AUSTIN ENERGY

PURCHASE SPECIFICATION

FOR

SWITCHGEAR, NTWK, VAULT, 15KV, INDOOR, METAL-CLAD

INTEL OFFICE BUILDING
400 SAN ANTONIO STREET

DATE	PREPARED BY	ISSUANCE/REVISION	APPROVAL PROCESS SUPV. / MANAGER
1/30/01	Leonard Hough, P.E.	Issuance	

REASON FOR REVISION	AFFECTED PARAGRAPHS

This specification, until rescinded, shall apply to each future purchase and contract for the commodity described herein. Retain for future reference.

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AUSTIN ENERGY
PURCHASE SPECIFICATION
FOR
INDOOR METAL-CLAD SWITCHGEAR
12.47 KV SPOT NETWORK

1.0 SCOPE AND CLASSIFICATION

1.1 Scope

1.1.1 Austin Energy requires a qualified supplier to provide 15 kV metal-clad switchgear for use as a spot network. The Supplier shall follow this specification and the associated drawings precisely and shall seek clarification whenever necessary.

1.1.2 The switchgear furnished under these specifications shall be assembled in the continental United States by a domestic Supplier of switchgear, or if assembled elsewhere, proof of experience and compliance with ANSI standards must be provided with bid. Supplier must have a minimum of 5 years of experience. The circuit breakers and the circuit breaker cubicles shall be furnished by the same manufacturer or a certified OEM

1.2 Classification

1.2.1 The switchgear will be used as a 12.47 kV spot network on a network distribution system.

1.2.2 All exceptions to this specification and the reasons for each exception shall be listed in writing and submitted with the bid. Non-conformance to the specification may result in bid rejection. All exceptions must be resolved in writing prior to the awarding of a contract to the successful bidder. After the contract is awarded no additional exceptions will be allowed.

2.0 APPLICABLE STANDARDS

The switchgear furnished under this specification shall conform to the latest NEMA, IEEE, ANSI/IEEE, ANSI, and ASTM standards applicable to metal-clad power switchgear, power circuit breakers, instrument transformers, and other equipment covered in this specification. In the case of a conflict between any of the standards mentioned in this specification and the contents of this document, the Austin Energy specification shall govern. The applicable standards shall include but not be limited to, the following:

2.1 ANSI/IEEE C37.04-1979 (Reaff 1988) Standard Rating Structure for AC High-Voltage Circuit Breakers Rated on a Symmetrical Current Basis (Includes Supplement C37.04c-1985)

2.2 ANSI/IEEE C37.04f-1990 Supplement to ANSI/IEEE C37.04-1979

2.3 ANSI/IEEE C.37.06-1987 Standard for AC High-Voltage Circuit Breakers Rated on a Symmetrical Current Basis-Preferred Ratings and Related Capabilities

2.4 ANSI/IEEE C37.09-1979 (Reaff 1988) Standard Test Procedure for AC High-Voltage Circuit Breakers Rated on a Symmetrical Current Basis

2.5 ANSI/IEEE C37.09e-1985 Supplement to ANSI/IEEE C37.09-1979

2.6 ANSI/IEEE C37.09g-1985 Draft Supplement to ANSI/IEEE C37.09-1979

2.7 ANSI/IEEE C37.1-1987 Standard Definition, Specification, and Analysis of Systems Used for Supervisory Control, Data Acquisition, and Automatic Control

2.8 ANSI/IEEE C37.2-1991 Draft Standard Electrical Power System Device Function Numbers

2.9 ANSI/IEEE C37.20.2-1987 Standard for Metal-Clad and Station Type Cubicle Switchgear

2.10 ANSI/IEEE C37.21-1985 Standard for Control Switchboards

2.11 ANSI/IEEE C37.23-1987 Standard for Metal-Enclosed Bus and Calculating Losses in Isolated-Phase Bus

2.12 ANSI/IEEE C37.54-1987 Standard Conformance Test Procedures for Indoor Alternating-Current High-Voltage Circuit Breakers Applied as Removable Elements in Metal-Enclosed Switchgear Assemblies

2.13 ANSI/IEEE C37.55-1989 Standard Conformance Test Procedures for Metal-Clad Switchgear Assemblies

2.14 ANSI/IEEE C37.90-1987 Standard for Relays and Relay Systems Associated with Electric Power Systems

2.15 ANSI/IEEE C37.90.1-1989 Standard Surge Withstand Capability (SWC) Tests for Protective Relays and Relay System

2.16 ANSI/IEEE C37.100-1981 (Reaff 1989) Standard Definitions for Power Switchgear

2.17 ANSI/IEEE C37.100b-1986 Supplement to ANSI/IEEE C37.100-1981

2.18 ANSI/IEEE Cl00d-1990 Draft Supplement to ANSI/IEEE C37.100-1981

2.19 ANSI/IEEE C57.13-1978 (Reaff 1986) Standard Requirements for Instrument Transformers

2.20 ANSI/IEEE C57.13.2-1991 Conformance Test Procedures for Instrument Transformers

2.21 ANSI/IEEE C62.11-1987 Standard for Metal-Oxide Surge Arresters for AC Power Circuits

2.22 ANSI/IEEE Std 100-1984 IEEE Standard Dictionary for Electrical and Electronic Terms

2.23 ANSI/NFPA 70-1999 National Electrical Code

2.24 ANSI C2-1993 National Electric Safety Code

2.25 ANSI Z55.1-1967 (Reaff 1973) American National Standard Gray Finishes for Industrial Apparatus and Equipment

2.26 ANSI/IEEE Std 1-1986 Standard General Principles for Temperature

2.27 ASTM F855-83 Specification for Temporary Grounding Systems to be used on De-energized Electric Power lines and Equipment.

3.0 DESIGN

3.1 Functional Requirements

The switchgear will be used to provide six 12,470/7200-volt wye, 4-wire, solidly grounded neutral, 3-phase electric utility distribution circuits from the 12,470Y/7200-volt secondary of four transformers. The functions that the switchgear will perform shall include, but not be limited to, the following:

a) Independent circuit on and off switching of each distribution circuit.

b) Fault protection for each distribution circuit.

c) Metering for each customer circuit.

3.2 Circuit Breaker and Switchgear Ratings

Nominal voltage class, rms:	13.8 kV
Rated voltage class, rms:	15 kV
Nominal 3-Phase MVA class:	500 MVA
Rated frequency:	60 Hz
Rated continuous current:	1200 Amps
Rated impulse withstand voltage:	95 kV peak
60 Hz RMS 60-second withstand (ANSI C37.20):	36 kV peak
Short-circuit current rated maximum kV, rms:	18,000 Amps
Voltage range factor, k:	1.3
Rated momentary closing and latching capability at 2.7 K times rated short circuit current (Ref: ANSI C37.06):	62 kA Crest
Three-second short circuit rating	23 kA
Permissible tripping delay, Y:	2 Seconds
Rated interrupting time:	5 cycles
Heater circuit supply voltage:	120 VAC
Control circuit supply voltage:	120 VAC and capacitor trip devices

Service Conditions:

Temperature:	-30C to +60C
Humidity:	0% to 100%
Altitude:	Sea Level to 1500 feet above sea level

3.3 Bus Ratings

All bus shall be of a non-segregated design. All bus shall be designed, constructed, and tested in accordance with ANSI/IEEE C37.23-1987 and other applicable standards. All bus and bus duct shall be rated as follows:

Maximum operating voltage, rms:	15 kV
60 Hz withstand, peak:	36 kV
Impulse withstand, peak:	95 kV
Continuous current at 60 Hz, rms:	1200 Amps
Momentary current, Asym. rms:	58 kA

3.4 Power Source

This switchgear will be connected to four transformers, each rated as follows:

Capacity	2500 kVA
Primary Voltage	34.5 kV delta
Secondary Voltage	12,470/7200-V wye grnd. neut.
Primary BIL	200 kV
Secondary BIL	95 kV

4.0 CONSTRUCTION

4.1 General

The switchgear shall be designed with a total of 12 cubicles arranged in a single row. Four line-side circuit-breaker cubicles, one tiebreaker cubicle, six feeder breaker cubicles, and one transition cubicle shall be included. The circuit breakers shall draw out horizontally.

4.2 Structural

4.2.1 Each of the 12 cubicles shall be built as an integral item complete with a frame heavy and rigid enough to maintain it true and square during shipping and installation.

4.2.2 The top of each cubicle shall be equipped with lifting eyes or a lifting bar to facilitate handling with a small overhead crane. Lifting points on the sides or bottoms of the cubicles are not acceptable. Each lifting bar shall include a 3"x 3" jack pad facing toward the front and rear of the cubicle.

4.2.3 Austin Energy will attach the switchgear assembly directly on a concrete slab floor utilizing lead expansion anchors and bolts.

4.2.4 Smooth steel plates shall be utilized for the switchgear floor, adequately supported to withstand moving the circuit breakers. All floor joints shall be smooth and even, with the plates butted solidly together.

4.2.5 All cubicles shall be constructed with overall dimensions not to exceed 95 inches in height, 98 inches in depth and 36 inches in width.

4.2.6 There shall be two hinged doors on the front of each cubicle: one for the lower (breaker) compartment and one for the upper (auxiliary) compartment. The doors shall have a single-point latching mechanism, with no required bolts, and a provision for padlocking. Each front cubicle door shall have a handle for opening and closing, rather than bolts or screw knobs.

4.2.7 There shall be a single hinged door on the rear of each cubicle. Each door shall be fabricated as a single piece and extend from the top to the bottom of the cubicle opening. Double doors will not be allowed. No bracing shall be allowed in the door opening. The door hinges shall be mounted such that the doors cannot be removed unless the door is open. Captive fasteners shall not be used. The door shall have a single-point latching mechanism, with no required bolts, and a provision for padlocking. Each rear cubicle door shall have a handle for opening and closing, rather than bolts or screw knobs.

4.2.8 The circuit breaker shall be located in the lower half of the cubicle. The circuit breaker compartment shall be equipped to house the removable breaker element. The mechanism for levering the breaker shall be cell mounted and include all the necessary interlocks to render the breaker mechanism mechanically trip free during the levering procedure. A contact shall ground the breaker between and at the operating and test positions. Rails shall be provided that will allow withdrawal of each circuit breaker for inspection and maintenance without the use of a separate lifting device.

4.2.9 Cable entrance shall be from the bottom. Removable plates shall be provided on the bottom for the installation of conduit.

4.2. 10 Relays and instruments shall be mounted on rigid formed hinged panels with hinges of sufficient strength to fully support the panel when open without sag. Hinged panels shall have 90-degrees-turn-handle draw-tight latches.

4.2.11 All doors shall open a minimum of 105 degrees and be equipped with doorstops.

4.2.12 Auxiliary tripping relays shall not be mounted on hinged panels. Relays should not operate as a result of circuit breaker motion or vibration.

4.2.13 Moving shutters shall cover the primary stationary contacts when the circuit breakers or potential transformer trays are moved from the operating to the disconnected position.

4.2.14 All metalwork shall be constructed of No.11 standard gauge steel or greater.

4.2.15 Except for CPT, all 12,470/7200 voltages in the switchgear shall be separated from all lower voltages by a steel barrier.

4.3 Ventilation

4.3.1 Protected, filtered, rodent-proof ventilation openings shall be provided as required. The ventilation should be designed so that forced cooling is not required to maintain equipment rating.

4.3.2 Equipment heaters shall be provided in each cubicle, with one central thermostat control, to prevent condensation.

4.4 Circuit Breakers

4.4.1 The circuit breakers shall be Westinghouse or Powell (or Austin Energy-approved equivalent) vacuum horizontal drawout type, capable of being withdrawn on rails. The breakers shall be operated by a motor-charged stored-energy spring mechanism, charged normally by a universal electric motor and in an emergency by a manual handle. No other type of operating mechanism is acceptable. The primary disconnecting contacts shall be silver-plated copper.

4.4.2 Each circuit breaker shall contain three vacuum interrupters separately mounted in a self-contained, self-aligning pole unit that can be removed easily. The vacuum interrupter pole unit shall be mounted on glass polyester supports.

4.4.3 A contact wear gap indicator for each vacuum interrupter, which requires no tools to indicate available contact life, shall be easily visible when the breaker is removed from its compartment.

4.4.4 The current transfer from the vacuum interrupter moving stem to the breaker main conductor shall be a non-sliding design.

4.4.5 The breaker front panel shall be removable when the breaker is withdrawn, for ease of inspection and maintenance.

4.4.6 The secondary contacts shall be silver-plated and shall automatically engage in the breaker operating position, which can be manually engaged in the breaker test position.

4.4.7 Interlocks shall be provided to prevent closing of a breaker between operating and test positions, to trip breakers upon insertion or removal from housing and to discharge stored energy mechanisms upon insertion or removal from the housing. The breaker shall be secured positively in the housing between and including the operating and test positions.

4.4.8 The circuit breakers shall be self-aligning and shall be rigidly held in the operating position without locking bars or bolts.

4.4.9 Circuit breakers shall be provided with a test position wherein the primary contacts are disengaged and the secondary contacts are engaged to allow testing of the mechanism and circuitry. A two-pole switch shall be provided with one contact closed to indicate that the breaker is in the test position and the other contact shall close when the circuit breaker is fully engaged.

4.4. 10 Vacuum circuit breakers shall be provided with a minimum of four spare "a" and four spare "b" auxiliary contacts, wired to terminal blocks for future use.

4.4.11 Nameplates shall be provided for all switches and major components in the circuit breaker control enclosure.

4.4.12 Control and auxiliary switches shall have wiping type contacts. Roller type contacts are not acceptable.

4.4.13 All capacitor trip devices shall be per drawing 01A5-717 (Attachment II) and shall include a pushbutton and test light located on the front of the cubicle doors. Suppliers shall verify that capacitor sizing is adequate for use with manufacturer's trip coils to provide a minimum of two trip operations after loss of power.

4.4.14 The circuit breaker shall have a counter to register the number of breaker opens.

4.5 Bus

4.5.1 The main bus shall be copper and all taps shall be insulated with non-tracking flame retardant insulation. The main bus shall be rated for 1200 amperes continuous current, in accordance with ANSI standards for temperature rise. All bus shall be supported with porcelain insulating material. Aluminum bus bars are not acceptable.

4.5.2 All bus joints shall be silver-plated, insulated, and bolted with at least two stainless steel bolts, with stainless steel flat washers on head, nut, and lockwashers. Bolts shall be torqued to meet bus design strength for maximum short circuit forces. Provisions shall be made at the ends of the line-up for future extension of the buswork.

4.5.3 The main bus shall be braced to withstand the forces that result from the maximum short circuit current and/or the circuit breaker close-and-latch capability.

4.6 Boots

4.6.1 Molded boots shall be furnished for all buswork connections and all connections including, but not limited to, PT's, CT's, terminations, entrance bushings, and the station service transformer.

4.6.2 Boots shall be of a split design, easily installed and removed from the buswork using snap fasteners, nylon nuts and bolts, etc. Taped joints and/or taped boots are not acceptable.

4.7 Ground Bus

4.7.1 A ¼-inch by 2-inch copper ground bus shall extend the full length of the lineup and shall be bolted to the metal of each housing. All joints shall be made with at least two bolts.

4.7.2 Connectors shall be provided at each end, inside cubicles 1 and 12, for termination of 4/0 station ground stranded copper wire.

4.7.3 All circuit breaker and other equipment grounding devices shall be connected to the ground bus. A connector shall be provided in each cable termination cubicle for connecting cable shields and 250 MCM bare stranded-neutral copper wire.

4.7.4 Sections of copper bar may be connected to form the ground bus. The term continuous means the bus shall be all copper and not have some other material, such as a steel cubicle wall, connected between two sections of the copper bus.

4.8 Terminations

4.8.1 Line side power cable and control wiring shall enter from the bottom of the switchgear. Load side power cable and meter wiring will exit switchgear from the bottom.

4.8.2 Four-hole NEMA pad bolted terminals shall be furnished for all power cable terminations.

4.8.3 Sufficient clearance shall be provided to install stress relief cones on all power cable. Cable supports shall be provided in rear of all incoming cable compartments.

4.8.4 Phases shall be labeled in each termination compartment.

4.9 Instrument Transformers

4.9.1 The standard location for the current transformers on the bus side and line side of the breaker cubicles shall be front accessible to permit adding or changing current transformers without removing high voltage insulation connections. Shorting terminal blocks shall be furnished on the secondary of all the current transformers. All taps on multi-ratio current transformers shall be wired out to shorting terminal blocks accessible without removing circuit breaker or de-energizing equipment.

4.9.2 Current transformers shall be provided as indicated on the one-line diagram. These shall be mechanically rated to the momentary rating of the circuit breakers and shall be fully insulated for the rating of the switchgear.

4.9.3 Three metering-accuracy C.T.'s shall be provided in each of the four incoming line cubicles (BI, B2, B3, and B4; cubicles #5, #6, #8,and #9). These shall be provided for high burden with accuracy class 0.3 through B.9, rating factor 1.5 with a 1200:5 amp multi-ratio, Westinghouse SCV-D Type Cat# 6436C47HOl or approved equivalent. All other C.T.'s shall be Westinghouse SCV-D or approved equal with relay accuracy of C400.

4.9.4 Potential transformers shall be drawout type with primary and secondary fuses and shall be of the ratios indicated on the one-line diagram.

4.9.5 Three metering potential transformers, 7200-to-120-volt, accuracy-class 0.3 W, X, M, Y, connected Y-Y to the incoming service bus, fused with current limiting fuses and mounted on a drawout assembly shall be provided in cubicles 1 and 12.

4.9.6 One spare set of fuses shall be provided for each set of potential transformers.

4.10 Control Power Transformer and Automatic Transfer Switch

4. 10.1 A control power transformer, 12,470/7200-to-120/240 volts, and an automatic transfer switch shall be supplied to furnish all necessary control and auxiliary power for the entire switchgear assembly in the event that the preferred power source supplied by Austin Energy is lost. The automatic transfer switch shall provide for automatic or manual transfer capability.

4.10.2 The transformer shall be nonflammable dry type in a drawout enclosure with high voltage current limiting fuses. The Supplier is to provide two spare fuses.

4.10.3 The drawout enclosure shall be interlocked with a secondary breaker so that it cannot be opened unless the secondary breaker is in the open position.

4.10.4 Push-to-test indicating lamps shall be furnished on the cubicle panel front to indicate presence of voltage on each control power source and transfer switch position. In addition, one control (27) relay with double-throw double-pole contacts shall be furnished and connected to each source to provide remote alarm or indication.

4.11 Wiring

4.11.1 All panel power, control, and instrument-transformer secondary wiring shall be GE Vulkene insulated switchboard wire 600 volt, 90C Sl-57275, type SIS VW-1, single conductor, gray color, minimum size #14 AWG 41 strand tinned copper or buyer approved equal, terminated with ring-tongue insulated lugs. Fork-tongue terminals are not acceptable. Insulation of the wire must abut the ring-tongue terminal. All wiring from metering CT's and PT's to cubicle 1 shall be #10 AWG.

4.11.2 Wiring crossing hinges to hinged panels shall have fine stranding to prevent conductor breaking and shall be protected with sleeving to prevent abrasion.

4.11.3 Terminal blocks shall be rated for 600 V and 30 A per terminal. They shall accommodate wire sizes up to #10 gauge. All terminal blocks for external connections shall be completely free of factory wiring on the Austin Energy side of the terminal block. Wiring to these terminal blocks shall be grouped according to function, to allow a neat and orderly cable installation. Terminal blocks shall include 25 percent spare terminals. Terminal blocks shall not be mounted on floor, subfloor, or ceiling plates.

4.11.4 All C.T. leads shall be terminated on C.T. shorting and grounding type terminal blocks with ring type insulated terminals. All leads from each C.T. shall be brought to the terminal blocks. Terminal blocks shall be accessible from the front of the switchgear assembly and not located in the high voltage compartments. All C.T. wye and delta connections shall be made at the terminal blocks.

4.11.5 All wiring of transducer outputs shall be with #16 AWG shielded cable. Shields shall be grounded at the signal source only.

4.11.6 All secondary control wiring passing through primary compartments shall be enclosed in grounded metal troughs or conduit. A separate rigid or flexible trough shall be provided from cubicle 1 to cubicle 12, for metering C.T. and P.T. wiring.

4.11.7 Control power disconnects shall be provided for each circuit breaker.

4.11.8 Wiring between cubicles shall run from terminal board to terminal board in each cubicle. No splices shall be made in any wire.

4.11.9 All wiring shall be identified with captive permanent, clearly marked wire tags. Tags shall be of heat shrink type material. Supplier shall furnish samples with approval drawings.

4.11.10 Marathon heavy-duty keyless fuse blocks or equivalent shall be used. Pullout type fuse blocks are not acceptable.

4.11.11 Interconnect wiring shall be tagged, terminated, tested, then disconnected from both ends for shipment.

4.11.12 Supplier shall clearly identify all leads and terminal blocks intended for interconnections.

4.11.13 Provisions shall be made for the connection of future supervisory control. This shall include terminal block points for supervisory close, trip, network relay close blocking, circuit breaker and lockout relay status. These points shall all be grouped on the same or adjacent terminal blocks.

4.11.14 Alarm contacts shall be wired so that contact closing indicates an alarm condition.

4.11.15 One contact from each of the following shall be wired to a terminal block in cubicle #6 for connection to an external annunciator.

1. Transformer lockout relays
2. Bus differential lockout relays
3. Transformer low side vacuum circuit breaker trip
4. Feeder circuit breaker trip
5. Loss of normal control power
6. Loss of backup control power

4.12 Finish

4. 12.1 The switchgear shall be painted ANSI No.70 light gray in accordance with ANSI Z55.1, inside and outside.

4.12.2 All metal surfaces shall be cleaned and shotblasted before primer is applied. Cleaning and painting shall be done in a manner that will prevent dust or other airborne particles from contaminating freshly painted surfaces.

4.12.3 Surfaces shall be free of cracks, pits, projections, or other imperfections that would prevent the formation of a smooth, unbroken paint film.

4.12.4 All paint in any one paint coat shall be hard and dry through the entire paint film before the next coat is applied. In no case shall the elapsed time between the application of successive coats of paint to any surface be less than that recommended by the paint manufacturer.

4.12.5 Two coats of primer shall be applied to all exposed metal surfaces using application methods recommended by the paint manufacturer and shall be a minimum of two mils in thickness.

4.12.6 The top finish thickness shall be at least three mils in thickness at all points.

4.12.7 All primer and paint shall be lead-free.

4.13 Nameplates

4.13.1 The supplier shall furnish and install all nameplates as shown on Attachment I.

4.13.2 The nameplate material shall be laminated, phenol resin, 1/16" thick, semi-matte, black surfaces with white finish. The engraving shall cut through the black surface to the white lamination. Nameplates shall be fastened to the metal with permanent adhesive. Door mounted nameplates shall have a duplicate on the inside of the door.

4.13.3 The nameplate lettering shall be Gothic, block type, of standard sizes as shown on the nameplate schedules.

4.13.4 Each circuit breaker shall have affixed a waterproof tag stating the purchase order number, circuit breaker type, ratings, manufacturer, and shop order number.

4.13.5 Relay devices to which a device number is assigned shall have device number and relay type painted or otherwise indelibly and neatly marked on the rear of the case (e.g., "51-A, Over-Current Relay", etc.).

4.13.6 Supplier shall label with paint or otherwise identify each terminal block, all points used on each terminal block, and all fuse blocks.

4. 14 Relays

4.14.1 The following relays shall be used:

Device	Function	Type
51	Overcurrent	SEL-501-2
51	Overcurrent	SEL-351
87T	Transformer Differential	SEL-587-1
87B	Bus Differential	KAB Style # 6668D37A22
92	Network Relay	ETI with RS485, socket type or Cutler Hammer MPCR socket type

4.14.2 All relays shall be provided with covers.

4.14.3 Miscellaneous devices essential to the successful operation of the switchgear shall be mounted on the inside of the cubicle, on swinging panels, if necessary, to provide accessibility for maintenance and repair.

4.14.4 Relays mounted inside the cubicle shall be front connected.

4.14.5 Auxiliary tripping relays shall be mounted solidly to stationary sheets or panels to avoid accidental trips. Such devices shall not be mounted on hinged panels.

4. 14.6 Relays, fuses, or terminal blocks shall not be mounted on cubicle ceilings.

4.14.7 All devices mounted inside the cubicle shall be above the drawout level of the breaker.

4.14.8 All small miscellaneous items not specified elsewhere shall be supplied, including fuse blocks, fuses, wiring duct, terminal blocks, nameplates, resistors, capacitors, minilites and covers, etc., as shown on the drawings or required for a complete installation.

4.15 Cubicle Equipment Description

The following section provides a detailed description of the equipment in each cubicle. Where the supplier is allowed the option of furnishing either the ABB, SEL, or other manufacturer's devices, the supplier shall remain consistent through all cubicles in the selection of devices.

4.15.1 Cubicle 1 - Feeder 1

Item	Qty	Description
1	1	Digital meter, Electroindustries DWVA-300-H-KW-120VAC, with SENI-1 six-channel analog output module
2	1	Capacitor Trip Device per drawing 01A5-717
3	1	Breaker Control Switch, Electroswitch 2458D
4	1	Breaker Position Indicating Lamp, red translucent color cap, Type ET-16, 125 VDC, bulb #1835, GE 0116B6708G3R
5	1	Breaker Position Indicating Lamp, green translucent color cap, Type ET-16, 120 VAC, bulb #1835, GE 116B6708G5G
6	1	Meter Test Switch, 10 Pole, ABB Type FT-1, #129A514G01
7	1	Overcurrent Relay (ϕA, ϕB, ϕC), SEL-501-2
8	1	Overcurrent Relay (Neutral), SEL-501-2
9	1	Agastat Timing Relay, #7012PA
10		Diode, 1N4007 with MOV V250LA20B (as required)
11		Trip Blocking Diode, ECG 5932 with MOV V250LA20B (as required)

4.15.2 Cubicle 2 - Transition Bus

Item	Qty	Description

None

4.15.3 Cubicle 3 - Feeder 2

Item	Qty	Description
1	1	Digital meter, Electroindustries DWVA-300-H-KW-120VAC, with SENI-1 six-channel analog output module
2	1	Capacitor Trip Device per drawing 01A5-717
3	1	Breaker Control Switch, Electroswitch 2458D
4	1	Breaker Position Indicating Lamp, red translucent color cap, Type ET-16, 125 VDC, bulb #1835, GE 0116B6708G3R
5	1	Breaker Position Indicating Lamp, green translucent color cap, Type ET-16, 120 VAC, bulb #1835, GE 116B6708G5G
6	1	Meter Test Switch, 10 Pole, ABB Type FT-1, #129A514G01
7	1	Overcurrent Relay (ϕA, ϕB, ϕC), SEL-501-2
8	1	Overcurrent Relay (Neutral), SEL-501-2
9	1	Agastat Timing Relay, #7012PA
10		Diode, 1N4007 with MOV V250LA20B (as required)
11		Trip Blocking Diode, ECG 5932 with MOV V250LA20B (as required)
12	4	Push-to-test indicating lamp for control power source and transfer switch position indication, Type J, 120 VAC, amber glass lens, Square-D #9001-JT1A26 (or equivalent)
13	2	Control relay, DPDT, 120 VAC for control power source monitoring
14	1	Automatic transfer switch (to be sized for total load of switchgear assembly), Electroswitch 24202B
15	2	One pole circuit breakers for isolation of control power sources

4.15.4 Cubicle 4 - Feeder 3

Item	Qty	Description
1	1	Digital meter, Electroindustries DWVA-300-H-KW-120VAC, with SENI-1 six-channel analog output module
2	1	Capacitor Trip Device per drawing 01A5-717
3	1	Breaker Control Switch, Electroswitch 2458D
4	1	Breaker Position Indicating Lamp, red translucent color cap, Type ET-16, 125 VDC, bulb #1835, GE 0116B6708G3R
5	1	Breaker Position Indicating Lamp, green translucent color cap, Type ET-16, 120 VAC, bulb #1835, GE 116B6708G5G
6	1	Meter Test Switch, 10 Pole, ABB Type FT-1, #129A514G01
7	1	Overcurrent Relay (ϕA, ϕB, ϕC), SEL-501-2
8	1	Overcurrent Relay (Neutral), SEL-501-2
9	1	Agastat Timing Relay, #7012PA
10		Diode, 1N4007 with MOV V250LA20B (as required)
11		Trip Blocking Diode, ECG 5932 with MOV V250LA20B (as required)

4.15.5 Cubicle 5 - Transformer 1

Item	Qty	Description
1	1	Transformer Differential Relay, SEL-587-1
2	1	Digital meter, Electroindustries DWVA-300-H-KW-120VAC, with SENI-1 six-channel analog output module
3	1	Sudden Pressure Monitor Lamp, white translucent color cap, Type ET-16, 120 VAC, bulb #1835, GE 0116B6708G5W
4	1	High-Side Breaker Control Switch, Electroswitch 2458D
5	1	High-Side Switch Monitor Lamp, red translucent color cap, Type ET-16, 125 VDC, bulb #1835, GE 0116B6708G3R
6	1	High-Side Switch Monitor Lamp, green translucent color cap, Type ET-16, 120 VAC, bulb #1835, GE 116B6708G5G
7	1	Transformer Lockout Relay, 125 VDC Electroswitch 7804D
8	1	Lockout 86T1 Monitor Lamp, white translucent color cap, Type ET-16, 120 VAC, bulb #1835, GE 0116B6708G5W
9	1	Low-Side Breaker Control Switch, Electroswitch 2458D
10	1	Low-Side Switch Monitor Lamp, red translucent color cap, Type ET-16, 125 VDC, bulb #1835, GE 0116B6708G3R
11	1	Low-Side Switch Monitor Lamp, green translucent color cap, Type ET-16, 120 VAC, bulb #1835, GE 116B6708G5G
12	1	Lockout Capacitor Trip Device per Drawing 01A5-717
13	1	Low-Side Breaker Capacitor Trip Device per Drawing 01A5-717
14	1	Lockout Trip Test Switch, ABB Type FT-1, 129A501G01
15	1	Low-Side Metering Test Switch, 10 Pole, ABB Type FT-1, #129A514G01
16	1	LS Breaker Overcurrent Relay (ϕA, ϕB, ϕC), SEL-351
17	1	LS Breaker Overcurrent Relay (Neutral), SEL-351
18	2	Network Relay, ETI with RS485 board, socket type (1 spare) or Cutler Hammer MPCR
19	2	Agastat Timing Relay, #7012 PA
20		Diode, 1N4007 with MOV V250LA20B (as required)
21		Trip Blocking diode, ECG 5932 with MOV V250LA0B (as required)

4.15.6 Cubicle 6 - Transformer 2

Item	Qty	Description
1	1	Transformer Differential Relay, SEL-587-1
2	1	Digital meter, Electroindustries DWVA-300-H-KW-120VAC, with SENI-1 six-channel analog output module
3	1	Sudden Pressure Monitor Lamp, white translucent color cap, Type ET-16, 120 VAC, bulb #1835, GE 0116B6708G5W
4	1	High-Side Breaker Control Switch, Electroswitch 2458D
5	1	High-Side Switch Monitor Lamp, red translucent color cap, Type ET-16, 125 VDC, bulb #1835, GE 0116B6708G3R
6	1	High-Side Switch Monitor Lamp, green translucent color cap, Type ET-16, 120 VAC, bulb #1835, GE 116B6708G5G
7	1	Transformer Lockout Relay, 125 VDC Electroswitch 7804D
8	1	Lockout 86T2 Monitor Lamp, white translucent color cap, Type ET-16, 120 VAC, bulb #1835, GE 0116B6708G5W
9	1	Low-Side Breaker Control Switch, Electroswitch 2458D
10	1	Low-Side Switch Monitor Lamp, red translucent color cap, Type ET-16, 125 VDC, bulb #1835, GE 0116B6708G3R
11	1	Low-Side Switch Monitor Lamp, green translucent color cap, Type ET-16, 120 VAC, bulb #1835, GE 116B6708G5G
12	1	Lockout Capacitor Trip Device per Drawing 01A5-717
13	1	Low-Side Breaker Capacitor Trip Device per Drawing 01A5-717
14	1	Lockout Trip Test Switch, ABB Type FT-1, 129A501G01
15	1	Low-Side Metering Test Switch, 10 Pole, ABB Type FT-1, #129A514G01
16	1	LS Breaker Overcurrent Relay (ϕA, ϕB, ϕC), SEL-351
17	1	LS Breaker Overcurrent Relay (Neutral), SEL-351
18	2	Network Relay, ETI with RS485 board, socket type (1 spare) or Cutler Hammer MPCR
19	2	Agastat Timing Relay, #7012 PA
20		Diode, 1N4007 with MOV V250LA20B (as required)

21		Trip Blocking diode, ECG 5932 with MOV V250LA0B (as required)
22	1	Bus Lockout Relay, 125 VDC, Electroswitch 7805D
23	1	Lockout 86B1 Monitor Lamp, white translucent color cap, Type ET-16, 120 VAC, bulb #1835, GE 0116B6708G5W
24	1	Bus Differential Relay (ϕA), KAB Style #6668D37A22
25	1	Bus Differential Relay (ϕB), KAB Style #6668D37A22
26	1	Bus Differential Relay (ϕC), KAB Style #6668D37A22
27	1	Bus Differential Capacitor Trip Device per Drawing 01A5-717
28	1	Bus Differential Lockout Trip Test Switch A, ABB Type FT-1, 129A501G01
29	1	Bus differential Lockout Trip Test Switch B, ABB Type FT-1, 129A501G01

4.15.7 Cubicle 7 - Bus Tie Breaker

Item	Qty	Description
1	1	Bus 1 Voltmeter, Electroindustries 3DVA120-H-(SNFI-1), with SNFI-1 four- channel analog output module
2	1	Bus 2 Voltmeter, Electroindustries 3DVA120-H-(SNFI-1), with SNFI-1 four-channel analog output module
3	1	Digital meter, Electroindustries DWVA-300-H-KW-120VAC, with SENI-1 six-channel analog output module
4	1	Bus Tie Breaker Capacitor Trip Device per Drawing 01A5-717
5	1	Breaker Control Switch, Electroswitch 2458D
6	1	Breaker Position Indicating Lamp, red translucent color cap, Type ET-16, 125 VDC, bulb #1835, GE 0116B6708G3R
7	1	Breaker Position Indicating Lamp, green translucent color cap, Type ET-16, 120 VAC, bulb #1835, GE 116B6708G5G
8	1	Meter Test Switch, 10 Pole, ABB Type FT-1, 129A514G01
9	1	Tie Breaker Overcurrent Relay (ϕA, ϕB, ϕC), SEL-351
10	1	Tie Breaker Overcurrent Relay (Neutral), SEL-351
11	1	Voltmeter Test Switch, 10 Pole, ABB Type FT-1, 129A501G01
12		Diode, 1N4007 with MOV V250LA20B (as required)

4.15.8 Cubicle 8 - Transformer 3

Item	Qty	Description
1	1	Transformer Differential Relay, SEL-587-1
2	1	Digital meter, Electroindustries DWVA-300-H-KW-120VAC, with SENI-1 six-channel analog output module
3	1	Sudden Pressure Monitor Lamp, white translucent color cap, Type ET-16, 120 VAC, bulb #1835, GE 0116B6708G5W
4	1	High-Side Breaker Control Switch, Electroswitch 2458D
5	1	High-Side Switch Monitor Lamp, red translucent color cap, Type ET-16, 125 VDC, bulb #1835, GE 0116B6708G3R
6	1	High-Side Switch Monitor Lamp, green translucent color cap, Type ET-16, 120 VAC, bulb #1835, GE 116B6708G5G
7	1	Transformer Lockout Relay, 125 VDC Electroswitch 7804D
8	1	Lockout 86T3 Monitor Lamp, white translucent color cap, Type ET-16, 120 VAC, bulb #1835, GE 0116B6708G5W
9	1	Low-Side Breaker Control Switch, Electroswitch 2458D
10	1	Low-Side Switch Monitor Lamp, red translucent color cap, Type ET-16, 125 VDC, bulb #1835, GE 0116B6708G3R
11	1	Low-Side Switch Monitor Lamp, green translucent color cap, Type ET-16, 120 VAC, bulb #1835, GE 116B6708G5G
12	1	Lockout Capacitor Trip Device per Drawing 01A5-717
13	1	Low-Side Breaker Capacitor Trip Device per Drawing 01A5-717
14	1	Lockout Trip Test Switch, ABB Type FT-1, 129A501G01
15	1	Low-Side Metering Test Switch, 10 Pole, ABB Type FT-1, #129A514G01
16	1	LS Breaker Overcurrent Relay (ϕA, ϕB, ϕC), SEL-351
17	1	LS Breaker Overcurrent Relay (Neutral), SEL-351
18	2	Network Relay, ETI with RS485 board, socket type (1 spare) or Cutler Hammer MPCR
19	2	Agastat Timing Relay, #7012 PA
20		Diode, 1N4007 with MOV V250LA20B (as required)

21		Trip Blocking diode, ECG 5932 with MOV V250LA0B (as required)
22	1	Bus Lockout Relay, 125 VDC, Electroswitch 7805D
23	1	Lockout 86B2 Monitor Lamp, white translucent color cap, Type ET-16, 120 VAC, bulb #1835, GE 0116B6708G5W
24	1	Bus Differential Relay (ϕA), KAB Style #6668D37A22
25	1	Bus Differential Relay (ϕB), KAB Style #6668D37A22
26	1	Bus Differential Relay (ϕC), KAB Style #6668D37A22
27	1	Bus Differential Capacitor Trip Device per Drawing 01A5-717
28	1	Bus Differential Lockout Trip Test Switch A, ABB Type FT-1, 129A501G01
29	1	Bus differential Lockout Trip Test Switch B, ABB Type FT-1, 129A501G01

4.15.9 Cubicle 9 - Transformer 4

Item	Qty	Description
1	1	Transformer Differential Relay, SEL-587-1
2	1	Digital meter, Electroindustries DWVA-300-H-KW-120VAC, with SENI-1 six-channel analog output module
3	1	Sudden Pressure Monitor Lamp, white translucent color cap, Type ET-16, 120 VAC, bulb #1835, GE 0116B6708G5W
4	1	High-Side Breaker Control Switch, Electroswitch 2458D
5	1	High-Side Switch Monitor Lamp, red translucent color cap, Type ET-16, 125 VDC, bulb #1835, GE 0116B6708G3R
6	1	High-Side Switch Monitor Lamp, green translucent color cap, Type ET-16, 120 VAC, bulb #1835, GE 116B6708G5G
7	1	Transformer Lockout Relay, 125 VDC Electroswitch 7804D
8	1	Lockout 86T4 Monitor Lamp, white translucent color cap, Type ET-16, 120 VAC, bulb #1835, GE 0116B6708G5W
9	1	Low-Side Breaker Control Switch, Electroswitch 2458D
10	1	Low-Side Switch Monitor Lamp, red translucent color cap, Type ET-16, 125 VDC, bulb #1835, GE 0116B6708G3R
11	1	Low-Side Switch Monitor Lamp, green translucent color cap, Type ET-16, 120 VAC, bulb #1835, GE 116B6708G5G
12	1	Lockout Capacitor Trip Device per Drawing 01A5-717
13	1	Low-Side Breaker Capacitor Trip Device per Drawing 01A5-717
14	1	Lockout Trip Test Switch, ABB Type FT-1, 129A501G01
15	1	Low-Side Metering Test Switch, 10 Pole, ABB Type FT-1, #129A514G01
16	1	LS Breaker Overcurrent Relay (ϕA, ϕB, ϕC), SEL-351
17	1	LS Breaker Overcurrent Relay (Neutral), SEL-351
18	2	Network Relay, ETI with RS485 board, socket type (1 spare) or Cutler Hammer MPCR
19	2	Agastat Timing Relay, #7012 PA
20		Diode, 1N4007 with MOV V250LA20B (as required)
21		Trip Blocking diode, ECG 5932 with MOV V250LA0B (as required)

4.15.10 Cubicle 10 - Feeder 4

Item	Qty	Description
1	1	Digital meter, Electroindustries DWVA-300-H-KW-120VAC, with SENI-1 six-channel analog output module
2	1	Capacitor Trip Device per drawing 01A5-717
3	1	Breaker Control Switch, Electroswitch 2458D
4	1	Breaker Position Indicating Lamp, red translucent color cap, Type ET-16, 125 VDC, bulb #1835, GE 0116B6708G3R
5	1	Breaker Position Indicating Lamp, green translucent color cap, Type ET-16, 120 VAC, bulb #1835, GE 116B6708G5G
6	1	Meter Test Switch, 10 Pole, ABB Type FT-1, #129A514G01
7	1	Overcurrent Relay (ϕA, ϕB, ϕC), SEL-501-2
8	1	Overcurrent Relay (Neutral), SEL-501-2
9	1	Agastat Timing Relay, #7012PA
10		Diode, 1N4007 with MOV V250LA20B (as required)
11		Trip Blocking Diode, ECG 5932 with MOV V250LA20B (as required)

4.15.11 Cubicle 11 - Feeder 5

Item	Qty	Description
1	1	Digital meter, Electroindustries DWVA-300-H-KW-120VAC, with SENI-1 six-channel analog output module
2	1	Capacitor Trip Device per drawing 01A5-717
3	1	Breaker Control Switch, Electroswitch 2458D
4	1	Breaker Position Indicating Lamp, red translucent color cap, Type ET-16, 125 VDC, bulb #1835, GE 0116B6708G3R
5	1	Breaker Position Indicating Lamp, green translucent color cap, Type ET-16, 120 VAC, bulb #1835, GE 116B6708G5G
6	1	Meter Test Switch, 10 Pole, ABB Type FT-1, #129A514G01
7	1	Overcurrent Relay (ϕA, ϕB, ϕC), SEL-501-2
8	1	Overcurrent Relay (Neutral), SEL-501-2
9	1	Agastat Timing Relay, #7012PA
10		Diode, 1N4007 with MOV V250LA20B (as required)
11		Trip Blocking Diode, ECG 5932 with MOV V250LA20B (as required)

4.15.12 Cubicle 12 - Feeder 6

Item	Qty	Description
1	1	Digital meter, Electroindustries DWVA-300-H-KW-120VAC, with SENI-1 six-channel analog output module
2	1	Capacitor Trip Device per drawing 01A5-717
3	1	Breaker Control Switch, Electroswitch 2458D
4	1	Breaker Position Indicating Lamp, red translucent color cap, Type ET-16, 125 VDC, bulb #1835, GE 0116B6708G3R
5	1	Breaker Position Indicating Lamp, green translucent color cap, Type ET-16, 120 VAC, bulb #1835, GE 116B6708G5G
6	1	Meter Test Switch, 10 Pole, ABB Type FT-1, #129A514G01
7	1	Overcurrent Relay (ϕA, ϕB, ϕC), SEL-501-2
8	1	Overcurrent Relay (Neutral), SEL-501-2
9	1	Agastat Timing Relay, #7012PA
10		Diode, 1N4007 with MOV V250LA20B (as required)
11		Trip Blocking Diode, ECG 5932 with MOV V250LA20B (as required)

5.0 ACCESSORIES

The switchgear manufacturer shall furnish accessories for test, inspection, maintenance, and operation, including:

(1) A ground and test device for use in any circuit breaker cubicle to permit testing or grounding of the bus and line circuits. The device is to be mounted on a frame that can be easily rolled in and out of the circuit breaker cubicles.

(2) A maintenance tool for manually charging the breaker closing spring and manually opening the shutter.

(3) A levering crank for moving the breaker between test and connected positions.

(4) A test jumper for electrically operating the breaker while it is out of its compartment.

(5) A breaker lifting yoke used for attachment to breaker for lifting the breaker on or off the compartment rails.

(6) A set of rail extensions and rail clamps.

(7) A dockable transport dolly for moving the breaker about outside its compartment.

(8) A test cabinet for testing electrically operated breakers outside the housing.

(9) A ramp for rolling the breaker mounted in the lower compartment directly onto the floor.

(10) An electrical levering device.

6.0 INSPECTION AND TESTING

6.1 General

Austin Energy reserves the right to visit the manufacturing facility and observe the switchgear and circuit breakers undergoing construction and testing. Advance notice of at least two weeks shall be given to Austin Energy before the start of testing.

6.2 Factory Testing

Before shipment, the fully assembled switchgear line-up shall be tested in accordance with ANSI/IEEE C37.54-1987 and ANSI/IEEE C37.09-1979 for the circuit breakers and ANSI/IEEE C37.55-1989 and ANSI/IEEE C37.20.2-1987 for the switchgear. Five copies of certified test reports shall be furnished before shipment.

6.3 Field Testing

The Supplier shall provide personnel and equipment to field-inspect and test each circuit breaker for proper operation. The supplier's service personnel shall inspect units per the manufacturer's recommendations, including the following as a minimum:

(1) Check interrupters, operating mechanism, and current transformers for loose hardware, correct alignment, and proper operation.

(2) Test vacuum bottles for dielectric strength

(3) Check all bus joints and supports for tightness

The successful bidder shall mail a copy of all test reports within ten days after completion of tests.

7.0 DRAWINGS

7.1 The following will be furnished to the Supplier as part of these specifications:

(1) Nameplate schedules (Attachment I)

(2) Capacitor trip device drawing (Attachment II; Drawing 01A5-717)

(3) Relay one-line diagram (Attachment III; Drawings 01F5-718 through 01F5-720)

(4) Switchgear layout drawing (Attachment IV; Drawing 01F5-721)

(5) Typical control schematics (to be given to successful bidder)

7.2 The Supplier shall furnish to the Austin Energy engineer three sets of approval drawings within four weeks after the receipt of the order and prior to beginning construction of the switchgear. The drawings shall include but not be limited to the following:

(1) Switchgear three-line AC and DC schematics including alarm contacts

(2) Switchgear internal wiring diagram

(3) One-line drawing showing size and location of control and power conduit entrance plates

(4) Excitation and ratio correction factor curves for all current transformers

(5) Interrupting duty for each feeder circuit breaker

(6) Switchgear material schedule

(7) Nameplate information

All drawings shall be 24" x 36". A minimum of two weeks is required by Austin Energy for review of approval drawings.

The Supplier shall furnish five sets of "as built" electrical control drawings in addition to one set on AutoCad version 14 (or later) on 5 1/4" or 3 1/2" disk prior to shipment of the switchgear.

The Supplier shall furnish complete installation, operating, and maintenance instruction books for each of the switchgear components and each relay and control device. The books are to be bound in 8 1/2" x 11" light weight folders suitable for reference and filing (five copies), with the particular model supplied clearly noted on documents that apply to more than one type or model. A spare parts list with prices and catalog numbers shall also be provided.

In addition to the above-supplied instruction books, one set of instruction books, complete with "as built" drawings, shall be packed with the metal-clad switchgear when shipped. The Supplier shall ship these documents in weatherproof packaging.

All drawings and correspondence, after contract award, shall be directed to:

Austin Energy
Leonard Hough, Network Engineering
4411-B Meinardus Drive,
Austin, Texas 78744.

8.0 DELIVERY

8.1 The apparatus shall be shipped in assembly units, insofar as consistent with good shipping practices. When items must be disassembled for shipment, they shall be matchmarked. All units and their containers shall be piece marked and show the purchase order number.

8.2 Machined and other unpainted surfaces shall be fully protected from impact and weather damage with all holes and openings plugged or covered. All costs of packing, loading, blocking, and unloading are to be borne by the Supplier. Delivery shall be made to the job site.

8.3 Cubicles #1 and #2 shall be shipped as individual units. The remaining cubicles shall be shipped in two-cubicle units, pairing cubicles #3 and #4, #5 and #6, #7 and #8, #9 and #10, #11 and #12. For purposes of shipping, the cubicles shall be loaded onto the truck in such a manner that cubicle #2 is the first to be unloaded from the truck at the delivery point; followed by cubicle #11/12; then cubicle #9/10; then cubicle #7/8; then cubicle #5/6; then cubicle #3/4; and finally cubicle #1. Circuit breakers shall be shipped separately. Supplier shall provide detailed instructions for field assembly.

8.4 Final acceptance of the work supplied under this specification shall be rendered when the following conditions have been met:

(1) Delivery requirements as specified have been met.

(2) Instruction book requirements as specified have been met.

(3) Sufficient tests and inspections have been made by the purchaser to determine that the work meets all the requirements of the specification and any written agreements between Austin Energy and the Supplier. The conditions of any tests shall be mutually agreed upon by Austin Energy and Supplier and the Supplier shall be notified of and may be represented at all tests made. If inspection and/or tests show the work or any part thereof not to be warranted and/or contracted for, Austin Energy may refuse to accept it, and the Supplier shall be so advised and shall have a reasonable time within which to correct the work at the Supplier's own expense.

8.5 Austin Energy shall be given 48 hours advance notice of intent to deliver. If proper notice of intent to deliver is not received, then the shipment will be rejected. Any additional charges due to the refusal of the shipment will be the responsibility of the Supplier.

9.0 WARRANTY

If any defect in the apparatus supplied or any failure to comply with said specification shall appear within the period of one year from the energization of the equipment or a maximum of eighteen months from the date of final acceptance of the work, Supplier shall be immediately notified, and Supplier shall thereupon correct without delay and at Supplier's own expense the defect or defects of failure of compliance, by repairing the defective part or parts, by supplying a non-defective replacement or replacements, or by correcting a defective or deficient design. Supplier shall further replace or repair all other similar equipment if such defect may reasonably be expected to develop or occur in said similar equipment. Removal and installation cost of the defective parts or equipment shall be at the Supplier's expense. In the event the Supplier must correct any defect or defects or failure of compliance by repair, replacement or correction as hereinabove provided, then with respect to the apparatus corrected, the aforesaid period shall begin from the date of completion of installation of such correction and acceptance thereof, provided same is not unreasonably delayed by Austin Energy. This warranty provision is in addition to and not in lieu of any other warranties or rights Austin Energy may have.

ATTACHMENT I

NAMEPLATE SCHEDULES

ATTACHMENT I

NAMEPLATE SCHEDULE
CUBICLE 1

NP#	First Line	Second Line	Third Line
1	CUBICLE 1	FEEDER 1	
2	FEEDER 1	BREAKER METERING	
3	CIRCUIT BREAKER	CAP. TRIP DEVICE	TEST
4	FEEDER 1	CIRCUIT BREAKER	CONTROL SWITCH
5	FEEDER 1	METER	TEST SWITCH
6	FEEDER 1	OVERCURRENT RELAY	51 ϕA, ϕB, ϕC
7	FEEDER 1	OVERCURRENT RELAY	51 N

NOTES
All nameplates are black with white letters.
NP#1 is 1" x 4", with 3/8" letters.
All others are 3/4" x 2 1/2", with 5/32" letters.

ATTACHMENT I

NAMEPLATE SCHEDULE
CUBICLE 2

NP#	First Line	Second Line	Third Line
1	CUBICLE 2	TRANSITION BUS	

NOTES
The nameplate is black with white letters.
NP#1 is 1" x 4", with 3/8" letters.

ATTACHMENT I

NAMEPLATE SCHEDULE
CUBICLE 3

NP#	First Line	Second Line	Third Line
1	CUBICLE 3	FEEDER 2	
2	FEEDER 2	BREAKER METERING	
3	CIRCUIT BREAKER	CAP. TRIP DEVICE	TEST
4	FEEDER 2	CIRCUIT BREAKER	CONTROL SWITCH
5	FEEDER 2	METER	TEST SWITCH
6	FEEDER 2	OVERCURRENT RELAY	51 ϕA, ϕB, ϕC
7	FEEDER 2	OVERCURRENT RELAY	51 N
8	NETWORK GRID	POWER	AVAILABLE
9	CONTROL POWER	TRANSFORMER	AVAILABLE
10	AUTOMATIC TRANSFER	SWITCH	NORMAL
11	AUTOMATIC TRANSFER	SWITCH	EMERGENCY

NOTES
All nameplates are black with white letters.
NP#1 is 1" x 4", with 3/8" letters.
All others are 3/4" x 2 1/2", with 5/32" letters.

ATTACHMENT I

NAMEPLATE SCHEDULE
CUBICLE 4

NP#	First Line	Second Line	Third Line
1	CUBICLE 4	FEEDER 3	
2	FEEDER 3	BREAKER METERING	
3	CIRCUIT BREAKER	CAP. TRIP DEVICE	TEST
4	FEEDER 3	CIRCUIT BREAKER	CONTROL SWITCH
5	FEEDER 3	METER	TEST SWITCH
6	FEEDER 3	OVERCURRENT RELAY	51 ϕA, ϕB, ϕC
7	FEEDER 3	OVERCURRENT RELAY	51 N

NOTES
All nameplates are black with white letters.
NP#1 is 1" x 4", with 3/8" letters.
All others are 3/4" x 2 1/2", with 5/32" letters.

ATTACHMENT I

NAMEPLATE SCHEDULE
CUBICLE 5

NP#	First Line	Second Line	Third Line
1	CUBICLE 5	TRANSFORMER 1	
2	TRANSFORMER 1	DIFFERENTIAL	87T1 ϕA, ϕB, ϕC
3	TRANSFORMER 1	LOW SIDE CIRCUIT	BREAKER METERING
4	TRANSFORMER 1	SUDDEN PRESSURE	TEMPERATURE TRIP
5	TRANSFORMER 1	HIGH SIDE CONTROL	SWITCH S1
6	TRANSFORMER 1	LOCKOUT	86T1
7	TRANSFORMER 1	LOW SIDE BREAKER	CONTROL SWITCH
8	TRANSFORMER 1	LOCKOUT CAP. TRIP	DEVICE TEST
9	TRANSFORMER 1	LS BREAKER CAP. TRIP	DEVICE TEST
10	TRANSFORMER 1	LOCKOUT TRIP	TEST SWITCH
11	TRANSFORMER 1	LOW SIDE METERING	TEST SWITCH
12	TRANSFORMER 1	LS BREAKER OVERCURRENT	51T1 ϕA, ϕB, ϕC
13	TRANSFORMER 1	LS BREAKER OVERCURRENT	5LT1 N
14	TRANSFORMER 1	LS BREAKER NETWORK	RELAY 92T1

NOTES
All nameplates are black with white letters.
NP#1 is 1" x 4", with 3/8" letters.
All others are 3/4" x 2 1/2", with 5/32" letters.

ATTACHMENT I

NAMEPLATE SCHEDULE
CUBICLE 6

NP#	First Line	Second Line	Third Line
1	CUBICLE 6	TRANSFORMER 2	
2	TRANSFORMER 2	DIFFERENTIAL	87T2 ϕA, ϕB, ϕC
3	TRANSFORMER 2	LOW SIDE CIRCUIT	BREAKER METERING
4	TRANSFORMER 2	SUDDEN PRESSURE	TEMPERATURE TRIP
5	TRANSFORMER 2	HIGH SIDE CONTROL	SWITCH S2
6	TRANSFORMER 2	LOCKOUT	86T2
7	TRANSFORMER 2	LOW SIDE BREAKER	CONTROL SWITCH
8	TRANSFORMER 2	LOCKOUT CAP. TRIP	DEVICE TEST
9	TRANSFORMER 2	LS BREAKER CAP. TRIP	DEVICE TEST
10	TRANSFORMER 2	LOCKOUT TRIP	TEST SWITCH
11	TRANSFORMER 2	LOW SIDE METERING	TEST SWITCH
12	TRANSFORMER 2	LS BREAKER OVERCURRENT	51T2 ϕA, ϕB, ϕC
13	TRANSFORMER 2	LS BREAKER OVERCURRENT	5LT2 N
14	TRANSFORMER 2	LS BREAKER NETWORK	RELAY 92T2
15	BUS 1	DIFFERENTIAL LOCKOUT	86B1
16	BUS 1	DIFFERENTIAL RELAY	87B1 ϕA
17	BUS 1	DIFFERENTIAL RELAY	87B1 ϕB
18	BUS 1	DIFFERENTIAL RELAY	87B1 ϕC
19	BUS 1	DIFFERENTIAL CAP. TRIP	DEVICE TEST
20	BUS 1	DIFFERENTIAL LOCKOUT	TRIP TEST SWITCH A
21	BUS 1	DIFFERENTIAL LOCKOUT	TRIP TEST SWITCH B

NOTES
All nameplates are black with white letters.
NP#1 is 1" x 4", with 3/8" letters.
All others are 3/4" x 2 1/2", with 5/32" letters.

ATTACHMENT I

NAMEPLATE SCHEDULE
CUBICLE 7

NP#	First Line	Second Line	Third Line
1	CUBICLE 7	BUS TIE BREAKER	
2	BUS 1	VOLTAGE	
3	BUS 2	VOLTAGE	
4	BUS TIE BREAKER	AMPS	
5	BUS TIE BREAKER	CAP. TRIP	DEVICE TEST
6	BUS TIE BREAKER	CONTROL SWITCH	
7	BUS TIE BREAKER	METER	TEST SWITCH
8	BUS TIE BREAKER	OVERCURRENT RELAY	51 ϕA, ϕB, ϕC
9	BUS TIE BREAKER	OVERCURRENT RELAY	51 N
10	VOLTMETER	TRANSDUCER	TEST SWITCH

NOTES
All nameplates are black with white letters.
NP#1 is 1" x 4", with 3/8" letters.
All others are 3/4" x 2 1/2", with 5/32" letters.

ATTACHMENT I

NAMEPLATE SCHEDULE
CUBICLE 8

NP#	First Line	Second Line	Third Line
1	CUBICLE 8	TRANSFORMER 3	
2	TRANSFORMER 3	DIFFERENTIAL	87T3 ϕA, ϕB, ϕC
3	TRANSFORMER 3	LOW SIDE CIRCUIT	BREAKER METERING
4	TRANSFORMER 3	SUDDEN PRESSURE	TEMPERATURE TRIP
5	TRANSFORMER 3	HIGH SIDE CONTROL	SWITCH S3
6	TRANSFORMER 3	LOCKOUT	86T3
7	TRANSFORMER 3	LOW SIDE BREAKER	CONTROL SWITCH
8	TRANSFORMER 3	LOCKOUT CAP. TRIP	DEVICE TEST
9	TRANSFORMER 3	LS BREAKER CAP. TRIP	DEVICE TEST
10	TRANSFORMER 3	LOCKOUT TRIP	TEST SWITCH
11	TRANSFORMER 3	LOW SIDE METERING	TEST SWITCH
12	TRANSFORMER 3	LS BREAKER OVERCURRENT	51T3 ϕA, ϕB, ϕC
13	TRANSFORMER 3	LS BREAKER OVERCURRENT	5LT3 N
14	TRANSFORMER 3	LS BREAKER NETWORK	RELAY 92T3
15	BUS 2	DIFFERENTIAL LOCKOUT	86B2
16	BUS 2	DIFFERENTIAL RELAY	87B2 ϕA
17	BUS 2	DIFFERENTIAL RELAY	87B2 ϕB
18	BUS 2	DIFFERENTIAL RELAY	87B2 ϕC
19	BUS 2	DIFFERENTIAL CAP. TRIP	DEVICE TEST
20	BUS 2	DIFFERENTIAL LOCKOUT	TRIP TEST SWITCH A
21	BUS 2	DIFFERENTIAL LOCKOUT	TRIP TEST SWITCH B

NOTES
All nameplates are black with white letters.
NP#1 is 1" x 4", with 3/8" letters.
All others are 3/4" x 2 1/2", with 5/32" letters.

ATTACHMENT I

NAMEPLATE SCHEDULE
CUBICLE 9

NP#	First Line	Second Line	Third Line
1	CUBICLE 9	TRANSFORMER 4	
2	TRANSFORMER 4	DIFFERENTIAL	87T4 ϕA, ϕB, ϕC
3	TRANSFORMER 4	LOW SIDE CIRCUIT	BREAKER METERING
4	TRANSFORMER 4	SUDDEN PRESSURE	TEMPERATURE TRIP
5	TRANSFORMER 4	HIGH SIDE CONTROL	SWITCH S4
6	TRANSFORMER 4	LOCKOUT	86T4
7	TRANSFORMER 4	LOW SIDE BREAKER	CONTROL SWITCH
8	TRANSFORMER 4	LOCKOUT CAP. TRIP	DEVICE TEST
9	TRANSFORMER 4	LS BREAKER CAP. TRIP	DEVICE TEST
10	TRANSFORMER 4	LOCKOUT TRIP	TEST SWITCH
11	TRANSFORMER 4	LOW SIDE METERING	TEST SWITCH
12	TRANSFORMER 4	LS BREAKER OVERCURRENT	51T4 ϕA, ϕB, ϕC
13	TRANSFORMER 4	LS BREAKER OVERCURRENT	5LT4 N
14	TRANSFORMER 4	LS BREAKER NETWORK	RELAY 92T4

NOTES
All nameplates are black with white letters.
NP#1 is 1" x 4", with 3/8" letters.
All others are 3/4" x 2 1/2", with 5/32" letters.

ATTACHMENT I

NAMEPLATE SCHEDULE
CUBICLE 10

NP#	First Line	Second Line	Third Line
1	CUBICLE 10	FEEDER 4	
2	FEEDER 4	BREAKER METERING	
3	CIRCUIT BREAKER	CAP. TRIP DEVICE	TEST
4	FEEDER 4	CIRCUIT BREAKER	CONTROL SWITCH
5	FEEDER 4	METER	TEST SWITCH
6	FEEDER 4	OVERCURRENT RELAY	51 ϕA, ϕB, ϕC
7	FEEDER 4	OVERCURRENT RELAY	51 N

NOTES
All nameplates are black with white letters.
NP#1 is 1" x 4", with 3/8" letters.
All others are 3/4" x 2 1/2", with 5/32" letters.

ATTACHMENT I

NAMEPLATE SCHEDULE
CUBICLE 11

NP#	First Line	Second Line	Third Line
1	CUBICLE 11	FEEDER 5	
2	FEEDER 5	BREAKER METERING	
3	CIRCUIT BREAKER	CAP. TRIP DEVICE	TEST
4	FEEDER 5	CIRCUIT BREAKER	CONTROL SWITCH
5	FEEDER 5	METER	TEST SWITCH
6	FEEDER 5	OVERCURRENT RELAY	51 ϕA, ϕB, ϕC
7	FEEDER 5	OVERCURRENT RELAY	51 N

NOTES
All nameplates are black with white letters.
NP#1 is 1" x 4", with 3/8" letters.
All others are 3/4" x 2 1/2", with 5/32" letters.

ATTACHMENT I

NAMEPLATE SCHEDULE
CUBICLE 12

NP#	First Line	Second Line	Third Line
1	CUBICLE 12	FEEDER 6	
2	FEEDER 6	BREAKER METERING	
3	CIRCUIT BREAKER	CAP. TRIP DEVICE	TEST
4	FEEDER 6	CIRCUIT BREAKER	CONTROL SWITCH
5	FEEDER 6	METER	TEST SWITCH
6	FEEDER 6	OVERCURRENT RELAY	51 ϕA, ϕB, ϕC
7	FEEDER 6	OVERCURRENT RELAY	51 N

NOTES
All nameplates are black with white letters.
NP#1 is 1" x 4", with 3/8" letters.
All others are 3/4" x 2 1/2", with 5/32" letters.

ATTACHMENT II

CAPACITOR TRIP DEVICE

DRAWING NUMBER 01A5-717

(8 ½” X 11" SHEET)

ATTACHMENT III

RELAY ONE-LINE DIAGRAM

DRAWING NUMBERS 01F5-718, 01F5-719, 01F5-720

(24" X 36" SHEETS)

ATTACHMENT IV

SWITCHGEAR LAYOUT

DRAWING NUMBER 01F5-721

(24" X 36" SHEET)