



ADVERTISEMENT FOR BIDS
FOR

Substation Power Transformers, Contract #10-PCC-02

Sealed bids will be received at the **Office of the City Clerk, 100 East First Street, Grand Island, NE 68801, until 2:00 pm. (Local Time), May 10, 2010** for furnishing Substation Power Transformers, FOB the City of Grand Island. Quotes will be publicly opened at this time at the Office of the City Clerk, 100 East First Street, Grand Island, NE. Bids received after the specified time will be returned unopened to sender.

Specifications are on file in the office of the Purchasing Division. Bids shall be submitted on forms that will be furnished by the City.

Each bidder shall submit with their bid a certified check, cashiers check, or bid bond payable to the City Treasurer in an amount not less than five percent (5%) of the bid price which shall guarantee good faith on the part of the bidder and the entering into a contract within 14 days, at the bid price, if accepted by the City. **Your certified check, cashiers check or bid bond must be submitted in a separate envelope attached to the outside of the envelope containing the bid.** Each envelope must be clearly marked indicating its contents. Failure to submit the necessary qualifying information in clearly marked and separate envelopes will result in your bid not being opened or considered. Bid bonds must be issued by surety companies authorized to do business in the State of Nebraska.

Bids will be evaluated by the purchaser based on price, delivery, quality, and adherence to specifications. Each bidder shall supply four (4) copies of equipment specifications. The Purchaser reserves the right to reject any or all bids, to waive technicalities, and to accept whichever bid that may be in the best interest of the City.

No Company may withdraw its bid for a period of 30 days after date of bid opening.

RaNae Edwards,
City Clerk

BID PACKAGE
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**CITY OF GRAND ISLAND, NEBRASKA
INSTRUCTIONS TO BIDDERS**

EXCEPTIONS TO SPECIFICATIONS: Each bidder shall carefully check all requirements herein set forth and shall offer items which fully comply with these requirements or shall plainly set forth all points, features, conditions, specifications, etc., wherein his items offered do not meet these specifications. Such exceptions as are made shall be listed by page number in the following blanks and shall be marked in ink on the pages of these specifications. If additional space is required for exception explanation, please reference and attach a letter to bid. Reference shall not be made to other attachments for exceptions and supplementary terms. Failure to outline such exceptions as specifically stated herein will require the successful bidder to comply with these specifications. In case of conflict between the bid and these specifications, these specifications shall govern unless specific exceptions are listed by the bidder.

Exceptions to specifications, pages _____

SUBMISSION OF BIDS: All bids shall be submitted using the City's bid form. Bids shall be addressed to the City Clerk and plainly marked, "**BID FOR SUBSTATION POWER TRANSFORMERS**".

INSURANCE COVERAGE: The Contractor shall purchase and maintain at his expense as a minimum insurance coverage of such types and in such amounts as are specified herein to protect Contractor and the interest of Owner and others from claims which may arise out of or result from Contractor's operations under the Contract Documents, whether such operations be by Contractor or by any subcontractor or anyone directly or indirectly employed by any of them or for whose acts any of them may be legally liable. Failure of Contractor to maintain proper insurance coverage shall not relieve him of any contractual responsibility or obligation.

BASE BID: The bidder is expected to base his bids on materials and items complying fully with these specifications, and in the event he names in his bid materials or items which do not conform, he will be responsible for furnishing materials and items which fully conform at no change in his bid price.

ALTERNATE BIDS: It is the desire of the Owner that the bidder base his bid price for this project on the written specifications. If an alternate bid or bids are submitted by a bidder, it is desired that he first submit a bid price as above described and then describe his alternate bid. Failure to do so may be reason for not extending any consideration to alternate bids.

BIDDER QUALIFICATION: Bids will be received only from qualified bidders. A bidder will be considered qualified if he is a recognized electric utility contractor and has had experience in the construction of projects of equal or greater size than that specified herein. If requested, the Bidder shall supply experience data. Such data will be used to assist in determining the qualifications of the Bidder. Bidder must comply with all applicable Federal, State and Local rules and regulations.

CHECKS OR BID BONDS: Checks or bid bonds of the unsuccessful bidders will be returned when their bids have been rejected and not to exceed 60 days from the date bids are opened. All bids shall remain in force for this 60-day period. The check or bid bond of the successful bidder will be returned when the Contracts are signed by both parties and necessary bonds supplied. Should the Purchaser make an award to a Contractor who refuses to enter into Contract and furnish the required bonds within 20 days after notification of acceptance, then the bid security which has been deposited with the Purchaser will be forfeited to the Purchaser as liquidated damages.

PERFORMANCE BOND: On award of the Contract, the successful Contractor shall furnish a Performance Bond which shall be in an amount equal to the full Contract price, guaranteeing faithful compliance with all requirements of the Contract Documents and complete fulfillment of the Contract, and payment of all labor, material and other bills incurred in carrying out this Contract. According to Nebraska Law, the surety company executing the Performance Bond must be authorized to do business in the State of Nebraska.

PAYMENT BOND: On award of the Contract, the successful Contractor shall furnish a Payment Bond which shall be in an amount equal to the full Contract price, guaranteeing protection of all persons supplying labor and

materials to the Contractor or its subcontractors for the performance of the work provided for in the Contract. In accordance with Nebraska Law, the surety company executing the Payment Bond must be authorized to do business in the State of Nebraska.

TAXES: The City Utilities Department pays sales tax amounting to 5.5% State and 1.5% City; payment of 7% sales tax must be in the contractor's bid. Contractor must pay any other tax which might be applicable.

REQUESTS FOR PAYMENT: The City of Grand Island will make payments only after approval at regularly scheduled City Council meetings. These meetings typically occur the second and fourth Tuesday each month. Requests for payment must be received no less than ten working days prior to the designated meeting to allow proper review and consideration. Payments will only be made after final completion of the project to City's satisfaction unless otherwise stated in bidding documents.

REQUEST FOR INTERPRETATION: If any person contemplating submitting a bid for this Contract is in doubt as to the true meaning of any part of the specifications or other proposed Contract documents, he may submit to the Purchasing Department a written request for an interpretation thereof. The person submitting the request will be responsible for its prompt delivery. Any interpretation of the proposed documents will be made only by addendum duly issued and/or delivered to each person receiving a set of such documents. The addenda upon closing shall become a part of the Contract. The Purchasing Department will not be responsible for any other explanation or interpretation of the proposed documents.

ADDENDA: Any addendum to the specifications issued during the time allowed for preparation of bids shall be covered in the bid and shall become a part of the specifications. One copy of each addendum issued before the date of the letting will be sent to all bidders. One signed copy is to be returned immediately to the sender as acknowledgment of receipt.

TIME OF COMPLETION: Time of completion is the essence of this Contract, and all work shall be completed no later than September 1, 2011.

MODIFICATION OF BIDS: Bids may be modified or withdrawn by an appropriate document duly executed in the manner that a bid must be executed and delivered to the place where bids are to be submitted at any time prior to the final time set for receiving bids. Bidders may modify or withdraw bids by Fax communication at any time prior to the time set for receiving bids provided this instruction is positively identified. Any Fax modification should not reveal the amended bid price but should provide only the addition, subtraction or other modifications. A duly-executed document confirming the Fax modification shall be submitted within three days after bids are opened.

BID DATA: Bidders shall submit bid documents and data, in triplicate, by filling in the document and data sheets supplied by the Purchasing Department. The bid sheets shall be filled out legibly in ink to permit reproduction.

BIDDER SECURITY: Bidder security shall be enclosed in a special envelope marked, "**BIDDER SECURITY / BID FOR SUBSTATION POWER TRANSFORMERS,**" the envelope shall contain only a cashier's check, certified check or bidder's bond.

This special envelope shall be attached to a sealed envelope containing the bid and any other bid materials. This second envelope shall be marked "**BID FOR SUBSTATION POWER TRANSFORMERS**" and be addressed to the "City Clerk." Bids of an incomplete nature or subject to multiple interpretations may, at the option of the Purchaser, be rejected as being irregular.

FINANCIAL STATEMENT: The bidder shall furnish upon request a complete financial statement signed by the bidder, if an individual, by all partners if the bidder is a partnership and, by the President or Secretary, if the bidder is a corporation.

EQUAL EMPLOYMENT OPPORTUNITY: The Contractor agrees that during the performance of this Contract not to discriminate in hiring or any other employment practice on the basis of race, color, religion, sex, disability, age or national origin, and to comply with Executive Order 11,246 of September 24, 1965, and the rules, regulations and relevant orders of the Secretary of Labor, and Chapter 20 of the Reissue Revised Statutes of the State of Nebraska.

GRATUITIES AND KICKBACKS: City Code states that it is unethical for any person to offer, give, or agree to give any City employee or former City employee, or for any City employee or former City employee to solicit, demand, accept, or agree to accept from another person, a gratuity or an offer of employment in connection with any decision, approval, disapproval, recommendation, or preparation of any part of a program requirement or a purchase request, influencing the content of any specification or procurement standard, rendering of advice, investigation, auditing, or in any other advisory capacity in any proceeding or application, request for ruling, determination, claim or controversy, or other particular matter, pertaining to any program requirement or a contract or subcontract, or to any solicitation or proposal therefore. It shall be unethical for any payment, gratuity, or offer of employment to be made by or on behalf of a subcontractor under a contract to the prime contractor or higher tier subcontractor or any person associated there within, as an inducement for the award of a subcontract or order.

LOCAL CONDITIONS: Each bidder shall have an authorized representative visit the site of the work and thoroughly inform himself of all conditions and factors which would affect the work and the cost thereof, including the arrangement and conditions of existing or proposed structures affecting or affected by the proposed work; the procedure necessary for maintenance of uninterrupted operation; the availability and cost of labor and facilities for transportation, handling, and storage of materials and equipment.

It must be understood and agreed that all such factors have been investigated and considered in the preparation of every bid submitted. No claims for financial adjustment (to any Contract awarded for the work under these Specifications and documents) will be permitted by the City, which are based on lack of such prior information, or its effect on the cost of the work.

CORRESPONDENCE: Correspondence regarding drawings, instruction manuals, and other engineering data shall be sent to:

Attn: Travis W. Burdett P.E.
City of Grand Island
Utility Department
P.O. Box 1968
Grand Island, NE 68802-1968
(308) 385-5466

LOCAL BIDDER PREFERENCE: In case of tied low bids, all other things being equal, preference shall be given in the following order:

1. To those bidders who manufacture their products within the limits of the City of Grand Island.
2. To those bidders who manufacture their products within the limits of the County of Hall.
3. To those bidders who package, process, or through some other substantial operation have employees and facilities for these purposes in the City of Grand Island.
4. To those bidders who package, process, or through some other substantial operation have employees and facilities for these purposes in the County of Hall.
5. To those bidders who maintain a bona fide business office in the City of Grand Island, whose products may be made outside the confines of the City of Grand Island.
6. To those bidders who maintain a bona fide business office in the County of Hall, whose products may be made outside the confines of the County of Hall.
7. To those bidders whose commodities are manufactured, mined, produced, or grown within the state of Nebraska, and to all firms, corporations, or individuals doing business as Nebraska firms, corporations or individuals, when quality is equal or better, and delivered price is the same or less than the other bids received.

8. To those bidders whose commodities are manufactured, mined, produced, or grown within the United States of America, and to all firms, corporations, or individuals doing business as firms registered in states other than Nebraska, when quality is equal or better, and delivered price is the same or less than the other bids received.

**SUBSTATION POWER TRANSFORMERS
CITY OF GRAND ISLAND, NEBRASKA
CONTRACT # 10-PCC-02
CONTRACTOR'S BID**

TO THE MEMBERS OF THE COUNCIL
CITY OF GRAND ISLAND
GRAND ISLAND, NEBRASKA

THE UNDERSIGNED BIDDER, having examined the plans, specifications, general and special conditions, and other proposed contract documents, and all addenda thereto and being acquainted with and fully understanding (a) the extent and character of the work covered by this Bid, (b) the location, arrangement, and specified requirements for the proposed work, (c) the location, character, and condition of existing streets, roads, highways, railroad, pavements, surfacing, walks, driveways, curbs, gutters, trees, sewers, utilities, drainage courses and structures, and other installations, both surface and underground which may affect or be affected by the proposed work, (d) the nature and extent of the excavations to be made and the handling and re-handling of excavated materials, (e) the location and extent of necessary or probable dewatering requirements, (f) the difficulties and hazards to the work which might be caused by storm and flood water, (g) local conditions relative to labor, transportation, hauling and rail delivery facilities, and (h) all other factors and conditions affecting or which may be affected by the work.

HEREBY PROPOSES to furnish all required materials, supplies, equipment, tools and plans, to perform all necessary labor and supervision, and to construct, install, erect, equip and complete all work stipulated in, required by and in accordance with the contract documents and the plans, specifications and other documents referred to therein (as altered, amended or modified by all addenda thereto) for and in consideration of the following prices:

1.1 BID PRICE: The bidder shall complete the work as stated in these specifications and as shown on the plans and drawings for the total lump sum firm contract price of:

_____ Dollars

\$ _____

If bidder fails to include sales tax in their bid price or takes exception to including sales tax in their bid price, the City will add a 7% figure to the bid price for evaluation purposes; however, the City will only pay actual sales tax due.

According to Nebraska Sales and Use Tax Requirements, Section 1-017, Contractors, check which option you have selected to file with the Nebraska Department of Revenue:

- Option 1 (Section 1-017.05)
- Option 2 (Section 1-017.06)
- Option 3 (Section 1-017.07)

The choice of option is made by completing and mailing to the Department of Revenue, a Nebraska Sales and Use Tax Election for Contractors. This form must be filed within three months after beginning to operate as a contractor. If this form is not filed, the contractor will be treated as a retailer under Option 1 for sales and use tax purposes.

EXPERIENCE DATA:

Each bidder shall supply the following data on his experience:

Name of Bidder:

<u>Project Owner</u>	<u>Contact</u>	<u>Phone No.</u>	<u>Project Location</u>	<u>Completion Date</u>

Additional Data: _____

INSURANCE: Bidder acknowledges that bid includes compliance with the attached insurance requirements.

ADDENDA: Bidder acknowledges that Addenda Number(s) _____ were received and considered in Bid preparation.

SCHEDULE: Bidder acknowledges and accepts the delivery and installation schedule as outlined in the Detailed Equipment Specification, Shipment and Marking, Section 25.

The undersigned bidder agrees to furnish the certificate of insurance and bonds, and to enter into a contract within 20 days after acceptance of this Bid, and further agrees to complete all work covered by the foregoing bid in accordance with specified requirements. The proposed work will commence as soon as possible after the contract execution with completion of the total contract to be no later than September 1, 2011. **No work shall commence until the certificate of insurance and bonds are approved by the City and the contract is executed.**

Enclosed herewith is the bid security in the amount of:

_____ Dollars
(\$ _____)

which the undersigned bidder agrees is to be forfeited to and become the property of the City of Grand Island, Nebraska, as liquidated damages should this Bid be accepted and a contract be awarded to him and he fail to enter into a contract in the form prescribed and to furnish the required bond within 20 days, but otherwise the aforesaid bid guarantee will be returned upon his signing the contract and delivering the approved bond.

It is understood and agreed that time is the essence of the contract.

In submitting this bid it is understood that the right is reserved by the City to reject any and all bids; to waive irregularities therein and to accept whichever bid that may be in the best interest of the City, at its sole discretion. It is understood that this bid may not be withdrawn until after 60 days from bid opening.

In submitting this bid, the bidder states that bidder fully complies with, and will continue to comply with, applicable State fair labor standards as required by section 73-102 RRS, 1943 and also complies with, and will continue to comply with, section 48-657 RRS, 1943 pertaining to contributions to the Unemployment Compensation Fund of the State of Nebraska.

The undersigned bidder hereby certifies (a) that this bid is genuine and is not made in the interest of or in the behalf of any undisclosed person, firm or corporation, and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation, (b) that he has not directly or indirectly induced or solicited any person, firm or corporation to refrain from bidding, (c) that he has not sought, by collusion or otherwise, to obtain for himself an advantage over any other bidder or over the City of Grand Island, and (d) that he has not directly or indirectly induced or solicited any other bidder to put in a false or sham bid.

DATED _____

SIGNATURE OF BIDDER:

If an Individual: _____ doing business

as _____

If a Partnership: _____

by _____, member of firm.

If a Corporation: _____

by _____ (Seal)

Title _____

BUSINESS ADDRESS OF BIDDER _____

TELEPHONE NUMBER OF BIDDER _____

FAX NUMBER OF BIDDER _____

LIST ALL SUBCONTRACTORS:

<u>Company Name</u>	<u>Work Subcontracted</u>	<u>Business Address</u>	<u>Business Telephone Number</u>
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_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

MINIMUM INSURANCE REQUIREMENTS

CITY OF GRAND ISLAND, NEBRASKA

The Contractor shall secure and maintain throughout the duration of this Contract insurance, from companies authorized to do business in Nebraska, of such types and in such amounts as may be necessary to protect themselves and the interests of the City against all hazards or risks of loss as hereinafter specified. This insurance shall cover all aspects of the Contractor's operations and completed operations. The form and limits of such insurance, together with the underwriter thereof in each case, shall be approved by the City but regardless of such approval, it shall be the responsibility of the Contractor to maintain adequate insurance coverage at all times. Failure of the Contractor to maintain adequate coverage shall not relieve him of any contractual responsibility or obligation. Minimum insurance coverage shall be the amounts stated herein or the amounts required by applicable law, whichever are greater.

1. **WORKERS' COMPENSATION AND EMPLOYER'S LIABILITY**

This insurance shall protect the Contractor against all claims under applicable State worker's compensation laws. This insurance shall provide coverage in every state in which work for this project might be conducted. The Contractor shall also be protected against claims for injury, disease or death of employees which, for any reason, may not fall within the provisions of a workers' compensation law. This policy shall include an "all states" endorsement.

The liability limits shall not be less than the following:

Workers' Compensation	Statutory
Employer's Liability	\$100,000 each accident
	\$100,000 each employee
	\$500,000 policy limit

2. **BUSINESS AUTOMOBILE LIABILITY**

This insurance shall be written in comprehensive form and shall protect the Contractor, Contractor's employees, or subcontractors from claims due to the ownership, maintenance, or use of a motor vehicle.

The liability limits shall be not less than the following:

Bodily Injury & Property Damage	\$ 500,000 Combined Single Limit
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3. **COMPREHENSIVE GENERAL LIABILITY**

The comprehensive general liability coverage shall contain no exclusion relative to explosion, collapse, or underground property.

The liability limits shall be not less than the following:

Bodily Injury & Property Damage	\$ 500,000 each occurrence
	\$1,000,000 aggregate

4. **UMBRELLA LIABILITY INSURANCE**

This insurance shall protect the Contractor against claims in excess of the limits provided under employer's liability, comprehensive automobile liability, and commercial general liability policies. The umbrella policy shall follow the form of the primary insurance, including the application of the primary limits.

The liability limits shall not be less than the following:

Bodily Injury & Property Damage	\$1,000,000 each occurrence
	\$1,000,000 general aggregate

5. ADDITIONAL REQUIREMENTS

The City may require insurance covering a Contractor or Subcontractor more or less than the standard requirements set forth herein depending upon the character and extent of the work to be performed by such Contractor or Subcontractor.

Insurance as herein required shall be maintained in force until the City releases the Contractor of all obligations under the Contract.

The Contract shall provide and carry any additional insurance as may be required by special provisions of these specifications.

6. CERTIFICATE OF INSURANCE

Satisfactory certificates of insurance shall be filed with the City prior to starting any work on this Contract. The certificates shall show the City as an additional Insured on all coverage except Workers Compensation. The certificate shall state that thirty (30) days written notice shall be given to the City before any policy is cancelled (strike the "endeavor to" wording often shown on certificate forms). If the Contractor cannot have the "endeavor to" language stricken, the Contractor may elect to provide a new certificate of insurance every thirty (30) days during the contract. The Contractor shall immediately notify the City if there is any reduction of coverage because of revised limits or claims paid which affect the aggregate of any policy.

CONTRACT AGREEMENT

THIS AGREEMENT made and entered into by and between _____
hereinafter called the Contractor, and the City of Grand Island, Nebraska, hereinafter called the City.

WITNESSETH:

THAT, WHEREAS, in accordance with law, the City has caused contract documents to be prepared and an advertisement calling for bids to be published, for construction of SUBSTATION POWER TRANSFORMERS; and

WHEREAS, the City, in the manner prescribed by law, has publicly opened, examined, and canvassed the bids submitted, and has determined the aforesaid Contractor to be the lowest responsive and responsible bidder, and has duly awarded to the said Contractor a contract therefore, for the sum or sums named in the Contractor's bid, a copy thereof being attached to and made a part of this contract;

NOW, THEREFORE, in consideration of the compensation to be paid to the Contractor and of the mutual agreements herein contained, the parties have agreed and hereby agree, the City for itself and its successors, and the Contractor for itself, himself, or themselves, and its, his, or their successors, as follows:

ARTICLE I. That the Contractor shall (a) furnish all tools, equipment, superintendence, transportation, and other construction materials, services and facilities; (b) furnish, as agent for the City, all materials, supplies and equipment specified and required to be incorporated in and form a permanent part of the completed work; (c) provide and perform all necessary labor; and (d) in a good substantial and workmanlike manner and in accordance with the requirements, stipulations, provisions, and conditions of the contract documents as listed in the attached General Specifications, said documents forming the contract and being as fully a part thereof as if repeated verbatim herein, perform, execute, construct and complete all work included in and covered by the City's official award of this contract to the said Contractor, such award being based on the acceptance by the City of the Contractor's bid;

ARTICLE II. That the City shall pay to the contractor for the performance of the work embraced in this contract and the contractor will accept as full compensation therefore the sum (subject to adjustment as provided by the contract) of _____ Dollars
\$ _____

for all services, materials, and work covered by and included in the contract award and designated in the foregoing Article I; payments thereof to be made in cash or its equivalent in the manner provided in the General Specifications.

ARTICLE III. The contractor hereby agrees to act as agent for the City in purchasing materials and supplies for the City for this project. The City shall be obligated to the vendor of the materials and supplies for the purchase price, but the contractor shall handle all payments hereunder on behalf of the City. The vendor shall make demand or claim for payment of the purchase price from the City by submitting an invoice to the contractor. Title to all materials and supplies purchased hereunder shall vest in the City directly from the vendor. Regardless of the method of payment, title shall vest immediately in the City. The contractor shall not acquire title to any materials and supplies incorporated into the project. All invoices shall bear the contractor's name as agent for the City. This paragraph will apply only to these materials and supplies actually incorporated into and becoming a part of the finished product of SUBSTATION POWER TRANSFORMERS.

ARTICLE IV. That the contractor shall start work as soon as possible after the contract is signed and the required bonds and insurance are approved, and that the Contractor shall complete the work on or before September 1, 2011. It is understood and agreed that time is the essence of the contract.

CONTRACT AGREEMENT (Continued)

ARTICLE V. The Contractor agrees to comply with all applicable State fair labor standards in the execution of this contract as required by Section 73-102, R.R.S. 1943. The Contractor further agrees to comply with the provisions of Section 48-657, R.R.S. 1943, pertaining to contributions to the Unemployment Compensation Fund of the State of Nebraska. During the performance of this contract, the contractor and all subcontractors agree not to discriminate in hiring or any other employment practice on the basis of race, color, religion, sex, national origin, age or disability. The Contractor agrees to comply with all applicable Local, State and Federal rules and regulations.

IN WITNESS WHEREOF, the parties hereto have executed this Contract Agreement.

Contractor _____

By _____

Date _____

Title _____

CITY OF GRAND ISLAND, NEBRASKA,

By _____

Date _____

Mayor

Attest: _____

City Clerk

The contract, insurance, and any required bonds are in due form according to law and are hereby approved.

Attorney for the City

Date _____

DETAILED EQUIPMENT SPECIFICATIONS SUBSTATION POWER TRANSFORMERS

1.0 SCOPE

- A. This specification describes the electrical/mechanical characteristics required for the purchase of two (2) 115/13.8-kV, 22.5/30/37.5/42 MVA (55°C/65°C rise). three phase, power, step-down, LTC Substation transformers.
- B. All equipment shall be the Manufacturer's standard design as far as is consistent with the intent of these specifications. It shall be of first class construction conforming to the best modern practice.
- C. Equipment shall be factory fabricated and each sub-assembly completely assembled and wired at the manufacturing location for inspection and test, to assure accuracy of operation.

2.0 LAWS, SAFETY CODES, AND STANDARDS

- A. The design of all equipment to be supplied on this contract shall be such that it may be installed to comply with all applicable rules of the National Electric Code and the National Electrical Safety code.
- B. All equipment shall conform to the latest applicable standards of the IEEE, OSHA, National Electrical Manufacturer's Association, and the American National Standards Institute, unless specifically stated otherwise. In particular ANSI standards C57.12.00, C57.12.10, and C57.12.30 and NEMA TR-1 shall apply. In the event of a conflict of these standards, the strictest standard shall apply.

3.0 WARRANTY AND GUARANTEE

- A. Manufacturer warrants to purchaser that all materials and equipment will be new, and that all work will be of good quality and free from defects in accordance with the Contract Documents and any inspections, tests or approvals provided for in the Contract Documents. Manufacturer shall bid on the basis of an extended warranty period of five years.
- B. Manufacturer guarantees to remedy promptly, and without cost to the Purchaser, any defective materials, equipment, or workmanship which appear within the warranty period after the date of energization, not to exceed 3 months from date of delivery, or from the date of acceptance of installed transformer by the City, whichever comes first and in accordance with any special guarantees provided by the Contract Documents.
- C. Manufacturer's warranty under this contract will include, in addition to the equipment repair or replacement cost, the direct cost, if required, for:

1. Removing the transformer from the pad.
2. Transportation of unit to be repaired to and from factory, if required.
3. Installation of the repaired unit after certifying that the repaired unit is ready to be placed back in service.

4.0 EXPERIENCE

- A. Bidders shall submit a list of at least ten (10) installations of outdoor LTC transformers of the same capacity and voltage rating, that have been in successful operation for a period of not less than three (3) years, as well as a list of all suits pending covering installations made over the last five (5) years. These lists must include the name of the Utility, their contact telephone number and address.
- B. The manufacturer shall supply verification of continuous manufacturing of similar transformers over the past two years at the manufacturing plant bid.

5.0 SUBSTATION TRANSFORMERS

- A. Type:
Outdoor, two winding, oil immersed, 3 phase, 60 cycle.
- B. Capacity:
22.5 MVA (ONAN self cooled) 55° rise.
30.0/33.6 MVA (ONAF forced air cooled) 55°/65°C rise.
37.5/42.0 MVA (ONAF forced air cooled in two stages) 55°/65°C rise.

Elevation is less than 2,000 feet above sea level.
- C. High Voltage Copper Winding, utilizing magnet wire or continuously transposed cable:
115 kV high voltage
550kV BIL
Delta connected
- D. Low Voltage Copper Winding, utilizing magnet wire or continuously transposed cable:
13,800 Y/7967 Volts - 15kV Class
110 kV BIL
Wye connected – Solidly Grounded
- E. Neutral:
Low Voltage Side
110 kV BIL
- F. Impedance:

8.0% H-X at 22.5 MVA ONAN self-cooled rating.

G. High Voltage Taps:

4 - 2½% full capacity taps, two above and two below rated voltage, @ 109,250 volt, 112,125 volt, 115,000 volt (rated), 117,875 volt and 120,750 volt.

H. Low Voltage Taps:

An automatic three (3) phase Load Tap Changer shall be furnished with the high voltage held constant on any fixed tap to provide automatic regulation of the low voltage winding. The tap changer shall be designed to vary the low voltage by +/- 10% in thirty two (32) 5/8% steps (16 above and 16 below normal voltage). The taps above the midtap position shall be rated full KVA and the taps below shall be capable of carrying rated current corresponding to rated KVA voltage.

The tap changing control equipment shall include the following items:

1. Voltage regulating relay with potential source furnished from station service 120 source.
2. Control and time delay relays shall be furnished so that the tap changer will not operate on loss of voltage from potential source.
3. Voltage testing terminals shall be provided.
4. An automatic-manual selector switch shall be provided. Manual operation must be independent of voltage regulating relay and potential transformers.
5. Load tap changer motor and control to be operated from customer's 240V AC 3 wire supply.
6. Spare, terminal blocks, etc. shall be provided for future addition of a remote tap position indication transmitter. Remote position indication of high and low TLC limit shall be provided (wiring to be extended to terminal blocks).
7. Tap positions shall be numbered with respect to the neutral position. Progressive tap numbers above neutral increase the secondary voltage. Progressive tap numbers below neutral decrease the secondary voltage.
8. There shall be no direct connection between the current, potential and power circuit or their respective neutrals.

9. Heaters and a switchable lamp shall be included in the control cabinet. These will be operated from the station service 120/240 V AC 3 wire supply.
 10. Alarm devices shall be provided to indicate loss of AC to LTC, out of step LTC and loss of LTC vacuum. These alarms shall have a 120 second time delay.
 11. The manufacturer shall supply all necessary drawings and instruction books along with the transformer required data.
- I. Over excitation:
The transmission system normally operates at 118 kV, with excursions above and below this value. Occasionally, the voltage remains at 124 kV for extended periods. The transformer shall be designed to operate at 105% of 121 kV, without incurring any damage from over excitation.

6.0 CONSTRUCTION OF TRANSFORMERS

- A. The construction shall conform to ANSI standards, unless modified by these specifications. The transformer design shall be able to withstand short circuits, with the fault current limited only to the impedance of the transformer itself. Design considerations should assume an infinite bus available.
- B. The tank shall be constructed of high grade steel plate of welded construction and conform to general requirements of ANSI 12.18.19. All covers shall be gasketed and the top shall be welded construction. All tank seams shall be double welded (inside and out), no seam shall be at or within 6" of the corner. The design shall be capable of withstanding all pressures and vacuums possible during all loading cycles vacuum filling and fault conditions. Guides are required for centering coil and core assembly. All external tank supports or stiffeners shall be box beam construction and continuously welded.

A device suitable for mounting a safety device in the approximate center of the tank cover and supporting hardware including harnesses utilizing gravity brakes shall be provided.

- C. The base shall be constructed of structural steel shapes or plates to form a rigid skid on which the transformer can be slid or rolled on either main centerline axis. Suitable openings shall be provided in the base to give adequate ventilation and to prevent accumulation of moisture.
- D. Lifting lugs, jack bosses and pulling eyes shall be provided on each corner of the tank and have a minimum of 8" x 8" jacking surface.

- E. Radiators shall be manufacturer's standard design and removable. The radiator assemblies shall be provided with lifting eyes, top and bottom shut off valves to permit removing radiator without draining transformer, drain plugs in radiators and adequate bracing as required for fan support. Radiators shall be interchangeable, match marking is not permitted. Radiators shall be constructed to withstand tank operating pressure and full vacuum.
- F. The core and coil assembly shall be the Manufacturer's standard assembly rigidly braced to withstand short circuits. All joints shall be brazed, or silver soldered.

The transformer, including all core and coil assemblies, shall be power class, round core/circular coil design and construction. High voltage and low voltage windings for the main core/coil assembly shall be either disk or helical construction; layer/barrel windings are not acceptable. All windings shall be copper conductor and either rectangular magnet wire or continuous transposed cable.

The purchaser reserves the right to inspect the completed core and coil assembly prior to tanking. The manufacturer shall notify the purchaser not less than five days prior to the date of tanking to allow the customer to witness tanking, if so desired.

The transformer design shall be adequate to withstand short circuits, with the fault current limited only by the impedance of the transformer itself.

The regulating winding shall be fully distributed and be electrically independent from or placed on a separate winding tube from the high and low voltage windings.

Internal surge arresters or non-linear resistors shall not be included as part of the internal insulation system, unless written authorization is first obtained from the engineer.

Insulation on all conductors used in the coil winding process shall be cellulose insulating paper. It shall be wound onto the conductor employing a spinning process. The paper insulation shall be applied in single or multiple strands such that a minimum of 30% of the paper surfaces are overlapped to provide for a continuous insulating surface. Sufficient tension shall be maintained on the paper strands so as to prevent loose wraps. If clamping rings are utilized in the transformer design, full circumference rings shall be used. Core and coils shall be dried using a "vapor phase" system prior to filling.

Cores shall be grounded at only one point and the core grounds for both the main and series transformer shall be brought to a convenient location for testing and be brought out on the cover through bushings and

grounded externally. Core ground bushing(s) shall be enclosed.

Core grounds for series transformer or preventive auto transformers shall also be brought out for testing when applicable.

- G. The transformer shall meet the short circuit requirements given in ANSI C57-12.00.
- H. The transformer shall have copper faced grounding pads on all four (4) corners of the tank.
- I. The transformer shall have automatic positive pressure oil preservation as follows:
 - 1. Oil shall be protected by positive pressure nitrogen system including replaceable nitrogen cylinder three-stage pressure reducing assembly, high and low tank pressure alarms, low cylinder pressure gage.
 - 2. Initial nitrogen cylinder shall be DOT approved and supplied by transformer manufacturer. Nitrogen system controls, gages and alarm contacts to be housed in a windowed weatherproof enclosure. Nitrogen shall be mounted on a platform and attached to the transformer using a method which will permit easy replacement.
 - 3. A bleed tube for gas blanket dew point measurement shall be provided from the gas space to an elevation of six feet above the base of the transformer.
 - 4. Suitable piping and valves shall be provided from the gas space to an elevation of six feet above the base of the transformer.
- J. All wiring designations shall be plainly marked at their terminal blocks or studs in the cabinet, and nameplates with ANSI device numbers shall be provided for all devices.
- K. Wiring and Devices
 - 1. All wiring shall be installed as neatly as possible and shall be in accordance with the best industry standards and practices. Wiring shall be avoided on swing panels and in front of any pieces of equipment that may require maintenance. Wires and harnesses shall be such that incoming and outgoing cables are supported. All wiring shall be continuous from terminal to terminal utilizing ring

type connectors. No splices will be allowed. All secondary connection points for connecting to incoming leads shall be wired to terminal blocks in the main control cabinet. All spare contacts of alarm and auxiliary relays shall be brought out to the terminal blocks. None of the wiring shall have more than two (2) wires at each terminal block screw.

2. Control wiring shall be no smaller than No. 14 AWG. The secondary leads of current transformers shall be No. 10 AWG. The control wire shall be stranded copper conductor, with 600 volt class, 90° C, flame retardant, moisture and heat resistant insulation, type SIS or equal.
 3. All control wiring in the control cabinet(s) shall be terminated on terminal blocks, mounted vertically and having washer head, binding, screw type terminals. Twenty five percent (25%) spare terminals shall be furnished. All Cts to be terminated on General Electric short-circuit type blocks, one block per CT, Model "EB-27, each block supplied with four (4) shorting screws. All other terminations are to be made on General Electric blocks Model EB-25.
 4. The devices in the control cabinet shall be provided with neat and adequate markings or nameplates to ensure proper identification. The devices shall be labeled in accordance with identification on the drawings using a type of label that will not peel off or become unreadable during the life of the transformer.
- L. The transformer shall be designed to meet seismic zone 2 criteria. Refer to IEEE Std. 693, "IEEE Recommended Practices for Seismic design of Substations".

7.0 FINISHES

- A. Equipment shall be new and suitably painted, including all necessary filler, priming, and finishing coats.
- B. After all welding is complete on the main tank, it should be shot grit blasted for removal of dirt, oils, weld splatters, and oxidation. Transformer tank and all auxiliary equipment shall be painted with a rust-inhibiting primer and top coat to provide a minimum 3 mil dry film thickness. External paint color shall be Sky Gray, ANSI 70. One quart of matching touch-up paint shall be provided with each transformer.
- C. The base and underside of the transformer shall have an additional coating of an asphalt base or equal rust inhibiting compound.

- D. Non-skid coating shall be applied to all top surfaces of the transformer main tank and LTC compartment, which would be walked on during installation and maintenance.
- E. The interior of the transformer, LTC compartment, control equipment cabinets, and all junction boxes shall be painted white.
- F. Accelerated aging test must be performed on the paint to be used inside the tank. A plate steel sample coated with the white paint shall be submerged in transformer insulating oil and heated to 130°C. After 1,000 hours there may not be any change in the painted surface, or in the power factor of the oil used for the test.
- G. Radiators shall be hot dipped galvanized, prior to painting.

8.0 TRANSFORMER OIL REQUIREMENTS

- A. Necessary insulating oil shall be furnished for the transformer. Oil supplied by Manufacturer or used at the factory must be compatible with domestic oils.
- B. Oils shall be in accordance with ASTM Standard D3487-79, Mineral Insulating Oil used in Electrical Apparatus.
- C. Supplier shall furnish a certified, EPA approved test report of residual oil in the transformer prior to shipment indicating) PPM of PCBs. The same certification shall be furnished for the condition of each container of oil, which is supplied for the transformer. PCB content of the oil shall be in accordance with EPA Regulation Number 40CFR761. The electrical insulating oil shall be Type I Mineral oil per NEMA Standards No. SG-P1. The nameplate shall be marked to identify the insulating oil as non-PCB.
- D. Oils shall pass the ASTM D1275, Method B Corrosive Sulfur test.
- E. Oils shall be tested for Acid Number using ASTM D974 with a result of 0.015 mg KOH/g or less.

9.0 BUSHINGS

- A. The high voltage bushings shall be 1,200 A, 115kV, 550 kV BIL and shall be condenser type with draw leads. The low voltage bushings shall be 3,000 A, 25kV. Neutral bushing 3,000A identical to the LV Line bushings , 25 kV. All bushings are to be top mounted.

- B. The low and high side bushing location and design shall be such that for replacement, the oil will not have to be lowered to a point that will uncover the coil.
- C. Oil level gages shall be on one side of the tank, tilted toward the ground and located so they can be easily read from the ground.
- D. All bushings, both high and low voltage shall be porcelain and shall have ANSI No. 70 gray glaze and shall have provisions for power factor testing. Bushings shall be oil-filled condenser type.
- E. A ¼" x 1" copper bar connection from the neutral bushing terminal to the ground pad at the base of the tank shall be provided. A removable link in the copper bar at least 6" in length shall be provided and located at the neutral bushing terminal. This bar is to be insulated from the transformer tank except at the ground pad.
- F. Stud connectors with NEMA four hole terminal pads shall be provided for high voltage terminals. Four-hole, four inch spade type connectors shall be provided for low voltage terminals.

10.0 THERMAL COOLING EQUIPMENT

- A. Cooling equipment shall be controlled by two thermal relays which simulate actual winding hot-spot temperature. Both should consist of a detecting device and an indicating device functioning upon oil temperature and/or load current in one phase. Both shall be the direct-stem, bimetallic type or the liquid filled type similar to Qualitrol Series 120 (in no case will capillary tube type be allowed).
- B. The detecting devices shall have three normally open control contacts calibrated so that first and second contact closures shall start first and second stages of cooling, respectively, and third contact shall be set for 150° C for City's use.
- C. A selector switch shall be provided in the control cabinet to permit either of the two groups of fans to be selected as the initially energized group.
- D. The indicating device shall have a dial indicating winding hot-spot temperature in degrees C, and shall include a maximum indicating hand. The maximum indicating hand should be reset by push button, operable from ground level.
- E. A shorting type test switch shall be provided in the secondary of the winding temperature detector current transformer.

- F. The liquid temperature indicator shall be provided with one normally open contact adjustable from 100° C to 120° C, set at 105° C.
- G. The high temperature alarm contact of the liquid temperature indicator shall be wired through a SPST disabling switch to a terminal block in the transformer control cabinet. Temperature detector elements shall be designed to permit their removal without taking the transformer out of service or lowering the oil level.
- H. Cooling fans shall have pre-lubricated sealed, lifetime bearings. They shall be mounted for horizontal air flow only.
- I. Voltage available for the fans will be 240V AC.
- J. The manufacturer shall furnish all control apparatus required for the fans including contactors, relays, motor running protection, etc. The fans shall be conveniently grouped and located to permit maintenance without de-energizing transformer. A control switch shall be provided for manual operation and testing.
- K. All conduit runs and boxes externally mounted on the transformer shall be rigid aluminum or cast aluminum.

11.0 CABINETS

- A. The control cabinet enclosure shall be stainless steel of the NEMA 4 class. The control cabinet must be conveniently located at an accessible location on tank wall. Weatherproof connections must be used on conduit runs leaving enclosure. Cabinet shall be located so as to be completely interchangeable with existing control cabinet on existing transformer without modification of existing wiring.
- B. The cabinet in which the current transformers are terminated on short circuiting blocks shall have a copper bar ground bus (minimum 1" x ¼" of suitable length) for connection to 4/0 copper lead from the station ground grid.
- C. Each of the cabinet(s) shall be equipped with sufficient heaters, thermostats, breathers and filters to prevent moisture condensation and dust accumulation in order to ensure proper operation of the apparatus. Each cabinet shall also be equipped with a grounded 120 volt AC duplex convenience receptacle (Hubbell #5362 or equal) with ground fault interrupting (GFI) protection for external use, and an incandescent, vibration resistant and thermal rated lamp with guard and a door-operated switch.

- D. All devices in the control cabinet shall be labeled in accordance with identification on the drawings using a type of label that will not peel off or become unreadable during the life of the transformer.
- E. All wiring terminations shall be identified by the use of preprinted permanent wire labels.

12.0 APPURTENANCES

- A. The main tank pressure relief device shall be a mechanical self-resealing type equipped with a visual indicator such as an optical flag which will clearly show from the ground when the device has operated.
- B. The liquid level indicator shall have non-grounded minimum-level alarm contacts suitable for interrupting a 250 volts maximum for the following:
 - 1. 0.02 ampere direct-current inductive load.
 - 2. 0.20 ampere direct current no inductive load.
 - 3. 2.5 ampere alternating-current no inductive or inductive load.
- C. The pressure/vacuum gauge shall be Qualitrol No. 50-35 and the pressure/vacuum bleeder shall be Qualitrol No. 351.2.

13.0 ARRESTERS

- A. Hardware and/or support brackets for mounting of high voltage surge arresters on the transformer shall be provided. Similar brackets and hardware shall be provided for mounting of low voltage surge arresters. The arresters shall be provided by the manufacturer and shall be Station Type metal oxide.
- B. An unpainted ¼" x 2" copper bus bars shall be provided between the arresters mounting bases and extending to a transformer ground pad at the bottom of the tank wall. The bus bar shall be drilled near each arrester base and provided with NEMA 2 hold flat ground connector suitable for connection of a 250 MCM copper conductor for grounding the arresters. The bus bar shall be bolted to the tank wall.

14.0 VALVES

- A. Drain and filter valves for the main tank shall be two inch and shall be gate valves, not globe valves. Each drain valve shall include 3/8" sampler valve.
- B. Install valve on each detachable radiator bank, top and bottom.
- C. A 2" tapped pipe shall be provided in the cover for connection to a vacuum

pump.

15.0 CURRENT TRANSFORMERS

- A. Bushing current transformers shall be furnished as listed in the table below (in addition to Cts for winding temperature indicator relay):

<u>Bushing</u>	<u>No. Required</u>	<u>Ratio</u>	<u>Accuracy Class</u>
H1, H2, H3	6 ea.	1200:5 M.R.	C400
X1, X2, X3	6 ea.*	2000:5 M.R.	C400
XO	1 ea.	600:5 M.R.	C400

* In addition to any required for LTC

- B. All Cts to be terminated on General Electric short-circuit type blocks, one block per CT, Model EB-27, each block supplied with four (4) shorting screws.
- C. All Cts to be located inside of transformer tank and shall have fully distributed windings with a minimum thermal rating of 2.0.

16.0 AUDIBLE SOUND LEVEL

- A. It is desired that the noise level be below 64 db (A) at the self-cooled, 22.5 MVA, rating of the transformer and in no event exceed the noise level permitted by NEMA Article TRI-2.041 or as amended.

17.0 SPARE PARTS

- A. The following spare parts shall be included in the bid price:
1. One (1) high side and one (1) low side bushing with gaskets.
 2. Two (2) manhole gaskets.
 3. Two (2) cooling fan motors.
- B. List of recommended spare parts, accompanied with firm prices which will be honored for one year after transformer delivery.

18.0 TRANSFORMER TESTS

- A. Power Factor:
In addition to the ANSI standard test code C57.12.90 routine tests, a power factor test shall be made and the results included in the test report. The power factor, corrected to 20° C, shall not exceed 0.5%.
- B. Winding Resistance:
In addition to normal requirements, resistance between each of the high

side bushing terminals and between each of the low side bushing terminals of the completed transformer shall be measured and included in the test report. Variations in measured resistance values between identically rated bushings shall not exceed 2%. These values will be compared with field measurements.

C. High Voltage Excitation Test:

In addition to normal requirements, single phase high voltage excitation current shall be measured with RMS ammeters at 10 kV and included in the test report. The values will be compared with field values measured using Doble equipment, so the report data must be compatible.

D. Gas-In-Oil Limits for Factory Temperature Rise Tests:

Oil samples shall be taken immediately before and after each temperature rise test, as well as 8 hours after the last temperature rise test. An oil sample taken immediately before the first temperature rise test shall be retained for diagnostic tests in case gas-in-oil limits are exceeded during the heat runs. The sampling and extraction of gases dissolved in oil, and then chromatographic separation and analysis shall be performed in accordance with C57.104 Section 5.

The gas concentrations in the transformer oil prior to the temperature rise tests shall not exceed the following:

TABLE 1
Initial Maximum Gas Concentrations

<u>Gas</u>	<u>Max. PPM</u>
Methane, CH ₄	3
Ethane, C ₂ H ₆	2
Ethylene, C ₂ H ₄	2
Hydrogen, H ₂	5
Acetylene, C ₂ H ₂	1
Carbon Monoxide, CO	80
Carbon Dioxide, CO ₂	200

Acceptance of the transformer will be based in part on the heat run gassing rates not exceeding the following limits for each heat run. The gassing rate is equal to the change in ppm gas concentration during the heat run divided by the heat run duration in hours.

TABLE 2
Maximum Gassing Rates for Acceptance

<u>Gas</u>	<u>Max. Gassing Rate (ppm/hr)</u>
Methane, CH ₄	0.45

Ethane, C ₂ H ₆	1.05
Ethylene, C ₂ H ₄	1.05
Hydrogen, H ₂	1.25
Acetylene, C ₂ H ₂	0.12
Carbon Monoxide, CO	6.25
Carbon Dioxide, CO ₂	25.0

Shipment shall not be made until the City has reviewed temperature rise and gas-in-oil test results and approves shipping. City shall have the right to refuse delivery of this transformer if these guidelines are not met.

- E. Sound Level Test:
Sound level test shall be conducted at the tap position producing the highest sound level.

19.0 LOSS EVALUATION

- A. Data accompanying the invitation to bid will include dollar figures Purchaser will assign to core and copper losses in evaluating the proposed transformer design. Also included will be the transformer loading at which copper losses will be evaluated. The transformer shall be designed for maximum efficiency at this rating as shown on the Evaluation Procedure form attached. Cooling pumps and/or fan losses will be considered as copper losses and included in the evaluation for loads at which they would operate.
- B. If the actual losses exceed the losses guaranteed in the proposal, and the equipment is accepted, the Successful Bidder agrees to pay the purchaser an amount equal to the actual losses minus the guaranteed losses multiplied by the Purchaser's assigned dollar figures. Core and copper losses will be considered separately, however, the charge will be limited to the amount that total cost of actual losses exceed total cost of guaranteed losses. No other credit will be allowed for losses less than guaranteed.

20.0 ACCEPTANCE

- A. The transformer shall be designed to permit loading in accordance with IEEE C57.91-1995, Guide for Loading Mineral Oil Immersed Power Transformers. Acceptance of these units will be based on the transformer's capability to meet the temperature limits indicated in table 3 (u) Page 38 of this guide. The specific allowable top oil and insulated conductor hot spot temperature at 125% peak load for 8 hours shall be 96° C and 146° C, respectively. These limits were established with a 30° C ambient. In addition, the hot spot temperature of other metallic parts shall not exceed 160° C.

- B. Acceptance will also be based on the limits for gas-in-oil concentrations listed previously.

21.0 ACCESSORIES

- A. Standard transformer accessories shall include the following:
 - 1. Oil level indicator, oil drain valve and oil sampling device Qualitrol CAS-652-2.
 - 2. A pressure relief device - Qualitrol 213 Series with alarm switch 213-001-03 and yellow semaphore assembly 207-60- 3.
 - 3. A sudden pressure relay - Qualitrol 900-004-01.
 - 4. A liquid temperature remote indicating thermometer - Qualitrol 104-078-01.
 - 5. A winding temperature remote indicating thermometer – Qualitrol 104-106-01.
- B. Accessories shall also include stud to 4 hole NEMA pad terminal connectors for all bushings, except spares.
- C. The LTC compartment will be provided with the following accessories:
 - 1. Oil filtration system.
 - 2. Automatic desiccant dryer.

22.0 ACCESS

- A. The City shall, at its option, be granted access to all documents and records necessary to verify conformance to the contract requirements and to observe routine work and inspect work in progress.
- B. Access will be during normal working hours unless other times are mutually agreed to or work is performed at other times.
- C. The conditions of this section apply to the manufacturer to which a contract is placed, and to all subcontracted suppliers.
- D. The conditions of this section shall not relieve the manufacturer of any responsibility for conformance to the requirements of this document.

23.0 DRAWINGS AND AS BUILT DRAWINGS

- A. As soon as possible, but no later than three (3) months after receipt of contract, furnish as specified in this contract, two (2) sets of all drawings unique to the equipment (generic drawings are not acceptable) and necessary for design of all equipment furnished under this contract. The Purchaser shall approve, or otherwise comment, the drawings and return one (1) set to the Manufacturer. Drawings shall include, but not be limited

to, the following:

1. Outline, Base Plan and detail dimensions
 2. C.T. connection diagram, excitation curves, and ratio correction factor curves.
 3. Bills of material.
 4. Schematic diagrams.
 5. Wiring diagrams.
 6. Shipping drawing, if details are not shown on outline drawings.
 7. Nameplate drawings, including City's Contract reference number.
 8. Bushing drawings.
 9. Any additional information necessary to demonstrate full compliance with these specifications.
 10. Index of all drawings furnished
- B. After Purchaser's approval is given to the drawings, the Manufacturer shall supply the Purchaser with two (2) complete sets of corrected drawings. These drawings shall be furnished within eight (8) weeks after the return of the corrected approval drawings.
- C. Approval of Manufacturer's drawings does not relieve supplier of the obligation to comply with these specifications, unless the exception is listed and accepted by the City in the Contract.
- D. All drawings shall have the location name and unit designation located above manufacturers standard title block.
- E. The transformer outline drawing shall indicate the location of the transformer's center of gravity, as shipped, and also as it is located when the transformer is completely assembled and filled with oil. This drawing shall also include data as to the weight of the heaviest item removed for shipment.

24.0 INSTRUCTION BOOKS

- A. For each transformer, furnish (5) copies of all instruction books, no later than equipment delivery. The instruction books shall contain instructions, drawings, and test reports for all apparatus furnished under this contract. An additional copy shall be shipped with each transformer and stored in its control cabinet.
- B. Bind all instruction books in an acceptable manner with durable plastic covers. Books shall be prepared by the manufacturer and show address of the nearest service facility authorized by the manufacturer. Books shall contain instructions for installation, operation, inspections, maintenance, spare parts lists, and data sheets showing model numbers and serial numbers of equipment furnished.

- C. Transformer Instruction Books shall include the following sections or information:
1. Table of Contents
 2. Descriptive Bulletins
 3. Transformer Handling Instructions
 4. Maintenance Instructions
 5. No Load Tap Changer
 6. Radiators
 7. Radiator Shut-Off Valve
 8. Cooling Fans
 9. Bushings
 10. Bushing Connections
 11. Oil Temperature Indicator/Relay
 12. Winding Temperature Indicator/Relay
 13. Oil Level Indicators
 14. Pressure Relief Devices
 15. Vacuum/Pressure Gauge
 16. Vacuum Pressure Bleeder
 17. Control Relays
 18. LTC and LTC Controller
 19. List of Spare Parts, with Manufacturer's catalog number
 20. Complete set of drawings, bound with the book
 21. Test Reports
- D. The manufacturer shall furnish two (2) CDs per transformer duplicating the contents of the Instruction Book with all files in Adobe Acrobat PDF format. Drawing files shall also be furnished AutoCAD DXF format on this CD.

25.0 SHIPMENT AND MARKING

- A. Delivery shall be F.O.B. destination, installed. Manufacturer is responsible for unloading, temporary storage, final placement, assembly, and acceptance testing of the transformer.
- B. No shipment shall be made without notification to the City of Grand Island. The transformers will be shipped to, and installed upon, foundations at a substation location in Grand Island, Nebraska.

The substation will be near Wildwood Drive and South Blaine Street.

Delivery will not be prior to June 1, 2011.
Delivery is scheduled for June 1, 2011 but shall be extendable until August 1, 2011 at no additional cost.

- C. At least 5 days (excluding normal holidays and weekends) prior to delivery of the transformer notify the following person:

Primary: Travis Burdett 308-385-5466 tburdett@grand-island.com
Alternate: Jeff Mead 308-385-5465 jmead@grand-island.com

- D. The Supplier shall prepare all equipment in such a manner as to facilitate handling and provide protection from damage while in transit. Truck shipment is preferred. If rail shipment is selected, Supplier shall so state at the time of bidding. If shipped by rail, the car carrying the transformer shall itself be equipped with a three axis impact recorder. Supplier shall be responsible for and make good any and all damage due to improper loading and preparation for shipment. The Supplier shall be responsible for verifying that the actual delivery can be made to the required location, and shall be cognizant of any physical limitations effecting delivery. Boxes and crates shall be suitably marked with delivery destination and contract number. Each box and crate shall have a packing list attached to the outside and a second list enclosed, showing the parts contained therein and include the City's Contract reference name.
- E. If the transformer is shipped without oil, the Supplier shall install the pressure-vacuum gauge on the transformer tank prior to shipment to show whether or not adequate pressure has been maintained during shipment. The transformer shall be clearly tagged to show that it is filled with dry air and the tag shall contain information as to the air's dew point at time of shipment.
- F. Each shipment of oil shall be the amount required for one transformer. Complete cost for delivering the oil shall be borne by the Supplier and shall include all demurrage charges. The oil shall be allowed to rest a minimum of 8 hours prior to its sampling and laboratory testing, followed by filling of the transformer.

26.0 ITEMS FURNISHED BY PURCHASER

- A. The purchaser will furnish the following:
1. Foundation for permanent installation.
 2. External wiring for power; 120/240 vac and 125 vdc.
 3. High voltage, low voltage, and grounding connection information.
 4. Single phase 120/240 vac for testing.

EVALUATION PROCEDURE
SUBSTATION POWER TRANSFORMERS
Contract 10-PCC-2

The following are the procedures and criteria that will be used by the City of Grand Island, Nebraska for bid evaluation:

1. Quote installed cost \$ _____
2. Add 7% State-City tax to Item 1 (If not included in 1.) \$ _____
3. Additional spare parts: The value of additional spare Parts that the City of Grand Island determines that it must have on hand for the bid transformer \$ _____
4. Cost of losses:
 - (a) No-load losses @ 20° C, rated voltage, at \$4,000 per KW \$ _____
 - (b) Load losses @ 75° C, & 22.5 MVA, at \$2,500 per KW \$ _____
 - © Accessory loss, at \$1,200 per KW \$ _____

Total cost of losses \$ _____
5. Add item 2, 3 and 4 - Total adjusted price \$ _____
6. Additional items to be considered in the evaluation \$ _____
7. The following items that will have a bearing on the bid evaluation will be per the judgment of the City of Grand Island.
 1. Compliance with the specifications.
 2. Bidders past five year failure rate experience per published data.
 3. City of Grand Island's experience with the bidders products and policies.
 4. References from other Customers.
 5. Interchange ability of spare parts with those on hand.
 6. The cost and coverage of warranties.
 7. Delivery/Installation schedule.
 8. Sound level.

TECHNICAL DATA
SUBSTATION POWER TRANSFORMERS
Contract 10-PCC-2

For evaluating purposes, bidders shall fill in the following data:

A. TRANSFORMER WEIGHTS:

- 1. Core and Coil _____ lb.
- 2. Tank & fittings _____ lb.
- 3. Oil in transformer _____ lb.
- 4. Gal. Of oil in transformer _____ gal.
- 5. Weight of total assembled unit _____ lb.
- 6. Weight of heaviest part as shipped _____ lb.

B. TRANSFORMER DIMENSIONS

- 1. Standard dimensions A (overall height) _____ in.
- 2. Standard dimension B (projected floor space) _____ in.
- 3. Standard dimension C (projected floor space) _____ in.
- 4. Standard dimension D (height over tank) _____ in.
- 5. Minimum untanking height
(foundation to crane hook) _____ in.

C. SHIPPING DATA:

- 1. Shipment Method _____
- 2. Describe parts removed for shipment.

D. PAINTING:

Describe method of painting and composition of paint.

GUARANTEED PERFORMANCE DATA
SUBSTATION POWER TRANSFORMERS
 Contract 10-PCC-2

Bidders shall fill in the following data:

- A. RATING:
 22.5 MVA (ONAN self cooled) 55° C rise. _____ MVA
 30 MVA (ONAF forced air cooled) 55° C rise. _____ MVA
 37.5 MVA (ONAF forced air cooled in two stages)
 55° C rise. _____ MVA
- B. REGULATION:
 Guaranteed regulation in percent for rated voltage, KVA and frequency at 75° C
 1. Unity power factor _____ %
 2. 80% power factor _____ %
- C. EXCITING CURRENT:
 1. 95% rated voltage _____ %
 2. 100% rated voltage _____ %
 3. 105% rated voltage _____ %
 4. 110% rated voltage _____ %
- D. IMPEDANCE:
 Guaranteed impedance volts in percent of full load at 75° C at OA rating, 22.5 MVA, on nominal high and low voltage guaranteed minimum.
 1. High to low voltage guaranteed minimum _____ %
 2. Tolerance on high to low _____ %
- E. FORCED COOLING:
 1. Maximum continuous rating in KVA not exceeding 55° C rise, copper temperature.
 a. With loss of one-third (1/3) of fans _____ KVA
 b. With loss of two-thirds (2/3) of fans _____ KVA
 2. Auxiliary power requirements at maximum continuous transformer rating _____ KW
 3. Rated voltage of fan motors _____ volts
- F. EFFICIENCY:
 1. Guaranteed efficiency in percent based on full load self-cooled rating.
 a. One-fourth (¼) load _____ %
 b. One-half (½) load _____ %
 c. Three-fourths (¾) load _____ %
 d. Full load _____ %

e. Five-thirds (5/3) load _____ %

G. LOSSES:

Guaranteed losses in KW rated voltage and frequency at the specified temperature. If losses are determined at another temperature, bidder shall compute and furnish them on the specified base for evaluation purposes.

1. No load losses at rated voltage and frequency at 20° C. _____ KW
2. No load losses at 110% of rated voltage and at rated frequency at 20° C. _____ KW
3. Total losses (OA rating, no load at 20° C plus copper at 75° C).
 - a. At 25% rated load _____ KW
 - b. At 50% rated load _____ KW
 - c. At 75% rated load _____ KW
 - d. At 100% rated load _____ KW
 - e. At 167% rated load _____ KW
4. Load losses (OA rating, copper losses only at 75° C).
 - a. At 25% rated load _____ KW
 - b. At 50% rated load _____ KW
 - c. At 75% rated load _____ KW
 - d. At 100% rated load _____ KW
 - e. At 167% rated load _____ KW

H. LOSS MEASUREMENT ACCURACY:

1. No load loss - error less than _____ %
2. Load loss - error less than _____ %

I. TEMPERATURE:

Guaranteed temperature rise at 22.5 MVA

1. Winding _____ %
2. Hot Spot _____ %

J. PARTIAL DISCHARGE LEVEL:

Guaranteed partial discharge less than 50 microvolts as specified _____

K. SOUND LEVEL:

Maximum average A-weighted sound level as defined and measured per ANSI C57.12.90-1987 at 22.5 MVA. _____ dB(A)

L. LTC:

Type of LTC _____

INSTALLATION SPECIFICATIONS
SUBSTATION POWER TRANSFORMERS
Contract 10-PCC-2

1.0 SCOPE

- A. This specification covers the installation of two (2) new 22.5 MVA Substation Power transformers, at the City of Grand Island, Nebraska. Specific site information will be given to the Installer by the City after award of the contract.
- B. The new Substation Power transformers shall be installed in a new substation. The bid shall include a total of 6 days and one round trip by the Manufacturer to assist the City with assembling, testing, and placing the transformers in service. A substation contractor will be on site during this period and may or may not be Union, the manufacturer shall handle any possible labor disputes. A schedule, revised monthly, shall be furnished by the Manufacturer/Installer so that progress can be monitored and completion coordinated with construction.
- C. Installation is an item separate from initial receipt and unloading. If the transformers are in temporary storage prior to installation, moving the transformers to the permanent foundation is part of installation. Any temporary storage will be at the appropriate substation site.

2.0 INTENT

- A. It is the intent of the City of Grand Island, Nebraska to receive bids from the Manufacturer of the transformer which includes installation in accordance with these specifications. The Manufacturer may subcontract the work, but the City intends to deal directly only with Manufacturer's designated representative. This designated representative shall be a permanent, full time employee of the Manufacturer and will be on site during the entire period described by these specifications. This employee shall be knowledgeable, experienced in this type work and shall have the authority to make decisions for Manufacturer/Installer. It will be the responsibility of the Manufacturer to guarantee that the labor and material will be in accordance with these specifications.

3.0 MATERIAL

- A. Installer shall furnish all material and equipment to complete the assembly and installation of the transformer in accordance with the

Manufacturer's Instruction Leaflets and Equipment Drawings.

- B. The required materials will include, but is not limited to the following:

Properly sized crane
Transformer ratio test set
Current Transformer test set
2000 volt megger
35 kV DC Hi-potential test set
10kV power factor bridge
480 V and 240 V power supplies
150 VDC power supply
Algor dew pointer
Dry air w/minimum dew point of -58°
Rigging Equipment
Voltmeter/Ohmmeter/Ammeter
Thermocouple/Thermometer
Man lifts/Boom truck
Vacuum pump
Filter press w/.5 micron filter
Oil degassing equipment
Oil heaters
Vacuum gauges
Oil Dielectric test set
Oil moisture content test set
Oil power factor test set
Oil Interfacial tension test set
Oil booms, pads, and absorbent
Air regulators
Cutting/Welding equipment

2.0 Safety Plan

- A. Installer must have all necessary safety equipment as required by OSHA, local and site requirements as well as any subcontractors own safety plan. This equipment includes air analyzer, retrieval winches, oxygen bottles, safety belts/harness, safety belts, hardhats, safety glasses, ear protection, foot protection, barricades, caution tapes and first aid supplies.
- B. Installer must have documented safety plans that include, as a minimum, lifting and rigging, working in energized electrical areas, confined entry, fall protection, and first aid. Installer shall submit, prior to the beginning of each job, a site specific safety plan and oil spill prevention plan.

3.0 ASSEMBLY

- A. The Installer shall assemble the transformer in accordance with the Manufacturer's Instruction Literature and Assembly Drawings.
- B. Connection of Substation Power transformer low and high voltage bushings to existing bus is not a part of this contract.
- C. Connection of external control and relay wiring are a part of this contract.

4.0 VACUUM AND OIL FILLING

- A. The Installer shall vacuum fill the transformer in accordance with Manufacturer's Instruction Literature and Equipment Drawings. A suitable dew point measurement must be obtained prior to beginning vacuum operations. Installer will be responsible for field drying of transformer, if it has an unacceptable dew point.

Vacuum and oil filling operations can only be conducted when the core and coil insulation temperature is in excess of 50° F. Installer will be responsible for any charges for pre-heat of the transformer.

- B. Prior to oil filling tanker oil must be tested for moisture content, dielectric strength, power factor, and Interfacial Tension. Oil must be a minimum of 50° F before entering the transformer tank.

Manufacturer shall supply oil in bulk oil tankers when the oil quantity to be delivered is in excess of 750 gallons. Oil delivery will be coordinated with the Installer. Manufacturer shall pay any demurrage on oil tankers.

5.0 TESTING

- A. The Installer shall be required to perform the following acceptance test on the new transformer after installation.
 - 1. Bushing power factor and capacitance tests.
 - 2. Insulation power factor test.
 - 3. Insulation resistance test.
 - 4. Core ground resistance test.
 - 5. Current transformer ratio and polarity checks at control cabinet.
 - 6. Transformer turns ratio and polarity checks at control cabinet.

7. Oil bath calibration of all temperature devices.
8. Functional check of cooling controls and alarm circuits at control cabinet.
9. Final oil tests:
 - a. Moisture content
 - b. Dielectric Strength
 - c. Power Factor
 - d. Interfacial Tension
 - e. Gas-in-oil
10. Control and relaying tests.
11. Phase sequence tests to confirm that phase sequence is proper and the unit is safe to put on the system.

6.0 RECORD KEEPING

- A. After completing installation, Installer must submit a complete listing of all electric, oil, and dew point test results, vacuum and oil processing logs, trip report and Manufacturer's Installation Checklist.
- B. Manufacturer must accept the assembly, installation, and testing by the Installer as being satisfactory for initiation of the Warranty.
- C. Installer shall warrant his workmanship for a period of one year from completion of installation.