SECTION 33 71 26.33:
TRANSMISSION SWITCHES

GENERAL

1.01 SCOPE AND QUALIFICATIONS

A. Design, fabricate, and deliver a three (3) way motor operated, group-operated air break switches for mounting on a spun concrete transmission structure.

B. Quantities are as listed in the Bidding Documents.

C. The Manufacturer must be an established company which within the last two years has produced switches of similar ratings and application for delivery to a Florida utility. The Manufacturer shall be responsible for the means, methods, techniques, sequences and procedures of fabrication.

D. All switches and motor operators shall conform to all applicable, IEEE, NEMA, ASTM and ANSI standards.

1.02 SECTION INCLUDES

A. This Section is a purchase specification which includes general requirements of the Manufacturer, and covers the minimum requirements for the design, materials, fabrication, and delivery of Transmission Switches.

B. Transmission Switches furnished under this Section shall be complete including insulators, vacuum interrupters, frames, and operating mechanism, as specified.

1.03 RELATED SECTIONS

A. The requirements of the Bidding Documents apply to work in this Section as if incorporated herein.

1.04 SWITCH RATINGS

A. Three way

B. Three-phase, group-operated, upright mount, side break

C. In-Line, on frame, conductor terminations rated for 10,000 pounds

D. Phase-over-phase configuration

E. 115 kV (123 kV class), 550 kV BIL

F. 2000 ampere continuous current, 61 kA momentary

G. Copper blade and live parts with tinned switch blade and jaws
H. Multiple vacuum or SF6 interrupter bottles per phase, as required, for paralleling / loop splitting

I. Porcelain standard-strength insulators, TR 286, 550 kV BIL, high leakage distance

J. Motorized operating mechanism with manual crank operating capabilities.

K. The insulators shall be bolted to the support structure in a 5” bolt circle pattern.

L. The switch geographical operating area is described as a “Coastal” environment located 3 miles from the Intracoastal Waterway and five (5) miles from the Atlantic Ocean.

1.05 TYPE AND SERVICE

A. Switch will be installed in an existing transmission circuit in a paralleling / loop splitting application.

B. The 3-way switch will be mounted on a new spun concrete pole with a to be finalized above ground height of approximately 90’. Pole framing shall be with in line vertical dead ended conductors with a maximum phase conductor tension of 10,000-lb each. The pole shall also contain an OPGW type shield wire. Underbuilt distribution will not be built on the 3-way switch pole. See Attachment 1 for general arrangement. Specific Pole details will be provided to the successful bidder after award.

1.06 REFERENCES

The design, materials, fabrication and testing of the Transmission Switches furnished under this Specification shall be in accordance with applicable portions of the requirements and/or recommendations of the following standards, codes and guidelines, latest revision.

A. ANSI/NEMA C29.9, Wet Process Porcelain Insulators- Apparatus, Post Type

B. ANSI C37.32, High-Voltage Switches, Bus Supports and Accessories- Schedule of Preferred Ratings, Construction Guidelines and Specifications

C. ASTM A123/A123M, Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products

D. IEEE C37.30, Requirements for High-Voltage Switches

E. IEEE C37.34, Test Code for High-Voltage Air Switches

F. IEEE C37.35, Guide for the Application, Installation, Operation, and Maintenance of High-Voltage Air Disconnecting and Load Interrupter Switches

G. NEMA SG6, Power Switching Equipment.

1.07 DEFINITIONS

Owner    Utilities Commission
         City of New Smyrna Beach
         200 Canal Street
         P O Box 100
SECTION 33 71 26.33:
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New Smyrna Beach, FL 3218
Phone: (561) 586-1651
Julie Couillard, PE.
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3970 Hendricks Avenue
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Garry Moore, P.E.
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Manufacturer The Transmission Switch fabricator

ANSI American National Standards Institute
ASTM American Society for Testing and Materials
IEEE Institute of Electrical and Electronics Engineers
NEMA National Electrical Manufacturers Association

1.08 BID REQUIREMENTS

A. The Manufacturer shall submit the following information for each different Transmission Switch:

1. Switch dimensions, including overall frame dimensions;

2. Typical mounting dimensions for the switch and operating pipes and mechanism, including bolt hole spacing and minimum bolt sizes;

3. List of motorized operating mechanism features included;

4. Any proposed exceptions or deviations from this Section and the reasons, therefore. No exceptions to this Section will be permitted without written approval of the Owner.

B. Bid prices shall include freight charges prepaid and allowed for delivery to the Owner’s Head End building and/or warehouse located in New Smyrna Beach, Florida.

C. The Manufacturer shall provide field support services by a qualified factory technician to assist with adjusting and commissioning the complete Transmission Switch. See section 3.05 for additional requirements. Field support services shall be separately quoted in the Bid Form.

1.09 SUBMITTALS

A. After award, the Manufacturer shall provide copies of following documents for each different Transmission Switch to the Owner for review and evaluation. Use US standard units of measurement and English language for text.

1. Detailed and dimensioned Fabrication Drawings (Shop Drawings).
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The Manufacturer shall submit four sets of the Shop Drawings for review and approval by the Owner (or PDF format by email will also be acceptable). This review is for determining conformance with this Section. It does not relieve the Manufacturer of responsibility for the accuracy of dimensions and structural detailing.

Two sets will be marked and returned to the Manufacturer (or marked PDF will be returned by email). Switches shall not be fabricated until the required Shop Drawings are reviewed and approved with “No exceptions noted” or “Approved as noted”.

The Manufacturer shall supply the Owners engineering firm an electronic “to scale” copy, in AutoCAD or MicroStation format, of the switch outline drawings and mounting details for use designing the spun concrete pole drilling details.

B. Fabrication Drawings: Fabrication drawings shall include:

1. Dimensions, weight and details of switches, operating mechanism, and accessories;
2. Location and size of required mounting bolts;
3. Identification plate details;
4. Details of motorized switch operator cabinet, including wiring provisions.

1.10 PROJECT RECORD DOCUMENTS

A. Final Fabrication Drawings shall be provided to the Owner, reflecting submittal review comments and any corrections made during the fabrication process.

1. Provide scaled drawings in DWG or DXF format and in Adobe PDF format suitable for printing on 11x17 paper.

1.11 OPERATION AND MAINTENANCE DATA

A. Manufacturer shall provide eight (8) copies of the installation procedures to the Owner.

B. Provide eight (8) copies of parts list, recommended operating procedures, and recommended routine maintenance.

1.12 DELIVERY, STORAGE, AND HANDLING

A. Unless agreed to otherwise, the Transmission Switches shall be delivered no later than the date specified in the Bidding Documents.

B. All material shall be shipped to the Owner’s “Head-End” building located across the street from Smyrna substation located west of I95 on 3131 State Road 44 in New Smyrna Beach, Florida. Should there not be available space inside the Head End building for items requiring inside storage for weathering damage prevention (such as control / motor operator cabinets and related assembly equipment), these items shall be delivered and stored at the Electric Operations warehouse at 350 Slaton St. in New Smyrna Beach, Florida.
C. Coordinate the delivery schedule with the Owner’s representative Jameson Parker, 386-424-3040, jparker@ucnsb.org, two (2) weeks prior to the anticipated ship date and at least 48 hours in advance of the actual ship date. Unloading will be done by the BIDDER’s forces and equipment or by a contractor representing the BIDDER. Failure to provide advance notice of delivery, as specified, may result in denial of material receipt.

D. The 3 way switch assembly and all associated components shall be shipped on flatbed truck(s), with removable side rails if present, to facilitate unloading at the Owners equipment storage location.

1.13 WARRANTY

A. Manufacturer shall warrant equipment to be free from defects in design, materials and workmanship for a minimum of 1 year from date of shipment.

PART 2 PRODUCTS

2.01 MANUFACTURER

A. The following Manufacturers and switch types have been determined to meet the intent of these specifications. Products of equivalent quality, dimensions and operating features may be acceptable, at the Engineer’s discretion, if they comply with all requirements specified.

1. SEECO type 3GL
2. Hubbell Turner type TU-3D
3. Southern States type ES-1
4. Cleveland Price type RL-C3W

B. The following Manufacturers and motorized switch operator types have been determined to meet the intent of these specifications. Products of equivalent quality, dimensions and operating features may be acceptable, at the Engineer’s discretion, if they comply with all requirements specified.

1. S&C type LS-1
2. Southern States type VM-1SE
3. SEECO type MNM2

2.02 MANUFACTURED ASSEMBLIES

A. Switch assemblies and bases shall be factory-assembled to the extent practical, for final assembly and adjustment by the Owner or their contractor. Switch live parts shall be completely assembled.
2.03 SWITCH COMPONENTS

A. Jaw contacts shall be designed so that wiping action is provided to minimize contact wear. Current Carrying Contact surfaces shall be silver to silver. Jaw contacts shall maintain the switch blade in the closed position under fault conditions. Springs shall not be in the current path.

B. Terminal pads shall have flat machined surfaces with NEMA standard 4-hole spacing for connectors and tin plated.

C. Supporting switch structures shall be constructed of 6061-T6 structural grade aluminum or hot dipped galvanized steel. Individual frames are acceptable to support the three poles of the switch. Supporting framework shall be designed for the high temperature, high humidity, high wind (NESC 125 mph wind zone) service conditions of the project location. Ferrous parts shall be hot dip galvanized. Any welding shall be performed by experienced and certified workers in accordance with industry standards.

D. Vertical spacing between phases of 18'-0" is required.

E. Interrupters shall be in the current path only when the switch is being operated, so they are not exposed to fault currents.

F. Insulators shall be wet-process porcelain, standard-strength, ANSI 70 gray, station post similar to type TR286, 550 kV BIL, except with minimum leakage distance of 155 inches.

G. The operating mechanism shall maintain all three phases in positive continuous control throughout the opening and closing cycles. Guides shall be provided as necessary for proper operation by an operator at grade level. Bearings shall be weatherproof, non-corroding, and maintenance-free. Ferrous parts shall be hot dip galvanized. The switch shall have a position indicator, and design shall provide for padlocking in the open and closed positions. Provide multiple flexible tinned copper braided grounding straps, as required, for grounding of the operating pipes to the pole including tinned grounding connectors and pipe clamps.

1. If operating pipe is required to be mounted on an in-line face of the pole, switch frame shall be capable of supporting transmission conductor dead-ends.

H. Switches shall be equipped with a non-corrosive nameplate per IEEE standards, permanently attached to the switch base.
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I. Switches shall be supplied with position indicators and installed on operating pipes in an operator viewable position.

J. Each switch shall have provisions for disconnecting the operating mechanism from the switch operating pipe assembly, at ground level, and pad locking it in place to prevent switch operation until the pad lock is removed and operating mechanism is engaged.

K. The manufacturer shall supply one (1) operator grounding platform for each motor control or manual switch operator supplied to the owner.

2.04 MOTORIZED SWITCH OPERATOR

A. Switch operator selection shall be coordinated with the overall design of the switch, including torque rating and direction of rotation. Operating time of up to 7 seconds is acceptable.

B. The motor operator shall have a minimum torque of 15,000-inch pounds.

C. Switch operator cabinets shall be NEMA 4X rated, 316 grade stainless steel.

D. Switch operators shall be capable of normal and emergency manual operation via worm gear operation.

E. Motor control voltage shall be 24-volt direct current (dc) of the manufacturer’s standard voltage level. The Owner will furnish supply power at 120/240 Vac. Motor control power shall be internally rectified and shall have battery back-up capable of performing an operating cycle after loss of ac supply. Batteries shall be located at the bottom of the cabinet.

F. At a future date, the owner will add remote/local operation to the switch. Provisions shall be made to easily integrate this capability in the motor operators. In addition to local control of the switch, operator shall be configured for remote control via remote RTU over Owner-furnished radio with serial DNP3 communication protocol or interface with fiber optic cable communications. The Owner’s communication device shall have access to contacts furnished for control, status, and alarm. The cabinet shall have space for mounting of the Owner’s future communication device in the motor control cabinet.

G. The motor operator shall be supplied with a minimum of six (6) each normally open and normally closed, form C adjustable, contacts for the Customers future use.

H. Switch motor operator(s) shall also be equipped with the following:

1. Local-Remote selector switch. The remote switch capabilities will initially be unused. Label the remote position as for “Future use” on the switch and drawings.

2. Switch position indicating lights

3. AC and DC Breaker circuit protection shall be provided by the Manufacturer.

4. Cabinet heater with thermostat
5. Convenience light and GFCI outlet.
6. Provide a “STOP” push button control
7. Each motor operator shall be supplied with one operator grounding platform

PART 3 EXECUTION

3.01 FABRICATION

A. Fabrication shall be performed in strict compliance with the Shop Drawing details. Material substitutions or deviations from the approved drawings shall not be made without written approval by the Owner.

3.02 INSPECTION AND QUALITY ASSURANCE

A. The Manufacturer shall have an active in-plant quality assurance program and perform regular checks and tests on the products made. The program shall cover the entire production process including the delivery of the product. Copies of certified test and inspection records shall be provided to the Owner upon request.

3.03 PACKING AND SHIPPING

A. Switch components to be stored temporarily at the manufacturers’ facility, in outdoor areas, shall be raised above ground level and separated with spacers to allow free circulation of air to all surfaces. Blocking and spacers shall be of materials that are not harmful to the surfaces, shall span the full width of each bearing point, and shall be spaced such that there are no undue stresses imposed.

B. Switch components shall be carefully loaded for protection during shipment.

C. Each shipment shall include a packing list identifying the components in the shipment.

D. The switch and all components shall be packaged for outdoor storage at the Owner’s facility, palletized for easy off loading and delivered on flat bed trailer(s) with removable side rails, if present.

3.04 DELIVERY INSPECTION

A. All materials will be subject to “Job Site Inspection”. Switches and accessories shall be protected from damage during storage, shipping, and handling. Members that arrive damaged shall be repaired or replaced as determined by the Owner.

B. Material may be rejected at the time of the first inspection or at any time defects are found during the progress of the erection or installation. Inspection by the Owner or waiving of inspection shall not relieve the Manufacturer from the responsibility for furnishing products that conform to the requirements of this Section, nor invalidate any claim of the Owner because of defective or unsatisfactory material or workmanship.
3.05 FIELD SERVICES

The Manufacturer shall provide field support services by a qualified factory technician to assist with adjusting and commissioning the complete Transmission Switch. The Manufacturer’s bid, see Bid Form Proposal line item #3, shall include travel to/from New Smyrna Beach, Florida including all expenses. The qualified factory technician shall allocate two (2), ten (10) hour workdays on site working directly with the owner’s employees or contractor to install, adjust and commission the switch. See line three (3) on the Bid Form.

END OF SECTION