CITY OF FLORENCE, ALABAMA

Procurement Department

Leigh Anne Kidd, Purchasing Agent

AN EQUAL OPPORTUNITY EMPLOYER

INVITATION-TO-BID NO. E-R-00632

Bid to Open February 25, 2025

January 30, 2025

Ladies/Gentlemen

In conformance with the competitive bid law of the state of Alabama, please quote F.O.B. Florence, Alabama, prices, terms, and earliest delivery on the following:

- Center Star Substation materials bid package to meet or exceed the attached specifications.

Items bid should equal to or exceed the attached minimum specifications. All bidders must list any exceptions to the specifications. If no exceptions are listed, the City shall assume the bidder CAN meet all specifications.

Note:

1. **Please submit your bid using the attached Packager Bid Sheet.**

2. **Payment shall be made within 15 days of delivery and acceptance in accordance with the City of Florence Accounting Department's standard operating procedures.**

P. O. Box 388 • Florence, AL 35631-0388
Phone (256) 740-4661 • lkidd@florenceal.org • Fax (256) 740-8857

The following conditions are to apply concerning the purchase of the above items:

1. Bids will be received in the office of the Purchasing Agent, Third Floor, Room 329, City Hall, 110 West College Street, Florence, Alabama 35630, until 1:30 p.m., CST, Tuesday, February 25, 2025, at which time they will be opened and read aloud in the City Auditorium.

2. All bids must be sealed and clearly marked as "Invitation-to-Bid No. E-R-00632, to open February 25, 2025".

3. It is understood that the City of Florence reserves the right to accept or reject any and/or all bids and waive any informalities.

4. In accordance with Section 41-16-50.(a) of the Code of Alabama, that in the event a bid is received for an item of personal property to be purchased of contracted for, from a person, firm, or corporation deemed to be a responsible bidder, having a place of business within the corporate limits of the City of Florence, Alabama, whose bid is no greater than five percent (5%) greater than the bid of the lowest responsible bidder, the City of Florence may award the contract to such bidder.

5. All bids must be dated and signed by authorized personnel.

6. No prices shall include state or federal excise taxes, state or local sales taxes.

Yours Truly,

Leigh Anne Kidd

Leigh Anne Kidd

Purchasing Agent

Center Star Substation Materials
Bid Package

Florence Utilities Electricity Department
Florence, Alabama

January, 2025

Clint Cannon
AL P.E. # 29451

patterson & dewar ENGINEERS
Georgia | Tennessee | Texas | Virginia
pdengineers.com | (770) 453-1410

Table of Contents

General

Exhibit 1: Specifications for Center Star Substation

Exhibit 3: Contract Payment and Completion Forms

Application and Certification for Payment
Change Order Request
Construction Contract Certificate of Completion
Certificate of Packager
Waiver and Release of Liens

Drawings

*To be provided after contract is awarded
+First drawing of a series of sequentially ordered drawings

General Conditions

Invitation

Florence Utilities Electricity Department will receive sealed bids in their office in Florence, Alabama until 1:30 PM local time February 25, 2025, for the steel and materials of Center Star Substation. Please submit your bid to the Owner in a sealed envelope clearly labeled **"Bid No. E-R-00632 opens 02/25/25".** Electronically submitted bids are NOT acceptable. Bids received after the above stated time will NOT be considered.

Additional specifications may be obtained by contacting the office of the Engineer.

Owner

City of Florence Utilities - Electricity Department
110 W. College Street, Room No. 329
Florence, AL 35630

Attn: Ms. Mary McDuffa
Telephone: (256) 760-6300
Email: mmcduffa@florenceal.org

Engineer

Patterson & Dewar Engineers, Inc.
P.O. Box 2808, Norcross, GA 30091
850 Center Way, Norcross, GA 30071

Attn: Mr. Clint Cannon
Telephone: (770) 453-1410
Email: ccannon@pdengineers.com

Bid Instructions

All bids, when submitted, shall include the following documents:

1. Packager's Bid Sheet
2. Preliminary Bill of Materials
3. Bid Surety

All bids should be sent to the address given previously and should be contained in a sealed envelope clearly labeled **"Bid No. E-R-00632 opens 02/25/25."** The successful Bidder will be required to execute two additional counterparts of all supplied documents.

The Packager's bid sheets, located in Exhibit 3, are to be completed using prices for materials for each group listed.

Bids shall only be accepted from pre-approved Packagers.

Award/Rejection/Correction of Bids

The Owner reserves the right to award the bid to the lowest and best bidder, as determined by the Owner and Engineer.

The Owner reserves the right to reject any or all bids, or to waive any informality in bids. In case of error in the extension of prices in the bid, unit prices will govern. The Packager shall be given opportunity to withdraw their bid, should errors be found.

Approved Suppliers/Packagers

Only approved suppliers/packagers may submit a bid for the project specified within this document. The Owner and the Engineer have approved the suppliers/packagers listed below.

Substation Enterprises
145 Commercial Court
Alabaster, AL 35007

Attn:	Mr. Larry Ware
Telephone:	(205) 685-2755
Fax:	(205) 685-2753
Email:	lrw@subenterprises.com

Substation Engineering & Design Corp.
661 Stuart Lane
Pelham, AL 35124-1928

Attn:	Mr. David Busby
Telephone:	(205) 620-4900
Fax:	(205) 620-4902
Email:	drbusby@subengineering.com

Dis-tran Packaged Substations
4725 Hwy 28 E.
Pineville, LA 71360

Attn:	Mr. David Ducote
Telephone:	(318) 448-0274
Email:	david.ducote@distran.com

M.D. Henry Company, Inc.
120 Clark Street
Pelham, AL 35124

Attn:	Mr. Hal Lockhart
Telephone:	(205) 663-6711
Email:	helockhart@mdhenryco.com

Preface

These specifications are to outline in general terms the materials and equipment necessary for construction of an electric distribution substation. Bidders are to quote on materials and equipment contained within these specifications. As used within these specifications, the terms "Bidder" and "Packager" shall denote the same person, persons, or organization. The drawings enclosed with these specifications are not intended to limit bidders as to type of structure, configuration of bays, dimensions (except minimums), material, and other equipment. The drawings are to serve only as a guide for making proposals. Details in the drawings are purposely omitted to allow the Bidder to propose deviations that take advantage of modern innovations in substation design. Such deviations, however, must conform to specifications insofar as safety, mode of operation, and electrical characteristics are concerned. Extensive deviations in structure design or location from that shown on the attached drawings shall be submitted to both the Owner and Engineer for approval at least five days prior to the bid opening. The Bidder shall not include any cost for foundation design. The Bidder is responsible for confirming and correlating all quantities and dimensions, fabrication and construction methods, and coordinating this work with all other trades and parties involved in this project.

Approval Drawings

The successful Bidder shall submit one set of drawings to the Owner and Engineer (electronic submittal is preferred) for approval no later than **twelve (12) weeks** after the contract is signed. These drawings shall include a minimum of the foundation and anchor bolt layout, steel calculations, steel base plate details, anchor bolt details, and any other information necessary for the Engineer to design the foundations. All other drawings shall be furnished no later than **fourteen (14) weeks** after the contract is signed. ***The Engineer will not issue foundation details for construction until all of the Packager's drawings have been approved.*** In addition, the successful Bidder shall furnish with the approval drawings all associated drawings referred to on the approval drawings. The structure design (including all drawings and design calculations) shall be approved prior to submittal by an Alabama registered professional engineer and so indicated by their seal. Design criteria (wind loading, etc.) shall be submitted with the drawings.

The design criteria for structurers shall be as follows:

A. Loading and deflection limits – **ASCE 113, latest edition** (unless noted)
B. Allowable structure stress – AISC manual of steel construction, latest edition.
C. NESC medium loading.
D. The substation shall be designed to meet the "IEEE Recommended Practices for Seismic Design of Substations" IEEE Standard 693-2005 or latest edition.

The Packager shall provide drawings showing each type of bolted electrical connection as well as each type of bolted bus support. **A torque table shall be provided by the Packager on the drawings for each bolted electrical connection. The torque table shall include torque requirements for connections utilizing Belleville washers.**

Final Drawings

The Owner shall be furnished a complete set of "AS BUILT" prints, BOMs and instruction books as well as one electronic copy of the same. The Engineer shall be furnished electronic copies only.

References

The applicable sections or portions of the standards and codes listed below shall apply, unless otherwise specified.

1. National Electrical Safety Code (NESC)
2. National Electric Code (NEC)
3. American National Standards Institute (ANSI)
4. National Electric Manufacturers Association (NEMA)
5. Rural Utilities Service (RUS)
6. State and Local Codes
7. Underwriters Laboratories (UL)
8. American Society of Testing Materials (ASTM)
9. Institute of Electrical and Electronic Engineers (IEEE)
10. American Institute of Steel Construction (AISC)
11. American Concrete Institute (ACI)
12. American Society of Civil Engineers (ASCE)

If a discrepancy is found between the drawings and the specifications, the Packager shall contact the Owner and/or Engineer as soon as possible for clarification.

Material and Equipment

Necessary structures are to be supplied. These structures shall be constructed of galvanized steel. Main members of the structure shall be no less than ¼ inch thick. The structures shall provide for the minimum clearances as shown on the drawings. All base plates shall mount to foundations using leveling nuts. All single column structures shall utilize square tube, minimum size 8" x 8". Leveling nuts will be used on all structures; structure bases and anchor bolt patterns must be designed with this in mind.

All structural steel shall conform to ASTM A36-87 specifications. All bolts, except anchor bolts, shall conform to ASTM A325-86 or A307-86a. All structural steel pipe and square tube sections shall conform to ASTM A53-88 grade B and ASTM A501-84, respectively. Galvanizing for all structural steel shall conform to ASTM A123. Hot dip galvanizing for all bolts, nuts, and washers shall be done in accordance with the latest revision of the "Standard Specifications for Zinc Coating (Hot Dip) on Iron and Steel Hardware," ASTM A153. Excess spelter shall be removed by centrifugal spinning. All anchor bolts shall be galvanized to at least 12 inches below the threaded surface.

All bolted electrical connections shall use stainless steel bolts, stainless steel flat washers, stainless steel Belleville washers, and **silicon bronze nuts. In all cases that require Belleville washers, at least one shall be used on each side of the connection.** All extremely thin or extremely thick connections shall be provided with two Belleville washers on each side of the connection. All bolts shall include certification markings. Stainless steel flat washers shall be a minimum of 1/16" thick. Belleville washers shall be approximately 7/64" thick and shall be work-hardened and/or spring steel. **The Packager shall furnish the Engineer a sample of the bolts, Belleville washers, and the flat washers for approval, as well as the spec sheet for the Belleville washers with torque specifications for approval. The Packager shall never exceed the Belleville washer manufacturer's recommended maximum torque.**

All bolted bus connections shall be made such that a low-resistance permanent connection will be maintained. All adjacent surfaces of the connection shall be coated with Alcoa No. 2 electrical joint compound or NO-OX-ID grade A special and then abraded through the coating with a wire brush or abrasive cloth. The plated contact surfaces shall not be scratch-brushed.

All rigid bus shall be supported such that deflection is less than 1/150th of the span length for a two-support span and less than 1/200th for a three-support span. The Packager shall supply bus deflection calculations. Bus shall be designed to allow for expansion and contraction by providing for both slip and fixed supports. *When using UABC-type bus, the Packager shall use SEFCOR type ASUA bus support clamps.*

For all switches specified herein, the following table relating continuous current to withstand/momentary current shall be used (Values taken from ANSI C37.32-2002 Table 3):

Rated Continuous Current (A)	Short-time Withstand (kA)	Peak Withstand (kA)	Asymmetrical Momentary (kA)
600	25	65	40
1200	38	99	61
2000	44	114	70

Note: All ratings are based on 30°C rise.

EXHIBIT 1

Project Construction Specifications

Project Overview

The successful Bidder (Packager) shall furnish all necessary materials for the modification/addition to the 46kV to 12kV facility known as Center Star Substation for Florence Utilities Electricity Department in accordance with the specifications and drawings.

Center Star Substation is an existing substation that presently operates at 46 to 12kV. The purpose of this work is to convert metal clad gear into standard outdoor structures with breakers, and add metering.

To perform foundation design, P&D must have all Packager's drawings and calculations approved. Therefore, it is our recommendation that the Packager begin design immediately following the award of this contract. Delivery of the steel package may occur at any time convenient to the Packager, but no later than June 1, 2025.

The 911 address of the substation is: **Center Star Substation, 4077 Florence Boulevard, Florence, Alabama**

Google Maps coordinates: **34.845061, -87.583448**

Group A: Structures

(1) High-Voltage Structures (46kV)

No work is required on the 46kV side.

(2) Low-Voltage Structures (15kV)

The low-voltage structures furnished shall include one boxed metering structure, one three-phase bus support structure and a five-bay switching structure.

The boxed metering structure shall provide mounting for three current transformers (furnished by Packager), three potential transformers (furnished by Packager), one station service transformer (furnished by Owner), and one metering test box (furnished by Owner).

The feeder breaker switching structure shall provide for one three-phase group-operated breaker by-pass switch and six breaker isolation switches in each bay. A main and transfer bus shall be provided.

All low-voltage bus shall be aluminum UABC or aluminum flat bar. Unless otherwise indicated on the drawings:

- The box structure bus shall have a 2,000-amp (minimum) capacity at the 30° Centigrade rise rating and, unless otherwise indicated on the drawings, shall be 4" x 4" x 3/8" UABC.
- The switching structure main bus and transfer bus shall have a 2,000-amp (minimum) capacity at the 30° Centigrade rise rating and, unless otherwise indicated on the drawings, shall be 4" x 4" x 3/8" UABC.
- Transfer bus switches shall connect to the transfer bus and to the feeder breaker load side isolation switches with 4" x 3/8" aluminum flat bar.

Bus supports shall utilize SEFCOR 'ASUA' bus support clamps. The bus support insulators shall be rated 15kV, gray, post-type, and capable of withstanding a fault current of 15,000 amperes. All insulators required for the low-voltage structures shall be 110kV BIL. All fused disconnect switches shall be mounted using 18" fiberglass standoff brackets (Hubbell #1SBM18SGLB or equivalent).

All conductor on the low-voltage structures for the bus, as well as connections to all equipment associated with the low-voltage portion of the substation, shall be provided. Unless otherwise indicated on the drawings:

- The conductor connecting the low-voltage regulator box structure to the new metering box structure shall be two parallel 500 MCM copper conductors with Sefcor type GFCS spacers.
- Feeder circuit breakers shall be connected to the switching structure with 500 MCM copper conductor.
- Station service transformer connections should be made using #2 tinned copper connected with NEMA two-hole pads.
- Potential transformer connections should be made using #2 tinned copper connected with hotline clamps and stirrups (see below).
- Riser-pole class lightning arresters should be made using #2 tinned copper connected with 2-bolt parallel clamps (Anderson type K or equal).
- Station class lightning arrester connections should be made using #4/0 AWG copper or rigid bus.

All aluminum cable connectors shall be compression-type. Copper cable connectors shall be mechanical. All parallel cable conductors shall utilize SEFCOR, types GFCS cable spacers. The spacing shall be as minimal as possible, 1.5" to 2" on centers.

Three spare 15kV insulators shall be supplied for future use.

Group B: Three-Pole, Group-Operated, Air-Break Switches

The Packager shall submit their bid containing the switches specified herein. All switches shall conform to Table 3 of ANSI C37.32-2002 or latest edition.

All three-pole, air-break switches shown in the drawings shall be supplied per the specifications and drawings. All air-break switches shall be furnished with gray, post-type insulators adequate to maintain the specified switch BIL rating. Construction of the switches shall be such that the switch operation is not unduly impaired during icing, high temperatures, or by industrial contaminates.

The main bearings on the rotating insulator shall be equipped with enclosed dust-proof seals. The balls shall be stainless steel on a non-corrosive race of differing hardness; or the use of Timkin tapered roller bearings shall be used on heavy-duty switches. Aluminum housing and races are not acceptable. The bearings may be of the dry-type or permanently filled with grease of the Bentone grade for maintenance-free service. Sleeve-type bushings on the main switch bearing are acceptable only on low-voltage, vertical-break switches. No nylon bushings will be acceptable; only ultra-high molecular weight polyethylene is acceptable.

The Packager shall make sure that each switch has adequate phase-to-phase and phase-to-ground clearance with the switch in both the open and closed positions. Counter-balancing springs or weights shall be supplied to ensure relatively uniform effort throughout the operating cycle. **Switches shall be supplied completely assembled and adjusted by the manufacturer. Where worm-gear or motor-operated op-mechs are specified, the op-mech shall be a dual action swing-handle mechanism with disconnect coupler to the worm-gear or motor-operator. Rotation of vertical pipe shall be limited to that of a standard swing handle mechanism.**

(1) Transfer Bus Switches (219, 229, 239, 249, 259)

Five 15kV, three-phase, gang-operated, air-break switches shall be supplied. The switches shall be side-break, manually operated, copper live parts, and provided with standard arcing horns. The switches shall have a continuous current rating of 1200 amperes RMS at the 30° Centigrade rise rating per NEMA standards with a BIL rating of 110 kV. Operating mechanism shall be swing-handle type, shall have no universal joints, and shall be mounted at a three-foot six elevation. The switches shall be Cleveland/Price type RL-C with gray, post-type insulators.

Group C: Lightning Protection

(1) Overhead Ground Wire Support Pole

None required.

(2) Overhead Ground Wire

The Packager shall furnish labor and material for the 3/8" HSS Grade B static wire as shown on the site plan. Substation structures with static wire connections shall be designed to support such connections. Each conductor shall have a design tension of 1500 pounds (unfactored, under NESC loading), with a daily tension of approximately 300 pounds. These structures shall have a maximum deflection of one percent under everyday conditions.

(3) Lightning Arresters

Eighteen (18) riser pole-class, metal-oxide, surge arresters shall be Packager-provided. These arresters shall have a maximum continuous operating voltage (MCOV) of approximately 8.4kV for use on a solidly grounded 7.2/12.47 kV system as recommended by the arrester manufacturer. The arresters shall be Ohio Brass type PVR or GE Tranquell UD II. These arresters will be mounted on the five breakers and three regulators. Mounting brackets shall be included with breakers (by Owner). The Packager shall furnish mounting for the regulators using a bracket similar to Joslyn type L.

Group D: Single-Pole Disconnecting Switches and Fuses

(1) Breaker Isolation Switches

Thirty (30) single-phase hookstick operated switches shall be supplied for use as isolating switches for the feeder breaker positions. The switches shall be copper with a BIL of 110 kV. Switches shall be Cleveland/Price type LCO-C with gray post-type insulators. These switches shall be rated 1,200 amperes continuous at the 30° Centigrade rise rating per NEMA standards.

(2) 15kV Station Service Fuses

The 15kV station service fuse holders and fuses, as well as provisions for mounting and connecting these fuses, shall be supplied by the Packager. The fused disconnect switch shall be mounted using 18" fiberglass standoff brackets (Hubbell #1SBM18SGLB or equivalent). The Packager shall furnish two complete S&C Fault Tamer current limiter switches (1 for station service transformer and 1 spare). The switches shall be 15kV class, 110kV BIL (S&C catalog #98021-D) with four 5-amp fuses (S&C catalog #526005).

(3) Air-Break Switch Accessories

One hookstick and one hookstick container kit (including pipe) are to be furnished complete with container mounting accessories for mounting near the gate. The hookstick shall be a telescoping pole, 20 ft. extended length with a NEMA disconnect head, Hastings #3122. The hookstick container kit shall be 01-3253 for 4" PVC pipe size.

Group E: Circuit Breakers

(1) 15kV Breakers

Five 15 kV power circuit breakers shall be supplied by the Owner. The breakers will be equipped with stud-to-4-hole pad connectors. Anchor bolts for all foundations and all wiring (including grounding) connectors shall be furnished by the Packager. The Packager shall also provide arresters for the five feeder breakers as described in Group C.

Group F: Automatic Switches

No work is required in this group.

Group G: Instrument Transformers, Switchboard, and Reactors

(1) Metering Current & Potential Transformers

The Packager shall furnish one set of metering CTs & PTs for this substation. This includes the following:

- three (3) Ritz GIFD 25-03 current transformers, ratio 1500:5, Accuracy 0.3B-2.0 (C400), rating factor 2.0, catalog #112053003 05507 with bar kit and spacers.
- three (3) Ritz VZF 15-09 potential transformers, ratio 7200:120V (60:1), Accuracy 0.3WXY, catalog #12153009 395003.

Group H: Power Transformers

No work is required in this unit.

Group I: Voltage Regulators

No work is required in this unit.

Group J: Supervisory Equipment

No work is required in this unit.

Group K: Conduit and Cable

(1) Station Service Distribution Box

No work is required in this unit.

Group L: Foundations

The Packager shall supply anchor bolt layout and foundation reactions/calculations for all foundations. Foundations shall be designed by Patterson & Dewar Engineers.

Group M: Site Maintenance and Final Site Work

No work is required in this group.

Group N: Fence

The fence will be provided and installed by the Owner or others. The Packager is expected to provide materials for grounding the fence as described in Group O.

Group O: Station Grounding

The ground grid shall be installed according to the grounding drawing(s) as well as these specifications. The main conductors, secondary conductors, and connections to the ground grid shall be bonded at the points of connection and intersections indicated on the drawing by using thermal-welded connections. The spacing of the main grid conductors should be uniform but may vary slightly, if necessary, to provide for connection to the equipment and structures.

(1) Buried Grid

The grid conductors shall be buried at a minimum depth of two feet in the earth (28" below rock grade) or below the frost line, whichever is deeper. The grounding conductor in the main substation grid shall be stranded copper conductor and shall be #4/0 AWG as shown on the drawing.

One 3/4" x 10' copperweld ground rod shall be installed at each location shown on the drawing.

(2) Structure and Equipment Grounds

All above-grade conductor shall be #4/0 AWG copper. The conductor shall be connected to the equipment and/or structures with a bronze clamp-type connector. All structure clamps shall be SEFCOR GTC or GTC2 or equivalent.

2.1 Columns, stands, and towers: must have at least one ground grid connection. If the base exceeds 10 square feet, at least two connections shall be placed at diagonally-opposite corners. All switch operator platforms and switch operating rods shall be grounded as shown on the detail.

2.2 Air-break switches: If the switch is group-operated, a flexible tinned copper braid (#4/0 AWG copper cable equivalent) shall be clamped to the vertical shaft and have a ferrule on the free end connected to the grounded, steel-structure ground wire. If the vertical shaft makes more than one rotation, the braid shall be connected to the shaft through a slip-ring connection.

2.3 Neutral reactors: The bottom side of the reactor shall be connected to the ground grid using two parallel 4/0 copper conductors. All ground clamps shall accept double 4/0 copper to steel. It is best to attach each 4/0 conductor to the grid at different locations.

2.4 Power transformers: The power transformer will have two grounding loops provided by the manufacturer. The Packager shall provide Anderson VL4S connectors or equal for the four corner connections to these loops, as well as any neutral bushing connections that may be required.

2.5 Station Service Transformer: The station service transformer shall have a 'loop' connection to a ground bus having at least two ground connections. The 'loop' connection shall be #2 Cu. This ground shall start at the 4/0 copper column ground and pass through the high-voltage neutral bushing, the low-voltage neutral bushing, both transformer case ground lugs, and then back to the 4/0 Cu column ground. Parallel ground clamps (4/0 and #2) shall be used at each attachment point. The 4/0 Cu ground for the structure shall be brought up at least to the height of the tank top.

2.6 Voltage regulators and oil-filled instruments: tanks shall have two ground connections as shown on the detail drawing.

2.7 Circuit breakers and switcher: The tanks and/or mounting frames shall have at least two connections placed on diagonally opposite corners. The bolted frame extensions shall be grounded. Breakers shall have a continuous ground loop from one side to the other, to which the lightning arresters mounted on the breakers will tap.

2.8 Lightning arresters: One connection shall be made to the ground terminal. The lightning arresters shall be connected to a common ground bus having two or more connections to the ground grid. The lightning arresters mounted on the power transformer shall be connected to the transformer ground loops by the manufacturer.

2.9 Cabinets and housings: For all cabinets, AC panels and junction boxes, At least one connection using a minimum of a #4 AWG Cu bare conductor shall be made to this equipment whether or not it is mounted on grounded steel structures.

2.10 Conduit runs: All metallic conduit runs shall be bonded to the ground grid using a grounding bushing on the end of the conduit and connected to the ground grid using a minimum of a #4 AWG Cu bare conductor.

2.11 Static poles: All static wire support poles and structures shall have a #4/0 AWG Cu conductor connecting the static wire directly to the ground grid. For concrete poles, this conductor shall run the length of the pole/structure and shall be attached at intervals not to exceed ten feet. If the pole is metal, the metal can be considered a conductor, but bolted attachments of wire to steel must be made at the top of and bottom of the pole, and any breaks (segmented poles) must be strapped across the break.

(3) Security Fence Grounding

The chain link fence shall be connected to the substation ground grid and to the ground rods as shown in the drawings. The connections shall be made along the member to its height at each corner post, gate post, and every 50 feet of fabric length. At the fence fabric, connections shall be made to its highest point by weaving a #2 Cu SD tinned conductor within the fabric. The fence grounding conductor shall be no less than #4/0 stranded copper. The post connectors shall be similar to the Anderson type GC-115 parallel connector. Be sure post connectors are visible above rock grade.

(4) Switch Ground Platforms

Grounding platforms shall be galvanized steel, welded bar grating with a serrated surface. Unless otherwise specified in the drawings, platforms shall be 4' x 3'.

Group P: Control Building

No work is required in this group.

Group Q: Station Service

The Owner shall furnish one 25KVA distribution-type transformer. The Packager shall provide mounting for the transformer and its associated fuse switches as described in Group D-3.

Group R: Substation Lighting

Substation lighting shall be Owner-furnished.

Group U: Switch, Breaker, and Phase Designations

All air-break switches, circuit switchers, transformers, and circuit breakers shall be provided with permanent numbers. Numbering shall be as shown on the one-line diagram. All numbers and phase markers shall be porcelain on steel. **Reflective paint shall be used if available.** A possible source is Cherokee Porcelain Enamel Corp. (865) 637-7833. **All numbers and phase markings** shall be mounted in **aluminum** slide-in mounting tags. Holders shall be installed with stainless steel screws.

All numbers shall and phase markers shall be four inches tall.

Numbers shall be black text on white background and shall be mounted as follows:

- All gang-operated switches: Mount at switch handle and switch location on structure.
- Hookstick and fuse switches: Mount on structure in proximity to switch or on switch base.
- Switchers/Breakers: Mount on mechanism housing doors, both sides of breaker.

- Power Transformers: Mount on control cabinet door and on the side of the transformer that is visible from the control house (clip mounting may be necessary).

Phase markings (A.B.C.) shall be installed on all incoming and outgoing lines, on each end of main and transfer buses, and at each transformer disconnect switch. **A total of ten sets will be required.**

Phase marking colors shall be:

A – White letter on red background
B – Black letter on white background
C – White letter on blue background

Group V: Oil Spill Containment Facilities

No work is required in this group.

City of Florence Utilities - Electricity Department
Center Star Substation Bid No. E-R-00632
Packager Bid Sheet

Packager Name _____

Center Star Substation Material and Equipment

Price $ _____

Delivery _____
**Please attach preliminary Bills of Material.

Notes / Exceptions

AUTHORIZED PERSONNEL: _____

PRINT NAME: _____

DATE SIGNED: _____

COMPANY NAME: _____

ADDRESS: _____

CITY: _____ STATE: _____ ZIP _____

TELEPHONE NUMBER: _____

PRINT EMAIL ADDRESS: _____