

**SPECIFICATION
FOR
DESIGN AND FURNISHING OF
SWITCHGEAR BUILDING
FOR
JEA
KENNEDY SUBSTATION TRANSFORMER AND SWITCHGEAR
INSTALLATION PROJECT**

Written By: Thomas M. Pohn Date: 8/25/17
Reviewed By: Steph Pugh Date: 8/25/17
Approved By: _____ Date: _____



Stantec

**Stantec Consulting
8130 Baymeadows Way West Suite 104
Jacksonville, FL 32256-7450
Phone (561) 222-0136
Fax
COA #**

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PART 1 – GENERAL

1.1 Summary

1.1.1 General Description

- 1.1.1.1 The intent of this project is to design, engineer, fabricate, deliver and install a substation switchgear Walk-In Enclosure herein referred to as "switchgear building" to house outdoor rated switchgear, communications equipment, and associated components. The switchgear shall be an integral part of the building, with access doors to the rear switchgear compartments forming a portion of the exterior wall.
- 1.1.1.2 The Seller shall furnish all labor, materials and equipment to perform and coordinate the necessary operations for the design, engineering, manufacturing, fabrication, delivery, off-loading and securing to Buyer-supplied foundation of the switchgear building. It shall be equipped with all components and accessories required to provide a complete structure, weather tight, and suitable for the service intended, which is to provide shelter for substation electrical equipment.
- 1.1.1.3 The Seller shall provide complete and functioning equipment and systems capable of safe and reliable operation including metal clad switchgear, electrical, lighting, equipment grounding, lightning protection and HVAC.
- 1.1.1.4 The Seller shall furnish and install a UPS system and a Fiber Optic Patch Panel as described in this document.
- 1.1.1.5 Any work, materials or equipment that may reasonably be inferred from the contract documents or from prevailing custom or trade usage as being required to produce the intended result shall be furnished and performed, whether or not specifically stated herein. Literal adherence to this specification shall not relieve the Seller of the ultimate responsibility for accomplishing the intent of this specification.
- 1.1.1.6 At minimum, the Seller shall complete all work in accordance with this specification. Any deviations from this specification or the drawings must be submitted to JEA in writing prior to commencement. No fabrication shall begin without written approval of drawings from JEA.

1.1.2 Terminology

- 1.1.2.1 The "Seller" means any individual, company or subcontractor furnishing materials or services covered by this document.
- 1.1.2.2 The "Buyer" is JEA.

1.2 Related Specifications

Kennedy Substation Transformer and Switchgear Installation Technical Specification
16345 – 15kV Metal Clad Switchgear

1.3 References

- 1.3.1 The latest edition and published addenda of the following publications in effect on the date of Contract Award are a part of this Specification:

National Standards Institute (ANSI)
Florida Building Code (FBC)
American Institute American of Steel Construction (AISC)
American National Standards Institute, Inc. (ANSI)
American Society for Testing and Materials (ASTM)
American Welders Society (AWS)
Institute of Electrical and Electronic Engineers (IEEE)
National Electrical Code (NEC)
National Electrical Safety Code (NESC)
National Electrical Manufacturers Association (NEMA)
Occupational Safety and Health Administration (OSHA)
Steel Door Institute (SDI)

- 1.3.2 Where the above referenced codes and standards contain recommendations in addition to requirements, the recommendations shall be considered requirements and shall be followed unless stated otherwise by this Specification Section.

- 1.3.3 In the event of any conflict between codes, or Specifications and codes, the more stringent requirement shall apply.

1.4 Submittals

- 1.4.1 Manufacturer shall provide copies of the requested documents to the Buyer in accordance with Appendix C.

1.5 Quality Assurance

- 1.5.1 Seller shall have specialized in the manufacture and assembly of specified material for a minimum of 10 years.

- 1.5.2 All components and materials provided by the Seller shall be new and free from defects.

- 1.5.3 Design, materials and workmanship including the various accessories furnished shall fully comply with the requirements of the latest editions of all state and federal laws, codes and regulations.
- 1.5.4 Particular attention needs to be given to the fact that the Codes and Standards referenced in the specifications and procurement documents will not be generic and will vary depending on the location of the site and are indeed contract specific.
- 1.5.5 The Seller shall provide for approval, prior to the start of fabrication, a copy of their Quality Assurance Program and/or an Inspection and Test Plan that describes how the quality of the product is assured throughout the fabrication and test process. This information shall also show any witness and hold points that are established as part of this assurance process.
- 1.5.6 Authorized representatives of the Buyer shall be allowed free access to the Manufacturer's facility for the purpose of inspection and witness testing of equipment, or any of its parts, and for obtaining information as to the progress of the work. If requested by the Buyer, notification shall be given to him at least ten working days prior to testing and shipment so that his inspector may be present for factory tests and inspection.

1.6 Delivery, Storage and Handling

1.6.1 Labeling

- 1.6.1.1 Equipment shall be labeled for shipment on the outside of the shipping container(s) with the Purchase Order number, equipment tag number, and description, as a minimum.

1.6.2 Protection for Shipment

- 1.6.2.1 All equipment openings shall be protected against entrance of dirt, dust, moisture or other deleterious elements. All surfaces, which may be subject to corrosion or oxidation, shall be protected in accordance with Seller's standards.
- 1.6.2.2 All entrances to internal wiring, control devices and the like shall be effectively protected or otherwise sealed to prevent entrance of moisture, dust, dirt or other deleterious matter. All connections shall be protected by metal covers to prevent damage during shipment.

1.6.3 Packaging

- 1.6.3.1 Packaging shall be labeled and numbered so that each section or assembly may be identified before being uncrated. Any items not fully assembled shall be packaged separately.
- 1.6.3.2 Adequate means shall be provided for moving the units on rollers.

1.6.3.3 All equipment shall be packaged for outdoor storage.

1.6.3.4 Seller shall also include storage instructions that will minimize damage to the equipment and material. Storage requirements shall be geographically specific. Storage requirements shall be as stringent as the most sensitive component requires.

1.6.3.5 All equipment shall be shipped to the project address:

JEA Kennedy Substation
4215 Talleyrand Avenue
Jacksonville, FL 32206

1.6.4 Shipping

1.6.4.1 At least six weeks prior to shipping, Seller shall create and transmit to JEA a shipping scheduled showing, at a minimum, the following information:

1.6.4.1.1 Item description (Breaker 123)

1.6.4.1.2 Shipping Form (crate, carton, pallet, etc.)

1.6.4.1.3 Gross Weight

1.6.4.1.4 Date of Arrival

1.6.4.2 Exactly one each separate shipping schedule shall be supplied per shipping vessel (truck) to assure that JEA's on-site representative knows exactly what is to arrive and when. Minor changes of one or two items from the shipping schedule may be changed up to one week in advance of shipping, provided that a new, updated shipping schedule is provided at least 48 hours in advance of delivery. When such changes occur, the new shipping schedule will clearly delineate the schedule changes by showing and old and new dates, quantities, items, etc.

1.6.4.3 The equipment shall be ruggedly designed and braced to withstand shipment by truck or rail.

1.6.4.4 Seller shall prepare and crate all equipment and materials to protect them against damage in transit. Seller, at his option, may elect to ship on a designated truck, not crating cubicles.

1.6.4.5 Where equipment sections must be separated for shipment, all materials and equipment required to facilitate re-assembly and reconnection of interconnecting bus work in the field shall be furnished. Wiring between equipment sections separated for shipment shall be brought to terminal blocks appropriately identified so as to require only short jumper connections, furnished and identified by Seller, for field assembly.

- 1.6.4.6 Shipping splits, if required, will be enclosed with a protective covering to prevent entrance of dust and water. Temporary bracing as required to support the roof and wall structure to prevent damage during shipment shall be installed. Equipment shall be shipped F.O.B. jobsite, freight prepaid and allowed. Unloading will be the responsibility of others.
- 1.6.4.7 Seller shall prepare procedures covering storage, handling and preventive maintenance requirements to be applied after the receipt of the equipment at the site.
- 1.6.4.8 Seller shall provide complete written instructions 6 weeks prior to shipping (PTS) describing procedures necessary to receive the material and equipment in a safe manner that prevents injury to the receiving personnel and minimizes equipment damage.
- 1.6.4.9 Each group shall be bolted to skids and enclosed in a protective covering and be equipped to be handled by crane or industrial "fork" truck. Under no circumstances shall any one group exceed a shipping weight of 4,000 pounds.
- 1.6.4.10 All apparatus or equipment, not bolted to the housing structure and not forming a part thereof in shipment, shall be packed in separate boxes. Circuit breakers, accessories and installation materials shall be packed and crated separately. Detailed packing lists shall be provided.
- 1.6.4.11 Shipping splits shall be limited to two (2) coupled compartments during transit.
- 1.6.4.12 Switchgear and switchgear building shall be provided with adequate lifting means.

1.6.5 Tagging and Labeling Requirements

- 1.6.5.1 Each shipping item shall include, affixed to the exterior shipping package in a conspicuous location, a large (at least 8 x 10) sheet containing the following information:

Customer Name: JEA
Customer Order Number: (JEA Purchase Order #)
Customer Project Name: (to be determined)
Customer Contact: (to be determined)
Contents: (Vertical Section Unit 17, Breaker 123, etc.)

1.7 Project Conditions

- 1.7.1 Project Site Conditions are as follows:

- 1.7.1.1 Location: JEA Kennedy Substation, 4215 Talleyrand Avenue, Jacksonville, FL 32206, Lat 30.3640, Long. -81.6274.

1.7.1.2 Applicable Codes: ASCE-7-10 Minimum design loads for Buildings and Other Structures; Florida Building Code 5th Edition (2014).

1.7.1.3 Structural Loads

1.7.1.3.1 Dead loads shall include all future structural, electrical and mechanical components of the switchgear building including but not limited to switchgear, cable tray, control cable, HVAC units, etc.

1.7.1.3.2 Live Loads

- a. Roof Live Load = 40 psf
- b. Ceiling Dead Load = 10 psf
- c. Floor Live Load = 200 psf
- d. Floor Lifting Load = 125 psf
- e. Maximum Deflection = $L/240$

1.7.1.3 Structure Risk Classification: Risk Category II.

1.7.1.4 Wind: Basic Wind Speed: $V_{ult} = 125\text{mph}$; Wind Importance Factor = 1.15; Exposure Category C; Occupancy Category = III.

1.7.1.5 Seismic: Mapped response acceleration parameter for 0.2 second period $S_s = 0.114$; Mapped response acceleration parameter for 1.0 second period $S_1 = 0.060$; Site Class D; Site Coefficient $F_a = 1.6$; Site Coefficient $F_v = 2.4$; Maximum response acceleration parameter for 0.2 second period $S_{MS} = 0.182$; Maximum response acceleration parameter for 1.0 second period $S_{M1} = 0.144$; Design response acceleration parameter for 0.2 second period $S_{DS} = 0.122$; Design response acceleration parameter for 1.0 second period $S_{D1} = 0.096$; Seismic Design Category B; Seismic Importance Factor $I_e = 1.00$

1.7.1.6 Rainfall: 25-yr, 24-hr rainfall $R_{25\text{yr}_24\text{hr}} = 8.75\text{ in}$

1.7.1.7 Temperature: $T_{\text{max_avg}} = 93^\circ\text{F}$, July/August; $T_{\text{min_avg}} = 38^\circ\text{F}$ January

1.8 Extended Warranty

- 1.8.1 The Seller shall act as a "single point of responsibility for all components installed in the switchgear assembly that are not furnished by the Buyer. This equipment shall be warranted for a period of 36 months from startup date or 48 months from shipment, whichever time limit occurs first.
- 1.8.2 The switchgear building shall be guaranteed to be completely weather-tight under all weather conditions for the warranty period, Leaks that occur during

the warranty period, whether through roofs, walls, doors, or accessory equipment shall be repaired to the satisfaction of and at no cost to JEA.

- 1.8.3 The switchgear building roof shall be warrantied against leakage for a period of not less than twenty (20) years.

1.9 Professional Services

- 1.9.1 The Seller shall employ an Engineer(s) licensed in the State of Florida and experienced in this work or similar work to perform each of the engineering tasks required. The Engineer's determinations shall be reduced to writing and shall include all plans, drawings, specifications or otherwise and shall be submitted to JEA for review. The Design Engineer or Engineer of Record shall sign and seal all required submitted project documentation.

1.10 Project Record Documents

- 1.10.1 **Maintain an up-to-date set of Contract documents. Note any and all revisions and deviations that are made during the course of the project.**
- 1.10.2 Provide six (6) copies of all final, approved, copies of all components.
- 1.10.3 Six (6) copies of instruction books and operating manuals of all provided equipment, shall be furnished by the Seller, and are considered an essential part of the requirements of this specification.
- 1.10.4 **Supply an electronic copy (.PDF format) of instruction books, operating manuals, and drawings for all provided equipment.**

1.11 Optional Items

- 1.11.1 Pricing for optional items are to be covered under commercial terms and conditions.

PART 2 - TECHNICAL REQUIREMENTS

2.1 General

- 2.1.1 All materials and equipment supplied by the Seller shall be new, of good quality and shall conform to these specifications as well as any codes governing the use of the material.**
- 2.1.2 Where specific materials are specified, Seller may submit an equivalent product for Approval. Equivalent product submittals shall demonstrate equivalency.**
- 2.1.3 Fabrication and Assembly requirements**
 - 2.1.3.1 All metal work shall be free from burrs and sharp edges. Elements may be connected by bolts, thread forming screws, or welds.**
 - 2.1.3.2 All steel structure members shall be cleaned prior to finishing.**
- 2.1.4 All steel members shall be coated with an electrostatically applied polyester powder with a final baked on average thickness between 2.0 and 4.0 MILS.**
- 2.1.5 Interior aisle space in front of the switchgear shall be not less than 5'-6" and shall be adequate to permit withdrawal of the circuit breakers for inspection, test and maintenance as a minimum. Additional equipment space, where required, shall be provided**
- 2.1.6 Provide aisle space extension, as required, to locate the required UPS system and a 19" F/O Termination rack. The 19" F/O rack, Battery Charger, Electrical Switches, Panelboards, Fire Alarm and Building controls shall be located in a designated area of sufficient size between the building interior wall and switchgear side.**
- 2.1.7 Wall Penetrations: Any exit point or structural penetration must be sealed with a removable barricade that will keep animals, insects, and environmental elements from entering the switchgear building, yet allow for temporary removal should it become necessary.**

2.2 Structural

- 2.2.1 The structural members sized by design calculations to meet or exceed specified loads. Structural members shall be located to coordinate with the enclosed equipment so as to properly support it and allow maximum access to equipment floor and wall openings.**
- 2.2.2 The structure base shall be designed with lifting lugs capable of lifting the fully equipped structure at the designed lifting points to not exceed allowable deflection.**

- 2.2.3 The building will be supported on a slab with an open trench running the length of the switchgear under the power cable openings. Provide stairways with handrails from the slab to the building floor level.

2.3 Mechanical

- 2.3.1 Switchgear building walls shall be insulated between the inner and outer walls. The interior wall shall be capable of self-supporting wall mounted loads, as required, located at the end of the Switchgear Building.

- 2.3.2 The enclosure shall be cooled and heated with HVAC equipment sized to meet the conditions as required. Air conditioning units are to be wall mounted.

- 2.3.2.1 HVAC shall be controlled via wall-mounted programmable thermostat with auto-changeover capability. Default settings shall be 62 deg. F for heating and 78 deg. F for cooling with manual overrides while attended.

- 2.3.2.2 The heating and air conditioning equipment shall be capable of continuously maintaining an indoor temperature between 60°F and 80°F. Hot spots shall not exceed plus or minus 10°F from the set point temperatures.

- 2.3.2.3 The HVAC units shall provide filtered outdoor air for ventilation in accordance with building code requirements. The system shall also provide make-up air for any required exhaust systems.

- 2.3.2.4 All HVAC units shall be interlocked with the fire detection system to automatically shutdown the HVAC units in accordance with NFPA 90A requirements.

- 2.3.2.5 Provide a form "C" contact for HVAC trouble alarm.

- 2.3.2.6 Insulation Factors

- a. Roof = R-30
- b. Walls = R-19
- c. Floor = R-13
- d. Door = R-6.4

2.4 Doors

- 2.4.1 A minimum of two doors, located at opposite ends of the enclosure, are required. Doors measuring four feet (4') wide by eight feet (8') tall shall be provided to allow for equipment entry and removal and personnel ingress and egress.

- 2.4.2 Doors shall be hinged and have the ability to be locked for restricted entry. Coordinate door lock requirements with the Buyer.

- 2.4.3 All doors shall be steel honeycomb, flush, seamless entrance doors, fabricated of galvanized steel. Doors shall be phosphatized, and shall receive one coat of baked primer and one finish coat of baked-on enamel. Doors shall be internally reinforced with steel for mounting of surface closers, and shall be furnished with top caps for weather protection.
- 2.4.4 All latching doors shall be equipped with panic hardware that operate under simple pressure and open outward.
- 2.4.5 Door Frames shall be fabricated of galvanized steel. Frames shall be bonderized, and shall receive one coat of baked-on primer and one finish coat of baked-on enamel. Frames shall be reinforced and provide heavy duty door closers.
- 2.4.6 Doors shall have a gasket to provide a weather seal.

2.5 Grounding

- 2.5.1 Two external ground pads shall be bonded to the structural base to serve as an equipment ground connection point to a grounding grid.
- 2.5.2 The ground bus from each piece of installed equipment will be connected to the base assembly so as to provide a continuous ground path. An accessible, internal ground bus shall be provided for this, and any future, connections.
- 2,5,3 An additional continuous copper ground bus located above the communication equipment shall be provided.
- 2.5.4 A grounding electrode conductor shall be provided from the AC Panel, DC Panel, Breaker Test Station, and other electrical equipment in the building to the internal ground bus.
- 2.5.5 All other grounding for the switchgear building equipment to be in accordance with the NEC and applicable IEEE standards.

2.6 Electrical

- 2.6.1 The switchgear building electrical installation shall be comply with NFPA 70 - National Electrical Code, NFPA 70E - Standard for Electrical Safety in the Workplace and IEEE C2 - National Electrical Safety Code. In cases of differing requirements between codes, the one with more stringent requirements shall be followed.

2.6.2 UPS System

The Seller shall provide a separate, single cabinet, 125VDC UPS system, to be located inside the switchgear building. The UPS system shall be a SENS, Power Cab 120 Model #4BG8410NTBAC00 or approved equal. Battery shall be sized

in accordance with IEEE 485 and calculations showing the battery size specified is adequate shall be provided.

2.6.3 Fiber Optic Patch Panel

2.6.3.1 The Seller shall provide one (1) Fiber Optic patch panel for mounting the Buyer's F/O termination equipment in a location in the switchgear building. Provisions shall also include providing required conduit and cables for routing F/O cable interconnections between the switchgear Auxiliary compartment SEL-3555 RTAC unit, the patch panel and the remote JEA control house.

2.6.3.2 The patch panel shall be a 12 Frame Panel with 4 – 8 type LC Duplex port frames.

2.6.3.2 The patch panel shall be mounted in a Chatsworth Products Part Number 55053-103 19" communications rack. The rack shall be grounded to the switchgear ground bus.

2.6.3.3 A 125VDC power circuit shall be routed from a breaker at the UPS unit panel and terminated on a terminal block mounted on the equipment rack.

2.6.3.4 The Fiber Optic cable installation shall minimize the number of bends. The minimum cable bend radius shall be twice the minimum allowed by the fiber optic cable manufacturer.

2.6.4 AC Power Panel

2.6.4.1 Switchgear Building shall have an AC power panel for building service loads which will be fed and powered from an external power source; 120/208VAC, 3-phase, 4-wire, 200A main breaker, 22kAIC, ground bar, surface mounted, top entry, 42 pole, with NEMA 1 type enclosure, cover and door. Provide a conduit from a junction box on the exterior of the building to the panelboard for the feeder.

2.6.4.2 The AC power panelboard shall be Square D type "NQOD" or approved equal. Seller shall include a factory installed Surge Protective Device (SPD) as recommended by the panelboard manufacturer.

2.6.4.3 The Seller shall be responsible for labeling of all AC supply branches to agree with the designations as shown on the Drawings.

2.7 Raceways

2.7.1 Wiring within the building shall be in metallic raceways. Power, control, and instrument cables shall be in separate raceways. Cable trays inside the building shall maintain a minimum 6 inches clearance from top of tray to the lowest part of ceiling or ceiling beam. All cable trays and components shall be in accordance with NEMA VE 1 or NEMA FG 1 and as specified herein.

- 2.7.2 Power and control cable trays shall be aluminum ladder type with 9" rung spacing. Instrumentation trays shall be solid bottom hot dipped galvanized steel trays with steel covers.
- 2.7.3 Ethernet cables shall be run in instrumentation trays. Control cables and fiber optic cables shall be run in the control tray with a barrier between the control cables and the fiber optic cable.
- 2.7.4 Conduit shall be EMT for lighting and receptacle circuits. All others shall be rigid galvanized steel.
- 2.7.5 The Seller shall specify all required conduits and installation procedures and necessary details including a Conduit Plan shown on a Construction Drawing.
- 2.7.6 The Conduit Plan should identify which cables from the Cable Schedule are routed within each conduit. Cable fill shall be in accordance with the NEC.
- 2.7.7 Conduit and wiring to the power panel and its loads shall be designed, supplied and pre-installed as much as possible for quick field assembly.

2.8 Cable

- 2.8.1 Furnish for 600 volt maximum service, totally enclosed in conduit, NEC type XHHW or THWN (size per NEC as required).
- 2.8.2 Fiber Optic cable shall be 8 type OM3 fiber, multimode, indoor distribution cable Belden Catalog No. FL3D008R9 or Buyer Approved equal.
- 2.8.3 Cable shall be identified on an AC Panel schedule drawing and include at a minimum, the cable identification number, conductor size, number of conductors, and a brief description of the conductor function.
- 2.8.4 All installed cables shall have each end clearly labeled with the correct cable number identification as per the drawings. Cable identification tags shall be RhinoPRO 1/2" Flexible Nylon Labels - Black on White, manufacturer part# 18488, unless otherwise approved. Indoor labels shall be secured with no less than two plastic cable ties.

2.9 Lighting

2.9.1 Exterior Lighting

- 2.9.1.1 Exterior lighting shall be provided near the doors at suitable height and be of the full cutoff design.

- 2.9.1.2 Seller to furnish and install two (2) exterior lights; 120VAC, HPS, 70W,

wall mount with full cutoff optics, Grainger, 2RGW8.

- 2.9.1.3 Exterior lighting shall be photocell controlled. Seller to design, furnish and install a control system to accomplish dusk-dawn operation.

2.9.2 Interior Lighting

- 2.9.2.1 Provide interior overhead lighting, T-8 fluorescent type with electronic ballasts and lamp guards. Interior aisle space shall be illuminated to a minimum of 45 foot candles at a working height of 36" above the floor. Lighting shall be controlled by three way switches at each egress door.

2.9.3 Emergency Egress Lighting

- 2.9.3.1 Powered emergency exit signs with integral lighting and 90 minute battery backup shall be provided for each egress door.

2.10 Receptacles

- 2.10.1 Provide two exterior duplex receptacles with integral ground fault protection, one adjacent to each egress door.
- 2.10.2 Install four interior duplex receptacles equally spaced around the interior walls.

2.11 Finishing

- 2.11.1 Exterior Walls shall be light grey in color. Seller to submit to Buyer available color options immediately upon project commencement.
- 2.11.2 Interior walls & ceiling shall be RAL 9010 Pure White.
- 2.11.3 Floor shall be Painted light gray with "Non-Skid" element added. Finish shall have a minimum pencil hardness of 2H as tested per ASTM D3363.
- 2.11.4 Finish shall pass the ASTM B117 salt spray test for a minimum of 1000 hours.
- 2.11.5 An undercoat shall be applied to the entire base using an industrial grade, high solid, and high build epoxy. This undercoat shall be a minimum of 4 mils.
- 2.11.6 All structural elements including channels and angles shall be caulked to seal gaps and spaces.
- 2.11.7 An additional 4 mil undercoat shall be applied to the bottom of the base assembly.

- 2.11.8 The sides of the base assembly shall be finished using polyurethane paint to a minimum thickness of 2 mils
- 2.11.9 Certified production test reports indicating satisfactory completion of all inspection and test procedures shall be provided.
- 2.11.10 The equipment shall be made available for customer inspection prior to shipment

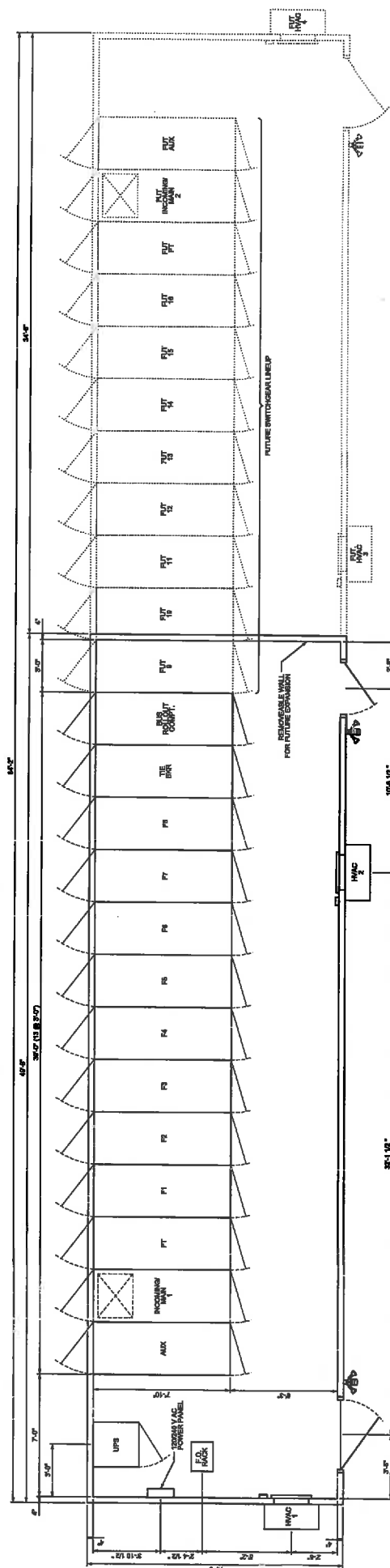
2.12 Miscellaneous

- 2.12.1 Furnish and install door limit switch contact alarms for each egress door, 2P2T, Honeywell S&C, DTE6-2RN2 or equivalent. Contacts shall be wired to the SEL-2523 annunciator device for remote alarming to SCADA.
- 2.12.2 Provide a temperature monitor with high/low temperature alarm contacts wired to the SEL-2523 device for remote alarming to SCADA. High temperature setpoint shall be 85 degrees F; low temperature setpoint shall be 50 degrees F.
- 2.12.3 Provide two (2) photoelectric type smoke detectors, with alarm contacts rated for 125VDC wired to the /sel-2523 device for remote alarming to SCADA.
 - 2.12.3.1 Activation of the Fire Detection system shall inhibit the operation of HVAC. Seller to design, furnish and install the necessary controls to provide the fire detection interlock.
- 2.12.4 Seller to furnish and install one (1) fire extinguisher; class D, Haldtron 1, 11 pounds, 125 PSI operating pressure, 15 feet max range including heavy duty bracket, Grainger, 4XP83.

ATTACHMENT A
SPECIFICATIONS AND DRAWINGS

The following Specifications and Drawings shall be considered as part of this Specification.

<u>Specification/Drawing No.</u>	<u>Title</u>
17128 SK1	Switchgear Building
16345	15kV Metal Clad Switchgear



NOTES:

1. CONTRACTOR TO INSTALL ALL CABLES AND CONDUITS IN THE CONTROL HOUSE ACCORDING TO THE FOLLOWING SPECIFICATIONS AND CONDUIT SCHEDULE. ALL CABLE AND CONDUIT SCHEDULES REQUIRED FOR THESE CABLES SHALL BE PROVIDED BY THE CONTRACTOR.

CONTROL HOUSE MANUFACTURER WILL INSTALL ALL LIGHTING, OUTLET, BACKUP ALARM, AND CORD WIRING.

CONTROL HOUSE MANUFACTURER WILL INSTALL ALL CABLE TRAY.

[illegible]

ATTACHMENT B**BID SUBMITTALS CHECKLIST**

The Seller shall submit complete information concerning the scope of supply, design, construction, and materials of all equipment to be furnished with the proposal. The following table lists the minimum requirements for information to be submitted with the proposal:

X	Description
	Dimensional outline drawings of the enclosure
	Weight of entire assembly, sizes and weights of shipping sections
	Electrical equipment data sheets (lights, HVAC, etc.)
	Extent of factory wiring of electrical equipment provided
	Extent of wiring to be done by others in the field for equipment provided by the Seller
	Major component and assembly electrical nameplate ratings
	Variations, if any, from the specification
	A statement of guarantee or warranty, stating guaranteed performance data
	Guaranteed delivery schedule based on contract award date
	Guaranteed schedule for:
	- Equipment Outline Drawing
	- Schematic Diagrams
	- Wiring and Connection Diagrams
	- Shipping
	- O&M Manuals
	- Procedures
	Power requirements of all Seller supplied equipment
	Equipment pricing including all spare parts required for installation and start-up.
	Freight costs assuming FOB project site, Jacksonville, FL

ATTACHMENT C
REQUIRED SUBMITTALS
(After Contract Award) Checklist

The submittals listed in the table below are required for this equipment and defined in the paragraphs below:

	Document	Size	Submitted	Copies	Electronic File	Schedule (Weeks)
C-1	Design Data and Engineering Calculations	A	A,C	2	Required	6-8 ARO
C-2	General Arrangement Dimensioned Outline Drawings	D	A,C	2	Required	6-8 ARO
C-3	Foundation Interface Drawings	D	A,C	2	Required	6-8 ARO
C-4	Electrical Plans	D	A,C	2	Required	6-8 ARO
C-5	Electrical Connection Drawings	D	A,C	2	Required	6-8 ARO
C-6	Equipment Schematics	D	A,C	2	Required	6-8 ARO
C-7	One Line Diagrams	D	A,C	2	Required	6-8 ARO
C-8	Bill of Material	A	I	3	Not Required	6-8 ARO
C-9	Data Sheets	A	I	3	Not Required	6-8 ARO
C-10	Shop Drawings	A,D	A	3	Required	6-8 ARO
C-11	Catalog Cut Sheets	A	I	3	Not Required	2 ARO
C-12	O&M Manuals	A	I	3 + 1 on CD-ROM	Required	4 PTS
C-13	Receiving & Storage Instructions	A	I	3	Not Required	6 PTS
C-14	Shop Test Reports	A	I	3	Not Required	2 PTS
C-15	Section Interconnection Drawings	B	A,C	2	Required	4 PTS
C-16	Record Drawings	A	I	6 + 1 ON CD-ROM	Not Required	4 APA

Legend

A	Approval
C	Certified
I	Information
ARO	After Receipt of Order
PTS	Prior to Shipment
APA	After Project Acceptance

C-1 Design Data and Engineering Calculations

Design criteria, data, and/or engineering calculations performed during the project design phase for structural, mechanical and electrical design. JEA reserves the right to request design data and calculations during the design phase.

C-2 General Arrangement Dimensioned Outline Drawings

The general arrangement drawings shall provide an overview of the equipment arrangement or layout including plans, elevations, wall sections and details, shipping splits and all dimensions. Drawings shall also show equipment ratings, clearances and access dimensions, all accessories, weights of components and shipping dimensions and weights. General Arrangement shall include mounting details, cable entry area, door swing requirements, detailed dimensioned drawings of the end units for future additions, etc.

The equipment outlines shall be dimensioned drawings of all major components provided. The drawings shall also show suggested support locations. Hoisting plan and instructions/specifications shall also be included.

All plan and section views shall be to scale with regards to all major architectural, civil, structural, electrical, and all equipment including AC and DC panels, etc.

The Seller shall show any relevant, to-scale sections and elevations required to fully detail and verify means and methods of installation. At minimum, show heights of AC panels, cable trays, lighting fixtures, doorways, louvers, fans, wall mounted HVAC units, etc, to provide sufficient detail for installation and coordination of all components with respect to the Switchgear Building's interior dimensions.

C-3 Foundation Interface Drawings

These drawings will include the foundation interface information such as location and details of channel sill, anchor bolts and terminations of power and control cables.

Certified Foundation Interface Drawings shall be submitted showing loads on foundation including dynamic loads, foundation details, location and details of channel sill, anchor bolt sizes and locations, terminations of power and control cables showing locations for top and bottom entry, baseplates and grout requirements. Drawings shall include the requirements for Buyer supplied foundation and/or support for mounting equipment including complete load data (allowable loads).

C-4 Electrical Plans Drawings

The electrical plan drawings shall include conduit and Cable Tray plans and details, grounding plan and details, lighting plan and details, Fire alarm plan and details and AC panel wiring and loading schedule.

C-5 Electrical Connection Drawings

The electrical connection drawings shall show all Buyer interface points. These drawings shall clearly identify all Buyer connection points including power, grounding, network and signal wire termination. All terminal blocks, terminals, ground bars, etc. shall be uniquely numbered and labeled. All drawings will use ANSI/IEEE standard symbols.

C-6 Equipment Schematics

Equipment schematics clearly depicting operation of equipment shall be provided. All schematics will use ANSI/IEEE standard symbols. External connections, Terminal block numbers, and internal wiring diagrams shall be shown clearly.

C-7 One Line Diagrams

The One Line Diagrams shall show all devices contained within the controller gear. All diagrams shall use ANSI/IEEE standard symbols.

C-8 Bill of Materials

The Bill of Materials (BOM) shall include a complete listing of all equipment and/or material being supplied. The BOM shall provide a complete description of each item supplied including tag number, manufacturer, model number, range and setpoint. Items shipped loose for installation by the Buyer's or by Seller's field service shall be clearly identified. Items, which are not manufactured by the Seller, shall have the original manufacturer's name and catalog number with other descriptive data.

C-9 Data Sheets

Seller shall provide complete data sheets updated to reflect any changes made during the bid review process. Submittal of data sheets in electronic format is preferred.

C-10 Shop Drawings

Submit the following detail drawings and data covering switchgear building components and systems for approval prior to fabrication;

- Roofing Structure and Materials
- Color charts for paints
- Catalog cuts of proposed doors and all related hardware

C-11 Catalog Specification or Cut Sheets

Seller shall provide Manufacturer's cut sheets for all commodity type items such as interior lighting, receptacles, junction boxes, AC panels, electric disconnects, cable tray, raceways, smoke/Heat Detectors, relays, etc.

HVAC detail drawings including electrical control schematic diagrams/calculations, manufacturer cut sheets of air handler, compressor, louvers, exhaust fans, etc.

C-12 Operation and Maintenance Manuals

Operation and Maintenance (O&M) manuals shall be assembled and bound and submitted to the Buyer. Manuals shall not be submitted in loose form. Binder capacities shall not exceed 3". In addition, provide two electronic copies of the manuals on CD ROM. O&M manuals shall include the following as a minimum:

- Bill of Material
- Performance curves
- Equipment outline
- Installation, start-up, and test instructions
- Operating instructions
- Maintenance instructions
- Maintenance procedures
- Manufacturer's procedures
- Manufacturer's O&M manuals for components (i.e., gauges, control valves, relays, switches, etc.)
- Spare parts list with start-up spares identified
- Wiring diagrams for all electrical equipment
- Detailed description of each principle component
- Performance and name plate data including
- Safety precautions
- List of electrical relay settings: control and alarm contact settings

C-13 Receiving and Storage Instructions

Provide shipping schedule and written instructions and procedures for receiving, unloading, and storage of equipment.

C-14 Shop Test Reports**C-15 Section Interconnection Drawings**

Seller shall provide a unique set of drawings and instructions for the mechanical and electrical interconnection of shipping split sections. These are to be separate from the standard equipment schematics. They will include clear identification of all field work required to complete the installation of the switchgear lineup.

C-16 Section Interconnection Drawings

Maintain an up-to-date set of Contract documents and drawings. Note any and all revision and deviations that are made during the course of the project. Provide copies of all final components and record drawings. Provide copies of record drawings, operating manuals and instruction books. Supply an electronic .PDF copy of record drawings,

operating manuals and instruction books. Supply an electronic .dwg copy of record drawings.

ATTACHMENT D
PROJECT SPECIFIC REQUIREMENTS

Refer to paragraph 1.7 for project specific requirements.

ATTACHMENT E

TECHNICAL DATA SUPPLIED BY SELLER

Seller furnished data and information shall be included in this section to describe the general design, interface characteristics and construction features of Seller furnished equipment. The accuracy of such information and the compatibility of such information with overall performance requirements specified by Buyer are the sole responsibility of Seller.

Quotation shall include applicable product literature, arrangement drawings showing dimensions, catalog numbers for all devices, and completed data sheet.

E-1 Equipment No. 017S345

E-1.2 Dimensions and Weights

Assembled Switchgear Building, inches _____L, _____W, _____H

Total Weight including switchgear, lbs.

Height Floor to Ceiling, Maximum, inches

Height Floor to Ceiling, Minimum, inches

Clear Height in Building, inches

Clear Height at Exterior Doorways, inches

Clear Height at Interior Doorways, inches

Height of Floor above top of Support, inches

Minimum Aisle Space from Front of Switchgear, inches

Maximum Aisle Space from Front of Switchgear, inches

Largest Shipping Piece Dimension, inches

Largest Shipping Unit Weight, lbs

Building Power Requirements , kW

E-1.3 Description of Wall Construction

E-1.4 Description of Roof Construction

E-1.5 Method of Support

E-1.6 References

Please list three references for recent purchases.

Contact Name	Company	Telephone Number
1.		
2.		
3.		

E-1.14 Exceptions

Please list any and all exceptions and clarifications to this Specification.

SPECIFICATION
FOR
DESIGN AND FURNISHING OF
15 KV METAL CLAD SWITCHGEAR
FOR
JEA
KENNEDY SUBSTATION TRANSFORMER AND SWITCHGEAR
INSTALLATION PROJECT

Written By: *Thomas M. O'Brien* Date: 9/8/2017
Reviewed By: *Steph* *Yas* Date: 9/8/2017
Approved By: _____ Date: _____



Stantec

Stantec Consulting
8130 Baymeadows Way West Suite 104
Jacksonville, FL 32256-7450
Phone (561) 222-0136
Fax
COA #

REVISION INDEX

Revision	Description	Date
A	Issued For Review	6/9/2017
B	Issued for Review	6/15/2017
C	Issued for Review	6/23/2017
D	Issued for Bid	9/08/2017

| - Denotes Change

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ATTACHMENTS

ATTACHMENT A – SPECIFICATIONS AND DRAWINGS

ATTACHMENT B – BID SUBMITTALS CHECKLIST

ATTACHMENT C – REQUIRED SUBMITTALS

ATTACHMENT D – PROJECT SPECIFIC REQUIREMENTS

ATTACHMENT E – TECHNICAL DATA SUPPLIED BY SELLER

1. – GENERAL

1.1 Summary

1.1.1 This Specification includes requirements for the design, fabrication, testing, documentation, delivery and installation of 15kV Class Arc Resistant Outdoor Metal Clad Switchgear and Building. Compliance with this specification does not relieve the Seller of the responsibility of designing, fabricating and furnishing a system to reasonable engineering and industry standards necessary to meet the performance requirements.

1.1.2 JEA is replacing an existing transformer and outdoor metal clad switchgear lineup at their Kennedy Substation located in Jacksonville, FL.

1.1.3 Work to Be Included:

1.1.3.1 Design, fabrication, shop testing, documentation, delivery and installation of 15 kV Arc-Resistant Type 2B Metal Clad Switchgear and Building as described herein.

1.1.3.2 Base Scope

The switchgear and switchgear building to be provided by the Seller.

1.1.3.3 Detailed scope for switchgear is included in Attachment D.

1.1.3.4 The Seller shall furnish and install 125VDC UPS System and Fiber Optic rack in the Switchgear Building. See Switchgear Building Specification 17128 for details.

1.1.3.5 Documents shall be supplied per Attachment C.

1.1.3.6 Seller shall provide equipment and/or services that meet the requirements of all the drawings and specifications listed in Attachment A and all other attachments. If any discrepancies exist, this specification shall take priority.

1.1.4 Work Not to Be Included:

1.1.4.1 The station 24/32/40MVA Power Transformer and the cable connection between the transformer and switchgear to be provided by JEA.

1.1.4.2 Switchgear building foundation

1.2 References

The latest edition and published addenda of the following publications in effect on the date of Contract Award are a part of this Specification:

ANSI C37.06	Switchgear-AC High Voltage Circuit Breakers Rated on a Symmetrical Current Basis-Preferred Ratings and Related Required Capabilities
ANSI C37.55	American National Standard for Switchgear - Medium Voltage Metal-Clad Assemblies - Conformance Test Procedures
ANSI C39.1	Electrical Analog Indicating Instruments, Requirements for
IEEE C37.04	Rating Structure for AC High-Voltage Circuit Breakers rated on a Symmetrical Current Basis
IEEE C37.11	Standard Requirements For Electrical Control for AC High-Voltage Circuit Breakers Rated on a Symmetrical Current Basis
IEEE C37.20.2	Metal-Clad and Station-Type Cubicle Switchgear
IEEE C37.20.7	IEEE Guide for Testing Metal-Enclosed Switchgear Rated Up to 38 kV for Internal Arcing Faults
IEEE C57.13	Standard Requirements for Instrument Transformers
IEEE C37.90	Standard for Relays and Relay Systems Associated with Electric Power Apparatus
NEMA ICS 2	Industrial Control and Systems Controllers, Contactors and Overload Relays rated 600 Volts
NEMA ICS 4	Terminal Blocks
NEMA SG 2	High Voltage Fuses
NEMA SG 4	Alternating Current High Voltage Circuit Breaker
NEMA SG 5	Power Switchgear Assemblies
NFPA 70	National Electric Code
NESC	National Electrical Safety Code
OSHA	Occupational Safety and Health Administration
UL 347	High Voltage Industrial Control Equipment
EEMAC G14-1	Procedure for Testing the Resistance of Metal-clad Switchgear under Conditions of Internal Fault
FSBC	Florida State Building Code

1.3 Submittals

1.3.1 Manufacturer shall provide copies of the following documents to the Buyer in

accordance with Appendix C.

1.4 Quality Assurance

- 1.4.1 Seller shall have specialized in the manufacture and assembly of specified material for a minimum of 10 years.
- 1.4.2 All components and materials provided by the Seller shall be new and free from defects.
- 1.4.3 Design, materials and workmanship including the various accessories furnished shall fully comply with the requirements of the latest editions of all state and federal laws , codes and regulations.

Particular attention needs to be given to the fact that the Codes and Standards referenced in the specifications and procurement documents will not be generic and will vary depending on the location of the site and are indeed contract specific.

- 1.4.4 The supplier shall provide for approval, prior to the start of fabrication, a copy of their Quality Assurance Program and/or an Inspection and Test Plan that describes how the quality of the product is assured throughout the fabrication and test process. This information shall also show any witness and hold points that are established as part of this assurance process.
- 1.4.4 Authorized representatives of the Buyer shall be allowed free access to the Manufacturer's facility for the purpose of inspection and witness testing of equipment, or any of its parts, and for obtaining information as to the progress of the work. If requested by the Buyer, notification shall be given to him at least ten working days prior to testing and shipment so that his inspector may be present for factory tests and inspection.

1.5 Delivery, Storage and Handling

1.5.1 Labeling

Equipment shall be labeled for shipment on the outside of the shipping container(s) with the Purchase Order number, equipment tag number, and description, as a minimum.

1.5.2 Protection for Shipment

- 1.5.2.1 All equipment openings shall be protected against entrance of dirt, dust, moisture or other deleterious elements. All surfaces, which may be subject to corrosion or oxidation, shall be protected in accordance with Seller's standards.
- 1.5.2.2 All entrances to internal wiring, control devices and the like shall be effectively protected or otherwise sealed to prevent entrance of moisture, dust, dirt or other deleterious matter. All connections shall be

protected by metal covers to prevent damage during shipment.

1.5.3 Packaging

- 1.5.3.1 Packaging shall be labeled and numbered so that each section or assembly may be identified before being uncrated. Any items not fully assembled shall be packaged separately.
- 1.5.3.2 Adequate means shall be provided for moving the units on rollers.
- 1.5.3.3 All equipment shall be packaged for outdoor storage.
- 1.5.3.4 Seller shall also include storage instructions that will minimize damage to the equipment and material. Storage requirements shall be geographically specific. Storage requirements shall be as stringent as the most sensitive component requires.
- 1.5.3.5 All equipment shall be shipped to the project address:
JEA Kennedy Substation
4215 Talleyrand Avenue
Jacksonville, FL 32206

1.5.4 Shipping

- 1.5.4.1 At least six weeks prior to shipping, Seller shall create and transmit to JEA a shipping scheduled showing, at a minimum, the following information:
 - 1.5.4.1.1 Item description (Breaker 123)
 - 1.5.4.1.2 Shipping Form (crate, carton, pallet, etc.)
 - 1.5.4.1.3 Gross Weight
 - 1.5.4.1.4 Date of Arrival
- 1.5.4.2 Exactly one each separate shipping schedule shall be supplied per shipping vessel (truck) to assure that JEA's on-site representative knows exactly what is to arrive and when. Minor changes of one or two items from the shipping schedule may be changed up to one week in advance of shipping, provided that a new, updated shipping schedule is provided at least 48 hours in advance of delivery. When such changes occur, the new shipping schedule will clearly delineate the schedule changes by showing and old and new dates, quantities, items, etc.
- 1.5.4.3 The equipment shall be ruggedly designed and braced to withstand shipment by truck or rail.
- 1.5.4.4 Seller shall prepare and crate all equipment and materials to protect them against damage in transit. Seller, at his option, may elect to ship on a

designated truck, not crating vertical sections.

- 1.5.4.5 Where equipment sections must be separated for shipment, all materials and equipment required to facilitate re-assembly and reconnection of interconnecting bus work in the field shall be furnished. Wiring between equipment sections separated for shipment shall be brought to terminal blocks appropriately identified so as to require only short jumper connections, furnished and identified by Seller, for field assembly.
- 1.5.4.6 Shipping splits, if required, will be enclosed with a protective covering to prevent entrance of dust and water. Temporary bracing as required to support the roof and wall structure to prevent damage during shipment shall be installed. Equipment shall be shipped F.O.B. jobsite, freight prepaid and allowed. Unloading will be the responsibility of others.
- 1.5.4.7 Seller shall prepare procedures covering storage, handling and preventive maintenance requirements to be applied after the receipt of the equipment at the site.
- 1.5.4.8 Seller shall provide complete written instructions prior to shipping (PTS) describing procedures necessary to receive the material and equipment in a safe manner that prevents injury to the receiving personnel and minimizes equipment damage.
- 1.5.4.9 Each group shall be bolted to skids and enclosed in a protective covering and be equipped to be handled by crane or industrial "fork" truck. Under no circumstances shall any one group exceed a shipping weight of 4000 pounds.
- 1.5.4.10 All apparatus or equipment, not bolted to the housing structure and not forming a part thereof in shipment, shall be packed in separate boxes. Circuit breakers, accessories and installation materials shall be packed and crated separately. Detailed packing lists shall be provided.
- 1.5.4.11 Shipping splits shall be limited to two (2) coupled compartments during transit.
- 1.5.4.12 Switchgear shall be provided with adequate lifting means.

1.5.5 Tagging and Labeling Requirements

- 1.5.5.1 Each shipping item shall include, affixed to the exterior shipping package in a conspicuous location, a large (at least 8 x 10) sheet containing the following information:

Customer Name: JEA

Customer Order Number: (JEA Purchase Order #)

Customer Project Name: (to be determined)

Customer Contact: (to be determined)

Contents: (Vertical Section Unit 17, Breaker 123, etc.)

1.6 Project Conditions

1.6.1 Project Site Conditions are as follows:

- 1.6.1.1 Location: JEA Kennedy Substation, 4215 Talleyrand Avenue, Jacksonville, FL 32206, Lat 30.3640, Long. -81.6274.
- 1.6.1.2 Applicable Codes: ASCE-7-10 Minimum design loads for Buildings and Other Structures; Florida Building Code 5th Edition (2014).
- 1.6.1.3 Structure Risk Classification: Risk Category II.
- 1.6.1.4 Wind: Basic Wind Speed: $V_{ult} = 125\text{mph}$; Wind Importance Factor = 1.15; Exposure Category C; Occupancy Category = III.
- 1.6.1.5 Seismic: Mapped response acceleration parameter for 0.2 second period $S_s = 0.114$; Mapped response acceleration parameter for 1.0 second period $S_1 = 0.060$; Site Class D; Site Coefficient $F_a = 1.6$; Site Coefficient $F_v = 2.4$; Maximum response acceleration parameter for 0.2 second period $S_{MS} = 0.182$; Maximum response acceleration parameter for 1.0 second period $S_{M1} = 0.144$; Design response acceleration parameter for 0.2 second period $S_{DS} = 0.122$; Design response acceleration parameter for 1.0 second period $S_{D1} = 0.096$; Seismic Design Category B; Seismic Importance Factor $I_e = 1.00$
- 1.6.1.6 Rainfall: 25-yr, 24-hr rainfall $R_{25\text{yr}_24\text{hr}} = 8.75$ in
- 1.6.1.7 Temperature: $T_{\text{max_avg}} = 93^\circ\text{F}$, July/August; $T_{\text{min_avg}} = 38^\circ\text{F}$ January

1.7 Extended Warranty

The manufacturer shall act as a “single point of responsibility for all components installed in the switchgear assembly that are not furnished by the Buyer. This equipment shall be warranted for a period of 36 months from startup date or 48 months from shipment, whichever time limit occurs first.

1.8 Optional Items

- 1.8.1 Pricing for optional items are to be covered under commercial terms and conditions.

2. - TECHNICAL REQUIREMENTS

2.1 Performance Requirements

- 2.1.1 The quality of the equipment and workmanship shall be the best of their respective kinds.
- 2.1.2 One-high, medium voltage, arc resistant type 2B metal-clad switchgear, as specified and rated in Attachment D, intended for use on 13.4 kV, three-phase, three-wire, grounded, 60-Hz system. Enclosures and circuit breakers shall have a basic impulse rating as specified in Attachment D. Switchgear, including circuit breakers, meters and relays, shall be factory tested.
- 2.1.3 The lineup shall consist of an auxiliary vertical section with buses for future extension to the left and top and bottom auxiliary compartments, a 2000A main breaker with auxiliary compartment, eight 1200A feeder breakers with auxiliary compartments, a 2000A tie breaker with auxiliary compartment and a bus roll out vertical section for future extension to the right equipped with a top auxiliary compartment.
- 2.1.4 Metal-clad switchgear shall be installed in a switchgear building integral to the switchgear. See specification 17128 for requirements.
- 2.1.5 Enclosures shall be designed for outdoor locations. The design of the enclosure shall conform to the Category A requirements of Table A1 of Appendix A to IEEE C37.20.2.
- 2.1.8 Temperature Limits
 - 2.1.8.1 The normal current carrying capacity rating of the circuit breakers and other equipment covered under this specification shall be based upon their temperature rise, including connections, as enclosed, when carrying full rated current continuously.
 - 2.1.8.2 The switchgear structure shall be so designed that the average air temperature within the enclosure shall not exceed 15 degrees Celsius over a maximum ambient of 40 degree Celsius outside the enclosure.
 - 2.1.8.3 The temperature rise of current carrying parts and apparatus shall not exceed 65 degrees Celsius over average air temperature of 40 degrees Celsius outside the enclosure.
 - 2.1.8.4 The temperature of non-current carrying parts of the structure shall not exceed 50 degrees Celsius.
- 2.1.9 Equipment shall be completely factory-built, assembled, wired, and tested. All equipment and components shall be of new construction.
- 2.1.10 All equipment furnished under this contract shall be labeled and listed by a nationally recognized testing laboratory.

2.2 Design/Fabrication

2.2.1 Structure

2.2.1.1 Incoming Line Compartment

The proposal shall include provision for incoming bottom entry cable as specified in Attachment D of this specification. Connections for cable shall include all necessary bus adapters, bolting and insulating supports. Incoming line compartment shall include a metal oxide type surge suppressor, per Seller's standard, capable of providing protection against over voltage transients.

2.2.1.2 The switchgear shall consist of one or more of one (1) high vertical sections containing breaker and auxiliary compartments with the specified circuit breakers, buses, instrumentation, relays, controls, and other required devices joined together to form rigid self-supporting assemblies, for outdoor mounting as indicated in Attachment D. In each unit, major primary circuit parts (breaker, buses, control power transformers, etc.) shall be completely enclosed by grounded metal barriers.

2.2.1.3 Vertical sections shall be fabricated, rigidly braced, structural steel framework, with interior barriers and breaker module side sheets of not less than 11 gauge sheet steel and external panels and covers of not less than 11 gauge sheet steel. Each compartment shall have a front hinged flanged panel door. A hinged flanged door shall also be provided on the rear of the vertical section. Rear hinged doors shall open directly to the exterior of the switchgear building and shall form part of the exterior wall. Hinged doors shall be provided with multi-point latching systems. Panels shall be reinforced with stiffening members to minimize vibration. The assembly shall be provided with adequate lifting facilities. Structures shall be manufactured so that future expansion on either end is possible.

2.2.1.4 The phase arrangement of the switchgear buses, primary connections, and devices shall be A, B, C front to back, top to bottom, or left to right when viewed from the front.

2.2.1.5 Switchgear shall be designed in accordance with the testing requirements of EEMAC G14-1 Type B for one-high construction. Switchgear shall be flanged along both sides and the top and bottom of each vertical section to maintain an arc-resistant seal. Under internal arc fault conditions, all related exterior vents shall automatically close and pressure shall be directed through the roof of the unit.

2.2.1.6 Provide a self-supporting plenum that will be designed to attach directly to the top of the switchgear. Exhaust vents extending from the plenum to the outside shall be included with the switchgear assembly.

- 2.2.1.7 Space heaters, with mechanical guards to prevent inadvertent contact of personnel with the thermal elements, shall be provided in each vertical section. Heaters shall be of the low temperature type, rated (nominally) at 240 volts and operated at 120 volts, each with an individual single-pole circuit breaker. The heaters shall be sized to keep the air inside the vertical section above its dew point. Heaters shall be thermostatically controlled.

2.2.2 Compartment Segregation

- 2.2.2.1 Separate compartments, completely isolated with metal barriers shall be provided in each vertical section for circuit breakers, buses, instrument transformers, and cable entrances.
- 2.2.2.2 The manufacturer shall use fittings and materials that help to prevent propagation of damage to adjacent compartments.

2.2.3 Insulation

- 2.2.3.1 Primary bus conductors shall be covered with liquid dipped epoxy and connections shall be covered insulating boots either matching the color of the bus insulation or be of a clear insulating material. Insulating barriers shall be provided where primary buses pass from one compartment to another.
- 2.2.3.2 All bus supports and other insulating material subject to line-to-line or line-to-ground voltages shall be of high grade wet process porcelain or cycloaliphatic epoxy, including stationary primary disconnects. This equipment shall be shipped assembled to the maximum possible extent.
- 2.2.3.3 Designs shall minimize the use of insulating tapes at factory and field joints.

2.2.4 Buses

- 2.2.4.1 Buses shall be rated as shown in Attachment D.
- 2.2.4.2 Buses shall be of high-conductivity copper, sized for the rated continuous and momentary currents within allowable temperature rise, and shall not be tapered.
- 2.2.4.3 Bus joints shall be bolted. Bolted joints shall be silver plated with a minimum of two bolts. Bolts and associated hardware shall be of non-magnetic, corrosion-resistant material.
- 2.2.4.4 Materials shall be supplied for insulating the bus at joints between vertical sections separated for shipment. Bolt sequencing and torquing instructions shall be provided. All field assembly drawings shall be accompanied by illustrated and well written instructions that describe the specific sequence of steps that must be taken in order to properly

field assemble the switchgear.

- 2.2.4.5 The switchgear line and load contacts for the breaker shall be constructed of silver-plated copper. All moveable contact fingers and springs shall be mounted on the circuit breaker where they may be easily inspected.
- 2.2.4.6 A ground bus extending the entire length of each switchgear assembly shall be provided. All the metal parts of the structure shall be effectively connected to this bus. The ground bus shall be silver-plated copper, $\frac{1}{4}$ x 2 inches minimum in cross-section.
- 2.2.4.7 Two (2) control buses consisting of insulated copper cable shall run the entire length of each switchgear assembly. Control buses shall be isolated from the primary devices in separate solid raceways or metal conduit. One two-wire bus with an auxiliary undervoltage alarm relay shall operate at the dc voltage specified in Attachment D and shall supply power to the close and trip circuits of the switchgear and the spring charging motor of the stored-energy mechanism. The second control bus shall carry a 3-phase, 4-wire, 120/208 volt ac circuit to supply heater power and power to operate elevating mechanisms of vertical lift-type breakers, if applicable. The load on the ac control power bus shall be arranged such that it is balanced as closely as possible for each switchgear assembly.

2.2.5 External Connections

- 2.2.5.1 Load cable compartments shall have at least 33 inches of vertical space provided to accommodate cable bending radius and stress cones and shall include cable supports. Terminal connectors for cable connections will use NEMA 4-hole drilling and adapters where required for multiple cables and shall be silver-plated copper. Connections made to bus ducts, shall have all necessary bus adapters, bolting, insulating supports and metal flanges provided. Ground sensing current transformers, when indicated on the Contract Drawings, shall be mounted in the respective cable compartments.
- 2.2.5.2 Bottom entry shall be provided for power cables. Top and Bottom entry shall be provided for control cables. The bottom cable entry for 2000A breakers shall be large enough to accommodate five 6" conduits, each containing one 3-phase circuit cable of up to 1000MCM. The bottom entry shall be large enough to accommodate three 6" conduits, each containing one 3-phase circuit cable of up to 1000MCM. A cable tray on top of the switchgear and running the length of the switchgear to the exterior wall shall be provided for top entry of control cables and conduits.

2.2.6 Circuit Breakers

- 2.2.6.1 Circuit breakers shall be three-pole, single-throw, removable, horizontal

draw-out type with current, voltage and interrupting ratings as shown in Attachment D.

- 2.2.6.2 Circuit breakers shall be vacuum-break type.
- 2.2.6.3 Circuit breakers shall be electrically-operated, trip-free, with stored-energy closing mechanism and provision for manual spring-close, and shall be equipped with self-aligning silver-plated copper primary and secondary disconnecting devices, grounding contacts, operation counter, position indicator, and an auxiliary switch with a minimum of 6 “a” normally open (N.O.) and 6 “b” normally closed (N.C.) contacts rated 20 amps continuous, 10 amps interrupting at the specified control voltage and wired to terminal strips in the auxiliary compartment for use by Buyer.
- 2.2.6.4 Circuit breakers of like continuous current, short circuit and voltage rating shall be interchangeable both physically and functionally without having to change any wiring.
- 2.2.6.5 Breakers and compartments shall be manufactured so a breaker of lesser continuous amperage or short circuit capacity cannot be installed in a compartment manufactured for a specific higher breaker rating. The installation of highest rated breaker of the switchgear into all other compartments shall be demonstrated at the factory with the specific breakers for this project being inserted and tested in each cell.
- 2.2.6.6 Circuit breakers shall be provided with self-aligning contacts for grounding the removable elements when they are inserted in the housings or in the test position. Circuit breaker removable elements shall have three (3) distinct positions in their housings: “Inserted” - ready for operation; “Test” - primary contacts separated a safe distance, switchgear primary contact shutter closed and secondary contacts connected; and “Removed,” primary and secondary contacts separated a safe distance.
- 2.2.6.7 Design of the circuit breakers shall be such that they will provide successful interruption of low magnetizing currents, as well as high load currents and short-circuit currents.
- 2.2.6.8 Protective front covers shall be provided on the circuit breaker element to prevent access to the operating mechanism or live parts when the circuit breaker is in the connected position.
- 2.2.6.9 The circuit breaker front panel shall be a grounded steel barrier that effectively isolates the instrument and control compartments. The breaker truck front panel shall have the following control and indication features: Breaker open-close indication, closing springs charged-discharged indication, operations counter and manual trip-close push buttons.

- 2.2.6.10 A handle shall be used to manually charge the spring for slow closing of contacts for inspection or adjustment. One handle shall be provided for each switchgear assembly.
- 2.2.6.11 The circuit breakers shall be equipped with metal oxide type surge suppressor devices per Seller' standards, capable of providing protection against overvoltage transients to the load supplied by the breaker.
- 2.2.6.12 An extension jumper shall be provided for each switchgear assembly so that the circuit breaker and the circuit breaker's operation may be checked with the breaker element outside of the circuit breaker compartment.

2.2.7 Circuit Breaker Compartment

- 2.2.7.1 Breaker compartment complete with removable circuit breaker elements, silver plated copper contacts, and grounded metal safety shutters to isolate primary connections when the breaker is in the test, disconnected or removed position. The shutter assembly shall be capable of being padlocked in the closed position. Shutters shall be permanently marked to indicate the "BUS" or "FEEDER" side primary stationary disconnects. Phase markings shall also be included.
- 2.2.7.2 A self-aligning manually operated mechanism that will positively rack the breaker between positions with the front door open or closed. Three breaker positions shall be indicated with door closed: OPERATE, TEST and DISCONNECTED.
- 2.2.7.3 Provisions shall be provided for padlocking in either the OPERATE OR TEST positions. The padlock will not interfere with the operation of the breaker and its mechanism.
- 2.2.7.4 All breaker auxiliary contacts and other devices will function normally in TEST position; an umbilical cord shall be included, if required.
- 2.2.7.5 Mechanical Interlocks
 - 2.2.7.5.1 Mechanical interlocks shall be provided to prevent racking of the circuit breaker unless it is in the open position.
 - 2.2.7.5.2 Operating springs shall be discharged automatically when breaker is moved from the connected or disconnected position.
 - 2.2.7.5.3 It shall be impossible to close the breaker either electrically or mechanically when the removable element is at any point between the operating and the test position. Dead front protection shall be maintained throughout the withdrawal operation.

2.2.7.6 Mechanism Operated Cell Switches

- 2.2.7.6.1 Seller shall furnish, in each compartment a mechanism operated cell (MOC) switch with a minimum of six (6) normally open ("a") and six (6) normally closed ("b") contacts rated 20 amps continuous, 10 amps interrupting at the specified control voltage. Mechanism operated cell switches shall be operated directly by the breaker mechanism when in the connected and test positions, and shall be capable of individual adjustment. All wiring to mechanism operated cell switches shall be brought out to terminal blocks for external secondary connections.

2.2.7.7 Truck Operated Cell Switches

- 2.2.7.7.1 Seller shall furnish, in each compartment a truck operated cell (TOC) switch with a minimum of three (3) "a" and three (3) "b" breaker cell mounted position contacts rated 20 amps continuous, 10 amps interrupting at the specified control voltage. Truck operated cell switch shall be operated when the breaker is moved into or out of the connected position. All wiring to truck operated cell switches shall be brought out to terminal blocks for external secondary connections.

2.2.8 Breaker Controls and Indication

- 2.2.8.1 Control switches shall be rotary, multi-position, cam-operated, multi-stage type with silver-to-silver contacts rated 600 volt, 20 amperes Direct Current. Breaker control switches and selector switches shall have "pistol grip" handles. The control switches for the circuit breakers shall be of the pull-out type. In the operating position, they shall provide for local control and indication of the equipment. In the pull-out position they shall provide for supervisory control of the equipment, local indication shall be operational and local control shall be disabled. Circuit breaker control switches shall have a mechanical flag indicator with red and green markers to indicate the last manual operation of the switch. Switches shall be GE Type SB-10.
- 2.2.8.2 Lockout relays shall have "oval" handles and shall be Electroswitch Series 24 Type LOR with electric trip and hand reset.
- 2.2.8.3 Main contacts of all switching devices shall be silver-plated or equivalent. The contact surfaces of secondary disconnecting devices and relays shall be silver-plated or equivalent.
- 2.2.8.4 Each circuit breaker shall be provided with Light Emitting Diode (LED) lights mounted on the breaker panel and wired to provide indication unless the breaker is in the test or disconnected position. Indicating lights shall be of the series resistor type with color caps designed for maximum visibility and long service life, GT Type ET-16 or approved

equal. The indicating light colors shall be as follows: Red to indicate the closed position, White to indicate relay operation or equipment status and Green to indicate open position.

- 2.2.8.5 Appropriate test switches shall be provided for voltage, current and trip circuits of all the protection relays and panel metering units.

2.2.9 Control Wiring

- 2.2.9.1 Control wiring shall be provided in accordance with the Contract Drawings, including all auxiliary relays and devices indicated to be furnished with the switchgear. Control buses and wiring for each vertical section shall be enclosed in conduit or in compartments isolated from the primary circuits.
- 2.2.9.2 All secondary control circuit wiring shall be minimum of #14 AWG and shall be identified on both ends by sleeve type wire markers. PT, close and trip circuit wiring shall not be smaller than #14 AWG; CT wiring shall be a minimum of #12 AWG. The control wire shall be extra flexible, stranded tinned copper, SIS, 600V rated. All control wire shall be UL listed and have a VW-1 flame retardant rating.
- 2.2.9.3 Control cables, electronic instrument cables and fiber optic cables installed between compartments shall be routed via the cable tray installed above the switchgear.
- 2.2.9.4 All single pair electronic instrument wire shall be #16 AWG, 7 strand copper conductor 90°C non-polyvinyl chloride primary insulation, colored black (negative leads) and white (positive leads), twisted, shielded, with non-polyvinyl chloride outer jacket. Conductors shall be identified on each end with sleeve type wire markers.
- 2.2.9.5 Multiple pair electronic instrument wire shall be #18 AWG, 7 strand copper conductor with 90°C non-polyvinyl chloride insulation, each pair numbered, twisted, and cabled with an overall shield with non-polyvinyl chloride outer jacket. Conductors shall be identified on each end with sleeve type wire markers.
- 2.2.9.6 Seller shall supply unit internal connection diagrams and data with identification of devices, terminals, and connecting wires. The system used for designation of control wiring shall show device identification with terminals arranged in substantially correct physical relationship. The identification system shall provide sufficient information at each wire termination to locate the other termination without referring to supplementary tabulations or data on function of wire. Seller is solely responsible for correctness of the internal wiring and for proper functioning of the equipment being furnished.
- 2.2.9.7 The diagram shall show any connections to be made in the field because of shipping sectionalizing.

- 2.2.9.8 All Seller's control wiring shall be brought to terminal blocks. Connections made on terminal blocks and on internal devices shall be by means of crimped ring type, insulation-gripping insulated terminals. On internal devices which do not permit ring type, insulation-gripping insulated terminals, control wiring shall be held by screw type compression devices. Terminal blocks, wired to outgoing control circuits, shall be mounted inside of each compartment.
- 2.2.9.9 Secondary control wires shall be armored when they pass thru primary compartments.
- 2.2.9.10 Terminal blocks for Buyer connections shall be 600 volt class, GE type EB-25 or approved equal, barrier type, minimum rating 20 amps, with marker strips identifying internal and external wiring. All auxiliary and unused contacts shall be wired out to terminal blocks. Terminal blocks shall have at least 20% spare terminals where physically possible and as many as possible when room is not adequate for 20% spares and shall be in accordance with NEMA ICS 4. The system shall be designed so that only one outgoing wire per terminal is connected to any terminal. On the unit side of the terminals, a maximum of two wires shall be terminated on any one terminal.
- 2.2.9.11 All terminals for external customer wiring, for example breaker breaker auxiliary contacts, MOC contacts, ,TOC contacts and remote breaker controls, shall be located in the low voltage compartment.
- 2.2.9.12 Terminal blocks with internal wiring and jumpers as required shall be provided for remote close and trip contacts, remote breaker position indicator lights, remote protective relaying and a remote block close contact.
- 2.2.9.13 Current Transformer Terminal Blocks
 - 2.2.9.13.1 Shorting terminal blocks in the low voltage compartment shall be provided for all CT's including CT's for relays and other remote devices with connection external to the switchgear, including shorting blocks for neutral connections to ground.
 - 2.2.9.13.2 Delta or wye connections for the current transformers shall be made at the terminal block and the ground connection for the CT circuit shall be made at this terminal block only. Do not ground the CT's at the CT.
 - 2.2.9.13.3 The shorting block terminals for the main breaker bus side CT's closest to the bus shall be capable of terminating up to two #4 conductors per terminal.

2.2.10 Control Power

- 2.2.10.1 DC Control Power, with the voltage range specified in Attachment D will be provided by the Buyer. Separate terminals for connection to switchgear DC control bus shall be supplied.
- 2.2.10.2 All control and PT secondary fuse blocks shall be range type pullout fuse blocks. Fuse blocks shall be accessible from the control side of the switchgear regardless of the position of the circuit breaker.
- 2.2.10.3 Each breaker's close, lockout, and trip circuit shall be fused separately in each low voltage compartment. Any control or protective devices that are common to more than one breaker shall be on separately fused circuits. Minimum trip circuit fuse rating shall be 30 A.
- 2.2.10.4 All contacts for control circuit devices shall be heavy-duty type, rated 600 volts, 20 amperes continuous, 10 amperes interrupting.
- 2.2.10.5 Breaker indicating lights shall be powered from the breaker trip circuit.
- 2.2.10.6 Each vertical section shall be provided with a breaker spring charging motor circuit "ON-OFF" toggle switch located in the low voltage compartment.

2.2.11 Instrument Transformers

- 2.2.11.1 Current transformers shall be provided with quantity, ratios and relaying or metering accuracy as shown Attachment D, with a mechanical rating equal to the momentary rating of the circuit breakers, with 600V insulation, and shall be insulated for the full BIL rating of the switchgear achieving full 15 kV voltage insulation by location over insulated primary contact housing or over insulated conductor. All CT's shall be properly identified for polarity. Secondary terminals shall be of the solder-less clamp type.
- 2.2.11.2 The quantity, ratio, connections and metering accuracy of potential transformers shall be as shown in Attachment D. Transformers shall be equipped with current limiting, high interrupting capacity primary fuses and shall be mounted in separate compartments on a draw-out frame with shutters or barriers to prevent contact with energized parts in the disconnected position. Potential transformers shall be automatically grounded.

2.2.12 Nameplates

- 2.2.12.1 All equipment (relays, control switches, meters, etc.) shall be identified by appropriate nameplates attached with corrosion resistant screws. Nameplates shall each be 1/16-inch thick, black phenolic with white letters and beveled edges. Lettering shall be ¼" minimum.
- 2.2.12.2 Two 2-1/2" wide nameplates shall be provided for each vertical section: one to be installed on the breaker compartment door and one to be loose

for Buyer's use. The following format shall be used:

2.2.12.2.1 Line 1 7/16" Letters . . . Equipment Tag Number

2.2.12.2.2 Line 2 7/16" Letters . . . Description

2.2.12.2.3 Line 3 7/16" Letters . . . Description

2.2.12.3 One, 2-1/2" wide master nameplate containing information such as: Equipment ratings, Manufacturer's name, Shop Order Number, Buyer's Purchase Order Number, Date of Manufacture, etc., shall be provided. Letters shall be 1/2" high.

2.2.12.4 A Mimic Bus engraved nameplate showing the entire one line switchgear diagram with all buses, circuit breakers, VT's, CT's, etc. shall be provided on designated unit/units.

2.2.12.5 All doors and hinged bolted panels, giving access to high-voltage components or bus work shall be provided with warning labels with the text: "DANGER - HIGH VOLTAGE"

2.2.12.6 Each component located inside the low voltage compartment shall have a permanent tag engraved with 1/4" letters to identify the component as it appears in the Seller's drawings.

2.2.12.7 Test switch nameplate shall be affixed exactly above each test switch onto the control cabinet swing door and not onto the test switch cover. Nameplate shall be aligned such that nameplate description corresponds with each test switch pole and associated function.

2.2.12.8 The Buyer shall provide the detailed information for the Annunciator Panel window labels.

2.2.12.9 Prior to shop fabrication, the Buyer shall provide complete nameplate information.

2.2.13 Meters, Relays, Instruments, and Controls

2.2.13.1 Meters and protective relays shall be furnished and installed by the Seller. Refer to Attachment D for requirements.

2.2.13.2 Instruments and controls shall be provided and installed by the Seller. These shall be installed and wired on the hinged front panels. Arrangement of these devices on the hinged panels is subject to approval by Buyer.

2.2.13.3 Energized bare parts mounted on doors shall be guarded where the door must be opened for maintenance of equipment or removal of draw-out equipment.

2.2.13.4 Meters and Relays

2.2.13.4.1 Seller shall furnish Flexitest type switches for protective relay and meter inputs/outputs.

2.2.13.4.2 Protective relays shall be mounted on the hinged front door of each low voltage compartment. Auxiliary relays shall be mounted inside of the appropriate low voltage compartment. Location and arrangement of the devices is subject to approval by the Buyer

2.2.14 Finish

2.2.14.1 All steel surfaces shall be chemically cleaned and given an iron phosphate corrosion resistant treatment providing a strong bond for paint adhesion. All parts shall be immersed in paint applying 0.7 -0.8 mils of cathodic epoxy paint electrically bonded to all surfaces for maximum adhesion. The finish shall be cured in an oven at to insure maximum toughness and prolong service in severe environments.

2.2.14.2 All exterior surfaces of the switchgear assembly shall be cleaned by bonderizing, or equivalent process, followed by one $\frac{3}{4}$ -1 mil coat of rust-resisting primer and one 1.5 – 2 mil coat of ANSI 61 light gray for indoor equipment and in ANSI #70 gray for outdoor equipment which will provide a minimum 3 mil dry finish. Switchgear manufacturer shall have performed a salt spray endurance test for a minimum of 1500 hours continuous on the paint finish being proposed.

2.2.15 Cleaning

2.2.15.1 The equipment furnished shall be smooth and free of all foreign matter such as scale, sand, blisters, weld splatter, metal chips and shavings, oil, grease, organic matter and rust

2.2.15.2 Equipment openings, terminals and connections shall be protected against entrance of dirt, dust, moisture, or other deleterious elements. All surfaces shall be protected from corrosion and oxidation in accordance with Seller's standard methods.

2.2.16 Accessories

One complete set of manufacturer's standard accessories for test, inspection, and operation shall be furnished. Such accessories shall include at least the following, unless a particular item is not used with the selected design:

- 1 – Breaker charging handle.
- 1 – Control jumper for checking breakers outside the stationary structures.
- 1 – Test cabinet for testing electrically operated breakers outside the stationary structures.
- 1 – Hand crank for breaker levering-in mechanism.
- 1 – Transport lifter as required and necessary to transfer breaker.

2.2.17 Quality Assurance

- 2.2.17.1 Seller shall employ such quality assurance measures as are necessary to ensure that the Work conforms to this Specification.

2.3 Tests, Inspections, and Reports

2.3.1 Testing

- 2.3.1.1 The Seller shall perform routine factory tests on each item of electrical equipment and all similar equipment supplied as spare parts, and also other tests as specified, to ensure successful operation of all parts of the assemblies. The tests shall conform to the applicable requirements of NEMA and UL standards.

- 2.3.1.2 The Seller shall perform all standard production tests and certify that the equipment meets all design tests, including the following standards:

2.3.1.2.1 ANSI C37.55

2.3.1.2.2 ANSI/IEEE C37.20.2

2.3.1.2.3 NEMA ICS-2-324

- 2.3.1.3 Tests on the switchgear assembly shall be performed in accordance with ANSI/IEEE C37.20.2, paragraph 5.3 using three phase voltage and current and include, but not be limited to the following:

Dielectric

Sequence Test (control circuit continuity

Control Wiring Insulation

Functional Check

Mechanical Operation Tests

Polarity Verification

Test procedures along with certificates of calibrations of test instruments traceable to National Institute of standards and Technology, shall be submitted and approved prior to test.

- 2.3.1.4 The Seller shall check and align all mechanisms.

- 2.3.1.5 Each circuit in the high voltage portion (except ones containing electronic components) shall be given insulation resistance test with all equipment connected.

- 2.3.1.6 A simulated operating test shall be conducted on each Controller. This test shall include steps that are necessary to determine that the relays, instrument transformers, interlocks, control systems, etc., are correctly wired and function correctly when energized.

2.3.2 Inspection/Witness Test

2.3.2.1 The purchaser reserves the right to inspect the equipment during manufacturing and prior to shipment. Such visits to the manufacturer's plant will be at the purchaser's expense. The purchaser will not accept any charges for visiting the plant. The manufacturer shall notify purchaser in writing three weeks before the intended date for test and shipment.

2.3.2.2 Every medium voltage draw-out circuit breaker element which will be used in the line-up shall be uncrated and inserted into the breaker compartments of said line-up for the purpose of verifying alignment and proper operation during ANSI production tests. After testing is complete, these breakers shall be packed into appropriate boxes to protect them against shipping damage.

2.3.3 Reports

Two (2) certified reproducible copies of the reports of all tests, including complete test data, shall be furnished.

2.4 Field Service and Training

2.4.1 The switchgear manufacturer shall supply a field service technician for installation and startup after equipment has been delivered. Up to five (5) working days, arbitrarily loaded into not more than two (2) trips, shall be included in the base price. This shall include all travel and living expenses. A separate price shall be quoted on a per man day basis for any additional number of days needed by the buyer.

2.4.2 The field service technician shall be a qualified technician having a minimum of five (5) years field experience in the installation, operation, and maintenance of switchgear and associated equipment.

2.4.4 The relay settings shall be programmed in the field by the Buyer.

2.4.5 In addition to the foregoing, the Manufacturer shall provide a training session for three (3) normal working days at the jobsite location determined by the Buyer. A manufacturer's qualified representative shall conduct the training session. The training program shall include instructions on the assembly, circuit breaker, protective devices, and other major components.

2.5 JEA Drawing Standards for Wiring Diagram Development

The following Standards and procedures shall be used by the switchgear manufacturer for developing wiring diagrams.

2.5.1 Procedures for Device Designation

2.5.1.1 List termination as shown on Typical Drawings included in Attachment A.

2.5.1.2 Label devices by levels.

Ex.: Level 1: "AB", "AC", "AD"...

Level 2: "BA", "BC", "BD" ...and so on.....Letters "U" & "R" as first character are reserved for fuses & resistors

2.5.1.3 Do not use double letters for devices.

Ex : Do not use "AA", "BB", "CC", "DD" ...

2.5.1.4 Do not use "I", "O", or "Z" as letter to designate the devices.

Ex: Do not use "AI", "AO", "OA", "ZA" etc...

2.5.1.5 Delete the device label "GB"(it is reserved for Ground Bus).

2.5.1.6 List each termination on a device separately.

Ex.: AB

1-AC1

1-AC2

1-AC3

And not like

AB

1-AC1, AC2, AC3

2.5.1.7 Fuses shall begin with "U" - Delete "UI", "UO", "UZ".

2.5.1.8 Devices on sub-panels shall be labeled with the next available letter and shall be designated with dotted lines.

2.5.1.9 Resistors shall begin with "R" - Delete "RI", "RO", "RZ".

2.5.1.10 Each pot light shall be given a separate device label. All other lights associated with devices shall share the devices' label and be designated by the light's color.

2.5.1.11 Devices on the sides of cells shall be labeled in such a way as to continue the sequence of the device labels around the cell, so that no label is repeated.

2.5.1.12 Ground Bus shall be designated as "GND BUS". Terminal blocks for landing control cable shields shall be identified as "shield wire bus".

2.5.1.13 The designation of the terminal blocks should be in the format aaXbb. "aa" is the two digit unit number. "X" is alphabet "A" to "Z" excluding alphabets U, I, O, Q, and X. "bb" is the terminal numbers of a block and are sequential numbers starting from "1". No two terminals shall have the same designation.

- 2.5.1.14 Cell to cell wires shall go from Terminal Blocks only and not directly from devices, and shall be listed by destination's Cell Number/Terminal Block Number.
- 2.5.1.15 When a device such as annunciator contains Terminal Blocks, the Terminal Blocks shall be labeled by position starting with "TB1". All Terminal Blocks of this device shall share the same device name.
- 2.5.1.16 List all the jumpers within the same device next to the termination listings.
- 2.5.1.17 List all light-device and light-light connections along with termination listing.

2.5.2 Procedure for Assigning Drawing Number

All protection and control drawings concerning this project shall be named as per the following standard practices.

- 2.5.2.1 The drawing numbers will be comprised of 3 upper case characters followed by two digit numbers written in the following style.

AAXNN

- 2.5.2.2 The first two Characters (AA) designate the substation and will be "KP" for Kennedy Substation. The third character (X) will be selected from the following list:

- A For AC Schematic Diagrams, Three Line Power Diagrams
- D For DC Schematic Diagrams
- I For Interconnection Diagrams
- L For Layout and General Arrangement Diagrams
- M For Equipment (Excluding control panels) Manufacturer's Diagrams
- S Single Line Diagrams
- SS Station Single Line Diagrams
- W For Wiring Diagrams
- C For Communications Diagrams

- 2.5.2.3 Project Manager will sequentially allot two digit number (NN). The practice of using sheet numbers with same drawing number will not be adopted under any circumstance.

2.6 JEA Wiring Approval Process

- 2.6.1 Once wiring diagrams have been developed, Switchgear Manufacturer will transmit wiring diagrams to JEA's Project Manager in Microstation format and updated cable schedule in Microsoft Word format.
- 2.6.2 JEA's Project Manager shall be responsible for providing feedback. After incorporate JEA's comments in the drawings, Switchgear Manufacturer shall transmit the drawings to JEA for approval.

- 2.6.3 Once, approval from Project Manager has been received, Switchgear Manufacturer will commence wiring of the panels
- 2.6.4 During wiring of the panel if any changes to previously approved drawing and cable package are required, Switchgear Manufacturer shall inform JEA Project Manager. JEA Project Manager shall be responsible to provide approval to above changes.
- 2.6.5 Once, approval is received from JEA Project Manager, Switchgear Manufacturer shall proceed with approved changes and provide JEA with updated electronic Microstation drawings. Therefore, both JEA and Switchgear Manufacturer will have most up to date design drawings at all times.

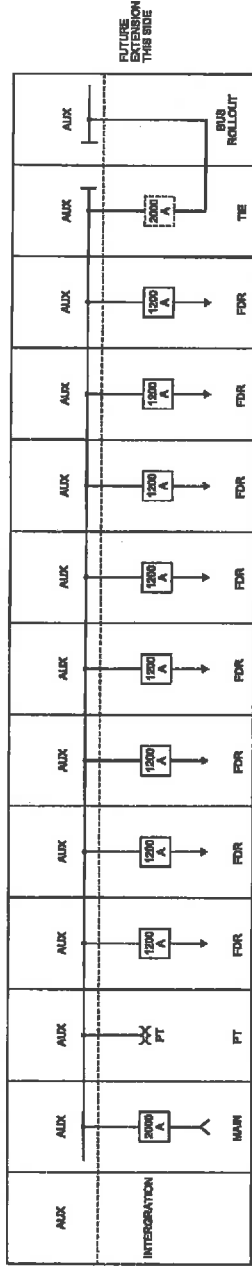
ATTACHMENT A
SPECIFICATIONS AND DRAWINGS

A-1 The following Specifications and Drawings shall be considered as part of this Specification.

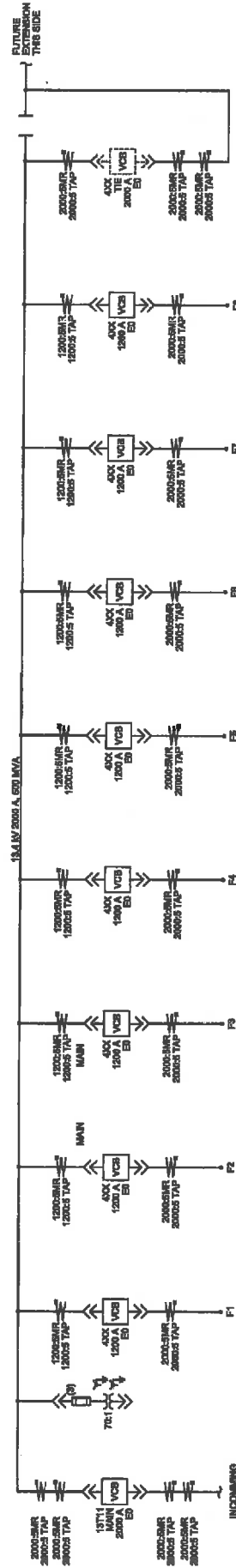
<u>Specification/Drawing No.</u>	<u>Title</u>
16345-SK1	Single Line Diagram
17128	Switchgear Building Specification

A-2 The following Typical Drawings shall be considered part of the specification:

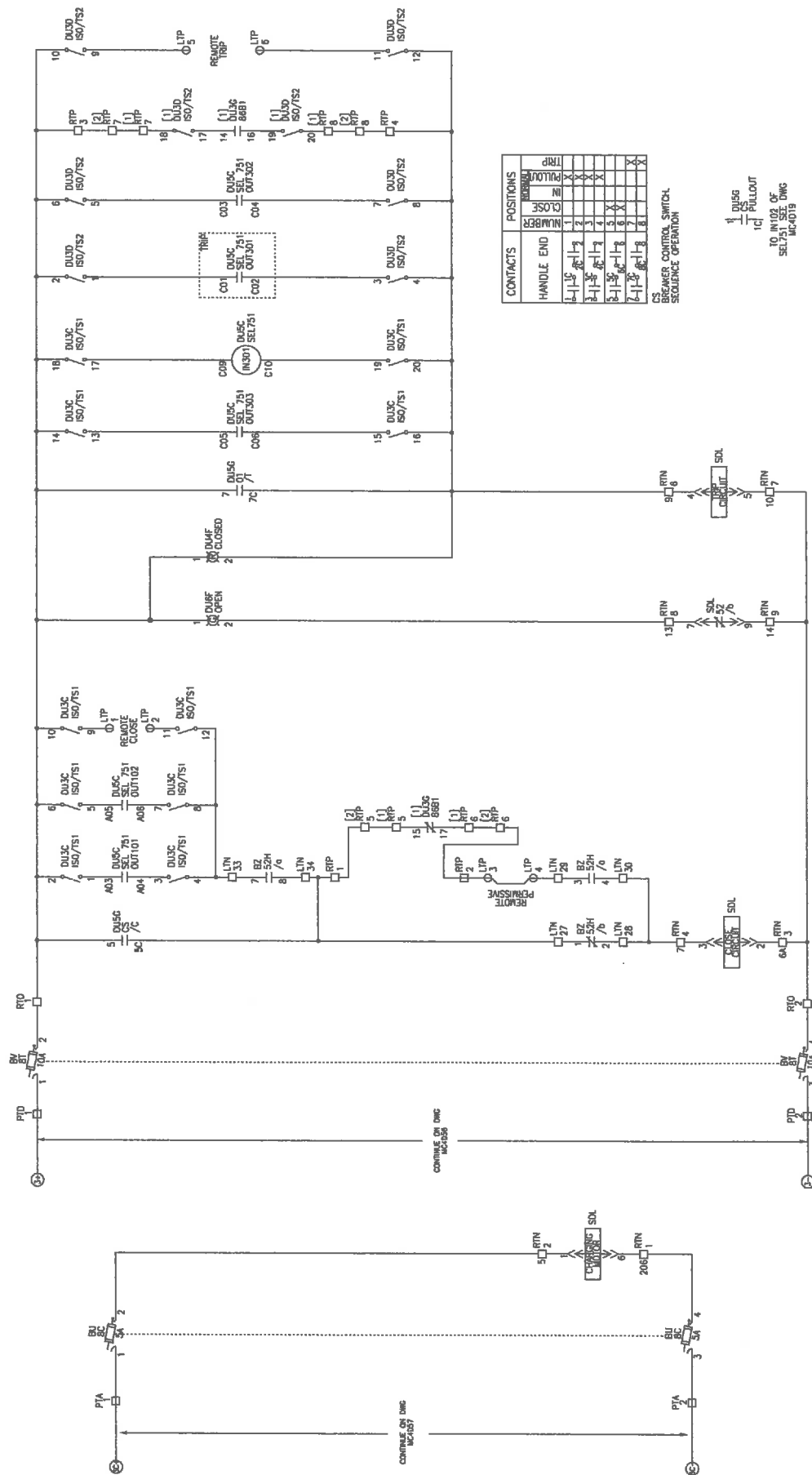
<u>Drawing No.</u>	<u>Title</u>
XX4A06	AC Diagram
XX4D18	DC Diagram
XX4D19	DC Diagram
XX4W05	Wiring Diagram
XX4W06	Wiring Diagram



SWITCHGEAR ELEVATION



KENNEDY SUBSTATION										SWITCHGEAR SINGLE LINE DIAGRAM										69KV / 25KV HIGH PROFILE SUBSTATION										PROJECT DESIGN SEGMENT 04-18										1 OF 1																			
JEA										JEA										JEA										JEA										JEA										JEA									
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SWITCHGEAR - SECTIONS 3

SYSTEM PROTECTION AND CONTROL PROJECTS 20413

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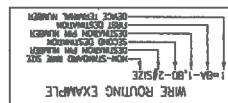
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ATTACHMENT B**BID SUBMITTALS CHECKLIST**

The Seller shall submit complete information concerning the scope of supply, design, construction, and materials of all equipment to be furnished with the proposal. The following items are the minimum requirements for information to be submitted with the proposal:

- Dimensional outline drawings of the equipment
- Equipment assembly drawings that indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection
- Variations, if any, from the specification.
- A statement of guarantee or warranty, stating guaranteed performance data
- Guaranteed delivery schedule based on contract award date
- Guaranteed schedule for:
 - Equipment Outline Drawing
 - Schematic Diagram
 - Wiring and Connection Diagram
 - Mechanical Power flow and 3-line Diagrams
 - Shipping
 - O&M Manuals
 - Procedures
- Completed Equipment Data Sheets (Attachment E)
- Heat load to the environment in Btu/hr for all components.
- 125VDC UPS Battery Sizing Calculation
- Power requirements of all accessories
- Protective relays, devices and fuses, characteristic curves and application information
- Current transformer excitation curves and characteristics
- Exhaustive Spare Parts List with parts for a) start-up b) commissioning and c) five years of operation.

ATTACHMENT C
REQUIRED SUBMITTALS
(After Contract Award) Checklist

The submittals listed in the table below are required for this equipment and defined in the paragraphs below:

	Document	Size	Submitted	Copies	Electronic File	Schedule (Weeks)
C-1	General Arrangement Equipment Outline Drawings	D	A,C	2	Required	6-8 ARO
C-2	Foundation Interface Drawings	D	A,C	2	Required	6-8 ARO
C-3	Electrical Connection Drawings	D	A,C	2	Required	6-8 ARO
C-4	Equipment Schematics	D	A,C	2	Required	6-8 ARO
C-5	One Line Diagrams	D	A,C	2	Required	6-8 ARO
C-6	Bill of Material	A	I	3	Not Required	6-8 ARO
C-7	Data Sheets	A	I	3	Not Required	6-8 ARO
C-8	Catalog Cut Sheets	A	I	3	Not Required	2 ARO
C-9	O&M Manuals	A	I	6 + 1 on CD-ROM	Required	4 PTS
C-10	Receiving & Storage Instructions	A	I	3	Not Required	2 PTS
C-11	Shop Test Reports	A	I	3	Not Required	2 PTS
C-12	Section Interconnection Drawings	B	A,C	2	Required	4 PTS

Legend

A Approval
C Certified
I Information
ARO After Receipt of Order
PTS Prior to Shipment

C-1 General Arrangement Dimensioned Outline Drawings

The general arrangement drawings shall provide an overview of the equipment arrangement or layout including plans, elevations, shipping splits and all dimensions. Drawings shall also show equipment ratings, clearances and access dimensions, all accessories, weights of components and shipping dimensions and weights. General Arrangement shall also include section views and detailed dimensioned drawings of the end units for future additions.

The equipment outlines shall be dimensioned drawings of all major components provided. The drawings shall also show suggested support locations.

C-2 Foundation Interface Drawings

. These drawings will include the foundation interface information such as location and details of channel sill, anchor bolts and terminations of power bus and control cables.

Certified Foundation Interface Drawings shall be submitted showing loads on foundation including dynamic loads, foundation details, location and details of channel sill, anchor bolt sizes and locations, terminations of power and control cables showing locations for top and bottom entry, baseplates and grout requirements. Drawings shall include the requirements for Buyer supplied foundation and/or support for mounting equipment including complete load data (allowable loads).

C-3 Electrical Connection Drawings

The electrical connection drawings shall show all Buyer interface points. These drawings shall clearly identify all Buyer connection points including power, grounding, network and signal wire termination. All terminal blocks, terminals, ground bars, etc. shall be uniquely numbered and labeled. All drawings will use ANSI/IEEE standard symbols.

C-4 Equipment Schematics

Equipment schematics clearly depicting operation of equipment shall be provided. All schematics will use ANSI/IEEE standard symbols. External connections, Terminal block numbers, and internal wiring diagrams shall be shown clearly.

C-5 One Line Diagrams

The One Line Diagrams shall show all devices contained within the controller gear. All diagrams shall use ANSI/IEEE standard symbols.

C-6 Bill of Materials

The Bill of Materials (BOM) shall include a complete listing of all equipment and/or material being supplied. The BOM shall provide a complete description of each item supplied including tag number, manufacturer, model number, range and setpoint. Items shipped loose for installation by the Buyer's or by Seller's field service shall be clearly

identified. Items, which are not manufactured by the Seller, shall have the original manufacturer's name and catalog number with other descriptive data.

C-7 Data Sheets

Seller shall provide complete data sheets updated to reflect any changes made during the bid review process. Submittal of data sheets in electronic format is preferred.

C-8 Catalog Specification or Cut Sheets

Seller shall provide Manufacturer's cut sheets for all commodity type items such as relays, switches, lights, etc.

C-9 Operation and Maintenance Manuals

Operation and Maintenance (O&M) manuals shall be assembled and bound and submitted to the Buyer. Manuals shall not be submitted in loose form. Binder capacities shall not exceed 3". In addition, provide two electronic copies of the manuals on CD ROM. O&M manuals shall include the following as a minimum:

- Bill of Material
- Performance curves
- Equipment outline
- Installation, start-up, and test instructions
- Operating instructions
- Maintenance instructions
- Maintenance procedures
- Manufacturer's procedures
- Manufacturer's O&M manuals for components (i.e., gauges, control valves, relays, switches, etc.)
- Spare parts list with start-up spares identified
- Wiring diagrams for all electrical equipment
- Detailed description of each principle component
- Performance and name plate data including
- Safety precautions
- List of electrical relay settings: control and alarm contact settings

C-10 Receiving and Storage Instructions

C-11 Shop Test Reports

C-12 Section Interconnection Drawings

Seller shall provide a unique set of drawings and instructions for the mechanical and electrical interconnection of shipping split sections. These are to be separate from the standard equipment schematics. They will include clear identification of all field work required to complete the installation of the switchgear lineup.

ATTACHMENT D

PROJECT SPECIFIC REQUIREMENTS

D-1 RATINGS

D-1.1 Equipment number

Equipment Name	Kennedy Substation Metal-Clad Switchgear
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D-1.2 Service

Characteristics	13.4kV, 3 phase, 3 wire, 60 Hz
System Grounding	Solid
Transformer	24/32/40 MVA, 69kV delta /13kV wye with LTC, 9.00% @ 24 MVA
Power Connections	Base - Cable connection, Bottom Entry Alternate- Bus Duct, Top Entry

D-1.3 Equipment Rating

Nominal Voltage	13.4 kV
Maximum Voltage	15 kV
Nominal Three Phase MVA	500 MVA (18kAIC)
Continuous Current	2,000A, copper
BIL	95 kV

D-1.4.0 Main Incoming Service

Entry	Bottom
Type	Cable (5) 750MCM/Phase
Rating	2,000A
Location	Left-most bottom compartment, facing front

D-1.5 Main Circuit Breaker

Quantity	One (1)
Continuous Current	2,000A
Interruption	Vacuum
Interrupting Rating	18 kA rms sym
Close and Latch Rating	37 kA rms sym

D-1.6 Feeder Circuit Breakers

Quantity	Eight (8)
Continuous Current	1,200A
Interruption	Vacuum
Interrupting Rating	18 kA rms sym
Close and Latch Rating	37 kA rms sym

D-1.7 Tie Breaker

Quantity	One (1) Fully Equipped space for future breaker
Continuous Current	2,000A
Interruption	Vacuum
Interrupting Rating	18 kA rms sym
Close and Latch Rating	37 kA rms sym

D-1.8 Switchgear Vertical Sections

Quantity	One Auxiliary Vertical Section with two (2) compartments, One (1) Main Breaker with Incoming Line, One PT, Eight (8) Fully Equipped Feeder Breakers, One (1) Tie Breaker, One (1) Bus compartment, One (1) Bus Rollout for Future Lineup Extension
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D-1.9 Instrument Transformers

Potential Transformers (3) - 1 set on bus

PT Ratio	8400V/120V
Class	Relaying
Burden	0.3 W, X, M, Y, 1.2ZZ
Thermal Rating	1500VA (35°F Rise/55°C Ambient)
Connection	Wye-Wye

Current Transformers

Ratio	As shown on One Line Diagram
Class	Relaying
Accuracy	C800

D-1.10 Indicating Lights

Type	125 VDC LED GE Type ET-16
Open Status	Green
Close Status	Red
Ready	White

D-1.11 Control Power

Nominal Voltage	125 VDC
Close Voltage Range	90 VDC – 140 VDC
Trip Voltage Range	70 VDC – 140 VDC

D-1.12 Switchgear Enclosure

Outdoor with integral switchgear building in accordance with attached specification 17128.

D-2 METERING AND RELAYING REQUIREMENT**D-2.1 Arc Flash Sensor Provisions**

D-2.1.1 The Switchgear manufacturer shall provide the SEL bare-fiber loops and point sensors, jacketed duplex fiber zipcord, splice connectors and Dual V-Pin Latch terminators, in lengths as required.

D-2.1.2 All arc flash sensors shall be provided and installed in accordance with recommendations of SEL Application Guide, Volume III, AG2011-01.

D-2.2 Protective Devices

D-2.2.1 Protective relays shall be SEL751 and SEL487B relays. Relays shall be provided by the Switchgear Manufacturer.

D-2.3 Cell and Door equipment details

D-2.3.1 The following equipment shall be provided by the switchgear manufacturer. Details below do NOT include miscellaneous devices such as terminal blocks, fuse blocks, fuses, wiring, lugs, screws, etc. These materials shall also be provided by the Seller as part of this specification and per the completed wiring diagrams developed by the Seller.

D-2.3.2 Typical Door for Main Breaker Compartment:
 Door Size: 2 @ 36 inch wide & 45 inch high
 Door Hinge Location: On left hand side while facing the outside of door
 Main Breaker Equipment Items To Be Furnished and Installed:

Qty	Details
1	Electro Industry digital meter model SHARK 100-60-10-V3-D2-485P-X.
1	G.E. Breaker control switch, type SB10, 1 stage, escutcheon engraved TRIP-NORM-CLOSE with large pistol grip handle, spring return to NORM position. Part number: 16SB1AB300SSS16L
1	SEL-751 Multifunction Relay, SEL Part # 751101ACA3A7085A620 with all required mounting hardware. Settings will be provided by JEA.

3	Indicating light Red = 1, Green = 1, White = 1. G.E Type ET-16
1	ABB Test switch for trip isolation. Type FT-19R, 3RU LO 30 Pole, 30 Potential Arranged (P P P P P P P P P) (P P P P P P P P P) (P P P P P P P P P). Part number: FRXG-001-001-001
1	ABB Test switch, Type FT-19R, 3RU LO 30 Pole, 22 Potential, 8 Current Shorting, Arranged (C-C C-C C-C C-C P P) + (P P P P P P P P P) + (P P P P P P P P P). Part number: FRXG-083-001-001
2	ABB Test switches for ION 7650 meter (Quantity = 1) and SHARK meter (Quantity = 1). Type FT-1, 10 Pole, 4 Potential and 6 Current. Part number: 129A514G01.

D-2.3.3 Typical Door for Feeder and Tie Breaker Compartments:

Door Size: 2 @ 36 inch wide & 45 inch high

Door Hinge Location: On left hand side while facing the outside of door
Feeder and Tie Breaker Equipment Items To Be Furnished and Installed:

Qty	Details
1	Electro Industry digital meter model SHARK 100-60-10-V3-D2-485P-X. Note: Tie breaker compartment does not require digital meter item 215.
1	G.E. Breaker control switch, type SB10, 1 stage, escutcheon engraved TRIP-NORM-CLOSE with large pistol grip handle, spring return to NORM position. Part number: 16SB1AB300SSS16L.
3	Indicating light Red = 1, Green = 1, White = 1. GE Type ET-16

1	SEL-751 Multifunction Relay, SEL Part #751101ACA3A7085A620 with all required mounting hardware. Settings will be provided by JEA.
1	ABB Test switch for trip isolation. Type FT-19R, 3RU LO 30 Pole, 30 Potential Arranged (P P P P P P P P P) (P P P P P P P P P) (P P P P P P P P P). Part number: FRXG-001-001-001
2	ABB Test switches for SHARK meter (Quantity = 1). Type FT-1, 10 Pole, 4 Potential and 6 Current. Part number: 129A514G01
1	ABB Test switch, Type FT-19R, 3RU LO 30 Pole, 22 Potential, 8 Current Shorting, Arranged (C-C C-C C-C C-C P P) + (P P P P P P P P P) + (P P P P P P P P P). Part number: FRXG-083-001-001

D-2.3.4 Typical Door Integration Compartment

Door Size: 2 @ 36 inch wide & 90 inch high

Door Hinge Location: On left hand side while facing the outside of door

Auxiliary Compartment Items To Be Furnished and Installed:

Qty	Details
1	SEL Managed Ethernet switch, SEL part # 2730M0ARAA1111AAAAX0.
13	Industrial Rated, Double-Shielded, PUR- Jacketed SEL-CA605 Ethernet cable. To be provided by switchgear manufacturer. One Routed between the RTAC communications controllers and the Ethernet Switch SEL 2730M. Twelve Routed between the Ethernet Switch SEL 2730M and each SEL 751, SEL 487B relay in Main, Feeder, Tie breaker, and Bus compartment.
1	SEL-3555 Real-Time Automation Controller (RTAC) model 3555#JHF6. Settings will be provided by JEA.

1	Satellite Clock, SEL-2407, part # 24070001B with receiver antenna and coax, mounted on the exterior of the switchgear enclosure.
1	SEL-C972 cable routed between satellite clock SEL-2407 and the RTAC.
1	SEL-C953 cable routed between satellite clock SEL-2407 and the SEL 487B.
1	SEL-2523 ANNUNCIATOR PANEL WITH COMMUNICATIONS; STANDARD FIRMWARE; 125/250 VDC OR VAC POWER SUPPLY; HORIZONTAL RACK MOUNT, 5U; 2 EIA-232 REAR PORTS, 1 EIA-232 FRONT PORT, COMMUNICATIONS OPTIONS; STANDARD PLUS DNP 3.00 LEVEL 2 SLAVE, SERIAL COMMUNICATIONS PROTOCOLS; EIA-232 OR EIA-485 SERIAL COMMUNICATION AUXILIARY CARD; 125 VDC OR VAC CONTROL INPUT VOLTAGE; NONE CONFORMAL COATED CIRCUIT BOARDS; PART NUMBER: 252301H13A0A0XX
1	SEL MONITOR, TOUCHSCREEN, 19", WITH A 19" RACK MOUNT BRACKET. PART NUMBER: 91610028
1	KEYBOARD/DRAWER, USB, 19" RACK MOUNTED SLIDE OUT, WITH MOUSE. PART NUMBER: 91610050
1	SEL-C605A CABLE TO BE PROVIDED BY THE SWITCHGEAR MANUFACTURER. ROUTED BETWEEN SEL-2523 AND THE SEL-3555.

- D-2.3.5 Typical Door for Bus Compartment:
 Door Size: 2 @ 36 inch wide & 45 inch high suggested
 Door Hinge Location: On left hand side while facing the outside of door
 Bus Equipment Items To Be Furnished and Installed:

Qty	Details
2	SEL-487B Multifunction Relay, SEL Part # 487B1X4X52XC0XEH9EEEEEX supplied with all required mounting hardware. Settings will be prepared by JEA.
3	G.E ET-16 Indicating light, 11686708G7-C. For Bus Voltage
1	G.E ET-16 Indicating light, 11686708G3-C. For Alarm Received
3	ABB Test switch. Type FT-19R, 3RU LO 30 Pole, 12 Potential, 18 Current Shorting Arranged (P P P C C C C C C P) (P P P C C C C C C P) (P P P C C C C C C P). Part number: FRXG-014-014-014
3	ABB Test switch for trip isolation. Type FT-19R, 3RU LO 30 Pole, 30 Potential Arranged (P P P P P P P P P P) (P P P P P P P P P P) (P P P P P P P P P P). Part number: FRXG-001-001-001

ATTACHMENT E**TECHNICAL DATA SUPPLIED BY SELLER**

Seller furnished data and information shall be included in this section to describe the general design, interface characteristics and construction features of Seller furnished equipment. The accuracy of such information and the compatibility of such information with overall performance requirements specified by Buyer are the sole responsibility of Seller.

Quotation shall include applicable product literature, arrangement drawings showing dimensions, catalog numbers for all devices, and completed data sheet.

E-1 Equipment No. 016E345, 15 KV METAL CLAD SWITCHGEAR

E-1.1 Ratings

Nominal Voltage Class, kV

Nominal 3-phase MVA Rating

Max. Rated Voltage (RMS), kV

Rated Voltage Factor (K)

Insulation Level

Low Frequency RMS Voltage, kV

Crest Impulse Voltage

Short Circuit RMS current rating at rated maximum kV, kA

Rated Interrupting Time, Cycles

Rated Permissive Tripping Delay, sec

Rated Maximum RMS voltage divided by k, kV

Max. Symmetrical Interrupting Capability, kA

3 second short time current carrying capability, kA

Closing and latching capability RMS current, kA

E-1.2 Dimensions and Weights

Assembled Lineup, inches

____ L, ____ W, ____ H

Weight 2000A Breaker, lbs.

Weight 1200A Breakers lbs.

Incoming Line Compartment, inches

____ L, ____ W

Bus Transition Compartment, inches

____ L, ____ W

2000A Breaker Compartment, inches

____ L, ____ W

1200A Breaker Compartment, inches

____ L, ____ W

Relay Compartment, inches

____ L, ____ W

PT Compartment, inches

____ L, ____ W

E-1.3 Control Power Requirements

Closing circuit, including charging motor and closing coil

Voltage Range, minimum to maximum, VDC

Closing Spring, Closing Coil, A

Spring Motor, A

Tripping Coil, A

Racking Mechanism Motor, A

Time to Recharge Mechanism, cycles

Lockout Relay, A

Protective Relay, A

Lamp Load, Total for Lineup

E-1.4 Ancillary Device Descriptions

Description of Current Transformers

Ratio and Quantity

Thermal Rating (VA)

BIL (kV)

Accuracy Class

Description of Potential Transformers

Ratio and Quantity

Thermal Rating (VA)

BIL (kV)

Accuracy Class

E-1.5 Description of Lineup_____
_____E-1.6 Gauges of Steel Used in Construction_____
_____E-1.8 Method of Interrupting of Current of All Magnitudes

E-1.9 Characteristics of Vacuum Power Interrupters

E-1.10 Bus Covering

E-1.11 Bus Supports

E-1.12 Bus Joints and Taps

E-1.13 References

Please list three references for recent purchases.

Contact Name	Company	Telephone Number
1.		
2.		
3.		

E-1.14 Exceptions

Please list any and all exceptions and clarifications to this Specification.

APPENDIX B- LIST OF SUBCONTRACTORS FORM

138-17 Arc-Resistant Metal-Clad Switchgear and Switchgear Building for Kennedy 13kV Substation

JEA Solicitation Number 138-17 requires certain major Subcontractors be listed on this form, unless the work will be self-performed by the Company.

The undersigned understands that failure to submit the required Subcontractor information on this form will result in bid rejection, and the Company agrees to employ the Subcontractors specified below: (Use additional sheets as necessary)

Note: This list of Subcontractors shall not be modified subsequent to bid opening, without a showing of good cause and the written consent of JEA.

Type of Work	Corporate Name of Subcontractor	Subcontractor Primary Contact Person & Telephone Number	Subcontractor's License Number (if applicable)	Percentage of Work or Dollar Amount

Signed: _____

Company: _____

Address: _____

Date: _____

Appendix B - Minimum Qualification Form
#138-17 Arc-Resistant Metal-Clad Switchgear and Switchgear Building for Kennedy 13kV Substation

GENERAL

THE MINIMUM QUALIFICATIONS SHALL BE SUBMITTED ON THIS FORM. IN ORDER TO BE CONSIDERED A QUALIFIED BIDDER BY JEA YOU MUST MEET THE MINIMUM QUALIFICATIONS LISTED BELOW, AND BE ABLE TO PROVIDE ALL THE SERVICES LISTED IN THIS SOLICITATION/TECHNICAL SPECIFICATION.

THE BIDDER MUST COMPLETE THE BIDDER INFORMATION SECTION BELOW AND PROVIDE ANY OTHER INFORMATION OR REFERENCE REQUESTED. THE BIDDER MUST ALSO PROVIDE ANY ATTACHMENTS REQUESTED WITH THIS MINIMUM QUALIFICATIONS FORM.

PLEASE SUBMIT THE ORIGINAL AND THREE (3) COPIES AND ONE (1) CD OF THIS FORM AND ANY REQUESTED ADDITIONAL DOCUMENTATION WITH THE BID SUBMISSION.

BIDDER INFORMATION

COMPANY NAME: _____

BUSINESS ADDRESS: _____

CITY, STATE, ZIP CODE: _____

TELEPHONE: _____

FAX: _____

E-MAIL: _____

PRINT NAME OF AUTHORIZED REPRESENTATIVE: _____

SIGNATURE OF AUTHORIZED REPRESENTATIVE: _____

NAME AND TITLE OF AUTHORIZED REPRESENTATIVE: _____

MINIMUM QUALIFICATIONS:

Bidder shall have the following Minimum Qualifications to be considered eligible to submit a Bid in response to this Solicitation.

- Bidder shall provide references to confirm the successful completion for three (3) projects that each include the design, fabrication, testing, documentation, delivery, and installation of 15kV Class Arc Resistant Outdoor Metal Clad Switchgears and associated walk-in enclosures in the United States, within the last five (5) years ending August 31, 2017.

Bidder shall provide information where indicated below:

Appendix B - Minimum Qualification Form
#138-17 Arc-Resistant Metal-Clad Switchgear and Switchgear Building for Kennedy 13kV Substation

PROJECT (1)

Company Name _____

Company Contact Name _____

Company Contact Phone Number _____

Company Contact E-Mail Address _____

Project Completion Date _____

Where was this project installed? _____

Does this project include the design, fabrication, testing, documentation, delivery, and installation of 15kV Class Arc Resistant Outdoor Metal Clad Switchgears and associated walk-in Enclosure? Yes ☐ No ☐

Description of Project _____

PROJECT (2)

Company Name _____

Company Contact Name _____

Company Contact Phone Number _____

Company Contact E-Mail Address _____

Project Completion Date _____

Where was this project installed? _____

Does this project include the design, fabrication, testing, documentation, delivery, and installation of 15kV Class Arc Resistant Outdoor Metal Clad Switchgears and associated walk-in Enclosure? Yes ☐ No ☐

Description of Project _____

Appendix B - Minimum Qualification Form
#138-17 Arc-Resistant Metal-Clad Switchgear and Switchgear Building for Kennedy 13kV Substation

PROJECT (3)

Company Name _____

Company Contact Name _____

Company Contact Phone Number _____

Company Contact E-Mail Address _____

Project Completion Date _____

Where was this project installed? _____

Does this project include the design, fabrication, testing, documentation, delivery, and installation of 15kV Class Arc Resistant Outdoor Metal Clad Switchgears and associated walk-in Enclosure? Yes ☐ No ☐

Description of Project _____

APPENDIX B
BID FORM FOR SOLICITATION # 138-17

Arc-Resistant Metal-Clad Switchgear and Switchgear Building for Kennedy 13kV Substation

Submit an **original, two (2) copies and one (1) CD** along with other required forms in a sealed envelope to: JEA Procurement Dept., 21 W. Church St., Bid Section, Customer Center, 1st Floor, Room 002, Jacksonville, FL 32202-3139.

Company Name: _____

Company's Address _____

License Number (if applicable) _____

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 Bid 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

Item No.	ENTER YOUR BID FOR THE FOLLOWING DESCRIBED ARTICLES OR SERVICES: Arc-Resistant Metal-Clad Switchgear and Switchgear Building for Kennedy 13kV Substation	TOTAL BID PRICE
2.1	Enter Total Bid Price from Appendix B- Bid Workbook for: Arc-Resistant Metal-Clad Switchgear and Switchgear Building for Kennedy 13kV Substation	\$ _____

☐ **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'S 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 Bidder's 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, and that the Bidder is an authorized distributor or manufacturer of the equipment that meets the Technical Specifications stated herein.

We have received addenda _____

_____ Handwritten Signature of Authorized Officer of Company or Agent _____ Date

_____ through _____

_____ Printed Name and Title