



## Integrated Power Solutions

- Low & Medium Voltage Distribution
- Power Distribution Centers
- Skid-Mounted Substations
- Custom Control & Automation

### *ESS Metron Proposal 64000V1*

|          |  |
|----------|--|
| DATE:    | PAGES (including cover): 7                                     |
| TO:      | Phone:   |
| ATTN:    | FAX No.:   |
| FROM:    | Email:   |
| SUBJECT: | Reference: Drawings & specifications provided at time of quote |

ESS Metron is pleased to offer the following proposal:

|  |                     |
|--|---------------------|
| <b>ITEM #1 15kV &amp; 5kV Switchgear Lineups</b> | <b>\$.00</b>        |
| <b>ITEM #1A 15kV Switchgear</b>                  |                     |
| <b>ITEM #1B 5kV Switchgear</b>                   |                     |
| <b>ITEM #2 Remote Racking Device</b>             | <b>\$.00/ each</b>  |
| <b>ITEM #3 Breaker Lift Truck</b>                | <b>\$.00 / each</b> |
| <b>ITEM #4 Breaker Test Cabinet</b>              | <b>\$.00 / each</b> |
| <b>ITEM #5 Remote Breaker Control Panel</b>      | <b>\$.00 / each</b> |

#### **ITEM #1A 15kV (13.8kV Operating) Switchgear Lineup (NP1-13.8-1/2):**

9-Section Switchgear Lineup with the following features:

Overall Switchgear Approximate Dimensions: 94”D x 324”W x 95”H

**Enclosure:** Metal Clad Switchgear, N1 (indoor), free standing, front/rear access, front door compression latch mechanisms, hinged front doors, bolted rear panels, powder coat finish, ANSI-61 light gray.

**Main Bus:** 15kV (13.8kV Operating), 1200A, 63kA, 95kV BIL, 3-Phase, 3-Wire, 60HZ, tin plated copper with fluid bed epoxy insulation and boots, porcelain insulators and bus support

**Ground Bus:** ¼” x 2” tin plated copper

**Space Heaters:** 120/240VAC, 300W w/ Thermostat (in each switchgear section)

**Remote Racking:** Remote Breaker Receptacle for each Circuit Breaker, mounted on front door (for use with Portable Remote Breaker Operator, ITEM#2)

#### **SECTION 101 Feeder Breaker (52-11):**

-(1) Vacuum Circuit Breaker, 15kV, 1200A, 63kA, 3-Phase, 3-Wire, 125VDC Control (Trip/Close/Charging Motor), 5 cycle, drawout type, set of MOC/TOC contacts (Bottom Compartment)

-(1) Protective Relay, SEL 551C, P/N 0551C0BX553X

-(2) Test Switch, ABB FT-1

-(1) Lockout Relay, Electros witch, 24 Series



- (1) Indicating Light, 125VDC, white (LOCKOUT)
- (1) Circuit Breaker Control Switch, 2-pos, spring return to center
- (1) Indicating Light, 125VDC, green (OPEN)
- (1) Indicating Light, 125VDC, red (CLOSED)
- (1) Indicating Light, 125VDC, amber (TEST)
- (1) IR window, 4" diameter
- (1 lot) Terminal Blocks, Shorting Terminal Blocks, Nameplates, etc.

**SECTION 102 Feeder Breakers (52-9 & 52-7):**

- (2) Vacuum Circuit Breaker, 15kV, 1200A, 63kA, 3-Phase, 3-Wire, 125VDC Control (Trip/Close/Charging Motor), 5 cycle, drawout type, set of MOC/TOC contacts
- (2) Protective Relay, SEL 551C, P/N 0551C0BX553X
- (4) Test Switch, ABB FT-1
- (4) Lockout Relay, Electros witch, 24 Series
- (4) Indicating Light, 125VDC, white (LOCKOUT)
- (2) Circuit Breaker Control Switch, 2-pos, spring return to center
- (2) Indicating Light, 125VDC VDC, green (OPEN)
- (2) Indicating Light, 125VDC VDC, red (CLOSED)
- (2) Indicating Light, 125VDC, amber (TEST)
- (3) CT's, 1200:5, multi ratio, bus side connected, for breaker 52-9
- (3) CT's, 2000:5, single ratio, line side connected, for breaker 52-9
- (1) Zero Sequence CT, 50:5, for breaker 52-9
- (3) CT's, 1200:5, multi ratio, bus side connected, for breaker 52-7
- (3) CT's, 2000:5, single ratio, line side connected, for breaker 52-7
- (1) Zero Sequence CT, 50:5, for breaker 52-7
- (2) IR window, 4" diameter
- (1 lot) Terminal Blocks, Shorting Terminal Blocks, Nameplates, etc.

**SECTION 103 Feeder Breakers (52-5 & 52-3):**

- (2) Vacuum Circuit Breaker, 15kV, 1200A, 63kA, 3-Phase, 3-Wire, 125VDC Control (Trip/Close/Charging Motor), 5 cycle, drawout type, set of MOC/TOC contacts
- (2) Protective Relay, SEL 551C, P/N 0551C0BX553X
- (1) Transformer Protection Relay, SEL 787, P/N 07870X1ABA0X0X850400
- (4) Test Switch, ABB FT-1
- (4) Lockout Relay, Electros witch, 24 Series
- (4) Indicating Light, 125VDC, white (LOCKOUT)
- (2) Circuit Breaker Control Switch, 2-pos, spring return to center
- (2) Indicating Light, 125VDC VDC, green (OPEN)
- (2) Indicating Light, 125VDC VDC, red (CLOSED)
- (2) Indicating Light, 125VDC, amber (TEST)
- (3) CT's, 1200:5, multi ratio, bus side connected, for breaker 52-5
- (3) CT's, 2000:5, single ratio, line side connected, for breaker 52-5
- (1) Zero Sequence CT, 50:5, for breaker 52-5
- (3) CT's, 1200:5, multi ratio, bus side connected, for breaker 52-3
- (3) CT's, 1200:5, multi ratio, bus side connected, for breaker 52-3
- (3) CT's, 2000:5, single ratio, line side connected, for breaker 52-3
- (1) Zero Sequence CT, 50:5, for breaker 52-3
- (2) IR window, 4" diameter
- (1 lot) Terminal Blocks, Shorting Terminal Blocks, Nameplates, etc.

**SECTION 104 Main Circuit Breaker (52-1) and PT/CPT:**

- (1) Vacuum Circuit Breaker, 15kV, 1200A, 63kA, 3-Phase, 3-Wire, 125VDC Control (Trip/Close/Charging Motor), 5 cycle, drawout type, set of MOC/TOC contacts (Bottom Compartment)
- (1) Line PT Drawer: (3) PT's, 14400V-120V, wye, fused (E-Rated), drawout type (Top Compartment)
- (1) Line CPT Drawer: (1) CPT, 13800V-120/240, 15 KVA, single phase w/ fuses (E-rated) (Top Compartment)
- (1) Protective Relay, SEL 351S, P/N 0351S7X343B5421



- (1) High-Impedance Differential Relay, SEL 787Z, P/N 0587Z0X325512XX
- (2) Test Switch, ABB FT-1
- (1) Lockout Relay, Electroswitch, 24 Series
- (1) Indicating Light, 125VDC, white (LOCKOUT)
- (1) Circuit Breaker Control Switch, 2-pos, spring return to center
- (1) Indicating Light, 125VDC, green (OPEN)
- (1) Indicating Light, 125VDC, red (CLOSED)
- (1) Indicating Light, 125VDC, amber (TEST)
- (3) CT's, 1200:5, multi ratio, bus side connected
- (3) CT's, 2000:5, single ratio, line side connected
- (1) Zero Sequence CT, 50:5
- (3) Surge arrestors, 15kV, Station Class
- (1) IR window, 4" diameter
- (1 lot) Terminal Blocks, Shorting Terminal Blocks, Nameplates, etc.

#### **SECTION 105 Tie Breaker (24-1) and Bus1PT:**

- (1) Vacuum Circuit Breaker, 15kV, 1200A, 63kA, 3-Phase, 3-Wire, 125VDC Control (Trip/Close/Charging Motor), 5 cycle, drawout type, set of MOC/TOC contacts (Bottom Compartment)
- (1) Bus PT Drawer: (3) PT's, 14400V-120V, wye, fused (E-Rated), drawout type (Top Compartment)
- (1) Protective Relay, SEL 351S, P/N 0351S7X343B5421
- (2) Test Switch, ABB FT-1
- (1) Lockout Relay, Electroswitch, 24 Series
- (1) Indicating Light, 125VDC, white (LOCKOUT)
- (1) Circuit Breaker Control Switch, 2-pos, spring return to center
- (1) Indicating Light, 125VDC, green (OPEN)
- (1) Indicating Light, 125VDC, red (CLOSED)
- (1) Indicating Light, 125VDC, amber (TEST)
- (3) CT's, 1200:5, multi ratio
- (6) CT's, 2000:5, single ratio
- (1) IR window, 4" diameter
- (1 lot) Terminal Blocks, Shorting Terminal Blocks, Nameplates, etc.

#### **SECTION 106 Communication Cabinet and Bus2PT:**

- (1) Bus PT Drawer: (3) PT's, 14400V-120V, wye, fused (E-Rated), drawout type (Bottom Compartment)
- (2) Test Switch, ABB FT-1
- (1) SEL 2890MIX
- (1) SEL 240700013 Satellite-Synchronized Clock
- (2) SEL 35303B0DX211X0XXXXXX
- (1) SEL 235-0103 Legacy GPS Antenna
- (2) SEL 2886
- (1 lot) Terminal Blocks, Shorting Terminal Blocks, Nameplates, etc.

#### **SECTION 107 Main Circuit Breaker (52-2) and PT/CPT:**

- (1) Vacuum Circuit Breaker, 15kV, 1200A, 63kA, 3-Phase, 3-Wire, 125VDC Control (Trip/Close/Charging Motor), 5 cycle, drawout type, set of MOC/TOC contacts (Bottom Compartment)
- (1) Line PT Drawer: (3) PT's, 14400V-120V, wye, fused (E-Rated), drawout type (Top Compartment)
- (1) Line CPT Drawer: (1) CPT, 13800V-120/240, 15 KVA, single phase w/ fuses (E-rated) (Top Compartment)
- (1) Protective Relay, SEL 351S, P/N 0351S7X343B5421
- (1) High-Impedance Differential Relay, SEL 787Z, P/N 0587Z0X325512XX
- (1) Lockout Relay, Electroswitch, 24 Series
- (1) Indicating Light, 125VDC, white (LOCKOUT)
- (1) Circuit Breaker Control Switch, 2-pos, spring return to center
  
- (1) Indicating Light, 125VDC, green (OPEN)
- (1) Indicating Light, 125VDC, red (CLOSED)
- (1) Indicating Light, 125VDC, amber (TEST)



- (3) CT's, 1200:5, multi ratio, bus side connected
- (3) CT's, 2000:5, single ratio, line side connected
- (1) Zero Sequence CT, 50:5
- (3) Surge arrestors, 15kV, Station Class
- (1) IR window, 4" diameter
- (1 lot) Terminal Blocks, Shorting Terminal Blocks, Nameplates, etc.

**SECTION 108 Feeder Breakers (52-4 & 52-6):**

- (2) Vacuum Circuit Breaker, 15kV, 1200A, 63kA, 3-Phase, 3-Wire, 125VDC Control (Trip/Close/Charging Motor), 5 cycle, drawout type, set of MOC/TOC contacts
- (2) Protective Relay, SEL 551C, P/N 0551C0BX553X
- (1) Transformer Protection Relay, SEL 787, P/N 07870X1ABA0X0X850400
- (4) Test Switch, ABB FT-1
- (4) Lockout Relay, Electros witch, 24 Series
- (4) Indicating Light, 125VDC, white (LOCKOUT)
- (2) Circuit Breaker Control Switch, 2-pos, spring return to center
- (2) Indicating Light, 125VDC VDC, green (OPEN)
- (2) Indicating Light, 125VDC VDC, red (CLOSED)
- (2) Indicating Light, 125VDC, amber (TEST)
- (3) CT's, 1200:5, multi ratio, bus side connected, for breaker 52-6
- (3) CT's, 2000:5, single ratio, line side connected, for breaker 52-6
- (1) Zero Sequence CT, 50:5, for breaker 52-6
- (3) CT's, 1200:5, multi ratio, bus side connected, for breaker 52-4
- (3) CT's, 1200:5, multi ratio, bus side connected, for breaker 52-4
- (3) CT's, 2000:5, single ratio, line side connected, for breaker 52-4
- (1) Zero Sequence CT, 50:5, for breaker 52-4
- (2) IR window, 4" diameter
- (1 lot) Terminal Blocks, Shorting Terminal Blocks, Nameplates, etc.

**SECTION 109 Feeder Breakers (52-8 & 52-10):**

- (2) Vacuum Circuit Breaker, 15kV, 1200A, 63kA, 3-Phase, 3-Wire, 125VDC Control (Trip/Close/Charging Motor), 5 cycle, drawout type, set of MOC/TOC contacts
- (2) Protective Relay, SEL 551C, P/N 0551C0BX553X
- (4) Test Switch, ABB FT-1
- (3) Lockout Relay, Electros witch, 24 Series
- (3) Indicating Light, 125VDC, white (LOCKOUT)
- (2) Circuit Breaker Control Switch, 2-pos, spring return to center
- (2) Indicating Light, 125VDC VDC, green (OPEN)
- (2) Indicating Light, 125VDC VDC, red (CLOSED)
- (2) Indicating Light, 125VDC, amber (TEST)
- (3) CT's, 1200:5, multi ratio, bus side connected, for breaker 52-8
- (3) CT's, 2000:5, single ratio, line side connected, for breaker 52-8
- (1) Zero Sequence CT, 50:5, for breaker 52-8
- (3) CT's, 1200:5, multi ratio, bus side connected, for breaker 52-10
- (3) CT's, 1200:5, multi ratio, bus side connected, for breaker 52-10
- (3) CT's, 2000:5, single ratio, line side connected, for breaker 52-10
- (1) Zero Sequence CT, 50:5, for breaker 52-10
- (2) IR window, 4" diameter
- (1 lot) Terminal Blocks, Shorting Terminal Blocks, Nameplates, etc.

**Switchgear Accessories:**

- (1) Standard set of accessories (manual charging handle, gag plate, breaker contact grease)

**ITEM #1B 5kV (4160V Operating) Switchgear Lineup (NP1-4.16-1/2):**

3-Section Switchgear Lineup with the following features:

Overall Switchgear Approximate Dimensions: 94”D x 108”W x 95”H

**Enclosure:** Metal Clad Switchgear, N1 (indoor), free standing, front/rear access, front door compression latch mechanisms, hinged front doors, bolted rear panels, powder coat finish, ANSI-61 light gray.

**Main Bus:** 5kV (4160V Operating), 1200A, 50kA, 60kV BIL, 3-Phase, 3-Wire, 60HZ, tin plated copper with fluid bed epoxy insulation and boots, porcelain insulators and bus support

**Ground Bus:** ¼” x 2” tin plated copper

**Space Heaters:** 120/240VAC, 300W w/ Thermostat (in each switchgear section)

**Remote Racking:** Remote Breaker Receptacle for each Circuit Breaker, mounted on front door (for use with Portable Remote Breaker Operator, outlined in Switchgear Accessories)

**SECTION 101 Main Circuit Breaker (52-1) and PT/PT:**

-(1) Vacuum Circuit Breaker, 5kV, 1200A, 50kA, 3-Phase, 3-Wire, 125VDC Control (Trip/Close/Charging Motor), 5 cycle, drawout type, set of MOC/TOC contacts (Bottom Compartment)

-(1) Line PT Drawer: (3) PT’s, 4200V-120V, wye, fused (E-Rated), drawout type (Top Compartment)

-(1) Bus PT Drawer: (3) PT’s, 4200V-120V, wye, fused (E-Rated), drawout type (Top Compartment)

-(1) Protective Relay, SEL 351S, P/N 0351S7X343B5421

-(2) Test Switch, ABB FT-1

-(1) Circuit Breaker Control Switch, 2-pos, spring return to center

-(1) Indicating Light, 125VDC, green (OPEN)

-(1) Indicating Light, 125VDC, red (CLOSED)

-(1) Indicating Light, 125VDC, amber (TEST)

-(3) CT’s, 1200:5, multi ratio, line side connected

-(3) CT’s, 4000:5, multi ratio, bus side connected

-(1) IR window, 4” diameter

-(1 lot) Terminal Blocks, Shorting Terminal Blocks, Nameplates, etc.

**SECTION 102 Tie Breaker (24-1):**

-(1) Vacuum Circuit Breaker, 15kV, 1200A, 50kA, 3-Phase, 3-Wire, 125VDC Control (Trip/Close/Charging Motor), 5 cycle, drawout type, set of MOC/TOC contacts (Bottom Compartment)

-(1) Protective Relay, SEL 351S, P/N 0351S7X343B5421

-(1) SEL 35303B0DX211X0XXXXXX

-(2) Ethernet Switch, NTRON 517FX, P/N 517FX-A-ST-S

-(2) Test Switch, ABB FT-1

-(1) Circuit Breaker Control Switch, 2-pos, spring return to center

-(1) Indicating Light, 125VDC, green (OPEN)

-(1) Indicating Light, 125VDC, red (CLOSED)

-(1) Indicating Light, 125VDC, amber (TEST)

-(3) CT’s, 1200:5, multi ratio

-(1) IR window, 4” diameter

-(1 lot) Terminal Blocks, Shorting Terminal Blocks, Nameplates, etc.

**SECTION 103 Main Circuit Breaker (52-2) and PT/PT:**

-(1) Vacuum Circuit Breaker, 5kV, 1200A, 50kA, 3-Phase, 3-Wire, 125VDC Control (Trip/Close/Charging Motor), 5 cycle, drawout type, set of MOC/TOC contacts (Bottom Compartment)

-(1) Line PT Drawer: (3) PT’s, 4200V-120V, wye, fused (E-Rated), drawout type (Top Compartment)

-(1) Bus PT Drawer: (3) PT’s, 4200V-120V, wye, fused (E-Rated), drawout type (Top Compartment)

-(1) Protective Relay, SEL 351S, P/N 0351S7X343B5421

-(2) Test Switch, ABB FT-1



- (1) Circuit Breaker Control Switch, 2-pos, spring return to center
- (1) Indicating Light, 125VDC, green (OPEN)
- (1) Indicating Light, 125VDC, red (CLOSED)
- (1) Indicating Light, 125VDC, amber (TEST)
- (3) CT's, 1200:5, multi ratio, line side connected
- (3) CT's, 4000:5, multi ratio, bus side connected
- (1) IR window, 4" diameter
- (1 lot) Terminal Blocks, Shorting Terminal Blocks, Nameplates, etc.

**Switchgear Accessories:**

- (1) Standard set of accessories (manual charging handle, gag plate, breaker contact grease)

**MV SWITCHGEAR CLARIFICATIONS / EXCEPTIONS:**

**CLARIFICATION** – Our offering is based on our best interpretation of the drawings and specifications provided. Pricing is per the above bill of material only. Any deviation will require a pricing adjustment.

**CLARIFICATION** – MV Switchgear will be manufactured in accordance with ANSI/IEEE standard (C37.20.2). All Breakers, Frames, Control, Metering and Relaying components will be UL/UR listed.

**CLARIFICATION** – 125VDC control power to be provided by others.

**CLARIFICATION** – Our offering includes SEL Quickset Design Template LDG0003-01 to be loaded in the SEL 351S relays for MTM transfer scheme. Relay coordination study and final relay settings are by others.

**CLARIFICATION** – HRG system is not located in the proposed switchgear and is not included in our offering.

**CLARIFICATION** – Provisions will be made for bus duct connection for breakers 52-1 and 52-2 in ITEM#1B. Bus duct is to be provided by others.

**EXCEPTION** – Relay Coordination Study is not included in our offering.

**EXCEPTION** – Exception is taken to all references to arc resistant switchgear.

**EXCEPTION** – Field Services are not included in our Offering.

**Terms and Conditions:**

**COMMODITY METAL PRICE DISCLAIMER**  
 Due to highly unstable commodity metal prices related to factors beyond our control, ESS Metron is unable to hold its prices firm for longer than 30 days. We are making every effort to minimize the impact of such variations and appreciate your understanding. Orders placed later than 30 days after quotation are subject to a price revision based on most current metal commodity pricing.

- |                        |  |
|------------------------|--|
| <b>Shipment:</b>       | <b>Engineering Design Submittal Drawings:</b>  |
|                        | <b>Fabrication, Assembly and Wiring:</b>   |
| <b>Warranty:</b>       | One (1) year from date of commercial use or operation, or eighteen (18) months from date of delivery by Seller, whichever comes first. |
| <b>FOB:</b>            | FOB - Factory, Denver, Colorado. Freight prepaid and allowed.  |
| <b>Quote Validity:</b> | Prices Valid Thirty (30) Days from the date of this Proposal   |
| <b>Payment Terms:</b>  | All Payments are NET 30 Days after invoice issue   |



If you have any questions or comments, please do not hesitate to contact me.

Sincerely,

Brock Blue  
ESS Metron  
[bblue@essmetron.com](mailto:bblue@essmetron.com)  
Phone: 720-236-2579