



**SimplexGrinnell #458 & JCI
9520 10th Avenue South, Suite 100
Seattle, WA 98108
RE: Western State Hospital; Lakewood, WA
318,000 Gallon Bolted STP
August 3, 2018
Ms. Melissa Fraser
Systems Integrity Representative
(206) 291-1439
Job No. 318298-A**

If you would like to speak with Patrick Heltsley concerning this report, call (270) 826-9000, Ext. 4601

For additional copies of this report, call (270) 826-9000, Ext. 4601



Photos show the tank is secured with fencing. There is no signage on the fence. We recommend posting a **No Trespassing** sign.



Photo shows the foundation, which is in compliance with [AWWA D103-09; 13.5.1: Height above ground](#) and appears to be in good condition.



Photo shows the condition of the foundation. **NFPA 22-2018; 12.2.1.2** states, "... the junction of the tank bottom and the top of the concrete foundation shall be tightly sealed to prevent water from entering the base." We recommend repairing any cracks and spalling in the concrete with a commercial non-shrinking grout, caulking around the base of the tank to foundation connection to prevent water from entering under the tank, then sealing the foundation with a sealant.



Photo shows more of the condition of the tank. **NFPA 780-2017; 5.4: Metal Towers and Tanks** states, "Metal towers and tanks constructed so as to receive a stroke of lightning without damage shall require only bonding to grounding electrodes..." We recommend electrically grounding the tank for lightning protection as required by **OSH Act of 1970 Section 5** and **NFPA 780-2017; 5.4: Metal Towers and Tanks**.



Photos show the condition of the anchor bolts. [AWWA D103-09; 5.9.1.1 Required anchorage](#) states, "Anchor bolts shall be provided when the wind or seismic loads exceed the limits for self-anchored tanks." We recommend cleaning the area around the anchor bolts, tightening the anchor nuts to specifications, then tack welding the circumference of the nut-to-base plate connections and tack welding the bolt-to-nut connections for preventive maintenance.



Photo shows the condition of the shell. Currently there is no drain valve. We recommend installing a frost proof drain valve near the shell-to-floor connection, complete with a 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.



Photo shows the condition of the 24" primary shell manway. **NFPA 22-2018; 14.7.2.1.1** states, "The design of the manholes for steel tanks shall be in accordance with ...and **AWWA D103** for bolted steel tanks." The primary manway requires the following to be in compliance with **NFPA 22-2018; 14.7.2.1.1, AWWA D103-09; 7.1: Shell Manholes** and **OSHA 1910.146(c)(2) Confined spaces**.

We recommend:

- Install a davit arm on primary shell manway
- Install a 30" secondary shell manway 180° from primary manway
- Post **Confined Space Entry** signs
- Install maintenance free galvanized steel bolts



Photos shows the condition of the 2" stub overflow pipe. **NFPA 22-2018; 14.6.3.2** states, "The pipe shall be extended with a slight downward pitch to discharge beyond the tank or balcony and away from the ladders and shall be adequately supported." We recommend extending the overflow down the exterior to grade with same size pipe, complete with standoffs every 10' on center, an elbow at the base fitted with a flapper valve and screen to prevent the ingress of contaminants into the water supply, and a splash pad to direct the water away from the tank foundation. Splash pad to be installed by owner.



Photos show the 8" overflow pipe system, which is equipped with a flapper valve as required by [AWWA D103-09; 7.3: Overflow](#).



Shell access ladder in above photos is not equipped with anti-skid rungs and is only 15" wide. **OSHA 1910.23(b)(4)** states, "Ladder rungs, steps, and cleats have a minimum clear width of... 16 inches (41 cm)..." We recommend installing an **OSHA** compliant shell access ladder complete with standoffs every 10' on center and anti-skid rungs, a cable type ladder safety device, a lockable ladder guard to prevent unauthorized access and posting a **Fall Protection Required** sign at the base of the ladder.



Photo shows the tank is not equipped with a liquid level indicator. **NFPA 22-2018; 14.1.8* Water-Level Gauge** states, "A water-level gauge of suitable design shall be provided. It shall be carefully installed, adjusted, and properly maintained." We recommend installing a liquid level indicator, complete with target board and float.



Photos show the tank roof edge is not equipped with a required handrail system for fall protection. **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.**" We recommend installing an **OSHA** compliant 42" high handrail system around the circumference of the tank roof, complete with intermediate rail, toeboard and a swing gate at the junction of the shell-to-roof access ladder and tank roof.



Photo shows the condition of the existing 30" roof hatch. Roof openings on this tank require the following to be in compliance with **AWWA D103-09; 7.6: Roof Openings** and **OSHA 1910.146(c)(2) Confined spaces**.

We recommend:

- Replace 30" primary hatch cover with a 2" overlapping cover
- Install 30" secondary hatch 180° from primary roof hatch
- Post **Confined Space Entry** signs
- Install lock on primary hatch

We further recommend installing an **OSHA** compliant interior access ladder complete with standoffs every 10' on center, and cable type ladder safety devices at the suggested secondary roof hatch.

*In cold climates it's up to the owner's discretion on placement of internal ladders.



Photos show the condition of the existing 25" roof vent. **NFPA 22-2018; 4.15.3** states, "A corrosion-resistant screen or perforated plate with $\frac{3}{8}$ in. (9.5 mm) holes, to exclude birds or other animals, shall be provided and have a net area at least equal to the vent line." **This vent is allowing the ingress of rain and wind-borne contaminants into the water system. An improperly vented tank may cause external pressure to act on the tank which can cause buckling even at low pressure differential.** We recommend replacing the existing roof vent with a vacuum-pressure, frost proof vent and screen in compliance with **NFPA 22-2018; 4.15: Roof Vent.**

This work should be performed on an emergency basis.



Photos show the tank exterior coating system. We recommend pressure washing the tank exterior with biodegradable detergent injection (minimum 1,500 psi at 1.5 gpm), spot prime and apply one (1) full coat of epoxy mastic, followed by a top coat of polyurethane.



Interior access ladder in above photo is 15" wide, and is seriously deteriorated. **OSHA 1910.23(b)(10)** states, "Any ladder with structural or other defects is immediately tagged "Dangerous: Do Not Use" or with similar language in accordance with § **1910.145** and removed from service until repaired in accordance with § **1910.22(d)**, or replaced;..." We recommend installing an **OSHA** compliant interior access ladder complete with standoffs every 10' on center and anti-skid rungs, and a cable type ladder safety device.

This ladder should be replaced on an emergency basis.

**In cold climates it's up to the owner's discretion on placement of internal ladders.*



Photo shows the condition of the spider rods and hub assembly. The assembly does not affect the structural integrity of the tank, it was for erection purposes only. We recommend removing the spider rod assembly from the tank.

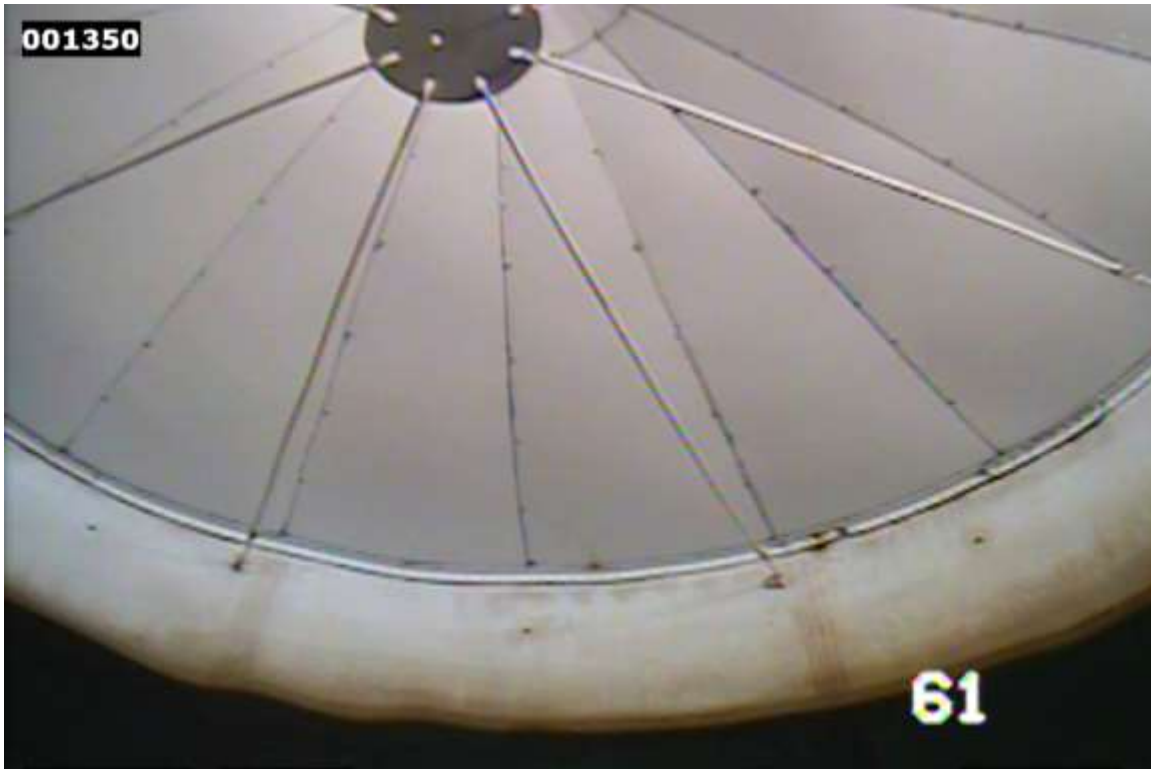


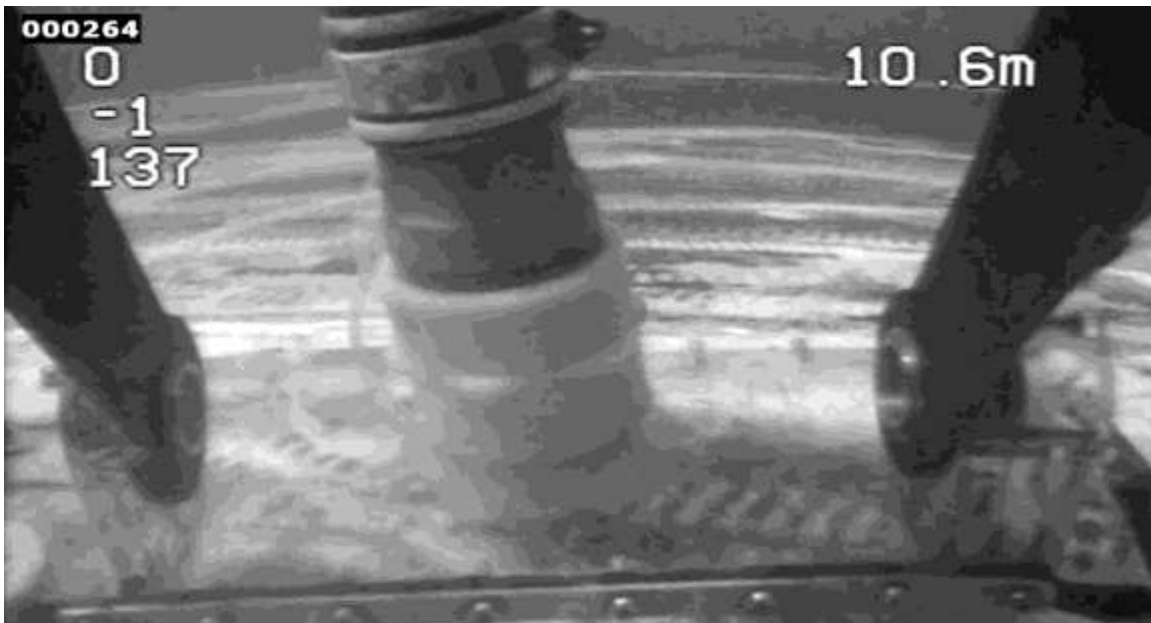
Photo shows the interior roof, which appears to be in good condition.



Photo shows the interior roof-to-rim angle connection, which appears to be in good condition.



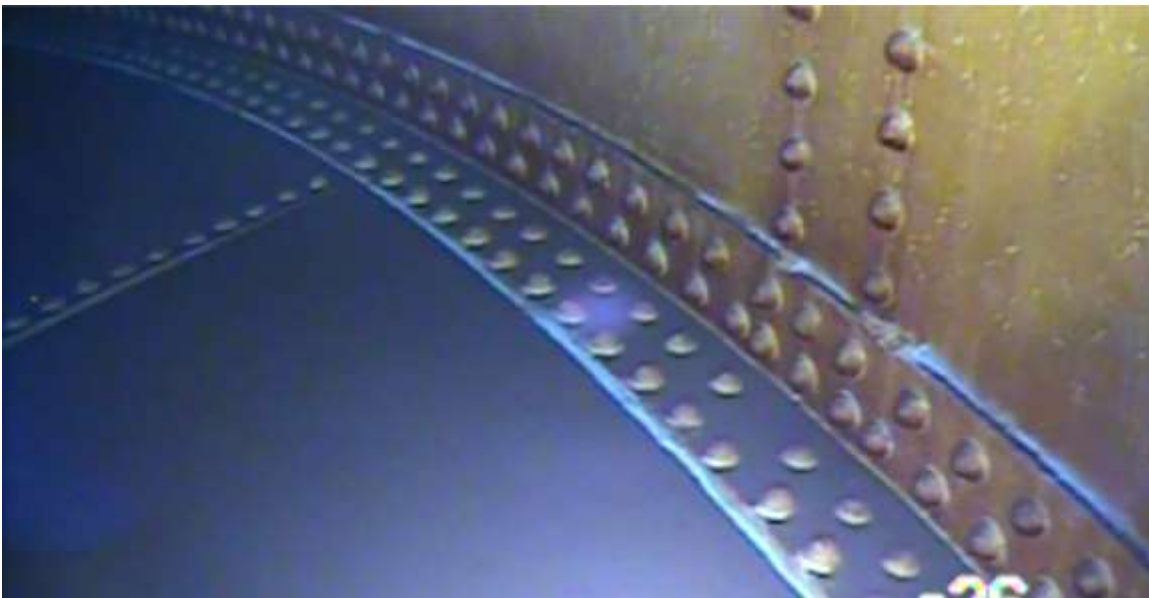
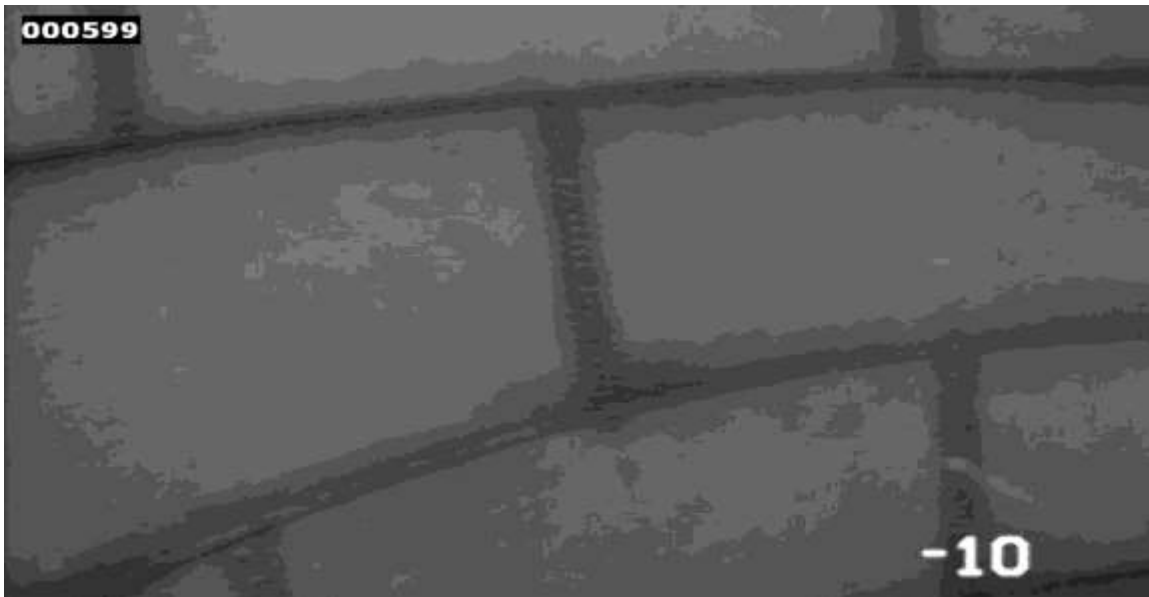
Photos show sediment and debris in the tank interior prior to the performance of the tank clean out.



Photos show the tank interior during the performance of the tank clean out.



Photo shows a suction pipe on the interior of the tank. **NFPA 22-2018; 14.2.13.1** states, “ The discharge outlet for every suction tank shall be equipped with an anti-vortex plate assembly.” We recommend installing a properly sized anti-vortex plate on the suction pipe to prevent formation of a vortex.



Photos show the tank interior bolt seams. We recommend cleaning the interior seams, then as needed applying a high solids CIM 1000 Trowel grade rubberized coating to all horizontal and vertical seams on the tank interior shell, floor and around the circumference of the shell-to-floor connection. This coating allows up to 350% elongation due to contraction and expansion caused by thermal shifts as well as filling and draining of the tank. All seams will be dry prior to application for proper adhesion. CIM is a flexible coating that also responds to potential leaks. This product is applied thicker than most coatings at up to 30 mils resulting in longer life.



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STANDPIPE INSPECTION REPORT

JOB NO: 318298-A INSPECTOR: Christian Costello (LJ)
TANK OWNER: Western State Hospital
OWNER'S REPRESENTATIVE: SimplexGrinnell #458 & JCI; Ms. Melissa Fraser
TITLE: Systems Integrity Representative
MAILING ADDRESS: 9520 10th Avenue South, Suite 100, Seattle, WA 98108
PHYSICAL ADDRESS: 9520 10th Avenue South, Suite 100, Seattle, WA 98108
E-MAIL: Melissa.fraser@jci.com
CITY, STATE: Seattle, WA ZIP: 98108 COUNTY: Pierce County
TELEPHONE: (206) 291-1439 FAX: (206) 291-1500
LOCATION OF TANK: Western State Hospital; 9601 Steilacoom Blvd. SW, Lakewood, WA 98498

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Seattle, WA 98108
August 3, 2018
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ORIGINAL CONTRACT NO: Not Provided YEAR BUILT: Not Provided
ORIGINAL MANUFACTURER: Not Provided CAPACITY: 318,000 Gallon
DATE OF LAST INSPECTION: Not Provided TYPE: Fire Protection
DIAMETER: 30'-0" HEIGHT: 60'-0"
OVERFLOW: 8" INLET: Not Provided
TYPE CONSTRUCTION: WELDED: RIVETED: BOLTED: X
ACCOUNT EXECUTIVE: Bobbie Shelton

Testing	Exterior	Interior
Lead	Paint Sample	Negative
Adhesion	A-5 @ 15.1 mils	5.19 mils

Mil Thickness Testing									
Roof	15.2	15.9	13.7	11.7	14.1	11.8	15.7	16.5	13.9
	11.3								
Ring 10	18.1	17.5							
Ring 9	20.1	15.1							
Ring 8	13.4	15.9							
Ring 7	12.8	13.1							
Ring 6	9.4	15.7							
Ring 5	16.2	14.3							
Ring 4	14.0	13.3							
Ring 3	16.5	19.1							
Ring 2	17.3	19.9							
Ring 1	15.1	27.9	35.0	25.7	19.7	21.6	21.5	22.3	15.7
	19.6	17.5	24.0	21.3	25.6	22.0	25.1		

Ultrasonic Thickness Testing									
Roof	.220	.210	.217	.221	.214	.220	.215	.219	.217
	.221								
Ring 10	.264	.275							
Ring 9	.214	.210							
Ring 8	.222	.234							
Ring 7	.273	.287							
Ring 6	.356	.341							
Ring 5	.341	.330							
Ring 4	.356	.369							
Ring 3	.424	.418							
Ring 2	.536	.516							
Ring 1	.529	.567	.598	.531	.539	.558	.557	.510	.501
	.541	.532	.551						

Page #	Work Proposed	Critical Deficiency	NON-Critical Deficiency	OSHA	Structural	Preventive Maintenance
2	Post a No Trespassing sign.		X			
4	Repair any cracks and spalling in the concrete with a commercial non-shrinking grout.					X
	Caulk around the base of the tank to foundation connection.					X
	Seal the foundation with a sealant.					X
5	Electrically ground the tank.		X	X		
6	Clean the area around the anchor bolts, tighten the anchor nuts to specifications, then tack weld on the circumference of the nut-to-base plate connections and tack weld the bolt-to-nut connections.					X
7	Install a frost proof drain valve near the shell-to-floor connection, complete with a locking device and a splash pad. Splash pad to be installed by owner.		X			
8	Install davit arm on existing shell manway.		X	X		
	Install 30" secondary shell manway 180° from primary manway.		X	X		
	Post Confined Space Entry signs on primary and secondary shell manways.			X		
	Install maintenance free galvanized steel bolts on primary and secondary shell manway.					X
9	Extend the overflow down the exterior to grade with same size pipe, complete with standoffs every 10' on center, an elbow fitted with a flapper valve and screen, and a splash pad. Splash pad to be installed by owner.		X			
11	Replace the existing exterior shell access ladder with a compliant ladder complete with standoffs every 10' on center and anti-skid rungs.	X		X		
	Install a cable type ladder safety device on exterior shell access ladder.			X		
	Install a lockable ladder guard on exterior shell access ladder.					X
	Post Fall Protection Required sign at base of exterior shell access ladder.			X		
12	Install a liquid level indicator complete with a target board and float.		X			
13	Install a compliant 42" high handrail system around the circumference of the tank roof, complete with intermediate rail, toeboard and a swing gate at the junction of the shell-to-roof access ladder and tank roof.			X		

Page #	Work Proposed	Critical Deficiency	NON-Critical Deficiency	OSHA	Structural	Preventive Maintenance
14	Replace 30" primary hatch cover with a 2" overlapping cover.					
	Install 30" secondary roof manway 180° from primary roof manway.		X			
	Post Confined Space Entry signs on roof manways.			X		
	Install lock on primary roof hatch.					X
	Install a compliant interior access ladder complete with standoffs every 10' on center at the suggested secondary roof hatch.			X		
	Install cable type ladder safety device on the suggested secondary roof hatch interior access ladder.			X		
15	Replace the existing roof vent with a vacuum-pressure, frost proof vent and screen. This work should be performed on an emergency basis.	X			X	
16	Pressure wash the tank exterior with biodegradable detergent injection (minimum 1,500 psi at 1.5 gpm) spot prime and apply one (1) full coat of epoxy mastic, followed by a top coat of polyurethane.					X
17	In cold climates it's up to the owner's discretion on placement of internal ladders. Replace the existing interior access ladder with a compliant ladder complete with standoffs every 10' on center and anti-skid rungs. This ladder should be replaced on an emergency basis.	X		X		
	Install a cable type ladder safety device on the interior access ladder.			X		
18	Remove the spider rod assembly from the tank.					X
23	Install a properly sized anti-vortex plate on the suction pipe.		X			X
24	Clean the interior seams, then as needed apply a high solids CIM 1000 Trowel grade rubberized coating to all horizontal and vertical seams on the tank interior shell, floor and around the circumference of the shell-to-floor connection.					X