SECTION 09910
RESERVOIR PAINTING AND PROTECTIVE COATINGS

PART 1 - GENERAL

1.01 DESCRIPTION

A. The purpose of this specification is to establish methods and procedures for coating and disinfection. Work to be performed includes application of protective coatings to interior and exterior surfaces and disinfection of interior surfaces, including surface preparation and other Work necessary to accomplish the approved end result of a totally protected and usable structure. Areas to be coated shall include: all interior surfaces including, but not limited to, shell, roof plates, framing, columns, reinforcing, ladder, floor, piping, and access manholes; all exterior surfaces including, but not limited to, shell, roof, roof hatch, reservoir vents, ladder, and piping. This specification applies to both existing and proposed steel reservoirs.

B. Definitions:

1. "Engineer" refers to the person authorized by the District to oversee the execution of the contract.
2. "Coating" refers to protective materials used or applied on interior surfaces.
3. "Paint" refers to protective materials used or applied on exterior surfaces.
4. "Coat" refers to paint applied in a single or multiple pass application to form an evenly distributed film when dry. Designations for "coats" are primer or first coat, intermediate or second coat, and finish coat, and any coats applied beyond the designated coats.

C. Surfaces not to be painted include fencing, concrete surfaces, glass, plastic, nameplates, and other surfaces on which coatings or paints would not adhere or would interfere with operation of specific item.

D. If severely corroded or damaged areas are discovered during the course of abrasive blast cleaning operations, the Contractor shall notify the Engineer or authorized representative. Welding and repair of severely corroded areas of tank and other mechanical repairs may be required during project at the sole discretion of the District Engineer.

1. Where damage exceeds anticipated levels, in the sole opinion of the District Engineer, the Contractor shall allow the District access to make tank repairs. Contractor shall cease all internal work while repairs are made. The District reserves the option to repair the tank structure with:
    a. Change order to the contract.
    b. District employees.
    c. A separate Contractor.
    d. Any combination of the above.

2. Should tank repairs be necessary, Contract Work shall continue while tank repairs are being made unless the District determines that the structural work precludes coating and painting work. A time extension up to two weeks will be issued to the Contractor if the tank repairs preclude Contract Work. The time extension will assume the Contractor will be able to re-mobilize and begin Contract Work within two weeks. No additional time will be granted to permit the Contractor to complete other projects prior to this project. No additional compensation shall be granted for delays due to tank work during this time.

Additional compensation will be provided to the contractor if additional time is required, or demobilization and remobilization is required for the District to complete the tank repairs. Compensation shall include costs associated with delays greater than two weeks including remobilization, equipment, and material costs.

1.02 REFERENCE SPECIFICATIONS AND STANDARDS

A. Without limiting the general aspects or other requirements of this specification, Work and equipment shall conform to applicable requirements of municipal, state and federal codes, laws and ordinances governing the Work, the Valley Center Municipal Water District and manufacturer's printed instructions, subject to Engineer's approval.

B. The Engineer's decision shall be final as to interpretation and/or conflict between any of the referenced codes, laws, ordinances, specifications and standards contained herein.

C. Except as otherwise indicated, the current editions of the following apply to the Work of this Section:

1. ANSI/AWWA D102, "Coating Steel Water-Storage Tanks" – latest edition.
2. ASTM C920, "Specification for Elastomeric Joint Sealants"
3. National Association of Corrosion Engineer's (NACE International), including NACE TM-01-70, "Visual Standard for Surfaces of New Steel Airblast Cleaned with Sand Abrasive", and SPO 188-06 "Discontinuity (Holiday) Testing of New Protective Coatings on Conductive Substrates".
4. National Association of Corrosion Engineers (NACE International) SP0178-07. "Design, Fabrication, and Surface Finish Practices for Tanks and Vessels to be Lined for Immersion Service".
5. National Sanitation Foundation (NSF) Standard 61 for Contact with Drinking Water.
6. OSHA Safety and Health Standards for Construction (29CFR1926)
7. Specifications of The Society For Protective Coatings (SSPC)

D. The District's decision shall be final as to interpretation and/or conflict between any of the referenced codes, laws, ordinances, specifications and standards contained herein.

1.03 CONTRACTOR SUBMITTALS

A. Submittals shall include the following information and be submitted at least 15 days before protective coating WORK:

1. Baseline schedule per Article 6 of the General Conditions.

2. Coating Materials List: The coating materials list shall show the Manufacturer and coating number, keyed to the coating systems herein.

3. Paint Manufacturer's Information: For each coating system to be used, the following data shall be provided:

   a. Paint manufacturer's data sheet for each product proposed, including statements on the suitability of the material for the intended use.

   b. Technical and performance information that demonstrates compliance with the system performance and material requirements.

   c. Paint manufacturer's instructions and recommendations on surface preparation and application.

   d. Color sample (4" x 4" min on metal plate) for exterior paint.

   e. Material Safety Data Sheet for each product used.

   f. Affidavit of compliance, after coating completion, in accordance with AWWA D102.

   g. Material warranty.

4. Overspray Protection Plan.

5. Applicators quality assurance: SSPC QP1 certification or evidence of having preformed a minimum of three reservoir coating projects for the District within the past ten years.

6. Manufacturer's standard warranty.

7. Fifteen (15) year paint manufacturer's warranty covering color and gloss for exterior coating.

B. District shall approve the above submittals prior to contractor beginning any work.

1.04 WARRANTY INSPECTION

A. Warranty Inspection: Warranty inspection shall be conducted the tenth (10^{th}) and thirty-forth (34^{th}) months following completion of all Work and filing of the Notice of Acceptance. All personnel present at the Pre-Construction Conference should be present at this inspection. All defective Work shall be repaired in strict accordance with the contract documents and to the satisfaction of the Engineer.

1. Notification: The District shall establish the date for the inspection and shall notify the Contractor at least 30 days in advance. The District will drain the tank prior to inspection. Contractor is required to coordinate the removal of the

remaining water from the tanks for complete draining. Work is only allowable at one tank site at a time. Contractor shall provide, at his own expense, suitable lighting, scaffolding and ventilation for the inspection. At the District's option, warranty inspection for interior surfaces may be accomplished by diving operations with tank in service.

2. Interior Inspection: The newly applied interior coating systems shall be visually inspected as specified herein. All defective coating in these areas as well as damaged or rusting spots of the tank shall be satisfactorily repaired by and at the sole expense of the Contractor. All repairs and testing procedures shall be repeated until the surface is acceptable to the Engineer.

3. Exterior Inspection: The newly applied exterior paint systems shall be visually inspected as specified in herein. All defective paint in these areas as well as damaged or rusting spots of the tank shall be satisfactorily repaired by and at the sole expense of the Contractor. All repaired areas shall then be again inspected and repair procedure repeated until surface is acceptable to the Engineer.

4. Inspection Report: The Engineer shall prepare an inspection report covering the first anniversary inspection, setting forth the number and type of failures observed, the percentage of the surface area where failure has occurred, and the names of the persons making the inspection.

5. Schedule: Upon completion of inspection and receipt of Inspection Report as noted herein, District shall notify Contractor of results of inspection and establish a date for Contractor to proceed with remedial Work. Any delay on part of Contractor to meet schedule may cause District to proceed to have defects remedied by others as outlined under General Provisions.

6. Remedial Work: Any location where coating or paint has peeled, bubbled, or cracked and any location where rusting is evident shall be considered to be a failure of the system. The Contractor shall make repairs at all points where failures are observed by removing the deteriorated coating or paint, cleaning the surface, and reapplying the same system. If the area of failure exceeds 25 percent of a specific coated or painted surface, the entire applied system may be required to be removed and reapplied based on the District's sole judgment in accordance with the original specification. Contractor shall disinfect reservoir after completing all repairs.

7. Costs: All noted costs for Contractor's inspection and all costs for repair shall be borne by the Contractor and in figuring his bid, the Contractor shall include an appropriate amount for testing and repair as no additional allowance will be paid by the District for said inspection and repair.

1.05 CONTRACTOR

A. The Coatings Applicator shall be SSQP QP1 certified working under the direct supervision and authority of a licensed Contractor; A-1, General Engineering or C-33, Painting and Decorating.

1.06 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 acceptable professional standards and are approved by the Engineer.

B. All materials furnished and all Work accomplished under the Contract shall be subject to inspection by the Engineer. The Contractor shall be held strictly to the true intent of the Specifications in regard to quality of materials, workmanship, and diligent execution of the Contract.

C. Work accomplished in the absence of prescribed inspection may be required to be removed and replaced under the proper inspection, and the entire cost of removal and replacement, including the cost of all materials which may be furnished by the District and used in the Work thus removed, shall be borne by the Contractor, regardless of whether the Work removed is found to be defective or not. Work covered up without the authority of the Engineer or Inspector, shall, upon order of the Engineer, be uncovered to the extent required, and the Contractor shall similarly bear the entire cost of accomplishing all the Work and furnishing all the materials necessary for the removal of the covering and its subsequent replacement, as directed and approved by the Engineer.

D. The Engineer will make, or have made, such tests as he deems necessary to assure the Work is being accomplished in accordance with the requirements of the Contract. Unless otherwise specified in the Special Conditions, the cost of such testing will be borne by the Contractor. In the event such tests reveal non-compliance with the requirements of the Contract, the Contractor shall bear the cost of such corrective measures deemed necessary by the Engineer, as well as the cost of subsequent retesting and re-inspection. It is understood and agreed the making of tests shall not constitute an acceptance of any portion of the Work, nor relieve the Contractor from compliance with the terms of the Contract.

E. Surface Preparation: Surface preparation will be based upon comparison with: "Pictorial Surface Preparation Standards for Painting Steel Surfaces", SSPC-Vis 1, ASTM Designation D2200, NACE Standard TM-01-70, and as described below. Anchor profile for prepared surfaces shall be measured by using a non-destructive instrument such as a K-T Surface Profile Comparator or Testex Press-O-Film System. Temperature and dewpoint requirements noted herein shall apply to all surface preparation operations, except low and high temperature limits and operation of dehumidification equipment shall be determined at the Pre-Job Conference.

F. Application: No coating shall be applied under the following conditions:

1. When the surface is wet or damp or is less than 5 degrees F above the dew point.

2. When the surface to be coated or painted is below the minimum and above the maximum surface temperature listed on the coatings manufacturers product data sheet for each product.

3. When the temperature is less than 5 degrees F. above the dew point or when the surface to be coated or painted is below the minimum and above the maximum surface temperature listed on the coatings manufacturers product data sheet for each product within two (2) hours after application of coatings or paints.

   a. Dew point 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 or equivalent. When dehumidification is used, equipment must be operated on a continuous basis.

If above conditions are prevalent, coating and paint application shall be delayed or postponed until conditions are favorable. The day's application shall be completed in time to permit the film sufficient drying time prior to damage by atmospheric conditions. The Engineer shall control all aspects of coating application and surface preparation. Daily reports shall be kept as to the temperature and humidity conditions during coating application.

G. Overspray and Dust Control: The Contractor shall conduct all operations so as to confine abrasive blasting debris and coating and paint overspray to within the bounds of the site. The Contractor shall take all precautions necessary to prevent adverse off-site consequences of blast cleaning or application operations. Any complaints received by the District relating to any such potential off-site problems will be immediately delivered to the Contractor-assigned jobsite representative. The Contractor shall immediately halt blast cleaning or application Work and shall take whatever corrective action is required to mitigate any such problems. All costs associated with protection of off-site properties and/or correction of damage to property as a result of blast cleaning or application operations shall be borne directly by the Contractor at no additional expense to the District.

   1. District approval of Contractor's blast cleaning and overspray prevention procedures and Engineer's presence on project does not free Contractor from responsibility for compliance. Daily approval of procedures will be required prior to start of blast cleaning or spray operations.

H. Thickness Testing: Thickness of coatings and paints shall be tested by the Engineer, with a non-destructive film thickness gauge. An instrument such as a Tooke Gage should be used if a destructive tester is deemed necessary. Testing shall be accomplished in conformance to SSPC-PA 2, "Measurement of Dry Paint Thickness with Magnetic Gages" except as modified hereinafter.

   1. Flat coated or painted surfaces shall be tested in conformance to SSPC-PA 2.

   2. Structural members, piping and other irregular surfaces shall be tested with frequency and locations as directed by the Engineer.

I. Holiday Testing: Coating integrity of all coated surfaces shall be Holiday tested with an approved inspection device and in accordance with NACE SP0188-06. Testing shall be performed in the presence of the Engineer. All holidays shall be marked, repaired in accordance with the manufacturer's printed recommendations and retested. The final coating shall be 100% Holiday-free with no pinholes or other irregularities.

J. Inspection Devices: Contractor will furnish, until final acceptance of coatings and paints, inspection devices in good working condition for detection of holidays and measurement of dry-film thickness. They shall also furnish U.S. Department of Commerce, National Bureau of Standards certified thickness calibration plates to test accuracy of thickness gauges. Dry film thickness gauges and holiday detectors shall be available at all times until final acceptance of application. Inspection devices shall be operated by, or in the presence of the Engineer with location and frequency basis determined by the Engineer. The Engineer is not precluded from furnishing his own inspection devices and rendering decisions based solely upon results of tests using those devices.

K. Acceptable Inspection Devices: Acceptable devices for ferrous metal surfaces include, but are not limited to Tinker and Rasor Models AP and AP-W holiday detectors and "Inspector", or "Positest", or "Positector" or "Quanix" units for dry film thickness gauging. Inspection devices shall be operated in accordance with these specifications and the manufacturer's instructions.

1.07 SAFETY AND HEALTH REQUIREMENTS

A. Contractor shall submit a notarized letter signed by a principal officer of the Corporation certifying the Contractor fully complies with California Code of Regulations pertaining to the Work including, but not limited to, the following Construction Safety Orders (CSO) or General Industry Safety Orders (GISO):

1.	Illness Injury Prevention Program	CSO/GISO	1508/3203
2.	Confined Space Plan	GISO	5156/5159
3.	Respiratory Protection	CSO/GISO	1531/5144
4.	Hazard Communication	GISO	5194
5.	Rolling Scaffolds	CSO	1646
6.	Employee Safety Instruction	CSO	1510
7.	Emergency Medical Service	CSO	1512
8.	Dusts, Fumes, Mists, Vapors & Gases	CSO	1528

B. General: Contractor assumes the responsibility to accomplish all Work in a safe and prudent manner, and to conform to all applicable safety requirements, regulations and guidelines of federal, state and local regulatory agencies, as well as applicable manufacturer's printed instructions and appropriate technical bulletins and manuals. Without in any way limiting that responsibility or assuming responsibility for safety, District is particularly concerned that the following are strictly observed:

1. Life Saving Equipment: Contractor shall provide and require use of personal protective life saving equipment for all its personnel working in or about the project site.

2. Access Facilities: All ladders, scaffolding and rigging shall be designed for their intended uses. Ladders and scaffolding shall be erected where requested by

Engineer to facilitate inspection and be moved by the Contractor to locations requested by the Engineer.

3. Ventilation: Contractor shall ensure there is proper ventilation, air eduction and exhausting of solvent vapors to reduce the concentration of air contaminants to a level which poses no hazard or personnel at or near the job site. Air circulation and exhausting of solvent vapors shall be continued until coatings have fully cured. Forced air induction during blast cleaning and coating application operations is mandatory. The exhaust blower capacity shall be sufficient to maintain air changes within tank interior in accordance with Cal-OSHA, coating manufacturer's recommendations and local air quality management district regulations.

    a. When dehumidification is not used, exhaust blower shall exhaust into a District approved structure which precludes the exhausting of coating chips or particulate matter onto the site or into the atmosphere

4. Dehumidification: Dehumidification equipment or other alternate ventilation systems must be approved by the Engineer. Equipment must be operated on a continuous basis during all blasting and priming. Dehumidification shall be optional during the application of intermediate and finish coats and during curing operations. Requirement for exhausting of dust, etc. from tank interior noted in 1.07B(3)(a) applies to all ventilation and dehumidification operations.

5. 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. During abrasive blasting operations, nozzlemen shall wear U.S. Bureau of Mines approved positive pressure air-supplied helmets and all other persons who are exposed to blasting dust shall wear respiratory protection determined necessary by the exposure assessment of the Certified Industrial Hygienist. Barrier creams shall be used on any exposed areas of skin.

    Positive pressure air-fed hoods and/or masks shall be supplied by an air source currently certified to produce "Class D Breathing Air". Contractor shall at all times during the WORK maintain onsite current documentation to substantiate the quality of the breathing air.

6. Grounding: All hoses shall be grounded to prevent accumulation of charges of static electricity.

7. Illumination: Sparkproof artificial lighting shall be provided for all Work in confined spaces. Light bulbs shall be guarded to prevent breakage. Lighting fixtures and flexible cords shall comply with the requirements of NFPA 70 "National Electric Code" for the atmosphere in which they will be used. Whenever required by the Engineer, the Contractor shall provide additional illumination and necessary supports to cover all areas to be inspected. The level of illumination for inspection purposes shall be 2,153 Lux or Meter Candle or 200-foot candle per SSPC Painting Manual Volume 1, Fifth Edition, Section 5, “Inspection”.

8. Toxicity and Explosiveness: The maximum allowable concentration of vapor shall be kept below the maximum safe concentration for eight-hour exposure, plus Lower Explosive Limit (L.E.L.) must be strictly maintained. All regulations

related to safety of personnel and handling of removed materials shall be strictly followed. Cost of handling and disposing of such materials will be borne by the Contractor.

9. Protective Clothing: When handling and mixing coatings and paints, workmen shall wear gloves and eye shields.

10. Fire: Contractor shall provide appropriate fire abatement devices and prohibit any flames, welding and smoking during mixing and application of materials.

11. Sound Levels: Whenever the occupational noise exposure exceeds the maximum allowable sound levels, the Contractor shall provide and require the use of approved ear protective devices.

12. Noise suppression shall be practiced at all times to minimize disturbance to persons living or working nearby, and to the general public. Measures to be used in effecting noise suppression shall include (but not limited to) equipping all internal combustion engines with critical residential silencers (mufflers), shielding noise-producing equipment from nearest areas of human occupancy by location in such positions as to direct the greatest noise emissions away from such areas, and conducting operations in the most effective manner to minimize noise generation consistent with the prosecution of the Contract in a timely and economic manner. Whenever levels are above local ordinances, they shall be adjusted as directed by the Engineer.

13. Gas and Air Monitoring: Contractor shall furnish monitoring equipment to determine the presence of oxygen deficiency or dangerous air contamination. Continual monitoring will be required. Concentration levels will be as prescribed by Cal/OSHA and logs available for inspector review prior to entering reservoir.

PART 2 - PRODUCTS

2.01 GENERAL

A. Specified products are those specified in the Special Conditions and are listed as specified materials to establish a standard of quality for the project. Standard products of manufacturers other than those specified, will be accepted when it is proved to the satisfaction of the Engineer they are equal in composition, durability, usefulness and convenience for the purpose intended. Substitutions will be considered provided the following minimum conditions are met:

1. The proposed coating or paint system shall have a dry film thickness equal to or greater than that of the specified system.

2. The proposed coating or paint system shall employ an equal or greater number of separate coats.

3. The proposed coating or paint system shall employ coatings or paints of the same generic type.

4. All requests for substitution shall carry full descriptive literature and directions for application, along with complete information on generic type, non-volatile content by volume and a list of 10 similar projects, all at least three years

old, where the products have been applied to similar exposure.

5. Fifteen-year Color and Gloss Warranty.

B. All materials shall be brought to the jobsite in the original sealed containers. They shall not be opened or used until District's representative has physically inspected contents and obtained necessary data from information printed on containers or label. Materials exceeding storage life recommended by the manufacturer shall be rejected. Copy of invoice showing purchase and delivery dates will be required.

C. Flammability, toxicity, allergenic properties, and any other characteristic requiring field precautions shall be identified and specific safety practices shall be stipulated.

D. All coating materials shall be stored in enclosed structures to protect them from weather and excessive heat or cold. Flammable materials must be stored to conform to District, County, State and Federal safety codes for flammable materials. At all times coatings shall be protected from freezing.

E. Contractor shall use products of same manufacturer for all coats.

2.02 MATERIALS

A. Protective coatings shall be as listed in the Special Conditions. All interior coating materials shall be of one manufacturer and all exterior coating materials shall be of one manufacturer.

B. Coating materials for interior surfaces of reservoirs must be certified by NSF International in accordance with NSF/ANSI Std. 61. Products containing perchloroethylene (PCE), trichloroethylene (TCE), lead or chromium will not be permitted. In addition, products containing Methyl Ethyl Ketone (MEK) or Methyl Isobutyl Ketone (MIBK) will not be allowed in amounts that will cause volatile organic analysis to be above maximum contaminant levels or action levels.

1. The Contractor shall provide, prior to coating any surfaces of the tank, written certifications from the coating manufacturers stating that the coating materials, thinners, solvents, and equipment cleaning fluids provided by the manufacturers do not contain PCE or TCE. The Contractor shall also certify, in writing, that no material containing PCE, TCE, lead, chromium, or zinc in any form will be used for the interior coatings or exterior paints of the tank. This shall include all solvents, thinners, and cleaning fluids at the job site, regardless of where the materials were obtained.

2. The Engineer may require all solvents, thinners and cleaning fluids be tested for TCE and PCE prior to being used at the job site. The Contractor shall provide the Engineer with samples of each material at no cost to the District. Unacceptable materials shall be removed from the job site.

C. All coating materials shall comply with air pollution regulations, specifically the local air quality management district or air pollution control district rules, and rules for the District.

D. All coating materials shall also conform to regulations and applicable requirements of

local, State and Federal health regulatory agencies. Please refer to San Diego APCD VOC Rule 67.01.

http://www.sdapcd.org/content/dam/sdc/apcd/PDF/Rules_and_Regulations/Prohibitions/APCD_R67-0-1.pdf.

E. Joint sealant shall be a flexible polyurethane or polysulfide product.

PART 3 - EXECUTION

3.01 GENERAL

A. For interior recoating of existing reservoirs, Contractor shall provide District a written request to drain the reservoirs at least three weeks prior to desired entry date. District to drain reservoir via drain line. Contractor will be required to open and close the existing man-ways to access the interior of the reservoir for Work. After excess water has been drained, Contractor shall remove any mud, rock, concrete, or any other materials remaining in the reservoir. Contractor shall not use the reservoir floor drain to remove said material. Removal of said material shall be accomplished with brooms, squeegees, shovels and buckets.

B. Contractor shall not allow any discharges from the construction site which may have an adverse effect on receiving waters of the United States. Contractor shall, at his expense, obtain a discharge permit from the California Regional Water Quality Control Board, San Diego Region, for the discharge of water from the construction site for all phases of the construction project. A copy of said discharge permit shall be provided to the District. Contractor shall comply with conditions therein and perform the monitoring required. If the Regional Board determines that a discharge permit is not required for said Work, then contractor shall comply with any and all applicable criteria and conditions established by the Regional Board.

C. All surface preparation, coating and paint application shall conform to applicable standards of the Steel Structures Painting Council, Valley Center Municipal Water District, 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 Coatings Inspector at the expense of the Contractor.

D. All Work shall be accomplished by skilled craftsmen qualified to accomplish the required Work in a manner comparable with the best standards of practice. Resumes of personnel proposed to be used on the project shall be submitted for approval upon Notice of Award. Continuity of personnel shall be maintained and transfers of key personnel shall be coordinated with the Engineer.

E. The Contractor shall provide a supervisor to be at the Work site during cleaning and application operations. The supervisor shall have the authority to sign any change orders, coordinate Work and make other decisions pertaining to the fulfillment of their contract.

F. Dust, dirt, oil, grease or any foreign matter which will affect the adhesion or durability

of the finish must be removed by washing with clean rags dipped in an approved commercial cleaning solution, rinsed with clean water and wiped dry with clean rags.

G. The Contractor's 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. Blotter test shall be accomplished at each start-up period and as deemed necessary by the Engineer. Contractor's equipment shall be subject to approval of the Engineer. This approval does not relieve the Contractor's responsibility for the safe operation of the equipment or its performance.

1. Cleanliness of compressed air supply shall be verified daily, and as deemed necessary by Engineer, by directing a stream of air, without abrasive, from the blast nozzle onto a white blotter or cloth for twenty seconds. If oil or water appears on the blotter or cloth, all traps and separators shall be blown down until two subsequent twenty-second tests show no further oil or water.

H. Application of the first coat shall follow immediately after surface preparation and cleaning within an eight hour working day. The Contractor shall schedule his work such that all blasted surfaces be cleaned and coated by the end of the work day on Friday. Should blasted surfaces remain uncoated during non-working days, the surfaces shall be re-blasted and coated as specified herein. Any cleaned areas not receiving first coat within an eight hour period shall be re-blasted and cleaned prior to application of first coat.

1. Dehumidification equipment must be used during the blasting and application of the prime coat; cleaned areas may have first coat applied at last shift of the week, provided dehumidification equipment has run continuously during the complete week, and surfaces meet all requirements of the specification. Monitoring devices approved by the Engineer shall be used to ensure continuous operation.

I. Because of presence of moisture and possible contaminants in atmosphere, care shall be taken to ensure previously coated or painted surfaces are protected or recleaned prior to application of subsequent coat(s). Methods of protection and recleaning shall be approved by the Engineer.

1. Project is subject to intermittent shutdown if, in the opinion of the Engineer, cleaning and application operations are creating a localized condition detrimental to ongoing facility activities, personnel or adjacent property.

2. In the event of emergency shutdown by the Engineer, the Contractor shall immediately correct deficiencies. All additional costs created by shutdown shall be borne by Contractor.

J. The Contractor shall provide, at his own expense, all necessary power required for his operations under the contract.

K. Contractor shall seal any tank vents, pumps, motors, and other open areas to prevent intrusion of coating or paint or other contaminants. The sealing system shall be designed to allow continuous operation of facilities or equipment, with no detrimental effects. If

necessary, sealing system shall be removed daily at termination of Work, or as directed by the Engineer.

L. Contractor shall comply with requirements of Department of Health Services, Sanitary Engineering Branch, memorandum of May 1, 1986, titled "Reservoir Coatings". Submittal of "Tank Coating Data Sheet" shall be accomplished by the Contractor prior to start of contract. Upon receipt of submittal, the District will assume responsibility for transmittal to the Department of Health Services.

3.02 SURFACE PREPARATION, GENERAL

A. The latest revision of the following surface preparation specifications of the "Society for Protective Coatings" shall form a part of this specification. (Note: An element of surface area is defined as any given square inch of surface).

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 present 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 present to degree specified by power wire brushing, power impact tools or power sanders.
4. Commercial Blast Cleaning (SSPC-SP6): Blast cleaning until at least two-thirds of each element of surface area is free of all visible residue.
5. Brush-off Blast Cleaning (SSPC-SP7): Blast cleaning to remove loose rust, loose mill scale, and other detrimental foreign matter present to the degree specified.
6. Near-White Blast Cleaning (SSPC-SP10): Blast cleaning to near-white metal cleanliness, until at least ninety-five percent of each element of surface area is free of all visible residues.
7. Power Tool Cleaning to Bare Metal (SSPC-SP11): Power tool cleaning to produce a bare metal surface and to retain or produce a surface profile of at least 1.0 mil.
8. Water Jetting (SSPC-SP WJ-4/NACE WJ-4): Light Cleaning by use of Low Pressure Water Cleaning (LP WC) between 3,500 and 5,000 psi using a 0 degree rotating nozzle to remove loose rust, loose paint, and other detrimental foreign matter present.

B. Any burrs, weld spatter, sharp edges, corners, or rough welds which would cause difficulty in achieving a defect-free paint system shall be chipped or ground smooth in conformance to NACE Standard SP0178-07. It is not the intent to have the welds or "scars" ground "flush". The object of the grinding is to eliminate sharp edges, corners, and overlaps to provide a surface for the application of a uniform thickness of coating or paint without voids or other defects.

C. Abrasive blasting nozzles shall be equipped with a working "deadman" emergency shut-off nozzles. Blast nozzle pressure and number of nozzles used during all blast cleaning operations must be sufficient to ensure timely completion of project, subject to designation and approval by the Engineer.

D. All blast hose connections shall be tethered and secured to prevent separation during blast cleaning operations, and shall be taped with duct tape prior to pressurizing. All taped connections shall be visually inspected for leaks within five minutes after start of blast cleaning operations and at the end of blast cleaning operations. Leaking connections shall be immediately repaired to prevent further damage.

E. Field blast cleaning for all surfaces shall be by dry method unless otherwise directed. Contractor is responsible for maintaining dust emissions within the legal level and that level which would not create a nuisance.

F. Particle size of abrasives used in blast cleaning shall be that which will produce a 2.0 mil surface profile or in accordance with recommendations of the manufacturer of the specified coating or paint system to be applied, subject to approval of the Coating Inspector.

G. Abrasive used in blast cleaning operations shall be new, washed, graded and free of contaminants which would interfere with adhesion of coatings and paints and shall not be reused unless specifically approved by the Engineer. Abrasives shall be certified for unconfined dry blasting pursuant to the California Administrative Code, Section 92520 of Subchapter 6, Title 17 or subsequent revision, and shall appear on the current listing of approved abrasives.

H. During blast cleaning operations, caution shall be exercised to ensure existing coatings and paints are not exposed to abrasion from blast cleaning.

I. Blast cleaning from rolling scaffolds shall only be accomplished within confines of interior perimeter of scaffold. Reaching beyond limits of perimeter will be allowed only if blast nozzle is maintained in a position which will produce a profile acceptable to the Coating Inspector.

J. During blast cleaning operations, inlet, outlet, overflow, and drain openings in bottom shall be covered with plywood bulkheads, or other approved barriers, to prevent entry of spent abrasive, removed coating or other foreign materials.

K. The Contractor shall keep the area of his Work in a clean condition and shall not permit blasting materials to accumulate as to constitute a nuisance or hazard to the prosecution of the Work or the operation of the existing facilities. Spent abrasives and other debris shall be removed at the Contractor's expense as directed by the Engineer.

L. Blast cleaned and coated and painted surfaces shall be cleaned prior to application of specified coatings or paints via a combination of blowing with clean dry air, brushing/brooming and/or vacuuming as directed by the Engineer. Air hose for blowing shall be at least 1/2" in diameter and shall be equipped with a shut-off device.

M. All welds, when required, shall be neutralized with a suitable commercial chemical compatible with the specified coating or paint materials.

3.03 SURFACE PREPARATION, INTERIOR

A. All surfaces shall be blast cleaned, in conformance to Steel Structures Painting Council Specification SSPC-SP10 (Blast Cleaning to Near-White Metal) with 2.0 mil profile. **Blast cleaning to be performed AFTER all interior steel work, including removals and replacements are completed.**

3.04 SURFACE PREPARATION, EXTERIOR

A. All surfaces shall be inspected jointly by the Contractor and the Engineer to determine the condition of existing paint. The Engineer shall then mark the designated areas of deficient paint, and cleaning shall be accomplished as noted below:

1. Step One: All oily or greasy surface contaminants shall be removed by wiping the contaminated area with a clean rag wetted with solvent or degreasing solution in accordance with Steel Structures Painting Council Specification SSPC-SP1 (Solvent Cleaning), and then rinsed with clean water, wiped clean and dried.

2. All loose paint, chalking paint or other surface contaminants shall be removed by Low Water Cleaning per WJ-4/NACE WJ-4 (LPWC) between 3,500 and 5,000 psi using a 0 degree rotating nozzle. If all visible contaminates, loose rust and loose paint have not been removed, SSPC-SP2 Hand Tool Cleaning or SSPC-SP3 Power Tool Cleaning should be employed until the surface cleanliness definition is met.

3. Scrubbing the complete surface with a suitable broom or brush as approved by the Engineer, wetted with a solution of trisodium phosphate, detergent and water, or other approved cleaning solution shall be utilized if chalking paint has not been removed. All cleaned surfaces shall then be rinsed with clean water, wiped clean and dried.

4. Cleaning methods other than vacuum blasting may be used, after approval by the Engineer, which accomplishes the specified results. These include power tool cleaning to bare metal or chemical stripping.

3.05 APPLICATION, GENERAL

A. Coating and paint application shall conform to the requirements of the Society for Protective Coatings Paint Application Specification SSPC-PA1, latest revision, for "Shop, Field and Maintenance Painting," the District, the manufacturer of the coating and paint materials printed literature and as specified herein and approved by the Engineer.

B. Thinning shall only be permitted as recommended by the manufacturer and approved by the Engineer and shall not exceed limits set by applicable regulatory agencies.

1. If Contractor applies any materials which have been modified or thinned to such a degree as to cause them to exceed established VOC levels, Contractor shall be responsible for any fines, costs, remedies, or legal action and costs that may result.

C. Each application of coating and paint shall be applied evenly, free of brush marks, sags, overspray, runs and no evidence of poor workmanship. Care should be exercised to avoid lapping on glass or hardware. Coatings and paints shall be sharply cut to lines. Finished surfaces shall be free from defects or blemishes.

D. Protective coverings or drop cloths shall be used to protect floors, fixtures, equipment, prepared surface and applied paints. Personnel walking on exterior roof of tank shall take precautions to prevent damage or contamination of painted surfaces. If required by Engineer, personnel shall wear soft-soled shoes, or shoe coverings approved by Engineer. Care shall be exercised to prevent coating or paint from being spattered onto surfaces which are not to be coated or painted. Surfaces from which such material cannot be removed satisfactorily shall be refinished as required to produce a finish satisfactory to the Engineer.

E. All materials shall be applied as specified herein.

F. All welds and irregular surfaces including severely pitted areas shall receive a brush coat of the specified product prior to application of each complete coat. Coating and paint shall be brushed in multiple directions to ensure penetration and coverage, as approved by the Engineer. These areas include, but are not limited to, welds, nuts, bolts, irregular edges, etc. Care shall be exercised to ensure dry film thickness of coatings and paints does not exceed the maximum thickness allowed by the manufacturer of the specific product being applied.

G. At conclusion of each day's blast cleaning and coating and paint operations, a 6" wide strip of blast cleaned substrate shall remain uncoated to facilitate locating point of origin for successive day's blast cleaning operations.

H. Epoxy coated surfaces or other multi-component materials exposed to excessive sunlight or an excessive time element beyond manufacturer's recommended recoat cycle, shall be scarified by Brush-Off Blast Cleaning (SSPC SP-7) or methods approved by Engineer, prior to application of additional coating. Scarified coating shall have sufficient depth to assure a mechanical bond of subsequent coat, as recommended by the manufacturer.

I. All attachments, accessories, and appurtenances shall be prepared and finished in the same manner as specified for adjoining tank sections, except as specifically designated by the Engineer.

3.06 APPLICATION, INTERIOR EPOXY COATING SYSTEM

A. Interior Surfaces:

1. After completion of surface preparation as specified, all surfaces shall receive coating specified under 2.02, " MATERIALS".

B. Shell/roof junction void and other designated void areas:

1. Void areas include base plate perimeter, wall & roof interface, lapped steel roof plates, rafter & roof plate, and other voids as determined by the Engineer.

2. After completion and curing of finish coat application of epoxy coating, as specified, all void areas shall be primed, if required, and filled with joint sealant as specified under 2.02. Voids shall be filled flush.

C. No blasting or other work that generates dust, debris, or other material that may come in contact with the sealant is allowed.

3.07 QUALITY ASSURANCE, INTERIOR, EPOXY COATING SYSTEM

A. All coating components shall be mixed in exact proportions specified by the manufacturer. Care shall be exercised to ensure all material is removed from containers during mixing and metering operations. Blast cleaning to occur after epoxy has cured.

B. All coatings shall be thoroughly mixed, utilizing an approved slow-speed power mixer until all components are thoroughly combined and are of a smooth consistency. Coatings shall not be applied beyond pot-life limits or recoat cycles specified by manufacturer.

C. Thinners shall be added to coating materials only as required in accordance with manufacturer's printed literature and in the presence of the Engineer. Quantities of thinner shall not exceed limits set by applicable regulatory agencies.

D. Application shall be by airless spray method, except as otherwise specified. Drying time between coats shall be strictly observed as stated in manufacturer's printed instructions.

E. When two or more coats are specified, where possible, each coat shall contain sufficient approved color additive to act as an indicator of coverage or the coats must be of contrasting color.

F. Care shall be exercised during spray operations to hold the spray nozzle perpendicular and sufficiently close to surfaces being coated, to avoid excessive evaporation of volatile constituents and loss of material into the air or the bridging of cracks and crevices. Reaching beyond limits of scaffold perimeter will not be permitted. All overspray or blemishes identified by Engineer shall be removed by hand or pole sanding prior to application of subsequent coat.

G. Joint sealant may be applied by caulking gun, trowel or other approved method. Sealant shall be pressed firmly into voids to insure 100% filling/sealing. No blasting or other work that generates dust, debris, or other material that may come in contact with the sealant.

H. Upon completion of coating the prime coat and after curing interval in accordance with manufacturer's recommendations, holiday detection shall be accomplished, with a wirebrush electrode, using the specified instrument at 100 volt/mil or other device as determined by the Engineer. Said holiday detection will require approximately two (2) working days to complete. Contractor shall temporarily terminate Work until said holiday detection is completed. Repair and retesting shall be accomplished as specified under 1.06 "QUALITY ASSURANCE". Engineer is not precluded from verifying adequacy of holiday testing by accomplishing holiday detection of selected areas, using his own

holiday detector.

I. All mixing, thinning, application and holiday detection of coatings shall be accomplished in the presence of the Engineer.

J. Upon completion and cure of the interior reservoir surface coating (other than floor), and after curing interval in accordance with the manufacturer's recommendations, holiday detection shall be accomplished with a wirebrush electrode, using the specified instrument at 100 volt/mil or other device as determined by the Engineer. Said inspection will require approximately two (2) working days. Contractor shall temporarily terminate Work until said inspection is completed. Contractor shall repair all defects in reservoir interior surface coating (other than floor) prior to beginning reservoir floor coating Work. All repairs shall be performed as required by District at no additional cost. If repairs are required, District will perform a re-inspection. Contractor shall temporarily terminate Work until said inspection is completed.

K. After the reservoir floor coating has been completed, Contractor and District shall perform dry film thickness and holiday detection on same. Said inspection will require approximately two (2) working days. Contractor shall temporarily terminate Work until said inspection is completed. Contractor shall repair all defects in reservoir floor coating at no cost to District until all holidays are eliminated. Reservoir floor shall be completed, inspected, repaired, and approved by District prior to starting reservoir exterior work.

L. A time element equivalent to 7 days curing time at 70 degrees F. and 50% relative humidity or as stated on the manufacturer data sheet shall be allowed before placing the epoxy coating into service, as determined in 3.08 "FINAL CURING OF EPOXY COATINGS".

M. Reservoir surface must be free of dust and debris prior to applying any coating material.

3.08 FINAL CURING OF EPOXY COATINGS

A. Upon completion and acceptance of applied coating system, Contractor shall furnish an approved exhaust fan or blower of sufficient capacity to insure removal of solvent vapors during curing process. The fan or blower, after approval by District, shall be installed as approved by the District and shall remain in continuous operation until coating is completely cured as determined by the manufacturer of the coating system. Contractor may choose to utilize a dehumidification system during the curing period, if applicable to the coating system applied. Operation and maintenance of the blower or dehumidification system during curing operations shall be the responsibility of the Contractor.

1. Dehumidification equipment shall remain in-place and run continuously during all curing operations.

B. After completion of curing cycle as noted above, the Contractor may be required to test the applied coating, if required by Engineer or District representative, via an "acetone", "MEK double-rub test" or "hardness test" to verify, to the Engineer, adequate curing has been attained. "Acetone", "MEK double-rub test" or "hardness test"

requirements shall be as required by the coating manufacturer's written instructions.

1. If final cure has not been attained, based on above tests, ventilation shall be continued until applied coating passes the "acetone", “MEK double-rub test”, or "hardness test".

C. After final cure is approved by Engineer, Contractor shall remove fan or blower.

3.09 APPLICATION EXTERIOR PAINT AND QUALITY ASSURANCE FOR PAINT SYSTEMS

A. After completion of surface preparation as specified, all exposed steel surfaces or other identified areas shall receive the primer specified under 2.02, "MATERIALS". Dry film thickness shall not be less than the minimum manufacturer recommended thickness.

B. After proper drying interval, primed areas shall be carefully inspected to determine if paint edges have lifted or if other defects exist. If necessary, repairs shall be accomplished, using procedures as specified herein to effect a smooth transition between primer and subsequent coats.

C. After specified drying interval, all exterior surfaces shall receive the finish coat specified under 2.02, "MATERIALS", total dry finish thickness to be as specified herein.

D. Total dry film thickness of the completed two-coat system shall not be less than 10.0 mils at any point in the surface where bare metal was originally exposed, or less than 13.0 mils where the new two-coat system was applied over existing paint.

E. Prior to start of finish coat application, Contractor and Engineer shall conduct spot dry film thickness tests to determine the minimum dry film thickness of the existing paint system. A mutual agreement shall be reached as to the specific dry film thickness of the existing paint system, which shall then be used in determining if sufficient additional paint has been applied over the existing paint.

1. Maximum dry film thickness allowed, if not specified in manufacturer's approved literature, will be as determined, in writing, by the paint manufacturer's headquarters technical representative.

F. Paint shall not be applied when wind speed exceeds fifteen miles per hour.

G. Upon completion of exterior painting operations, inspection shall be accomplished as specified under 1.06 "QUALITY ASSURANCE". All applicable sections of 3.07 "QUALITY ASSURANCE, INTERIOR, EPOXY COATING SYSTEM" shall apply to exterior painting operations.

H. All mixing, thinning, application of paints shall be accomplished in the presence of the Engineer.

I. Color Scheme: The color of exterior coating shall be Section 2.02 Materials.

3.10 TESTING FOR VOLATILE ORGANIC COMPOUNDS (VOC'S)

A. To monitor the presence of VOC's leached into the water from the coating process, the following procedure shall be utilized:

1. After satisfactory curing, the tank shall be filled by District in accordance with standard filling procedure. Water shall then be retained for a period of five days.
2. On the sixth day following completion of filling of tank, samples of water shall be removed by District, in accordance with latest Health Department memoranda. Samples shall then be forwarded, by District, to an approved test laboratory for testing to determine presence of VOC's.
3. After testing of samples, results must show levels of leached organics to be in accordance with levels established by the Health Department for various VOC's. Results will be verified by Health Department and tank will then be placed into operating service.
4. If levels of leached organics exceed those acceptable to the Health Department, the tank shall be drained, flushed, refilled and retested at the Contractor's expense. Failure of the tank to attain levels acceptable to the Health Department shall be the responsibility of the Contractor and remedial measures to attain such levels shall be at his sole expense.
5. If leached organics produce any taste and odor objectionable to consumers of the water from the tank, the tank shall be drained, re-cleaned, flushed, refilled and retested at the Contractor's expense. Failure of the tank to be taste and odor-free shall be the responsibility of the Contractor and remedial measures to attain such a condition shall be at his sole expense.

3.11 DISINFECTION

A. Interior roof, shell and floor shall be scrubbed and washed, free of all abrasive material prior to disinfection.

B. Reservoir shall be disinfected by Contractor in accordance with Chlorination Method 2 as set forth in AWWA C625, latest edition.

3.12 BACTERIOLOGICAL TESTING

A. After disinfection and before the reservoir is placed in service, a sample or samples shall be collected from the reservoir and tested for bacteriological quality to demonstrate the absence of coliform organisms per AWWA C651 and as specified herein. Two consecutive sets of acceptable samples, taken at least 24-hours apart will be taken at a minimum of two separate locations. Sample locations will be determined in the field per the District Engineer. Samples of bacteriological analysis shall be collected in sterile bottles treated with sodium thiosulphate. No hose or fire hydrant shall be used as a sampling station.

B. All samples shall be taken by District Staff during routine sampling each Tuesday and Wednesday. Samples taken on any other day will be at the CONTRACTOR'S cost. The

CONTRACTOR shall provide a written request for District staff to take samples a minimum of forty-eight (48) hours prior to the requested date.

C. Should the first series of tests fail, CONTRACTOR may flush or take further action to obtain acceptable results and then re-sample a second time. If the second series of samples fail to produce passing results, then the CONTRACTOR shall re-disinfect the reservoir as stated earlier within these specifications and have samples taken. If the disinfection fails to produce satisfactory bacteriological test results, the CONTRACTOR may flush or take further action to obtain acceptable results and then re-sample a third time. Should these samples fail to produce satisfactory results, the CONTRACTOR shall prepare a written scope of work for the inspection of the reservoir for dirt, debris, or other foreign material within the reservoir. CONTRACTOR shall provide District with satisfactory inspection reports including video, photos, or other documentation indicating that the interior of the reservoir is free from any material that may impact reservoir disinfection and bacteriological testing. All costs including staff time, equipment, testing, and water used to flush and sample after the second series of failed bacteriological testing will be the responsibility of the CONTRACTOR.

3.13 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 Engineer. Coating, paint and thinner containers, and excess coatings, paints and thinners, shall be disposed of in conformance to current regulations. Coating or paint spots upon adjacent surfaces shall be removed and the entire jobsite cleaned. All damage to surfaces resulting from the Work of this section shall be cleaned, repaired or refinished to the complete satisfaction of the Engineer at no cost to the District.

3.14 OMISSIONS

A. Care has been taken to delineate herein those surfaces to be coated or painted. However, if coating and painting requirements have been inadvertently omitted from this section or any other section of the specifications, it is intended that all metal surfaces, unless specifically exempted herein, shall receive a first-class protective system equal to that given the same type surface pursuant to these specifications.

END OF SECTION 09910