Dixon Engineering, Inc.

Maintenance Inspection

250,000 Gallon Spheroid

Aleda E. Lutz V.A. Medical Center
Saginaw, Michigan

Inspection Performed: September 27, 2019
Reviewed by Joseph T. Hoban, P.E.: January 7, 2020

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CONCLUSIONS:

1. The exterior coating is a urethane system. The coating is in good condition overall. The main coating deterioration is topcoat delamination. There are only a few coating failures on the basebell and roof.

2. The dry interior coating is presumed to be an epoxy system. The coating is in good condition with no significant deterioration.

3. The wet interior coating is presumed to be an epoxy system. The coating is in good condition overall. Coating deterioration includes pinhole and spot failures to the substrate with areas isolated to the roof.

RECOMMENDATIONS (IMMEDIATE):

1. Coat the exposed steel at the hose attachment on the overflow pipe in the basebell and the transition cone rigging lug. Work could be performed by in-house personnel or the cost would be incidental to the overflow pipe discharge modification.

2. Modify the overflow pipe discharge to bring it into compliance with EGLE requirements and install a screened flap gate. The estimated cost is $4,000.

RECOMMENDATIONS (AFTER NEXT FIVE YEAR INSPECTION):

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

Complete the remaining work pending the revised condition assessment after the next five year inspection. The coating work is the greatest cost and largest part of the recommendations. The repairs and upgrades should be completed during the next major tank rehabilitation project when coating repairs are made.

1. Budget to overcoat the exterior pending the revised condition assessment after the next five year inspection. The current estimated cost is $75,000.

2. Repair the damaged cathodic protection system. The cost would be dependent on your contract with your cathodic vendor.

3. Install a painter's railing outside the existing roof handrail. The estimated cost is $6,000.

4. Install a handhold at the wet interior roof hatch, access tube roof hatch, and painter's (bird) hatch to assist entering and exiting the openings. The cost would be incidental to the next painting project.

5. Install a mud valve in the transition cone. The estimated cost is $5,000.

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

A series of accidents involving falls from or in water tanks has highlighted inadequacies in water tower 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, but even with safety training and proper equipment, accidents can occur. Most rescue squads are local or neighboring fire departments, with some departments having more experience than others. Water storage tanks are designed to store water and are not suited for rescue or retrieval convenience. 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 may soon require 30 inch manways and hatches with fall prevention on all ladders. DIXON has always objected to replacement of ladders especially on retrofit of existing tanks as new regulations are passed on a relatively frequent basis. We recommend the changes for the convenience and safety of your employees, rescue personnel, and others working on the structure. As far as we know, none of these conversion items recommended are required or mandated by any government agency for retrofits.

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

RETRIEVAL FROM WET INTERIOR:

Current Access:

The roof is accessed from dry interior ladders located in the basebell, riser, and access tube. There is a ladder in the wet interior from the roof hatch to the transition cone. All ladders are equipped with fall prevention devices. There is a 24 inch manway in the transition cone for access into the bottom of the wet interior. There is a 30 inch roof hatch to the dry interior and a 30 inch roof hatch to the wet interior. There is a handrail on the exterior roof. The area within the handrail is large enough for temporary rescue basket placement.

There is a full platform under the transition cone and a condensate ceiling at approximately 20 feet above the ground in the dry interior. Ladder openings in the platforms are 30 inch square.

Rescue Procedure:

1. It is not practical to install a 30 inch manway in the bottom of the tank or in the access tube. Retrieval must be through the roof hatch or roof vent opening by use of a winch and tripod. Rescue personnel would gain access to the roof using the existing ladders equipped with fall prevention devices. Rescue personnel would enter the tank through the 30 inch roof hatch or the existing bottom manway.

2. Inside the roof handrail, the rescue crew raises the rescue basket to the roof using a tripod and a winch. Place the rescue basket on the roof while the tripod is moved over the access tube hatch.

3. Lower the rescue basket down the access tube to the top platform. From the top platform, lower the rescue basket to ground level through the 30 inch platform hatches with a pulley or winch connected to the attachment lug on the tank's transition cone.

   From the roof it is possible to lower the rescue basket over the side to ground level, but that would require a very large winch and increased loading on the attachment point. On a rainy, windy, or snowy day, the objective would be to get rescue personnel off the roof as soon as possible, so lowering through the dry interior is preferred. If it is not possible to lower the rescue basket down the dry interior, a helicopter rescue will be required.

Equipment:

Winch or pulley system and tripod
Tag line
Rescue basket

INSPECTION:

On September 27, 2019 Dixon Engineering Inc. performed a preliminary maintenance inspection on the 250,000 gallon spheroid elevated water storage tank located in Saginaw, Michigan and owned by the Aleda E. Lutz V.A. Medical Center. 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 Kyle Lay, ROV Operator. The inspector was assisted by John Watson, Engineering Technician. Scheduling and arrangements for the inspection were completed through Kevin Russell.

The wet interior inspection was completed with a remotely operated vehicle (ROV). Video of the inspection and still photos are included with this report. No cleaning was performed in the wet interior during the ROV inspection.

GENERAL INFORMATION:

The tank was built in 2012 by Maguire Iron, Inc. with a height to high-water level of 151 feet.

CONDITIONS AND RECOMMENDATIONS:

EXTERIOR COATING CONDITIONS:

A coating sample was taken and sent to Tnemec Paint Company for lab analysis. Lab results indicate that the exterior coating is a urethane system. The coating is in good condition overall.

The basebell coating is in good condition with a few failures. The primary method of deterioration is delaminated topcoat.

The riser, bowl, and sidewall coating is in good condition with no failures. There is a "V.A." logo on the sidewall in two locations. The bowl is covered with light mildew growth.

The roof coating is in good condition with a few failures. The primary method of deterioration is delaminated topcoat.

Good adhesion was noted on the ASTM X-cut test areas with trace loss of topcoat to the intermediate coat. If overcoating is not performed within the next two years, additional adhesion testing should be performed.

EXTERIOR COATING RECOMMENDATIONS:

Budget for overcoating in approximately eight years. The typical overcoat frequency for modern urethane systems is fifteen years. There is always a risk in overcoating the exterior, but we have had several successful projects when performed in the timeframe noted. The risk of poor adhesion of the overcoat system gets higher as the existing system gets older. Current adhesion showed the existing coating would support an additional coating system.

Perform a maintenance inspection in five years to update the coating times and costs. The current estimated cost is $75,000.

DRY INTERIOR COATING CONDITIONS:

The dry interior on this structure is defined as the non-water contact surfaces, consisting of the basebell, riser, transition cone, and access tube.

The coating is presumed to be an epoxy system based on the appearance. Determining exact coating type is not essential because we do not recommend overcoating in the dry interior. The coating is in good condition overall.

The basebell, riser, platforms, transition cone, and access tube coating is in good condition with no failures.

There is some minor coating damage on the overflow pipe where a hose attachment was welded. The hose attachment location is not coated.

The transition cone rigging lug is not coated.

DRY INTERIOR COATING RECOMMENDATIONS:

Coat the exposed steel at the hose attachment on the overflow pipe in the basebell and the transition cone rigging lug. Work could be performed by in-house personnel or the cost would be incidental to the overflow discharge modification.

WET INTERIOR COATING CONDITIONS:

The coating is presumed to be an epoxy system based on the color and condition. Determining exact coating type is not essential because spot repair is not typically recommended and overcoating is the wet interior is never recommended.

The roof coating is in good condition with a few failures. There are minor coating failures on the roof panels but most of deterioration is along the welded seams and at the roof rigging coupling crevices.

The sidewall coating is in good condition with a few failures. Primary methods of deterioration are pinhole spot failures to the substrate. There is no significant coating damage at the high-water level which would be the area most affected by ice movement.

The access tube coating is in good condition no failures. There is no significant damage at the high-water level.

The coating on the bowl and transition cone is in good condition with no failures.

The surfaces below the normal operating water level are covered with mineral staining which does not affect the integrity of the coating system.

WET INTERIOR COATING RECOMMENDATIONS:

The existing coating system has not deteriorated to the point where replacement is warranted. The cathodic protection system should adequately protect all areas below the high-water level where the coating has deteriorated. Reinspect in five years to update conditions and recommendations.

CATHODIC PROTECTION CONDITIONS:

The tank has an impressed current ice-free cathodic protection system is in fair condition. Surfaces below the high-water level are protected by the submerged system that is suspended from the access tube from arms above the bowl. One support arm is broken off and lying on the bowl. The system appears to still be operating properly.

CATHODIC PROTECTION RECOMMENDATIONS:

Repair the damaged cathodic protection system. The cost would be dependent on your contract with your cathodic vendor.

PUMPHOUSE PIPING CONDITIONS:

There is a pumphouse adjacent to the tank that contains piping and valves. The piping is above the floor. The piping is in good condition. The coating on the piping is in good condition with minor surface corrosion.

SITE CONDITIONS:

The tank is located on a fenced site adjacent to the medical center parking lot and a wooded area.

FOUNDATION AND ANCHOR BOLT CONDITIONS:

The concrete foundation is not exposed. The site concrete was poured to the foundation level with the top. The concrete is in good condition.

There are sixteen anchor bolts evenly spaced on the baseplate around the basebell. The anchor bolts are in good condition with no deterioration of the nuts or bolts.

GROUT CONDITIONS:

The grout between the baseplate and the foundation is in good condition with none damaged or missing.

ROOF HANDRAIL, PAINTER'S RAILING, AND ROOF RIGGING CONDITIONS:

There is a handrail on the roof surrounding the roof hatches and the vent. The handrail is in good condition. A lightning rod is attached to the handrail.

The tank does not have a painter's railing.

There are roof rigging couplings for safety and staging lines during wet interior coating work.

ROOF HANDRAIL, PAINTER'S RAILING, AND ROOF RIGGING RECOMMENDATIONS:

Install a painter's railing outside the existing roof handrail. The railing gives the contractor a rigging point for staging. The estimated cost is $6,000.

LIGHTING CONDITIONS:

The tank has a single aviation light on the roof that is in good condition. There is a photocell that will switch the lights on when it's dark outside. The light is operating properly.

There are light fixtures located in the dry interior. All of the lights operated properly during the inspection.

OVERFLOW PIPE CONDITIONS:

The tank has a 6 inch diameter overflow pipe that extends along the access tube in the dry interior down through the dry riser and exits near the bottom of the basebell.

The discharge end of the overflow pipe is screened. The screen is in good condition but is oversized. There was debris covering approximately 50% of the screen at the time of the inspection.

The pipe discharges at an angle to a splash pad. The air gap meets the required 12-24 inches. The discharge area is in good condition.

OVERFLOW PIPE RECOMMENDATIONS:

Modify the overflow pipe discharge so the screen is in-line and install an elbow so the discharge is in a downward position and install a screened flap gate. This will bring the overflow pipe discharge into compliance with current EGLE requirements. The estimated cost is $4,000.

HATCH AND MANWAY CONDITIONS:

There is a 30 inch diameter roof hatch to the wet interior that is in good condition. The hinged cover is in good condition. There is no handhold next to the hatch to aid in entering and exiting the opening. The hatch was not secured.

There is a 30 inch diameter roof hatch into the dry interior that is in good condition. The hinged cover is in good condition. There is no handhold next to the hatch to aid in entering and exiting the opening.

There is a 24 inch diameter manway in the transition cone to the wet interior that is in good condition. The manway gasket showed no signs of leakage and the bolts are in good condition.

There is a 36 x 80 inch door in the basebell that is in good condition. The door operated properly during the inspection.

There is a 24 inch diameter painter's hatch (bird hatch) at the top of the riser that is in good condition. There is no safety handhold above the hatch.

The ladder openings in the dry interior platforms are 30 x 30 inch square shaped. The openings are equipped with hinged covers.

There is a rigging lug on the transition cone for rescue retrieval line attachment.

HATCH AND MANWAY RECOMMENDATIONS:

Install a handhold at the wet interior roof hatch, access tube roof hatch, and painter's (bird) hatch to assist entering and exiting the openings. The cost would be incidental to the next painting project.

VENT CONDITIONS:

The roof vent is a 16 inch frost-free pressure vacuum design that is in good condition. The pressure vacuum plate was found to be properly aligned and the screen is intact.

LADDER CONDITIONS:

The dry interior ladders are located in the basebell, riser, and access tube. The ladders are in good condition. All of the ladders are equipped with cable-type fall prevention devices that are in good condition.

There is a wet interior ladder from the roof to the transition cone that is in good condition. The ladder is not equipped with a cable-type fall prevention device that is in good condition.

FILL/DRAW PIPE CONDITIONS:

The fill pipe routes through the dry interior into the bottom of the transition cone and extends approximately 8 feet above the bottom of the tank.

The tank draws from a separate pipe. The draw pipe routes through the dry interior into the bottom of the transition cone and extends approximately 6 inches into the bottom of the tank. There are deflector bars over top of the draw pipe in the wet interior.

The tank has a hot water supply and return to the wet interior. The hot water supply routes through the dry interior into the bottom of the transition cone and extends approximately 8 feet above the bottom of the tank. The hot water return routes through the dry interior into the bottom of the transition cone and extends approximately 24 inches into the wet interior.

EXPANSION JOINT CONDITIONS:

The fill and draw pipes are equipped with an expansion joint that is located inside the basebell. The expansion joints are covered with insulation and are not accessible for inspection.

INSULATION CONDITIONS:

The fill, draw, hot water supply, and hot water return pipes are covered with rigid foam insulation that is in good condition. The insulation is covered with an aluminum jacket that is in good condition.

MUD VALVE CONDITIONS:

There is a coupling located in the bottom of the tank to aid in removal of sediment during inspections and routine maintenance. The coupling is accessible only in the wet interior. The coupling was not operated during the inspection.

MUD VALVE RECOMMENDATIONS:

Install a mud valve to aid with removal of sediment during regular maintenance inspections. Without a mud valve the sediment has to be removed by sending it down the draw pipe and flushing it out of a hydrant, which may not be possible on your tank. The estimated cost is $5,000.

CONDENSATE DRAIN CONDITIONS:

There is a condensate drain line that routes from the platform to the overflow pipe. There is a check valve in the line to stop backflow during overflow conditions. The line is in good condition. The drain opening appeared to be operational.

WET INTERIOR METAL CONDITIONS:

The steel structure is in good condition above and below the high-water level. No pitting was observed at the coating failures on the roof or sidewall.

DIXON ENGINEERING, INC.
STEEL TANK FIELD INSPECTION REPORT
PEDESTAL TANK

DATE: **September 27, 2019**

OWNER: **Aleda E. Lutz V.A. Medical Center**
CLIENT CODE: **22-73-95-01**
LOCATION: Address: **1500 Weiss St.**
City: **Saginaw**
State: **Michigan**
TANK SIZE: Capacity: **250,000 gallons**
Bottom (LWL): **119 feet 9 inches (from nameplate)**
Overflow (HWL): **151 feet (from nameplate)**
CONSTRUCTION:
Type: **Spheroid**
Type of roof: **Hemisphere**
Type of bowl: **Hemisphere**
YEAR CONSTRUCTED: **2012**
MANUFACTURER: **Maguire Iron**

COATING HISTORY	EXTERIOR	WET INTERIOR	DRY INTERIOR
YEAR LAST COATED	**2012**	**2012**	**2012**
COATING SYSTEM	**Polyurethane**	**Presumed Epoxy**	**Presumed Epoxy**
HEAVY METAL COATING SAMPLES	**No**	**No**	**No**
HEAVY METAL BEARING	**No**	**No**	**No**

PERSONNEL: Inspector **Kyle Lay & John Watson**, Top person **John Watson**, ROV operator **Kyle Lay**
TYPE OF INSPECTION: **Preliminary Maintenance**
METHOD OF INSPECTION: **ROV**
YEAR LAST INSPECTED: **Unknown**

SITE CONDITIONS

Fenced: **Yes**
Site large enough for contractor's equipment: **Yes**
Control building: **Yes**
Antenna control site: **No**
Neighborhood: **V.A. hospital site**

Power lines within 50 feet: **No**
Site drainage: **Away from tank**
Indications of underground leakage: **No**
Shrub, tree, etc. encroachment: **No**

EXPOSED PIPING

Location: **Adjacent to tank (in pumphouse building)**
Condition of structure: **Good**
Structure is: **Dry**
Pump present: **Yes**
Door condition: **Good**
Locked: **Yes**
Pipe coating condition: **Good**
Describe coating: **Spot coating failures to substrate**
Condition of metal: **Good**

FOUNDATION

Foundation exposed: **No**
Grout condition: **Good**
Amount missing: **0 feet**
Undermining of foundation: **No**
Foundation comments: **Site concrete pad butts up to the tank grout. The site concrete is in good condition**

EXTERIOR COATING

Basebell:

Topcoat condition: **Good**
Previous coat condition: **Good**
Describe coating: **Delaminating**
Dry film thickness: **9-11 mils**
Adhesion: **5A**
Metal condition: **Good**
Basebell comments: **Rust streaks present from security camera bases. Very minor corrosion present between the baseplate and grout. There are 5-10 spots of topcoat delamination ranging from ½-3 inches diameter**

Riser

Topcoat condition: **Good**
Previous coat condition: **Good**
Describe coating: **No significant coating deterioration**
Mildew growth: **No**

EXTERIOR COATING

Metal condition: **Good**

Bowl:

Topcoat condition: **Good**
Previous coat condition: **Good**
Describe coating: **No significant coating deterioration**
Mildew growth: **Yes**
Metal condition: **Good**
Bowl comments: **Light mildew**

Sidewall:

Lettering: **No**
Logo: **Yes**
Number: **2**
Describe logo: **VA**
Topcoat condition: **Good**
Previous coat condition: **Good**
Describe coating: **No significant coating deterioration**
Metal condition: **Good**

Roof:

Topcoat condition: **Good**
Previous coat condition: **Good**
Describe coating: **Delaminating**
Dry film thickness: **10-12 mils**
Adhesion: **4A**
Metal condition: **Good**
Roof comments: **There is one spot of topcoat delamination on the knuckle**

EXTERIOR APPURTENANCES

Basebell door:

Size: **36 x 80 inches**
Coating condition: **Good**
Metal condition: **Good**

Anchor bolts:

Number: **16**
Diameter: **1⅜ inches**
Location: **Exterior**
Coating condition: **Good**

EXTERIOR APPURTENANCES

Metal condition: **Good**

Overflow pipe:

Diameter: **6 inches**
Coating condition: **Good**
Metal condition: **Good**
Condition of screen: **Good**
Percent of screen open: **50**
Mesh size: **4**
Flap gate: **No**
Air gap: **Yes**
Lowest part of discharge to the ground distance: **16 inches**
Overflow discharges to: **Concrete pad**
Condition: **Good**
Overflow comments: **The overflow discharge area is damp**

Roof handrail:

Height: **41 inches**
Midrail height (x2): **28 and 15 inches**
Kick plate height: **4 inches**
Vertical post type: **Tube**
Size: **2 inches**
Top rail type: **Tube**
Size: **2 inches**
Midrail type (x2): **Tube**
Size: **2 inches**
Coating condition: **Good**
Metal condition: **Good**
Roof handrail comments: **There are scratches from lightning rod installation**

Painter's rail:

N/A

Roof rigging points:

Number: **5**
Couplings covered: **Yes**
Covered with: **Steel/brass plugs**
Coating condition: **Good**
Metal condition: **Good**

EXTERIOR APPURTENANCES

Wet interior roof hatch:

Neck size: **30 inches**
Distance from center of the tank (to outer edge): **5 feet**
Shape: **Round**
Handhold at opening: **No**
Curb height: **10 inches**
Cover overlap: **4 inches**
Hatch security: **None**
Outside coating condition: **Good**
Inside coating condition: **Good**
Metal condition: **Good**

Dry interior roof hatch:

Neck size: **30 inches**
Shape: **Round**
Handhold at opening: **No**
Hatch security: **None**
Outside coating condition: **Good**
Inside coating condition: **Good**
Metal condition: **Good**

Bolted ventilation hatch:

N/A

Roof vent:

Number: **1**
Distance from center of the tank (to outer edge): **5 feet**
Type: **Frost-free pressure-vacuum**
Neck diameter: **16 inches**
Flange opening diameter: **24 inches**
Coating condition: **Good**
Metal condition: **Good**
Screen condition: **Good**
    Mesh size: **4**
    Pressure plate free to move: **Yes**
Vent comments: **There are three slots in access tube hatch curb covered with screens to vent the dry interior**

Aviation lights:

Design: **Single red**
Location: **Free-standing mount**

EXTERIOR APPURTENANCES

Functioning: **Yes**
Globe condition: **Good**
Photoelectric cell: **Yes**
Aviation light comments: **Light flashes red**

Antennas:

N/A

Electrical:

Electrical conduit condition: **Good**
Exposed wiring: **No**

DRY INTERIOR COATING

Basebell:

Coating condition: **Good**
Describe coating: **No significant coating deterioration**
Dry film thickness: **8-14 mils**
Metal condition: **Good**
Floor: **Concrete**

Condensate platform:

Platform design: **Full**
Coating condition: **Good**
Describe coating: **No significant coating deterioration**
Metal condition: **Good**
Ladder opening size: **30 x 30 inches**
    Shape: **Square**
    Opening covered: **Yes**
    Handhold at opening: **Yes**
Drain: **Yes**
    Size: **2 inches**
    Type: **To overflow**
    Check valve: **Yes**

Riser above the condensate platform:

Diameter: **9 feet**
Coating condition: **Good**
Describe coating: **No significant coating deterioration**
Dry film thickness: **8-12 mils**
Metal condition: **Good**

DRY INTERIOR COATING

Top platform:

Platform design: **Full**
Material: **Steel plate**
Coating condition: **Good**
Describe coating: **No significant coating deterioration**
Metal condition: **Good**
Ladder opening size: **30 x 30 inches**
Shape: **Square**
Opening covered: **Yes**
Handhold at opening: **Yes**

Riser above the top platform:

Coating condition: **Good**
Describe coating: **No significant coating deterioration**
Dry film thickness: **7-15 mils**
Metal condition: **Good**

Transition cone:

Coating condition: **Good**
Describe coating: **No significant coating deterioration**
Metal condition: **Good**
Rigging lug above opening: **Yes**
Transition cone comments: **The rigging lug is not coated**

Access tube:

Diameter: **42 inches**
Topcoat condition: **Good**
Prime coat condition: **Good**
Describe coating: **No significant coating deterioration**
Dry film thickness: **8-12 mils**
Metal condition: **Good**

DRY INTERIOR APPURTENANCES

Electrical:

Lights functioning: **Yes**
Number of damaged globes: **0**
Number of damaged cages: **0**
Number of bulbs burned out: **0**
Additional lights needed: **No**
Electrical outlet/conduit condition: **Good**
Used during inspection: **No**

DRY INTERIOR APPURTENANCES

Sample tap:

Location: **In basebell**
Pipe diameter greater than ¼ inch: **Yes**
12 inches or more above the floor: **Yes**
Down turned: **No**
In heated room: **No**
Condition: **Good**
Sample tap comments: **The ball valve is covered with insulation and tape**

Expansion joint (x2):

Location: **Bottom of fill pipe and bottom of draw pipe**
Accessible for inspection: **No**

Fill and draw pipe insulation:

Type: **Styrofoam**
Condition: **Good**
Seams loose: **No**
Insulation cover: **Yes**
Type: **Aluminum**
Condition: **Good**
Insulation comments: **The hot water lines are also insulated and covered with aluminum**

Basebell ladder:

Toe clearance: **Less than 7 inches**
Width of rungs: **16 inches**
Thickness of rungs: **¾ inch**
Shape of rungs: **Diamond**
Coating condition: **Good**
Metal condition: **Good**
Fall prevention device: **Yes**
Type: **Cable**
Function properly: **Yes**
Cage: **No**

Riser ladder:

Ladder comments: **The riser ladder is a continuation of basebell ladder**

Painter's (bird) hatch:

Size: **24 inches**
Handhold above hatch: **No**

DRY INTERIOR APPURTENANCES

Coating condition: **Good**
Metal condition: **Good**
Hatch security: **Pin**

Manway to wet interior:

Size: **24 inches**
Location: **In transition cone**
Coating condition: **Good**
Metal condition: **Good**

Mud valve:

Number: **1**
Discharge material: **Pipe**
Discharge slope: **Downward**
Functioning properly: **Not used during inspection**
Metal condition: **Good**
Mud valve comments: **The mud valve is a coupling accessible only from the wet interior**

Access tube ladder:

Toe clearance: **7 inches or greater**
Width of rungs: **16 inches**
Thickness of rungs: **¾ inch**
Shape of rungs: **Diamond**
Coating condition: **Good**
Metal condition: **Good**
Fall prevention device: **Yes**
Type: **Cable**
Function properly: **Yes**

WET INTERIOR COATING

Roof:

Topcoat condition: **Good**
Primer coating condition: **Good**
Describe coating: **No significant coating deterioration**
Metal condition: **Good**
Lap seams: **Welded**
Condition of laps: **Good**
Roof comments: **There is minor corrosion at the welded seams. There are five small spot coating failures at the top of the sidewall weld seam above the water line**

WET INTERIOR COATING

Sidewall:

Topcoat condition: **Good**
Primer coating condition: **Good**
Describe coating: **Spot coating failures to substrate**
Mineral deposits: **Light**
Metal condition: **Good**
Active pitting: **No**
Previous pitting: **No**
Sidewall comments: **There are approximately 25± pinhole failures randomly throughout the sidewall**

Access tube:

Topcoat condition: **Good**
Primer coating condition: **Good**
Describe coating: **No significant coating deterioration**
Mineral deposits: **Light**
Metal condition: **Good**
Active pitting: **No**
Previous pitting: **No**

Tank bottom:

Type: **Bowl and transition cone**
Topcoat condition: **Good**
Primer coating condition: **Good**
Describe coating: **No significant coating deterioration**
Mineral deposits: **Light**
Metal condition: **Good**
Active pitting: **No**
Previous pitting: **No**
Sediment depth: **Approximately ½ inch**

WET INTERIOR APPURTENANCES

Tank ladder:

Toe clearance: **7 inches or greater**
Width of rungs: **16 inches**
Thickness of rungs: **¾ inch**
Shape of rungs: **Diamond**
Shape of side rails: **Flat**
Coating condition: **Good**
Metal condition: **Good**
Fall prevention device: **Yes, not used during the inspection**

WET INTERIOR APPURTENANCES

Type: **Cable**

Cathodic protection:

Type: **Arms off access tube**
Location of controls: **In basebell**
System condition: **Fair**
Arms damaged: **Yes**
Wires damaged: **Unknown**
Cathodic comments: **One of the support arms has broken off and is lying in the bowl**

Overflow pipe inlet:

Type: **Weir box**
Coating condition: **Good**
Metal condition: **Good**

Fill pipe:

Diameter: **12 inches (estimated)**
Height above transition cone: **8 feet (estimated)**
Deflector over end: **Yes**
Coating condition: **Good**
Metal condition: **Good**
Fill pipe comments: **The fill pipe has a tee at the discharge**

Hot water pipes:

Diameter: **6 inches**
Coating condition: **Good**
Metal condition: **Good**
Hot water pipes comments: **The hot water supply and return pipes route up the dry interior along the fill/draw/overflow. The supply discharges near fill pipe and has a tee at the end. The return pipe enters the tank at the transition cone and penetrates approximately 24 inches**

Separate draw pipe:

Diameter: **12 inches (estimated)**
Height above transition cone: **6 inches (estimated)**
Deflector over end: **Yes - bars**
Coating condition: **Good**
Metal condition: **Good**

WET INTERIOR APPURTENANCES

Mixer:

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.

250,000 gallon spheroid located in Saginaw, Michigan and
owned by the Aleda E. Lutz V.A. Medical Center.

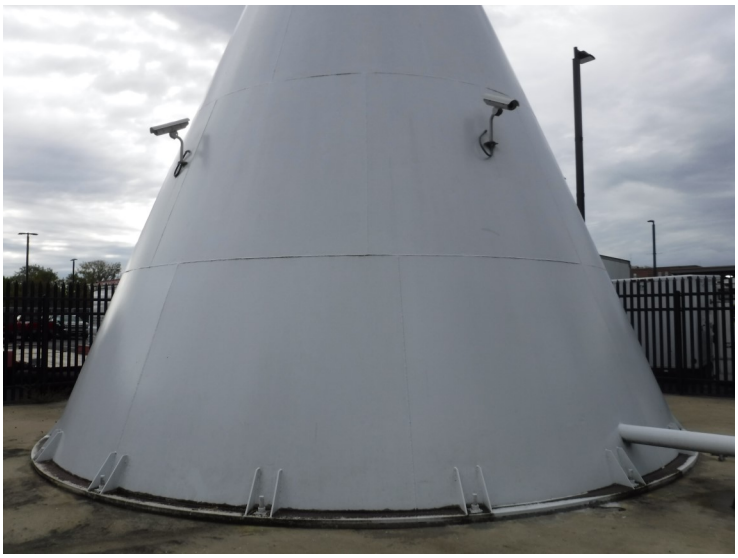
1) The baseplate and grout are in good condition. The concrete foundation is not exposed.

2) The anchor bolts are in good condition.

3) The overflow pipe discharge is in good condition.

4) The overflow screen is oversized.

5) The basebell door is in good condition.



6) The basebell coating is in good condition overall.

7) There are a few minor coating failures on the basebell.

8) The riser coating is in good condition.

9) The bowl coating is in good condition.

10) The sidewall coating is in good condition.

11) The roof coating is in good condition overall.

12) Topcoat delamination of the roof coating.

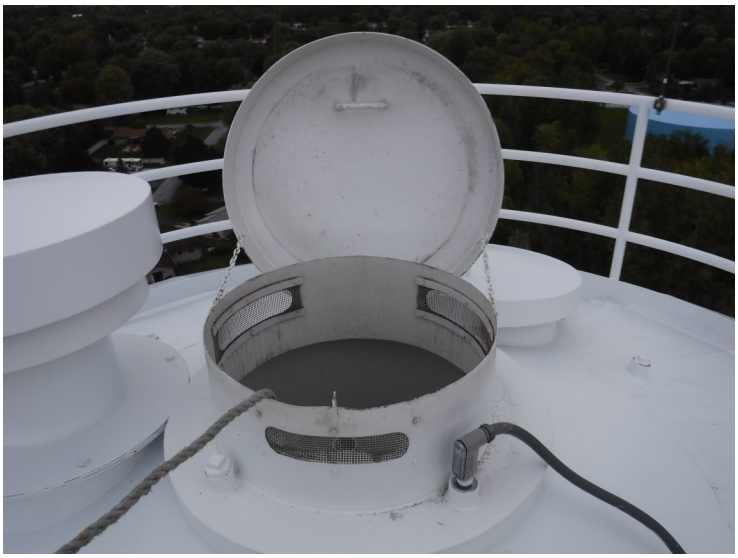
13) The roof rigging couplings are in good condition.

14) The roof handrail is in good condition.

15) The aviation light is in good condition.

16) The roof vent is in good condition.

17) The pressure vacuum plate in the vent was found to be in alignment.



18) The access tube hatch is in good condition. There are screens on the neck.

19) The wet interior roof hatch is in good condition.

20) The concrete floor in the basebell is in good condition.

21) The baseplate coating is in good condition.

22) There is a hose connection on the overflow pipe. There are weld burns and the connection is not coated.

23) The piping, insulation, and aluminum jacketing are in good condition in the basebell.

24) The electrical panels in the basebell are in good condition.

25) The basebell coating is in good condition.

26) The basebell ladder is in good condition. The ladder is equipped with a cable-type fall prevention device.

27) The condensate drain line and check valve are in good condition.

28) The condensate platform opening has a hinged cover.

29) The coating on the condensate platform is in good condition.

30) The riser coating is in good condition.

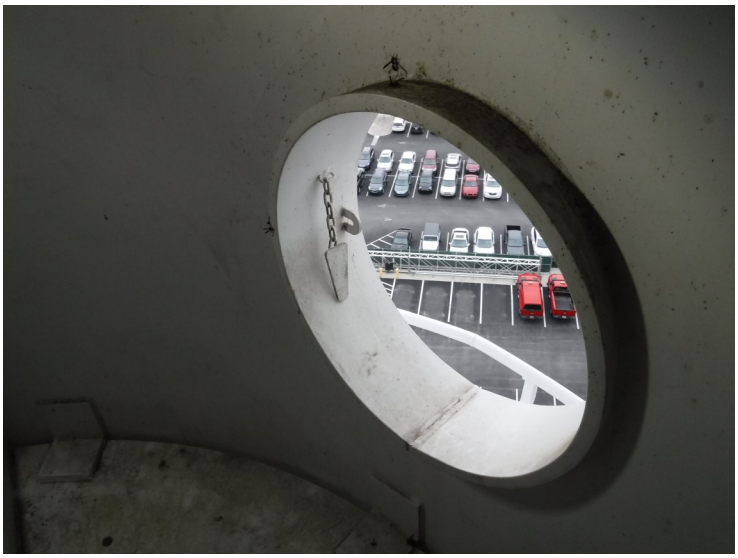
31) Typical light fixture was operational during the inspection.

32) The riser ladder is a continuation of the basebell ladder. The ladder is in good condition.

33) The coating on the underside of the top platform is in good condition.

34) The top platform opening has a hinged cover.

35) The coating on the top platform is in good condition.

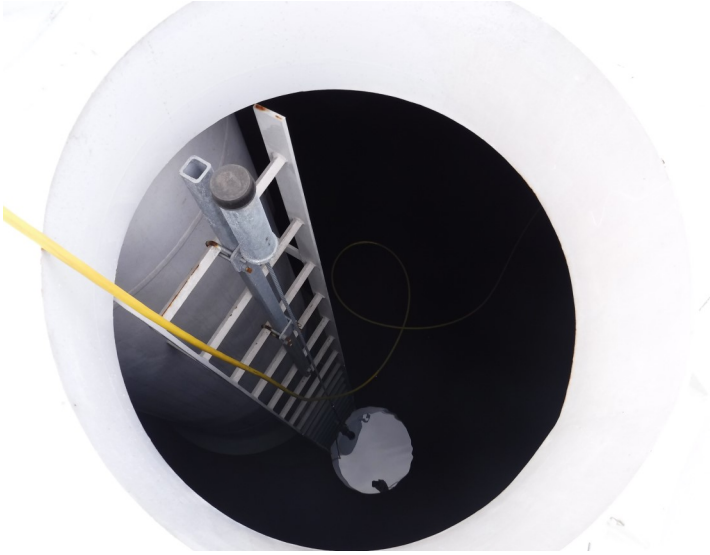


36) The painter's hatch (bird hatch) is in good condition.

37) There is a rigging lug on the transition cone. The lug is not coated.

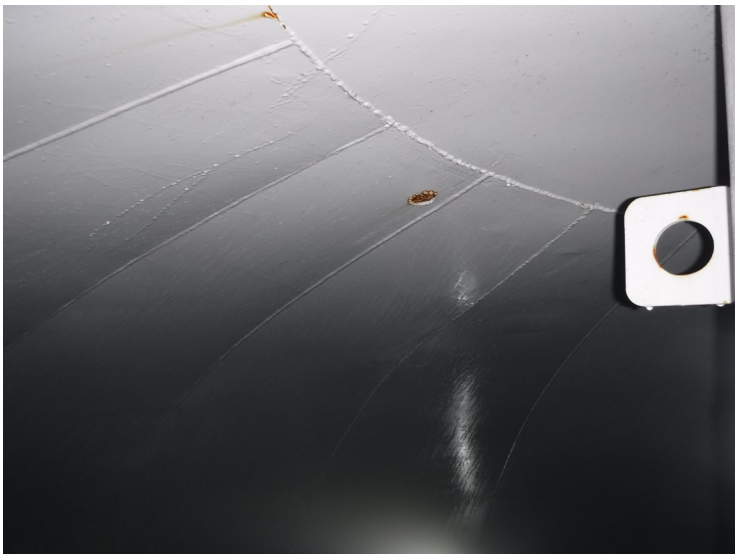
38) The wet interior manway in the transition cone is in good condition.

39) The access tube coating is in good condition.



40) The wet interior ladder is in good condition. The ladder is equipped with a cable-type fall prevention device.

41) The wet interior roof is in good condition with a few minor coating failures.

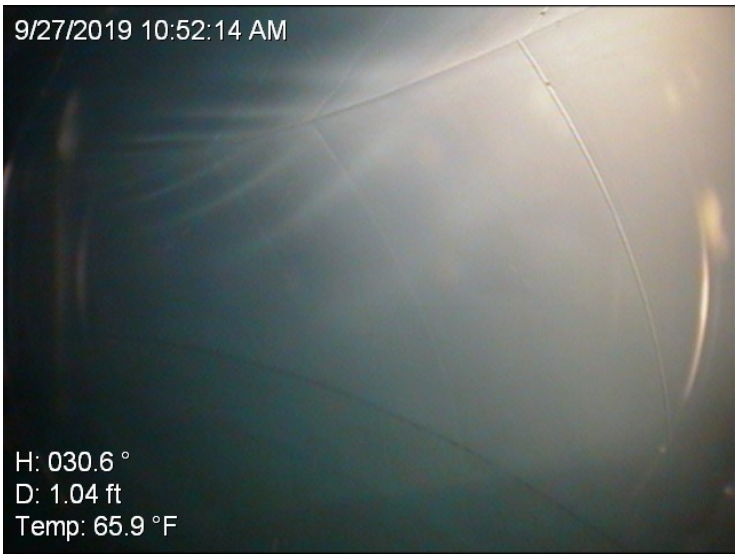


42) Same.

43) The overflow weir box is in good condition.

44) The access tube coating is in good condition.

45) Same.



46) The sidewall coating is in good condition.

47) Same.

48) One cathodic protection system support arm is broken off and lying on the bowl.

49) The fill pipe and hot water supply pipe are in good condition.

50) The bowl and transition cone coating is in good condition.

51) Same.

52) The wet interior manway cover is in good condition.

53) The draw pipe and hot water return pipe are in good condition. There are deflector bars over the draw pipe.

54) There is a coupling on the transition cone that can be used as a drain.

55) The pumphouse building west of the tank is in good condition.

56) The piping and valves in the building are in good condition.

57) Same.