

JEA

Northside Generating Station

JACKSONVILLE, FLORIDA

JEA NGS N03

Isolated Phase Bus

Cleaning Inspection and Repair Fall 2019

111-19 Appendix A Technical Specifications

Revision 3 6/3/19

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General Requirements and Scope of Work

1.1 Overall Site Description

The Northside Generating Station (NGS) is located north of downtown Jacksonville on 4377 Heckscher Drive, Jacksonville, FL 32226, in Duval County. JEA's NGS has four combustion turbines (CT's) (Units N33, N34, N35, and N36) that have been in service since Circa 1975 and three steam turbine units (N01, N02 and N03) that have been in service since 1965, 1972, and 1977 respectively.

1.2 Contractor's Scope of Work

This scope of work includes inspecting, cleaning and testing the Isolated Phase Bus (IPB) system between the Generator Terminals and the step-up power transformers. The Bidder shall furnish all equipment, supervision, labor, transportation, tools and expendables to clean by removing all foreign matter, inspect and make repair recommendations, for the existing IPB. The purpose is to ensure that the duct, bus, flex-links and insulators are sufficiently clean and that the duct is properly sealed against moisture intrusion. If any equipment is found to be damaged, it will be up to the JEA Project Manager (PM) to decide if the equipment is to be left as-is, repaired or replaced. It is expected that any existing damage, corrosion or any other issue(s) that might have previously affected reliability, or issues that may affect reliability in the future be brought to the attention of the PM immediately. Prior to any work on the IPB, the Foreman shall walk down the clearance with the PM and Engineer to gain an understanding of JEA's Lock Out Tag Out (LOTO) and to ensure safety prior to starting work. A daily meeting with the Contractor Foreman or PM shall be completed with the JEA PM to go over any safety issues, discovery work, project status, and the project schedule.

Electrical Testing – The bus was manufactured by Delta Star / H.K. Porter Circa 1977. It is a 3 phase, 18kV, 60Hz, 110kV BIL, 22kA forced-air cooled system with a 2kA tap bus for station service. The three phase system is roughly 400 feet in length making this approximately 1200 feet of IPB. The conductors were designed to operate at 105C. A 10kV megger test shall be performed before the 40kV DC High Potential testing (Hi-Pot), both before, and after the cleaning, to provide an indication of whether the bus is ready to go back into service or not. The bus is expected to megger in the Giga-Ohm range at the end of the job. The megger shall be able to read in the Giga-Ohm magnitude and the Hi-Pot test machine shall be capable of delivering results in sub micro-amp magnitude. The megger – Hi-Pot plan, along with expected values, shall be prepared by the contractor and shared with the JEA PM for approval. All readings will be shared with the JEA PM and be included in the final report. Electrical testing results will be used to understand the initial condition of the system and then to prove that all insulators are intact and have been properly cleaned and that there are no grounds on the system at completion of work. Either the JEA Engineer or PM shall be present for each and every test.

IPB Inspection - N03 IPB will be inspected from the outside, next to TG3A and TG3B, to the inside of the turbine building, underneath the generator, unless rain or weather makes starting work inside more practical. If work starts inside the turbine building, every effort must be made to begin work outside as most of the discovery is expected to be found outside of the turbine building. Ideally, the work will start on top of the step up transformers, TG3A - TG3B, and work toward the wall plate adjacent to the N03 switchgear room. After the visual inspection is completed, electrical isolation will be verified between the generator, the IPB, and the step up power transformers TG3A - TG3B. The initial megger and Hi-Pot will be conducted to have a base point recorded and to see if there are any points of electrical tracking. Each accessible location where it is possible for physical contact with the bus, shall be either manned with an employee, or protected with red danger tape and a barricade information tag that states the hazard information and JEA PM or Engineers cell phone number. All seals, insulators and connections shall be visually inspected using a bore scope and documented with both a video log and a still photograph log both before and after cleaning. The photographs will be edited (adding pointer, circles, notes and location references) to show any found deficiencies. A copy of both the video log and the photo log will be included in the final report.

IPB Repairs – The discovery work found during the inspection shall be discussed in detail with the JEA PM and Engineer prior to commencing any repairs. The awarded contractor shall have the ability to receive the insulators, flex links, bus support assembly's, bushings, and all hardware within 5 business days after the inspection is complete. This is to ensure that the outage will not be extended. All bolts shall be torqued to the OEM's specification. The first and last set of connections shall be left removed until after the final Hi-Pot. The existing drawings shall be printed out and red-lined in order for JEA to create as-built's drawings if any repairs are accomplished.

After the discovery work is addressed and sufficiently complete the PM shall give permission to start the final Megger and Hi-Pot tests. If the IPB test results show that the bus is ready to be put back in service, the remaining flex links shall be installed and the access points shall be properly closed. If there is questionable results, it will be expected to isolate the problem area and correct the issue before the job is complete. All testing shall be done with either the PM or Engineer present.

Equipment List – The equipment list is intended to be a partial list with special notes on the scope of work. It is not intended to provide an exhaustive list.

1. Access hatches and gaskets - All access hatches (125) are to be removed and be left loose until the JEA PM directs the contractor to permanently reinstall them. All gaskets will be replaced with new approved gaskets. The covers will be placed back into position at the end of each day or shift. All hardware will be replaced with 316 stainless steel supplied by the contractor.
2. Insulators and Bushings – The insulators (139) for the 20 5/8” conductors are class “B-50” high creep and the insulators (24) for the 4” square tap bus are also class “B-50” high creep bushings (18). Look for any damage using bore scope and video/picture log. All hardware will be replaced with 316 stainless supplied by the contractor.
3. Isolated Phase Bus – The current carrying conductors are painted aluminum pipe. In places, the painted surface may have started to flake. This electrical bus and the inside of the surrounding grounded duct is to be thoroughly cleaned using lint free rags, mops, and vacuum cleaners to remove all foreign matter where accessible from the access hatches.
4. Flexible shunts braids - All (208) of the flexible shunts (flex braids) internal to the IPB shall be indexed such that, they could be re-installed in the exact location and orientation that they were removed from. This is to make sure that the face to face connections have the same amount of contact if the original links are put back in place. The flex links shall be disconnected and visually inspected for discoloration, broken leafs, pits, hot spots and have a DLRO (digital low resistance ohm) test performed to make sure they are all within 1% resistance of each other (so there is no selectivity of flexible links carrying more current than others). A thin layer of Mobil 28 shall be applied to each electrical connection and then wiped off so that no dripping occurs. This is only expected to be enough grease to fill porosity voids. All hardware is to be replaced with 316 stainless, including stainless steel conical washers.
5. Grounding Connections – All bolts that are used for grounding connections shall be re-torqued to manufacturer recommendations.
6. 18 kV Connections – All electrical bolted connections in the bus duct are believed to be silver plated copper or copper clad silver plated aluminum. If damaged, it will be up the JEA PM to decide if the stab/connector is to be repaired or cut out and replaced with a new silver plated connector. All stainless steel conical washers and hardware to be replaced with 316 stainless steel.
7. Enclosures and Seals – The transformer termination enclosures, the disconnect inside the switchgear room, and the dog houses on the mezzanine have seals that will have to be replaced.
8. Torque All Bolts – After inspection and upon reassembly, all bolts that are used for the 18 kV electrical connections will be re-torqued to manufacturer recommendations. In the absence of any manufacture recommendations:

5/8” 55Ft-lbs
1/2” 45Ft-lbs
9. Grounding – The exterior of the IPB is grounded. The ground connections shall be inspected and tightened or checked for tightness.
10. Cleaning – All insulators, bushings and connections and shall be wiped down and cleaned to remove all FME (foreign material). The inside of the bus duct that can be reached by hand and with mops from the

access hatches shall also be cleaned. Sufficient cleanliness shall be defined as the inability to wipe dust off of a surface before any access point is closed.

11. Welding – A hole was discovered in the top of the IPB during the Fall 2018 outage. This and any other holes in the duct shall be welded shut by the contractor. An OEM welding specification will be provided for reference, however it will be expected that the Contractor has welded bus and bus duct in the past and currently has an established procedure in place to safely perform the welds. The Contractor shall possess the AWS D1.2/D1.2M certification for welding aluminum.

For the final cleaning, the contractor shall supply and use the following product or approved equivalent to wipe down the insulators and bushings:

JEA part number:

ADCCL024

JEA DESCRIPTION - CLEANER,

DIELECTRIC SOLVENT & DEGREASER,

5 OR 6 GALLON PAIL DI-ELECTRIC

MIN 28 KV NON-HAZARDOUS,

COMPLETE EVAPORIZATION LEAVING NO FILM OR RESIDUE

NO SUBSTITUTE

Manufacturer of the cleaner:

SELIG CHEMICAL INDUSTRIES (p/n 2231, ZONE DEFENSE-5 GALLON)

ECOLINK (p/n 0296)

Suppliers:

IRBY,

HD Supply,

12. Drain system – Each drain will need to be cleaned and inspected.

Preliminary Reports – during the cleaning and inspection, the contractor will keep JEA informed of any damaged equipment along with recommendations on their disposition, including how to repair or replace damaged equipment.

Final Report – The contractor shall prepare a final written report that includes a copy of the video log and picture log. The pictures shall include typical insulators as found, all cleaned insulators and all equipment identified as having flaws before and after repair of all work done.

Extra work – It is anticipated that repair work will be necessary. The contractor shall provide unit costs for each of the following items:

1. Inspect additional connections.
2. Clean electrical connections.
3. Copper/Silver re-plating of aluminum connectors.
4. Silver re-plating of electrical connections.
5. Replace damaged or missing 18 kV connection bolts (316 SS, not 304).
6. Replace cracked or damaged insulators.
7. Replace insulator hardware.
8. Replace hatch cover bolts.

1.3 Site Conditions

The Contractor acknowledges that it has investigated prior to bidding and satisfied itself as to the conditions affecting the Work, including but not restricted to those bearing upon transportation, disposal handling and storage of materials, availability of labor, roads, or storage areas. Any failure by the Contractor to acquaint itself with the available information will not relieve them from responsibility for estimating properly the difficulty or cost of successfully

performing the Work. JEA assumes no responsibility for any conclusions or interpretations made by the Contractor on the basis of the information made available by JEA. Site parking will be available on the property in an area designated by the JEA PM. Site access will be available 7 days per week. Site water and power are available for cleaning. Contractor must provide their own telephone services, office spaces and or portable restroom facilities. Any staging areas or work areas that are required to be created due to the existing conditions are the responsibility of the Bidder. Access to work areas require ladders and JEA provided scaffolding. The scaffolding will be staged per the contractor's direction one week before the start of the project. Contractor shall provide their own rental portable

1.4 Safety, Health, and Accident Prevention

The bus duct electrical connections were originally made with Zinc – Chromate grease, part number D-50H47. It is expected to find the grease at the face-to-face electrical connections and that the Contractor shall dispose of it by wiping down with rags and disposing of in marked plastic trash bags so that the appropriate disposal can be accomplished by JEA. Due to the unknown condition of the interior of the bus duct, it shall be required to initially open the duct wearing a respirator and face-shield, mitigating any possibility of dust inhalation or dust entering face orifices. This is a precaution. It is not expected to be in constant contact with a known carcinogen. Gloves shall be worn and Tyvek suits shall be on-site in the event that they are needed.

Contractor shall take all JEA required contractor safety and site specific safety training.

All JEA contractors, and their subcontractors performing safety sensitive work on our projects will adhere to our safety practices and guidelines. Every person who works on any JEA project is expected to follow these practices to ensure their personal safety as well as the safety of every other person on a site or in the nearby community.

Contractors must be safety qualified **before** their bid will be accepted for this scope of work. **Safety qualification is necessary** for contractors and subcontractors for this project.

Every JEA safety qualified vendor **must re-qualify annually**.

1.5 Forced Shutdown

JEA reserves the right to shut down the activities at no additional cost to JEA due to one or more of the following conditions:

- Potential safety concerns.
- Weather
- The need to terminate the unit outage prematurely.

1.6 Site Security

Site security is provided by JEA on a 24 hour, 7day per week basis. All contractor employees will pass thru security and vehicle inspections may occur.

1.7 Schedule

The NGS outage is scheduled for November 7, 2019 thru December 7, 2019. It is anticipated that this work may begin on the fourth day of the outage, November 11, and must complete by end of business November 29, 2019. No extensions will be granted.

The Contractor shall not commence any work until a notice to proceed is received. A project schedule for this Contract shall be prepared and maintained by the Contractor to provide coordination, to establish the basis for measuring and monitoring Contractor progress and to detect problems for the purpose of taking corrective action. Contractor shall provide JEA with weekly updates. These updates shall include the following:

- Current status of the job progress
- Three day Look-Ahead Schedule
- Report the planned and actual progress of the current week
- Report all planned work that is to be accomplished during the follow week
- Changes in the Work
- Safety and Quality Control issues
- Problem areas or concerns

Appendix B - Bid Form
111-19 Isolated Phase Bus Clean and Inspect at Northside Generating Station for Unit 3

Submit an **original, three (3) copies and one (1) CD or thumb drive** along with other required forms in a sealed envelope to: JEA Procurement Dept., 21 W. Church St., Bid Office, Customer Center, 1st Floor, Room 002, Jacksonville, FL 32202-3139.

Company Name: _____

Company's Address _____

License Number: _____

Phone Number: _____ FAX No: _____ Email Address: _____

BID SECURITY REQUIREMENTS

- ☐ None required
☒ Certified Check or Bond Five Percent (5%)

TERM OF CONTRACT

- ☐ One Time Purchase
☐ Annual Requirements
☒ Other, Specify - Project Completion

SAMPLE REQUIREMENTS

- ☒ None required
☐ Samples required prior to Response Opening
☐ Samples may be required subsequent to Bid Opening

SECTION 255.05, FLORIDA STATUTES CONTRACT BOND

- ☐ None required
☒ Bond required 100% of Bid Award

QUANTITIES

- ☐ Quantities indicated are exacting
☒ Quantities indicated reflect the approximate quantities to be purchased Throughout the Contract period and are subject to fluctuation in accordance with actual requirements.

INSURANCE REQUIREMENTS

Insurance required

PAYMENT DISCOUNTS

- ☐ 1% 20, net 30
☐ 2% 10, net 30
☐ Other _____
☐ None Offered

Description of Services	TOTAL EVALUATED BID PRICE
Total Evaluated Bid Price for Work as described in this Solicitation from Page 2 of the Bid Form	\$ _____

☐ **I have read and understood the Sunshine Law/Public Records clauses contained within this solicitation. I understand that in the absence of a redacted copy my proposal will be disclosed to the public "as-is".**

BIDDER CERTIFICATION

By submitting this Bid, the Bidder certifies that it has read and reviewed all of the documents pertaining to this Solicitation, that the person signing below is an authorized representative of the Bidding Company, that the Company is legally authorized to do business in the State of Florida, and that the Company maintains in active status an appropriate contractor's license for the work (if applicable). The Bidder also certifies that it complies with all sections (including but not limited to Conflict Of Interest and Ethics) of this Solicitation.

We have received addenda

_____ through _____

Handwritten Signature of Authorized Officer of Company or Agent Date

Printed Name and Title

Appendix B - Bid Form
111-19 Isolated Phase Bus Clean and Inspect at Northside Generating Station for Unit 3

Unit	Description	# Required	Price \$ Total
1	Lump Sum for Scope of Work described in this solicitation for NGS Unit 3	1	\$
Additional Materials, <u>options</u> for execution based on discovery during performance of the project: Pricing includes installation of <u>total</u> quantity listed below.			
2	Copper/Silver re-plating of electrical connections (See Figure 1 below)	24 Ea.	\$
3	Replace cracked/damaged insulators	18 Ea.	\$
4	Replace Flexible Shunt Braids instead of DLRO testing	24 EA	\$
Total Evaluated Bid Price (total of Lines 1 through 4) Enter this Total on the Bid Form, Page 1			\$

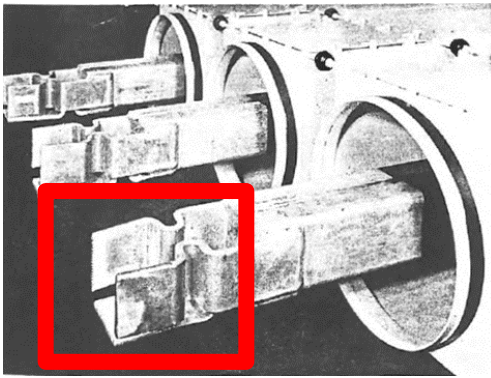


Figure 1 - Plating of Conductor Stab

Base silver plating cost on up to 100 square inches each. This is an approximate surface area to silver plate one end of one conductor/stab. Pricing includes all labor, materials and equipment to remove, plate and reinstall.

111-19 Appendix B - Minimum Qualifications Form
Isolated Phase Bus Clean and Inspect at Northside Generating Station for Unit 3

The minimum qualifications shall be submitted in the format attached. The references shall be presented in the order described below. In order to be considered a qualified supplier by JEA you must meet all the criteria listed and be able to provide all the services listed in this specification. Submit with Bid or Proposal in accordance with the requirements of the solicitation.

Company shall ensure listed references can be contacted to verify minimum qualifications compliance. If JEA cannot contact the submitted reference, JEA may request an additional point of contact from the same reference, however, will not allow the Company to change references. If the reference cannot be verified, JEA may reject the submitted Bid or Proposal.

RESPONDENT INFORMATION

COMPANY NAME: _____

BUSINESS ADDRESS: _____

CITY, STATE, ZIP CODE: _____

TELEPHONE: _____

FAX: _____

E-MAIL: _____

- The Bidder shall have successfully completed five (5) similar projects as stated in the technical specifications totaling \$200,000 or more within the past three (3) years, ending April 30, 2019. Isolated phase bus projects completed for JEA shall be included and will count as a similar project regardless of cost.
- The Bidder shall have an ISO9001 quality management certification. Employees performing the work, shall be employed by the prime contractor.
- The Bidder shall have a current aluminum AWS D1.2 welding certification.

