

ADVERTISEMENT FOR BIDS

Sealed proposals will be received in the Office of the Purchasing Technician, Greenville Utilities Commission, 401 S. Greene Street, Greenville, North Carolina 27834 until 2:00 PM (ESDT) on April 5, 2011 and immediately thereafter publicly opened and read for the furnishing of two (2) 20 MVA, 115 to 13.2Y/7.62 kV Power Transformers with LTC for Sugg Parkway and Frog Level Substations.

Instructions for submitting bids and complete specifications will be available in the Office of the Purchasing Technician, 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.

SECTION I

GENERAL INSTRUCTIONS FOR FORMAL BIDS

RELATED TO THE PURCHASE OF APPARATUS, SUPPLIES,

MATERIALS, AND EQUIPMENT

1.0 NOTICE TO BIDDERS

Sealed bids, subject to the conditions made a part hereof, will be received in the Office of the Purchasing Technician, Greenville Utilities Commission, 401 S. Greene Street, Greenville, North Carolina 27834 until 2:00 PM (EDST) on April 5, 2011, the day of opening. Bids submitted in a fax or e-mail in response to this Invitation for Bids **will not be acceptable**.

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 PURCHASING TECHNICIAN, 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 Purchasing Technician, Greenville Utilities Main Office, 401 S. Greene Street, Greenville, North Carolina. Bidders or their authorized agents are invited to be present.

5.0 DEPOSIT

A deposit is **NOT** 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 responsible, responsive 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, responsive 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 DELIVERY TIME

Delivery time is to be stated and will be considered in the evaluation of bids.

15.0 MANUFACTURER

Bidder is to specify the manufacturer of items being quoted.

16.0 CONTACT INFORMATION

Questions regarding this bid request should be directed to Todd Rouse, Substation/Control Engineer at (252) 551-1570, rouset@guc.com or Cleve Haddock, Purchasing Technician at (252) 551-1533, haddocgc@guc.com.

17.0 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.

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SECTION II

GREENVILLE UTILITIES COMMISSION

SPECIFICATIONS AND BID DOCUMENTS FOR TWO (2) 20 MVA, 115 TO 13.2Y/7.62 kV

POWER TRANSFORMERS WITH LOAD TAP CHANGER FOR SUGG PARKWAY AND FROG

LEVEL SUBSTATIONS

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 two (2) three-phase power transformers.

As basic delivery of the transformer, the Supplier shall provide unloading, handling, rigging, and placement of the transformer(s) at Greenville Utilities' Operation Center and Frog Level Substation.

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 48 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 2004 format. Approval Drawings shall be submitted by email to rouset@guc.com or mailed to Greenville Utilities, 801 Mumford Road, Greenville NC 27834, Attention: J. Todd Rouse, PE.

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 rousejt@guc.com compatible with AutoCad 2004.

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 Sugg Parkway transformer shall be shipped to the Greenville Utilities' Operation Center, 801 Mumford Road, Greenville, NC and placed on the foundation by the Supplier. The Frog Level transformer shall be shipped to 3308 Frog Level Road, Greenville, NC. Assembly of any component parts removed for shipment will be performed by Greenville Utilities under the supervision of the manufacturer's field service engineer.
- 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 railyard 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.

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. 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

8.1 Type and Rating

The transformer shall be a three-phase, two-winding power transformer, rated 20 MVA at 60 Hz. The transformer high voltage shall be 115,000 volts delta at 550 kV BIL and low voltage shall be 13,200Y/7,620 volts at 110 kV BIL. High voltage shall lead low voltage by 30° phase angle. The transformer shall be equipped with a load tap changer.

8.2 The transformer shall be capable of carrying rated load continuously at five percent (5%) above rated secondary voltage without exceeding an average winding temperature rise of 55° above a 40° maximum ambient and 30°C average ambient over twenty-four (24) hours.

8.3 The transformer shall be 55/65°C construction where the winding temperature rise by resistance will not exceed 65°C; hottest-spot winding temperature rise will not exceed 80°C.

8.4 Case and Cover

8.4.1 To achieve uniformity and compliance with Greenville Utilities' standard design for substation facilities, each transformer tank design shall observe the following criteria for location of external equipment and accessory hardware:

8.4.1.1 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 1 or 2 as identified by ANSI C57.12.10.

8.4.1.2 Placement of auxiliary cooling equipment including radiators, fans, and pumps shall be located on the side of the tank in either Segment 2 or Segment 3 as identified by ANSI C57.12.10. Placement of radiators shall not obstruct the operator's view of any indicating dial or gauge located within Segment 1 of the transformer.

8.4.1.3 The control cabinet and the LTC compartment must be positioned to provide any substation operator a clear and unobstructed view of the LTC position indicator while standing at the control cabinet operating panel.

8.4.1.4 A brief outline sketch of the proposed transformer illustrating key dimensions for height, width, depth, and component arrangement must accompany the Supplier's Proposal.

8.4.1.5 The LTC compartment shall be located on the side of the tank in either Segment 1 or Segment 2 as identified by ANSI C57.12.10.

- 8.4.1.6 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 Greenville Utilities. Relocation of these components will be required only as necessary to physically comply with Greenville Utilities' standard facilities design for foundations, oil containment systems, and surrounding substation structures.
- 8.4.2 Tank shall be designed and braced for full vacuum and shall be suitable for filling with oil under a vacuum of twenty-eight inches (28") of mercury in the field.
- 8.4.3 Containing case shall not leak oil. Welded joints and seams shall be employed wherever practicable.
- 8.4.4 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 to permit their being made oil-tight in reassembly. Mechanical stops shall be provided to prevent crushing (controlled compression).
- 8.4.6 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. At least three coats of exterior paint are to be applied. Total paint thickness on the transformer tank and control box shall be 5 mils, minimum. Total paint thickness on the transformer radiators shall be 3 MILS, minimum.
- 8.4.7 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.
- 8.4.8 Paint shall be standard light gray, ANSI No. 70, certified "lead-free."
- 8.4.9 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 supporting spacer beams. The dimensions and locations of these beams shall be shown in the manufacturer's Drawings.
- 8.4.10 The transformer tank shall provide two (2) grounding pads suitable for attachment of NEMA 2-hole bronze connectors. The pads shall be located on diagonally opposite front and rear corners of the tank, and shall be located approximately twelve inches (12") above the transformer base.

- 8.4.11 A grounding bus (loop configuration) shall be supplied by the manufacturer including attachment to the X0 neutral bushing, the base of all surge arresters and to two (2) tank ground pads.
- 8.4.12 The tank shall include a one-fourth by three-inch (1/4" x 4") 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 X0 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 a 4-hole NEMA drilling at the lower end for attachment of bonding conductors from the ground grid.
- 8.4.13 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 grounding conductor from the arresters to the one-fourth inch by three-inch (1/4" x 3") copper ground bus. The grounding conductor shall be 4/0 AWG copper conductor and Anderson Type "TLS" connectors for attachment of the conductor to the support brackets.

8.4 Impedance

The transformer impedance at normal base rating shall be as close as possible to 8.00% impedance at 75°C within ANSI standard tolerances of 7.5% at 115,000 volts to 13,200/7,620 volts.

8.5 Sound Level

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

8.6 Bushings and Terminals

- 8.6.1 The transformer shall be provided with three (3) primary and four (4) secondary cover-type bushings constructed of high-strength, wet-process porcelain.
- 8.6.2 All high-voltage bushings shall be oil-filled and dimensionally interchangeable between circuit breakers and transformers according to latest revisions of ANSI Standard C76. High-voltage bushings shall be draw-lead-type rated 115 kV, 550 kV BIL, 600 amperes draw lead. Low-voltage bushings shall be rated 15 kV, 110 kV BIL, 2000 amperes. All bushings shall be light gray, standard creepage. The bushings shall be condenser-type and have provisions for power factor testing.

- 8.6.3 All bushings shall be capable of continuous maximum load as defined in Section 8.1.
- 8.6.4 Primary and secondary bushings shall be provided with copper threaded studs sited in accordance with their respective current ratings. A connector suitable for flat spade connection with NEMA four-hole drilling shall be either built into each bushing or furnished as a separate item for each bushing. High-voltage and low-voltage terminal studs and flat spade terminal connectors shall have polished silver-plated contact surfaces.
- 8.6.5 The secondary neutral X0 bushing shall be rated 15 kV and 110 kV BIL. All bushings shall be provided with a connector for flat spade connections with NEMA four-hole drilling and connected to a three inch by one-fourth inch (4" x 1/4") (minimum) copper bus, discussed in Section 8.4, via the 1200 ampere flexible copper shunt.
- 8.6.6 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 ANSI and NESC Standards. 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 Provisions shall be made for cooling radiators to be mounted independently of one another on the transformer and individually removable from the transformer tank. Radiators shall be designed and braced to withstand all vibration and operating forces.
- 8.7.2 Each radiator shall have a drain valve to assist in radiator removal. This valve shall be a bronze ball valve suitable for vacuum service meeting MSS-SP-110 standard, providing blowout proof stem with adjustable packing gland.
- 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 without loss of either oil or gas above oil in the transformer tank.
- 8.7.4 Each fan (and pump) 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 (and pump) shall be dynamically balanced for vibration-free operation. All fan guards shall be stainless steel and shall meet OSHA safety standards.
- 8.7.5 The transformer shall incorporate a Qualitrol 509 electronic temperature monitoring system to provide measurement of oil, winding, ambient and LTC differential temperatures. The unit shall be programmed to provide control of the cooling system apparatus for stage one and two.

The third set of contacts shall be wired to a control cabinet terminal block for use by Greenville Utilities for alarm and tripping. All temperature sensors shall be provided for full operation of the Qualitrol 509. Unit shall be mounted in the control cabinet.

8.7.6 The cooling systems shall provide a control switch 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 (and pumps).

8.8 Current Transformers

8.8.1 Provisions shall be made in the power transformer for installing bushing-type current transformers mounted inside the main case on terminals H1, H2, H3, X1, X2, X3, and X0 with leads brought to identified terminals in a control cabinet. Terminal blocks shall have short-circuiting devices which will maintain a continuous CT secondary circuit while CT tap positions are being changed. Each CT shall be connected to a separate six-point terminal block.

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

Provide three (3) 600/5 ampere, with standard BCT multi-ratio, 5 leads, 10C400 relaying accuracy current transformer, one (1) each on H1, H2, and H3 with taps for 50, 100, 150, 200, 250, 300, 400, 450, 500, and 600 to 5 ampere ratios.

Provide one (1) 600/5 ampere, with standard BCT multi-ratio, 5 leads, 10C400 relaying accuracy current transformer in the neutral of the secondary (X0) with taps for 50, 100, 150, 200, 250, 300, 400, 450, 500, and 600 to 5 ampere ratios.

Provide three (3) 2000/5 ampere, with standard BCT multi-ratio, 5 leads, 10C400 relaying accuracy current transformers, one (1) each on X1, X2, and X3 with taps for 300, 400, 500, 800, 1100, 1200, 1500, 1600, and 2000 to 5 ampere ratios.

Provide one (1) 1500/5 ampere, single winding current transformer on X2 for LTC Control and Winding Temperature control. The LTC control current circuit will utilize an auxiliary 5/0.2 ampere transformer for input into the control. The current transformer secondary shall also be routed through a 4-20 ma transducers for input into the Gas-in-oil monitor.

- 8.8.3 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 Greenville Utilities. A metal CT diagram instruction plate shall be provided. Turns progression and accuracy class of bushing current transformers shall be shown on the nameplate.

8.9 Control Cabinet

- 8.9.1 A weatherproof NEMA 3R control cabinet shall be furnished enclosing control circuits, alarm circuits, interior lighting, convenience outlet, and a suitable 240-volt single-phase, 60 Hertz, heater with thermostat.
- 8.9.2 The control cabinet shall be completely weatherproof, utilizing a U-channel drip trough along the top face of the cabinet opening. Cabinet doors shall be sealed with butyl weather-stripping for waterproof fit against the cabinet. Each door shall employ a three-point latching mechanism operated by a single handle. The handle and latch mechanism shall be designed to allow padlocking of the doors. Doors shall be hinged on either left or right side. For single door cabinets, left hinged doors shall be provided. Bolted door covers will not be accepted.
- 8.9.3 The weatherproof cabinet shall be centrally located near the bottom of the tank at a location subject to final approval by Greenville Utilities. The cabinetry shall be designed and located such that all switches, alarms, controls, and relays involving operator interface are located on a dead-front panel and are located at approximately eye level. Panel-mounted equipment shall not be located in the cabinet at a distance greater than six feet (6') above the base of the transformer.
- 8.9.4 The cabinet shall be provided with natural convection ventilation using a silicon gel breather. All ventilation ports shall be filtered against coarse particulate matter.
- 8.9.5 All wire into the control cabinet shall have 600-volt, flame-resistant, moisture-proof insulation and shall be enclosed in metallic conduit. All control conductors shall be tinned copper. All control conductors into the control cabinet shall terminate on a clearly marked and properly identified terminal boards. Terminal boards for CT leads shall be shorting-type and each CT shall be connected to a separate six-point terminal block. All terminal boards shall be equipped with non-magnetic split-type lock washers and ring-type compression lugs.
- 8.9.6 A control cabinet heater shall be furnished and equipped with guards and thermostatically controlled so that the guard temperature cannot exceed 120°F. The 240-volt electric terminals of the heater shall also

be covered. All ac service wiring in the control cabinet shall be equipped with circuit breakers for each branch circuit to provide thermal overhead and short-circuit protection.

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

8.10 Wiring

8.10.1 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. All connections for wiring shall be made using silicon bronze, split-type lockwashers.
- b. All wires shall be identified at each end with legible permanent labels with the opposite end termination information.
- c. Wiring connections between fixed and hinged sections shall be minimum 45-stranded wire.
- d. Seven-stranded control wire is not acceptable.
- e. All terminal connections for conductor sizes #10 AWG in size and smaller shall be made with pre-insulated, full-ring tongue, crimp-type lugs. Lugs shall be AMP, Inc., "Pre-Insulated Diamond-Grip" (PIDG) with nylon or PVC sleeves or approved equivalent. Spade-type terminals or slip-on connectors are not acceptable.
- f. All terminal connections for conductors sizes #2 AWG through #9 AWG shall be made with Burndy Insulug Type YAEV or approved equivalent.
- g. 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.)
- h. High temperature wire shall be used for connections to heaters.

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

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

- 8.10.4 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.
- 8.10.5 If accidental short circuiting of certain wires can result in malfunction of equipment, these wires shall not be terminated on adjacent terminal block points.
- 8.10.6 One and two wires per terminal point are permissible.

8.11 Terminal Blocks and Fuseholders

- 8.11.1 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.
- 8.11.2 Marathon 1600 DJ series of Buchanan or equivalent Type HD or XHD 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.
- 8.11.3 Marathon 1600 SC series 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. A States terminal block is not an acceptable substitution.
- 8.11.4 One (1) three-pole terminal block sized for #6 to #2/0 AWG wire for Commission's single-phase, three-wire, 120/240 volt, control power leads shall be furnished.
- 8.11.5 A minimum of fifteen percent (15%) spare (but not less than twelve (12) points) terminal points shall be provided in the control cabinet. These terminal points shall be furnished with all screws and lockwashers.
- 8.11.6 Fuseholders shall be Marathon (FR30A2S for 30A and RF60A2S for 60A) series thermoplastic fuseblocks with hard-gripping fuse clips (reinforcing member) and straight-slotted silicon bronze screws on each terminal, or approved equivalent. Terminals are to be supplied without ears.

8.12 Alarms and Relays

The transformer shall be equipped with various alarm contacts. Each alarm shall be in the form of a normally open contact wired to terminal blocks and then wired to

the Puleo PE12-1 (48VDC) Annunciator in the transformer control cabinet via paired wire leads. The Annunciator RS485 port shall be cabled to the RuggedComm server to serial port.

The following alarms are to be provided:

- 8.12.1 Transformer Sudden Pressure (63FP)
- 8.12.2 Transformer Lockout Relay (86T)
- 8.12.3 Transformer Liquid Level - Main Tank (71Q)
- 8.12.4 Transformer Pressure Relief (63PR)
- 8.12.5 Transformer Undervoltage (auxiliary power) (27-1)
- 8.12.6 Transformer Gas System - High Pressure (63G-HI)
- 8.12.7 Transformer Gas System - Low Pressure (63G-LO)
- 8.12.8 Gas Cylinder Low Pressure (63G)
- 8.12.9 LTC Sudden Pressure (63FP-LTC)
- 8.12.10 LTC Sudden Pressure (63PR-LTC)
- 8.12.11 LTC Liquid Level (71Q-LTC)
- 8.12.12 LTC Lockout Relay (86LTC)
- 8.12.13 LTC Lockout Alarm (63FP-LTC)
- 8.12.14 Transformer Oil High Fault Gas (74Q-H2-L1)
- 8.12.15 Transformer Oil High Fault Gas (74Q-H2-L2)
- 8.12.16 Transformer Oil High Moisture (74Q-H20-L1)
- 8.12.17 Transformer Oil High Moisture (74Q-H20-L2)
- 8.12.18 Transformer Oil Monitor Failure (7Q-F)

* As Applicable

8.13 Fault Pressure Relay

- 8.13.1 A fault pressure relay shall be provided and installed on the transformer to detect rapid rate of rise in internal transformer tank pressure. The fault pressure relay system shall be complete with a bellows-operated Form C contact, which upon operation by sudden pressure rise, shall initiate a target relay. The target relay shall be designed to seal in while

initiating a mechanically-latching hand-reset trip relay. Operation of the latching relay shall release the target relay and simultaneously provide a minimum of one (1) isolated trip contact and one (1) isolated alarm contact for Greenville Utilities' use.

8.13.2 The manufacturer shall provide all components, complete with wiring, as described for operation at 48 volts dc. The fault pressure relay shall be Qualitrol Series 900 or equal, with General Electric Type HAA target relay and General Electric Type HEA or Electroswitch Type LOR latching hand-reset relay.

8.13.3 The fault pressure relay shall be located under oil on the transformer so as to avoid false trip operation during through-fault conditions.

8.14 Oil and Winding Temperature Measurement

8.14.1 Visual indication of transformer top oil temperature, winding temperature, and LTC differential temperature shall be provided by a Qualitrol 509-200 ITM intelligent temperature monitor part number ITM 509-00043381:CS-41915. The monitoring system shall be mounted inside the control cabinet. The monitoring system shall be provided with the appropriately sized resistance temperature detectors (RTDs) and winding temperature current transformer per ANSI standards. In lieu of a thermal sensing bulb and capillary tube, the RTD shall be installed in the thermal well located in the hottest oil near the top of the transformer tank and LTC compartment. An RTD shall also be provided for the ambient temperature reading.

8.14.2 The electronic monitoring system shall provide local display of the transformer top oil temperature, the simulated winding temperature, the ambient temperature, LTC differential temperature and the load current. The top oil temperature display shall be capable of measuring and displaying a range of 0° to 120° Celsius in 1° increments. The winding temperature display shall be capable of measuring and displaying a range of 0° to 180° Celsius in 1° increments.

8.14.3 The electronic monitoring system shall provide measurement of the following: ambient temperature, main tank liquid temperature, LTC tank liquid temperature, fans/pumps stage 1 running current, fans/pumps stage 2 running current, and secondary current flow.

8.14.4 The electronic monitoring system shall calculate the following: winding temperature, Main/LTC differential temperature, fan failure stage 1 and fan failure stage 2.

8.14.5 The electronic monitoring system shall provide at least six (6) programmable relay outputs to automatically actuate first and second stage auxiliary cooling, based upon the calculations of the temperature inputs. Additionally, the system shall provide a third stage of contacts for remote alarming of excessive temperature conditions. The

electronic monitor shall provide a 4-20 ma output of the top oil liquid temperature for input into the Gas-in-oil monitor.

8.14.6 The power supply for the electronic monitoring system shall be configured for 48 V dc input to maintain stability of the temperature data during ac power system disturbances.

8.14.7 The electronic temperature monitoring system shall be mounted within the main control compartment. The monitor chassis must be positioned for direct viewing through a glass viewing port in the control cabinet door. Mounting of the unit shall be such that all communication ports including fiber ports shall be fully accessible.

8.14.8 The Qualitrol 900-200 RS485 port and the RS232 port shall be cabled to the RuggedComm RS401 each to serial ports.

8.15 Gas-in-Oil and Moisture Online Monitoring

8.15.1 The transformer shall be equipped with a GE Hydran M2 unit for monitoring hydrogen and moisture content in the transformer oil of the main tank.

8.15.2 The Hydran M2 wiring shall be extended to the control cabinet. Wiring requirements are the RS232 communications, RS485 communications, five output contacts, two 4-20 ma inputs for top oil liquid temperature and load current. The RS485 communications shall be wired to a RS485 serial port on the RuggedComm server.

8.16 Surge Arresters

8.16.1 Surge arresters shall be the station-class-type and shall be rated:

<u>System Voltage</u>	Metal Oxide MCOV (maximum continuous operating voltage) <u>Arrester Rating</u>
115 kV, 550 kV BIL	76 kV
13.2/7.62 kV, 110 kV BIL	8.4 kV

8.16.2 The arresters shall be transformer-mounted for the high- and low-voltage side on each phase of the three-phase transformer.

8.16.3 The surge 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 NEMA standard TR1-0.07. Phase-to-ground clearances shall exceed 10.2 inches.

8.16.4 The surge arrester shall be provided with a connection suitable for a flat spade connection with NEMA four-hole drilling either built into the arrester or furnished as a separate item. Flat spade connections shall

be silver-plated. Provisions shall be provided for connection of arrester to 4/0 copper ground conductor.

- 8.16.5 The surge arrester shall be Ohio Brass Type PVN with ESP™ silicone alloy weather shed polymer housing.

8.17 Positive Pressure System

A positive pressure system shall be provided.

- 8.17.1 The transformer shall be equipped with a positive pressurizing system utilizing nitrogen gas to protect the transformer oil in the main tank from oxidation and moisture absorption. The system shall consist of a nitrogen gas supply (cylinder) complete with supply pressure gauge, multi-stage pressure reduction assembly, and associated piping and valves to control the flow of gas to and from the tank. The system shall provide alarms for low gas supply, high tank pressure, and low tank pressure conditions. The nitrogen supply cylinder, supply pressure gauge, and multi-stage pressure reduction assembly shall be housed in a weatherproof enclosure.
- 8.17.2 The system shall maintain transformer tank pressure at 0.5 psi minimum and 5.0 psi maximum, with appropriate fill and bleed-off regulation. Gas system alarms shall actuate whenever pressure falls below 0 (zero) psi or rises above 5.5 psi or whenever supply pressure falls below 200 psi.

8.18 Load Tap Changer (LTC) for Transformer Secondary

- 8.18.1 The transformer shall provide a Reinhausen MR Type RMV-II-2000 LTC for regulating the output voltage of the transformer secondary windings.
- 8.18.2 The LTC and all tests applied thereto shall conform to the latest standards of the IEEE, ANSI, NEMA, and NESC.
- 8.18.3 For voltage regulation ranging between nominal and ten percent below (lower tap positions), the LTC shall have capacity for secondary load current corresponding to rated transformer kVA and the selected voltage tap position.
- 8.18.4 The LTC shall be designed to withstand full-voltage short-circuit conditions, and complete automatic operation of any tap change under such conditions without failure of the tapchanger mechanism or tapchanger windings. The oil-filled tapchanger compartment shall be outfitted with an oil temperature sensor for input into the Qualitrol 509 monitor device.
- 8.18.5 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.

- 8.18.6 The compartment housing the motor drive assembly shall provide the following features and accessories:
- a. 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.
 - b. 120 vac duplex convenience outlet, ground fault protected in accordance with the National Electric Code.
 - c. 120 vac thermostatically-controlled low wattage strip heater, complete with overcurrent circuit breaker, for protection against condensation within compartment.
 - d. 120 vac compartment lamp with plunger switch activated by compartment door, and protected by overcurrent circuit breaker.
 - e. 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.

8.19 Automatic Voltage Regulation Equipment for LTC's

- 8.19.1 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 Digital Tapchanger Control as manufactured by Beckwith Electric Company, Inc. of Largo, Florida. The LTC controller shall provide DNP 3.0 communications via fiber optic port for connection to our SCADA system. No substitutions will be accepted.
- 8.19.2 The Beckwith 2001D tapchanger control shall be mounted in the main control cabinet of the transformer using a Beckwith M-2270B adapter panel.
- 8.19.3 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 2001D. The parallel balancing module shall be a Beckwith Model M-0115A control. No substitutions will be accepted.
- 8.19.4 Tap position shall be monitored by the M-2001D. The Beckwith M-2025D current loop and the appropriate Beckwith tap sensor shall be installed to provide tap position indication on the control.
- 8.19.5 To accommodate digital access to the digital tapchanger control memory, one copy of the latest version of Beckwith M-2029 shall be provided "TapTalk" communications software shall be provided. The software shall be Windows/IBM compatible.
- 8.19.6 Copies of Beckwith literature detailing the features of the M-2001D, M-2270B, M-0115A, and M-2029 shall be included in the final drawings.

- 8.19.7 The transformer shall provide a current transformer for line-drop compensation measurement by the tapchanger control. The current transformer shall provide 1500:5 ratio with a 5:0.2 ratio auxiliary transformer. The current transformer shall be located on the X2 bushing within the main transformer tank.
- 8.19.8 A Greenville Utilities externally mounted potential transformer having a line to neutral voltage ratio of 60:1 will supply sensing voltage input to the tapchanger control.
- 8.19.9 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:
- External sensing voltage input
 - Paralleling connections to future transformer
 - Self-test alarm contact outputs
 - Multi-step voltage reduction input
- 8.19.9 The manufacturer shall provide fiber optic jumper between the control and the RuggedComm RS401 server – fiber port.

8.20 Communications Server

The RuggedComm server RS401 shall be provided to network the Beckwith 2001D (fiber Ethernet), Qualitrol 900-200 ITM (RS232 & RS485), Puleo (RS485), and Hydran M2 (485). The manufacturer shall supply interconnection cables between devices and the RS401.

9.0 Additional Features

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

- 9.1 Two (2) NEMA 2-hole ground pads per ANSI C57.12-17.99 for connectors of 4/0 through 500 kcmil stranded copper conductor.
- 9.2 Main transformer core ground shall be connected to a bushing in the side of the tank wall and provided with an external grounding point.
- 9.3 Magnetic liquid-level gauge with alarm contacts.
- 9.4 Pressure vacuum gauge and bleeder device with sampling and purging valve. Gauge shall be mounted at eye level.
- 9.5 Pressure relief device with alarm contacts and visual alarm on top of unit.
- 9.6 Upper valve for filter-press connection and a filling connection, both one inch (1").

- 9.7 Lower valve for combination filter-press connection, two-inch (2"), with 3/8" oil drain and sampling device and vacuum fittings.
- 9.8 Pressure vacuum bleeder.
- 9.9 Manhole (eighteen inches (18") diameter minimum) and, if required, one or more handholes (eight inches (8") diameter minimum).
- 9.10 Lifting lugs on tank, lifting eyes on cover, and provisions for jacking. Location of jack bosses shall be a minimum of thirteen inches (13") above the transformer base line.
- 9.11 Stainless steel nameplate in accordance with ANSI Standards located on the main tank near the control cabinet.
- 9.12 Metal diagram instruction plate shall be stainless steel. Turn progression and accuracy class of bushing current transformers shall be shown on nameplate.
- 9.13 Support brackets, conductor, and connectors for the transformer grounding system.
- 9.14 Undervoltage relay for all phases of cooling power.
- 9.15 All valves shall have silicone rubber (or better) packing to prevent leaking.
- 9.16 No tripping relays shall be mounted on a swinging panel. All tripping relays shall have covers.
- 9.17 Insulating oil with associated PCB certification and nameplate, per General Conditions.
- 9.18 Forced-air cooling fans shall be single phase, 60 Hertz, 230 volts with OSHA guards.
- 9.19 Fault pressure relay with leads and auxiliary relays as specified.
- 9.20 All alarm contacts shall be suitable for 48V 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 non-magnetic split-type lock washers and ring-type compression lugs. All current transformer leads to be #10 or larger and terminated on separate six-point shorting-type terminal blocks in the control cabinet.
- 9.21 Each removable radiator shall be provided with removable drain and vent plugs connected at top and bottom. Gate valves at the bottom shall be provided for removal of radiators, coolers, and/or pumps from oil-filled main tank.
- 9.22 All equipment required for positive pressure gas regulation system, including alarms, in the event that a positive pressure system is included with the transformer.

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:

25,000 kVA	Watts @ 55°C OA
28,000 kVA	Watts @ 65°C OA
33,333 kVA	Watts @ 55°C OA/FA
37,333 kVA	Watts @ 65°C OA/FA
41,667 kVA	Watts @ 55°C OA/FA/FA or FOA
46,667 kVA	Watts @ 65°C OA/FA/FA or FOA

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 and pumps, 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:

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

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

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:

	<u>20 MVA Base Rating</u>
No-Load Loss (A)	\$13,500 per kW
Winding Loss (B)	\$5,000 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

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GREENVILLE UTILITIES COMMISSION

PROPOSAL FORM

TWO (2) 20 MVA, 115 to 13.2Y/7.62 kV POWER TRANSFORMERS WITH LTC

FOR SUGG PARKWAY AND FROG LEVEL SUBSTATIONS

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:

<u>Description</u>	<u>Estimated Quantity</u>	<u>Total Price</u>
(l)		
Substation transformer, dual rated 25/33.33/41.67 MVA ONAN/ONFA 55°C and 28/37.33/46.67 MVA ONAN/ONFA 65°C, 115 kV delta primary voltage, 13.2Y/7.62 kV secondary voltage, designated for delivery to Operation Center and Frog Level Substation, (Five (5)-year warranty) all in accordance with specifications	2	\$ _____

Delivery _____ (Days)

DEDUCT NO. 1-1

Subtotal	\$ _____
Deduct for Temperature Rise Test	\$ _____
Adder for Sound Test	\$ _____
Total Bid Price (Excluding Tax)	\$ _____

* Price includes delivery F.O.B. pad, unloading, at the Operations Center and Frog Level substation sites.

MAXIMUM GUARANTEED LOSSES⁽¹⁾⁽²⁾

	<u>LTC 1R Pos:</u>	<u>LTC Avg. 15R & 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⁽¹⁾

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

⁽¹⁾These levels will be considered in evaluating the bids.

⁽²⁾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 two (2) 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).

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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 Technician.

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 Technician, 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 Technician.

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

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 U.S. copyrighted articles or any patented or unpatented invention, device, or appliance manufactured or used in the performance of this contract, or for any other violation of intellectual property law rights.

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 reasonable 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 Provider or from the use of combination of products provided by Provider with products provided by GUC or by others; and (5) should such product(s) become, or in Provider’s opinion be 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 become 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 Technician, 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.

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 Technician. 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 Technician.**

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.

Delivery of all equipment, materials, or supplies shall be made Free on Board (FOB) GUC Warehouse, 801 Mumford Road, 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 Third Party claims, actions, costs, expenses, including reasonable attorney fees, judgments, or other damages resulting from injury to any person (including injury resulting in death), or damage (including loss or destruction) to third party tangible property arising out of the negligent 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 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 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 NOTICES

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

Cleve Haddock
Purchasing Technician
Greenville Utilities Commission
P.O. Box 1847
Greenville, NC 27835-1847

Todd Rouse
Substation/Controls Engineer
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: _____
Ronald D. Elks

Title: General Manager/CEO
(Authorized Signatory)

Date: _____

Attest: _____

Name (Print): Amy Carson Quinn

Title: Executive Secretary

Date: _____

(OFFICIAL SEAL)

COMPANY NAME:

By: _____

Name (Print): _____

Title: _____
(Authorized Signatory)

Date: _____

Attest: _____

Name (Print): _____

Title: Corporate Secretary

Date: _____

(CORP. SEAL)

This instrument has been pre-audited in the manner required by the Local Government Budget and Fiscal Control Act.

By: _____
Jeff W. McCauley

Title: Chief Financial Officer

Date: _____

APPROVED AS TO FORM AND LEGAL CONTENT:

By: _____
Phillip R. Dixon

Title: Commission Attorney

Date: _____