Technical Specifications

1. SCOPE

1.1 This specification provides the requirements for corrosion treatment and the application of protective coatings on rack transformers, circuit breakers, switchgear and associated equipment located at the JEA Electric Substations and Generating Plants listed in the Bid Proposal Form and/or at other locations that may be determined later, to be accomplished on a unit price basis.

1.2 **All work under this contract will be performed in accordance with NACE International Standard RP0297-2004, included in the bid package.** JEA emphasizes that work on this project will be very hazardous. Load requirements may prevent or only allow for short periods of de-energization on much of the equipment on this project. Bidders must understand, that to complete this project within the time span allowed, their personnel would be required to work in very close proximity to unprotected and non-insulated high voltage and high current devices. Work may be required to be performed, with minimally available spatial clearances, on and around energized equipment up to voltage levels of 230KV**. Only personnel qualified to work in energized high voltage environments will be permitted. Bidders shall be required to submit the Minimum Qualification Form as set forth in the specification.**

1.3 The bulk of services outlined in this specification will take place annually between the months of March through May and October through December. If the awarded contractor cannot accommodate this schedule, the contract will be cancelled and awarded to the next responsible lowest bidder.

2. GENERAL REQUIREMENTS

The contractor selected for this project shall provide all labor and equipment, including all materials as specified, required to accomplish this project within the time spans allocated by JEA.

2.1 The contractor shall:

2.1.1 Take action to protect any equipment which may be damaged by the corrosion treatment process and/or application protective coatings. Equipment nameplates, which are not removable, shall be masked for protection during the sandblasting, stripping or painting processes. Where nameplates are found to have been painted over in the past, significant effort shall be made to remove this paint. Equipment control cabinets shall be masked to keep blasting materials from entering and damaging electrical circuits and components. All non-metallic structures, such as gasket materials, shall be effectively protected so that sandblasting will not cause their deterioration.

2.1.2 Prep the surface per SSPC- SP1 by either solvent cleaning or high-pressure wash, followed by SPC-SP3 mechanical tool cleaning, or SSPC-SP6 Commercial blast cleaning as necessary to remove all oil, dirt, glass, chalk, contaminants and corrosion from structures and equipment.

2.1.3 Neutralize any solvents or cleaners to prevent further corrosion.

2.1.4 Caulk all equipment rails and bases, overlapping plates, back to back angles, joined flanges, skip welded metals and crevices to prevent intrusion of moisture or corrosive contaminants. Patch and sand metal areas that have partially deteriorated through with suitable metal patching materials.

2.1.5 Prime, body coat and finish coat as required to provide a long lasting protective coating which will impede corrosion and present a smooth appearance.

2.2 Materials required:

2.2.1 A list of approved coatings suppliers and their approved products is found in the appendix.

2.2.2 The contractor will select which supplier they will utilize for the work described in this specification.

2.2.3 The contractor is permitted to change suppliers during the course of the contract.

2.2.4 Each unit of JEA equipment shall be cleaned, prepped, coated, and finished with materials from a single supplier.

2.2.5 The contractor is responsible for the warranty of the work and materials outlined in this specification.

3. PREPARATION

3.1 METAL SURFACES

3.1.1 Transformer tanks, circuit breakers, switchgear cabinets, accessories, etc., are to be high pressure washed at a minimum of 4000 PSI to remove dirt, grease and chalk, and Chlorides. Sand blasted to remove all rust, loose paint and corrosion. The Contractor shall take all necessary precautions to protect interior equipment of control cabinets, gasket materials, etc., during the cleaning process. All sand blasted areas shall be spot primed, fully sprayed with a body coat and fully sprayed finish coat.

3.1.2 Transformer radiator tubes shall be high pressure washed, and/or flow-coat stripped as required per paragraph 3.3, to remove all rust, chalk and gloss. Sand blasting shall only be performed cautiously, so as not to blast through the thin tube areas. A full flow prime coat, the tube edges being rolled and radiator tubes being full flow finish coated, shall be applied.

3.1.3 Substation galvanized structures - Remove any oil or grease from the surface to be coated using clean rags soaked in a suitable thinner. Areas of heavy pitting should be power tool cleaned per SSPC-SP3 and spot primed. Specified coating shall be applied in accordance with the manufacturers' recommendations.

3.2 PREPARATION OF SURFACE FOR PAINTING

3.2.1 When painted, all surfaces shall be dry and free of dirt, dust, sand, grit, mud, oil, grease, rust, loose mill scale, or other objectionable substance. Cleaning and painting shall be done in a manner which will prevent dust or other airborne particles from contaminating freshly painted surfaces. Areas of heavy oil or grease shall be washed with clean rags according to SSPC-SP1.

3.2.2 Clean cloths and clean fluids shall be used to avoid leaving a film of greasy residue on the surface being cleaned. Surfaces not intended to be painted shall be adequately protected from contamination, discoloration, or other damage resulting from cleaning or painting operations.

3.2.3 Surfaces shall be free of cracks, pits, projections, or other imperfections, which would prevent the formation of a smooth, unbroken paint film, in accordance with SSPC-SP3.

On smaller areas, where corrosion has caused complete deterioration through the metal surface, the Contractor shall use an approved surface patching material that would be applied to fill the subject areas. The patched area would then be sanded smooth to conform to the original surface contours. Where extreme deterioration of the metal surface has occurred, the Contractor shall notify the project representative for further direction as to the course of action to be followed.

3.2.4 **Leaks in radiator tubes or tanks will be repaired by JEA**.

3.3 CLEANING

Metal surfaces shall be cleaned as follows:

3.3.1 All metal surfaces shall be solvent, steam or pressure washed, as required to loosen old paint and rust using a brush-off blast cleaning according to SSPC-SP7

3.3.2 Radiator tubes, which have under-film corrosion, surface rust, rust on stabilizer bars, rust behind radiator tubes, button-type spacers, and radiator tubes which have in excess of 12 mils of paint, will be stripped to bare metal.

3.3.3 The stripping will be done using the flow coat method of application. The stripping solution shall be heated to 160 degrees F to insure total removal of the paint. DOT approved drums shall be used for reclaiming and disposal of the stripper and paint sludge. Drums shall be disposed by the contractor.

3.3.4 Some radiator tubes may be found to have epoxy primer. In these cases, the decision to strip will be left to the JEA representative.

3.3.5 After all paint and residue is removed, radiator tubes and adjacent metal surfaces shall be rinsed down with water to remove any residual caustic solutions. A final rinse, with a 5% solution of phosphoric acid shall be used to neutralize any remaining caustic solution and help to protect the metal until the surface is painted.

3.3.6 Where the existing coating is damaged or corrosion is evident, metal surfaces shall be sandblasted, power sanded or hand sanded to remove damaged paint or corrosion and expose clean bare metal. All sand blasted metal will be primed within four hours of sandblasting. No sandblasted metal may be left unprimed overnight without re-blasting.

3.4 PRETREATMENT

All surfaces of radiator tubes and other bare metal surfaces exhibiting >2% rust, shall be treated with a 25% solution of Phosphoric acid the specified metal conditioner, then rinsed with clean water and retreated with a 3% solution of phosphoric acid.

4. PAINT APPLICATION

4.1 Surfaces to be painted shall be at a temperature not less than the minimum surface temperature recommended by the paint manufacturer. In no case shall paint be applied under any of the following conditions:

4.1.1 When the surface temperature or air temperature is below 45 degrees F.

4.1.2 When insects or windblown dust, dirt, or debris would adhere to the freshly applied paint.

4.1.3 When atmospheric conditions are causing condensation on the surface, or air temperatures that are not 5 degrees higher than the dew point.

4.1.4 When exterior surfaces are wet or damp.

4.1.5 All painting materials shall be applied in accordance with the manufacturer's recommendations by competent and experienced painters.

4.2 MIXING

Paint shall be thoroughly mixed each time any is withdrawn from the container. Paint containers shall be kept tightly closed at all times, except while paint is being withdrawn.

4.3 TINTING

Job site tinting of finish coats shall be done only when acceptable to JEA representative. All tinting colors shall be of a type recommended by the manufacturer of the paint being used.

4.4 THINNING

Paint shall not be thinned except as recommended by the manufacturer of the paint.

4.5 APPLYING

4.5.1 Paint shall be flow coated or spray applied except as otherwise specified or as otherwise acceptable to the JEA representative. Application of paint shall continue without interruption to all surfaces between corners, seams, or other surface breaks. No laps will be permitted except at such surface breaks.

Primer, body coat, and finish coat for transformer radiator tubes shall be applied by the flow coat process.

4.5.1.1 Flow coating radiator tubes is a process with results that are similar to dipping radiator tubes in a vat of paint, which coats all nooks, crannies, and crevices on the radiator tube surfaces. No other method of application is acceptable unless specified.

4.5.1.2 As defined in this specification, flow coating consists of a system of pumps, hoses, and specially treated canvas or pans, which are arranged around and under a set of transformer radiator tubes in a fashion that will collect all of the paint and cleaning agents that are pumped upon the radiator tubes. The canvas or pans are placed directly under the tubes forming a sump for the collection of paint and cleaning agents flowed over all tube surfaces. This is the point of liquid pickup for the suction hose on the flow coat pump.

4.5.1.3 Successful flow coating depends upon flooding a large volume of paint at the proper viscosity down the tube surfaces utilizing a pump capable of producing a minimum of 35 gallons per minute at a 20-foot head. This paint is recirculated for a maximum of 15 minutes until all tube surfaces are completely covered with paint. Paint and cleaning agents shall be discharged on to the radiator tubes through a ¾-inch minimum inside diameter hose, which is connected to a flow coating wand with a minimum ¾-inch flared orifice. The minimum inside diameter of the pump suction hose shall be 1-1/4 inches.

4.5.1.4 At the option of the Contractor, and as acceptable to the JEA representative, other equipment surfaces may be painted with spray equipment. Special

precautions shall be taken to ensure that material loss into the air will not damage equipment or adjacent materials or property.

4.5.1.5 Care shall be taken at all times during spray application of paint to hold the spray nozzle perpendicular and sufficiently close to the surface being painted in order to avoid excessive loss of material into the air and evaporation of volatile paint solvents.

4.5.1.6 Air spray equipment shall be provided with pressure gauges, pressure regulators, and moisture traps or separators. Nozzles shall be of proper size and type for the paint being applied in each case. Air delivered to the spray nozzle shall be dry and of sufficient and suitable pressure for the proper application of the paint used.

4.5.1.7 Airless spray equipment shall be equipped with double tip nozzles of proper size and type for the paint being applied in each case.

4.5.1.8 Spray application of paint shall be followed immediately with a paintbrush applied along vertical and lower horizontal edges of steel members, abutting surfaces, edges of connections, and between and beneath bolt heads and nuts, to remove all surplus paint and to smooth out all runs. All sags in paint films shall be brushed out immediately. When paint is sprayed out-of-doors, every precaution shall be taken to prevent drifting or spreading of airborne material, which might damage adjacent property. Equipment bushings, nameplates, gauges, gaskets, etc., shall be covered and protected during paint application.

4.5.1.9 Each coat of paint shall be a visibly different color or shade from the preceding coat. Paints shall be factory tinted.

Each coat of paint may be inspected by the JEA representative before the next coat is applied.

Paint systems applied under these specifications, whether flow coat or spray applied, shall have a dry film thickness of not less than 5 mils nor more than 10 mils. Each coat should be applied to yield from 1 1/2 to 2 mils in dry film thickness, and the total dry film thickness for 3 coats should be a minimum of 5 mils.

4.6 CURING

4.6.1 All paint in any one paint coat shall be hard and dry throughout the entire paint film before the next coat is applied. In no case shall the elapsed time between the applications of successive coats of paint to any surface be less than that recommended by the paint manufacturer.

4.6.2 In order to assure that all layers of the paint are dry when repainted, all paint shall be applied in a film of uniform thickness at all points. In no case shall paint be applied at a rate of coverage per gallon which is greater than the maximum rate recommended for that paint by its manufacturer.

4.7 CAULKING

The specified caulking material shall be applied to bases, rails, and elsewhere as required to prevent penetration of moisture into, around, or under installed equipment. Caulking will be done as follows:

4.7.1 All surfaces to be caulked will be sandblasted to remove all dirt, mill scale, loose paint, etc.

4.7.2 All sandblasted areas will be fully primed; after priming the specified caulking material will be applied.

4.7.3 After caulking is complete, all caulked surfaces will be fully finish coated (see Section VII, Paragraph 2.1.4).

4.8 DEFECTS

Newly applied paint films, which show sags, checks, blisters, teardrops, or fat edges, will not be accepted and any final coat of paint, which shows any of these defects, shall be entirely removed from the member or unit involved and the surface repainted. If the defects occur in any of the undercoats, they shall be repaired to the satisfaction of the JEA representative before additional paint coats are applied. Dry film thickness must comply with the maximum and minimum requirements.

4.9 PROTECTION OF SURFACES

4.9.1 Throughout the work, the Contractor shall provide and use proper drop cloths, masking tapes, and other protective measures necessary to protect surfaces, including grease fittings, electrical cords, motor shafts, nameplates, bushings, gauges, gaskets, etc., from accidental spraying, spattering, or spilling of paint, or spray, mists or vapors of material such as strippers. Surfaces that have been accidentally sprayed or spattered shall be thoroughly cleaned and all residues removed. The Contractor shall be responsible for, and shall correct and repair, any damaged condition resulting from his operations or from the operations of those who are responsible to him. Any paint deposited on surfaces, which are not being painted at the time, shall be immediately removed.

4.9.2 Any exposed concrete or masonry not specified to be painted which is damaged by paint shall be either removed and rebuilt or, where so authorized by JEA representative, painted at the Contractor's expense with a complete paint system as recommended by the paint manufacturer.

4.9.3 The Contractor shall furnish all ladders, stages, and scaffolds required for his work; such equipment shall be maintained in safe condition, adequate to support the workload. Scaffolds and ladders, when not in daily use, shall not be left where they interfere with the work of other trades. **All ladders shall be made of non-conductive material.**

4.10 CLEANUP

The Contractor shall leave all areas clean and free from rubbish and accumulated material left from his work. The Contractor will be responsible for meeting all Environmental Protection Agency (EPA) requirements in regard to disposal of cleaning solutions, rinse waters, coatings, cans, thinners, and the like which may alter the project's surrounding environment, except the stripper and paint sludge as stated elsewhere in this specification. Contractor must remove all materials from the job site and may not use JEA trashcans or dumpsters.

4.11 SAFETY

4.11.1 The contractor must be JEA Safety Qualified prior to bidding. The Contractor Safety Qualification Questionnaire is located at the following link:

https://www.jea.com/About/Procurement/Contractor_Safety/

All personnel who are to enter JEA substations must first pass JEA's Substation Safety Training class. This 4-hour class is offered once per month. Please contact Jim Ayers (904-665-5362, ayerjl@jea.com) for scheduling.

4.11.2 The Contractor is expected to comply with the terms and specifications of the contract. Only those conditions that are beyond the control of the Contractor, as determined by the JEA representative, will be considered as sufficient reason to adjust the contract price. Any adjustments in specifications, conditions, or pricing will be in writing and signed by both the Contractor and JEA before any work is started or stopped.

4.11.3 A JEA representative will be responsible for identifying and requesting clearances for all work to be performed under this contract. The JEA representative will request the issuance of line clearances, hold tags, and switching orders directly with the JEA's System Dispatch Division. JEA procedural requirements will be required to be followed for all requested outages. Specifics of Hold Tag Procedures will be reviewed with the Contractor prior to the start of any work covered under this contract.

4.11.4 JEA personnel will be responsible for performing switching and grounding of equipment.

5. BUSHING CAPS

All bushing caps will be hand cleaned to remove grease, dirt and loose paint. They will then receive two full coats of Bushing Cap coating.

6. TRANSFORMER COOLING FANS

6.1 Transformer cooling fans, shrouds, motors and support brackets are not required to be removed by the Contractor as part of work under this contract. Rust removal and painting shall be performed in place. Aluminum fan blades are **not** to be painted.

6.2 The transformer cooling fan motors, shrouds and support brackets are to be corrosion treated in the same manner as the transformer on which they are mounted. Fan motors shall be thoroughly sealed from the entrance of sand blasting grit, paint, or other materials into the motor or bearings prior to treatment. After painting, the sealing materials are to be removed.

7. STENCILS

7.1 After each item of equipment has been painted, the Contractor will apply painted numbers and/or letters onto the equipment to denote the JEA Equipment Designation.

7.2 These numbers and/or letters will be applied using stencils a minimum of 5" high and with JEA Equipment Designation coating.

7.3 The actual JEA Equipment Designation to be painted, and the location on the equipment where it will be placed, will be determined at the time by the JEA project representative.

7.4 By way of example, in most cases, transformers will be designated "T-1", "T-2", etc., and circuit breakers will be designated "661T1", "662T2", etc.

8. WORK INSPECTION STOPS

The Contractor may be instructed to stop after each phase of the painting process (cleaning, stripping, priming, body coat, intermediate coat, finish coat, etc.) for an inspection by the JEA representative before proceeding to the next step. Failure to allow for these inspection stops will result in rejection of the entire paint job.

9. EPA REGULATED WASTES

9.1 All liquid and solid EPA Regulated Waste Materials created or generated by work on this contract shall be containerized and disposed of by the Contractor.

9.2 Each container is to be marked on the top by the Contractor with an indelible paint marker with:

9.2.1 Date filled

9.2.2 Substance within container

9.2.3 Contractor company name

9.3 Although all EPA Regulated Waste Materials are to be containerized as work of this Contract, as a minimum, this will include:

9.3.1 Lead or other heavy metal, impregnated paint residue such as from sand blasting, scraping or other stripping operations.

9.3.2 Spent solvents, paint thinners, caustic stripping solutions or phosphoric acid cleaning solutions.

10. ADDITIONAL WORK

10.1 From time to time, as JEA sees fit, additional items of equipment to be corrosion treated and painted will be added to the scope of work of this contract. This equipment will be done on a unit price basis. The Contractor will be requested to submit a detailed and itemized scope of work to be accomplished for each additional unit of equipment. Written approval must be received from the Substation Department before starting the execution of this additional work.

10.2 In the case of transformers, power circuit breakers, panels, or any equipment that has a particular or unique physical structure, the quote shall be a fixed price for that particular equipment type.

10.3 In the case of several pieces of equipment that are similar in physical configuration, the unit prices shall be quoted under the following guidelines:

10.4 **OIL CIRCUIT BREAKERS**

10.4.1 FULL BLAST

10.4.1.1 Solvent clean or high pressure-wash to remove dirt, grease, chalk and/or gloss, and neutralize.

10.4.1.2 Remove rust and/or loose paint from all tank areas (Hand sand, power sand, scrape, full blast or water blast).

10.4.1.3 Bolts and nuts used to support the main tank on drop-tank style oil circuit breakers shall not be painted.

10.4.1.4 Full prime all surfaces.

10.4.1.5 Full body coat.

10.4.1.6 Full finish coat.

10.4.1.7 Material list - Primer

10.4.1.8 Material list - Body Coat

10.4.1.9 Material list - Finish Coat

10.4.1.10 Total Price Quote

10.5 **GAS (SF6) BREAKERS**

10.5.1 Solvent clean or high pressure-wash to remove dirt, grease, chalk and/or gloss, and neutralize.

10.5.2 Remove rust and/or loose paint from all tank areas (Hand sand, power sand, scrape, full blast or water blast).

10.5.3 Unpainted aluminum or stainless steel surfaces shall remain unpainted.

10.5.4 Full prime all surface.

10.5.5 Full body coat.

10.5.6 Full finish coat.

10.5.7 Material list - Primer

10.5.8 Material list - Body Coat

10.5.9 Material list - Finish Coat

10.5.10 Total Price Quote

10.6 **POWER TRANSFORMERS**

Due to the variation of power transformer sizes which are in service on JEA's electric system, the Contractor will be asked to provide specific price quotations for any additional work on each specific unit that is determined to require painting during the period of this contract. Prices shall be quoted under the following guidelines, unless otherwise directed:

10.6.1 High pressure-wash tank, accessories and radiators to remove gloss/chalk and neutralize.

10.6.2 Remove rust and/or loose paint from all tank areas (Hand sand, power sand, scrape, spot blast or water blast).

10.6.3 Spot prime all bare metal areas.

10.6.4 Full body coat tank and accessories.

10.6.5 Full body coat radiator tubes (Flow coat).

10.6.6 Full spray finish coat tank and accessories.

10.6.7 Finish coat radiator tubes (Flow coat).

10.6.8 Material list - Primer

10.6.9 Material list - Body coat

10.6.10 Material list - Finish coat

10.6.11 Total Price Quote.

10.7 **PT AND CT JUNCTION BOXES AND AC YARD CABINETS**

The Contractor may be asked to provide specific price quotations for additional substation yard junction boxes, cabinets, etc. that are determined to require painting during the period of this contract. Prices shall be quoted under the following guidelines, unless otherwise directed:

10.7.1 Solvent clean or high pressure-wash to remove dirt, grease, chalk and/or gloss, and neutralize.

10.7.2 Remove rust and/or loose paint from all tank areas (Hand sand, power sand, scrape, full blast or water blast).

10.7.3 Full prime all surface.

10.7.4 Full body coat.

10.7.5 Full finish coat.

10.7.6 Material list - Primer

10.7.7 Material list - Body Coat

10.7.8 Material list - Finish Coat

The Contractor shall quote a general unit price for each one of the above paragraphs, except paragraph 10.7, according to the following operating voltages:

27KV

69KV

138KV

230KV

The Proposal Form shall include a fixed price per unit quoted.

11. COMPENSATION AND PAYMENT

11.1 Compensation for work performed under the terms and conditions of this contract shall be firm unit prices.

11.2 Compensation shall be at the rates bid on the Proposal Form for the time Contractor's personnel are engaged in JEA work and includes all holiday and vacation allowances, fringe benefits, overhead, housing, per diem, employee contributions required, law and taxes based on the wages of employees performing the work, worker's compensation and comprehensive general liability insurance premium supplies, and all associated expenses and profits.

12. Delays

12.1 JEA intends to supply the contractor with consistent work while the contractor is on site. At times, electric system requirements and weather may force delays.

12.2 JEA will make efforts to keep these delays to a minimum.

12.3 JEA will not be charged for contractor downtime.

APPENDIX