

SECTION 411—PROTECTIVE COATING OF METAL IN STRUCTURES

411.01—Description

- (a) **Scope of Work:** This work shall consist of preparing and coating ferrous metal surfaces on new and existing structures, including, (but not limited to), main units, diaphragms, bearing assemblies, shop and field contact surfaces, surfaces in contact with concrete, parts designed to be embedded in concrete, rails, expansion joints, drainage systems, utility lines, and attachments, in accordance with these specifications.
- (b) **Classification of Structures:** Existing structures will be classified on the plans by the Department as follows:

Type A: Structures that have no coatings or that have coatings, which do not contain hazardous materials.

Type B: Structures that have coatings that may generate hazardous wastes.

Should the structure require application of a coating and no classification is specified in the contract documents the Contractor shall bid Type B.

Galvanized surfaces and surfaces protected with other coatings shall not be coated unless otherwise specified. Cast, ductile and nodular iron castings need not be coated. Application procedures not specified herein, shall be as specified by the manufacturer and approved by the Engineer.

411.02—Materials

- (a) **Coating** shall conform to the requirements of Section 231.
- (b) **Water used in cleaning operations** shall be potable. At the Contractor's option, water used in cleaning activities may be recycled for reuse in cleaning operations. If the water is to be recycled, it shall be tested for heavy metals before reuse. Water exceeding the regulatory limit specified in 40 CFR 261.24 Table 1 shall not be reused. Any recycled water shall have a resistivity greater than 2,000 ohm-cm.
- (c) **Abrasives used in cleaning operations** shall be selected of two categories from the Department's approved products list.
 - 1. **Expendable** abrasives shall conform to SSPC-AB 1 Type I or Type II Class A except that silica and quartz sands will not be allowed.

The abrasive shall not contain any of the heavy metals listed in 40 CFR 261.24 Table 1 in excess of 20 times the specified regulatory limits.

2. **Recyclable** abrasives, newly manufactured or re-manufactured steel, shall conform to the requirements of SSPC-AB 3. Recycled abrasive shall be checked by the Contractor for oil contamination prior to start up and at least once per 8-hour shift in accordance with the requirements of VTM-82. Recycled abrasive shall not contain non-abrasive residue in excess of the requirements of SSPC-AB 2.

411.03—Certifications

- (a) **QP-1:** Effective August 1, 2001, the Contractor shall be certified to perform coating operations on all new and existing steel structures, Types A and B. Prior to performing coatings application, the Contractor shall submit proof of certification meeting the criteria of SSPC QP-1 Standard Procedure for Evaluating Qualifications of Painting Contractors, Field application in Complex Structures.
- (b) **DPOR:** If the project work involves the removal of greater than 100 square feet of coating from a Type B Structure or is anticipated to generate greater than $30 \mu\text{g}/\text{m}^3$ lead per structure, the Contractor shall be licensed as an organization to perform removal operations from Type B structures. Additionally, the Contractor shall provide an individual with a supervisor level license in lead-based paint abatement to oversee operations and individuals with worker level certification in lead-based painting abatement. All licenses shall be issued by Virginia Department of Professional and Occupational Regulation (DPOR).
- (c) **Professional Engineer:** If the project involves the erection of any containment structure with the bridge serving as the primary means of support, then the Contractor shall describe such system as specified in Section 411.08 (a) and provide certification by a Professional Engineer, licensed in the Commonwealth of Virginia. This requirement is waived for any containment structure with a total weight bearing capacity of less than 1000 pounds.

411.04—General Surface Preparation and Application Standards

Prior to coating, surfaces shall be free from rust, loose or brittle paint, chalking, oil, grease, salt contaminants, dirt and other substances that would prevent coating from adhering tightly. Surfaces shall be prepared in accordance with SSPC Specifications. Surface conditions and finished surface profiles shall conform to SSPC-Vis Standards or NACE Comparators.

Should an area of steel that has previously been cleaned become soiled, contaminated or rusted, the Contractor shall reclean that area to the satisfaction of the Engineer prior to application of coating at no additional cost to the Department.

Regardless of the method of cleaning, all surface imperfections described in the "Procedures Following Blast Cleaning and Immediately Prior to Painting" section of *SSPC-SP 10*, and any other matter which will prohibit a smooth unobstructed surface for the application of the specified coating, shall be removed.

(a) **Application Conditions**

Preparing Surfaces To Be Coated: The Contractor shall keep contaminants from coming in contact with surfaces during surface preparation and coating operations. Unsealed connections, small cracks, cavities and depressed areas on flanges shall be filled in accordance with the requirements of Section 407.

Prior to application of coating, the surface shall be prepared according to one or more of the following methods. All surfaces being coated shall be cleaned in accordance with the requirements of Method 1 prior to other surface preparation methods.

1. **Method 1:** Solvent, emulsion, or steam shall remove oil, dust, dirt, grease, concrete, chalking, and salt in accordance with the requirements of SSPC-SP-1. Contaminated solvent shall be removed before it evaporates by wiping or rinsing with clean solvents to prevent a film of contaminants from remaining on the surface. Solvent wiping may be required between coats. All solvents used in the work shall be as recommended by the paint manufacturer.
2. **Method 2:** Hand-tool cleaning shall remove loose coating, loose rust, and loose mill scale in accordance with the requirements of SSPC-SP-2.
3. **Method 3:** Power-tool cleaning shall remove loose coating, loose rust, and loose mill scale in accordance with the requirements of SSPC-SP-3.
4. **Method 4:** Power-tool cleaning shall remove coating, rust, and mill scale to bare metal in accordance with the requirements of SSPC-SP-11.
5. **Method 5:** Abrasive blast cleaning shall remove visible coating, rust, and mill scale in accordance with the requirements of SSPC-SP-10/NACE No. 2 (National Association of Corrosion Engineers). Abrasives shall be recycled unless otherwise specified or approved by the Engineer. If an expendable abrasive is used on a Type B structure, it shall be used in conjunction with a process that will allow beneficial reuse of the expended product.

After blast cleaning, the surface profile shall be from 1 to 3 mils in a dense uniform pattern of depressions and ridges as determined by a spring micrometer with surface profile replica tape in accordance with ASTM D 4417 Method C. If the surface profile is greater than 3 mils, the Contractor shall apply additional coating equivalent to the excessive profile height and at no additional cost to the Department. Both shop-blasted and field-blasted surfaces shall be coated within 24 hours. If rust bloom develops, blast cleaning shall be repeated at no additional cost to the Department.

6. **Method 6:** Brush-off blasting shall remove loose or brittle coating, loose rust, and loose mill scale in accordance with the requirements of SSPC-SP-7/NACE No.4.
7. **Method 7:** Low pressure water cleaning shall remove dust, debris, and salt contaminants in accordance with SSPC-SP12/NACE No. 5 (LP WC), Low Pressure Water Cleaning. The pressure washer shall be capable of achieving 2000 pounds per square inch at the nozzle when used prior to blast cleaning and 5000 pounds per square inch at the nozzle when used to remove loose or brittle coatings. When using the power washing equipment, the nozzle shall be maintained no more than 10 inches from the surface. Any detergents or cleaners used in conjunction with this method shall be recommended by the coating's manufacturer and as approved by the Engineer.

Regardless of which method of cleaning is used for surface preparation, the Contractor shall collect and contain all solid and liquid waste. The waste material(s) generated from work performed on Type B Structures shall be tested by the EPA Method 1311 Toxicity Characteristic Leaching Procedure (TCLP) and corresponding EPA 6000 or 7000 series metals analytical method for (but not limited to) the following metals to determine if the waste material(s) requires management as hazardous waste: arsenic, barium, cadmium, chromium, lead, mercury, selenium and silver. All waste material(s) shall be disposed of in accordance with all federal, state and local regulations.

(b) **Physical Application**

Application: The Contractor shall conform to SSPC-PA 1 for coatings application. Coating shall not be applied under conditions shown below, unless recommended by the manufacturer and approved by the Engineer. Without manufacturer's recommendation and the approval of the Engineer, coatings shall not be applied when:

1. air, coating, or metal temperature is below 40 degrees F
2. air, coating, or metal temperature is expected to fall below 40 degrees F before the coating has cured

**TABLE IV-6
COATING SYSTEMS**

System	Coat	Coating	Min. Dry Film Thickness (DFT) (mil)
A	Primer	No. 1	2.0
	Intermediate	No. 8, Federal No. 595-20219	2.5
	Finish	No. 8, color as specified	2.5
B	Primer	Zinc-rich (from approved systems list)	
	Intermediate		
	Finish		
F	Primer	No. 14	5.0
	Finish	No. 14	5.0
W	1st Primer	No. 101 Federal No.595-30045	2.0-4.0
	2nd Primer	No. 102, White	2.0-4.0
	Intermediate	No. 103 Federal No.595-20219	2.0-4.0
	Finish	No. 103 *	2.0-4.0 **

*Color as specified. If not specified, color shall be Federal No. 595-26307.

**DFT shall be no less than specified thickness, however it shall completely cover the intermediate coat.

3. snow, sleet, or rain is falling
4. moisture is visible on metal
5. humidity is above 85 percent
6. the temperature of the steel or metal surface to be coated may cause blistering as indicated in the manufacturer's product data sheet
7. the surface temperature is less than 5 degrees F above the dew point or is expected to fall to that point before the coating has dried or cured, and
8. in no case shall System W as shown in Table IV-6 be applied unless the air, surface and material temperature is above and maintained above 50 degrees F and rising.

Prior to application of coatings, the surface shall be dry. Coatings shall be applied in a neat and orderly manner by brushing, rolling, or spraying as recommended by the manufacturer. However, rollers, daubers, or sheepskins shall not be used to apply zinc-rich coatings.

Zinc-rich coatings may be applied by brush, limited to isolated areas of 1 square foot or less.

Application of coating shall provide a tight film of specified uniform thickness well bonded to metal or underlying coating, including crevices and corners, and shall be free from laps, streaks, sags, runs, overspray, dryspray, shadow-through, skips, excessive film build-up, mud cracking, misses, and other defects.

Beam edges, bolts, washers and nuts shall receive a stripe coat prior to the full coat application. If a multi-coat system is being applied, beam edges, bolts and nuts shall be striped prior to each coat except that a stripe coat will not be required for a zinc-rich primer. Stripe coatings shall dry or cure to touch before overcoating.

Deficient, impaired, or damaged areas of each coat shall be repaired using material from the Department's approved systems list. Two-component, solvent-based, inorganic zinc shall be considered cured when only trace amounts are removed in accordance with the requirements of ASTM-D4752.

Successive coatings shall not be applied until each preceding coat has dried and cured in accordance with the requirements of the manufacturer's recommendations and has been approved by the Engineer. Coatings shall be applied in accordance with the requirements of Table IV-6.

Mixing: Coatings shall be mixed in accordance with the requirements of the manufacturer's instructions. Zinc-rich coatings shall be applied from containers equipped with a mechanical agitator, which shall be in motion throughout the application period unless otherwise specified by the manufacturer. Coatings shall not be thinned beyond the Volatile Organic Compound (VOC) limit or the manufacturer's recommendation, whichever is the most restrictive. Individual components of multi-component coatings shall be mixed separately, prior to mixing with other components of the kit. Mixing shall be by use of a power mixer. Multiple component material shall not be mixed in proportions less than packaged quantities.

(c) **Quality Control**

1. **Measuring film thickness** The dry-film thickness of coating will be determined by the Engineer with a Tooke gage when the thickness of previous coatings are not known and with a magnetic dry-film thickness gage when the previous thickness is known. The magnetic gage will be used and calibrated in accordance with the requirements of SSPC-PA-2. The Contractor shall repair test areas at no additional cost to the Department. The method of repair shall conform to methods as outlined in this Section or as approved by the Engineer.
2. **Adhesion of existing paint**
 - a. **For existing aged alkyd coatings** with measured Dry Film Thickness (DFT) of 5 mils or less, loose or brittle coating is defined as that which is deteriorated and has an adhesion rating of less than 3B when tested in accordance with ASTM D3359 Method B. If the DFT is more than 5 mils, loose or brittle coat-

ing is defined as that which is deteriorated and has an adhesion rating of less than 3B when tested in accordance with ASTM D3359 Method B, using a 5mm guide.

- b. **For existing coatings other than aged alkyds** with dry film thickness of more than 5 mils, loose or brittle coating is defined as that which is deteriorated and having an adhesion rating of less than 3A when tested in accordance with ASTM D3359 Method A. If the existing coating has DFT of 5 mils or less, loose or brittle coating is defined as that which is deteriorated and having an adhesion rating of less than 3B when tested in accordance with ASTM D3359 Method B.

Sufficient tests shall be accomplished in an area to determine the extent of loose or brittle coating. All loose or brittle coating shall be removed before overcoating by the process stipulated in (a) herein.

- 3. **Adhesion of newly applied coatings** shall have an adhesion rating of at least 3B when tested in accordance with ASTM D3359 Method B, for DFT of 5 mils or less. Coatings shall be fully cured before adhesion measurements are made. If the newly applied coating has DFT of 5 mils, the coating shall have an adhesion rating of at least 3A when tested in accordance with ASTM D3359 Method A.
- (d) **Record Keeping and Protective Coating Identification:** The Contractor shall maintain a record that establishes and describes the location and limits of the work area where protective coating removal or application has been accomplished. Such records shall be maintained and completed on a daily basis and shall provide at minimum the following information: Contractor's name, date, time work began, time work is completed, ambient air and structure temperature and relative humidity ranges during coating operation, and coating system applied. The record shall include a mapping indicating areas where the protective coating has been applied as accurately located on the actual bridge structure; except structures as described in Section 411.05(b) 3. Daily record and mapping format shall meet the approval of the Engineer and shall be established prior to commencement of work. The daily records and mappings shall be maintained in a 3-ring binder throughout the duration of the project. Prior to final acceptance, the Contractor shall submit to the Engineer the 3-ring binder complete, and shall certify that all information contained therein is factual and correct.

For new steel and after recoating an existing structure, after the final coat has cured, the Contractor shall stencil on the structure a legend indicating the type of coating system(s) and the month and year in which it was applied. The legend shall be placed inside a fascia stringer near an abutment at a location approved by the Engineer and shall be black in color.

411.05—Existing Structures

Coated steel structures built before 1978 and weathering steel ASTM A709, Grade 50W structures may contain mill scale.

- (a) **Bare Steel:** Uncoated ASTM A709, Grade 50W weathering steel shall be cleaned in accordance with the requirements of Method 4 or Method 5 and shall be coated with System B. If an inorganic zinc primer is used, surface preparation shall be in accordance with the requirements of Method 5. The following areas of weathering steel shall be coated as indicated below:
1. All areas within 5 feet of a deck joint, including, but not limited to cross frames, diaphragms, stiffeners, connector plates, girders, and beams.
 2. The entire outside surface of fascia girders and beams, including the underside of the bottom flange.

These areas shall be thoroughly cleaned to no less than 6 inches outside the area to be coated, and shall be coated with System B.

- (b) **Coating Remaining:** Coating application will be specified as follows:
1. **Prepare and spot coat existing structure:** All surfaces being coated shall be prepared in accordance with Method 1 followed by Method 7 using a pressure of 5000 pounds per square inch at the nozzle. Rust shall be removed in accordance with Method 4 or Method 5. Prepared areas shall be spot-primed with primer(s) from the system specified. Intermediate and finish coat shall be applied to spot-primed areas only and shall be feathered into the existing finish coat to produce a uniform homogeneous appearance with the existing structure. The coating system shall be as specified on the plans. If no system is specified, System W shall be used.
 2. **Prepare and overcoat existing structure:** Prepared areas shall be spot-primed with primer(s) from the system specified. Intermediate and finish coat shall be applied to the entire structure. The coating system shall be as specified on the plans. If no system is specified, System W shall be used.

The entire structure shall be cleaned in accordance with the requirements of Method 1 followed by Method 7 using a pressure of 5000 pounds per square inch at the nozzle. Areas to be primed and coated shall be prepared in accordance with Method 5 or Method 4.

3. **Recoat existing structure:** The entire structure shall be cleaned in accordance with the requirements of Method 1 followed by Method

7 using a pressure of 2000 pounds per square inch at the nozzle. The entire structure shall be cleaned to bare metal in accordance with Method 5. The structure shall be recoated using System B.

4. **Coating new steel members used to repair existing structure:** Unless otherwise directed or approved by the Engineer, the newly installed steel members shall be cleaned to bare metal in accordance with the requirements of Method 4 or abrasive-blast cleaned in accordance with the requirements of Method 5. Prepared areas shall extend 6-inches beyond new steel member into the existing structure at the point of repair and shall be spot-primed with primer(s) from the system specified. Intermediate and finish coat shall be applied to spot-primed areas only and shall be feathered into the existing finish coat to produce a uniform homogeneous appearance with the existing structure. The coating system shall be as specified on the plans. If no system is specified, System W shall be used.
5. **Zone coating:** All surfaces shown on the plans or in the contract as being coated shall be cleaned in accordance with the requirements of Method 1 followed by Method 7 using a pressure of 5000 pounds per square inch at the nozzle. Areas to be primed shall be prepared in accordance with Method 4 or Method 5.

Areas designated for zone coating shall be primed and coated with the specified intermediate and topcoat. If a zinc primer is used, surface preparation shall be in accordance with the requirements of Method 5. Zone coating shall be required when shown or specified elsewhere in the Contract Documents.

If a winter season elapses between application of coats, the structure shall be prepared again in accordance with the requirements of Method 1 prior to resuming application of additional coatings and at no additional cost to the Department.

Existing steel on structures to be widened shall not be prepared and coated, unless otherwise specified. When specified on the plans for coating, the entire coating on the existing structure shall be removed in accordance with the requirements of Method 4 or 5 and the existing structure shall be coated with the same system as required on the new steel. If an inorganic zinc primer is used, surface preparation shall be in accordance with the requirements of Method 5.

411.06—New Structures

Non-stainless ferrous metal shall be coated using System B as specified in Table IV-6.

- (a) **Shop Coating:** Metal surfaces to be coated shall be abrasive blast cleaned in accordance with the requirements of Method 5 prior to application of primer. Material shall not be shipped until the primer has cured.

Machine-finished surfaces and/or areas that are to bear on other surfaces in a sliding movement shall not receive an applied protective coating as specified in Table IV-6 but shall be coated with a multipurpose grease or other specified coating prior to shipment.

Erection and weight marks shall be stenciled or painted on structural steel subsequent to application of shop primer. No other lettering shall be allowed.

The following areas of ASTM A709, Grade 50W weathering steel shall be coated:

1. All areas within 5 feet of a deck joint, including, but not limited to cross frames, diaphragms, stiffeners, connector plates, girders, and beams.
2. The entire outside surface of fascia girders and beams, including the underside of the bottom flange.

These areas shall be thoroughly cleaned to no less than 6 inches outside the area to be coated, and shall be coated with System B.

All deficiencies and nonconformities shall be satisfactorily corrected prior to shipment.

- (b) **Field Coating:** Field application of coatings shall not be performed until concrete work is completed and forms are removed. Concrete deposited on coated steel surfaces shall be removed. Prior to coating, surfaces shall be cleaned in accordance with the requirements of Method 1 followed by Method 7 using a pressure of 2000 pounds per square inch at the nozzle. All uncoated surfaces and deficient or damaged areas shall be cleaned in accordance with requirements of the coating manufacturer and touch-up primed with a primer from System B.

If a winter season elapses between application of coats, the structure shall be prepared again in accordance with the requirements of Method 1 and at no additional cost to the Department.

After installation and approval by the Engineer, galvanized bolts or bolts protected with approved coatings shall be cleaned with water-based biodegradable cleaner, and followed by a potable water rinse. All other erection bolts that will be coated shall be degreased and abrasive blasted in accordance with Section 411.04. Suitable precautions shall be taken to mask off the surrounding primed area to prevent overblasting. Cleaning agents and rinse water shall be collected and disposed of in accordance with applicable state and federal regulations. After cleaning, bolts shall be coated with the identical intermediate and topcoats being applied to the rest of the structure. If additional surface preparation of galvanized bolts is required, preparation shall be as recommended by the coating manufacturer.

Surfaces that will be inaccessible after assembly and erection shall be coated prior to assembly.

When the superstructure is concrete, the color of bearing assemblies shall be Gray, Federal No. 595-26307.

ASTM A709, Grade 50W weathering steel topcoat shall be Brown, Federal No. 595-20059. Other structures finish topcoatings shall be Gray, Federal No. 595-26307, unless otherwise specified on the plans. When only portions of a structure are designated for coating, the edges of coated areas shall be masked to a straight line.

411.07—Galvanized Surfaces

- (a) **Existing Uncoated:** The surface shall be prepared in accordance with Method 1 or Method 7. Rust shall be removed using Method 2 or Method 3. The surface shall be coated with a coating system from the Department's approved list.
- (b) **New Surface:** Prior to coating, galvanized surfaces shall be cleaned in accordance with the recommendations of the coating manufacturer. The surface shall be coated with a coating system from the Department's approved list.

411.08—Environmental Protection

In accordance with the requirements of Section 107, the Contractor shall protect the public and the environment from leaded paint or hazardous material resulting from coating preparation (cleaning) removal operations, blast abrasive, rust and over spray.

Depositing or dropping waste materials into water, onto the ground, or onto roadways or outside the containment system will not be permitted. Waterways and all travel-ways shall be protected against coating drift and overspray. All equipment and containment devices shall arrive at the site in a decontaminated condition and shall be decontaminated prior to relocating or moving unless otherwise properly disposed. All residues from decontamination and any disposable items shall be properly disposed of according to all applicable federal, state and local regulations.

The Contractor shall at all times be in compliance with these specifications and the regulations of, but not exclusive to, the following agencies: U. S. Environmental Protection Agency, U. S. Department of Transportation, Virginia Department of Environmental Quality, Virginia Department of Labor and Industry, Virginia Department of Professional and Occupational Regulations and the U. S. Coast Guard.

The Contractor shall make all necessary notifications, obtain the necessary permits and pay required fees in accordance with applicable state law and Virginia Department of Labor and Industry regulations.

- (a) **Plan:** The Contractor shall submit a detailed site-specific environmental plan to the Engineer for Department records and review for completeness only, not approval. The Contractor shall provide one comprehensive plan that covers all facets of operation. No work shall proceed until the Engineer has notified the Contractor that the plan contains all the necessary elements. The Environmental Plan shall include controls for capture, containment, collection, storage and transportation of waste material generated by the work. The Contractor shall use the most effective method possible for capture, collection, containment and transportation operations. Plans shall include measures for accidental spill cleanup.

The Environmental Plan shall be certified by a DPOR Licensed Lead Supervisor (LLS) or a Certified Industrial Hygienist (CIH) certified by the American Board of Industrial Hygiene. If the project design involves the erection of a supported containment system with a total weight bearing capacity of greater than 1000 pounds, the plan shall also be reviewed and certified by a Professional Engineer, registered in the Commonwealth of Virginia as to the design acceptability for the structural load of the containment system on the bridge.

After project award but not less than three weeks prior to commencing operations covered by this plan, the Environmental Plan shall be submitted to the Engineer. Within two weeks of receipt, the Department will review the submitted plan for completeness. Should deficiencies in the plan exist, the plan will be returned to the Contractor for incorporation of revisions as noted by the Engineer. The Contractor shall make such revisions and submit completed plans for the Engineer's record prior to commencing operations. In no case shall the Contractor begin work prior to the Engineer's receipt and review of a satisfactorily complete plan.

- (b) **Monitoring:** Visual inspections of the containment structures, dust collector and abrasive recycling equipment shall be continuously performed to detect and control any emissions into the unconfined air space. Emissions will not be permitted outside the containment system. Visual emissions outside the containment system shall immediately be corrected to comply with emission standards. Minimal visible air emissions will be allowed for properly operating vacuum-assisted power tools provided that a secondary means for collecting large particles is employed and the technology is applied using usual and customary industry practices. Excessive emissions caused by improperly operated or functioning equipment shall be immediately corrected. Adequate lighting shall be provided as necessary to aid visual inspections.

Perimeter air monitoring shall be performed using high volume air samplers equipped for the collection of total suspended particulate (TSP) samples. The filters shall be analyzed for lead in accordance with EPA 40 CFR Part 50 Appendix G for a minimum of 8 hours per day of operation. Samples shall be collected within 500 feet downwind of paint abatement,

dust collection and abrasive recycling equipment. Perimeter monitoring results shall be maintained below the National Ambient Air Quality Standard for lead (40 CFR Part 50) using the Adjusted Daily Allowance (ADA) procedure outlined in SSPC-Guide 6 Method D. The results of all sample analysis shall be submitted to the Engineer as soon as they are available. Should emissions exceed the limits set herein or material begin to reach the ground or enter state waters, the Contractor shall notify the Engineer and operations shall be halted until such time that corrective actions are implemented.

- (c) **Waste Characterization and Disposal:** Material removed from Type A structures shall be disposed of as a non-hazardous waste in accordance with the requirements of (d) 1. herein.

Material removed from Type B structures shall be contained, collected, and stored in closed 55-gallon U.S. Department of Transportation approved steel drums or portable metal roll-off containment refuse disposal bins.

The Contractor shall under the direction of the Engineer; collect a minimum of one composite sample per three containers of waste material (with a minimum of three samples per structure) and provide to the Department for analysis. All samples shall be randomly collected and shall be representative of the contained waste. Waste shall not accumulate for more than 30 days before samples are collected. A laboratory certified by the American Industrial Hygiene Association to perform lead analysis and approved by the Department shall perform the testing. The Department shall pay the cost of all tests performed by the laboratory. If the material is determined to be a hazardous waste, the Contractor in accordance with the requirements of (d) 2. herein shall dispose of the material.

Each structure shall have a separate lockable storage area for waste material located immediately adjacent to the structure. The Contractor shall collect the material at the end of each workday and shall transport the waste material to the storage area in a closed container that will not permit leakage. Each container shall be marked indicating the origin of the material; the date the material was placed in the storage area; and a 24-hour telephone number of the Contractor and the Department representative. Prominent warning signs shall be displayed around the perimeter of the storage. The signs shall be located at a distance from the storage area that will allow personnel to read the sign and take the necessary protective actions required before entering the storage area. All warning signs and notices shall be posted in accordance with CFR 29 Part 1926, Section 62.

One centralized storage site may be used to store waste materials from structures at adjacent projects provided that transport of waste over roads open to the public is not required and that the materials shall be labeled and stored separately. If a centralized storage location is used, suitable security

fencing shall be installed around the perimeter of the centralized storage area to prevent unauthorized access. The Contractor shall establish this site, with Department approval, prior to beginning any coating removal.

The site for the temporary storage of the waste material shall be approved by the Engineer and shall not be located within a flood plain or drainage area or where water will pond. The site shall have a berm around the perimeter to ensure spill control. Containers of waste material shall have tops secured and be covered with waterproof coverings, and the site shall be secured. If such a site is not available immediately adjacent to the structure, an alternate location on state property shall be used as approved by the Engineer.

(d) **Disposal**

1. Solid waste material from Type A structure or waste from a Type B structure that is determined by the Department not to be a hazardous waste shall be disposed of in a sanitary (*RCRA Subtitle D*) or licensed industrial landfill that has a permit from the Virginia Department of Environmental Quality or an equivalent state or federal agency for out-of-state disposal facilities. The Contractor shall identify the landfill used by name, address and permit number and shall certify that the waste material was properly disposed.
2. Liquid waste from Type A and Type B structures that is determined by the Department not to be a hazardous waste shall be legally disposed of in a Publicly Owned Treatment Works Facility (POTW). The Contractor shall identify the POTW used by name, address and permit number and shall certify that the waste material was properly disposed.
3. If waste material from Type B structures is classified as hazardous by the Department, the Contractor shall obtain a provisional hazardous waste generator number from Virginia Department of Environmental Quality in accordance with applicable federal and state regulations, and shall legally store, pack, label and ship such material by a transporter with a RCRA Hazardous Waste Transporter permit to a RCRA Subtitle C, Treatment Storage and Disposal Facility (TSDF) for treatment and disposal. The Contractor shall prepare the hazardous waste shipping manifest and provide to the Engineer for signature. One copy of the manifest shall be signed and dated by the licensed TSDF designated in the manifest and shall be forwarded by the Contractor to the Engineer for his records.

- (e) **Certifications:** The Environmental Plan shall be implemented in accordance with the provisions contained therein; any deviations from the plan shall be separately approved by the Engineer. The individual providing the plan certification shall at a minimum be present during startup and removal operations to ensure that the plan is fully implemented. Within

one week following completion of the lead-based paint activities, the Contractor shall submit for the Engineer's record, written certification by the LLS or CIH, including notations of any areas of non-compliance and corrective actions taken, that all work has been completed in full compliance with all applicable regulations and requirements as set forth in these specifications and that the plans on record were fully implemented. The Contractor shall forward for the Engineer's record one copy of the Environmental Plan complete with all revisions and results from the air monitoring activities, including notations of any areas of non-compliance and corrective actions taken.

411.09—Health and Safety

In accordance with the requirements of Section 107, the Contractor shall protect the health and safety of the workers, the public and the environment from leaded paint or hazardous material resulting from coating preparation (cleaning) removal operations, blast abrasive, rust and over spray.

- (a) **Plan:** The worker health and safety plan shall be in accordance with the requirements of Virginia Occupational Safety and Health agency requirements, 29 CFR 1926.62 requirements and the applicable requirements of 29 CFR 1910.1025 and other applicable toxic metal standards, whichever is more restrictive.

The worker health and safety plan shall be approved by a Certified Industrial Hygienist (CIH) currently certified by the American Board of Industrial Hygiene or by a DPOR Licensed Lead Supervisor (LLS).

These plans shall not be submitted to the Engineer for approval, but shall be submitted for the Engineer's review and record. After project award but not less than three weeks prior to commencing operations, the worker health and safety plan shall be submitted to the Engineer.

Within two weeks of receipt, the Department will review the submitted plan for completeness. Should deficiencies in the plan exist, the plan will be returned to the Contractor for incorporation of revisions as noted by the Engineer. The Contractor shall make such revisions and submit completed plans for the Engineer's record, prior to commencing operations. In no case shall the Contractor begin work prior to the Engineer's receipt and review of a satisfactorily complete plan.

- (b) **Monitoring:** The CIH or LLS providing plan approval or a qualified designated representative shall be present during start-up, surface preparation periods and as needed during removal operations throughout the duration of the project to ensure the provisions of the worker safety and health and environmental plans are properly implemented.

- (c) **Certification:** At completion of the project, the CIH or LLS shall submit a written statement of certification for the Engineer's record, complete with all revisions including notations of any areas of non-compliance and corrective actions taken, that the worker health plans fully complied with all regulations and that the plans were fully implemented.

411.10—Measurement and Payment

Coating of new metal on structures will not be measured for separate payment but shall be included in the price for structural steel or metal items. When a pay item, coating of new metal in or on structures will be paid for at the contract lump sum price per structure.

Prepare and spot coat existing structure, when a pay item, will be measured in square feet of surface area and will be paid for at the contract unit price per square foot.

Prepare and overcoat existing structure, when a pay item, will be paid for at the contract lump sum price per structure.

Recoat existing structure, when a pay item, will be paid for at the contract lump sum price per structure.

Zone coating of existing structure, when a pay item, will be paid for at the contract lump sum price per structure.

These prices shall include washing, surface preparation, and applying protective coating.

Environmental protection and health and safety will be paid for at the contract lump sum price per structure. This price shall include containment operation, regulation compliance, environmental protection plan preparation and approval and worker health and safety plan preparation and approval, providing CIH and LLS monitoring services, worker protection and all other related costs.

Disposal of material will be paid for at the contract lump sum price per structure. This price shall include transporting, storing, and disposal.

Payment will be made under:

<u>Pay Item</u>	<u>Pay Unit</u>
Coating of new metal on structures (B or Str. No.)	Lump sum
Prepare and spot coat existing structure (B or Str. No. and type)	Square foot
Zone coating of existing structure (B or Str. No. and type)	Lump sum
Prepare and overcoat existing structure (B or Str. No. and type)	Lump sum
Recoat existing structure (B or Str. No. and type)	Lump sum
Environmental protection and health and safety (B or Str. No.)	Lump sum
Disposal of material (B or Str. No. and type)	Lump sum