bent 3 in. or more from original position</p> <p>1- Metal loss of 25% to 40% T Missing attachment bolts or cracked welds General instability</p> <p>2- Metal loss of 10% to 25% T Loose bolts</p> <p>3- Metal loss of 5% to 10% T</p> <p>4- Metal loss of less than 5% T, or surface rust</p> <p>5- No deterioration or no shell ladder</p>	5
<p style="text-align: center;">Safety Device</p> <p>0- Device improperly attached and/or in danger of coming loose No safety device present or device inoperable</p> <p>2- Present safety device works rough</p> <p>5- Safety device installed properly and in good condition No shell ladder</p>	5
<p style="text-align: center;">Dimensions</p> <p>0- 13 in. or less clear distance between side rails Rungs greater than 12 in. center-to-center Lacks non-slip rungs, 7 in. toe clearance or 30 in. head clearance</p> <p>3- 13 in. to 15 in. clear distance between side rails Side rails less than 2 in. x 3/8 in.</p> <p>4- Side rails less than 2-1/2 in. x 3/8 in.</p> <p>5- 16 in. or greater clear distance between side rails No shell ladder</p>	0
<p style="text-align: center;">Ease of Climbing</p> <p>0- Major obstructions limiting climbing surface</p> <p>1- Difficult transition to balcony (i.e. must climb over handrail)</p> <p>2- Improper or erratic rung spacing</p> <p>3- Minor obstructions connected to side rails</p> <p>5- Ladder clear of obstructions and easy to climb No shell ladder</p>	5

TANK 425
TABLE C.10-1 (Cont'd)

SHELL CONDITION RATING	
<p style="text-align: center;">Coating Condition</p> <p>2 - Sound concrete surfaces exposed over 50% of area 3 - Sound concrete surfaces exposed 25% to 50% of area 4 - Sound concrete surfaces exposed 0% to less than 25% of area 5 - No problems noted for coating No coating present</p>	5
<p style="text-align: center;">Concrete Condition</p> <p>0- Major spalling of concrete surface, large pop-outs, crumbling of concrete Water leaking or flowing from cracks in wall Water leaks at the shell-to-bottom joint 1- Spalling of concrete surface, pop-outs of concrete Rust streaks at cracks in wall Exposed rebar with minor surface corrosion Open cracks up to 1/4 in. wide Failure of previous concrete surface repairs 2- Minor spalling of concrete Open cracks up to 1/8 in. wide Water efflorescence on surface 3- Wall cracks that have "self-healed" Open cracks up to 1/16 in. wide 4- Minor temperature or shrinkage cracks Tight, non-open cracks Minor, widely scattered honeycombs 5- No cracking or honeycombing problems noted</p>	5
<p style="text-align: center;">Shell Manhole</p> <p>0- Manhole leaking water 1- Only one manhole less than 20 in. diameter 2- Only one manhole with dimensions not less than 20 in. diameter 3- Two or more shell manholes but none 30 in. diameter or larger Missing or parts 5- Two or more shell manholes (one 30 in. diameter and others not less than 20 in. diameter)</p>	1
<p style="text-align: center;">Overflow</p> <p>0- More than 1/3 of the support brackets broken Pipe clogged or broken Holes of greater than 1 in. diameter in pipe 1- Less than 1/3 of the brackets broken Holes smaller than 1 in. diameter in pipe Overflow does not have a weir box or anti-vortex plate 2- Ineffective protective screen No screen or flap gate on discharge end of pipe Pipe does not extended to grade Overflow discharges through perimeter roof vent No visible air break 3- No splash block below overflow discharge 4- Rust on overflow pipe 5- No rust or deterioration</p>	2

TANK 425
TABLE C.10-1 (Cont'd)

ROOF CONDITION RATING	
<p style="text-align: center;">Coating Condition</p> <p>2 - Sound concrete surfaces exposed over 50% of area 3 - Sound concrete surfaces exposed 25% to 50% of area 4 - Sound concrete surfaces exposed 0% to less than 25% of area 5 - No problems noted for coating No coating present No roof (open top tank)</p>	5
<p style="text-align: center;">Concrete Condition</p> <p>0- Major spalling of concrete surface, large pop-outs, crumbling of concrete Water leaking or flowing from cracks in wall 1- Spalling of concrete surface, pop-outs of concrete Rust streaks at cracks in wall Exposed rebar with minor surface corrosion Open cracks up to 1/4 in. wide Failure of previous concrete surface repairs 2- Minor spalling of concrete Open cracks up to 1/8 in. wide Water efflorescence on surface 3- Wall cracks that have "self-healed" Open cracks up to 1/16 in. wide 4- Minor temperature or shrinkage cracks Tight, non-open cracks Minor, widely scattered honeycombs 5- No cracking or honeycombing problems noted No roof (open top tank)</p>	5
<p style="text-align: center;">Roof-to-Vent Connection</p> <p>0- Connection failed, vent no longer connected Wide cracks in concrete Evidence of water entry into tank 1- Spalling of concrete 2- Vent mounting bolts missing 3- Minor or tight concrete cracks 4- Previous concrete repairs intact 5- No deterioration at connection No roof (open top tank)</p>	5
<p style="text-align: center;">Roof Vent and Roof Opening</p> <p>0- No vent present Vent clogged or inoperative Screen missing, torn, or improperly placed 1- Vent deteriorated or damaged 2- Vent covered with rust Bolts or parts missing or loose 4- Minor rust on vent 5- No rust or deterioration No roof (open top tank)</p>	0
<p style="text-align: center;">Roof Manway</p> <p>0- Manway without locking features or lock missing 1- Allows water into tank from roof 3- Any dimension less than 24 in. diameter, 4 in. curb or 2 in. overlap 5- Manway locked and water tight All dimensions equal or greater than 24 in. diameter, 4 in. curb or 2 in. overlap No roof (open top tank)</p>	0

TANK 425
TABLE C.10-1 (Cont'd)

ROOF LADDER CONDITION RATING	
<p style="text-align: center;">Steel Condition</p> <p>0- Metal loss on rung, side rail, or bracket of over 40% T Ladder distorted or bent 3 in. or more from original position</p> <p>1- Metal loss of 25% to 40% T Missing attachment bolts or cracked welds General instability</p> <p>2- Metal loss of 10% to 25% T Loose bolts</p> <p>3- Metal loss of 5% to 10% T</p> <p>4- Metal loss of less than 5% T, or surface rust</p> <p>5- No deterioration No roof ladder</p>	5
<p style="text-align: center;">Safety Device</p> <p>0- Device improperly attached and/or in danger of coming loose No safety device present or device inoperable</p> <p>2- Present safety device works rough</p> <p>5- Safety device installed properly and in good condition No roof ladder</p>	5
<p style="text-align: center;">Dimensions</p> <p>0- 13 in. or less clear distance between side rails Rungs greater than 12 in. center-to-center Lacks non-slip rungs, 7 in. toe clearance or 30 in. head clearance</p> <p>3- 13 in. to 15 in. clear distance between side rails Side rails less than 2 in. x 3/8 in.</p> <p>4- Side rails less than 2-1/2 in. x 3/8 in.</p> <p>5- 16 in. or greater clear distance between side rails No roof ladder</p>	5
<p style="text-align: center;">Ease of Climbing</p> <p>0- Major obstructions limiting climbing surface</p> <p>1- Revolving ladder</p> <p>2- Improper or erratic rung spacing</p> <p>3- Minor obstructions connected to side rails</p> <p>5- Ladder clear of obstructions and easy to climb No roof ladder</p>	5

TANK 425
TABLE C.10-1 (Cont'd)

TANK BOTTOM CONDITION RATING	
<p style="text-align: center;">Coating Condition</p> <p>2- Concrete surfaces exposed over 40% of area 3- Concrete surfaces exposed over 25% to 40% of area Top coat failure over 50% of area 4- Concrete surfaces exposed over 10% to 25% of area Top coat failure over 25% to 50% of area 5- Concrete surfaces exposed up to 10% of area Top coat failure up to 25% of area No coating present</p>	5
<p style="text-align: center;">Concrete Condition</p> <p>0- Major spalling of concrete surface, large pop-outs, crumbling of concrete Exposed reinforcing steel Wide cracks or evidence of water leaking through bottom 1- Spalling of concrete surface, pop-outs of concrete Rust streaks at cracks in bottom Open cracks up to 1/8 in. wide Failure of previous concrete surface repairs 2- Minor spalling of concrete Open cracks up to 1/16 in. wide Water efflorescence on surface 3- Bottom cracks that have "self-healed" 4- Minor temperature or shrinkage cracks Tight, non-open cracks Minor, widely scattered honeycombs 5- No cracking or honeycombing problems noted</p>	5

TANK 425
TABLE C.10-1 (Cont'd)

INTERIOR SHELL CONDITION RATING	
<p style="text-align: center;">Coating Condition</p> <p>2- Concrete surfaces exposed over 40% of area 3- Concrete surfaces exposed over 25% to 40% of area Top coat failure over 50% of area 4- Concrete surfaces exposed over 10% to 25% of area Top coat failure over 25% to 50% of area 5- Concrete surfaces exposed up to 10% of area Top coat failure up to 25% of area No coating present</p>	5
<p style="text-align: center;">Concrete Condition</p> <p>0- Major spalling of concrete surface, large pop-outs, crumbling of concrete Exposed reinforcing steel Wide cracks or evidence of water leaking through bottom 1- Spalling of concrete surface, pop-outs of concrete Rust streaks at cracks Open cracks up to 1/8 in. wide Failure of previous concrete surface repairs 2- Minor spalling of concrete Open cracks up to 1/16 in. wide Water efflorescence on surface 3- Bottom cracks that have "self-healed" 4- Minor temperature or shrinkage cracks Tight, non-open cracks Minor, widely scattered honeycombs 5- No cracking or honeycombing problems noted</p>	5

TANK 425
TABLE C.10-1 (Cont'd)

INTERIOR ROOF CONDITION RATING	
<p style="text-align: center;">Coating Condition</p> <p>2- Concrete surfaces exposed over 40% of area 3- Concrete surfaces exposed over 25% to 40% of area Top coat failure over 50% of area 4- Concrete surfaces exposed over 10% to 25% of area Top coat failure over 25% to 50% of area 5- Concrete surfaces exposed up to 10% of area Top coat failure up to 25% of area No coating present Aluminum dome roof</p>	5
<p style="text-align: center;">Concrete Condition</p> <p>0- Major spalling of concrete surface, large pop-outs, crumbling of concrete Exposed reinforcing steel Wide cracks or evidence of water leaking 1- Spalling of concrete surface, pop-outs of concrete Rust streaks at cracks Open cracks up to 1/8 in. wide Failure of previous concrete surface repairs 2- Minor spalling of concrete Open cracks up to 1/16 in. wide Water efflorescence on surface 3- Bottom cracks that have "self-healed" 4- Minor temperature or shrinkage cracks Tight, non-open cracks Minor, widely scattered honeycombs 5- No cracking or honeycombing problems noted</p>	5

TANK 425
TABLE C.10-1 (Cont'd)

INTERIOR LADDER CONDITION RATING	
<p style="text-align: center;">Steel Condition</p> <p>0- Metal loss on rung, side rail, or bracket of over 40% T Ladder distorted or bent 3 in. or more from original position</p> <p>1- Metal loss of 25% to 40% T Missing attachment bolts or cracked welds General instability</p> <p>2- Metal loss of 10% to 25% T Loose bolts</p> <p>3- Metal loss of 5% to 10% T</p> <p>4- Metal loss of less than 5% T, or surface rust</p> <p>5- No deterioration No ladder</p>	3
<p style="text-align: center;">Safety Device</p> <p>0- Device improperly attached and/or in danger of coming loose No safety device present or device inoperable</p> <p>2- Present safety device works rough</p> <p>5- Safety device installed properly and in good condition No ladder</p>	5
<p style="text-align: center;">Dimensions</p> <p>0- 13 in. or less clear distance between side rails Rungs greater than 12 in. center-to-center Lacks non-slip rungs, 7 in. toe clearance or 30 in. head clearance</p> <p>3- 13 in. to 15 in. clear distance between side rails Side rails less than 2 in. x 3/8 in.</p> <p>4- Side rails less than 2-1/2 in. x 3/8 in.</p> <p>5- 16 in. or greater clear distance between side rails No ladder</p>	3
<p style="text-align: center;">Ease of Climbing</p> <p>0- Major obstructions limiting climbing surface</p> <p>1- Difficult transition to balcony (i.e. must climb over handrail)</p> <p>2- Improper or erratic rung spacing</p> <p>3- Minor obstructions connected to side rails</p> <p>5- Ladder clear of obstructions and easy to climb No ladder</p>	3

TANK 425
TABLE C.10-1 (Cont'd)

PAINTING SCHEDULES CONDITION RATING	
Exterior Surface Schedule 1- 0 to 1 years 2- 2 to 4 years 3- 5 or more years	3
Interior Surface Schedule 1- 0 to 1 years 2- 2 to 4 years 3- 5 or more years	3

**TANK 425 SUMMARY CONDITION EVALUATION STANDARDS
TABLE C.10-2**

External Summary Concrete Ground Water Tank

Foundations

1. Site drainage	<u>5</u>
2. Foundation projection	<u>5</u>
3. Concrete condition	<u>5</u>
4. Grout condition	<u>5</u>

Base of Tower - N/A

5. Steel condition	<u>6</u>
6. Base plate/ring	<u>6</u>
7. Anchor bolts	<u>6</u>
8. Anchor bolt chairs	<u>6</u>

Columns - N/A

9. Alignment	<u>6</u>
10. Coating condition	<u>6</u>
11. Steel condition	<u>6</u>

Riser - N/A

12. Alignment	<u>6</u>
13. Coating condition	<u>6</u>
14. Steel Condition	<u>6</u>
15. Riser Manhole	<u>6</u>

Shell Ladder

16. Steel condition	<u>5</u>
17. Safety device	<u>5</u>
18. Dimensions	<u>0</u> width 11-1/8 in.
19. Ease of climbing	<u>5</u>

Diagonal Bracing - N/A

20. Steel condition	<u>6</u>
21. Connections	<u>6</u>
22. Adjustment	<u>6</u>
23. Alignment	<u>6</u>
24. Coating condition	<u>6</u>

Truck Door/Man Door - N/A

1. Steel condition	N/A
2. Connections	N/A
3. Truck door	N/A
4. Man door	N/A
5. Coating condition	N/A

Riser Rods - N/A

25. Steel condition	<u>6</u>
26. Connections	<u>6</u>
27. Adjustment	<u>6</u>
28. Alignment	<u>6</u>
29. Coating condition	<u>6</u>

Struts - N/A

30. Coating condition	<u>6</u>
31. Steel condition	<u>6</u>
32. Connection to column	<u>6</u>

Balcony - N/A

33. Coating condition	<u>6</u>
34. Steel condition	<u>6</u>
35. Drainage	<u>6</u>
36. Handrail	<u>6</u>

Tank Bowl - N/A

37. Coating condition	<u>6</u>
38. Steel condition	<u>6</u>

Shell Condition

39. Coating condition	<u>5</u>
40. Concrete condition	<u>5</u>
41. Container manhole	<u>1</u>
42. Overflow	<u>2</u>

Roof Condition

43. Coating condition	<u>5</u>
44. Concrete condition	<u>5</u>
45. Roof-to-vent	<u>5</u>
46. Roof vent/opening	<u>0</u> no dedicated vent
47. Roof manway	<u>0</u> not locked & broken gasket

Roof Ladder

48. Steel condition	<u>5</u>
49. Safety device	<u>5</u>
50. Dimensions	<u>5</u>
51. Ease of Climbing	<u>5</u>

Internal Summary Concrete Ground Water Tank

Tank Bottom

52. Coating condition	<u>5</u>
53. Concrete condition	<u>5</u>

Interior Shell

54. Coating condition	<u>5</u>
55. Concrete condition	<u>5</u>

Interior Roof

56. Coating condition	<u>5</u>
57. Concrete condition	<u>5</u>

Riser - N/A

58. Coating condition	<u>6</u>
59. Steel condition	<u>6</u>
60. Safety Grating	<u>6</u>

Condition Evaluation Ratings

Safety Rating	82
Structural Rating	100
*Exterior PM Rating	100
*Interior PM Rating	100
Overall Rating	95

*PM = Painting Maintenance

Interior Ladders

61. Structural condition	<u>3</u>
62. Safety device	<u>5</u>
63. Dimensions	<u>3</u>
64. Ease of climbing	<u>3</u>

Painting Schedules

65. Exterior	<u>3</u>
66. Interior	<u>3</u>

TANK 707

EXTERIOR SURFACES:

DESCRIPTION:

Construction: concrete
Type: single pedestal

OVERFLOW PIPE:

Size: 8 in. (152 mm) diameter
Above Grade Air Break: no
Drain Basin:
Location: 20 ft (6.1 m) southeast of tank
Size: approx. 2 ft 4 in. (0.7 m) x 5 ft (1.5 m) x 6 ft 3 in. (1.9 m),
deep
Cover: 24 in. (610 mm) square

CONCRETE APRON:

Location: around base of pedestal
Projection: 4 ft (1.2 m) from pedestal

PEDESTAL ACCESS DOOR:

Size: 2 ft 3 in. (0.7 m) x 7 ft 2 in. (2.2 m)
Location: east side of pedestal
Locked: yes

PEDESTAL MANHOLES: 18-1/2 in. (470 mm) x 26-3/4 in. (680 mm)

ACCESS TUBE PROJECTION:

Cover: 8 ft 4 in. (2.5 m) diameter x 4 in. (102 mm) thick

Manhole:

Size: 25-3/4 in. (654 mm) square
Type: hinged
Curb: 2-1/2 in. (645 mm) tall
Gasket: yes
Locked: no

Safety Railing:

Diameter: 7 ft 3 in. (2.2 m)
Handrail:
Height: 40 in. (1016 mm)
Size: 1-7/8 in. (48 mm) diameter
Mid-Rails:
Number: 2
Size: 1 in. (25 mm) x 5/16 in. (8 mm), flat bar
Uprights: 1-7/8 in. (48 mm) diameter
Toe Bar:
Size: 6 in. (152 mm) x 5/8 in. (16 mm), channel
Height: 8 in. (203 mm)

TANK 707

OBSTRUCTION LIGHTS:

Singe Globe: northeast, northwest, and south perimeter

Double Globe: east, southwest, northwest

INTERIOR DRY SURFACES:

PEDESTAL:

Construction: concrete

Size: approx. 12 ft 9-1/2 in. (3.9 m) diameter

Thickness: 18 in. (457 mm)

INTERIOR DRY PIPING:

Number: 2

Size: 16 in. (406 mm) diameter and 8 in. (203 mm) diameter

Pedestal Brackets:

Size: 6-1/2 in. (165 mm) x 6 in. (152 mm), WF beams

Spacing: 21 ft 4 in. (6.5 m)

Transition Cone: 4-5/8 in. (118 mm) x 4-5/8 in. (118 mm), I-beams

Access Tube Bracket:

Location: overflow pipe only

Size: 2 in. (51 mm) x 3/4 in. (19 mm), flat bar and 2-3/8 in. (60 mm) x 5/16 in. (8 mm), flat bar

STAIRS:

Number of Stairs: 149

Size: 9 in. (229 mm) to 13-1/2 in. (343 mm) x 24-1/4 in. (616 mm)
minimum

Spacing: 9 in. (229 mm)

Safety Railing:

Handrail:

Height: 41 in. (1041 mm) to 41-3/4 in. (1061 mm)

Size: 1-1/8 in. (29 mm) diameter

Uprights:

Size: 1-1/8 in. (29 mm) diameter

Spacing: 9 in. (229 mm) to 10 in. (254 mm)

TANK 707

PEDESTAL PLATFORM:

Location: top of pedestal

Type: steel grate

Safety Railing:

Handrail:

Height: 40-3/4 in. (1035 mm)

Size: 1-1/8 in. (29 mm) diameter

Uprights:

Size: 1-1/8 in. (29 mm) diameter

Spacing: 4-3/4 in. (121 mm)

Toe Bar: none

Access Opening:

Size: approx. 4 ft (1.2 m) x 6 ft 6 in. (2 m)

Closure Chains: none

Closable Cover: none

ACCESS TUBE:

Size: 6 ft 6 in. (2 m) diameter

Concrete: 6 in. (152 mm) thick

Vents:

Number: 4

Size: 6 in. (152 mm) x 13 in. (330 mm) to 15 in. (381 mm)

Screening: 8 mesh

ACCESS TUBE LADDER:

Number of Sections: 4

Number of Rungs: 18 and 10 per section

Width: 16 in. (406 mm)

Side Rails: 2 in. (51 mm) x 1 in. (25 mm)

Rung Size: 3/4 in. (19 mm) diameter

Spacing: 10-1/4 in. (260 mm) on center

Toe Room: 7-1/4 in. (184 mm) minimum

Head Clearance: 20 in. (508 mm) minimum

Brackets:

Construction: welded and bolted

Size: 1-1/2 in. (38 mm) x 1/4 in. (6 mm), flat bar x 2-1/2 in.
(64 mm) to 6 in. (152 mm) long

Safe-Climbing Device: none

TANK 707

Safety Cage:

Depth: 22 in. (559 mm)

Width: 25-1/2 in. (648 mm)

Vertical Bars:

Size: 1 in. (25 mm) x 3/16 in. (9 mm), flat bar

Spacing: 14-1/2 in. (368 mm)

Horizontal Bars:

Size: 1 in. (25 mm) x 3/16 in. (9 mm), flat bar

Spacing: 17 in. (432 mm)

ACCESS TUBE PLATFORMS:

Number: 3

Type: steel grate

Safety Railing:

Handrail:

Height: 40-3/4 in. (1035 mm) and 41-3/4 in. (1061 mm)

Size: 1-1/8 in. (29 mm) and 1-1/2 in. (38 mm) diameter

Mid-Rails:

Number: 2

Size: 3/4 in. (19 mm)

Uprights: 1-1/8 in. (29 mm) and 1-1/2 in. (38 mm) x 3/4 in. (19 mm)

Toe Bar:

Location: bottom 2 platforms only

Size: 6 in. (152 mm) x 3/4 in. (19 mm), channel

Height: 7-1/4 in. (184 mm) above platforms

Access Opening:

Size: approx. 4 ft (1.2 m) x 6 ft 6 in. (2 m)

Closure Chains: none

INTERIOR WET SURFACES:

ROOF SUPPORT SYSTEM: 35 rafters

INTERIOR CONTAINER PLATFORMS:

Size: 29-1/2 in. (749 mm) wide

Safety Railing:

Handrail: 1-3/4 in. (45 mm) diameter

Mid-Rails:

Number: 2

Size: 1 in. (25 mm) x 1/4 in. (6 mm), flat bar

Uprights: 1-3/4 in. (45 mm) diameter

Access Opening:

Size: 23-5/8 in. (600 mm) square

Curb: 1-1/2 in. (38 mm)

Closable Cover: top platform only

TANK 707

INTERIOR WET CONTAINER LADDER:

Width: 15-3/4 in. (400 mm)

Side Rails: 1-1/2 in. (38 mm) x 3/4 in. (19 mm)

Rung Size: 3/4 in. (19 mm) diameter

Spacing: 10-1/4 in. (260 mm) on center

Toe Room: 5-3/4 in. (146 mm)

Brackets:

Construction: welded and bolted

Size: 1-1/2 in. (38 mm) x 3/4 in. (19 mm)

Spacing: approx. 5 ft 6 in. (1.7 m)

Safe-Climbing Device: none

Safety Cage:

Depth: 23-1/4 in. (591 mm)

Width: 23-1/4 in. (591 mm)

Vertical Bars:

Size: 1 in. (25 mm) x 1/4 in. (6 mm), flat bar

Spacing: 16-1/2 in. (419 mm)

Horizontal Bars:

Size: 1 in. (25 mm) x 1/4 in. (6 mm), flat bar

Spacing: 17 in. (432 mm)

OVERFLOW:

Inlet Type: funnel

Location: approx. 12 in. (305 mm) below top of cone

TANK 707 EVALUATION OF CONCRETE TANKS
TABLE C.11-1

FOUNDATION AND SITE-RELATED CONDITION RATING	
<p style="text-align: center;">Site drainage</p> 0- Deep depressions and water around foundations and/ or site saturated long after rain 1- Mild depressions around foundations and/or water ponds adjacent to tank 2- Water flows toward foundation 3- Water ponds on site, but not adjacent to foundation 4- Flat site 5- Ground well sloped away from foundations	4
<p style="text-align: center;">Foundation Projection and Settlement</p> 0- Concrete foundation tops buried 1- Concrete foundation tops even with ground and covered with vegetation and debris 2- Concrete foundation tops even with ground and clean 3- Concrete foundation tops with 1 in. to 2 in. projection 4- Concrete foundation tops with 2 in. to 6 in. or 12 in. to 24 in. projection 5- Concrete foundation tops with 6 in. to 12 in. projection	5
<p style="text-align: center;">Concrete Condition</p> 0- Concrete soft, crumbling and/or easily removed and/or hollow sound when tapped Exposed rebar that is corroded 1- Same as 0 except foundation still has basic original shape and/or Exposed rebar with minor surface corrosion and/or open cracks up 1/4" wide 2- Surface crumbling, but can be chipped to sound concrete, open cracks up to 1/8" wide 3- Some surface spalling, but solid sounding and/or deep cracks up to 1/16" wide Hollow sounding areas 4- Minor surface cracks or deficiencies. 5- Smooth surface with no cracks or deteriorations.	5
<p style="text-align: center;">Grout Condition / Sealant</p> 0- Grout greater than 40% gone 2- Grout 20 to 40% gone 3- Grout 5 to 20% gone 4- Some pieces can be removed and/or grout less than 5% gone 5- Cracks and minor chips, but intact	5

TANK 707
TABLE C.11-3 (Cont'd)

INTERIOR DRY STAIRS	
<p style="text-align: center;">Steel Condition</p> 0- Metal loss on stairs over 40% T Stairs distorted or bent 1- Metal loss of 25% to 40% T Missing attachment bolts or cracked welds General instability 2- Metal loss of 10% to 25% T Loose bolts 3- Metal loss of 5% to 10% T 4- Metal loss of less than 5% T, or surface rust 5- No deterioration	5
<p style="text-align: center;">Safety Railing</p> 0- No safety railing or safety railing broken 5- Safety railing in good condition No shell ladder or stairs	5
<p style="text-align: center;">Dimensions</p> 0- Stairs vary from OSHA requirements 5- Stairs meet OSHA requirements	5
<p style="text-align: center;">Ease of Climbing</p> 0- Major obstructions limiting climbing surface 1- Difficult transition to platforms (i.e. must climb over handrail) 2- Improper or erratic stairs spacing 3- Obstructions 5- Stairs clear of obstructions and easy to climb No shell ladder or stairs present	5

TANK 707
TABLE C.11-3 (Cont'd)

BOWL CONE/DOME CONDITION RATING	
<p style="text-align: center;">Coating Condition</p> <p>2 - Sound concrete surfaces exposed over 50% of area 3 - Sound concrete surfaces exposed 25% to 50% of area 4 - Sound concrete surfaces exposed 0% to less than 25% of area 5 - No problems noted for coating No coating present</p>	5
<p style="text-align: center;">Concrete Condition</p> <p>0- Major spalling of concrete surface, large pop-outs, crumbling of concrete Water leaking or flowing from cracks in wall Water leaks at the shell-to-bottom joint 1- Spalling of concrete surface, pop-outs of concrete Rust streaks at cracks in wall Exposed rebar with minor surface corrosion Open cracks up to 1/4 in. wide Failure of previous concrete surface repairs 2- Minor spalling of concrete Open cracks up to 1/8 in. wide Water efflorescence on surface 3- Wall cracks that have "self-healed" Open cracks up to 1/16 in. wide 4- Minor temperature or shrinkage cracks Tight, non-open cracks Minor, widely scattered honeycombs 5- No cracking or honeycombing problems noted</p>	5
<p style="text-align: center;">Shell or Bowl Manhole</p> <p>0- Manhole leaking water 1- Only one manhole less than 20 in. diameter 2- Only one manhole with dimensions not less than 20 in. diameter 3- Two or more shell manholes but none 30 in. diameter or larger Missing or parts 5- Two or more shell manholes (one 30 in. diameter and others not less than 20 in. diameter)</p>	5
<p style="text-align: center;">Overflow</p> <p>0- More than 1/3 of the support brackets broken Pipe clogged or broken Holes of greater than 1 in. diameter in pipe 1- Less than 1/3 of the brackets broken Holes smaller than 1 in. diameter in pipe Overflow does not have a weir box or anti-vortex plate 2- Ineffective protective screen No screen or flap gate on discharge end of pipe Pipe does not extended to grade Overflow discharges through perimeter roof vent No visible air break 3- No splash block below overflow discharge 4- Rust on overflow pipe 5- No rust or deterioration</p>	2

TANK 707
TABLE C.11-3 (Cont'd)

ROOF CONDITION RATING	
<p style="text-align: center;">Coating Condition</p> <p>2 - Sound concrete surfaces exposed over 50% of area 3 - Sound concrete surfaces exposed 25% to 50% of area 4 - Sound concrete surfaces exposed 0% to less than 25% of area 5 - No problems noted for coating No coating present No roof (open top tank)</p>	5
<p style="text-align: center;">Concrete Condition</p> <p>0- Major spalling of concrete surface, large pop-outs, crumbling of concrete Water leaking or flowing from cracks in wall 1- Spalling of concrete surface, pop-outs of concrete Rust streaks at cracks in wall Exposed rebar with minor surface corrosion Open cracks up to 1/4 in. wide Failure of previous concrete surface repairs 2- Minor spalling of concrete Open cracks up to 1/8 in. wide Water efflorescence on surface 3- Wall cracks that have "self-healed" Open cracks up to 1/16 in. wide 4- Minor temperature or shrinkage cracks Tight, non-open cracks Minor, widely scattered honeycombs 5- No cracking or honeycombing problems noted No roof (open top tank)</p>	5
<p style="text-align: center;">Roof-to-Vent Connection</p> <p>0- Connection failed, vent no longer connected Wide cracks in concrete Evidence of water entry into tank 1- Spalling of concrete 2- Vent mounting bolts missing 3- Minor or tight concrete cracks 4- Previous concrete repairs intact 5- No deterioration at connection No roof (open top tank)</p>	5
<p style="text-align: center;">Roof Vent and Roof Opening</p> <p>0- No vent present Vent clogged or inoperative Screen missing, torn, or improperly placed 1- Vent deteriorated or damaged 2- Vent covered with rust Bolts or parts missing or loose 4- Minor rust on vent 5- No rust or deterioration No roof (open top tank)</p>	0
<p style="text-align: center;">Roof Manway</p> <p>0- Manway without locking features or lock missing 1- Allows water into tank from roof 3- Any dimension less than 24 in. diameter, 4 in. curb or 2 in. overlap 5- Manway locked and water tight All dimensions equal or greater than 24 in. diameter, 4 in. curb or 2 in. overlap No roof (open top tank)</p>	0

TANK 707
TABLE C.11-3 (Cont'd)

ACCESS TUBE LADDER CONDITION RATING	
<p style="text-align: center;">Steel Condition</p> <p>0- Metal loss on rung, side rail, or bracket of over 40% T Ladder distorted or bent 3 in. or more from original position</p> <p>1- Metal loss of 25% to 40% T Missing attachment bolts or cracked welds General instability</p> <p>2- Metal loss of 10% to 25% T Loose bolts</p> <p>3- Metal loss of 5% to 10% T</p> <p>4- Metal loss of less than 5% T, or surface rust</p> <p>5- No deterioration No access tube ladder present</p>	5
<p style="text-align: center;">Safety Device</p> <p>0- Device improperly attached and/or in danger of coming loose No safety device present or device inoperable</p> <p>2- Present safety device works rough</p> <p>5- Safety device installed properly and in good condition No access tube ladder present</p>	5
<p style="text-align: center;">Dimensions</p> <p>0- 13 in. or less clear distance between side rails Rungs greater than 12 in. center-to-center Lacks non-slip rungs, 7 in. toe clearance or 30 in. head clearance</p> <p>3- 13 in. to 15 in. clear distance between side rails Side rails less than 2 in. x 3/8 in.</p> <p>4- Side rails less than 2-1/2 in. x 3/8 in.</p> <p>5- 16 in. or greater clear distance between side rails No access tube ladder present</p>	5
<p style="text-align: center;">Ease of Climbing</p> <p>0- Major obstructions limiting climbing surface</p> <p>1- Revolving ladder</p> <p>2- Improper or erratic rung spacing</p> <p>3- Minor obstructions connected to side rails</p> <p>5- Ladder clear of obstructions and easy to climb No access tube ladder present</p>	5

TANK 707
TABLE C.11-3 (Cont'd)

BOWL CONE/DOME CONDITION RATING	
<p style="text-align: center;">Coating Condition</p> <p>2- Concrete surfaces exposed over 40% of area 3- Concrete surfaces exposed over 25% to 40% of area Top coat failure over 50% of area 4- Concrete surfaces exposed over 10% to 25% of area Top coat failure over 25% to 50% of area 5- Concrete surfaces exposed up to 10% of area Top coat failure up to 25% of area No coating present</p>	5
<p style="text-align: center;">Concrete Condition</p> <p>0- Major spalling of concrete surface, large pop-outs, crumbling of concrete Exposed reinforcing steel Wide cracks or evidence of water leaking through bottom 1- Spalling of concrete surface, pop-outs of concrete Rust streaks at cracks in bottom Open cracks up to 1/8 in. wide Failure of previous concrete surface repairs 2- Minor spalling of concrete Open cracks up to 1/16 in. wide Water efflorescence on surface 3- Bottom cracks that have "self-healed" 4- Minor temperature or shrinkage cracks Tight, non-open cracks Minor, widely scattered honeycombs 5- No cracking or honeycombing problems noted</p>	5

TANK 707
TABLE C.11-3 (Cont'd)

ACCESS TUBE CONDITION RATING	
<p style="text-align: center;">Coating Condition</p> <p>2- Concrete surfaces exposed over 40% of area 3- Concrete surfaces exposed over 25% to 40% of area Top coat failure over 50% of area 4- Concrete surfaces exposed over 10% to 25% of area Top coat failure over 25% to 50% of area 5- Concrete surfaces exposed up to 10% of area Top coat failure up to 25% of area No coating present</p>	5
<p style="text-align: center;">Concrete Condition</p> <p>0- Holes in steel or cracked welds Evidence of leakage Steel thickness less than 1/8 in. Metal loss exceeding 3 in. diameter or 6 in. long, exceeding 10% T deep Rivet heads with 50% deterioration 1- Isolated pitting over 1 in. diameter exceeding 50% T Groove-type pitting exceeding 9 in. long or 25% to 50% T General metal loss exceeding 3 ft x 3 ft area exceeding 25% T General metal loss over the entire access tube exceeding 10% T Rivet heads with 25% deterioration 2- Widely scattered pitting (less than 3 per square foot) exceeding 50% T Scattered groove-type pitting exceeding 9" long of 25% to 50% T 3- Widely scattered pitting (less than 3 per square ft) of 25% to 50% T Scattered groove-type pitting not exceeding 25% T 4- Widely scattered pitting not exceeding 25% T 5- Scattered metal loss not exceeding 10% T</p>	5

TANK 707
TABLE C.11-3 (Cont'd)

INTERIOR ROOF CONDITION RATING	
<p style="text-align: center;">Coating Condition</p> <p>2- Concrete surfaces exposed over 40% of area 3- Concrete surfaces exposed over 25% to 40% of area Top coat failure over 50% of area 4- Concrete surfaces exposed over 10% to 25% of area Top coat failure over 25% to 50% of area 5- Concrete surfaces exposed up to 10% of area Top coat failure up to 25% of area No coating present Aluminum dome roof</p>	5
<p style="text-align: center;">Concrete Condition</p> <p>0- Major spalling of concrete surface, large pop-outs, crumbling of concrete Exposed reinforcing steel Wide cracks or evidence of water leaking 1- Spalling of concrete surface, pop-outs of concrete Rust streaks at cracks Open cracks up to 1/8 in. wide Failure of previous concrete surface repairs 2- Minor spalling of concrete Open cracks up to 1/16 in. wide Water efflorescence on surface 3- Bottom cracks that have "self-healed" 4- Minor temperature or shrinkage cracks Tight, non-open cracks Minor, widely scattered honeycombs 5- No cracking or honeycombing problems noted</p>	5

TANK 707
TABLE C.11-3 (Cont'd)

INTERIOR WET LADDER CONDITION RATING	
<p style="text-align: center;">Steel Condition</p> <p>0- Metal loss on rung, side rail, or bracket of over 40% T Ladder distorted or bent 3 in. or more from original position</p> <p>1- Metal loss of 25% to 40% T Missing attachment bolts or cracked welds General instability</p> <p>2- Metal loss of 10% to 25% T Loose bolts</p> <p>3- Metal loss of 5% to 10% T</p> <p>4- Metal loss of less than 5% T, or surface rust</p> <p>5- No deterioration No ladder</p>	5
<p style="text-align: center;">Safety Device</p> <p>0- Device improperly attached and/or in danger of coming loose No safety device present or device inoperable</p> <p>2- Present safety device works rough</p> <p>5- Safety device installed properly and in good condition No ladder</p>	5
<p style="text-align: center;">Dimensions</p> <p>0- 13 in. or less clear distance between side rails Rungs greater than 12 in. center-to-center Lacks non-slip rungs, 7 in. toe clearance or 30 in. head clearance</p> <p>3- 13 in. to 15 in. clear distance between side rails Side rails less than 2 in. x 3/8 in.</p> <p>4- Side rails less than 2-1/2 in. x 3/8 in.</p> <p>5- 16 in. or greater clear distance between side rails No ladder</p>	5
<p style="text-align: center;">Ease of Climbing</p> <p>0- Major obstructions limiting climbing surface</p> <p>1- Difficult transition to balcony (i.e. must climb over handrail)</p> <p>2- Improper or erratic rung spacing</p> <p>3- Minor obstructions connected to side rails</p> <p>5- Ladder clear of obstructions and easy to climb No ladder</p>	5

TANK 707
TABLE C.11-3 (Cont'd)

PAINTING SCHEDULES CONDITION RATING	
Exterior Surface Schedule 1- 0 to 1 years 2- 2 to 4 years 3- 5 or more years	3
Interior Surface Schedule 1- 0 to 1 years 2- 2 to 4 years 3- 5 or more years	3

**TANK 707 SUMMARY CONDITION EVALUATION STANDARDS
TABLE C.11-2**

External Summary Concrete Ground Water Tank

Foundations

1. Site drainage	<u>4</u>
2. Foundation projection	<u>5</u>
3. Concrete condition	<u>5</u>
4. Grout condition	<u>5</u>

Base of Tower - N/A

5. Steel condition	<u>6</u>
6. Base plate/ring	<u>6</u>
7. Anchor bolts	<u>6</u>
8. Anchor bolt chairs	<u>6</u>

Columns - N/A

9. Alignment	<u>6</u>
10. Coating condition	<u>6</u>
11. Steel condition	<u>6</u>

Riser - N/A

12. Alignment	<u>6</u>
13. Coating condition	<u>6</u>
14. Steel Condition	<u>6</u>
15. Riser Manhole	<u>6</u>

Interior Stairs

16. Steel condition	<u>5</u>
17. Safety device	<u>5</u>
18. Dimensions	<u>5</u>
19. Ease of climbing	<u>5</u>

Diagonal Bracing - N/A

20. Steel condition	<u>6</u>
21. Connections	<u>6</u>
22. Adjustment	<u>6</u>
23. Alignment	<u>6</u>
24. Coating condition	<u>6</u>

Riser Rods - N/A

25. Steel condition	<u>6</u>
26. Connections	<u>6</u>
27. Adjustment	<u>6</u>
28. Alignment	<u>6</u>
29. Coating condition	<u>6</u>

Struts - N/A

30. Coating condition	<u>6</u>
31. Steel condition	<u>6</u>
32. Connection to column	<u>6</u>

Balcony - N/A

33. Coating condition	<u>6</u>
34. Steel condition	<u>6</u>
35. Drainage	<u>6</u>
36. Handrail	<u>6</u>

Tank Shell - N/A

37. Coating condition	<u>6</u>
38. Steel condition	<u>6</u>

Bowl Cone/Dome

39. Coating condition	<u>5</u>
40. Concrete condition	<u>5</u>
41. Container manhole	<u>5</u>
42. Overflow	<u>2</u>

Roof Condition

43. Coating condition	<u>5</u>
44. Concrete condition	<u>5</u>
45. Roof-to-vent	<u>5</u>
46. Roof vent/opening	<u>2</u>
47. Roof manway	<u>0</u> not locked

Access Tube Ladder

48. Steel condition	<u>5</u>
49. Safety device	<u>5</u>
50. Dimensions	<u>0</u> head clearance <30 in.
51. Ease of Climbing	<u>5</u>

Internal Summary Concrete Ground Water Tank

Interior Bowl Cone/Dome

52. Coating condition	<u>5</u>
53. Concrete condition	<u>5</u>

Access Tube

54. Coating condition	<u>5</u>
55. Steel condition	<u>5</u>

Interior Roof

56. Coating condition	<u>5</u>
57. Concrete condition	<u>5</u>

Riser - N/A

58. Coating condition	<u>6</u>
59. Steel condition	<u>6</u>
60. Safety Grating	<u>6</u>

Condition Evaluation Ratings

Safety Rating	83
Sanitary Rating	35
Structural Rating	100
*Exterior PM Rating	95
*Interior PM Rating	100
Overall Rating	83

*PM = Painting Maintenance

Interior Ladders

61. Structural condition	<u>5</u>
62. Safety device	<u>5</u>
63. Dimensions	<u>0</u> head clearance <30 in.
64. Ease of climbing	<u>5</u>

Painting Schedules

65. Exterior	<u>3</u>
66. Interior	<u>3</u>

TANK 1011

ULTRASONIC THICKNESS MEASUREMENTS:

(all readings were taken through coating)

Roof Plates:

Cap: 0.232 in. (5.9 mm)

Upper Fingers: 0.183 in. (4.6 mm)

Lower Fingers: 0.187 in. (4.7 mm)

Shell:

Upper Ring: 0.201 in. to 0.203 in. (5.1 mm)

Lower Ring: 0.237 in. to 0.240 in. (6 mm)

Bottom Plate: 0.270 in. (6.9 mm)

FOUNDATION AND SITE:

SITE:

Size: approx. 70 ft (21.3 m) x 130 ft (39.6 m)

Nearest Structures:

Type: Building 1013 (pump house)

Direction: north

Distance: approx. 12 ft (3.7 m)

Type: building

Direction: northeast

Distance: approx. 95 ft (29 m)

Nearest Overhead Power Lines: none visible

FOUNDATION:

Projection Above Grade:

North: 2 in. (51 mm) to 12 in. (305 mm)

South: 11 in. (279 mm) to 16 in. (406 mm)

East: 10 in. (254 mm) to 12 in. (305 mm)

West: 9 in. (229 mm) to 12 in. (305 mm)

Grout: none visible

Sealant: approx. 1/8 in. (3 mm) thick rubber

TANK 1011

EXTERIOR:

DESCRIPTION:

Construction: welded steel
Shell Diameter: approx. 33 ft (10.1 m)
Shell Height: approx. 16 ft 8 in. (5.1 m)
Shell Rings: 2
Roof Type: dome

BOTTOM PLATE PROJECTION: 3-3/4 in. (95 mm) to 4 in. (102 mm)

ANCHOR BOLTS:

Number: 10
Size: 1 in. (25 mm) diameter
Gussets:
Width: 4 in. (102 mm) i/s - i/s
Size: 8 in. (203 mm) x 4 in. (102 mm) x 3/8 in. (9 mm), thick

SHELL MANHOLE:

Location: west side of shell ring #1
Type: flanged and bolted
Size: 24 in. (610 mm) diameter
Neck: 2-3/8 in. (60 mm) to 3-1/8 in. (79 mm) projection x 1/4 in. (6 mm) thick
Bolts:
Number: 24
Size: 5/8 in. (16 mm) diameter x 2 in. (51 mm) long
Cover Plate:
Size: 29-1/2 in. (832 mm) diameter x 1/2 in. (13 mm) thick
Hinged: yes, exterior

OVERFLOW PIPE:

Size: 8 in. (203 mm) diameter
Visible Air Break: 4 in. (102 mm) to 10 in. (254 mm)
Protective Screen: none
Brackets:
Size: 4 in. (102 mm) x 2 in. (51 mm), channel
U-Bolts: 3/8 in. (9 mm) diameter
Funnel: 6 in. (152 mm) diameter

TANK 1011

EXTERIOR LADDER:

Number of Rungs: 12

Distance From Foundation to Lowest Rung: 7 ft (2.1 m)

Width: 17-1/2 in. (445 mm)

Side Rails: 2-7/8 in. (73 mm) x 2-1/2 in. (64 mm)

Rung Size: 1 in. (25 mm) diameter

Spacing: 10-1/2 in. (267 mm)

Toe Room: 5-1/8 in. (130 mm)

Brackets:

Construction: welded and bolted

Size: 2-1/2 in. (64 mm) x 3/8 in. (9 mm), flat bar

Spacing: 4 ft 6 in. (1.4 m)

Safe-Climbing Device: none

Safety Cage:

Depth: 27-1/2 in. (699 mm)

Vertical Bars:

Size: 2-1/2 in. (654 mm) x 1 in. (25 mm), flat bar

Spacing: 12 in. (305 mm)

Horizontal Bars:

Size: 2-3/8 in. (57 mm) x 1/4 in. (6 mm), flat bar

Spacing: 52-1/2 in. (1334 mm)

Vandal Deterrent: none

ROOF SAFETY RAILING:

Location: adjacent to roof manhole, from manhole to vent, around vent

Handrail:

Height: 42-1/2 in. (1080 mm) minimum

Size: 1-5/8 in. (41 mm) diameter

Mid-Rail: 2-1/4 in. (57 mm) x 3/16 in. (5 mm), flat bar

Uprights: 2-3/8 in. (60 mm) x 2-3/8 in. (60 mm) x 1/4 in. (6 mm), angle

Toe Bar: 6 in. (152 mm) x 3/16 in. (5 mm), flat bar

Access Opening:

Size: 27 in. (686 mm) wide

Closure Chains: none

ROOF OPENINGS:

Manhole:

Size: 24 in. (610 mm) diameter

Type: hinged

Curb: 3-3/8 in. (86 mm)

Welded: exterior only

Bolts:

Number: 24

Size: 5/8 in. (16 mm) diameter x 2 in. (51 mm) long

Cover: 29 in. (737 mm) diameter x 1/2 in. (13 mm) thick

Locked: no

TANK 1011

Roof Manhole/Vent:

Type: removable, hinged cover

Size: 24 in. (610 mm) diameter

Neck Height: 2-3/4 in. (70 mm)

Screen:

Size: perforated plate w/ 3/16 in. (5 mm) diameter holes

Orientation: horizontal

Cover: 27-7/8 in. (708 mm) diameter

TABLE C.12-1

Tank 1011 Exterior Coating and Metal Condition

	Coating Thickness		% Failure to		Metal Loss	
	Range	Typical	Underlying Coating	Rust	Typical	Deepest
Shell	11 mils to 20.5 mils (281 μm to 523 μm)	15 mils (381 μm)	Negligible	Negligible	Negligible	Negligible
Roof	12 mils to 23 mils (305 μm to 587 μm)	14.5 mils (370 μm)	Negligible	Negligible	Negligible	Negligible

INTERIOR:

ROOF SUPPORT SYSTEM:

Rafters:

Number: 12

Size: 4 in. (102 mm) x 2 in. (51 mm), I-beams

Circumferential Stiffeners:

Cap:

Diameter: 4 ft (1.2 m)

Size: 4 in. (102 mm) x 2 in. (51 mm), rolled channel

Perimeter: 4 in. (102 mm) x 2 in. (51 mm), channel

Purlins: 2-1/4 in. (57 mm) x 1 in. (25 mm), angles

INTERIOR LADDER:

Width: 16 in. (406 mm)

Side Rails: 2-1/2 in. (61 mm) x 3/8 in. (9 mm), flat bar

Rung Size: 3/4 in. (19 mm) diameter

Spacing: 10-1/4 in. (260 mm)

Toe Room: 10-1/2 in. (268 mm)

Head Clearance: 22-1/2 in. (572 mm)

Brackets:

Construction: welded

Size: 2-1/2 in. (61 mm) x 1/2 in. (13 mm), flat bar x 9-1/2 in. (241 mm) long

Spacing: approx. 7 ft (2.1 m)

Safe-Climbing Device: none

TANK 1011

CATHODIC PROTECTION SYSTEM: none

OVERFLOW:

Inlet Type: funnel

Location: approx. 12 in. (305 mm) below roof-to-shell connection

TABLE C.12-2
Tank 1011 Interior Coating and Metal Condition

	Coating Thickness		% Failure to		Metal Loss	
	Range	Typical	Primer	Rust	Typical	Deepest
Roof	13.5 mils to 41 mils (344 μm to 1046 μm)	21 mils (536 μm)	Negligible	Negligible	Negligible	Negligible
Shell	23 mils to 26 mils (587 μm to 663 μm)	-	Negligible	Negligible	Negligible	Negligible

TANK 1011 EVALUATION OF STEEL GROUND WATER TANKS
TABLE C.12-3

FOUNDATION AND SITE-RELATED CONDITION RATING	
<p style="text-align: center;">Site drainage</p> 0- Deep depressions and water around foundations and/ or site saturated long after rain 1- Mild depressions around foundations and/or water ponds adjacent to tank 2- Water flows toward foundation 3- Water ponds on site, but not adjacent to foundation 4- Flat site 5- Ground well sloped away from foundations	5
<p style="text-align: center;">Foundation Projection and Settlement</p> 0- Concrete foundation tops buried 1- Concrete foundation tops even with ground and covered with vegetation and debris 2- Concrete foundation tops even with ground and clean 3- Concrete foundation tops with 1 in. to 2 in. projection 4- Concrete foundation tops with 2 in. to 6 in. or 12 in. to 24 in. projection 5- Concrete foundation tops with 6 in. to 12 in. projection	5
<p style="text-align: center;">Concrete Condition</p> 0- Concrete soft, crumbling and/or easily removed and/or hollow sound when tapped Exposed rebar that is corroded 1- Same as 0 except foundation still has basic original shape and/or Exposed rebar with minor surface corrosion and/or open cracks up 1/4" wide 2- Surface crumbling, but can be chipped to sound concrete, open cracks up to 1/8" wide 3- Some surface spalling, but solid sounding and/or deep cracks up to 1/16" wide Hollow sounding areas 4- Minor surface cracks or deficiencies 5- Smooth surface with no cracks or deteriorations	5
<p style="text-align: center;">Grout Condition / Sealant</p> 0- Grout greater than 40% gone 2- Grout 20 to 40% gone 3- Grout 5 to 20% gone 4- Some pieces can be removed and/or grout less than 5% gone 5- Cracks and minor chips, but intact	5

TANK 1011
TABLE C.12-3 (Cont'd)

CHIME AND ANCHORAGE CONDITION RATING	
<p style="text-align: center;">Base of Shell</p> <p>0- Metal loss greater than 50% T Spot pitting of 50% to 75% T</p> <p>1- Metal loss of 25% to 50% T Spot pitting of 25% to 50% T Rust over 50% to 75% of surface</p> <p>2- Metal loss up to 25% T Spot pitting less than 25% T Rust over 25% to 50% of surface</p> <p>3- Metal loss not exceeding 10% T Rust over 10% to 25% of surface</p> <p>4- General surface rust with only slight metal loss or minor pitting</p> <p>5- No visible deterioration</p>	4
<p style="text-align: center;">Chime Projection</p> <p>0- Holes in steel, bent plate Metal loss >75% T Cracked welds at bottom lap welds Water leaking from shell, shell-to-bottom joint or from beneath bottom</p> <p>1- Metal loss greater than 50% T Spot pitting exceeding 75% T.</p> <p>2- Chime projection less than 1/2" or thickness less than 1/8"</p> <p>3- Metal loss greater than 25% T Spot pitting less than 25% T Rust over 25% to 50% of surface Soil or debris covers all or parts of chime</p> <p>4- Metal loss not exceeding 25% T Deteriorated edges of chime General surface rust with only slight metal loss or minor pitting.</p> <p>5- No visible deterioration</p>	5
<p style="text-align: center;">Anchor Bolts</p> <p>0- Missing nuts Metal loss >1/3 original diameter</p> <p>1- Metal loss on nuts of 1/4 T or greater Metal loss on bolts of 1/4 to 1/3 original diameter</p> <p>2- Metal loss on nut <1/4 T Metal loss on bolt of 1/8 to 1/4 original diameter</p> <p>3- Loose nuts or scaled rust on bolts</p> <p>4- Paint failure and minor surface rust on bolts</p> <p>5- No visible deterioration No anchors</p>	5
<p style="text-align: center;">Anchor Bolts and Chairs</p> <p>0- Missing or cracked welds Missing or corroded rivets >50%</p> <p>1- Bent top plate</p> <p>3- Corrosion and/or debris inside chairs</p> <p>5- Chairs clean and well painted No anchors</p>	5

TANK 1011
TABLE C.12-3 (Cont'd)

SHELL LADDER CONDITION RATING	
<p style="text-align: center;">Steel Condition</p> <p>0- Metal loss on rung, side rail, or bracket of over 40% T Ladder distorted or bent 3 in. or more from original position.</p> <p>1- Metal loss of 25% to 40% T Missing attachment bolts or cracked welds General instability</p> <p>2- Metal loss of 10% to 25% T Loose bolts</p> <p>3- Metal loss of 5% to 10% T</p> <p>4- Metal loss of less than 5% T, or surface rust</p> <p>5- No deterioration or no shell ladder</p>	5
<p style="text-align: center;">Safety Device</p> <p>0- Device improperly attached and/or in danger of coming loose No safety device present or device inoperable</p> <p>2- Present safety device works rough</p> <p>5- Safety device installed properly and in good condition No shell ladder</p>	5
<p style="text-align: center;">Dimensions</p> <p>0- 13 in. or less clear distance between side rails Rungs greater than 12 in. center-to-center. Lacks non-slip rungs, 7 in. toe clearance or 30 in. head clearance</p> <p>3- 13 in. to 15 in. clear distance between side rails Side rails less than 2 in. x 3/8 in.</p> <p>4- Side rails less than 2-1/2 in. x 3/8 in.</p> <p>5- 16 in. or greater clear distance between side rails No shell ladder</p>	0
<p style="text-align: center;">Ease of Climbing</p> <p>0- Major obstructions limiting climbing surface</p> <p>1- Difficult transition to balcony (i.e. must climb over handrail)</p> <p>2- Improper or erratic rung spacing</p> <p>3- Minor obstructions connected to side rails</p> <p>5- Ladder clear of obstructions and easy to climb No shell ladder</p>	5

TANK 1011
TABLE C.12-3 (Cont'd)

SHELL CONDITION RATING	
<p style="text-align: center;">Coating Condition</p> <p>0 - Exposed steel area more than 40%</p> <p>1 - Exposed steel area 20% to 40%</p> <p>2 - Exposed steel area 10% to 20%</p> <p>3 - Exposed steel area 5% to 10%</p> <p>Exposed underlying coating area more than 40%</p> <p>Poor coating appearance</p> <p>4 - Exposed steel area 1% to 5%</p> <p>Exposed underlying coating area 5% to 40%</p> <p>5 - Exposed steel area less than 1%</p> <p>Exposed underlying coating less than 5% area</p>	5
<p style="text-align: center;">Steel Condition</p> <p>0 – Spot pitting over 50% T</p> <p>Rust over 75% or more of the surface</p> <p>Upper course steel thickness less than 1/8"</p> <p>General metal loss over 3" diameter and larger or 8" and longer</p> <p>Suspect repairs if shell plate exceeds 1/2" (square door corners, lap patches)</p> <p>Shell nozzles >4" diameter</p> <p>1 – Spot pitting of 25% to 50% T</p> <p>Rust over 50% to 75 % of surface</p> <p>Weld spacing around nozzles <3" for standard tanks or <4" for high strength steel</p> <p>2 – Spot pitting less than 25%</p> <p>Rust over 25% to 50% of surface</p> <p>3 – Rust over 10% to 25% of surface</p> <p>4 – Rust over 1% to 10% of surfaces</p> <p>5 – Rust over less than 1% of surfaces</p>	5
<p style="text-align: center;">Shell Manhole</p> <p>0- Manhole leaking water</p> <p>1- Only one manhole less than 20 in. diameter</p> <p>2- Only one manhole with dimensions not less than 20 in. diameter</p> <p>3- Two or more shell manholes but none 30 in. diameter or larger</p> <p>Missing or parts</p> <p>5- Two or more shell manholes (one 30 in. diameter and others not less than 20 in. diameter)</p>	1
<p style="text-align: center;">Overflow</p> <p>0- More than 1/3 of the support brackets broken</p> <p>Pipe clogged or broken</p> <p>Holes of greater than 1 in. diameter in pipe</p> <p>Stub overflow discharges near top of shell</p> <p>1- Less than 1/3 of the brackets broken</p> <p>Holes smaller than 1 in. diameter in pipe</p> <p>Overflow does not have a weir box or anti-vortex plate</p> <p>2- Ineffective protective screen</p> <p>No screen or flap gate on discharge end of pipe</p> <p>Pipe does not extended to grade</p> <p>Overflow discharges through perimeter roof vent</p> <p>No visible air break</p> <p>3- No splash block below overflow discharge</p> <p>4- Rust on overflow pipe</p> <p>5- No rust or deterioration</p>	2

TANK 1011
TABLE C.12-3 (Cont'd)

ROOF CONDITION RATING	
<p style="text-align: center;">Coating Condition</p> <p>0 - Exposed steel area more than 40% 1 - Exposed steel area 20% to 40% 2 - Exposed steel area 10% to 20% 3 - Exposed steel area 5% to 10% Exposed underlying coating area more than 40% Poor coating appearance 4 - Exposed steel area 1% to 5% Exposed underlying coating area 5% to 40% 5 - Exposed steel area less than 1% Exposed underlying coating less than 5% area Aluminum dome roof or no roof</p>	5
<p style="text-align: center;">Steel Condition</p> <p>0- Spot pitting over 50% T or holes in roof Rust over 75% or more of surface or leak Steel thickness less than 1/8" over 10"x10" area Significant roof distortions over large area 1- Spot pitting of 25% to 50%T Rust over 50% to 75% of surface 2- Spot pitting less than 25%T Rust over 25% to 50% of surface Minor roof distortion 3- Rust over 10% to 25% of surface 4- Rust over 1% to 10% of surface 5- Rust over less than 1% of surface No roof (open top tank)</p>	5
<p style="text-align: center;">Roof-to-Vent Connection</p> <p>0- Finial or vent connection failed / disconnected Holes greater than 1" diameter CP hand holes open or covers missing Evidence of water entry into tank 1- Holes around finial or vent less than 1" diameter 2- Metal loss around vent or finial of 50% T or greater Missing bolts or cracked welds 3- Rust and/or metal loss of less than 50% T 4- Minor corrosion at connection 5- No rust or deterioration at connection – or no roof (open top tank)</p>	5
<p style="text-align: center;">Roof Vent and Roof Opening</p> <p>0- No vent present Vent clogged or inoperative Screen missing, torn, or improperly placed 1- Vent deteriorated or damaged 2- Vent covered with rust Bolts or parts missing or loose 4- Minor rust on vent 5- No rust or deterioration – or no roof (open top tank)</p>	0
<p style="text-align: center;">Roof Manway</p> <p>0- Manway without locking features or lock missing 1- Allows water into tank from roof 3- Any dimension less than 24 in. diameter, 4 in. curb or 2 in. overlap 5- Manway locked and water tight All dimensions equal or greater than 24 in. diameter, 4 in. curb or 2 in. overlap No roof (open top tank)</p>	0

TANK 1011
TABLE C.12-3 (Cont'd)

ROOF LADDER CONDITION RATING	
<p style="text-align: center;">Steel Condition</p> <p>0- Metal loss on rung, side rail, or bracket of over 40% T Ladder distorted or bent 3 in. or more from original position.</p> <p>1- Metal loss of 25% to 40% T Missing attachment bolts or cracked welds General instability</p> <p>2- Metal loss of 10% to 25% T Loose bolts</p> <p>3- Metal loss of 5% to 10% T</p> <p>4- Metal loss of less than 5% T, or surface rust</p> <p>5- No deterioration No roof ladder</p>	5
<p style="text-align: center;">Safety Device</p> <p>0- Device improperly attached and/or in danger of coming loose No safety device present or device inoperable</p> <p>2- Present safety device works rough</p> <p>5- Safety device installed properly and in good condition No roof ladder</p>	5
<p style="text-align: center;">Dimensions</p> <p>0- 13 in. or less clear distance between side rails Rungs greater than 12 in. center-to-center. Lacks non-slip rungs, 7 in. toe clearance or 30 in. head clearance</p> <p>3- 13 in. to 15 in. clear distance between side rails Side rails less than 2 in. x 3/8 in.</p> <p>4- Side rails less than 2-1/2 in. x 3/8 in.</p> <p>5- 16 in. or greater clear distance between side rails No roof ladder</p>	5
<p style="text-align: center;">Ease of Climbing</p> <p>0- Major obstructions limiting climbing surface</p> <p>1- Revolving ladder</p> <p>2- Improper or erratic rung spacing</p> <p>3- Minor obstructions connected to side rails</p> <p>5- Ladder clear of obstructions and easy to climb No roof ladder</p>	5

TANK 1011
TABLE C.12-3 (Cont'd)

INTERIOR BOTTOM CONDITION RATING	
<p style="text-align: center;">Coating Condition</p> <p>0- Exposed steel over > 40% of the area Blistering to steel over 50% of the area</p> <p>1- Exposed steel over 20% to 40% of the area Blistering to steel over 25% to 50% of the area</p> <p>2- Exposed steel over 10% to 20% of the area Blistering to steel over 20% to 25% of the area Exposed primer over greater than 40%.</p> <p>3- Exposed steel over 5% to 10% of the area Blistering to steel over 10% to 20% of the area Exposed primer over 25% to 40%</p> <p>4- Exposed steel on less than 5% of the area Blistering to steel on less than 10% of the area Exposed primer over 10% to 25%.</p> <p>5- Exposed primer on less than 10% of the surface</p>	5
<p style="text-align: center;">Steel Condition</p> <p>0- Holes in steel or cracked welds Evidence of leakage Metal loss exceeding 3" diameter or 6" long, exceeding 1/8" deep Rivet heads with 50% deterioration Corroded shell-to-bottom fillet weld less than 1/4" in size Edge settlement exceeding API-653 limits General corrosion or pitting w/ remaining thickness of 1/8" or less</p> <p>1- Isolated pitting over 1" diameter w/ remaining thickness of 1/8" or less. Metal loss exceeding 3ft x 3ft area w/ remaining thickness of 3/16" or less. General metal loss over the entire bottom exceeding 1/16" Rivet heads with 25% deterioration Edge settlement exceeding 50% of API-653 limits.</p> <p>2- Widely scattered pitting (less than 3 per square foot) exceeding 1/8" deep Scattered groove-type pitting exceeding 9" long of 1/16" to 1/8" deep.</p> <p>3- Widely scattered pitting (less than 3 per square foot) of 1/16" to 1/8" deep Scattered groove-type pitting not exceeding 1/16" deep Edge settlement up to 50% of API-653 limits</p> <p>4- Scattered pitting not exceeding 1/16" in depth Edge settlement up to 25% of API-653 limits</p> <p>5- Scattered pitting not exceeding 1/32" in depth No visible edge settlement</p>	5

TANK 1011
TABLE C.12-3 (Cont'd)

INTERIOR SHELL CONDITION RATING	
<p style="text-align: center;">Coating Condition</p> <p>0- Exposed steel over > 40% of the area Blistering to steel over 50% of the area</p> <p>1- Exposed steel over 20% to 40% of the area Blistering to steel over 25% to 50% of the area</p> <p>2- Exposed steel over 10% to 20% of the area Blistering to steel over 20% to 25% of the area Exposed primer over greater than 40%.</p> <p>3- Exposed steel over 5% to 10% of the area Blistering to steel over 10% to 20% of the area Exposed primer over 25% to 40%</p> <p>4- Exposed steel on less than 5% of the area Blistering to steel on less than 10% of the area Exposed primer over 10% to 25%.</p> <p>5- Exposed primer on less than 10% of the surface No coating present</p>	5
<p style="text-align: center;">Steel Condition</p> <p>0- Holes in steel Upper shell steel thickness < 1/8" General metal loss >3" diameter General metal loss >8" long and 10% T General metal loss >8" long and 5% T (high-strength steel) Rivet head 50% deteriorated Cracked or missing shell welds Widespread groove type pitting</p> <p>1- Isolated pitting >1" diameter exceeding 50% T Rivet head 25% deteriorated General metal loss of 25% T in any 3' x 3' area General metal loss of 10%T over large areas</p> <p>2- Widely scattered pitting (< 3 per square foot) over 50% T Scattered groove-type pitting > 8" long and 25% to 50% T</p> <p>3- Widely scattered pitting (<3 per square foot) of 25% to 50% T Scattered groove-type pitting < 25% T</p> <p>4- Widely scattered pitting not exceeding 25% T</p> <p>5- Widely scattered metal loss not exceeding 10% T</p>	5

TANK 1011
TABLE C.12-3 (Cont'd)

INTERIOR ROOF CONDITION RATING	
<p style="text-align: center;">Coating Condition</p> <p>0 Exposed steel over 40% Blistering to steel over 50% of the area</p> <p>1 Exposed steel over 20% to 40% of the area Blistering to steel over 20% to 50% of the area</p> <p>2- Exposed steel over 10% to 20% of the area Blistering to steel over 20% to 25% of the area Exposed primer over 40% or more</p> <p>3- Exposed steel over 5% to 10% of the area Blistering to steel over 10% to 20% of the area Exposed primer over 25% to 40%</p> <p>4- Exposed steel on less than 5% of the area Blistering to steel on less than 10% of the area Exposed primer over 10% to 25%</p> <p>5- Exposed primer on less than 10% of the surface</p>	5
<p style="text-align: center;">Steel Condition</p> <p>0- Spot pitting over 50% T or holes in roof Steel thickness less than 1/8" over a 10"x10" area Rivet heads 50% deteriorated Cracked welds Rafters missing or ineffective Visible distortion of rafters, stiffeners, girders or bowing of columns Bolts missing or severely corroded, welds cracked</p> <p>1- Spot pitting over 25% T and over 1" diameter Rivet heads 25% deteriorated General metal loss of 25% T in any 3 ft x 3 ft area Column base plates welded to tank bottom</p> <p>2- Widely scattered pitting (< 3 per square foot) over 50% T Columns visibly out-of-plumb</p> <p>3- Widely scattered pitting (< 3 per square foot) of 25% to 50% T General metal loss of 10% T in the entire roof</p> <p>4- Widely scattered pitting not exceeding 25% T</p> <p>5- Scattered metal loss not exceeding 10% T</p>	5

TANK 1011
TABLE C.12-3 (Cont'd)

INTERIOR LADDER CONDITION RATING	
<p style="text-align: center;">Steel Condition</p> <p>0- Metal loss on rung, side rail, or bracket of over 40% T Ladder distorted or bent 3 in. or more from original position</p> <p>1- Metal loss of 25% to 40% T Missing attachment bolts or cracked welds General instability</p> <p>2- Metal loss of 10% to 25% T Loose bolts</p> <p>3- Metal loss of 5% to 10% T</p> <p>4- Metal loss of less than 5% T, or surface rust</p> <p>5- No deterioration No ladder</p>	5
<p style="text-align: center;">Safety Device</p> <p>0- Device improperly attached and/or in danger of coming loose No safety device present or device inoperable</p> <p>2- Present safety device works rough</p> <p>5- Safety device installed properly and in good condition No ladder</p>	5
<p style="text-align: center;">Dimensions</p> <p>0- 13 in. or less clear distance between side rails Rungs greater than 12 in. center-to-center. Lacks non-slip rungs, 7 in. toe clearance or 30 in. head clearance</p> <p>3- 13 in. to 15 in. clear distance between side rails Side rails less than 2 in. x 3/8 in.</p> <p>4- Side rails less than 2-1/2 in. x 3/8 in.</p> <p>5- 16 in. or greater clear distance between side rails No ladder</p>	5
<p style="text-align: center;">Ease of Climbing</p> <p>0- Major obstructions limiting climbing surface</p> <p>1- Difficult transition to balcony (i.e. must climb over handrail)</p> <p>2- Improper or erratic rung spacing</p> <p>3- Minor obstructions connected to side rails</p> <p>5- Ladder clear of obstructions and easy to climb No ladder</p>	5

TANK 1011
TABLE C.12-3 (Cont'd)

PAINTING SCHEDULES CONDITION RATING	
Exterior Surface Schedule 1- 0 to 1 years 2- 2 to 4 years 3- 5 or more years	3
Interior Surface Schedule 1- 0 to 1 years 2- 2 to 4 years 3- 5 or more years	3

**TANK 1011 SUMMARY CONDITION EVALUATION STANDARDS
TANK C.12-4**

External Summary Steel Ground Water Tank

Foundations

1. Site drainage	<u>5</u>
2. Foundation projection	<u>5</u>
3. Concrete condition	<u>5</u>
4. Grout condition	<u>5</u>

Chime and Anchorage Condition

5. Base of Shell	<u>4</u>
6. Chime Projection	<u>5</u>
7. Anchor bolts	<u>5</u>
8. Anchor bolt chairs	<u>5</u>

Columns - N/A

9. Alignment	<u>6</u>
10. Coating condition	<u>6</u>
11. Steel condition	<u>6</u>

Riser - N/A

12. Alignment	<u>6</u>
13. Coating condition	<u>6</u>
14. Steel Condition	<u>6</u>
15. Riser Manhole	<u>6</u>

Shell Ladder

16. Steel condition	<u>5</u>
17. Safety device	<u>5</u>
18. Dimensions	<u>0</u> toe room < 7 in.
19. Ease of climbing	<u>5</u>

Diagonal Bracing - N/A

20. Steel condition	<u>6</u>
21. Connections	<u>6</u>
22. Adjustment	<u>6</u>
23. Alignment	<u>6</u>
24. Coating condition	<u>6</u>

Truck Door/Man Door - N/A

1. Steel condition	<u>N/A</u>
2. Connections	<u>N/A</u>
3. Truck door	<u>N/A</u>
4. Man door	<u>N/A</u>
5. Coating condition	<u>N/A</u>

Riser Rods - N/A

25. Steel condition	<u>6</u>
26. Connections	<u>6</u>
27. Adjustment	<u>6</u>
28. Alignment	<u>6</u>
29. Coating condition	<u>6</u>

Struts - N/A

30. Coating condition	<u>6</u>
31. Steel condition	<u>6</u>
32. Connection to column	<u>6</u>

Balcony - N/A

33. Coating condition	<u>6</u>
34. Steel condition	<u>6</u>
35. Drainage	<u>6</u>
36. Handrail	<u>6</u>

Tank Bowl - N/A

37. Coating condition	<u>6</u>
38. Steel condition	<u>6</u>

Shell Condition

39. Coating condition	<u>5</u>
40. Steel condition	<u>5</u>
41. Container manhole	<u>1</u>
42. Overflow	<u>2</u>

Roof Condition

43. Coating condition	<u>5</u>
44. Steel condition	<u>5</u>
45. Roof-to-vent	<u>5</u>
46. Roof vent/opening	<u>0</u> not clog-resistant
47. Roof manway	<u>0</u> not locked

Roof ladder

48. Steel condition	<u>5</u>
49. Safety device	<u>5</u>
50. Dimensions	<u>5</u>
51. Ease of Climbing	<u>5</u>

Internal Summary Steel Ground Water Tank

Interior Bottom

52. Coating Condition	<u>5</u>
53. Steel Condition	<u>5</u>

Interior Shell

54. Coating condition	<u>5</u>
55. Steel condition	<u>5</u>

Interior Roof

56. Coating condition	<u>5</u>
57. Steel condition	<u>5</u>

Riser - N/A

58. Coating condition	<u>6</u>
59. Steel condition	<u>6</u>
60. Safety Grating	<u>6</u>

Interior Ladders

61. Structural condition	<u>5</u>
62. Safety device	<u>5</u>
63. Dimensions	<u>5</u>
64. Ease of climbing	<u>5</u>

Painting Schedules

65. Exterior	<u>3</u>
66. Interior	<u>3</u>

Condition Evaluation Ratings

Safety Rating **92**

Structural Rating **94**

*Exterior PCM Rating **100**

*Interior PCM Rating **100**

Overall Rating 96

*PCM = Painting, Corrosion, & Maintenance

APPENDIX D
PERTINENT BACKGROUND INFORMATION

NOMENCLATURE:

The terms used in describing the various components of water tanks are unique to the industry. In fact, the terms vary from firm to firm and from person to person. In an attempt to define the terms used in this report, a sketch of the general type of each tank covered is included. **Warning: Some appurtenances on these tanks may be referred to as erection or rigging attachments, lugs, or brackets. This does not mean that they are safe for weight loading, and personnel fall protection. Each attachment for each tank should be evaluated on an individual basis by a structural engineer or an experienced rigger before being used. These devices may have been intended for only the original erectors and painters to use with specialized equipment.**

HEAVY METALS TESTS:

Samples of the coating systems were taken from the exterior, interior, and/or piping (where present) at the time of the previous and current evaluations and were sent to a laboratory for atomic absorption analyses. The test results are listed in the following tables.

TABLE D-1

Results of Atomic Absorption Analysis of Coating Samples from Tank 823

	Cadmium		Chromium		Lead	
	mg/kg	percent	mg/kg	percent	mg/kg	percent
Interior Shell	<25	<0.0025%	<250	<0.025%	<250	<0.025%

TABLE D-2

Results of Atomic Absorption Analysis of Coating Samples from Tank 535

	Cadmium		Chromium		Lead	
	mg/kg	percent	mg/kg	percent	mg/kg	percent
Interior Shell	<25	<0.0025%	<250	<0.025%	<250	<0.025%

TABLE D-3

Results of Atomic Absorption Analysis of Coating Samples from Tank 612

	Cadmium		Chromium		Lead	
	mg/kg	percent	mg/kg	percent	mg/kg	percent
Exterior Brown	<25	<0.0025%	<250	<0.025%	<250	<0.025%
Exterior Yellow	<25	<0.0025%	<250	<0.025%	<250	<0.025%

TABLE D-4**Results of Atomic Absorption Analysis of Coating Samples from Tank 307**

	Cadmium		Chromium		Lead	
	mg/kg	percent	mg/kg	percent	mg/kg	percent
Exterior Riser (Red)	BDL	BDL	8,200	0.82%	105,000	10.5%
Exterior Column (White)	BDL	BDL	410	0.041%	68,000	6.8%
Abandoned Target Gage (Red)	BDL	BDL	6,100	0.61%	39,000	3.9%
Interior Wet Roof Cap	110	0.011%	40	0.004%	90	0.009%
Interior Wet Manhole Neck	120	0.012%	70	0.007%	130	0.013%

BDL = Below Detectable Limits

TABLE D-5**Results of Atomic Absorption Analysis of Coating Sample from Tank 707**

	Cadmium		Chromium		Lead	
	mg/kg	percent	mg/kg	percent	mg/kg	percent
Exterior Roof	<25	<0.0025%	<250	<0.025%	<250	<0.025%

These tests were limited to the detection of lead, cadmium, and chromium in the coating samples. The difficulty of retrieving all primer from the steel profile may cause the tests performed to not accurately represent the total coating system. Variations in thickness, types of coatings applied, and the interim cleaning and painting operations will also affect the actual readings. The Consumer Product Safety Commission specifies that an amount greater than 0.06% lead is considered potentially hazardous. Additional testing to determine the amount of leachable contaminants present in the spent cleaning debris must be performed following cleaning operations, at the time of repainting. Results from the laboratory analysis of coating samples taken during this evaluation follow.

- CERTIFICATE OF ANALYSIS -

Disp. Code: E I M N

Report Date: 29-Nov-12

Client ID: TANK_INDUST

Tank Industry Consultants
7740 West New York Street
Indianapolis, Indiana 46214

Phone: (317) 271-3100

Attn: Julie White

FAX: (317) 271-3300

Our Lab # 12015425-001

Your Sample ID: Exterior Roof

Your Project # 12214.H1238.019

Collection Date: 11/26/12

Your Project Name: Paint Sample

Collected By: Client

Sample Type: Paint Chips

Receipt Date: 11/27/12 10:20

Total Metals, ICP-AES

Analytical Method Prep Method Prep Date By
SW846 6010B SW846 3050B

Parameter	Result	Units	Quant. Qual Limit	CAS #	Analysis Date	By
Cadmium, Cd	< 25.0	mg/kg	25.0	7440-43-9	11/29/12	pace
Chromium, Cr	< 250	mg/kg	250	7440-47-3	11/29/12	pace
Lead, Pb	< 250	mg/kg	250	7439-92-1	11/29/12	pace



11/29/2012

Lab Manager

Date

Lab # 12015425-001

Sample ID: Exterior Roof

Page 1 of 1



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APPENDIX E

SUBSTANTIATION OF COST ESTIMATES

SUBSTANTIATION OF COST ESTIMATES

TANK 238

Clean and Paint Interior Piping:

L & E:	20 hrs @ \$80/hr	\$1,600	
Material:		\$3,000	<u>\$5,000</u>

Install Roof Safety Railing:

L & E:	24 hrs @ \$80/hr	\$1,920	
Material:		\$4,000	<u>\$6,000</u>

Remove Interior Ladders (3): \$3,000

***SOME OF THE COST ESTIMATES HAVE BEEN ROUNDED**

NOTE: Costs associated with mitigating the seismic and structural deficiencies are not included as too many variables exist which can greatly influence the estimate.

SUBSTANTIATION OF COST ESTIMATES

TANK 823

Modify Roof Safety Railing and Install Closure Chains:

L & E:	48 hrs @ \$80/hr	\$3,840	
Material:		\$1,000	<u>\$5,000</u>

Remove Interior Ladders (2): \$2,000

***SOME OF THE COST ESTIMATES HAVE BEEN ROUNDED**

NOTE: Costs associated with mitigating the seismic and structural deficiencies are not included as too many variables exist which can greatly influence the estimate.

SUBSTANTIATION OF COST ESTIMATES

TANK 535

Repair Exterior Concrete and Leak:

L & E:	60 hrs @ \$80/hr	\$4,800	
Material:		\$5,000	<u>\$10,000</u>

Clean and Paint Interior Piping:

L & E:	20 hrs @ \$80/hr	\$1,600	
Material:		\$3,000	<u>\$5,000</u>

Install Overflow Pipe Elastomeric Check Valve:

L & E:	8 hrs @ \$80/hr	\$640	
Material:		\$2,000	<u>\$3,500</u>

Replace Exterior Ladder:

L & E:	16 hrs @ \$80/hr	\$1,280	
Material:		\$2,000	<u>\$3,500</u>

Install Clog-Resistant Roof Vents (2):

L & E:	32 hrs @ \$80/hr	\$2,560	
Material:		\$12,000	<u>\$15,000</u>

Modify Roof Safety Railing and Install Closure Chains:

L & E:	48 hrs @ \$80/hr	\$3,840	
Material:		\$1,000	<u>\$5,000</u>

Remove Interior Ladders (2):

\$2,000

***SOME OF THE COST ESTIMATES HAVE BEEN ROUNDED**

NOTE: Costs associated with mitigating the seismic and structural deficiencies are not included as too many variables exist which can greatly influence the estimate.

SUBSTANTIATION OF COST ESTIMATES

TANK 492

Clean and Paint Interior Piping:

L & E:	20 hrs @ \$80/hr	\$1,600	
Material:		\$3,000	<u>\$5,000</u>

Install Overflow Pipe Elastomeric Check Valves (2):

L & E:	16 hrs @ \$80/hr	\$1,280	
Material:		\$6,000	<u>\$7,000</u>

Install Clog-Resistant Roof Vents (2):

L & E:	32 hrs @ \$80/hr	\$2,560	
Material:		\$12,000	<u>\$15,000</u>

Modify Stair Handrail and Install Platform Toe Bars:

L & E:	24 hrs @ \$80/hr	\$1,920	
Material:		\$2,000	<u>\$4,000</u>

Remove Interior Ladders (2): \$2,000

***SOME OF THE COST ESTIMATES HAVE BEEN ROUNDED**

NOTE: Costs associated with mitigating the seismic and structural deficiencies are not included as too many variables exist which can greatly influence the estimate.

SUBSTANTIATION OF COST ESTIMATES

TANK 612

Clean and Paint Interior Piping:

L & E:	20 hrs @ \$80/hr	\$1,600	
Material:		\$3,000	<u>\$5,000</u>

Modify Roof Safety Railing and Stair Safety Railing:

L & E:	80 hrs @ \$80/hr	\$6,400	
Material:		\$1,000	<u>\$7,500</u>

Remove Interior Ladders (3): \$3,000

***SOME OF THE COST ESTIMATES HAVE BEEN ROUNDED**

NOTE: Costs associated with mitigating the seismic and structural deficiencies are not included as too many variables exist which can greatly influence the estimate.

BACKUP DATA FOR COST ESTIMATES

TANK 307

Clean and Paint Interior:

Scope: Complete Blast Clean to SSPC-SP 5 and
Apply 3-Coat Epoxy System

L & E:	6,000 SF @ \$10.00/SF	\$60,000	
Material:	6,000 SF @ \$3.00/SF	\$18,000	<u>\$80,000</u>

Replace Tower and Shell Ladders:

L & E:	60 hrs @ \$80/hr	\$4,800	
Material:		\$13,000	<u>\$17,000</u>

Replace Vandal Deterrent: \$2,000

Remove Tower Ladder Platforms:

L & E:	16 hrs @ \$80/hr	\$1,280	
Material:			<u>\$2,000</u>

Replace Balcony Safety Railing:

L & E:	100 hrs @ \$80/hr	\$8,000	
Material:		\$7,000	<u>\$15,000</u>

Replace Roof Platform Safety Railing:

L & E:	32 hrs @ \$80/hr	\$2,560	
Material:		\$5,000	<u>\$8,000</u>

Install Clog-Resistant Vent:

L & E:	16 hrs @ \$80/hr	\$1,280	
Material:		\$6,000	<u>\$7,500</u>

Contingency to Replace Roof: \$110,000

Contingency for Shell Metal Loss Repairs: \$30,000

***SOME OF THE COST ESTIMATES HAVE BEEN ROUNDED**

NOTE: Costs associated with mitigating the seismic and structural deficiencies are not included as too many variables exist which can greatly influence the estimate.

SUBSTANTIATION OF COST ESTIMATES

TANK 214

Clean and Paint Interior Piping:

L & E:	20 hrs @ \$80/hr	\$1,600	
Material:		\$3,000	<u>\$5,000</u>

Remove Interior Ladders (4): \$4,000

***SOME OF THE COST ESTIMATES HAVE BEEN ROUNDED**

NOTE: Costs associated with mitigating the seismic and structural deficiencies are not included as too many variables exist which can greatly influence the estimate.

SUBSTANTIATION OF COST ESTIMATES

TANK 2105

Clean and Paint Interior Piping:

L & E:	20 hrs @ \$80/hr	\$1,600	
Material:		\$3,000	<u>\$5,000</u>

Install Overflow Pipe Elastomeric Check Valve:

L & E:	8 hrs @ \$80/hr	\$640	
Material:		\$3,000	<u>\$3,500</u>

Replace Exterior Ladder:

L & E:	16 hrs @ \$80/hr	\$1,280	
Material:		\$2,000	<u>\$3,500</u>

Modify Roof Safety Railing and Install Closure Chains:

L & E:	24 hrs @ \$80/hr	\$1,920	
Material:		\$1,000	<u>\$3,000</u>

Remove Interior Ladders (2): \$2,000

***SOME OF THE COST ESTIMATES HAVE BEEN ROUNDED**

NOTE: Costs associated with mitigating the seismic and structural deficiencies are not included as too many variables exist which can greatly influence the estimate.

SUBSTANTIATION OF COST ESTIMATES

TANK 2106

Repair Exterior Concrete and Leak:

L & E:	60 hrs @ \$80/hr	\$4,800	
Material:		\$5,000	<u>\$10,000</u>

Clean and Paint Interior Piping:

L & E:	20 hrs @ \$80/hr	\$1,600	
Material:		\$3,000	<u>\$5,000</u>

Install Overflow Pipe Elastomeric Check Valve:

L & E:	8 hrs @ \$80/hr	\$640	
Material:		\$3,000	<u>\$3,500</u>

Replace Exterior Ladder:

L & E:	16 hrs @ \$80/hr	\$1,280	
Material:		\$2,000	<u>\$3,500</u>

Modify Roof Safety Railing and Install Closure Chains:

L & E:	24 hrs @ \$80/hr	\$1,920	
Material:		\$1,000	<u>\$3,000</u>

Remove Interior Ladders (2): \$2,000

***SOME OF THE COST ESTIMATES HAVE BEEN ROUNDED**

NOTE: Costs associated with mitigating the seismic and structural deficiencies are not included as too many variables exist which can greatly influence the estimate.

SUBSTANTIATION OF COST ESTIMATES

TANK 425

Clean and Paint Interior Piping:

L & E:	20 hrs @ \$80/hr	\$1,600	
Material:		\$3,000	<u>\$5,000</u>

Replace Exterior Ladder:

L & E:	16 hrs @ \$80/hr	\$1,280	
Material:		\$2,000	<u>\$3,500</u>

Install Roof Safety Railing:

L & E:	24 hrs @ \$80/hr	\$1,920	
Material:		\$4,000	<u>\$6,000</u>

Install Clog-Resistant Roof Vent:

L & E:	16 hrs @ \$80/hr	\$1,280	
Material:		\$6,000	<u>\$7,500</u>

Remove Interior Ladders (2): \$2,000

***SOME OF THE COST ESTIMATES HAVE BEEN ROUNDED**

NOTE: Costs associated with mitigating the seismic and structural deficiencies are not included as too many variables exist which can greatly influence the estimate.

SUBSTANTIATION OF COST ESTIMATES

TANK 707

Clean and Paint Interior Wet Piping:

L & E:	20 hrs @ \$80/hr	\$1,600	
Material:		\$3,000	<u>\$5,000</u>

Replace Access Tube Ladder and Install Safe-Climbing Device: \$6,000

Remove Access Tube Ladder Safety Cage: \$2,000

Install Overflow Pipe Air Break and Elastomeric Check Valve: \$1,000

L & E:	24 hrs @ \$80/hr	\$1,920	
Material:		\$4,000	<u>\$6,000</u>

Install Clog-Resistant Roof Vent:

L & E:	24 hrs @ \$80/hr	\$1,920	
Material:		\$4,000	<u>\$6,000</u>

Modify Roof and Interior Dry Platform Safety Railing:

L & E:	48 hrs @ \$80/hr	\$3,840	
Material:		\$3,000	<u>\$7,000</u>

Modify Roof Manhole and Replace Cover: \$1,000

Remove Interior Wet Container Ladders and Platforms: \$4,000

***SOME OF THE COST ESTIMATES HAVE BEEN ROUNDED**

NOTE: Costs associated with mitigating the seismic and structural deficiencies are not included as too many variables exist which can greatly influence the estimate.

APPENDIX F
COST ESTIMATES SUMMARY

COST ESTIMATE

DATE PREPARED
November 2012

SHEET 1 OF 1

ACTIVITY AND LOCATION TANK 238 NAVAL AIR STATION SIGONELLA, ITALY	CONSTRUCTION CONTRACT NO.	IDENTIFICATION NUMBER
PROJECT TITLE Repair Tank 238	ESTIMATED BY TANK INDUSTRY CONSULTANTS	CATEGORY CODE NUMBER
	STATUS OF DESIGN [X] PED [] 30% [] 100% [] FINAL [] Other Specify)	JOB ORDER NUMBER

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENGINEERING ESTIMATE	
	NUMBER	UNIT	UNIT COST	TOTAL	UNIT COST	TOTAL	UNIT COST	TOTAL
Complete Clean and Paint Interior Piping	1	LS		3,000		2,000	5,000	\$ 5,000
Install Roof Safety Railing	1	LS		4,000		2,000	6,000	\$ 6,000
Remove Interior Ladders (3)	1	LS					3,000	\$ 3,000
Design Plans & Specifications								\$ 18,000
Resident Project Representation (2 weeks @ \$4,400 per week + mobilization)								\$ 8,800
Contract Administration & Laboratory Analysis								\$ 10,000
SUBTOTAL								\$ 50,800
Engineering Repair Design Contract @ 10%								\$ 5,080
ROUNDED TOTAL								\$ 56,000

* U.S. Government Printing Office 1984-708-012/17884 2-1

COST ESTIMATE

DATE PREPARED
November 2012

SHEET 1 OF 1

ACTIVITY AND LOCATION TANK 823 NAVAL AIR STATION SIGONELLA, ITALY	CONSTRUCTION CONTRACT NO.	IDENTIFICATION NUMBER
PROJECT TITLE Repair Tank 823	ESTIMATED BY TANK INDUSTRY CONSULTANTS	CATEGORY CODE NUMBER
	STATUS OF DESIGN [X] PED [] 30% [] 100% [] FINAL [] Other Specify)	JOB ORDER NUMBER

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENGINEERING ESTIMATE	
	NUMBER	UNIT	UNIT COST	TOTAL	UNIT COST	TOTAL	UNIT COST	TOTAL
Modify Roof Safety Railing and Install Closure Chains	1	LS		1,000		4,000	5,000	\$ 5,000
Remove Interior Ladders (2)	1	LS					2,000	\$ 2,000
Design Plans & Specifications								\$ 18,000
Resident Project Representation (2 weeks @ \$4,400 per week + mobilization)								\$ 8,800
Contract Administration & Laboratory Analysis								\$ 10,000
SUBTOTAL								\$ 43,800
Engineering Repair Design Contract @ 10%								\$ 4,380
ROUNDED TOTAL								\$ 49,000

* U.S. Government Printing Office 1984-708-012/17884 2-1

COST ESTIMATE

ACTIVITY AND LOCATION TANK 535 NAVAL AIR STATION SIGONELLA, ITALY	CONSTRUCTION CONTRACT NO.	IDENTIFICATION NUMBER
PROJECT TITLE Repair Tank 535	ESTIMATED BY TANK INDUSTRY CONSULTANTS	CATEGORY CODE NUMBER
	STATUS OF DESIGN <input checked="" type="checkbox"/> PED <input type="checkbox"/> 30% <input type="checkbox"/> 100% <input type="checkbox"/> FINAL <input type="checkbox"/> Other Specify)	JOB ORDER NUMBER

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENGINEERING ESTIMATE	
	NUMBER	UNIT	UNIT COST	TOTAL	UNIT COST	TOTAL	UNIT COST	TOTAL
Repair Exterior Concrete and Leak	1	LS		5,000		5,000	10,000	\$ 10,000
Complete Clean and Paint Interior Piping	1	LS		3,000		2,000	5,000	\$ 5,000
Install Overflow Pipe Elastomeric Check Valve	1	LS		2,000		1,500	3,500	\$ 3,500
Replace Exterior Ladder	1	LS		2,000		1,500	3,500	\$ 3,500
Install Clog-Resistant Vents (2)	1	LS		12,000		3,000	15,000	\$ 15,000
Modify Roof Safety Railing and Closure Chains	1	LS		1,000		4,000	5,000	\$ 5,000
Remove Interior Ladders (2)	1	LS					2,000	\$ 2,000
Design Plans & Specifications								\$ 18,000
Resident Project Representation (3 weeks @ \$4,400 per week + mobilization)								\$ 13,200
Contract Administration & Laboratory Analysis								\$ 10,000
SUBTOTAL								\$ 85,200
Engineering Repair Design Contract @ 10%								\$ 8,520
ROUNDED TOTAL								\$ 94,000

* U.S. Government Printing Office 1984-708-012/17884 2-1

COST ESTIMATE

DATE PREPARED
November 2012

SHEET 1 OF 1

ACTIVITY AND LOCATION TANK 492 NAVAL AIR STATION SIGONELLA, ITALY	CONSTRUCTION CONTRACT NO.	IDENTIFICATION NUMBER
PROJECT TITLE Repair Tank 492	ESTIMATED BY TANK INDUSTRY CONSULTANTS	CATEGORY CODE NUMBER
	STATUS OF DESIGN [X] PED [] 30% [] 100% [] FINAL [] Other Specify)	JOB ORDER NUMBER

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENGINEERING ESTIMATE	
	NUMBER	UNIT	UNIT COST	TOTAL	UNIT COST	TOTAL	UNIT COST	TOTAL
Complete Clean and Paint Interior Piping	1	LS		3,000		2,000	5,000	\$ 5,000
Install Overflow Pipe Elastomeric Check Valves (2)	1	LS		6,000		1,000	7,000	\$ 7,000
Install Clog-Resistant Roof Vents (2)	1	LS		12,000		3,000	15,000	\$ 15,000
Modify Stair Handrail and Install Platform Toe Bars	1	LS		2,000		2,000	4,000	\$ 4,000
Remove Interior Ladders (2)	1	LS					2,000	\$ 2,000
Design Plans & Specifications								\$ 18,000
Resident Project Representation (2 weeks @ \$4,400 per week + mobilization)								\$ 8,800
Contract Administration & Laboratory Analysis								\$ 10,000
SUBTOTAL								\$ 69,800
Engineering Repair Design Contract @ 10%								\$ 6,980
ROUNDED TOTAL								\$ 77,000

COST ESTIMATE

DATE PREPARED
November 2012

SHEET 1 OF 1

ACTIVITY AND LOCATION TANK 612 NAVAL AIR STATION SIGONELLA, ITALY	CONSTRUCTION CONTRACT NO.	IDENTIFICATION NUMBER
PROJECT TITLE Repair Tank 612	ESTIMATED BY TANK INDUSTRY CONSULTANTS	CATEGORY CODE NUMBER
	STATUS OF DESIGN [X] PED [] 30% [] 100% [] FINAL [] Other Specify)	JOB ORDER NUMBER

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENGINEERING ESTIMATE	
	NUMBER	UNIT	UNIT COST	TOTAL	UNIT COST	TOTAL	UNIT COST	TOTAL
Complete Clean and Paint Interior Piping	1	LS		3,000		2,000	5,000	\$ 5,000
Modify Roof Safety Railing and Stair Safety Railing	1	LS		1,000		6,500	7,500	\$ 7,500
Remove Interior Ladders (3)	1	LS					3,000	\$ 3,000
Design Plans & Specifications								\$ 18,000
Resident Project Representation (2 weeks @ \$4,400 per week + mobilization)								\$ 8,800
Contract Administration & Laboratory Analysis								\$ 10,000
SUBTOTAL								\$ 52,300
Engineering Repair Design Contract @ 10%								\$ 5,230
ROUNDED TOTAL								\$ 58,000

* U.S. Government Printing Office 1984-708-012/17884 2-1

COST ESTIMATE

DATE PREPARED
November 2012

SHEET 1 OF 1

ACTIVITY AND LOCATION TANK 307 NAVAL AIR STATION SIGONELLA, ITALY	CONSTRUCTION CONTRACT NO.	IDENTIFICATION NUMBER
PROJECT TITLE Repair and Interior Repaint Tank 307	ESTIMATED BY TANK INDUSTRY CONSULTANTS	CATEGORY CODE NUMBER
	STATUS OF DESIGN <input checked="" type="checkbox"/> PED <input type="checkbox"/> 30% <input type="checkbox"/> 100% <input type="checkbox"/> FINAL <input type="checkbox"/> Other Specify)	JOB ORDER NUMBER

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENGINEERING ESTIMATE	
	NUMBER	UNIT	UNIT COST	TOTAL	UNIT COST	TOTAL	UNIT COST	TOTAL
Complete Clean and Paint Interior	1	LS		20,000		60,000	80,000	\$ 80,000
Replace Tower and Shell Ladders	1	LS		13,000		4,000	17,000	\$ 17,000
Replace Vandal Deterrent	1	LS					2,000	\$ 2,000
Remove Tower Ladder Platforms	1	LS				2,000	2,000	\$ 2,000
Replace Balcony Safety Railing	1	LS		7,000		8,000	15,000	\$ 15,000
Replace Roof Platform Safety Railing	1	LS		5,000		3,000	8,000	\$ 8,000
Install Clog-Resistant Vent	1	LS		6,000		1,500	7,500	\$ 7,500
Contingency to Replace Roof	1	LS					110,000	\$ 110,000
Contingency for Shell Metal Loss Repairs	1	LS					30,000	\$ 30,000
Design Plans & Specifications								\$ 18,000
Resident Project Representation (16 weeks @ \$4,400 per week + mobilization)								\$ 70,400
Contract Administration & Laboratory Analysis								\$ 10,000
SUBTOTAL								\$ 369,900
Engineering Repair Design Contract @ 10%								\$ 36,990
ROUNDED TOTAL								\$ 407,000

* U.S. Government Printing Office 1984-708-012/17884 2-1

COST ESTIMATE

DATE PREPARED
November 2012

SHEET 1 OF 1

ACTIVITY AND LOCATION TANK 214 NAVAL AIR STATION SIGONELLA, ITALY	CONSTRUCTION CONTRACT NO.	IDENTIFICATION NUMBER
PROJECT TITLE Repair Tank 214	ESTIMATED BY TANK INDUSTRY CONSULTANTS	CATEGORY CODE NUMBER
	STATUS OF DESIGN [X] PED [] 30% [] 100% [] FINAL [] Other Specify)	JOB ORDER NUMBER

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENGINEERING ESTIMATE	
	NUMBER	UNIT	UNIT COST	TOTAL	UNIT COST	TOTAL	UNIT COST	TOTAL
Clean and Paint Interior Piping	1	LS		3,000		2,000	5,000	\$ 5,000
Remove Interior Ladders (4)	1	LS					4,000	\$ 4,000
Design Plans & Specifications								\$ 18,000
Resident Project Representation (2 weeks @ \$4,400 per week + mobilization)								\$ 8,800
Contract Administration & Laboratory Analysis								\$ 10,000
SUBTOTAL								\$ 45,800
Engineering Repair Design Contract @ 10%								\$ 4,580
ROUNDED TOTAL								\$ 51,000

* U.S. Government Printing Office 1984-708-012/17884 2-1

COST ESTIMATE

DATE PREPARED
November 2012

SHEET 1 OF 1

ACTIVITY AND LOCATION TANK 2105 NAVAL AIR STATION SIGONELLA, ITALY	CONSTRUCTION CONTRACT NO.	IDENTIFICATION NUMBER
PROJECT TITLE Repair Tank 2105	ESTIMATED BY TANK INDUSTRY CONSULTANTS	CATEGORY CODE NUMBER
	STATUS OF DESIGN [X] PED [] 30% [] 100% [] FINAL [] Other Specify)	JOB ORDER NUMBER

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENGINEERING ESTIMATE	
	NUMBER	UNIT	UNIT COST	TOTAL	UNIT COST	TOTAL	UNIT COST	TOTAL
Complete Clean and Paint Interior Piping	1	LS		3,000		2,000	5,000	\$ 5,000
Install Overflow Pipe Elastomeric Check Valve	1	LS		2,000		1,500	3,500	\$ 3,500
Replace Exterior Ladder	1	LS		2,000		1,500	3,500	\$ 3,500
Modify Roof Safety Railing and Install Closure Chains	1	LS		1,000		2,000	3,000	\$ 3,000
Remove Interior Ladders (2)	1	LS					2,000	\$ 2,000
Design Plans & Specifications								\$ 18,000
Resident Project Representation (2 weeks @ \$4,400 per week + mobilization)								\$ 8,800
Contract Administration & Laboratory Analysis								\$ 10,000
SUBTOTAL								\$ 53,800
Engineering Repair Design Contract @ 10%								\$ 5,380
ROUNDED TOTAL								\$ 60,000

NAVFAC 11013/7 (1-78)
Supersedes NAVDOCKS 2417 and 2417A

COST ESTIMATE

DATE PREPARED
November 2012

SHEET 1 OF 1

ACTIVITY AND LOCATION TANK 2106 NAVAL AIR STATION SIGONELLA, ITALY	CONSTRUCTION CONTRACT NO.	IDENTIFICATION NUMBER
PROJECT TITLE Repair Tank 2106	ESTIMATED BY TANK INDUSTRY CONSULTANTS	CATEGORY CODE NUMBER
	STATUS OF DESIGN [X] PED [] 30% [] 100% [] FINAL [] Other Specify)	JOB ORDER NUMBER

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENGINEERING ESTIMATE	
	NUMBER	UNIT	UNIT COST	TOTAL	UNIT COST	TOTAL	UNIT COST	TOTAL
Repair Exterior Concrete and Leak	1	LS		5,000		5,000	10,000	\$ 10,000
Complete Clean and Paint Interior Piping	1	LS		3,000		2,000	5,000	\$ 5,000
Install Overflow Pipe Elastomeric Check Valve	1	LS		2,000		1,500	3,500	\$ 3,500
Replace Exterior Ladder	1	LS		2,000		1,500	3,500	\$ 3,500
Modify Roof Safety Railing and Closure Chains	1	LS		1,000		2,000	3,000	\$ 3,000
Remove Interior Ladders (2)	1	LS					2,000	\$ 2,000
Design Plans & Specifications								\$ 18,000
Resident Project Representation (3 weeks @ \$4,400 per week + mobilization)								\$ 13,200
Contract Administration & Laboratory Analysis								\$ 10,000
SUBTOTAL								\$ 68,200
Engineering Repair Design Contract @ 10%								\$ 6,820
ROUNDED TOTAL								\$ 76,000

* U.S. Government Printing Office 1984-708-012/17884 2-1

COST ESTIMATE

DATE PREPARED
November 2012

SHEET 1 OF 1

ACTIVITY AND LOCATION TANK 425 NAVAL AIR STATION SIGONELLA, ITALY	CONSTRUCTION CONTRACT NO.	IDENTIFICATION NUMBER
PROJECT TITLE Repair Tank 425	ESTIMATED BY TANK INDUSTRY CONSULTANTS	CATEGORY CODE NUMBER
	STATUS OF DESIGN <input checked="" type="checkbox"/> PED <input type="checkbox"/> 30% <input type="checkbox"/> 100% <input type="checkbox"/> FINAL <input type="checkbox"/> Other Specify)	JOB ORDER NUMBER

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENGINEERING ESTIMATE	
	NUMBER	UNIT	UNIT COST	TOTAL	UNIT COST	TOTAL	UNIT COST	TOTAL
Complete Clean and Paint Interior Piping	1	LS		3,000		2,000	5,000	\$ 5,000
Replace Exterior Ladder	1	LS		2,000		1,500	3,500	\$ 3,500
Install Roof Safety Railing	1	LS		4,000		2,000	6,000	\$ 6,000
Install Clog-Resistant Roof Vent	1	LS		6,000		1,500	7,500	\$ 7,500
Remove Interior Ladders (2)	1	LS					2,000	\$ 2,000
Design Plans & Specifications								\$ 18,000
Resident Project Representation (2 weeks @ \$4,400 per week + mobilization)								\$ 8,800
Contract Administration & Laboratory Analysis								\$ 10,000
SUBTOTAL								\$ 60,800
Engineering Repair Design Contract @ 10%								\$ 6,080
ROUNDED TOTAL								\$ 67,000

COST ESTIMATE

ACTIVITY AND LOCATION TANK 707 NAVAL AIR STATION SIGONELLA, ITALY	CONSTRUCTION CONTRACT NO.	IDENTIFICATION NUMBER
PROJECT TITLE Repair Tank 707	ESTIMATED BY TANK INDUSTRY CONSULTANTS	CATEGORY CODE NUMBER
	STATUS OF DESIGN <input checked="" type="checkbox"/> PED <input type="checkbox"/> 30% <input type="checkbox"/> 100% <input type="checkbox"/> FINAL <input type="checkbox"/> Other Specify)	JOB ORDER NUMBER

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENGINEERING ESTIMATE	
	NUMBER	UNIT	UNIT COST	TOTAL	UNIT COST	TOTAL	UNIT COST	TOTAL
Clean and Paint Interior Wet Piping	1	LS		3,000		2,000	5,000	\$ 5,000
Replace Access Tube Ladder and Install Safe-Climbing Device	1	LS					6,000	\$ 6,000
Remove Access Tube Ladder Safety Cage	1	LS					2,000	\$ 2,000
Install Overflow Pipe Air Break and Elastomeric Check Valve	1	LS		4,000		2,000	6,000	\$ 6,000
Install Clog-Resistant Vent	1	LS		4,000		2,000	6,000	\$ 6,000
Modify Roof and Interior Dry Platforms	1	LS		3,000		4,000	7,000	\$ 7,000
Modify Roof Manhole and Replace Cover	1	LS					1,000	\$ 1,000
Remove Interior Wet Container Ladders and Platforms	1	LS					4,000	\$ 4,000
Design Plans & Specifications								\$ 18,000
Resident Project Representation (4 weeks @ \$4,400 per week + mobilization)								\$ 17,600
Contract Administration & Laboratory Analysis								\$ 10,000
SUBTOTAL								\$ 82,600
Engineering Repair Design Contract @ 10%								\$ 8,260
ROUNDED TOTAL								\$ 91,000

* U.S. Government Printing Office 1984-708-012/17884 2-1

COST ESTIMATE

ACTIVITY AND LOCATION TANK 1011 NAVAL AIR STATION SIGONELLA, ITALY	CONSTRUCTION CONTRACT NO.	IDENTIFICATION NUMBER
PROJECT TITLE Repair Tank 1011	ESTIMATED BY TANK INDUSTRY CONSULTANTS	CATEGORY CODE NUMBER
	STATUS OF DESIGN [X] PED [] 30% [] 100% [] FINAL [] Other Specify)	JOB ORDER NUMBER

ITEM DESCRIPTION	QUANTITY		MATERIAL COST		LABOR COST		ENGINEERING ESTIMATE	
	NUMBER	UNIT	UNIT COST	TOTAL	UNIT COST	TOTAL	UNIT COST	TOTAL
Remove Exterior Ladder Safety Cage	1	LS					1,000	\$ 1,000
Modify Exterior Ladder and Install Safe-Climbing Device	1	LS					5,000	\$ 5,000
Install Additional Shell Manhole	1	LS		7,000		2,000	9,000	\$ 9,000
Modify Roof Safety Railing and Install Closure Chains	1	LS		1,000		4,000	5,000	\$ 5,000
Install Clog-Resistant Roof Vent	1	LS		6,000		1,500	7,500	\$ 7,500
Remove Interior Ladder	1	LS					1,000	\$ 1,000
Design Plans & Specifications								\$ 18,000
Resident Project Representation (2 weeks @ \$4,400 per week + mobilization)								\$ 8,800
Contract Administration & Laboratory Analysis								\$ 10,000
SUBTOTAL								\$ 65,300
Engineering Repair Design Contract @ 10%								\$ 6,530
ROUNDED TOTAL								\$ 72,000

* U.S. Government Printing Office 1984-708-012/17884 2-1

APPENDIX G
REFERENCES

REFERENCES

1. AWWA D100 Welded Steel Tanks For Water Storage
2. AWWA D102 Coating Steel Water Storage Tanks
3. AWWA D110 Wire- and Strand-Wound, Circular, Prestressed Concrete Water Tanks
4. OSHA Regulations (Standards – 29 CFR)
5. MIL-HDBK 1110/1
6. ANSI/NSF Standard 61
7. SSPC (Society for Protective Coatings)
8. NACE (National Association of Corrosion Engineers)
9. UFC 3-310-04 Change 1 (January 27, 2010)
10. ASTM 3359 Adhesion Test Standard Test Methods for Measuring Adhesion by Tape Test