



ALASKA ENERGY AUTHORITY
 PROCUREMENT DEPARTMENT
 813 W Northern Lights Blvd
 Anchorage, AK 99503

RETURN BY EMAIL TO:
 jtibbe@aidea.org

REQUEST FOR QUOTATION

Multiple Site Transformer Purchase

RFQ NO: 19053
 Quotations due on/before
3:00PM Local Time April 5, 2019 ON
BEHALF OF CLARKS POINT, PORT
HEIDEN, AND KWIGILLINGOK

Page 1 of 13 Date: 3/29/19

VENDOR NOTICE (This is NOT a Purchase Order)

This is an informal quotation that will not be read at public opening. The information may be publicly reviewed after award. The terms and conditions should be reviewed and understood before preparing a quotation. The quotation shall be the best net price, F.O.B. destination, to include all delivery charges, but exclude applicable taxes. Return the quotation by email on or before the due date/time indicated above.

DELIVERY F.O.B. LOCATION:

Alaska Energy Authority Warehouse: 2601 Commercial Drive, Anchorage, AK 99501

BUYER:

Jake Tibbe

VENDOR QUOTATION – BID SCHEDULE

Item	Item Description	Qty	Unit Purchase Price (\$)	NL (Watt)	“A” Cost A x NL (\$)	LL (Watt)	“B” Cost B x LL(\$)	Unit Evaluated Price(\$)*
1	150 kVA 3-phase Step-Up Transformer 12470/7200 Volt Grounded Wye Primary 480/277 Volt Grounded Wye Secondary	1	\$		\$		\$	\$
2	Ground Sleeve for Transformer (Item 1)	1		-----	-----	-----	-----	
Clark’s Point Subtotal Purchase Price				Clark’s Point Subtotal Evaluated Price				
3	500 kVA 3-phase Step-Up Transformer 12470/7200 Volt Grounded Wye Primary 480/277 Volt Grounded Wye Secondary	1	\$		\$		\$	\$
Kwigillingok Subtotal Purchase Price				Kwigillingok Subtotal Evaluated Price				
4	225 kVA 3-phase Step-Up Transformer 12470/7200 Volt Grounded Wye Primary 480/277 Volt Grounded Wye Secondary	1	\$		\$		\$	\$
5	Ground Sleeve for Transformer (Item 4)	1		-----	-----	-----	-----	
6	45 kVA 3-phase Step-Down Transformer 12470/7200 Volt Grounded Wye Primary 208/120 Volt Grounded Wye Secondary	1	\$		\$		\$	\$

7	Ground Sleeve for Transformer (Item 6)	1		-----	-----	-----	-----	
8	15 kVA 1-phase Step-Down Transformer 7200 Volt Primary 240/120 Volt Secondary	1	\$		\$		\$	\$
9	Ground Sleeve for Transformer (Item 8)	1		-----	-----	-----	-----	
Port Heiden Subtotal Purchase Price				Port Heiden Subtotal Evaluated Price				
Grand Total Purchase Price				Grand Total Evaluated Price				
*** Bid Schedule Instructions: Input values above for Unit Purchase Price, NL, & LL. Calculate all other prices. ***								
Notes: See attached Scope of Work for Calculations.							REQUIRED DELIVERY	
1) A = \$7.25/Watt B = \$2.13/Watt							14 Weeks ARO	
2) *Unit Evaluated Price = Unit Price + (A x NL) + (B x LL)								
3) Provide manufacturer's data sheets demonstrating guaranteed values for NL and LL.								
4) For ground sleeve the Evaluated Price is equal to the Purchase Price.								
THIS SECTION MUST BE COMPLETED BY VENDOR								
Delivery shall be made in _____ calendar weeks after receipt of order.								
Payment Terms: _____								
Company Name					Address			
Alaska Business License No.		Vendor Tax I.D. No.			City	State	ZIP Code	Phone Number
By signing this RFQ, you are attesting that you have read and understand the Scope of Work and requirements herein.					Email Address			
_____ Signature			_____ Date		_____ Typed Name and Title			

**INSTRUCTIONS TO BIDDERS
TERMS AND CONDITIONS**

- 1. REQUEST FOR QUOTATION (RFQ) REVIEW:** Offerors shall carefully review this RFQ for defects and questionable or objectionable material. Offerors' comments concerning defects and questionable or objectionable material in the RFQ must be made in writing and received by the purchasing authority before the date and time set for receipt of quotes. This will allow time for an amendment to be issued if one is required. It will also help prevent the opening of a defective quote, upon which award cannot be made, and the resultant exposure of offerors' prices. Offerors' original comments should be sent to the purchasing authority listed on the front of this RFQ.
- 2. QUOTATION FORMS:** Offerors shall use this and attached forms in submitting quotes. A photocopied quote may be submitted.
- 3. SUBMISSION:** Quotations shall be signed where applicable and received at the designated Purchasing Office no later than as indicated.
- 4. QUOTE REJECTION:** The State reserves the right to reject any or all quotes, combinations of items, or lot(s), and to waive defects or minor informalities.
- 5. EXTENSION OF PRICES:** In case of error in the extension of prices in the quote, the unit prices will govern; in a lot bid, the lot prices will govern. Negligence by the vendor in preparing the quotation confers no right for the withdrawal of the quotation after it has been opened.
- 6. ALASKA PROCUREMENT CODE:** The Procurement Code (AS.36.30) and its Regulations (2 AAC Ch. 12), are made a part of this document as if fully set forth herein. Note: AS.36.30 and 2 AAC Ch. 12 are available at most public libraries and legislative information offices; and both are available for review at Alaska State Purchasing Offices.
- 7. PRICES:** The offeror shall state prices in the units of issue on this RFQ. Prices quoted for commodities must be in U.S. funds and include applicable federal duty, brokerage fees, packaging, and transportation cost to the FOB point so that upon transfer of title the commodity can be utilized without further cost. Prices quoted for services must be quoted in U.S. funds and include applicable federal duty, brokerage fee, packaging, and transportation cost so that the services can be provided without further cost. Prices quoted must be exclusive of federal, state, and local taxes. If the offeror believes that certain taxes are payable by the State, the offeror may list such taxes separately, directly below the bid price for the affected item. The State is exempt from Federal Excise Tax except the following:
 - Coal - Internal Revenue Code of 1986 (IRC), Section 4121 - on the purchase of coal;
 - "Gas Guzzler" - IRC, Section 4064 - on the purchase of low m.p.g. automobiles, except that police and other emergency type vehicles are not subject to the tax;
 - Air Cargo - IRC, Section 4271 - on the purchase of property transportation services by air;
 - Air Passenger - IRC, Section 4261 - on the purchase of passenger transportation services by air carriers;
 - Leaking Underground Storage Tank Trust Fund Tax (LUST) - IRC, Section 4081 - on the purchase of Aviation gasoline, Diesel Fuel, Gasoline, and Kerosene.
- 8. PAYMENT FOR STATE PURCHASES:** Payment for agreements under \$500,000 for the undisputed purchase of goods or services provided to a State agency, will be made within 30 days of the receipt of a proper billing or the delivery of the goods or services to the location(s) specified in the agreement, whichever is later. A late payment is subject to 1.5% interest per month on the unpaid balance. Interest will not be paid if there is a dispute or if there is an agreement which establishes a lower interest rate or precludes the charging of interest.
- 9. PAYMENT DISCOUNT:** Discounts for prompt payment will not be considered in evaluating the price you quote. However, the State shall be entitled to take advantage of any payment discount(s) offered by the vendor provided payment is made within the discount period. Payment discount periods will be computed from the date of receipt of the commodities or services and/or a correct invoice, whichever is later. Unless freight and other charges are itemized, any discount provided will be taken on full amount of invoice.
- 10. VENDOR TAX ID NUMBER:** If goods or services procured through this RFQ are of a type that is required to be included on a Miscellaneous Tax Statement, as described in the Internal Revenue Code, a valid tax identification number must be provided to the State of Alaska before payment will be made.
- 11. INDEMNIFICATION:** The Contractor and Buyer shall indemnify and hold each other harmless, from and against any claim of, or liability for error, omission or negligent act under this agreement.
- 12. SEVERABILITY:** If any provision of this contract is declared by a court to be illegal or in conflict with any law, the validity of the remaining terms and provisions shall not be affected; and the rights and obligations of the parties shall be construed and enforced as if the contract did not contain the particular provision held to be invalid.
- 13. TITLE:** Title passes to the State for each item at FOB destination.
- 14. FILING A PROTEST:** An offeror shall attempt to informally resolve a dispute with the procurement officer regarding a small procurement. If the attempt is unsuccessful, the vendor may protest the solicitation or the award of a small procurement contract under AS 36.30.320. The protest must be filed in writing with the commissioner of the purchasing agency or the commissioner's designee and include the following information: (1) the name, address, and telephone number of the protester; (2) the signature of the protester or the protester's representative; (3) identification of the contracting agency and the solicitation or contract at issue; (4) a detailed statement of the legal and factual grounds of the protest, including copies of relevant documents; and (5) the form of relief requested. The protester must file a copy of the protest with the procurement officer for the purchasing agency. Protests will be treated in accordance with AS 36.30.550 and 2 AAC 12.695.
- 15. COMPLIANCE:** In the performance of a contract that results from this RFQ, the contractor must comply with all applicable federal, state, and borough regulations, codes, and laws; and be liable for all required insurance, licenses, permits and bonds; and pay all applicable federal, state, and borough taxes.

**INSTRUCTIONS TO BIDDERS
TERMS AND CONDITIONS**

16. SUITABLE MATERIALS, ETC.: Unless otherwise specified, all materials, supplies or equipment offered by a offeror shall be new, unused, and of the latest edition, version, model or crop and of recent manufacture.

17. SPECIFICATIONS: Unless otherwise specified in the RFQ, product brand names or model numbers are examples of the type and quality of product required, and are not statements of preference. If the specifications describing an item conflict with a brand name or model number describing the item, the specifications govern. Reference to brand name or number does not preclude an offer of a comparable or better product, if full specifications and descriptive literature are provided for the product. Failure to provide such specifications and descriptive literature may be cause for rejection of the offer.

18. FIRM OFFER: For the purpose of award, offers made in accordance with this RFQ must be good and firm for a period of ninety (90) days from the date of quote opening.

19. QUOTE PREPARATION COSTS: The State is not liable for any costs incurred by the offeror in quote preparation.

20. CONSOLIDATION OF AWARDS: Due to high administrative costs associated with processing of purchase orders, a single low quote of \$50 or less may, at the discretion of the State, be awarded to the next low offeror receiving other awards for consolidation purposes. This paragraph is not subject to the protest terms enumerated in "FILING A PROTEST" above.

21. CONTRACT FUNDING: Offerors are advised that funds are available for the initial purchase and/or the first term of the contract. Payment and performance obligations for succeeding purchases and/or additional terms of the contract are subject to the availability and appropriation of funds.

22. CONFLICT OF INTEREST: An officer or employee of the State of Alaska may not seek to acquire, be a party to, or possess a financial interest in, this contract if (1) the officer or employee is an employee of the administrative unit that supervises the award of this contract; or (2) the officer or employee has the power to take or withhold official action so as to affect the award or execution of the contract.

23. ASSIGNMENT(S): Assignment of rights, duties, or payments under a contract resulting from this RFQ is not permitted unless authorized in writing by the procurement officer of the contracting agency. Quotes that are conditioned upon the State's approval of an assignment will be rejected as nonresponsive.

24. SUBCONTRACTOR(S): Within five (5) working days of notice from the state, the apparent low bidder must submit a list of the subcontractors that will be used in the performance of the contract. The list must include the name of each subcontractor and the location of the place of business for each subcontractor and evidence of each subcontractor's valid Alaska business license.

25. FORCE MAJEURE: (Impossibility to perform) The contractor is not liable for the consequences of any failure to perform, or default in performing, any of its obligations under this Agreement, if that failure or default is caused by any unforeseeable Force Majeure, beyond the control of, and without the fault or negligence of, the contractor. For the purposes of this Agreement, Force Majeure will mean war (whether declared or not); revolution; invasion; insurrection; riot; civil commotion; sabotage; military or usurped power; lightning; explosion; fire; storm; drought; flood; earthquake; epidemic; quarantine; strikes; acts or restraints of governmental authorities affecting the project or directly or indirectly prohibiting or restricting the furnishing or use of materials or labor required; inability to secure materials, machinery, equipment or labor because of priority, allocation or other regulations of any governmental authorities.

26. LATE QUOTES: Late quotes are quotes received after the time and date set for receipt of the quotes. Late quotes will not be accepted.

27. CONTRACT EXTENSION: Unless otherwise provided in this RFQ, the State and the successful offeror/contractor agree: (1) that any holding over of the contract excluding any exercised renewal options, will be considered as a month-to-month extension, and all other terms and conditions shall remain in full force and effect and (2) to provide written notice to the other party of the intent to cancel such month-to-month extension at least thirty (30) days before the desired date of cancellation.

28. DEFAULT: In case of default by the contractor, for any reason whatsoever, the State of Alaska may procure the goods or services from another source and hold the contractor responsible for any resulting excess cost and may seek other remedies under law or equity.

29. DISPUTES: Any dispute arising out of this agreement shall be resolved under the laws of Alaska. Any appeal of an administrative order or any original action to enforce any provision of this agreement or to obtain any relief from or remedy in connection with this agreement may be brought only in the superior court for the State of Alaska.

30. CONSUMER ELECTRICAL PRODUCT: AS 45.45.910 requires that "...a person may not sell, offer to sell, or otherwise transfer in the course of the person's business a consumer electrical product that is manufactured after August 14, 1990, unless the product is clearly marked as being listed by an approved third party certification program." Electrical consumer products manufactured before August 14, 1990, must either be clearly marked as being third party certified or be marked with a warning label that complies with AS 45.45.910(e). Even exempted electrical products must be marked with the warning label. By signature on this quote the offeror certifies that the product offered is in compliance with the law. A list of approved third party certifiers, warning labels and additional information is available from: Department of Labor, Labor Standards & Safety Division, Mechanical Inspection Section, P.O. Box 107020, Anchorage, Alaska 99510-7020, (907)269-4925.

31. CONTINUING OBLIGATION OF CONTRACTOR: Notwithstanding the expiration date of a contract resulting from this RFQ, the contractor is obligated to fulfill its responsibilities until warranty, guarantee, maintenance and parts availability requirements have completely expired.

32. ORDER DOCUMENTS: Except as specifically allowed under this RFQ, an ordering agency will not sign any vendor contract. The State is not bound by a vendor contract signed by a person who is not specifically authorized to sign for the State under this RFQ. The State of Alaska Purchase Order, Contract Award and Delivery Order are the only order documents that may be used to place orders against the contract(s) resulting from this RFQ.

**INSTRUCTIONS TO BIDDERS
TERMS AND CONDITIONS**

33. BILLING INSTRUCTIONS: Invoices must be billed to the ordering agency's address shown on the individual Purchase Order, Contract Award or Delivery Order. The ordering agency will make payment after it receives the merchandise or service and the invoice. Questions concerning payment must be addressed to the ordering agency.

34. COMPLIANCE WITH ADA: By signature of their quote the offeror certifies that they comply with the Americans with Disabilities Act of 1990 and the regulations issued thereunder by the federal government. Services or activities furnished to the general public on behalf of the State must be fully accessible. This is intended to ensure that agencies are in accordance with 28 CFR Part 35 Section 35.130 and that services, programs or activities furnished to the public through a contract do not subject qualified individuals with a disability to discrimination based on the disability.

Project Description

This Request for Quotes is for furnishing transformers as described below.

Work Included

- Furnish Transformers in accordance with attached specifications 33 73 13. The size and configuration shall be as indicated in the Bid Schedule which follows.
- Furnish Ground Sleeves in accordance with attached specifications 33 73 13. The size shall be as indicated in the Bid Schedule which follows.
- Provide submittals in accordance with the specifications for review and approval.
- Package and label in accordance with the specifications.
- Deliver F.O.B.: Alaska Energy Authority
2601 Commercial Drive, Anchorage, AK 99501, (907)771-3092.

Pricing and Evaluation

- **Pricing** - The Bidder shall provide Unit, Sub-Total, and Grand Total Purchase and Evaluate pricing as indicated in the Bid Schedule and defined below. All prices shall be firm fixed prices, which include all costs and profit associated with furnishing the items as specified to the F.O.B. point by the date indicated.
- **Bid Response Requirements** – In addition to pricing, bidders shall provide manufacturer’s data sheets with guaranteed values for the transformers. The guaranteed values shall be in accordance with the specifications and shall demonstrate, at a minimum, the impedance, no load loss (NL), and load loss (LL).
- **Transformer Price Evaluation** – The following formula shall be used to determine the evaluated price for each transformer:
Evaluated Price = Purchase Price + (A x NL) + (B x LL) Where:
A = \$7.25 per Watt
NL = No Load Loss in Watts (guaranteed value in accordance with specifications)
B = \$2.13 per Watt
LL = Load Loss in Watts (guaranteed value in accordance with specifications)
- **Determination of Low Bid** - Determination of the low bid shall be based on the **Grand Total Evaluated Price** for all items in aggregate.
- **Method of Award** – A Purchase Order will be issued to the responsive and responsible low bidder based for the **Grand Total Purchase Price**.

Required Delivery

14 weeks This is the maximum time in calendar weeks from award of order to delivery at the F.O.B. point. If you anticipate factory delays that may affect the ability to meet the firm delivery you must notify the AEA prior to submitting your quote.

PART 1 - GENERAL

1.1 SCOPE

- A. This specification covers electrical characteristics and mechanical safety features of mineral-oil immersed, self-cooled, padmounted transformers with separable insulated high voltage bushings. All characteristics, voltage designations and tests shall be in accordance with the latest editions of ANSI Standards C57.12.26 and C57.12.00, except as modified herein.
- B. Transformers shall be designed in accordance with RUS requirements and shall be of new construction.
- C. Transformers shall be suitable for step-up or step-down service as indicated on the Bid Schedule.
- D. The transformers will be evaluated.

1.2 STANDARDS

All characteristics, definitions, and terminology, except as specifically covered in this specification, shall be in accordance with the latest revision of the following ANSI and NEMA standards.

- C57.12.00 IEEE Standard General Requirements for Liquid-Immersed Distribution, Power, and Regulating Transformers.
- C57.12.26 IEEE Standard for Pad-Mounted, Compartmental-Type, Self-Cooled, Three-Phase Distribution Transformers for Use with Separable Insulated High-Voltage Connectors (34500GrdY/19920 Volts and Below; 2500 kVA and Smaller).
- C57.12.28 Pad-Mounted Equipment - Enclosure Integrity.
- C57.12.34 IEEE Standard Requirements for Pad-Mounted, Compartmental-Type, Self-Cooled, Three-Phase Distribution Transformers (2500 kVA and Smaller) - High Voltage: 34500GrdY/19920 Volts and Below; Low-Voltage: 480 Volt 2500 kVA and Smaller.
- C57.12.35 Bar Coding for Distribution Transformers.
- C57.12.90 IEEE Standard Test Code for Liquid-Immersed Distribution, Power, and Regulating Transformers and IEEE Guide for Short-Circuit Testing of Distribution and Power Transformers.
- C57.12.91 Guide for Loading Mineral-Oil-Immersed Overhead and Pad-Mounted Transformers rated 500 kVA and less with 55°C or 65°C average winding rise.
- NEMA TR-1 Transformers, Regulators, and Reactors.
- NEMA TP-1 Guide for Determining Energy Efficiency for Distribution Transformers
- NEMA TP-3 Standard for Labeling of Distribution Transformer Efficiency.
- NEMA 260 Safety Labels for Pad-Mounted Switchgear and Transformers Sited in Public Areas.

DOE 10 CFR Part 431 – Department of Energy – Energy Conservation Program for Commercial Equipment: Distribution Transformers Energy Conservation Standards; Final Rule

1.3 SUBMITTALS

- A. Submit complete electrical data, mechanical and layout drawings, and wiring and connection diagrams for each type of transformer provided.
- B. Drawings shall indicate the kVA rating, transformer impedance, voltage (both primary and secondary), phase of the transformer, winding connection, and tap changers.
- C. Provide certified test reports prior to shipment of the transformers. Test reports shall indicate the impedance, no load, and full load loss of each transformer, by serial number, and shall include the transformer efficiency, expressed in percent, of the transformer based on the test procedures specified herein.
- D. Certified test reports shall contain a statement identifying the amount of PCB in the insulating oil.

1.4 BID EVALUATION

When the bid is evaluated with guaranteed losses due to a loss evaluation, the manufacturer shall conform to guaranteed average losses as specified in IEEE Std C57.12.00. The no-load losses of a transformer shall not exceed the specified no-load losses by more than 10%, and the total losses of a transformer shall not exceed the specified total losses by more than 6%.

1.5 WARRANTY

The failure of any transformer due to defective design, material and/or workmanship within 12 months after being energized or eighteen months after being delivered, whichever comes first, shall be repaired or replaced without cost. Any defect in design, material and/or construction discovered within this period shall be corrected at the manufacturer's expense, either by repair or replacement.

PART 2 – PRODUCTS

2.1 RATINGS

- A. General:
 - 1. Primary Voltage Rating: As indicated on the Bid Schedule.
 - 2. Secondary Voltage Rating: As indicated on the Bid Schedule.
 - 3. Frequency: 60 Hz.
 - 4. Phase: Single or three-phase, as indicated on the Bid Schedule.
 - 5. Impedance: NEMA Standard.
 - 6. kVA Rating: As indicated on the Bid Schedule.
 - 7. BIL Rating: 7.2/12.47 kV: 95 kV.
600 Volt and lower: 30 kV.
 - 8. Temperature Rating: Self-cooled, 65° C above a 30° C ambient.

2.2 ACCEPTABLE MANUFACTURERS

Acceptable manufactures shall be as follows.

- A. ABB.
- B. Cooper Power.
- C. Ermco.
- D. General Electric.
- E. Howard Transformers.
- F. Approved equal.

2.3 TRANSFORMER LOSSES

Transformer no load and load losses shall be quoted with the transformer bid and shall be guaranteed by the manufacturer. Transformer losses determined by the factory tests on the individual transformers shall not exceed the guaranteed bid losses by more than 10%. No individual unit shall be shipped that exceeds guaranteed no load losses by more than 10%.

2.4 TRANSFORMER TAPS

Transformers shall be furnished with four each 2-1/2% full capacity high-voltage taps, 2 above and 2 below rated nominal voltage. The tap changer shall be clearly labeled to reflect that the transformer must be de-energized before operating the tap changer as required in Section 4.3 of IEEE Std C57.12.34.

2.5 TERMINAL ARRANGEMENTS

A. Primary terminals:

- 1. On three-phase transformers provide six (6) 200-amp loadbreak inserts in accordance Figure 2 dimensions of ANSI C57.12.34 for loop feed configurations. The bushing heights shall be in accordance with Figure 3 minimum dimensions of ANSI C57.12.34.

B. Secondary terminals:

- 1. On three-phase transformers with 600 volt, or less, rated secondary windings the secondary terminals shall be provided with tin-plated spade-type bushings for vertical takeoff. The spacing of the connection holes shall be 1.75" on center, per ANSI C57.12.34 Figure 13a. Provide six connection holes.
- 2. On single-phase transformers, provide threaded stud-type line and neutral terminals per the table below:

kVA Rating	Thread Size	Minimum Length (Inches)
10-75	0.625-11 UNC-2A	1.25

- C. On transformers provided with a wye-wye connection, the primary neutral connection shall be brought out as a fully insulated H0 bushing in the primary compartment and the low voltage neutral connection shall be brought out as a fully insulated X0 bushing in the secondary compartment. A single H0/X0 bushing will not be acceptable. Provide each bushing with a removable external ground strap connected to a ground pad.

2.6 PROTECTION

- A. Bayonet with current limiting fuses. The high-voltage overcurrent protection scheme provided with the transformer shall be an externally removable loadbreak expulsion Bay-O-Net fuse assembly with a flapper valve to minimize oil spillage. The bayonet fuses shall be in series with ELSP under-oil partial-range current-limiting back-up fuses with an interrupting rating of 50,000 RMS symmetrical amperes interrupting with minimum melting current approximately 200% of transformer nameplate rating.

2.7 CORE AND COIL

- A. Windings shall be copper or aluminum. All windings shall meet with the guaranteed temperature rise requirements.
- B. The core and coil shall be vacuum processed to ensure maximum penetration of insulating fluid into the coil insulation system. The windings will be energized to heat the coils and drive out moisture, and the transformer will be filled with preheated filtered degassed insulating fluid.
- C. The core shall be manufactured from either amorphous metal or from burr-free, grain-oriented silicon steel and shall be precisely stacked to eliminate gaps in the corner joints. The coil shall be insulated with B-stage, epoxy coated, diamond pattern, insulating paper, which shall be thermally cured under pressure to ensure proper bonding of conductor and paper.

2.8 TANK AND CABINET

- A. The enclosure integrity of the tank and cabinet shall meet the requirements for tamper resistance set forth in ANSI C57.12.28 including but not limited to the pry test, pull test, and wire probe test.
- B. Enclosures:
 - 1. Three-phase transformers shall be compartmental type with dual compartment and barrier between high and low voltage compartments. The high-voltage and low-voltage compartments, separated by a metal barrier, shall be located side-by-side on one side of the transformer tank. When viewed from the front, the low-voltage compartment shall be on the right. Each compartment shall have a door that is constructed so as to provide access to the high-voltage compartment only after the door to the low-voltage compartment has been opened. There shall be one or more additional fastening devices that must be removed before the high-voltage door can be opened. Where the low-voltage compartment door is of a flat panel design, the compartment door shall have three-point latching with a handle provided for a locking device. Hinge pins and associated barrels shall be constructed of corrosion-resistant material, passivated AISI Type 304L.
 - 2. Single-phase transformers shall be ANSI Type 2 provided with a single lift up door. Door shall be provided with tamper resistant strips.
 - 3. A recessed, captive, penta-head or hex-head bolt that meets the dimensions per IEEE Std C57.12.28 standard shall secure all access doors. Handles and doors shall be provided with provisions for padlocking.

4. The compartment depth shall be in accordance with IEEE Std C57.12.34 standard, unless additional depth is specified.
5. Transformer enclosures shall be provided with a 304L stainless steel cabinet, door, & sill.
6. All hardware, handles, and hinges shall be 304L stainless steel.
7. Enclosure shall meet ANSI C56.12.28 for coating and ANSI C57.12.28 for enclosure integrity.

C. TANK

1. The transformer tank shall be carbon steel with a 304L stainless steel base.
2. Bolted main tank cover, where applicable.
3. The compartment depth shall be in accordance with C57.12.34.
4. The tank base shall be designed to allow skidding or rolling in any direction. Lifting provisions shall consist of four lifting lugs welded to the tank.
5. The tank shall be constructed to withstand 7 psi without permanent deformation, and 15 psi without rupture. The tank shall include a 15-psig pressure relief valve with a minimum flow rate of 35 SCFM.

2.9 PAINTING

- A. The transformer unit shall be painted Munsell 7GY3.29/1.5 green. All parts of the transformer shall be painted.
- B. The tank and cabinet coating shall meet all the requirements of ANSI C57.12.28 including:
 1. Salt Spray Test.
 2. Crosshatch Adhesion Test.
 3. Humidity Test.
 4. Impact Test.
 5. Oil Resistance Test
 6. Ultraviolet Accelerated Weathering Test.
 7. Abrasion Resistance - Taber Abraser.

2.10 INSULATING OIL

The dielectric coolant in the transformer shall be highly refined Type II inhibited new mineral oil and meet the minimum requirements as specified in Table 1, "Functional Property Requirements," of ASTM D3487 and ANSI C57.106.

2.11 NOISE

Standard transformer sound level shall not exceed the values given in Table 0-3 of the latest edition of NEMA Publication TR1.

2.12 NAMEPLATES & LABELS

- A. Diagrammatic nameplate that conforms to the latest edition of ANSI C57.12.00. Impedance of the transformer shall be included on the nameplate. The nameplate shall be etched and black-filled aluminum or stainless steel. Affix to the enclosure with rivets.
- B. Safety labels shall be provided with each transformer. Safety labels shall meet the latest edition of NEMA Standard No. 260. Labels shall be made of weather resistant material per the latest edition of NEMA Standard 9.15 and UL969.
- C. In addition to warning labels, provide a label indicating the transformer kVA rating on the front of the transformer, in minimum 2-1/2" black letters.

2.13 ACCESSORIES

Provide the following accessories:

- A. Three-Phase Transformers 225 kVA and larger:
 - 1. Bolted main tank cover.
 - 2. 1.0" upper fill plug.
 - 3. 1.0" drain valve with sampling device in LV compartment.
 - 4. Tank anchoring.
 - 5. Automatic pressure relief valve.
 - 6. Metal drip shield.
 - 7. Ground provisions per C57.12.34 section 9.11.
 - 8. Meet NEMA TR-1 sound levels.
 - 9. Liquid level gauge.
 - 10. Dial-type thermometer gauge.
 - 11. Pressure vacuum gauge.

2.14 GROUND SLEEVE

Provide a ground sleeves as indicated in the Bid Schedule. Ground sleeves shall be sized for the associated transformer, minimum 24 inches high, with cable entrances. Color shall be Munsell green. Nordic Fiberglass, Inc., or approved equal.

PART 3 – EXECUTION

3.1 TESTING AND LOSSES

- A. All units shall be tested for the following:
 - 1. No Load (Core) Losses.
 - 2. Load Losses at 85°C and rated current.
 - 3. Percent Impedance at 85°C and rated current.
 - 4. Excitation current (100% voltage) test.
 - 5. Winding resistance measurement tests.
 - 6. Ratio tests using all tap settings.
 - 7. Polarity and phase relation tests.
 - 8. Induced potential tests.
- B. The manufacturer shall provide certification for all design and other tests listed in Table 17 of ANSI C57.12.00 including verification that the design has passed Short Circuit Criteria per ANSI C57.12.00 and C57.12.90.

- C. One PDF copy of the factory certified test report of each test, in IEEE 1388 format, shall be delivered to the Engineer prior to shipment of the transformers.

3.2 SHIPPING

- A. The transformers shall be packaged to protect from damage during shipment, handling and storage.
- B. The transformers shall be shipped complete and fully assembled. Each transformer shall be fastened to a pallet to allow loading and unloading with a forklift.
- C. Exterior of shipping unit shall carry identification of contents.

END OF SPECIFICATION