January 23, 2015

City of Lynchburg
Department of Water Resources
525 Taylor St.
Lynchburg, VA 24501

Attn: Scott Parkins, P.E.

Re: 2,000,000 Gallon Huntingwood Reservoir
Maintenance Inspection

Dear Mr. Parkins:

Please find enclosed the above referenced report for the 2,000,000 reservoir. The inspection was completed on November 5, 2014. The report consists of: 1) cover page; 2) conclusions and recommendations; 3) detailed report; 4) Field Inspection Report (FIR); 5) photographs and descriptions; and 6) flash drive.

Brief explanation: 1) The cover page is self-explanatory. 2) Conclusions and recommendations explain in short form what was found on the tank and what DIXON recommends for repair and maintenance of the tank. 3) This section is the long report that goes into detail to explain what exactly was found and why DIXON makes the recommendations. 4) Field Inspection Report (FIR) is the form that was completed when the inspection team was on-site and includes the dimensions and conditions of the tank. 5) Photographs and descriptions give the Owner a visual record of the condition of the tank and appurtenances. 6) Flash drive is an Adobe PDF format of the complete report and photos for your convenience.

If you have any questions or concerns, please call me at 616-374-3221 ext. 310.

Thank you for choosing DIXON for your inspection needs.

FOR DIXON ENGINEERING, INC.,

Thomas Rounds
Project Manager

Enclosures

Dixon Engineering, Inc.

Maintenance Inspection

2,000,000 Gallon Reservoir
Huntingwood

Lynchburg, Virginia

Inspection Performed: November 5, 2014
Report Prepared: January 22, 2015
Reviewed by Ira M. Gabin, P.E.: January 23, 2015

Phone (616) 374-3221
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Dixon Engineering Inc.
1104 Third Ave. Lake Odessa, MI 48849

INSPECTION:

On November 5, 2014, Dixon Engineering, Inc. performed a maintenance inspection on the 2,000,000-gallon Huntingwood reservoir owned by the City of Lynchburg, Virginia. 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 Trevor Felton, Staff Engineer. The inspector was assisted by Eric Binkowski, Inspection Department Supervisor, and Tom Rounds, Project Manager. Scheduling and arrangements for the inspection were completed through Scott Parkins. A source of water for cleaning was provided by the City. Following the inspection, chlorine was added to disinfect the tank per AWWA Standard C652-11 method No. 3.

TANK INFORMATION:

The tank was built in 1978 with an estimated height to high water line of 36 feet, the tank is welded construction. The exterior was last painted in 2012 by Spensieri. The wet interior was last painted in 1991.

CONDITIONS AND RECOMMENDATIONS:

EXTERIOR COATING CONDITIONS:

The exterior coating system is a multiple coat epoxy urethane overcoat system.

The exterior coating is in good condition with no failures noted. The touch-ups performed on the roof couplings is a slightly different color from the rest of the tank.

WET INTERIOR COATING CONDITIONS:

The wet interior coating is an epoxy system applied in 1991.

The roof coating is in poor condition, with the primary areas of deterioration along the lap seams, the beam edges, and in the crevices. Some steel loss has started on the roof beams. Roof beam edge corrosion is typical but should be corrected before significant loss of steel occurs.

The sidewall and floor coating is in good condition with no coating breaks found.

Overall adhesion of the sidewall and floor coating is good. Adhesion was tested by use of low-pressure washing. With poor adhesion, it would be possible to notice the coating fluctuate and layers of coating would be removed. With very poor adhesion, the existing coating may be removed.

This is a crude form of testing, yet the least destructive. The destructive tests cut the coating to the substrate. The test area is then susceptible to corrosion because it has been scratched to bare metal.

WET INTERIOR COATING RECOMMENDATIONS:

Remove the roof coating system by abrasive blast cleaning the metal to a near white metal grade (SSPC-SP 10) and apply a new three-coat epoxy coating system with a zinc primer.

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.

Note: A review of our 2009 report showed the roof coating to be in fair condition at that time. Its condition has worsened significantly since then, which is to be expected for a system now over 20 years old.

CATHODIC PROTECTION CONDITIONS:

The tank has a floating ring, ice-free cathodic protection system that is in good condition. Tank's surfaces below the high water line are protected by the submerged cathodic protection system that is suspended from the sidewall.

CATHODIC PROTECTION RECOMMENDATIONS:

Continue operation of the submerged cathodic protection. Have a qualified contractor maintain the system.

PIT AND PIT PIPING CONDITIONS:

The tank is operated by valves located in the pit next to the tank.

The piping is in good condition. Coating on the pipes is in good condition. The pipes and valves have minor surface rust.

FOUNDATION CONDITIONS:

The top 7-8 inches of the foundation is exposed. Soil is covering the rest of the foundation.

The exposed foundation is in good condition with no cracking or spalling noted.

CAULK CONDITIONS:

The caulk between the concrete foundation and baseplate is in good condition.

ROOF HANDRAIL AND PAINTER'S RAIL:

A handrail is located on the roof to either side of the sidewall ladder at the roof hatch.

HATCH AND MANWAY CONDITIONS:

The tank has a 30-inch square, flip-top roof access hatch to the wet interior. The hatch is in good condition.

The tank has two 24-inch diameter access manways in the sidewall that are in good condition.

VENT CONDITIONS:

The roof has three 24-inch vents with a pressure-vacuum design. The vents are in good condition. The screens are fully intact.

VENT RECOMMENDATIONS:

Annually inspect the vents to make sure the screen is open and not damaged.

LADDER CONDITIONS:

Exterior:

The tank has an exterior sidewall ladder that starts approximately 10-15 feet above ground level, and extends up to the roof. The ladder is in good condition and contains a rail-type fall prevention device.

Wet:

The wet interior contains a ladder that is in good condition and has a rail-type fall prevention device.

MISCELLANEOUS CONDITIONS:

There is an inoperable level indicator on the sidewall that attaches to a float in the wet interior with a cable. The cable does not route through the conduit properly making the device inoperable.

MISCELLANEOUS RECOMMENDATIONS:

Remove the level indicator and seal the openings in the roof. The cost would be incidental to wet interior roof painting.

DIXON ENGINEERING, INC.

STEEL TANK FIELD INSPECTION REPORT

RESERVOIR TANK

DATE: **November 5, 2014**

OWNER: **City of Lynchburg**
CLIENT CODE: **46-61-01-09**
TANK NAME: **Huntingwood Tank**
LOCATION: Street: **Fox Hollow Rd.**
City: **Lynchburg**
State: **Virginia**
TANK SIZE: Capacity: **2,000,000 gallons**
Diameter: **98 feet (estimated)**
Height to overflow (HWL): **36 feet (estimated)**
Sidewall height: **37 feet (estimated)**
CONSTRUCTION: **Welded**
Type of structure: **Reservoir**
Type of roof: **Flat**
DATE CONSTRUCTED: **1978**
MANUFACTURER: **Reco**
CONTRACT NUMBER: **D0492**

COATING HISTORY	EXTERIOR	WET INTERIOR
DATE LAST COATED	2012	1991
CONTRACTOR	Spensieri	Unknown
COATING SYSTEM	Epoxy urethane	Epoxy
SURFACE PREPARATION	SSPC SP-11	SSPC SP-10
COATING MANUFACTURER	Induron	Unknown
COATING SAMPLES	No	No
HEAVY METAL	No	No

PERSONNEL: Inspector **Trevor Felton**, Top person **Eric Binkowski**,
Ground person **Tom Rounds**

TYPE OF INSPECTION: **Maintenance**
METHOD OF INSPECTION: **Dry**
DATE LAST INSPECTED: **2011 Warranty**

SITE CONDITIONS

Fenced: **Yes**
Site large enough for contractors equipment: **Yes**
Control building: **No**
Antenna control site: **No**
SCADA controls: **No**
Site conditions: **Well maintained**
Neighborhood: **Residential with woods around the immediate tank area**
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 pit)**
Condition of structure: **Good**
Condition of structure: **Good**
Structure is: **Dry**
Altitude valve: **Yes**
Condition of coating: **Good**
Describe coating: **Rust bleedthrough**
Condition of metal: **Good**

FOUNDATION

Foundation exposed: **Yes**
Exposed height: **7-8 inches**
Exposed foundation condition: **Good**
Damage or deterioration: **Yes**
Type of damage: **Chips**
Severity: **Minor**
Foundation coated: **Yes**
Coating condition: **Good**
Type of grout: **Caulk**
Condition: **Good**
Missing: **No**

FOUNDATION

Indications of foundation settlement: **No**
Undermining of foundation: **No**

EXTERIOR COATING

Sidewall:

Lettering: **No**
Logo: **No**
Topcoat condition: **Good**
Previous system condition: **Good**
Describe coating: **No significant coating deterioration**
Dry film thickness: **13-16 mils**
Metal condition: **Good**

Roof:

Topcoat condition: **Good**
Previous system condition: **Good**
Describe coating: **No significant coating deterioration**
Dry film thickness: **14-18 mils**
Metal condition: **Good**

EXTERIOR APPURTENANCES

Anchor bolts:

N/A

Level indicator:

Condition: **Poor**
Comments: **Indicator stuck, maybe due to frayed cable**

Sidewall manway:

Number: **2**
Size: **24 inches**
Gasket leaking: **No**
Hinged: **Yes**
Sealed with: **Bolted cover**
Coating condition: **Good**
Metal condition: **Good**

EXTERIOR APPURTENANCES

Mud valve:

N/A

Sidewall ladder:

Coating condition: **Good**
Metal condition: **Good**
Height ladder starts above ground: **10.5 feet**
Toe clearance: **7 inches or greater**
Width of rungs: **16 inches**
Thickness of rungs: **¾ inch**
Shape of rungs: **Round**
Fall prevention device: **Yes**
Type: **Rail**
Condition: **Good**
Cage: **No**

Step-off platform:

N/A

Balcony:

N/A

Roof handrail:

Location: **Either side of sidewall ladder**
Height: **42⅜ inches**
Midrail height: **19 inches and 31 inches**
Toe plate height: **4 inches**
Coating condition: **Good**
Metal condition: **Good**

Roof hatches:

Wet interior:
Coating condition: **Fair**
Metal condition: **Good**
Neck diameter: **30 inches**
Shape: **Square**
Hatch security: **Lock**

EXTERIOR APPURTENANCES

Bolted ventilation hatch:

N/A

Roof vent:

Number: **3**
Type: **Screened pressure-vacuum**
Neck diameter: **24 inches**
Vent material: **Steel**
Coating condition: **Good**
Metal condition: **Good**
Screen condition: **Good**
Percent of screen open: **100**

Aviation lights:

N/A

Removable cathodic caps:

N/A

Roof rigging points:

Rigging couplings: **Yes**
Number: **26**
Couplings plugged: **Yes**
Rigging clips: **No**
Coating condition: **Good**
Metal condition: **Good**

WET INTERIOR COATING

Roof:

Topcoat condition: **Poor**
Primer coating condition: **Poor**
Describe coating: **Rust bleedthrough**
Metal condition: **Good**
Lap seams: **Open**
Condition of laps: **Fair**
Roof comments: **Rust bleedthrough; weld burns throughout**

WET INTERIOR COATING

Sidewall:

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

Tank bottom:

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

WET INTERIOR APPURTENANCES

Tank ladder:

Coating condition: **Good**
Metal condition: **Good**
Toe clearance: **7 inches or greater**
Width of rungs: **15 inches**
Thickness of rungs: **¾ inch**
Shape of rungs: **Round**
Shape of side rails: **Flat**
Fall prevention device: **Yes**
Type: **Rail**
Condition: **Good**

Cathodic protection:

Type: **Floating ring**
Clips and pressure fitting present: **Yes**
Location of Clips: **On sidewalls**
Location of controls: **Sidewall**
System condition: **Good**

WET INTERIOR APPURTENANCES

Fill pipe:

Diameter: **18 inches**
Height above floor: **0 inches**
Configuration: **Stubs at floor**
One way valves present: **No**
Deflector on end: **No**
Removable silt ring: **Yes**
Mixing system: **No**
Coating condition: **Good**
Metal condition: **Good**

Drain pipe:

Diameter: **14 inches**
Height above floor: **2.5 inches**
Deflector over end: **No**
Removable silt ring: **No**
Coating condition: **Good**
Metal condition: **Good**

Overflow pipe:

Type: **Weir box**
Coating condition: **Good**
Metal condition: **Good**
Overflow comments: **Pipe is 12 inches in diameter, runs inside wet interior and enters pit**

Roof beams:

Number in inner ring: **30**
Number in outer ring: **54**
Number of circular beams: **1**
Style: **Radial**
Shape: **Channel**
Dimensions: **8 x 2 inches**
Connections: **Welded**
Coating condition: **Poor**
Metal condition: **Fair**
Roof beam comments: **Starting to lose steel at outer connections**

WET INTERIOR APPURTENANCES

Sidewall beams:

N/A

Columns:

Number: **7**
Shape: **Round**
Dimensions: **8 inches**
Coating condition: **Good**
Metal condition: **Good**

Baffle wall:

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.

1) 2,000,000 gallon (Huntingwood) reservoir located in Lynchburg, VA.

2) Typical foundation section with no damage.

3) Sidewall manway with davit arm.

4) Pit vault with access doors.

5) Pit piping and valves with some rust bleedthrough.

6) Sidewall ladder with vandal guard. There is also a level indicator.

7) Painter's railing at the upper sidewall.

8) Roof hatch and railing.

9) Level indicator conduit.

10) Roof coupling with touch up paint visible.

11) Roof coating is in good over-all condition.

12) Frost free roof vent is in good condition.

13) Wet interior roof with rust bleedthrough in several areas most heavily around the center column.

14) Roof section with rusting at the lap seams and stiffeners.

15) Roof stiffener with rust undercutting.

16) Coating failures on the roof stiffeners.

17) Coating failures with rust undercutting.

18) Weld burns on the roof at coupling.

19) Wet interior ladder is intact.

20) Overflow pipe and supports.

21) Cathodic protection pressure fitting.

22) Typical sidewall cathodic clip and rope connection.

23) Overflow, fill and draw line in the floor.

24) Column base.

25) Wet interior floor. Coating is in good overall condition.

26) Section of the floor.

27) Another floor section.