

Dixon Engineering, Inc.

Preliminary Maintenance Inspection

40,000 Gallon
Double Ellipse

Lake County DPW
Countryside Manor Tower
#4811110

Libertyville, Illinois

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Inspection Performed: April 13, 2010
Report Prepared: May 14, 2010

Legged Storage Tank

CONCLUSIONS:

EXTERIOR COATING:

The exterior coating is an acrylic overcoat system that is in fair condition. The coating has faded moderately. Primary modes of failure delamination, checking and spot coating breaks to the substrate. The coating has good adhesion. There are numerous areas of spot coating failures on the legs. Coating deterioration is minor and the condition is average for an 8 year old overcoat system.

WET INTERIOR COATING:

The wet interior coating is an epoxy system that is in fair condition. The coating has areas of minor spot failures on the floor and sidewalls. Above the high water line, the coating is in fair condition. The roof coating is deteriorating at the open lap seam.

RECOMMENDATIONS:

Schedule regular cleanings and inspections of the tank by an independent third party as recommended by AWWA, or once every five years.

Complete the recommended work in 1-2 years. The coating work is the greatest cost and largest part of the recommendations. The repairs and up grades should be completed during the next major tank rehabilitation process when coating repairs are made.

EXTERIOR COATING:

1. Budget for exterior over coating in 1-2 years, or when aesthetics dictate. At that time, the tank's exterior coating would be nearing its service life. The estimated cost is \$40,000.

WET INTERIOR COATING:

2. Abrasive blast clean the tank's entire wet interior to a near white metal condition (SSPC-SP10), and apply a three-coat epoxy polyamide system. The estimated cost is \$30,000.
3. After coating the wet interior, seam seal the roof lap joints with urethane caulk. The estimated cost is \$1,000.

CATHODIC PROTECTION:

4. Install cathodic clips and a pressure fitting for future installation of a submerged cathodic protection system. The estimated cost is \$2,000.

FOUNDATION:

5. Rebuild the deteriorated concrete. The estimated cost is \$4,000.
6. Repair cracks and seal the surface with an epoxy coating. The estimated cost is \$1,000.

GROUT:

7. Regrout areas of missing grout between the tank's base plates and foundations. The estimated cost is \$1,000.

OVERFLOW PIPE:

8. Install a screened flap gate on the end of the overflow pipe. The estimated cost is \$1,000.

ROOF HANDRAIL AND PAINTER'S RAIL:

9. Install a 42-inch high railing and a painter's rail on the roof. The estimated cost is \$9,000.
10. Install safety grabs on the exterior roof for fall prevention of workers in the wet interior. Cost would be incidental to coating costs.

HATCHES AND MANWAYS:

11. Install a 36-inch manway in the bottom of the riser. The estimated cost is \$6,000.
12. Replace the roof hatch with a 30-inch hatch. The estimated cost is \$3,000.

VENTS:

13. Replace the roof vent with a new frost-free pressure vacuum vent. The estimated cost is \$5,000.

RODS:

14. Adjust the sway rods. Cost is incidental to the exterior painting.
15. Install rigging clips under the bowl, halfway between each leg and the riser. The clips would be used by contractors for rigging safety lines. Cost would be incidental to repainting costs.

LADDERS:

16. Repair the fall prevention device on the exterior leg ladder.
17. Install a new wet ladder and fall prevention device. The estimated cost is \$5,000.
18. Replace the sidewall ladder with a vertical ladder and a step-off platform. The estimated cost is \$5,000.
19. Remove the roof ladder, and replace with handrails from the step-off platform to the roof handrail. The estimated cost is \$1,000.

WET INTERIOR METAL:

20. Weld pits deeper than one-half original metal thickness in the wet interior. The estimated cost is \$1,000. This is a dummy figure for bidding.
21. Fill pits with epoxy in the wet interior that are up to one-quarter original metal thickness. The estimated cost is \$1,000. This is a dummy figure for bidding.

A DISCUSSION ON RESCUE AND RETRIEVAL OPERATIONS FROM ELEVATED LEG STORAGE TANKS

A series of accidents involving falls from or in water tanks has highlighted inadequacies in tank design and a potentially greater problem. The rescue may be more dangerous, with potential for more loss of life or injury, than the original accident. Contractors and engineers are responsible for their own employees. Even with safety training and proper equipment, accidents will occur. Most rescue squads are local or neighboring fire departments, some with more practice than other departments. Elevated tanks were designed to store water, not for rescue or retrieval convenience. The following items would make working on and retrieval from water tanks safer. This discussion is offered as a starting point. We recommend that you meet with your rescue personnel and draft a rescue plan. A copy of the plan should be kept at the tank and with the rescue crew.

OSHA now requires 30-inch manways and hatches, and roof ladders are to be replaced with platforms, steps, and railings. We have always objected to replacement of ladders every other year as regulations change, especially on retrofit of existing tanks. We recommend the changes for the convenience and safety of your employees rescue personnel, and others working on the tank. As far as we know, none of these conversion items to be discussed are required or mandated by any government agency for retrofits.

DIXON recommends these changes be made during the next major tank painting.

RETRIEVAL FROM INTERIOR:

Current Access:

Access to the roof is from the leg ladder, the sidewall ladder, and the roof ladder. These ladders do not meet OSHA size standards. All ladders do contain a rail-type fall prevention device. There is not a ladder in the wet interior from the roof hatch to the bowl area. There is a 12 x 16 inch elliptical manway in the bottom of the riser. The roof has a 24 inch diameter roof hatch for the wet interior. There is a grate over the top of the riser in the bowl. There is no roof rail or painter's rail.

Modified Access:

Providing safe access to rescue personnel is essential. Replace the sidewall ladder so it extends straight up to a work platform with railings that surrounds the roof edge hatch. Replace the existing roof hatch with a 30-inch hatch with lockable, rainproof lid. The existing hatch is too small for a rescue basket and rescue personnel with equipment. Replace the roof ladder with a series of steps and railings to permit access to the center of the roof standing upright. Install a moveable fall prevention device on the railing. Install a 42-inch high railing on the roof. The railing would allow tie-off locations and increase safety during routine maintenance. This ladder and railing can be used by your personnel for checking lights, vents, and security annually, or by antenna personnel. The railing can be used for antenna mounting. Install a new wet interior ladder from the roof hatch to the wet interior floor. Once in the tank there is a 3 foot riser.

Retrieval down the riser:

1. Retrieval down through the riser is usually the safest method. Remove the new vent from the top center of the tank, and attach a winch or pulley system to a tripod set-up over the vent.
2. Raise and lower the basket through the riser and out the new 36-inch diameter manway at the bottom of the riser. Rescue personnel would also raise and lower all their equipment through the riser, and then leave the wet interior using the wet interior ladder with fall prevention. On the roof, personnel would be working from inside the security of a roof railing around the center attachment area and the roof hatch.

Modifications Necessary (As stated in the recommendations):

1. Install a 30-inch manway in the bottom of the riser. (\$6,000)
2. Install a new sidewall ladder with a step-off platform and roof handrails. (\$6,000)
3. Install a new 30-inch roof hatch. (\$3,000)
4. Install a roof railing. (\$7,000)
5. Install a roof painter's rail. (\$2,000)
6. Install a new vent and neck. (\$5,000)
7. Install a new wet interior ladder. (\$5,000)

Equipment:

Winch or pulley system and a tripod.
Basket.
Fall prevention sliders.

COST SUMMARY:

Paint the exterior	\$40,000
Paint the wet interior	30,000
Repair the cathodic clips and coupling	2,000
Repair the pits - weld	1,000
Repair the pits - fill	1,000
Seal the lap seams	1,000
Repair concrete and seal	5,000
Repair the grout	1,000
Repair the flap gate	1,000
Install a roof handrail and painter's ring	9,000
Install a wet interior ladder	5,000
Install a step-off platform with handrail	6,000
Replace the roof vent	5,000
Replace the roof hatch	3,000
Replace the riser manway	<u>6,000</u>
	116,000
Engineering and Contingencies	24,000
Total	\$140,000

INSPECTION:

On April 13, 2010, Dixon Engineering, Inc. (DIXON) performed a preliminary maintenance dive inspection on the 40,000-gallon double ellipse water storage tank owned by Lake County DPW, Illinois. Purposes of the inspection were to evaluate the interior and exterior coating's performance and life expectancy; assess the condition of metal surfaces and appurtenances; review safety and health aspects; and make budgetary recommendations for continued maintenance of the tank. All recommendations, with budgeting estimates for repairs are incorporated in this report. The inspection was performed by Kayla S. Melton, Certified Diver. The diver was assisted by Josh M. Grover, Staff Technician and standby diver; and Jeremy W. Jashinski. Staff Technician. The dive profile used was 30 feet for 30 minutes. Chlorine residuals were taken prior to the inspection and after the diver exited the tank. All equipment and the diver were chlorinated prior to entry into the wet interior. Pre-entry chlorine residual and an exit residual showed that the chlorine residual did not decrease during the inspection. No cleaning, paint thickness, or adhesion tests are performed in the wet interior during a dive inspection.

The tank was built by CB&I with a height-to-low-water line of 85 feet. The tank is welded construction. The exterior was last painted in 2002 by L. C. United. The wet interior was last painted in 2002 by L. C. United.

CONDITIONS AND RECOMMENDATIONS:

EXTERIOR COATING CONDITIONS:

The exterior coating system is a multiple coat acrylic overcoat system.

The exterior coating is beginning to chalk and fade and there is loss of gloss. Surfaces have faded due to exposure to ultraviolet rays, which is a normal occurrence for an exterior coating system. The coating is adequately protecting the metal and the aesthetics are fair. The system is performing as expected for an 8 year old system.

Several areas of rock chip damage were noted on the lower legs. These areas have started to surface rust and undercut the surrounding coating. The coating is 9 - 16mils thick on the legs.

The riser coating is in fair condition. There are minor coating breaks with small amounts of surface rust and rust staining. Primary methods of deterioration are spot coating breaks and delamination. There are minor coating breaks with small amounts of surface rust and rust staining on the riser.

The coating on the bowl is in fair condition. Primary methods of deterioration is chalking and fading. No coating breaks were found on the bowl.

Coating on the balcony is in fair condition.

The exterior sidewall coating is in fair condition. Primary methods of sidewall coating deterioration are delamination, checking, and spot coating breaks to the substrate. There are minor coating breaks with small amounts of surface rust and rust staining. There are minor areas of rust bleed-through on the sidewalls.

The exterior roof coating is in fair condition. Primary methods of roof coating deterioration are delamination, checking, rust bleed-through, and spot coating breaks to the substrate. There are minor areas of rust bleed-through on the roof. There are minor coating breaks with small amounts of surface rust and rust staining on the roof.

Good adhesion was noted throughout all the ASTM x-cut test areas. The tank is a candidate for overcoating with acrylic. The existing coating can support additional coats at this time.

EXTERIOR COATING RECOMMENDATIONS:

The existing coating is an alkyd system. Adhesion of the coating is good and would support an overcoat. The recommended procedure is to high-pressure water clean (5,000-10,000 psi) the exterior to remove any delaminating or flaking coating and any contaminants, followed by spot power tool cleaning to bare metal (SSPC-SP 11) any rusted or failed areas.

The coating system would consist of a spot prime coat on the bare metal, followed by two full coats of acrylic. The acrylic system has good gloss and sheen retention. The additional recoat would supply an added barrier thickness for continued service. This alternative was selected because the existing primer has good adhesion. The purpose of this procedure is to remove all the poorly adhering topcoat. This procedure greatly reduces the cost of the project and prolongs the life of the coating system. The system can be repainted every eight-to-ten years without disturbing the primer. With regular recoating the life of the existing system could be extended twenty years or more before the coating would have to be completely removed. The tank would be removed from service during the painting project. This is necessary to reduce moisture condensation on the tank's surface. The estimated cost to overcoat the existing system with an acrylic system is \$40,000.

WET INTERIOR COATING CONDITIONS:

The wet interior coating is an epoxy system applied by L.C. United in 2002. The wet interior was spot blasted and spot primed followed by a full coat of epoxy.

The roof coating is in fair condition. The coating is 99 percent intact, with the primary areas of deterioration along the lap seams, the beam edges, and in the crevices. The tank's roof contains open lap seams that have started to rust and streak. Staining is typical for a tank of this construction where the lap seams are open and not seal welded or caulked. Staining in the lap seams is not a concern, but should be monitored during future inspections for corrosion growth. Edge corrosion is typical but should be corrected before structural loss of steel occurs.

The sidewall coating is in fair condition. The coating on the sidewalls is 99 percent intact. There is not any significant damage at the high water line, which would be the area most affected by ice pressures and ice movement. Causes of deterioration are pinholes, and spot coating breaks. The coating is still protecting the metal, with the exception of several spot coating breaks.

The sidewalls are covered with light mineral staining, which does not affect the integrity of the coating system.

The coating on the tank bottom is in fair condition, 99 percent intact. Cause of deterioration is pinholes. The coating is still protecting the metal, with the exception of several spot coating breaks. The bottom is covered with light mineral staining.

The tank bottom was covered with approximately 1/2-inch of sediment.

The riser was not inspected due to the tank not being drained.

Moderate previous pitting of the metal was found on the sidewalls and floor. It appears that pit filler has been used to fill pits in sidewalls and floor in the past.

WET INTERIOR COATING RECOMMENDATIONS:

When the exterior is overcoated, remove the wet interior coating system by abrasive blast cleaning the metal to a near white grade (SSPC-SP 10) and apply a new coating system. Paint systems are approved for potable storage tanks contingent upon meeting requirements of National Sanitation Foundation Standard 60/61.

Epoxy paint systems are recommended in most applications. Their drawbacks are a minimum application temperature of 50°F or 35°F for fast cure; and long cure times, 7 days at 70°F and up to 28 days at 35°F. The coatings are formulated in high solids form to reduce VOC emissions and have good adhesion and abrasion resistant qualities. The coatings are normally applied in three coats with recoat times up to twenty-four hours. The estimated cost to apply the three-coat epoxy system is \$30,000.

After coating the roof, use a urethane caulk to fill gaps between roof sheets. The caulk will fill open joints and seal edges, extending the life of the wet interior coating. The estimated cost is \$1,000.

CATHODIC PROTECTION CONDITIONS:

The tank does not contain a functioning cathodic protection system.

CATHODIC PROTECTION RECOMMENDATIONS:

Install cathodic clips and couplings for future installation of floating-type cathodic protection system. The estimated cost is \$2,000.

SITE CONDITIONS:

The size of the tank site is average and is fenced with a single locking gate.

There is a small sized staging area for the contractor's equipment.

The site is maintained in a park-like condition.

The tank is located in a park.

FOUNDATION CONDITIONS:

The exposed leg and riser foundations are in fair condition and showed minor amounts of deterioration. Deterioration includes cracking, chipping, and spalling.

One leg foundation is in poor condition. The concrete is spalled without rebar exposure. Some cracks may be deep enough to present a structural problem.

FOUNDATION RECOMMENDATIONS:

High pressure wash the leg and riser concrete and patch the small areas of deterioration. Coat the exposed concrete to prevent further deterioration with an epoxy coating system. The estimated cost is \$1,000.

Rebuild the leg foundation using an epoxy grout. This will require removal of all loose and mottled concrete and attachment of tieback into the existing concrete. This work should be completed without loading from the tank proper. A temporary foundation to assume the dead load of the tank may be required. The estimated cost is \$4,000.

GROUT CONDITIONS:

The grout is in fair condition. 1 foot of the grout is missing between the bottom plate and the leg and riser foundation.

GROUT RECOMMENDATIONS:

Repair the grout at the leg and riser foundation. The purpose of the grout is to evenly distribute the dead and live loads onto the foundations. Grout also keeps water from getting between the foundation and tank.

Remove all loose or deteriorated leg and riser grout then repair with an epoxy grout. The estimated cost is \$1,000.

LEG CONDITIONS:

The legs are in good condition and appeared in alignment.

The tank is supported by 4 tubular columns that attach to the sidewall and bowl at the balcony level.

BALCONY CONDITIONS:

Disclaimer:

Unless we feel ladders and balconies are unsafe, it is our opinion that if the ladders were built to code at the time of construction, they do not require replacement. The code changed three times in the late 80's and early 90's and it seems excessive to replace ladders each time. However, it is our responsibility to inform you of this possible deficiency.

The exterior balcony is in good condition. The balcony on the exterior sidewall is 24-inches wide with a 36-inch high handrail. The handrail has a mid-rail and a kick plate at the balcony floor. The balcony and railing do not conform to OSHA requirements.

ROD CONDITIONS:

The tank's sway rods are in good condition.

The coating on the sway rods is in fair condition with minor spots of coating failure and surface rust on the rods and turnbuckles, and on the struts between the leg columns.

Because of the inaccessibility of the sway rods, the exact tension could not be determined. However, based on the amount of coating loss on the sway rods where the rods rub against each other, it was evident the rods are not tight.

ROD RECOMMENDATIONS:

Adjust the sway rods. Loose sway rods will allow the tank to move excessively placing undue stress on the connections. The estimated cost is incidental to the exterior painting.

Install rigging clips under the bowl halfway between each leg and the riser. The clips would be used by contractors for rigging safety lines. Currently the contractor has no separate, independent tie off location for safety lines. The rigging and safety lines are tied to the same location. Cost would be incidental to repainting costs.

Install rigging clips at the top of each leg. The contractor would use these connections for rigging safety lines instead of rigging them from the balcony where the lift equipment is anchored. Estimated cost is incidental to coating costs.

OVERFLOW PIPE CONDITIONS:

The tank has a 4-inch diameter overflow pipe that exits the roof knuckle, extends down along the sidewall, through the balcony, and down along a leg column to ground level.

The discharge end of the overflow pipe is screened. The screen is in fair condition.

OVERFLOW PIPE RECOMMENDATIONS:

Install a screened flap gate with a corrosion resistant screen on the end of the overflow pipe. The flap gate would allow water to discharge even if the screen becomes plugged or frosted over. It is designed to stay closed to prevent rodents or birds from entering the pipe. The estimated cost is \$1,000.

ROOF HANDRAIL AND PAINTER'S RAILS:

The tank has no roof handrail or painter's rail.

ROOF HANDRAIL AND PAINTER'S RAIL RECOMMENDATIONS:

Install a 42-inch high railing on the roof. Railing will allow tie-off locations and safety during routine vent screen and obstruction light inspections, and would provide a work area for retrieval personnel performing roof extraction. The railing should provide sufficient area to rest a basket for a helicopter lift, or for stabilizing before lowering down through the riser. Install a painter's rail outside the railing so contractor rigging does not interfere with the railing's interior clear area. The estimated cost is \$9,000.

Install safety grabs and rigging couplings on the exterior roof near the roof painter's rail for fall prevention of workers in the wet interior. These grabs would allow a contractor working in the wet interior to be completely tied off to a fall prevention device at all times. The cost would be incidental to the coating costs.

HATCH AND MANWAY CONDITIONS:

The tank has a 24-inch diameter flip-top, round roof access hatch to the wet interior. The hatch has a rainproof cover consisting of a 4-inch curb and a 2-inch lip on the cover. The hatch is in good condition.

The tank has a 12 x16-inch elliptical access manway in the riser that is in good condition.

HATCH AND MANWAY RECOMMENDATIONS:

Install a 36-inch manway in the riser, average rescue baskets will not pass through the existing manway. The estimated cost is \$6,000.

Replace the roof access hatch with a new 30-inch curbed hatch that has a 2-inch lip, a 4-inch curb, and lockable hasp. Average rescue baskets and rescue personnel wearing equipment will not pass through the existing 24-inch hatch. The estimated cost is \$3,000.

VENT CONDITIONS:

The roof vent is a 16-inch flow-through design. The vent is in good condition.

VENT RECOMMENDATIONS:

Replace the roof vent with a new, screened pressure vacuum vent. The new vent can be bolted to a new neck that is welded to the roof.

The vent has movable plates that would allow air to flow in and out of the tank even if the screens become plugged or frosted over. The vent can be removed during painting or rescue operation for additional light and ventilation. The estimated cost is \$5,000.

ANTENNAS:

The balcony has 6 antennas attached to mounting brackets.

LADDER CONDITIONS:

Exterior:

The tank has an exterior leg ladder that starts approximately 10-feet above ground level, and extends up to the balcony. The ladder is not caged. The ladder contains a rail -type fall prevention device.

The fall prevention device on the leg ladder is damaged and does not allow a rail slide to pass.

The tank has a revolving sidewall and roof ladder that is in good condition. The ladder does have a rail-type fall prevention device, preventing movement.

Wet:

There is no ladder in the wet interior.

LADDER RECOMMENDATIONS:

With antennas being installed on towers, the ladders will be used more often. OSHA requires a fall prevention device on ladders in excess of 20 foot, or 30 foot if a cage is present. There are two major types of fall prevention devices. One uses a rail; the other a cable. We generally recommend a rail-type device because it is easier to use. The easier a device is to use, the more it will be used by the contractors and owner personnel.

Exterior:

The revolving roof and revolving sidewall shell ladder should be replaced with a vertical sidewall ladder that runs up to a step-off platform surrounded with handrails at the roof hatch. The step-off platform will provide a safe working area around the roof hatch. Estimated cost is \$5,000.

A handrail from the step-off platform to the roof handrail would replace the roof ladder. Steps or cleats would be installed to increase traction. It would remove all loading from the roof vent pipe. The estimated cost is \$1,000.

Repair the fall prevention device on the exterior leg ladder.

Wet:

Install a ladder on the wet interior from the roof to the bowl with a fall prevention device to match the existing fall prevention device. The estimated cost is \$5,000.

WET INTERIOR METAL CONDITIONS:

The steel structure is in good condition above the high water line and in good condition below it.

No pitting was found at the existing coating breaks on the sidewalls floor.

Riser:

There is a grate over the riser opening.

WET INTERIOR METAL RECOMMENDATIONS:

Weld pits in the tank bottom, sidewalls, access tube, and riser that exceed half the original steel thickness. The purpose is to eliminate deeper pits that are closest to rupture of the steel plate. This type of repair is not intended to return the structure back to its original condition; however, it is a cost effective method of extending the life of the tank. An exact estimated cost cannot be determined until the surface is abrasive blast cleaned. A dummy figure of \$1,000 should be used for bidding.

Fill pits in the tank bottom, sidewalls, access tube, and riser with 100% solids pit filler that are less than one-quarter in depth the thickness of original steel thickness. The purpose of filling the pits is to smooth rough surfaces. This helps create a holiday-free coating. An exact estimated cost cannot be determined until the surface is abrasive blast cleaned. A dummy figure of \$1,000 should be used for bidding.

STEEL TANK FIELD INSPECTION REPORT
LEG TANK

DATE: April 13, 2010

I. TANK DATA

OWNER: Lake County DPW

CLIENT CODE: 99-49-66-03

TANK NAME: Countryside Manor Tower (#4811110)

LOCATION: Street: Park Lane

City: Libertyville

State: Illinois

GPS coordinates: N 42 ° 17 '58.6 "W 087 ° 55 ' 47.4 "

Ground elevation (Above MSL): 708 feet

TANK SIZE: Capacity: 40,000 gallons

Diameter: 23 feet

Height to bottom (LWL): 85 feet

Height to overflow (HWL): 102 feet

Head range: 17 feet

CONSTRUCTION: Welded

Type of structure: Double Ellipse

Type of Roof: Hemisphere

Type of Bowl: Hemisphere

MANUFACTURER: CB&I

COATING HISTORY	<u>EXTERIOR</u>	<u>WET INTERIOR</u>
DATE LAST COATED	<u>2002</u>	<u>2002</u>
CONTRACTOR	<u>L. C. United</u>	<u>L. C. United</u>
COATING SYSTEM	<u>135/30</u>	<u>Epoxy 20</u>
SURFACE PREPERATION	<u>Spot SSPC SP-11</u>	<u>Spot SSPC SP-10</u>
COATING MANUFATURER	<u>Tnemec</u>	<u>Tnemec 2-</u>
COATING SAMPLES	<u>No</u>	<u>No</u>
HEAVY METAL	<u>No</u>	<u>No</u>

INSPECTED BY: Dixon Engineering, Inc.

INSPECTORS: Diver Kayla S. Melton, Top person Josh M. Grover, Ground person

Jeremy W. Jashinski

TYPE OF INSPECTION: Preliminary Maintenance - Dive

II. INSPECTION DATA **SITE CONDITIONS**

Fenced: **Yes**

Control building: **Yes**

Location: **Adjacent to tank**

Antenna control site: **Yes**

Number: **1**

Location: **Adjacent to tank**

Site conditions: **Well maintained**

Neighborhood: **Residential and rural**

To the North: **Park**

To the East: **Park**

To the South: **Park**

To the West: **Park**

Power lines within 50 feet: **Yes**

Location: **Running north to south on the east side of the tank approximately
25 feet free from tank.**

Site drainage: **Away from tank**

Indications of underground leakage: **No**

Shrub, tree, etc. encroachment: **No**

Piping:

Pit: **No**

FOUNDATION

Riser:

Foundation exposed: **Yes**

Height exposed: **0 -2 inches**

Undermining of foundation: **No**

Exposed foundation condition: **Good**

Chipped or cracked: **No**

Exposed rebar: **No**

Type of grout: **Cement**

Condition: **Good**

Grout missing: **Yes**

Amount missing: **2 inches**

Indications of riser settlement: **No**

FOUNDATION

Legs:

Foundation exposed: Yes

Height exposed: 0-8 inches

Undermining of foundation: No

Exposed foundation condition: Poor

Chipped or cracked: No

Exposed rebar: No

Type of grout: Cement

Condition: Good

Grout missing: Yes

Amount missing: 2- 6 inches

Indications of leg settlement: No

Leg comments: The northeast leg foundation is badly deteriorated with large cracks and chipping. The other 3 legs have a good foundation.

EXTERIOR COATING

Legs:

Number: 4

Type: Tubular

Dimensions: 16 inches

Exterior connection to tank: Good

Topcoat condition: Fair

Previous coating condition: Good

Describe coating: Chalking, fading delamination, and spot coating breaks to substrate.

Dry film thickness: 9 - 16 mils

Coating adhesion: 4A

Metal condition: Good

Riser:

Type: Wet

Diameter: 36 inches

Exterior connection to tank: Good

Topcoat condition: Fair

Previous coating condition: Good

Describe coating: Chalking, fading, delamination, and spot coating breaks to the substrate.

Mildew growth: Yes

Amount: Light

Dry film thickness: 9 - 16 mils

Metal condition: Good

EXTERIOR COATING

Bowl:

Topcoat condition: **Fair**
Previous coating condition: **Good**
Describe coating: **Chalking and fading.**
Mildew growth: **Yes**
Amount: **Light**
Metal condition: **Good**

Sidewall:

Lettering: **No**
Logo: **No**
Topcoat condition: **Fair**
Previous coating condition: **Good**
Describe coating: **Chalking, fading, and spot coating breaks to substrate.**
Dry film thickness: **10 - 15 mils**
Metal condition: **Good**

Roof:

Topcoat condition: **Fair**
Previous coating condition: **Good**
Describe coating: **Chalking, fading, and spot coating breaks to substrate.**
Dry film thickness: **13 - 18 mils**
Coating adhesion: **2A**
Metal condition: **Good**

EXTERIOR APPURTENANCES

Anchor bolts:

Number of bolts per leg: **2**
Diameter: **1 inch**
Number of riser bolts: **0**
Coating condition: **Good**
Metal condition: **Good**

Exterior overflow pipe:

Coating condition: **Fair**
Metal condition: **Good**
Inside diameter: **4 inches**
Condition of screen: **Good**
Flap gate: **No**
Air gap: **Yes**
Pipe to ground distance: **20 inches**
Splash pad: **Yes**
Type: **Stone**
Condition: **Good**

EXTERIOR APPURTENANCES

Riser access:

Type: **Bottom manway**
Dimensions: **12 x 16 inches**
Coating condition: **Fair**
Metal condition: **Good**
Gasket: **Yes**
Leaking: **No**
Hinged: **No**

Struts and Rods:

Number of bays: **2**
Sway rods: Coating condition: **Fair**
Metal condition: **Good**
Struts: Coating condition: **Fair**
Metal condition: **Good**
Riser rods: Coating condition: **Fair**
Metal condition: **Good**
Rigging points: Number under bowl: **0**
Number at top of legs: **0**
Comments: **1 clip on each leg at lower strut for a total of 4**

Leg ladder:

Coating condition: **Fair**
Metal condition: **Good**
Height to start of ladder: **35 feet**
Toe clearance: **6+ inches**
Width of rungs: **13 inches**
Thickness of rungs: **3/4 inches**
Shape of rungs: **Round**
Fall prevention device: **Yes**
Type: **Rail**
Condition: **Good**
Cage: **No**
Step off platform: **No**
Ladder comments: **The rail at about 8 feet under the balcony is impossible for the rail glide to pass.**

EXTERIOR APPURTENANCES

Balcony:

Balcony width: **24 inches**

Railing height: **36 inches**

Midrail: **21 inches**

Toe plate height: **4 inches**

Coating condition: **Poor**

Describe coating: **Delamination**

Exterior connection to tank: **Good**

Missing any bolts or rivets: **No**

Number of penetrations: **1**

Penetrations reinforced: **No**

Penetration uses: **Overflow pipe**

Accumulation of bird droppings: **No**

Water pooling: **Yes**

Metal condition: **Good**

Sidewall ladder:

Type: **Follows roof**

Design: **Revolving**

Coating condition: **Fair**

Metal condition: **Good**

Toe clearance: **6 inches**

Width of rungs: **13 inches**

Thickness of rungs: **3/4 inches**

Shape of rungs: **Round**

Fall prevention device: **Yes**

Type: **Rail**

Condition: **Good**

Cage: **No**

Step-off platform:

N/A

EXTERIOR APPURTENANCES

Roof ladder:

Design: **Revolving**
Style: **Ladder**
Coating condition: **Fair**
Metal condition: **Good**
Toe clearance: **6 inches**
Width of rungs: **13 inches**
Thickness of rungs: **3/4 inches**
Shape of rungs: **Round**
Fall prevention device: **Yes**
 Type: **Rail**
 Condition: **Good**
Cage: **No**

Roof ladder handrail:

N/A

Center handrail:

N/A

Roof hatches:

Wet interior: Coating condition: **Fair**
 Metal condition: **Good**
 Neck diameter: **24 inches**
 Shape: **Round**
 Hatch security: **Lock**
Dry interior: **N/A**

Bolted ventilation hatch:

N/A

Roof vent:

Number: **1**
Type: **Standard**
Neck diameter: **16 inches**
Coating condition: **Fair**
Metal condition: **Good**
Screen condition: **Good**
 Percent of screen open: **99**

Aviation lights:

N/A

EXTERIOR APPURTENANCES

Removable cathodic caps:

N/A

Rigging points:

N/A

Antennas:

Number: **6**

Location: **Balcony**

Cable runs: **Up northwest leg around balcony to handrail and handrail mounts.**

Antennas or cables interfere with climbing: **No**

WET INTERIOR COATING

Roof:

Topcoat condition: **Fair**

Primer coating condition: **Good**

Describe coating: **Spot coating breaks to substrate**

Metal condition: **Good**

Condition of laps: Condition: **Fair**

Lap seams: **Open**

Sidewall:

Topcoat condition: **Fair**

Primer coating condition: **Good**

Describe coating: **Spot coating breaks to substrate**

Metal condition: **Good**

Active pitting: **No**

Previous pitting: **Yes**

Deepest pit depth: **1/32 inch**

Number of pits: **11-25**

Previous pit filling: **Unknown**

Tank bottom:

Topcoat condition: **Fair**

Primer coating condition: **Good**

Describe coating: **Spot coating breaks to substrate**

Metal condition: **Good**

Active pitting: **No**

Previous pitting: **Yes**

Deepest pit depth: **1/32 inch**

Number of pits: **11-25**

Previous pit filling: **Unknown**

Depth of sediment: **1/4 inch**

WET INTERIOR COATING

Riser:

Riser comments: **Diver did not go down to the riser. It is presumed that the riser coating is in slightly worse condition than the tank interior.**

WET INTERIOR APPURTENANCES

Tank ladder:

N/A

Cathodic protection:

N/A

Fill pipe:

Fill pipe comments: **Pipe is at the bottom of the riser; it could be not be inspected.**

Overflow pipe:

Type: **Weir box**

Coating condition: **Poor**

Metal condition: **Good**

Roof beams:

N/A

Sidewall beams:

N/A

Sidewall beam comments: **The area where the beam was removed is rusting.**

Riser safety:

Riser grate: **Yes**

Coating condition: **Fair**

Metal condition: **Good**

Riser railing: **No**

Siphon:

N/A

Interior balcony:

N/A

Spider:

N/A

Field Inspection Report is prepared from the contractor's viewpoint. It contains information the contractor needs to prepare his bid for any repair or recoating. The engineer uses it to prepare the engineering report. Cost estimates are more accurate if the contractor's problems can be anticipated. While prepared from the contractor's viewpoint, the only intended beneficiary is the owner. These reports are completed with diligence, but the accuracy is not guaranteed. The contractor is still advised to visit the site.

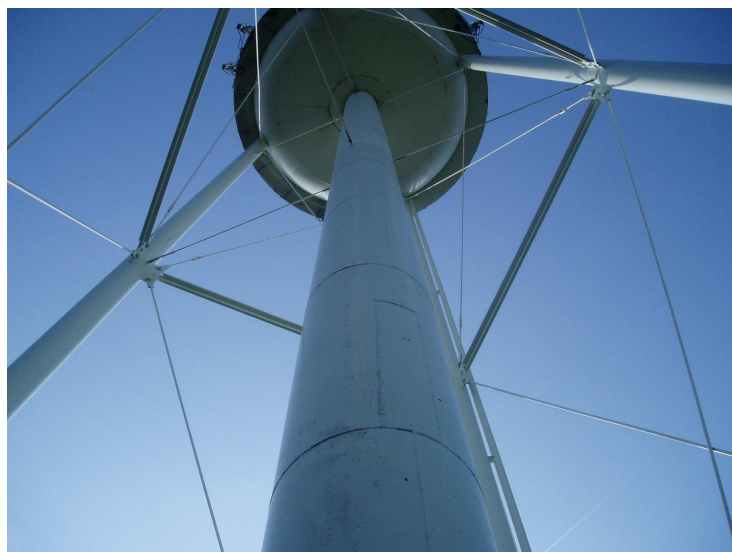
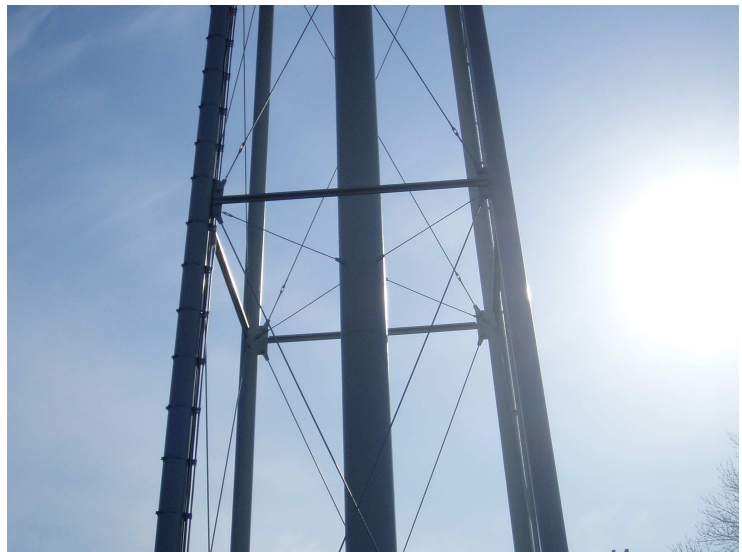


Looking at the 40,000 gallon legged tank owned by Lake County DPW.



1) View of the exterior bowl and sidewall.

2) Looking at the exterior legs and riser.



3) View of the bowl and riser.



4) Antenna equipment located next tank leg.

5) Mildew growth on the bottom of the exterior riser.



6) Coating delamination on the bottom of the exterior riser.



7) Bolted manway at the bottom of the riser.

8) Spot coating failures on the exterior riser.



9) Foundation for an exterior leg is in poor condition.



10) Leg foundation is has large areas of spalling concrete.

11) Area of missing grout between leg base plate and foundation.

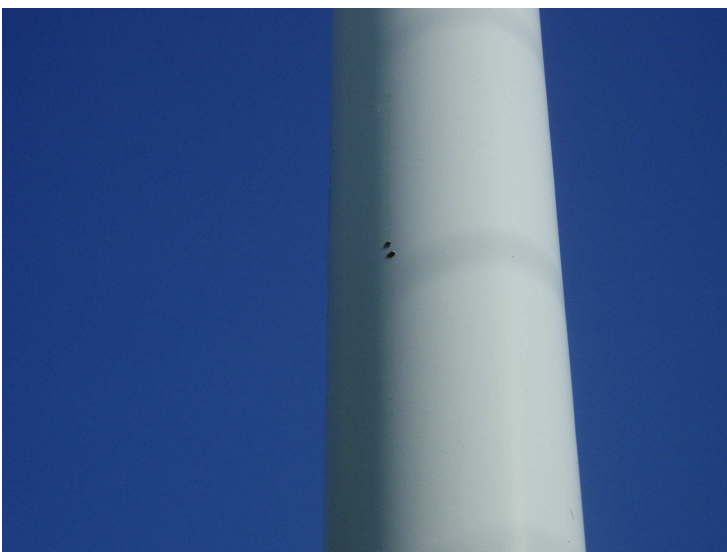


12) Closer view of the missing grout.



13) Overflow pipe with discharge area.

14) Looking at the screen on the overflow.

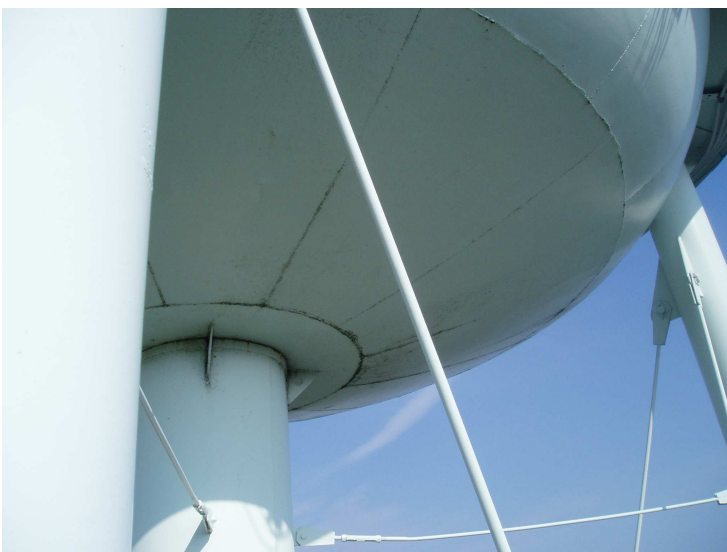


15) Looking at a spot coating failure on a exterior leg.



16) Another view of the exterior riser with spot failures.

17) Looking at the struts and sway rod connection to the leg.



18) Coating on the exterior bowl is in good condition.



19)Riser connection to the bowl is in good condition.

20)Spot coating delamination on the balcony floor.



21)View of the balcony handrail.



22)Antennas mounted to balcony handrail.

23)Spot coating failures in the exterior sidewall coating.

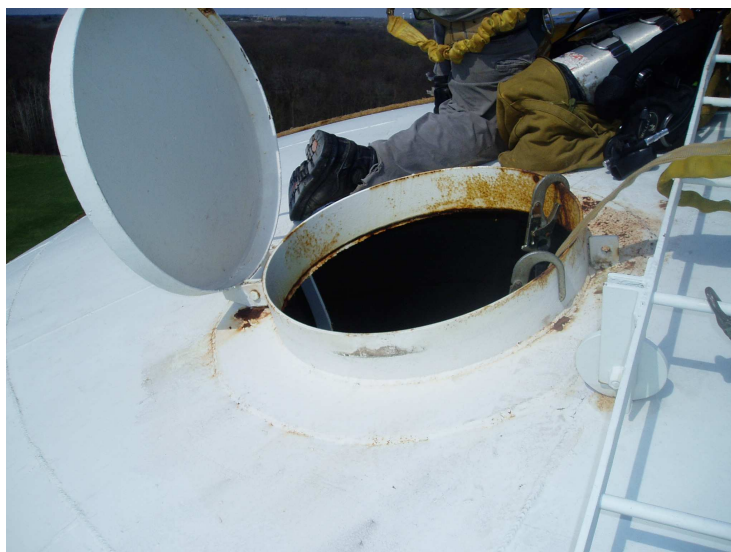


24)Coating delamination on the lower exterior sidewall.



24) Revolving roof ladder with rail fall prevention.

25) Coating damage to roof coating from ladder wheels.



26) Roof hatch to the wet interior.



27) View of the roof coating.

28) Coating around the roof hatch is in poor condition.

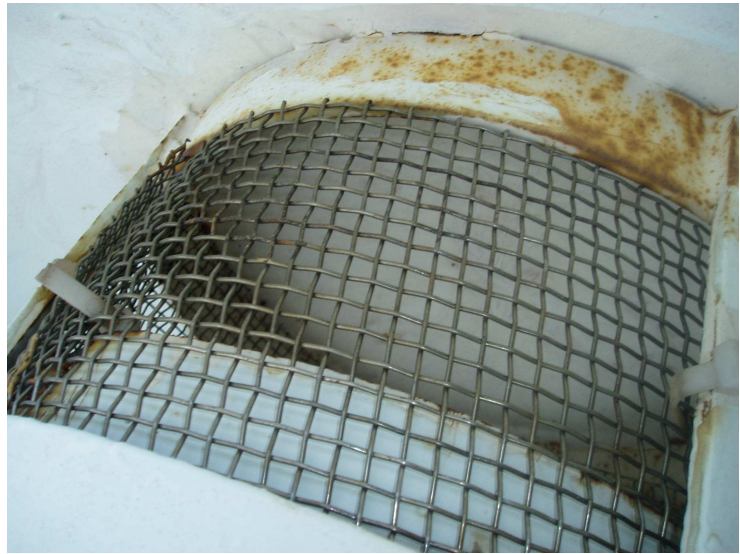


29) Same.



30) The roof vent is in good condition.

31) The screen on the roof vent is in good condition.

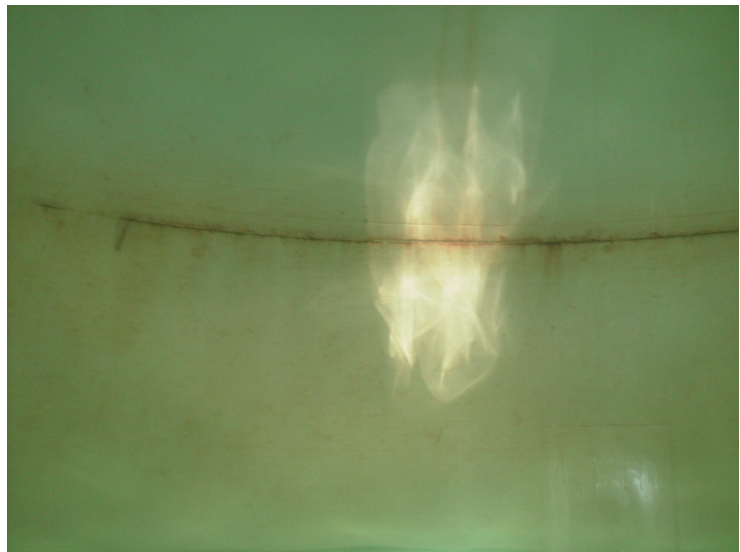


32) The wet interior roof coating is in fair condition.

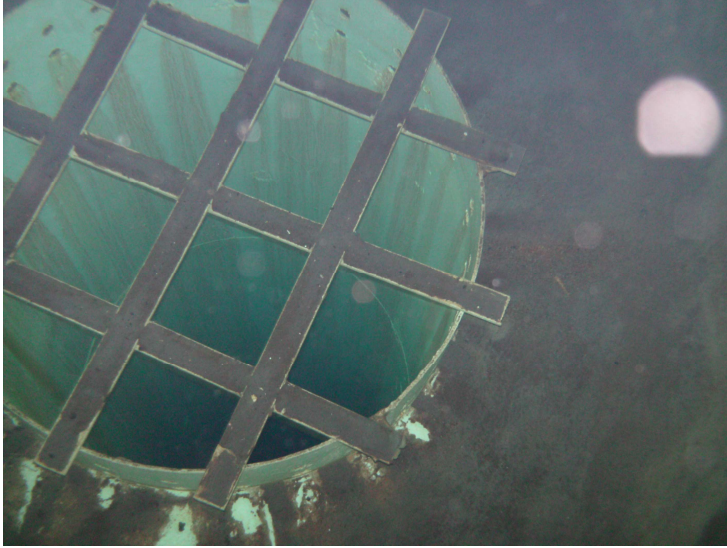


33) Rusting is occurring on the edges and in the crevices of the wet interior roof.

34) Same.



35) Same.



36) The floor is covered with a light layer of sediment. The riser grate is in good condition.

37) The coating on the roof knuckle is in good condition.



38) A few spot coating breaks were found on the sidewall above the high water level.



39) Spot coating breaks were found on the sidewalls below the water level.

40) The coating on the lower sidewalls is in good condition.



41) Coating on the sidewalls below the water level is in good condition.