

## **ADVERTISEMENT FOR BID**

Sealed proposals will be received in the Office of the Procurement Manager, Greenville Utilities Commission, 401 S. Greene Street, Greenville, North Carolina 27834 until 2:00 pm (EDST) on **May 30, 2023** and immediately thereafter publicly opened and read for the furnishing of:

One (1) Autotransformer with Load Tap Changer.

Instructions for submitting bids and complete specifications will be available in the Office of the Procurement Manager, Greenville Utilities Commission, 401 S. Greene Street, Greenville, North Carolina during regular office hours, which are 8:30AM – 5:00PM Monday through Friday.

Greenville Utilities Commission reserves the right to reject any or all bids. **Late bids will not be considered.**

**SECTION I**

**GENERAL INSTRUCTIONS FOR FORMAL BIDS**

**RELATED TO THE PURCHASE OF APPARATUS, SUPPLIES,**

**MATERIALS AND EQUIPMENT**

**MAY 30, 2023**

**1.0 NOTICE TO BIDDERS**

Sealed bids, subject to the conditions made a part hereof, will be received in the Office of the Procurement Manager, Greenville Utilities Commission, 401 S. Greene Street, Greenville, North Carolina 27834 until 2:00 pm (EDST) on the day of opening. **Bids submitted in a fax or e-mail in response to this Invitation for Bids will not be acceptable. Late Bids will not be considered.**

**2.0 STANDARD FORMS REQUIRED**

Each bidder must submit a proposal on the enclosed bid forms. **The bid must be signed by an authorized official of the firm. Return only the attached Proposal Form. Do not return the Advertisement for Bids, Instructions to Bidders or Specifications.**

**3.0 PREPARATION OF BID**

Bids must be in sealed envelopes clearly marked on the outside with the name of the bid and the bid opening date and time. Bid shall be addressed to PROCUREMENT MANAGER, GREENVILLE UTILITIES COMMISSION, 401 S. GREENE STREET, GREENVILLE, NORTH CAROLINA 27834.

**4.0 TIME FOR OPENING BIDS**

Bids will be opened promptly and read at the hour and on the date set forth in the advertisement in the Office of the Procurement Manager, Greenville Utilities Main Office, 401 S. Greene Street, Greenville, North Carolina. Bidders or their authorized agents are invited to be present.

**5.0 DEPOSIT/BID BOND**

A deposit/original bid bond is **required** for this bid.

**6.0 NC SALES TAX**

Do **not** include NC sales taxes in bid figure; however, Greenville Utilities Commission (GUC) does pay sales tax. Sales tax should be added to the invoice as a separate item.

**7.0 FEDERAL EXCISE TAX**

GUC is exempt from Federal Excise Tax and will issue a Federal Exemption Certificate upon request to the successful bidder.

## **8.0 EXCEPTIONS TO BE CLEARLY STATED**

If bid is not in strict accordance with Section II, "Specifications," bidder must list or note all exceptions **on the Request for Proposal Form**, otherwise, it is fully understood that the successful bidder will furnish equipment and/or materials exactly as specified. GUC reserves the right to accept or reject bids with noted minor deviations from specifications and to determine the lowest and best responsible bid from the standpoint of quality, performance, and price.

## **9.0 EVALUATION AND AWARD OF BIDS**

GUC reserves the right to reject any and all bids, to waive any and all informalities, and to disregard all nonconforming or conditional bids or counter proposals. In evaluating bids, GUC shall consider whether the bids comply with the prescribed requirements, plus all alternates or options requested. GUC reserves the right to include or exclude any option or alternative in GUC's opinion is in GUC's best interests. If a bid is to be awarded, it will be awarded to the lowest responsible bidder whose evaluation by GUC indicates that the award will be in GUC's best interests. Only firm prices will be considered for award of this bid.

## **10.0 PROMPT PAYMENT DISCOUNTS**

Bidders are urged to compute all discounts into the price offered. If a prompt payment discount is offered, it may be considered in the award of the contract.

## **11.0 NUMERICAL ERRORS**

In the case of a discrepancy between a unit price and the extension (the unit price multiplied by the number of units), the unit price governs. In the case where numerical bids are stated both in numbers and in words, the words govern.

## **12.0 BID WITHDRAWAL**

A bidder must notify GUC in writing of its request to withdraw a bid within seventy-two (72) hours after the bid opening, not including Saturdays, Sundays, or holidays. In order to justify withdrawal, the bidder must demonstrate that a substantial error exists and that the bid was submitted in good faith.

## **13.0 MINORITY BUSINESS PARTICIPATION PROGRAM**

GUC has adopted an Affirmative Action and Minority and Women Business Enterprise Plan (M/WBE) Program. Firms submitting a proposal are attesting that they also have taken affirmative action to ensure equality of opportunity in all aspects of employment, and to utilize M/WBE suppliers of materials and/or labor.

## **14.0 QUANTITIES**

Quantities specified are only estimates of GUC's requirements. GUC reserves the right to purchase more or less than the stated quantities at prices indicated in the submitted Proposal Form based on our actual needs.

## **15.0 DELIVERY**

Shipments will be made only upon individual releases from a blanket purchase order issued by GUC in accordance with GUC's current needs. Time is of the essence with respect to all deliveries under this Agreement.

Delivery of all equipment, materials, or supplies shall be made Free on Board (FOB) GUC Warehouse, 701 Utility Way, Greenville, North Carolina 27834, unless otherwise specified. The agreed price for such equipment, materials, or supplies shall include all costs of delivery and ownership, and risks of loss shall not be transferred from Provider to GUC until express written acceptance of delivery and inspection by GUC. Delivery hours are between 8:00 AM and 4:30 PM Monday-Friday only. **GUC's purchase order number is to be shown on the packing slip or any related documents.** GUC reserves the right to refuse or return any delivery with no purchase order number or which is damaged. GUC will not be charged a restocking fee for any delivery which is refused or returned.

## **16.0 DELIVERY TIME**

Delivery time is to be stated and will be considered in the evaluation of bids. Failure by the successful bidder to meet quoted delivery shall be interpreted as non-compliance with these specifications and may be deemed sufficient cause for removal of the manufacturer and/or distributor from our lists as acceptable manufacturers or bidders.

## **17.0 MANUFACTURER**

Bidder is to specify the manufacturer of cables being quoted. If requested, bidder shall identify the place of manufacturer of all cables quoted.

## **18.0 CONTACT INFORMATION**

Questions regarding this bid request should be directed to Cleve Haddock, CLGPO, Procurement Manager at (252) 551-1533, [haddocgc@guc.com](mailto:haddocgc@guc.com). All questions must be received by end of business day, **May 3, 2023**.

## **19.0 CONTRACT PERIOD**

NA

## **20.0 TERMS AND CONDITIONS**

**The attached Terms and Conditions apply to all purchases made by Greenville Utilities Commission (GUC) and must be considered as part of the bid proposal.**

**SECTION II**  
**GREENVILLE UTILITIES COMMISSION**  
**SPECIFICATIONS AND BID DOCUMENTS FOR**  
**(1) AUTOTRANSFORMER WITH LOAD TAP CHANGER**  
**FOR GREENVILLE 230kV SUBSTATION**  
**120 MVA, 230 TO 115 kV**  
**TECHNICAL SPECIFICATIONS**

1.0 Scope

The work shall include furnishing all equipment and materials as set forth in the Bid Documents and as specified herein. Bids will be received for the purchase of one (1) three-phase autotransformer.

As basic delivery of the transformer, the Supplier shall provide unloading, handling, rigging, and placement of one transformer at Greenville 230kV Substation, 1101 N. Holly Street, Greenville, NC.

2.0 General Conditions

- 2.1 All materials and equipment shall be new.
- 2.2 These Specifications describe the type, size, and characteristics of the various materials and equipment required to be furnished. The Drawings indicate general arrangement, equipment location, and spacing.
- 2.3 Strict adherence to these general Specifications and Drawings is requested to facilitate checking and consideration of the Proposal.
- 2.4 Proposals shall include the following:
  - 2.4.1 Catalog numbers, manufacturer, ratings, characteristics, types, sizes, etc., of all major removable materials and equipment included. A simple statement that all necessary materials and equipment will be provided is not satisfactory.
  - 2.4.2 Performance data and evidence of short circuit testing for similar designs for the several items as set forth in the Detailed Specifications.
  - 2.4.3 The Bidder shall state in his Proposal the manner in which the transformer will be shipped, namely, truck or rail; whether units shall be shipped oil-filled; and whether bushings will be installed or removed.

- 2.4.4 Prices shall include the cost of delivery to the substation site and unloading onto the pad as per Instructions to Bidders.
- 2.5 It is the intent of these Specifications that the transformer shall be complete and fully operable. Any details not mentioned in the Specifications but required for satisfactory operation shall be furnished and installed by the Supplier.
- 2.6 Station power available at Greenville Utilities' substation will be 120/240 volts, 60 Hz, single-phase. Control dc voltage at the substation will be 125 volts. The equipment on the transformers shall coordinate with these voltages as appropriate.

### 3.0 Special Conditions

#### Defective Materials, Equipment, and Workmanship

- 3.1 All materials and equipment furnished shall be subject to the inspection, tests, and approval of Greenville Utilities and the Supplier shall furnish all information required concerning the nature or source of any materials and equipment and provide adequate facilities for testing and inspecting the materials and equipment at the plant of the Supplier.
- 3.2 Basic Right of Rejection. The materials and equipment furnished hereunder shall become the property of Greenville Utilities when delivered at the point to which shipment is to be made, provided, however, that Greenville Utilities may reject any such materials and equipment that do not comply with the Specifications and warranties of the Supplier and manufacturers. Recognition and subsequent rejection of any defective materials and equipment may occur either before or after incorporation of such materials and equipment into the facilities, provided such rejection is made within one year of date of energization of the materials and equipment. Upon any such rejection, the Supplier shall replace the rejected materials and equipment with materials and equipment complying with the Specifications and warranties, F.O.B. truck at Greenville Utilities' associated substation. Greenville Utilities shall return the rejected materials F.O.B. truck at the same destination. In the event of the failure of the Supplier to so replace rejected materials and equipment, Greenville Utilities may make such replacement and the cost and expense thereof shall be paid by and recoverable from the Supplier.
- 3.3 The transformer to be provided herein shall include a full five (5) year warranty on the complete transformer together with all parts. This warranty shall extend for five (5) years from the date of energization not to exceed 5 1/2 years from date of delivery. Alternate bid schedules may be offered for the utilization of manufacturer's standard one (1) year or three (3) year warranty in lieu of the five (5) year warranty. However, any base bid not including at least a three (3) year warranty shall be considered less responsive.

### 4.0 Standards

All Equipment and Materials covered by these Specifications and all tests applied thereto shall, unless otherwise stated herein, be in accordance with the applicable provisions of the latest editions of the Standards of the ASTM, ANSI, AEIC, IEEE, NEMA, NESC, and OSHA.

Where the term "Standards" is used in the Specifications it shall be understood to refer to the above Standards.

## 5.0 Drawings

### 5.1 Preliminary

Before proceeding with fabrication, the manufacturer shall submit for approval sufficient Drawings to demonstrate that all parts conform to the requirements and intent of these Specifications. Drawings shall include Outline, Nameplate, Detail, Control, Elementary, and Control Wiring Drawings. All Drawings shall be dimensioned in feet and inches; metric measurements alone will not be acceptable. However, dual dimensioning in feet and inches and centimeters will be acceptable. Greenville Utilities prefers approval drawings to be submitted electronically in AutoCAD 2014 format. Approval Drawings shall be submitted by email to powelljl@guc.com or mailed to Greenville Utilities, PO Box 1847, Greenville NC 27835, Attention: John Powell.

The Outline Drawing shall show dimensions of equipment including bushings, radiators and cooling equipment, base, and all other important external features. These Drawings shall show weights, bushing catalog numbers, ampere ratings, and descriptions of top bushing terminals and arrangement of all external accessory devices, as well as the complete transformer rating.

Approval of Drawings shall not be held to relieve the Supplier of obligations to meet all requirements of the Specifications, of responsibility for correctness of the Drawings, or of responsibility to meet original shipping promise with Greenville Utilities being allowed two weeks for approval.

Receipt of Approval Drawings by the Supplier constitutes authorization for manufacture as noted or corrected. Greenville Utilities reserves the right to request resubmittal of Drawings as deemed appropriate prior to authorizing manufacture.

### 5.2 Final Drawings

Contingent upon Approval Drawing review and product manufacture, the Supplier shall issue final documentation as follows:

- 5.2.1 One (1) complete set of all Drawings, revised to "as-built" status, submitted electronically via email to powelljl@guc.com compatible with AutoCAD 2014.
- 5.2.2 Four (4) copies of all applicable instruction books, including one (1) print each of all Drawings representing physical and electric details as furnished per paragraph 5.2.1. The certified test reports can also be sent electronically in pdf format.
- 5.2.3 One (1) copy of certified test reports corresponding to functional performance measurements after final assembly.

All Drawings are to be certified correct and supplied prior to shipment of the equipment. Each set of Drawings and documentation shall include the following information:

- 5.2.4 Outline and Assembly Drawings showing size and location of major components and all principal dimensions.
- 5.2.5 Control and relay panel front view.
- 5.2.6 Details of bushing and bushing terminal connectors.
- 5.2.7 Diagram of bushing current transformers, connection, number of turns, polarity marking, ratios, and bushing orientation.
- 5.2.8 Current transformer performance characteristic curves and data for all relay accuracy CT's.
- 5.2.9 Details of control housing.
- 5.2.10 Panel connection diagram showing exact connection for all components furnished.
- 5.2.11 AC and DC elementary circuit diagrams for all relay and control equipment furnished.
- 5.2.12 Wiring control and schematic diagrams.
- 5.2.13 Instruction books.
- 5.2.14 Renewal parts catalog.
- 5.2.15 One (1) copy of certified test reports.

## 6.0 Shipping of Transformer

- 6.1 The autotransformer shall be shipped to Greenville 230kV Substation, 1101 N. Holly Street, Greenville, NC. Transport by rail or truck are the only acceptable delivery methods.
- 6.2 Before shipment, transformer shall be completely assembled to determine if all parts fit properly. Parts removed for shipment shall be marked to permit easy identification when reassembling.
- 6.3 Method of packing and loading shall ensure protection of all parts from dampness, corrosion, breakage, or vibration injury that might reasonably be encountered in transportation, storage, and handling.
- 6.4 Release for shipment is to be granted by Greenville Utilities based upon the manufacturer's compliance with the following:



- 6.4.1 Notification fourteen (14) consecutive days prior to testing, so Greenville Utilities may have a representative present for witness of the tests.
- 6.4.2 Furnishing of the requisite number of copies of the Final Drawings as called for in the Specifications.
- 6.4.3 Thirty (30) days' notification of tentative shipping schedule and forty-eight (48) hours' notification prior to delivery.
- 6.5 A three-direction impact recorder shall be installed to travel on the transformer for shipment and shall remain on the unit until it is unloaded unless the Supplier is relieved of this requirement by Greenville Utilities. The impact recorder shall be read prior to unloading, at the rail siding prior to unloading if applicable, on the trailer prior to transportation to the site, and after arrival at the site.
- 6.6 Transformer must be shipped oil-filled with the low-voltage bushings installed unless otherwise stated at the time of bid. The Supplier shall state method of shipment, and this shall be evaluated when awarding the Contract. Greenville Utilities prefers that the transformer be shipped oil-filled with the low-voltage bushings installed.  
  
If the transformer is not shipped oil-filled, it shall be shipped dry-air-filled and equipped with proper pipe connections for checking and filling under vacuum. The oil shall be shipped by tanker with the unloading facility (pump) furnished. The unloading facility shall have been flushed free of undesirable contaminants by flushing with the same type oil provided for the transformer. The Supplier shall furnish all equipment and supervision required for filling, and the Supplier shall coordinate timing and arrangements.  
  
The oil must meet the oil standards listed in IEEE PC57.106 prior to being installed in the power transformer. The tests and test methods are listed in the summary document
- 6.7 Type of shipment (oil-filled or dry-air-filled) shall be specified in the Proposal.
- 6.8 Lead times and delivery dates may impact the award of the bid. GUC will take into account our budgetary needs for capital spending when awarding the bid. GUC anticipates a 24 month or less lead time for this transformer.

## 7.0 Manufacturer's Field Representative

The manufacturer shall provide (and include in his base quotation) the services of a Field Service Engineer for a period of three (3) working days for each transformer. The manufacturer is responsible for all travel time. The duties of the Field Service Engineer shall include supervising installation of component parts removed for shipment, which may include but not be limited to bushings, radiators, lightning arresters, and oil. They shall perform field tests after assembly including (but not limited to) insulation test, sweep frequency response analysis, turns ratio test for all taps, dielectric tests, functional testing of alarms and controls, and PCB oil test (before and after site oil filling, if applicable). The manufacturer's representative will draw oil samples from each unit, and will be responsible for conducting

ASTM dielectric test and dissolved gas tests, to establish initial bench mark controls for future transformer maintenance. Additional time required (or credit for time not worked) shall be provided at the per-day rate quoted in the Supplier's Proposal.

8.0 Transformer

The following requirements shall apply to all Bid schedules except where explicitly noted otherwise.

8.1 Type and Rating

8.1.1 The transformer shall be 60 Hertz, suitable for outdoor service at an altitude less than one kilometer (3300 feet) above sea level.

8.1.2 **Windings shall be copper, circular concentric construction, utilizing helical type or disc type windings to ensure maximum strength during short circuits. Coil construction consisting of layered sheets shall not be allowed.**

8.1.3 The 230 kV autotransformer shall be a three-winding autotransformer with a buried delta tertiary. The autotransformer high voltage shall be 230,000 volts grdY/132,800 volts at 900 kV BIL. The autotransformer low voltage shall be 115,000 grdY/66,400 volts at 550 kV BIL. The tertiary shall be buried and rated 13.8 kV delta at 110 kV BIL minimum with provisions for testing the impedance of the tertiary winding. The 230 kV autotransformer shall be designed and built such that the power flow through the transformer is from high voltage to low voltage. The 230 kV autotransformer will be operated with the H<sub>2</sub>X<sub>o</sub> bushing terminal tied solidly to ground. All windings shall be copper.

8.1.4 The transformer shall be oil immersed for continuous self-cooled/forced air/forced air cooled operation ONAN/ONAF/ONAF with two (2) stages of fan cooling and shall be furnished complete with oil in accordance with the requirements of ASTM D3487. Fans shall be included with the transformer; operating voltage for fans shall be 230 volts, single-phase, and shall be thermally protected against overload failure.

8.1.5 Transformer ratings, when loaded in accordance with the latest IEEE C57.91 "Guide for Loading Mineral Oil-Immersed Transformers and Step-Voltage Regulators," shall be as follows:

| 230 kV Autotransformer    |              |
|---------------------------|--------------|
| Cooling                   | Rating (kVA) |
| 55°C rise, ONAN           | 120,000      |
| 55°C rise, ONAN/ONAF      | 160,000      |
| 55°C rise, ONAN/ONAF/ONAF | 200,000      |
| 65°C rise, ONAN/ONAF/ONAF | 224,000      |

8.1.6 The transformer shall be capable of carrying rated current continuously at five percent (5%) above rated secondary voltage without exceeding an average winding temperature rise of 55/65°C above a 40°C maximum ambient and 30°C average ambient over twenty-four hours.

8.1.7 The transformer shall be 55/65°C construction where the average winding temperature rise by resistance will not exceed 55/65°C; hottest-spot winding temperature rise will not exceed 65/80°C; suitable for loading in accordance with the latest IEEE C57.91 "Guide for Loading Mineral Oil-Immersed Transformers and Step-Voltage Regulators."

8.2 High Voltage Taps

8.2.1 The transformer to be provided shall have full capacity, high voltage taps, at rated kVA, and shall be provided as follows:

| 230 kV Autotransformer |
|------------------------|
| 241,500 volts          |
| 235,750 volts          |
| 230,000 volts          |
| 224,250 volts          |
| 218,500 volts          |

8.2.2 A weatherproof external hand operated tap changing mechanism shall be provided, suitable for de-energized operation, with one (1) external handle that may be operated from the transformer base level and have provision for locking in any position. An external indicator shall clearly display the tap position that is set.

8.3 Case and Cover

8.3.1 The transformer tank design shall observe the following criteria for location of external equipment and accessory hardware:

- a. The control cabinet housing all low voltage wiring associated with current transformer secondaries, automatic fan control, alarms, LTC control etc. shall be located on the side of the tank in Segment 4 as identified by IEEE C57.12.10.
- b. The LTC compartment shall be located on the side of the tank in either Segment 1 or Segment 2 as identified by IEEE C57.12.10.
- c. Placement of radiators shall not obstruct the operator's view of any indicating dial or gauge located within Segment 4 of the transformer.
- d. **Final placement of the control cabinetry, LTC compartment, LTC position indicator, radiators, and all other external auxiliary equipment shall be subject to the approval of the City or the City's Engineer. Relocation of these components will be required only as necessary to physically comply with standard facilities design for foundations, oil containment systems, and surrounding substation structures.**

8.3.2 Tank shall be designed and braced for full vacuum and be suitable for filling, with oil under a vacuum of 28 inches of mercury, in the field.

8.3.3 Containing case shall not leak oil. Welded joints and seams shall be employed whenever practicable.

8.3.4 Main transformer cover shall be welded. Gasketed joints for manhole covers, bushings, and other bolted attachments shall be

sealed with a durable and reusable gasket material (ordinary cork or corkprene not approved), and shall be designed so as to permit their being made oil tight in reassembly. Mechanical stops shall be provided to prevent crushing, (controlled compression).

- 8.3.5 Transformer base shall be suitable for skidding the transformer in a direction parallel to either centerline of the tank, and shall be capable of supporting the transformer on a two-pier foundation.
- 8.3.6 All surfaces of case and covers, both exterior and interior, shall be thoroughly cleaned by means of shot-blasting or by any other equally effective method. Primer and at least three (3) coats of exterior paint are to be applied. Total paint thickness on the transformer tank and control box shall be 5 mils minimum. Interior of tank shall be painted white.
- 8.3.7 The exterior surface of all bolts, nuts, and washers shall be primed and painted as above or such parts shall be stainless steel or galvanized. No exposed cadmium-plated or zinc chromate-plated parts will be allowed.
- 8.3.8 Exterior paint shall be standard light gray IEEE, No. 70 and certified as lead free.
- 8.3.9 The bottom of the transformer tank shall not bear on the concrete pad in the finished installation. The bottom shall be primed and painted as described above. Flat-bottom transformers shall be furnished with permanently welded supporting spacer beams. The dimensions and locations of these beams shall be shown in the manufacturer's Drawings.
- 8.3.10 Mounting brackets shall be supplied along the transformer tank as necessary to support 4/0 AWG copper grounding conductor from the base of all high-side and low-side surge arresters. The supports must provide for attachment of the grounding conductor from the arresters to the 1/4-inch x 4-inch copper ground bus and to the tank grounding pads located on the front and rear corners of the tank. The grounding conductor shall be 4/0 AWG copper conductor and Anderson Type "TLS" connectors for attachment of the conductor to the support brackets. See Appendix 2 for details.
- 8.3.11 The transformer tank shall provide two grounding pads per the latest IEEE C57.12.10, suitable for attachment of NEMA two-hole bronze connectors. The connectors shall be suitable for use with 4/0 through 500 kcmil, 37-strand copper conductor. The pads shall be located on diagonally opposite front and rear corners of the tank, and shall be located approximately twelve (12) inches above the transformer base.
- 8.3.12 A grounding bus (loop configuration) shall be supplied by the manufacturer for the transformer including attachment to the neutral bushing, the base of all surge arresters and to two tank ground pads as shown in Appendix 2.
- 8.3.13 The tank shall include a 1/4-inch x 4-inch minimum copper ground bus to connect on each diagonal corner to the grounding pads

located at the base of the transformer. The ground bus shall be supported along the surfaces of the tank by the necessary quantity of 5 kV style insulators. The ground bus shall be connected to the neutral bushing using a 1200-ampere flexible copper shunt to a 4-hole NEMA bushing terminal pad. The ground bus shall be connected to the NEMA 2-hole grounding pad at the base of the transformer using a 600-ampere flexible copper shunt. The copper ground bus shall provide four-hole NEMA drilling at the lower end for attachment of the substation ground grid. The bus shall also provide two-hole NEMA drilling located appropriately for attachment of bonding conductors from the bases of the transformer-mounted surge arresters.

8.4 Impedance

The transformer impedance at normal base rating shall be as close as possible to the values stated below at 75°C with IEEE Standards tolerances of 10.0% for power autotransformers.

| <u>Project</u>   | <u>Impedance</u> |
|--|------------------|
| Greenville 230 kV Substation<br>230 kV Autotransformer | 5.50%            |

8.5 Sound Level

8.5.1 The transformer will be designed so that the average sound level will be in accordance with the latest revision of NEMA TR-1.

8.5.2 The sound level at the 120 MVA self-cooled rating shall not exceed 72 dBA when factory-tested in accordance with the procedures stated in NEMA TR1-9.04.

8.6 Bushings and Terminals

8.6.1 All transformers shall be provided with three (3) primary and four (4) secondary cover-type bushings constructed of high strength wet process porcelain. All bushings shall be manufactured by either PCORE or ABB.

8.6.2 All high-voltage bushings shall be oil-filled and dimensionally interchangeable between circuit breakers and transformers according to latest revisions of IEEE Standard C76. The high-voltage bushings shall be condenser type and have provisions for power factor testing. Bushings for all schedules shall be draw lead type rated as follows:

| <b>HV Bushings<br/>(kV/kV BIL)</b> | <b>HV Bushings<br/>(Amp)</b> | <b>LV Bushings<br/>(kV/kV BIL)</b> | <b>LV Bushings<br/>(Amp)</b> |
|------------------------------------|------------------------------|------------------------------------|------------------------------|
| 230/1050                           | 800                          | 115/550                            | 1,600                        |

8.6.3 Primary and secondary bushings shall be provided with copper thread studs sited in accordance with their respective current

ratings. A connection suitable for flat spade connection with NEMA four-hole drilling shall be either built into the bushing or furnished as a separate item. High-voltage and low-voltage terminal studs and flat spade terminal connectors shall have silver-plated contact surfaces.

8.6.4 Low voltage neutral bushings shall be rated 25 kV/150 kV BIL and provided with a connection for flat spade connections with NEMA four-hole drilling and connected to a 4" x 1/4" (minimum) copper bus extending from the terminal to a tank ground pad for direct connection to the station ground system.

8.6.5 The bushings shall be spaced to comply with, or exceed, minimum phase-to-phase and phase-to-ground external clearances between live parts in accordance with IEEE Standard C57.12.00. All external bushing mounting hardware shall be stainless steel. All connections shall be suitable for either copper or aluminum connectors.

## 8.7 Auxiliary Cooling

8.7.1 Cooling equipment shall be furnished in accordance with IEEE standards for transformer self-cooled and forced air-cooled ratings of ONAN/ONAF/ONAF.

8.7.2 Provisions shall be made for cooling radiators to be mounted independently of one another on the transformer, and individually removable from the transformer tank and provided with valves on the transformer tank side so that one cooler may be removed from operation or replaced while the transformer is in service without interfering with the operation of the other coolers (radiators). Radiators shall be designed and braced to withstand all vibration and operating forces. Radiators shall be galvanized. No painted radiators will be allowed.

8.7.3 Radiator mounting flanges on the transformer tank shall each be equipped with valves to permit the removal or replacement of an individual cooling radiator or bank of radiators without loss of either oil or, gas above oil, in the transformer tank.

8.7.4 Each cooling radiator shall be equipped with a fill valve at the top and a drain valve at the bottom of the unit.

8.7.5 All cooling fans shall be equipped with automatic control via an SEL-2414 transformer monitor to provide the operation of all cooling stages based on the sensing of transformer winding temperature. Each fan shall be driven by an enclosed, waterproof induction motor rated 230 volts ac, single-phase, 60 Hertz. Each motor shall be equipped with thermal overload protection. Each fan shall be dynamically balanced for vibration-free operation. All fan guards shall be stainless steel and meet OSHA Safety Standards.

8.7.6 The SEL-2414 shall provide for the transfer of cooling operation from automatic to manual control. All cooling system controls shall be enclosed in the transformer control cabinet, complete with all conduit and inner wiring to the fans. Fans shall be wired such that

at least one bank will be fail safe in nature (fans operate if 2414 fails).

- 8.7.7 The SEL-2414 transformer monitor inputs/outputs are detailed in the appendix.
- 8.7.8 All cooling fans shall be located at sufficient height to permit their operation when the transformer is embedded in snow up to 30 inches from its base.

8.8 Lightning Arresters

- 8.8.1 Lightning arresters shall be of the station class type, transformer mounted for the high and low voltage side on each phase of the transformer and shall be rated:

| <b>System Voltage</b> | <b>Conventional Arrester Rating</b> | <b>MCOV Arrester Rating</b> |
|-----------------------|-------------------------------------|-----------------------------|
| 230 kV, 900 kV BIL    | 192 kV                              | 152 kV                      |
| 115 kV, 550 kV BIL    | 108 kV                              | 88 kV                       |

- 8.8.2 Metal oxide lightning arresters are rated either in terms of maximum continuous operating voltage (MCOV) or by the conventional arrester rating which they replace. MCOV ratings are assumed here for metal oxide arresters. However, metal oxide arresters which are given conventional ratings may be furnished if the MCOV equivalent ratings are as specified here.
- 8.8.3 The lightning arresters shall be located with relation to one another and the bushings to comply with, or exceed, minimum phase-to-phase and phase-to-ground clearances between live parts in accordance with IEEE Standard C57.12.00. They shall not be mounted on radiators or hand-hole covers. The location shall be such that the entire electrical path from connectors to ground pads can carry, without damage, the specified rated discharge current of the arrester.
- 8.8.4 The lightning arresters shall be provided with connections to the line-side bushing terminals with connections equivalent to the full capacity of the transformer. Ground conductors equivalent at minimum to 4" x 1/4" copper bus shall also be furnished and carried to the transformer ground pads with loop configuration as shown on the Drawing in Appendix 2.
- 8.8.5 The body of the lightning arresters shall be wet process porcelain, light gray, IEEE No. 70.
- 8.8.6 The lightning arresters shall comply with IEEE Standard C62.11.

8.9 Current Transformers

- 8.9.1 The transformer shall be equipped with bushing type current transformers mounted inside the main case on terminals (H<sub>1</sub>, H<sub>2</sub>, H<sub>3</sub>, X<sub>1</sub>, X<sub>2</sub>, X<sub>3</sub>) and Neutral (H<sub>0</sub>X<sub>0</sub>) with all secondary leads brought to identified terminals in a control cabinet mounted for nominal working height from ground level. Terminal blocks shall have short-

circuiting devices which will maintain a continuous CT secondary circuit while tap positions are being changed. Each CT shall be connected to a separate six-point terminal block; terminal designations shall comply with the CT Drawing included in the Appendices of these Specifications. The sixth terminal of each block shall be permanently wired to the ground bus on the internal side of the block to facilitate the customer grounding unused CTs.

8.9.2 All bushing type current transformers shall be standard multi-ratio, 5 leads, 10C800 relaying accuracy, 2.0 thermal factor, except when specified otherwise.

8.9.3 Bushing type current transformers to be furnished on terminals shall be as follows:

a. High Voltage Bushings

Provide two (2) each 600/5A BCT on H<sub>1</sub>, H<sub>2</sub>, and H<sub>3</sub> bushings.

Provide one (1) each 2000/5A BCT on H<sub>1</sub>, H<sub>2</sub>, and H<sub>3</sub> bushings (closest to winding).

b. Low Voltage Bushings

Provide three (3) each - 1200/5A BCT on X<sub>1</sub>, X<sub>2</sub> and X<sub>3</sub> bushings (set closest to winding for SEL-2414).

Provide two (2) BCT (ratio to be specified by manufacturer) on X<sub>2</sub> bushing for LTC control and winding temperature gauge.

c. Neutral Bushing

Provide two (2) each - 1200/5A BCT, on the neutral H<sub>0</sub>X<sub>0</sub>.

d. Tertiary Winding

Provide two (2) -- 1200/5A BCT, in the tertiary winding.

8.9.4 If the current transformers are mounted in a removable current transformer adapter, the current transformer shall be shipped in the main transformer mounted in the adapters. The current transformer secondary leads shall be permanently connected to the terminal blocks in the Control Cabinet. No splicing of secondary current transformer leads shall be required after delivery to the Owner. Marking of leads and locations of shorting-type terminal boards control panel shall be in accordance with the CT drawing included in the Appendices. A CT metal diagram instruction plate shall be provided. Turns progression and accuracy class of bushing current transformer shall be shown on the nameplate.

8.10 Control Cabinet

8.10.1 A weatherproof NEMA 3R control cabinet shall be furnished enclosing control circuits, signal circuits, protective relays, individual transformer alarm indicators, a 120-volt ac convenience duplex receptacle, a 40 watt incandescent light with guard, and a suitable 230-volt, 60 Hertz heater with double pole thermal circuit breaker.

8.10.2 The cabinet shall be furnished with swing door(s) complete with handle and three-point latching mechanism and provisions for



padlocking. The door(s) shall be equipped with provisions to fix the swing in the open position. Bolted door covers will not be accepted. Door shall be opened without use of tools.

8.10.3 All wire into the control cabinet shall have 600-volt flame-resistant, moisture-proof insulation and shall be enclosed in rigid metallic conduit. All conductors into the control cabinet shall terminate on a clearly marked and properly identified terminal board. Terminal boards for C.T. leads shall be shorting type, all terminal boards shall be equipped with non-magnetic split type lock washers and ring type compression lugs.

8.10.4 The weatherproof control panel shall be centrally located in Segment 2 or 4 per IEEE C57.12.10 at a location to be approved by the Owner. A dead-front control panel in the control cabinet shall contain the necessary switches, circuit breakers, relays, indicating lamps, etc. Target relays and alarm indicating lamps shall be visible through a Lexan window in the outer door(s).

8.10.5 Breathers for the LTC housing shall be silica gel type.

8.10.6 All cabinets attached to the transformer shall be solidly grounded to the transformer case.

8.10.7 The control cabinet heater shall be equipped with guards and thermostatically controlled so that the guard temperature cannot exceed 120°F. The 240-volt electric terminals at the heater shall be covered.

8.10.8 Control cabinet shall provide a cover plate with reusable gasket for the entrance of conduit. Detail drawings showing bottom of cabinet shall be provided.

## 8.11 Wiring

8.11.1 All power wiring shall be made with #10 AWG stranded tinned copper wire or larger sized wire. The primary insulation jacket of all wiring shall be 600 volt, 90°C, water, oil, and flame resistant. Control wiring shall be 45 or 65 mil stranded cable and not smaller in size than #14 AWG tinned copper wire, with the exception that wiring to alarm auxiliary relays and indicating lights may be smaller in size. SIS control wire is recommended. All current transformer leads are to be #10 AWG stranded tinned copper or larger.

a. Power wiring shall be sized as required in accordance with the National Electrical Code.

b. All connections for wiring shall utilize locking terminals such that screws or nuts do not loosen. Acceptable inherently locking terminals include: screws with integral locking washers (e.g. screws on Marathon 1500 series terminal blocks), Sems pressure saddle screws with external lock washers (e.g. screws on SEL relays). All connections for wiring which do not have inherently locking terminals shall be made using silicon bronze, split-type lockwashers, screws, and nuts.

c. All wires shall be identified at each end with legible permanent

labels.

- d. Wiring connections between fixed and hinged sections shall be minimum 41-stranded wire.
- e. Seven-stranded control wire is not acceptable.
- f. For screw and stud type terminals: All terminal connections for conductor sizes #10 AWG in size and smaller shall be made with pre- insulated full-ring tongue, compression-type lugs. Lugs shall be Burndy Type YAV, or approved equivalent. Spade-type terminals or slip-on connectors are not acceptable.
- g. For Phoenix type terminals: All wiring shall be connected using pre- insulated, closed-barrel, blade-type terminals; bare, stranded wire shall not be inserted into Phoenix terminal.
- h. All terminal connections for conductors sizes #2 AWG through #9 AWG shall be made with Burndy Type YAV or approved equivalent.
- i. All terminal connections for conductor sizes larger than #2 AWG shall be made with two-hole, long-barrel, double-indent, crimp-type lugs: Burndy Hylug Type YA or approved equivalent. (Single-hole lugs may be used only where necessary).

8.11.2 Grommets shall be provided for all openings in metal barriers used for wiring.

8.11.3 Uninsulated exposed conductor or terminal lug shall not extend beyond the sides of the terminal block or its insulating barriers.

8.11.4 All leads for multi-ratio current transformers shall be wired to terminal blocks in the control cabinet. If junction boxes are required in wiring between current transformer and control cabinet, terminal blocks shall be used for wiring connections. In-line-type disconnecting terminals such as American Petroleum Institute (API). No. 32488 or Burndy No. YZ10 will not be acceptable.

8.11.5 If accidental short circuiting of certain wires can result in malfunction of equipment, these wires shall not be terminated on adjacent terminal block points.

8.11.6 No more than two (2) wires per terminal point are permissible.

## 8.12 Terminal Blocks and Fuseholders

8.12.1 Molded-type terminal blocks, rated 600 volts and 30 amperes, for all external control connections shall be provided. Terminal blocks with self-contained pressure-type connectors are not acceptable.

8.12.2 Marathon 1500 DJ series or General Electric Type EB-25 terminal blocks shall be provided furnished with white marking strips for identification of terminal wires for all connections except current transformers. The terminals shall be identified with legible permanent markings.

8.12.3 Marathon 1500 SC series or General Electric Type EB-27 terminal

blocks shall be provided for current transformer leads with at least three shorting screws per terminal block. A separate short-circuit-type terminal block shall be provided for each set of current transformer leads.

- 8.12.4 One three-pole terminal block sized for #6 to #2/0 AWG wire for Owner's single-phase, three-wire, 120/240 volt, control power leads shall be furnished.
- 8.12.5 A minimum of 15 percent spare (but not less than 12 points) terminal points shall be provided in the control cabinet. These terminal points shall be furnished with all screws and lockwashers.
- 8.12.6 Fuseholders shall be Marathon (RF30AXS for 30A and RF60AXS for 60A) series fuseblocks with hard-gripping fuse clips (reinforcing member) and straight-slotted silicon bronze screws on each terminal, or approved equivalent. Terminals to be supplied without ears.
- 8.12.7 A full set of fuses for all types and sizes shall be provided for and secured within the control cabinet.

#### 8.13 Alarms and Relays

- 8.13.1 The transformer shall be equipped with various alarms and an alarm annunciator(s) to provide visual indication of abnormal conditions as designated herein. Each alarm shall be in the form of a normally open contact wired to terminal blocks in the transformer control cabinet via paired wire leads. The alarm annunciator shall be flush-mounted on the control panel within the transformer control cabinet and shall be wired to the designated alarms brought to the terminal blocks for customer's use.
- 8.13.2 The annunciator(s) shall be a ten window annunciator model SEL-2533 as manufactured by Schweitzer Engineering Laboratories, Inc. The annunciator(s) shall use a 125 Vdc power supply, 125 Vdc control voltage, and having 14 digital inputs and 7 digital outputs. The full model number shall be 2533#DPWG. See Appendix 3 for typical input and output wiring.
- 8.13.3 The transformer shall be equipped with a Schweitzer SEL-2414 transformer monitor, Model No. 241421ACA9X3A850000, Key Code 0563; 125 VDC power supply, 125 VDC control voltage.
- 8.13.4 The typical alarms are to be as identified in Appendix 3.
- 8.13.5 Contact outputs from the annunciator(s) shall be wired to terminal blocks for customer use as shown in Appendix 3.
- 8.13.6 The transformer undervoltage relay inputs to the annunciator shall be delayed by means logic internal to the annunciator. To avoid undervoltage nuisance alarms, the condition should be active for 60 seconds before the annunciator target is sealed in.

#### 8.14 Fault Pressure Relay

- 8.14.1 Two (2) fault pressure relays shall be provided; one (1) for the transformer main tank and one (1) for the LTC compartment for the

detection of rapid rates of positive increase in transformer tank pressure. The fault pressure relaying shall also provide contacts for the alarm to the SEL-2533 and remote initiation of transformer lockout to a relay panel provided by the Owner.

- 8.14.2 Contacts supplied for alarms and initiation of station lockout shall be dry, normally-open, latching operation with manual hand reset. Contacts shall be suitable for use at 125 volts dc. Current shall be limited to 20 amps resistive.
- 8.14.3 Contact leads for alarm and trip shall be brought to a terminal block for field connection to the Owner's relay switchboard.
- 8.14.4 All relay coils associated with fault pressure detection shall be driven by the Owner's 125 volts dc.
- 8.14.5 The fault pressure detection relay shall be Qualitrol Series 900 with Qualitrol Seal-in Relay Model Number 909-300-01. All associated auxiliary relays shall be mounted within the transformer control cabinet.
- 8.14.6 The fault pressure relay shall be located on the transformer so as to avoid false trip operation during through-fault conditions. The fault pressure relay shall be located under oil.

#### 8.15 Oil Preservation System

- 8.15.1 The transformer shall be equipped with a complete oil-preservation system, which shall include appropriate abnormal condition relays and alarms. The proper amount of oil for cooling and insulation and sufficient amount of inert gas for initial purging and oil filling shall be included.
- 8.15.2 The Materialman shall describe in the Proposal the type of oil-preservation system. A complete description of the system, a listing of all involved parts, and a description of operation and maintenance requirements must be submitted with the Proposal.
- 8.15.3 The oil-preservation system shall be a conservator-tank type with a bladder in the conservator to prevent exposure of oil to outside air. There shall be separate liquid level gauges and alarms on the conservator and main tank.

#### 8.16 Oil and Winding Temperature Measurement

- 8.16.1 Visual indication of transformer top oil temperature and winding temperature shall be provided by Qualitrol Model 104 temperature indicators. The system shall be provided with six inch (6") remote thermometers with an armored capillary and winding temperature current transformer per IEEE standards.
- 8.16.2 The top oil temperature display shall be capable of measuring and displaying a range of 0° to 120° Celsius. The winding temperature display shall be capable of measuring and displaying a range of 0° to 180° Celsius.
- 8.16.3 In addition to the visual indication, the temperature control shall be accomplished using a SEL-2414 transformer monitor. An RTD to

sense top oil temperature shall be furnished and installed. An RTD to sense ambient temperature shall be furnished and installed. An RTD to sense LTC top oil temperature shall be furnished and installed. All RTDs shall be 100 Ohm Platinum. The ambient temperature RTD shall be Qualitrol model 103-047, or approved equal, properly located and away from the wash of air from cooling fans. All RTDs are to be removable from their thermowells for testing without the need to unwire from a terminal block. All RTDs with weather-tight connectors must be lubricated with a non-washing rubber-safe grease and tightened only by hand.

- 8.16.4 Programming shall be done by the Owner's engineer.
- 8.16.5 The SEL-2414 and input/output drawing is included in the appendix.
- 8.16.6 The full model number of the temperature indicators and transformer monitor shall be shown on the drawings.

8.17 Load Tapchanger (LTC) for Transformer Secondary

- 8.17.1 The power autotransformer and power transformer shall provide an automatically-controlled vacuum Load Tapchanger (LTC) for regulating the output voltage of the transformer secondary windings. The LTC shall consist of the following subassemblies:
  - a. Secondary winding tap leads and auxiliary transformers (as may be required by manufacturer's design), all housed within the main transformer tank.
  - b. An oil-filled compartment separately partitioned from the main transformer tank and housing the mechanical tap selector switch, taps switch contactors, and reversing switch contactors as necessary for switching the tapped leads of the transformer secondary windings.
  - c. A motor drive assembly compartment housing the ac service-voltage drive motor, service voltage wiring, and related switches, interlocks, and motor drive controls necessary to electrically and mechanically operate the tapchanger mechanism.
  - d. Electronic control modules for the automatic sensing of transformer secondary voltage and automatic loop control of the drive motor thereby regulating the transformer secondary voltage. All control modules shall be located inside the transformer's main control cabinet. Refer to Section 8.19 for details regarding the automatic voltage control modules.
- 8.17.2 The LTC and all tests applied thereto shall conform to the latest standards of the IEEE, IEEE, NEMA, and NESC.
- 8.17.3 Assuming a constant voltage at the nominal rating of the transformer primary windings, the secondary load tapchanger shall provide automatic voltage regulation ranging from ten percent below (-10%) nominal secondary tap voltage to ten percent above (+10%) nominal secondary tap voltage while under any load current up to the maximum forced ratings of the transformer windings.

- 8.17.4 The full range of voltage regulation (+/- 10%) shall be accomplished by the LTC in sixteen (16) tap steps either side of the neutral (nominal) tap position. Each tap step shall provide an equally distributed 5/8-percent change in voltage in either the raise ("boost") or lower ("buck") direction.
- 8.17.5 For voltage regulation ranging between nominal and ten percent above ("raise" or "boost" tap positions), the LTC shall have capacity to deliver the full kVA rating of the transformer.
- 8.17.6 For voltage regulation ranging between nominal and ten percent below ("lower" or "buck" tap positions), the LTC shall have capacity for secondary load current corresponding to rated transformer kVA and the selected voltage tap position.
- 8.17.7 The LTC shall be designed to withstand full-voltage short-circuit conditions, and complete automatic operation of any tapchange under such conditions without failure of the tap-changer mechanism or tap-changer windings.
- 8.17.8 The tap-changer contact assembly of all LTC mechanisms shall be housed in an oil-filled compartment separately partitioned from the main transformer tank. The contact assembly shall include the tap selector switch and contactor mechanism, together with the reversing switch necessary for transfer from the neutral position to the raise or lower tap positions. The assembly shall provide mechanical stops to limit the travel of the switch movement within appropriate tolerances. The oil in this compartment shall provide dielectric strength for insulation. The compartment shall be designed to prevent any contamination of main tank oil from oil contained within the tapchanger assembly.
- 8.17.9 The oil-filled tapchanger compartment shall be outfitted with the following auxiliary equipment:
- a. Temperature-compensated Qualitrol dial-type liquid level gage with low level alarm contacts wired out for customer use.
  - b. Compartment breather shall be a Waukesha Auto-Recharging Dehydrating Breather, Model ARDB2.
  - c. Drain and filling valves, each one-inch (1") screw-end globe type.
- 8.17.10 The tapchanger may incorporate the following techniques to suppress contact arcing during tapchanges under load:
- a. preventive reactor winding;
  - b. resistance bridging device with oil filtration system;
  - c. vacuum interruption chamber (required).
  - d. The Manufacturer must clearly identify in the Proposal those arc suppression techniques and features that will be incorporated in the tapchanger assembly. Preventive reactor windings, where used, shall be located with the core and coil assembly in the main tank of the transformer.

- 8.17.11 The Manufacturer's Proposal shall identify the guaranteed minimum number of maintenance-free tapchange operations provided by the LTC mechanism. Mechanisms providing less than 500,000 operations between maintenance service will be evaluated as an unresponsive bid.
- 8.17.12 The secondary windings of the transformer shall be tapped as necessary to provide the desired number of tap steps and percent voltage regulation. A series transformer may be incorporated into the design of the main core and coil assembly if necessary to achieve the appropriate regulation.
- 8.17.13 The compartment housing the motor drive assembly shall provide the following features and accessories:
- a. Mechanism drive motor, 120 Vac service voltage input, with power supply cut-off switch, thermal overload protection, and complete with all service voltage terminal blocks and wiring. Refer to Section 8.19 for information regarding the automatic voltage regulation modules which control the drive motor.
  - b. Manual hand-crank operation of the mechanism drive shaft, electrically interlocked to prohibit operation of the drive motor when hand crank is in use.
  - c. Electrical transfer switch to block automatic control of the drive motor and provide electrical raise and lower control of the drive motor locally at the motor control compartment.
  - d. Mechanically-driven dial-type position indicator displaying the current tap position of the LTC. The indicator dial shall be clearly graduated for every step position from 16L to 16R including N demarcation for neutral position. At least every fourth step position shall be numerically identified on the dial.
    - 1) The position indicator shall be equipped with electrically resettable drag hands indicating the maximum travel of the tapchanger in the lower and raise positions.
    - 2) The position indicator shall provide upper (16R) and lower (16L) limit switches to remotely alarm the full travel of the LTC mechanism in either direction. The alarm contacts shall be fully wired to the main control compartment annunciator.
    - 3) The position indicator shall be mounted on the transformer in a location clearly visible and legible from average eye level while standing at the tap changer mechanism cabinet.
  - e. Tap-changer operations counter either mechanically- or electrically- triggered and mounted for unobstructed view at eye level within the compartment.
  - f. 120 vac duplex convenience outlet, ground fault protected in accordance with the National Electric Code.

- g. 120 vac thermostatically-controlled low wattage strip heater, complete with overcurrent circuit breaker, for protection against condensation within compartment.
- h. 120 Vac compartment lamp with plunger switch activated by compartment door, and protected by overcurrent circuit breaker.
- i. Selsyn-type transmitter as required for current-loop interface to the automatic tapchanger control equipment for indication of LTC tap position.
- j. All wiring necessary for interconnection between the components of the motor control compartment and the automatic voltage control equipment shall be provided by the Manufacturer.

8.17.14 SEL-2414 device shall have thermowell probes in both the main and LTC tanks for monitoring the condition of the LTC.

8.18 Automatic Voltage Regulation Equipment for LTC's

8.18.1 The transformer shall provide microprocessor-based automatic control of the LTC for load-compensated voltage regulation. The automatic LTC controller shall be a BECKWITH MODEL M-2001D-6L4S2BF0S00 Digital Tap-changer Control as manufactured by Beckwith Electric Company, Inc. of Largo, Florida. No substitutions will be accepted.

8.18.2 The Beckwith 2001 tapchanger control shall be mounted in the main control cabinet of the transformer using a BECKWITH M-2270 faceplate panel. All BECKWITH M-2270 faceplate panel features shall be electrically operable and fully functional. Features of the faceplate panel shall include:

- a. One pair of combination "banana plug/ binder post" test terminals for sensing voltage input;
- b. One pair of combination "banana plug/ binder post" terminals for external motor voltage input;
- c. One pair of combination "banana plug/ binder post" terminals for external sensing voltage input;
- d. Separate fuses in front-mounted fuse holders for each pair of test and input terminal posts;
- e. RAISE/OFF/LOWER manual switch control;
- f. AUTO/OFF/MANUAL selector switch control;
- g. VOLTAGE SOURCE selector switch between internal and external sources;
- h. DRAG HANDS RESET pushbutton;
- i. NEUTRAL LIGHT indicator;
- j. Built-in current transformer shorting protection whenever the M-2001 tapchanger control is disconnected from the wiring harness.

8.18.3 To accommodate bus voltage regulation in parallel with a future LTC transformer, a parallel current balancing control module shall be provided in conjunction with the Beckwith Model M-2001D. The



parallel balancing module shall be a BECKWITH MODEL M-0115 control. No substitutions will be accepted.

- 8.18.4 To accommodate the current loop interface between the Selsyn-type transmitter in the motor control compartment and the M-2001, a BECKWITH M-2025 Current Loop Interface module and an INCON Model 1250 position monitor/transducer shall be provided.
- 8.18.5 To accommodate digital access to the digital tapchanger control memory, one copy of the BECKWITH M-2029 "TapTalk" communications software shall be provided.
- 8.18.6 The transformer shall provide a current transformer for line-drop compensation measurement by the tapchanger control.
- 8.18.7 The current transformer shall provide dual taps for ratios of 1000:0.2 and 600:0.2. The current transformer shall be located on the X1 bushing within the main transformer tank.
- 8.18.8 Sensing voltage input to the tapchanger control will be supplied by an Owner- furnished externally-mounted potential transformer.
- 8.18.9 The Manufacturer shall provide all interconnection wiring between the control modules, current transformers, auxiliary equipment, and field termination blocks to achieve a completely functional automatic voltage regulating system. Terminations shall include all interconnections between the available I/O functions of the digital tapchanger control and field termination blocks. These functions include, but are not limited to, the following:
  - a. External sensing voltage input;
  - b. Paralleling connections to future transformer;
  - c. Self-test alarm contact outputs;
  - d. User-programmable alarm contact outputs;
  - e. Tapchange inhibit contact input;
  - f. Multi-step voltage reduction.

#### 8.19 Gas-in-Oil and Moisture Online Monitoring System

- 8.19.1 The transformer shall be equipped with a Morgan Schaffer, Calisto 5, Model C501, Product 600-CALIS unit for monitoring gas and moisture content in the transformer oil of the main tank.
- 8.19.2 The Calisto shall be factory equipped with a C501/C901, Product ECAL-0087 Optical Ethernet Card.
- 8.19.3 The Calisto will be piped to the main tank of the transformer per Morgan Schaffer requirements with Stainless Steel tubing, and cut-off valves on each tank connection.
- 8.19.4 Manufacturer shall install fiber optic cabling with appropriate connectors between the Calisto unit and the main control cabinet. Conduit for fiber optic cabling shall be sized adequately to remove and reinstall a cable with attached connectors for future repair.

#### 8.20 Flood Hardening

- 8.20.1 The transformer will be located in an area prone to flooding. Flood waters may reach an elevation of 8' above the surface of the concrete

pad.

- 8.20.2 All controls and operator cabinets and junction boxes shall be located above the flood elevation such that water will not enter the enclosure. If an enclosure must be located such that water may enter the enclosure, no devices, terminals, nor components shall be allowed to be located below the flood elevation and the elevation shall be permanently marked inside the cabinet with striping.
- 8.20.3 Cooling fans may be located below the flood elevation when wired to junction boxes above the flood elevation.
- 8.20.4 Access to controls and operator cabinets for operations and maintenance must be made available by galvanized steel or aluminum platforms. Equipment shall be located to maintain IEEE C2 "National Electrical Safety Code" electrical clearances for personnel. An option to provide and install the platforms will be included in the bid proposal.
- 8.20.5 Pressure cylinders required for the gas-in-oil monitoring system shall be located at ground level for ease of maintenance. Piping shall be installed from the cylinder location to the gas-in-oil monitor. Regulators and pressure switches shall be located above the flood elevation.

## 9.0 Additional Features

Transformer shall include, but is not limited to, the following mechanical and electrical features:

- 9.1 Two (2) ground pads per the latest IEEE C57.12.10 with connectors for 4/0 through 500 kcmil, 37-strand copper conductor.
- 9.2 Ground bus and grounding accessories, consisting of two (2) transformer tank grounding pads with connectors for 4/0 through 500 kcmil, 37-strand copper conductor; appropriate mounting brackets; 4/0 Cu bonding conductors; and 1/4-inch x 4-inch copper ground bars to connect the X<sub>0</sub> bushing to the tank grounding pad and station ground grid as shown in the Appendices.
- 9.3 Main transformer core ground pad with connection accessible through top handhole.
- 9.4 Magnetic liquid level gauge with alarm contacts. (Liquid temperature indicator.)
- 9.5 Pressure vacuum gauge and bleeder device with sampling and purging valve. Devices shall be mounted at eye level.
- 9.6 Pressure relief device with alarm contacts and visual alarm on top of unit.
- 9.7 Upper valve for filter-press connection, one-inch, with NPT threads and pipe plug.
- 9.8 Combination lower valve for filter-press connection, with 3/8-inch oil sampling device, and two-inch (2") drain and filter valve, with NPT threads and pipe plug.
- 9.9 Pressure-vacuum bleeder.
- 9.10 One or more handholes or manholes in cover. Round manholes shall have a

diameter of 18-inches minimum. Oval or rectangular manholes shall be dimensioned 10 inches x 16 inches minimum. Core ground to be brought to manhole for testing.

- 9.11 Lifting lugs on tank, lifting eyes on cover, and provisions for jacking. Location of jack bars shall be a minimum of 13" above the transformer base line.
- 9.12 Nameplates in accordance with IEEE Standards, located on the main tank, non-corrosive.
- 9.13 Non-corrosive diagram instruction plate. Turn progression and accuracy class of bushing current transformers shall be shown on nameplate.
- 9.14 Tap Changer instruction nameplate, stainless steel for the high-voltage tap changers.
- 9.15 Undervoltage relay to detect and alarm for the loss of all phases of cooling power.
- 9.16 All valves shall have silicone rubber (or better) packing to prevent leaking.
- 9.17 Insulating oil, with associated PCB certification and nameplate as per General Conditions.
- 9.18 Single-phase, 60 Hertz, 230 volts cooling fans.
- 9.19 All alarm contacts shall be suitable for 125 volts dc with separate wiring from all terminals of each device to a terminal board located in the transformer control cabinet. All control wiring and CT terminals to be equipped with nonmagnetic split type lock washers and ring type compression lugs. All current transformer leads to be No. 10 or larger and terminated on shorting type terminal blocks in the control cabinet.
- 9.20 Each removable cooling radiator shall be provided with a fill valve and a drain connected at top and bottom and transformer valves for detachable tank mounted radiators. The quantity of oil in each radiator shall be included on the nameplate.
- 9.21 All transformer oil supplied shall have antioxidant oil inhibitor added. The manufacturer may supply 0.3% wt DBPC or 0.3% wt DBP inhibitor. Installation of inhibitor shall be in accordance with the latest IEEE C57.106.
- 9.22 No tripping relays shall be mounted on a swinging panel. All tripping relays shall have covers.
- 9.23 Core ground pocket bushing with protective cover.

## 10.0 Tests

Transformer shall receive standard commercial tests in accordance with ANSI Standards.

### 10.1 Tests in Factory

- a. Routine tests listed in ANSI C57-12.00-1993, paragraph 8.2.1.

1. Resistance measurements of all windings on the rated voltage tap and at the tap extremes of the first unit made on new design.
  2. Ratio tests on the rated voltage connection and on all tap connections.
  3. Polarity and phase relation tests on the rated voltage connection.
  4. The No-load losses and excitation current at 100% and 110% rated voltage and frequency on the rated voltage connection. These tests shall be performed both before and after impulse tests.
  5. Impedance voltage and load loss at rated current and rated frequency on the rated voltage connection and at the tap extremes of the first unit of a new design.
  6. Temperature rise at minimum and maximum ratings of the first unit on a new design. Submit value of temperature rise as a deduct.
- b. Dielectric tests shall be applied and measured in accordance with IEEE Standard C57-12.90-1993 as follows:
1. Lightning impulse tests shall be applied to each terminal in the following order:
  2. One reduced full-wave, two chopped waves, and one full-wave, except the neutral, which shall receive one reduced-wave and two full-wave impulses. No front-of-wave tests shall be performed.
  3. Induced voltage (Corona) test shall be performed as described in 10.8 of IEEE Standard C57-12.90-1993.
  4. Applied-voltage test shall be applied in accordance with IEEE Standard C57-12.90-1993, paragraph 10.6, at test level specified in C57-12.00-1993.
- Copies of oscillograms and a formal report will be submitted as a record of the tests.
- c. As an adder, transformer sound level shall be tested in accordance with NEMA TR1-9.04, "Audible Sound Level Tests".
- d. The loss measurement system used to measure losses shall state in the test report the measurement error traceable to the National Bureau of Standards by means of a procedure described in NBS Technical Note 1204 or an approved equivalent procedure. This shall be applicable to the test system used to measure both the no-load and load losses for the transformers specified herein. The approach outlined in NBS Technical Note 1204 or an approved equivalent procedure shall be used to insure the traceability of measurements. The measurement error determined through the procedure outlined in Technical Note 1204 or an equivalent procedure will be added to the measured losses determined during the test prior to the determining if the

loss guarantee has been met. Should the Bidder (manufacturer) be unable to comply with this provision, he shall clearly so state in the section entitled "Form of Exceptions."

All transformer losses, including auxiliary losses, shall be shown on the test reports.

- e. Sweep Frequency Response Analysis shall be performed before and after dielectric tests.
- f. Insulation power factor tests shall be made and shall be one percent (1%) or less corrected to 20°C by the IEEE temperature correction curve.
- g. Prior to shipment, the assembled transformer shall be liquid-filled and pressure-tested for at least eight (8) hours at the maximum operating pressure for detecting the presence of leaks.
- h. The transformer core ground strap is to be made external to the tank. Tests for core grounds are to be performed after tanking and just prior to leaving the factory using a 1000-volt megger. Resistances measured are to be included in a certified test report and reported to Greenville Utilities prior to shipment. The Bidder may offer in his quotation deductions for substitution of manufacturers' standard tests in lieu of those specified. However, the basic quotation must include all tests specified.
- i. No transformer will be accepted for shipment until approved by Greenville Utilities.
- j. Temperature (heat run) tests along with Total Combustible Gas (TCG) analysis are to be made on the unit in accordance with IEEE Standards. (Deduct may be offered at time of bid for elimination of this test with submittal of test data for similar design in lieu thereof.)

Greenville Utilities reserves the option of having a representative witness any or all tests. The Manufacturer will take photographs of the core and coils from both high-voltage and low-voltage sides. Copies of the photographs will be furnished with the test reports.

## 10.2 Tests in the Field

The Manufacturer's field engineer shall perform a series of tests on the transformer after installation at the substation. These tests shall include:

- bushing power factor tests
- transformer turns ratio tests for all tap positions
- insulation megger tests including core
- current transformer checks (polarity, turns ratio, and connections)
- sweep frequency response analysis

Oil Tests as follows:

- specific gravity
- dielectric
- moisture content
- acidity
- interfacial tension
- PCB content
- DGA

The Manufacturer shall provide a complete dissolved gas in oil analysis on the oil installed in the transformer after final assembly. This test shall be conducted thirty (30) days after final assembly. The Manufacturer shall supply the collection syringe and shipping containers. Test results will be provided to Greenville Utilities. The Manufacturer's field engineer shall give approval for energizing the transformer. Any Manufacturer's requirements to observe the entire energization process shall be at the Manufacturer's expense.

### 10.3 Transformer Short-Circuit Strength

Without limiting in any way any obligation of the Bidder under this agreement, the Bidder shall demonstrate to the satisfaction of Greenville Utilities that the transformer proposed to be furnished under this Specification shall have sufficient mechanical strength to withstand without failure all fault currents. The Bidder shall demonstrate that the transformers meet this requirement by one of the following methods:

- a. Certified test data showing that a transformer with a core and coil identical in design and construction and identical or similar with respect to kVA capacity, kV ratings, BIL, impedance and voltage taps has been tested without failure for short-circuit strength. A description of the test code under which the transformer was tested for short-circuit strength will be provided by the Bidder to Greenville Utilities.
- b. A history of successful experience with transformers of identical or similar ratings, design, and construction. The Bidder shall list all transformers in service with core and coils which are essentially identical in design, construction, and manufacture to the transformer covered by this specification and provide information on the date of installation, location, and failures, if any. Where such transformers have not been built or the cumulative service record is less than twenty (20) transformer years, a list of transformers in service which represent the closest approximation to the transformer covered by this specification shall be submitted. The information submitted shall be representative of the total experience of the Manufacturer with the design of the transformer it proposes to furnish and shall include the dates of installation or shipping, the ratings of the transformers, and the failures and causes of failure, if any have been experienced.
- c. The Bidder shall submit with his Proposal a complete listing of all full-size transformers of his manufacture, in ratings 501 through 30,000 kVA, which

have been short-circuit tested. The list shall include all full-size units tested, whether they were development tests or tests of customer units. Complete ratings shall be given of each unit and each shall be noted as to whether copper or aluminum windings were used for comparison with that winding material offered on this bid.

In the case of units tested for or by the ultimate customer, indication shall be given on each unit as to whether the test was successful or unsuccessful and, if tested more than once, each subsequent test shall be so listed and appropriate comments given as to design changes made, if any.

- d. If the Bidder cannot furnish such test data, he shall so state on the Proposal.

#### 11.0 Guarantees

Included with the transformer data to be submitted by the Supplier with his Proposal shall be the following:

- a. Efficiencies at 1/4, 1/2, 3/4, and full load at unity power factor and 75°C.
- b. Total full-load loss in watts at each rating and temperature rise, plus auxiliary losses (shown separately), at:

|             |                       |
|-------------|-----------------------|
| 120,000 kVA | Watts @ 55°C OA       |
| 134,400 kVA | Watts @ 65°C OA       |
| 160,000 kVA | Watts @ 55°C OA/FA    |
| 179,200 kVA | Watts @ 65°C OA/FA    |
| 200,000 kVA | Watts @ 55°C OA/FA/FA |
| 224,000 kVA | Watts @ 65°C OA/FA/FA |

Include losses at 1-raise and the average of 15-raise and 16-raise for LTC unit.

- c. Full-load regulation at one hundred percent (100%) and eighty percent (80%) power factor.
- d. Exciting current at rated frequency in percentage of the rated voltage and rated kVA.
- e. Cooling fans, H.P. rating, and voltage.
- f. Net weight of transformer, including insulating oil.
- g. Shipping weight of transformer.
- h. Gallons of oil required per transformer.
- i. Limiting dimensions of transformer.
- j. Copies of the transformer test reports shall be furnished to Greenville Utilities at the time the transformers are shipped.

- k. Certification that the transformer and oil-filled liquid meet all EPA requirements and each unit shall be certified as operational with less than one (1) part per million polychlorinated biphenyls (PCB).

12.0 Transformer Bid Evaluation

Bids submitted shall be evaluated for "Equivalent First Cost" utilizing initial cost, transformer losses, and the cost of financing over a twenty-year (20-year) evaluation of ownership. The formulization is as follows:

$$\text{"Equivalent First Cost"} = (\text{Unit Cost}^*) + (\text{No Load Losses} \times A) + (\text{Winding Losses} \times B)$$

\*Including escalation, if any, and cost of insurance<sup>(1)</sup> if less than a five-year warranty is quoted and cost of complete assembly of the transformer.<sup>(2)</sup>

For the purpose of evaluating transformer losses both for the purpose of award and determination of compliance after manufacturing and test, the following will apply for the no-load and winding losses:

No-load losses will be evaluated using the average of quoted losses at LTC 1R position and LTC average 15R and 16R position.

Winding losses will be evaluated using the quoted losses at LTC average 15R and 16R position

The Cost of Losses will be evaluated using the following kW charge:

120 MVA Base Rating

|                  |                |
|------------------|----------------|
| No-Load Loss (A) | \$2,390 per kW |
| Winding Loss (B) | \$610 per kW   |

In evaluating the "Equivalent First Cost", the following adder will be applied during the evaluation process for quotation not including field supervision of assembly of the unit after delivery.

The no-load and winding losses quoted by the Bidder are of the essence of the Contract. Should the Supplier neglect, refuse, or fail to meet the quoted losses herein provided, Greenville Utilities shall have the right to deduct from and retain out of such monies which may be then due or which may become due and payable to the Supplier the sum equal to the difference in quoted loss values and the actual loss values as verified by the certified test reports provided after manufacture computed in dollars utilizing the no-load loss and winding loss values listed above as liquidated damages and not as a penalty. In no event shall the adjustment factor under this provision result in a net price increase to Greenville Utilities. If the amount due and to become due from Greenville Utilities to the Supplier is insufficient to pay in full any such liquidated damages, the Supplier shall pay to Greenville Utilities the amount necessary to effect such payment in full, provided, however, that Greenville Utilities shall promptly notify the Supplier in writing of the manner in which the amount retained, deducted, or claimed as liquidated damages was computed.



**SUBMIT BIDS ON ATTACHED REQUEST FOR PROPOSAL FORM**

[Balance of page left blank intentionally]

**GREENVILLE UTILITIES COMMISSION**

**PROPOSAL FORM**

**ONE (1) 120 MVA, 230 to 115 kV AUTOTRANSFORMER WITH LOAD TAP CHANGER**

**FOR GREENVILLE 230kV POINT OF DELIVERY STATION**

The undersigned bidder hereby declares that it has carefully examined the enclosed detailed specifications for the furnishing of Greenville Utilities with the items listed below. The undersigned bidder further agrees, if this proposal is accepted within sixty (60) days from the date of the opening, to furnish any or all of the items upon which prices are quoted at the price set opposite each item. Delivery shall be FOB Greenville, North Carolina, within the time indicated below:

| <b><u>Description</u></b>  | <b><u>Estimated Quantity</u></b> | <b><u>Total Price</u></b> |
|--|----------------------------------|---------------------------|
| (I) Substation autotransformer, dual rated<br>120/160/200 MVA ONAN/ONAF/ONAF 55°C and<br>134.4/179.2/224 MVA ONAN/ONAF/ONAF 65°C,<br>230 kV wye primary voltage, 115 kV wye<br>secondary voltage, designated for delivery to<br>Greenville 230 Substation, (Five (5)-year<br>warranty) all in accordance with specifications | 1                                | \$ _____                  |
| (II) Supply and install operator platforms for<br>access to equipment and controls cabinets.   | 1                                | \$ _____                  |

**Delivery** \_\_\_\_\_ (Days)

**DEDUCT NO. 1-1**

|  |                 |
|--|-----------------|
| Subtotal                               | \$ _____        |
| Deduct for Temperature Rise Test       | \$ _____        |
| Adder for Sound Test                   | \$ _____        |
| <b>Total Bid Price (Excluding Tax)</b> | <b>\$ _____</b> |

\* Price includes delivery F.O.B. pad, unloading, at the Greenville 230 Substation site.

**MAXIMUM GUARANTEED LOSSES**<sup>(1)(2)</sup>

|   | <u>LTC<br/>1R Pos:</u> | <u>LTC<br/>Avg. 15R<br/>&amp; 16R Pos:</u> |    |
|---|------------------------|--|----|
| Maximum guaranteed no-load kW losses, 100% voltage, 75°C, 20 MVA    | _____                  | _____                                      | kW |
| Maximum guaranteed load kW losses (not total losses) at 20 MVA load | _____                  | _____                                      | kW |
| Maximum guaranteed total kW losses at 20 MVA, 75°C                  | _____                  | _____                                      | kW |
| Auxiliary kW losses, first-stage cooling                            | _____                  |  | kW |
| Impedance %   | _____                  |  | %  |

**MAXIMUM GUARANTEED PCB DIELECTRIC LEVEL**<sup>(1)</sup>

Measured PCB level at the factory prior to oil filling of transformer \_\_\_\_\_ppm  
Measured PCB dielectric level at site after oil filling of the transformer \_\_\_\_\_ppm

<sup>(1)</sup>These levels will be considered in evaluating the bids.

<sup>(2)</sup>No-load and total losses are guaranteed per ANSI standards.

**SUPPLEMENTARY INFORMATION**

Manufacturer and Type \_\_\_\_\_

Place of Manufacture \_\_\_\_\_

Nearest Shop Repair Facility \_\_\_\_\_

LTC Manufacturer and Type \_\_\_\_\_

Other Utilities Purchasing Recent Units of Same Design \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Delivery (Days)**

Approval Drawing Submittal \_\_\_\_\_

Final Drawing Submittal \_\_\_\_\_

Transformer Delivery \_\_\_\_\_

- Allow two (2) weeks for receipt and return of approved Drawings.

**Field Service**

Field Service Engineering (beyond days required) \$ \_\_\_\_\_ per day

**Method of Award:** Item(s) one (1) estimated quantity of one (1) will be awarded as a total bid.

**Complete and Check All Math:** It is the responsibility of the Bidder to extend unit prices and supply a total for all item(s).

[Balance of page left blank intentionally]

It is certified that this proposal is made in good faith and without collusion or connection with any other person bidding on the same above listed items. It is also certified that this proposal is made in good faith and without collusion or connection with any GUC employee(s).

Certified check or cash for \$\_\_\_\_\_ or bid bond for \$\_\_\_\_\_ attached.

Firm Name \_\_\_\_\_ Phone (\_\_\_\_) \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip Code \_\_\_\_\_

Fax (\_\_\_\_) \_\_\_\_\_ E-Mail \_\_\_\_\_

Authorized Official \_\_\_\_\_ Title \_\_\_\_\_  
Typed Name

\_\_\_\_\_  
Signature Date \_\_\_\_\_

**Three (3) copies of your proposal should be received no later than  
May 30, 2023 at 2:00 PM (EDST)**

**NO BIDS CONSIDERED UNLESS SUBMITTED ON THIS FORM**

**(RETURN ONLY THIS FORM AND EXCEPTION FORM)**

Vendor Name: \_\_\_\_\_

**GREENVILLE UTILITIES COMMISSION**

**Exception/Variation Form**

**Specifications for:** one (1) 120 MVA, 230 kV to 115kV Autotransformer with Load Tap Changer for Greenville 230 Substation.

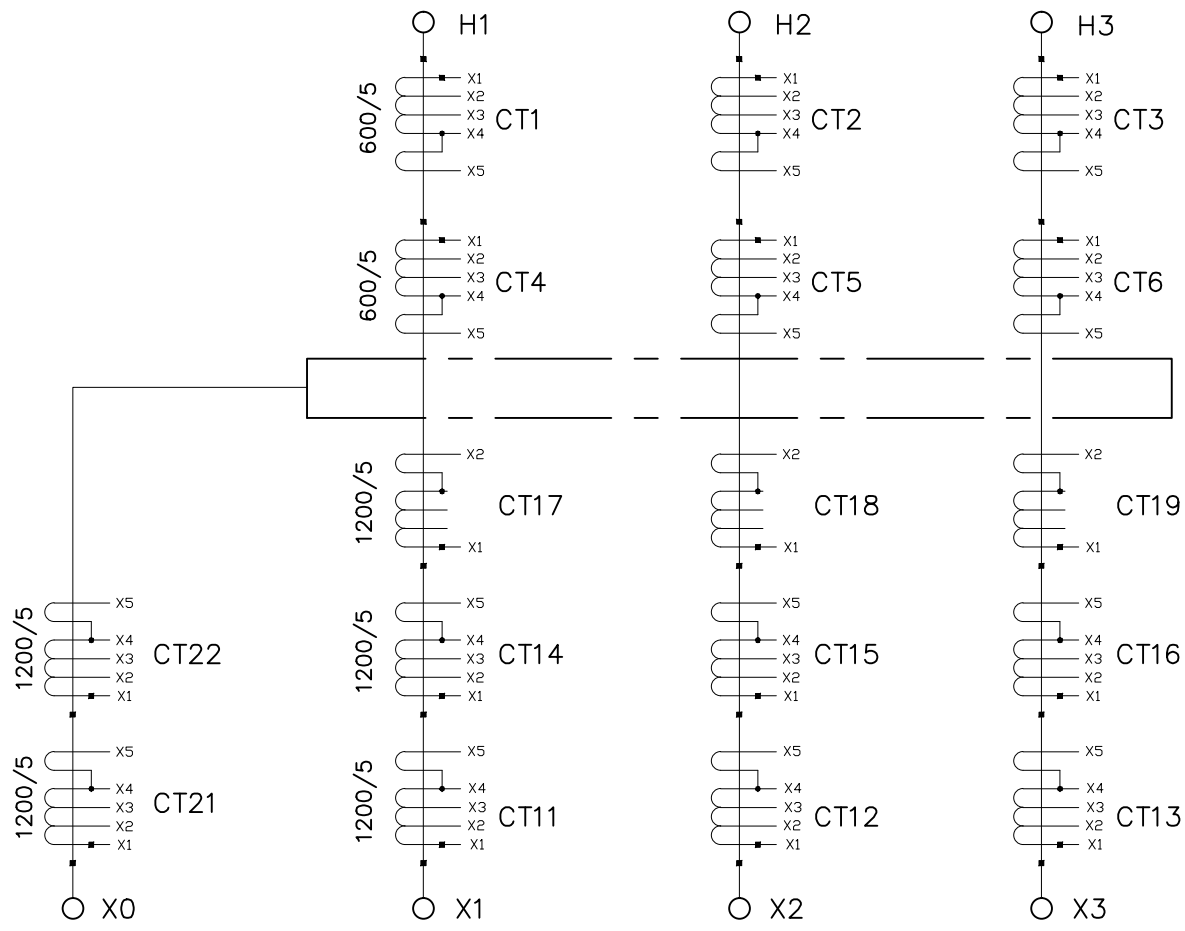
**Provider's Certification:** This is to certify that it is our intent to furnish equipment, material, services, etc. in absolute compliance with the bid specification except where expressly noted below.

**Instructions:** List all exceptions or variations to these bid specifications. Providers shall identify each exception or variation by specification page. The omission of exception or variation information shall be deemed by the Commission as the Provider's intent to absolutely comply with the bid specification. If additional space is required, Provider may reproduce this form as necessary.

| <u>Page #</u> | <u>Exception/Variation</u> |
|---------------|----------------------------|
| _____         | _____                      |
| _____         | _____                      |
| _____         | _____                      |
| _____         | _____                      |
| _____         | _____                      |
| _____         | _____                      |
| _____         | _____                      |
| _____         | _____                      |
| _____         | _____                      |
| _____         | _____                      |
| _____         | _____                      |
| _____         | _____                      |

Authorized Signature of Certification: \_\_\_\_\_  
Print Name: \_\_\_\_\_

Firm Represented: \_\_\_\_\_  
Address: \_\_\_\_\_  
\_\_\_\_\_

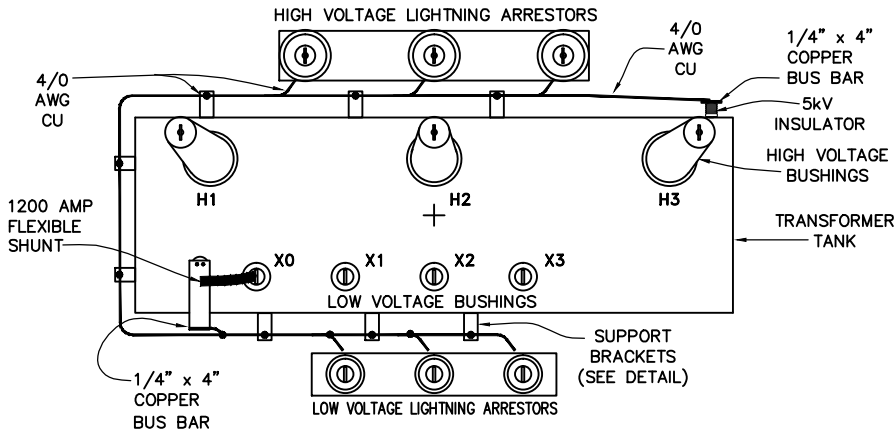


|     |     |      |      |      |      |
|-----|-----|------|------|------|------|
| H1  | H1  | X1   | X1   | X1   | X0   |
| 1X1 | 4X1 | 11X1 | 14X1 | 17X1 | 21X1 |
| 1X2 | 4X2 | 11X2 | 14X2 | 17X2 | 21X2 |
| 1X3 | 4X3 | 11X3 | 14X3 | 17X3 | 21X3 |
| 1X4 | 4X4 | 11X4 | 14X4 | 17X4 | 21X4 |
| 1X5 | 4X5 | 11X5 | 14X5 | 17X5 | 21X5 |
|     |     |      |      |      |      |
| H2  | H2  | X2   | X2   | X2   | X0   |
| 2X1 | 5X1 | 12X1 | 15X1 | 18X1 | 22X1 |
| 2X2 | 5X2 | 12X2 | 15X2 | 18X2 | 22X2 |
| 2X3 | 5X3 | 12X3 | 15X3 | 18X3 | 22X3 |
| 2X4 | 5X4 | 12X4 | 15X4 | 18X4 | 22X4 |
| 2X5 | 5X5 | 12X5 | 15X5 | 18X5 | 22X5 |
|     |     |      |      |      |      |
| H3  | H3  | X3   | X3   | X3   |      |
| 3X1 | 6X1 | 13X1 | 16X1 | 19X1 |      |
| 3X2 | 6X2 | 13X2 | 16X2 | 19X2 |      |
| 3X3 | 6X3 | 13X3 | 16X3 | 19X3 |      |
| 3X4 | 6X4 | 13X4 | 16X4 | 19X4 |      |
| 3X5 | 6X5 | 13X5 | 16X5 | 19X5 |      |
|     |     |      |      |      |      |

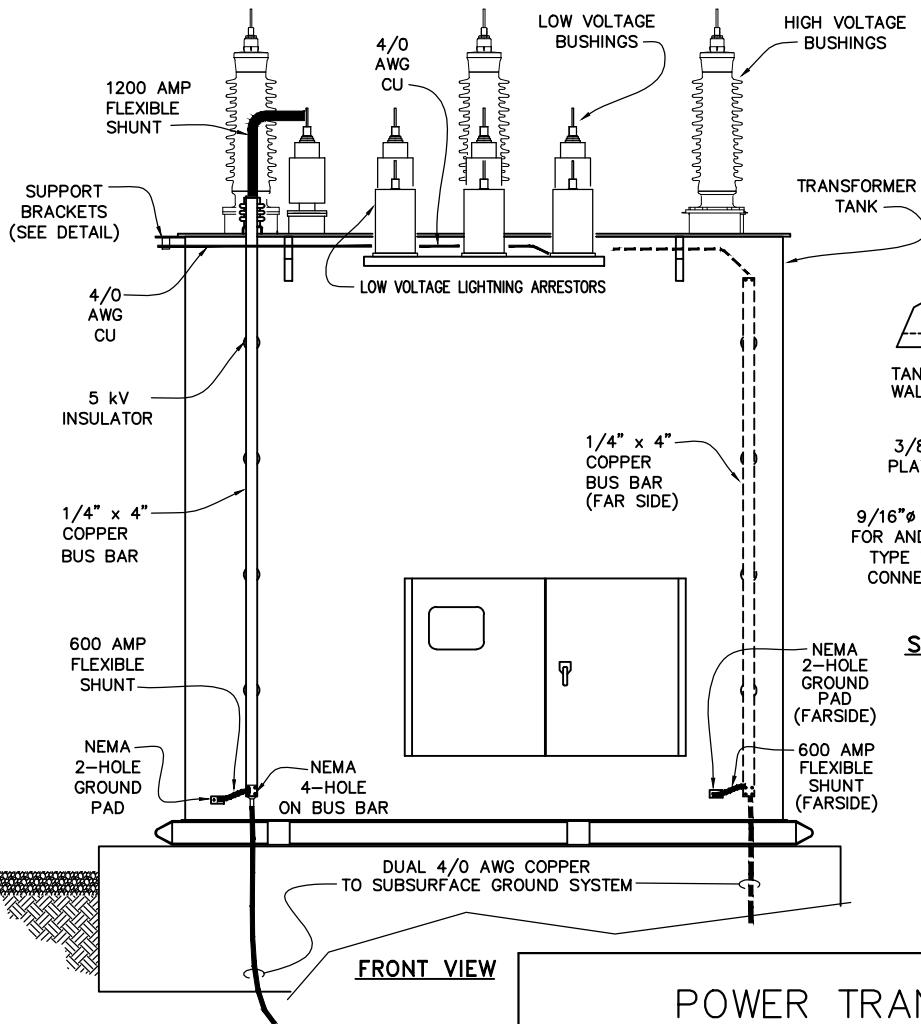
| CONNECTION FOR MULTI-RATIO BUSHING CURRENT TRANSF. |               |           |           |
|--|---------------|-----------|-----------|
| LEADS ON   | NOMINAL RATIO |           |           |
|  | 600/5BCT      | 1200/5BCT | 2000/5BCT |
| X1-X5  | 600/5         | 1200/5    | 2000/5    |
| X2-X5  | 500/5         | 1000/5    | 1600/5    |
| X3-X5  | 450/5         | 900/5     | 800/5     |
| X1-X4  | 400/5         | 800/5     | 1500/5    |
| X2-X4  | 300/5         | 600/5     | 1100/5    |
| X3-X4  | 250/5         | 500/5     | 300/5     |
| X4-X5  | 200/5         | 400/5     | 500/5     |
| X1-X3  | 150/5         | 300/5     | 1200/5    |
| X1-X2  | 100/5         | 200/5     | 400/5     |
| X2-X3  | 50/5          | 100/5     | 800/5     |
| ACCURACY CLASS                                     | 10C800        | 10C800    | 10C800    |

**APPENDIX 1**

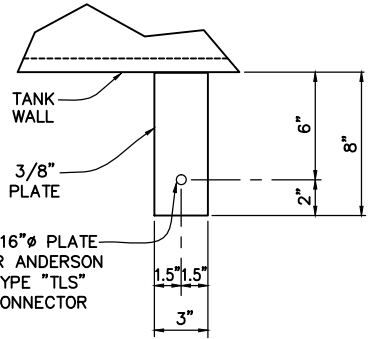
|  |               |          |
|--|---------------|----------|
| BOOTH & ASSOCIATES<br>STANDARD   |               |          |
| TYPICAL CURRENT<br>TRANSFORMER ARRANGEMENT<br>FOR POWER TRANSFORMERS   |               |          |
| <b>Booth &amp; Associates Inc.</b><br><small>5111 Glenwood Avenue   Raleigh, NC 27612   CONSULTING ENGINEERS   NC F-0221</small> |               |          |
| DWN. BNC   | DATE 08/22/13 | DWG. NO. |
| CKD. JEN   | APPD. CHW     | CT1 of 1 |
| NO.  | REVISION      | DATE     |
| SCALE: AS SHOWN  |               | CT1      |



**PLAN VIEW**



**FRONT VIEW**



**SUPPORT BRACKET DETAIL**  
(NTS)

**POWER TRANSFORMER  
NEUTRAL SUPPORT BRACKET DETAIL**

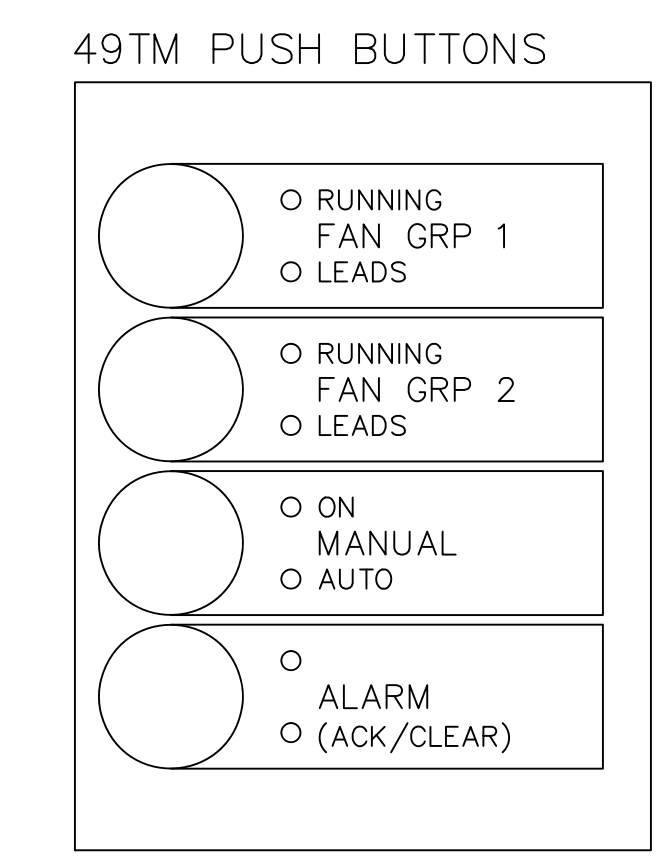
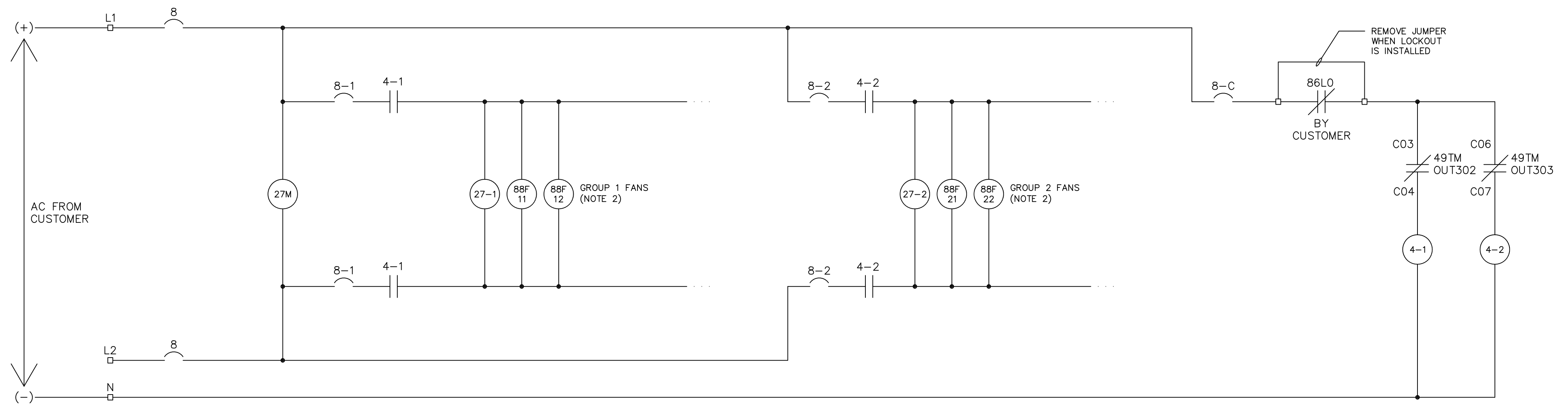
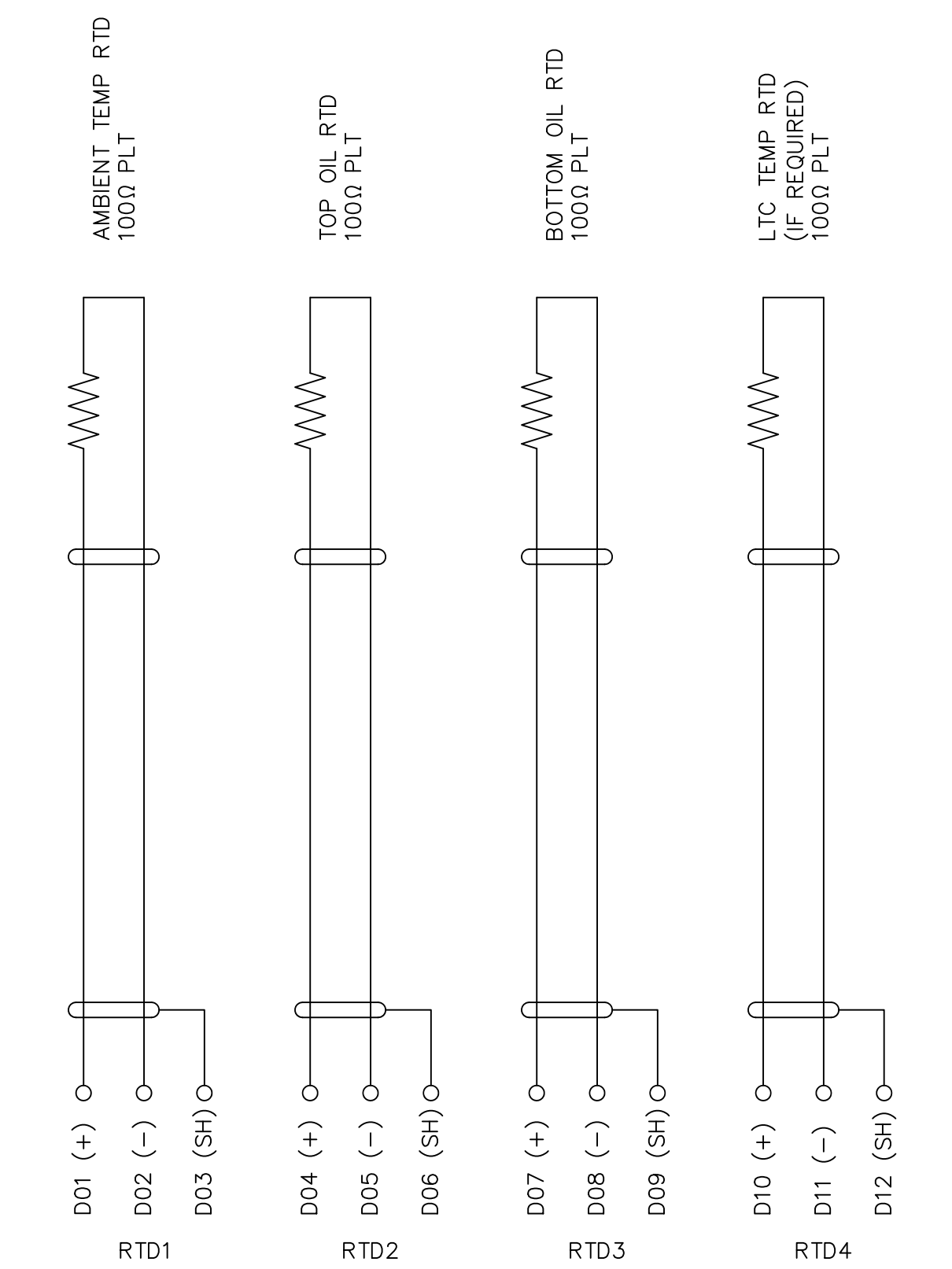
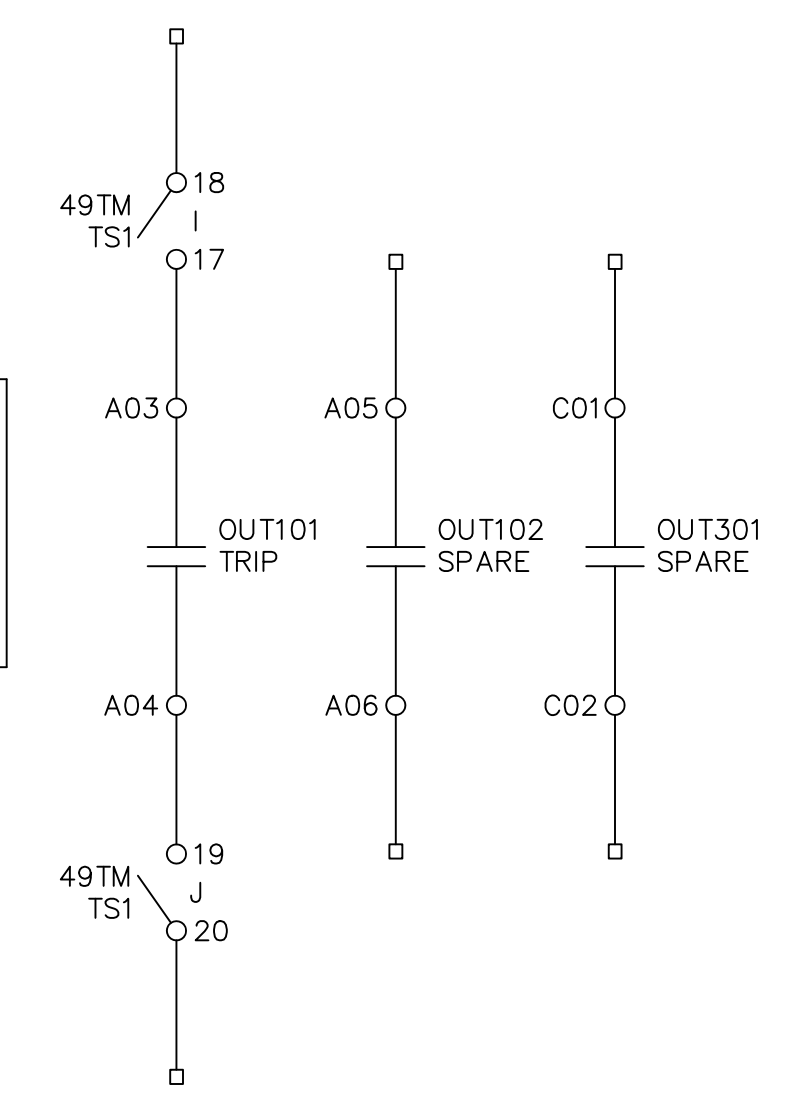
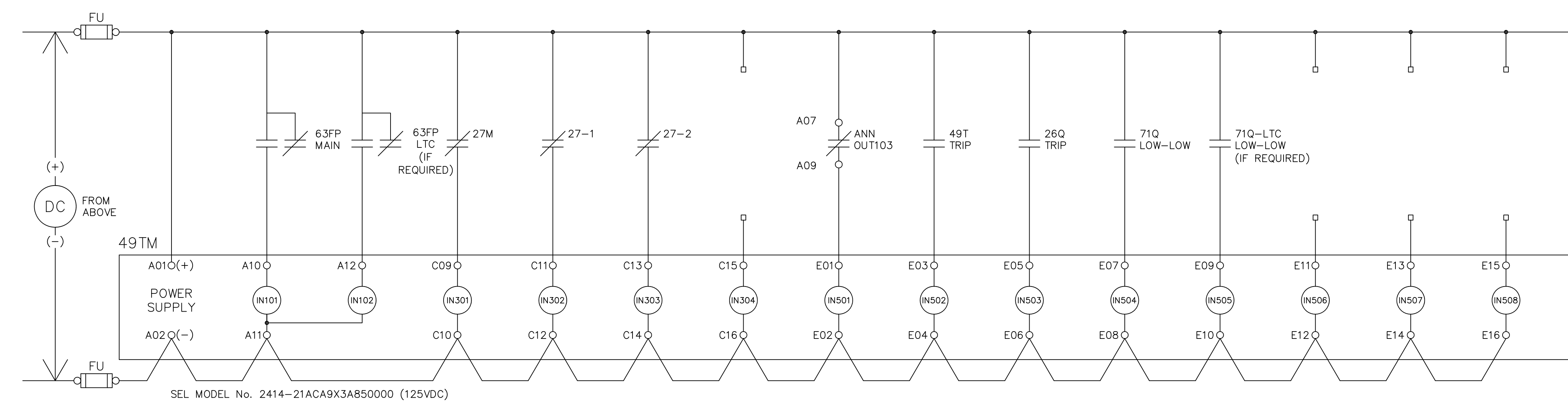
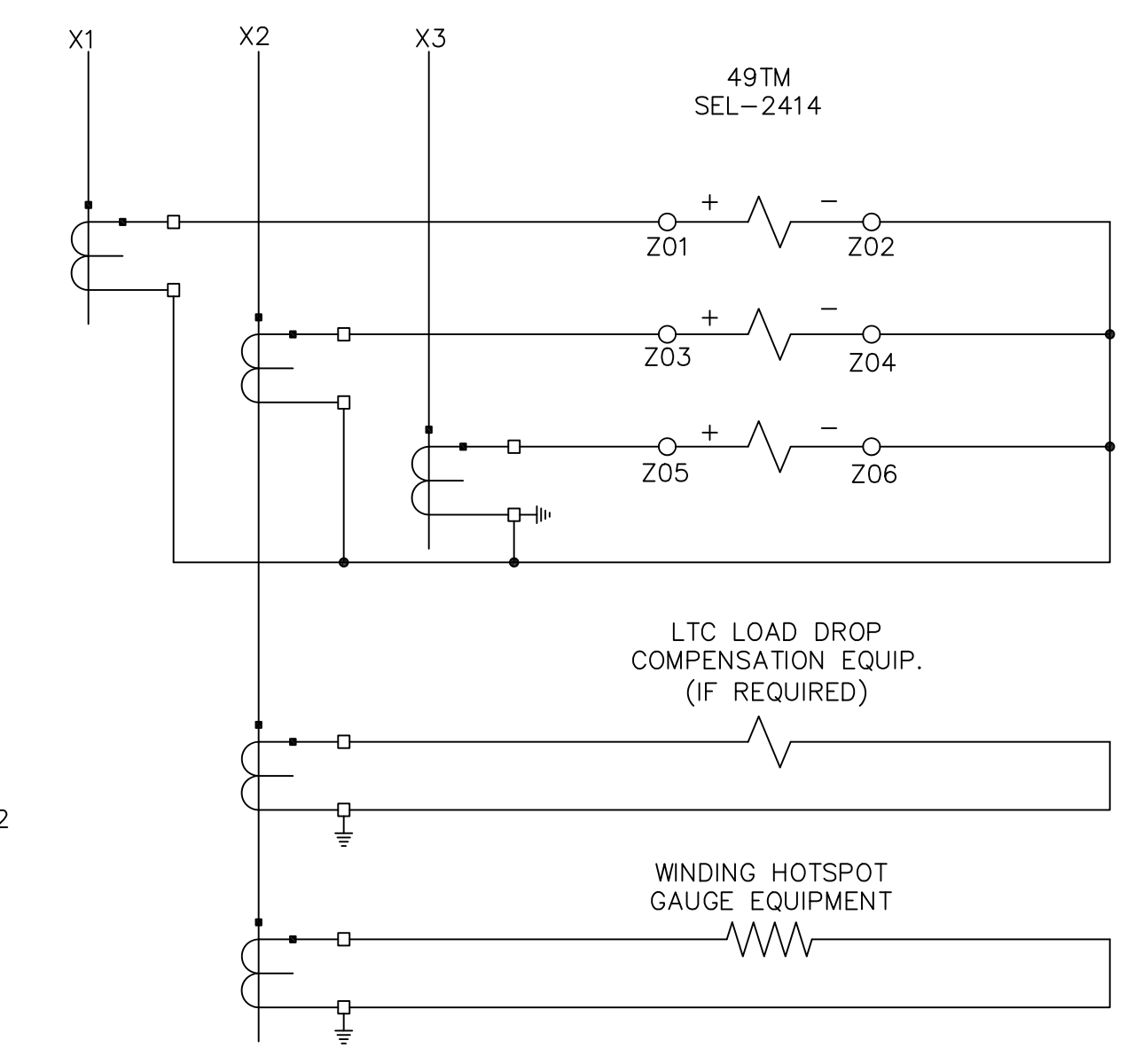
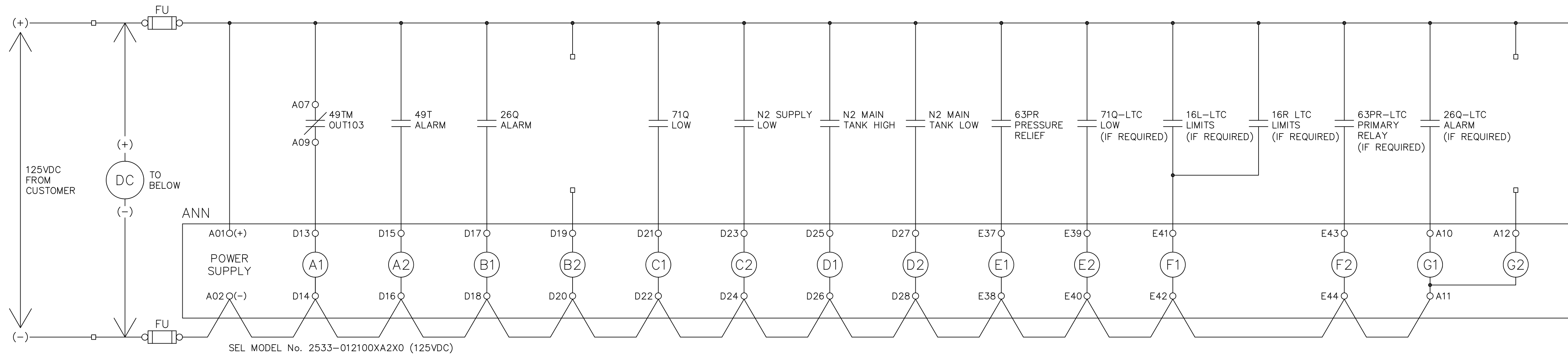
**Booth & Associates Inc.**

5811 Glenwood Avenue | Raleigh, NC 27610 CONSULTING ENGINEERS NC F-0221

|            |              |                             |
|------------|--------------|-----------------------------|
| DWN. KRG   | DATE 8/28/13 | DWG. NO.<br>XO-1<br>1000X01 |
| CKD. MLC   | APPD. MLC    |                             |
| SCALE NONE | PLOT: 1=48   |                             |

**APPENDIX 2**





NOTE

- CONTACTS SHOWN IN NORMAL STATE
- MANUFACTURER SHALL PROVIDE QUANTITY AND ARRANGEMENT OF FANS AS REQUIRED

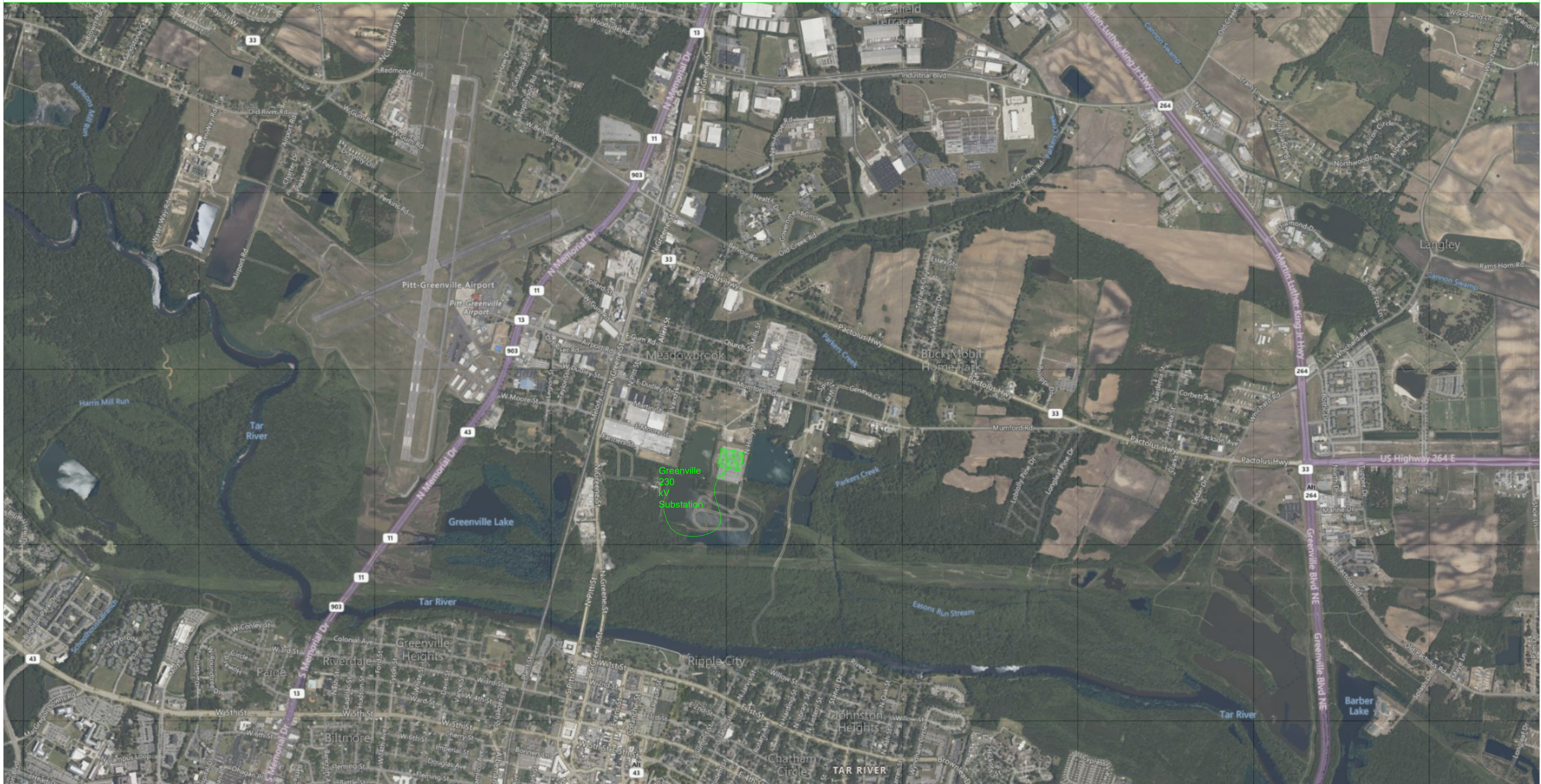
LEGEND

- DEVICE TERMINAL POINT
- TERMINAL POINT

|           |                          |
|-----------|--------------------------|
| NO.       | 1.A                      |
| REVISIONS | CAD BY: JDO<br>5/15/2023 |


|   |       |  |
|---|-------|--|
|   |       | GREENVILLE UTILITIES<br>Greenville, North Carolina |
| GREENVILLE 230KV SUBSTATION<br>TRANSFORMER SPEC APPENDIX 3<br>TRANSFORMER AC & ALARMS |       |  |
| DWN.  | DATE  | DWG. NO.   |
| CKD.  | APPD. |  |
| SCALE: NONE   |       |  |





|           |  |
|-----------|--|
| NO.       | 1.A  |
| REVISIONS | G230 T2 Replacement PRELIMINARY DESIGN JLP 3/14/23 |

**PRELIMINARY**

|   |       |          |
|---|-------|----------|
|  <b>GREENVILLE UTILITIES</b><br>Greenville, North Carolina |       |          |
| <b>G230 SUBSTATION</b><br><b>230 TO 115 KV</b><br>Vicinity Map<br>Appendix 4  |       |          |
| DWN.  | DATE  | DWG. NO. |
| CKD.  | APPD. |          |
| SCALE: NONE   |       |          |



**BID BOND**

KNOW ALL MEN BY THESE PRESENT, THAT WE \_\_\_\_\_  
\_\_\_\_\_

as Principal, and \_\_\_\_\_  
as Surety, who is duly licensed to act as Surety in North Carolina, are held and firmly bound unto the Greenville Utilities Commission, Greenville, NC, as Obligee, in the penal sum of \_\_\_\_\_ DOLLARS (\$ \_\_\_\_\_ ) (5% Bid Bond), lawful money of the United States of America, for the payment of which, well and truly to be made, we bind ourselves, our heirs, administrators, successors and assigns, jointly and severally, firmly by these present.

SIGNED, Sealed and dated this \_\_\_\_\_ day of \_\_\_\_\_, 2023.

WHEREAS, the said Principal is herewith submitting a Proposal for

One (1) Autotransformers with Load Tap Changer for Greenville 230 Substation.

and the Principal desires to file this Bid Bond in Lieu of making the cash deposit as required by the bidding documents contained herein;

NOW, THEREFORE, THE CONDITION OF THE ABOVE OBLIGATION is such that if the principal shall be awarded the Purchase Order for which the bid is submitted and shall accept the Purchase Order within ten (10) days after the award of same to the principal, then this obligation shall be null and void; but if the principal fails to so accept such purchase order as required by the bidding documents contained herein, the Surety shall, upon demand, forthwith pay to the Obligee the amount set forth in the first paragraph hereof, and upon failure to forthwith make such payment, the Surety shall pay the Obligee an amount equal to double the amount of this Bid Bond as set forth in the first paragraph hereof. Power of Attorney from the Surety to its Attorney in-Fact is attached hereto.

\_\_\_\_\_

Principal

By \_\_\_\_\_ (SEAL)

\_\_\_\_\_

Corporate Surety

By \_\_\_\_\_ (SEAL)

**Letter of Compliance to E-Verify for Greenville Utilities Commission**

1. I have submitted a bid for contract or desire to enter into a contract with the Greenville Utilities Commission;
2. As part of my duties and responsibilities pursuant to said bid and/or contract, I affirm that I am aware of and in compliance with the requirements of E-Verify, Article 2 of Chapter 64 of the North Carolina General Statutes, to include (mark which applies):
3. \_\_\_\_ After hiring an employee to work in the United States I verify the work authorization of said employee through E-Verify and retain the record of the verification of work authorization while the employee is employed and for one year thereafter; or
4. \_\_\_\_ I employ less than twenty-five (25) employees in the State of North Carolina.
5. As part of my duties and responsibilities pursuant to said bid and/or contract, I affirm that to the best of my knowledge and subcontractors employed as a part of this bid and/or contract, are in compliance with the requirements of E-Verify, Article 2 of Chapter 64 of the North Carolina General Statutes, to include (mark which applies):
6. \_\_\_\_ After hiring an employee to work in the United States the subcontractor verifies the work authorization of said employee through E-Verify and retains the record of the verification of work authorization while the employee is employed and for one year thereafter; or
7. \_\_\_\_ Employ less than twenty-five (25) employees in the State of North Carolina.  
Specify subcontractor: \_\_\_\_\_

\_\_\_\_\_ (Company Name)

By: \_\_\_\_\_ (Typed Name)

\_\_\_\_\_ (Authorized Signatory)

\_\_\_\_\_ (Title)

\_\_\_\_\_ (Date)

### **SECTION III**

#### **TERMS AND CONDITIONS FOR THE PURCHASE OF APPARATUS, SUPPLIES, MATERIALS, AND EQUIPMENT**

These Terms and Conditions, made and entered into on this the \_\_\_\_\_ day of \_\_\_\_\_, by and between GREENVILLE UTILITIES COMMISSION OF THE CITY OF GREENVILLE, PITT COUNTY, NORTH CAROLINA, with one of its principal offices and places of business at 401 S. Greene Street, Post Office Box 1847, Greenville, Pitt County, North Carolina 27835-1847, hereinafter referred to as "GUC" and \_\_\_\_\_, a \_\_\_\_\_ organized and existing under and by virtue of the laws of the State of \_\_\_\_\_, with one of its principal offices and places of business at \_\_\_\_\_, hereinafter referred to as "PROVIDER";

#### **1.0 TAXES**

No taxes shall be included in any bid prices. GUC is exempt from Federal Excise Tax. GUC is not exempt from North Carolina state sales and use tax or, if applicable, Pitt County sales and use tax. Such taxes shall be shown as a separate item on the invoice.

#### **2.0 INVOICES**

It is understood and agreed that orders will be shipped at the established contract prices and quantities in effect on dates orders are placed. Invoicing at variance with this provision may subject the contract to cancellation. Applicable North Carolina sales tax shall be invoiced as a separate line item. All invoices must bear the GUC purchase order number. Mail all invoices to Greenville Utilities Commission, Finance Department, P. O. Box 1847, Greenville, NC 27835-1847.

#### **3.0 PAYMENT TERMS**

Payments for equipment, materials, or supplies will be made after the receipt and acceptance of the equipment, materials, or supplies and after submission of a proper invoice. GUC's normal payment policy is thirty (30) days. GUC will not be responsible for any goods delivered without a purchase order having been issued. Payment will be made in U. S. currency only.

#### **4.0 QUANTITIES**

Quantities specified are only estimates of GUC's requirements. GUC reserves the right to purchase more or less than the stated quantities at prices indicated in the submitted Proposal Form based on our actual needs.

#### **5.0 AFFIRMATIVE ACTION**

The Provider will take affirmative action in complying with all Federal and State requirements concerning fair employment and employment of the handicapped, and concerning the treatment of all employees, without discrimination by reason of race, color, religion, sex, national origin, or physical handicap.

## **6.0 CONDITION AND PACKAGING**

Unless otherwise indicated in the bid, it is understood and agreed that any item offered or shipped shall be new and in first class condition, that all containers shall be new and suitable for storage or shipment, and that prices include standard commercial packaging.

## **7.0 SAMPLES**

Samples of items, if required, must be furnished free of expense to GUC, and if not destroyed, will, upon request, be returned at the Provider's expense. Request for the return of samples must be made at the bid opening, otherwise, the samples will become GUC's property. Each individual sample must be labeled with Provider's name.

## **8.0 SPECIFICATIONS**

Any deviation from specifications must be clearly pointed out, otherwise, it will be considered that items offered are in strict compliance with specifications, and the Provider will be held responsible. Deviations must be explained in detail. **The Provider shall not construe this paragraph as inviting deviation or implying that any deviation will be acceptable.**

## **9.0 INFORMATION AND DESCRIPTIVE LITERATURE**

Providers are to furnish all information requested. Further, as may be specified elsewhere, each Provider must submit with its proposal: cuts, sketches, descriptive literature, and/or complete specifications covering the products offered. Reference to literature submitted with a previous bid does not satisfy this provision. Bids which do not comply with these requirements will be subject to rejection.

## **10.0 AWARD OF CONTRACT**

As directed by statute, qualified bids will be evaluated and acceptance made of the lowest responsible, responsive bid most advantageous to GUC as determined upon consideration of such factors as prices offered, the quality of the article(s) offered, the general reputation and performance capabilities of the Provider, substantial conformity with the specifications and other conditions set forth in the bid, the suitability of the article(s) for the intended use, the related services needed, the date(s) of delivery and performance, and such other factors deemed by GUC to be pertinent or peculiar to the purchase in question.

Acceptance of the order includes acceptance of all terms, conditions, prices, delivery instructions, and specifications as shown on this set of Terms and Conditions and in this order or attached to and made a part of this order.

The conditions of this order cannot be modified except by written amendment in the form of "Amended Purchase Order," which has been approved by GUC's Purchasing Buyer II.

In the event of a Provider's failure to deliver or perform as specified, GUC reserves the right to cancel the order or any part thereof, without prejudice to GUC's other rights. The Provider agrees that GUC may return part of or all of any shipment at Provider's expense. GUC may charge the Provider with all reasonable expenses resulting from such failure to deliver or perform.

## **11.0 MEDIATION/BINDING ARBITRATION**

In the event of any dispute between the Parties, the Parties agree to submit any dispute to non-binding mediation before a mutually agreeable Mediator prior to initiating litigation. If the Parties are unable to agree upon a Mediator within thirty (30) days after demand therefore, either Party may petition a Court of competent jurisdiction for the designation of a qualified Mediator for these purposes. Each Party shall bear its own costs and expenses of participating in the mediation (including, without limitation, reasonable attorneys' fees), and each Party shall bear one-half (1/2) of the costs and expenses of the Mediator. Unless otherwise agreed, the Parties will hold the mediation in Greenville, North Carolina. The matters discussed or revealed in the mediation session shall not be disclosed in any subsequent litigation.

In the event the matter is not resolved in mediation, either Party may request arbitration. The parties shall jointly select an Arbitrator, and shall be bound by the decision of the Arbitrator with respect to any dispute between the parties with respect to this Agreement. If the parties are unable to mutually agree upon an Arbitrator, the Parties shall each select an Arbitrator, and the two Arbitrators so selected shall select a third Arbitrator, and the decision of the majority of the Arbitrators shall be conclusive and binding upon the Parties. The Parties at all times agree to equally split the costs of any Arbitrator(s) selected in an effort to resolve the dispute between the Parties. Any party desiring to resolve a dispute under the terms of this Agreement shall notify the other Party in writing, and the Parties shall seek to agree upon a mutually agreed-upon Arbitrator within a period of ten (10) days from the date of such written demand. If the Parties are unable to agree within such ten (10) day period, the Parties shall each select an Arbitrator, and the two (2) Arbitrators so selected shall select a third Arbitrator within fifteen (15) days from the date of the written demand for arbitration, and a decision shall be rendered by the Arbitrator(s) so selected within five (5) days after such Arbitrator(s) is selected.

## **12.0 GOVERNMENT RESTRICTIONS**

In the event any Governmental restrictions may be imposed which would necessitate alteration of the material, quality, workmanship, or performance of the items offered on this bid prior to their delivery, it shall be the responsibility of the successful Provider to notify the GUC Purchasing Buyer II, at once, indicating in its letter the specific regulation which required such alterations. GUC reserves the right to accept any such alterations, including any price adjustments occasioned thereby, or, in the sole discretion of GUC, to cancel the contract.

## **13.0 INSURANCE**

**13.1 Coverage** – During the term of the contract, the Provider at its sole cost and expense shall provide commercial insurance of such type and with the following coverage and limits:

**13.1.1 Workers' Compensation** – The Provider shall provide and maintain Workers' Compensation Insurance, as required by the laws of North Carolina, as well as employer's liability coverage with minimum limits of \$1,000,000 each accident, covering all Provider's employees who are engaged in any work under the contract. If any work is sublet, the Provider shall require the subcontractor to provide the same coverage for any of its employees engaged in any work under the contract.

**13.1.2 General Liability** – Commercial Liability Coverage written on an

“occurrence” basis in the minimum amount of \$1,000,000 per occurrence.

**13.1.3 Automobile** – Automobile Liability Insurance, to include coverage for all owned, hired, and non-owned vehicles used in connection with the contract with a minimum combined single limit of \$1,000,000 per accident.

**13.2 Requirements** - Providing and maintaining adequate insurance coverage is a material obligation of the Provider. All such insurance shall meet all laws of the State of North Carolina. Such insurance coverage shall be obtained from companies that are authorized to provide such coverage and that are authorized to do business in North Carolina by the Commissioner of Insurance. The Provider shall at all times comply with the terms of such insurance policies and all requirements of the insurer under any of such insurance policies, except as they may conflict with existing North Carolina laws or this contract. The limits of coverage under each insurance policy maintained by the Provider shall not be interpreted as limiting the Provider’s liability and obligations under the contract. It is agreed that the coverage as stated shall not be canceled or changed until thirty (30) days after written notice of such termination or alteration has been sent by registered mail to GUC’s Purchasing Buyer II.

#### **14.0 PATENTS AND COPYRIGHTS**

The Provider shall hold and save GUC, its officers, agents, and employees, harmless from liability of any kind, including costs and expenses, including reasonable attorney fees, on account of any copyrighted articles or any patented or unpatented invention, device or appliance manufactured or used in the performance of this contract.

#### **15.0 PATENT AND COPYRIGHT INDEMNITY**

The Provider will defend or settle, at its own expense, any action brought against GUC to the extent that it is based on a claim that the product(s) provided pursuant to this agreement infringe any U.S. copyright or patent; and will pay those costs, damages, and attorney fees finally awarded against GUC in any such action attributable to any such claim, but such defense, settlements, and payments are conditioned on the following: (1) that Provider shall be notified

promptly in writing by GUC of any such claim; (2) that Provider shall have sole control of the defense of any action on such claim and of all negotiations for its settlement or compromise; (3) that GUC shall cooperate with Provider in a reasonable way to facilitate the settlement of defense of such claim; (4) that such claim does not arise from GUC modifications not authorized by the Provider or from the use of combination of products provided by the Provider with products provided by GUC or by others; and (5) should such product(s) become, or in the Provider’s opinion likely to become, the subject of such claim of infringement, then GUC shall permit Provider, at Provider’s option and expense, either to procure for GUC the right to continue using the product(s), or replace or modify the same so that it becomes non-infringing and performs in a substantially similar manner to the original product.

#### **16.0 EXCEPTIONS**

All proposals are subject to the terms and conditions outlined herein. All responses will be controlled by such terms and conditions and the submission of other terms and conditions, price catalogs, and other documents as part of a Provider’s response will be waived and have no



effect on this Request for Proposal or any other contract that may be awarded resulting from this solicitation. The submission of any other terms and conditions by a Provider may be grounds for rejection of the Provider's proposal. The Provider specifically agrees to the terms and conditions set forth in this set of Terms and Conditions by affixing its name on the signatory page contained herein.

#### **17.0 CONFIDENTIAL INFORMATION**

Except as provided by statute and rule of law, GUC will keep trade secrets which the Provider does not wish disclosed confidential. Each page shall be identified in boldface at the top and bottom as "CONFIDENTIAL" by the Provider. Cost information shall not be deemed confidential. The determination of whether a matter is confidential will be determined by North Carolina law.

#### **18.0 ASSIGNMENT**

No assignment of the Provider's obligations or the Provider's right to receive payment hereunder shall be permitted without the express written consent of GUC, provided however, upon written request approved by the GUC Purchasing Buyer II, solely as a convenience to the Provider, GUC may:

- Forward the Provider's payment check directly to any person or entity designated by the Provider, and
- Include any person or entity designated by Provider as a joint payee on the Provider's payment check.
- In no event shall such approval and action obligate GUC to anyone other than the Provider, and the Provider shall remain responsible for fulfillment of all contract obligations.

#### **19.0 ACCESS TO PERSON AND RECORDS**

GUC shall have reasonable access to persons and records of Provider as a result of all contracts entered into by GUC.

#### **20.0 INSPECTION AT BIDDER'S SITE**

GUC reserves the right to inspect, at a reasonable time, the item, plant, or other facilities of a prospective Provider prior to contract award and during the contract term as necessary for GUC's determination that such item, plant, or other facilities conform with the specifications/requirements and are adequate and suitable for the proper and effective performance of the contract. Provider may limit GUC's access to restricted areas.

#### **21.0 AVAILABILITY OF FUNDS**

Any and all payments of compensation of this specific transaction and any continuation or any renewal or extension are dependent upon and subject to the allocation of GUC funds for the purpose set forth in this Agreement.

## **22.0 GOVERNING LAWS**

All contracts, transactions, agreements, etc., are made under and shall be governed by and construed in accordance with the laws of the State of North Carolina.

## **23.0 ADMINISTRATIVE CODE**

Bids, proposals, and awards are subject to applicable provisions of the North Carolina Administrative Code and General Statutes and Laws of the State of North Carolina.

## **24.0 EXECUTION**

In the discretion of GUC, failure of a duly authorized official of Provider to sign the Signatory Page may render the bid invalid.

## **25.0 CLARIFICATIONS/INTERPRETATIONS**

Any and all questions regarding these Terms and Conditions must be addressed to the GUC Purchasing Buyer II. Do not contact the user directly. **These Terms and Conditions are a complete statement of the parties' agreement and may only be modified in writing signed by Provider and the GUC Purchasing Buyer II.**

## **26.0 SITUS**

The place of all contracts, transactions, agreements, their situs and forum, shall be North Carolina, where all matters, whether in contract or tort, relating to the validity, construction, interpretation, and enforcement shall be determined.

## **27.0 TERMINATION OF AGREEMENT**

GUC or Provider may terminate this Agreement for just cause at any time. Provider will be paid for all time and expenses incurred as of the termination date. Termination for just cause by either party shall be by certified letter and shall be effective thirty (30) days after signed and acknowledged receipt of said letter. Just cause shall be based on reasonable grounds, and there must be a fair and honest cause or reason for such action. The causes for termination, include, but are not limited to: (1) Provider's persistent failure to perform in accordance with the Terms and Conditions, (2) Provider's disregard of laws and regulations related to this transaction, and/or (3) Provider's substantial violation of the provisions of the Terms and Conditions.

## **28.0 DELIVERY**

**Shipments will be made only upon releases from a purchase order issued by GUC in accordance with GUC's current needs.** Time is of the essence with respect to all deliveries under this Agreement.

Delivery of all equipment, materials, or supplies shall be made Free on Board (FOB) GUC Warehouse, 701 Utility Way, Greenville, North Carolina 27834, unless otherwise specified. The agreed price for such equipment, materials, or supplies shall include all costs of delivery and ownership, and risks of loss shall not be transferred from Provider to GUC until express written acceptance of delivery and inspection by GUC. Delivery hours are between 8:00 AM and 4:30

PM Monday-Friday only. **GUC's purchase order number is to be shown on the packing slip or any related documents.** GUC reserves the right to refuse or return any delivery with no purchase order number or which is damaged. GUC will not be charged a restocking fee for any delivery which is refused or returned.

### **29.0 INDEMNITY PROVISION**

Provider agrees to indemnify and save GREENVILLE UTILITIES COMMISSION of the City of Greenville, Pitt County, North Carolina, and the City of Greenville, North Carolina, its co-owners, joint venturers, agents, employees, and insurance carriers harmless from any and all losses, claims, actions, costs, expenses including reasonable attorney fees, judgments, subrogations, or other damages resulting from injury to any person (including injury resulting in death), or damage (including loss or destruction) to property of whatsoever nature of any person arising out of or incident to the performance of the terms of this Contract by Provider, including, but not limited to, Provider's employees, agents, subcontractors, and others designated by Provider to perform work or services in, about, or attendant to, the work and services under the terms of this Contract. Provider shall not be held responsible for any losses, expenses, claims, subrogations, actions, costs, judgments, or other damages, directly, solely, and proximately caused by the negligence of Greenville Utilities Commission of the City of Greenville, Pitt County, North Carolina. Insurance covering this indemnity agreement by the Provider in favor of Greenville Utilities Commission of the City of Greenville, Pitt County, North Carolina, and the City of Greenville, North Carolina, shall be provided by Provider.

### **30.0 FORCE MAJEURE**

Neither party shall be considered in default in the performance of its obligations hereunder to the extent that the performance of any such obligation is prevented or delayed by any cause, existing or future, which is beyond the reasonable control of such party. In any such event of force majeure, the parties shall advise each other of such event, and the parties shall negotiate an equitable adjustment to their respective obligations under this Agreement.

### **31.0 WARRANTY(IES)**

The Provider hereby includes all warranties, whether expressed or implied, including, but not limited to, the Implied Warranty of Merchantability and the Implied Warranty of Fitness for a Particular Purpose.

### **32.0 INTEGRATED CONTRACT**

These Terms and Conditions, Instructions to Bidders, Specifications, and the selected Provider's bid represents the entire contract between the Parties. No verbal or other written agreement(s) shall be held to vary the provisions of this Agreement.

### **33.0 CONTRACT PROVISIONS**

Each of the provisions of these Terms and Conditions shall apply to the full extent permitted by law, and the invalidity in whole or in part of any provision shall not affect the remainder of such provision or any other provisions.

### **34.0 E-VERIFY**

E-Verify - I understand that E-Verify is the federal E-Verify program operated by the United States Department of Homeland Security and other federal agencies, or any successor or equivalent program used to verify the work authorization of newly hired employees pursuant to federal law in accordance with NCGS §64-25 et seq. I am aware of and in compliance with the requirements of E-Verify and Article 2 of Chapter 64 of the North Carolina General Statutes. To the best of my knowledge, any subcontractors employed by me as a part of this contract are in compliance with the requirements of E-Verify and Article 2 of Chapter 64 of the North Carolina General Statutes.

### **35.0 IRAN DIVESTMENT ACT CERTIFICATION**

By acceptance of this purchase order, Vendor/Contractor certifies that, as of the date of the purchase order or contract, it is not on the Final Divestment List as created by the State Treasurer pursuant to N.C.G.S. § 143-6A-4. In compliance with the requirements of the Iran Divestment Act and N.C.G.S. § 143C-6A-5(b), Vendor/Contractor shall not utilize in the performance of the contract any subcontractor that is identified on the Final Divestment List.

### **36.0 UNIFORM GUIDANCE**

Contracts funded with federal grant or loan funds must be procured in a manner that conforms with all applicable federal laws, policies, and standards, including those under the Uniform Guidance (2 C.F.R. Part 200).

### **37.0 NOTICES**

Notices to the Parties should be sent to the names and addresses specified below:

Cleve Haddock, CLGPO  
Procurement Manager  
Greenville Utilities Commission  
P.O. Box 1847  
Greenville, NC 27835-1847

Vendor Specified on Page 1 of Section III when awarded.

GREENVILLE UTILITIES COMMISSION

By: \_\_\_\_\_  
Anthony C. Cannon

Title: General Manager/CEO  
(Authorized Signatory)

Date: \_\_\_\_\_

Attest: \_\_\_\_\_

Name (Print): Amy Wade

Title: Executive Secretary

Date: \_\_\_\_\_

(OFFICIAL SEAL)

COMPANY NAME:

By: \_\_\_\_\_

Name (Print): \_\_\_\_\_

Title: \_\_\_\_\_  
(Authorized Signatory)

Date: \_\_\_\_\_

Attest: \_\_\_\_\_

Name (Print): \_\_\_\_\_

Title: Corporate Secretary

Date: \_\_\_\_\_

(CORP. SEAL)

APPROVED AS TO FORM AND LEGAL CONTENT:

By: \_\_\_\_\_  
Phillip R. Dixon

Title: General Counsel

Date: \_\_\_\_\_