

MOBILIZATION AND PROJECT CLOSEOUT

02-105-1

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. Comply with ConnDOT Form 818, Article 9.75.01

1.2 REFERENCES

- A. ConnDOT Form 818

1.3 SUBMITTALS

- A. None Required

PART 2 - PRODUCTS

2.1 MOBILIZATION AND PROJECT CLOSEOUT

- A. No products required.

PART 3 - EXECUTION

3.1 MOBILIZATION AND PROJECT CLOSEOUT

- A. Comply with ConnDOT Form 818, Article 9.75.

PART 4 - METHOD OF MEASUREMENT

- A. This item shall be measured individually, under the bid item for “Mobilization and Project Closeout”.

PART 5 - BASIS OF PAYMENT

- A. This item shall be paid individually, under the Contractor’s lump sum bid price for “Mobilization and Project Closeout”.

END OF SECTION

EROSION AND SEDIMENT CONTROL MEASURES

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PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. Provide all labor, tools, materials, equipment and incidentals required to perform the work called for in this Section of the Specifications, including, but not necessarily limited to, the following:
1. Install silt fencing around the perimeter of the site, and in other locations directed by the Engineer.
 2. All other aspects of the Sedimentation and Erosion Control Plan.

PART 2 - MATERIALS

2.1 FILTER FENCES

A. Materials

1. Synthetic Filter Fabric
 - a. Synthetic filter fabric shall be a pervious sheet of propylene, nylon, polyester or ethylene filaments and shall be certified by the manufacturer or supplier as conforming to the following requirements.

<u>Physical Property</u>	<u>Requirements</u>
Filtering Efficiency	75% (min.)
Tensile Strength at 20% max. Elongation	Extra strength – 50 lbs. / linear in. (min) Standard strength – 30 lbs. / linear in. (min)
Flow Rate	0.3 gal./square ft./min/ (min.)

B. Synthetic Filter Fabric Requirements

1. Standard strength – 30 lbs. / linear in. (min)
2. Burlap shall be 10 ounce per square yard fabric.

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3. Posts for filter fences shall be either 2 x 3 or 2 x 4 inch studs of 0.5 pounds (minimum) per linear foot steel with a minimum length of 5 feet. Steel posts shall be projections for fastening wire to them.
4. Stakes for filter fences shall be 1" x 2" wood or equivalent metal with a minimum length of 3 feet.
5. Wire fence reinforcement for silt fences using standard strength filter cloth shall be a minimum of 42" in height, a minimum of 14 gauge and shall have a maximum mesh spacing of 6".
6. Some silt fences do not require a wire backing. Consult manufacturer's instructions for proper installation requirements.

C. Installation Requirements

1. This sediment barrier utilizes burlap or standard strength or extra strength synthetic filter fabrics. It is designed for situations in which only sheet or overland flows are expected. In special cases, burlap may be used in drainage ways.
2. The height of the barrier shall not exceed 36" (higher barriers may impound volumes of water sufficient to cause failure of the structure). Ideally, the filter fence shall be placed 6 feet away from the toe of slope.
3. When joints are necessary, filter cloth shall be spliced together only at a support post, with a minimum 6" overlap, and securely sealed. See manufacturer's recommendations.
4. Posts shall be spaced a maximum of 10 feet apart at the barrier location and driven securely into the ground (minimum of 12"). When extra strength fabric is used without the wire support fence, post spacing shall be as manufacturer recommends.
5. A trench shall be excavated approximately 6" wide and 6" deep along the line of posts and upslope from the barrier in accordance with manufacturer's recommendations.
6. When standard strength filter fabric is used, a wire mesh support fence shall be fastened securely to the upslope side of the posts using heavy duty wire staples at least 1" long, tie wires or hog rings. The wire shall extend into the trench a minimum of 2" and shall not extend more than 36" above the original ground surface.
7. The standard strength filter fabric shall be stapled, wired or tied to the wire fence, and 8" of the fabric shall be extended into the trench. The fabric shall not extend more than 36" above the original ground surface. Filter fabric shall not be stapled to existing trees.

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8. When extra strength filter fabric or burlap and closer post spacing are used, the wire mesh support fence may be eliminated. In such a case, the filter fabric is stapled, wired, or tied directly to the posts with all other provisions of Item f apply.
9. The trench shall be backfilled and the soil compacted over the filter fabric.
10. Filter barriers shall be removed when they have served their useful purpose, but not before the upslope area has been permanently stabilized.

2.2 MAINTENANCE

- A. Filter barriers shall be inspected immediately after each rainfall and at least daily during prolonged rainfall. Any required repairs shall be made immediately.
- B. Should the fabric decompose or become ineffective prior to the end of the expected usable life and the barrier still be necessary, the fabric shall be replaced promptly.
- C. Sediment deposits should be removed when they reach approximately one half the height of the barrier.
- D. Any sediment deposits remaining in place after the silt fence or filter barrier is no longer required shall be dressed to conform to the existing grade, prepared and seeded.

PART 3 - EXECUTION:

3.1 NOT APPLICABLE.

PART 4 - METHOD OF MEASUREMENT

- A. This item shall be measured individually, under the bid item “Erosion and Sediment Control Measures”.

PART 5 - BASIS OF PAYMENT

- A. This item shall be paid for in the Contractor’s lump sum bid price for the “Erosion and Sediment Control Measures”.

END OF SECTION

PART 1 - GENERAL

1.1 SCOPE OF WORK

- A. Provide all labor, tools, materials, equipment and incidentals required to perform the work called for in this Section of the Specifications, including, but not necessarily limited to, the following:
1. Cleaning, priming, and recoating of all exterior surfaces and appurtenances,
 2. Remove and replace tank exterior ladder system with a new, code compliant ladder system, ladder guard and ladder safety climb device.
 3. Extend existing tank overflow pipe to within 24” of ground surface, provide screen and duck-bill check valve, and splash pad.
 4. Re-construct existing tank roof hatch with new code compliant tank hatch.
 5. Re-caulk area between the chime plate and concrete foundation.
 6. Installation of an OSHA compliant roof handrail system.
 7. Lead paint abatement (See Specification Section 13-282)
 8. Other areas shown on the plans, or as directed by the Engineer.
 9. Site restoration.
- B. Use coating systems specified in this section to finish all interior and exterior water tank components, unless otherwise indicated. Without restricting volume or generality, work to be performed under this section may include, but is not limited to:
1. All exterior metallic surfaces, including the tank and all appurtenances.
 2. Approximate Dimensions of Tank:
 - 40 foot tall, 375,000 gallon capacity steel standpipe.
 3. Refer to **Appendix A** for a copy of the March 15, 2022 Water Tank Inspection Report.
- C. Test Results

Results from the March 15, 2022 Tank Inspection indicated that lead and chromium were present in the exterior coating. Refer to Specification Section 13-282.

1.2 REFERENCE STANDARDS

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- A. The latest edition of the following standards and specifications shall be used with regard to materials, design, construction, inspection and testing to the extent specified herein:
1. ANSI/NSF 61 - Drinking Water System Components - Health Effects.
 2. ASTM D 16 - Terminology Relating to Paint, Varnish, Lacquer, and Related Products.
 3. ASTM D 4263 - Indicating Moisture in Concrete by the Plastic Sheet Method.
 4. ASTM F 1869 - Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.
 5. AWWA C 652 - Disinfection of Water-Storage Facilities.
 6. AWWA D 100 – Welded Steel Water Tanks for Water Storage
 7. AWWA D 102 - Coating Steel Water Storage Tanks.
 8. International Concrete Repair Institute (ICRI) Guideline No. 03732 - Selecting and Specifying Concrete Surface Preparation for Sealers, Coatings, and Polymer Overlays.
 9. SSPC-SP 1 - Solvent Cleaning.
 10. SSPC-SP 2 - Hand Tool Cleaning.
 11. SSPC-SP 3 - Power Tool Cleaning.
 12. SSPC-SP 6/NACE 3 - Commercial Blast Cleaning.
 13. SSPC-SP 7 – Brush-Off Blast Cleaning.
 14. SSPC-SP 10/NACE 2 - Near-White Metal Blast Cleaning.
 15. SSPC-SP 11 - Power Tool Cleaning to Bare Metal.
 16. SSPC-SP 12 – Water Jetting Prior to Recoating

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17. SSPC-SP 13/NACE 6 - Surface Preparation of Concrete.
18. SSPC-PA 1 – Painting Application Specification.
19. SSPC-PA 3 – Painting Application Guide for Safety in Paint Application.
20. SSPC Vis-1 - Pictorial Surface Preparation Standards for Painting Steel Structures.

1.3 DEFINITIONS

- A. Definitions of Painting Terms: ASTM D 16, unless otherwise specified.
- B. Dry Film Thickness (DFT): Thickness of a coat of paint in fully cured state measured in mils (1/1000 inch).

1.4 QUALITY ASSURANCE

- A. No contractor shall be considered qualified unless it has at least five years experience in the field of water tank cleaning and tank painting of similar size and complexity in New England, as determined by the Engineer. Contractor shall provide references and experience description upon request of the Engineer.
- B. The Contractor shall be a qualified rigger or shall engage the services of a qualified rigger on the job at all times when rigging is being used. The foreman in charge shall be a trained “competent person” and have all rigging inspected by the rigger prior to use.
- C. The Contractor shall abide by all local, state and federal laws for confined space entry.
- D. All colors, unless specified herein, shall be selected by the Owner. The color selected will not necessarily conform to the manufacturer's color chart and any tinting required shall be done by the paint manufacturer to conform to the approved sample.
- E. Only non, lead, chromium and cadmium based pigmentation shall be allowed for exterior primers and topcoats.

1.5 SUBMITTALS

- A. Shop Drawings: Submit the following in accordance with Section 01300 – “Submittals”:
1. Product Data: Submit manufacturer's product data for each coating, including generic description, product line number, complete technical data, surface preparation, and application instructions.
 2. Product Data: Submit technical data sheets for each coating, giving descriptive data. Curing times, mixing, thinning, and application requirements.
 - a. Provide material analysis, including vehicle type and percentage by weight and by volume of vehicle, resin and pigment.
 - b. Provide upon request of the Engineer, specific ASTM Performance Criteria for the submitted materials.
 3. Product Data: Submit manufacturer's Material Safety Data Sheets (MSDS) and other safety requirements
 4. Color Samples: Submit manufacturer's color samples showing full range of standard colors.
 - a. Submit 3 samples of each coating and color selected, showing bare, prepared surface and each successive coat.
 - b. Samples shall be submitted on hardboard or metal as appropriate to coating system (size not less than 5" x 11"). Label samples on back identifying manufacturer, product name, and color number.
 5. Manufacturer's Quality Assurance: Submit manufacturer's certification that coatings comply with specified requirements and are suitable for intended application.
 6. Applicator's Quality Assurance: Submit list of a minimum of 5 completed projects of similar size and complexity to this Work. Include for each project:
 - a. Project name and location.
 - b. Name of owner.
 - c. Name of contractor.

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- d. Name of engineer.
 - e. Name of coating manufacturer.
 - f. Approximate area of coatings applied.
 - g. Date of completion.
- 7. Applicator's Quality Assurance: Provide certification that specialized equipment as may be required by manufacturer for proper application of coating materials shall be utilized.
 - 8. Warranty: Submit manufacturer's standard warranty.
 - 9. A plan for providing adequate cross ventilation during welding, abrasive blasting, painting and curing of the interior of the tank.
 - 10. A certified test report from a NACE certified inspector shall be submitted indicating results from the dry film thickness and holiday tests.
 - 11. A plan for chlorinating method to be used shall be submitted with the calculation for the amount of chlorine to be added to the tank.
 - 12. Type of Chlorine proposed for use, including MSDS sheets and NSF-61 certification.
- B. Pre-Installation meetings:
- 1. Schedule a conference and inspection to be held on-site before field, blasting and application of coating systems begins.
 - 2. Conference shall be attended by Contractor, Engineer, Owner's representative, coating applicators and a representative from the coating material manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying:
- 1. Coating or material name.

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2. Manufacturer.
 3. Color name and number.
 4. Batch or lot number.
 5. Date of manufacture.
 6. Mixing and thinning instructions.
- B. Storage:
1. Store materials in a clean dry area and within temperature range in accordance with manufacturer's instructions.
 2. Keep containers sealed until ready for use.
 3. Do not use materials beyond manufacturer's shelf life limits.
 4. Comply with all health and fire safety regulations.
- C. Handling: Protect materials during handling and application to prevent damage or contamination.

1.7 ENVIRONMENTAL REQUIREMENTS

- A. Weather:
1. Air and Surface Temperatures: Prepare surfaces and apply and cure coatings within air and surface temperature range in accordance with manufacturer's instructions. Any variation from the published coating manufacturer's stated condition requirements must be approved in writing by the coating manufacturer.
 2. Surface Temperature: Minimum of 5 degrees F (3 degrees C) above dew point.
 3. Relative Humidity: Prepare surfaces and apply and cure coatings within relative humidity range in accordance with manufacturer's instructions.

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4. Precipitation: Do not prepare surfaces or apply coatings in rain, snow, fog, or mist.
 5. Wind: Do not spray coatings if wind velocity is above manufacturer's limit.
- B. Ventilation: Provide ventilation during coating evaporation stage in confined or enclosed areas in accordance with AWWA D 102.
- C. Dust and Contaminants:
1. Schedule coating work to avoid excessive dust and airborne contaminants.
 2. Protect work areas from excessive dust and airborne contaminants during coating application and curing.
 3. Furnish automated, mechanical dust collection equipment of suitable size and CFM capability to capture and filter all exhaust dust for both the interior surface preparation procedures.
 4. Surfaces of the tank must be free of accumulated blast dust prior to dropping the containment enclosure.

PART 2 - PRODUCTS

2.1 GENERAL

- A. All tank painting shall be in accordance with the latest edition of AWWA D102, the Steel Structures Painting Council Specification SSPC-PA1, approved paint manufacturer specifications, and as specified herein.
- B. Each paint system shall be from a single manufacturer. Materials specified are those that have been evaluated for the specific service. Products of the Tnemec Company, Inc. are listed to establish a standard of performance and quality. Requests for substitution shall include manufacturer's literature for each product giving name, product number, generic type, descriptive information, solids by volume, recommended dry film thickness and certified lab test reports showing results to equal the performance criteria of the products specified herein. In addition, a list of five projects shall be submitted in which each product has been used and rendered satisfactory service.

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- C. All paint systems shall be environmentally (VOC) compliant in accordance with all Federal and Connecticut regulations and the latest OTC (Ozone Transport Commission) VOC regulations.

2.2 EXTERIOR COATING SYSTEM

- A. The exterior coating system shall be applied to all exterior surfaces of the tank, including all appurtenances such as platforms, columns, overflow pipe, vent pipes, vents, frames, hatch covers, ladders, etc.

- B. Exterior Coating System (15 year color/gloss warranty)

First Coat: Tnemec Series 94-H₂O Hydro-Zinc @ 2.5-3.5 mils dry.

Stripe Coat: Tnemec Series 21 Epoxoline @ 3.0-4.0 mils dry.

Third Coat: Tnemec Series 1095 Endura-shield (100 g/litre) @ 2.5-3.0 mils dry.

Fourth Coat: Tnemec Series V701 HydroFlon (100 g/litre) @ 2.5-3.0 mils dry.

- D. The finish color of the top coat for the tank shall be selected by the Owner.

- E. Furnish to the Owner 2 gallons of exterior topcoat of the same type and color used on the work.

2.3 EXTERIOR LADDER

- A. Remove existing exterior tank ladder and replace it with a new code compliant ladder. The outside ladder shall have side rails not less than 2 in. x 3/8", with a spacing between side rails of not less than 16", and rungs not less than 3/4" round or square, spaced 12" on center, with at least 7 in. of toe clearance from the rung center to the nearest surface. The tank ladder shall be extended to 8 feet above ground level.

- B. Submit shop drawings for new exterior ladder to Engineer for approvals.

2.4 LADDER GUARD

- A. Provide a welded steel ladder guard on the bottom 8 feet of the exterior ladder. Provide a locking hinged platform at the bottom of the ladder guard.

- B. Submit shop drawings for new ladder guard to Engineer for approvals.

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2.5 SAFETY CLIMB DEVICE

- A. Provide a cable type safety climb device on the retrofitted exterior ladder.
- B. Submit shop drawings for new safety climb devices to Engineer for approval.

2.6 EXTEND OVERFLOW PIPE

- A. Extend new 10" schedule 40 welded steel pipe from the current overflow location near the top of the tank, to approximately 24" above finished grade. Provide pipe support connections to tank every 10 feet minimum. Provide an aluminum screen at the end of the overflow pipe, but prior to the duck-bill style check valves. Provide a duck-bill style check valve at the bottom of the overflow pipe. Provide a concrete splash pad beneath overflow pipe to direct water away from tank foundation.
- B. Verify overflow pipe diameter (estimated at 10" from photos) prior to ordering pipe.
- C. Submit shop drawings for new overflow pipe to Engineer for approvals.

2.7 RECONSTRUCT ROOF ACCESS HATCH

- A. Modify existing roof access hatch, to provide for a minimum height of 4-in. sanitary neck above the roof plates, a minimum of 2-in. overlap on the tank cover, internal sealing gasket between the hatch neck and cover, and an attachment point for a pad lock.
- B. Submit shop drawings for reconstructed roof access hatch to Engineer for approvals.

2.8 RECAULK CHIME PLATE

- A. Remove existing caulking between the tank foundation and the chime plate, make minor concrete repairs as required, and reseal around the tank with a new non-shrinking urethane caulking. Caulking to be Sikaflex 2C, or approved equal by the Engineer.

Submit material information on caulking to Engineer for approval.

2.9 ROOF HAND RAIL SYSTEM

- A. Install new, OSHA compliant welded steel handrail system for 5 feet on either side of the new tank shell ladder, where it intersects the roof. (10 foot total). Handrails shall be welded steel, 42-inch high with a 21-inch high mid-rail system, and a 4-inch high toe kick, meeting the requirements of OSHA 29CFR1910.23.
- B. Contractor to submit shop drawing of proposed handrail system to Engineer for approval.

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PART 3 - EXECUTION

3.1 GENERAL

- A. No paint shall be applied when the temperature of the surface to be painted is below the minimum temperature specified by the paint manufacturer, or less than 5 degrees above the dew point temperature. Paint shall not be applied to wet or damp surfaces or when the relative humidity exceeds 85%. Follow paint manufacturers recommendations for the specific paint system used.
- B. The Contractor shall remove and legally dispose of all sediment, including the debris from the tank interior visible after the tank has been drained, prior to any coating.
- C. Before painting, surface shall meet NACE SP0178 stand by, removing slag, weld metal splatter and sharp edges by chipping or grinding. All surfaces that have been welded, abraded or otherwise damaged shall be cleaned and primed in the field in accordance with the paint system requirements.
- D. Take precautionary measures to prevent fire hazards and spontaneous combustions. Remove empty paint containers from site.
- E. Place cotton waste, cloths and hazardous material in containers, and remove from site daily.
- F. Protect elements surrounding work of this section from damage or disfiguration.
- G. During application of coating materials, post Wet Paint signs.
- H. During application of solvent based materials, post No Smoking signs.

3.2 EXTERIOR CONTAINMENT SYSTEMS

- A. Contractor shall erect appropriate scaffolding and containment, or approved equal by the Engineer, which shall contain the paint chips within the containment system and prevent paint chips and other materials from the recoating operation from escaping and contaminating additional areas of the project site, and adjacent properties. The shell and roof of the Tank must be contained as per SPCC Class 3A standards and meet the intent of the specification. The exterior containment system shall be stamped by a licensed

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Professional Engineer in Connecticut. Submit proposed containment system to Engineer for approval.

- B. Interior and exterior scaffolding shall provide direct OSHA compliance arm length access to the tank surfaces by the Owner's Rep for inspection.

3.3 COATING SYSTEM EXAMINATION

A. Site Verification of Conditions:

1. Examine areas and conditions under which application of coating systems shall be performed for conditions that will adversely affect execution, permanence, or quality of coating system application.
2. Correct conditions detrimental to timely and proper execution of Work.
3. Do not proceed until unsatisfactory conditions have been corrected.
4. Commencement of installation constitutes acceptance of conditions and responsibility for satisfactory performance.

3.4 COATING SYSTEM PREPARATION

- A. All exterior surfaces shall be abrasive blast cleaned in accordance with SSPC SP-10 - Near White Blast Cleaning. Entire tank exterior must be shrouded during abrasive blast cleaning.
- B. Surface preparation shall not be done simultaneously with priming. An entire area or section shall be cleaned and inspected by the Engineer before primer is applied to that area. No primer is to be applied until the entire area has been viewed by the Engineer. Any defect not properly cleaned as specified will be cause for rejection of the entire area in question and no priming shall be done on this area until satisfactory corrections are made and approved by the Engineer.
- C. The blast cleaning procedure shall use angular grit abrasive. The size and gradation shall be such as to produce a 2.0-4.0 mils angular anchor profile that is sharp and clean with no embedded spent abrasive material.

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D. The abrasive blast cleaning shall be effective in removing corrosion deposits and scale as defined in the surface preparation SSPC SP-10 / SP-6 specification and as shown in the visual standards SSPC Vis-1.

E. Surface Preparation:

1. General Requirements:

- a. Prior to application of primer, surfaces shall be prepared to receive specified coating system in compliance with manufacturer's recommendations and specifications of Steel Structures Painting Council.
- b. Clean surfaces of residual deposits of grease, scale, rust, oil, dirt, and other foreign matter, immediately prior to priming. Surfaces to be coated shall be clean, dry, smooth and free from dust and foreign matter which will adversely affect adhesion or appearance.

2. Ferrous Metal Surfaces:

- a. Surfaces shall be free of residual deposits of grease, rust, scale, dirt, dust, and oil.
- b. Surfaces shall be cleaned in compliance with specifications of Steel Structures Painting Council.

3.5 COATING SYSTEM APPLICATION

- A. All coatings materials shall be stored, mixed, applied and cured within ambient temperature ranges identified by the painting manufacturer. Application and curing shall also be accomplished within the relative humidity range. Natural ambient conditions for curing periods shall be anticipated by the Contractor and have Engineer's approval.
- B. No coating work shall be done if the ambient temperatures (air, coating materials and substrate) are not within the allowable ranges unless the Contractor is able to control these conditions through the use of effective equipment.
- C. The coating materials shall be applied in strict accordance with the respective coating manufacturer's written recommendations.

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- D. Spot field prime coat materials shall be applied to the surface after blast cleaning before any rust back occurs or before the end of each day of surface preparation effort, whichever comes first.
- E. The full prime coat shall be applied to the entire tank surface (interior and exterior). Unprimed areas, abraded areas and areas considered in an advanced state of deterioration by the Engineer shall be blast cleaned and the remaining shop primed areas shall be brush cleaned prior to application of the full intermediate prime coat.
- F. Spray guns shall be held perpendicular to the surface being coated in such a manner that all dry overspray is kept at a minimum. All spray application of coatings shall utilize a cross spray technique to maximize coverage of all irregular surfaces. All dry spray accumulation on weld beads and flat surfaces shall be removed prior to the subsequent coating is applied.
- G. All coating material for interior surfaces shall be applied by airless spray equipment of a type and size suitable for the respective material. Coating material shall be applied around rivets, welds, edges and inside angles by use of a brush.
- H. All coating material for exterior surfaces shall be applied by brush, roller or airless spray equipment of a type and size suitable for the respective material. Use of airless spray equipment shall be allowed only if adequate containment is provided to minimize overspray and emissions to the surrounding areas meeting the approval of the Engineer. Application of prime coat to the base and six inches up the side walls shall be by brush, as well as to all rivets, welds, edges and inside angles to ensure proper coverage and application.
- I. After surface preparation, interior weld seams, roof plate seams, leading edges and nut and bolt assemblies shall be “stripe-coated” by brush method with one coat of intermediate epoxy. Application may be performed prior to or following the application of the full prime coat on prepared surfaces. “Stripe-coat” shall be a contrasting color for inspection purposes.
- J. Make edges of paint adjoining other materials or colors sharp and clean, without overlapping.
- K. Apply coatings in accordance with manufacturer's instructions.

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- L. Mix and thin coatings, including multi-component materials, in accordance with manufacturer's instructions. All thinner to be measured in volumetric cups for addition.
- M. Keep containers closed when not in use to avoid contamination.
- N. Do not use mixed coatings beyond pot life limits.
- O. Use application equipment, tools, pressure settings, and techniques in accordance with manufacturer's instructions.
- P. Uniformly apply coatings at spreading rate required to achieve specified DFT.
- Q. Apply coatings to be free of film characteristics or defects that would adversely affect performance or appearance of coating systems.
- R. Stripe paint with brush critical locations on steel such as welds, corners, and edges using specified products.
- S. Roof plate lap joint seams and other narrow gaps that cannot be effectively painted shall be sealed with Sikaflex 1a caulking after the full coating system is applied.

3.6 VENTILATION DURING COATING

- A. During application of coatings inside the tank, adequate ventilation shall be provided and all equipment shall be non-sparking and explosion-proof. Necessary precautions shall be taken to ensure safe working conditions are maintained during use of paints which contain toxic and flammable solvents.
- B. Effectiveness of the ventilation system shall be checked by making periodic explosive meter readings, in which the concentration of volatile material shall not exceed 20 percent of the lower explosive limit.

3.7 COATING SYSTEM ACCEPTANCE

- A. The base for acceptance of the coating work is listed below. Deviations beyond these parameters shall, at the Engineer's discretion, be corrected by the Contractor at his own expense and in accordance with the manufacturer's recommendations.

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1. No runs or sags
 2. No overspray or roughness
 3. No holidays or pinholes
 4. No color or gloss variations
 5. Allowable film thickness +2.0 mils over specified thickness.
- C. Wet and dry film thickness measurements shall be made by the Contractor for each 100 square feet of surface painted. Additional coats shall be applied as required to attain the minimum dry film thickness specified for the painting system.
- D. The Owner may retain the services of a NACE certified coatings inspector, to conduct supplemental wet and dry film thickness measurements, in locations determined by the Inspector. The Contractor shall provide OSHA approved scaffolding, or operate aerial lift Equipment for the use of the Inspector, for the duration of the recoating project.

3.8 DISINFECTION AND WATER QUALITY TESTING OF WATER CONTACT SURFACES

- A. The Contractor shall disinfect the interior surfaces of the tank within 7 days after completion of all painting (including curing time) for the tank.
- B. Do not disinfect water contact surfaces or fill water storage tanks until application of coating systems is complete, coatings have fully cured, and field quality control inspection is complete.
- C. Allow number of days in accordance with manufacturer's instructions and as directed by Engineer for full cure of coating systems on water contact surfaces before flushing, disinfecting, or filling with water.
- D. Disinfection: tank shall be disinfected according to AWWA C652 Method 2 or as approved by Engineer.
- E. Water samples shall be collected by the Contractor and tested by a Connecticut Certified laboratory for Chlorine Residual, HPC Bacteria, Coliform Bacteria and VOC's. Test results to be submitted to the Engineer and approved prior to placing the tank back in service.
- F. Method of disposal of highly chlorinated water shall be approved by the Engineer. Use of a reducing agent shall also be approved by the Engineer.

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- G. Disinfection shall be accomplished by the use of either liquid chlorine, sodium hypochlorite solution, or calcium hypochlorite granules or tablets. These chemicals and their use shall be in compliance with AWWA standards.
- H. Before any chemical disinfection begins, the interior surfaces of the tank shall be thoroughly cleaned by use of a pressure washer at a minimum 2500 psi, or equally effective means. All water and dirt or foreign material accumulated in the cleaning operation shall be discharged from the tank or otherwise removed.
1. Following the cleaning operation, the vent screens, overflow screens, and any other screened openings shall be checked and put in satisfactory condition to prevent birds, insects, and any other contaminants from entering the tank.
 2. The following are brief descriptions of three different acceptable methods of chlorination and do not necessarily describe the requirements of each disinfection method as detailed in AWWA C652.
 - a. The tank shall be filled to the overflow level with potable water to which enough chlorine is added to provide free chlorine residual in the full tank of not less than 10 mg/l at the end of an appropriate retention time.
 - b. A solution of 200 mg/l available chlorine shall be directly applied for at least 30 minutes to the surface of all parts of the tank which would be in contact with the water when the tank is full to the overflow elevation.
 - c. Water and chlorine shall be added to the tank in amounts such that initially the solutions will contain 50 mg/l available chlorine and will fill approximately 5% of the total storage volume of the tank. This solution shall be held in each tank for at least 6 hours. The tank shall then be filled to the overflow level by flowing potable water into the highly chlorinated water and shall be held full for at least 24 hours.
- I. After the chlorination procedures are completed, and before the tank is placed in service, water from the full tank shall be sampled and tested by the Contractor for coliform organisms in accordance with the latest edition of Standard Methods for Examination of Water and Wastewater. Testing shall be by either the multiple tube fermentation or membrane filter technique.

WATER TANK RECOATING AND TANK IMPROVEMENTS

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- a. Each water sample shall also be tested to assure that no offensive odor exists due to chlorine reaction or excess chlorine residual.
- b. If the water samples are negative, then the tank may be placed in service. If the samples show the presence of coliform bacteria, repeat samples shall be taken until 2 consecutive samples are negative, or the tank shall again be subject to disinfection.
- c. Samples shall also be taken from water inflowing to the tank and tested to determine if coliforms are present in the typical potable water source(s).
- d. Samples must be analyzed at a State of Connecticut certified laboratory.

3.9 COATING SYSTEM REPAIRS

- A. Damaged Materials: Repair or replace damaged materials and surfaces not scheduled to be coated.
- B. Damaged Coatings: Touch-up or repair damaged coatings. Touch-up of minor damage shall be acceptable where result is not visibly different from adjacent surfaces. Recoat entire surface where touch-up result is visibly different, either in sheen, texture, or color.
- C. Coating Defects: Repair in accordance with manufacturer's instructions coatings that exhibit film characteristics or defects that would adversely affect performance or appearance of coating systems.

3.10 CLEANING

- A. At completion of day's work, remove from site rubbish and accumulated materials.
- B. Leave storage area clean and in same condition indicated for equivalent spaces in Project.
- C. The Contractor shall at all times keep the premises free from accumulation of waste materials and rubbish caused by his employees or work. At the completion of the

WATER TANK RECOATING AND TANK IMPROVEMENTS

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painting, the Contractor shall remove all tools, scaffolding, surplus materials, and rubbish from and about the tanks.

3.11 WASTE MANAGEMENT

- A. Place materials defined as hazardous or toxic waste in designated containers.
- B. Do not dispose of paints or solvents by pouring on the ground. Place in designated containers for proper disposal.
- C. Contractor shall be responsible for all costs associated with containment, sediment and waste disposal that may result from execution of this project.

3.12 FIRST ANNIVERSARY INSPECTION:

- A. The Contractor shall perform a first anniversary inspection of the tank and make repairs to the paint system in accordance with AWWA D102.

PART 4- METHOD OF MEASUREMENT

- A. All items listed in this document shall not be measured individually, but instead shall be measured as part of the Base Bid Contract Price for “Water Tank Exterior Recoating and Tank Improvements”.

PART 5 - BASIS OF PAYMENT

- A. All other items listed in this document shall be paid for at the contract lump sum price for “Water Tank Exterior Recoating and Tank Improvements”.

END OF SECTION

WATER TANK RECOATING AND TANK IMPROVEMENTS

09-901-19

APPENDIX A

MARCH 21, 2022 TANK INSPECTION REPORT

**Lenard Engineering- Colchester Elmwood
Inspection Report**

CorrTech Report No. 15495-FOR-01-1



Prepared For:

**Lenard Engineering
2210 Main St.
PO Box 1088
Glastonbury, CT 06033**

CORRTECH
CORROSION UNDERSTOOD
**25 South Street
Hopkinton, MA 01748**

3/21/2022

STATEMENT OF LIMITATION

Conclusions presented in this document are based on the services described and performed and not on tasks or procedures beyond the scope of the contracted services or time and budgetary constraints imposed by contract limitations.

CorrTech, Inc. has performed this assessment in a professional manner using the degree of skill and care exercised for similar projects under similar conditions by reputable and competent consultants, and in accordance with the procedures established within CorrTech's quality assurance, quality control protocol.

CorrTech, Inc. shall not be responsible for conditions or consequences arising from relevant facts that were concealed, withheld or not fully disclosed at the time the evaluation was performed.



Report Prepared by: Garth Lund
Project Manager
NACE CIP II #49983
January 31, 2025



Report Reviewed by: Ben Palmer
Project Manager
NACE CIP II # 44612
January 31, 2023

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APPENDIX III Paint Sample Analysis	
GLOSSARY OF TERMS	

INTRODUCTION

On March 15, 2022, CorrTech representatives, Garth Lund and Ben Palmer performed a corrosion and structural assessment of the exterior and interior of a drinking water storage tank for Lenard Engineering. The inspection was conducted to establish the current condition of the tank's coatings and steel substrate. The tank inspected included:

Elmwood Tank

For applicable standards used in this inspection, please see below.

The interior of the reservoir was inspected with the MiniRover remotely operated vehicle, while full. By using the MiniRover the interior of the tank was inspected with no special preparation, confined space entry, no additional disinfection and no downtime.

The MiniRover is equipped with high-powered thrusters, which are used to maneuver throughout the tank and are used to wash away bottom sediment for observations. Video is recorded with audio narration on site with digital stills captured for the report.

The MiniRover and all tether were prepared for the inspection by disinfecting equipment with a 200 ppm chlorine spray in accordance with AWWA C652-11.

The exterior portions of the tank were inspected by walking the roof and shell portions that were accessible from the ground.

The objectives of the assessment were to:

1. Perform field inspections and tests to assess the structural integrity of the tank.
2. Assess condition of any protective coatings present
3. Review the safety compliance of tank ladders and access.
4. Review sanitary protection equipment
5. Provide recommendations for rehabilitation.

APPLICABLE STANDARDS

AWWA D100, 2011, AWWA D100, Welded Carbon Steel Tanks for Water Storage, American Water Works Association (AWWA) Standard D100, Welded Carbon Steel Tanks for Water Storage

AWWA D101, 1986, AWWA D101, Inspecting Steel Tanks, Standpipes, Reservoirs, and Elevated Tanks, for Water Storage, American Water Works Association (AWWA) Standard D101, Inspecting Steel Tanks, Standpipes, Reservoirs, and Elevated Tanks for Water Storage

AWWA C652, 2011, AWWA C652, Disinfection of Water-Storage Facilities, American Water Works Association (AWWA) Standard C652, Disinfection of Water-Storage Facilities

AWWA M42, 2013, AWWA M42, Steel Water Storage Tanks, American Water Works Association (AWWA) Manual M42, Steel Water Storage Tanks

CT DPH RCSA Section 19-13-B102, May, 2021, CT DPH RCSA Section 19-13-B102, Standards for Quality of Public Drinking Water, Connecticut Department of Public Health (CT DPH), Regulations of Connecticut State Agencies (RCSA) Section 19-13-B102, Standards for Quality of Public Drinking Water

EXECUTIVE SUMMARY

The condition and recommendations for the tank are briefly summarized in this section. For detailed information regarding detailed tank conditions and the specific recommendations please refer to the designated section for the tank.

The exterior coating system has considerable delaminations forming from cracking and adhesion loss of the coating. Corrosion has occurred in the areas where the substrate has been exposed.

The interior coating system is almost completely intact. Minor areas of corrosion were observed on the roof.

No significant metal loss was found during the ultrasonic thickness survey and no significant corrosion was observed.

Significant amounts of lead and chromium were found in the sample taken.

The roof vent pressure relief plate is warped and preventing it from properly functioning. Because the plate will not seat this represents a sanitary deficiency.

The overflow pipe should be modified to come within 24-in of grade.

An anti-climb should be installed on the shell ladder.

The exterior of the tank should be blasted and coated.

A ladder safety climb should be installed.

The roof hatch should be replaced to meet current sanitary standards and in accordance with AWWA recommendations a second lower shell manhole should be installed.

In accordance with the current AWWA recommendations this tank should be next inspected in 2027.

Tank Data

TANK DATA FOR Elmwood Heights 2										
Site Information	Fencing In Place:	Yes				Locks on Gates:	Yes			
Address:	19 Elmwood Heights Colchester, CT				Vault Lock in Place:	Yes				
Tank Information	Tank Name:	Elmwood Heights 2				Tank Diameter:	40-ft			
Tank Height:	40-ft	Tank Capacity:	375,000		Previous Cleaning Date:	U/K				
Previous Inspect. Date:	U/K			Previous Coating Application:	U/K					
Foundation	Height:	7-10-in	Adequate Drainage:	Yes		Chime Plate Size:	Below concrete			
# of Anchors:	0	Anchor Bolt Diameter:	N/A		Chair Thickness	N/A				
Anchor Chair Dimensions:	N/A									
Shell Manhole	# of Manholes	1			Diameter:	20-in				
Ladder	Height from Ground:	14-ft			Safety Cage:	No				
Anti Climb Lock :	No			Climbing Safety System Style:	None					
Rung to Rung Dim:	12-in	Distance from Shell:	6-in		Width:	15-in				
Overflow	Diameter:	6-in		Air Gap	38-ft		Overflow Protection	Screen		
Screen Condition:	Intact	Screen Type:	Fine mesh			Splash Pad	No			
Roof Hatch	Dimensions:	29.75-in			Sanitary Neck	6.75-in				
# of Hatches:	1	Hatch Cover Overlap	1.5-in			Lock	Yes			
Roof Vent	Style:	Pressure relief			Diameter:	12-in				
Cap to Roof Distance:	10.5-in	Screen Condition:	Intact			Type:	Fine and coarse			
Roof Handrail Hts	Top Rail:	N/A		Mid Rail:	N/A		Toe Kick Plate:	N/A		
Interior	Sediment Depth:	Less than 0.25-in			Sediment Coverage:	90%				
Inlet/Outlet Pipe:	Separate		Sediment Ring:	Yes						
Interior Ladder	Climbing Safety System:	None			Style:	N/A				
Columns:	Yes		Column Number:	1		Interior Column Style	Center steel C channel			

OBSERVATIONS

Photos provided in the report were created from a digital camera and interior pictures were captured in digital format from the interior video. The interior images are as clear as our printed technology will allow. The copies in the report provide a reference for our comments. Keep in mind that for underwater video snaps, the video provides the greatest detail and should be viewed as part of the report.

Narration on the video is done in the field and some of the comments may be different than the written report.

TESTING

Dry Film Thickness Readings

A Positector 6000 gauge was used to take dry film coating thickness readings on the exterior shell and roof. These reading measure the thickness of the paint remaining on the substrate. For complete data, see APPENDIX II.

Dry Film Thickness Readings

Location	Number of Readings	Average	Minimum	Maximum
Shell – Batch 40	45	13.74	10	20.5
Roof – Batch 41	45	20.08	10.5	29

(All measurements taken in mils)

Ultrasonic Thickness Readings

A Danatronics gauge was used to take ultrasonic thickness readings were taken on the shell, roof, and floor of the tank. These readings measure the thickness of the substrate. Base on the readings taken during the ultrasonic survey there does no appear to be any significant general metal loss on either the shell plates or roof plates.

Ultrasonic Thickness Readings

Location	Number of Readings	Average	Minimum	Maximum
Shell Course 1	3	0.338	0.336	0.339
Shell Course 2	3	0.273	0.267	0.274
Shell Course 3	3	0.240	0.224	0.253
Shell Course 4	3	0.250	0.243	0.256
Shell Course 5	3	0.272	0.259	0.279
Roof Plate 1	3	0.177	0.176	0.1788
Roof Plate 2	3	0.178	0.177	0.179
Roof Plate 3	3	0.179	0.178	0.180
Roof Plate 4	3	0.187	0.187	0.187

(All readings are in inches)

PAINT SAMPLE ANALYSIS

A paint sample was taken from the exterior coating system. It was tested for lead, cadmium, and chromium. Significant amounts of lead and chromium were found in the sample, please see the attached report for full details in APPENDIX III.

INTERIOR

Roof Structure

The roof is a flat conical structure with rafters and a central column for support. Corrosion was observed along 70% of the edges of roof rafters and plate seams. Minor bowing was observed towards the perimeter of the roof.

Roof Coating

The roof coating system is mostly intact with no visible coating loss or adhesion loss. Corrosion has formed along edges of 70% of the roof rafters and 5% of the roof plates.

Shell Structure

The shell is completely free from corrosion. No bowing or deformation was observed.

Shell Coating

The shell coating system is completely intact with no visible coating or adhesion loss.

Columns

A single column is located at the center of the tank. The column is free of corrosion and metal loss.

Floor Structure

The floor is free of all corrosion, bowing, and deformation.

Sediment

A very minor layer of sediment has accumulated across the floor of the tank. No large piles or foreign debris was observed.

Floor Coating

The floor coating is completely free of all coating loss and adhesion loss.

Piping

There are separate inlet and outlet pipes. Both pipes enter through the tank floor. The outlet pipe is equipped with a sediment ring.

EXTERIOR

Foundation

The tank has a concrete ring wall foundation. Cracking and spalling were observed on 25% of the foundation. The chime plate and grouting could not be observed since it has been covered with asphalt.

Manholes

There is one lower shell manhole that was free from significant corrosion or visible leaks.

Ladder

A fixed shell ladder is used to access the roof of the tank. The ladder dimensions do not meet current OSHA standards and does not have a safety cage or safety climb system. There is no locking anti-climb system installed on the ladder.

Overflow

The overflow pipe is located in the upper shell of the tank. It discharges from the top of the shell onto the ground beside the foundation. The overflow has intact fine mesh screening.

Shell Coating

The exterior coating has extensive delamination's between coats and too the substrate. 20% of the remaining coating is cracking with corrosion blush.

Roof Hatch

The roof hatch is free of unsealed penetrations but does not meet current sanitary standards.

Roof Vent

A pressure relief vent is installed at the center of the tank. Both the fine mesh screening and coarse screening are intact. The pressure relief plate has warped and no longer functions properly.

Roof Coating

Minor biological staining has formed on the perimeter of the roof. Pooling water was observed at the perimeter due to bowing in the roof plates. Corrosion has formed in their areas. Cracking in the coating has formed on 2% of the roof and led to minor delaminations and corrosion.

RECOMMENDATIONS

In accordance with current AWWA recommendations the Colchester Elmwood tank should be next inspected in 2027.

Overflow pipe needs to be replaced or modified to meet current standards.

Per AWWA D100 Section 7.3 Overflow pipe shall be of sufficient size to equal the specified inlet rate. Pipe should extend down to within 16-24-in above ground for maintenance and be fitted with a corrosion resistant 24-mesh screen with or without a self-closing flapper cover. Rubber type duck bill check valves can be used in lieu of the flapper cover. Discharge point must be onto a splash pad or drainage structure to prevent erosion of the tank foundation. In areas where freezing is common rubber duckbill check valves may need to be protected against freeze up.

Locking Ladder Guard should be installed.

Based on water industry vulnerability assessments tank ladders should be no closer than 16-ft above grade and should be fitted with a locking guard. Installing an 8-ft ladder guard is advised for security to the tank. The most vulnerable location on the tank for vandalism is the roof. Unwanted access to the roof can be prevented by raising the bottom rung of the ladder and/or installing a locking ladder guard.

Ladders (roof, shell, leg or interior) need to be repaired or upgraded.

Tank ladder does not meet OSHA or AWWA D100 Section 7.4 standards and should be replaced next time the tank is rehabilitated. Ladder rungs should be non-skid 12-in on center, 3/4-in thick with at least 7-in of toe clearance from rung center to nearest surface. Ladder rails should be 16-in wide. This would bring the ladder into OSHA compliance. Special note that no cellular cable equipment should be attached directly to the ladder or in a location as to impeded full use of the ladder rungs.

Ladder Safety Climb should be installed or possibly updated.

A safety climb system should be installed on any ladder that is 20-ft long or more. For new fixed ladders erected on or after November 19, 2018, the employer must equip the ladder with a ladder safety or personal fall arrest system (1910.28(b)(9)(i)(B)). Fixed notched rail climbs meet OSHA requirements but are very tiring to climb. Installing a cable type safety climb system will keep your tank current with OSHA standards and the device is less tiring to use than a notch railed type device. It is not recommended to use these devices on internal underwater ladders. Underwater galvanic corrosion is caused between the cable and tank making the safety device unsafe after a few years.

Foundation Chime seal is in need of repair or replacement.

Chime plate to foundation gap should be re-caulked in accordance with the latest version of AWWA D100 12.6.2. Sealing the gap between the chime plate and the ring wall foundation limits moisture and oxygen from freely moving under of the tank floor which supports active corrosion. Tank floors in contact with bedding sand are not normally coated and will corrode if exposed to moisture and oxygen. As the tank level moves up and down the tank floor will flex moisture and air can be pulled in if the gap is not sealed. Typically a product such as Sikaflex 2c a non-shrinking urethane caulking is applied in this area.

Exterior Coating should be replaced.

Tank exterior should be fully blasted and coated in the next 2-3-years using a properly written job specification and certified coating inspection. To ensure longest possible service life from the new coating, contractors should follow the AWWA D102-latest, AWWA Standard for Painting Steel Water-Storage Tanks with a full-time coatings inspector to ensure proper surface preparation and application.

Applicable Standards:

- AWWA D100-latest, AWWA Standard for Welded Steel Tanks for Water Storage
- AWWA D102-latest, AWWA Standard for Painting Steel Water-Storage Tanks
- AWWA C652-latest, AWWA Standard for Disinfection of Water-Storage Facilities

Above Ground Tank Roof Hatch Modification Required-

Roof hatch should be replaced and a new hatch assembly installed in accordance with AWWA D101, AWWA D100 to meet current industry sanitary protection requirements. Replacement hatch must have the required sanitary controls such as at least a 4-in sanitary neck above the roof plates, 2-in overlap on the hatch cover, internal sealing gasket between the hatch neck and cover and an attachment point for a lock. Hatches can be modified on the tank, replaced as welded assemblies or prefabricated and installed as bolt on assemblies to avoid interior coating damage.

Auxiliary Shell Grade Hatch installation is suggested.

Tank should have two shell grade level manways with a minimum diameter of 30-in installed 180 degrees from the primary manway to comply with AWWA D100 7.4. A second hatch provides redundancy for confined space entry, improves airflow as well as offer access for ductwork and other equipment used in coating and rehabilitation. New hatch covers should be suspended on a swing davit arm to control weight when opening and closing.

Appendix I: Photographs



1) Tank overall



4) Ladder and overflow



2) Corrosion on the shell



5) Lower shell and foundation



3) Shell manhole



6) Cracking on the foundation



7) Coating delamination with corrosion



10) Typical condition of roof plates



8) Delaminated shell coating



11) Corrosion the roof plates



9) Roof hatch, roof ladder, roof plates



12) Roof vent



13) Intact vent screen



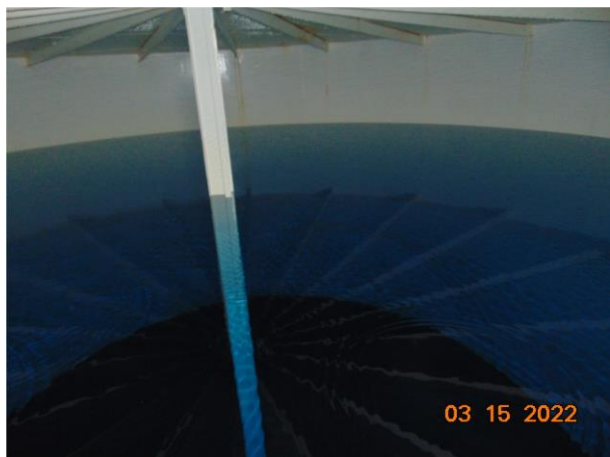
16) Overflow pipe and shell



14) Vent vacuum plate warped



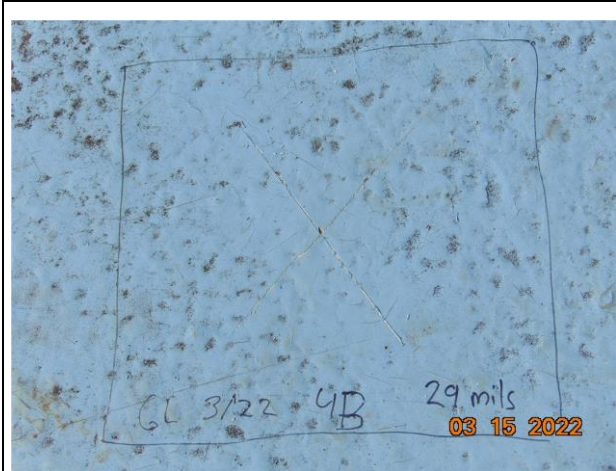
17) Rafters and center column



15) Interior roof and upper shell



18) Locked roof hatch



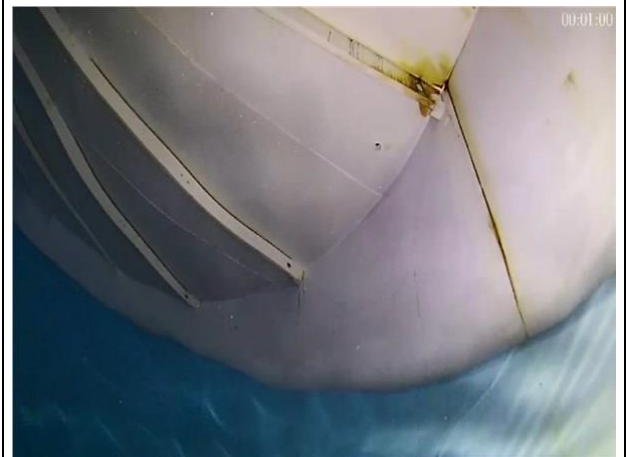
19) ASTM D3359 Test on roof



22) 00:37 Roof to shell seam



20) Intact overflow screen



23) 01:07 Corrosion on the roof to shell seam



21) 00:02 Open roof hatch



24) 02:31 Center column



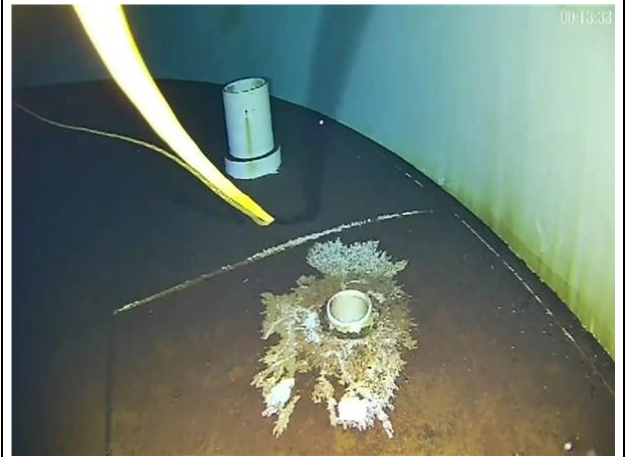
25) 03:45 Shell weld seam



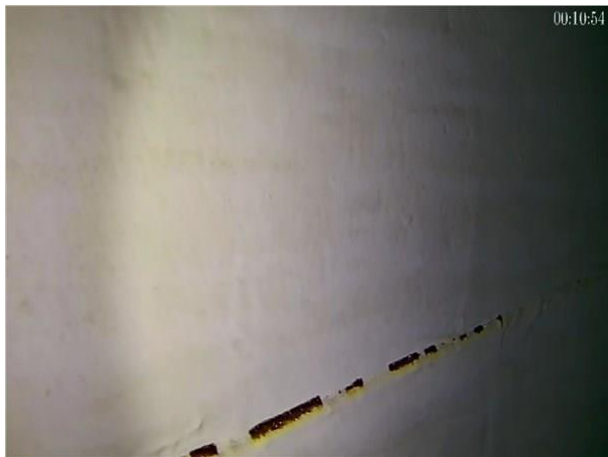
28) 13:30 Shell manhole



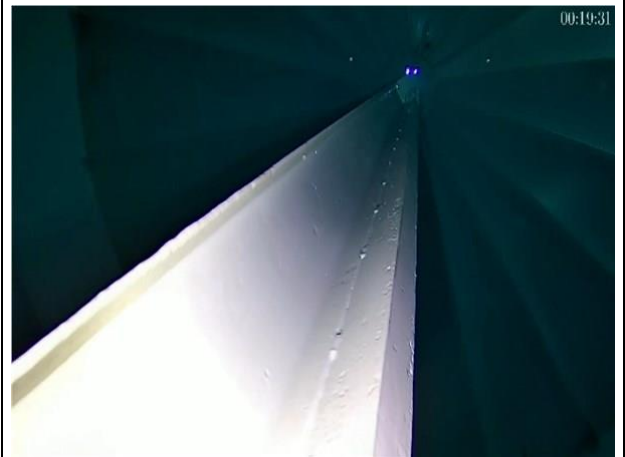
26) 07:27 Typical shell condition



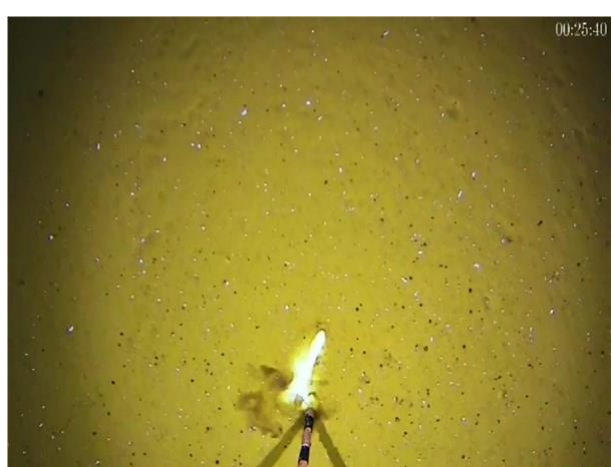
29) 13:40 Inlet and outlet pipes



27) 11:02 Sediment on weld seam



30) 19:39 Center column



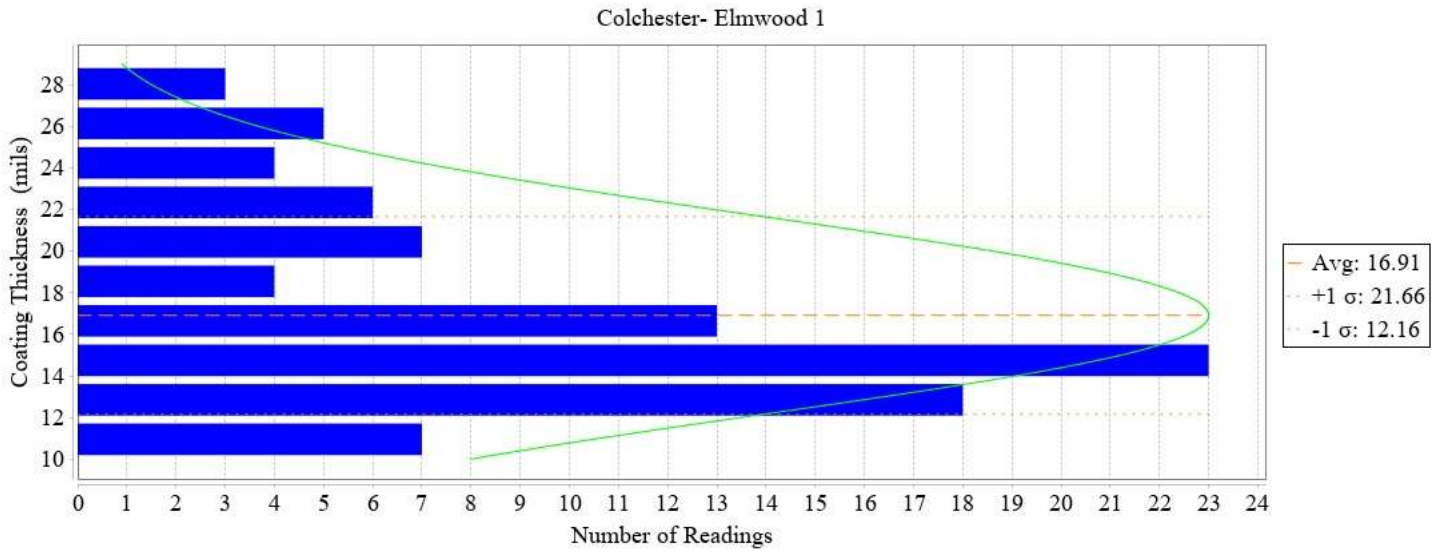
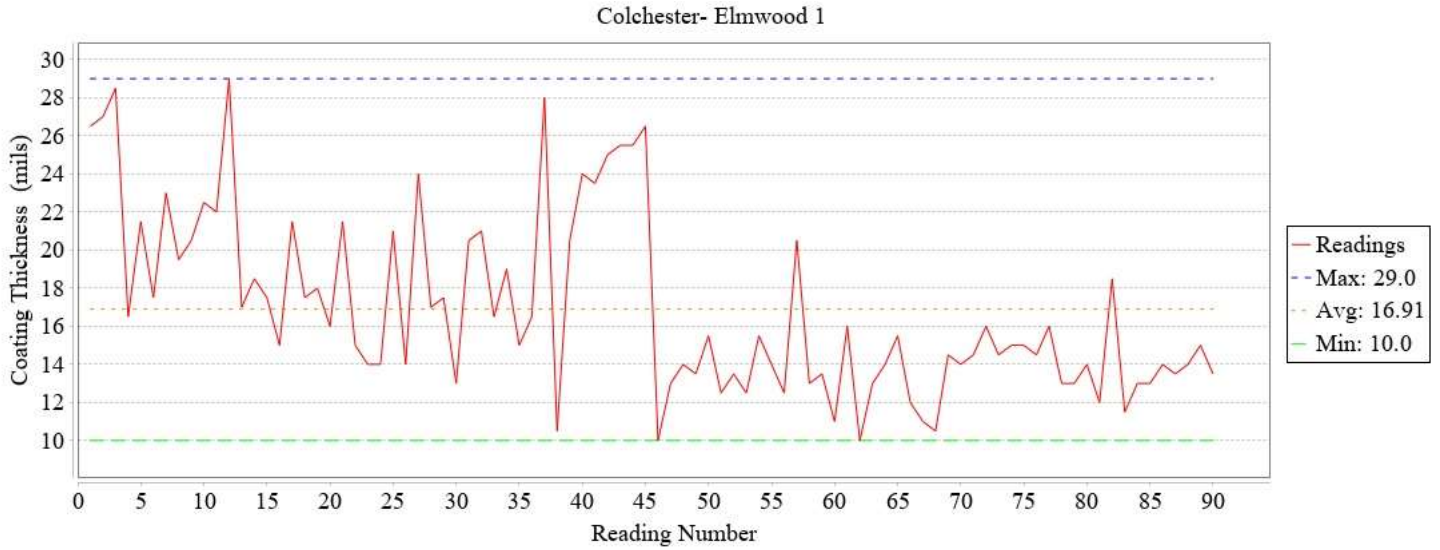
31) 21:45 Sediment depth reading of 1/8-in

Appendix II
Exterior Paint Thickness Readings

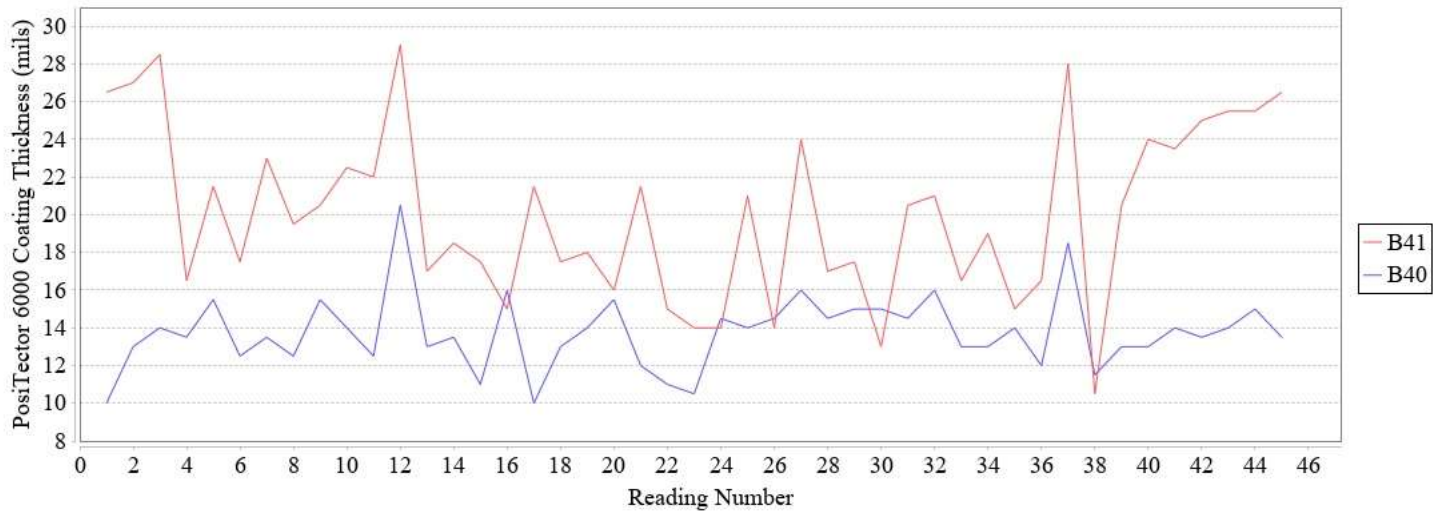
B40 SHELL
B41 ROOF

Colchester- Elmwood 1 Summary

	#	x	σ	↓	↑
Coating Thickness (mils)	90	16.91	4.75	10.0	29.0



Colchester- Elmwood 1



B41

Created: 2012-01-01 02:04:47
PosiTector Body S/N: 840822
Probe Type: PosiTector 6000 FTS
Probe S/N: 367559
CAL: Cal 1

Summary

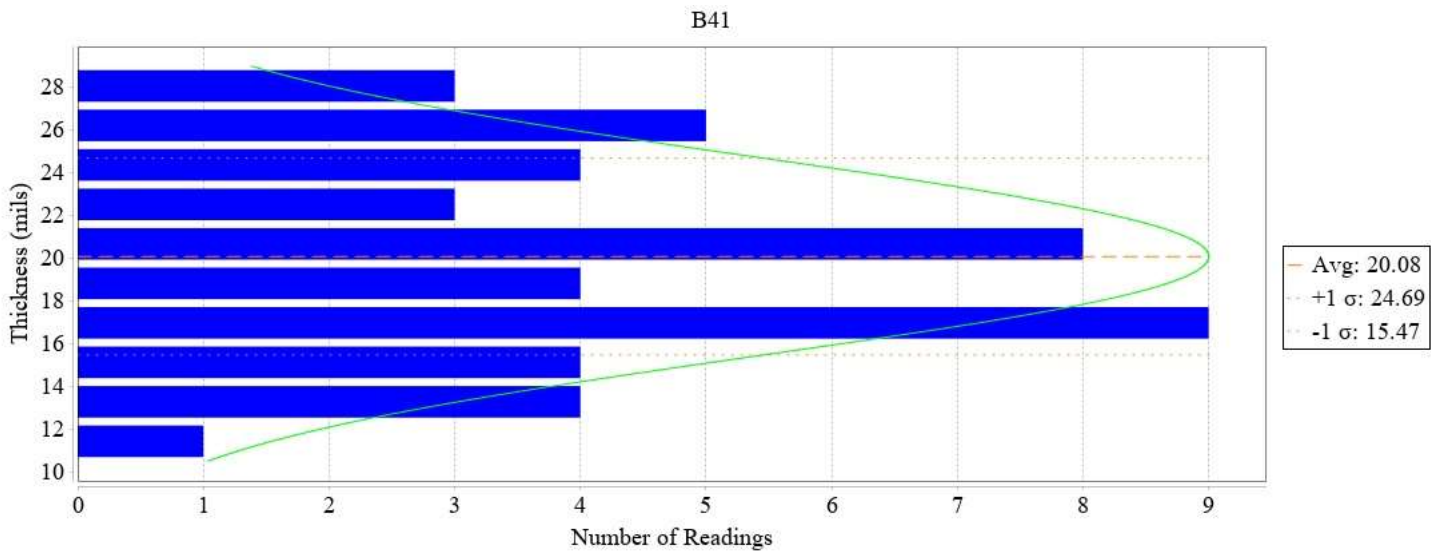
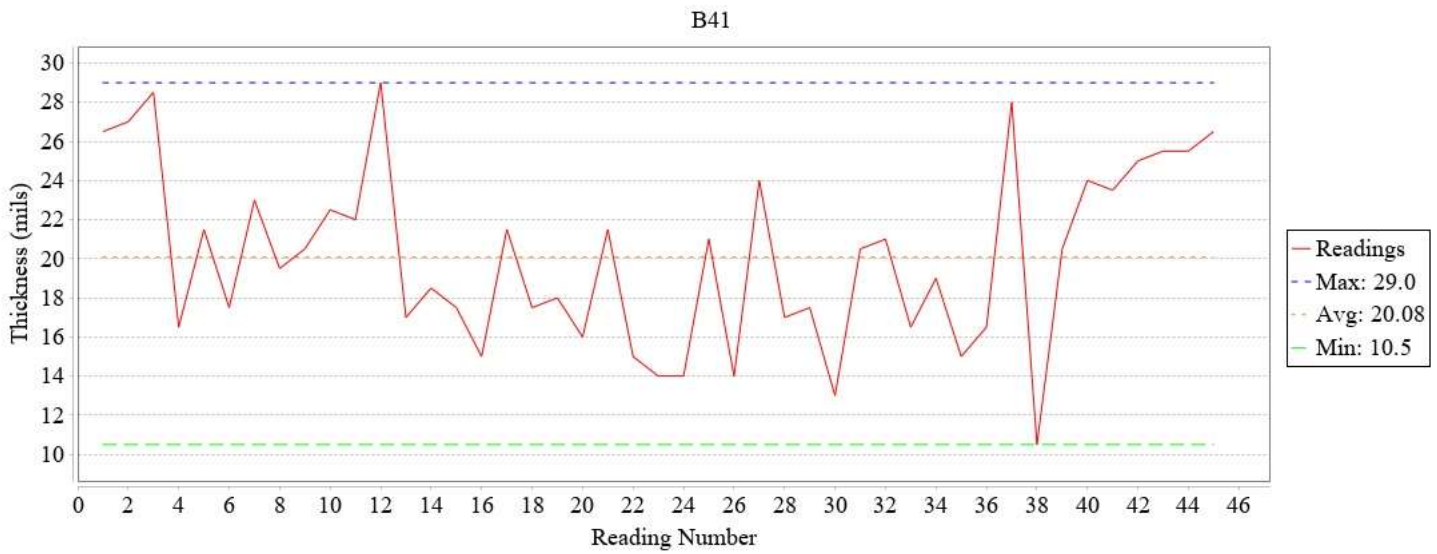
	#	x	σ	↓	↑
Thickness (mils)	45	20.08	4.61	10.5	29.0

Readings

#	Thickness (mils)	Time
1	26.5	2012-01-01 02:04:51
2	27.0	02:04:52
3	28.5	02:04:53
4	16.5	02:04:54
5	21.5	02:04:55
6	17.5	02:04:56
7	23.0	02:04:57
8	19.5	02:04:58
9	20.5	02:04:59
10	22.5	02:05:04
11	22.0	02:05:05
12	29.0	02:05:06
13	17.0	02:05:07
14	18.5	02:05:08
15	17.5	02:05:09
16	15.0	02:05:10
17	21.5	02:05:11
18	17.5	02:05:12
19	18.0	02:05:14
20	16.0	02:05:14
21	21.5	02:05:15
22	15.0	02:05:21
23	14.0	02:05:22
24	14.0	02:05:23
25	21.0	02:05:24
26	14.0	02:05:24
27	24.0	02:05:25
28	17.0	02:05:27
29	17.5	02:05:27
30	13.0	02:05:28
31	20.5	02:05:34
32	21.0	02:05:35
33	16.5	02:05:36
34	19.0	02:05:37
35	15.0	02:05:38

B41 Readings

#	Thickness (mils)	Time
36	16.5	02:05:39
37	28.0	02:05:45
38	10.5	02:05:46
39	20.5	02:05:47
40	24.0	02:05:48
41	23.5	02:05:49
42	25.0	02:05:49
43	25.5	02:05:50
44	25.5	02:05:51
45	26.5	02:05:52



B40

Created: 2012-01-01 00:00:40
PosiTector Body S/N: 840822
Probe Type: PosiTector 6000 FTS
Probe S/N: 367559
CAL: Cal 1

Summary

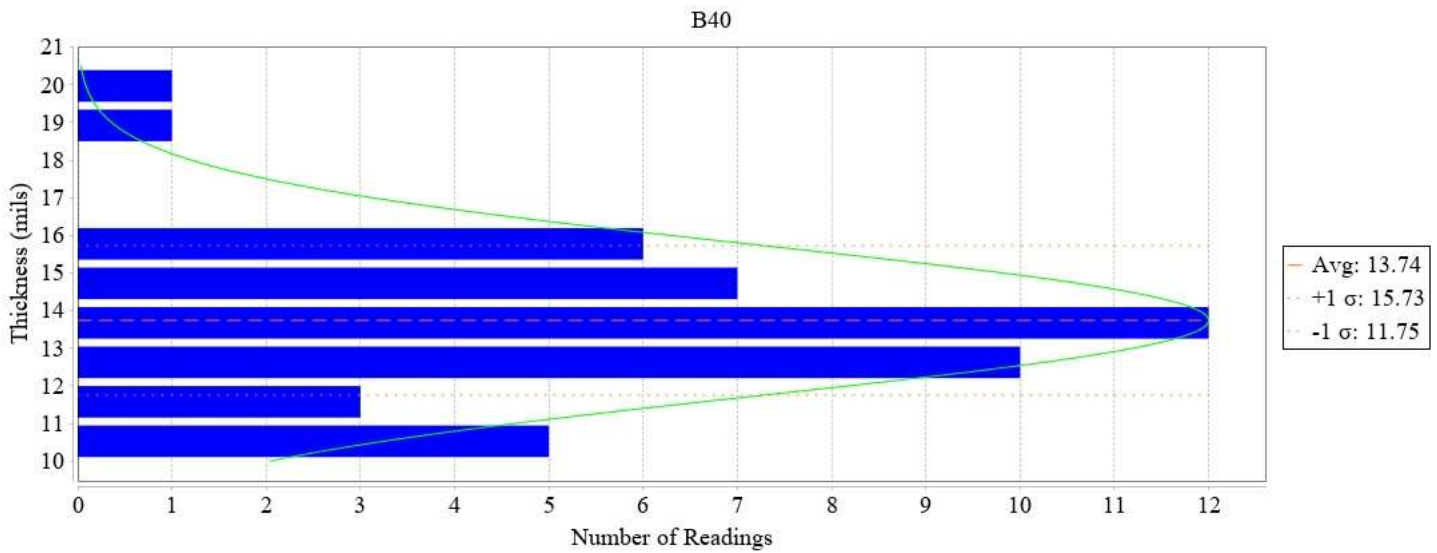
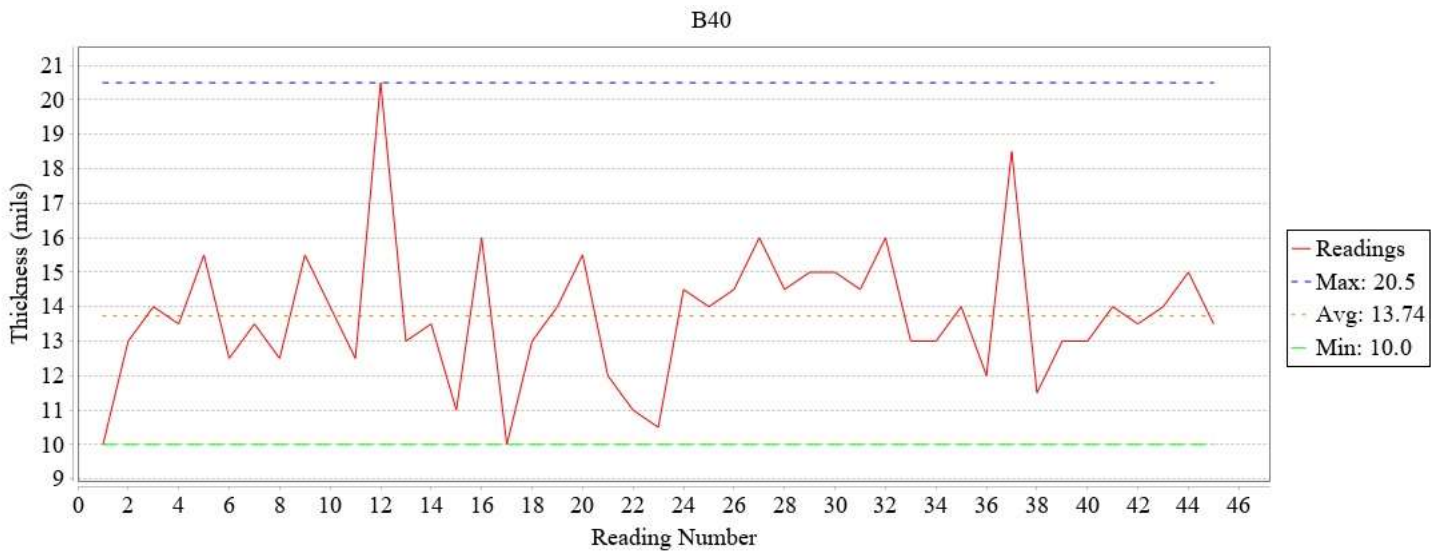
	#	x	σ	↓	↑
Thickness (mils)	45	13.74	1.99	10.0	20.5

Readings

#	Thickness (mils)	Time
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2	13.0	00:00:55
3	14.0	00:00:55
4	13.5	00:00:56
5	15.5	00:00:57
6	12.5	00:00:58
7	13.5	00:01:02
8	12.5	00:01:03
9	15.5	00:01:03
10	14.0	00:01:04
11	12.5	00:01:04
12	20.5	00:01:05
13	13.0	00:01:10
14	13.5	00:01:11
15	11.0	00:01:12
16	16.0	00:01:24
17	10.0	00:01:24
18	13.0	00:01:25
19	14.0	00:01:30
20	15.5	00:01:31
21	12.0	00:01:32
22	11.0	00:01:38
23	10.5	00:01:39
24	14.5	00:01:40
25	14.0	00:01:52
26	14.5	00:01:54
27	16.0	00:01:55
28	14.5	00:02:01
29	15.0	00:02:03
30	15.0	00:02:04
31	14.5	00:02:09
32	16.0	00:02:10
33	13.0	00:02:11
34	13.0	00:02:21
35	14.0	00:02:22

B40 Readings

#	Thickness (mils)	Time
36	12.0	00:02:23
37	18.5	00:02:24
38	11.5	00:02:25
39	13.0	00:02:26
40	13.0	00:02:27
41	14.0	00:02:43
42	13.5	00:02:44
43	14.0	00:02:45
44	15.0	00:02:45
45	13.5	00:02:46



APPENDIX III
Paint Sample Analysis



Wednesday, March 23, 2022

Attn:
Corrtech
25 South Street
Hopkinton MA 01748

Project ID: 15495
SDG ID: GCK90414
Sample ID#s: CK90414

This laboratory is in compliance with the NELAC requirements of procedures used except where indicated.

This report contains results for the parameters tested, under the sampling conditions described on the Chain Of Custody, as received by the laboratory. This report is incomplete unless all pages indicated in the pagination at the bottom of the page are included.

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

A scanned version of the COC form accompanies the analytical report and is an exact duplicate of the original.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200. The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.

Sincerely yours,

A handwritten signature in black ink that reads "Phyllis Shiller". The signature is written in a cursive style.

Phyllis Shiller
Laboratory Director

NELAC - #NY11301
CT Lab Registration #PH-0618
MA Lab Registration #M-CT007
ME Lab Registration #CT-007
NH Lab Registration #213693-A,B

NJ Lab Registration #CT-003
NY Lab Registration #11301
PA Lab Registration #68-03530
RI Lab Registration #63
UT Lab Registration #CT00007
VT Lab Registration #VT11301



Environmental Laboratories, Inc.
587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
Tel. (860) 645-1102 Fax (860) 645-0823

Sample Id Cross Reference

March 23, 2022

SDG I.D.: GCK90414

Project ID: 15495

Client Id	Lab Id	Matrix
EXTERIOR	CK90414	BULK



Environmental Laboratories, Inc.
 587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
 Tel. (860) 645-1102 Fax (860) 645-0823

Analysis Report

March 23, 2022

FOR: Attn: Corrtch
 25 South Street
 Hopkinton MA 01748

Sample Information

Matrix: BULK
 Location Code: CORRT-MA
 Rush Request: Standard
 P.O.#:

Custody Information

Collected by:
 Received by: SW
 Analyzed by: see "By" below

Date

03/15/22
 03/21/22

Time

11:33

Laboratory Data

SDG ID: GCK90414
 Phoenix ID: CK90414

Project ID: 15495
 Client ID: EXTERIOR

Parameter	Result	RL/ PQL	Units	Dilution	Date/Time	By	Reference
Cadmium	30.6	1.0	mg/Kg	1	03/22/22	TH	SW6010D
Chromium	1890	10	mg/Kg	10	03/22/22	TH	SW6010D
Lead	103000	100	mg/Kg	100	03/22/22	TH	SW6010D
Total Metals Digest	Completed				03/21/22	M/AG	SW3050B

RL/PQL=Reporting/Practical Quantitation Level ND=Not Detected BRL=Below Reporting Level

Comments:

Results are reported on an "as received" basis, and are not corrected for dry weight.

All soils, solids and sludges are reported on a dry weight basis unless otherwise noted in the sample comments.

If you are the client above and have any questions concerning this testing, please do not hesitate to contact Phoenix Client Services at ext.200. The contents of this report cannot be discussed with anyone other than the client listed above without their written consent.

Phyllis Shiller, Laboratory Director

March 23, 2022

Reviewed and Released by: Helen Geoghegan, Project Manager



Environmental Laboratories, Inc.
 587 East Middle Turnpike, P.O.Box 370, Manchester, CT 06045
 Tel. (860) 645-1102 Fax (860) 645-0823

QA/QC Report

March 23, 2022

QA/QC Data

SDG I.D.: GCK90414


Parameter	Blank	Blk RL	Sample Result	Dup Result	Dup RPD	LCS %	LCSD %	LCS RPD	MS %	MSD %	MS RPD	% Rec Limits	% RPD Limits
QA/QC Batch 616618 (mg/kg), QC Sample No: CK90516 (CK90414)													
<u>ICP Metals - Soil</u>													
Cadmium	BRL	0.33	<0.33	<0.33	NC	94.5	92.9	1.7	96.1			75 - 125	35
Chromium	BRL	0.33	4.65	4.56	2.00	97.4	96.9	0.5	94.7			75 - 125	35
Lead	BRL	0.33	3.61	3.44	4.80	105	106	0.9	96.6			75 - 125	35

Comment:

Additional Criteria: LCS acceptance range is 80-120% MS acceptance range 75-125%.

If there are any questions regarding this data, please call Phoenix Client Services at extension 200.

- RPD - Relative Percent Difference
- LCS - Laboratory Control Sample
- LCSD - Laboratory Control Sample Duplicate
- MS - Matrix Spike
- MS Dup - Matrix Spike Duplicate
- NC - No Criteria
- Intf - Interference


 Phyllis Shiller, Laboratory Director
 March 23, 2022

Wednesday, March 23, 2022

Criteria: None

State: CT

Sample Criteria Exceedances Report

GCK90414 - CORR-MA

SampNo	Acode	Phoenix Analyte	Criteria	Result	RL	Criteria	RL Criteria	Analysis Units
--------	-------	-----------------	----------	--------	----	----------	----------------	-------------------

*** No Data to Display ***

Phoenix Laboratories does not assume responsibility for the data contained in this exceedance report. It is provided as an additional tool to identify requested criteria exceedences. All efforts are made to ensure the accuracy of the data (obtained from appropriate agencies). A lack of exceedence information does not necessarily suggest conformance to the criteria. It is ultimately the site professional's responsibility to determine appropriate compliance.



Environmental Laboratories, Inc.
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Tel. (860) 645-1102 Fax (860) 645-0823



Analysis Comments

March 23, 2022

SDG I.D.: GCK90414

The following analysis comments are made regarding exceptions to criteria not already noted in the Analysis Report or QA/QC Report: None.

GLOSSARY OF TERMS FOR STEEL/CONCRETE TANKS

Adhesion- State in which two surfaces are held together by interfacial forces which may consist of valence forces or interlocking action or both

Aggregate- Granular material, such as sand, gravel, crushed stone, crushed hydraulic-cement concrete, or iron blast-furnace slag used with a hydraulic cementing medium to produce either concrete or mortar.

Bugholes- Small regular or irregular cavities, usually not exceeding 15 mm in diameter, resulting from entrapment of air bubbles in the surface of formed concrete during placement and compaction.

Cathodic Protection - The use of a sacrificial metal or energized substance to polarize the structures surfaces and prevents corrosion.

Chalking - The degradation of a paint binders when exposed to ultra-violet light which creates a loose residue on the surface.

Chemical Attack- Decomposition of a coating or concrete due to the action of a chemical.

Chime- Portion of tank floor plate that extends outside the tank shell and rests on top of the foundation.

Contraction Joint- Formed, sawed, or tooled groove in a concrete structure to create a weakened plane and regulate the location of cracking resulting

Corrosion Cell - A concentrated localized site of accelerated corrosion that creates pitting.

Disbondment- The loss of adhesion between a coating and the substrate.

Dry Film Thickness - Total thickness of a paint film when completely cured.

Efflorescence- A white crystalline or powdery deposit on the surface of concrete. Efflorescence results from leaching of lime or calcium hydroxide out of a permeable concrete mass over time by water, followed by reaction with carbon dioxide and acidic pollutants.

Finish- The texture of a concrete surface after compaction and finishing operations have been performed.

Finial Vent - The central roof vent on top of a water tank.

Grout- A plastic mixture of cementitious materials and water used as a filler for cracks, or other void spaces, in concrete surfaces to be coated.

Holiday - A hole or void in a protective coating that may be invisible to the unaided eye that extends to the substrate.

Honey Comb- Voids left in concrete due to failure of the mortar to effectively fill the spaces among coarse aggregate particles.

Hydraulic, Hydrostatic Pressure- A force exerted on the concrete/coating interface due to the level of the ground water.

Isolation Joint- A separation between adjoining parts of a concrete structure

Joint Sealant- Compressible material used to exclude water and solid foreign materials from joints.

Lap Joint Seam- Overlapping seam between roof plates that is open and un-welded on the interior.

Laitance- A thin, weak brittle layer of cement and aggregate fines on a concrete surface. The amount of laitance is influenced by the degree of working or the amount of water in the concrete.

Lead Abatement - The removal of a lead bearing paint system.

Lead Encapsulation - The covering over of a lead based paint by applying a compatible topcoat.

Osmotic Blister - Raised coating area created by buildup of fluid under the coating. Fluid moves through coating in response to water/solvent concentrations between coating and tank water.

Osmotic Pressure- A force exerted on the concrete /coating interface through the capillaries in the concrete due to a moisture differential across the coating.

Overflow Weir Box- internal or external box that captures water above the operating height of the tank and directs it to an overflow pipe.

Pack Rust/Crevice Corrosion- Advanced form of steel corrosion that forms visible layers of oxidized steel swollen larger than the original steel plate thickness, usually found between steel plates or surfaces.

Pinholes- Film defect characterized by small pore-like flaws in a coating which extend entirely through the applied film and have the general appearance of pinpricks, fine holes, or voids when viewed by reflected light.

Plastic Cracking or Shrinkage- Cracking that occurs in the surface of fresh concrete soon after it is placed and while it is still plastic,

Porosity- The ratio usually expressed as a percentage, of the volume of voids in a material to the total volume of the material, including the voids.

Reflective Cracking-Cracking that develops in a coating directly over a dynamic crack in concrete.

Rigging plug- Thread steel nipple welded to a tank roof for the purposes of rigging painting cables. Usually sealed with a threaded plug when not in use.

ROV - Remotely operated vehicle, underwater inspection device "TankRover" by CorrTech

Screen Mesh- Number of openings per linear inch of screen.

Silt - Material that accumulates in the bottom of a water tank originating from treatment by products, raw water particles and distribution system debris.

Silt Stop- Solid cylinder installed on a floor inlet or outlet pipe to extend the pipe above the floor. Pipe prevents floor sediment from being stirred up or sucked out of the tank during flow.

Static Cracks- A crack in the concrete surface whose width does not change.

GLOSSARY OF TERMS FOR STEEL/CONCRETE TANKS

Stitch or Skip Weld- Method of welding two pieces of steel together with intermittent short sections of weld bead. Leaves open lap joints along the unwelded sections.

Tubercle - Domed shaped buildup of corrosion products over an active corrosion site. Promotes metal loss through pitting due to differential oxygen concentrations.

Ultrasonic Measurement - The use of high frequency sound waves passed through a material to measure the time required to return. The time required to pass through the material is correlated to the speed of sound in the substrate to yield an actual thickness at a specific location.

Vapor Barrier- Waterproof membrane placed under concrete floor slabs that are placed on grade.

LEAD PAINT ABATEMENT

13-282-1

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Provide all labor, tools, equipment and incidentals required to perform all lead paint removal work as specified herein, including but not limited to worker protection, environmental protection and handling/disposal of debris generated from the lead paint removal.
- B. Furnish all necessary permits, licenses, and certifications as required by this Section, as well as all applicable regulations.
- C. Provide a containment and filtration system to collect all fugitive emissions and to provide total containment of all debris, refer to SECTION 09901 – Water Tank Recoating and Improvements.
- D. This Section covers hazardous materials found in paint such as lead, cadmium, chromium, etc. These hazardous materials are collectively referenced to as lead paint in this Specification.

1.2 RELATED SECTIONS

- A. SECTION, 09-901 Water Tank Recoating and Tank Improvements

1.3 REFERENCES

- A. All applicable Federal, State, and local regulations including but not limited to:
 - 1. Code of Federal Regulations
- 29 CFR 1910, “Occupational Safety and Health Standards” (General Industry Standards)
- 29 CFR 1910.1020, “Access to Employee Exposure and Medical Records”
- 29 CFR 1910.134, “Respiratory Protection”
- 29 CFR 1910.1025, “Permit Required Confined Space”
- 29 CFR 1910.1200, “Lead”

LEAD PAINT ABATEMENT

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29 CFR 1910.1200, “Hazardous Communication”

29 CFR 1926, “Safety and Health Regulations for Construction” (Construction Industry Standards)

29 CFR 1926.62, “Lead-Construction”

29 CFR 1926.500, “Fall Protection”

40 CFR 50, “National Primary and Secondary Ambient Air Quality Standards”

40 CFR 60, “Standards of Performance for New Stationary Sources”, Appendix A, “Test Methods”

40 CFR 117, “Determination of Reportable Quantities for Hazardous Substances”

40 CFR 122, “EPA Administered Permit Program: The National Pollutant Discharge Elimination System”

40 CFR 172, “Hazardous Waste Transportation”

40 CFR 261, “Identification and Listing of Hazardous Waste”

40 CFR 262, “Standards Applicable to Generators of Hazardous Waste”

40 CFR 263, “Standards Applicable to Transporters of Hazardous Waste”

40 CFR 264, “Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities.

40 CFR 265, “Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities.

40 CFR 268, “Land Disposal Restrictions”

LEAD PAINT ABATEMENT

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40 CFR 300, “National Oil and Hazardous Substances Pollution Contingency Plan”

2. Occupational Safety and Health Administration OSHA Booklet 3126, “Working with Lead in the Construction Industry”
3. National Institute for Occupational Health and Safety (NIOSH) Method 7082, “Lead”
4. American Society for Testing Materials – ASTM D3335, “Test Method for Low Concentration for Lead, Cadmium, and Cobalt in Paint by Atomic Absorption Spectroscopy”.
5. EPA (Environmental Protection Agency) Publications

SW-846, Test Methods for Evaluating Solid Waste – Physical/Chemical Methods

1. Method 1311, Toxicity Characteristic Leaching Procedure (TCLP)

EPA Method 3050, “Acid Digestion of Sediments, Sludge’s, and Soils”

6. Steel Structures Painting Council

SSPC Guide 6I (CON) Guide for Containing Debris Generated During Paint Removal Operations

SSPC Guide 6-95 Guide for Containing Debris Generated During Paint Removal Operations

SSPC Guide 7I (DIS) Guide for the Disposal of Lead Contaminated Surface Preparation Debris

7. Local State, Town, City or County bylaws, rules and regulations
8. State of Connecticut Department of Energy and Environmental Protection (DEEP) Regulations

Section 22a-449 (c) - 100 to 119, “Hazardous Waste Management” System

LEAD PAINT ABATEMENT

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Section 22a-69 – 1 to 7.4, “Noise”

Section 22a – 449 (c) – 11, “Hazardous Waste Transporter Permits”

1.4 SUBMITTALS

- A. Ten (10) days after project award, the Contractor will submit written procedures addressing the following information:
- A. Written Removal/Containment/Ventilation Plan: Submit a written plan for the methods to be employed for lead paint removal to include but not be limited to surface preparation, containment compliant with SSPC Guide 6-95 or most recent revision, ventilation, interface of trades, sequencing of lead related work/repainting, respirator usage, spill prevention plan, protective equipment, etc. Shop drawings shall also be provided to show the containment/ventilation setup, decontamination area and other pertinent information. A Connecticut registered structural PE engineer hired by the Contractor shall stamp this compliance plan in regards to load bearing capacities, structural integrity, wind loads, etc. for the containment system and shall certify that this system complies with all applicable codes and regulations.
 - B. Cleaning and Securing of Containment at End of Work Day, Prior to Moving, and When the Containment will be Unmanned
 - 1. At the end of work each day, remove loose abrasive and debris from within the containment to prevent emissions during non-working hours. Secure the containment and equipment as a safeguard against unanticipated heavy winds, inclement weather, or as directed by the Owner or Engineer.
 - 2. Prior to removing, dropping, or moving the containment, remove loose abrasive, debris, and dust to the extent that it is not dislodged by handling. Cleaning may be accomplished by blowing down all horizontal tank surfaces with the ventilation system in operation and/or by HEPA vacuuming.

LEAD PAINT ABATEMENT

13-282-5

-
- C. Written Health and Safety Plan (Compliance Plan): Develop a health and safety plan for all work to include lead in construction 29 CFR 1926.62, respiratory protection under 29 CFR 1910.134, confined space entry procedures under 29 CFR 1910.146, noise exposure 29 CFR 1910.95, fall protection 29 CFR 1926.500, etc. Material Safety Data Sheets shall be submitted for all products containing hazardous materials used in the paint removal work, including coatings. Prepare a plan for air monitoring of ambient air and workers, and a contingency plan for emergencies in the event of a containment failure. If available, submit historical air sampling data for OSHA regulations. The plan shall be reviewed and approved by a Certified Industrial Hygienist employed by the Contractor.
- D. Certifications: Provide worker certifications, training and medical records for each person involved in the work performed under 29 CFR 1926.62. If available, provide Contractor certifications in accordance with SSPC Painting Contractor Certification Program.
- E. Waste handling, site storage disposal and testing of debris: Submit written procedures to be followed for waste handling to include the sampling and testing of debris to determine its characteristics; emergency preparedness, etc. Sampling shall be conducted to ensure representative numbers of samples of the waste stream collected and analyzed. A minimum of 4 samples are required for the waste characterization of each bulk media (I.e. soil, water) storage container such as roll off . The name of the testing laboratory to be utilized shall be included. The laboratory shall be certified by the State of Connecticut for all analysis. Confirm that an EPA identification number will be obtained and that proper manifesting of the waste will be addresses. All on-site storage, handling and disposal shall comply with SSPC – Guide 7I (DIS), State, Federal, and local hazardous waste regulations, including but no limited to the time of storage, container requirements, contingency plan, and personnel training.
- F. Transportation: Submit confirmation that proper transportation of the debris by a properly licensed transporter will be accomplished in accordance with the requirements of State, Federal and local regulations (i.e. 40 CFR 263). Include the name of the transporter and the transporters permit number.
- G. Disposal: Submit written confirmation that the debris will be treated and disposed of in accordance with the requirements of State, Federal and local regulations (i.e. 40 CFR 264 and 40 CFR 268). The program shall provide proper assurance that the waste/debris is handled properly from cradle to grave;

LEAD PAINT ABATEMENT

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include the necessary notification and certifications on shipments; provide the name of the disposal facility and include a schedule for the submittal of the completed manifests to the Owner.

- H. Submit a list of all equipment and pertinent specifications (i.e. HEPA filter tools, ventilation systems, etc.).
 - b. Within 30 days of completion of the project.
- A. Submit a Certificate of Completion including a final closeout report shall be provided. This shall include all air sampling data, waste disposal manifests, on-site logs, test, etc.

1.5 QUALITY ASSURANCE

- A. An adequate number of skilled workmen who are trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and methods required for proper performance of the work in this Section shall be used. At a minimum, workers shall be trained in accordance with the OSHA lead standard 29 CFR 1910.62.
- B. Provide a competent person who is capable of identifying existing and predictable lead hazards and has authorization to take prompt corrective actions to eliminate them.
- C. Provide a confined space entry supervisor responsible for determining acceptable entry conditions and overseeing entry operations.

LEAD PAINT ABATEMENT

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PART 2 PRODUCTS

2.1 EQUIPMENT

- A. Tools – Furnish all equipment and tools to perform the work in a safe manner. Noise from power equipment shall conform to OSHA 1910.95 Occupational Noise Exposure.
- B. HEPA Units – All vacuum and exhaust equipment shall have HEPA filtering in conformance with ANSI Z9.2. No bypass devices are permitted. All used filters and other contaminated materials shall be disposed of as lead contaminated waste.
- C. Local Ventilation – All mechanical tools for working lead paint will have HEPA equipped ventilation shrouds to collect dust if used outside of the Class 2W containment system. The Class 2W containment system is as defined in SSPC Guide 6 (95).
- D. For containment ventilation of air, dust collection and air handling devices will be dry dust collectors, bag houses, etc. All will be filters contained within a steel or impermeable containment. No loose bag filtration will be allowed. All final air exhausting from the site shall be HEPA filtered prior to discharge.
- E. Ambient Air Monitoring will be conducted with two TSP air samplers placed onsite and located per the Engineer daily.

PART 3 EXECUTION

3.1 AMBIENT AIR MONITORING

- A. Ambient Air Monitoring will be conducted with two TSP air samplers placed onsite and located per the Engineer daily.
- B. Ambient Air Monitoring will be conducted by a trained subcontracted Environmental Technician not by Contractor personnel.
- C. No personnel air sampling cassettes will be used to monitor ambient air for lead emissions.
- D. Ambient air test results will be reported to the Engineer daily via written correspondence on the testing laboratories letterhead.

LEAD PAINT ABATEMENT

13-282-8

3.2 CONTAINMENT

- A. Containment of the 375,000 Water Tank will be as described in the Section 09-901- Water Tank Recoating and Tank Improvements.

3.3 COLLECTION OF WATER FROM PRESSURE WASHING ACTIVITIES

- A. The base of each tank will be covered with sufficient filter fabric to filter all water and collect all paint debris falling from the tank exterior surface.

3.4 PRE & POST SITE SOIL SAMPLING

- 1. General

- a. Owners' Rep shall collect pre-project and post-project samples of ground (soil) and have the samples analyzed for total lead content.

- 2. Acceptance Criteria for Ground (Soil) Analysis

- a. Visible paint chips or debris on the ground are not allowed and must be removed regardless of the laboratory test results.
- b. If the laboratory analysis shows the soil to have been impacted by the work, as directed by the Owner, Contractor shall conduct the cleanup or remediation necessary to return the soil to pre-existing levels, at no additional cost to the Owner.

PART 4- METHOD OF MEASUREMENT

- A. All items listed in this section shall be measured individually as part of the Lump Sum Contract Price for "Lead Paint Abatement".

PART 5 - BASIS OF PAYMENT

- A. All items listed in this section shall be included at the contract lump sum bid price for "Lead Paint Abatement".

END OF SECTION