Greeneville Energy Authority
1200 W Andrew Johnson Hwy
Greeneville, TN 37745

TO: Transformer manufacturers and their representatives

SUBJECT: Power Transformer for Greeneville Energy Authority

All:

You are invited to submit a proposal to furnish one (1) power transformer for a new Greeneville Energy Authority project. The following manufacturers are approved to submit proposals for the transformer described in the attached specifications: Hitachi, Va. Transformer Co., Delta Star, Pennsylvania Transformer, Howard, Waukesha. Proposals to be based on US manufacturing. Under no circumstances will proposals be accepted from other manufacturers. Bids are to be electronically returned no later than May 14th, 2025. If additional information is required, please contact Robert Keller, office 423-636-6216, cell 423-620-1187

Please submit your bid for the unit based on two different loss evaluation "A" and "B" factors using two bid sheets.

Proposals to be valid for 30 days from bid closing.

Please submit your proposal using the bid sheet included in this package by 11:00 AM May 14th, 2025 to:

T. J. Freshour	Robert Keller
tfreshour@mygea.net	rkeller@mygea.net

Copies of bids are to be sent to both recipients.

Thank you for your interest.

Robert Keller
Power Services Director
Greeneville Energy Authority
423-636-6216
rkeller@mygea.net

BID SHEET #1 FOR GREENEVILLE LIGHT & POWER SYSTEM
POWER TRANSFORMER

NAME OF BIDDER: _____

BASE UNIT

One (1) 68.8KV to 13.090/7.558 KV, 12/16/20 MVA Three Phase Power Transformer with NO LOAD TAP CHANGERS, as described in specifications.

Unit Price Each $_____
Field Services Charges $ _____
Freight Charges$ _____
Manufacturer _____

Total Weight with Oil (per unit) _____ (lbs)

Oil Capacity (per unit) _____ (gal.)

GLPS "A" factor = $4,800 $/kW (NLL)
GLPS "B" factor = $1,950 $/kW (LL)

No Load Losses (per unit) _____ (KW)
Load Losses (per unit) _____
(KW)

Approximate Dimensions
- Width _____ (in)
- Depth _____ (in)
- Height-base to top of tank _____ (in)
- Height-base to top of HV busing _____ (in)
- Height-base to top of LV busing _____ (in)

Approximate Impedance at 12 MVA Base _____ (%)

Approximate Sound Levels
- OA _____
- FA _____
- FA/FA _____

BID SHEET #2 FOR GREENEVILLE LIGHT & POWER SYSTEM
POWER TRANSFORMER

NAME OF BIDDER: _____

BASE UNIT

One (1) 68.8KV to 13.090/7.558 KV, 12/16/20 MVA Three Phase Power Transformer with NO LOAD TAP CHANGERS, as described in specifications.

Unit Price Each $_____
Field Services Charges $ _____
Freight Charges$ _____
Manufacturer _____

Total Weight with Oil (per unit) _____ (lbs)

Oil Capacity (per unit) _____ (gal.)

GLPS "A" factor = $6,400 $/kW (NLL)
GLPS "B" factor = $2,600 $/kW (LL)

No Load Losses (per unit) _____ (KW)

Load Losses (per unit) _____
(KW)

Approximate Dimensions

- Width _____ (in)
- Depth _____ (in)
- Height-base to top of tank _____ (in)
- Height-base to top of HV busing _____ (in)
- Height-base to top of LV busing _____ (in)

Approximate Impedance at 12 MVA Base _____ (%)

Approximate Sound Levels

- OA _____
- FA _____
- FA/FA _____

GENERAL CONDITIONS

Throughout these specifications the terms bidder, supplier, and manufacturer are used synonymously and shall refer to the persons or companies invited to bid and/or the person or company that is awarded the contract. Likewise the terms purchaser and owner are used synonymously and refer to Greeneville Energy Authority.

1. ACCEPTANCE AND REJECTION

The owner reserves the right to reject any or all bids, to waive any informality in bids and, unless otherwise specified by the bidder, to accept any items in the bid. In case of error in the extension of prices in the bid, unit prices will govern.

The owner reserves the right to award the bid to lowest and best bidder, as determined by the owner.

2. SUPPORTING DATA

Any supporting letters, drawings, specifications, and other data shall be furnished with each copy of the bid. Within twenty (20) days after date of notice of award of contract, the supplier shall furnish, if required, up to five (5) additional copies of all data which were submitted with the bid.

3. PRICE POLICY

Only firm prices are acceptable. The quoted prices shall be FOB Greeneville Energy Authority.

4. RISK OF LOSS OR DAMAGE IN TRANSIT

Title to the goods and risk of loss or damage shall remain with the supplier until delivery in acceptable condition at the substation site.

5. INSPECTION AT DESTINATION

An inspection shall be made by the owner at destination unless otherwise specified, but such inspection shall not relieve the supplier for failure to meet the contract requirements.

6. WARRANTY

The supplier warrants that all materials, equipment and work furnished pursuant to this contract comply in all respects with the contract; and that they are free from latent and patent defects in design material and workmanship; that they are suitable and adequate for the purposes for which they were designed in and for such other purposes, if any, as are specified

in the contract; and that they will give efficient and satisfactory service under such conditions as may be specified, for a period, of **five (5) years** after delivery.

Any materials, equipment, or work, or parts thereof, which fail to meet the guarantees or other requirements of the contract may be rejected; provided however, that if correction of defects or deficiencies may be made through minor alterations, or replacements of minor parts, and the supplier proceeds immediately to complete such alterations or replacements of minor parts, or to furnish and install new parts, as are work shall not be rejected on account of defects or deficiencies so corrected. The correction of defects of deficiencies shall not operate to extend the time for performance of the contract as specified here under or to waive any claim for damages resulting from delay in performance or from any other cause. Greeneville Energy Authority shall give the supplier prompt notice of any breach of this warranty.

Operation or use by the owner of the materials, equipment, work or any part therefore shall not constitute a waiver of any of the Greeneville Energy Authority rights under this contract.

The manufacturer warrants that the materials, equipment, or work furnished hereunder are free from any and all claims, demands, and encumbrances; and that the manufacturer will defend the title thereto. The foregoing warranties or guarantees contained in this contract shall supersede any and all others.

7. PRICE BREAKDOWN

If the data is required by the Owner for use in its cost accounting and plant records, Supplier shall furnish to the Owner a breakdown to show separately the proportionate part of the contract price applicable to each of the principal components for the items covered by the contract. The sum of the components must equal the total amount of the contract. Greeneville Energy Authority will request the price breakdown list from the Supplier when and if needed. Failure of the supplier to complete and return the breakdown within a reasonable time after its request by the Owner may result in delaying final payment of the contract.

8. TITLE TO DRAWINGS

The property interest in any drawings which the Supplier supplies Greeneville Energy Authority in connection with the work done under the provisions of this contract shall vest in Greeneville Energy Authority the right to use them, or disclose them to others, in any manner it wishes.

9. SUBCONTRACTORS

The manufacturers shall promptly furnish Greeneville Energy Authority with a statement specifying the subcontractor or agent assigned to the erection and preparation of the transformer for operation in the field. Greeneville Energy Authority shall have the right to disapprove of any or all such subcontractors or agents within thirty (30) days of receipt of such information.

10. FURNISHING OF INFORMATION

Bidder shall furnish all information requested in the schedule, specifications, and data questionnaires, if any.

The owner reserves the right to reject any bid that does not comply with this requirement.

11. PATENTS

The Supplier shall at his own expense defend any suit instituted by any part against Greeneville Energy Authority so far as it is based on the claim that any apparatus or part thereof furnished under this contract or the owners use of such apparatus or part for the purpose for which it was designed or for such purposes, if any, specified in this contract constitutes infringement of any United States patent.

Greeneville Energy Authority shall give to the Supplier immediate notice in writing of the institution of such suit, and shall permit the Supplier, through his counsel, to defend the same and shall give all requisite authority and all needed and available information and assistance to enable the supplier to do so. The supplier shall pay all damages and costs finally awarded therein against Greeneville Energy Authority for any reason of such suit, but the Supplier shall not be liable under any compromise made without his consent.

If in any such suit said apparatus or part use thereof by the owner is held to constitute infringement and such use is enjoined, the manufacturer shall at his own expense procure for the owner forthwith the right to use or continue to use the said apparatus or part; provided, however, that subject to the owners approval the manufacturer may at his sole expense replace said apparatus or part with non-infringing.

12. CLAIMS BY THIRD PARTIES

The manufacturer shall, at his own expense, assure the defense of and save harmless the owner from all claims for materials furnished, or work done; shall promptly discharge the same and not suffer any mechanics or other liens to remain outstanding against the property. Satisfactory evidence must be presented that all people who have done work or furnished materials have been fully paid. If the manufacturer fails to comply with his obligations above, the owner may take such steps as he may deem appropriate to discharge such liens or claims and may withhold from any monies due to the manufacturer such amount as may be necessary to satisfy and discharge the same and any expense incident thereto.

13. LIABILITY

The Supplier shall at their own expense defend any suit instituted by any party against Greeneville Energy Authority so far as it is based on the claim that damage is incurred as a

result of alleged negligence by the supplier, subcontractors, or their employees during fulfillment of the contract.

Greeneville Energy Authority shall give immediate notice in writing of the institution of such a suit, and shall permit the Supplier, through his counsel, to defend the same and shall give all requisite to do so. The Supplier shall pay all damages and costs finally awarded therein against Greeneville Energy Authority for any reason of such a suit, but the Supplier shall not be liable under any compromise made without their consent.

14. LIQUIDATED DAMAGES

If the manufacturer fails to deliver the equipment within the times specified in the contract, Greeneville Energy Authority may, at their option, invoke a liquidated damages charge of $500.00 per calendar day that the equipment is delayed. This charge will be assessed the manufacturer when delay is caused by other than an act of God, act of purchaser, embargo or other governmental act or regulation authority or request, fire, theft, strike, war or riot.

15. EVALUATION OF ALL BIDS

All bids will be evaluated on the same basis as far as is possible. Losses will be capitalized. For bid comparison, losses will be evaluated on the following basis:

Bid #1 using:
No-load Losses $4,800 per KW (“A” factor)
Load Losses $1,950 per KW (“B” factor)

Bid #2 using:
No-load Losses $6,400 per KW (“A” factor)
Load Losses $2,600 per KW (“B” factor)

Losses shall be stated at OA, 55 degrees Centigrade rise rating for all transformers. (Losses shall be referred to 55 degrees Centigrade rise above a 20 degree Centigrade ambient) The load loss cost will be calculated by multiplying the stated load loss KW by the load loss per KW cost given above. The no-load loss cost will be calculated by multiplying the stated no-load loss KW by the no-load loss per KW cost given above. A total loss cost will be calculated by adding the load loss cost to the no-load loss cost. The total evaluated bid price will be the sum of the purchase price of the transformer and the total loss cost.

The total losses quoted (load + no-load) shall be stated separately and shall be guaranteed values. If the test values exceed those quoted, a penalty equal to the difference between the values times the applicable $ per KW capitalized cost given above invoked. If the quoted loss values are less than the test loss values no adjustment to price shall be made.

16. INSPECTION PRIOR TO SHIPMENT

Greeneville Energy Authority may require an inspection at the plant prior to completion of construction. All rights are reserved by Greeneville Energy Authority to observe any and all tests the units may require. The manufacturer shall give sufficient notice to arrange observation tests.

ITEMS 17 THRU 33 PERTAIN TO THE 69 TO 13KV TRANSFORMER

17. GENERAL CHARACTERISTICS

A. Number of Units: One (1)

B. Three Phase

C. MVA Ratings

MVA (self cooled) 12 at 55/65 degrees by resistance
MVA (1st stage fans) 16 at 55/65 degrees by resistance
MA (2nd stage fans) 20 at 55/65 degrees by resistance

D. The following manufacturers are acceptable: Hitachi, Delta Star, Howard, Pennsylvania Transformer, Va. Transformer, and Waukesha. Proposals to be based on US manufacturing. Proposals will not be accepted from other manufacturers.

E. Supplemental Cooling: Fans - OA/FA/FA, Fan Cords to be in Flex Conduit.

F. The hottest spot temperature rise for the 55 degrees C average temperature rise ratings shall not exceed 65 degrees C. The hottest spot temperature rise for the 65 degrees C average temperature rise ratings shall not exceed 80 degrees C.

G. Voltage Rating 68,800 - 7.558/13.090 KV, 60 Hertz.

H. Impedance: Based on rated voltage and self-cooled rating and to be within standard applicable ANSI limits, at lowest temperature rise value the high voltage (HV) to low voltage (LV) impedance shall be between 6.5% and 7.5% at a base of the 12 MVA. The transformers shall be suitable for parallel operation with each other.

I. Color: The tank, fittings, control cabinets, bushings, and arrestors shall be gray in color (ANSI 70)

J. All electrical characteristics and mechanical features on herein specified shall be in accordance with the latest applicable IEEE standards as follows:

If any requirement of these specifications contradicts or differs from information given in the listed standards or other normal industry practice, Greeneville Energy Authority shall be contacted for clarification.

IEEE Std C57.12.00-2021 Standard General Requirements for Liquid Immersed Distribution, Power, and Regulating Transformers.

IEEE C57.12.10-2017 Standard Requirements for Liquid-Immersed Power Transformers

IEEE C57.12.70-2020 Standard for Standard Terminal Markings and Connections for Distribution and Power Transformers

IEEE C57.12.90-2021 Standard Test Code for Liquid Immersed Distribution, Power and Regulating Transformers

IEEE C57.19.01-2017 Standard for Performance Characteristics and Dimensions for Power Transformer and Reactor Bushings

IEEE C57.19.00-2023, Standard for General Requirements and Test Procedure for Power Apparatus Bushings

Latest edition of ANSI C2, National Electric Safety Code

18. OPERATING CONDITIONS

A. Elevation above sea level is less than 3300 feet.

B. Winding Connections

High Voltage winding connected Delta and rated 68,800 Volts
Low Voltage winding connected Ground Wye and rated 13,090 Volts.

C. Auxiliary supply voltages

(1) 120/240 volts 3 wire single phase, 60 Hz AC will be supplied for all motors and heaters. The AC power source will be supplied by Greeneville Energy Authority.

(2) 125 volts DC will be used for all alarms and control circuits. DC power source to be supplied by Greenville Energy Authority.

19. TESTING

A. Factory tests shall include all tests as specified in applicable IEEE, ANSI and NEMA standards.

B. Transformer shall have all windings subjected to Standard Impulse Tests in accordance with IEEE C57.12.00--2021. The neutral current method of fault detection may be employed. Manufacturers abbreviated quality control impulse tests are acceptable in lieu of IEEE standard tests.

C. Insulation Power Factor tests shall be performed on all winding to winding and winding to ground insulations. All measurements exceeding 0.5% corrected to 20 degrees C will be reviewed with the purchaser before shipment.

D. The Transformer short circuit strength shall meet the requirements set forth in IEEE C57.12.90-2021 Standard Test Code for Liquid Immersed Distribution, Power and Regulating Transformers and Guide for Short Circuit Testing of Distribution and Power Transformers (ANSI). The purchaser has the right to request through-fault testing (at extra cost) at any time prior to final testing of assembled unit.

E. The transformers shall have SFRA tests performed at the factory prior to loading and again after delivery to the utility pad.

F. The purchaser shall be immediately notified of any unusual damage occurring during construction of the transformer and if all tests which do not meet specified or standard values. The purchaser shall be permitted, at his option, to personally inspect such damage and/or test failures.

20. HIGH VOLTAGE WINDING

A. MVA = 12/16/20, 55 degrees C; 13.44/17.9/22.4, 65 degrees C; rated volts = 68,800 volts line-to-line; connection = Delta.

B. No Load Taps at:

70,600 volts line-to-line
67,000 volts line-to-line
65,200 volts line-to-line
63,400 volts line-to-line

C. Insulation Ratings:

69 KV Class
350 KV BIL

D. Windings shall be of copper construction and circular. Rectangular windings are not acceptable.

21. LOW VOLTAGE WINDING

A. MVA = 12/16/20, 55 degrees C; 13.44/17.92/22.4, 65 degrees C; rated volts = 7,558/13,090; connection = Grounded wye.

B. Insulation Ratings:

15 KV class
110 KV BIL

C. The angular displacement between the high and low voltage winding vectors shall be 30 electrical degrees with the low voltage lagging the high voltage assuming, H1, H2, H3 rotation.

D. Winding shall be of copper construction and circular. Rectangular windings are not acceptable.

22. CORE GROUND

The core ground shall be located so to be readily accessible and easily removable for test purposes. The location shall be shown on the outline drawings.

23. SUPPLEMENTARY COOLING EQUIPMENT

A. Initial facilities shall include two stages of cooling.

B. Control of cooling equipment shall be by single phase winding temperature equipment.

C. The control shall be manufactured by Qualitrol Design 104 Series and be readily accessible for adjusting the temperature at which the cooling equipment starts. Dial type indicators shall be provided on the temperature relays. The relays shall provide four (4) separate double-pole contacts to accomplish the following functions:

1st contact - 1st stage cooling
2nd contact - 2nd stage cooling
3rd contact - Alarm
4th contact - Tripping

D. The temperature relay nameplate shall give the manufacturer’s temperature settings for each level.

E. All of these settings shall be calculated on the basis of operation at 65 degrees C winding temperature rise by resistance.

F. This information shall also be provided in the wiring diagram.

G. The fans shall be manufactured by Krenz Fans and shall be individually connected to the power supply through a flexible conduit, with weatherproof plugs and receptacles. The motors shall be totally enclosed and furnished without centrifugal switches. Cooling fans, cords and plugs shall be from Krenz-Vent design.

H. Flapper type shut-off valves shall be welded to the transformer tank to permit removal of oil from radiators without draining oil from the transformer.

I. Each radiator shall be equipped with 1.00 IPS fill and drain valves.

24. DE-ENERGIZED TAP CHANGING EQUIPMENT

The mechanism shall be externally operated by a single operating handle extending through the wall of the tank at a height convenient to transformer design. The mechanism shall be complete with a position indicator and an operating handle with provisions for locking.

25. BUSHINGS

A. High voltage bushing: 69 KV Class; 350 KV BIL.

B. Low voltage bushings: 15 KV Class; 110 KV BIL.

C. Low voltage neutral bushing: 15 KV Class; 110 KV BIL.

D. The bushing arrangement shall be as follows:

The H2 and X2 bushings shall be located on the same centerline but on opposite sides of the tank.

Segment 1 and Segment 3 centerline shall be located approximately in the center of the tank cover.

The H1 and H3 bushings shall be properly spaced on each side of this centerline and parallel to the segment 3 side.

High voltage bushings shall be equally spaced.

The X1 and X3 bushings shall be properly spaced on each side of the X2 bushing and parallel to the segment 1 side.

All low voltage bushings including the neutral bushing shall be equally spaced.

E. The bushing porcelain glaze shall be Gray (ANSI 70)

F. Stud to 4-hole pad connectors are to be provided by the Transformer Manufacturer.

26. BUSHING CURRENT TRANSFORMERS

A. The following multi-ratio bushing current transformers will be provided. They shall have five secondary ANSI standard tap positions. They should be provided with CT type terminal blocks with shorting bar and four shorting screws all equal to Penn-Union Series 6066 SCS. Allow at least 10% spare terminals. Three PK test blocks shall be including in CT secondary circuit.
B. All secondary leads from CT shall be brought through conduit to terminal blocks mounted in control cabinet.

C. Location and Number Required:

Bushing	Number	Ratio	Use
H1	2	600/5 MR	Metering and Protective Relaying
H2	2	600/5 MR	Metering and Protective Relaying
H3	2	600/5 MR	Metering and Protective Relaying
X1	1	1200/5 MR	Metering and Protective Relaying
X2	1	1200/5 MR	Metering and Protective Relaying
X3	1	1200/5 MR	Metering and Protective Relaying
X0	1	600/5 MR	Metering and Protective Relaying

D. Accuracy Classes: All CT's shall be accuracy class C400.

27. SURGE PROTECTION

A. Arrestors shall be in accordance with the current ANSI Standard C62.1. They shall be metal-oxide gapless with metal cap. They shall have exhaust vent ports and be mounted in such a manner as to not cause critical damage to adjacent apparatuses.

B. Furnish a total of 6 surge arrestor (per unit) mounting brackets located adjacent to the H1, H2, H3, X1, X2, and X3 bushings.

C. Furnish a total of 6 surge arrests (per unit).(PORCELAIN)

3-MCOV 48 KV, Station class, 10.0-inch bolt circle for 69KV delta connected high voltage side.

3-MCOV 8.4 KV, Station class, for 13090/7.558 grounded wye connected low voltage.

D. Porcelain glaze shall be gray (ANSI 70)

E. Arrestors shall be manufactured by either General Electric, Cooper, Ohio Brass or ABB.

28. OIL PRESERVATION

A. Oil shall be protected by Automatic Nitrogen System.

B. A bleed tube for gas blanket dew point measurement shall be provided from the gas space to an elevation of six feet above the base for the transformer.

C. Suitable valves shall be provided to permit purging the gas space and testing the seal on the tank by admitting dry nitrogen under pressure.

D. Pressure relief device shall be mechanical automatic resealing type with alarm contacts and shall be manufactured by Qualitrol, series 208 pressure relief device wired to a seal-in relay part number 909-200-01.

E. The system should also include the following:

(1) 200 cubic foot Nitrogen cylinder mounted less than 2 feet above base. A certificate of ownership shall be provided to Greeneville Light & Power System for the Nitrogen cylinder.

(2) Pressure Regulator.

(3) Cylinder Pressure Gauge. (w/alarm contacts - 10% volume remaining)

(4) Transformer Pressure Gauge (w/alarm contacts - high and low) manufactured by Qualitrol.

F. The normal transformer tank pressure is to between plus (+) 1/2 and plus (+) 8 psig.

G. The system gauges, valves, regulators, cylinder, etc., shall be contained within a single painted steel housing with a single handed, lockable access door.

29. TANK DESIGN

A. Tank shall have welded steel plate construction with welded cover and lifting lugs, top and bottom shall be minimum 3/8" steel. All welds shall be ground to a smooth finish. No tank corner welds. Welds must be 4 to 6 inches off corner of tank.

B. Lifting lugs shall be provided for lifting complete transformer. Pulling eyes shall also be provided.

C. Jack bosses with at least 13" clearance to bottom of base shall be provided.

D. The base shall be of the welded steel shape (i.e. "I" beam, channel, etc.), built to provide a rigid support and designed to permit the completely assembled and filled transformer to be skidded, rolled, etc., along either axis.

E. Manhole covers shall be bolted.

F. The center of gravity of the assembled transformer shall be as near to the center of the tank as practical.

30. TANK ACCESSORIES

A. The following accessories are to be provided with the transformer.

(1) A NEMA, 3R or 4 control cabinet with hinged door complete with padlocking handle, hinged front panel, and removable bottom plate.

(2) Magnet oil gauge with 2 low level contacts from the main tank and located so as to be easily visible from the ground. Contact 1 shall activate alarm panel. (Alarm panel furnished Greeneville Energy Authority) Contact 2 shall send trip signal to auxiliary tripping relay (device 86).

(3) Dial type thermometers with maximum reading pointer, one for top oil temperature and one for hot-spot temperature with closed oil well, located no higher than 6'-6" above transformer base with contacts as follows:

(4) Upper filter press connections with 2" valve main tank.

(5) Lower filter press connection with 2" valve and Ohio Brass Co. No. 5700, or equal, disc sampling device main tank. Valve to be arranged so that sample may be taken only with valve open.

(6) Drain valve for main tank.

(7) Copper faced or stainless steel ground pads with two 1/2" tapped holes on 1 3/4" centers (NEMA Standard), welded to tank for attaching ground conductors on both the HV and LV sides looped to lightning arrestors. Minimum number required - 4 on each side containing arrestors.

(8) Standard nameplate located no higher than 6' above transformer base.

(9) Pressure relief device with alarm contacts. Both "Normally Open" and "Normally Closed" contact leads shall be brought down to the terminal blocks in the control cabinet.

(10) Sudden Pressure relay will be a Qualitrol type 910-010-01 or equivalent (Qualitrol brand only) with auxiliary circuit and relays only as recommended by manufacturer for use with this sudden pressure switch. The scheme shall have a mechanical target or sealed-in-indicating light and shall trip a lockout relay device number 86 to be supplied by Greeneville Energy Authority and located external to transformer.

(11) All relay and alarm contacts including spares shall be wired terminal block in control housing. Terminal blocks are to be rated 600 volts.

(12) Control cabinet shall contain a 120 volt AC convenience outlet, incandescent light and heater protected by a circuit breaker of fuses.

B. Bolts, cap screws, nuts, unpainted metal surfaces, etc., that are exposed to weather shall be made of non-corrosive material.

C. Radiators shall be bolted and equipped with drain plugs. Cut-off valves shall be at both top and bottom of tank, near flange connection.

31. CONTROL EQUIPMENT

A. All wiring shall terminate on terminal blocks suitable for #10 conductors.

B. Current transformer conductors shall terminate on Penn-Union series 6066 SCS terminal blocks or equal. All other wiring shall terminate on Penn-Union series 6000-wide slotted blocks or equal.

C. All wiring shall be labeled at termination with designation of opposite end termination.

D. All devices requiring external connections to transformer shall be factory wired to terminal strips located in control cabinet

E. Any enclosure containing terminal blocks, alarms contacts, etc., shall be in a weatherproof and dust-tight NEMA 3R or 4.

F. All required conduit shall be galvanized rigid steel or galvanized intermediate metal.

32. INSULATING OIL

A. Oil shall be in accordance with ASTM 3487-88 Specification of Mineral Insulating Oil Used in Electrical Apparatus and IEEE C57.106-1991, Guide for Acceptance and Maintenance of Insulating Oil in Equipment (ANSI). Oil shall contain 0.15% DBP or DBPC synthetic oxidation inhibitor.

B. Oil shall not be contaminated by PCB's and shall be certified to contain no more than 1 ppm at time of shipment. A statement to this effect shall be etched on the transformer nameplate.

C. The purchaser reserves the right to make the tests described in IEEE C57.106-1991 Table 1 and Table 2 and to reject any oil which does not meet the requirements listed therein except that the water content shall not exceed 15 ppm.

33. SHIPMENT

A. The transformer core and coils shall be shipped upright, completely assembled in their tank and if not in oil, dry air with dew point -60 degrees or lower at atmospheric pressure. The dry air must meet the requirements of less than 0.5 percent by volume of impurities and less than 0.03 percent by weight of moisture.

B. Two impact recorders shall be required in shipment.

C. Shipment is to be FOB transformer pad. The site is located in East Tennessee.

D. Manufacturer is to arrange for all loading and unloading of transformer to Substation site.

E. Manufacturer shall coordinate shipping date with purchaser to ensure pads are ready and substation site attended.

34. ERECTION AND WARRANTY TESTING

A. Services of an erecting engineer shall be provided by manufacturer to erect and prepare the transformer for service.

B. Manufacturer shall provide labor, tools, material, and equipment, for erection, necessary warranty testing and preparation to transformer for service. Greeneville

Energy Authority has the option of providing Field Services from others, in house, and or a contractor.

C. The erecting engineer shall check transformer thoroughly for gas and oil leaks, proper and adequate assembly of radiators, bushings, and other components.

D. Erection and testing shall be completed within 36 hours of delivery of the transformer to the pad. Immediately upon completion, a representative of the manufacturer shall provide the purchaser with a document stating that the transformer is ready to be energized and load applied. If load is not to be applied immediately, the document shall state the time and date that load can be applied.

35. FIELD ACCEPTANCE TESTS

The owner reserves the right to conduct additional testing of transformer before final acceptance.

36. TRANSMITTALS AND APPROVAL DRAWINGS

A. All transmittals shall show purchaser's name and purchaser's order number.

B. Greeneville Energy Authority shall be supplied with three copies of outline, nameplate, connections and wiring diagrams for approval. All associated drawings referred to on the approval drawings shall be furnished with the approval drawings.

37. DAMAGE CURVES

A. The manufacturer shall furnish complete time-current damage curves for each transformer supplied.

B. The subject curves shall be used in setting the substation protection relays.

38. FINAL DRAWINGS

A. The purchaser shall be furnished four (4) complete sets of drawings, four (4) instruction books, one (1) complete set of drawings on CD or DVD in a format compatible with AutoCAD 2007, and three (3) copies of certified test reports for the transformer supplied. The distribution shall be as follows.

(1) One complete set of drawings and one instruction book shall be shipped in the transformer cabinet.

(2) Three complete sets of drawings plus a CD or DVD of the AutoCAD format drawings, three instruction books, and three copies of certified test results shall be forwarded to:

Greeneville Energy Authority
1200 W Andrew Johnson Hwy
Greeneville, TN 37745
Attn: Robert Keller

B. One complete set of record drawings shall be submitted to Greeneville Light & Power System, at the above address, after all approvals and corrections are completed.

39. MANUFACTURERS SPECIFICATIONS (supplied at time of bid)

A. The manufacturer shall list any exceptions to these specifications under a separate paragraph entitled “Exceptions to Purchaser’s Specifications”.

B. The manufacturer’s specifications shall be complete including a detailed description of the electrical and mechanical design features, and a detailed description of all accessories including the following:

(1) Transformer tank and radiators.

(2) Transformer core and coils.

(3) High- and low- voltage tap changers.

(4) Bushings.

(5) Bushing current transformers.

(6) Transformer oil and oil preservation equipment.

(7) Temperature indicating and alarm equipment.

(8) Liquid level indicating and alarm equipment.

(9) Pressure relief device.

(10) Forced cooling equipment.

(11) Lightning arrestors.

40. DATA REQUIRED AT QUOTATION

The following data shall be supplied for each proposed unit:

(1) Complete ANSI standard C57.12.00-2010, Power Transformer Specification For (of facsimile) including all optional or “only when requested” items such as regulation, auxiliary losses, and efficiencies.

(2) Complete Bid Sheet (see attachment)

(3) Itemized list of any and all exceptions to these specifications

(4) Dimensioned Outline drawing.

(5) Information required in section 39.

41. SCHEDULE

Bid period closed: 11:00 a.m May 14th, 2025.

Approval Drawings are due within 30 days of P.O.