

**LEGAL NOTICE - BD-11-18**

Sealed bids will be received by the officers of the Board of Public Utilities (BPU), City of Jamestown, New York, at its 92 Steele Street office until 1:30 PM, Eastern Daylight Time, *Tuesday June 5, 2018*, for the supply of labor, materials, equipment, supervision, and technical direction for *One Power Transformer*.

Detailed specifications and bid forms may be obtained at the office of the Board of Public Utilities located at 92 Steele Street, Jamestown, New York or at [www.jamestownbpu.com](http://www.jamestownbpu.com) under quick links, choose Legal Notice. Note that all laborers, workers and mechanics working on the construction site described by these specifications must be certified as having successfully completed the OSHA 10-hour construction safety and health course.

The BPU reserves the right to reject any or all bids, the right to waive any informalities, the right to permit exceptions deemed not to be of substance, and the right to accept any bid which the BPU deems to represent the prudent and economical expenditure of the public monies for the benefit of its customers by securing the maximum quality at the lowest possible cost.

Bids shall be placed in a sealed envelope addressed to the General Manager, Board of Public Utilities, City of Jamestown, New York, be plainly marked on the outside, "PROPOSAL NO. BD-11-18" and be delivered at the Board's office located at 92 Steele Street.

David Leathers, General Manager  
Board of Public Utilities  
City of Jamestown  
92 Steele Street  
Jamestown, New York 14701

May 9, 2018

Contents

- I. INSTRUCTION TO BIDDERS..... 5
  - A. INSTRUCTION TO BIDDERS ..... 5
  - B. APPROVED BIDDERS ..... 6
  - C. DEFINITION OF TERMS ..... 7
  - D. AUTHORITY OF BIDDERS..... 8
  - E. INTERPRETATION OF SPECIFICATIONS ..... 8
  - F. STANDARDS AND SUBSTITUTIONS..... 8
  - G. EXCEPTIONS..... 9
  - H. BULLETINS/PROJECT COMMUNICATION..... 10
    - BPU TECHNICAL LEAD..... 10
    - BPU ADMINISTRATIVE LEAD ..... 10
- II. LEGAL REQUIREMENTS..... 11
  - A. INTERPRETATION OF SPECIFICATIONS ..... 11
  - B. ORAL STATEMENTS NOT BINDING ..... 11
  - C. SUITS IN COURTS ..... 11
  - D. LAWS TO BE OBSERVED ..... 11
  - E. PREVAILING WAGES ..... 11
  - F. SAVE HARMLESS ..... 12
  - G. INDEPENDENT MANUFACTURER ..... 12
  - H. SUBCONTRACTORS ..... 12
  - I. HAZARDOUS WASTES ..... 12
  - J. INSURANCE ..... 12
  - K. PATENTS..... 14
  - L. NO WAIVER OF LEGAL RIGHTS..... 14
  - M. CONFLICTING TERMS ..... 14
- III. FINANCIAL ..... 15
  - A. INTENT AND MEANING OF SPECIFICATIONS ..... 15
  - B. PERFORMANCE GUARANTY ..... 15
  - C. TRANSFORMER LOSS EVALUATION ..... 15
  - D. WARRANTY ..... 15
  - E. TERMS OF PAYMENT ..... 16
  - F. CHANGES IN WORK..... 16
  - G. INCIDENTAL WORK AT MANUFACTURER'S EXPENSE..... 17
  - H. PURCHASER NOT LIABLE ..... 17

- I. ACCEPTANCE..... 17
- IV. FORMS AND TABLES ..... 18
  - A. TABLE 1 ..... 18
  - B. FORM OF PROPOSAL ..... 19
  - C. BID DATA SHEET..... 21
  - D. GUARANTY FOR PROPOSAL CONTRACT ..... 22
  - E. NON-COLLUSIVE BIDDING CERTIFICATION – CORPORATION..... 23
  - F. NON-COLLUSIVE BIDDING CERTIFICATION ..... 24
- V. GENERAL INFORMATION ..... 25
  - A. WORK SITE DESIGNATION ..... 25
  - B. PROJECT/SITE CONDITIONS ..... 25
  - C. SUPERINTENDENT, WORKMEN, ORDERS, ETC..... 26
  - D. WORK SITE SAFETY ..... 27
  - E. USE OF BPU TOOLS AND EQUIPMENT ..... 28
  - F. PROGRESS REPORTS ..... 28
- VI. DELIVERY, STORAGE, AND HANDLING..... 29
  - A. SHIPMENT OF MATERIALS, EQUIPMENT, AND SPARES ..... 29
    - PROJECT DELIVERY ADDRESS: ..... 29
    - SPARE PARTS DELIVERY ADDRESS: ..... 29
  - B. DELIVERY RESPONSIBILITIES ..... 29
  - C. DELIVERY SCHEDULE ..... 30
  - D. TRANSPORTATION AND HANDLING..... 30
  - E. FIELD ASSEMBLY AND FILLING ..... 31
- VII. TESTING REQUIREMENTS ..... 32
  - A. FACTORY INSPECTION /WITNESS TESTING ..... 32
  - B. FACTORY TESTING..... 32
  - C. FIELD TESTING ..... 33
- VIII. SUBMITTALS AND DRAWINGS ..... 34
  - A. SUBMITTAL SCHEDULE ..... 34
  - B. SHOP DRAWING REVIEW COMMENTS ..... 34
  - C. SUBMITTAL PRESENTATION..... 35
  - D. REQUIRED SUBMITTALS..... 35
  - E. INSTRUCTION MANUAL CONTENT ..... 36
- IX. DETAILED TECHNICAL INFORMATION ..... 38
  - A. GENERAL TECHNICAL..... 38

- B. TRANSFORMER SIZE AND LAYOUT REQUIRMENTS ..... 38
- C. ELECTRICAL SPECIFICATIONS ..... 38
- D. WIRING ..... 39
- E. TERMINAL BLOCKS..... 39
- F. CONDUIT ..... 40
- G. PAINTING ..... 40
- H. COMPONENTS ..... 40
  - 1. Transformer Tank..... 40
  - 2. Core ..... 41
  - 3. Windings..... 41
  - 4. Air terminal Compartments ..... 41
  - 5. Bushings ..... 42
  - 6. Insulating Boots..... 43
  - 7. Main Transformer Control Cabinet ..... 43
  - 8. Bushing Current Transformers ..... 44
  - 9. Surge Arresters ..... 44
  - 10. Cooling Equipment..... 45
  - 11. Transformer Oil..... 45
  - 12. Oil Preservation System ..... 46
  - 13. De-Energized Tap Changer (DETC) ..... 46
  - 14. Automatic Load Tap Changer (LTC) ..... 46
  - 15. Additional Gauges, Instruments, controls ..... 48
  - 16. General Accessories ..... 48
  - 17. Name Plates ..... 49
- I. SPARE PARTS ..... 49

## I. INSTRUCTION TO BIDDERS

### A. INSTRUCTION TO BIDDERS

Proposals for the work referred to in the foregoing Legal Notice and covered by the attached Specifications, must be submitted within the specified time and must be accompanied by such information as the Specifications require. When bidding on this work, Bidders shall use the forms included with these Specifications, returning the same, intact, with such supplementary specifications, data, drawings, etc., as are to be included. **Table 1** provides a checklist summary of these requirements. In addition, when so designated, requirements related to providing good faith through financial deposits or bonds must be complied with.

A bid cannot be withdrawn after the expiration of the time set for receiving bids, nor can any change in price or other details be made by letter, telegram, or verbal statement. The prices and other information must be legibly written (or printed) in ink, the bid price, or prices being written in words as well as figures.

Bidders must acquaint themselves fully with the amount and nature of the work to be done by carefully studying the Specifications and drawings and by visiting the site, examining existing construction, and inquiring into any local conditions which may affect their work.

No bid will be accepted from, nor will any contract be awarded to any person or company who is in arrears with the Board of Public Utilities upon debt or contract, or who is in default, as surety or otherwise, upon any obligation to said Board or whose work has heretofore proven unsatisfactory or dilatory.

When designated as a requirement by **Table 1**, the proposal shall be accompanied by a Proposal Bond issued by a surety company authorized by license to write insurance contracts in New York State and rated "A" or better by A. M. Best Company, Inc. in Best's Key Rating Guide, and otherwise acceptable to the BPU, or by a certified check on a solvent bank in an amount of at least ten percent (10%) of the amount bid, as an evidence of good faith that the Bidder will, within ten (10) days after the date of notification that its Proposal has been accepted, enter into a contract with the Board of Public Utilities of the City of Jamestown (BPU), New York, to execute its proposal. If a certified check is furnished, it shall be drawn to the order of the Treasurer of the City of Jamestown, New York. If a Proposal Bond is furnished, it shall be on the blank form attached hereto.

Also when designated as a requirement by **Table 1**, each Bidder shall furnish with the Proposal, a "Statement of Surety" to the effect that, should the bid be accepted, the Surety is willing to provide a Performance Bond in the sum of one hundred percent (100%) of the contract price, conditioned upon the faithful and satisfactory performance of all obligations and requirements of the contract and guaranty of materials and workmanship for one year following final acceptance of the work by the BPU. The Performance Bond shall not expire earlier than six months after the expiration of the Contract, including all warranty periods.

If the Bidder to whom this Contract is awarded fails to sign same, and provide the required Performance Bond within ten (10) days after the award is made, the award may be canceled and in that event, the Bidder will forfeit to the BPU such portion of the check or Proposal Bond as may be required to pay the difference between its bid and that of the Bidder who shall eventually accept and fulfill the contract, or

shall be used to reduce the cost of the work if done by the BPU.

A bid which is not accompanied by the required certified check or Proposal Bond, or a bid which is incomplete, or which contains alterations, erasures, discrepancies, or a conditional proposal, or a bid in which the surety company is not named, may be rejected. All certified checks will be returned to their respective depositors immediately after the contract has been signed and the MANUFACTURER's Performance Bond herein required has been furnished and approved by the BPU's properly authorized representatives.

The BPU reserves the right to reject any bid or all bids, the right to waive any informalities, the right to permit exceptions deemed not to be of substance, and the right to accept any bid which the BPU deems to represent the prudent and economical expenditure of the public moneys for the benefit of the BPU's ratepayers by securing the maximum quality at the lowest possible cost.

All proposals shall be submitted in an opaque sealed envelope or package plainly marked on the outside with the name, address, and phone number (including FAX number) of the person, firm, partnership, or corporation bidding and the name of their respective representatives whom they expect to be present when the bids are opened. The SPECIFICATION - PROPOSAL - CONTRACT NUMBER on which the bid is submitted shall be plainly marked on the outside of the sealed envelope containing the bid. If forwarded by US Mail, the envelope containing each proposal shall be placed in another envelope addressed to Mr. David Leathers, General Manager, Board of Public Utilities, PO Box 700, Jamestown, New York 14702-0700. If forwarded other than by US Mail, it must be delivered to Mr. David Leathers, General Manager, Board of Public Utilities, 92 Steele Street, Jamestown, New York 14701.

An original and two (2) complete copies of the Proposal shall be provided in sealed envelopes marked "BD-11-18 - COPIES" and include the bidders' information as indicated above.

Two (2) proposals from a firm, corporation, or association under different names will not be considered. Reasonable grounds for supposing that any bidder is interested in more than one proposal for this work will be cause for the rejection of all proposals in which it has been interested. Any or all proposals will be rejected if there is reasonable ground for supposing that there is collusion among bidders, and all participants in such collusion will receive no further recognition for this work.

The Bidder shall submit a complete proposal providing prices for all options and supply any information (with the proposal) which may be required to completely evaluate its proposal, or the bid may be declared irregular.

If the Bidder should encounter any condition not provided for in the Contract Documents, that will affect its bid or the performance of its contract obligations should the Bidder be awarded the contract, the Bidder shall notify the BPU in writing, at least five (5) days prior to the opening of the bids and enclose a copy of such letter with the bid.

## B. APPROVED BIDDERS

The transformer, including the core and coil assembly, shall be manufactured in the continental United States.

The Purchaser's approved manufacturers are as follows:

1. Delta Star
2. WESCO (for ABB)
3. Waukesha Electric
4. Niagara Transformer
5. Pennsylvania Transformer
6. Virginia Transformer

Manufacturers with a minimum of fifteen (15) years of experience may request the Purchaser to designate it as an "Approved Manufacturer" at any time. The initial information required by the Purchaser to evaluate the Manufacturer includes, but is not limited to, the following:

1. Manufacturer's marketing brochures and information
2. Listing of transformer users with contact names and phone numbers
3. Historical description of manufacturer's business
4. Certified Design Test Reports for the type of assemblies utilized by the Purchaser.
5. Quality Assurance Manual
6. Examples of drawings and documentation typically provide
7. Financial information and credit references demonstrating the financial condition of the Manufacturer
8. Professional experience history of the manufacturer's principal design engineers on the permanent staff of the manufacturer
9. Field service capabilities to support the installation and long-term integrity of the manufacturer's equipment

### C. DEFINITION OF TERMS

The terms and expressions used in these specifications and contract shall be understood as follows:

1. The word "BPU" or "JBPU" to mean the City of Jamestown, New York acting through its Board of Public Utilities.
2. "Bid Specifications" refers to the entire package of documents.
3. The word "Bidder" to mean any individual, firm or corporation submitting a proposal to the Board of Public Utilities of the City of Jamestown, New York.
4. "Contract" shall refer to a purchase order.
5. The word "Manufacturer" to mean any individual, firm or corporation undertaking this contract with the City of Jamestown, New York.
6. The word "General Manager" to mean the General Manager of the Board of Public Utilities, City of Jamestown, New York.
7. The word "Inspector" to mean the person appointed to inspect the materials used and the work performed under this contract.

8. "Performance Bond" N/A
9. "Proposal Bond" shall mean the written financial guaranty of a financial guarantor (surety) that the bidder will execute a contract with the BPU upon notification that the bid has been awarded to that MANUFACTURER.
10. The word "days" when used in this contract shall be held to mean calendar days unless otherwise specified.
11. The "amount of the contract" shall be held to mean the total amount bid in the Manufacturers proposal.
12. The word "MANUFACTURER" shall be held to have the same meaning as "Manufacturer"
13. "Products" means new material, machinery, components, equipment, fixtures, systems and manufactured units used in Work. Does not include machinery and equipment used for preparation, fabrication, conveying and erection of the work.

#### D. AUTHORITY OF BIDDERS

If the bid is made by a firm or partnership, the name and the place of residence of each member of the firm or partnership must be given. If made by a corporation, the person signing the bid shall state under the laws of what state the corporation was chartered and the name and title of officer or officers having authority under the by-laws to sign contracts. Anyone signing a proposal as agent must file it with legal evidence of their authority to do so.

#### E. INTERPRETATION OF SPECIFICATIONS

The documents in this bid package are collectively intended to describe and provide for the complete work and each form a part of the Contract (s). They are to be cooperative and what is called for by one is as binding as if called for by all. It is important, therefore, that Bidders familiarize themselves with all documents.

#### F. STANDARDS AND SUBSTITUTIONS

The names or make of any article, device, material, form of construction, fixture, etc., named in these specifications whether or not the words "or equal" are used, shall be known as "standard".

All proposals shall be based on the standards specified.

Where two or more standards are named together, Bidders may bid on any of the standards named, regardless of the order in which they are named.

Bidders are invited to submit substitutions for the standards specified, provided:

1. They name the substitution bid upon and the additions or deduction they will make to, or from their base bid provided each substitution is approved by the BPU.

2. The substitute bid upon shall be written on a substitute blank and attached to the formal proposal.
3. The complete specifications and a description of the substitution bid upon shall be furnished to the BPU prior to the award of the contract.

If the Bidder names no substitutions, the standards as specified shall be used.

The MANUFACTURER shall hold current certificates of authorization to cover all work covered by these specifications and shall provide appropriate documentation to the JBPU. All materials, equipment, and labor supplied must be suitable for the intended service and shall comply with the latest edition of all applicable local, State and Federal laws, guidelines and regulations, including applicable local, State or Federal building, fire and electrical codes and standards. All shop fabricated work shall be subject to inspection by the JBPU or any agent assigned by the JBPU. The MANUFACTURER shall bear any Code inspection costs and shall obtain all necessary permits, licenses and authorizations to complete the work.

At a minimum design, manufacture and test in accordance with this section and applicable sections of the latest revision of the following standards:

1. ANSI B16.5, Slip-on Welding Flanges
2. ANSI C57 and NEMA TR-1, Transformers, Regulators and Reactors
  - a. ANSI C57.12.00, Testing
  - b. ANSI C57.12.90, Testing
3. ANSI C57.19, Apparatus Bushings
4. ANSI C57.92, NEMA TR-98 overload capabilities
5. ANSI C57.106, Oil
6. ANSI C57.104, DGA
7. ANSI C62, Surge Arresters
8. ANSI C 76.1 and C37.09a.
9. ANSI C80.1, Standard Specifications for Rigid Steel Conduit
10. ANSI Z55.1, Standard Gray Finishes for Industrial Apparatus and Equipment
11. ASCE 7, Minimum Design Loads for Buildings and Other Structures
12. ASTM D-3487, Mineral Insulating Oil Used in Electrical Apparatus
13. IEEE, Latest Short Circuit Withstand Requirements
14. IEEE 693-1997, Recommended Practice for Seismic Design of Substations. The seismic qualification level shall be "MODERATE".
15. ICEA, Specifications for Wire and Cable
16. NEC, Current rating of Control Wiring
17. NEMA 1C-1, Standard for Industrial Control

## G. EXCEPTIONS

Any exceptions to the bidding specifications shall be noted on the Proposal Form in the space provided, if additional space is required the Bidder shall note in the space that the exceptions are stated on an attached page(s). The attached page(s) shall be numbered and inserted immediately following the signature page of the Proposal Form and clearly titled "EXCEPTIONS"

## H. BULLETINS/PROJECT COMMUNICATION

It shall be understood that any bulletins issued from time to time to furnish additional information to the bidders shall become an integral part of these specifications. Receipt of bulletins shall be acknowledged by the bidders in the space provided on the proposal sheet.

### NOTES:

1. The bidding documents may be obtained at the offices of the Board of Public Utilities by any approved bidder.
2. Bidders should provide any questions concerning the proposal in writing. The questions and requests for information should be submitted in writing to the following address, all questions submitted will be answered in writing along with any documentation being sent to all prospective bidders and who have previously obtained the bid documents. Address all correspondence to:

### BPU TECHNICAL LEAD

David Paterniti/ Substation Engineer  
Jamestown Board of Public Utilities  
P.O. Box 700  
Jamestown, NY 14702-0700  
(716) 661-1622  
FAX (716) 661-1645  
E-Mail: dpaterniti@jamestownbpu.com

### BPU ADMINISTRATIVE LEAD

Todd Hoaglund/ Purchasing Agent  
Jamestown Board of Public Utilities  
P.O. Box 700  
Jamestown, NY 14702-0700  
(716) 661-1662  
FAX (716) 661-1645  
E-Mail: thoaglund@jamestownbpu.com

## II. LEGAL REQUIREMENTS

### A. INTERPRETATION OF SPECIFICATIONS

Should any misunderstanding arise as to the intent or meaning of the plans or Bid Specifications, or any discrepancies appear in either, the decision of the General Manager in such case shall be final and conclusive.

No person or persons except the General Manager or his designee shall have the power to revoke, alter, enlarge, or relax the stipulations or requirements of these specifications. No interpretation of the meaning of the plans, specifications or other documents will be made by the JBPU to any bidder orally. Every request for interpretation shall be made to the JBPU in writing at the address listed herein, and must be received seven (7) days prior to the date fixed for the opening of bids. Each response will be transmitted to each bidder that received a copy of the Bid Specifications.

### B. ORAL STATEMENTS NOT BINDING

It is understood that the written terms and provisions of these specifications, as incorporated into a Contract, supersede all prior oral statements of officers of all parties to the Contract and such statements shall not be effective or be construed as entering into or forming part of, or altering in any way, the written Contract.

### C. SUITS IN COURTS

These Bid Specifications, and any Contract incorporating them, shall be interpreted in accordance with the laws of the State of New York. Any action brought against the JBPU or its officers or agents under this Contract shall be brought in the courts of the State of New York, Chautauqua County.

### D. LAWS TO BE OBSERVED

The MANUFACTURER at all times shall observe and comply with all Federal, State and City laws, ordinances, and regulations, in any manner affecting the conduct of the work, and all such orders or decrees as exist at present and those that may be enacted later, of bodies or tribunals having any jurisdiction or authority over the work, and shall indemnify and save harmless the JBPU and all its offices, officers, agents, and employees, against any claim or liability arising from or based on the violations of any such law, ordinance, regulation, order, or decree, whether by the MANUFACTURER, or its employees or subcontractors.

### E. PREVAILING WAGES

Work performed under this contract is public work subject to New York State Prevailing Wages for Chautauqua County. The relevant prevailing wage schedule and other applicable requirements may be viewed by referencing:

<https://applications.labor.ny.gov/wpp/publicViewProject.do?method=showIt&id=1452880>

The MANUFACTURER shall post the prevailing wage schedule at the job site in an area that is visible to employees. All employees performing work pursuant to this contract, whether employed by the MANUFACTURER or subcontractors thereof, shall be paid in accordance with the prevailing wage schedule. The MANUFACTURER shall provide the BPU with copies of certified payrolls upon request.

#### F. SAVE HARMLESS

MANUFACTURER agrees to indemnify and save harmless the JBPU from and against any loss, expense, claims by reason of damage to property, or for bodily injury or both arising out of the performance of this Contract where such damage or injury is attributable to the negligence of MANUFACTURER or its subcontractors, and in the event that such damage or injury is caused by the joint or concurrent negligence of the JBPU, the loss shall be borne by the MANUFACTURER and the JBPU proportionately to their degree of negligence.

#### G. INDEPENDENT MANUFACTURER

The relationship between the MANUFACTURER and JBPU shall be that of an independent MANUFACTURER and not that of agent or employee. The MANUFACTURER, its employees, subcontractors and material suppliers shall, at all times during the term of the contract, conduct themselves in a matter consistent with this status and shall not hold themselves out as, or claim to be, acting in the capacity of officers, employees, agents, representatives or servants of the BPU, nor make any claim, demand or application for any right or privilege applicable to an employment relationship, nor have the right to bind the BPU to any obligation or liability to any third party.

#### H. SUBCONTRACTORS

No part of this Contract shall be assigned, nor the work be sublet, to any MANUFACTURER or subcontractor without the express written consent of the JBPU upon a written request by the MANUFACTURER. Permission by the JBPU to sublet or subcontract all or any portion of the work shall not relieve the MANUFACTURER from full responsibility for the work included in this contract, and for the due performance of all the terms and conditions of this contract. The JBPU will not grant authority to assign or subcontract any work unless and until the MANUFACTURER has furnished the JBPU with satisfactory evidence that the MANUFACTURER is able to meet the insurance requirements to the same extent and in the same manner as herein provided to be furnished by the MANUFACTURER.

#### I. HAZARDOUS WASTES

Unless stated otherwise in the Technical Specifications, the MANUFACTURER shall be responsible for the removal of all hazardous wastes used or generated on the site under this contract.

#### J. INSURANCE

The MANUFACTURER shall procure and maintain at its own expense and without expense to the JBPU, until final acceptance by the JBPU of the work covered by the contract, and covering the full periods covered by the contract, insurance for liability for damages of the kinds and in the amounts hereinafter provided. Said insurance shall be procured through insurance companies authorized by license to write

insurance contracts in New York State and rated "A" or better by A. M. Best Company, Inc. in Best's Key Rating Guide, and otherwise acceptable to the JBPU covering all operations under the contract whether performed by it or by subcontractors. Before commencing the work, the MANUFACTURER shall furnish to the JBPU a certificate or certificates of insurance in forms satisfactory to the JBPU showing that it has complied with this paragraph. The kinds and amounts of insurance are as follows:

	COVERAGE	LIMITS OF LIABILITY
1.	Worker's Compensation Including U S L & H	Statutory
2.	Employer's Liability Including: Owned, non-owned, hired Including: Environmental Restoration Endorsement	\$1,000,000 occurrence BI & PD Combined
3.	Comprehensive Automobile Liability Including: Owned, non-owned, hired Including: Environmental Restoration Endorsement	\$1,000,000 each occurrence BI & PD Combined
4.	Comprehensive General Liability Including: Premises & Operations; X, C, U Coverage's; Personal Injury Liability; Completed Operations & Product Liability; Environmental Impairment Liability	\$1,000,000 per occurrence, \$2,000,000 aggregate, BI & PD Combined
5.	Umbrella Liability - First Layer	\$5,000,000 per occurrence
6.	Builder's Risk	Not required

- Notes:** U S L & H - United States Longshoreman & Harbor Compensation Act  
 X - Explosion  
 C - Collapse  
 U - Underground  
 BI - Bodily Injury  
 PD - Property Damage

All policies of insurance for public liability as above provided shall name the Board of Public Utilities and City of Jamestown as an additional insured and provide for a 30-day notice prior to cancellation. In the event that the MANUFACTURER fails to meet these requirements for the duration of the contract, the JBPU may continue the MANUFACTURER's insurance or procure insurance protecting the interests of the JBPU at the expense of the MANUFACTURER.

THE FOLLOWING PARAGRAPH MUST BE TYPED ON THE CERTIFICATE OF INSURANCE TO INDICATE THAT THE INSURANCE POLICIES INCLUDE THE MANUFACTURER'S INDEMNIFICATION OBLIGATION: "**The MANUFACTURER shall indemnify, hold harmless and defend the Jamestown Board of Public Utilities from any and all damages and liability by reason of personal injury, or property damage arising either directly or indirectly from the work to be performed under the terms of this contract.**"

Included with the Proposal the Person(s) shall supply either a certificate showing the meeting of the above levels of insurance, or a statement from its insurance agent that the above levels will be supplied.

If the MANUFACTURER proposes the furnishing of insurance levels lower than those indicated above it shall be so stated and noted as an exception to the proposal. In making the exception the MANUFACTURER shall indicate the cost of obtaining the limits requested herein, as a deduction to the base bid to arrive at the MANUFACTURER's proposed levels. Where possible the MANUFACTURER shall supply as much detailed information including costs for various levels of insurance to allow complete evaluation of its proposal.

#### K. PATENTS

The MANUFACTURER agrees that it will, at its own expense, defend all suits or proceedings instituted against the JBPU and pay any award of damages assessed against the JBPU in such suits or proceedings, insofar as the same are based on any claim that the said apparatus or any part thereof constitutes an infringement of any patent of the United States, provided the JBPU gives to the MANUFACTURER prompt notice in writing of the institution of the suit or proceeding and permits the MANUFACTURER through its Counsel to defend the same and give the MANUFACTURER all needed information, assistance, and authority to enable the MANUFACTURER so to do. In case such apparatus is in such suit held to constitute infringement and its use is enjoined, the MANUFACTURER, within a reasonable time, will either secure for the JBPU a license or will, at its own expense, replace such apparatus with non-infringing apparatus or modify it so that it becomes non-infringing or remove the said enjoined apparatus and refund the sums paid therefor. In the event any or all apparatus need be replaced, the replacing apparatus shall be to the satisfaction of the JBPU. The foregoing (patent indemnity) shall not apply to any apparatus furnished or specified by the JBPU and/or agents.

#### L. NO WAIVER OF LEGAL RIGHTS

Neither the inspection by the JBPU, nor by any of its duly authorized agents, nor any order, measurement, or certificate by the JBPU, or said agents nor any orders by the JBPU for the payment of money, nor any payment for, nor acceptance of, any work by the JBPU, nor any possession taken by the JBPU or its duly authorized agents, shall operate as a waiver of any provision of this Contract, or of any power herein reserved to the JBPU, or any right to damage herein provided, nor shall any waiver of breach of this Contract be held to be a waiver of any subsequent breach.

#### M. CONFLICTING TERMS

The terms of this Bid Specification shall be incorporated into any contract arising there from. If any conflict arises between these Specifications and a subsequent Contract, the terms of the Contract shall prevail.

### III. FINANCIAL

#### A. INTENT AND MEANING OF SPECIFICATIONS

It is the intent and meaning of the specifications that the price bid is to include all expenses in connection with furnishing all labor, materials, tools, equipment, and supervision to completely perform the items covered by the attached Technical Specifications, whether or not all items necessary for such complete assembly of the items of equipment are mentioned in these specifications (except those items which are specifically stated to be furnished by the JBPU).

#### B. PERFORMANCE GUARANTY

When designated as a requirement by **Table 1**, the MANUFACTURER shall furnish a Performance Bond to the JBPU in the amount of one hundred percent (100%) of the contract price as a guaranty that all work done under this contract will fully comply with the requirements of the plans and specifications. This bond shall be issued by a surety company authorized by license to do business in the State of New York, and the company issuing the bond shall be rated "A" or better by A. M. Best Company, Inc. in Best's Key Rating Guide. The Performance Bond shall guaranty the workmanship and materials required by the Bid Specifications and, if the MANUFACTURER uses subcontractors or material suppliers, the Performance Bond shall include a payment bond to guarantee the payment to subcontractors and material suppliers. The Performance Bond shall not expire earlier than six months after the expiration of the Contract, including all warranty periods.

#### C. TRANSFORMER LOSS EVALUATION

If the tested losses for the transformer do not exceed the quoted guaranteed maximum losses, the transformers will be accepted.

If the tested No-Load losses for the transformer exceed the quoted guaranteed maximum No-Load losses, a sum equal to the excess amount of the No Load loss times the No Load loss factor will be deducted from the contract dollar amount. Credits will not be issued for tested losses below quoted values.

If the tested Load-Loss losses for the transformer exceed the quoted guaranteed maximum Load-Loss values, a sum equal to the excess amount of the Load-Loss times the Load-Loss factor will be deducted from the contract dollar amount. Credits will not be issued for tested losses below quoted values.

1. No load loss (NLL) factor: \$ 4510.49 per kW at nominal voltage ratings
2. Load loss (LL) factor: \$ 1624.79 per kW at ONAN rating
3. Evaluated price =  $NLL(kw) \times 4510.49 + LL(kw) \times 1624.79 + \text{Purchase Price}$

#### D. WARRANTY

Include in the base bid cost a warranty that covers a period of 12 months from the date of energization, or 18 months from the date of acceptance by the OWNER, whichever is shorter. Warranty shall include rigging and transport costs to and from the factory if factory repair is required.

Provide an additional cost in the appropriate line item on the bid form for five (5) year extended warranty coverage in lieu of the standard warranty above. The five-year warranty shall provide coverage for a period of 60 months from energization, or 66 months from date of acceptance by the OWNER, whichever is shorter. The extended Warranty shall include rigging and transport costs to and from the factory for at least the first 12 months after energization if factory repair is required.

## E. TERMS OF PAYMENT

Payments on account of the work done by the MANUFACTURER will be made by the JBPU on monthly detailed invoices submitted by the MANUFACTURER and approved by the General Manager of the Board of Public Utilities.

Ten percent (10%) of the amount of each invoice will be deducted and retained by the JBPU pending final completion and acceptance of the work by the JBPU, including a lien search. Invoices submitted on or before the eighth day of each calendar month will be paid on or before the 28th day of the same month providing the invoice is approved by the General Manager of the Board of Public Utilities. The JBPU reserves the right to retain additional amounts equal to the value of mechanics liens properly filed. Said retained amounts shall be paid to the MANUFACTURER upon proof of release of mechanics liens.

Monthly invoices will not include any allowance for raw material delivered to the site of the work which has not been actually used in the progress of the construction of the work contemplated by these specifications unless agreed to by the MANUFACTURER and the JBPU. A partial payment of this contract will in no way signify the final approval of any portion of the work.

Final payment of the contract price, including retained percentages, will be made after the regular Board meeting, normally the third Monday of the month, following the final acceptance of the work by the JBPU, the submission of the maintenance guarantee as required by these specifications and the furnishing by the MANUFACTURER of satisfactory releases of claims, liens, and claims for liens of subcontractors, workmen, MANUFACTURERS of material and equipment and all other persons and/or firms in any way performing service or furnishing labor, equipment, or materials to the MANUFACTURER in connection with the project covered by these specifications.

Failure to deliver in accordance with the DELIVERY SCHEDULE VI.C will result in a reduction of the contract purchase price as follows:

Delivery 8 to 14 days from DELIVERY SCHEDULE date – 1% reduction.

Delivery 15 to 21 days from DELIVERY SCHEDULE date – 3% reduction.

Delivery 22 to 28 days from DELIVERY SCHEDULE date – 6% reduction.

Delivery 29 to 35 days from DELIVERY SCHEDULE date – 7% reduction.

An additional reduction of 1% shall be made for each 7 days in which delivery is made beyond 35 days.

No reduction will be made for each week in which the bidder can demonstrate that the delay in delivery was directly caused by the fault of the BPU.

## F. CHANGES IN WORK

In case it becomes necessary to perform extra work of a character not covered by this contract, or the JBPU desires to omit some work specified in the work scope, it shall be done by the MANUFACTURER when so agreed upon by the JBPU and MANUFACTURER in writing in the form of a Change Order. Extra work shall be paid for by the JBPU on the same basis as contract work. Omitted work shall be

taken as a deduction against future payments.

#### G. INCIDENTAL WORK AT MANUFACTURER'S EXPENSE

All work to be done by the MANUFACTURER, specified or mentioned in the plans or specifications, as well as minor details of work not specifically mentioned but obviously necessary for the proper completion of the work, shall be considered as incidental, and as being a part of, and included in, the contract. The MANUFACTURER will not be entitled to any extra or additional compensation for the same.

#### H. PURCHASER NOT LIABLE

Neither the JBPU, nor any agent, officer, nor representative thereof, shall be liable for, or be held to pay any money to the MANUFACTURER, except as herein provided; and the acceptance by the MANUFACTURER for the final payment shall operate as and shall be a release to the JBPU, its officers, and agents, from all claims and liability to the MANUFACTURER for anything done, or furnished for, or relating to the work, or for any act or neglect of the JBPU or any person relating to or affecting the work.

#### I. ACCEPTANCE

Acceptance shall be made by the JBPU based on the compliance of the equipment with the specifications requirements, as determined by the General Manager. Compliance shall be judged by the results of test, operation and inspection.

The MANUFACTURER hereby agrees that the final inspection and acceptance of the work is to take place at the completion of the entire work under the contract, and that any inspection or acceptance of materials and workmanship at the mills, shops, or elsewhere, to facilitate the progress of the work shall not waive the JBPU's right to reject said materials or workmanship thereafter if same be found unsuitable or not in complete accord with the specifications.

## IV. FORMS AND TABLES

### A. TABLE 1

Document	<u>Required (Y/N)</u>	Provided
Bidder's Federal Tax Identification Number:	<u>Yes</u>	_____
Guaranty for Proposal Contract (Proposal Bond)	<u>Yes</u>	_____
-or-		
Certified Check (if permitted in bid specifications)	<u>Yes</u>	_____
Form of Proposal	<u>Yes</u>	_____
Statement of Surety related to Performance Bond	<u>No</u>	_____
Non-Collusive Bidding Certification (provide one)	<u>Yes</u>	_____
(Corporation)		_____
(Individual or Partnership)		_____
Site Visit Certification	<u>No</u>	_____
Construction Schedule Form	<u>No</u>	_____
MANUFACTURER Qualifications	<u>Yes</u>	_____
Contract (at time of award)      This will be a P.O.	<u>Yes</u>	_____
Insurance Certificate or Statement from Agent	<u>Yes</u>	_____
Exceptions to Bid (list on "Form of Proposal"):		

**BPU Admin Lead to complete this page in conjunction with Technical Lead and Legal**

**B. FORM OF PROPOSAL**

Board of Public Utilities  
City of Jamestown, New York

Date \_\_\_\_\_

The undersigned, a \_\_\_\_\_ (individual, partnership, corporation) represented by \_\_\_\_\_ proposes to furnish all of the engineering, labor, material, equipment, tools, scheduling, permits, licensing, and supervision required to perform all of the work covered by the accompanying specification BD-11-18 and abide and submit to all conditions embodied therein for a total lump sum bid price for one substation transformer as described in the attached specifications:

\$ \_\_\_\_\_  
(in figures) (in writing)

5 Year Warranty Cost (WARRANTY): \$ \_\_\_\_\_

Spare Parts Total Cost: (SPARE PARTS – Attach Itemized List) \$ \_\_\_\_\_

Delivery Date (V.I.C): \_\_\_\_\_

**We (I) the undersigned declare that we (I) have carefully examined the specifications and will fully comply with the requirements of the specifications except as noted below (list all exceptions taken and provide additional pages if necessary):**

#1 Section: \_\_\_\_\_ Page: \_\_\_\_\_ Paragraph: \_\_\_\_\_ Description of exception (include proposed substitution):  
\_\_\_\_\_  
\_\_\_\_\_

#2 Section: \_\_\_\_\_ Page: \_\_\_\_\_ Paragraph: \_\_\_\_\_ Description of exception (include proposed substitution):  
\_\_\_\_\_  
\_\_\_\_\_

#3 Section: \_\_\_\_\_ Page: \_\_\_\_\_ Paragraph: \_\_\_\_\_ Description of exception (include proposed substitution):  
\_\_\_\_\_  
\_\_\_\_\_

#4 Section: \_\_\_\_\_ Page: \_\_\_\_\_ Paragraph: \_\_\_\_\_ Description of exception (include proposed substitution):  
\_\_\_\_\_

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#5 Section: \_\_\_\_\_ Page: \_\_\_\_\_ Paragraph: \_\_\_\_\_ Description of exception (include proposed substitution):

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#6 Section: \_\_\_\_\_ Page: \_\_\_\_\_ Paragraph: \_\_\_\_\_ Description of exception (include proposed substitution):

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#7 Section: \_\_\_\_\_ Page: \_\_\_\_\_ Paragraph: \_\_\_\_\_ Description of exception (include proposed substitution):

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The above proposal is based on the receipt of bulletin(s) No.(s) \_\_\_\_\_,  
\_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_.

**By:** \_\_\_\_\_,  
**(Signature of MANUFACTURER's Representative) (Print Name)**

**Title:** \_\_\_\_\_, **Date** \_\_\_\_\_

**C. BID DATA SHEET**

The bidder shall enter the appropriate data in the spaces provided and return the Bid Data Sheet with their bid.

- 1. Guaranteed Losses (total losses = no load losses + load losses)
  - a. No load losses \_\_\_\_\_
  - b. Load losses \_\_\_\_\_
  - c. Total losses \_\_\_\_\_
  
- 2. Transformers Data
  - a. Manufacturer \_\_\_\_\_
  - b. Location of manufacturing facility \_\_\_\_\_
  - c. Outline Drawing Attach the drawing
  - d. Total Assembled Weight \_\_\_\_\_
  - e. Shipping Weight \_\_\_\_\_
  - f. Conductor material \_\_\_\_\_
  - g. Surge Arrestors – high voltage
    - i. Manufacturer \_\_\_\_\_
    - ii. Catalog number \_\_\_\_\_
  - h. Surge Arrestors – low voltage
    - i. Manufacturer \_\_\_\_\_
    - ii. Catalog number \_\_\_\_\_
  - i. Gallons of insulating fluid \_\_\_\_\_

**D. GUARANTY FOR PROPOSAL CONTRACT**

(Proposal Bond)

KNOW ALL PERSONS BY THESE PRESENTS, that we \_\_\_\_\_, a corporation organized and having principal offices at \_\_\_\_\_ are held and firmly bound unto in the penal sum of \$ \_\_\_\_\_ Dollars (\$ \_\_\_\_\_), lawful money of the United States of America, to be paid to \_\_\_\_\_ or to its certain attorneys, successors, or assigns; for which payment will and truly to be made we bind ourselves, our successors, and assigns, jointly and severally by these presents.

WHEREAS \_\_\_\_\_ has presented a proposal to the Board of Public Utilities, of the City of Jamestown, New York on the foregoing proposal sheets.

THE CONDITION OF THIS OBLIGATION IS SUCH that if the said proposal, herewith accompanying, dated \_\_\_\_\_ be accepted as to any or all of the items offered, and if within ten (10) days after notice of such acceptance, said Person shall enter into contract with the Board of Public Utilities, of the City of Jamestown, New York and shall furnish a bond with good and acceptable sureties, as required, then this obligation shall be void and of no effect; otherwise, it shall remain in full force and virtue.

IN WITNESS WHEREOF, the \_\_\_\_\_ has caused its corporate seal to be hereto affixed this \_\_\_\_\_ day of \_\_\_\_\_, and these presents to be signed by its \_\_\_\_\_ pursuant to a resolution of its \_\_\_\_\_ passed on the \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_ A.D., a certified copy of which resolution is hereto attached.

ATTESTS:

**E. NON-COLLUSIVE BIDDING CERTIFICATION – CORPORATION**

By submission of this proposal, each person signing on behalf of any Person certifies, and in the case of a joint proposal, each party thereto certifies as to its own organization, under penalty of perjury that to the best of their knowledge and belief:

1) The prices of this proposal have been arrived at independently without collusion, consultation, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other bidder or with any competitor;

2) Unless otherwise required by law, the prices which have been quoted in this bid have not been knowingly disclosed by the bidder and will not knowingly be disclosed by the bidder prior to opening, directly or indirectly, to any other bidder or to any competitor; and

3) No attempt has been made or will be made by the bidder to induce any other person, partnership or corporation to submit or not to submit a bid for the purpose of restricting competition.

The person signing this bid or proposal certifies that they have fully informed themselves regarding the accuracy of the statements contained in this certification and under the penalties of perjury, affirms the truth thereof, such penalties being applicable to the bidder as well as to the person signing in its behalf.

IN WITNESS WHEREOF, the undersigned corporation has caused its corporate seal to be hereto affixed, and these presents to be signed by its duly authorized officer, this \_\_\_\_\_ day of \_\_\_\_\_, \_\_\_\_\_.

\_\_\_\_\_  
(Name of Corporation)

By \_\_\_\_\_

(Corporate Seal)

\_\_\_\_\_  
(Title of Officer Executing)

Individual or Partnership

**F. NON-COLLUSIVE BIDDING CERTIFICATION**

By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid, each party thereto certifies as to its own organization, under penalty of perjury that to the best of their knowledge and belief:

1) The prices of this bid have been arrived at independently without collusion, consultation, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other bidder or with any competitor;

2) Unless otherwise required by law, the prices which have been quoted in this bid have not been knowingly disclosed by the bidder and will not knowingly be disclosed by the bidder prior to opening, directly or indirectly, to any other bidder or to any competitor; and

3) No attempt has been made or will be made by the bidder to induce any other person, partnership or corporation to submit or not to submit a bid for the purpose of restricting competition.

The person signing this bid or proposal certifies that they have fully informed themselves regarding the accuracy of the statements contained in this certification and under the penalties of perjury, affirms the truth thereof, such penalties being applicable to the bidder as well as to the person signing in its behalf.

Dated \_\_\_\_\_, \_\_\_\_\_

\_\_\_\_\_  
(Signature)

or if partnership

\_\_\_\_\_  
(Name of Partnership)

\_\_\_\_\_  
(Signature of Partner)

By \_\_\_\_\_  
(Signature of Partner)

## V. GENERAL INFORMATION

### A. WORK SITE DESIGNATION

The JBPU will provide a construction site for the MANUFACTURER and their subcontractors to use for construction trailers, storage of materials, and the staging of work. It is the MANUFACTURER's responsibility for all services within this area including security, weather protection surface stabilization, runoff control, etc. The MANUFACTURER shall restore the area to JBPU requirements upon the completion of the project and MANUFACTURER demobilization. The MANUFACTURER shall not, without consent from the proper parties, enter or occupy with peoples, tools, or materials, any lands outside of the rights of way or property of the JBPU. Documentation of such consent shall be provided to the JBPU upon written request.

JBPU facilities shall not be used without prior written approval from the JBPU.

Any construction trailers or other large items left on the job site over 30 days following the final acceptance of the project without the written consent from the JBPU shall be liable for a rental charge of \$100.00 per day plus any expenses by the JBPU arising from this storage. The JBPU may, if required, move any such items at the MANUFACTURER's expense and without any liability by the JBPU.

The MANUFACTURER shall maintain the site in a neat condition and no undesirable accumulation of debris or materials shall be allowed. Debris shall be disposed of at legally authorized and licensed dumping sites only. Burning of debris on site will not be permitted.

Upon completion of work, the JBPU shall be provided an itemized list of any new and unused materials which are remaining from the project. JBPU shall have the right to retain these items without cost and the MANUFACTURER shall not remove such items from the job site without the written approval of the JBPU. The MANUFACTURER shall promptly remove all other items including tools, equipment, apparatus and rubbish leaving the premises clean, neat and orderly.

The JBPU shall have the right to inspect the work site at any time to verify MANUFACTURER compliance with these instructions. MANUFACTURER immediately shall remedy any deficiencies noted by JBPU representative.

The MANUFACTURER shall cooperate with other MANUFACTURERS of the JBPU engaged in work which may affect or concern its work, keeping the JBPU advised of all disputes, interference's, contemplated changes, etc., which may in any way have to do with the work covered by these Specifications, or the proper coordination and tying in of one part or section of the work with another.

### B. PROJECT/SITE CONDITIONS

Project should be built for continuous operation and the ability to with stand (at a minimum) the following site conditions:

1. Isokeraunic level - 40 thunderstorm days/year
2. Snow Load - 40 pounds per square foot
3. Elevation above sea level less than 3,300 feet NGVD
4. Temperature range (min/max) - minus 40 degrees F/plus 104 degrees F
5. Precipitation - 40-45 inches/year average

### C. SUPERINTENDENT, WORKMEN, ORDERS, ETC.

While the work is in progress, the MANUFACTURER shall at all times be represented on the grounds by a competent Superintendent, satisfactory to the JBPU. The Superintendent shall be deemed the agent of the MANUFACTURER, and he shall receive and promptly carry out any instructions given by the JBPU. The Superintendent shall cooperate with other MANUFACTURERS of the JBPU engaged in work which may affect or concern its work, keeping the JBPU advised of all disputes, interference's, contemplated changes, etc., which may in any way have to do with the work covered by these Specifications, or the proper coordination and tying in of one part or section of the work with another. Any disobedient, disorderly, or incompetent Superintendent or other workmen shall be removed at once by the MANUFACTURER, upon the Order of the JBPU, and shall not be reinstated on the work except with its consent.

The Superintendent shall be the sole source contact point between the MANUFACTURER and the JBPU. If at any time the Superintendent has reason to leave the job site, the Superintendent shall so inform the JBPU's representative and indicate who the replacement for the MANUFACTURER shall be. The complexity of this project and the duration of the work required the MANUFACTURER must insure that the Superintendent will remain on this project unless otherwise agreed to with the JBPU.

As representative of the MANUFACTURER the Superintendent shall be solely responsible for all workers employed by the MANUFACTURER and its subcontractors. The Superintendent shall maintain a listing of each MANUFACTURER worker on the job site, updated daily. This log book will be available to the JBPU representative upon request and will contain as a minimum, the following information:

Worker's Name, Address, Phone

Name, Address, and Phone of person to contact in case of emergency

Vehicle Description and License Plate Number

The Bidder as part of its proposal shall include an itemized list of all costs associated with the Superintendent including other Technical/Field Service support personnel employed by the MANUFACTURER.

## D. WORK SITE SAFETY

The JBPU requires that only qualified MANUFACTURERS (and Subcontractors) knowledgeable and experienced at completing the type of work involved in any project shall be hired and that only qualified employees knowledgeable of the project and the specific site conditions shall be admitted to the work site. The following procedure is intended to provide a framework to ensure that a safe working environment is maintained in such areas. A copy of the applicable JBPU Safety Rules will also be provided to the successful bidder before the commencement of construction work. An advance copy of these requirements shall be provided during the bidding period upon request.

1. Work will be conducted in accordance with prevailing industry safety practices
  - a. Prior to the start of on-site work, the Superintendent shall provide the JBPU with a written copy of its safety procedures including all documents necessary to certify that MANUFACTURER and its employees are in compliance with all safety requirements of the planned tasks.
2. Safety Orientation Requirements:
  - a. MANUFACTURER employees who will be on BPU property for a period in excess of four (4) hours shall complete Project Safety Orientation. MANUFACTURER employees who will be on the BPU property for a period of less than four (4) hours shall be considered a "Visitor". Visitors must be escorted by a qualified MANUFACTURER host employee who has completed Safety Orientation and is knowledgeable of the safety provisions for the area being visited. The Superintendent shall ensure that all MANUFACTURER employees and Visitors adhere to safety regulations including the completion of Safety Orientation.
3. MANUFACTURER Superintendent Additional Responsibilities:
  - a. Act as the primary safety related point of contact with the BPU.
  - b. Shall be on the project site whenever work is being performed by any MANUFACTURER employee(s). An alternate acceptable to the BPU may be designated for absences.
  - c. Maintain a log of MANUFACTURER employees and Visitors who are on the work site. Log shall be available for BPU inspection at any time.
  - d. Acquire/retain and provide copies to BPU of safety training certifications or other documents required for the work involved.
  - e. Work closely with BPU personnel to complete a Project Safety Assessment and to then use this assessment and BPU provided materials to perform Safety Orientation training for all MANUFACTURER employees entering the work site.
  - f. Conduct regular follow-up safety meetings with BPU personnel as warranted to ensure that site safety is maintained.
  - g. Monitor employee's work practices for safety compliance and promptly resolve concerns as they develop.
  - h. Promptly report accidents to the BPU.
4. BPU Host Supervisor: The BPU will assign a "Host Supervisor" (and alternate) to every MANUFACTURER. The Host Supervisor will be responsible to oversee the MANUFACTURER Superintendent to ensure compliance with the provisions set forth in this procedure.

Specific tasks to be performed by the Host Supervisor include:

- a. Act as the BPU's primary safety related point of contact with the MANUFACTURER.
- b. Lead process to perform a Project Safety Assessment before on-site work begins. Process will include a meeting to be attended by a BPU Safety Department representative, the MANUFACTURER Superintendent and any other personnel needed for an accurate assessment to be performed. During this meeting the Project Safety Assessment form (see Attachment A) will be completed.
- c. Lead process to define and agree to the content of Project Safety Orientation. BPU expectations include:
  - d. Project Safety Orientation will be completed before an employee enters the work site.
  - e. A listing of all MANUFACTURER employees working on the site shall be maintained and their completion of the Project Safety Orientation shall be documented.
  - f. All MANUFACTURER employees will view the BPU Safety Overview Video.
  - g. All MANUFACTURER employees shall receive a 1 to 2 page handout that contains project and site specific safety information including emergency phone numbers and rendezvous locations.
  - h. Applicable sections of the Project Safety Assessment shall be reviewed with each employee.
  - i. Review MANUFACTURER Superintendent's safety log sheets on a regular basis.
  - j. Acquire/retain safety training certifications or other documents required for the work involved.
  - k. Coordinate activities of BPU personnel who enter work-site to ensure safe interactions occur.
  - l. Conduct additional and regular follow-up safety meetings with MANUFACTURER and BPU personnel as warranted to ensure that site safety is maintained.
  - m. Monitor MANUFACTURER's safety compliance and resolve safety concerns as they develop.
  - n. Promptly report accidents to the BPU Safety Department.

## E. USE OF BPU TOOLS AND EQUIPMENT

Unless specifically provided for in the Technical Specifications, the use of BPU tools and equipment in the performance of the work specified herein shall be prohibited. In the event that use of BPU tools or equipment is permitted under the Technical Specifications, the MANUFACTURER shall only allow individuals who have received the proper training to use the tools or equipment. The MANUFACTURER shall indemnify and hold the BPU harmless from injury or accident caused as a result of the use of BPU tools or equipment.

## F. PROGRESS REPORTS

Upon written request, a weekly Progress Report shall be submitted reporting MANUFACTURER's progress against the manufacturing and document submittal schedules required herein. The Progress Report shall be submitted to the JBPU the Monday morning of the week following and shall report progress through the end of the previous week. When specifically requested, the Progress Report shall include an updated purchase order list showing status of material ordered by MANUFACTURER for use on this contract along with a listing of other costs associated with the project correlated to each major equipment or milestone item.

## VI. DELIVERY, STORAGE, AND HANDLING

### A. SHIPMENT OF MATERIALS, EQUIPMENT, AND SPARES

Materials and equipment shall be consigned to the MANUFACTURER in care of its local representative. Materials and equipment shall not be shipped, delivered, or consigned to the JBPU until final acceptance of all materials has been completed. All materials to be shipped under these specifications shall be shipped directly to the MANUFACTURER, or its representative. The JBPU will assume no responsibility for any materials, or shipments, until delivered to the installation MANUFACTURER in good condition.

The JBPU may bill the MANUFACTURER for shipments which it receives when the above conditions are not followed by the MANUFACTURER. The MANUFACTURER shall be responsible for unloading and storing material and equipment and any demurrage on shipments. Materials shall be stored so as to secure the preservation of their quality and fitness for the work. JBPU representative shall be allowed access to any and all storage areas upon request. Any deficiencies noted in the method of material or equipment storage shall be remedied by the MANUFACTURER.

#### PROJECT DELIVERY ADDRESS:

Jamestown Board of Public Utilities  
Huxley Substation  
28 Huxley St.  
Jamestown, New York 14701  
**Attention:** David Paterniti  
Phone (716) 661-1622, FAX (716) 661-1645  
E-Mail: dpaterniti@jamestownbpu.com

#### SPARE PARTS DELIVERY ADDRESS:

Any spare parts or materials to be shipped to the JBPU following the demobilization of the installation MANUFACTURER shall be to the address below. For such items a copy of the "Bill of Materials" will be mailed to:

Jamestown Board of Public Utilities  
86 Steele St.  
Jamestown, New York 14701  
**Attention:** David Paterniti  
Phone (716) 661-1622, FAX (716) 661-1645  
E-Mail: dpaterniti@jamestownbpu.com

### B. DELIVERY RESPONSIBILITIES

1. MANUFACTURER is responsible for arranging and paying for all rigging, transportation, and hoisting services required to place the transformer on an OWNER-furnished foundation, as well as hoisting, rigging and assembly of any transformer accessories (including oil if required).
2. MANUFACTURER must use an approved crane operator for any hoisting, rigging, and

- assembly on OWNER property. OWNER will provide a list of approved crane operators upon request.
3. Foundation drawings will be provided to MANUFACTURER upon request following final foundation design, to take place following receipt of transformers outline and weight shop drawings.
  4. If the transformer requires assembly and/or filling, the MANUFACTURER shall provide a qualified technical representative to receive transformers and accessories on site and supervise rigging activities.
  5. The MANUFACTURER will be responsible for all charges caused by delays in offloading the transformer associated with damage or impact recording during shipment, including excess crane, demurrage and personnel charges.
  6. MANUFACTURER is responsible for all required transportation surveys, routing and permitting. MANUFACTURER is advised to inspect site during bid period to identify any site access concerns.
  7. MANUFACTURER is responsible for arranging for, coordinating and paying for delivery and handling of accessories.
  8. MANUFACTURER to retain responsibility for any damage to Product until delivery is accepted by OWNER.

#### C. DELIVERY SCHEDULE

1. Shipment Notification shall be provided to the OWNER at least one (1) weeks prior to shipment and owner shall have approved test results prior to shipment.
2. Provide owner information for impact recorder logon information prior to shipment.
3. Shipment shall be scheduled so that the transformer is delivered to Jamestown NY during the week of **August 5, 2019**. Failure to deliver during the week of August 5, 2019 will result in a payment adjustment as set forth in the PAYMENT SCHEDULE.
4. Onsite assembly and testing shall be completed within three (3) weeks after delivery date.

#### D. TRANSPORTATION AND HANDLING

1. Prepare and load Products in such a manner as to provide protection from damage during shipment. Securely cover and protect Product so that it is not damaged during shipment by environmental factors such as rain, wind, snow, etc. or by physical conditions such as rocks or other objects.
2. Provide advance copy of weight list for each shipment. Weight list to be received by OWNER in accordance with the minimum delivery notice requirements.
3. Ship heavy or bulky equipment in open-top truck to facilitate unloading at OWNER's site.
4. Where appropriate, mount heavy parts on skids or crates, and box or bundle securely small parts that may be lost. Mark packaged items for ready identification. Arrange Products exceeding 200 pounds in weight so that slings may be properly attached for lifting by crane.
5. Mark all parts for ease of field assembly.
6. Provide notices and packing lists required by Contract Documents
7. MANUFACTURER to retain responsibility for any damage to Product until delivery is accepted by OWNER.
8. Transformer accessories will be delivered to an OWNER designated location within the project site.
9. Deliver all accessories, including oil if required, to the Project Site. MANUFACTURER is

- responsible for arranging for, coordinating and paying for delivery and handling of accessories.
10. Transformer and associated equipment to be shipped via truck if possible.
  11. Transformer to be shipped either oil-filled, or if not practical then filled with breathable dry air.
  12. Firmly attach three-way electronic impact recorder/accelerometer with GPS and remote access capability. Recorder shall provide routine updates of the location and status of the unit, including accelerometer readings. Recorder shall provide unscheduled updates when the accelerometer records a value above manufacturer's standards. All recorder data shall be available on a web site that is accessible to the OWNER. Provide address of web site and any required username/password data via E-Mail prior to shipping transformers.
  13. For units that are shipped filled with dry air, a dew point measurement shall be taken with the transformers on the shipping vehicle, 24 hours after filling the tank with dry air. The dew point shall meet the MANUFACTURER's standard requirements for oil filling, but shall be no greater than minus 30°C at 20°C ambient temperature. The results shall promptly be reported to OWNER. The OWNER reserves the right to reject or require corrective actions to the transformers if it does not pass this test.

#### E. FIELD ASSEMBLY AND FILLING

1. MANUFACTURER shall fully assemble all parts required to make the transformer ready for service, including but not limited to radiators, bushings and surge arresters.
2. Upon completion of the transformer assembly, add oil required to fill transformer and accessories in accordance with MANUFACTURER's requirements. Perform a dew point measurement prior to filling unit with oil. The measurement shall meet the MANUFACTURER's requirements for oil filling but shall be no greater than negative 30°C at 20°C ambient temperature. OWNER reserves the right to reject the transformer or require corrective actions in the event that the dew point does not meet these standards.
3. The MANUFACTURER will be responsible for any/all oil containment, clean-up and remediation of site in the event oil should be released on the OWNER'S site prior to OWNER taking ownership.
4. Perform a dielectric test on a sample of oil from each shipping container in accordance with ASTM method D-877. Advise OWNER immediately if the dielectric test is less than 30 kV. OWNER reserves the right to refuse oil delivery if dielectric strength is less than 30 kV. Filter and process the insulating oil, as required, to fill the transformers tank to the required levels. Take proper precautions to prevent contamination of the insulating oil during handling.
5. MANUFACTURER shall wipe clean all porcelain, unwrap and clean all gauges, remove any surface contamination resulting from shipping and properly touch up any damaged paint.
6. The OWNER shall provide all required external wiring connections to each transformer, including primary, secondary, control and grounding connections.

## VII. TESTING REQUIREMENTS

OWNER may inspect unit and/or witness all or a portion of the testing procedures. Please note loss evaluation and warranty requirements in previous sections.

### A. FACTORY INSPECTION /WITNESS TESTING

The OWNER intends to attend factory witness testing. The cost of such visit for two people excluding travel and housing shall be included in this proposal. OWNER may inspect unit and/or witness all or a portion of the testing procedure. OWNER shall approve test results prior to shipment of transformer(s).

### B. FACTORY TESTING

Assemble, adjust and complete routine production tests in accordance with Table 19 of ANSI C57.12.00-2000, NEMA TR-1 and these specifications. In addition, complete the following other tests.

1. Insulation resistance:
  - a. High Voltage to Low Voltage
  - b. High Voltage to Low Voltage grounded
  - c. Low Voltage to High Voltage grounded
  - d. Each core to ground with core ground strap removed
2. Turns ratio test shall be performed for all three phases, on all De-energized Tap Changer positions with LTC in neutral and on all LTC positions with DETC in center position.
3. Polarity and Phase Relationship tests shall be performed on each phase to verify subtractive polarity and correct angular displacement and phase sequence.
4. No-load Loss and Excitation Current Tests
  - a. Perform tests at 90%, 100% and 110% of rated voltage on the exciting winding, with the other winding on rated voltage tap.
  - b. Perform single-phase excitation test on all three phases, in all De-energized Tap Changer positions, with LTC in neutral.
5. Impedance and Load Loss Tests
  - a. Test values to be corrected to 85°C.
  - b. Perform tests at the ONAN and top ONAF ratings, for all De-energized Tap Changer positions and LTC in neutral, and for highest loss tap combination.
  - c. Report impedance values in percent on the base ONAF rating of the high voltage winding.
  - d. Perform a zero-sequence impedance test.
6. Noise Tests
  - a. Conduct noise tests.
  - b. Measure and report the A-weighted sound level, in accordance with ANSI C57.12.90, for all ratings.
  - c. Perform the noise test with the actual auxiliary equipment (fans, etc.) that will be supplied with the transformers.
7. Temperature Rise Tests
  - a. Conduct a temperature rise test in accordance with ANSI C57.12.90 for both the ONAN and top ONAF ratings. Take sufficient measurements to ensure that no portion of the transformers exceeds the maximum allowable temperature rise.

- b. Temperature rise tests to be conducted at the tap and connection configuration that results in the highest temperature rise.
  - c. Temperature rise tests shall utilize the actual cooling equipment that will be furnished with the transformers, not substitute equipment.
  - d. DGA tests shall be performed in accordance with ANSI C57.104 before the Temperature rise test, and immediately after each test (one after ONAN rating test and one after top ONAF rating test)
8. Dielectric Tests
- a. Insulation power factor
  - b. Test and report the following readings
    - i. High Voltage to Low Voltage and Ground
    - ii. Low Voltage to High Voltage and Ground
    - iii. High Voltage and Low Voltage to Ground
    - iv. low Voltage to Ground, Guard on High Voltage
    - v. High Voltage to Ground, Guard on Low Voltage
    - vi. High Voltage to Low Voltage, Guard on Ground
  - c. Readings shall be corrected to 20°C for reporting and analysis.
  - d. Direct failure criteria shall be based on ANSI C57.12.90, Method II. If any corrected insulation power factor reading listed in Method II is greater than 0.5%, then the OWNER must be consulted prior to shipment. The OWNER reserves the right to reject any transformers with an insulation power factor reading, corrected to 20°C, that is greater than 0.5%. in accordance with ANSI C57.12.90, Method II.
  - e. Lightning Impulse tests, in accordance with ANSI C57.12.90
  - f. Partial discharge measurement concurrent with the Induced Voltage test. Failure detection criteria shall be in accordance with ANSI C57.12.90-1999, 10.8.5
  - g. DGA tests shall be performed in accordance with ANSI C57.104 both before and immediately after the Dielectric Tests.
  - h. Perform a corrosive sulfur test on the final oil that will be used in the transformer main/LTC tanks and provide owner with results.
9. Accessory Tests:
- a. Test each bushing in accordance with routine tests as detailed in ANSI C 76.1 and C37.09a.
  - b. Test each surge arrester in accordance with ANSI standards
  - c. Test each auxiliary device (fans, gauges, controls, relays, etc.) for proper operation and in accordance with Manufacturer recommendations.
  - d. Perform dielectric tests on control devices and wiring per NEMA IC-1, "Standard for Industrial Control".
  - e. Perform the following tests on each current transformer:
    - i. Low frequency, one-minute 2,500 volts to ground dielectric test on secondary's
    - ii. Proper nameplate and polarity marking check.
    - iii. Polarity and ammeter ratio check after installation in bushing.

### C. FIELD TESTING

The OWNER will contract with a third-party entity for field testing of the transformer prior to energization, however this does not preclude the MANUFACTURER from performing their own testing at the OWNER's site. As stated in the Warranty section the MANUFACTURER will be responsible for all costs to remedy any issues discovered.

## VIII. SUBMITTALS AND DRAWINGS

### A. SUBMITTAL SCHEDULE

1. Provide a submittal schedule within fourteen (14) calendar days after MANUFACTURER receipt of order indicating anticipated date of each required submittal.
2. Deliver submittals to the OWNER at the email address shown in the specifications.
3. Include the following:
  - a. Description of each submittal
  - b. Date by which each submittal will be delivered to OWNER.
  - c. Date by which each submittal must be approved to maintain project schedule.
  - d. Relevant specification section reference
4. Allow reasonable time for OWNER to review shop drawings and for possible resubmittal.
5. Shop drawing submittals are required no later than the following periods after Contract Award:
  - a. Transformer Outline and weight drawings – 10 weeks after MANUFACTURER receipt of order
  - b. Remaining Transformer Drawings – as required to meet delivery schedule but not later than factory witness testing.
6. Submit as-built drawings and manuals prior to delivery of the respective equipment

### B. SHOP DRAWING REVIEW COMMENTS

1. OWNER's review will be completed within a reasonable time after receipt by OWNER of each submittal in proper sequence, and will be returned to MANUFACTURER with one of the following markings:
  - a. "**Approved**" indicates submittal has been reviewed and appears to be in conformance with requirements of the Specifications. MANUFACTURER may proceed with construction shown on the submittal.
  - b. "**Make corrections noted**" indicates submittal appears to be in conformance with requirements of the Specifications. MANUFACTURER shall incorporate the corrections noted and may proceed with construction shown on the submittal. No resubmittal is required.
  - c. "**Amend - resubmit**" indicates submittal does not appear to be in conformance with the Procurement Documents. OWNER's comments will be noted on the submittal or in a separate letter. MANUFACTURER shall recheck, make necessary revisions and resubmit.
  - d. "**Submittal not required - no action taken**" indicates that the submittal is not called for by the Specifications and that no action was taken by OWNER.
2. Review for conformance with design concepts and compliance with Specifications does not require OWNER to review features solely related to construction or all dimensions, quantities and other data. MANUFACTURER shall not rely on OWNER's approval as a verification or check of all such items in the submittal or of satisfactory and safe installation and construction. MANUFACTURER shall verify all fabrication and installation requirements, quantities and dimensions.
3. It is the MANUFACTURER's responsibility for errors and omissions in submittals is not relieved by the OWNER's review.

4. Shop drawing acceptance by the OWNER shall not be construed as approving departures from the Contract requirements.

### C. SUBMITTAL PRESENTATION

1. Present in a clear and thorough manner.
2. Drawings
  - a. Use sheet size of 22" x 34" D-size for all drawings.
  - b. Identify dimensions, show relation to adjacent or critical features.
  - c. Show color coded revisions for changes after OWNER comments have been submitted.
  - d. Use a color pallet that is legible when printed on white paper in full color. I.e. do not use Yellow
  - e. Digital drawing files shall be submitted in AutoCAD 2013 format with editing permissions. The submittals shall include any required plot, shape, font or line type files to allow for proper plotting.
  - f. Include a written description of the layer naming and line weight conventions and any instructions for setup of files for proper plotting.
  - g. A PDF file for each drawing will be provided in addition to the AutoCAD 2013 format
3. Manuals
  - a. 8 1/2" x 11" format, bound in a substantial binder with three (3) D-type rings (Avery Heavy-duty binder or equal, with clear cover pockets).
  - b. Internally subdivide the binder contents with permanent page dividers logically organized in accordance with the general table of contents below. Tab titles shall be clearly printed on reinforced, laminated plastic tabs, and keyed to a table of contents.
  - c. Each copy of the manuals shall be assembled and bound in a substantial binder imprinted on the backbone (spine) and cover with the following:

Jamestown Board of Public Utilities  
Jamestown, New York  
HUXLEY SUBSTATION  
POWER TRANSFORMER  
(DATE OF DELIVERY)  
Manufacturer's Name  
Manufacturer's Address
  - d. Identify individual volumes as "1 of 2", "2 of 2", etc. on backbone and cover if manual requires multiple volumes.
  - e. Prepare a detailed table of contents for each binder, with material, equipment or system identified, to describe each section of the manual.

### D. REQUIRED SUBMITTALS

A total of three (3) instruction manuals shall be sent at time of final drawing submittal (to take place prior to the shipment of equipment).

One copy of the equipment instruction manual shall be provided in a pocket on the inside of the control cabinet door on each item of equipment. The manual and drawings shall be placed in the equipment prior to shipment

## E. INSTRUCTION MANUAL CONTENT

Provide the contents of the instruction manual on a CD in Adobe Acrobat PDF format using searchable files as well as AutoCAD files for drawings. A CD shall be included in each manual.

Provide a complete Operations, Maintenance and Installation Manuals (“Instruction Manual”) covering the Goods furnished under this Contract. The instruction manuals shall include, as a minimum, the following:

1. Directory listing the name, address and contact telephone numbers of MANUFACTURER and any local field service facilities
2. Shop order numbers for each item of equipment or component
3. General Table of Contents /Index
4. Descriptions of equipment furnished
5. Specifications, test data, and curves
6. Nameplate information
7. Instructions in the methods of receiving, inspection, storage, handling, and maintenance
8. Methods of installation and trial operation of the equipment
9. Parts list and Bill of Materials
10. Recommended spare parts with pricing
11. Lubrication instructions (if applicable)
12. Product Data
  - a. Catalogs and cut sheets
13. Design Data
  - a. MANUFACTURER's certification that all equipment and assemblies conform to the seismic performance requirements specified in this document
  - b. Certified short circuit withstand test results on units of comparable rating and design.
14. Drawings:
  - a. Outline showing general arrangement, legend, plan, elevation, base details, shipping and installed weights, dimensions, gallons of oil, with location of centers of gravity on outline. All user interface points (conduit entrance plates, flanges, etc.) shall be dimensioned on the outline drawing.
  - b. Connection, alarm, control and auxiliary schematic diagrams.
  - c. Internal wiring and connection diagrams. Tabular format is not acceptable. Wiring diagrams shall use a "destination" wire labeling scheme, i.e. each wire shall have a label showing the termination point of the other end of the wire.
  - d. Assembly drawings
  - e. Physical drawings showing equipment arrangement, terminal block locations, cable entrance and panel layout.
  - f. Terminal block connections
  - g. Notes and symbols
  - h. Bushing lifting accessories and ground pad outlines
  - i. As-Built Drawings
    - i. Show all changes and revisions to date of equipment shipment and delivery on OWNER site.
    - ii. Revise all drawings to reflect the as-shipped condition of all equipment.
    - iii. Submit as-built drawings prior to delivery of the respective equipment
    - iv. Indicate "As-Built" in revision block and sign. Show all changes and revisions to

date of completion.

15. Bushing current transformers
  - a. Excitation and ratio correction factor curve for each secondary ratio.
  - b. Resistance of current transformers secondary and connecting leads for each ratio.
  - c. Actual current ratio and turn ratio for each tap.
  - d. Mechanical and thermal short time (one second) rating.
  - e. Nameplate data, including current transformers taps. Resubmit nameplate drawing after factory tests with all fill-in data completed.
16. Test Reports
  - a. Certified factory test reports of transformers after final test.
  - b. Certified factory test reports for all accessories.
  - c. Certified field test reports of transformers after installation and assembly (if applicable)
17. MSDS
  - a. MSDS sheets for all applicable items furnished with the transformers, including but not limited to mineral oil, paint, nitrogen.
18. Pictures
  - a. Take a minimum of ten (10) high resolution color photographs of the core and coil assembly prior to placement in the tank, from different perspectives including two from the top and two of each of the four sides. Pictures shall show internal construction and connection details and leads. Pictures shall be taken with high-resolution digital camera, in focus, and under good lighting conditions.

## IX. DETAILED TECHNICAL INFORMATION

### A. GENERAL TECHNICAL

The transformer, including the core and coil assembly, shall be manufactured in the continental United States.

Design the transformer and all ancillary equipment with applicable standards in “Codes and Standards”

### B. TRANSFORMER SIZE AND LAYOUT REQUIRMENTS

1. Design the transformer to fit within the following size envelope (including all items mounted to the tank):
  - a. Length (Segment 1 to Segment 3): 14'-0”
  - b. Width (segment 2 to segment 4): 18'-0”
2. Design the transformer layout with the following requirements:
  - a. Control Cabinet – ANSI Segment 1
  - b. High voltage (H) compartment – ANSI Segment 4
  - c. Low voltage (L) compartment – ANSI Segment 2
  - d. Radiators shall be mounted to ANSI segment 3 to the greatest extent practical. Additional radiators may be mounted to ANSI segment 1 if required.
  - e. Load Tap Changer Location: Lower voltage winding
  - f. No Load Tap Changer: High Voltage Winding
  - g. Ancillary gauges and instruments – ANSI Segment 1
  - h. Oil Preservation System(s) – ANSI Segment 1

### C. ELECTRICAL SPECIFICATIONS

Furnish power transformers with the following principal ratings and electrical characteristics.

1. Overload capabilities: in accordance with ANSI C57.92, NEMA TR-98.
2. Number of phases: ..... 3
3. Frequency: ..... 60 Hz
4. Cooling class: .....ONAN/ONAF
5. Continuous Ratings:
  - a. ONAN, 55 degrees C rise.....7500 KVA
  - b. ONAF, 55 degrees C rise, .....9375 KVA
  - c. ONAN, 65 degrees C rise.....8400 KVA
  - d. ONAF, 65 degrees C rise, .....10500 KV
6. High voltage to secondary voltage impedance at ONAN Rating: 7.5%.
7. High voltage winding (H)
  - a. Voltage: .....13,800 V
  - b. Connection: .....Delta
  - c. Basic Impulse Level (BIL): .....110 kV
  - d. De-Energized tap changer: Plus or minus 5 percent in four 2.5 percent steps
8. Low voltage winding (L)

- a. Rated voltage: .....4,160 Y/2400
- b. Connection: .....Wye
- c. Basic Impulse Level (BIL): .....110 kV
- d. On load tap changer: 32-5/8 percent taps, 10 % above and 10 % below rated voltage
- 9. Maximum Temperature Rise
  - a. By resistance: .....65 degrees C
  - b. By hot spot: .....80 degrees C
- 10. Duty: .....Continuous
- 11. Angular displacement: ..... ANSI Standard
- 12. Noise level: .....NEMA standard for all ratings, or quieter.
- 13. Short circuit forces .....In accordance with ANSI C57.12.00 and C57.12.90. Certified short circuit test data for a transformer of similar design, voltages and MVA capacity showing no evidence of failure during the short circuit test shall be provided to document the capability of the transformers plant and design. A description of the test code under which the transformers was tested shall be provided.
- 14. Control Power
  - a. 120/240 volts ac, 1-phase, 3-wire source for fans, space heaters and other accessories
  - b. 125 volts dc for control functions.

#### D. WIRING

- 1. 600 volt insulated copper, 90 degrees C rating.
- 2. No. 10 AWG minimum for current transformers wiring within control cabinet
- 3. No. 12 AWG minimum for auxiliary circuits
- 4. No. 14 AWG minimum for control circuits
- 5. AC auxiliary circuit neutral wires shall utilize white insulation.
- 6. Ground wires shall utilize green insulation
- 7. Terminated with crimp type, ring-tongue connectors with non-insulated short shanks; maximum of two terminations per terminal point.
- 8. Connected to separate power terminal blocks for power circuits
- 9. Clearly identify with permanent sleeve markers at terminations. Markers shall identify the destination of wire or cable (i.e. the marker lists the location of the other end of the wire). Markers shall be black on white for standard AC/DC circuits and Black on Yellow for CT circuits.
- 10. AC auxiliary power shall be routed separately from the control and indication circuits.
- 11. All wiring shall be installed and routed so as to be protected from damage. All holes and sheet metal edges shall be fitted with suitable grommets or guards to prevent wire damage.
- 12. Wiring in conduits shall be continuous and without splices.

#### E. TERMINAL BLOCKS

- 1. Provide with bases and barriers molded integrally with brass inserts.
- 2. Rated at 600 volts
- 3. Able to accommodate up to No. 10 AWG wire
- 4. Provide with marking strips
- 5. Install in sufficient quantity to provide 20 percent minimum spare for each type block. Group spare terminal points together as much as practical.
- 6. Short circuiting type for current transformers

7. Mark to identify source and function

## F. CONDUIT

1. Wiring shall be installed in galvanized conduit when external to control cabinets or enclosures
2. Galvanized conduit shall be properly treated and painted to match the adjoining surface.
3. Conduit runs shall be neat, parallel where multiple conduits are run together, generally parallel to the main dimensions of the tank, and secured properly to the tank.
4. Short sections of flexible, liquid-tight conduit are acceptable where a flexible connection to equipment is desired.

## G. PAINTING

1. Clean and treat tank interior and exterior transformers surfaces according to MANUFACTURER's standards. Carefully treat all exposed metal, including galvanized surfaces, to properly receive paint.
2. Apply one prime coat to the exterior surface. Ensure that all surfaces are coated, including areas partially blocked by conduit or equipment.
3. Apply two finish coats of ANSI 70 Gray color to the exterior surface. Ensure that all surfaces are coated, including areas partially blocked by conduit or equipment.
4. Top surface of the transformer tank and LTC compartment to be coated with non-skid paint
5. Paint interior of cabinets white.

## H. COMPONENTS

### 1. Transformer Tank

- a. Welded steel plate construction, liquid tight, with bolted and gasketed manhole(s) on top of tank. Mounted on steel skid base, suitable for skidding in any direction. Assembled transformer base shall be sufficiently flat to be installed on a flat concrete foundation without supplemental shims.
- b. Adequately designed and braced to allow full vacuum filling and vacuum drying operations in the field.
- c. Provide jacking lugs and pulling eyes for lifting or moving along either axis when completely assembled and oil-filled. Lifting lugs to be mounted near the top of the tank. Jacking lugs shall be installed with approximately 12 inches of clearance to the bottom of the base plate.
- d. Provide two NEMA 2-hole copper faced or stainless-steel ground pads at diagonally opposite corners of transformers tank near base, with two-bolt terminal connectors for 4/0 AWG copper conductors.
- e. Provide NEMA 2-hole copper faced or stainless-steel ground pads at Surge Arrester ground points and at the core ground point.
- f. Maintain positive pressure continually to prevent ingress of moisture during shipping.
- g. Provide an adequately braced domed or sloped top on all major surfaces. Design tank and fittings to prevent water ponding on surfaces or in cavities.
- h. Provide raised flanges with thru-bolts for all removable cover penetrations, including

bushings, manhole/handhole covers and removable equipment. Welded studs are not acceptable.

## 2. Core

- a. Highest quality, non-aging, cold-rolled, grain-oriented, stress free, thin silicon steel laminations, having high permeability and low hysteresis loss
- b. Properly annealed, with smooth surfaces at edges
- c. Have each sheet provided with an insulated surface treatment which is impervious to hot transformer oil.
- d. Carefully assembled, rigidly clamped and blocked to prevent deteriorating vibrations, interference with oil circulation, objectionable noise conditions and short circuit and shipment distortions.
- e. Provide a core ground lead connected to an external bushing for each core. Provide a flexible ground strap to connect the terminal of the bushing to the transformers tank, thereby grounding the transformers core. Provide a suitable cover or deflector to protect the core ground bushing from damage from falling objects. Provide an engraved nameplate clearly indicating the function of the bushing. Provide a separate core ground bushing and ground strap for each separate core (main core, preventative auto, etc.).
- f. Provide with means for properly handling core assembly when untanked.
- g. The core shall be cruciform shape, fabricated with sheets stepped in dimension to approximate a circle and minimize the clearance from core steel to windings.

## 3. Windings

- a. Electrolytic copper with high conductivity characteristics
- b. Winding type: circular in plan view. Sheet type windings are not acceptable.
- c. Provided with thermally upgraded insulation system of high dielectric and mechanical strength, arranged to permit free circulation of oil
- d. Made up, shaped and braced to provide for expansion and contraction due to temperature changes and avoid abrasion of insulation
- e. Adequately braced to prevent distortion due to any normal or abnormal operating condition
- f. Brazed joints and pressure connectors are acceptable. Soldered connections are not allowed. No more than one connection shall be made in a single lead. Crimp connectors shall be “long barrel” type, with a minimum of two crimps each end.
- g. Each lead for connection to tap changers, bushings, etc. shall be permanently identified.
- h. Leads shall be adequately supported to resist movement due to normal or abnormal operating conditions, including maximum rated short circuit.
- i. The maximum hot spot temperature of any lead shall not exceed the hot spot for any winding under operating condition, including specified overload ratings.

## 4. Air terminal Compartments

- a. Located as specified in layout section
- b. Construction: Welded plate steel
- c. Height: Minimum 36 inches from bottom plate to bottom of the bushing extensions.
- d. Compartments will be vented to prevent moisture condensation. Vents shall be designed

- and covered to prevent water and insect infiltration.
- e. Size: as required to maintain suitable phase-phase (minimum 15" on center) and phase-ground (minimum 8") spacing within enclosure.
- f. Design compartment to project a minimum of 36 inches beyond the sidewall of the transformers tank. The compartments will be a minimum of 60" high and a minimum of 48" wide. Compartment may be removable for shipping purposes if necessary.
- g. Conduit Entrance Plate
  - i. Provide a removable aluminum gasketed bottom plate for power conduit entry for both the high voltage and low voltage box.
  - ii. Plate shall be of sufficient size to accommodate at least four (4) 6" trade size conduits in a 2x2 arrangement.
  - iii. Plate shall be centered on the center bushing extension bus.
  - iv. Provide two handles to assist in plate removal.
- h. Provide two (2) stainless steel or copper faced ground pads with NEMA 2-hole drilling welded in the bottom side walls of the terminal compartments. These pads shall be used to connect the secondary surge arrester ground leads through the compartment wall to external ground leads.
- i. Provide three hinged, gasketed, weatherproof doors for access to the air terminal compartment (one on each face). Each door shall be secured with nuts to threaded studs welded to the enclosure on all four edges. Each door shall be removable from its hinges to allow full access to the inside. The doors shall be sized to allow as much access as is practical without compromising the structural integrity of the enclosure. Doors shall be provided with lifting handles to facilitate lifting by hand or hoist.

## 5. Bushings

- a. Located as specified in layout section
- b. All high and low side bushings shall be side mounted
- c. The bushing studs shall be threaded, stud type, and silver plated. Provide stud connectors with NEMA standard 4-hole (minimum) pad drilling sized to accommodate the full rating of the bushing.
- d. Porcelain glazing: Free of imperfections
- e. Color: ANSI Z 55.1, No. 70, Light Gray
- f. High Voltage Bushings (H1, H2, H3)
  - i. Mounted in HV air terminal compartment
  - ii. Type: .....Interchangeable, ABB Type A #015JO200AS or equivalent.
  - iii. BIL rating: .....110 kV
  - iv. Current rating: .....2000 Amp
  - v. Creepage distance: .....Standard
  - vi. Material: Porcelain manufactured by the wet process.
- g. Low Voltage Phase and Neutral Bushings (X1, X2, X3, X0)
  - i. Mounted in LV air terminal compartment
  - ii. Type: ..... Interchangeable, ABB Type A #015JO200AS or equivalent.
  - iii. BIL rating: .....110 kV minimum
  - iv. Current rating: .....2,000 Amp
  - v. Creepage distance: .....Standard
  - vi. Material: Porcelain manufactured by the wet process.
- h. Provide Secondary bushing extensions: X1, X2, X3, X0

- i. The bus rating shall be 1,600 amperes minimum (size for specified ampacity within enclosed space of terminal compartment.)
- ii. The bus material shall be copper bar, with silver plating on both sides of the bus in the areas with holes for bolted connections.
- iii. Drill the copper bus bars to accommodate six (6) sets of NEMA 2-hole lugs.
- iv. Support the bus from the roof of the compartment with minimum of two polymer standoff insulators per phase. No mechanical force is to be transferred to the bushings.
- v. Provide 1,600 ampere minimum rated (sized for operation within enclosed terminal compartment) flexible connectors from secondary bushings to extension bars.
- i. The HV/LV bushings are intentionally specified as identical in order to facilitate having one spare bushing that could be used to replace any one of the transformers' bushings.

## 6. Insulating Boots

- a. Provide removable boot type insulated covers to insulate the bushings, flexible connectors, bus extension bars, bushing connections, surge arrestors, and cable terminations.
- b. All live parts shall be provided with insulated covers – no exposed live parts shall be present in the HV/LV air terminal chambers.
- c. Insulated covers shall be fabricated in two pieces, one for the bushings and flexible connections and a second one for the bus bars, cable terminations, etc. The intent is to allow removal of the boots and flexible straps from the bushings (to allow for testing of the transformers) without disturbing the cable terminations, bus extension bars, and their insulating boots

## 7. Main Transformer Control Cabinet

- a. Located as specified in layout section
- b. Make weatherproof.
- c. Fasten securely to transformer tank.
- d. Doors: Vertically hinged with padlocks.
- e. The conduit entrance shall be a removable, gasketed aluminum bottom plate that will be field drilled.
- f. Mount terminal blocks and equipment at least 6 inches above bottom plate.
- g. Provide thermostatically-controlled anti-condensation space heaters powered from transformers auxiliary supply. Heaters shall be rated at 240 V ac, **operated at 120 V ac**, and properly sized for reduced output. Provide an ammeter to measure heater current. Provide a nameplate indicating "Control Compartment Heater Ammeter - Normal = \_\_\_\_\_ A". Fill in normal amp reading.
- h. Three rows of DIN rail shall be installed horizontally in a 30" x 30" vertical panel space (equally spaced) on a removeable panel mounted to the back wall and shall be free of other equipment/wiring for OWNER-installed equipment.
- i. A 7.36" x 5.47" panel cutout in a hinged door shall be made available for OWNER installed SEL 2411L PLC.
- j. All controls shall be mounted for operator access when the control cabinet doors are opened. Beckwith front panel controls, and AC/DC breakers shall be accessible when the control cabinet doors are open. No controls will be located behind panels or swing-doors.

8. Bushing Current Transformers

- a. Windings: fully distributed
- b. Minimum thermal rating factor: 2.0
- c. All multi-ratio current transformers shall be 5-lead bushing type for relaying duty.
- d. Leads
  - i. Bring out to short circuiting-type terminal blocks in control terminal cabinet.
  - ii. Terminate each current transformer on separate terminal block.
  - iii. Mark leads with permanent sleeve markers to indicate taps and polarity.
  - iv. Use #10 AWG minimum, stranded copper with oil proof insulation.
- e. Required current transformers:
  - i. One 1200 - 5A MR, C400 Accuracy Class, on the low voltage neutral bushing
  - ii. One 2000:5 MR, on X1 bushing for line drop compensation control of load tap changer.
  - iii. One CT on X2 bushing for winding temperature indicator.

9. Surge Arresters

- a. Type: Outdoor, station class, gapless, metal oxide, one per phase, polymer composite body with internal epoxy fiberglass wrap around metal-oxide varistor blocks for each H and X bushing.
- b. H Bushing Arrestors - Ratings:
  - i. Arrestors shall be Ohio Brass EVP-001500-3001 or equivalent
  - ii. Nominal Line-Line Voltage: .....13.8kV
  - iii. Maximum Line-Line Voltage: .....15kV
  - iv. Duty-Cycle Voltage: .....12kV
  - v. Maximum Continuous Operating Voltage (MCOV): .....15.3kV
  - vi. TOV capability, rms kV (L-N) at one second: .....18kV
  - vii. Mounting: inside HV air terminal compartment. Locate surge arresters and route connecting cables to maintain required phase-phase and phase-ground clearances
- c. X Bushing Arrestors- Ratings:
  - i. Arrestors shall be Ohio Brass EVP-000300-30001, or equivalent
  - ii. Nominal Line-Line Voltage: .....4.16 kV
  - iii. Maximum Line-Line Voltage: .....4.37 kV
  - iv. Duty-Cycle Voltage: .....3 kV
  - v. Maximum Continuous Operating Voltage (MCOV): ....2.55 kV
  - vi. TOV capability, rms kV (L-N) at one second: .....3.62 kV
  - vii. Mounting: inside LV air terminal compartment. Locate surge arresters and route connecting cables to maintain required phase-phase and phase-ground clearances.
- d. Connect ground end terminals of arresters with copper cable or straps (minimum 4/0 CU equiv.) to stainless steel or copper-faced two-hole ground pad attached to transformers tank side. Locate ground pad near base of arresters, but located so that there is a direct path for discharge current to flow to the two transformer ground pads at the base of the transformers tank without having to pass through a structural bolted connection (cover to tank, etc.)
- e. Connect live end terminals of bushing arresters to primary (H)/secondary (L) bus extensions with 15 kV insulated cable and compression lugs (minimum 1/0 CU).

- f. Provide insulating caps over arrester live terminals.

## 10. Cooling Equipment

- a. Type: ONAF
  - i. One-stage ONAF conforming to ratings previously specified.
- b. Radiators
  - i. Located as specified in layout section
  - ii. The radiators shall be constructed on galvanized steel with welded construction, with flanged connections and provisions for draining and venting, and without external cavities that would collect moisture
  - iii. Provided with lifting eyes or lugs
  - iv. Provided with oil-tight valves at connections to main tank that will allow removal of radiators without taking transformer out of service
  - v. Radiators shall be completely supported from the transformer tank. Additional supports requiring foundations are not acceptable.
- c. Fans
  - i. Weatherproof construction with motors designed for fan duty.
  - ii. Mounted on sides of radiators. Bottom mounting is not acceptable.
  - iii. Provided with weatherproof locking type plug and socket connections.
  - iv. Provide with OSHA approved blade guards.
  - v. The fans shall be provided for operation at the control power rating specified under electrical specifications.
- d. Fan Controls
  - i. Controls located in main terminal control cabinet.
  - ii. Enable automatic control by the winding temperature device, provided with automatic starting switches, auxiliary relays, alarm contacts, selector switches and any other necessary devices.
  - iii. Provide a control switch to select fan operation: AUTOMATIC - MANUAL ON – MANUAL OFF - REMOTE. In the REMOTE position, the REMOTE-CONTROL FAN RELAY will provide REMOTE AUTO/REMOTE-ON control.
  - iv. Provide REMOTE-CONTROL FAN RELAY for REMOTE AUTO/REMOTE-ON controls to be used to control fan operation when FAN operation switch is set to REMOTE. The preferred relay/contactors is either an Eaton Cutler Hammer CN15 series type or an Allen Bradley 100-C IEC series type. Contactor voltage/current rating shall be sufficiently rated to operate fans at the appropriate voltage/current. The coil input voltages must be rated for 24V DC and must be wired to a terminal block where the OWNER will make final SCADA connections. A dry relay status contact shall also be wired to terminal blocks for OWNER connections. When the fan operation switch is set to REMOTE and the REMOTE-CONTROL FAN RELAY is de-energized the fans will operate in automatic. When the fan operation switch is set to REMOTE and the REMOTE-CONTROL FAN RELAY is energized the fans will be ON.

## 11. Transformer Oil

- a. Pure inhibited Type II mineral oil meeting the requirements of ASTM D 3487 and ANSI C57.106. The oxidation inhibitor concentration shall be 0.3% of DBPC by weight.

- b. Perform a corrosive sulfur test on the final oil that will be used in the transformer main tank and provide owner with results.

## 12. Oil Preservation System

- a. The main tank oil preservation system shall consist of a sealed main tank with automatic gas control system. The automatic gas control system shall consist of a nitrogen tank, regulator, valves, and gauges mounted in an enclosure. The enclosure shall be mounted to the transformer and shall have a gasketed, lockable door. A diagrammatic nameplate shall be installed inside the enclosure to indicate the piping diagram and operating instructions for the gas control system. An isolation valve shall be provided to isolate the gas control system from the main tank. Alarm contacts for low tank pressure, high tank pressure, and low cylinder pressure shall be provided and wired to terminal blocks in the transformer control cabinet.
- b. A gas-space vent valve shall be provided and shall be located on the opposite side of the transformer from the gas control enclosure.
- c. Provide thermostatically-controlled anti-condensation space heaters powered from transformers auxiliary supply. Heaters shall be rated at 240 V ac, **operated at 120 V ac**, and properly sized for reduced output. Provide an ammeter to measure heater current. Provide a nameplate indicating "Control Compartment Heater Ammeter - Normal = \_\_\_\_\_ A". Fill in normal amp reading.

## 13. De-Energized Tap Changer (DETC)

- a. Location: High voltage winding
- b. Externally operated when transformer is de-energized
- c. Provided with indicating pointer, dial, and means for locking in any tap position. Include provisions for OWNER supplied padlock.
- d. Mounted at a convenient operating height
- e. Capable of withstanding full transformers short circuit current without damage
- f. Configured to prevent leaving a winding open or short circuited when operating handle is in locked position

## 14. Automatic Load Tap Changer (LTC)

- a. Location: Low voltage winding
- b. Manufacturer: Reinhausen type RMV-II
- c. Type: Inductive bridging with vacuum interrupters.
- d. Regulating range: 10 percent above to 10 percent below rated voltage in 32 approximately 5/8 percent steps.
- e. Rating
  - i. Capable of delivering full rated transformers kVA at the rated (nominal) secondary voltage position and all positions above rated voltage.
  - ii. The transformers shall be capable of delivering current corresponding to rated secondary current at nominal tap for all positions below nominal tap. These values shall include the overload capabilities noted in the standards.
- f. LTC tap selector switch and mechanism
  - i. Mount in oil-filled compartment separate from main transformers tank.

- ii. Maintain physical isolation so it is not necessary to drain oil or break seal of main transformers tank when servicing LTC.
- g. LTC Tank accessories
  - i. Hinged maintenance door with oil-resistant gasket
  - ii. Drain, filter, and sampling valves
  - iii. Magnetic level indicator with low level alarm and low-low level trip contacts
  - iv. Dehydrating breather with a desiccant canister and provided with a heating element to automatically dry the desiccant.
  - v. Dehydrating breather alarm contact wired to terminal blocks for OWNER connections
- h. LTC Controls
  - i. The controls shall be wired to implement a fully functional LTC control scheme.
  - ii. The primary (Auto) LTC control shall be a Beckwith M-2001C, catalog number M-2001C-6EV, with Ethernet Com3 and vacuum fluorescent display.
  - iii. Provide a Beckwith M-0169A auxiliary CT for the 5A:0.2A LTC-CT transformation.
  - iv. LTC mechanism inputs shall be wired to the M-2001C to implement the Beckwith "Contact Keep Track™ Method II" scheme. See Beckwith Electric document "Methods to Obtain Positive Tap Position Knowledge for LTC Transformers" dated 05/18/12.
  - v. Provide a control switch to select LOCAL-REMOTE operation. In the LOCAL position, the AUTOMATIC-MANUAL switch controls LTC operation. In the REMOTE position, the REMOTE-CONTROL RELAYS will provide Auto/Manual and Raise/Lower controls.
  - vi. Provide a control switch to select AUTOMATIC-MANUAL operation. In the AUTOMATIC position, the primary control determines LTC operation. In the MANUAL position, the RAISE-LOWER switch can be used to manually operate the LTC.
  - vii. Provide a control switch to select RAISE-LOWER, spring-loaded to the center position. This switch will be used to manually operate the LTC when the control switches are in the LOCAL and MANUAL positions.
  - viii. Provide REMOTE-CONTROL RELAYS for REMOTE AUTO/MANUAL, REMOTE RAISE, REMOTE LOWER. The preferred relay is the Allen Bradley 700-HK32Z24 or equivalent. The coil contacts are to be 24VDC and should be wired out to terminals for OWNER connections along with a dry status contact from each relay. These relays control the operation of the tap changer when the LOCAL-REMOTE switch is set to REMOTE.
  - ix. The following LTC circuits shall be wired to terminal blocks for OWNER connections:
    - 01. M-2001C dry alarm contact
    - 02. Dry status contacts for switch position detection for the AUTO-MANUAL, LOCAL-REMOTE switches.
    - 03. Dry status contacts for REMOTE-CONTROL RELAYS (REMOTE AUTO/REMOTE MANUAL, REMOTE RAISE, REMOTE LOWER)
    - 04. Dry control contacts for REMOTE-CONTROL RELAYS (REMOTE AUTO/REMOTE MANUAL, REMOTE RAISE, REMOTE LOWER)
    - 05. LTC block circuit to allow for customer connections to block LTC operation
    - 06. LTC Alarms
  - x. All controls shall be mounted for operator access when the control cabinet doors are

- opened. No control will be located behind panels or swing-doors.
- i. Additional LTC Accessories
  - i. Position indicator with resettable drag hands to indicate maximum travel.
  - ii. Limit switches and stops to prevent travel beyond extreme tap positions.
  - iii. Crank or hand wheel for manual operation during maintenance
  - iv. Off-position contacts
  - v. Operations counter
  - vi. Control circuit protective devices
- j. Wiring: LTC control wiring shall be extended to main terminal cabinet to terminal blocks. Wire power supply switch, light and convenience outlet, space heater and switch to main terminal cabinet.

#### 15. Additional Gauges, Instruments, controls

- a. Protect all gauges and instruments with protective guards and mount at eye level when operator is standing on ground level.
- b. Dry contacts shall be wired to terminals in the main terminal cabinet.
- c. All contacts shall be 125VDC rated
- d. Oil level indicators, with non-adjustable contact(s), as follows:
  - i. Main Tank oil level indicator, with low level alarm and low-low level trip contacts
  - ii. LTC Tank oil level indicator, with low level alarm and low-low level trip contacts
- e. Main Tank oil temperature indicator, with adjustable alarm and trip contacts and resettable drag hands
- f. Winding temperature indicator, with adjustable alarm and trip contacts and resettable drag hands
- g. Qualitrol Series 900 sudden pressure relay, under oil type, 125 Vdc, mounted to a suitably sized full port gate or ball valve on the side of the transformer main tank. The sudden pressure relay can be mounted not less than two feet above the base of the transformers to avoid covering the device in snow in the winter months.
- h. Qualitrol XPRD pressure relief valves (one for the main tank and one for the LTC), self-resealing, with visual signal flag, alarm and trip contacts. Pipe the discharged oil towards the base of the transformers but away from locations where personnel are likely to be standing while accessing transformers components. Discharge pipe to run to a point approximately 2 feet above the base of the transformers
- i. Loss of AC auxiliary relays wired to indicate loss of AC auxiliary power with open while energized (N.C.) wired to terminal blocks for customer connection
- j. Loss of DC auxiliary relay wired to indicate loss of DC control power with open while energized (N.C.) contacts wired to terminal blocks for customer connection

#### 16. General Accessories

- a. 120 volt, LED light fixture (lamp shall be an A19-style LED white-light bulb with lumens between 750 and 900) with SPST switch and 120 volt, 20 ampere single-phase duplex GFI receptacle, complete with protective fuses or circuit breakers.
- b. Other standard accessories per ANSI, C57.12.10, Table 11

17. Name Plates

- a. Main Transformer Nameplate:
  - i. The nameplate shall be of weatherproof corrosion resistant stainless-steel construction and shall be mounted on the transformers at approximate eye level. The nameplate shall be in accordance with the latest ANSI Standards and shall also include:
  - ii. Date of Manufacture
  - iii. Sound level in dB
  - iv. Type of metal used as conductor in each winding for each voltage rating.
  - v. Volume of insulating oil in gallons
  - vi. Actual tested impedance
  - vii. Ratings of windings with natural cooling and at all forced cooling stages.
  - viii. A statement that the transformers oil contains no PCB's at the time of manufacture
  - ix. Special devices included in the transformers (i.e. winding surge suppressors).
  - x. State core design (e.g. shell, core)
  - xi. If transformer is equipped with an LTC, state the actual tap voltages for the LTC
  - xii. Type of insulating oil (e.g. Type II mineral oil)
- b. Device Nameplates:
  - i. Provide a weatherproof corrosion resistant stainless steel engraved nameplate at each external device (gauge, relay, etc.) indicating its designation and ANSI function number where applicable.
  - ii. Prior to shipment, the nameplates and labels shall be inspected to ensure that all information is readily visible and that they are clean.

I. SPARE PARTS

Furnish and delivery of spare parts. Spare parts shall be interchangeable with and are of the same material and workmanship as corresponding original parts. Include the cost of these spare parts in the appropriate item on the Bid Form (not to be included in the Base Bid).

<u>Qty</u>	<u>Description</u>
2	Spray containers of touch-up paint the same color as paint specification
2	Complete sets of gaskets for all removable openings, including cover, manholes and handholds.
1	LV/HV bushing ABB Type A #015JO200AS or equivalent used in transformer for LV/HV bushings