Walden West Tank Improvements

Scope of Work and Specifcation

Tank Summary

Test Results

Interior Lead Results
Negative

Exterior Lead Results
Negative

Tank Address
Walden West Center - 15555 Sanborn Road

Tank City
Saratoga

Tank State
California

Tank Zip
95070

Tank County
Santa Clara

Latitude
37.23884

Longitude
-122.06895

Last Inspection Date
Not Provided

Inspection Date
Jun 19, 2023

Manufacturer
Not Provided

Year Built
Not Provided

Contract Number
Not Provided

Tank Type
Ground Storage Tank

Tank Use
Potable

Material
Carbon Steel

Construction
Welded

Capacity
304,000

Diameter
42'-0"

Height
29'-4"

Drain Diameter
N/A

Overflow Diameter
Not Provided

Roof Rail Height
N/A

Anchor Bolts
12

Chairs
12

Primary Manway Diameter
22"

Primary Roof Hatch
24"

Roof Vent 1
Not Provided

Secondary Manway Diameter
36"

Secondary Roof Hatch
N/A

Roof Vent 2
N/A

Scope of Work Summary

Critical

Coatings/Interior Wet

- Sandblast all interior areas to SSPC-SP10 (near white), apply one (1) stripe coat of epoxy primer to weld seams, then apply an NSF 600 approved epoxy liner to the entire interior wet area of the tank. Beginning Jan. 1, 2023, all new interior coating systems for potable water tanks must adhere to the new NSF 600 regulations.

Coatings/Sediment

- Perform a dry interior cleanout to remove sediment. *WORK SHOULD BE PERFORMED ON AN EMERGENCY BASIS.*

Ladders/Platforms/Primary Interior Ladder

- Remove the primary interior ladder and install a new ladder with a cable-type safety climb device. *WORK SHOULD BE PERFORMED ON AN EMERGENCY BASIS.*

Roof /Roof Vent 1

- Replace the screen on the vent. *WORK SHOULD BE PERFORMED ON AN EMERGENCY BASIS.*

Structural

Foundation & Grade/Anchor Bolts

- Tighten the anchor nuts and tack weld the anchor nuts to the bolts.

OSHA

Ladders/Platforms/Shell Ladder

- Replace the shell ladder complete with a new cable-type safety climb device, lockable ladder guard, and a fall protection required sign.

Access Points/Primary Roof Hatch

- Post a Confined Space Entry sign at the primary roof hatch.

Access Points/Secondary Shell Manway

- Install a Confined Space Entry sign on the secondary shell manway.

Roof /Roof Handrails

- Install 360° 42" handrails around the circumference of the tank roof complete with an intermediate rail, toeboard, and a swing gate.

Deficiency

Security/Site Security

- Install a fence and proper signage. *Fence installation to be done by others.*

Foundation & Grade/Foundation

- Clean the exposed foundation and seal or paint to protect the concrete.
- Remove all fill to expose 6" of foundation and properly grade for drainage. *This work to be performed by others.*

Shell Accessories/Liquid Level Gauge

- Install a float-type liquid level gauge.

Shell Accessories/Overflow

- Disconnect the existing overflow pipe from the drain and install a screened flange creating an air break.

Access Points/Primary Roof Hatch

- Install a lock on the primary roof hatch. *Owner to provide a lock.*

Access Points/Primary Shell Manway

- Replace the primary shell manway with a 30" shell manway complete with a davit arm. Post a Confined Space Entry sign on the new manway.

Access Points/Secondary Roof Hatch

- Install a 30" secondary roof hatch complete with a confined space entry sign and lock. *Owner to provide a lock.

Preventive

Coatings/Exterior

- Pressure wash the tank with an antifungal solution.

Coatings/Interior Wet

- Seal all un-welded interior roof lap seams. This work is to be performed in conjunction with the application of a new interior liner. Failure to perform this work in conjunction with a new interior liner could result in premature coating failure.
- Seal the circumference of the roof to rim angle connection. This work is to be performed in conjunction with the application of a new interior liner. Failure to perform this work in conjunction with a new interior liner could result in premature coating failure.

Foundation & Grade/Foundation

- Remove the vegetation/debris from around the tank. *This work to be performed by others.*

Foundation & Grade/Grounding

- Install two (2) grounding assemblies.

Shell Accessories/Drain

- Install a frost-proof drain valve complete with a locking device. *Lock to be provided by owner.*

Ladders/Platforms/Secondary Interior Ladder

- At the suggested secondary hatch, install a secondary interior access ladder complete with standoffs and a cable type safety climb device.

Interior /Mixing System

- Install a Grid Bee mixing system to enhance water quality. *Electrical work to be done by others.*

Coatings

Exterior

Current Conditions:

- The tank's exterior coating is in good condition; however, it needs to be cleaned.

Scope:

- Pressure wash the tank with an antifungal solution.

Coatings

Exterior (Cont...)

Coatings

Exterior (Cont...)

Coatings

Interior Wet

Current Conditions:

- The tank's interior coating has heavy corrosion and has failed.
- Corrosion is forming on the underside of the roof at the lap weld seams.
- Corrosion is forming at the roof to rim angle connection.

Scope:

- Seal all un-welded interior roof lap seams. This work is to be performed in conjunction with the application of a new interior liner. Failure to perform this work in conjunction with a new interior liner could result in premature coating failure.
- Sandblast all interior areas to SSPC-SP10 (near white), apply one (1) stripe coat of epoxy primer to weld seams, then apply an NSF 600 approved epoxy liner to the entire interior wet area of the tank. Beginning Jan. 1, 2023, all new interior coating systems for potable water tanks must adhere to the new NSF 600 regulations.
- Seal the circumference of the roof to rim angle connection. This work is to be performed in conjunction with the application of a new interior liner. Failure to perform this work in conjunction with a new liner could result in premature coating failure

Coatings

Interior Wet (Cont...)

Coatings

Interior Wet (Cont...)

Coatings

Sediment

Current Conditions:

- The tank has excessive sediment buildup.

Scope:

- Perform a dry interior cleanout to remove sediment. *WORK SHOULD BE PERFORMED ON AN EMERGENCY BASIS.*

Coatings

Sediment (Cont...)

Security

Site Security

Current Conditions:

- The tank is not secured by a fence and does not have signage to deter unauthorized access.

Scope:

- Install a fence and proper signage. *Fence installation to be done by others.*

Foundation & Grade

Anchor Bolts

Current Conditions:

- The anchor nuts appear to be loose.

Scope:

- Tighten the anchor nuts and tack weld the anchor nuts to the bolts.

Foundation & Grade

Anchor Bolts (Cont...)

Foundation & Grade

Foundation

Current Conditions:

- The foundation does not appear to be sealed.
- The structure currently has vegetation/debris near the tank.
- The top of the foundation is less than 6" above grade.

Scope:

- Clean the exposed foundation and seal or paint to protect the concrete.
- Remove the vegetation/debris from around the tank. *This work to be performed by others.*
- Remove all fill to expose 6" of foundation and properly grade for drainage. *This work to be performed by others.*

Foundation & Grade

Foundation (Cont...)

Foundation & Grade

Foundation (Cont...)

Foundation & Grade

Grounding

Current Conditions:

- The tank does not appear to be properly grounded for lightning protection.

Scope:

- Install two (2) grounding assemblies.

Shell Accessories

Drain

Current Conditions:

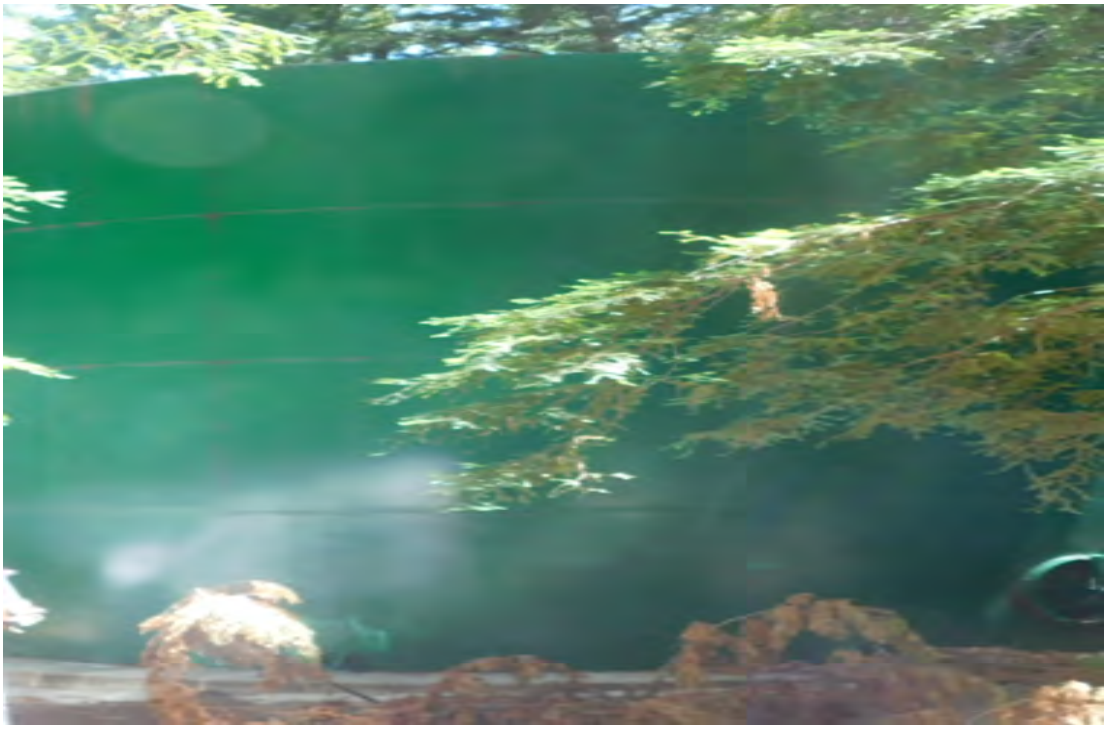
- The tank is not equipped with a drain valve.

Scope:

- Install a frost-proof drain valve complete with a locking device. *Lock to be provided by owner.*

Shell Accessories

Liquid Level Gauge



Current Conditions:

- The tank is not equipped with a liquid level gauge.

Scope:

- Install a float-type liquid level gauge.

Shell Accessories

Overflow

Current Conditions:

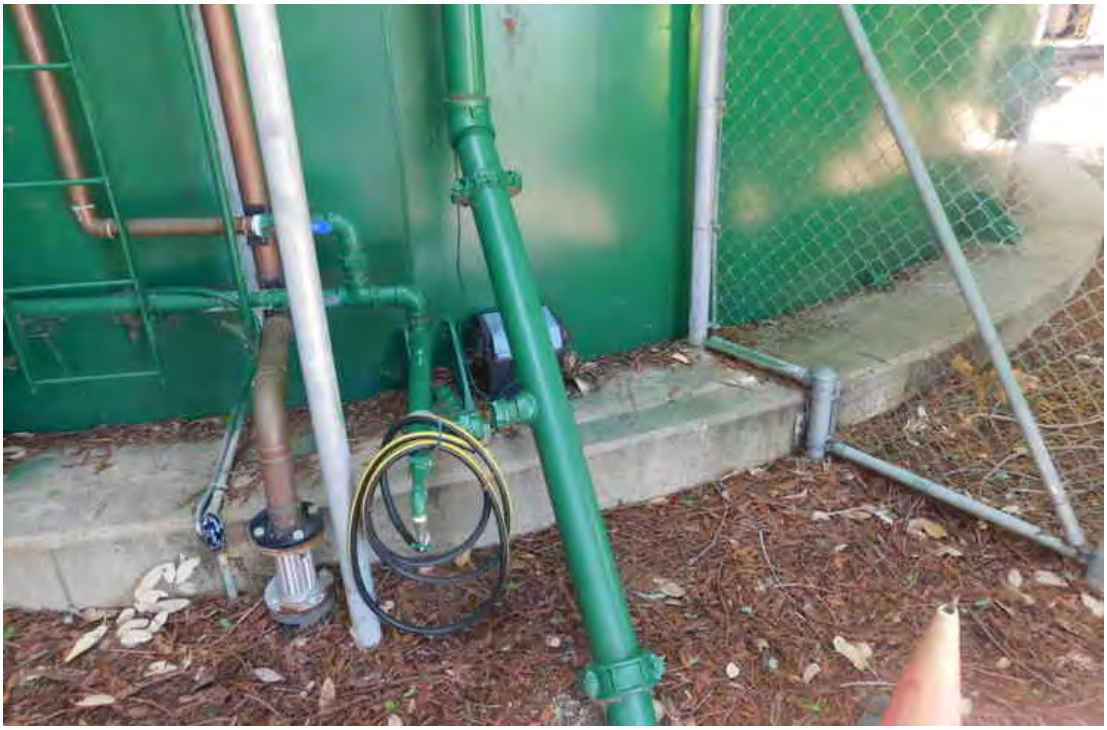
- The overflow is currently connected to a drain, which can allow contaminants into the water system.

Scope:

- Disconnect the existing overflow pipe from the drain and install a screened flange creating an air break.

Shell Accessories

Overflow (Cont...)



Ladders/Platforms

Primary Interior Ladder

Current Conditions:

- The primary interior ladder is not in compliance for the following reason: Ladder is deteriorated and in an unsafe condition.

Scope:

- Remove the primary interior ladder and install a new ladder with a cable-type safety climb device. *WORK SHOULD BE PERFORMED ON AN EMERGENCY BASIS.*

Ladders/Platforms

Primary Interior Ladder (Cont...)

Ladders/Platforms

Shell Ladder

Current Conditions:

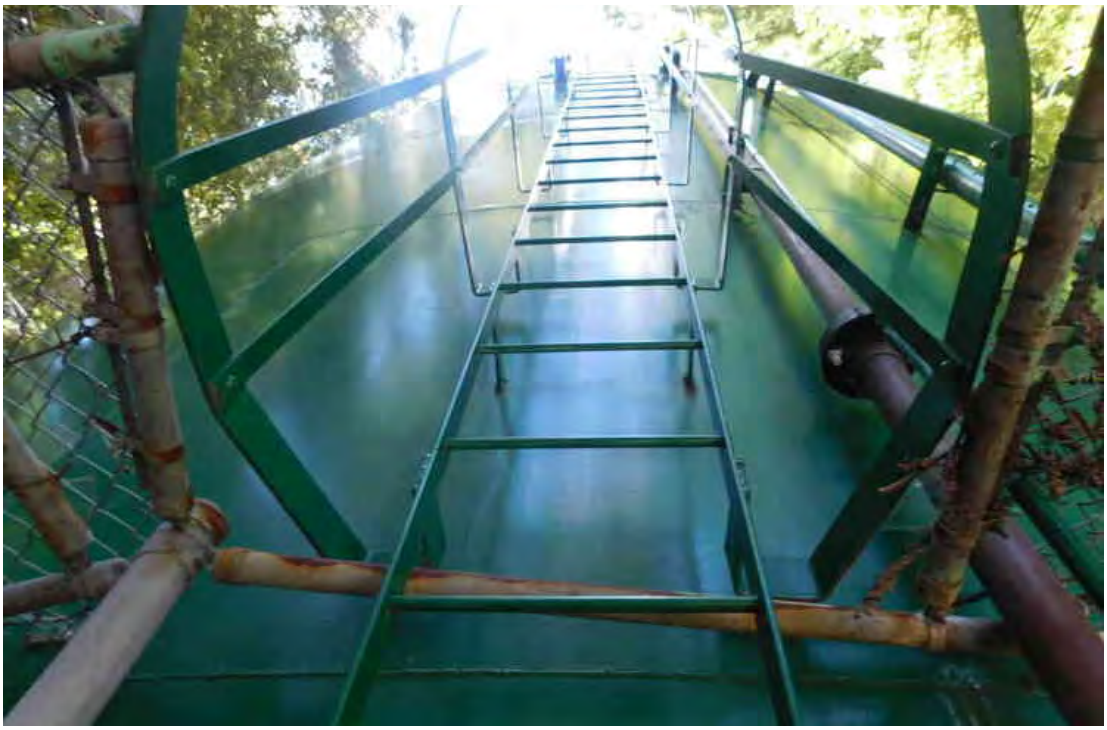
- The shell ladder is not in compliance for the following reason: Dimensional deficiencies.

Scope:

- Replace the shell ladder complete with a new cable-type safety climb device, lockable ladder guard, and a fall protection required sign.

Ladders/Platforms

Shell Ladder (Cont...)



Ladders/Platforms

Shell Ladder (Cont...)

Ladders/Platforms

Secondary Interior Ladder

Current Conditions:

- The tank is not equipped with a secondary interior access ladder.

Scope:

- At the suggested secondary hatch, install a secondary interior access ladder complete with standoffs and a cable type safety climb device.

Access Points

Primary 24" Roof Hatch

Current Conditions:

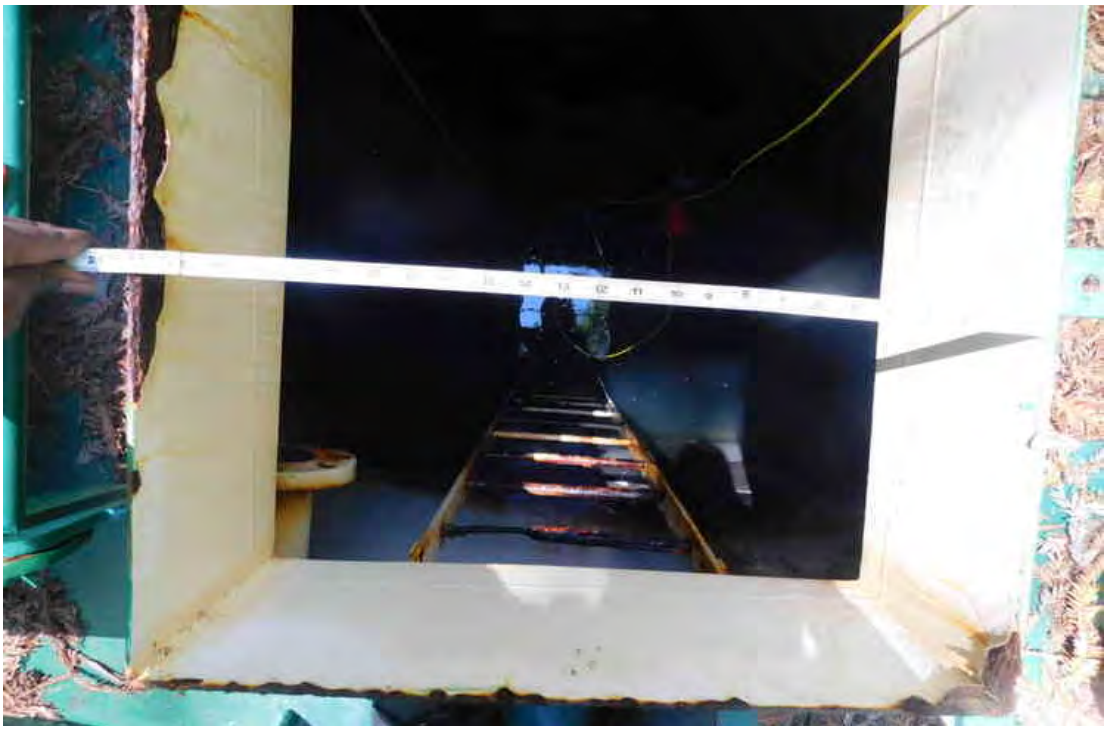
- The primary roof hatch does not have a Confined Space Entry sign.
- The primary roof hatch does not have a locking device.

Scope:

- Post a Confined Space Entry sign at the primary roof hatch.
- Install a lock on the primary roof hatch. *Owner to provide a lock.*

Access Points

Primary Roof Hatch (Cont...)



Access Points

Primary 22" Shell Manway

Current Conditions:

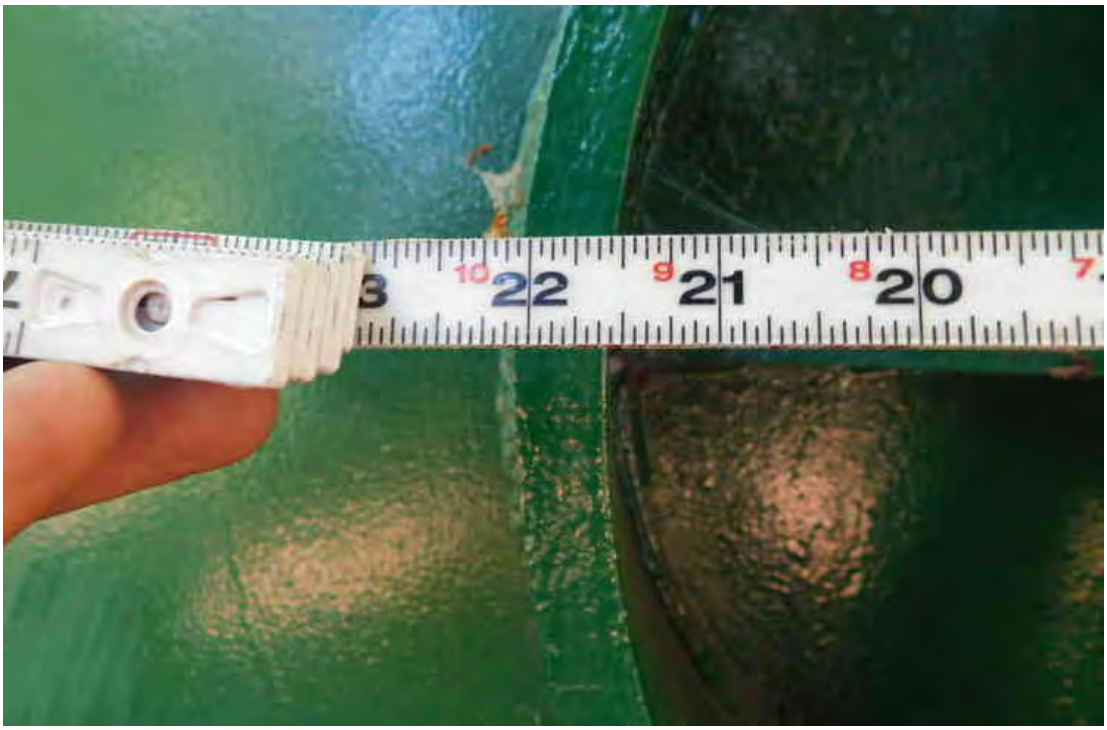
- The primary shell manway does not meet size requirements.

Scope:

- Replace the primary shell manway with a 30" shell manway complete with a davit arm. Post a Confined Space Entry sign on the new manway.

Access Points

Primary Shell Manway (Cont...)



Access Points

Secondary Roof Hatch

Current Conditions:

- The tank is not equipped with a secondary roof hatch.

Scope:

- Install a 30" secondary roof hatch complete with a confined space entry sign and lock. *Owner to provide a lock.

Access Points

Secondary 36" Shell Manway

Current Conditions:

- The secondary shell manway does not have a Confined Space Entry sign.

Scope:

- Install a Confined Space Entry sign on the secondary shell manway.

Access Points

Secondary Shell Manway (Cont...)

Roof

Roof Handrails

Current Conditions:

- The tank does not have 360° handrails around the circumference of the roof.

Scope:

- Install 360° 42" handrails around the circumference of the tank roof complete with an intermediate rail, toeboard, and a swing gate.

Roof

Not Provided Roof Vent 1

Current Conditions:

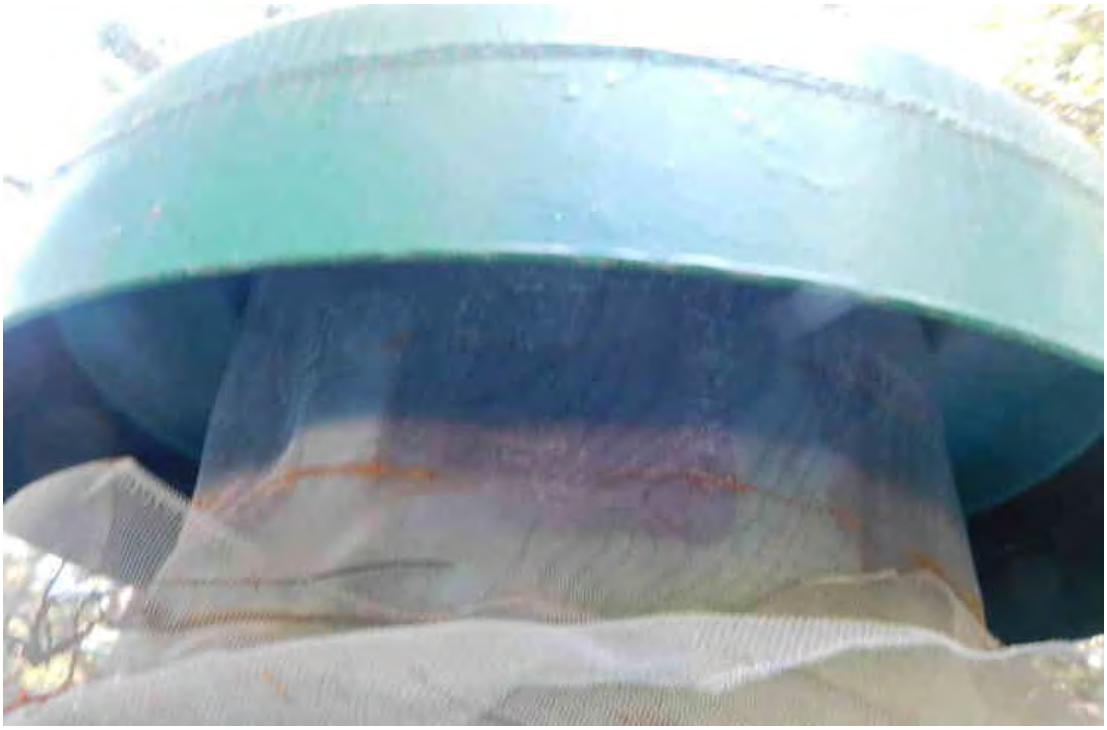
- The screen on the vent is damaged or missing.

Scope:

- Replace the screen on the vent. *WORK SHOULD BE PERFORMED ON AN EMERGENCY BASIS.*

Roof

Roof Vent 1 (Cont...)



Interior

Rafter-Support-Shell

Current Conditions:

- The roof rafters appear to be in good condition.

Scope:

- No work recommended.

Interior

Rafter-Support-Shell (Cont...)

Interior

Support Column

Current Conditions:

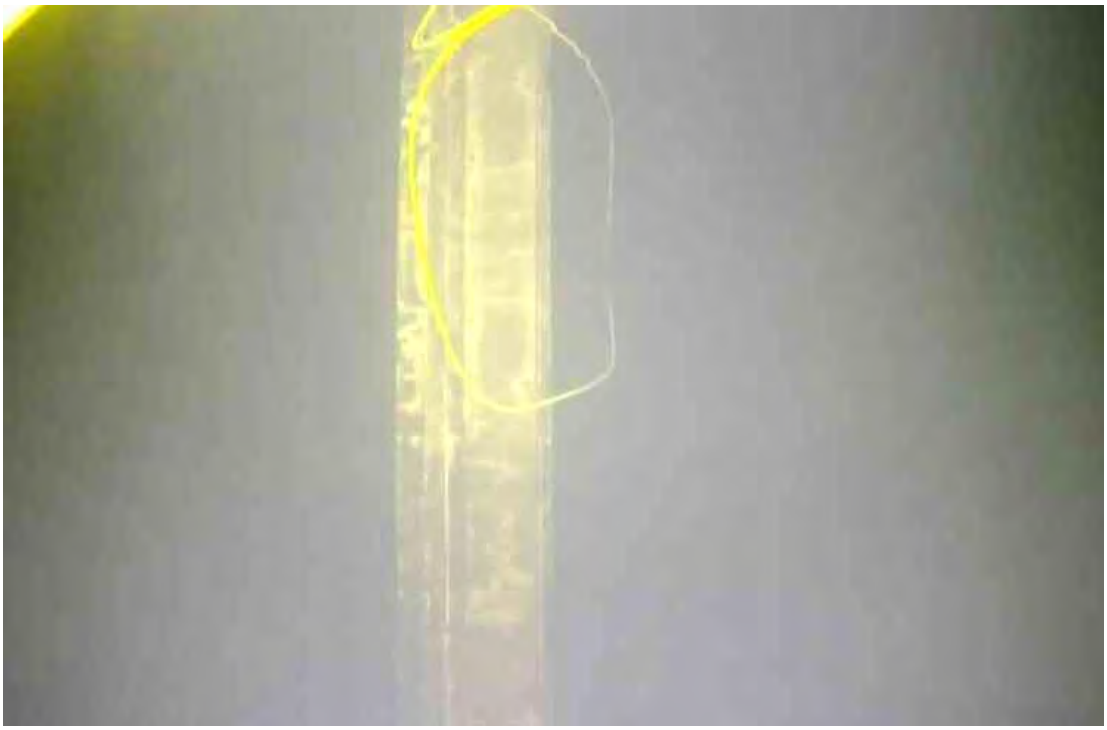
- The support column appears to be in good condition.

Scope:

- No work recommended.

Interior

Support Column (Cont...)



Interior

Mixing System

Current Conditions:

- The tank is not currently equipped with a mixing system.

Scope:

- Install a Grid Bee mixing system to enhance water quality. *Electrical work to be done by others.*

Code Summary

Coatings/Exterior

AWWA D102-17 4.3 Outside Coating Systems

Coatings/Interior Wet

AWWA D102-17 A.5.6 Caulking of accessible interior roof plate lap joints, perimeter joints, and tee joints with suitable NSF/ANSI 61–certified caulking material compatible with the coating system.

AWWA D102-17 4.6.3.2.3 Interior wet surfaces shall have existing coatings removed and be blast cleaned in accordance with SSPC-SP 10/NACE No. 2 when (1) the existing coatings have deteriorated extensively, (2) the existing coating system is determined not to be a candidate for overcoating when evaluated in accordance with SSPC-TU 3, or (3) the candidate overcoat system or systems are not compatible with the existing coating system.

AWWA D102-17 A.5.6 Caulking of accessible interior roof plate lap joints, perimeter joints, and tee joints with suitable NSF/ANSI 61–certified caulking material compatible with the coating system.

Coatings/Sediment

AWWA M42 2013 4.6.3.4.2 Tanks should be washed out and inspected at least once every three years, and where water supplies have sediment problems, annual washouts are recommended.

Security/Site Security

Federal Regulations Public Health US Code title 42, section 300i-2 Any person who tampers with a public water system shall be imprisoned for not more than 5 years, or be fined in accordance with Title 18 or both.

Foundation & Grade/Anchor Bolts

AWWA D100-21 3.8.1.1 For ground-supported flat-bottom reservoirs and standpipes mechanical anchorage shall be provided when the wind or seismic loads exceed the limits for self-anchored tanks.

Foundation & Grade/Foundation

PTTG PGR 2000 Caulk or grout should be installed at the base of the tank to prevent water from collecting under the floor and chime area. Foundations should be sealed or painted to protect the

concrete.

PTTG PGR 2003 Storage tanks and their surrounding areas should be kept clean to allow for maintenance and inspections to be performed.

AWWA D100-21 12.7.1 The tops of the concrete foundations shall be a minimum of 6 in. (152 mm) above the finished grade, unless otherwise specified.

Foundation & Grade/Grounding

PTTG PGR 2004 Storage tanks should be grounded for lightning protection.

Shell Accessories/Drain

PTTG PGR 5000 Tanks should be equipped with a drain valve.

Shell Accessories/Liquid Level Gauge

PTTG PGR 5003 Tanks should be equipped with a mechanical liquid level indicator system. This allows the tank level to be monitored.

Shell Accessories/Overflow

RSWW Rules and Regulations for public water systems 7.0.7 No overflow may be connected directly to any drain, sanitary sewer, or storm sewer. All overflow pipes shall be located so that any discharge is visible.

Ladders/Platforms/Primary Interior Ladder

OSHA 1910 23(b)(10) Any ladder with structural or other defects is immediately tagged Dangerous: Do Not Use or with similar language in accordance with § 1910145 and removed from service until repaired in accordance with § 191022(d) or replaced;

Ladders/Platforms/Shell Ladder

OSHA 1910 23(b)(4) Ladder rungs steps and cleats must have a minimum clear width of… 16 inches (41 cm) (measured before installation of ladder safety systems) for fixed ladders

AWWA D100-21 7.4.2.1 Ladders shall have side rails not less than 2 in. x 3/8 in. (51 mm x 9.5 mm), with a spacing between the side rails of not less than 16 in. (406 mm) and rungs not less than ¾ in. (19 mm) round or square, spaced 12 in. (305 mm) apart on centers. Ladders shall not in any place have a backward slope. Ladders with a single point of connection, including rolling ladders, shall not be used. Skid-resistant rungs shall be provided when specified.

Ladders/Platforms/Secondary Interior Ladder

AWWA D100-21 5.4/7.4.2.4 Inside tank ladder. When specified, an inside tank ladder shall be provided for access from the roof to the bottom of the tank.

Access Points/Primary Roof Hatch

OSHA 1910 146 (c)(2) If the workplace contains permit spaces, the employer shall inform exposed employees, by posting danger signs or by any other equally effective means, of the existence and location of and the danger posed by the permit spaces.

AWWA D100-21 7.4.3.1 A roof opening with hinged cover and hasp for locking shall be provided near the outside tank ladder, or roof ladder if provided. The opening shall have a minimum dimension of 24 in. (610 mm), or as required by OSHA, if used to access an inside tank ladder. The opening shall have a curb at least 4 in. (102 mm) high, and the cover shall have a downward overlap of at least 2 in. (51 mm).

Access Points/Primary Shell Manway

AWWA D100-21 7.4.4 Two shell manholes shall be provided in the first ring of the tank shell. The location of the manholes shall be specified. If any access cover weighs more than 50 lb (22.7 kg), a hinge or davit shall be provided. At least one manhole shall be circular with a minimum diameter of 30 in. (760 mm). Other manholes may be circular, 24 in. (600 mm) in diameter, or elliptical, 18 in. x 22 in. (450 mm x 550 mm) minimum size. The shell plate where the manholes are located shall be reinforced to comply with Sec. 3 .13, and portions of the manholes, including reinforcing of the neck, the bolting, and the cover, shall be designed to withstand the weight and pressure of the tank contents.

Access Points/Secondary Roof Hatch

AWWA D100-21 7.4.3.2 An opening with a removable cover having an opening dimension or diameter of at least 20 in. (500 mm) and a 4-in. (102-mm) minimum height neck shall be provided at, or near, the center of the tank. The opening may be used as a tank vent opening, provided the vent is removable. Where conveniently accessible from an outside balcony or platform, a shell manhole may be substituted for the additional opening. If properly designed, the shell manhole may be placed below the TCL.

Access Points/Secondary Shell Manway

OSHA 1910 146 (c)(2) If the workplace contains permit spaces, the employer shall inform exposed employees, by posting danger signs or by any other equally effective means, of the existence and location of and the danger posed by the permit spaces.

Roof /Roof Handrails

OSHA 1910 29(a)(1) "General requirements The employer must ensure each fall protection system and falling object protection other than personal fall protection systems that this part requires meets the requirements in this section The employer must ensure each personal fall protection system meets the requirements in subpart I of this part; and 191029(a)(2) Provide and install all fall protection systems and falling object protection this subpart requires and comply with the other requirements in this subpart before any employee begins work that necessitates fall or falling object protection"

Roof /Roof Vent 1

EPA SCWDA Drinking Water Act 2002 Potential Health Impacts 2.1.2 Pathogen Contamination and Microbial Growth Microbial contamination from birds or insects is a major water quality problem in storage tanks. . .these stem from design problems with roof hatch systems and vents that do not provide a watertight seal.

AWWA D100-21 7.5.2 The vent shall be designed and constructed to prevent the entrance of birds or animals. 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. The screens or relief mechanism shall not be damaged by the occurrence and shall return automatically to operating position after the clogging is cleared.

Interior /Rafter-Support-Shell

PTTG PGR 7003 Roof rafters and components should be repaired or replaced if significant rusting or thinning of steel is observed.

Interior /Support Column

PTTG PGR 7004 Support column baseplate guides should be repaired or replaced if damaged.

Interior /Mixing System

PTTG PGR 7006 Many operators rely on mixing via normal cycling of water in and out of the tank to limit water age and deterioration of disinfectant chemicals. This reliance on “passive mixing” is not enough in most cases to prevent thermal stratification, which can lead to a drop in residual chlorine and a resultant growth of bacteria.

Dry Film Thickness Readings (Mils)

Shell 1	**Shell 2**	**Shell 3**	**Shell 4**	
8.4	10.2	11.8	25.2	
13.9	10.4	8.5	12.4	
9.7				
10.4				
13.7				
10.1				
7.4				
16.4				
24.0				
18.9				
Roof		**Adhesion Test**		
6.6		Exterior		
11.0		A3 @ 9.9		
9.4		Interior		
8.1		A2 @ 9.4		
9.5				
10.5				
7.4				
7.1				
8.0				
9.5				
Comments:				

Ultrasonic Thickness Readings (Inches)

Shell 1	**Shell 2**	**Shell 3**	**Shell 4**	
0.296	0.275	0.281	0.276	
0.307	0.279	0.284	0.289	
0.280				
0.279				
0.282				
0.268				
0.310				
0.284				
0.284				
0.301				
Roof				
0.217				
0.211				
0.214				
0.216				
0.208				
0.208				
0.213				
0.207				
0.235				
0.217				
Comments:				

WALDEN WEST TANK AND PUMP WATER SYSTEM IMPROVEMENTS

SCOPE OF WORK AND SPECIFICATIONS

EXTERIOR AND INTERIOR RECOATING

1.01 Scope Of Work

A. Provide all labor, materials, equipment and incidentals required to remove the existing interior coatings and repaint the tank interior shell, ladder, overflow, roof drain piping and other miscellaneous steel on the interior of the tank with an epoxy coating system, in three coats. The Contractor is responsible for de-watering the remaining water in the tank and to remove any remaining silt as per all State and Federal regulations. Provide all labor, materials, equipment and incidentals required to remove the existing exterior coatings and repaint the Tank exterior shell, ladder, overflow, roof piping and other miscellaneous steel on the exterior of the tank with an epoxy, urethane system. The exterior coaling contains hazardous materials, the exterior coating will be totally removed. The exterior of the tank will require full containment as per all Local, State, and Federal regulations.

B. When the new coating has completely cured, clean and disinfect the tank. After filling the tank, test the tank waters for bacteriologic and volatile organic contamination and for aesthetic quality. The Work shall not be accepted until the tank water meets California Department of Health Services (DHS) and federal drinking water standards including all Title 22. **The Contractor shall note and make allowance for the fact that the existing Walden West well is the sole source of water for the tank and pumps less than 10 gallons per minute. Allowance shall be made for filling and disinfecting the tank.**

C. Dispose of all wastes from abrasive blasting, and any other wastes generated during the Work. Sample and test wastes as required by regulatory agencies, and as necessary for classification of wastes prior to disposal. This work includes all costs for waste sampling, testing, accumulation, transport, and disposal, including the cost for wastes classified as hazardous and non-hazardous**.**

D. The CONTRACTOR may expect that the entire surface under the existing coatings is corroded or has mill scale, and shall completely remove such materials down to bare steel, (SSPC/SP#5) white metal blast to allow for proper adhesion of the interior coating system. The exterior abrasive blast cleaning shall be (SSPC/SP) #10 near white.

E. A one-year anniversary inspection shall be conducted by the Contractor, for which the Contractor shall furnish floor protection, lighting, and scaffolding. The Contractor shall also be present at the inspection. The County will withhold $2,500 from the total contract amount to reimburse the Contractor after completion of the one-year anniversary inspection.

F. In preparation of the work schedule, CONTRACTOR shall allow forty five (45) calendar days for the County to fill the tank after the coating has cured. **The Contractor shall note and make allowance for the fact that the existing Walden West well is the sole source of water for the tank and pumps less than 10 gallons per minute. Allowance shall be made for filling and disinfecting the tank.**

G. The County will retain the services of a consulting paint inspector to review the Contractors work.

1.02 Governing Standards

The following standards shall govern the work unless specified otherwise in these specifications. The latest version of each standard shall be used.

A. **SSPC Vol. 1, Steel Structures Painting Manual, Volume 1,** Good Painting Practice.

B. **SSPC Vol.2, Steel Structures Painting Manual, Volume 2**, Systems and Specifications.

1.	**SSPC-SP5**	White Metal Blast Cleaning
2.	**SSPC-SP6**	Commercial Blast Cleaning
3.	**SSPC-SP7**	Brush-off Blast Cleaning
4.	**SSPC-SP1O**	Near White Blast Cleaning
5.	**SSPc-SP11**	Power Tool Cleaning to Bare Metal
6.	**SSPC-AB1**	Mineral and Slag Abrasives
7.	**SSPC-PA1**	Shop, Field and Maintenance Painting
8.	**SSPS-PA2**	Measurement **of** Dry Paint Thickness with Magnetic Gages
9.	**SSPS-PA Guide 3**	Guide to Safety in Paint Application
10.	**SSPC-Guide to Vis 1-89**	Visual Standard for Abrasive Blast Cleaned Steel
11.	**SSPC-V15 (3.93)**	Visual Standard for Power and Hand-Tool Cleaned Steel
12.	**SSPC-Guide 61**	Guide for containing debris generated during paint removal operations

C. **AWWA D102-97,** Standard for Painting Steel Water-Storage Tanks

D. **AWWA C652,** Disinfection of Water Storage Facilities.

E. All applicable OSHA and safety standards.

1.03 Submittals

A. All submittals shall be prepared and submitted in accordance with Section 1500.

B. Provide a separate submittal for each material to be used in the work. At a minimum provide submittals for:

1. Abrasive material
2. Paint system
3. Thinners and any other additives
4. Removal/Containment/Ventilation Plan
5. Programs for the protection of the ambient air and soil: The Contractor shall submit the testing and evaluation programs that will be used to confirm that the work does not violate Federal, State, or Local regulations. The Contractor shall provide a minimum of

four soil samples test results prior to the start of work. All soil samples shall be mapped of each area taken. At the end of project the Contractor shall re-test the four areas that have been mapped at the start of the project. The Contractor shall pay for all testing.

6. Particulate Matter Contractor shall monitor emissions of particulate equal to or greater than 10 micrometers in aerodynamic size (PM 10) in accordance CFR. The type and number of samplers to be used, their with proposed, locations provisions for background monitoring, and the duration of testing shall be provided.
7. **Lead:** Contractor shall submit a program for analysis of airborne lead emissions accordance with 40 CFR 50. The type and number of samplers to be used, their proposed locations, provisions for background monitoring, and the duration of testing shall be provided:

C. Submittals should include technical data documenting that the material to be provided complies with these specifications. Submittals will not be accepted until all requirements of this specification have been confirmed.

D. Interior/exterior coating system submittal shall include the following data

1. Weight in pounds/gallon - ASTM D-2196
2. Percent solids by volume - ASTM D-2369
3. Percent solids by weight - ASTM D-2369
4. Air cure thy time to re-coat - ASTM D-1640
5. Adhesion to steel substrate - ASTM D-4541
6. Adhesion between coats - ASTM D-4541
7. Manufacturer's batch numbers and dates of manufacture for materials to be furnished as part of this project.

E. Provide manufacturer's recommended handling and installation instructions for the proposed paint system including:

1. Storage - including maximum and minimum storage temperatures
2. Surface preparation
3. Coating repair
4. Application equipment
5. Mixing and application of coating system including a table of minimum and maximum time to re-coat as a function of temperature
6. Curing - including curing time required before holiday testing, and curing time required before immersion as function of temperature and coating thickness. Minimum and maximum re-coat times.
7. Ventilation
8. Acceptable temperatures at the time of application

F. Equipment

1. Submit details of vacuum system for removing dust and abrasive from abrasive blast cleaned surfaces.
2. Air Compressor-submit manufacturer's latest written operation instructions including recommendations for air filter maintenance and change interval

G. Reports

1. Submit actual weight of blast cleaning abrasive used for field abrasive blast cleaning. Submit immediately after blasting is completed.
2. Submit quantity of coating material used for each coat. Submit immediately after completion of each coat.
3. Submit the name of laboratories proposed to be used to test wastes and tank water prior to testing any materials.
4. Submit laboratory analysis results for bacteriological and volatile organics concentrations, before the tank is put back in service.
5. Before removing any waste materials from the Job site, Contractor shall submit laboratory test results for representative waste samples as required by the owner of the disposal facility. *At* a minimum, the samples shall be tested for total concentrations of the 17 metals identified in Tide 22, for comparison to Total Threshold Limit Concentrations (TTLC) values. The California Waste Extraction Test (WET) shall be performed for each sample for which the total concentrations exceeds 10 times the STLC value, if any, specified in Title 22. Toxicity Characteristic Leaching Procedure (TCLP) testing shall be performed for each analyses of each sample for which the total concentration exceeds 20 times the TCLP values, if any, specified in the Federal Resource Conservation and Recovery Act. Reactivity, Corrosively, and Ignitability testing shall be performed as required by Title 22 and/or the owner of the disposal facility.
6. Submit receipts from disposal site for all wastes. Receipts shall identify disposed material and source, show quantity of disposed material in tons or cubic yards, and show method used for final disposition as buried, incinerated, chemically treated and/or other means.

H. Disposal Plan

1. Submit a materials disposal plan that complies with all applicable requirements of the Federal Resource Conservation and Recovery Act; Title 22 and Title 26 of the California Administrative Code; and all applicable regulations of all Local, state and federal agencies having jurisdiction over the disposal of spent abrasive blast media, removed coating materials, and other waste, whether hazardous or non-hazardous.
2. Submit name and Environmental Laboratory Accreditation Program Certificate number of laboratory that will sample and test spent abrasive blast media and removed coating materials. Include statement of laboratory's certified testing areas and analyses that laboratory is qualified to perform.
3. Submit permission to dispose of material from disposal site owner. Include name, address, and telephone number of disposal site and of owner.
4. The Disposal Plan shall be acceptable to the County prior to disposal of any wastes.

1.04 Quality Assurance

A. Qualifications

1. Contractor shall be regularly engaged in application of similar coatings on tanks for at least five years immediately prior to this work.
2. Foreman and workers on-site shall be experienced and knowledgeable in preparation for and application of high performance industrial coatings.

B. Workmanship shall conform to standards and recommendations of SSPS VoL 1, especially Chapters 5.1 and 6.

C. Testing: The County may use any method deemed necessary to test the Work. A specialized coatings inspection firm shall perform inspections for the County. The County will monitor the quality of Work under this Section.

D. Materials Handling and Use: Coating materials shall be labeled and used in accordance with SSPC-PA 1, Paragraphs 5.1.1 through 5.1.5, except all coating system materials without a stated shelf life shall be delivered and used within six months of the date of manufacture; and certification, from any source, that the coating system materials are still suitable for use beyond the stated shelf life or beyond the six month period specified above will not be accepted.

E. CONTRACTOR shall perform the necessary quality assurance in accordance with the approved plan.

F: Wastes:

1. All testing of spent abrasive blast media and removed coating materials to classify these wastes as hazardous or non-hazardous shall be performed by a laboratory that complies with and is certified under the Environmental Laboratory Accreditation Program (ELAP) of the California Department of Health Services.
2. The Laboratory shall perform all analyses needed for comparison to limits, and RCA limits, and to all other applicable regulatory limits. Laboratory shall retain samples at least ninety (90) calendar days after all analyses are complete.
3. Contractor shall collect as many representative samples as required by the owner of the disposal facility, but not less than 4 total.
4. Each sample shall have an identifying sample number assigned by the Contractor when the sample is taken. Sample number shall be included on the sampling chain of custody and in all reports, correspondence, and other documentation related to the sample. Each sample shall have a sampling chain of custody. Chain of custody shall show the name and organization of each person having custody of the sample, and shall also show the sample number, job name and location, time of day and date sample was taken, material sampled, and tests to be performed.
5. County will witness sampling and may take samples for additional analyses if required. Notify the County at least 24 hours prior to sampling.
6. Transportation **40 CFR 264 and 268**

1.05 Existing Interior Coatings

A. It is the County's assumption that the existing interior coatings were applied when the tank was

built in about 1970.

B. Sampling of the existing exterior and interior coatings has been tested for lead, the results are located in the aforementioned sections.

C. It is the Contractor's responsibility to estimate the quantity and classification of the wastes resulting from the Work, and to accumulate, transport, and dispose of all wastes at no additional cost to the County.

1.06 Warranty

A. Anniversary inspection requirements and failure criteria shall be in accordance with **AWWA D-102**, Section 9, except as modified herein.

1.07 Warranty Inspection

A. A first anniversary warranty inspection will be conducted by the Contractor, approximately eleven months following finial acceptance of the work. The County will establish the date of the inspection and will notify the Contractor at least thirty (30) calendar days in advance of the inspection. Tank will be dived by an underwater inspector for inspection.

B. Contractor shall furnish ventilation, scaffolding, and lighting equipment as necessary for warranty inspections, and shall be present for such inspections.

C. Inspection Report: Contractor will prepare and deliver to the County a report of the warranty inspection. The inspection report will set forth the number and types of failures observed, the percentage of surface area where failures have occurred, and the names of the persons making the inspections. Videos and photographs or reports of the coating imperfections or failures shall be considered acceptable evidence of failure.

D. Failure: Any location where coating has delaminated, peeled, blistered, or cracked; and any location where rusting is evident will be considered a failure of the coating system.

E. Remedial Work: Repair all failures by removing the deteriorated coating, cleaning the surface, and recoating with the same system in accordance with this Section. With the approval of the County, Surface preparation of small failures (areas less than 1 sq/ft.) may be made by cleaning to bare metal in accordance with appropriate SSPC-SP standards

F. Schedule of Remedial Work: The County will establish a starting date and reasonable time of completion for the remedial work. The starting will be no more than thirty (30) calendar days after the submittal of the inspection report to the County. Should the Contractor fail to start the remedial work within ten (calendar days) after the starting date established by the County, the County may at its option perform the remedial work, and the Contractor shall pay to the County the actual cost of such work, plus 20 percent to cover added engineering and administrative cost.

G. Warranty inspections of the remedial work shall be at the expense of the Contractor.

H. The County will withhold $2,500 from the total contract amount to reimburse the Contractor after completion of the one-year anniversary inspection.

2.01 Interior Coating System Materials

A. The new interior coating system shall be high solids epoxy recommended for corrosion protection of steel water storage tanks: #233H, by Devoe; 140 Porta-Pox Plus by Tnemec, or County approved equal. Solids content shall not be less than 65% by weight. Volatile organic compounds concentration shall be less than 340 grams per liter.

2.02 Exterior Coating System Materials

A. The new exterior coating system shall be high solids epoxy recommended for corrosion protection of steel water storage tanks and a finish coat of Urethane: Devoe Primer #233H, Devoe Finish coat #379, Tnemec Primer #151 Finish coat # 74, Ameron Primer #400, finish coat Amershield, or County approved equal. Solids content shall not be less than 65% by weight. Volatile organic compounds concentration shall be less than 340 grams per liter.

B. The coating system and any thinners or additives shall be approved and listed by the National Sanitation Foundation, Standard 61 (NSF 61) for use in potable water tanks.

C. The coating shall be "certified non-lead" (less than 0.06 percent lead by weight in the dried film) as defined in part 1303 of the consumer products safety act.

2.02 Abrasive

A. Abrasive grit for field blast cleaning shall conform to the following:

1. Produce a surface profile of 1.5 to 2.5 mils
2. New, clean and free of contaminants, and containing no hazardous materials.
3. Certified by California Air Resources Board, Executive Order *G-565.*
4. Conform to all applicable requirements of the Bay Area Air Quality District.

3.01 Quality Control

A. Provide adequate lighting, without shadows, during all phases of work to insure that work is performed as specified. illuminate entire area of work.

B. Provide ground supported scaffolding and lighting, as determined by the Inspector, to facilitate visual and instrument inspection by the Inspector of each phase of the work and of the completed work. Place as directed to minimize glare and shadows.

C. Provide personnel to move scaffolding and furnish other assistance to the County or County's representative as required.

D. Inspector will examine surfaces after blast cleaning to verify that all deposits of contaminants have been removed. Contractor shall blow down, or vacuum all surfaces prior to inspection.

E. Verify at a minimum of two times daily that air supply is free of oil and moisture contamination.

Effective oil and water separators shall be used in all main compressor-air lines and shall be placed as close as practicable to the equipment Prior to using compressed air, quality of air downstream of the separators shall be tested at suitable outlets by blowing the air on clean white blotter for 2 minutes to check for any contamination, oil, or moisture.

F. Measure air temperature, humidity, relative humidity, and metal surface temperature, and determine dew point and relative humidity prior to abrasive blasting or painting each day. Provide portable temperature/humidity recorders to provide continuous permanent hard copy of the tank conditions. Repeat measurements and determination of dew point as often as the Inspector deems necessary but not less often than every four hours.

Maintain a written record of measurements and dew points, and time that measurements were taken. Make record available to Inspector immediately on request.

G. Inspector will evaluate surface preparation using field abrasive blasting standards, and Testex tape. Evaluation will include inspection of blasted surfaces for dust and abrasive residue, using clear adhesive coated tape. Evaluation will be made immediately prior to coating application. Contractor will furnish 4 rolls of Testex tape 1.5 to *2.5* mils X-course, and three 12" wire brushes for DE. Stearns Model 14t20 prior to the start of abrasive blasting.

H. Verify cleanliness of all spray application equipment prior to, or no later than, time of mixing coating material.

I. Measure wet film thickness during coating application of coating to ensure adequate coating thickness. Take at least one measurement every 100 square feet.

J. Measure dry film thickness after each coat using a non-destructive magnetic dry film thickness gauges.

1. Measure in accordance with SSPC-PA 2 except: Delete paragraph 3.1.1 through
2. and replace with "for each 1,000 square feet area, three 100 square feet areas shall be randomly selected and measured."
3. Inspector will also measure coating thickness, at random locations, after each coat.

K. Inspector will evaluate cleanliness of coated surface immediately prior to application of a subsequent coat.

L. Contractor shall test all coated surfaces for pinholes and holidays after application of the final coat in accordance with the following:

1. Perform test in presence of Inspector.
2. Perform test after coating has cured as recommended by the manufacturer.
3. Use an appropriate detector, such as a D.E Sterns Model 14/20 or as approved by the County's representative.
4. Re-test after coating repairs.

3.03 <u>Limiting Environmental Conditions</u>

A. Do not abrasive blast when air temperature is less than *5* degrees F above dew point.

B. Apply coatings only when conditions are within the limits prescribed by the manufacturer but, do not apply coatings when:

1. Metal temperature is less than 50 degrees F.
2. Relative humidity is greater than 60 percent.

3.04 Dehumidification

A. Provide dehumidification as required to establish and maintain the specified temperature and relative humidity inside the tank. The Contractor will have fifteen working days tank to complete all blasting and coating operations on the interior of the tank. No time extension will be granted for weather delays. The County will assume no responsibility for re-blasting because of dehumidification equipment failure, breakdown, or down time.

B. Provide dehumidification continuously from start of white metal (SP *#5)* abrasive blasting, until a minimum of 48 hours after application of final coat and all repairs are completed, or for a longer period as recommended by the coating system's manufacturer.

C. Dehumidification equipment shall be a solid desiccant (not liquid, granular, or loose lithium chloride) design having a single rotary desiccant bed capable of continuous operation, fully automatic with drip-proof electrical controller. Air heaters (only) are not acceptable as dehumidification units.

D. Relative humidity of processed air from dehumidification unit shall not exceed forty percent.

E. Dehumidification equipment shall provide a minimum of two complete air changes inside the tank every sixty minutes.

F. Areas adjacent to the surface that is to be blasted and coated shall not be exposed to a relative humidity greater than forty-five percent at any time during blasting, cleaning, coating, or curing.

G. During blast cleaning and coating, and for 48 hours after final coat and all repairs are completed, dehumidification units shall maintain an air temperature of 60F minimum inside the tank.

H. Place dehumidification equipment as close to tank manhole as possible.

I. Clean dehumidification filters prior to start of dehumidification and clean weekly there after.

J. Dehumidification Tubing

1. Mechanically connected and sealed with duct tape at joints
2. Extend to the center of the tank and attach to a diffuser that will distribute air equally throughout tank.
3. Have no dust or other foreign matter inside tubing.

K. Provide and maintain 24-hour strip chart recorder for humidity and temperature. Place humidity and temperature measuring devices inside tank.

3.05 Preparation

A. Prepare surfaces to be coated in accordance with the manufacturer's instructions but not less than specified herein.

B. Cleaning. Remove all visible oil, grease, dirt, welding residue, and other contaminants from areas to be coated. Inspection shall use a black light to locate oil and grease. All slag and weld metal accumulation and splatters shall be removed by chipping or grinding as required by the engineer.

C. Blast Cleaning Interior. Remove existing coating, under film corrosion, corrosion, and other corrosion products from all areas to be coated. Prepare all surfaces to be coated by abrasive blast cleaning to SSPC-SP #5 with a surface profile of 1.5 to 2.5 mils.

D. Blast Cleaning Exterior. Remove existing coating, under film corrosion, corrosion, and other corrosion products from all areas to be coated. Prepare all surfaces to be coated by abrasive blast cleaning to SSPC-SP #10 with a surface profile of 1.5 to 2.0 mils.

E. Complete abrasive blast cleaning of metal prior to application of coating system.

F. Do not reuse abrasive blast media unless the media is specifically designed for reuse.

G. Abrasive Blasting Equipment

1. Install an oil moisture separator in the airline between compressor and blast machine.
2. Install an air cooler in the airline between the compressor and the oil and moisture separator.
3. Use venturi nozzle**.**
4. Change compressor air filters at least as often as required by compressor manufacturer's written instructions.
5. All surfaces to be blast cleaned shall be **electrically** grounded during blast cleaning.

H. Provide exhaust air dust collector or dust control to prevent discharge of dust to outside air.

I. Mask-off and protect all exposed machined metal surfaces, plastic, and other surfaces not to be painted or that may be damaged by abrasive blasting.

J. Remove all dust and abrasive from freshly blasted surfaces. Use approved vacuum system.

K. Dispose of abrasive blast media and other waste materials off-site and in accordance with approved material disposal plan.

L. Discard directly from tank to a portable container and remove container from site. Do not place media on ground or other intermediate location.

3.06 Application

A. General

1. Mix and apply all coatings in accordance with the manufacturer's recommendations and instructions, the applicable requirements of SSPC-PA 1, and as specified herein.
2. Obtain Inspector's evaluation and approval of steel surface preparation immediately prior to application of first coat.
3. Obtain inspector's evaluation and approval of cleanliness of previous coat immediately prior to application of a subsequent coat.
4. Stripe coat all welds, bolts, nuts, washers, and edges by brush only, between the first coat and second coat.
5. Completely coat all surfaces above floor prior to coating floor.
6. For each portion of the tank-shell, roof, and floor, complete application of first coat before application of second coat.
7. Re-stripe all welds, bolts, nuts, washers, and edges by brush only, between the second coat and finish coat.
8. Apply coatings by airless spray except
9. Areas of less than 6 square inches may be brushed.
10. Required brush striping of welds, nuts, bolts, and edges.
11. Apply coatings at a temperature recommended by manufacturer. Prior to mixing, coating materials shall be not less than 6O degrees F. Use explosion-proof in line heaters, as necessary.
12. Discard all catalyzed coatings at the end of each working day or at the end of manufacturer's recommended pot life, whichever is first.
13. Scaffolding or other support system shall be free of abrasive blast media, dirt, and other foreign matter.
14. After each coat and immediately prior to application of a subsequent coat, clean surface as required to remove dirt, dust, over-spray, and other contaminants that may affect adhesion of the subsequent coat
15. Each coat shall be a different color than the preceding coat. Additional coats, where required, shall be tinted to provide color contrast but finish coat shall be color specified.
16. Finish coat shall be uniform in color and gloss over the entire surface. Finish coat shall be smooth to touch with no sags, runs, over-spray, cracks, pinholes or other surface defects.

B. Color

1. First coat: White
2. Intermediate coat: Blue/buff
3. Finish coat: White

C. Dry Film Thickness Interior (DFT)

1. First coat: 5.0 mils minimum to 7.0 mils maximum
2. Intermediate coat: 5.0 mils minimum to 7.0 mils maximum
3. Finish coat: 5.0 mils minimum to 7.0 mils maximum
4. Minimum total DFT: 15.0 mill
5. Maximum total DFT: 21.0 mils

D. Dry Film Thickness Exterior (DFT)

1. Prime coat: 5.0 mils minimum to 7.0 mils maximum
2. Finish coat: 3.0 mils minimum to 6.0 mils maximum
3. Minimum total DFT: 8.0 mills
4. Maximum total DFT: 13.0 mils

Additional coats may be required to achieve specified minimum dry film thickness.

E. Application Equipment:

1. Use airless spray pump in compliance with manufacturer's requirements. Pump shall have anti-freeze device, and fluid filter.
2. Use fluid tip size recommended by manufacturer.
3. Use 3/8" minimum interior diameter fluid hose.
4. Use clean fluid lines not previously used to apply zinc-rich or water-based coating materials.
5. Clean equipment using only products recommended by the coating manufacturer.
6. Blow lines to remove all thinners prior to painting.

F. Coating Repairs

1. Touch-up or refinish all chipped, abraded, or otherwise unsatisfactory portions of the work in accordance with the manufacture? s recommendations.
2. Re-coating or touch-up or areas that have cured beyond the maximum time recommended by the manufacturer require special preparation.
   - **a.** Sweep blast area and 3-inches into the surrounding area. Sweep blast under low pressure to uniformly abrade surface and feather edges. Featheredges by sanding or other means acceptable to the Inspector.
   - **b.** Remove abrasive blast residue from blasted area with special attention to marginal areas of intact coating.
   - **c.** Clean area with a bond solvent recommended by the manufacturer.

3.08 Interior Curing And Cleaning

A. Cure all coatings by forced air ventilation for a minimum of 168 (ventilating) hours, or longer if recommended by the manufacturer after coating application and repairs are completed.

1. Equipment shall have a time recorder that provides a cumulative record of operating time.
2. Deliver air from ventilating fan to center of tank through continuous flexible duct that is not reduced in area from the fan outlet.
3. Roof vent covers shall be removed during forced air ventilation.

B. Cleaning

1. Clean dust and abrasive-blasting residue from the roof ventilation screens.
2. Thoroughly wash down with water all interior surfaces, including but not limited to, roof, walls, floor, piping and supports.
3. Steam clean surface where necessary.

3.09 Tank Disinfection

A. After all other work has been completed the interior of the tank shall be thoroughly cleaned and disinfected in accordance with the most current edition of AWWA C652, Disinfection of Water Storage Facilities. Disinfect in accordance with Chlorination Method 2, which requires spray wash of the tank interior with a 200 mg/l chlorine solution. The County will fill the tank.

B. Furnish all cleaning and disinfection materials and all equipment and labor necessary for the cleaning and disinfecting operations**.**

C. Upon completion of disinfection activities, Contractor shall have two samples tested for bacteriological, Volatile Organic Compounds and all Title 22 constituates. Copies of test results shall be forwarded to the County as soon as they become available. Should these tests prove the water to be of unacceptable quality the County may require that the tank be completely drained and re-disinfected by the Contractor.

D. Any water used in cleaning and in disinfection of the tank-which is to be wasted shall be disposed of in a manner acceptable to the County and the appropriate pollution control agency. All water wasted shall, at least, be dechlorinated.

3.10 Soak Period And Testing For Volatile Organic Compounds In Tank Water

A. After the tank has been filled to the over-flow level and disinfected, the water in the tank shall be allowed to soak for five (5) days.

B. After the five-day soak period the Contractor shall sample and submit a single sample to a certified laboratory, approved by the County, to test the water for organic chemical contaminants which may have leached from the new paint system. The sample shall be tested in accordance with EPA Method 524.2. The water sample shall be taken in the presence of the County, and shall be a true representation of the water in the tank at the time. Contractor shall pay to have all re-tests conducted and for the water if tank water draining and replacement is necessary.

C. Submit test results to the County promptly. Results will be evaluated and acceptable to the County as a condition of final acceptance of the Work. Acceptance criteria will be in conformance with state and federal regulations.

3.11 Disposal of Existing Coatings And Spent Abrasive Blast Media

A. Disposal of spent abrasive blast media and removed coating materials shall be in accordance with the disposal plan approved by the County.

B. Coordinate and pay all costs for all sampling and testing, and disposal of spent abrasive blast media and removed coating materials in order to document waste class. Minimum sampling and testing requirements are listed previously in this Section..

C. Before any wastes are removed from the site, Contractor shall allow the County time for review of laboratory test results, as well as the time required to obtain a Hazardous Waste Generator's U.S. EPA Number if required.

C. County will give Contractor written notice to dispose of all or a portion of the spent abrasive blast media and/or removed coating materials as hazardous waste the County determines that such disposal is required.

E. Contractor shall be responsible for all costs associated with accumulating, transporting, and disposing of spent abrasive blast media and removed coating materials.

3.12 Cleanup

A. Upon completion of the work Contractor shall make a detailed inspection of all work.

B. Contractor shall be solely responsible for all paint over-spray or dust fallout claims.

C. Remove all spattering, spits, and blemishes.

D. Upon completion, of work all staging, tarps, scaffolding, and containers shall be removed from the site. Paint and thinner containers and excess paint and thinners shall be disposed of in conformance to all current regulations. Paint spots shall be removed and the entire job site cleaned. All damage to surfaces resulting from the work from this section shall be cleaned, repaired or refinished to the complete satisfaction of the County and the project Engineer at no cost to the County. All clean up shall be completed within 7 calendar days starting at the last day of holiday testing of each tank.

END OF SECTION

TANK REPAIRs

1.01 Scope of Work

The work consists of replacement of the existing roof hatch, replacement of the existing center vent, installation of handrails, installation of 36" diameter shell manway and repair of interior welds on the existing tank as directed by the County.

1.02 Governing Standards

Materials and construction standards shall conform to **AWWA D-100 Welded Steel Water Storage Tanks**.

2.01 System Materials

All materials shall conform to **AWWA D-100 Welded Steel Water Storage Tanks**.

3.01 Workmanship

All workmanship and installation shall conform to **AWWA D-100 Welded Steel Water Storage Tanks**.

3.02 Weld Replacement Length

A maximum of 200 feet of weld replacement is anticipated. Quantities greater than this amount will be considered extra work.

END OF SECTION