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**Consulting Engineers**

Matthew D. Dunn
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ADDENDUM NO. 2

DATE: August 16, 2024

PROJECT: Benton Washington Regional Public Water Authority
Water Treatment Plant Improvements – High Service Pump Station
Electrical Equipment Procurement
Rogers, Arkansas

BID DATE: **August 28, 2024 at 10:00AM**

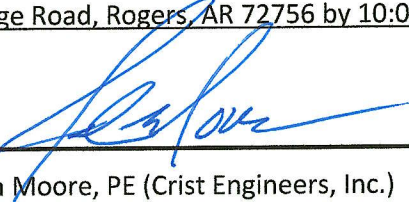
This Addendum forms a part of the Contract Documents and replaces the original documents provided to Bidders, as noted below.

Item No. 1. All prior Bid documents previously issued for the Electrical Equipment Procurement for the High Service Pump Stations are to be removed and not to be used for bidding purposes.

Item No. 2. The attached RFP Package 1: Power Transformers with all supporting documentation should be utilized for the Request for Proposals for bids for the supplying of five (5) power transformers for the High Service Pump Station project.

END OF ITEMS

Bids must be received at Benton Washington Regional Public Water Authority office, 15531 Woods Lodge Road, Rogers, AR 72756 by 10:00 AM on August 28, 2024.


Josh Moore, PE (Crist Engineers, Inc.)

08/16/2024

Date

PROCUREMENT
AND
SPECIFICATION DOCUMENTS

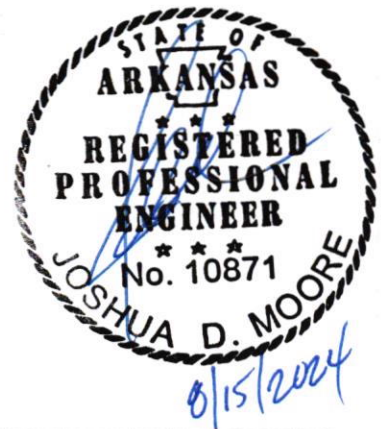
**HIGH SERVICE PUMP STATION
TRANSFORMERS**



**BENTON WASHINGTON REGIONAL
PUBLIC WATER AUTHORITY
ROGERS, ARKANSAS**

AUGUST 2024

Job 2124



CRIST ENGINEERS, INC.

www.cristengineers.com

REQUEST FOR PROPOSALS
August 2024
RFP PACKAGE 1: POWER TRANSFORMERS
BENTON WASHINGTON REGIONAL PUBLIC WATER AUTHORITY
Rogers, Arkansas

The Benton Washington Regional Public Water Authority is accepting proposals for the items and services listed in this package **RFP Package 1: Power Transformers** for completion of the **High Service Pump Station** project. Proposals will be opened on the date and at the time and location as indicated. All proposals will be subject to the conditions and specifications attached hereto. Submission of a proposal constitutes acceptance of the terms and conditions of this invitation and the conditions and specifications attached hereto. If certain items and services in the specifications cannot be achieved by the submitter's product, provide in the proposal a list of exceptions. Detail the quantity and type of each component contemplated for use on the project. *Any and all exceptions to the requested proposal must be clearly listed and detailed in a cover letter provided by the Materialman/Equipment Supplier.*

Installation of all equipment and services included in this proposal shall be under a separate contract.

All RFP responses must be submitted by the time indicated. Each proposer must submit the proposal, Sections 1.3, 1.4, and 1.5 of this RFP as well as any additional specified requirements, in a sealed envelope properly addressed and identified, as detailed in Section 1.1 INVITATION FOR BID below.

1.0 CONTRACT DOCUMENTS AND GENERAL REQUIREMENTS

1.1 INVITATION FOR BID

Proposals will be received by the **Benton Washington Regional Public Water Authority (BWRPWA)**, (hereinafter referred to as the Owner), for a contract to furnish the materials, supplies, and equipment listed and described in the Materialman's Proposal hereinafter mentioned, desired by the Owner for the project and equipment designated as:

HIGH SERVICE PUMP STATION:
RFP PACKAGE 1: POWER TRANSFORMERS

The project and equipment designated is more fully described in the Plans and Specifications (as applicable) and is therefore on file with Owner's Engineer, **Crist Engineers, Inc., 1188 N. Salem Road, Suite 14, Fayetteville, Arkansas 72704**, (hereinafter referred to as the Engineer). Proposals for the designated equipment for the project shall be submitted to the Owner, sealed, addressed, and identified as described here, on or before **10:00 A.M., August 28, 2024**. All proposals shall be delivered to **Mr. Scott Borman, General Manager, Benton Washington Regional Public Water Authority, 15531 Woods Lodge Road, Rogers, Arkansas 72756**, in a sealed envelope, with words clearly written **ENCLOSED BID, RFP PACKAGE 1: POWER TRANSFORMERS**, and on which shall also appear the name and address of the Bidder, by the date and time indicated. ***Proposals will be publicly opened and read aloud.***

1.2 INSTRUCTIONS TO BIDDERS

All proposals must be submitted on the form of Materialman's Proposal furnished by the Engineer. All questions shall be directed to **Josh Moore, PE, Crist Engineers, Inc., 1188 N. Salem Road, Suite 14, Fayetteville, Arkansas 72704, office number 479-485-3300, email – jmoore@cristengineers.com.**

Prior to submitting proposals, Bidders shall make a careful examination of the Specifications and Drawings (as applicable) attached heretofore, also on file with the Engineer of the Owner. The successful Bidder will be required to execute a Materials Contract on the form(s) attached to the Materialman's Proposal, as required herein.

Bidders must make bids on one or more complete schedules of the Materialman's Proposal. Incomplete bids or partial bids on schedules will not be considered.

In estimating the lowest cost to the Owner as one of the factors in deciding the award of the Contract, the Owner will consider, in addition to the price quoted in the Materialman's Proposal, the estimated delivery time and the Materialman/Equipment Supplier's experience. If requested by the Owner, the Bidder shall furnish evidence, satisfactory to the Owner, that the Bidder has the necessary facilities, ability, and financial resources to perform the Contract.

The Owner reserves the right to waive minor irregularities or minor errors in any Materialman's Proposal if it appears to the Owner that such irregularities or errors were made through inadvertence. Any such irregularities or errors so waived must be corrected on the Materialman's Proposal in which they occur prior to the execution of any contract, which may be awarded thereon.

The acceptance of the Materialman/Equipment Supplier's standard sales terms and conditions will not be considered. These documents will constitute the entire agreement.

Any exceptions to these specifications, drawings, and/or contract documents (as applicable) shall be clearly set forth in the Materialman/Equipment Supplier's initial proposal and specifically identified, on a separate cover letter, for each exception. Comments must be clearly separated, on a separate cover letter, from exceptions. Any proposed equipment with exceptions must be accompanied with proof of comparable installations and performance history, as required by the equipment technical specification and the general specifications in Part 2.0 of this RFP.

The Owner reserves the right to accept or reject any, one, or all bid schedules from a Bidder or Bidders.

The Owner reserves the right to accept or reject any optional items listed in the bid schedule.

The Owner reserves the right to reject any proposal that does not fully comply with these instructions.

Benton Washington Regional Public Water Authority, Owner

Dated the 15th of August 15, 2024.

1.3 MATERIALMAN'S PROPOSAL

TO: **Benton Washington Regional Public Water Authority** (hereinafter called the *Owner*) the undersigned (hereinafter called the *Materialman, Equipment Supplier, Manufacturer, or Bidder*) hereby proposes to sell and deliver to the Owner, upon the terms and conditions herein stated, the materials, supplies, and equipment (hereinafter called the *Materials*) specified in the schedule or schedules attached hereto and by this reference made part hereof, (hereinafter called the *Schedules*), for the project designated as the **High Service Pump Station** (hereinafter called the *Project*) for the equipment designated **RFP Package 1: Power Transformers** (hereinafter called the *Equipment or System*), according to the following:

1. The prices of Materials set forth herein do not include any sums, which are, or may be payable by the Materialman on account of taxes imposed by any taxing authority upon the sale, purchase, or use of the materials. If any such tax is applicable to the sale, purchase, or use of the Materials or System hereunder, the amount thereof shall be added to the purchase price and paid by the Owner.
2. The Materials will conform to the Specifications and Drawings (as applicable) attached hereto and made part hereof.
3. The Owner may accept one, any, or all of the bid schedules from a Bidder or Bidders.
4. The prices of Materials set forth herein shall include the cost of delivery to the following point or points:

Attention: **Scott Borman, General Manager**
Benton Washington Regional Public Water Authority
15531 Woods Lodge Road
Rogers, Arkansas 72756
Ph (479) 925-7795

Delivery shall be coordinated with designated representative, as indicated above. The time of delivery to be stated by Materialman and shall occur within the timeframe listed as follows:

 Days/Weeks (circle one)

The time for delivery shall be extended for the period of any reasonable delay due exclusively to causes beyond the control and without the fault of the Materialman, including acts of God, fires, floods, strikes, and delay in transportation.

5. Title to the Materials or System shall pass to the Owner upon delivery to the point above specified.
6. This proposal is made on a unit basis, the quantities herein set forth being approximate, and on a lump sum basis. Billings shall be computed by applying the unit prices, as required, set forth herein, to the quantities actually shipped.
7. This proposal is void unless a materials contract based on this proposal is entered into by the Owner and the Materialman within sixty (60) days after the date hereof.

1.4 PROPOSAL

The Bidder shall furnish the equipment, materials, or system(s) as specified herein and on the following pages for the following firm prices:

No.	Description	Quantity	Unit	Unit Price	Total Price
1	RFP Package 1: Power Transformers (5 – Total)	1	LS	\$	\$
Total Proposal					\$

Time of delivery: _____ Days/Weeks

Address _____

Phone: _____

Fax: _____

Materialman

By: _____

Title: _____

Date: _____

E-mail: _____

1.5 REFERENCES

Provide the information listed below for current users of similar transformers to the **RFP Package 1: Power Transformers.**

List up to three (3) references:

Reference No. 1 _____ Purchased Date: _____
Name _____
Phone No. _____
Address _____

Reference No. 2 _____ Purchased Date: _____
Name _____
Phone No. _____
Address _____

Reference No. 3 _____ Purchased Date: _____
Name _____
Phone No. _____
Address _____

This AGREEMENT is made as of _____, 2024, between **Benton Washington Regional Public Water Authority**, (hereinafter called the *Owner*), a corporation organized and existing under the laws of the State of Arkansas and _____, (hereinafter called the *Materialman, Equipment Supplier, Manufacturer, or Bidder*), a corporation organized and existing under the laws of the State of _____.

RFP Package 1: Power Transformers

The Materialman agrees to sell and deliver to the Owner and the Owner agrees to purchase and receive from the Materialman the following Materials in accordance with the provisions of the Notice and Instructions to Bidders (if any shall be attached hereto) and the Materialman's Proposal attached hereto and made part hereof.

The Materialman shall submit to the Owner a detailed invoice in duplicate of the Materials shipped. *All payments shall become due upon 30 days net.* Owner shall make payment to the Materialman, in accordance with the following payment schedule:

- SECTION 1. All materials furnished hereunder shall be subject to the inspection, tests, and approval of the Owner and the Materialman shall furnish all information required concerning the nature or source of any Materials and provide adequate facilities for testing and inspecting the Materials at the Plant of the Materialman.

SECTION 2. The Materials furnished hereunder shall become the property of the Owner when delivered at the point to which shipment is to be made, provided, however, that the Owner may reject any such Materials as do not comply with the Specifications for Materials and warranties of the Materialman and manufacturers; and any defective materials either before or after incorporation of such Materials into the Project, **provided such rejection is made within twelve (12) months of date of delivery of the Materials.** Upon any such rejection, the Materialman shall replace the rejected Materials with Materials complying with the Specifications for Materials and warranties, f.o.b. at a suitable destination. The Owner shall return the rejected Materials f.o.b. at the same destination. In the event of the failure of the Materialman to so replace rejected Materials, the Owner may make such replacement and the cost and expense thereof shall be paid by and recoverable from the Materialman.

Article IV -- Miscellaneous

SECTION 1. All manufacturers' guaranties of Materials shall be transferred and assigned to the Owner upon delivery of any Materials and before payment is made for such materials. Such guaranties shall be in addition to those required of the Materialman by other provisions of this contract.

SECTION 2. The Materialman shall hold harmless and indemnify the Owner, its agents and employees, from any and all claims suits and proceedings for infringement of any patent or patents covering Materials purchased hereunder. The Materialman shall defend any suitor proceeding brought against the Owner, its agents or employees, based upon a claim that the materials or any part thereof constitute an infringement of any patent, or if the Materialman shall fail to defend such suit or proceeding, the Owner may do so and the Materialman shall make reimbursement for the expense of such litigation. If the Materials or any part thereof, are held to constitute infringement and the use thereof is enjoined, the Materialman shall, at his own expense, either procure for the Owner the right to continue to use the Materials, or such part thereof, or shall replace the Materials or such part thereof, with non-infringing materials.

SECTION 3. Simultaneously with the final payment to the Materialman, as provided herein, the Materialman shall deliver to the Owner duplicate original releases of lien of subcontractors, if any.

SECTION 4. In the event any of the provisions of this contract are violated by the Materialman or by any of the Materialman's subcontractors, the Owner may serve a written notice of intention to terminate such contract upon the Materialman, which notice shall specify the reasons therefore. Unless within ten (10) days after the serving of such notice upon the Materialman such violation shall cease and an arrangement for the correction thereof satisfactory to the Owner be made, this contract shall, upon the expiration of the said ten (10) days, cease and terminate. In the event of such termination, the Owner may purchase the Materials necessary for complete performance of this contract for the account and at the expense of the Materialman, and the Materialman shall be liable to the Owner for any excess cost occasioned thereby. The foregoing shall be in addition to every right or remedy now or hereafter existing at law or in equity or by statute.

SECTION 5. Each and all of the covenants and agreements herein contained shall extend to and be binding upon the successors and assigns of the parties hereto. However, the Materialman shall not assign this contract or any part thereof or enter into any contract with any person, firm or corporation for the performance of the Materialman's obligations hereunder, or any part thereof, without the approval, in writing, of the Owner.

SECTION 6. Except for the Materialman's willful delay or refusal to perform the contract in accordance with its terms, the Materialman's liability for special or consequential damages on account of any breach of this contract shall not exceed an amount equal to the contract price. If the contract provides for the furnishing of more than one unit of equipment or materials, the limitation prescribed hereinabove shall be applied to each individual unit with respect to which such breach has occurred and *contract price* shall be deemed to mean the unit price specified in the contract, or, if none is specified, a proportionate part of the total price stipulated for all such units.

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be executed by their duly authorized representatives all as of the day and year first above written.

Benton Washington Regional PWA

Title

Date

By _____
(Representative)

(Materialman)

Title

Date

By _____
(Representative)

2.0 GENERAL SPECIFICATIONS

2.1 SCOPE

- A. This Request for Proposals (RFP) and specifications cover the furnishing of **Five (5)** medium voltage power transformers of different specifications, and all necessary appurtenances as specified and referred to as **RFP Package 1: Power Transformers**. Transformers shall be for the finished High Service Pump Station project and shall be as specified in Section 262730 "Liquid Filled Pad Mounted Transformers", of the technical specifications hereto attached with Sheet E5.2 "Electrical Flow Diagram".
- B. Acceptable manufacturers shall be those whose product meets or exceeds all performance, material, warranty, and service requirements of these specifications – no exceptions.

2.2 WORK INCLUDED

- A. The products and services referenced herein pertain to furnishing **Five (5) Power Transformers**, as specified, for **Benton Washington Regional Public Water Authority (BWRPWA)**. The transformers and accessories shall be provided by a single source supplier to insure complete responsibility for an integrated system by the Equipment Supplier. The equipment performance and material specifications shall be used to establish a level of quality suitable for the intended service. Equipment shall conform to standards as set forth as a minimum level of performance. Where applicable, BWRPWA personnel or a designated Contractor shall perform the work of system installation.
- B. The System Equipment Supplier shall furnish equipment for installation by BWRPWA or a designated Contractor under a separate contract. The equipment specified herein shall be provided complete for installation at an Owner furnished location. Installation and electrical connections shall be performed by others and noted in the specifications and on the plans.
- C. The Materialman/Equipment Supplier shall be responsible for supplying and deliver of the equipment specified herein. The Materialman/Equipment Supplier shall be an Authorized Distributor of the proposed products and shall be capable of direct responsive communications within **two (2) hours** of notification in regards to service requests and parts availability. The responsive Materialman/Equipment Supplier shall routinely stock or have the ability to obtain any and/or all parts for repair of specified equipment. Spare parts shall be provided as noted in the specifications. All equipment approved for this project shall meet or exceed the specifications, and shall meet or exceed all performance, service, and warranty requirements.
- D. Refer to the Technical Specifications included with this Request for Proposals for further information on requirements and work included, specifically Section 262730 "Liquid Filled Pad Mounted Transformers".

- E. Refer to specification Section 016000 “Materials and Equipment” as included with this RFP.

2.3 QUALITY ASSURANCE

- A. All equipment approved for this project shall meet or exceed all performance, workmanship and materials, service, and warranty requirements of the specification.

2.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and ensure proper storage and handling of equipment to prevent damage.
- B. Provide Equipment Supplier’s instructions for short-term and long-term storage, particularly with respect to proper lubricants and periodic rotation of moving parts, as applicable.
- C. Provide materials required for any touch-up painting or other coating, to prevent corrosion.

2.5 SUBMITTALS

- A. Refer to the attached specification Section 013300 “Submittal Procedures”.
- B. The Materialman/Equipment Supplier shall furnish any assembly, foundation support, and installation drawings or requirements of the equipment furnished under this Request for Proposals.
- C. Prior to fabrication, Equipment Supplier shall submit information on each proposed transformer, for review and approval.
- D. Drawings/Plans shall be complete with respect to dimensions, materials of construction, wiring diagrams, and all supporting engineering information.
- E. Data and specifications for the equipment shall include, but not be limited to, the following:
 - 1. Setting Plans, to include (as applicable):
 - a. Anchor bolt layout.
 - b. Anchor bolt dimensions and quantity.
 - c. Outline dimensions and weight of system including the weights of equipment (if applicable), and any enclosures or other accessories.
 - 2. Transformers, to include (as applicable):
 - a. Manufacturer, type, and model number.
 - b. Assembly drawings, nomenclature, material lists, Operation & Maintenance (O&M) manual, and parts list (as applicable).
 - c. Parts materials, sizes, and dimensions (as applicable).

3. All warranty information for the proposed equipment, in accordance with the attached specifications and requirements set forth herein.

2.6 OPERATING CONDITIONS

- A. Transformers shall be capable of performing all requirements of the specifications for each transformer.

2.7 TESTING AND SERVICES

- A. The Materialman/Equipment Supplier shall make, at Materialman/Equipment Supplier's own expense, all necessary changes, modifications, and/or adjustments required to ensure satisfactory operation.
- C. Equipment shall be field acceptance tested as specified. The Materialman/Equipment Supplier shall provide the services of an authorized Equipment Supplier's Representative to assist in conducting all field tests (if applicable).
- D. In the event the tests reveal noncompliance of the workmanship or materials of the equipment, the Materialman/Equipment Supplier shall coordinate and make any and all necessary alterations, corrections, or replacements, to the equipment or system, to achieve smooth, and as specified, operation, at no additional cost to the Owner.
- E. The Engineer and Owner shall make final determination on any disputes regarding noncompliance with workmanship or installation.
- F. The Equipment Supplier's Representative shall instruct operations personnel in the operation and maintenance of the system, as specified herein.

2.8 SERVICE AND WARRANTY

- A. The Materialman/Equipment Supplier shall provide, in writing, a warranty for the units supplied to the Owner against defects in material and workmanship for a period of at least **one (1) year**, under the operating conditions presented by this project, from the day of acceptance. Materialman/Equipment Supplier shall demonstrate ability to support claimed warranty coverage by meeting all requirements of this specification.

EQUIPMENT SUPPLIER'S CERTIFICATE OF DELIVERY

Owner: BENTON WASHINGTON REGIONAL PUBLIC WATER AUTHORITY

Project: POWER TRANSFORMERS

Contract No.: 2124

EQUIPMENT SPECIFICATION SECTION: _____

EQUIPMENT DESCRIPTION: _____

I, _____, Authorized Representative of
(Print Name)

(Print Equipment Supplier's Name)

hereby CERTIFY that _____
(Print Equipment Name and Model with Serial No.)

delivered for the subject project has (have) been shipped and delivered in a satisfactory manner

and is (are) ready for final acceptance testing and operation, on _____, 20____.

CERTIFIED BY: _____
(Signature of Equipment Supplier's Representative)

Date: _____

Time: _____

3.0 NOTICE OF AWARD

Date of Issuance: _____, 2024.

Owner: BENTON WASHINGTON REGIONAL
PWA

Owner's Contract No.: _____

Engineer: Crist Engineers, Inc.

Engineer's Project No.: 2124

Project: High Service Pump Station

Contract Name: RFP Package 1: Power
Transformers

Materialman/Equipment Supplier: _____

Address: _____

TO MATERIALMAN/EQUIPMENT SUPPLIER:

You are notified that Owner has accepted your proposal dated _____ for the above Contract, and that you are awarded a Contract for the:

High Service Pump Station RFP Package 1: Power Transformers

The Lump Sum Contract Price of the awarded Contract is:

_____ \$ _____

Three (3) unexecuted counterparts of these Contract Documents accompanies this Notice of Award.

☐ a set of the Drawings is included in Appendix A of this RFP.

You must comply with the following conditions precedent within 15 days of the date of receipt of this Notice of Award:

1. Deliver to Owner **three (3)** counterparts of these Contract Documents, fully executed by Materialman/Equipment Supplier.
2. As applicable: Deliver with the executed Contract Documents the Contract security [e.g., performance and payment bonds] and insurance documentation, if required.
3. Other conditions precedent (if any): None

Failure to comply with these conditions within the time specified will entitle Owner to consider you in default, annul this Notice of Award, and declare your Bid and any applicable Bid security forfeited.

Within **ten (10) days** after you comply with the above conditions, Owner will return to you one fully executed counterpart of the Agreement, together with any additional copies of the Contract Documents as required.

Owner: _____

(Authorized Signature)

By: _____

Title: _____

SECTION 013300

SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other miscellaneous submittals.

1.3 SUBMITTAL PROCEDURES

- A. Identification: Place a permanent label or title block on each submittal for identification.
 - 1. Indicate name of firm or entity that prepared each submittal on label.
 - 2. Provide a space approximately 4 by 5 inches on label or beside title block to record Contractor's review and approval markings and action taken by Engineer.
 - 3. Include the following information on label for processing and recording action taken:
 - a. Project name,
 - b. Date,
 - c. Name and address of Engineer,
 - d. Name and address of Contractor,
 - e. Name and address of subcontractor,
 - f. Name and address of supplier,
 - g. Name of manufacturer,
 - h. Unique identifier, including revision number,
 - i. Number and title of appropriate Specification Section,
 - j. Drawing number and detail references, as appropriate,
 - k. Other necessary identification.
- B. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Engineer will discard submittals received from sources other than Contractor.

1.4 SUBMITTAL PROCEDURES

- A. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows:
 - 1. Initial Review: Allow fifteen (15) days for initial review of each submittal. Allow additional time if processing must be delayed to permit coordination with subsequent submittals. Engineer will advise Contractor when a submittal being processed must be delayed for coordination.
 - 2. Time for review shall commence on Engineers receipt of submittal.

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

- A. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
 2. Mark each copy of each submittal to show which products and options are applicable.
 3. Include the following information, as applicable:
 - a. Manufacturer's written recommendations.
 - b. Manufacturer's product specifications.
 - c. Manufacturer's installation instructions.
 - d. Color charts.
 - e. Manufacturer's catalog cuts.
 - f. Wiring diagrams showing factory-installed wiring.
 - g. Printed performance curves.
 - h. Operational range diagrams.
 - i. Mill reports.
 - j. Standard product operating and maintenance manuals.
- B. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
1. Preparation: Include the following information, as applicable:
 - a. Dimensions.
 - b. Identification of products.
 - c. Fabrication and installation drawings.
 - d. Roughing-in and setting diagrams.
 - e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
 - f. Shopwork manufacturing instructions.
 - g. Templates and patterns.
 - h. Schedules.
 - i. Design calculations.
 - j. Compliance with specified standards.
 - k. Notation of coordination requirements.
 - l. Notation of dimensions established by field measurement.
 2. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.
 3. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 30 by 40 inches.
 4. Number of Copies: Submit four (4) minimum black-line prints of each submittal, unless prints are required for operation and maintenance manuals. Submit five (5) prints where prints are required for operation and maintenance manuals. Engineer will retain three (3) prints; remainder will be returned. Mark up and retain one (1) returned print as a Project Record.

2.2 INFORMATIONAL SUBMITTALS

- A. Manufacturer Certificates: Prepare written statements on manufacturer's letterhead certifying that manufacturer complies with requirements. Include evidence of manufacturing experience where required.
- B. Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with requirements.
- C. Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements.
- D. Maintenance Data: Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment.
- E. Manufacturer's Instructions: Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer.
- F. Manufacturer's Field Reports: Prepare written information documenting factory-authorized service representative's tests and inspections.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

- A. Review each submittal and check for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Engineer.
- B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ENGINEER'S ACTION

- A. General: Engineer will not review submittals that do not bear Contractor's approval stamp and will return them without action.
- B. Action Submittals: Engineer will review each submittal, make marks to indicate corrections or modifications required, and return it. Engineer will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken.
- C. Informational Submittals: Engineer will review each submittal and will not return it or will reject and return it if it does not comply with requirements. Engineer will forward each submittal to appropriate party.
- D. Submittals not required by the Contract Documents will not be reviewed and may be discarded.

END OF SECTION

SECTION 014000
QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 GENERAL

A. SECTION INCLUDES:

1. Quality assurance - control of installation.
2. Tolerances
3. References.
4. Testing laboratory services.
5. Manufacturer field services and reports.

1.2 QUALITY ASSURANCE - CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, manufacturers, Products, services, site conditions, and workmanship, to produce Work of specified quality.
- B. Comply with manufacturer's instructions, including each step in sequence.
- C. Should manufacturer's instructions conflict with Contract Documents, request clarification from Engineer before proceeding.
- D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Perform Work by persons qualified to produce workmanship of specified quality.
- F. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

1.3 TOLERANCES

- A. Monitor tolerance control of installed products to produce acceptable Work. Do not permit tolerances to accumulate.
- B. Comply with manufacturer's tolerances. Should manufacturer's tolerances conflict with Contract Documents, request clarification from Engineer before proceeding.
- C. Adjust products to appropriate dimensions; position before securing Products in place.

1.4 REFERENCES

- A. For products or workmanship specified by association, trade, or other consensus standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- B. Conform to reference standard by date of issue current on date of Contract Documents, except where a specific date is established by governmental body.
- C. Obtain copies of standards where required by specification sections.
- D. The contractual relationship, duties, and responsibilities of the parties in the Contract nor those of the Engineer shall not be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.5 TESTING LABORATORY SERVICES

- A. Contractor will appoint and employ services of an independent firm to perform inspecting and testing.
- B. The independent firm will perform inspections, tests, and other services specified in individual Specification sections and as required by the Engineer and/or the Owner.
- C. Inspecting, testing, and source quality control may occur on or off the project site. Perform off-site inspecting or testing as required by the Engineer or the Owner.
- D. Reports will be submitted by the independent firm to the Owner, Engineer and Contractor indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents.
- E. Cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage, safe access, and assistance by incidental labor as requested.
 - 1. Contractor shall notify Engineer, Owner and independent firm 24 hours prior to expected time for operations requiring services.
 - 2. Make arrangements with independent firm and pay for additional samples and tests required for Contractor's use.
- F. Testing or inspecting does not relieve the Contractor of his responsibility to perform Work to Contract requirements.
- G. Retesting required because of non-conformance to specified requirements shall be performed by the same independent firm on instructions by the Engineer. Payment for retesting shall be the Contractor's responsibility.

1.6 MANUFACTURER FIELD SERVICES AND REPORTS

- A. When specified, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, as applicable, and to initiate instructions when necessary.
- B. Report observations and site decisions or instructions that are supplemental or contrary to manufacturer's written instructions.
- C. Submit report in duplicate within 30 days of observation to Engineer for information.

PART 2 - PRODUCTS

Not used.

PART 3 - EXECUTION

Not used.

END OF SECTION

SECTION 016000
MATERIAL AND EQUIPMENT

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Transportation and handling.
- B. Storage and protection.
- C. Product options.
- D. Substitutions.

1.2 STANDARD SPECIFICATIONS

- A. Arkansas Highway and Transportation Department Standard Specifications for Highway Construction.

1.3 TRANSPORTATION AND HANDLING

- A. Transport and handle products in accordance with manufacturer's instructions and contract documents.
- B. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.
- C. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.
- D. Pipe for potable water to be transported with exposed ends tarped or otherwise closed to prevent accumulation of airborne contaminants during transport.

1.4 STORAGE AND PROTECTION

- A. Store and protect products in accordance with manufacturer's instructions, with seals and labels intact and legible.
- B. Store sensitive products in weather tight, climate-controlled enclosures.
- C. For exterior storage of fabricated products, place on sloped supports, above ground.
- D. Provide off-site storage and protection when site does not permit on-site storage or protection.
- E. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to avoid condensation or potential degradation of product.
- F. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
- G. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- H. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

- I. Install 48" tall pvc orange mesh barrier fence around stored materials.

1.5 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Any Product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers: Products of manufacturers named and meeting specifications, no options or substitutions allowed.
- C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named in accordance with the following article. Where terms such as Aor equal,@ Aor equivalent@ are used in this Contract, they shall be taken to mean Aor approved equivalent.@ Proposed equivalents shall be offered as substitutions.

1.6 SUBSTITUTIONS

- A. Engineer will consider requests for substitutions only within 90 days after date established in Notice to Proceed.
 - 1. Substitutions may be considered when a product becomes unavailable through no fault of the Contractor.
- B. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents.
- C. A request constitutes a representation that the Contractor:
 - 1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
 - 2. Will provide the same warranty for the substitution as for the specified product.
 - 3. Will coordinate installation and make changes to other Work which may be required for the Work to be complete with no additional cost to Owner.
 - 4. Waives claims for additional costs or time extension which may subsequently become apparent.
- D. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.
- E. Substitution Submittal Procedure:
 - 1. Submit copies of Request for Substitution for consideration. Number of copies as specified in Section 013300. Limit each request to one proposed substitution.
 - 2. Submit shop drawings, product data, and certified test results attesting to the proposed Product equivalence. Burden of proof is on proposer.
 - 3. The Engineer will notify Contractor in writing of decision to accept or reject request.

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, that are new at time of installation.

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
4. Descriptive, performance, and reference standard requirements in the Specifications establish "salient characteristics" of products.
5. Or Equal: Where products are specified by name and accompanied by the term "or equal" or "or approved equal" or "or approved," comply with provisions in Part 2 "Comparable Products" to obtain approval for use of an unnamed product.

B. Product Selection Procedures:

1. Product: Where Specifications name a single product and manufacturer, provide the named product that complies with requirements.
2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements.
3. Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed that complies with requirements.
4. Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements.
5. Available Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed, or an unnamed product, that complies with requirements.
6. Available Manufacturers: Where Specifications include a list of manufacturers, provide a product by one of the manufacturers listed, or an unnamed manufacturer, that complies with requirements.
7. Product Options: Where Specifications indicate that sizes, profiles, and dimensional requirements on Drawings are based on a specific product or system, provide the specified product or system.
8. Basis-of-Design Product: Where Specifications name a product and include a list of manufacturers, provide the specified product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named.
9. Visual Selection Specification: Where Specifications include the phrase "as selected from manufacturer's colors, patterns, textures" or a similar phrase, select a product that complies with other specified requirements.
 - a. Standard Range: Where Specifications include the phrase "standard range of colors, patterns, textures" or similar phrase, Engineer will select color, pattern, density, or texture from manufacturer's product line that does not include premium items.
 - b. Full Range: Where Specifications include the phrase "full range of colors, patterns, textures" or similar phrase, Engineer will select color, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 PRODUCT SUBSTITUTIONS

- A. Conditions:** Engineer will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Engineer will return requests without action, except to record noncompliance with these requirements:

1. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Engineer for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
2. Requested substitution does not require extensive revisions to the Contract Documents.
3. Requested substitution is consistent with the Contract Documents and will produce indicated results.
4. Substitution request is fully documented and properly submitted.
5. Requested substitution will not adversely affect the Construction Schedule.
6. Requested substitution has received necessary approvals of authorities having jurisdiction.
7. Requested substitution is compatible with other portions of the Work.
8. Requested substitution has been coordinated with other portions of the Work.
9. Requested substitution provides specified warranty.
10. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

2.3 COMPARABLE PRODUCTS

- A. Conditions: Engineer will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Engineer will return requests without action, except to record noncompliance with these requirements:
1. Evidence that the proposed product does not require extensive revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
 2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
 3. Evidence that proposed product provides specified warranty.
 4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
 5. Samples, if requested.

PART 3 - EXECUTION

Not used.

END OF SECTION

SECTION 262730

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. General:
 - 1. As specified in Section 16050 - Common Work Results for Electrical.
- B. American National Standards Institute (ANSI).
- 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. C57.12.70 - IEEE Standard Terminal Markings and Connections for Distribution and Power Transformers.
 - 6. C57.12.80 - IEEE Terminology for Power and Distribution Transformers.
 - 7. C57.12.90 - IEEE Standard Test Code for Liquid-Immersed Distribution, Power and Regulating Transformers.
 - 8. 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.
 - 9. C57.93 - IEEE Guide for Installation of Liquid-immersed Power Transformers.
 - 10. C57.98 - IEEE Guide for Transformer Impulse Tests.
 - 11. C57.106 - IEEE Guide for Acceptance and Maintenance of Insulating Mineral Oil in Electrical Equipment.
 - 12. C57.147 - IEEE Guide for Acceptance and Maintenance of Natural Ester Fluids in Transformers.
- D. National Electrical Manufacturers Association (NEMA):
 - 1. TR-1 - Transformers, Regulators, and Reactors.
- E. U.S. Department of Energy (DOE):
 - 1. 10 CFR Part 431 - Energy Efficiency Program for Certain Commercial and Industrial Equipment.

1.03 DEFINITIONS

- A. As specified in Section 16050 - Common Work Results for Electrical.
- B. As listed in IEEE C57.12.80.

1.04 SYSTEM DESCRIPTION

- 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:
 - 1. Suitable for continuous operation at full load at the Project location and elevation after applying any derating factors.
 - 2. Pad mounted transformers shall be compartmental type, designed for outdoor installation on a concrete pad.

1.05 SUBMITTALS

- A. Furnish submittals as specified in Sections - Submittal Procedures and 16050 - Common Work Results for Electrical.
- 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 all 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.
 - 20. For equipment installed in structures designated as seismic design category C, D, E, or F submit the following as specified in Section 16050 - Common Work Results for Electrical:
 - a. Manufacturer's statement of seismic qualification with substantiating test data.
 - b. Manufacturer's special seismic certification with substantiating test data.

- C. Shop drawings:
 - 1. Complete detailed, dimensioned drawings showing the equipment being furnished, with all pertinent information, including the following:
 - a. Dimensions and locations of conduit entrance windows.
 - 2. Complete nameplate schedule, except impedance.
- D. Installation instructions:
 - 1. Detail the complete installation of the equipment including rigging, moving, and setting into place.
 - 2. For equipment installed in structures designated as seismic design category A or B:
 - a. Provide manufacturer's installation instructions and anchoring details for connecting equipment to supports and structures.
 - 3. For equipment installed in structures designated as seismic design category C, D, E, or F:
 - a. Provide project-specific installation instructions and anchoring details based on support conditions and requirements to resist seismic and wind loads as specified in Section 16050 - Common Work Results for Electrical.
 - b. Submit anchoring drawings with supporting calculations.
 - c. Drawings and calculations shall be stamped by a professional engineer registered in the state where the Project is being constructed.
- E. 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 all bolts.
 - 6. List of recommended preventative maintenance tests, test frequencies, test procedures, acceptable test result ranges and disposal recommendations for utilized mineral oil in accordance with IEEE C57.106 or natural ester fluids in accordance with IEEE C57.147.
 - 7. Copies of factory test reports.
- F. Test reports:
 - 1. Certified copies of test reports from factory tests.
- G. Record documents.
- H. 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.
 - 2. **All transformers shall be limited to have an inrush current of less than 5x full load current (approximately). Submit transformer inrush current calculations and inrush current vs. time curves for review.**
 - 3.

1.06 QUALITY ASSURANCE

- A. As specified in Section 16050 - Common Work Results for Electrical.
- B. Manufacturer qualifications:
 - 1. Manufacturer shall be in the business of regularly manufacturing the specified transformers for minimum 10 years with satisfactory performance record.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. As specified in Section 16050 - Common Work Results for Electrical.
- B. 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. The 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.
- C. Furnish temporary equipment heaters within the transformer to prevent condensation from forming.

1.08 PROJECT OR SITE CONDITIONS

- A. As specified in Section 16050 - Common Work Results for Electrical.

1.09 SEQUENCING

- A. Make all 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.
- B. Conduct factory acceptance test and submit certified test results for Engineer's review.
- C. Ship equipment to Project Site after successful completion of factory acceptance test.
- D. Assemble equipment in the field.
- E. Conduct field acceptance test and submit certified test results for Engineer's review.
- F. Verify installation is in accordance with IEEE C57.93.
- G. Submit manufacturer's certification that equipment has been properly installed and is fully functional for Engineer's review.

- H. Set taps.
- I. Commissioning as specified in Section 01756 - Commissioning.

1.10 SCHEDULING (NOT USED)

1.11 WARRANTY

- A. As specified in Section 16050 - Common Work Results for Electrical.

1.12 SYSTEM START-UP

- A. As specified in Section 16050 - Common Work Results for Electrical.
- B. Provide the services of a manufacturer's authorized representative:
 - 1. Inspect installation before start-up.
 - 2. Witness energization.
- C. Energize transformer according to manufacturer's recommended procedure and in accordance with IEEE C57.91.

1.13 OWNER'S INSTRUCTIONS (NOT USED)

1.14 MAINTENANCE (NOT USED)

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. One of the following or equal:
 - 1. Asea Brown Boveri (ABB).
 - 2. General Electric (GE).
 - 3. Cooper Power Systems.
 - 4. Schneider Electric.

2.02 EXISTING PRODUCTS (NOT USED)

2.03 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.

2.04 MANUFACTURED UNITS (NOT USED)

2.05 EQUIPMENT

- A. The 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:
 - a. **TLA: 13.2kV**
 - b. **TGX: 13.2kV**
 - c. **TB1A: 13.2kV**
 - d. **TSA: 13.2kV**
 - e. **TH1: 4160V**
 - 5. Primary connection:
 - a. **TLA: DELTA**
 - b. **TGX: DELTA**
 - c. **TB1A: DELTA**
 - d. **TSA: DELTA**
 - e. **TH1: DELTA**
 - 6. Secondary voltage:
 - a. **TLA: 480Y/277 V**
 - b. **TGX: 4160Y/2400 V**
 - c. **TB1A: 4160Y/2400 V V**
 - d. **TSA: 480Y/277 V**
 - e. **TH1: 480Y/277 V**
 - 7. Secondary connection:
 - a. **TLA: WYE**
 - b. **TGX: WYE**
 - c. **TB1A: WYE**
 - d. **TSA: WYE**
 - e. **TH1: WYE**
 - 8. Kilovolt-ampere rating:
 - a. **TLA: 1000 kVA**
 - b. **TGX: 3750 kVA**
 - c. **TB1A: 3000 kVA**
 - d. **TSA: 225 kVA**
 - e. **TH1: 500 kVA**
 - 9. Basic impulse insulation level (BIL) in accordance with IEEE C57.98:
 - a. 1.2 kV Class: 30 kV.
 - b. 2.5 kV Class: 45 kV.
 - c. 5.0 kV Class: 75 kV.
 - d. 8.7 kV Class: 75 kV.
 - e. 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.

2.06 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. The doors in both the high voltage section and the low voltage section shall be able to be latched in the open position.
6. The 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 40 inches deep.
8. Secondary compartment:
 - a. The secondary compartment shall enclose the low voltage bushings and provide for incoming cable from below the compartment.
 - b. This 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. The primary line compartment shall 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. This compartment shall also house:
 - 1) Dead front lightning arresters.
 - 2) No-load tap changer.
 - 3) Parking stands for 6 elbows.
 - c. The primary compartment shall be accessible only after the door for the secondary compartment has been opened. The 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:
 - 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.
 - 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:**
 - 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.

2.07 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 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. The well shall be threaded into a fitting that is welded to the transformer tank wall.
 - 2. The thermometer shall have a slave hand which is moved by the indicating hand to indicate maximum oil temperature. The slave hand shall be externally resettable.
- D. Sampling device:
 - 1. Allow for sampling of the transformer insulating fluid.
 - 2. Threaded into a fitting that is welded to the transformer tank wall.
- E. Liquid level gauge:
 - 1. Dial-type liquid level gauge.
- F. Vacuum pressure gauge:
 - 1. 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 16075 - 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.
- M. Bayonet-type fuse:
 - 1. Oil immersed expulsion type fuse with an interrupting rating of 3,800 amperes at 8.3 kilovolts; 2,000 amperes at 15.5 kilovolts.
 - 2. Hook stick-operable.
 - 3. Drawout.
 - 4. Load break design.
 - 5. 2 types of fuse links:
 - a. Overload sensing; or
 - b. Fault sensing.

2.08 MIXES (NOT USED)

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.

2.11 SOURCE QUALITY CONTROL (NOT USED)

PART 3 EXECUTION

3.01 EXAMINATION (NOT USED)

3.02 PREPARATION (NOT USED)

3.03 INSTALLATION

- A. As specified in Section 16050 - Common Work Results for Electrical.
- B. Install the equipment in accordance with the accepted installation instructions and anchorage details to meet the seismic and wind load requirements at the Project site.
- C. General:
1. Furnish concrete pad and all lugs, bolts, anchors, sealants, and other accessories needed to complete the installation of the transformer.
 2. Perform Work in accordance with manufacturer's instructions and shop drawings.
 3. Raise the tank above the pad to protect the bottom finish during installation and to minimize corrosion due to moisture accumulation.
 4. Furnish components and equipment as required to complete the installation.
 5. Replace any hardware lost or damaged during installation or handling.
 6. Position the transformer so all required working space and clearance requirements of the National Electrical Code and the local building authorities are met.

3.04 ERECTION, INSTALLATION, APPLICATION, CONSTRUCTION (NOT USED)

3.05 REPAIR/RESTORATION (NOT USED)

3.06 RE-INSTALLATION (NOT USED)

3.07 COMMISSIONING

- A. As specified in Section - Commissioning.
- B. Perform the following factory tests as required by IEEE C57.12.00 and in accordance with IEEE C57.12.90:
 - 1. No-load (85 degrees Celsius) losses at rated current. (Maximum allowable no load losses: 10 percent).
 - 2. Total (85 degrees Celsius) losses at rated current. (Maximum allowable total losses: 6 percent).
 - 3. Percent impedance (85 degrees Celsius) at rated current.
 - 4. Excitation current (100 percent voltage) test.
 - 5. Winding resistance measurement tests.
 - 6. Turns ratio tests using all tap settings.
 - 7. Polarity and phase relation tests.
 - 8. Temperature test.
- C. Verification of performance:
 - 1. Submit manufacturer's certified test results before shipping the transformer.

3.08 FIELD QUALITY CONTROL

- A. As specified in Section 16950 - Field Electrical Acceptance Tests.
- B. Provide the services of a qualified manufacturer's representative to:
 - 1. Install all transformer equipment shipped separately from the transformer.
 - 2. Fill the transformer with insulating fluid.
 - 3. Install the nitrogen blanket.
- C. Any and all other Work required to make the transformer ready for testing and energization.

3.09 ADJUSTING

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

3.10 CLEANING

- A. As specified in Section 16050 - Common Work Results for Electrical.

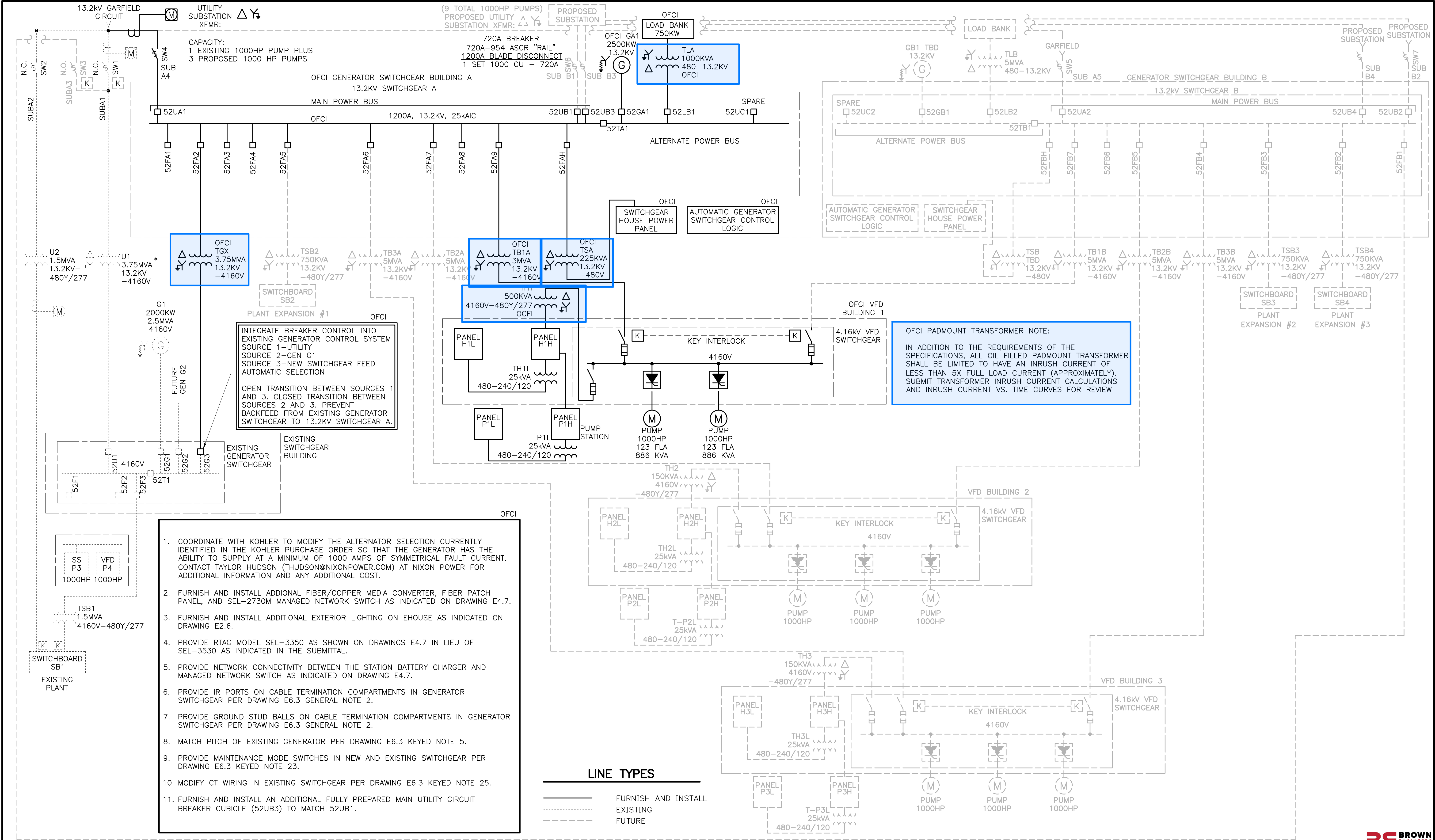
3.11 PROTECTION

- A. As specified in Section 16050 - Common Work Results for Electrical.

3.12 SCHEDULES (NOT USED)

END OF SECTION

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* PEAK DEMAND REPORTED BY CARROLL ELECTRIC 1123.95KW

REV. NO.	DATE	DRWN	CHKD	REMARKS
1	6-24	CD	BB	ISSUED FOR GMP



0 1" = 1"
THIS LINE MEASURES 1" WHEN PLOTTED FULL SIZE

DESIGNED:	BB
DRAFTED:	CD
CHECKED:	BB
DATE:	DEC. 2023



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