



November 4, 2020

VA Medical Center
2501 West 22nd Street
Sioux Falls, SD 57117

Ref: Job # 55092

Dear Aaron Kompelien:

As an added service provided to our loyal customers, we are reviewing all of our recently inspected tanks. Part of this review will include providing you with a summary report detailing areas of your tank that are in need of maintenance as dictated by EPA, OSHA, AWWA, NFPA, and general recommendations to help in prolonging the lifespan of your tank.

For ease of understanding, we have organized the report into categories:
Safety & Health (OSHA/EPA)
Facilities (AWWA/NFPA)
General Deficiencies and Suggested Maintenance

We appreciate your business and look forward to handling your tank maintenance.

Sincerely,

Liquid Engineering Corporation
Randy Hurtt
Project Manager
406-869-3142 – Direct
406-651-0120 – Fax
rhurtt@liquidengineering.com

Summary Report

VA Medical Center
Tower
Liquid Engineering Corporation Job #55092

Tank Name:	Tower	Tank Type:	Elevated
City:	Sioux Falls	Tank Capacity:	100,000
State:	SD	Type of Construction:	Riveted Steel
Year Built:	Not Provided		

Inspected By:	LEC Dive Team 14
Inspection Date:	October 5, 2020

This report is a supplement to the visual and video inspection undertaken for the VA Medical Center, Sioux Falls, SD, by Liquid Engineering Corporation of Billings, MT. Tower is an elevated water storage tank. The tank has a 100,000 gallon capacity, with an approximate height of 180'-0".



SUMMARY

Safety & Health (OSHA & EPA)

- We recommend posting a **Confined Space Entry** sign on the riser manway to adhere with **AWWA D100-11; 5.4.4 Steel riser manhole** and **OSHA 1910.146(c)(2) Confined spaces**. (See photo 6)
- **OSHA 1910.23(b)(4)** states, "Ladder rungs, steps, and cleats have a minimum clear width of... 16 inches (41 cm) (measured before installation of ladder safety systems) for fixed ladders,..." We recommend posting a **Fall Protection Required** sign at the tower access ladder. (See photo 8)
- **OSHA 1910.28(b)(1)(i)** states, "...the employer must ensure that each employee on a walking-working surface with an unprotected side or edge that is 4 feet (1.2 m) or more above a lower level is protected from falling by one or more of the following: 1910.28(b)(1)(i)(A) Guardrail systems." **OSHA 1910.29(b)(1)** states, "The top edge height of top rails, or equivalent guardrail system members, are 42 inches (107 cm), plus or minus 3 inches (8 cm), above the walking-working surface." **OSHA 1910.29(b)(2)(i)** states, "Midrails are installed at a height midway between the top edge of the guardrail system and the walking-working surface;..." **OSHA 1910.29(k)(1)** states, "The employers must ensure toeboards used for falling object protection:..." We recommend installing a swing gate at the opening in the handrail at the junction of the tower access ladder and structural girder. (See photo 10)
- We recommend installing two (2) 30" shell manways 180° apart and posting **Confined Space Entry** signs to adhere with **OSHA 1910.146(c)(2) Confined spaces**. We further recommend installing **OSHA** compliant interior bowl access ladders complete with standoffs every 10' on center, and cable type ladder safety devices at the suggested primary and secondary shell manways. **In cold climates it's up to the owner's discretion on placement of internal ladders.* (See photo 11)
- **OSHA 1910.28(b)(1)(i)** states, "...the employer must ensure that each employee on a walking-working surface with an unprotected side or edge that is 4 feet (1.2 m) or more above a lower level is protected from falling by one or more of the following: 1910.28(b)(1)(i)(A) Guardrail systems." **OSHA 1910.29(b)(1)** states, "The top edge height of top rails, or equivalent guardrail system members, are 42 inches (107 cm), plus or minus 3 inches (8 cm), above the walking-working surface." **OSHA 1910.29(b)(2)(i)** states, "Midrails are installed at a height midway between the top edge of the guardrail system and the walking-working surface;..." **OSHA 1910.29(k)(1)** states, "The employers must ensure toeboards used for falling object protection:..." We recommend installing an **OSHA** compliant 42" high handrail system around the circumference of the tank roof, complete with an intermediate rail, a toeboard, and a swing gate at the junction of the shell-to-knuckle roof access ladder and tank roof. (See photo 13)

Safety & Health (OSHA & EPA)

- We recommend installing a 30" secondary hatch 180° from the primary roof hatch, posting **Confined Space Entry** signs, and installing a lock on the primary hatch to adhere with **AWWA D100-11; 5.4.3 Roof openings** and **OSHA 1910.146(c)(2) Confined spaces**. We further recommend installing **OSHA** compliant interior access ladders complete with standoffs every 10' on center, and cable type ladder safety devices at the primary and suggested secondary roof hatches. **In cold climates it's up to the owner's discretion on placement of internal ladders.* (See photo 14)

Facilities (AWWA & NFPA)

- We recommend fencing the area around the tank. We further recommend posting a **No Trespassing** sign and a **Warning, Tampering With This Facility is a Federal Offense** (US code title 42, section 300i-1) sign. Fence installation to be done by others. (See photo 1)
- **AWWA D100-11; 12.7.1** states, “The tops of the concrete foundations shall be a minimum of 6 in. (152 mm) above the finished grade, unless otherwise specified.” We recommend clearing any dirt, debris and other loose gravel away from the tank foundations, down to a minimum 6” below top of foundations. This should be done by a local excavating company. (See photo 2)
- We recommend cleaning the area around the anchor bolts, tightening the anchor nuts, then tack welding the circumference of the nut-to-base plate connections and bolt-to-nut connections to eliminate loosening to adhere with **AWWA D100-11; 3.8 Anchorage**. (See photo 4)
- We recommend installing a new screen on the existing overflow pipe elbow. (See photo 7)
- We recommend adjusting the windage rods, as needed, to withstand 100 mph winds blowing from any direction to adhere with **AWWA D100-11; 3.1.4 Wind load**. **This work should be performed on an emergency basis**. (See photo 9)
- We recommend installing a float-type liquid level indicator. (See photo 12)
- **AWWA D100-11; 5.5** states, “When the vent is provided with screening against insects, a pressure-vacuum-screened vent or a separate pressure-vacuum relief mechanism shall be provided that will operate in the event that the screens frost over or become clogged.” We recommend replacing the existing roof vent with a vacuum-pressure, frost proof vent and screen. **This work should be performed on an emergency basis**. (See photo 15)

General Deficiencies and Suggested Maintenance

- We recommend sealing the foundations with a sealant. (See photo 3)
- We recommend replacing the existing drain valve with a frost proof drain valve, complete with locking device to prevent unauthorized draining of the tank and a splash pad to direct water away from the foundation. **Splash pad to be installed by owner.* (See photo 5)
- We recommend re-evaluating the tank exterior to determine the condition of the exterior coating system at your next scheduled inspection. (See photos 16 & 17)
- We recommend installing a mixing system. Electrical work to be done by others if required. (See photo 18)
- We recommend replacing the existing cathodic protection system with a new active cathodic protection system. (See photos 19 & 20)
- We recommend sandblasting all rusted and abraded interior areas to SSPC-SP10 (near white), and brush blasting all remaining interior areas to SSPC-SP7; then applying one (1) spot coat of epoxy primer to all areas sandblasted to #10, stripe coating all weld seams, and applying epoxy to the entire tank, to achieve 8 to 10 mils of total dry film thickness. Total mil thickness will include a combination of the existing and new coating. (See photos 21 & 22)

DISCLAIMER

Unless otherwise noted, the findings documented in this report were neither prepared by nor reviewed by a Licensed Professional Engineer.

APPENDIX A

Photographs

1.) Lack of Fence



2.) Ungraded Foundations



3.) Unsealed Foundations



4.) Anchor Bolts



5.) Drain



6.) Riser Manway



7.) Overflow



8.) Tower Access Ladder



9.) Windage Rods



10.) Balcony Handrails



11.) Lack of Shell Manways



12.) Lack of Liquid Level Indicator



13.) Lack of Roof Handrails



14.) Primary Roof Hatch



15.) Roof Vent



16.) Exterior Coating System



17.) Exterior Coating System



18.) Lack of Mixing System



19.) Cathodic Protection System



20.) Cathodic Protection System



21.) Interior Coating System



22.) Interior Coating System

