

5. COMMUNICATION LINE

- 5.1. CNP will order and pay for the communication line(s) from the telephone company. The Customer shall supply the name and telephone number of a representative for purposes of co-ordinating the installation of these line(s). The communication line(s) will be in CNP's name.
 - 5.1.1. The Customer shall provide one dedicated 25-pair cable for communications circuits between the SCADA RTU Cabinet and an appropriate telephone company demarcation point. The cable shall have the following specifications:
 - 5.1.1.1. Grease filled
 - 5.1.1.2. Shielded, twisted pair cable
 - 5.1.1.3. 22 - 24 AWG solid copper
 - 5.1.1.4. ANSI/ICEA S-85-625-1996 (Formerly RUS / REA Specification PE-38)
 - 5.1.1.5. gas tube lightning protection
 - 5.1.2. The Customer shall provide a conduit between the communication circuit and the SCADA RTU Cabinet. The conduit shall be sized for the communications cable.
- 5.2. CNP, at its option, may use SCADA Radio (952/928 MHz FM) for the SCADA communication circuit. The requirements of the radio, antenna, and associated equipment will be determined by CNP. The Customer shall provide a location for this equipment.
- 5.3. The Customer shall provide a full business (IFB) phone line inside the relay control house. This phone shall have a cord extendable to the SCADA RTU cabinet. This phone is an outside phone line independent from Customer phone system.
- 5.4. The telephone communication circuit(s) will not fail in the event of power failure. Line conditioners or loopback devices shall fail with the communications line connected.

6. CALIBRATION AND MAINTENANCE

- 6.1. After all equipment necessary for remote telemetry has been installed, CNP personnel will calibrate and verify operation of all equipment installed per this specification.
- 6.2. The RTU and transducers installed per this specification will be maintained by CNP unless otherwise noted in the Customer operational agreement. Maintenance will include accuracy checks , recalibration and replacement/repair of equipment when needed.
- 6.3. CNP personnel shall be allowed access at a mutually agreeable time to those locations containing equipment to be calibrated and maintained by CNP. Access shall be granted for initial calibration, periodic maintenance, and unexpected maintenance.
- 6.4. A lock box with a CNP Co. lock shall be installed by the door to give CNP personnel access to the control house.

7. CURRENT TRANSFORMERS AND POTENTIAL TRANSFORMERS

- 7.1. The current transformers (CTs) and potential transformers (PTs) necessary for transducers and meter circuits itemized in this specification shall be provided according to CNP specification 007-231-14. If a particular application is not covered by this specification, then CNP will designate the necessary PT(s) and CT(s) on the substation one-line diagram that the Customer submits for comment and approval.
- 7.2. For some substation layouts a potential rollover circuit shall be needed. If a potential rollover circuit is needed, it will be designated by CNP on the one-line diagram that the Customer submits for comment and approval.

8. DRAWING APPROVAL

8.1. The Customer shall provide three (3) folded copies of all drawings showing equipment connections and structural details of all equipment associated with SCADA installation for comment and approval by CNP Substation System Engineering. Preliminary drawings shall be submitted sixteen (16) weeks in advance of equipment purchase so that timely changes can be implemented. The minimum turn around time for comment and/or approval of preliminary drawings by CNP System Engineering is four weeks. All drawings returned unapproved to the Customer shall be re-submitted for approval before ordering equipment or starting construction. Transmission Customers shall submit the drawings to the CNP Industrial and Large Commercial Account (ILCA) Representative.

8.2. Drawings required by this specification include:

1. Substation one-line relay and metering diagrams illustrating the overall telemetry scheme,
2. Relay control room layout(s) and floor plan(s),
3. Conduit and cable lists and layout
4. RTU manufacturers prints and customer connections
5. AC Schematics for all power and control circuits,
6. AC Relaying Schematics (Electrical Three-Line),
7. Relay panel layouts,
8. Bill of material for items required by this specification,
9. Battery charger alarm relay(s) schematics,
10. AC & DC Distribution Panels,
11. Communication cable and conduit routing through Customer facility,
12. Customer Facility Plot Layout,

LIST OF ABBREVIATIONS AND SYMBOLS USED IN FIGURE 1

aN4, aN14 = TYPICAL WIRE NAMES IN CNP CARRIER RELAYING SCHEMES

ATCR = AUTOMATIC CARRIER REMOVAL

C = CLOSE

C = BREAKER CLOSE COTL

CS = CONTROL SWITCH

CVE = SYNCRO-VERIFIER RELAY

ICR = INDICATION CONTROL RELAY

N 11, N21 = TYPICAL WIRE NAMES IN CNP RECLOSE REMOVAL SCHEMES

NO = NORMALLY OPEN

RC = AUTOMATIC RECLOSING RELAY

RR = RECLOSE REMOVAL LATCHING RELAY

T = TRIP

TC = BREAKER TRIP COIL

X, Y = AUXILIARY COILS OF RC RELAY

SSS = SLIDER-LINK TERMINAL

R = RESISTOR

DDD = ZENER DIODE

AMS = AUTOMATIC / MANUAL THROWOVER SWITCH

Insert CNP Drawing: BSC-007-400-02 SH.2

Transmission breaker SCADA Control

Insert CNP Drawing: BSC-007-400-02 SH.1
SCADA Cabinet Mounting Detail

Exhibit "I"
Attached Drawings

