

**DIVISION 09 – SECTION 9705
WATER TANK REHABILITATION**

PART 1 GENERAL

1.01 REFERENCES

- A. The publications listed below form a part of this specification to the extent referenced.

ASTM INTERNATIONAL (ASTM)

ASTM C920	(2011) Standard Specification for Elastomeric Joint Sealants
ASTM D1200	(2010) Viscosity by Ford Viscosity Cup
ASTM D1640	(2003; R 2009) Drying, Curing, or Film Formation of Organic Coatings at Room Temperature
ASTM D3276	(2007) Painting Inspectors (Metal Substrates)
ASTM D3925	(2002; R 2010) Sampling Liquid Paints and Related Pigmented Coatings
ASTM D4285	(1983; R 2012) Indicating Oil or Water in Compressed Air
ASTM D7127	(2005) Measurement of Surface Roughness of Abrasive Blast Cleaned Metal Surfaces using a Portable Stylus Instrument
ASTM E11	(2009; E 2010) Wire Cloth and Sieves for Testing Purposes

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)

ISO 9001	(2008; Corr 1 2009) Quality Management Systems-Requirements
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NACE INTERNATIONAL (NACE)

NACE SP0188	(1999; R 2006) Discontinuity (Holiday) Testing of New Protective Coatings on Conductive Substrates
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THE SOCIETY FOR PROTECTIVE COATINGS (SSPC)

SSPC 7/NACE No.4	(2007; E 2004) Brush-Off Blast Cleaning
SSPC AB 2	(1996; E 2004) Cleanliness of Recycled Ferrous Metallic Abrasive
SSPC AB 3	(2003; E 2004) Ferrous Metallic Abrasive
SSPC Guide 12	(1998; E 2004) Guide for Illumination of Industrial Painting Projects

SSPC Guide 6	(2004) Guide for Containing Surface Preparation Debris Generated During Paint Removal Operations
SSPC PA 1	(2000; E 2004) Shop, Field, and Maintenance Painting of Steel
SSPC PA 2	(2012) Measurement of Dry Coating Thickness With Magnetic Gages
SSPC QP 1	(1998; E 2004) Standard Procedure for Evaluating Painting Contractors (Field Application to Complex Industrial Structures)
SSPC QP 5	(1999; E 2004) Standard Procedure for Evaluating the Qualifications of Coating and Lining Inspection Companies
SSPC QS 1	(2004) Standard Procedure for Evaluating a Contractor's Advanced Quality Management System
SSPC SP 1	(1982; E 2004) Solvent Cleaning
SSPC SP 10/NACE No. 2	(2007) Near-White Blast Cleaning
SSPC SP COM	(2004) Surface Preparation Commentary for Steel and Concrete Substrates
SSPC VIS 1	(2002; E 2004) Guide and Reference Photographs for Steel Surfaces Prepared by Dry Abrasive Blast Cleaning

U.S. NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)

29 CFR 1910-SUBPART Z	Toxic and Hazardous Substances
29 CFR 1910.1000	Air Contaminants
29 CFR 1910.134	Respiratory Protection
29 CFR 1926.59	Hazard Communication

1.02 SUBMITTALS

- A. The following shall be submitted in accordance with Section 01340.
- B. SUBMITTAL PROCEDURES:
 - 1. SD-05 Design Data
 - a. Containment System
 - b. Environmental Control System

2. SD-06 Test Reports
 - a. Coatings Qualification Test Reports
 - b. Coating Sample Test Reports
 - c. Inspection Report Forms
 - d. Daily Inspection Reports
3. SD-07 Certificates
 - a. Qualifications of Coating Contractors
 - b. Joint Sealant Materials
 - c. Coating Materials
 - d. Coating System Component Compatibility
 - e. Color Chips for each color to be used.
4. SD-08 Manufacturer's Instructions
 - a. Joint Sealant Instructions
 - b. Coating System Instructions
5. SD-11 Closeout Submittals
 - a. Disposal of Used Abrasive

1.03 SYSTEM DESCRIPTION

- A. Interior Coating System - Contractor shall furnish and install a new coating system on the interior of the elevated storage tanks listed below. Dimensions marked with an asterisk are estimates.

Name	Capacity	Height to Bottom	Head Range	Containment	Tank Type
Port	500,000 gal	86.33'	*37'	-	Multi Leg

- B. Exterior Coating System - Contractor shall furnish and install a new coating system on the exterior of the elevated storage tanks listed below. Dimensions marked with an asterisk are estimates.

Name	Capacity	Height to Bottom	Head Range	Containment	Tank Type
Port	500,000 gal	86.33'	*37'	YES	Multi Leg

- C. Miscellaneous Rehabilitation Work - Contractor shall perform additional rehabilitation work as described herein at the elevated storage tanks listed below. Dimensions marked with an asterisk are estimates.

Name	Capacity	Height to Overflow	Head Range	Containment	Tank Type
Port	500,000 gal	86.33'	*37'	YES	Multi Leg

1.04 QUALITY ASSURANCE

- A. General: Quality assurance procedures and practices shall be utilized to monitor all phases of surface preparation, application, and inspection throughout the duration of the project. Procedures or practices not specifically defined herein may be utilized provided they meet recognized and accepted professional standards and are approved by the Engineer.
- B. Surface Preparation: Surface preparation will be based upon comparison with: "Pictorial Surface Preparation Standards for Painting Steel Surfaces", SSPC-Vis-1 and ASTM Designation D2200; "Standard Methods of Evaluating Degree of Rusting on Painted Steel Surfaces" SSPC-Vis-2 and ASTM Designation D610; "Visual Standard for Surfaces of New Steel Air Blast Cleaned with Sand Abrasive" or "Guideline for Selecting and Specifying Concrete Surface Preparation for Sealers, Coating and Polymer Overlays" and ICRI CSP Surface Profile Chips.
- C. Contractor's Qualifications
1. The Contractor shall have five years practical experience and successful history in the application of specified products in similar projects. He shall substantiate this requirement by furnishing a list of references and job completions.
 2. Applicator must successfully demonstrate to the product manufacturer the ability to apply the material correctly and within the confines of the specifications. The Contractor must provide a letter from the

manufacturer stating their acceptance of the Contactor for this project to apply these products.

3. The Contractor shall possess the applicable license to perform the work as herein described and as specified by local, state and federal laws. The Contractor's licenses shall appear in the lower left-hand corner of the envelope containing the bids.
4. The Contractor shall provide a site mock up with each paint system as a representative of how the systems shall be installed and their final appearance, which is to be approved by the Owner before any work is started. For overcoat projects this mock up shall be used to test for adequate adhesion. This approved mock up shall be the quality standard for the rest of the project.
5. No work shall be done at night or on weekends without permission from the Engineer.

D. Design Data

1. Containment System - Submit complete design drawings and calculations for the scaffolding and containment system, including an analysis of the loads which will be added to the structure by the containment system and waste materials. A South Carolina registered engineer shall approve calculations and scaffold system design. A containment system shall only be necessary if a lead-based coating is present and a blasting operation is necessary to prepare the surface.
2. Environmental Control System - For interior coating systems, submit design details of the proposed environmental control system to include ventilation, humidity control, and temperature regulation. Provide calculations for humidity control during separate surface preparation and coating application procedures, ventilation requirements during coating application, and maximum allowable coating application rates to coincide with ventilation. Include basis of design data on local conditions. Provide equipment layout sketches and procedures showing function of each piece of equipment and fail-safe measures.
3. Safety Plan – Submit a plan detailing the safety procedures and equipment that will be implemented on this project.

E. Test Reports

1. Coatings Qualification Test Reports - Submit test results from independent laboratory of representative samples of each coating material. Samples must have been tested within the last three years.

1.05 PRODUCT DATA

- A. Joint Sealant Instructions - Submit manufacturer's printed instructions including detailed application procedures, minimum and maximum application temperatures, and curing procedures. Include materials safety data sheets (MSDS) for materials to be used at the job site in accordance with 29 CFR 1926.59.
- B. Coating System Instructions - Submit manufacturer's printed instructions including detailed mixing and application procedures, number and types of coats required, minimum and maximum application temperatures, and curing procedures. Include materials safety data sheets (MSDS) for materials to be used at the job site in accordance with 29 CFR 1926.59.

1.06 DELIVERY AND STORAGE

- A. Ship, store, and handle materials in accordance with SSPC PA 1, and as modified in this Section. Maintain temperature in storage spaces between 40 and 85 degrees F, and air temperature more than 5 degrees F above the dew-point at all times. Inspect materials for damage prior to use and return non-compliant materials to manufacturer.
- B. Materials exceeding the storage life recommended by the manufacturer shall be rejected.
- C. One gallon of each type and color coatings shall be delivered to The Owner and packaged for long term storage for future touch ups.

1.07 COATING HAZARDS

- A. Ensure that employees are trained in all aspects of the safety plan. Specified coatings may have potential health hazards if ingested or improperly handled. The coating manufacturer's written safety precautions shall be followed throughout mixing, application, and curing of the coatings. During all cleaning, cleanup, surface preparation, and paint application phases, ensure that employees are protected from toxic and hazardous chemical agents which exceed concentrations in 29 CFR 1910.1000. Comply with respiratory protection requirements in 29 CFR 1910.134.

PART 2 PRODUCTS

2.01 GENERAL

- A. Materials specified are those that have been evaluated for the specific service. Products of the Tnemec Co. or approved equal are listed to establish a standard of quality. Equivalent materials of other manufacturers may be substituted on written approval of the Owner. The referenced manufacturer is

Tnemec Company, Incorporated
101 Rice Bent Way Unit #5
Columbia, SC 29229
803-736-1553
Nick Vause 803-422-3650
Email: nvause@tnemec.com

- B. Requests for substitution shall include manufacturer's literature for each product giving the name, product number, generic type, descriptive information, solids by volume, recommended dry film thickness and certified test reports showing results to equal the performance criteria of the products specified herein. No request for substitution shall be considered that will decrease film thickness or offer a change in the generic type of coatings specified. In addition, a list of five similar projects shall be submitted in which each product has been used and rendered satisfactory service. Requests for product substitution shall be made at least thirty (30) days prior to bid date. Any material savings shall be passed to the owner in the form of a contract dollar reduction.
- C. Manufacturer's color charts shall be submitted to the Owner at least 30 days prior to paint application. General contractor and painting contractor shall coordinate work so as to allow sufficient time (five to ten days) for paint to be delivered to the jobsite.
- D. All materials shall be brought to the jobsite in original, sealed containers. They shall not be used until the Owner has inspected contents and obtained data from information on containers or labels. Materials exceeding storage life recommended by the manufacturer shall be rejected.
- E. All coatings and paints shall be stored in enclosed structures to protect them from weather and excessive heat or cold. Flammable coatings or paint must be stored to conform to City, County, State and Federal safety codes for flammable coating or paint materials. At all times, coating and paints shall be protected from freezing.

- F. A NACE Level 3 certified technical representative from the paint manufacturer shall visit the job site to climb the tank and to support the Contractor's personnel or the Owner as needed and/or requested. Visits shall be made on a weekly basis as a minimum or as needed to review hold points for the Owner. Additional visit shall be made as needed and/or requested by Owner or Contractor. A notice of 48 hours is required by the Contractor for each hold point observation.

2.02 INTERIOR COATING SYSTEM

- A. Alternate systems or products will not be considered. All primer, intermediate, and topcoat materials shall be manufactured by one manufacturer.
- B. Surface Preparation: SSPC SP10/NACE 2 Near White Metal Blast Cleaning. All unwelded seams, lapped plates, joints and other inaccessible areas will be filled. The surface shall be clean and dry before painting.
 - 1. 1st Coat - Zinc Rich Aromatic Urethane applied at 2.5 – 3.5 dry mils. Provide Tnemec Series 91H20/94H20 Tneme-Zinc or approved equal.
 - 2. Stripe Coat - NSF Approved Polyamidoamine Epoxy applied at 2.0 – 8.0 dry mils. Provide Tnemec Series N140/N140F Pota-Pox Plus or approved equal.
 - 3. 2nd Coat - NSF Approved Polyamidoamine Epoxy applied at 4.0 – 8.0 dry mils. Provide Tnemec Series N140/N140F Pota-Pox Plus or approved equal.
 - 4. 3rd Coat - NSF Approved Polyamidoamine Epoxy applied at 4.0 – 8.0 dry mils. Provide Tnemec Series N140/N140F Pota-Pox Plus or approved equal.
- C. Color: The interior color shall be Tnemec Tank White (15 BL) by Tnemec or approved equal.

2.03 EXTERIOR COATING SYSTEM

- A. All primer, intermediate, and topcoat materials shall be manufactured by one manufacturer.
- B. Surface Preparation: SSPC SP6/NACE 3 Commercial Blast Cleaning. The surface shall be clean and dry before painting.
 - 1. 1st Coat - Zinc Rich Aromatic Urethane applied at 2.5 – 3.5 dry mils. Use Tnemec Series 91H20/94H20 Tneme-Zinc or approved equal.

2. Stripe Coat: Polyamide Epoxy applied at 2.0 – 8.0 dry mils. Use Tnemec Series 161 TnemeFascure or approved equal.
 3. 2nd Coat - Aliphatic Acrylic Polyurethane applied at 3.0 – 5.0 dry mils. Use Tnemec Series 73 Endura Shield or approved equal.
 4. 3rd Coat - Advanced Thermoset Solution Fluoropolymer applied at 2.5 – 3.0 dry mils. Use Tnemec Series 700 Hydro-Flon or approved equal.
 5. Lettering/Logo: Two coats of an Advanced Thermoset Solution Fluoropolymer shall be used for the lettering/ logo applied at a dry film thickness of 2.0 – 3.0 per coat. Provide Tnemec Series 700 Hydro-Flon or approved equal. See Appendix C for Logo details.
- C. Color Choices: The exterior color shall be Tnemec KC Blue (21BL) by Tnemec or approved equal.
- D. Caulking: Fill all gaps between the concrete foundation and the bottom plates of the steel tank with a Modified Polyurethane. Overlap 2 inches on both sides of the gap. Provide Tnemec Series 265 Elasto-Shield TG or approved equal.
- E. Concrete Foundation: The concrete foundation shall be cleaned and shall receive two coats of Polyamide Epoxy at 4.0 – 8.0 dry mils. Provide Tnemec Series 27WB 34GR Tpoxy or approved equal.

PART 3 EXECUTION

3.01 GENERAL

- A. All surface preparation, coating and painting shall conform to applicable standards of the Steel Structures Painting Council, NACE ICRI, CSP and the manufacturer's printed instructions. Material applied prior to approval of the surface by the Engineer shall be removed and reapplied to the satisfaction of the Engineer at the expense of the Contractor.
- B. All work shall be performed by skilled craftsmen qualified to perform the required work in a manner comparable with the best standards of practice. Continuity of personnel shall be maintained and transfers of key personnel shall be coordinated with the Engineer.
- C. The Contractor shall provide an English-speaking supervisor at the work site during cleaning and application operations. The supervisor shall have the authority to sign change orders, coordinate work, and make decisions pertaining to the fulfillment of the contract.

- D. Dust, dirt, oil, grease or any foreign matter that will affect the adhesion or durability of the finish must be removed by washing with clean rags dipped in an approved cleaning solvent and wiped dry with clean rags.
- E. The Contractor's coating and painting equipment shall be designed for application of materials specified and shall be maintained in first class working condition. Compressors shall have suitable traps and filters to remove water and oils from the air. Contractor's equipment shall be subject to approval of the Owner.
- F. Application of the first coat shall follow immediately after surface preparation and cleaning and before rust bloom or flash rusting occurs. Any cleaned areas not receiving first coat within this period shall be recleaned prior to application of first coat.

3.02 REMOVAL OF COATINGS CONTAINING HAZARDOUS MATERIALS

- A. Coatings containing hazardous materials and identified for disturbance during surface preparation, including removal, shall be handled in accordance with all State and Federal Regulations.
- B. If the interior and/or exterior coating is known to contain lead primer and blasting is required, the Contractor shall sandblast a representative area of the interior and exterior of the tank as described in Section 3.05 Surface Preparation. Samples from the blasting of the interior and exterior shall be collected in the presence of the Engineer and sent to a laboratory for analysis. The laboratory must be certified by the State of South Carolina. The Contractor shall furnish the Engineer a certified test report for each tank of the Toxicity Characteristic Leaching Procedure (TCLP) results of a representative random sample taken from the debris and paint chips of the interior and/or exterior coating. Should the results exceed any of the EPA maximum limits, the Contractor shall apply for an EPA identification number for a generator of hazardous waste on notification Form 8700-12. Application and disposal of debris generated shall be through the Solid and Hazardous Waste Assessment Section of the South Carolina Department of Health and Environmental Control. Should the results of the certified test be less than the EPA maximum limit, the Contractor shall dispose of the debris generated in an approved landfill as directed by the Solid and Hazardous Waste Assessment Section of the South Carolina Department of Health and Environmental Control.

3.03 LIGHTING

- A. Provide lighting for all work areas as prescribed in SSPC Guide 12.

3.04 ENVIRONMENTAL CONDITIONS

A. Containment

1. Containment shall be required for all structures listed under Section 1.03 System Description with "Yes" in the containment column and/or any structures on which exterior blasting will be performed. For all such structures, the contractor shall design and provide a containment system for the capture, containment, collection, storage and disposal of the waste materials generated by the work described herein, to meet the requirements of SSPC Guide 6. Vapor concentrations shall be kept at or below 10 percent of Lower Explosive Limit (LEL) at all times. Containment shall be designed as fixed containment for the complete structure and shall remain in place from the beginning of abrasive blasting through initial cure of coating. Waste materials covered by this paragraph shall not include any material or residue from removal of coatings containing lead, chromium, cadmium, PCB, or any other hazardous material.
2. Sandblasting shall not begin until the Engineer has inspected and approved the containment system.
3. The contractor shall be responsible for all costs associated with the capture, storage and disposal of all debris and blasting media. Disposal of debris shall be coordinated with the Solid and Hazardous Waste Assessment Section of the South Carolina Department of Health and Environmental Control.
4. A laboratory certified by the State of South Carolina shall be contracted to test debris generated during sandblasting and power tool cleaning to determine if debris exceeds leachable limits for arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver as determined by EPA's Toxicity Characteristic Leaching Procedure (TCLP). All costs associated with sample collection and testing shall be paid for by the contractor. A copy of the certified report shall be provided to the Engineer.
5. If the containment system fails to function satisfactorily, the Contractor shall suspend all operations, except those required to minimize adverse impact on the environment or government property. Operations shall not resume until modifications have been made to correct the cause of the containment system failure.

B. Monitoring Requirements

1. Provide periodic monitoring of temperature, relative humidity, and dew point data at pertinent points on the structure, during surface preparation, coating application, and initial cure. Locate sensors to provide pertinent data for the surface preparation and coat application being performed. Monitor any heating, cooling, or dehumidification equipment used. Make data available to the Engineer upon request.

C. Temperature and Humidity

1. Provide a surface temperature thermometer and sling psychrometer (or other device for reliable measurement of humidity). The surface temperature of the tank and the relative humidity shall be read and recorded periodically, several times each day. A log shall be maintained at the site indicating the time, date, and readings of the temperature, humidity and dew point.

3.05 SURFACE PREPARATION

A. The latest revision of the following surface preparation specifications of the Steel Structures Painting Council and NACE shall form a part of this specification:

1. Solvent Cleaning (SSPC SP1): Removal of oil, grease, soil and other contaminants by use of solvents, emulsions, cleaning compounds, steam cleaning or similar materials and methods which involve a solvent or cleaning action.
2. Hand Tool Cleaning (SSPC SP2): Removal of loose rust, loose mill scale and other detrimental foreign matter to degree specified by hand chipping, scraping, sanding and wire brushing.
3. Power Tool Cleaning (SSPC SP3): Removal of loose rust, loose mill scale and other detrimental foreign matter to degree specified by power wire brushing, power impact tools or power sanders.
4. Commercial Blast Cleaning (SSPC-SP6/NACE 3): Blast cleaning until at least 66 percent of each element of surface area is free of all visible residues.
5. Brush-Off Blast Cleaning (SSPC-SP7/NACE 4): Brush-off blast cleaned surface, when viewed without magnification, shall be free of all visible oil, grease, dirt, dust, loose mill scale, loose rust, and loose coating. Tightly adherent mill scale, rust, and coating may remain on the surface. Mill scale, rust, and coating are considered tightly adherent if they cannot be

removed by lifting with a dull putty knife after abrasive blast cleaning has been performed.

6. Near White Blast Cleaning (SSPC SP10/NACE 2): Blast cleaning to nearly white metal cleanliness, until at least 95 percent of each element of surface area is free of all visible residues.
 7. Power Tool Cleaning to Bare Metal (SSPC-SP11): This standard covers the requirements for power tool cleaning to produce a bare metal surface and to retain or produce a minimum 25 micrometer (1.0 mil) surface profile. This standard is suitable where a roughened, clean, bare metal surface is required, but where abrasive blasting is not feasible or permissible.
 8. Surface Preparation of Concrete (SSPC SP13/NACE 6): This standard gives requirements for surface preparation of concrete by mechanical, chemical, or thermal methods prior to the application of bonded protective coating or lining systems.
- B. Blast cleaning for all surfaces shall be by dry method unless otherwise directed.
 - C. Particle size of abrasives used in blast cleaning shall be that which will produce a 1.5 – 2.0 mil (37.5 microns – 50.0 microns) surface profile or in accordance with recommendations of the manufacturer of the specified coating or paint system to be applied.
 - D. Abrasive used in blast cleaning operations shall be new, washed, graded and free of contaminants that would interfere with adhesion of coating or paint and shall not be reused unless specifically approved by the Owner.
 - E. During blast cleaning operations, caution shall be exercised to ensure that surrounding existing coatings or paint are not exposed to abrasion from blast cleaning.
 - F. The Contractor shall keep the area of his work and the surrounding environment in a clean condition. He shall not permit blasting materials to accumulate as to constitute a nuisance or hazard to the accomplishment of the work, the operation of the existing facilities, or nuisance to the surrounding environment.
 - G. Blast cleaned surfaces shall be cleaned prior to application of specified coatings or paint. No coatings or paint shall be applied over damp or moist surfaces.

3.06 MIXING AND APPLICATION OF SEALANT AND COATING SYSTEM

- A. Preparation of Sealant and Coating Materials for Application

1. Each of the sealant, primer, intermediate, and topcoat materials is a two-component material supplied in separate containers.
2. Mixing Sealant, Primer and Intermediate Coat Materials
3. Mix in accordance with manufacturer's instructions, which may differ for each product. Do not mix partial kits or alter mix ratios. Mix materials in same temperature and humidity conditions specified in paragraph DELIVERY AND STORAGE. Allow mixed material to stand for the required induction time based on its temperature.
4. Mixing Topcoat Material - Do not mix partial kits, or alter mix ratios. Mix polyurethane coating materials in same temperature conditions specified in paragraph DELIVERY AND STORAGE. The polyurethane coating material is moisture sensitive and any introduction of moisture or water into the material during mixing or application will shorten usable pot life. Use a mixer that does not create a vortex. Do not add solvent without specific written recommendation from the manufacturer. No induction time is required, only thorough agitation of the mixed material.
5. Pot Life - Apply mixed products within stated pot life for each product. Stop applying when material becomes difficult to apply in a smooth, uniform wet film. Add all required solvent at time of mixing. Do not add solvent to extend pot life. Pot life is based on standard conditions at 70 degrees F and 50 percent relative humidity. For every 18 degrees F rise in temperature, pot life is reduced by approximately half, and for every 18 degrees F drop it is approximately doubled. Usable pot life depends on the temperature of the material at the time of mixing and the sustained temperature at the time of application. Other factors such as the shape of the container and volume of mixed material may also affect pot life. Precooling or exterior icing of components for at least 24 hours to a minimum of 50 degrees F in hot climates will extend pot life. High humidity at time of mixing and application shortens pot life of the Polyurethane topcoat material. Following are approximate pot life times:
 - a. Sealant - As specified by manufacturer:
 1. Epoxy primer and intermediate materials - 4 hours
 2. Polyurethane topcoat materials – 2 hours

B. Application of Coating System and Joint Sealant

1. No coating or paint shall be applied:

- a. When the surrounding air temperature or the temperature of the surface to be coated is below the minimum required temperature for the specified product.
 - b. When the surface is too wet or damp surfaces or in fog or mist.
 - c. When the temperature is less than 5 degrees Fahrenheit above the dewpoint. Dewpoint shall be measured by use of an instrument such as a Sling Psychrometer in conjunction with U.S. Department of Commerce Weather Bureau Psychrometric Tables.
 - d. When the air temperature is expected to drop below 40 degrees F. within six hours after application of coating.
2. If the above conditions are prevalent, coating or painting shall be delayed or postponed until conditions are favorable. The day's coating or painting shall be completed in time to permit the film sufficient drying time prior to damage by atmospheric conditions.
 3. Apply coatings in accordance with SSPC PA 1, latest revision, and as specified herein. Apply coatings only to surfaces that meet all stated surface preparation requirements.
 4. Apply each spray coat in a consistent wet film, at 90 degrees to previous coat. Ensure that primer and intermediate coat "cold joints" are no less than six inches from welds.
 5. Protective coverings or drop cloths shall be used to protect floors, fixtures, and equipment. Care shall be exercised to prevent coatings or paint from being spattered onto surfaces that are not to be coated or painted. Surfaces from which materials cannot be removed satisfactorily shall be recoated or repainted as required to produce a finish satisfactory to the Engineer.
 6. When two coats of coating or paint are specified, where possible, the first coat shall contain sufficient approved color additive to act as an indicator of coverage or the two coats must be of contrasting color.
 7. All welds, edges and other irregular surfaces shall receive a brush coat of the specified product prior to application of the first complete coat.
 8. Thinning shall be permitted only as recommended by the manufacturer and approved by the Engineer, and utilizing the thinners specified herein.

9. Application of Topcoat - Make all required repairs to primer and intermediate coats as specified in paragraph entitled "Procedure for Holiday and Spot Repairs of Newly Applied Coating" prior to applying topcoat. Apply topcoat within RECOAT WINDOW of intermediate coat. The polyurethane topcoat may require multiple passes to achieve desired aesthetics and required thickness. Consult manufacturer for thinning and application procedures for anticipated temperature, humidity, and wind conditions. Touch-up blemishes and defects within recoat window of polyurethane topcoat. Retain sample of polyurethane topcoat, from the same batch used to coat structure, to make touch-ups that might be required later.
10. Application of Joint Sealant - Apply joint sealant to back-to-back steel joints that are less than 3/8 inches wide and are not seal welded. Apply sealant to top and bottom, or each side, of narrow joints. Apply sealant within 48 hours of application of the topcoat, and touch-up with topcoat after appropriate cure of the sealant.
11. Application of Stripe Coat - Apply stripe coat of epoxy primer material prior to application of general primer coat on CEILING. Apply stripe coat of epoxy intermediate coat material after application of general primer coat on BOWL. Where stripe coat is applied to areas of joint sealant, allow appropriate curing time for joint sealant. Apply stripe coat by brush, working the material into corners, crevices, pitted areas, and welds, and onto outside corners and angles. Where roof-to-rafter joints exceed a 1-inch gap and roof joint sealant was not applied, use appropriate application tools to provide "best effort" coating of all exposed steel surfaces in the gap. Mini-rollers or other tools may be required.
14. Tank Occupancy after Coating Application - Use clean canvas, or other approved, shoe covers when walking on coated surfaces, regardless of curing time allowed. For heavily trafficked areas, provide cushioned mats for additional protection.
15. Extended Cure of Coating System Prior to Immersion Service - Allow a cure time of at least 14 days after the final coating material has been applied before introducing water into tank.
16. All coating shall be applied evenly and shall be free of roller marks, sags, runs, overspray, dryspray or any other imperfections that would be an indication of poor workmanship. Finished surfaces shall be free from defects and blemishes.

17. Exterior coatings shall be brushed and rolled. Exterior spray applications shall only be allowed up on prior approval from the Engineer.

3.07 ADDITIONAL REHABILITATION WORK

- A. The following work shall only be performed on the Port Tank. See Appendix B for photos of the existing tank conditions.
 1. Roof Vent – Replace roof vent with a mushroom vent with a number 24 mesh stainless steel screen to exclude all rainwater, birds, animals, dust and insects. The vent shall be 24” minimum diameter or as needed to prevent implosion of the tank in the event of a rapid discharge. Screening for vent shall conform to Section 5.5.2 of AWWA D100 or Section 5.5.2 of AWWA D103, which ensures fail-safe operation in the event that screen frosts over and the bottom of the screen shall be sufficiently elevated for snow consideration in the area.
 2. Overflow Outlet Modifications – remove bend on the end of overflow pipe and weld flange to end so that water exits the pipe parallel to grade. Install a number 4 mesh stainless steel screen over the end of the overflow pipe and secure it in place with a second flange, which shall be bolted to the welded flange. Install a new flap valve on the overflow outlet.
 3. Riser Opening Fall Protection – Install steel grate over riser opening in tank bowl to comply with SCDHEC Primary Drinking Water Regulation R61-58.4.C(2)(k). Grate shall be hinged on one end with a maximum 6” opening between grate bars.
 4. Interior Ladder Rung Replacement – Replace severely damaged and/or corroded ladder rungs on tank interior access ladder. Replacement ladder rungs shall be similar geometry to existing ladder rungs and shall be A36 steel. Engineer to identify in the field which ladder rungs are to be replaced.
 5. Exterior Ladder Modifications – There are 5 locations where the existing bolts fastening the exterior ladder to the leg standoffs are severely corroded. In these areas the ladder shall be welded to the standoff plate and the existing bolts removed. There are also 2-3 standoff plates which have severely corroded. In these areas, a reinforcement plate can be welded onto the existing standoff, or the standoff can be replaced with a new standoff plate of equivalent thickness.
 6. Safety Climb Cables - Remove bar climbing system and install new 3/8” safety climb cable. Cable shall be galvanized steel that will pass a 10,000-

pound test. Attach to the face of the ladder at the top and bottom. Provide cable stays at 20' maximum spacing. Replace on all ladders on the interior and exterior. Cable system shall be as specified and per manufacturer's recommendations.

7. Riser Foundation Bolt Sealant – Once final coating is completed and has properly cured, install caulk in voids around riser foundation bolts.
8. Column Base Plate Gaps – Add grout to fill large voids beneath plate and Caulk around all foundation base plates prior to applying coating to concrete.
9. Concrete Foundation Coating – Apply 2 coats of Polyamide Epoxy at 4.0 – 8.0 dry mils. Provide Tnemec Series 161 34GR TnemecFascure or approved equal to concrete foundations. Coating shall be applied down to 1 inch below grade. Transition between base plate and concrete must be coated as well using Tnemec Series 265 Elasto-Shield TG or approved equal.
10. Level Indicator System – Remove and replace float and cable assembly with new stainless steel float and cable assembly for level indicator. Apply silicone grease to all pulleys. All pulleys to have pulley guards to prevent cable from disengaging from the pulley.
11. Riser Drain – Remove 2" existing tap and replace with 4" tap in riser and install a drain pipe with a 4" handwheel grate valve and 4" quick connect. Coordinate with City to determine if the 4" quick connect will match their method of disposal. Use Mueller 4" flange by flange A-2361 resilient Wedge Gate Valve.

3.08 FIELD QUALITY CONTROL

- A. General: Quality assurance procedures and practices shall be utilized to monitor all phases of surface preparation, application, and inspection throughout the duration of the project. Procedures or practices not specifically defined herein may be utilized provided they meet recognized and accepted professional standards and are approved by the Engineer.
- B. All parties, to include the Engineer, General Contractor and product manufacturer(s) shall meet prior to any work being started to review the project manual and discuss job specific expectations, needs and requirements.
- C. For marking of tank surfaces, use chalk for marking bare steel, and water-based markers for marking coated surfaces, and remove marks prior to coating. Do not

use any wax or grease based markers, or any other markers that leave a residue or stain.

- D. Holiday Testing - No sooner than 48 hours after application of the topcoat, perform holiday testing in accordance with the low voltage wet sponge method of NACE SP0188. Repair holidays per paragraph entitled "Procedure for Holiday and Spot Repairs of Newly Applied Coating."
- E. Procedure for Holiday and Spot Repairs of Newly Applied Coating - Repair coating film defects at the earliest practicable time, preferably before application of the succeeding coat. Observe all requirements for soluble salts contamination, cleanliness between coats, and application conditions. Prepare defective area in accordance with SSPC SP 10/NACE No. 2, and feather coating as required to leave 4 inches of each succeeding coat feathered and abraded. Protect adjacent areas from damage and overspray. Remove dust and solvent wipe the prepared area plus an additional 4 inches beyond the prepared area with clean denatured alcohol. Within four hours of preparation, apply primer to prepared steel and feather onto prepared primer. Apply intermediate coat to primed area and feather to prepared intermediate area. Apply topcoat to intermediate coat and feather to prepared topcoat. Apply each repair coat to approximate thickness of surrounding coating system.
- F. Thickness and Holiday Checking: Thickness of coatings and paint shall be checked with a non-destructive, magnetic type thickness gauge. The integrity of coated interior surfaces shall be tested with an approved inspection device. Non-destructive holiday detectors shall not exceed the voltage recommended by the manufacturer of the coating system. For thicknesses between 10 and 20 mils (250 microns and 500 microns), a non sudsing type wetting agent, such as Kodak Photo Flo, may be added to the water prior to wetting the detector sponge. All pinholes shall be marked, repaired in accordance with the manufacturer's printed recommendations, and retested. No pinholes or other irregularities will be permitted in the final coating.
- G. Inspection Equipment
 - 1. The Contractor shall furnish, until final acceptance of coating and painting, inspection devices in good working condition for detection of holidays and measurement of dry-film thickness of coating and paint. The Contractor shall also furnish U.S. Department of Commerce; National Bureau of Standard certified thickness calibration plates to test accuracy of dry film thickness gauges and certified instrumentation to test accuracy of holiday detectors.

2. All equipment shall be in good condition, operational within its design range, and calibrated as required by the specified standard for use of each device.
3. All necessary testing equipment shall be made available for the Engineer's use at all times until final acceptance of application. Holiday detection devices shall be operated in the presence of the Engineer.

3.09 SAFETY AND HEALTH REQUIREMENTS

- A. General: In accordance with requirements set forth by regulatory agencies applicable to the construction industry and manufacturer's printed instructions and appropriate technical bulletins and manuals, the Contractor shall provide and require use of personnel protective lifesaving equipment for persons working on or about the project site.
- B. Head and Face Protection and Respiratory Devices: Equipment shall include protective helmets, which shall be worn by all persons while in the vicinity of the work. In addition, workers engaged in or near the work during sandblasting shall wear eye and face protection devices and air purifying half mask or mouthpiece respirators with appropriate filters. Barrier creams shall be used on any exposed areas of skin.
- C. Ventilation: Where ventilation is used to control hazardous exposure, all equipment shall be explosion-proof. Ventilation shall reduce the concentration of air contaminant to the degree a hazard does not exist. Air circulation and exhausting of solvent vapors shall be continued until coatings have fully cured.
- D. Sound Levels: Whenever the occupational noise exposure exceeds maximum allowable sound levels, the Contractor shall provide and require the use of approved ear protective devices.
- E. Illumination: Adequate illumination shall be provided while work is in progress, including explosion-proof lights and electrical equipment. Whenever required by the Owner, the Contractor shall provide additional illumination and necessary supports to cover all areas to be inspected. The Owner shall determine the level of illumination for inspection purposes.
- H. Confined Space: When applicable it is mandatory that all work be performed in compliance with OSHA'S rules and regulations for working in confined space. Atmospheres within confined spaces as defined by the Occupational Safety and Health Administration are classified as being either a Class A, Class B or Class C environment.

3.10 DISINFECTION

- A. The elevated tank and connecting lines thereto shall be disinfected with chlorine before being placed in operation.
- B. Tank
 - 1. After the coating system has been inspected, approved, and cured, the tank shall be rinsed with potable water and disinfected in accordance with AWWA C652. After the chlorination procedure is completed and before the storage facility is placed in service, the Contractor shall flush the tank until the free chlorine residual has reached the normal levels in the existing system and then take two samples 24 hours apart for bacteriological testing. Testing must be conducted by a laboratory that has been certified by SCDHEC. The chlorine residual at the time of sample collection must be measured and reported. Both samples must be free of total coliform bacteria before the tank can be placed into service.
- C. Piping
 - 1. The valves and piping shall be disinfected in accordance with Section 33 1100 WATER DISTRIBUTION.

3.11 FINAL CLEANUP

- A. Upon completion of the work, all staging, scaffolding, and containers shall be removed from the site or destroyed in a manner approved by the Owner. Coating or paint spots and oil or stains upon adjacent surfaces shall be removed and the jobsite cleaned. All damage to surfaces resulting from the work of this section shall be cleaned, repaired, or refinished to the satisfaction of the Owner at no cost to the Owner.

3.12 WARRANTY

- A. The Contractor will warrant the work free of defects in material and workmanship for a period of one year from the acceptance of the work. At the end of one year, the Contractor will return for a one-year anniversary inspection of the work. The Contractor will correct any deficiencies found with no cost to the owner. Inspections shall be conducted to ensure conformance with the specification.

End of Section