CITY OF GREELEY
INVITATION FOR BID

Bellvue Electrical Equipment

BID # F24-02-015

DUE MARCH 15, 2024 BEFORE 2:00 P.M. MST

Serving Our
Community
It's A Tradition

BID # F24-02-015
INVITATION FOR BID

The City of Greeley, Colorado is requesting **sealed** bids for Bellvue Electrical Equipment due **March 15, 2024 before 2:00 PM MST** via electronic submission which at that time all bids will be publicly opened and read aloud via video conferencing(see link below for access.) No late or faxed bids will be accepted. It is the responsibility of the vendor to ensure the solicitation documents are submitted to the correct email address as noted in the Solicitation Documents. Solicitations delivered to other City of Greeley email addresses may be deemed as late and not accepted.

F24-02-015 Bid Opening
Join on your computer, mobile app or room device
Click here to join the meeting
Meeting ID: 241 947 119 056
Passcode: yC7vLG
Download Teams | Join on the web
Or call in (audio only)
+1 347-966-8471,,702972926# United States, New York City
Phone Conference ID: 702 972 926#
Find a local number | Reset PIN
Learn More | Meeting options

Instructions for electronic submittal.
Email your Bid Response to purchasing@greeleygov.com Submit your Bid response to this email only – please do not email to multiple people. Only email's sent to will be considered as responsive to the invitation to bid. Emails sent to other City emails may be considered as non-responsive and may not be reviewed.

Bids shall be submitted in a single Microsoft Word or PDF file under 20MB.

The Bid number and Project name **must be noted** in the subject line, otherwise the Bid may be considered as non-responsive to the Bid.

Electronic submittals will be held, un-opened, until the time and date noted in the Bid documents or posted addenda.

The City of Greeley disseminates all bids through the Rocky Mountain E-Purchasing System site. Go to http://www.RockyMountainBidSystem.com, then "Bid Opportunities" and then select "The City of Greeley". Bids submitted to the City of Greeley must include all Sections in this invitation. Addenda must be acknowledged in the bidding documents. Bidders failing to acknowledge any and all addenda may be considered non-responsive.

No bid shall be withdrawn after the opening of the bids without the consent of the City of Greeley, Colorado, for a period of sixty (60) days after the scheduled time of the receiving the bids.

All bids/proposals will be confidential until a contract is awarded and fully executed. At that time, all bids/proposals and documents pertaining to the proposals will be open for public inspection, except for material that is proprietary or confidential. However, requests for confidentiality can be submitted to the Purchasing Contact provided that the submission is in accordance with the following procedures. This remains the sole responsibility of the offeror. The Purchasing Contact will make no attempt to cure any information that is found to be at variance with this procedure. The offeror may not be given an opportunity to cure any variances after bid opening. **Neither a proposal in its entirety, nor proposal**

price information will be considered confidential/proprietary. Questions regarding the application of this procedure must be directed to the Purchasing Contact listed in this RFP.

"Public Viewing Copy: The City is a governmental entity subject to the Colorado Open Records Act, C.R.S. §§ 24-72-200.1 et seq. ("CORA"). Any bids/proposals submitted hereunder are subject to public disclosure by the City pursuant to CORA and City ordinances. Vendors may submit one (1) additional complete bid/proposal clearly marked "FOR PUBLIC VIEWING." In this version of the bid/proposal, the Vendor may redact text and/or data that it deems confidential or proprietary pursuant to CORA. Such statement does not necessarily exempt such documentation from public disclosure if required by CORA, by order of a court of appropriate jurisdiction, or other applicable law. Generally, under CORA trade secrets, confidential commercial and financial data information is not required to be disclosed by the City. Bids/Proposals may not be marked "Confidential" or 'Proprietary' in their entirety. All provisions of any contract resulting from this request for proposal will be public information."

The City of Greeley retains the right to reject any and all bids and to waive any informality as deemed in the best interest of the city.

Questions pertaining to the project may be directed to Alex Adame via email: purchasing@greeleygov.com or at 970-350-9325. Deadline to receive questions is **March 6, 2024 by 4:00 PM MST.** Answers to those questions will be publicly posted on **March 8, 2024.**

Bellvue Electrical Equipment BID For
FIXED PRICING

The City of Greeley is accepting bids for the 2024 fixed pricing and purchase of electrical equipment based on one-line drawings and specifications.

The vendor must provide the information requested set forth in herein. Please fill out completely. Failure to complete bid form will result in a "NO BID"

SCOPE (ITEM): Provide quotes for electrical equipment that is specified in the electrical one-lines and specifications. Provide a two-year warranty for the electrical equipment.

Pricing:

- The pricing shall include the cost of the equipment and delivery to Bellvue WTP.
- THE CONTRACT TERM IS a one-time purchase.
- ITEMS:

Quantity	Description	Price
3	15-Kilovolt Pad-Mounted Switchgear	$
2	Liquid Fill Pad Mounted Transformers	$
	TOTAL	$

VENDOR NAME: _____

AUTHORIZED SIGNATURE: _____

PRINTED SIGNATURE: _____

PHONE NUMBER: _____ EMAIL: _____

BID ACKNOWLEDGEMENT

The offeror hereby acknowledges receipt of addenda numbers _____ through _____.

Falsifying this information is cause to deem your proposal nonresponsive and therefore ineligible for consideration. In addition, falsification of this information is cause to cancel a contract awarded based on one or both of the above preferences.

By signing below, you agree to all terms & conditions in this Invitation for Bid.

_____
Original Signature by
Authorized Officer/Agent

_____ _____
Type or printed name of person signing Company Name

_____ _____
Title Phone Number

_____ _____
Vendor Mailing Address Email Address

_____ _____
City, State, Zip Proposal Valid Until (at least for 90 days)

_____
Website Address

Project Manager:

_____ _____
Name (Printed) Phone Number

_____ _____
Vendor Mailing Address Email Address

_____
City, State, Zip

CONTRACT FOR GOODS

This Contract is entered into by and between the parties identified on the bid for this Contract ("VENDOR"), and the CITY OF GREELEY, COLORADO acting by and through the department named on the Invitation for Bid for this Contract ("CITY") and collectively referred to as the "PARTIES." The PARTIES agree to the terms and conditions in this Contract.

ARTICLE 1. DEFINITIONS

CITY- the City of Greeley, Colorado and shall include its agents, officials, and employees.

CONTRACT – an enforceable Contract as defined in Section 4.20.030 of the Greeley Municipal Code that is written evidence of the CITY'S acceptance of the VENDOR'S offer to provide goods and/or perform the work of the contract for the price stated therein.

PURCHASE ORDER – an enforceable contract as defined in Section 4.20.030 of the Greeley Municipal Code that is written evidence of the CITY'S acceptance of the VENDOR'S previous and unretracted offer to sell the goods and/or perform the work of the purchase order for the price stated therein.

GOODS – the merchandise, material, and/or labor the VENDOR is to provide to the CITY by operation of the purchase order.

SELLER - any individual person or business entity to which the contract is issued and includes the Seller's agents, servants, and employees. A Seller shall be referred to herein as a "VENDOR."

ARTICLE 2. SALE OF GOODS

2.1 VENDOR shall sell to CITY and CITY shall purchase from VENDOR the goods set forth on the Specifications issued by the CITY (the "Goods"). The VENDOR shall provide the Goods:

A. in the quantities, at the prices and in accordance with the terms and subject to the conditions set forth in the Specifications and this Contract; and

B. to the reasonable satisfaction of CITY.

2.2 CITY will pay to VENDOR for the Goods in accordance with VENDOR'S bid.

2.3 The place for delivery of the goods is the CITY'S place of business. All goods are FOB Greeley, Colorado.

2.4 All goods sold to CITY are "sale on approval" and may be returned to VENDOR at the convenience of CITY any time before use at VENDOR'S risk and expense, or at any time if the goods are nonconforming or defective. CITY agrees to notify VENDOR within a reasonable time of its election to return the goods.

2.5 If city personnel assistance is needed to unload the goods or special access is required, the vendor must contact the city department representative twenty-four hours prior to the delivery or as soon as is reasonable for emergency purchases.

2.6 If CITY deems it inexpedient to repair or replace damaged or nonconforming goods, or to correct damaged work or work not performed in accordance with the contract, CITY shall make an equitable reduction of the contract price. VENDOR is responsible for special orders goods made to the specifications identified by the CITY. If the special order specifications provided by CITY are not correct, CITY is responsible for the cost of the order.

2.7 CITY certifies the following:

A. An amount of money equal to or greater than the contract amount has been appropriated and budgeted for the Goods.

B. No change order or additional Contract, which requires additional goods from the VENDOR, will be issued by CITY unless an amount of money has been appropriated and budgeted in an amount sufficient to compensate VENDOR for such additional goods.

ARTICLE 3. TERM AND TERMINATION

3.1 This Contract shall commence as of the Effective Date and shall continue thereafter until the completion of the Services unless sooner terminated.

3.2 CITY in its sole discretion, may terminate this Contract in whole or in part, at any time without cause, and without liability except for required payment for services rendered, and reimbursement for authorized expenses incurred, prior to the termination date, by providing at least 60 days' prior written notice to Service Provider.

3.3 Either Party may terminate this Contract, effective upon written notice to the other Party (the "Defaulting Party"), if the Defaulting Party breaches this Contract, and such breach is incapable of cure or is not cured within a reasonable time.

ARTICLE 4. PURCHASING ORDINANCE

This solicitation and contract is done in accordance with Chapter 4.20 of the Greeley Municipal Code, which law is incorporated by reference as if fully set forth herein. Time is of the essence hereof.

ARTICLE 5. UNIFORM COMMERCIAL CODE

The Uniform Commercial Code, Title 4 of the Colorado Revised Statutes, shall prevail as the basis for contractual obligations between the VENDOR and CITY for any terms and conditions not specifically stated in this Contract.

ARTICLE 6. JURISDICTION AND COMPLIANCE WITH LAW

This Contract is executed and delivered and is intended to be performed in the State of Colorado. The laws of Colorado shall govern the interpretation and enforcement of this Contract. Venue for all actions regarding this Contract shall be Weld County, Colorado. VENDOR will perform all obligations under this Contract in strict compliance with all federal, state, and municipal laws.

ARTICLE 7. INSURANCE

VENDOR shall procure, at his own expense, and maintain for the duration of any work, insurance coverage as set forth herein at all times during the term of this Contract. All insurance policies shall be issued by insurance companies approved to do business in the State of Colorado.

6.1 Workers' Compensation. Workers' compensation insurance as required by state statute, and employers' liability insurance covering all VENDOR'S employees acting within the course and scope of their employment.

6.2 General Liability. Commercial general liability insurance covering premises operations, fire damage, independent contractors, products and completed operations, blanket contractual liability, personal injury, and advertising liability with minimum limits as follows:

A. $1,000,000 each occurrence;

B. $1,000,000 general aggregate;

C. $1,000,000 products and completed operations aggregate.

6.3 Automobile Liability. Automobile liability insurance covering any auto (including owned, hired and nonowned autos) with a minimum limit of $1,000,000 each accident combined single limit.

6.4 Additional Insured. CITY shall be named as additional insured on all required policies.

6.5 Primacy of Coverage. Coverage required of CONTRACTOR/PURCHASER/SELLER shall be primary over any insurance or self-insurance carried by CITY.

6.6 Cancellation. The above insurance policies shall include provisions preventing cancellation or non-renewal, except for cancellation based on non-payment of premiums, without at least 10 days prior notice to CITY.

6.7 Certificates. If requested, the Contractor shall provide to CITY certificates evidencing VENDOR'S insurance coverage required in this Contract within 7 Business Days following the Effective Date. No later than 15 days before the expiration date of VENDOR'S coverage, VENDOR shall deliver to the CITY certificates of insurance evidencing renewals of coverage. At any other time during the term of this Contract, upon request by the CITY, VENDOR shall, within 7 Business Days following the request by the CITY, supply to the CITY evidence satisfactory to the CITY of compliance with the provisions of this Contract.

ARTICLE 8. INDEPENDENT CONTRACTOR

VENDOR is, and shall be, in the performance of all activities under this Contract, an independent contractor, and not an employee, agent, or servant of the CITY. All persons engaged in any of the work performed pursuant to this Contract shall, at all times and in all places, be subject to VENDOR'S sole direction, supervision and control. VENDOR shall exercise control over the means and manner, in which it and its employees perform the work and, in all respects, VENDOR'S relationship and the relationship of its employees to CITY shall be that of an independent contractor and not as employees or agents of CITY.

ARTICLE 9. CHANGES TO THE CONTRACT

CITY, without invalidating the contract, may order additional goods, and make any other reasonable related changes to the contract by altering, adding to, or deducting from the original order. The contract price, or delivery date of the goods may be adjusted accordingly by signing a change order.

ARTICLE 10. INSPECTION BY CITY

The authorized representative of CITY shall be given an opportunity to inspect the merchandise, material, and/or labor offered by the VENDOR and/or will, at all times, have access to the site of the work for the purpose of inspection. VENDOR shall provide safe, convenient and proper facilities for such access and inspection.

ARTICLE 11. ACCEPTANCE AND FINAL PAYMENT

Within ten days after delivery of goods and completion of the associated work, CITY will make a final inspection to determine whether the goods have been provided and all associated work has been completed in accordance with the contract and collateral documents. If any requirements of the contract are not complete, VENDOR shall promptly rectify all items. When the CITY indicates acceptance of the work, VENDOR may requisition final payment of contract price.

ARTICLE 12. GUARANTY AND WARRANTIES

VENDOR shall furnish the CITY with a written guaranty for one (1) year covering all goods, labor, materials and workmanship incorporated in the work. VENDOR, in instances of work performed or material or equipment furnished for which warranties are required by the specification, shall procure such warranties and deliver them to CITY on completion of the work. Such warranties will in no way lessen VENDOR'S responsibilities, under the contract documents. Whenever warranties or guaranties are required by the specifications for a period longer than one (1) year, such longer period shall govern.

ARTICLE 13. POST-COMPLETION INSPECTIONS

Final payment made to VENDOR for completion of the work shall not operate to relieve VENDOR of responsibility for faulty material or workmanship and, unless otherwise provided, VENDOR shall remedy any defect due thereto and pay for any damages resultant therefrom which shall appear within one year from the date of final acceptance of the work. If VENDOR fails to promptly rectify defects or deficiencies identified during post-completion inspections, CITY may correct such defects and deficiencies and back charge VENDOR for the cost thereof.

ARTICLE 14. DEDUCTION FOR NON-CONFORMING GOODS

If the CITY deems inexpedient the repair or replacement of damaged or nonconforming goods, or of labor or work not performed in accordance with the contract, the CITY shall make an equitable reduction of the contract price.

ARTICLE 15. DISPUTES

Any dispute arising under this contract, which is not disposed of by Contract, shall be decided by CITY, who shall reduce its decision to writing and furnish a copy thereof to the contractor. The decision of CITY shall be final. Pending final decision of a dispute hereunder, VENDOR shall proceed diligently with the performance of this contract.

ARTICLE 16. INDEMNIFICATION

VENDOR shall indemnify and save harmless CITY, from and against all claims, liability, demands, losses, and/or expenses resulting from any negligent act or omission of VENDOR, its agents, subcontractors and suppliers in the performance of services under this Contract. Such duty to indemnify and save harmless CITY shall be for an amount represented by the degree or percentage of negligence or fault attributable to VENDOR.

ARTICLE 17. TABOR

The parties understand and acknowledge that each party is subject to Article X, Section 20 of the Colorado Constitution ("TABOR"). The parties do not intent to violate the terms and requirements of TABOR by the execution of this Contract. It is understood and agreed that this Contract does not create a multi-fiscal year direct or indirect debt or obligation within the meaning of TABOR and, notwithstanding anything in this Contract to the contrary, all payment obligations of CITY are expressly dependent and conditioned upon the continuing availability of funds beyond the term of CITY'S current fiscal period ending upon the next succeeding December 31. Financial obligations of CITY payable after the current fiscal year are contingent upon funds for that purpose being appropriated, budgeted, and otherwise made available in accordance with the rules, regulations, and resolutions of CITY and applicable law. Upon the failure to appropriate such funds, this Contract shall be deemed terminated.

ARTICLE 18. ELECTRONIC SIGNATURES

The Contract Documents may be executed in two or more counterparts, each of which shall be deemed an original but all of which together shall constitute one and the same document. The Contract

Documents, including all component parts set forth above, may be executed and delivered by electronic signature by any of the parties and all parties consent to the use of electronic signatures.

ARTICLE 19. AUTHORITY TO BIND

Each individual signing this Contract directly and expressly warrants that he/she has been given and has received and accepted authority to sign and execute the documents on behalf of the Party for whom it is indicated he/she has signed, and further has been expressly given and received and accepted authority to enter into a binding Contract on behalf of such Party with respect to the matters concerned herein and as stated herein.

ARTICLE 20. SUCCESSORS AND ASSIGNS

This Amendment shall inure to the benefit of and be binding upon the heirs, executors, administrators, successors and assigns of the respective parties hereto.

ARTICLE 21. ASSIGNMENT

This Contract shall not be assignable by either party without the other party's prior written consent. Except as so restricted, this contract shall inure to the benefit of and be binding upon the heirs, personal representatives, successors and assigns of the parties.

ARTICLE 22. SEVERABILITY

If any term or provision of this Contract or any portion of a term or provision hereof or the application thereof to any person or circumstances shall, to any extent, be invalid or unenforceable, the remainder of this Contract shall not be affected thereby, and each term and provision of this Contract and each portion thereof shall be valid and be enforced to the fullest extent permitted by law.

ARTICLE 23. VENUE AND GOVERNING LAW

This Contract is being executed and delivered and is intended to be performed in the State of Colorado, and the laws of Colorado shall govern the validity, construction, enforcement, and interpretation of this Contract. Venue for all actions regarding this Contract shall be Weld County, Colorado.

This bid may be awarded to one or multiple vendors as deemed in the best interest of the City of Greeley.

By submitting a bid you acknowledge that you understand and comply with all terms and conditions set forth in the Contract associated with this Invitation for Bid. Signing this bid evidences your intent to be bound by the terms of the Contract.

By submitting this bid you further certify that this bid is made without prior understanding, Contract or connection with any business or person submitting a competitive bid and without prior commitment or influence from any person or department from the City of Greeley for this same material or service: and therefore, is in all respects fair and without collusion or fraud. Collusive quoting is a violation of State and Federal law and can result in fines, imprisonment, and civil damages. Bids received without this signed statement will be deemed non-responsive.

Be advised that price will not be the only criteria of award; vendor performance and service history with the City of Greeley will also be considered.

Payment will be made to the vendor submitting pricing for this bid unless otherwise noted. It is the responsibility of the vendor to inform the City of Greeley of this information prior to a purchase order

being processed. If this information is not made available to the City of Greeley prior to this time, it is the responsibility of the vendor submitting this bid to issue payment to another party.

Thank you for submitting a competitive bid to the City of Greeley.

DUNS NUMBER:_____

VENDOR NAME_____

AUTHORIZED SIGNATURE_____

PRINT AUTHORIZED SIGNATURE_____

EMAIL ADDRESS_____

PHONE NUMBER_____ DATE_____

IN WITNESS WHEREOF, the parties have caused this instrument to be executed as of the day and year first above written.

EXECUTED:
The City of Greeley
Approved as to Substance

Signed: _____
Name: _____
Title: _____
Date: _____

CONSULTANT:

Signed: _____
Name: _____
Title: _____
Date: _____

ENDORSED:
The City of Greeley
Approved as to Legal Form

Signed: _____
Name: _____
Title: _____
Date: _____

ENDORSED:
The City of Greeley
Certification of Contract Funds Availability

Signed: _____

Name: _____

Title: _____

Date: _____

Debarment/Suspension Certification Statement

The proposer certifies that neither it nor its principals are presently debarred, suspended, proposed for debarment, declared ineligible or voluntarily excluded from participation in this transaction by any Federal, State, County, Municipal or any other department or agency thereof. The proposer certifies that it will provide immediate written notice to the City if at any time the proposer learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstance.

DUNS # (Optional) _____

Name of Organization_____

Address_____

Authorized Signature_____

Title_____

Date_____

CITY OF GREELEY, CO

BELLVUE WTP CHEMICAL BUILDING SWITCHGEAR REPLACEMENT

CLIENT PROJECT NO. _____

TECHNICAL SPECIFICATIONS

100% SUBMITTAL

VOLUME 1 OF 1

DECEMBER 2023

10822 WEST TOLLER DRIVE, SUITE 200 ▪ LITTLETON, COLORADO 80127 ▪ P 303-980-8260

CIY OF GREELEY

BELLVUE WTP CHEMICAL BUILDING SWITCHGEAR REPLACEMENT

TABLE OF CONTENTS

VOLUME 1 OF 1

DIVISION 26 - ELECTRICAL

SECTION 26_12_20

LIQUID FILLED PAD MOUNTED TRANSFORMERS

PART 1 GENERAL

1.01 SUMMARY

A. Section includes:
   1. Medium voltage, outdoor, liquid-filled pad mounted transformers.

1.02 REFERENCES

A. American National Standards Institute (ANSI).

B. ASTM International (ASTM).

C. Institute of Electrical and Electronic Engineers (IEEE):
   1. C57.12.00 - IEEE Standard General Requirements for Liquid-Immersed Distribution, Power and Regulating Transformers.
   2. C57.12.10 - IEEE Standard Requirements for Liquid-Immersed Power Transformers.
   3. C57.12.26 - IEEE Standard for Pad-Mounted, Compartmental-Type, Self-Cooled, Three-Phase Distribution Transformers.
   4. C57.12.28 - IEEE Standard for Pad-Mounted Equipment-Enclosure Integrity.
   5. C57.12.90 - IEEE Standard Test Code for Liquid-Immersed Distribution, Power and Regulating Transformers.
   6. C57.91 - IEEE Guide for Loading Mineral-Oil-Immersed Power Transformers up to and including 100 MVA with 65 degrees or 55 degrees Average Winding Rise.
   7. C57.93 - IEEE Guide for Installation of Liquid-immersed Power Transformers.
   8. C57.98 - IEEE Guide for Transformer Impulse Tests.
   9. C57.147 - IEEE Guide for Acceptance and Maintenance of Natural Ester Fluids in Transformers.

D. National Electrical Code (NEC).

E. National Electrical Manufacturers Association (NEMA):
   1. TR-1 - Transformers, Regulators, and Reactors.

F. U.S. Department of Energy (DOE):
   1. 10 CFR Part 431 - Energy Efficiency Program for Certain Commercial and Industrial Equipment.

1.03 DELEGATED DESIGN

A. As specified in Section 01_35_73 - Delegated Design Procedures.

B. Anchoring and bracing.

1.04 SUBMITTALS

A. Furnish Submittals as specified in Section 01_33_00 - Submittal Procedures.

B. Product data:
   1. Complete installation instructions.
   2. Complete storage and handling instructions.
   3. Kilovolt-ampere rating, including derating calculations.
   4. Primary/secondary connections.
   5. Primary voltage and available taps.
   6. Secondary voltage.
   7. BIL rating.
   8. Temperature rise.
   9. Lightning arrester data.
   10. %Z, %X, %R, X/R.
   11. Efficiency.
   12. Gross weight.
   13. Torque values for bolted connections for secondary cable connections.
   14. Manufacturer's suggested hi-potential test procedures and test levels for field-testing:
      a. Initial field test.
      b. Subsequent maintenance tests.
   15. Certification from the manufacturer stating the transformer design complies with IEEE C57,12,00.
   16. Type of oil.
   17. Gallons of oil.
   18. Weight of oil.
   19. Complete MSDS sheets. There is no C57 standard for ANSI or IEEE.

C. Shop Drawings:
   1. Complete detailed, dimensioned drawings showing the equipment being furnished, with pertinent information, including the following:
      a. Dimensions and locations of conduit entrance windows.
   2. Complete nameplate schedule, except impedance.

D. Delegated Design Submittals:
   1. Anchoring and bracing: Provide project-specific calculations based on support conditions and requirements to resist loads specified in Section 01_81_50 - Design Criteria:
      a. For equipment installed outdoors.

E. Installation instructions:
   1. Detail the complete installation of the equipment including rigging, moving, and setting into place.
   2. Provide manufacturer's installation instructions.

F. Commissioning Submittals:
   1. As specified in Section 01_75_17 - Commissioning, including the following:
      a. Manufacturer's representative qualifications:
      b. Certificates:
         1) Requirements as specified in this Section.

c. Test Plans:
    1) Test requirements as specified in this Section.
d. Test Reports.
e. Manufacturer's representatives field notes and data.

G. Operation and maintenance manuals:
1. Complete as-built dimensioned and scaled drawings for transformer.
2. Recommended periodic maintenance requirements.
3. Maintenance instructions including schedules, parts identification, troubleshooting, assembly instructions, parts list, and predicted life of parts subject to wear and deterioration.
4. Recommended field test levels and procedures before installation and for maintenance purposes after being placed in service.
5. Periodic and preventative maintenance torque values for bolts.
6. List of recommended preventative maintenance tests, test frequencies, test procedures, acceptable test result ranges and disposal recommendations for utilized natural ester fluids in accordance with IEEE C57.147.
7. Copies of factory test reports.

H. Record documents.

I. Calculations:
1. Detailed calculations or details of the actual physical testing performed on the transformers to prove the transformers are suitable for the seismic requirements at the Project Site.

1.05 QUALITY ASSURANCE

A. Manufacturer qualifications:
1. Manufacturer shall be in the business of regularly manufacturing the specified transformers for a minimum of 10 years with a satisfactory performance record.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Ship transformers to the job site on a dedicated air ride vehicle that will allow the Contractor to utilize onsite off-loading equipment:
1. Each transformer shall be shipped with a global positioning system (GPS) unit to record the shipping route.
2. Provide monitoring of the acceleration the transformer experiences during shipment:
    a. GPS unit can record the acceleration.
    b. Utilize a G-force gauge that indicates that the acceleration has exceeded allowed values.
3. Transformers that experience vertical accelerations greater than 3 G or horizontal accelerations greater than 5 G shall not be accepted.

B. Furnish temporary equipment heaters within the transformer to prevent condensation from forming.

1.07 PROJECT OR SITE CONDITIONS

A. As specified in Section 01_81_50 - Design Criteria.

1.08 ADMINISTRATIVE REQUIREMENTS

A. Sequencing:
   1. Make necessary field measurements to verify the equipment will fit in the allocated space in full compliance with the minimum clearances required by the NEC and local codes.
   2. Conduct factory acceptance test and submit certified test results for Engineer's review.
   3. Ship equipment to Project Site after successful completion of factory acceptance test.
   4. Assemble equipment in the field.
   5. Conduct field acceptance test and submit certified test results for Engineer's review.
   6. Verify installation is in accordance with IEEE C57.93.
   7. Submit manufacturer's certification that equipment has been properly installed and is fully functional for Engineer's review.
   8. Set taps.
   9. Commissioning as specified in Section 01_75_17 - Commissioning.

1.09 WARRANTY

A. As specified in Section 01_78_36 - Warranties and Bonds.

PART 2 PRODUCTS

2.01 GENERAL

A. Outdoor oil-filled, pad mounted transformers for operation on a 60 hertz system with voltage and kilovolt-ampere ratings as indicated on the Drawings.

2.02 DESIGN AND PERFORMANCE CRITERIA

A. Provide equipment and components that are fully rated for the site elevation and operating environment where the equipment will be installed as specified in Section 01_81_50 - Design Criteria and as indicated on the Drawings.

B. Pad mounted transformers shall be compartmental type, designed for outdoor installation on a concrete pad.

2.03 MANUFACTURERS

A. One of the following or equal:
   1. Asea Brown Boveri (ABB).
   2. Eaton/Cooper Power Systems.
   3. Schneider Electric.

2.04 MATERIALS

A. Windings:
   1. Primary and secondary windings shall be high conductivity copper.

B. Insulating fluid:
   1. Envirotemp FR3.
   2. Insulating fluid shall meet or exceed the requirements of the appropriate IEEE and ASTM fluid standards.

2.05 MANUFACTURED UNITS (NOT USED)

2.06 EQUIPMENT

A. Transformer and associated terminal compartments designed and constructed to be tamper-resistant:
   1. No externally removable screws, bolts, or other devices.

B. Ratings:
   1. 3-phase, 60 hertz.
   2. Self-cooled.
   3. 65-degree Celsius rise.
   4. Primary voltage as indicated on the Drawings.
   5. Primary connection as indicated on the Drawings.
   6. Secondary voltage as indicated on the Drawings.
   7. Secondary connection as indicated on the Drawings.
   8. Kilovolt-ampere rating as indicated on the Drawings.
   9. Basic impulse insulation level (BIL) in accordance with IEEE C57.98:
      a. 15 kV Class: 95 kV.
   10. Sound levels:
      a. In accordance with NEMA TR1.
      b. Measurement procedure in accordance with IEEE C57.12.90.
   11. Efficiency:
      a. Transformers 2,500 kVA and less shall have an efficiency rating in accordance with DOE 10 CFR Part 431.
   12. Short-circuit capacity:
      a. Mechanical short-circuit capability in accordance with IEEE C57.12.90.
   13. Thermal short-circuit capability in accordance with IEEE C57.12.00.

2.07 COMPONENTS

A. Core and coil:
   1. Manufactured from burr-free, grain-oriented silicon steel laminations and stacked to eliminate gaps in the corner joints.
   2. Insulated with B-stage, epoxy coated, diamond pattern, insulating paper, thermally cured under pressure to ensure proper bonding of conductor and paper.
   3. Clamped and braced to resist distortion caused by short-circuit stresses within ratings or by shipping and handling and to prevent the shifting of core laminations.

4. Vacuum processed to ensure maximum penetration of insulating fluid into the coil insulation system:
    a. Energize the windings under vacuum to heat the coils and drive out moisture.
    b. While under a vacuum and the coils are heated, fill the tank with preheated, filtered and degassed insulating fluid.

B. Tank:
1. Conforming to the enclosure integrity requirements in accordance with IEEE C57.12.28.
2. Equipped with extra-heavy duty, welded-in-place lifting lugs and jacking pads:
    a. Provide adequate cross-bracing of the base to allow skidding or rolling in any direction.
3. Capable of withstanding a pressure of 7 pounds per square inch gauge without permanent distortion, and 15 pounds per square inch gauge without rupturing.
4. Provide a pressure relief valve as a means to relieve pressure in excess of pressure resulting from normal operation:
    a. Cracking pressure: 10 pounds per square inch gauge within 2 psig.
    b. Resealing pressure: 6 pounds per square inch gauge minimum.
    c. Zero leakage from reseal pressure to 8 pounds per square inch gauge.
    d. Flow at 15 pounds per square inch gauge: 35 scfm minimum.

C. Terminal compartments:
1. Conforming to the enclosure integrity requirements in accordance with IEEE C57.12.28.
2. Full-height, air filled primary and secondary terminal compartments with hinged doors shall be located side-by-side separated by a steel barrier, with the primary compartment on the left, complete with tamper resistant hardware.
3. Hinges and pins to be passivated Type 304 stainless steel or equivalent corrosion-resistant metal.
4. Doors and compartment hood shall be removable:
    a. Removable doorsill on compartments shall be provided to permit rolling or skidding of unit into place over conduit stubs in foundations.
5. Doors in both the high-voltage section and the low-voltage section shall be able to be latched in the open position.
6. Entire terminal compartment for the transformer shall be bolted to the transformer so that the terminal compartment may be unbolted from the transformer and the transformer removed without disturbing conduits that enter the compartment from the side or top.
7. Minimum of 18 inches deep.
8. Secondary compartment:
    a. Enclose the low voltage bushings and provide for incoming cable from below the compartment.
    b. Compartment shall also house:
        1) Liquid level indicator.
        2) Drain valve with sampling device.
        3) Dial type thermometer.
        4) Pressure relief valve.
        5) Vacuum pressure gauge.

c. Door to low-voltage section shall have a 3-point latching mechanism with pad-locking provision.

9. Primary compartment:
   a. Enclose the high voltage bushings and provide for incoming cables from below the compartment:
      1) Coordinate primary bushing size with incoming cables size as indicated on the Drawings.
   b. Compartment shall also house:
      1) Dead front lightning arresters.
      2) No-load tap changer.
   c. Accessible only after the door for the secondary compartment has been opened. Door shall be held closed by a captive bolt; access to this bolt shall be provided only when the door to the low-voltage section is opened.
10. Primary terminals and parking stands:
   a. Dead front construction, in accordance with IEEE C57.12.26, utilizing high voltage elbows for connections to primary cable and lightning arresters.
   b. Terminal arrangement with 6-bushing wells:
      1) 3 for terminating primary power cables.
      2) 3 for connecting lightning arresters.
      3) 6 parking stands.
   c. Supporting structure within cabinet to support cables and eliminate mechanical stress on insulators.
11. Secondary terminals:
   a. 4 low voltage spade bushings with 2 holes for each cable, in accordance with IEEE C57.12.26.
   b. Extend low voltage bushings as necessary to accommodate the cable arrangement indicated on the Drawings or indicated on the conduit schedule:
      1) Extension via a fully rated, tin-plated, copper bus system braced to withstand the available fault current.
   c. Neutral brought out through an insulated bushing and externally grounded to the tank with a removable ground strap.
   d. Supporting structure within cabinet to support cables and eliminate mechanical stress on insulators.

D. De-energized tap changer:
   1. Furnish with full capacity high-voltage taps:
      a. Two 2-1/2 percent taps above and below rated voltage.
   2. Labeled to indicate that the transformer must be de-energized before operating the tap changer as required by IEEE C57.12.10.
   3. Externally operated no-load tap changer switch with snap action switch and lever handle.
   4. Padlocking provision in each tap position.
   5. Position indication.

2.08 ACCESSORIES

A. Lightning arresters:
   1. High voltage dead front design for elbow connection.
   2. Metal oxide varistor arresters.

3. Distribution class arresters.
4. Rating as indicated on the Drawings and/or consistent with the distribution voltage.

B. Tank ground pads:
   1. 2 stainless steel pads, welded to the tank wall, with unpainted surfaces:
      a. 1 pad in primary compartment.
      b. 1 pad in secondary compartment:
         1) If additional load ground connections are required, a tin-plated, copper equipment ground bus shall be bolted to the pad.

C. Dial-type thermometer:
   1. Direct stem mounted in a closed well so that the thermometer can be removed without breaking the tank seal:
      a. Well shall be threaded into a fitting that is welded to the transformer tank wall.
   2. Thermometer shall have a marking hand which is moved by the indicating hand to indicate maximum oil temperature:
      a. Marking hand shall be externally resettable.

D. Sampling device:
   1. Provide for external sampling of the transformer insulating fluid.
   2. Threaded into a fitting that is welded to the transformer tank wall.
   3. Piped such that valve and sample point are external to the termination cabinet:
      a. NEMA Type 4X stainless steel box supported to transformer to house sample device.

E. Liquid level gauge: Dial-type liquid level gauge.

F. Vacuum pressure gauge: 10 pounds per square inch gauge vacuum to plus 10 pounds per square inch gauge scale.

G. Pressure relief device:
   1. Located in the air space in the transformer tank to provide a method of relieving internal tank pressure.
   2. Self-relieving.
   3. Indicating.
   4. Operating pressure: 10 within 2 pounds per square inch gauge.

H. Nameplates:
   1. Provide nameplate as specified in Section 26_05_53 - Identification for Electrical Systems and the following:
      a. Provide complete nameplates identifying equipment, caution, voltage, etc.
      b. Provide complete nameplates for both inside and outside of the transformer terminal compartments.
      c. Provide diagrammatic nameplate.

I. Bolted 8-inch (minimum) diameter round handhold on cover.

J. Lifting lugs at each corner of tank for lifting complete transformer.

K. Jacking facilities at each corner of base for jacking the complete transformer.

L. Base designed for rolling or skidding in any direction.

2.09 FABRICATION

A. Tanks:
   1. Construction: Sealed tank construction with welded cover. Permanently locate an inorganic gasket between the cover and the tank flange during the welding of the transformer cover to prevent the entrance of weld spatter into the tank.
   2. Large handhole with bolted cover and protected with a weather cover.
   3. 4 lifting hooks.
   4. Jacking pads.
   5. Fluid sample valve.
   6. Designed for 7 pounds per square inch gauge without permanent distortion; 12 pounds per square inch gauge when silicone oil insulating fluid is specified.

2.10 FINISHES

A. In accordance with IEEE C57.12.28 including the following performance requirements:
   1. Salt spray test.
   2. Crosshatch adhesion test.
   3. Humidity test.
   4. Impact test.
   5. Oil resistance test.
   6. Ultraviolet accelerated weathering test.
   7. Abrasion resistance: Taber® Abraser.

B. Procedure:
   1. Clean with an alkaline cleaning agent to remove grease and oil.
   2. Chemically bond iron phosphate coating to metal surface to ensure coating adhesion and retard corrosion.
   3. Prime metal surface with an electrodeposited powder epoxy to provide a barrier against moisture, salt, and corrosives.
   4. Coat with an electrostatically applied, oven-cured polyester powder coat to enhance abrasion and impact resistance.
   5. Topcoat: Liquid polyurethane coating to seal and add ultraviolet protection:
      a. Color: Munsell Green 7GY.

PART 3 EXECUTION

3.01 PREPARATION

A. Anchoring and bracing to structures:
   1. Prepare equipment anchor setting template(s) and use to position anchors during construction of supporting structure(s).
   2. Install anchors of type and material indicated on approved anchoring designs.
   3. Install anchors with embedment indicated on approved anchoring designs.

3.02 INSTALLATION

A. Install the equipment in accordance with the accepted installation instructions and anchorage details.

B. General:
   1. Furnish concrete pad and lugs, bolts, and other accessories needed to complete the installation of the transformer.
   2. Assemble and install the transformer in the location and layout indicated on the Drawings.
   3. Perform Work in accordance with manufacturer's instructions and Shop Drawings.
   4. Raise the tank above the pad to protect the bottom finish during installation and to minimize corrosion due to moisture accumulation.
   5. Furnish components and equipment as required to complete the installation.
   6. Replace any hardware lost or damaged during installation or handling.
   7. Position the transformer so required working space and clearance requirements of the NEC and the local building authorities are met.

3.03 COMMISSIONING

A. As specified in Section 01_75_17 - Commissioning.

B. Source testing:
   1. Perform the following factory tests as required by IEEE C57.12.00 and in accordance with IEEE C57.12.90:
      a. No-load (85 degrees Celsius) losses at rated current. (Maximum allowable no-load losses: 10 percent).
      b. Total (85 degrees Celsius) losses at rated current. (Maximum allowable total losses: 6 percent).
      c. Percent impedance (85 degrees Celsius) at rated current.
      d. Excitation current (100 percent voltage) test.
      e. Winding resistance measurement tests.
      f. Turns ratio tests using tap settings.
      g. Polarity and phase relation tests.
      h. Temperature test.
   2. Furnish test reports and Manufacturer's Certificate of Source Testing.

C. Installation verification:
   1. Furnish Manufacturer's Certificate of Installation Verification.

D. Functional Testing:
   1. As specified in Section 26_08_50 - Field Electrical Acceptance Tests.

3.04 FIELD QUALITY CONTROL

A. Provide the services of a manufacturer's authorized representative:
   1. Inspect installation before start-up.
   2. Witness energization.

B. Energize transformer according to manufacturer's recommended procedure and in accordance with IEEE C57.91.

3.05 ADJUSTING

A. Set the transformer taps as required to obtain nominal output voltage on the secondary terminals.

END OF SECTION

SECTION 26_13_17

15-KILOVOLT PAD-MOUNTED SWITCHGEAR

PART 1 GENERAL

1.01 SUMMARY

A. Section includes: 15 kilovolt low profile, dead-front pad-mounted switchgear.
   1. Dead-front pad-mounted switchgear consisting of a single self-supporting enclosure, containing sealed insulated load-interrupter switches and microprocessor-controlled arc spinners or vacuum fault interrupters:
      a. Load interrupter way or fault-interrupter ways as indicated on the Drawings.

1.02 REFERENCES

A. Standards:
   1. Institute of Electrical and Electronic Engineers (IEEE):
      a. C57.12.28 - IEEE Standard for Pad-Mounted Equipment - Enclosure Integrity.
      b. 386 - IEEE Standard for Separable Insulated Connector Systems for Power Distribution Systems Above 600 V.
   2. International Electrotechnical Commission (IEC):
      a. 60507 - Artificial Pollution Tests on High-Voltage Insulators to be Used on A.C. Systems.
   3. National Electrical Code (NEC).
   4. National Electrical Manufacturer's Association (NEMA):
      a. 260 - Safety Labels for Pad-Mounted Switchgear and Transformers Sited in Public Areas.
   5. Underwriters Laboratories, Inc. (UL).

1.03 DELEGATED DESIGN

A. As specified in Section 01_35_73 - Delegated Design Procedures.

B. Anchoring and bracing.

1.04 SUBMITTALS

A. Furnish submittals as specified in Section 01_33_00 - Submittal Procedures.

B. Product data:
   1. Manufacturer of switchgear.
   2. Manufacturer of all components and accessories.
   3. Dimensions:
      a. Height.
      b. Length.

c. Width.
d. Weight.

4. Nameplate schedule.
5. Bill of material.
6. Ratings:
   a. Voltage.
   b. Phase.
   c. Current.
   d. Interrupting rating (circuit breakers and fuses).
   e. Momentary current rating.
7. List of recommended spare parts.

C. Shop drawings:
   1. Layout drawings:
      a. Provide fully dimensioned and to scale equipment layout drawings which include:
         1) Equipment furnished: Plan, front and side views.
         2) Required pad dimensions, including conduit window sizes and locations.
   2. Complete electrical wiring diagrams:
      a. Indicate wire numbers.
   3. Internal schematics, elementary diagrams, and wiring diagrams of each unit or compartment, including wiring identification and terminals.
   4. Internal cell-to-cell interconnection wiring diagrams, including wiring identification and terminal numbers.
   5. Complete 1-line and 3-line diagrams for each switchgear line-up:
      a. Identify all components comprising the switchgear assembly including, but not limited to, circuit breakers, control power and instrument transformers, meters, relays, switches, monitoring devices, and terminal blocks.
      b. Clearly indicate device electrical ratings on the drawings.

D. Delegated design submittals:
   1. Anchoring and bracing: Provide project-specific calculations based on support conditions and requirements to resist loads specified in Section 01_81_50 - Design Criteria:
      a. For equipment installed outdoors.

E. Installation instructions:
   1. Detail the complete installation of the equipment including rigging, moving, and setting into place.
   2. Provide manufacturer’s installation instructions.

F. Commissioning submittals:
   1. As specified in Section 01_75_17 - Commissioning, including the following:
      a. Manufacturer’s representative qualifications.
      b. Certificates:
         1) Requirements as specified in this Section.
      c. Test plans:
         1) Test requirements as specified in this Section.

d. Test reports.
e. Manufacturer's representatives field notes and data.
f. Owner training.

G. Operation and maintenance manuals:
1. Operating instructions:
a. Detail the operational functions of all controls.
2. Maintenance manual:
a. Furnish maintenance manuals with instructions for maintenance of the equipment and data identifying the parts.
b. Include all information needed to maintain the switchgear including but not limited to the following:
1) Instructions for testing, adjustment, and start-up.
2) Detailed control instructions that outline the function and operation of every control device.
3) Schematic and wiring diagrams:
a) Showing all internal and external connection.
b) Furnish in a reduced 11-inch by 17-inch fully legible format.

1.05 QUALITY ASSURANCE

A. Where indicated on the Drawings as service entrance equipment, the switchgear shall be UL labeled and listed "Suitable for Service Entrance".

B. Dead-front pad-mounted switchgear shall be UL listed and labeled.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Ship the switchgear and associated equipment to the Project Site on a dedicated air ride vehicle that will allow the Contractor to utilize onsite off-loading equipment.

B. Furnish temporary equipment heaters within the switchgear to prevent condensation from forming.

1.07 PROJECT OR SITE CONDITIONS

A. As specified in Section 01_81_50 - Design Criteria.

1.08 ADMINISTRATIVE REQUIREMENTS

A. Sequencing:
1. Conduct the initial fault current study as specified in Section 26_05_74 - Electrical System Studies and submit results for Engineer's review.
2. After successful review of the initial fault current study, submit complete equipment submittal.
3. Conduct factory acceptance test and submit certified test results for Engineer's review.
4. Ship equipment to project site after successful completion of factory acceptance test.
5. Assemble equipment in the field.
6. Conduct final fault current and coordination study.

7. Conduct field acceptance test and submit results for Engineer's review.
8. Submit manufacturer's certification that equipment has been properly installed and is fully functional for Engineer's review.
9. Conduct Owner's training sessions.
10. Commissioning as specified in Section 01_75_17 - Commissioning.

1.09 WARRANTY

A. As specified in Section 01_78_36 - Warranties and Bonds.

PART 2 PRODUCTS

2.01 GENERAL

A. Provide dead-front pad-mounted switchgear consisting of a sealed tank, load-interrupter switches, and resettable fault interrupters with visible open gaps on sources and taps and integral visible grounds, and a microprocessor-based overcurrent control:
   1. Include relay-based overcurrent control on each switch way.

B. Provide devices or accessories not specified in this Section but necessary for the proper installation and operation of the equipment.

2.02 DESIGN AND PERFORMANCE CRITERIA

A. Provide equipment and components that are fully rated for the site elevation and operating environment where the equipment will be installed as specified in Section 01_81_50 - Design Criteria and as indicated on the Drawings.

B. Outdoor installations:
   1. Provide conditioning equipment incorporated into the equipment to maintain the enclosures within the equipment manufacturer's specified operating ranges.

C. Low-profile, dead-front pad-mounted switchgear factory assembled, factory wired and factory tested.

2.03 MANUFACTURERS

A. One of the following or equal:
   1. S & C Electric Co.:
      a. VISTA Pad-mounted Distribution Switchgear.
   2. Eaton:
      a. VFI Vacuum Fault Interrupter Pad-mounted Distribution Switchgear.

2.04 EQUIPMENT

A. 15 kV pad mounted switchgear:
   1. Ratings: Frequency, Hz – 60.0.
      a. Short Circuit Rating, Amperes RMS Symmetrical – 25,000.

b. Insulation:
    1) Voltage Class – 15.5 kV.
    2) Maximum, kV – 15.5 kV.
    3) BIL – 95 kV.
c. Main Bus Continuous Amperes:
    1) Three-Pole Interrupter Switches:
        a) Continuous, Amperes – 600.
        b) Load Dropping, Amperes – 600.
        c) Fault Closing Duty Cycle
            (1) Amperes, RMS Symmetrical – 25,000.
    2) Fault Interrupters:
        a) Continuous, Amperes – 600.
        b) Load Dropping, Amperes – 600.
        c) Fault Interrupting Duty Cycle
            (1) Amperes, RMS Symmetrical – 25,000.

B. Bus bars:
1. Bare aluminum bar of 56 percent conductivity.
2. Treat all joints to prevent oxidation.
3. Use Belleville spring washers to maintain optimum contact pressure on all bus connections.
4. Capable of withstanding the rated short circuit current of the switchgear.

C. Ground pads:
1. Provide a ground connection pad in each compartment:
    a. Welded to the interior of the enclosure near the cable entrances.
2. Nickel-plated copper or stainless steel.
3. NEMA 2-hole pattern for ground connections.
4. Capable of carrying the fault duty of the switchgear.

D. Enclosure:
1. The switchgear shall be provided with a pad-mounted enclosure.
2. Include an oversized termination compartment as required to terminate and “piggyback” all t-body connections, as well as to accommodate all lightning arrestors for all bushing sizes as indicated on the Drawings and as specified herein.
3. The cabinet shall allow clear access to the bushings and bushing wells for cable terminations.
4. The enclosure shall be provided with removable front and back panels, and hinged lift-up roof sections for access to the operating and termination compartments. Each roof section shall have a retainer to hold it in the open position.
5. Lift-up roof sections shall overlap the panels and shall have provisions for padlocking that incorporate a means to protect the padlock shackle from tampering.
6. The base shall be suitable for mounting to concrete pad.
7. Panel openings shall have 90-degree flanges, facing outward, that shall provide strength and rigidity as well as deep overlapping between panels and panel openings to guard against water entry.

8. An instruction manual holder shall be provided.
9. Non-removable lifting tabs shall be provided.
10. To guard against corrosion due to extremely harsh environmental conditions, the gastight tank shall be made of Type 304 stainless steel.

E. Finish:
1. All exterior welded seams shall be filled and sanded smooth.
2. All surfaces shall undergo a thorough pretreatment process to remove all oils and dirt.
3. After pretreatment, protective coatings shall be applied that shall help resist corrosion and protect the steel enclosure.
4. The finish shall be manufacturer's standard.

F. Insulating tank:
1. The tank shall be of welded construction and shall be made of 304 stainless steel or mild steel.
2. Insulated with either SF_6mineral oil fluid, or envirotemp fluid.

2.05 COMPONENTS

A. Load-interrupter switches:
1. Rating as specified in this Section.
2. The switch shall be provided with an integral ground position, close position, and open position, visible through the viewing window.
3. Fault-interrupters:
a. Fault interrupters shall have a three-time and ten-time duty-cycle fault-closing and fault interrupting rating.
1) The rating defines the fault interrupter's ability to close the designated number of times against a three-phase fault with asymmetrical (peak) current in at least one phase equal to the rated value and clear the resulting fault current, with the interrupter remaining operable and able to carry and interrupt rated current.
b. The fault interrupter shall be provided with a disconnect with an integral ground position and open position, visible through the viewing window.
c. The fault interrupter, including its three-position disconnect, shall be integrated so that operation between the closed and open positions or the open and grounded positions is accomplished with a single movement.
d. The open gaps of the disconnect shall be sized to allow cable testing through a feed through bushing or the back of the elbow.
e. An internal indicator shall be provided for each fault interrupter to show when it is in the tripped condition. The indicator shall be clearly visible through the viewing window:
1) Include external indicators for any relay-monitored devices if applicable:
a) Labeled, LED, push-to-test pilot devices mounted on the control cabinet if applicable.
4. Operating mechanisms:
a. Load-interrupter switches and fault interrupters shall be operated by means of a quick-make, quick-break mechanism.
b. The manual handle shall charge the operating mechanism for opening, closing, and grounding of the switches and fault interrupters.

c. Operating mechanisms shall be equipped with an operation selector to prevent inadvertent operation from the closed position directly to the grounded position, or from the grounded position directly to the closed position.
    1) The operation selector shall require physical movement to the proper position to permit the next operation.
d. Operating shafts shall be padlockable in any position to prevent operation.

5. Viewing windows:
    a. Each load-interrupter switch shall be provided with a viewing window to allow visual verification of the switch-blade position (open, closed, and grounded).
    b. Each fault interrupter shall be provided with a viewing window to allow visual verification of the disconnect-blade position (open, closed, and grounded).
    c. A cover shall be provided for each viewing window to prevent operating personnel from viewing the flash, which may occur during switching operations.
6. Overcurrent control:
    a. Manufacturer standard.
7. Insulators, bushing and bushing wells:
    a. Manufactured of cycloaliphatic epoxy resin.
        1) Operating experience of at least 15 years.
        2) Adequate leakage distance established by test in accordance with IEC Standard 60507.
        3) Adequate strength for short circuit stress established by test.
        4) Homogeneity of the cycloaliphatic epoxy resin throughout each insulator to provide maximum resistance to power arcs:
            a) Ablation due to high temperatures from power arcs shall continuously expose more material of the same composition and properties so that no change in mechanical or electrical characteristics takes place because of are induced ablation.
            b) Any surface damage to insulators during installation or maintenance of the dead-front pad-mounted switchgear shall expose material of the same composition and properties so that insulators with minor surface damage need not be replaced.
    b. Bushings and bushing wells shall be copper and conform to IEEE 386.
    c. Mount bushings and bushing wells in such a way that the semi-conductive coating is solidly grounded to the enclosure.
    d. Bushings rated 600 amperes continuous shall have a removable threaded stud so that the bushings are compatible with all 600-ampere t-body systems.
8. Terminations:
    a. Dead-front terminations.
    b. Termination compartments for bushings rated 600 amperes continuous shall be of an adequate depth to accommodate:
        1) 600-ampere T-body connectors for termination of up to 2 parallel runs and surge arrestors.
    c. Provide parking stands for each bushing or bushing well.
    d. Encapsulated surge arresters or grounding elbows mounted on 600-ampere elbows having 200-ampere interfaces or other similar accessory combinations without the need for an enclosure extension.

2.06 ACCESSORIES

A. Warning labels:
   1. The switchgear shall be labeled in accordance with NEMA 260.
   2. Voltage:
      a. Provide a minimum of 2 warning signs on the front of the switchgear lineup and 2 on the back.
      b. Red laminated plastic engraved with white letters approximately 1/2 inch high.
      c. Signs shall read: “WARNING-HIGH VOLTAGE-KEEP OUT.”
   3. Arc flash:
      a. Provide 1 warning sign for each switchgear compartment.
      b. Signs shall have read a minimum of:
         1) “DANGER ELECTRIC ARC FLASH HAZARD.”
         2) Signs shall meet the requirements of the NEC.

B. Nameplates:
   1. Furnish an individual nameplate for each compartment identifying the source or load served.
   2. As specified in Section 26_05_53 - Identification for Electrical Systems:
      a. Mounted using 2 steel self-tapping screens.
      b. All empty cubicles and/or spaces shall have a blank nameplate.
   3. Manufacturer’s labels:
      a. Rating label.
      b. Date of manufacture.
      c. Weight.
      d. Serial number.
      e. Catalog number.
      f. Bus rating.
      g. Date of manufacture.
      h. Model and manufacturer for each fuse and fuse folder.
      i. Circuit diagram.

C. Provide preformed insulating boots for all cable landing pads and lugs. Cable termination boots shall have the same dielectric withstand rating as the switchgear.

D. Provide encapsulated surge arresters or grounding elbows mounted on 600-ampere elbows or other similar accessory combinations without the need for an enclosure extension.

E. Power metering system:
   1. Provide power metering as indicated on the Drawings as specified in Section 26_09_13 - Electrical Power Monitoring.

2.07 FINISHES

A. Finish shall be in accordance with IEEE C57.12.28.

B. Finish color shall be Munsell green no. 7GY3.29/1.5.

PART 3 EXECUTION

3.01 PREPARATION

A. Anchoring and bracing to structures:
   1. Prepare equipment anchor setting template(s) and use to position anchors during construction of supporting structure(s).
   2. Install anchors of type and material indicated on approved anchoring designs.
   3. Install anchors with embedment indicated on approved anchoring designs.

3.02 INSTALLATION

A. Install the equipment in accordance with the accepted installation instructions and anchorage details.

B. General:
   1. Furnish lugs, bolts, and other accessories needed to complete the installation of the switchgear.
   2. Physically assemble and install the switchgear in the location and layout indicated on the Drawings.
   3. Perform work in accordance with manufacturer's instructions and drawings.
   4. Furnish components and equipment as required to complete the installation.
   5. Replace hardware lost or damaged during the installation or handling to provide a complete installation.

C. Provide the services of a qualified manufacturer's representative to:
   1. Inspect, verify, and certify that the mechanical installation meets the manufacturer's requirements.
   2. Make control connections across the shipping splits.
   3. Perform field tests.

3.03 COMMISSIONING

A. As specified in Section 01_75_17 - Commissioning.

B. Source testing:
   1. Witnessed, in-person:
      a. Number of Owner and Engineer representatives in person: 2.
   2. Test the complete switchgear at the manufacturer's establishment:
      a. Completely assemble, wire, and test the switchgear:
         1) Detailed inspections before and after assembly to ensure correctness of design and workmanship.
   3. Furnish test reports and Manufacturer's Certificate of Source Testing.

C. Installation verification:
   1. Furnish Manufacturer's Certificate of Installation Verification.

D. Functional testing:
   1. As specified in Section 26_08_50 - Field Electrical Acceptance Tests.

E. Owner training:
   1. Perform Owner training as specified in Section 01_75_17 - Commissioning.
   2. Number of sessions:
      a. Operations 6 hours per session.
      b. Maintenance 6 hours per session.

3.04 FIELD QUALITY CONTROL

A. As specified in Section 26_05_00 - Common Work Results for Electrical.

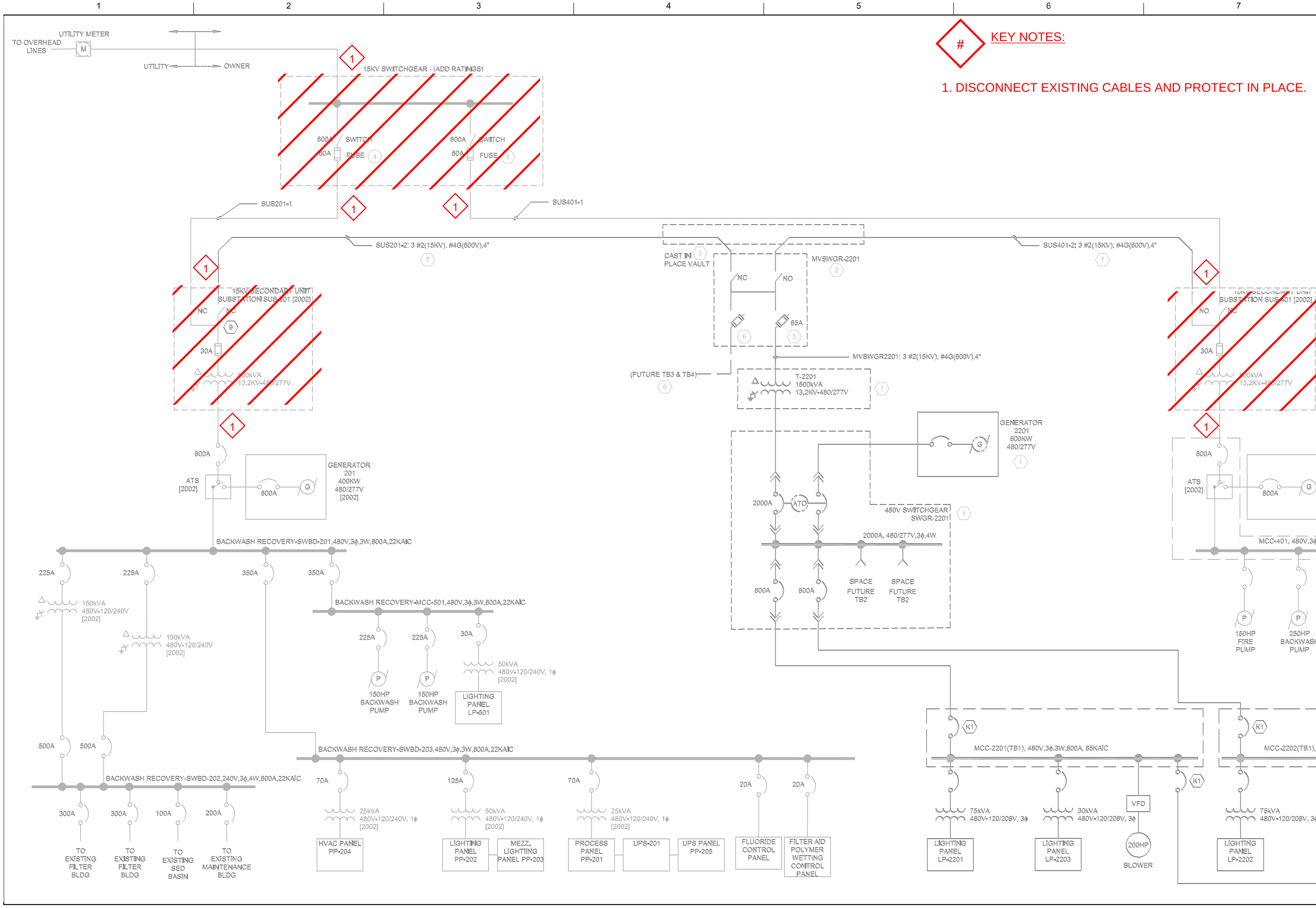
B. Provide the services of a qualified manufacturer's representative to:
   1. Be present at the Project Site when the switchgear arrives.
   2. Act as an advisor in assisting the Contractor regarding the unloading and move-in operations.
   3. Furnish the services of a factory-certified technician during the start-up and adjustment period to ensure that items furnished are in proper operating condition:
      a. Technician must be completely knowledgeable in the operation, maintenance, and start-up of the electrical system.

3.05 ADJUSTING

A. Make all adjustments as necessary and recommended by the manufacturer, Engineer, or testing firm.

END OF SECTION

OVERALL DEMO ONE-LINE DIAGRAM



KEY NOTES:

1. DISCONNECT EXISTING CABLES AND PROTECT IN PLACE.

GENERAL NOTES:

A. BRACKETS [] INDICATE APPROXIMATE YEAR OF EQUIPMENT INSTALLATION.
B. ONLY MOTORS GREATER THAN OR EQUAL TO 100HP ARE SHOWN.

KEY NOTES:

1. SEE 00E603 FOR EQUIPMENT DETAILS.
2. PAD-MOUNTED SWITCHGEAR
3. NEW CAST IN PLACE VAULT INSTALLED IN EXISTING DUCT BANK. SEE SITE PLAN 02E101.
4. REPLACE EXISTING FUSES WITH NEW FUSES TYPE, SPEED AND RATING AS DETERMINED IN PROTECTIVE DEVICE COORDINATOR STUDY.
5. INSTALL NEW FUSES. FINAL FUSE TYPE, SPEED, AND RATING TO BE AS DETERMINED BY PROTECTIVE DEVICE COORDINATION STUDY.
6. FUSES TO BE PROVIDED BY OTHERS. (FUTURE)
7. EXISTING CONDUIT TO BE RE-USED. NEW CABLES TO BE INSTALLED.
8. SPARE CONDUITS TO BE STUBBED OUT OF SWITCH FOR FUTURE USE.
9. CLOSE BOTH SWITCHES IN SUS-201, SO POWER IS FED TO MVSWGR-2201.

OVERALL ONE-LINE DIAGRAM