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TOWER INSPECTIONS + CONSULTING SERVICES

FACILITY CONDITION REPORT: 250M CAPACITY - ELEVATED POTABLE WATER TOWER

MANGUM, OK - DOWNTOWN TOWER

Potable Water Storage Tower (Location: Downtown Mangum, OK - Pigg St & Commerce)
12/14/2024 – Inspector: Alek Gray
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Email: info@tankspek.com

During the inspection, structural or sanitary issues may have been discovered. Please read this report carefully, as any items requiring corrective measures will be addressed here. Such items may require your attention, as corrective measures could be necessary in order to comply with state and OSHA rules.




Standards and references on final page

Preliminary Recommendations

1. **The interior coating system has completely failed and exhibits widespread debonding and corrosion blistering both above and below the water line.[1]**
2. **The exterior coatings have completely failed and are not providing sufficient protection against corrosion of the steel substrate.**
3. **Sediment was observed at a minimal accumulation along the tower's bowl/floor.**
4. **The tower's exterior ladders are not equipped with a fall-arresting system as required by OSHA. The rolling roof ladder continues in its original design to be able to roll around the roof. The shell ladder was modified temporarily for safe access by inspection crew. Both ladders will require permanent attachment and/or relocation. The leg ladder is draped in conduit and coax such as to sufficiently render the ladder unsafe for typical use. The interior ladder is unsafe for any use or access.**
5. **There is no seal along the roof hatch as required by ODEQ. The roof hatch does not meet ODEQ standards and should be replaced.**
6. **The tower is equipped with a finial ball on the roof's apex, and this finial ball has been drilled to allow for ventilation. This finial ball should be replaced with a proper vent.**
7. **Multiple sway rods were checked and noted loose.**
8. **Earth has accumulated over the tower's concrete foundations. This earth should be excavated to expose no less than 6" of foundation sidewall. Cracks and spalling were noted along the observable areas of the foundations.**
9. **The tower's upper balcony handrail measures 36" in height, and does note meet current OSHA Fall protection requirements.**
10. **There is a a gap between the roof and the sidewall which will require sealant. The tower also still has its original spider rods which should be removed and those areas sealed where removed.**

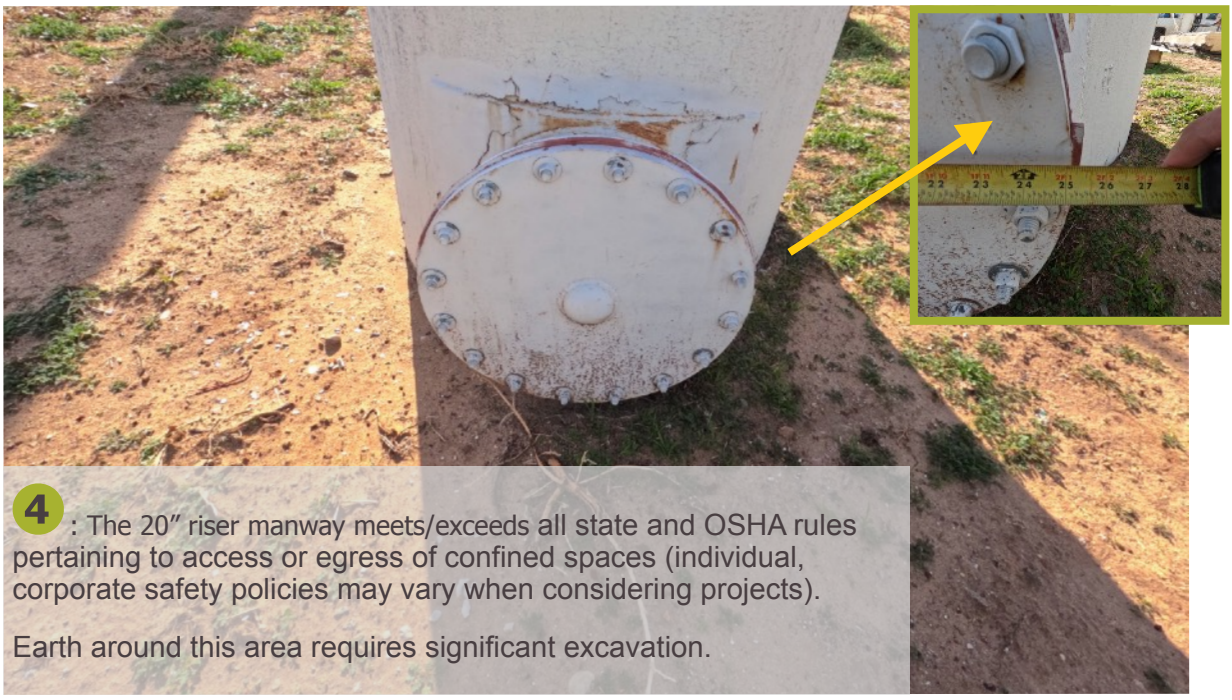
[1] We notate deficiencies only if they are supported with applicable, written regulations from the appropriate state regulatory agency, OSHA, or DHS. AWWA may be cited if no state rule pertains; however, written state rules will summarily override peripheral standards such as those from AWWA, FDA, etc. 10 State Standards will not be cited in states that are not listed by **GLUMRB** among cold weather states.

Components, Anchorage, & Structural

1 All anchorage was checked and noted properly torqued with no observable damage. Several wind rods were checked and noted loose.

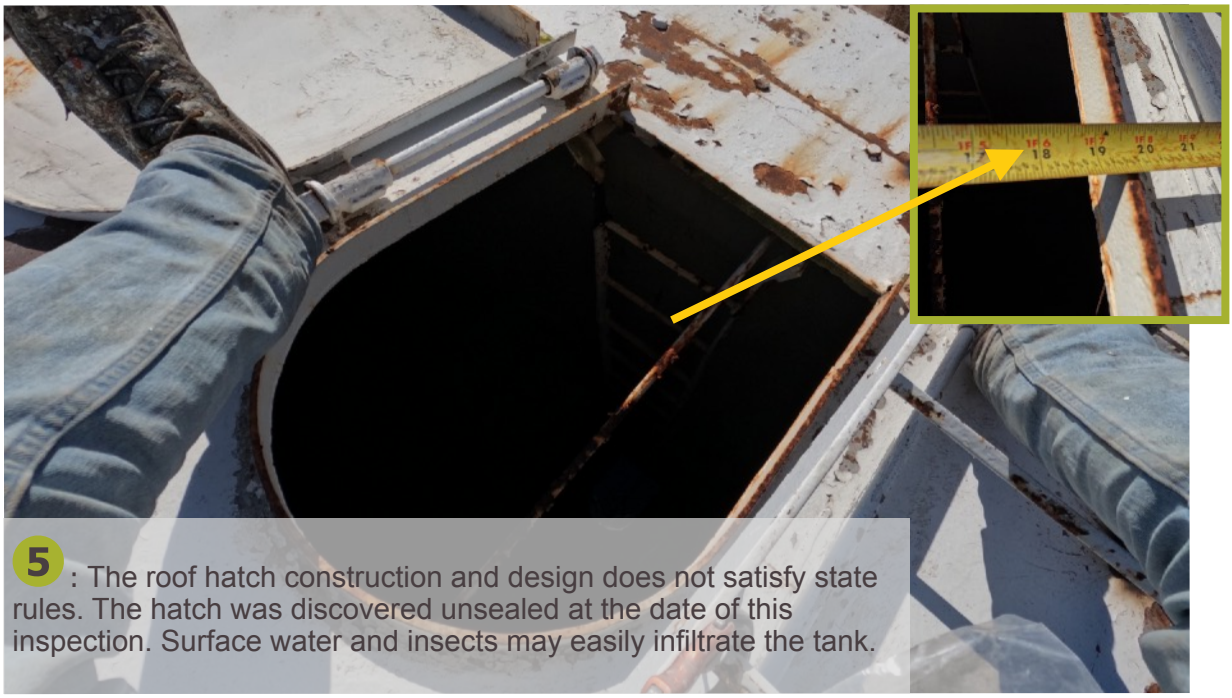
2 : Observable surfaces of the tower's concrete foundations were noted in poor condition with spalling and cracks along exposed areas of the foundations.

3 :Earth around the concrete foundation was noted not properly excavated as earth has accumulated over foundation pads.



4 : The 20″ riser manway meets/exceeds all state and OSHA rules pertaining to access or egress of confined spaces (individual, corporate safety policies may vary when considering projects).

Earth around this area requires significant excavation.



5 : The roof hatch construction and design does not satisfy state rules. The hatch was discovered unsealed at the date of this inspection. Surface water and insects may easily infiltrate the tank.

6 : The tower's 6", interior overflow extends from beneath the ground, and is protected with a screen (see specific standard on the final page).

The overflow extending inside the tank can be see in the lower inset photograph to the right.

This overflow will likely need to be fully replaced as properly preparing the interior surfaces of the riser behind interior overflow is unlikely.

7 : The old finial ball used for the rolling ladder to swing around has been drilled for a secondary use as a vent. This finial ball will require removal and replacement with a proper, designated vent.

8 :The exterior, fixed ladders are not equipped with any fall protection system as required by OSHA. Note in the above photograph, temporary repairs being performed by inspection crew. The roof ladder is a rolling ladder. The roof and shell ladders will need to be replaced and/or relocated and properly attached as required (rolling roof ladders are not allowed by OSHA). See photograph of interior ladder on page 13. This interior ladder is unsafe for any use by any personnel!

The leg ladder has been covered in telecom coax. All coax must be removed from the handrail of the ladder. This is seen to the left.

9 : The handrail along the upper balcony measures 36” in height, and does not meet the minimum 42” height requirement from OSHA regarding handrails.

[3]

[3] On November 18, 2016, OSHA issued a final rule updating its general industry Walking- Working Surfaces standards. In the preamble, the final rule explicitly rescinds STD 01-01-010 and all subsequent letters of interpretation allowing guardrails to have a minimum height of 36 inches. Previously, this interpretation letter (STD 01-01-010) had allowed handrails which were installed before the writing of the current rule to be “grandfathered”.

Coating Conditions

1 : Coating condition seen here, along the roof. Widespread debonding of the coatings all the way past the original coatings, to the steel substrate. This strongly indicates that the tower has been overcoated too many times creating excess wight.

4

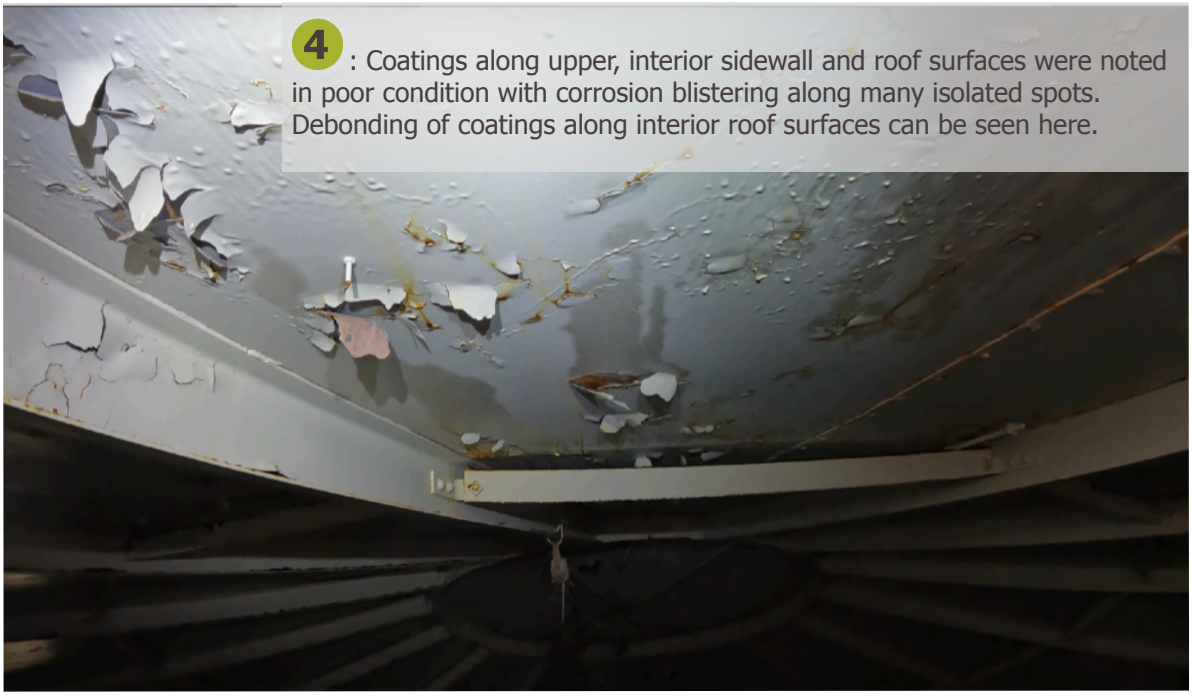
2 : Coatings condition along the upper shell and roof eave.

[4] All coatings applications necessitate, at minimum, a cursory evaluation of existing coatings in effort to determine an appropriate preparation procedure, as there are several factors that are considered when making these procedural determinations. Coating specifications should be obtained by a selected paint manufacturer or engineer.

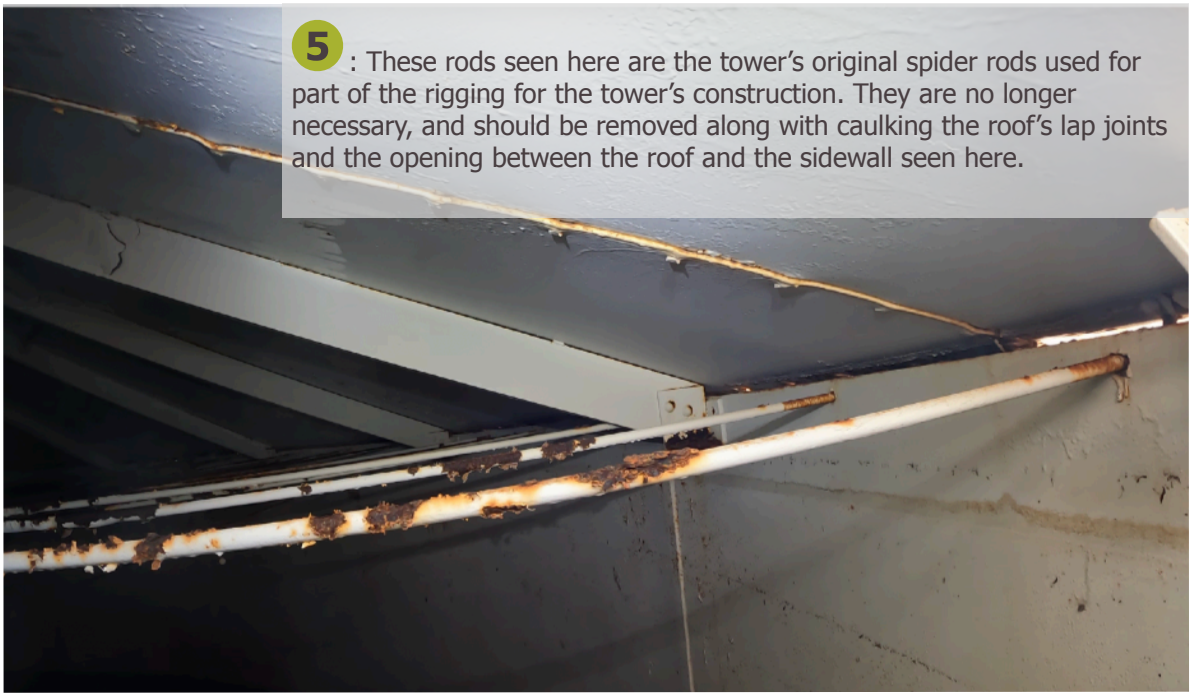
5

3 : Exterior coatings were noted in poor condition overall and have failed. Some further testing is necessary to determine a proper coatings solution for this tower.

[5] All coatings applications necessitate, at minimum, a cursory evaluation of existing coatings in effort to determine an appropriate preparation procedure, as there are several factors that are considered when making these procedural determinations. Coating specifications should be obtained by a selected paint manufacturer or engineer.

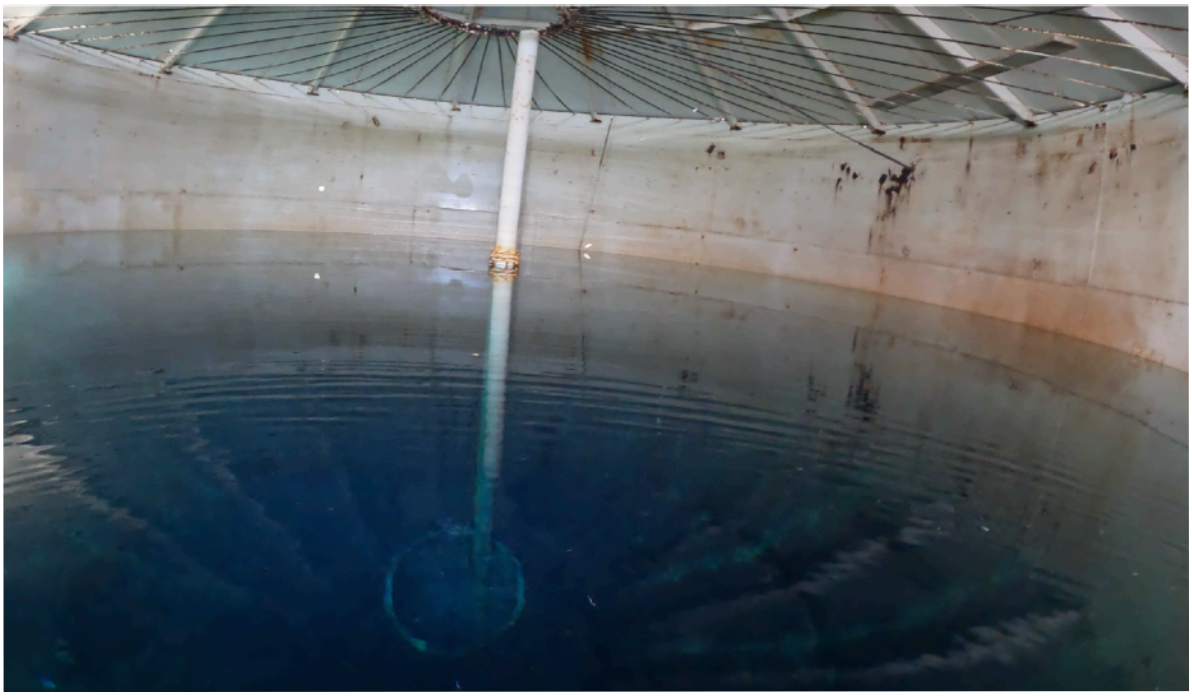


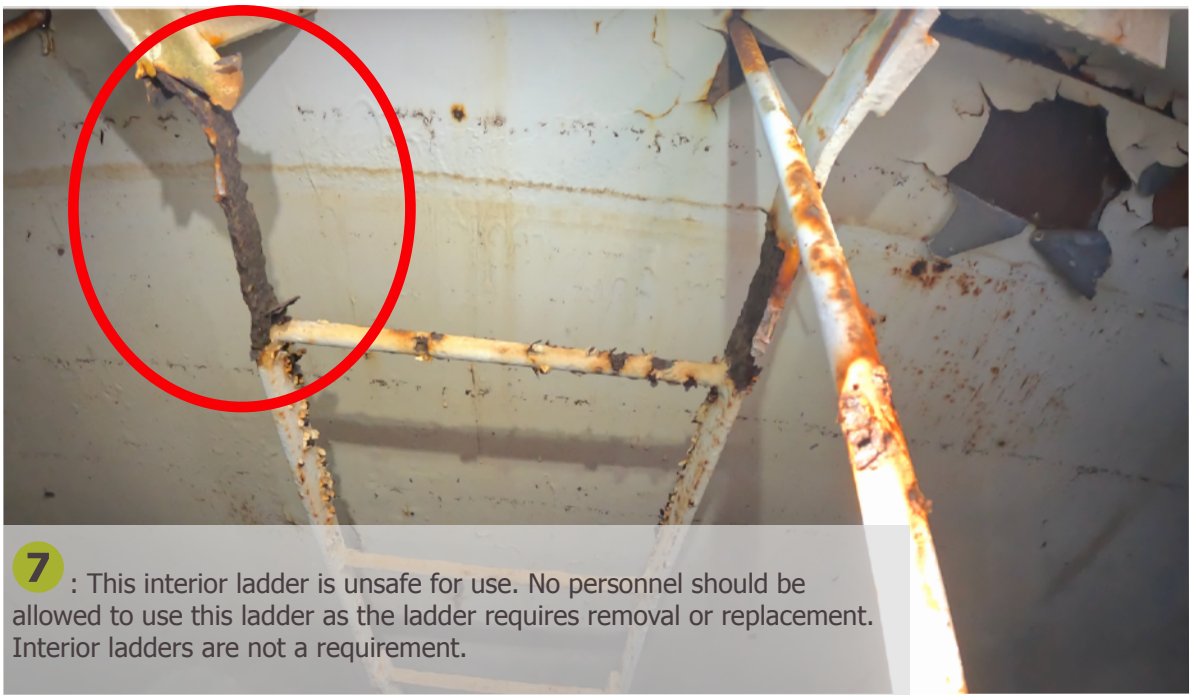
4 : Coatings along upper, interior sidewall and roof surfaces were noted in poor condition with corrosion blistering along many isolated spots. Debonding of coatings along interior roof surfaces can be seen here.



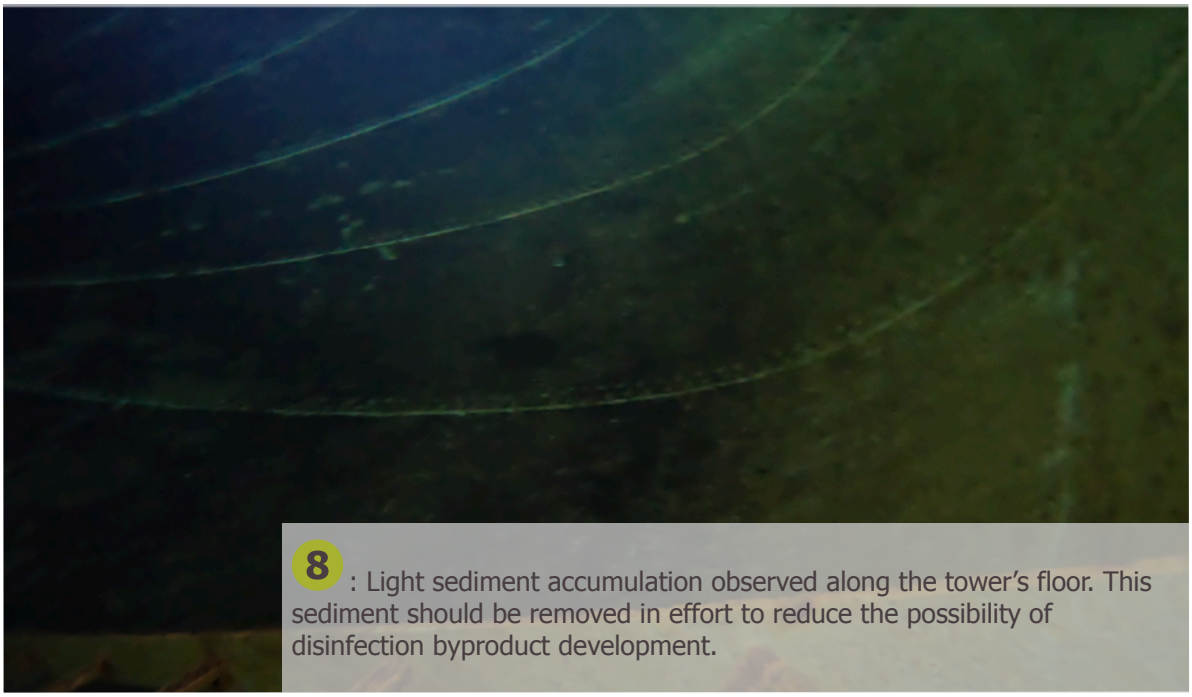
5 : These rods seen here are the tower's original spider rods used for part of the rigging for the tower's construction. They are no longer necessary, and should be removed along with caulking the roof's lap joints and the opening between the roof and the sidewall seen here.

6 : This tower's roof was noted properly fastened to the sidewall. Coatings seen here: a complete failure observed for all interior coatings.





7 : This interior ladder is unsafe for use. No personnel should be allowed to use this ladder as the ladder requires removal or replacement. Interior ladders are not a requirement.



8 : Light sediment accumulation observed along the tower's floor. This sediment should be removed in effort to reduce the possibility of disinfection byproduct development.

Standards & References

C. Overflows :

Overflow. Provide all water storage structures with an overflow that terminates at an elevation between 12 and 24 inches above the ground surface, and release water over a drainage inlet structure or splash plate.

(1) Do not connect the water storage structure overflow line to a sewer or storm drain.

(2) Locate all overflow pipes so that any release of water is visible.

(3) Equip the ends of the pipes with flex gates.

G. Vents and Other Openings:

Vent all finished water storage structures. Overflows are not considered vents.Open construction between the side wall and roof is not allowed. Design of vents must:

(1) prevent the entrance of surface water, rainwater, birds, insects and animals,

(2) limit the introduction of dust,

(3) terminate in an inverted U with the opening 24 to 36 inches above the roof or sod covering on ground-level structures, and

(4) be covered with a 24 mesh corrosion resistant screen installed at a location least susceptible to vandalism.

AMERICAN WATER WORKS ASSOCIATION:

D100-11 Standards for welded steel storage tanks D102-11 Coating steel water storage tanks

Safety & OSHA STANDARDS:

29 CFR 1910.146- Confined Space Awareness Compliance 29 CFR 1910.27- Fixed ladders

29 CFR 1910.28- Fall Prevention

K. Roof and side wall:

Make the roof and side walls of all structures watertight with no openings except properly constructed vents, manholes, overflows, risers, drains, pump mountings, control ports, and piping for inflow and outflow.

Prepared by: Nathan Gray

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