

SPECIFICATION FOR

**12 kV and 35 kV
PRIMARY SERVICE**

**CENTERPOINT ENERGY
ELECTRIC ENGINEERING
P.O. BOX 1700
HOUSTON, TEXAS 77251**

REFERENCE DRAWINGS:

REFERENCE SPECIFICATIONS:

ANSI / IEEE- C2
CenterPoint Energy Specification 007-231-76
CenterPoint Energy Specification 007-231-82
CenterPoint Energy Specification 007-231-83
CenterPoint Energy Service Standards
Public Utility Commission of Texas Substantive
Rules 25.211 and 25.212



						WRITTEN	7-01-78	J.H. Stout
9	5-23-22	Complete Revision	BJD	WSC	JRH / MEM	CHECKED	8-31-78	J.W. Hanson
8	4-10-12	2.12, 3.1.2, 3.2.5, 4.6.3, 4.6.5, 4.7.6, 4.7.7, 4.7.8, 4.7.13, 5.1, 5.2, 5.3, 5.4, 9.2.1.1, 9.2.1.7, 12.3, 13.2, Sheet 14	VTT	WSC	RKW / LSN	APPROVED	8-31-78	E.E. Gruchalla
7	12-19-05	Complete Revision	SLJ	WRB	RKM / LSN	JRH MEM	SHEET 1 of 21 SHEETS	
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C O N T E N T S

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1.0 SCOPE

- 1.1 This specification covers minimum customer requirements for 12,470Y / 7,200 volt and 34,500Y / 19,920 volt, three-phase, four-wire, grounded neutral, primary service on the CenterPoint Energy electric system.

2.0 GENERAL

- 2.1 Hereafter, CenterPoint Energy will be designated as “CNP” and the Contractor, Customer, or Facility Owner will be designated as “Customer”.
- 2.2 Hereafter, 12,470Y / 7,200 Volt, 3Ø, Four-Wire, Grounded Neutral Service will be designated as “12kV Primary Service”; and 34,500Y / 19,920 Volt, 3Ø, Four-Wire, Grounded Neutral Service will be designated as “35kV Primary Service”.
- 2.3 Equipment shall be furnished by the Customer unless otherwise noted by this specification.
- 2.4 If the Customer’s utilization equipment on a 12kV Primary Service is configured for three-wire service, the customer shall utilize CNP system neutral as a bond to their equipment ground. Three-wire service equipment is **NOT** permitted on a 35kV Primary Service system (see Article 7.0).
- 2.5 CNP reserves the right to refuse to energize any service which fails to meet this specification or any CNP approved project drawings.
- 2.6 Any deviations from this specification or CNP approved project drawings shall require the written approval of the CNP Manager of Power Quality Engineering or designated representative. All items requiring CNP approval shall be submitted to the CNP Manager of Power Quality Engineering or designated representative.
- 2.7 Customers operating generation (DER or DG) either in parallel or for back-up emergency with high speed closed transition to/from the CNP Utility Distribution System shall meet the requirements of the Public Utility Commission of Texas substantive rules 25.211 and 25.212, the CNP Service Standard, the latest revision of the CNP Specification For Customer Generation 007-231-76, all applicable rules and codes (such as the NESC and NEC), and requirements of the authority having jurisdiction (AHJ).
- 2.8 Customers utilizing secondary load transfer shall meet the operating requirements of the CNP Specification For Secondary Load Transfer 007-231-82, latest revision.
- 2.9 The Customer shall comply with CNP harmonic requirements, contained in the CNP Specification for Limitation of Harmonic Distortion on the Distribution System 007-231-83, latest revision.
- 2.10 Where there is a conflict between this specification and CNP approved project drawings, the drawings will take precedence.
- 2.11 Installations by the Customer shall comply with the current National Electrical Code (NEC), the National Electrical Safety Code (NESC), ANSI / IEEE C2, and all local governing authority requirements.

- 2.12 Customers with three-phase services which have a connected transformer capacity that exceeds 4 MVA at 12 kV or 6 MVA at 35 kV may be required to split single services into two (or more) separate services. CNP will notify Customers when this requirement is necessary. An Operational Agreement between CNP and the customer is required when served from multiple services.
- 2.13 In accordance with CNP Service Standards, single-phase primary services may not exceed 500 kVA and two-phase primary services may not exceed 1000 kVA. In addition, for two-phase services the load must be balanced between phases.
- 2.14 The basic impulse insulation level (BIL) of all overhead equipment connected to a 12kV or 35kV primary system shall be at least 110 kV for 12 kV Primary Service and 150 kV for 35kV Primary Service. Underground (pad mounted) equipment for 12 kV shall be a minimum of 95kV BIL, for 35 kV shall be a minimum 150kV BIL.
- 2.15 CNP will **NOT** provide 35kV Primary Service from a 35kV underground system that is located within a dedicated underground area.

3.0 PRIMARY SERVICE ARRANGEMENT

3.1 Overhead Primary Service

- 3.1.1 The Customer's first structure, on which the CNP conductors are dead-ended, will be designated as the "Customer's Primary Service Pole".
- 3.1.2 Based on the type of protective device installed by the Customer, the arrangement of equipment on the Primary Service Pole shall be as shown by Sheets 13, 14, 15, 16, 17, 18, 19, 20 and 21.
- 3.1.3 The Customer's Primary Service Pole shall be of adequate strength to support the full tension of the Customer's conductors without backup support from the CNP conductors. It shall also be of adequate strength to support a horizontal, in line tension of 200 pounds from each of the CNP conductors.
- 3.1.4 The Customer's Primary Service Pole shall meet the following criteria for primary metering service, in accordance with CNP design criteria: CNP adopted National Electrical Safety Code (NESC) Rule 250C (Extreme Wind) and 250D (Extreme Ice with Concurrent Wind Loading), regardless of pole height. All new distribution structures and replacements will be designed to applicable hurricane level extreme wind speeds; 110-mph (North of US 59 and Hwy 90) and 132-mph (South of US 59 and Hwy 90)
- 3.1.5 The Customer's Service Pole shall be a minimum distance of 50' from the CNP primary metering pole—there shall be no line angle on the CNP meter pole. If the customer requests the Service Pole closer than 50' to the CNP meter pole, approval is required by CNP Manager of Power Quality or designated representative and there must be all weather truck access on both sides of the meter pole. Otherwise the CNP meter pole shall be truck accessible.
- 3.1.6 All clearances on the Customer's Primary Service Pole shall be in accordance with the current edition of the NESC (ANSI / IEEE C2).

- 3.1.7 CNP will furnish, install, and maintain the conductors between the CNP metering pole and the Customer's Primary Service Pole including insulators, dead-ending devices, and electrical connectors except as noted in sub-division 3.1.8.
- 3.1.8 The Customer shall provide a suitable dead-end point or support for the CNP dead-end devices and conductors in a horizontal or "delta" configuration. This point or support shall be on the side of the primary service pole nearest the CNP primary meter pole. This dead-end point or support shall not be the conductor termination point on the disconnecting or protective device. The CNP dead-end devices will consist of clevis, post, or pin insulators.
- 3.1.9 The conductor termination point on the Customer's equipment shall be one of the following:
1. A NEMA two or four hole terminal pad if the termination point is to be a non-fused switch or breaker, or
 2. A "self-contained" bolted terminator able to accommodate conductor diameters from 0.289 to 0.575 inches (2 AWG to 4/0 AWG) if the terminator point is a fused disconnect or power fuse.
- 3.1.10 Specific information on the electrical apparatus on the Customer's Primary Service Pole shall be submitted to CNP for approval as required by Article 9.0.

3.2 Underground Primary Service

- 3.2.1 Customers requesting underground primary service will receive their CNP information from a representative from Major Underground Engineering.
- 3.2.2 Customers who are requesting primary service from underground facilities have the option of being served from either outdoor or indoor facilities.
- 3.2.3 The Customer installed cable exiting the pad mounted metering cabinet (outdoor service) or the vault (indoor service) shall be designated as the "Customer's Primary Service Point."
- 3.2.4 The Customer will be provided with a Terms & Conditions Package including applicable sketches, drawings and reference specifications by the Major Underground department.
- 3.2.5 The typical outdoor arrangements of equipment are shown on Sheets 16 and 17. Indoor equipment arrangements vary and will be treated on a case by case basis. The Customer will be provided with a one line diagram illustrating the actual CNP equipment that will be utilized to provide the underground primary service.

4.0 MAIN PROTECTIVE DEVICE

- 4.1 12kV and 35kV Primary Service customers shall provide, install, and maintain a Main Protective Device. Except as noted by item 4.4, this device shall consist of either a single group of three fuses, or an electronically or electromechanically controlled circuit breaker. Hydraulically controlled breakers shall not be used.
- 4.2 The Main Protective Device shall be located on the Customer's Primary Service Pole unless the Main Protective Device is a pad mounted fused switch, breaker or indoor equipment, unless prior approval is granted from the CNP Manager of Power Quality or designated representative.
- 4.3 Permission to install a customer owned disconnecting device on the Customer's Primary Service Pole and then one short span (50') to the customer owned protective device must be granted from the CNP Manager of Power Quality or designated representative and will require an Operational Agreement. In this configuration the distance between the CNP metering pole and the Customer's Primary Service Pole shall be 50'. See page 21 for typical one-line.
 - 4.3.1 Customer conductor size, type, pole framing and installation shall be approved by CNP Manager of Power Quality or designated representative. No other customer equipment or poles shall be installed between the customer's primary service pole and the customer's protective device.
- 4.4 Permission to use multiple protective devices is not usually granted; however, multiple protective devices may be permitted only if protective device coordination is impractical through a single device and prior approval is granted from the CNP Manager of Power Quality Electric Engineering or designated representative.
- 4.5 The symmetrical current interrupting capability of the Main Protective Device shall be greater than the ultimate fault duty as specified by CNP.
- 4.6 The basic impulse insulation level (BIL.) of the Main Protective Device, for Over head, shall be at least 110 kV for 12 kV Primary Service and 150 kV for 35 kV Primary Service. For Underground (pad mounted) equipment for 12 kV shall be a minimum of 95kV BIL, for 35 kV shall be a minimum 150kV BIL.
- 4.7 FUSES
 - 4.7.1 Fuses can be utilized as the main protective device only if the demand or connected transformer capacity is less than or equal to the limits specified in article 4.8.1. Customer shall submit the size and type of the proposed fuse to CNP for approval along with other information as required by article 9.0.
 - 4.7.2 When the Customer proposes to use fuses of a size larger than 100 amperes, those fuses shall either be type N, E, K, or other "fast-acting" fuse types. All proposed fuse sizes will be evaluated for coordination with CNP facilities. If coordination does not exist, or if the Customer proposes to use fuses larger than 200 amperes, then the service shall be protected by a circuit breaker/recloser.

- 4.7.3 Fused disconnects comprising the Main Protective Device shall have load-breaking provisions, unless used in conjunction with a 3Ø, gang-operated, load-break switch on either the Primary Service Pole as shown by Sheets 13 and 14, a pad mounted switch as shown by Sheets 17 and 18, or in the specifications provided by the Major Underground Department as related to indoor service.
- 4.7.4 The Customer shall maintain an adequate supply of replacement fuse elements. Replacement parts shall be of the same size/type, or smaller, as the original approved fuse. CNP will not replace Customer-owned fuses.
- 4.7.5 The Customer shall permanently stencil the approved fuse size and type below the primary conductors of the Customer's Primary Service Pole. The stenciling shall be visible from the CNP metering pole.

4.8 CIRCUIT BREAKERS

- 4.8.1 Customers having either a demand or connected transformer capacity exceeding 4,320 kVA at 12 kV or 11,950 at 35 kV shall be required to install a three-phase circuit breaker.
- 4.8.2 The circuit breaker shall be either a pole mounted recloser, a pad mounted breaker or an indoor breaker and shall have either an electronic or an electromechanical control.
- 4.8.3 The circuit breaker and its control shall be located so as to be accessible at all times by CNP personnel.
- 4.8.4 The circuit breaker control cabinet shall be equipped to allow installation of both CNP and Customer-owned locks with access through either of the two.
- 4.8.5 The relay settings for the circuit breaker used as the main protective device shall be determined by and placed in the relay by the Customer. Customer shall perform functional testing of their equipment. CNP requires Customer's relay settings to be provided in an electronic data file. In addition, the Customer must provide certified test reports for the main protective device. CNP will verify coordination and loading with CNP's upstream equipment prior to final energization of Customer's facilities. Customer is responsible for the protection of all equipment behind Customer's main protective device.
- 4.8.6 Circuit breaker/Recloser installations are recommended to include a 3Ø gang-operated bypass switch. The 3Ø bypass switch shall be rated in accordance with the Customer's anticipated maximum load requirements, but is not required to be a load-break device. If the customer chooses not to install a 3Ø gang-operated bypass switch; customer outages for maintenance purposes shall be requested and scheduled with CNP. This arrangement will be detailed in an Operational Agreement.
- 4.8.7 The customer may elect to install a 3Ø gang operated isolation switch on the line side of the circuit breaker—this isolation switch shall be 50' from the CNP meter pole and 50' max from the customer's overcurrent protection device and comply with the requirements of CNP generator specification (007-231-082).

- 4.8.8 The 3Ø bypass switch operating handle shall be equipped so as to allow the installation of a CNP pad lock.
- 4.8.9 The Customer will have the option of scheduling an outage for the purpose of maintaining their equipment. Maintenance of Customer's equipment shall be the responsibility of the Customer, both upon initial cut-in and each year thereafter. A maintenance program, as specified in the manufacturer's instruction manual, must be followed. The Customer shall maintain complete maintenance records.
- 4.8.10 Automatic reclosing shall not be permitted.
- 4.8.11 Bushing current transformers located inside the Customer's circuit breaker shall have a relay accuracy of C100 or better.
- 4.8.12 Bushing current transformers shall always be installed on the source side of the circuit breaker.
- 4.8.13 Circuit breakers shall be equipped with capacitor trip devices or batteries to insure proper trip potential at all times.
- 4.8.14 The circuit breaker control shall be equipped with at least three overcurrent relays with the equivalent protective capability as shown by the arrangement shown on Sheet 19.
- 4.8.15 Any Customer who uses a circuit breaker as their Main Protective Device shall maintain a stock of replacement components of equal or greater value. CNP will not provide replacement components.
- 4.8.16 Pad mounted breakers shall be located within a maximum of 25 feet of the Customer's Service Pole or within a maximum of 50 feet of the pad mounted meter cabinet.

5.0 DISCONNECTING DEVICE

- 5.1 A Disconnecting Device may be installed on the Customer's Primary Service Pole in addition to the Main Protective Device as shown on Sheets 13, 14 and 15.
- 5.2 A Disconnecting Device may be installed in the Underground Service Arrangement in addition to the Main Protective Device as shown on Sheet 18.
- 5.3 A Disconnecting Device shall be installed on the Customer's Primary Service Pole when the Main Protective Device is a pad mounted breaker as shown on Sheet 17.
- 5.4 A Disconnecting Device shall be installed in the Underground Service Arrangement when the Main Protective Device is a pad mounted breaker or indoor breaker as shown on Sheet 18.
- 5.5 The Disconnecting Device shall be rated for maximum expected load and fault duty, and shall have a basic impulse insulation level (B.I.L) at least 110 kV for 12 kV Primary Service, and at least 150 kV for 35 kV Primary Service.
- 5.6 The Disconnecting Device is not required to be a load break device except as noted by in sub-division 4.7.3.

- 5.7 Specific information on the proposed Disconnecting Device shall be submitted for approval to CNP as outlined in article 9.0.

6.0 OVERVOLTAGE PROTECTION

- 6.1 CNP recommends that lightning arresters be installed on the Customer's Primary Service Pole.
- 6.2 If the Main Protective Device is mounted on the Customer's Service Pole, then lightning arresters shall be connected on the load side of the protective device.
- 6.3 Lightning arresters shall be tested in accordance with the latest ANSI/IEEE C62.11, and meet the following minimum requirements:

	<u>12.47kV</u>	<u>34.5kV</u>
Voltage (kV)	10	27
MCOV (kV)	8.4	22.0

- 6.4 All lightning arresters shall have a ground lead isolator.

7.0 TRANSFORMER CONNECTIONS

- 7.1 Transformers connected grounded wye primary - delta secondary shall **NOT** be used on the Customer's 12 kV or 35 kV distribution system.
- 7.2 Transformers with ungrounded primary connections, such as delta or ungrounded wye, shall **NOT** be used on the Customer's 35 kV distribution system.

8.0 CAPACITOR BANKS

- 8.1 Customers who wish to install a 12 kV or 35 kV capacitor bank shall submit to CNP a description of the bank and any control mechanism.
- 8.2 Where so required by CNP, the capacitor installation shall be switched by a load or power factor sensitive capacitor control. Settings for such a control shall be submitted to CNP for approval as outlined in Article 9.0.
- 8.3 Customer with harmonic producing loads may be required to install harmonic filters in accordance with CNP Specification 007-231-83 "Specification for Limitation of Harmonic Distortion on the Distribution System", latest revision.

9.0 SPECIFICATION AND DRAWING APPROVAL

- 9.1 Two copies of all specifications and / or drawings showing equipment connections or structural details that might affect the operation or integrity of the CNP electrical system shall be submitted for approval and comments to the Director of Electric Engineering or designated representative. One copy with comments and required modifications will be returned. Preliminary drawings and specifications should be submitted well in advance of construction and equipment purchase so that any required changes can be implemented.

9.2 SPECIFICATION AND/OR DRAWINGS REQUIRED FOR PRIMARY SERVICES

9.2.1 All Customers

1. Electrical one-line diagram and a load analysis. The one-line diagram shall show all transformer sizes and connections (both primary and secondary).
2. Customer plot plan of property and facilities to be served.
3. Specific information on all major electrical equipment on primary service pole-manufacturer and catalog numbers, specifications, etc.
4. Specific information on all major electrical equipment in the Underground Service Arrangement-manufacturer and catalog numbers, specifications, etc.
5. Plan and profile drawings showing the configuration and construction details of the proposed Primary Service Pole including clearances.
6. Capacitor bank information as required by Article 8.0.
7. Motor starting information for motors, or smaller motors that have a simultaneous start, of 250 HP or larger. Rural areas may be required to submit motor starting information for simultaneous starts less than 250 HP.

9.2.2 Customer with Fuses as Main Protective Device

1. Fuse size, type, and manufacturer.
2. Fuse curves.

9.2.3 Customers with Breaker or Recloser as Main Protective Device

1. Relay and equipment bill(s) of material showing relay styles and ranges.
2. Breaker or Recloser schematic diagrams including C.T. and control and relay wiring diagrams.
3. Electronic Setting File and TCC Curves for Customers fuses or sub-main breaker required to coordinate with main breaker or recloser.

9.3 If any additional drawings or specifications are required by CNP to confirm that the proposed installation will meet the required safety and construction standards and will not adversely affect the integrity of the CNP electrical system, they will be requested of the Customer.

9.4 All specifications and drawings in sub-articles 9.2 and 9.3 shall have been submitted and approved before any construction required to serve the Customer may begin.

10.0 INSPECTIONS

- 10.1 After CNP approval of the specifications and drawings in Article 9.0 and after all construction is completed by the Customer, the CNP Manager of Power Quality Engineering or designated representative will inspect the Customer's construction. If deficiencies are noted, they will be pointed out and a re-inspection must be made. The service will not be energized until it passes inspection, all CNP construction and easement requirements are complete, arrangements are secured from the Customer's Retail Electric Provider and necessary Permits are obtained from governmental authorities.
- 10.2 If utilizing a recloser/breaker as the protective device, customer is responsible for performing a witness test demonstrating the function of the device. Witness test shall include a test with secondary current injection to verify protective settings and functionality of the device. Field verification of previously approved settings, per section 4.7.5, will also occur.
1. LG Fault at minimum pickup value. Trip and no reclose.
 2. LLL Fault at minimum pickup value. Trip and no reclose.
 3. Customer is responsible for providing all equipment to run test.

11.0 EASEMENTS

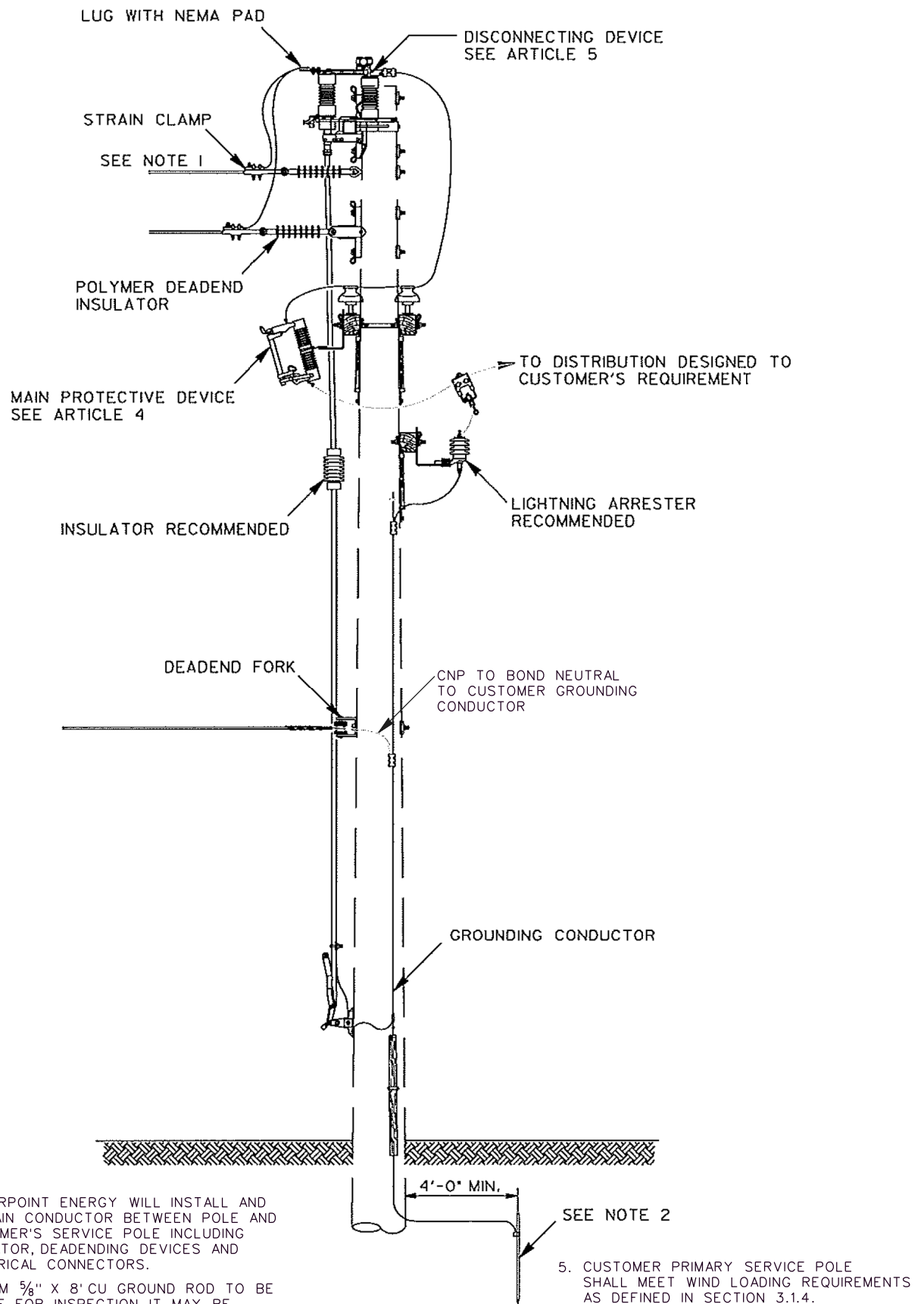
- 11.1 The Customer shall grant CNP an easement on the Customer's property to accommodate CNP facilities and conductors. In addition to the standard easement requirements, Customers wishing to take 12 kV Primary Service in designated 35 kV areas may be required to grant additional easements to accommodate a future 35 kV - 12 kV step transformer. The specific easement requirements vary and will be supplied to the Customer as part of the Service Outlet Location and Data Statement or Terms and Conditions Package. Easements shall extend to a minimum of 10' beyond CNP conductors and all conductors protected by CNP devices.
- 11.2 CNP will prepare an instrument for easements to be granted by the property owner. Construction by CNP cannot begin until the signed instrument for all easements has been returned to CNP.
- 11.3 CNP Metering equipment and Customer Primary Service pole shall not be located in public road rights-of-way nor encroach on public utility easements. Equipment shall be located within CNP easement on Customer property.

12.0 OPERATIONAL AGREEMENT

- 12.1 Operational agreements are required between CNP and the Customer when any of the following applies:
 - 12.1.1 The Customer utilizes a circuit breaker as a Main Protective Device.
 - 12.1.2 The Customer does not install a bypass switch on the Customer Primary Service Pole (See page 21).
 - 12.1.3 The Customer operates generation in parallel with CNP.
 - 12.1.4 The Customer receives service from two CNP feeds and has the capability of transferring load from one feed to the other. Such installations require CNP approval and may require a contract with associated fees from CNP
- 12.2 The operational agreement outlines procedures the Customer shall follow in the event the circuit breaker should trip or whenever the Customer wishes to perform maintenance on or place a work tag on their Main Protective Device.
- 12.3 The operational agreement shall be signed, with the original signed hard copy returned to CNP before the Customer's facilities may be energized.

13.0 TYPICAL ARRANGEMENTS

- 13.1 12 kV Primary Service Pole - See Page 13.
- 13.2 35 kV Primary Service Pole - See Page 14.
- 13.3 Pole Mounted Circuit Breaker (Recloser) With Bypass Switch - See Page 15.
- 13.4 Pole Mounted Circuit Breaker (Recloser) Without Bypass Switch - See Page 16.
- 13.4 Pad Mounted Equipment - See Page 17.
- 13.5 Underground Service Arrangement - See Page 18.
- 13.6 Schematic of Customer Owned Breaker Control Circuit - See Page 19.
- 13.7 One Line Diagram Overhead - See Page 20.
- 13.8 One Line Diagram With Customer Disconnect Pole - See Page 21.

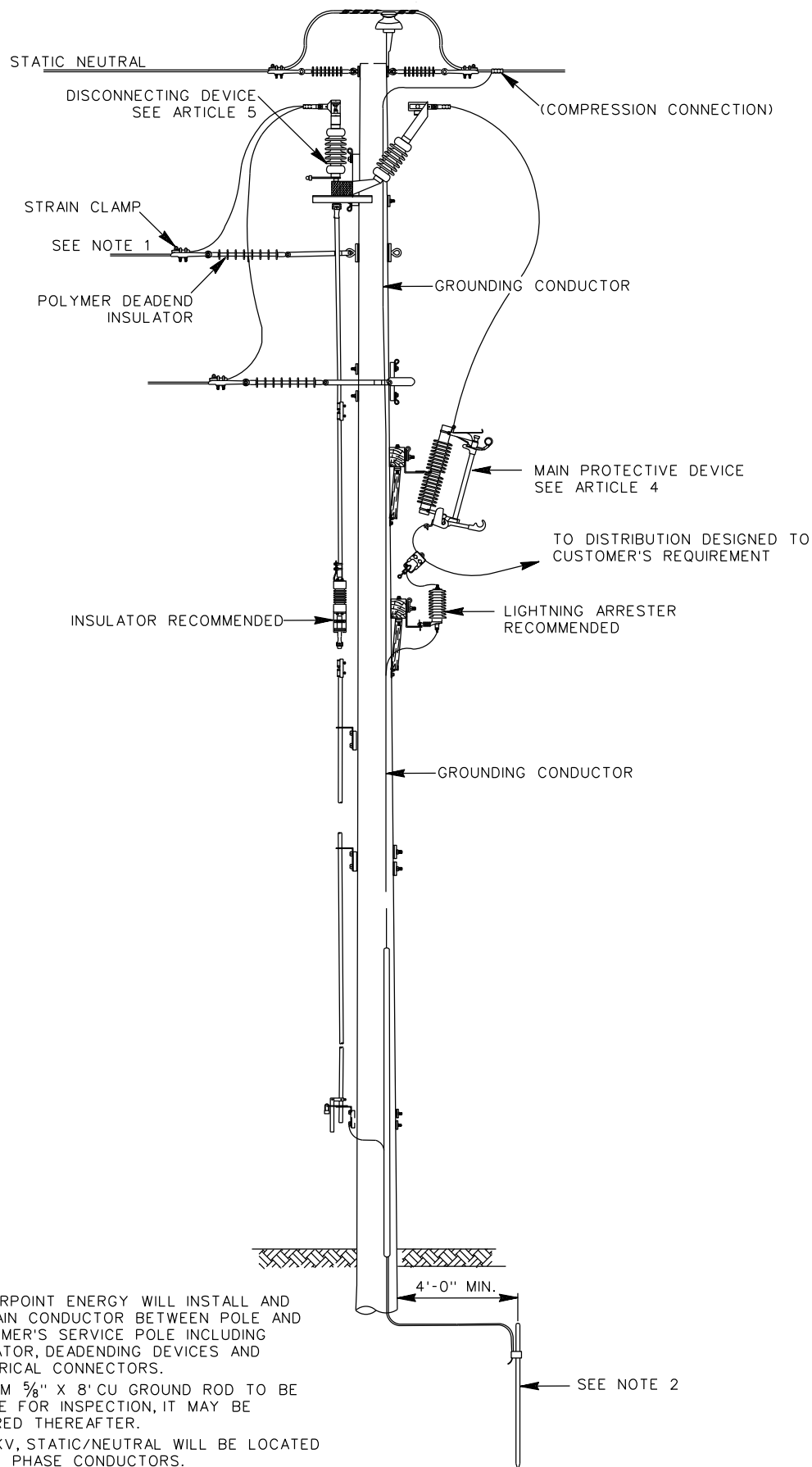


NOTES:

1. CENTERPOINT ENERGY WILL INSTALL AND MAINTAIN CONDUCTOR BETWEEN POLE AND CUSTOMER'S SERVICE POLE INCLUDING INSULATOR, DEADENDING DEVICES AND ELECTRICAL CONNECTORS.
2. MINIMUM $\frac{5}{8}$ " X 8' CU GROUND ROD TO BE VISIBLE FOR INSPECTION, IT MAY BE COVERED THEREAFTER.
3. APPROVED FUSE SIZE AND TYPE SHALL BE PERMANENTLY STENCILED ON POLE FACING TOWARD CENTERPOINT ENERGY METER POLE
4. CUSTOMER MUST PROVIDE ALL WEATHER ACCESS ON BOTH SIDES OF METER POLE.

5. CUSTOMER PRIMARY SERVICE POLE SHALL MEET WIND LOADING REQUIREMENTS AS DEFINED IN SECTION 3.1.4.

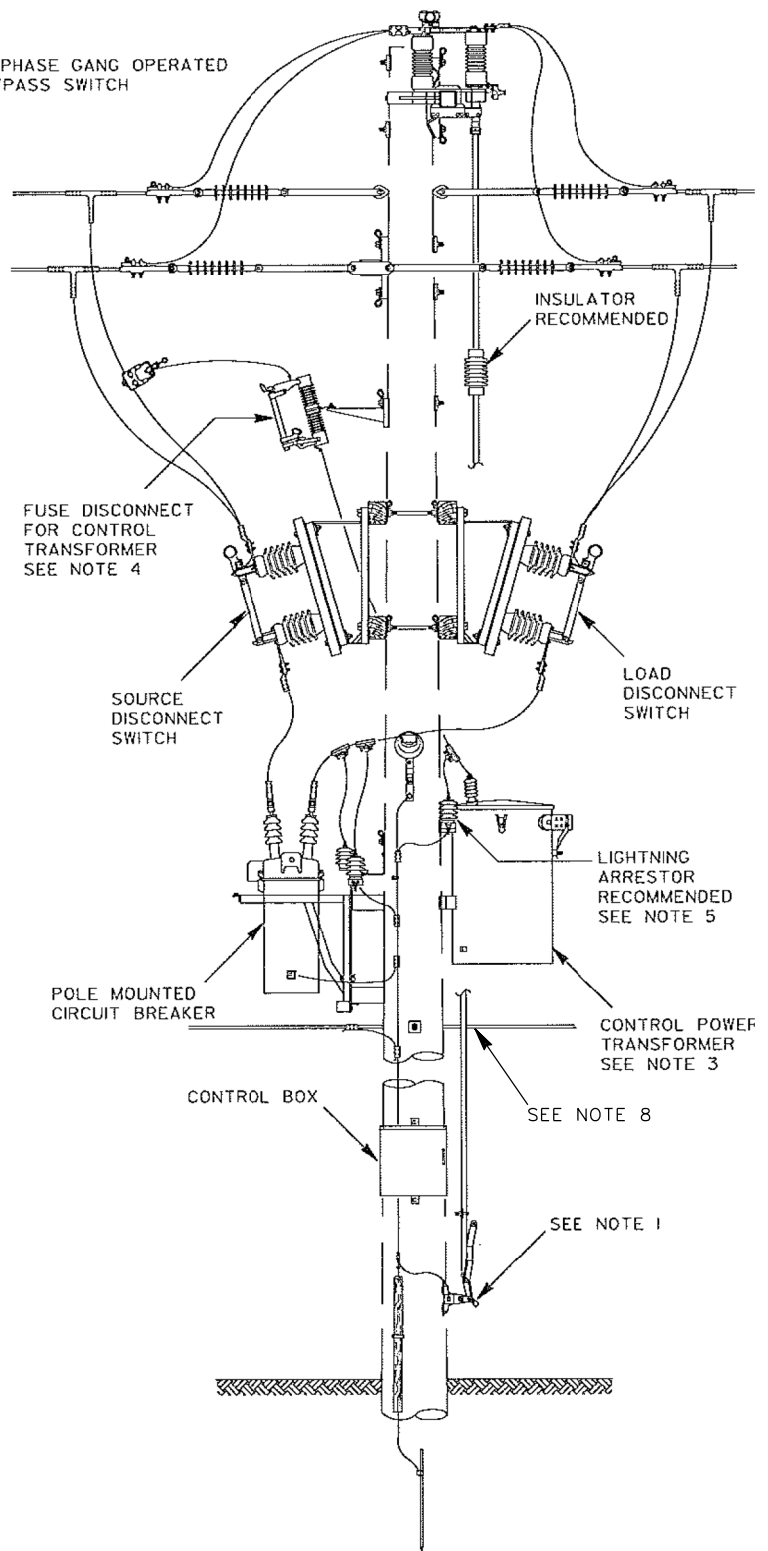
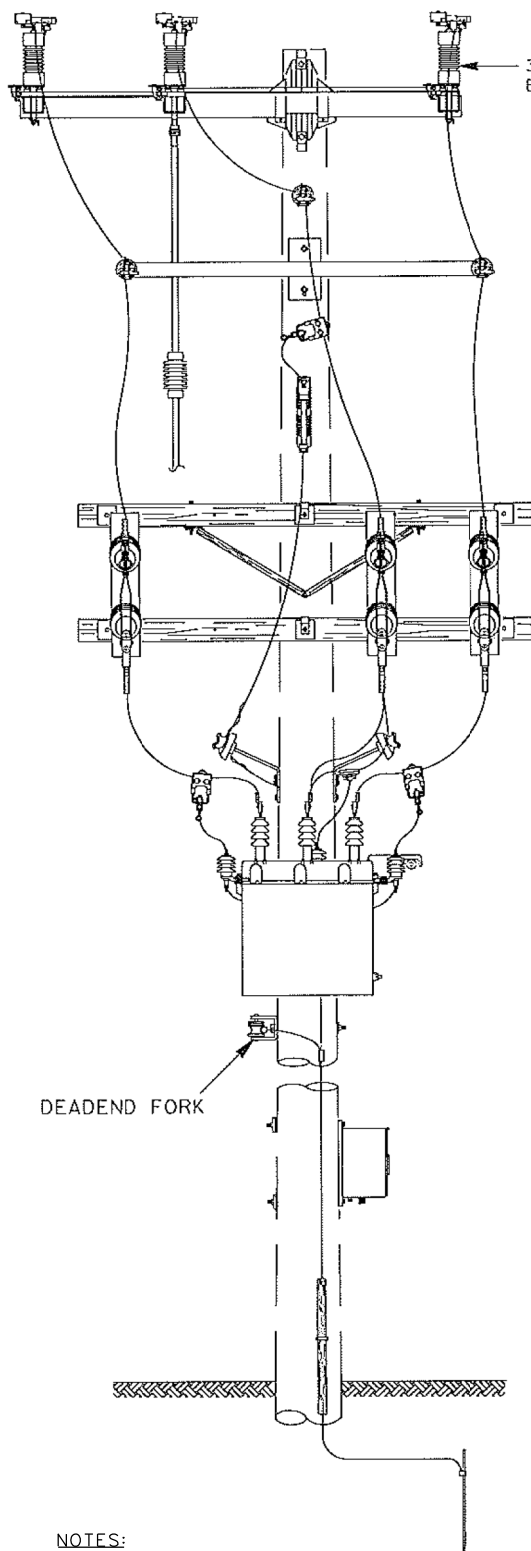
TYPICAL ARRANGEMENT
NEUTRAL PRIMARY SERVICE POLE



NOTES:

1. CENTERPOINT ENERGY WILL INSTALL AND MAINTAIN CONDUCTOR BETWEEN POLE AND CUSTOMER'S SERVICE POLE INCLUDING INSULATOR, DEADENDING DEVICES AND ELECTRICAL CONNECTORS.
2. MINIMUM $\frac{5}{8}$ " X 8' CU GROUND ROD TO BE VISIBLE FOR INSPECTION, IT MAY BE COVERED THEREAFTER.
3. IF 35KV, STATIC/NEUTRAL WILL BE LOCATED ABOVE PHASE CONDUCTORS.
4. CUSTOMER MUST PROVIDE ALL WEATHER ACCESS ON BOTH SIDES OF METER POLE.
5. CUSTOMER PRIMARY SERVICE POLE SHALL MEET WIND LOADING REQUIREMENTS AS DEFINED IN SECTION 3.1.4.

TYPICAL ARRANGEMENT
STATIC NEUTRAL PRIMARY
SERVICE POLE

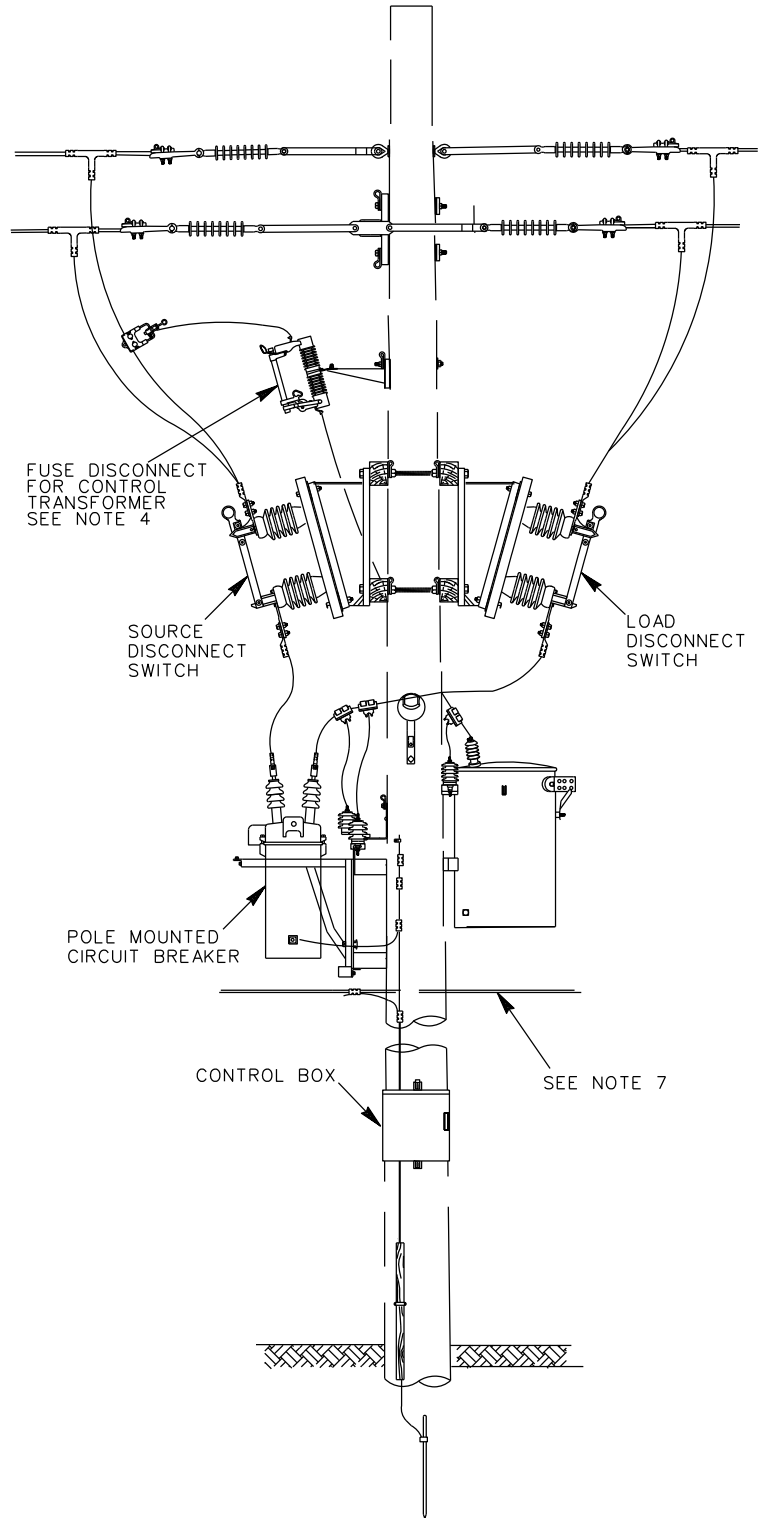
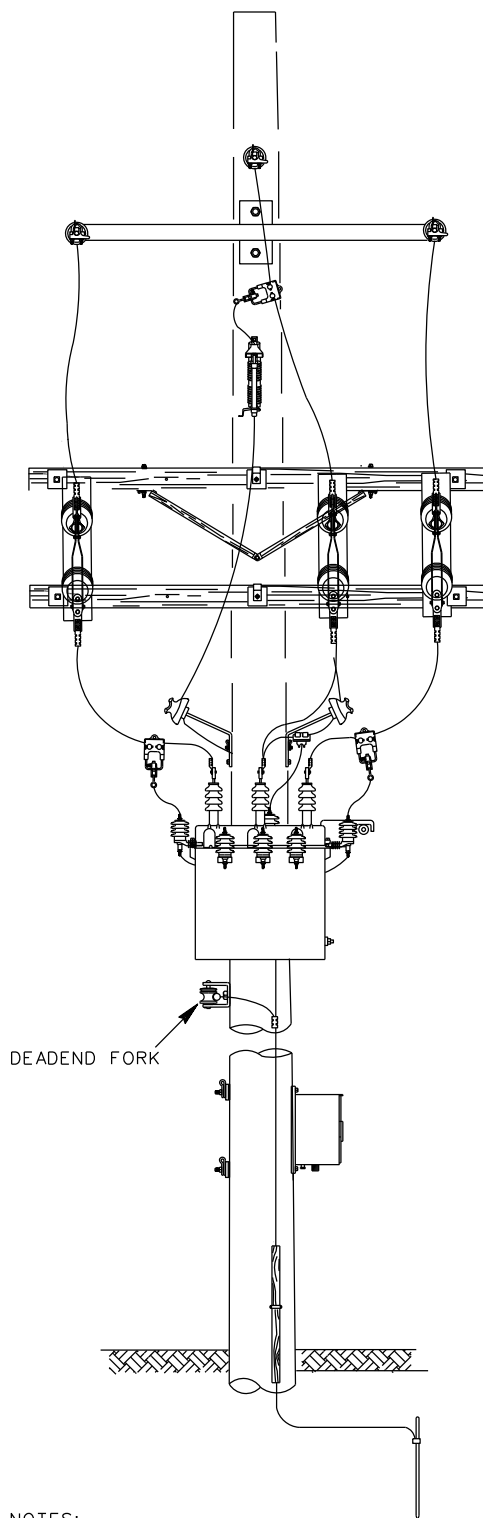


NOTES:

1. BYPASS SWITCH OPERATING HANDLE SHALL BE ACCESSIBLE FROM GROUND LEVEL
2. CENTERPOINT ENERGY WILL INSTALL AND MAINTAIN CONDUCTOR BETWEEN METER POLE AND CUSTOMER'S PRIMARY SERVICE POLE INCLUDING INSULATOR, DEADENDING DEVICES AND ELECTRICAL CONNECTORS.
3. THE CONTROL POWER TRANSFORMER MUST NOT HAVE INTERNAL OVERCURRENT PROTECTION.
4. THE MAXIMUM ALLOWABLE FUSE SIZE FOR THE CONTROL POWER TRANSFORMER IS 10AMP.
5. ARRESTOR CONNECTED TO LOAD SIDE OF PROTECTION DEVICE.
6. THE CUSTOMER IS TO PROVIDE THE CONNECTOR FOR THE CONTROL TRANSFORMER DISCONNECT. CENTERPOINT ENERGY WILL MAKE THE CONNECTION TO THE JUMPER WIRE.

7. MINIMUM $\frac{5}{8}$ " X 8' CU GROUND ROD TO BE VISIBLE FOR INSPECTION, IT MAY BE COVERED THEREAFTER.
8. IF 35KV, STATIC/NEUTRAL WILL BE LOCATED ABOVE PHASE CONDUCTORS.
9. CUSTOMER MUST PROVIDE ALL WEATHER ACCESS ON BOTH SIDES OF METER POLE.
10. CUSTOMER PRIMARY SERVICE POLE SHALL MEET WIND LOADING REQUIREMENTS AS DEFINED IN SECTION 3.1.4.

TYPICAL ARRANGEMENT POLE MOUNTED CIRCUIT BREAKER WITH BYPASS SWITCH

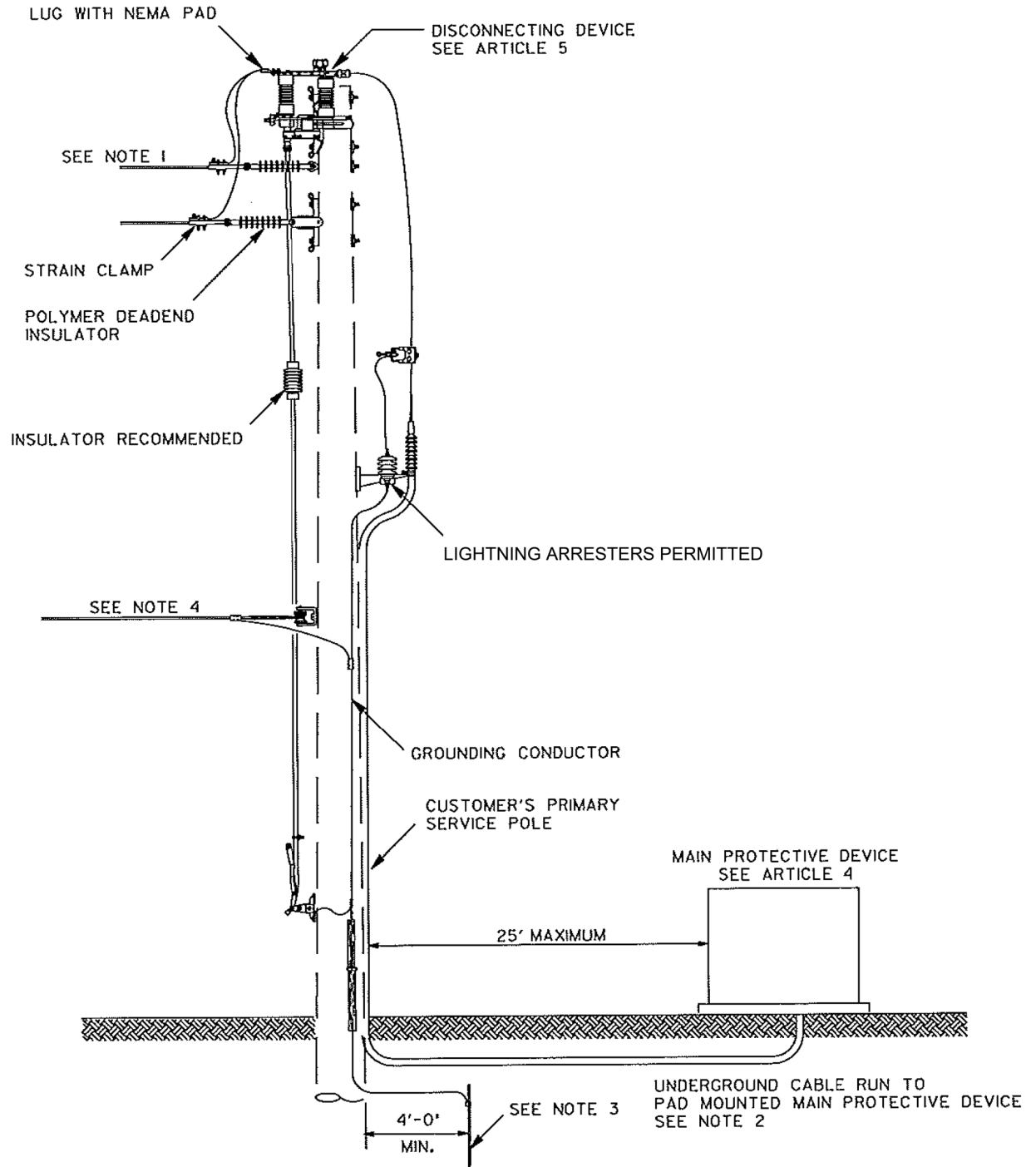


NOTES:

1. CENTERPOINT ENERGY WILL INSTALL AND MAINTAIN CONDUCTOR BETWEEN METER POLE AND CUSTOMER'S PRIMARY SERVICE POLE INCLUDING INSULATOR, DEADENDING DEVICES AND ELECTRICAL CONNECTORS.
2. THE CONTROL POWER TRANSFORMER MUST NOT HAVE INTERNAL OVERCURRENT PROTECTION.
3. THE MAXIMUM ALLOWABLE FUSE SIZE FOR THE CONTROL POWER TRANSFORMER IS 10AMP.
4. ARRESTOR CONNECTED TO LOAD SIDE OF PROTECTION DEVICE.

5. THE CUSTOMER IS TO PROVIDE THE CONNECTOR FOR THE CONTROL TRANSFORMER DISCONNECT. CENTERPOINT ENERGY WILL MAKE THE CONNECTION TO THE JUMPER WIRE.
6. MINIMUM $\frac{5}{8}$ " X 8' CU GROUND ROD TO BE VISIBLE FOR INSPECTION, IT MAY BE COVERED THEREAFTER.
7. IF 35KV, STATIC/NEUTRAL WILL BE LOCATED ABOVE PHASE CONDUCTORS.
8. CUSTOMER MUST PROVIDE ALL WEATHER ACCESS ON BOTH SIDES OF METER POLE.
9. CUSTOMER PRIMARY SERVICE POLE SHALL MEET WIND LOADING REQUIREMENTS AS DEFINED IN SECTION 3.1.4.

TYPICAL ARRANGEMENT POLE MOUNTED CIRCUIT BREAKER WITHOUT BYPASS SWITCH

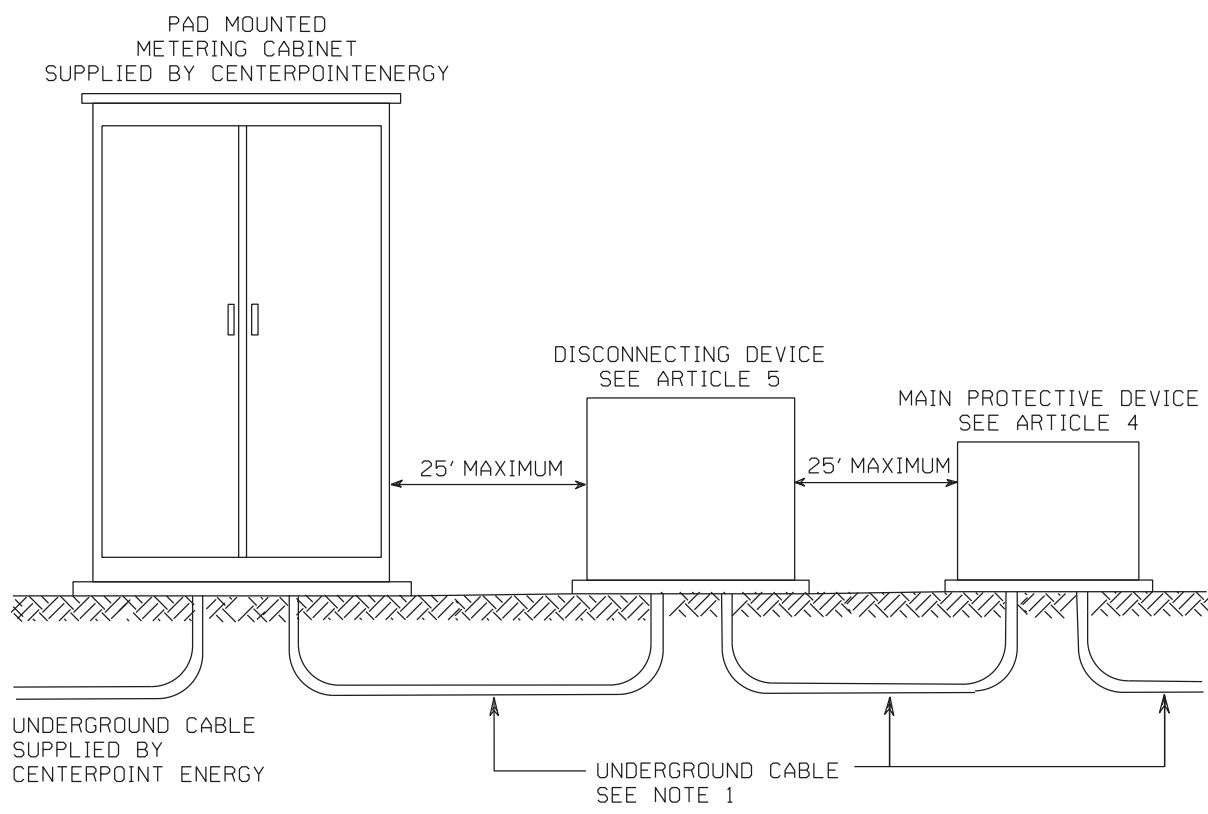


NOTES:

1. CENTERPOINT ENERGY WILL INSTALL AND MAINTAIN CONDUCTOR BETWEEN POLE AND CUSTOMER'S SERVICE POLE INCLUDING INSULATOR, DEADENDING DEVICES AND ELECTRICAL CONNECTORS.
2. CABLE MUST BE IN CONCRETE ENCASED CONDUIT, DIRECT BURIED CABLE IS NOT PERMITTED.
3. MINIMUM $\frac{5}{8}$ " X 8' CU GROUND ROD TO BE VISIBLE FOR INSPECTION, IT MAY BE COVERED THEREAFTER.
4. IF 35KV, STATIC/NEUTRAL WILL BE LOCATED ABOVE PHASE CONDUCTORS.

5. CUSTOMER MUST PROVIDE ALL WEATHER ACCESS ON BOTH SIDES OF METER POLE.
6. CUSTOMER PRIMARY SERVICE POLE SHALL MEET WIND LOADING REQUIREMENTS AS DEFINED IN SECTION 3.1.4.

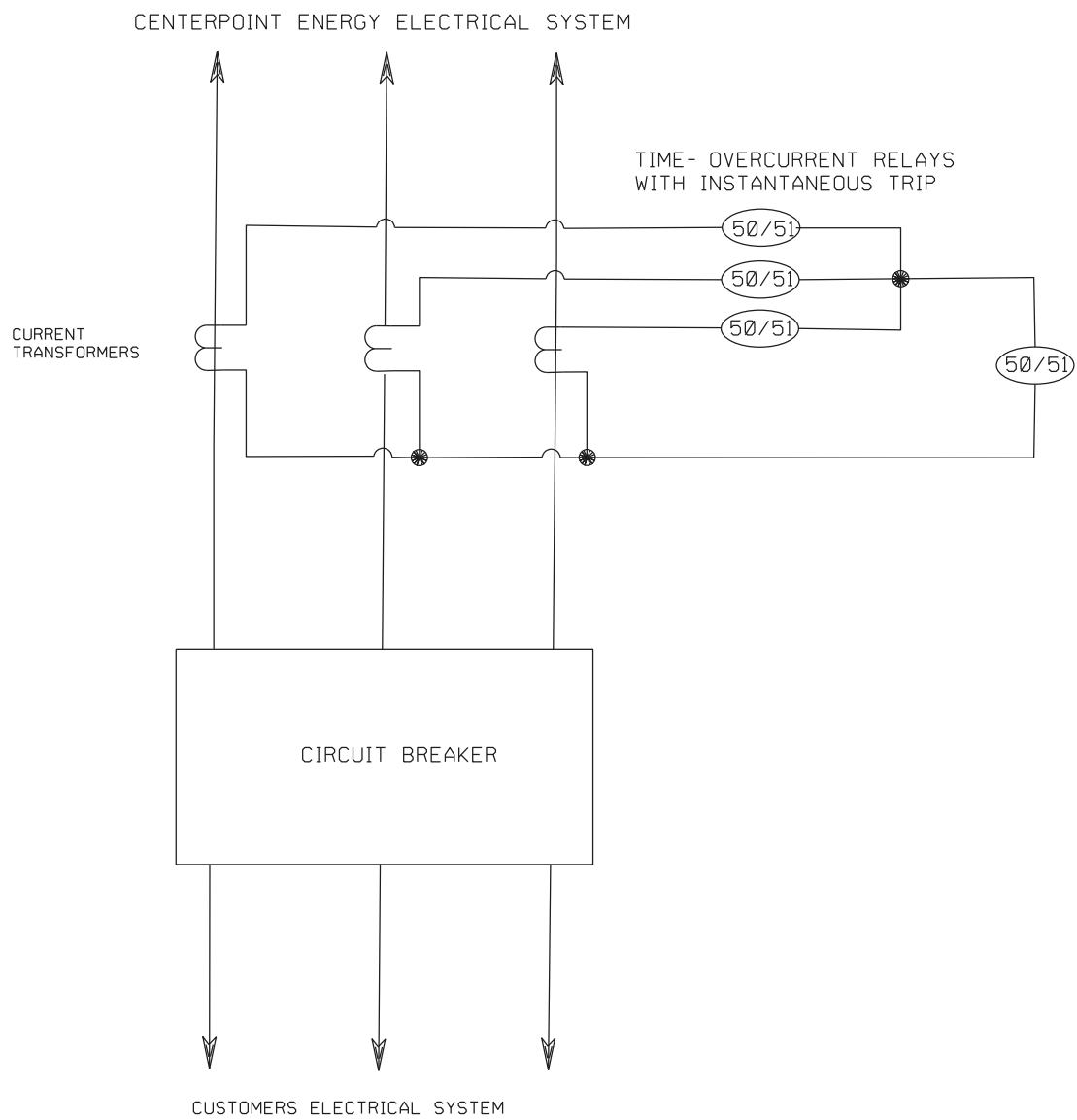
**TYPICAL ARRANGEMENT
PAD MOUNTED EQUIPMENT**



NOTES:

1. CABLE MUST BE IN CONCRETE ENCASED CONDUIT, DIRECT BURIED CABLE IS NOT PERMITTED

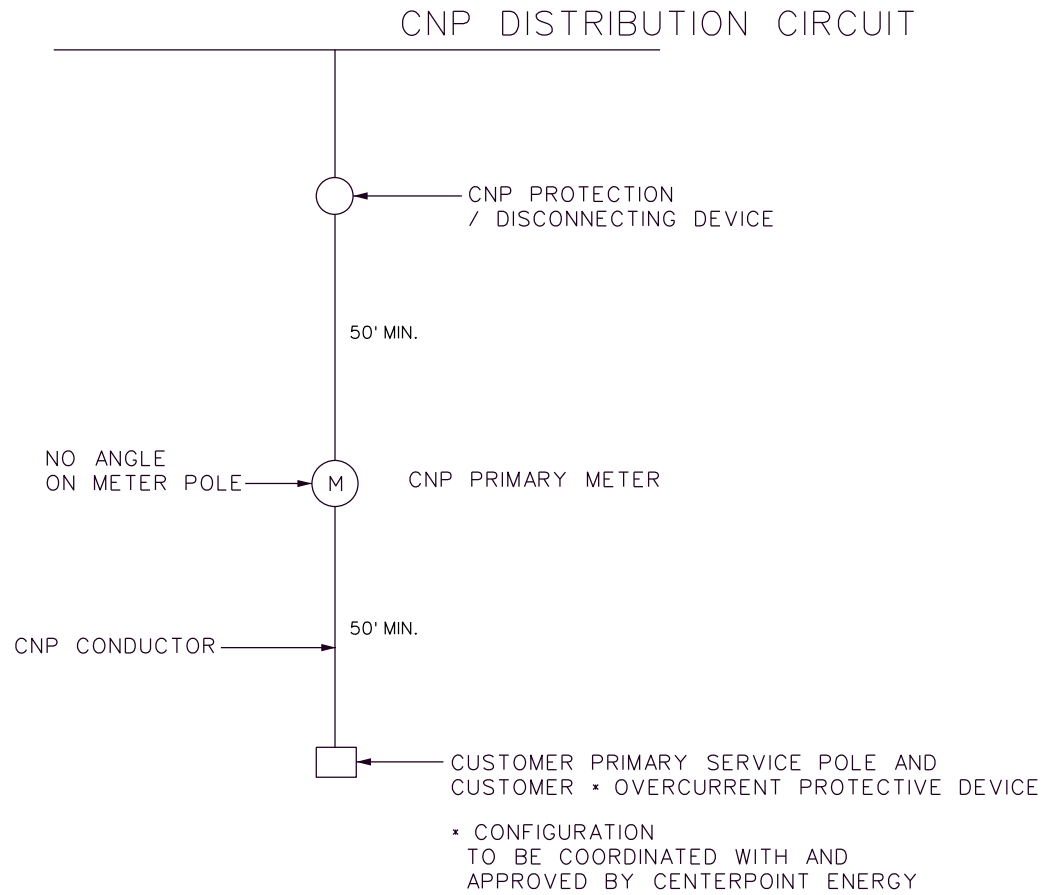
TYPICAL ARRANGEMENT
UNDERGROUND SERVICE



LEGEND:

50- INSTANTANEOUS OVERCURRENT RELAY
51- TIME OVERCURRENT RELAY

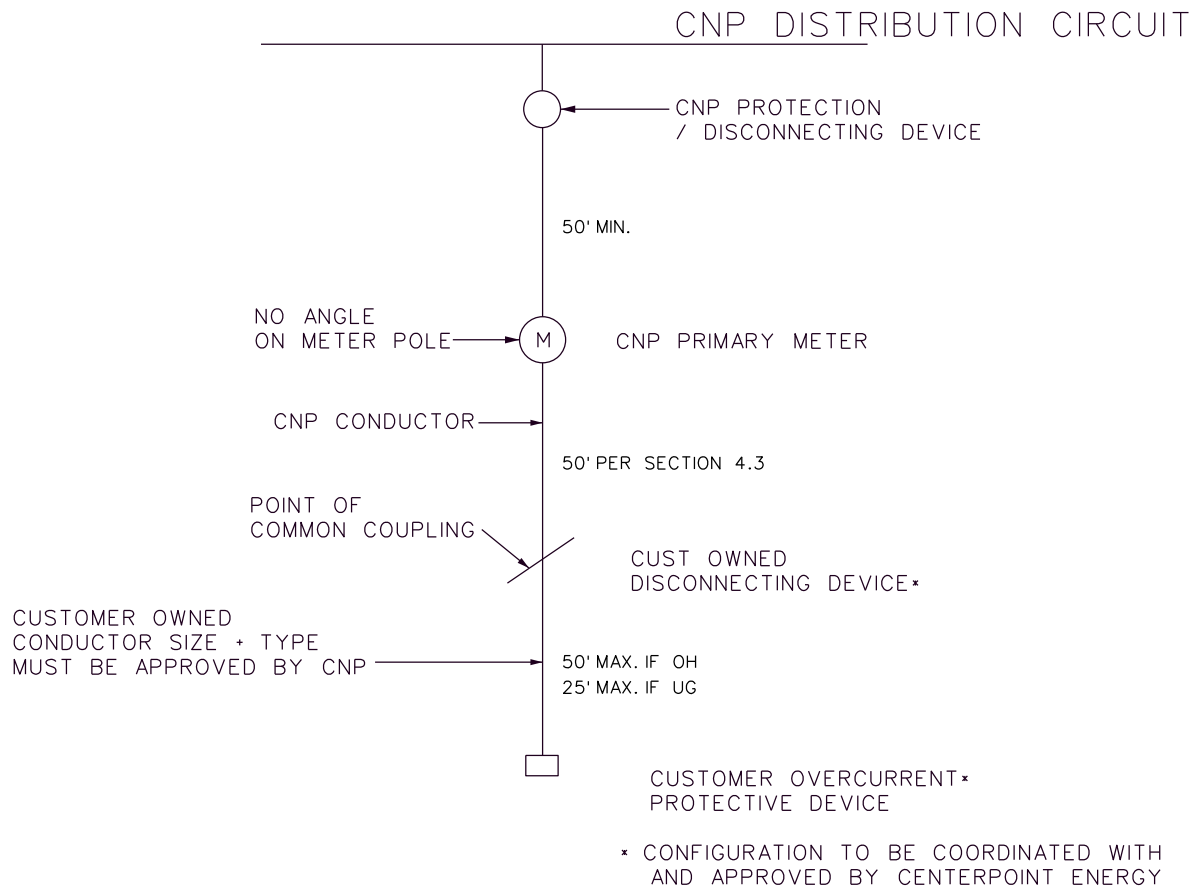
SCHEMATIC OF CUSTOMER
OWNED BREAKER CONTROL
CIRCUIT



NOTES:

1. CNP METER POLE SHALL BE TRUCK ACCESSIBLE. NO LINE ANGLE IS PERMISSABLE ON CNP METER POLE
2. CUSTOMER PRIMARY SERVICE POLE SHALL MEET WIND LOADING REQUIREMENTS AS DEFINED IN SECTION 3.1.4.
3. CUSTOMER MUST PROVIDE ALL WEATHER ACCESS ON BOTH SIDES OF METER POLE.

TYPICAL ONE LINE
DIAGRAM OVERHEAD



NOTES:

1. CNP METER POLE SHALL BE TRUCK ACCESSIBLE. NO LINE ANGLE IS PERMISSABLE ON CNP METER POLE
2. CUSTOMER PRIMARY SERVICE POLE SHALL MEET WIND LOADING REQUIREMENTS AS DEFINED IN SECTION 3.1.4.
3. CUSTOMER MUST PROVIDE ALL WEATHER ACCESS ON BOTH SIDES OF METER POLE.

TYPICAL ONE LINE DIAGRAM
WITH CUSTOMER DISCONNECT
ON SEPARATE POLE FROM
CUSTOMER OVERCURRENT
DEVICE