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PROJECT NO. 35077

INFORMATIONAL FILING OF ERCOT INTERCONNECTION AGREEMENTS PURSUANT TO SUBST. R. §25.195(e)	**§ § §**	**PUBLIC UTILITY OF COMMISSION OF TEXAS**

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January 26, 2017

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ERCOT STANDARD GENERATION INTERCONNECTION AGREEMENT

Between

Chamon Power LLC

and

CenterPoint Energy Houston Electric, LLC

for

Castleman Power CHAMON Generation Project 17INR0042,
Harris County, Texas

December 15, 2016

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ERCOT STANDARD GENERATION INTERCONNECTION AGREEMENT

This Standard Generation Interconnection Agreement is made and entered into between **CenterPoint Energy Houston Electric, LLC** ("Transmission Service Provider"), a Texas limited liability company, and **Chamon Power LLC** ("Generator"), a Texas limited liability company, hereinafter individually referred to as "Party," and collectively referred to as "Parties." In consideration of the mutual covenants and agreements herein contained, the Parties hereto agree as follows:

Transmission Service Provider represents that it is a public utility that owns and operates facilities for the transmission and distribution of electricity. Generator represents that it will own and operate the Plant. Pursuant to the terms and conditions of this Agreement, Transmission Service Provider shall interconnect Generator's Plant with Transmission Service Provider's System consistent with the Facilities Study Agreement executed between the Parties on August 30, 2016.

This Agreement applies only to the Plant and the Parties' interconnection facilities as identified in Exhibit "C".

This Agreement shall become effective on the date of the last signature executing this Agreement below, subject to Governmental Authority approval, if required, and shall continue in full force and effect until terminated in accordance with Exhibit "A".

This Agreement will be subject to the following, all of which are incorporated herein:

A. The "Terms and Conditions of the ERCOT Standard Generation Interconnection Agreement" attached hereto as Exhibit "A";
B. The ERCOT Requirements (unless expressly stated herein, where the ERCOT Requirements are in conflict with this Agreement, the ERCOT Requirements shall prevail);
C. The PUCT Rules (where the PUCT Rules are in conflict with this Agreement, the PUCT Rules shall prevail);
D. The Time Schedule attached hereto as Exhibit "B";
E. The Interconnection Details attached hereto as Exhibit "C";
F. The notice requirements attached hereto as Exhibit "D";
G. The Security Arrangement Details attached hereto as Exhibit "E";
H. The Transmission Service Provider's "Specification for Customer-Owned 138 kV Substation Design", specification 007-231-14 Rev 15, as it may be updated from time to time, the current version of which is attached hereto as Exhibit "F";
I. The Transmission Service Provider's "Outage and Clearance Coordination Procedure", as it may be updated from time to time, the current version of which is attached hereto as Exhibit "G";
J. The Transmission Service Provider's "Telemetry Specification", specification 007-400-02, as it may be updated from time to time, the current version of which is attached hereto as Exhibit "H"; and

K. Selected drawings related to the interconnection between Plant and Transmission Service Provider's System, attached hereto as Exhibit "I".

IN WITNESS WHEREOF, the Parties have executed this Agreement in duplicate originals, each of which shall constitute and be an original effective Agreement between the Parties.

CHAMON POWER LLC	CENTERPOINT ENERGY HOUSTON ELECTRIC, LLC
By:	By:
Title: PRESIDENT	Title: V.P. - High Voltage Power Delivery
Date: 12/20/16	Date: 12/19/2016

Exhibit "A"
Terms and Conditions of the ERCOT Standard Generation Interconnection Agreement

ARTICLE 1. DEFINITIONS

Capitalized terms shall have the meanings as set forth below, except as otherwise specified in the Agreement:

1.1 "CCN" shall mean a Certificate of Convenience and Necessity issued by the PUCT.

1.2 "Commercial Operation" shall mean the date on which Generator declares that the construction of the Plant has been substantially completed, Trial Operation of the Plant has been completed, and the Plant is ready for dispatch.

1.3 "Control Area" shall have the meaning ascribed thereto in PUCT Rule 25.5(19) or its successor.

1.4 "ERCOT" shall mean the Electric Reliability Council of Texas, Inc.

1.5 "ERCOT Requirements" means the ERCOT Operating Guides, ISO Generation Interconnection Procedures as well as any other documents adopted by the ISO or ERCOT relating to the interconnection and operation of generators and transmission systems in ERCOT as amended from time to time, and any successors thereto. Any requirement in the foregoing documents imposed upon generation entities or generation facilities shall become the responsibility of the Generator, and any requirements imposed on transmission providers or transmission facilities shall become the responsibility of the TSP.

1.6 "Facilities Study" shall have the meaning as described in PUCT Rule 25.198(d) or its successor.

1.7 "Facilities Study Agreement" shall mean an agreement executed by the Parties relating to the performance of the Facilities Study.

1.8 "GIF" shall mean Generator's interconnection facilities as described in Exhibit "C."

1.9 "Good Utility Practice" shall have the meaning described in PUCT Rule 25.5(56) or its successor.

1.10 "Governmental Authority(ies)" shall mean any federal, state, local or municipal body having jurisdiction over a Party.

1.11 "In-Service Date" shall be the date, as reflected in Exhibit "B," that the TIF will be ready to connect to the GIF

1.12 "ISO" shall mean the ERCOT Independent System Operator. As of the effective date of this Agreement, the ISO is ERCOT.

1.13 "Plant" shall mean the electric generation facility owned and operated by the Generator, as specified in Exhibit "C."

1.14 "Point of Interconnection" shall mean the location(s) where the GIF connects to the TIF as negotiated and defined by the Parties and as shown on Exhibit "C" of this Agreement.

1.15 "PUCT" shall mean the Public Utility Commission of Texas.

1.16 "PUCT Rules" shall mean the Substantive Rules of the PUCT.

1.17 "Reasonable Efforts" shall mean the use of Good Utility Practice and the exercise of due diligence (pursuant to PUCT Rule 25.191(d)(3)).

1.18 "System Protection Equipment" shall mean those facilities located within the TIF and the GIF as described in Section 5.6 and Exhibit "C."

1.19 "System Security Study" shall have the meaning as described in PUCT Rule 25.198(c) or its successor.

1.20 "TCOS" shall mean the TSP's transmission cost of service as allowed by the applicable Governmental Authority.

1.21 "TIF" shall mean the TSP's interconnection facilities as described in Exhibit "C" to this Agreement.

1.22 "Trial Operation" shall mean the process by which the Generator is engaged in on-site test operations and commissioning of the Plant prior to Commercial Operation.

1.23 "TSP" shall mean the Transmission Service Provider.

1.24 "TSP System" shall mean the electric transmission facilities, including the TIF, and all associated equipment and facilities owned and/or operated by the TSP.

ARTICLE 2. TERMINATION

2.1 Termination Procedures. This Agreement may be terminated as follows:

A. the Generator may terminate this Agreement after giving the TSP thirty (30) days advance written notice; or

B. the TSP may terminate this Agreement (subject to Governmental Authority approval, if required) on written notice to the Generator if the Generator's Plant has not achieved Commercial Operation within one year after the scheduled Commercial Operation date reflected in Exhibit "B"; or

C. either Party may terminate this Agreement in accordance with Section 10.6.

2.2 Termination Costs. If a Party elects to terminate the Agreement pursuant to Section 2.1 above, the Generator shall pay all costs incurred (or committed to be

incurred) by TSP, as of the date of the other Party's receipt of such notice of termination, that are the responsibility of the Generator under this Agreement. In the event of termination by either Party, both Parties shall use commercially reasonable efforts to mitigate the damages and charges that they may incur as a consequence of termination. The provisions of the Sections 2.2 and 2.3 shall survive termination of the Agreement.

2.3 Disconnection. Upon termination of this Agreement, the Parties will disconnect the GIF from the TIF.

ARTICLE 3. REGULATORY FILINGS

3.1 Filing. The TSP shall file this executed Agreement with the appropriate Governmental Authority, if required. Any portions of this Agreement asserted by Generator to contain competitively sensitive commercial or financial information shall be filed by the TSP identified as "confidential" under seal stating, for the TSP's showing of good cause, that Generator asserts such information is confidential information and has requested such filing under seal. If requested by the TSP, Generator shall provide the TSP, in writing, with the Generator's basis for asserting that the information referred to in this Section 3.1 is competitively sensitive information, and the TSP may disclose such writing to the appropriate Governmental Authority.

3.2 Regulatory Approvals. Unless exempt, the TSP shall timely request ISO and all regulatory approvals necessary for it to carry out its responsibilities under this Agreement. Such approvals shall include any CCN required for the construction of the TIF.

ARTICLE 4. INTERCONNECTION FACILITIES ENGINEERING, PROCUREMENT, AND CONSTRUCTION

4.1 Options. The Generator shall select one of the following options (subsection A or subsection B) and include the selected option in Exhibit "B" for completion of the TIF:

A. The TSP shall design, procure, and construct the TIF, using Reasonable Efforts to complete the TIF by the In-Service Date reflected in Exhibit "B." The TSP will utilize its own resources and will contract for additional resources, as reasonably necessary, to meet the In-Service Date. Such resources shall include, as the TSP believes is reasonable, use of other contractors, other equipment suppliers, other material suppliers, additional contract personnel, additional payments to contractors for expedited work, and premiums paid to equipment and material suppliers for expedited delivery. The TSP shall not be required to undertake any initiative which is inconsistent with its standard safety practices, its material and equipment specifications, its design criteria and construction procedures, its labor agreements, applicable laws and regulations, and ERCOT Requirements. In the event the TSP reasonably expects that it will not be able to complete the TIF by the In-Service Date, the TSP will promptly provide written notice to the Generator and will undertake Reasonable Efforts to meet the earliest date thereafter.

B. (i) The TSP shall design, procure, and construct the TIF by the In-Service Date reflected in Exhibit "B." The Parties acknowledge that the In-Service Date was either agreed upon through good faith negotiations or designated by the Generator upon failure of the Parties to agree. In the process of negotiating the In-Service Date, Generator will request a date upon which it reasonably expects it will be ready to begin use of the TIF and upon which it reasonably expects to begin doing so. Any date designated by the Generator shall in no event be less than fifteen months from the date that all conditions of Sections 4.2 and 4.3 have been satisfied. The designated In-Service

Date will be extended day for day for each day that the ISO refuses to grant clearances to install equipment. If the TSP fails to complete the TIF by the In-Service Date reflected in Exhibit "B," the TSP shall pay the Generator liquidated damages in accordance with this Section 4.1.B.

(ii) The Parties agree that actual damages to the Generator, in the event the TIF are not completed by the In-Service Date, may include Generator's fixed operation and maintenance costs and lost opportunity costs. Such actual damages are uncertain and impossible to determine at this time. The Parties agree that, because of such uncertainty, any liquidated damages paid by the TSP to the Generator shall be an amount equal to ½ of 1% of the actual cost of the TIF, per day. However, in no event shall the total liquidated damages exceed 20% of the actual cost of the TIF. The Parties agree that such liquidated damages are less than the Generator's actual damages. The Parties agree that the foregoing payments will be made by the TSP to the Generator as just compensation for the damages caused to the Generator, which actual damages are uncertain and impossible to determine at this time, and as reasonable liquidated damages, but not as a penalty or a method to secure performance of this Agreement.

(iii) The TSP shall apply to have the full costs of the TIF included in TCOS. If the PUCT issues a final, appealable order excluding from TCOS any portion of the TIF costs, including higher contractor and vendor costs due to liquidated damage provisions in those contracts and insurance costs to cover liquidated damages, which costs may have been reasonably incurred but which the PUCT finds should not be recovered through TCOS, the Generator shall reimburse the TSP for such costs in an amount not to exceed the difference between the TSP's estimate of the cost of the TIF under section 4.1.A and

the TSP's estimate of the cost of the TIF under Section 4.1.B as reflected in Exhibit "C." Such costs shall be estimated using Good Utility Practice.

(iv) No liquidated damages shall be paid to Generator if the Generator is not ready to commence use of the TIF for the delivery of power to the Plant for Trial Operation or export of power from the Plant on the In-Service Date, unless the Generator would have been able to commence use of the TIF for the delivery of power to the Plant for Trial Operation or export of power from the Plant but for TSP's delay.

(v) If the In-Service Date has been designated by the Generator upon a failure of the Parties to agree on the In-Service Date, the TSP may, at its option, require the Generator to subcontract with the TSP for all or part of the design, procurement and construction of the TIF in accordance with the TSP's standard subcontractor agreements. In such event, the TSP shall be subject to the payment of liquidated damages to the Generator only if the In-Service Date is not met solely due to the TSP's failure to complete the portion of the TIF for which the TSP has retained responsibility. It is the intent of this subsection to give the TSP full control of the contents and quality of the TIF. To the extent the Generator acts as a subcontractor to the TSP, the following will apply: 1) The Generator shall engineer, procure equipment, and construct the TIF (or portions thereof) using Good Utility Practice and using standards and specifications provided in advance by the TSP; 2) In its engineering, procurement and construction of the TIF, the Generator shall comply with all requirements of law to which the TSP would be subject in the engineering, procurement or construction of the TIF; 3) The TSP shall review and approve the engineering design, acceptance tests of equipment, and the construction of the TIF; 4) The TSP shall have the right to approve and accept for

operation the TIF in accordance with the standards and specifications provided in advance by the TSP, such approval and acceptance shall not be unreasonably withheld, conditioned, or delayed; 5) Should any phase of the engineering, equipment procurement, or construction of the TIF, including selection of subcontractors, not meet the standards and specifications provided by the TSP, and therefore be deemed unacceptable, then the Generator shall be obligated to remedy that portion of the TIF or selection of subcontractors that is deemed unacceptable, the TSP's approval of the Generator's selection of subcontractors will not be unreasonably withheld, conditioned or delayed; and 6) Once the TIF is accepted for operation by the TSP, then the TSP shall reimburse the Generator for the reasonable and necessary costs incurred by the Generator to complete the TIF, not to exceed the amount specified in the subcontract. Such reimbursement shall be made within thirty days after receipt of the invoice, unless otherwise agreed to by the Parties.

4.2 Equipment Procurement. If responsibility for construction of the TIF is borne by the TSP, then the TSP shall commence design of the TIF and procure necessary equipment within a reasonable time after all of the following conditions are satisfied:

A. The TSP has completed the Facilities Study pursuant to the Facilities Study Agreement;

B. The TSP has received written authorization to proceed with design and procurement from the Generator by the date specified in Exhibit "B"; and

C. The Generator has provided security to the TSP in accordance with Section 8.3 by the dates specified in Exhibit "B."

4.3 Construction Commencement. The TSP shall commence construction of the TIF

as soon as practicable after the following additional conditions are satisfied:

A. Approval of the appropriate Governmental Authority has been obtained for any facilities requiring regulatory approval;

B. Necessary real property rights, if any, have been obtained;

C. The TSP has received written authorization to proceed with construction from the Generator by the date specified in Exhibit "B"; and

D. The Generator has provided security to the TSP in accordance with Section 8.3 by the dates specified in Exhibit "B."

4.4 Work Progress. The Parties will keep each other advised periodically as to the progress of their respective design, procurement and construction efforts. If, at any time, the Generator becomes aware that the completion of the TIF will not be required until after the specified In-Service Date, the Generator will promptly provide written notice to the TSP of a new, later In-Service Date.

4.5 Conditions Precedent Delay. To the extent this Agreement incorporates a specified In-Service Date and the Generator fails to satisfy conditions precedent under Sections 4.2 and 4.3 so that the TSP may meet the In-Service Date, the Parties will negotiate in good faith to establish a new schedule for completion of the TIF.

ARTICLE 5. FACILITIES AND EQUIPMENT

5.1 Information Exchange. The Parties shall exchange information and mutually agree upon the design and compatibility of the Parties' interconnection facilities. The Parties shall work diligently and in good faith to make any necessary design changes to ensure compatibility of the GIF to the TSP System.

5.2 GIF Construction. Generator agrees to cause the GIF to be designed and constructed in accordance with Good Utility Practice, ERCOT Requirements and the National Electrical Safety Code in effect at the time of construction. Within one-hundred and twenty (120) days after Commercial Operation, unless the Parties agree on another mutually acceptable deadline, the Generator shall deliver to the TSP the following "as-built" drawings, information and documents for the GIF: a one-line diagram, a site plan showing the Plant and the GIF, plan and elevation drawings showing the layout of the GIF, a relay functional diagram, relaying AC and DC schematic wiring diagrams and relay settings for all facilities associated with the Generator's main-power transformers, the facilities connecting the Generator to the main power transformers and the GIF, and the impedances (determined by factory tests) for the associated main power transformers and the generators.

5.3 TIF Construction. The TSP agrees to cause the TIF to be designed and constructed in accordance with Good Utility Practice, ERCOT Requirements and the National Electrical Safety Code in effect at the time of construction.

5.4 Equipment Changes. For facilities not described in Exhibit "C," if either Party makes equipment changes to the Plant, the GIF, the TIF or the TSP System which it knows will affect the operation or performance of the other Party's interconnection facilities, the Parties agree to notify the other Party, in writing, of such changes. Such changes shall be made in accordance with ERCOT Requirements and coordinated between the Parties.

5.5 Metering, Telemetry and Communications Requirements.

A. Metering and telemetry of data will be accomplished in accordance with ERCOT Requirements. The specific metering, telemetry and communications equipment to be installed and data to be telemetered are described in Exhibit "C."

B. At the Point of Interconnection, the metering and telemetry equipment shall be owned by the TSP. However, the TSP shall provide the Generator with metering and telemetry values in accordance with ERCOT Requirements.

C. A minimum set of inputs to the telemetry equipment are specified in Exhibit "C." Additional sets of inputs may be subsequently mutually agreed upon.

D. The TSP will notify the Generator at least five (5) working days in advance of any planned maintenance, inspection, testing, or calibration of the metering equipment, unless otherwise agreed to in writing. The Generator, or its designated representative, shall have the right to be present for these activities and to receive copies of any documents related to the procedures and results.

E. Prior to the connection of the GIF to the TIF, acceptance tests will be performed by the owning Party to ensure the proper functioning of all metering, telemetry and communications equipment associated with the Point of Interconnection and both Parties' interconnection facilities, and to verify the accuracy of data being received by the TSP, the Control Area(s) in which the Plant and the TSP are located and the Generator. All acceptance tests will be performed consistent with ERCOT Requirements.

F. The TSP shall, in accordance with Good Utility Practice and ERCOT Requirements, specify communications facilities, including those necessary to transmit data from the metering equipment to the TSP, that are necessary for the effective operation of the Plant and the GIF with the TSP System. Such communication facilities

shall be included in Exhibit "C." The Generator shall make arrangements to procure and bear the cost of such facilities.

G. Any changes to the meters, telemetry equipment, voltage transformers, current transformers, and associated panels, hardware, conduit and cable, which will affect the data being received by the other Party must be mutually agreed to by the Parties.

H. Each Party will promptly advise the other Party if it detects or otherwise learns of any metering, telemetry or communications equipment errors or malfunctions that require the attention and/or correction by the other Party. The Party owning such equipment shall correct such error or malfunction as soon as reasonably feasible in accordance with ERCOT Requirements.

5.6 System Protection and Other Controls Requirements.

A. Each Party's facilities shall be designed to isolate any fault, or to correct or isolate any abnormality, that would negatively affect the other Party's system or other entities connected to the TSP System.

B. The Generator shall be responsible for protection of its facilities consistent with ERCOT Requirements.

C. Each Party's protective relay design shall incorporate the necessary test switches to perform the tests required in Section 5.6.F. The required test switches will be placed such that they allow operation of lockout relays while preventing breaker failure schemes from operating and causing unnecessary breaker operations and tripping the Generator's units.

D. Recording equipment shall be installed to analyze all system disturbances in accordance with ERCOT Requirements.

E. Each Party will test, operate and maintain System Protection Equipment in accordance with ERCOT Requirements. Each Party will provide reasonable notice to the other Party of any testing of its System Protection Equipment allowing such other Party the opportunity to have representatives present during testing of its System Protection Equipment.

F. Prior to the In-Service Date, and again prior to Commercial Operation, each Party or its agent shall perform a complete calibration test and functional trip test of the System Protection Equipment. At intervals suggested by Good Utility Practice or at intervals described in the ERCOT Requirements if so defined therein, and following any apparent malfunction of the System Protection Equipment, each Party shall perform both calibration and functional trip tests of its System Protection Equipment. These tests do not require the tripping of any in-service generation unit. These tests do, however, require that all protective relays and lockout contacts be activated.

5.7 No Annexation. Any and all equipment placed on the premises of a Party shall be and remain the property of the Party providing such equipment regardless of the mode and manner of annexation or attachment to real property, unless otherwise mutually agreed by the Parties.

ARTICLE 6. OPERATION AND MAINTENANCE

6.1 Operation and Maintenance of Interconnection Facilities. The Parties agree to operate and maintain their systems in accordance with Good Utility Practice, National

Electrical Safety Code, the ERCOT Requirements, PUCT Rules and all applicable laws and regulations. Subject to any necessary ISO approval, each Party shall provide necessary equipment outages to allow the other Party to perform periodic maintenance, repair or replacement of its facilities. Such outages shall be scheduled at mutually agreeable times, unless conditions exist which a Party believes, in accordance with Good Utility Practice, may endanger persons or property. No changes will be made in the normal operation of the Point of Interconnection without the mutual agreement of the Parties except as otherwise provided herein. All testing of the Plant that affects the operation of the Point of Interconnection shall be coordinated between the TSP, the Control Area(s) in which the Plant and the TSP are located, and the Generator and will be conducted in accordance with ERCOT Requirements.

6.2 Control Area. The Control Area within ERCOT is a single Control Area.

6.3 Land Rights and Easements. Terms and conditions addressing the rights of the TSP and the Generator regarding any facilities located on the other Party's property shall be addressed in a separate, duly executed and recorded easement agreement between the Parties. Prior to Commercial Operation, the Parties will mutually agree upon procedures to govern access to each other's property as necessary for the Parties to fulfill their obligations hereunder.

6.4 Service Interruption. The Parties recognize that the interruption of service provisions of the PUCT Rules give TSP the right to disconnect the TSP System from the Plant under the conditions specified therein. The Generator will promptly disconnect the Plant from the TSP System when required by and in accordance with the PUCT Rules and ERCOT Requirements.

6.5 Switching and Clearance.

A. Any switching or clearances needed on the TIF or the GIF will be done in accordance with ERCOT Requirements.

B. Any switching and clearance procedure necessary to comply with Good Utility Practice or ERCOT Requirements that may have specific application to the Plant shall be addressed in Exhibit "C."

6.6 Start-Up and Synchronization. Consistent with ERCOT Requirements and the Parties' mutually acceptable procedure, the Generator is responsible for the proper synchronization of the Plant to the TSP System.

6.7 Routine Operational Communications. On a timely basis, the Parties shall exchange all information necessary to comply with ERCOT Requirements.

6.8 Blackstart Operations. If the Plant is capable of blackstart operations, Generator will coordinate individual Plant start-up procedures consistent with ERCOT Requirements. Any blackstart operations shall be conducted in accordance with the blackstart criteria included in the ERCOT Requirements and the TSP Blackstart Plan on file with the ISO. Notwithstanding this section, the Generator is not required to have blackstart capability by virtue of this Agreement. If the Generator will have blackstart capability, then Generator shall provide and maintain an emergency communication system that will interface with the TSP during a blackstart condition.

6.9 Power System Stabilizers. The Generator shall procure, install, maintain and operate power system stabilizers if required to meet ERCOT Requirements and as described in Exhibit "C."

ARTICLE 7. DATA REQUIREMENTS

7.1 Data Acquisition. The acquisition of data to realistically simulate the electrical behavior of system components is a fundamental requirement for the development of a reliable interconnected transmission system. Therefore, the TSP and the Generator shall be required to submit specific information regarding the electrical characteristics of their respective facilities to each other as described below in accordance with ERCOT Requirements.

7.2 Initial Data Submission by TSP. The initial data submission by the TSP shall occur no later than 120 days prior to Trial Operation and shall include transmission system data necessary to allow the Generator to select equipment and meet any system protection and stability requirements.

7.3 Initial Data Submission by Generator. The initial data submission by the Generator, including manufacturer data, shall occur no later than 90 days prior to the Trial Operation and shall include a completed copy of the following forms contained in the ISO's Generation Interconnection Procedure: (1) Plant Description/Data and (2) Generation Stability Data. It shall also include any additional data provided to the ISO for the System Security Study. Data in the initial submissions shall be the most current Plant design or expected performance data. Data submitted for stability models shall be compatible with the ISO standard models. If there is no compatible model, the Generator will work with an ISO designated consultant to develop and supply a standard model and associated data.

7.4 Data Supplementation. Prior to Commercial Operation, the Parties shall supplement their initial data submissions with any and all "as-built" Plant data or "as-

tested" performance data which differs from the initial submissions or, alternatively, written confirmation that no such differences exist. Subsequent to Commercial Operation, the Generator shall provide the TSP any data changes due to equipment replacement, repair, or adjustment. The TSP shall provide the Generator any data changes due to equipment replacement, repair, or adjustment in the directly connected substation or any adjacent TSP-owned substation that may affect the GIF equipment ratings, protection or operating requirements. The Parties shall provide such data no later than 30 days after the date of the actual change in equipment characteristics. Also, the Parties shall provide to each other a copy of any additional data later required by the ISO concerning these facilities.

7.5 Data Exchange. Each Party shall furnish to the other Party real-time and forecasted data as required by ERCOT Requirements. The Parties will cooperate with one another in the analysis of disturbances to either the Plant or the TSP's System by gathering and providing access to any information relating to any disturbance, including information from oscillography, protective relay targets, breaker operations and sequence of events records.

ARTICLE 8. PERFORMANCE OBLIGATION

8.1 Generator's Cost Responsibility. The Generator will acquire, construct, operate, test, maintain and own the Plant and the GIF at its sole expense. In addition, the Generator may be required to make a contribution in aid of construction in the amount set out in and for the facilities described in Exhibit "C," if any, in accordance with PUCT Rules.

8.2 TSP's Cost Responsibility. The TSP will acquire, own, operate, test, and maintain the TIF at its sole expense, subject to the provisions of Section 4.1.B and the contribution in aid of construction provisions of Section 8.1 of this Agreement.

8.3 Financial Security Arrangements. The TSP may require the Generator to pay a reasonable deposit or provide another means of security, to cover the costs of planning, licensing, procuring equipment and materials, and constructing the TIF. The required security arrangements shall be specified in Exhibit "E." Within five business days after the Plant achieves Commercial Operation, the TSP shall return the deposit or security to the Generator. However, the TSP may retain an amount to cover the incremental difference between the TSP's actual out of pocket costs associated with the choice of Section 4.1.B over Section 4.1.A, pending a final PUCT Order as contemplated in Section 4.1.B (iii). If the Plant has not achieved Commercial Operation within one year after the scheduled Commercial Operation date identified in Exhibit "B" or if the Generator terminates this Agreement in accordance with Section 2.1 and the TIF are not required, the TSP may, subject to the provisions of Section 2.2, retain as much of the deposit or security as is required to cover the costs it incurred in planning, licensing, procuring equipment and materials, and constructing the TIF. If a cash deposit is made pursuant to Exhibit "E," any repayment of such cash deposit shall include interest at a rate applicable to customer deposits as established from time to time by the PUCT or other Governmental Authority.

ARTICLE 9. INSURANCE

9.1 Each Party shall, at its own expense, maintain in force throughout the period of this Agreement and until released by the other Party the following minimum insurance coverages, with insurers authorized to do business in Texas:

A. Employers Liability and Worker's Compensation Insurance providing statutory benefits in accordance with the laws and regulations of the State of Texas. The minimum limits for the Employer's Liability insurance shall be One Million Dollars ($1,000,000) each accident bodily injury by accident, One Million Dollars ($1,000,000) each employee bodily injury by disease, and One Million Dollars ($1,000,000) policy limit bodily injury by disease.

B. Commercial General Liability Insurance including premises and operations, personal injury, broad form property damage, broad form blanket contractual liability coverage (including coverage for the contractual indemnification) products and completed operations coverage, coverage for explosion, collapse and underground hazards, independent contractors coverage, coverage for pollution to the extent normally available and punitive damages to the extent normally available and cross liability coverage, with minimum limits of One Million Dollars ($1,000,000) per occurrence/One Million Dollars ($1,000,000) aggregate combined single limit for personal injury, bodily injury, including death and property damage.

C. Business Automobile Liability Insurance for coverage of owned, non-owned and hired vehicles, trailers or semi-trailers designed for travel on public roads, with a minimum combined single limit of One Million Dollars ($1,000,000) per occurrence for bodily injury, including death, and property damage.

D. Excess Liability Insurance over and above the Employer's Liability, Commercial General Liability and Business Automobile Liability Insurance coverage, with a minimum combined single limit of Twenty Million Dollars ($20,000,000) per occurrence/Twenty Million Dollars ($20,000,000) aggregate.

E. The Commercial General Liability Insurance, Business Automobile Liability Insurance, and Excess Liability Insurance policies shall name or cover the other Party, its parent, associated and affiliated companies and their respective directors, officers, agents, servants and employees ("Other Party Group") as additional insured. All policies shall contain provisions whereby the insurers waive all rights of subrogation in accordance with the provisions of this Agreement against the Other Party Group and each Party shall provide thirty (30) days advance written notice to Other Party Group prior to anniversary date of cancellation or any material change in coverage or condition.

F. The Commercial General Liability Insurance, Business Automobile Liability Insurance and Excess Liability Insurance policies shall contain provisions that specify that the policies are primary and shall apply to such extent without consideration for other policies separately carried and shall state that each insured is provided coverage as though a separate policy had been issued to each, except the insurer's liability shall not be increased beyond the amount for which the insurer would have been liable had only one insured been covered. Each Party shall be responsible for its respective deductibles or retentions.

G. The Commercial General Liability Insurance, Business Automobile Liability Insurance and Excess Liability Insurance policies, if written on a Claims First Made basis, shall be maintained in full force and effect for two (2) years after termination

of this Agreement, which coverage may be in the form of tail coverage or extended reporting period coverage if agreed by the Parties.

H. The requirements contained herein as to the types and limits of all insurance to be maintained by the Parties are not intended to and shall not in any manner, limit or qualify the liabilities and obligations assumed by the Parties under this Agreement.

I. Within ten (10) days following execution of this Agreement, and as soon as practicable after the end of each fiscal year or at the renewal of the insurance policy and in any event within ninety (90) days thereafter, each Party shall provide certification of all insurance required in this Agreement, executed by each insurer or by an authorized representative of each insurer, or a letter of self-insurance executed by an authorized representative of the Party.

J. Notwithstanding the foregoing, each Party may self-insure to the extent it maintains a self-insurance program; provided that, such Party's senior secured debt is rated at investment grade, or better, by Standard & Poor's. For any period of time that a Party's senior secured debt is unrated by Standard & Poor's or is rated at less than investment grade by Standard & Poor's, such Party shall comply with the insurance requirements applicable to it under Sections 9.1.A through 9.1.I. In the event that a Party is permitted to self-insure pursuant to this Section 9.1.J, it shall not be required to comply with the insurance requirements applicable to it under Sections 9.1.A through 9.1.I.

K. The Parties agree to report to each other in writing as soon as practical all accidents or occurrences resulting in injuries to any person, including death, and any property damage arising out of this Agreement.

ARTICLE 10. MISCELLANEOUS

10.1 Governing Law and Applicable Tariffs.

A. This Agreement for all purposes shall be construed in accordance with and governed by the laws of the State of Texas, excluding conflicts of law principles that would refer to the laws of another jurisdiction. The Parties submit to the jurisdiction of the federal and state courts in the State of Texas.

B. This Agreement is subject to all valid, applicable rules, regulations and orders of, and tariffs approved by, duly constituted Governmental Authorities.

C. Each Party expressly reserves the right to seek changes in, appeal, or otherwise contest any laws, orders, rules, or regulations of a Governmental Authority.

10.2 No Other Services. This Agreement is applicable only to the interconnection of the Plant to the TSP System at the Point of Interconnection and does not obligate either Party to provide, or entitle either Party to receive, any service not expressly provided for herein. Each Party is responsible for making the arrangements necessary for it to receive any other service that it may desire from the other Party or any third party. This Agreement does not address the sale or purchase of any electric energy, transmission service or ancillary services by either Party, either before or after Commercial Operation.

10.3 Entire Agreement. This Agreement, including all Exhibits, Attachments and Schedules attached hereto, constitutes the entire agreement between the Parties with reference to the subject matter hereof, and supersedes all prior and contemporaneous understandings or agreements, oral or written, between the Parties with respect to the subject matter of this Agreement. There are no other agreements, representations, warranties, or covenants which constitute any part of the consideration for, or any

condition to, either Party's compliance with its obligations under this Agreement. Notwithstanding the other provisions of this Section, the Facilities Study Agreement, if any, is unaffected by this Agreement.

10.4 Notices. Except as otherwise provided in Exhibit "D," any formal notice, demand or request provided for in this Agreement shall be in writing and shall be deemed properly served, given or made if delivered in person, or sent by either registered or certified mail, postage prepaid, overnight mail or fax to the address or number identified on Exhibit "D" attached to this Agreement. Either Party may change the notice information on Exhibit "D" by giving five business days written notice prior to the effective date of the change.

10.5 Force Majeure.

A. The term "Force Majeure" as used herein shall mean any cause beyond the reasonable control of the Party claiming Force Majeure, and without the fault or negligence of such Party, which materially prevents or impairs the performance of such Party's obligations hereunder, including but not limited to, storm, flood, lightning, earthquake, fire, explosion, failure or imminent threat of failure of facilities, civil disturbance, strike or other labor disturbance, sabotage, war, national emergency, or restraint by any Governmental Authority.

B. Neither Party shall be considered to be in Default (as hereinafter defined) with respect to any obligation hereunder (including obligations under Article 4), other than the obligation to pay money when due, if prevented from fulfilling such obligation by Force Majeure. A Party unable to fulfill any obligation hereunder (other than an obligation to pay money when due) by reason of Force Majeure shall give notice and the

full particulars of such Force Majeure to the other Party in writing or by telephone as soon as reasonably possible after the occurrence of the cause relied upon. Telephone notices given pursuant to this Section shall be confirmed in writing as soon as reasonably possible and shall specifically state full particulars of the Force Majeure, the time and date when the Force Majeure occurred and when the Force Majeure is reasonably expected to cease. The Party affected shall exercise due diligence to remove such disability with reasonable dispatch, but shall not be required to accede or agree to any provision not satisfactory to it in order to settle and terminate a strike or other labor disturbance.

10.6 Default

A. The term "Default" shall mean the failure of either Party to perform any obligation in the time or manner provided in this Agreement. No Default shall exist where such failure to discharge an obligation (other than the payment of money) is the result of Force Majeure as defined in this Agreement or the result of an act or omission of the other Party. Upon a Default, the non-defaulting Party shall give written notice of such Default to the defaulting Party. Except as provided in Section 10.6.B, the defaulting Party shall have thirty (30) days from receipt of the Default notice within which to cure such Default; provided however, if such Default is not capable of cure within 30 days, the defaulting Party shall commence such cure within 30 days after notice and continuously and diligently complete such cure within 90 days from receipt of the Default notice; and, if cured within such time, the Default specified in such notice shall cease to exist.

B. If a Default is not cured as provided in this Section, or if a Default is not capable of being cured within the period provided for herein, the non-defaulting Party

shall have the right to terminate this Agreement by written notice at any time until cure occurs, and be relieved of any further obligation hereunder and, whether or not that Party terminates this Agreement, to recover from the defaulting Party all amounts due hereunder, plus all other damages and remedies to which it is entitled at law or in equity. The provisions of this Section will survive termination of this Agreement.

10.7 Intrastate Operation. The operation of the Plant by Generator shall not cause there to be a synchronous or an asynchronous interconnection between ERCOT and any other transmission facilities operated outside of ERCOT unless ordered by the Federal Energy Regulatory Commission under Section 210 of the Federal Power Act. The Parties recognize and agree that any such interconnection will constitute an adverse condition giving the TSP the right to immediately disconnect the TIF from the GIF, until such interconnection has been disconnected. The Generator will not be prohibited by this Section from interconnecting the Plant with facilities operated by the Comisión Federal de Electricidad of Mexico, unless such interconnection would cause ERCOT utilities that are not "public utilities" under the Federal Power Act to become subject to the plenary jurisdiction of the Federal Energy Regulatory Commission.

10.8 No Third Party Beneficiaries. This Agreement is not intended to and does not create rights, remedies, or benefits of any character whatsoever in favor of any persons, corporations, associations, or entities other than the Parties, and the obligations herein assumed are solely for the use and benefit of the Parties, their successors in interest and, where permitted, their assigns.

10.9 No Waiver. The failure of a Party to this Agreement to insist, on any occasion, upon strict performance of any provision of this Agreement will not be considered a

waiver of obligations, rights, or duties imposed upon the Parties. Termination or Default of this Agreement for any reason by the Generator shall not constitute a waiver of the Generator's legal rights to obtain an interconnection from the TSP under a new interconnection agreement.

10.10 Headings. The descriptive headings of the various articles and sections of this Agreement have been inserted for convenience of reference only and are of no significance in the interpretation or construction of this Agreement.

10.11 Multiple Counterparts. This Agreement may be executed in two or more counterparts, each of which is deemed an original but all constitute one and the same instrument.

10.12 Amendment. This Agreement may be amended only upon mutual agreement of the Parties, which amendment will not be effective until reduced to writing and executed by the Parties.

10.13 No Partnership. This Agreement shall not be interpreted or construed to create an association, joint venture, agency relationship, or partnership between the Parties or to impose any partnership obligation or liability upon either Party. Neither Party shall have any right, power or authority to enter into any agreement or undertaking for, or act on behalf of, or to act as or be an agent or representative of, or to otherwise bind, the other Party.

10.14 Further Assurances. The Parties agree to (i) furnish upon request to each other such further information, (ii) execute and deliver to each other such other documents, and (iii) do such other acts and things, all as the other Party may reasonably request for the purpose of carrying out the intent of this Agreement and the documents referred to in this

Agreement. Without limiting the generality of the foregoing, the TSP shall, at the Generator's expense, when reasonably requested to do so by the Generator at any time after the execution of this Agreement, prepare and provide such information in connection with this Agreement (including, if available, resolutions, certificates, opinions of counsel or other documents relating to the TSP's corporate authorization to enter into this Agreement and to undertake the obligations set out herein) as may be reasonably required by any potential lender to the Generator under a proposed loan agreement. The TSP will use commercially reasonable efforts to obtain any opinion of counsel reasonably requested by Generator, but the TSP shall not be in Default of any obligation under this Agreement if the TSP is unable to provide an opinion of counsel that will satisfy any potential lender to the Generator. Specifically, upon the written request of one Party, the other Party shall provide the requesting Party with a letter stating whether or not, up to the date of the letter, that Party is satisfied with the performance of the requesting Party under this Agreement.

10.15 Indemnification and Liability. The indemnification and liability provisions of the PUCT Rule 25.202(b)(2) or its successor shall govern this Agreement.

10.16 Consequential Damages. OTHER THAN THE LIQUIDATED DAMAGES HERETOFORE DESCRIBED, IN NO EVENT SHALL EITHER PARTY BE LIABLE UNDER ANY PROVISION OF THIS AGREEMENT FOR ANY LOSSES, DAMAGES, COSTS OR EXPENSES FOR ANY SPECIAL, INDIRECT, INCIDENTAL, CONSEQUENTIAL, OR PUNITIVE DAMAGES, INCLUDING BUT NOT LIMITED TO LOSS OF PROFIT OR REVENUE, LOSS OF THE USE OF EQUIPMENT, COST OF CAPITAL, COST OF TEMPORARY EQUIPMENT OR

SERVICES, WHETHER BASED IN WHOLE OR IN PART IN CONTRACT, IN TORT, INCLUDING NEGLIGENCE, STRICT LIABILITY, OR ANY OTHER THEORY OF LIABILITY; PROVIDED, HOWEVER, THAT DAMAGES FOR WHICH A PARTY MAY BE LIABLE TO THE OTHER PARTY UNDER ANOTHER AGREEMENT WILL NOT BE CONSIDERED TO BE SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES HEREUNDER.

10.17 Assignment. This Agreement may be assigned by either Party only with the written consent of the other; provided that either Party may assign this Agreement without the consent of the other Party to any affiliate of the assigning Party with an equal or greater credit rating and with the legal authority and operational ability to satisfy the obligations of the assigning Party under this Agreement; and provided further that the Generator shall have the right to assign this Agreement, without the consent of the TSP, for collateral security purposes to aid in providing financing for the Plant, provided that the Generator will require any secured party, trustee or mortgagee to notify the TSP of any such assignment. Any financing arrangement entered into by the Generator pursuant to this Section will provide that prior to or upon the exercise of the secured party's, trustee's or mortgagee's assignment rights pursuant to said arrangement, the secured creditor, the trustee or mortgagee will notify the TSP of the date and particulars of any such exercise of assignment right(s). Any attempted assignment that violates this Section is void and ineffective. Any assignment under this Agreement shall not relieve a Party of its obligations, nor shall a Party's obligations be enlarged, in whole or in part, by reason thereof. Where required, consent to assignment will not be unreasonably withheld, conditioned or delayed.

10.18 Severability. If any provision in this Agreement is finally determined to be invalid, void or unenforceable by any court having jurisdiction, such determination shall not invalidate, void or make unenforceable any other provision, agreement or covenant of this Agreement; provided that if the Generator (or any third-party, but only if such third-party is not acting at the direction of the TSP) seeks and obtains such a final determination with respect to any provision of Section 4.1.B, then none of the provisions of Section 4.1.B. shall thereafter have any force or effect and the Parties' rights and obligations shall be governed solely by Section 4.1.A.

10.19 Comparability. The Parties will comply with all applicable comparability and code of conduct laws, rules and regulations, as amended from time to time.

10.20 Invoicing and Payment. Unless the Parties otherwise agree (in a manner permitted by applicable PUCT Rules and as specified in writing in an Exhibit "E" attached hereto), invoicing and payment rights and obligations under this Agreement shall be governed by PUCT Rules or applicable Governmental Authority. Invoices shall be rendered to the paying Party at the address specified on, and payments shall be made in accordance with the requirements of, Exhibit "D."

10.21 Confidentiality.

A. Subject to the exception in Section 10.21.B, any information that a Party claims is competitively sensitive, commercial or financial information under this Agreement ("Confidential Information") shall not be disclosed by the other Party to any person not employed or retained by the other Party, except to the extent disclosure is (i) required by law; (ii) reasonably deemed by the disclosing Party to be required to be disclosed in connection with a dispute between or among the Parties, or the defense of

litigation or dispute; (iii) otherwise permitted by consent of the other Party, such consent not to be unreasonably withheld; or (iv) necessary to fulfill its obligations under this Agreement or as a transmission service provider or a Control Area operator including disclosing the Confidential Information to the ISO. The Party asserting confidentiality shall notify the other Party in writing of the information it claims is confidential. Prior to any disclosures of the other Party's Confidential Information under this subsection, or if any third party or Governmental Authority makes any request or demand for any of the information described in this subsection, the disclosing Party agrees to promptly notify the other Party in writing and agrees to assert confidentiality and cooperate with the other Party in seeking to protect the Confidential Information from public disclosure by confidentiality agreement, protective order or other reasonable measures.

B. This provision shall not apply to any information that was or is hereafter in the public domain (except as a result of a breach of this provision).

Exhibit "B"
Time Schedule

1) Interconnection Option chosen by Generator (check one):
   ___X___ Section 4.1.A. or ____ Section 4.1.B

   A) If Section 4.1.B is chosen by Generator, the In-Service Date(s) was determined by (check one): (1) ___N/A___ good faith negotiations, or (2) ___N/A___ designated by Generator upon failure to agree.

2) Generator must provide by December 31, 2016 ("NTP Need Date"), a written notice to proceed with design, procurement, and construction of the TIF and provide security, as specified in Exhibit "A", Section 4.2 and 4.3, (collectively, the "Notice to Proceed"), so that TSP may maintain schedule to meet the In-Service Date identified below. The NTP Date shall be the date Generator provides such full Notice to Proceed to TSP. The Parties acknowledge and agree that the authorization provided by Generator pursuant to Paragraph 12(B) and 12(C) of Exhibit "C", Interconnection Details, for TSP to proceed with the design, procurement and construction of the TIF collectively constitutes the provision of the Notice to Proceed by the NTP Need Date.

   TIF In-Service Date: May 15, 2017

   Scheduled Generation Trial Operation Date: The later of:
   a) **May 15, 2017; or**
   b) **1 month after the TIF In-Service Date.**

   Scheduled Generation Commercial Operation Date: The later of:
   a) **1 month after the TIF In-Service Date; or**
   b) **June 1, 2017**

3) The designated TIF In-Service Date, Scheduled Trial Operation Date, and Scheduled Commercial Operation Date will each be extended day-for-day for:
   A) each day after 180 calendar days after the date that Notice to Proceed was given that real property rights to be provided by Generator pursuant to Paragraph 8(F), Exhibit "C", Interconnection Details, are not in place; and
   B) each day after ten (10) days after the effective date of this Agreement that security arrangements outlined in Exhibit "A", Article 8, Paragraph 8.3, Financial Security Arrangements, and Exhibit "E" are not in place.
   C) each day that ERCOT does not grant outages as required by TSP to perform work that must be accomplished to connect the Generator to the ERCOT transmission system.

4) Due to the nature of the subject of this Agreement, the Parties may mutually agree to change the dates and times of this Exhibit B.

Exhibit "C"
Interconnection Details

1) Plant Name: Castleman Power CHAMON Generation Project.

2) Point of Interconnection Location
   A) TSP System side of each of the Generator's two (2) transmission line terminating structures ("Dead-end Structures") located at Generator's 138 kV CHAMON Substation at 18511 Beaumont Highway, Harris County, Texas.

3) Delivery Voltage: 138 kV

4) Number and Size of Generating Units
   A) Plant will be comprised of two (2) generators with a total net rating of approximately 100 MW ("Planned Capacity"), which is projected to be the Plant's Net Dependable Capability, as defined by ERCOT Requirements.

5) Type of Generating Unit
   A) Generation Description

Natural gas combustion turbine generators				
Description	Manufacturer	Rating	GSU Transformer Voltages	Type
LM-6000PC Sprint	GE	50 MW	13.8kV – 138 kV	GE Prolec
LM-6000PC Sprint	GE	50 MW	13.8kV – 138 kV	GE Prolec
Total net MW:	Approximately 100 MW			

Each step-up, standby and auxiliary transformer that is directly connected at 138 kV will have a circuit breaker for isolation from the TIF.

B) Generator Unit Data
Electrical characteristics of Plant's generating units shall be in accordance with the most recent version of data that Generator has provided to TSP via the ERCOT Resource Registration Form ("RARF") data submittal.

6) Metering and Telemetry Equipment
   A) TSP shall provide and install ERCOT Polled Settlement ("EPS") primary and check meters, current transformers and associated wiring required for measuring the output of the Plant generation and for measuring the Plant electrical load at Generator's CHAMON Substation. The 138 kV metering current transformers and metering potential transformers for the EPS metering of Plant electrical load shall be procured by TSP and owned, maintained, and replaced by TSP. TSP shall install and maintain the metering

system's components in a manner consistent with ERCOT Requirements and the PUCT Rules. TSP shall install RS485 communication circuits between the EPS metering, to measure Plant electrical load, and the TSP Supervisory Control & Data Acquisition ("SCADA") Remote Terminal Unit ("RTU"). These communication circuits will transfer primary and backup meter data to the TSP RTU and EPS metering data will be available to the Generator through TSP's RTU in accordance with 6C. TSP will provide a port in TSP's RTU for Generator. Generator will provide a port for TSP at Generator's RTU.

B) TSP shall install the substation SCADA RTU at the CHAMON Substation. The RTU will be multi-port equipped and operate with protocols compatible with TSP. The RTU will be equipped to monitor CHAMON Substation as outlined in Paragraph 11, and shall only control the in-line circuit breakers in the CHAMON Substation. Selected real-time data of the CHAMON Substation will be available at TSP's RTU for Generator's use. TSP's RTU will be equipped with a MODBUS or DNP-3 "Slave" communications port for this purpose. Generator shall furnish the fiber optic cable between the CHAMON Substation and the Plant RTU or DCS "Master" communications port for this purpose.

C) Generator shall furnish Plant data to TSP's RTU communication port at the CHAMON Substation. The RTU shall be multi-port equipped and operable with protocols compatible with TSP. Generator shall furnish the fiber optic cable between the CHAMON Substation and the Plant RTU or DCS. Generator's RTU or DCS shall be equipped with a MODBUS or DNP-3, respectively, for "Slave" communications port for this purpose.

7) Generator's Interconnection Facilities (GIF)

A) Generator shall provide two (2) Dead-end Structures, herein the Point of Interconnection, located at Generator's CHAMON Substation for connection to TSP System.

B) Generator shall construct the CHAMON Substation as a 4-breaker ring bus full-loop substation in accordance with the most recent version of TSP's "Specification for Customer-Owned 138 kV Substation Design".

C) Generator shall construct, operate, and maintain a complete generation facility, including, but not limited to, all generators, power system stabilizers, generator step-up transformers, protective devices, and other transformers and associated foundations, the terminating structures, all relays necessary for the protection, synchronization and coordination of the generators, generator auxiliary equipment and the disconnect switches and foundations downstream of the Point of Interconnection. Generator shall use commercially reasonable efforts to cause the generation facility to be capable of generating the Planned Capacity.

D) The Generation unit(s) shall meet all voltage and reactive requirements as outlined in the ERCOT Protocols and ERCOT Operating Guides.

E) Electrical design of the Plant shall be in accordance with the most recent version of TSP's "Specification for Customer-Owned 138 kV Substation Design", particularly the section pertaining to "Generation".

F) Generator shall provide NEMA standard four-hole flat pads or similar hardware for attachment of the TSP's line conductor terminal fittings to the first item of equipment or bus in the Generator's substation at the Point of Interconnection with the TSP System.

G) Generator shall own all protective relays, instrumentation, and control equipment physically located on Plant side of the Point of Interconnection.

8) TSP's Interconnection Facilities (TIF)
   A) TSP shall complete its scope of work for protection and coordination, controls, and other equipment and/or wiring as necessary to provide an interconnection between the Plant's generation facilities and the TSP System.
   B) TSP shall furnish, own, and maintain the connection from TSP System to the CHAMON Substation Dead-end Structure(s), including phase conductors, static wires, structures, tower fittings, suspension insulators, dead-end clamps and line conductor terminal fittings with NEMA standard four-hole flat pads and their attachment to the first item of equipment or bus in the Generator's substation.
   C) TSP shall develop and install transmission improvements that it determines, in its sole discretion, are foreseeable and reasonably necessary to safely, reliably, and economically integrate the Plant into the TSP System. TSP MAKES NO PROMISE, REPRESENTATION, OR WARRANTY AS TO WHETHER THE TSP SYSTEM WILL BE FREE OF CONSTRAINTS AT ANY TIME, INCLUDING BUT NOT LIMITED TO TIMES WHEN THE TRANSMISSION IMPROVEMENTS UNDER THIS AGREEMENT ARE BEING MADE OR AFTER THEIR COMPLETION.
   D) Generator shall convey, or cause to convey, at no cost to TSP, ground and aerial easements, in a form reasonably acceptable to TSP and Generator, from the Point of Interconnection at Generator's CHAMON Substation Dead-end Structures to TSP's transmission system.

9) Communications Facilities
   A) All facilities provided under TSP's obligations in this Section 9 shall be considered part of the TIF. All facilities provided under Generator's obligations in this Section 9 shall be considered part of the GIF.
   B) TSP shall order, maintain, and provide at TSP's expense a communication circuit for real-time data transmittal via SCADA equipment from the CHAMON Substation to TSP's Energy Management System.
   C) TSP shall order, maintain, and provide at TSP's expense a communication circuit for the EPS meters at the CHAMON Substation.
   D) Generator shall provide a voice telephone extension at the CHAMON Substation.
   E) Generator shall furnish RTU inputs identified in Exhibit "C", Paragraph (11)(A) from the Plant to the CHAMON Substation's communication interface point.
   F) Generator shall provide a voice telephone extension outlet in Generator's collector yard that is located within the Plant. Such telephone extension outlet shall be connected to the local exchange carrier's telephone system; however, the telephone extension outlet may be connected to Plant's internal telephone system, provided Plant's internal telephone system is equipped with an uninterruptible power supply system.

10) System Protection Equipment
   A) Per the "Specification for Customer-Owned 138 kV Substation Design" in Exhibit "F", TSP shall provide a Bill of Material to Generator for the procurement of the transmission line relays at the CHAMON Substation. Generator shall be responsible for procuring and installing the transmission line protective relays to ensure the generation units do not

sustain a fault and cause interference with the automatic reclosing schemes at CHAMON Substation associated with TSP System.

B) TSP will calculate and implement relay settings for the CHAMON Substation transmission line protective relays.

C) Generator will provide trip-interposing devices at the Plant associated with the protective relaying between each disconnecting devices and CHAMON Substation and the Plant.

D) Generator shall implement local breaker failure relaying functionality as specified in Exhibit "F". Any 138 kV breakers located in positions adjacent to Generator Step-Up transformers shall implement the local breaker failure relaying functionality by incorporating overcurrent based breaker failure protection and low current or no current mechanical breaker status failure protection. The Generator may choose to implement comparable or superior breaker failure relaying functionality to accomplish the local breaker failure relaying functionality as prescribed by TSP.

11) Inputs to Telemetry Equipment

A) Generator shall provide to TSP at Generator's CHAMON Substation the following signals originating at Generator's Plant:

1) Analog Signals From Plant

(i) Kilovolts for each generator bus (one phase only).

(ii) Frequency of each generating unit, if available.

(iii)Net megawatts for each generating unit.

(iv)Net megavars for each generating unit.

(v) Data from each of the Plant electrical load EPS meters (auxiliary power watts, vars, watt-hr from each meter).

2) Status Signals From Plant

(i) Status of selected transmission voltage circuit breakers, generator breakers, and two switches that may impact power flows on TSP's System.

(ii) Status of generator automatic voltage regulator (automatic and manual) for each generating unit.

12) Supplemental Terms and Conditions

A) The following drawings are attached and made a part of this agreement as Exhibit "I" – Selected Drawings:

1) Castleman Power Chamon Substation One-line Diagram

B) Cost Responsibility:

1) Notwithstanding the provisions of Exhibit "A", Section 8.3, the amount of the financial security that Generator is responsible for is specified in Exhibit "E", Security Arrangement Details.

2) The TIF described herein is designed based on the generating capacity provided by the Generator. It is assumed that the generating facility will be capable of generating the Planned Capacity by the Scheduled Commercial Operation Date specified in Exhibit "B". Within the first 12 months following Commercial Operation, if the highest level of Actual Capacity is materially less than the Planned Capacity, the Generator shall be responsible for TIF costs, if any, that are determined, solely by the

TSP, to have been incurred to accommodate Generator's Planned Capacity, but are then determined to not be necessary to accommodate Generator's Actual Capacity. As used here, "Actual Capacity" shall mean the Plant's total Net Dependable Capability, as determined or accepted by ERCOT, in accordance with ERCOT Requirements. Generator shall pay such costs determined herein within thirty (30) days following the receipt of TSP's invoice.

C) Authorization to Proceed:
Pursuant to Exhibit "B" Paragraph 2, Generator hereby provides the full notice to proceed authorizing TSP to proceed with the design, procurement and construction of the TIF, including, without limitation, work on any required transmission system additions, modifications, and any upgrades required to complete the TIF by the TIF In-Service Date.

D) Clarifications to Exhibit "A"
The Parties agree that at the time of executing this Agreement the references to the PUCT Rules contained within certain definitions set forth in Exhibit "A", "Article 1. Definitions" have the meanings ascribed to such terms as established in the current PUCT Rules. The Parties recognize that the PUCT Rules are amended from time to time by the PUCT. The parties also acknowledge that ERCOT issues ERCOT Requirements in which terms are redefined from time to time. When the PUCT Rules or ERCOT Requirements are amended and terms defined in Exhibit "A", "Article 1. Definitions" are affected by such amendments, the Parties agree that such terms shall have the meanings as amended by the PUCT or ERCOT. The term "System Security Study" shall have the same definition as "Security Screening Study" in the ERCOT Requirements.

E) Miscellaneous
1) Each Party shall be solely responsible for keeping itself informed of, and understanding its respective responsibilities under, all applicable North American Electric Reliability Corporation ("NERC") Standards and ERCOT Requirements and all valid, applicable laws, rules, regulations and orders of, and tariffs approved by, duly constituted Governmental Authorities.
2) If required by any Governmental Authority, Generator shall provide, maintain, or upgrade, any existing county road or access roads to the TIF in such a manner and condition to allow passage of heavy utility vehicles.
3) Each Party's personnel, contractors, subcontractors, and agents shall abide by and comply with the other Party's reasonable safety requirements and procedures while in areas designated as under that other Party's control.
4) At no cost to TSP, Generator shall provide access to restroom facilities and potable water facilities located at the Plant to TSP and TSP's personnel, contractors, subcontractors and agents, provided, that TSP shall be responsible for any damage caused to such facilities by such parties outside or normal wear and tear use. Such access shall be limited to personnel engaged in normal operations and maintenance activities.
5) In the event that Generator's personnel, contractors, subcontractors, or agents cause delays in the work schedule of TSP, Generator shall reimburse to TSP the additional

costs associated with such delays within 30 days of receipt of an invoice for such costs.

6) Generator agrees that identification of any stability or oscillation condition that may affect Generator's Plant, and implementation of any associated protective measures, are the sole responsibility of Generator.
7) ERCOT Requirements.
   (i) Unless expressly stated herein, where the ERCOT Requirements are in conflict with TSP's specifications or procedures, the ERCOT Requirements shall prevail.
   (ii) ERCOT requirements currently require installation of power system stabilizers on generators.
   (iii)Prior to commercial operation, ERCOT may verify that the Generator is meeting ERCOT Requirements, including complying with reactive standards, the provision of accurate stability models, and the installation of power system stabilizers, if required. Failure to meet these ERCOT Requirements may result in delays to commercial operation. Additionally, ERCOT recommends that wind farms fulfill the NERC/FERC under-voltage ride through capability requirements.
8) All generator data, including data for stability studies (transient and voltage) and subsynchronous resonance data, as required by the ERCOT Requirements, shall be provided to ERCOT and the TSP before commercial operation. This data shall be updated when the Plant begins commercial operation. Any updates to this information will be provided within 60 days to ERCOT and the TSP as changes or upgrades are made during the life of the Plant. This requirement shall also apply to all future owners of the Plant. The Generator and any future owners of the Plant shall comply with these data requirements along with all applicable NERC Standards. Such Standards are subject to change from time to time, and such changes shall automatically become applicable based upon the effective date of the approved change.

13) Special Operating Conditions, if any, attached: None.

14) Cost Estimate Differences, if applicable:
The difference between the estimated cost of the TIF under 4.1.A ($__N/A____) and the estimated cost of the TIF under 4.1.B ($___N/A_____) is: ___N/A___.

Exhibit "D"
Notice and EFT Information

(a) All notices of an OPERATIONAL nature shall be in writing and/or may be sent between the Parties via electronic means including facsimile as follows:

If to *Chamon Power LLC*	If to *CenterPoint Energy Houston Electric, LLC*
Chamon Power LLC 5850 San Felipe, Ste 650 Houston, TX 77057 Phone: 713-400-7693 Fax: 713-334-0701	**CenterPoint Energy Houston Electric, LLC** **Attn: Real Time Operations** **P.O. Box 1700** **Houston, Texas 77251** 24 Hour Telephone **713-207-2393** Operational/Confirmation Fax **713-207-2349**

(b) Notices of an ADMINISTRATIVE nature:

If to *Chamon Power LLC*	If to *CenterPoint Energy Houston Electric, LLC*
Chamon Power LLC Attn: Ryan Castleman 5850 San Felipe, Ste 650 Houston, TX 77057 Phone: (713) 275-7999 Cell: (281) 732-8235 E-mail: ryan@castlemanpower.com	**CenterPoint Energy Houston Electric, LLC** **Manager, Transmission Accounts & Support** **P.O. Box 1700** **Houston, TX 77251** Phone **713-207-7617** Fax: **713-207-9122** E-mail: lesli.cummings@CenterPointEnergy.com

(c) Notice for STATEMENT AND BILLING purposes:

If to *Chamon Power LLC*	If to *CenterPoint Energy Houston Electric, LLC*
Chamon Power LLC Attn: Ryan Castleman 5850 San Felipe, Ste 650 Houston, TX 77057 Phone: (713) 275-7999 Cell: (281) 732-8235 E-mail: ryan@castlemanpower.com	**Accounts Payable** **P.O. Box 1374** **Houston, TX 77251-1374** Phone **713-207-7888** Fax: **713-207-9986** **E-mail: AP.invoices@centerpointenergy.com** **Mark Invoices with WF022096**

(d) Information concerning ELECTRONIC FUNDS TRANSFERS:

If to *Chamon Power LLC*	If to *CenterPoint Energy Houston Electric, LLC*
Chamon Power Wilmington Trust, National Association ABA No. 03110092 For further credit to: Account Name: Agilon Energy- Depositary A/C Account No. 117238-003	**Chase Bank of Texas** **Houston, Texas** **ABA No. 113000609** **For credit to:** **CenterPoint Energy Houston Electric, LLC** **Account No. 0010-097-0798**

Exhibit "E"
Security Arrangement Details

Cash Deposit

1) The total estimated project cost to construct the TIF as described in Exhibit "C" is $1,105,000 ("Secured Cost").
2) In accordance with Exhibit "A", Article 8, Paragraph 8.3 Financial Security Arrangements, Generator shall provide, by wire transfer or other mutually agreeable method, to TSP a cash deposit, in the form of U.S. dollars, in the amount of the Secured Cost to secure Generator's obligations outlined in Exhibit "A", Article 2.
3) Within five business days after execution of this Agreement, TSP shall invoice Generator for the Secured Cost.
4) Within five business days of receipt of invoice, Generator shall provide Secured Cost to TSP.
5) Within five business days after the Generator declares the Plant in Commercial Operation as scheduled in Exhibit "B", the TSP shall return the Secured Cost amount to Generator.
6) If the Plant does not achieve Commercial Operation as listed in Exhibit "B", or if the Generator terminates this Agreement in accordance with Exhibit "A" Article 2 and the TIF is deemed not required, the TSP may, subject to the provisions of Section 2.2, retain as much of the deposit or security as is required to cover the costs it incurred in planning, licensing, procuring equipment and materials, and constructing the TIF.

Exhibit "F"

SPECIFICATION

FOR

CUSTOMER-OWNED 138 kV SUBSTATION DESIGN

CenterPoint Energy

ELECTRIC ENGINEERING DEPARTMENT

P.O. BOX 1700 HOUSTON, TEXAS 77251

REFERENCE DRAWINGS: Latest revision of
CenterPoint Energy 004-241-04, Customer-Owned Substation Line Termination Standard
CenterPoint Energy 171-190-06, Design Criteria 138 kV Standard Instrument Transformer Stand, Sh.'s 1 and 2
CenterPoint Energy 581-500-01, 138 kV Potential Transformer Schematic and Wiring Diagram

REFERENCE DOCUMENT: Latest revision of
CenterPoint Energy Transmission & Substation Outage and Clearance Coordination Procedures

REFERENCE SPECIFICATIONS: Latest revision of
CenterPoint Energy 007-400-02, Specification for Remote Telemetry of a Customer-Owned Facility

REFERENCE STANDARDS: Latest revision of

AASHTO
AISC, "Manual of Steel Construction"
ASCE 10
ASCE 113
ANSI C12.1
ANSI C37.32
IEEE C37.06
IEEE C37.04
IEEE C37.40
IEEE C37.60
IEEE C57.12.00
IEEE C57.13
IEEE C2 (NESC)
IEEE 80
IEEE 519
IEEE 837
IEEE 1119
IEEE 998
IEEE 142
IEEE 1453
NEMA CC 1

						CENTERPOINT ENERGY HOUSTON, TEXAS	
						WRITTEN	4/9/74	E. C. Reid
						CHECKED	4/10/74	L. G. Pond
15	11-16-2015	Updates	Var	Var	DRS	APPROVED	7/17/74	C. S. Kayser
14	7-22-2005	Change to 4000A and other updates	Var	Var	DRS		Page 1 of 45	
NO	DATE	ITEMS REVISED	BY	CH	APP	SPECIFICATION NO.	007	231 14

Table of Contents

1. SCOPE

1.1. This specification covers design criteria for a customer-owned 138 kV substation connected to the CenterPoint Energy Houston Electric, LLC (CenterPoint Energy) 138 kV transmission system. This specification is intended to apply to a new customer-owned substation or expansion of an existing customer-owned substation. However, the information in this specification may be applicable when equipment in an existing customer-owned substation is being replaced or modified.

2. GENERAL

2.1. A customer that is approved by CenterPoint Energy to receive service from the CenterPoint Energy 138 kV transmission system is required to provide a substation capable of accepting that service from CenterPoint Energy. The customer-owned substation becomes an integral part of the CenterPoint Energy transmission system network and the Electric Reliability Council of Texas (ERCOT) and, therefore, can have a significant impact on overall system reliability. The customer is obligated to meet present CenterPoint Energy design criteria and modify the customer-owned substation in the future as the CenterPoint Energy transmission system continues to evolve. When deemed necessary by CenterPoint Energy, changes may be needed to conform to industry standards, transmission system characteristics, CenterPoint Energy practices, and technological advances to maintain reliability or meet future reliability requirements.

2.2. All equipment shall be in accordance with designated standards of this specification, the American National Standards Institute (ANSI), the Institute of Electrical and Electronic Engineers (IEEE), the American Society of Civil Engineers (ASCE), the American Institute of Steel Construction (AISC), and the National Electrical Manufacturing Association (NEMA). In the event of conflicting requirements, the order of precedence shall be this specification, ANSI, IEEE, ASCE, AISC, and NEMA standards. All electrical clearances shall comply with the latest version of the National Electric Safety Code (NESC).

2.3. This specification is not intended to be totally comprehensive. To ensure the efficient coordination between CenterPoint Energy and the customer during the design and construction of the customer-owned substation, CenterPoint Energy requires that engineering documents be submitted to CenterPoint Energy for review before certain equipment is ordered or construction begins. All items requiring CenterPoint Energy review are listed in Article 14 of this specification and shall be submitted in writing to the designated CenterPoint Energy representative.

2.4. Any deviations from this specification or project drawings reviewed by CenterPoint Energy require written acceptance from CenterPoint Energy.

2.5. All labor and equipment shall be furnished by the customer unless otherwise stated in this specification.

2.6. Unless otherwise stated in this specification:

2.6.1. CenterPoint Energy will provide only functional reviews of completed drawings and schematics.

2.6.2. CenterPoint Energy will not verify, or correct, point-to-point wiring drawings for the customer –owned substation.

2.6.3. CenterPoint Energy requires specific tests which are to be conducted by the customer to verify the proper operation and coordination of the customer-owned substation protection and control equipment (see Article 16 of this specification).

2.7. CenterPoint Energy reserves the right to refuse to energize any customer-owned substation which fails to meet this specification.

2.8. The customer will coordinate the energization and operation of their high voltage facilities with CenterPoint Energy's Real Time Operations (RTO) Department per CenterPoint Energy's "Transmission & Substation Outage and Clearance Coordination Procedures" document.

2.9. During energization of new or existing equipment, the customer shall not disable a single level, or multiple levels, of protection that results in no protection for an energized element, such as, a transmission line, high voltage bus, or transformers.

2.9.1. The customer shall immediately notify the RTO System Controller (281-894-0491) whenever the customer becomes aware of an energized element that has no protection if the protection cannot be immediately restored.

2.9.2. The customer shall immediately notify the RTO System Controller (281-894-0491) of a protective relay that is not functional (such as a "CPU Failure" alarm) or when a protective relay is found powered down, or out of service (such as not enabled), for an energized element

2.10. As owner of the substation, it is the customer's responsibility to comply with the applicable laws, ordinances, codes, rules, and regulations established by applicable government entities.

2.11. Because the customer-owned substation becomes an integral part of the CenterPoint Energy transmission system network, CenterPoint Energy requires access to the customer-owned substation and CenterPoint Energy right-of-ways 7 days-a-week, 24 hours-a-day, 365 days-a-year. Site access, site operating procedures and road access to the customer-owned substation by CenterPoint Energy personnel should be considered when determining the substation location.

2.12. When terminal blocks and other connections permit, ring tongue lugs shall be used instead of spade or stab-on lugs.

3. CENTERPOINT ENERGY SYSTEM CHARACTERISTICS

3.1. CenterPoint Energy's phase rotation is designated C-B-A counterclockwise and the customer shall phase equipment accordingly. Connection of the customer's H_1-H_2-H_3 power transformer leads to CenterPoint Energy's C-B-A, B-A-C or A-C-B phases, respectively, is recommended.

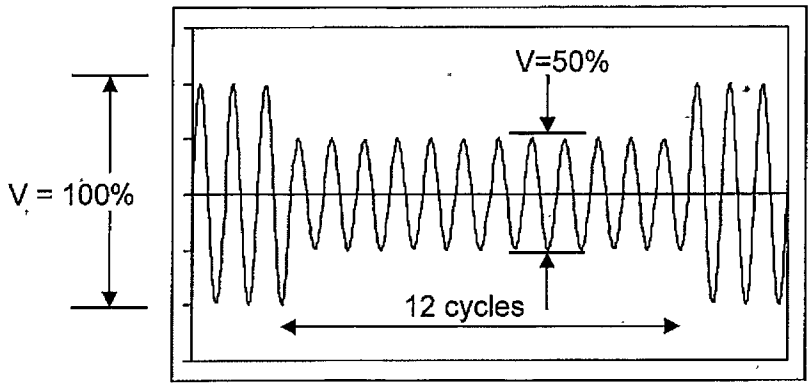
3.2. The CenterPoint Energy nominal system voltage is 138kV (L-L)/79.7kV (L-G) +/- 5%. Actual steady-state operational voltage varies around the CenterPoint Energy transmission system network, but facilities with a means to regulate the 138 kV transmission system are typically used to control the voltage to be no more than approximately 142 kV (L-L)/82 kV (L-G) to provide a margin from the maximum 145kV (L-L)/83.7 kV (L-G). Dynamic conditions may be encountered which result in voltage exceeding this range. For the purpose of the design and rating of the substation and equipment,

it shall be assumed that the maximum continuous negative sequence component of the voltage at the 138 kV bus is 2% of the positive sequence voltage. See Sub-Articles 3.4, 3.5, 4.7 and 7.1.4 of this specification for additional relevant information.

3.3. Only instrument transformers, surge arresters, station service voltage transformers, generator step-up transformers and autotransformers are allowed to be connected phase-to-ground on their 138 kV primary terminals.

3.4. As the independent system operator (ISO) for the ERCOT Region, ERCOT is responsible for maintaining frequency, which is nominally 60 Hz. Refer to ERCOT (www.ercot.com) Nodal Operating Guides and Protocols for information regarding frequency regulation.

3.5. The "voltage dip ride-through" design criteria, that CenterPoint Energy suggests the customer utilize when designing and selecting process and control equipment is illustrated in Figure 1 (Note: This design criteria does not supersede any regulatory voltage ride-through requirements).



"V" represents the phase-to-neutral voltage at the customer's "load side" of a delta-wye transformer for a phase-to-ground fault at the "high-side" of the transformer.

Figure 1

3.6. Multiple-shot, staggered, voltage-supervised, automatic reclosing is utilized on the CenterPoint Energy transmission system. The first automatic reclosing attempt for a CenterPoint Energy transmission line typically occurs approximately one second after the fault has cleared. The number of automatic reclosing attempts varies, but the total duration of the automatic reclosing sequence is typically one minute. The customer shall coordinate operation and protection of electric motors, computers and other equipment accordingly.

4. ELECTRICAL DESIGN CRITERIA

4.1. The minimum acceptable electrical design characteristics for 138 kV facilities and equipment are listed below:

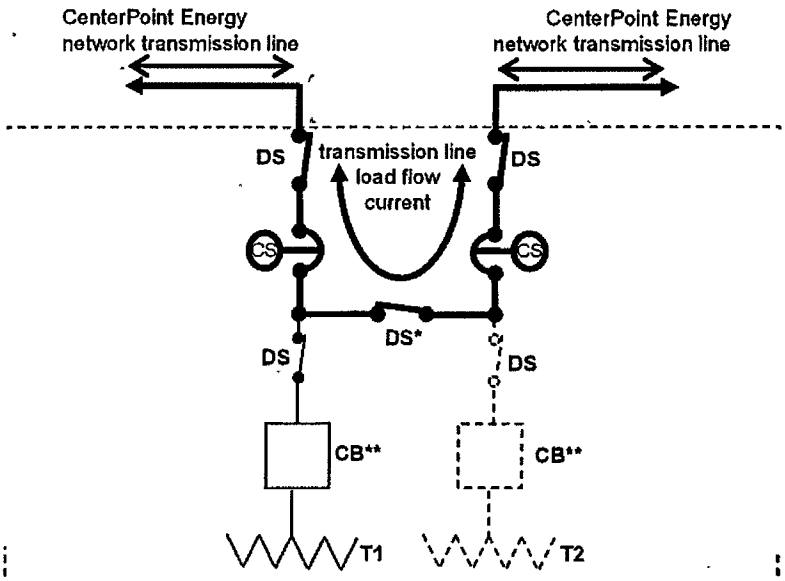
Transformer winding impulse level	550 kV BIL
Bus and switch insulators, and apparatus bushings (i.e., circuit breaker bushings, transformer bushings, coupling capacitors, capacitive voltage transformers (CVT), current transformers (CT), potential transformers (PT), surge arresters etc.)	650 kV BIL

impulse level

Bus and switch insulators leakage distance	132 in. leakage distance (equivalent to extra creep 650 kV BIL or 750 kV BIL). Additionally, insulators may require 'coating' in some areas of the system to minimize the likelihood of flashover.
Apparatus bushing leakage distance (circuit breaker bushings, transformer bushings, CVT, CT, PT, surge arresters etc.)	92 in. creep (equivalent to 650 kV BIL – light contamination levels). Additionally, apparatus bushings may require 'coating' in some areas of the system to minimize the likelihood of flashover.
Phase-to-ground clearance	52 in. (metal to metal)
Phase-to-phase bus spacing (including vertical spacing at crossover point of high and low bus)	63 in. (metal to metal)
Phase-to-phase horizontal spacing (center line to center line) at incoming line dead-end structure	144 in. (regardless of the line angle)

4.2. An air insulated customer-owned substation configured in a 'ring bus', 'double-breaker, double-bus' or 'breaker-and-a-half' arrangement equipped with transmission line protective relaying ("full loop") or an air insulated customer-owned substation configured in a 'loop line tap' arrangement without transmission line protective relaying ("loop tap") are allowed by CenterPoint Energy (see Figure 2 through Figure 7).

4.3. Based on the customer-owned substation configuration, equipment in the substation that is subjected to transmission line load flow current (circuit breakers and disconnect switches, bus work, conductors or any series-connected, current carrying devices, such as, free-standing current transformers, protective relays, instrumentation, or hardware within the ring bus or transmission line breaker-and-a-half bay) and incoming transmission line positions (transmission line disconnect switches, line traps, etc.) shall have a continuous current rating of 4000 A minimum and shall have an overload capability of 110 percent of rated current for 2 hours, unless otherwise specified by CenterPoint Energy. The equipment in the customer-owned substation that is not subjected to transmission line load flow current is not required to be 4000 A minimum. However, operational scenarios associated with certain equipment outages could exist that would result in transmission line load current flowing on customer internal lines or buses (customer site internal 'loop line' or customer site internal 'loop bus') and potentially overload the customer's equipment if it is rated less than 4000 A. Therefore, CenterPoint Energy suggests that any customer site internal 'loop line' and customer site internal 'loop bus' (except customer site internal 'radial' line or customer transformer bus connections) be 4000 A minimum (see Figure 2 through Figure 7). For customer-owned substations connecting to four or more CenterPoint Energy 138 kV transmission lines, contact CenterPoint Energy for the required equipment rating.



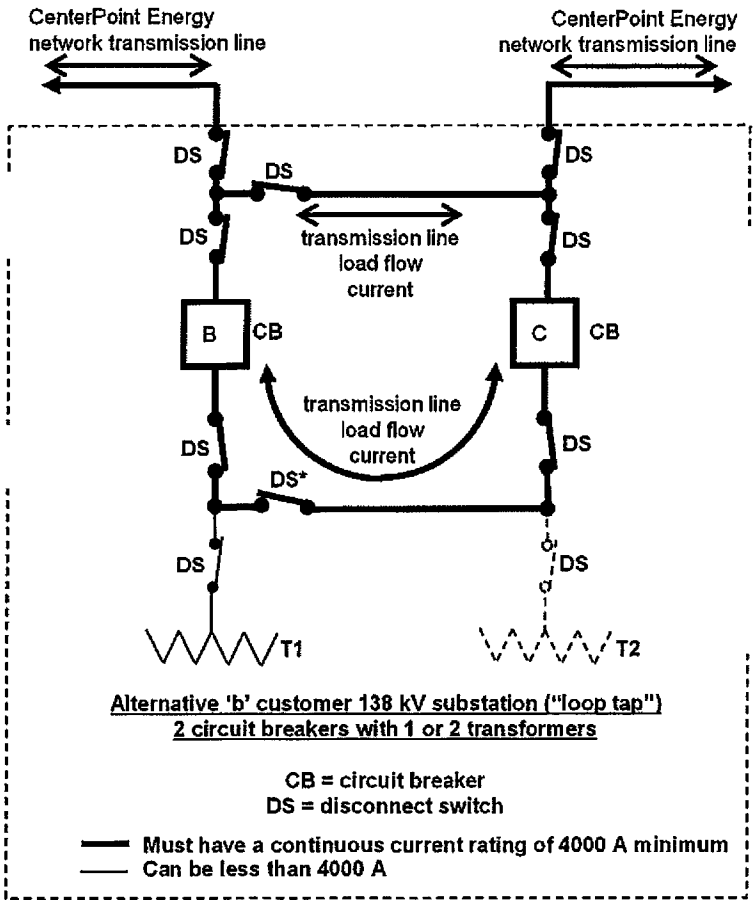
Alternative 'a' customer 138 kV substation ("loop tap")
2 circuit switchers with 1 or 2 transformers and circuit breakers

CS = circuit switcher
CB = circuit breaker
DS = disconnect switch

Must have a continuous current rating of 4000 A minimum
Can be less than 4000 A

All disconnect switches only have arcing horns. Circuit switchers are required to be installed in this configuration. The circuit switchers are used for manual switching of the network transmission line sections.
•If two transformers are installed then this disconnect switch is installed and is 'normally closed'.
** For substation arranged for future "full loop" service, the 138 kV circuit breakers that will be in the substation 'loop' shall have a continuous current rating of 4,000 A (see figures 3 to 7)

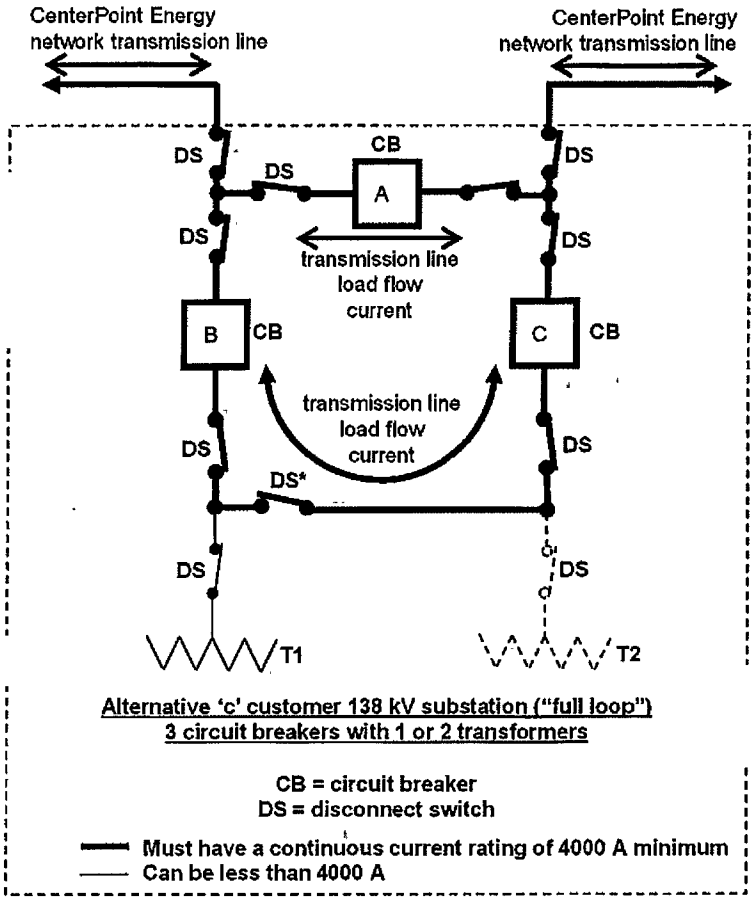
Figure 2



All disconnect switches only have arcing horns. Circuit switchers are not used for manual switching of the network transmission line sections in this configuration. The circuit breakers are used for manual switching of the network transmission line sections.

* If two transformers are installed then this disconnect switch is installed and is 'normally open'.

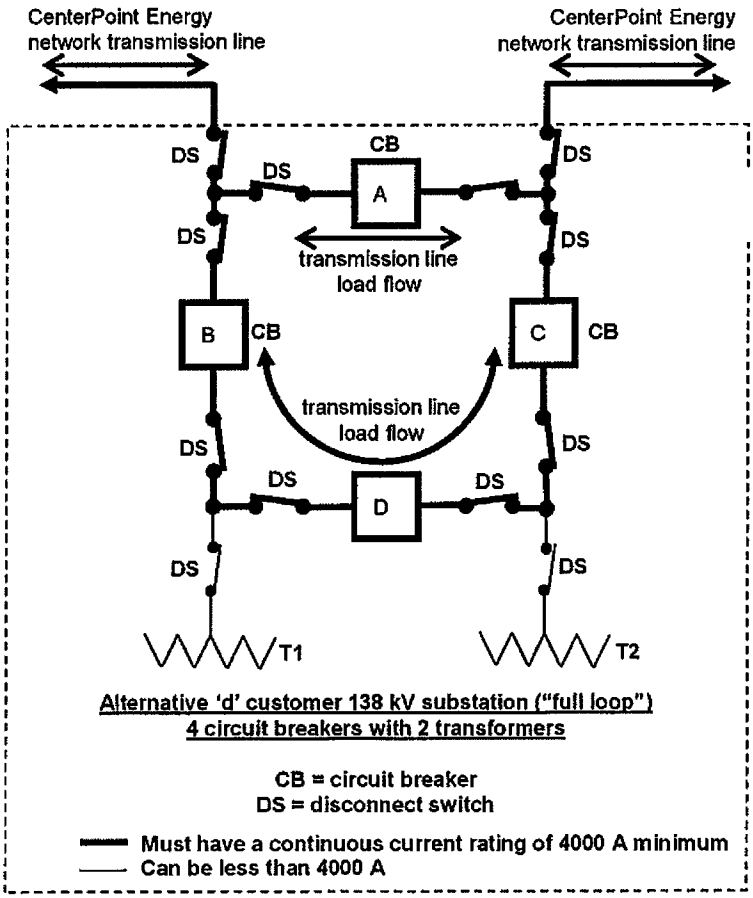
Figure 3



All disconnect switches only have arcing horns. Circuit switchers are not used for manual switching of the network transmission line sections in this configuration. The circuit breakers are used for manual switching of the network transmission line sections..

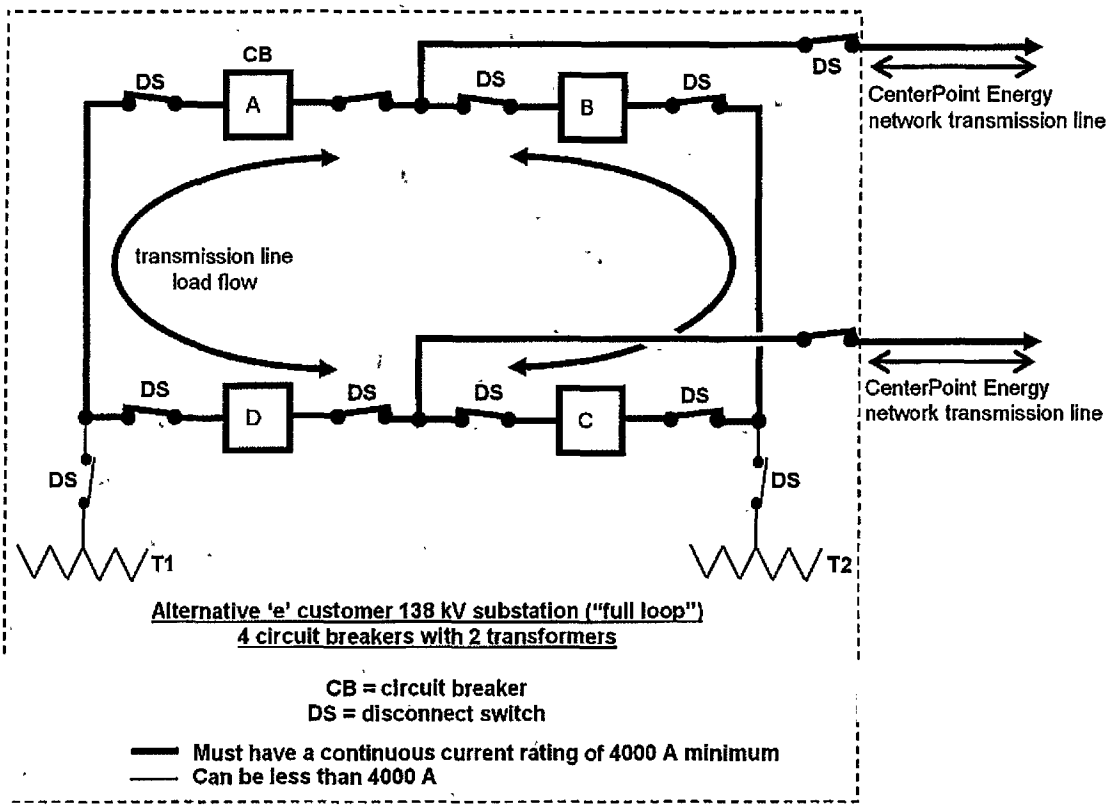
* If two transformers are installed then this DS is 'normally open' or 'normally closed' depending on customer operating preference.

Figure 4



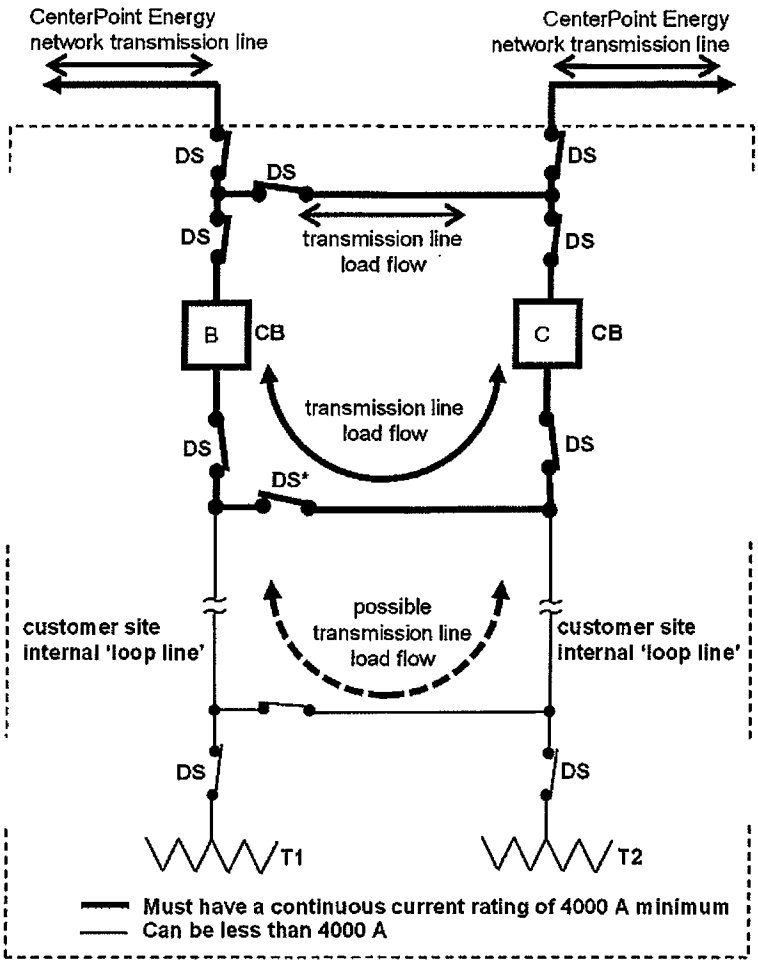
All disconnect switches only have arcing horns. Circuit switchers' are not used for manual switching of the network transmission line sections in this configuration. The circuit breakers are used for manual switching of the network transmission line sections.

Figure 5



All disconnect switches only have arcing horns. Circuit switchers' are not used for manual switching of the network transmission line sections in this configuration. The circuit breakers are used for manual switching of the network transmission line sections.

Figure 6



Any customer connection from the "full loop" substation or "loop tap" substation to the customer's transformers, customer buses, or customer lines (i.e. customer plant internal 'loop lines', etc.) are not required to be 4000 A minimum. However, operational scenarios after a scheduled outage of equipment in a customer substation could exist that would result in transmission line load current flowing on customer site internal lines or buses (customer site internal 'loop line' or 'loop bus') and potentially overload the customer's equipment if it is rated less than 4000 A. Therefore, CenterPoint Energy suggests that any customer site internal 'loop line' and customer site internal 'loop bus' (except customer site internal 'radial' line or customer transformer bus connection) be 4000 A minimum.

Figure 7

4.4. The 138 kV customer-owned substation shall be designed for a short circuit current of 63 kA rms symmetrical, with X/R ratio of 15, unless otherwise specified by CenterPoint Energy.

4.5. The application of key interlock systems are <u>not</u> permitted on customer-owned substation 138 kV equipment.

4.6. The customer's connected load and equipment shall be designed and operated to adhere to the recommended harmonic limits of IEEE 519 and limits of voltage fluctuations and associated light flicker of IEEE 1453.

4.7. The customer shall not, without CenterPoint Energy's consent, connect or operate equipment that produces voltage fluctuations, interference or distorted wave forms that adversely affect service to other customers or that may be detrimental to the CenterPoint Energy transmission system. Such equipment includes, but is not limited to, motors, arc furnaces, capacitor banks, etc. The customer is obligated to provide load and equipment information (i.e., load magnitude, peak load, load profile, amount of self-serve generation, load characteristics, motor starting data, load increase) for CenterPoint Energy interconnection study and development of interconnection requirements. CenterPoint Energy may require the installation, on customer's side of the meter, of suitable apparatus or other equipment designed specifically to reasonably limit such adverse effects.

4.8. The customer-owned substation ground mat shall be designed for a short circuit current of 63 kA rms symmetrical with X/R ratio of 15 and duration of 0.25 seconds and comply with IEEE 80 and IEEE C2 (NESC). Ground mat connections shall comply with IEEE 837, unless otherwise specified by CenterPoint Energy.

4.9. The customer-owned substation direct lightning stroke shielding design shall comply with IEEE 998.

4.10. The customer shall refer to the current CenterPoint Energy tariff for retail delivery service regarding additional information pertaining to load balance, intermittent electrical loads and limitations on adverse effects, equipment sensitive to voltage and wave forms, change in retail customer's electrical load, power factor, and testing of retail customer equipment.

5. STRUCTURAL AND MECHANICAL DESIGN CRITERIA

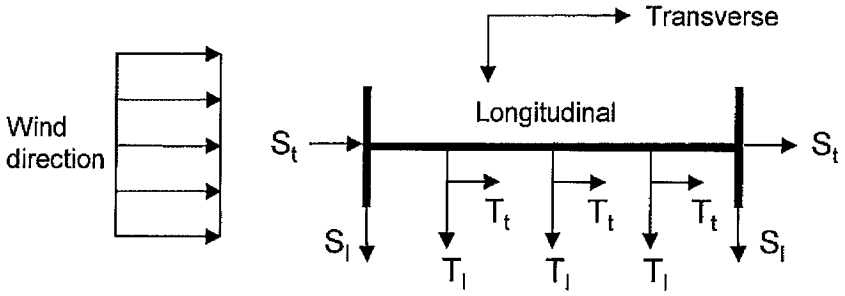
5.1. The customer shall provide a complete structural and foundation design package for the dead-end structures (supporting the CenterPoint Energy transmission lines connected to the customer-owned substation) and the instrument transformer stands in accordance with Article 14 of this specification. The design package shall be signed and sealed by a professional engineer registered in Texas and shall include design references/codes, computer analysis, member design, connection design, foundation design, soil report, structural and foundation drawings, and all other information that documents the design of the structure(s). ASCE 113 may be used for guidance in the design of structures inside the customer-owned substation.

5.2. Design shall be based upon loadings realistically combined to cause the most unfavorable effect upon the structure or component. If the AISC ASD method is used, the 1/3 increase in allowable stress is not permitted for wind loads. The loads and overloads used in Sub-Article 5.4 of this specification must be used for the loading with Allowable Stress Design. If the AISC LRFD method is used, the structure must have a second order elastic analysis (also called a Geometric Nonlinear Analysis). Refer also to Sub-Article 5.4 and 5.5.5 of this specification.

5.3. Structures shall meet the Strength Requirements of IEEE C2 (NESC), Section 26, for grade B construction.

5.4. The minimum acceptable structural design loading criteria shall be the more severe of the following two cases (note the cases incorporate loads up to a 30 degree angle):

5.4.1. Case 1 - Combined Ice and Wind Loading: Reference specification IEEE C2 (NESC); minimum allowable strength factors per Section 26, Table 261-1; loading requirements per Section 25, Rule 250.B and Table 250-1; and loading components to be applied to the structure shall be according to Figure 8 of this specification. The static wire and phase wire loads shown in Case 1 include the required overload factors. The wind on the structure must include a 2.50 overload.



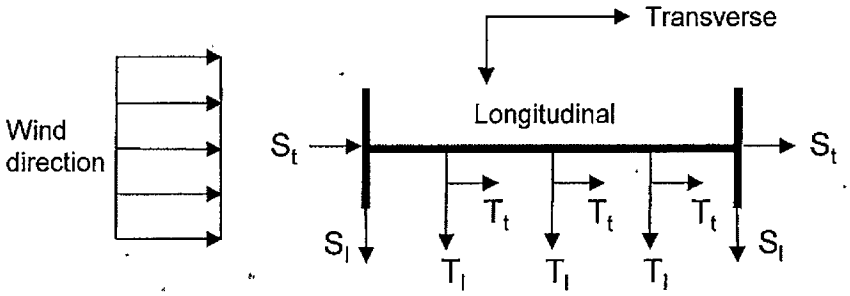
Wind and Ice loads are specified in Section 25 of IEEE C2

Static wire	Phase wire
Sl = 10.5 kips/wire longitudinally	Tl = 23.0 kips/phase longitudinally
St = 6.7 kips/wire transversely	Tt = 14.4 kips/phase transversely
Sv = 0.5 kips/wire vertically	Tv = 1.5 kips/phase vertically

CASE 1 - Combined Ice and Wind Loading – Overhead View
static wire and phase wire loading component
(The static wire and phase wire loads shown include the required overload factors)

Figure 8

5.4.2. Case 2 - Extreme Wind Loading: Reference specification; IEEE C2 (NESC) Section 25, Rule 250.C; minimum allowable strength factors per IEEE C2 (NESC), Section 26, Table 261-1; and magnitude and direction of static wire and phase wire loading components to be applied to the structure shall be according to Figure 9 of this specification. The static wire and phase wire loads shown in Case 2 include the required overload factors. The wind on structure loads are applied in the Transverse direction and must include a 1.1 overload factor.



For Case 2 the following shall apply:
Basic Wind speed determined from wind map in, Exposure category C, Importance factor 1.0, Design wind pressure equation and coefficients per IEEE C2 (NESC) Rule 250.C in latest version.

Static wire	Phase wire
Sl = 12.0 kips/wire longitudinally	Tl = 22.0 kips/phase longitudinally
St = 5.5 kips/wire transversely	Tt = 10.5 kips/phase transversely
Sv = 0.5 kips/wire vertically.	Tv = 1.5 kips/phase vertically

CASE 2 - Extreme Wind Loading – Overhead View
static wire and phase wire loading component
(The static wire and phase wire loads shown include the required overload factors)

Figure 9

5.5. The requirements for dead-end structures are as follows:

5.5.1. Customer shall design all attachment points to ensure that sufficient electrical clearance is maintained to the customer's structure ground and equipment. CenterPoint Energy will extend the phase wires to the first item of customer's equipment or bus and will furnish, own and maintain all necessary fittings for terminating the phase wires including the tower fittings, suspension insulators, dead-end clamps and phase wire terminal fittings with NEMA CC 1 standard four-hole terminals (0.5625 in. diameter holes, 1.75 in. centers) for attachment to the first item of equipment or bus in the customer-owned substation. CenterPoint Energy will also furnish stirrup clamps or other similar devices (such as a bar on the NEMA pad that is used with ACSS conductors) on the phase wires as required for connection of surge arresters and potential transformers. Customer will provide a grounding conductor from the customer-owned substation ground mat, up the dead-end structure, to the static wire pull-off plates. CenterPoint Energy will furnish, own and maintain all necessary fittings for terminating the static wire and for connecting the static wire to the customer provided substation ground conductor at the static wire pull-off plates including the tower fittings, dead-end clamps and static wire terminal fittings for attachment to the customer provided substation ground conductor.

5.5.2. Customer shall provide pull-off plates for terminating the phase wires and static wires which will accommodate a minimum of 1 in. pin. All pull-off plates must satisfy Equations 4.6-1 and 4.6-2 in ASCE 10. Details for division of ownership shall be in accordance with CenterPoint Energy Drawing 004-241-04 Customer-Owned Substation Line Termination Standard.

5.5.3. The height of the dead-end structure's phase wire attachment shall be in accordance with the National Electric Safety Code (IEEE C2) or 40 ft. whichever is greater, unless otherwise specified by CenterPoint Energy. The static wire height at attachment shall be at a sufficient

elevation and position to provide a shield angle to the outside phase wires of 30° and 45° between two adjacent static wires (see IEEE 142).

5.5.4. CenterPoint Energy will determine if the installation of fiber optic cable is required for transmission line protective relaying and/or control purposes. The fiber optic cable installation will normally be installed underground from the transmission line protective relay requiring fiber optic communication (i.e., relay located in the substation control cubicle) to the base of the first CenterPoint Energy transmission line structure outside the substation. However, should an overhead installation be required, additional loadings will be imposed on the customer's dead-end structure. Additional design information concerning the fiber optic cable will be supplied by CenterPoint Energy when overhead fiber optic cable is to be used. The connection for the fiber optic cable is typically at least 8 feet from the nearest phase wire. If an overhead installation is required and the fiber optic cable cannot be accommodated on the dead-end structure, a single pole must be installed in the customer-owned substation to transition the fiber optic cable from overhead to underground.

5.5.5. If multiple dead end bays are installed that share a middle column or support, the support must be designed to withstand the loads from the adjacent circuits.

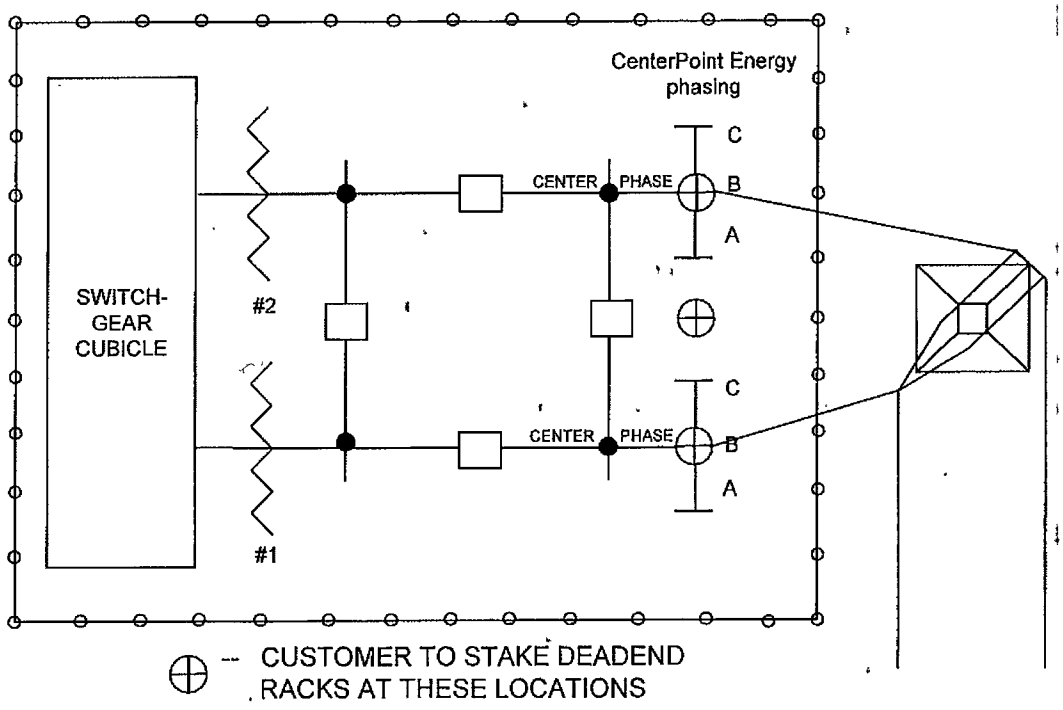
5.6. When high-side (138 kV) metering is utilized, the customer shall design, provide and install stands for mounting CenterPoint Energy furnished instrument transformers (potential and current transformers). The customer shall also design and build foundations to support the stands and instrument transformers. The designs shall be in accordance with Sub-Articles 5.1- 5.4 of this specification. The instrument transformer parameters to be used for the design of the instrument transformer stand are indicated on CenterPoint Energy drawing 171-190-06. Since the instrument transformer may change in the future, the stand mounting surface for the instrument transformer must be adjustable or use grating to accommodate diverse mounting bolt patterns. If a grating is used for the stand mounting surface for the instrument transformer, washer plates of sufficient size and thickness to load up 4 bars must be used on top and bottom of the grating. Design calculations showing the load transfer from the bolt to the washer plates to the bars to the column must be provided. The customer is responsible for providing the bolts and washer plates. The customer will design a mounting stand and foundation for the hurricane wind speeds and overloads from Sub-Article 5.4.2 of this specification. If the AISC ASD design method is used, the 1/3 increase in allowable stress will not be permitted. If the AISC LRFD method is used, the structure must have a second order elastic analysis (also called a Geometric Nonlinear Analysis). The customer shall limit the horizontal deflection of the potential transformer and current transformer stand at the instrument mounting height to the mounting height divided by 100. The wind load used for the deflection limit shall be the 5-year mean recurrence interval wind. A conversion factor of 0.78 applied to the hurricane wind pressure will yield the 5 year MRI.

6. SITE CRITERIA

6.1. Site preparation and plot plan drawings shall be submitted to CenterPoint Energy for comment. Facilities that must be shown on this drawing include: dimensions of the customer-owned substation site, access roadways, space between the customer-owned substation and access roadways, and drainage features such as culverts, ditches and detention facilities (if required). Refer to Sub-Article 14.1.1 of this specification.

6.2. The customer shall stake the location of the dead-end structures according to Figure 10. The owner of the substation must submit drawings/documents specific to their substation to CenterPoint Energy in

accordance with Article 14 of this specification. The drawings required by Sub-Articles 14.1.1 and 14.1.3 of this specification should show the customer's desired location for CenterPoint Energy phases. CenterPoint Energy will review this information and, based on the customer-owned substation location and CenterPoint Energy transmission line tower location, will determine if the customer's desired location for CenterPoint Energy phases can be achieved.



Staking Requirements for **Typical** Customer Substation

Figure 10

6.3. An all-weather access roadbed capable of supporting heavy construction vehicles shall be provided to the customer-owned substation. The areas within the customer-owned substations that need to support heavy vehicular traffic should conform to AASHTO H20 loading.

6.4. Access for CenterPoint Energy to attach its transmission line wires to the customer-owned substation dead-end structures shall be provided by either:

6.4.1. A 25 ft. wide, leveled, and unobstructed access outside the customer-owned substation site from a main road to the CenterPoint Energy right-of-way and in front of the dead-end structures with substation fencing a maximum of 20 ft. from the attachment point of the dead-ends and a 13 ft. (minimum) wide gate for access into the customer-owned substation.

6.4.2. A 25 ft. wide access inside the customer-owned substation from the substation access gate (20 ft. wide minimum) to the front of the dead-ends with substation fencing a minimum of 25 ft. from the attachment point.

6.5. Access and space shall be provided for installation and future replacement of high voltage equipment including metering instrument transformers.

6.6. The design elevation of the customer-owned substation site, equipment and control cubicle should take into consideration locating essential components above flood and storm surge levels.

7. HIGH VOLTAGE EQUIPMENT

7.1. The requirements for power transformers are as follows:

7.1.1. Power transformers shall have a delta winding for connection to the 138 kV system. Power transformers shall conform to IEEE C57.12.00. Power transformers should be equipped with sudden pressure and low oil level detection devices.

7.1.2. Power transformers shall have a minimum of two 600:5 A multi-ratio bushing current transformers (BCTs) per 138 kV bushing. Each BCT shall have IEEE C57.13 accuracy C400 or better. Where applications require additional BCTs and/or different ratios, CenterPoint Energy shall provide ratios to support equipment purchase schedule. The secondary resistance of power transformer BCTs shall not exceed 0.0025 ohms per turn. The power transformer BCT secondary rated continuous current shall be 10 A minimum. The power transformer BCT rating factor (R.F.) shall equal 2.0.

7.1.3. High-side surge arresters shall be provided in accordance with Sub-Article 7.4 of this specification.

7.1.4. The customer shall determine the need for, and if applicable, settings for a transformer tap changer for de-energized operation (no load tap) and automatic on-load tap changer. CenterPoint Energy recommends power transformers be equipped with an automatic on-load tap changer.

7.2. The requirements for circuit breakers are as follows:

7.2.1. Circuit breakers shall be of the three-pole, outdoor type, 138 kV nominal, in accordance with IEEE C37.06, C37.60, C37.04 and C37.40.

7.2.2. For a "full loop" customer-owned substation, "loop tap" substation, or a substation arranged for future "full loop" service, the 138 kV circuit breakers that are or will be in the substation 'loop' shall have a continuous current rating of 4,000 A, an overload capability of 110 percent of the rated current for 2 hours and a rated isolated capacitor bank current switching capability of 600 A. For customer-owned substations connecting to four or more 138 kV CenterPoint Energy transmission lines, circuit breakers may be required to have a higher continuous rating. The three phase symmetrical short circuit current interrupting capability of all 138 kV circuit breakers shall be 63 kA rms symmetrical. The rated interrupting time of all 138 kV circuit breakers shall be three cycles or less. In some applications, the installation of TRV shaping capacitors may be required in order to achieve the circuit breaker interrupting capability of 63 kA rms symmetrical for line faults. CenterPoint Energy shall determine the placement of TRV shaping capacitors, when required for line faults.

7.2.3. Each 138 kV circuit breaker shall be equipped with two 4000:5 A multi-ratio BCTs per 138 kV bushing. Each circuit breaker BCT shall have a relaying accuracy class of C800 on the 4000:5 A tap in accordance with IEEE C57.13. The secondary resistance of the circuit breaker BCT

shall not exceed 0.0025 ohms per turn. The circuit breaker BCT secondary rated continuous current shall be 10 A minimum. The circuit breaker BCT rating factor (R.F.) shall equal 2.0.

For the replacement or addition of a 138 kV circuit breaker in an existing customer-owned substation that already has other 138 kV circuit breakers that do not have a continuous current rating of 4,000 A, the following applies to the replacement or addition circuit breaker (i.e., the following requirement is to accommodate interface of the 4000 A replacement or addition 138 kV circuit breaker with any existing circuit breakers that have 2000:5 multi-ratio BCT's in an existing substation while maintaining the design capability for 4000 ampere operation in the future). Each replacement or addition 138 kV circuit breaker shall be equipped with two 3000:5 A multi-ratio BCTs per 138 kV bushing. Each circuit breaker BCT shall have a relaying accuracy class of C800 on the 2000:5 A tap (equivalent to C1200 on the full ratio 3000:5) in accordance with IEEE C57.13. The secondary resistance of circuit breaker BCTs shall not exceed 0.0025 ohms per turn. Circuit breaker BCT secondary rated continuous current shall be 10 A minimum. Circuit breaker BCT rating factor (R.F.) shall equal 2.0.

7.2.4. Two trip circuits shall be provided with independent 125 V DC control circuits. If two trip coils operate a single armature, both coils shall be designed or marked in such a way as to prevent their being connected in a manner that would result in the circuit breaker not tripping in the event that both coils are energized simultaneously.

7.2.5. Trip circuit or close circuit DC current shall not exceed 15 A (instantaneous and steady state) for the circuit breaker trip or close circuit. If electromechanical protective relays with DC operated 'target and seal-in' units are used in the substation, then the circuit breaker trip circuit shall not draw less than 4 A DC current and a circuit breaker close circuit shall not draw less than 2 A DC current in order ensure reliable 'target and seal-in' unit operation.

7.2.6. The DC negative of a trip circuit shall not be fused or use a circuit breaker inside the circuit breaker control cabinet.

7.2.7. Surge suppression shall be provided on each trip and close coil. Reference CenterPoint Energy 007-400-02 Specification for Remote Telemetry of a Customer-Owned Facility.

7.2.8. The circuit breaker operating mechanism shall be both mechanically and electrically trip-free in any position. For oil circuit breakers, a latch check switch shall be provided.

7.2.9. Circuit breakers with air closing mechanisms shall have stored energy for at least 5 close-open operations. Circuit breakers with spring closing mechanisms shall have the spring charging motor circuit connected to a 125 V DC battery source utilizing a DC supply cable dedicated for this purpose. Voltage rollover from AC to DC shall not be installed for the spring charging motor circuit for circuit breakers.

7.2.10. Gas circuit breakers shall have low SF6 gas pressure alarm and close inhibit contacts. The customer shall indicate on the relay and metering one-line diagram whether the low SF6 gas pressure wiring is set to 'BLOCK TRIP' or to 'AUTO TRIP' the circuit breaker.

7.2.11. Circuit breaker internal time delay circuitry for reclosing shall not be utilized. External time delayed automatic reclosing, when utilized, shall be wired/connected directly to the circuit

breaker close circuit. External time delay for the circuit breaker closing circuit is to be provided by the automatic reclosing scheme.

7.2.12. The circuit breaker internal close and trip circuits shall not go through a 'local/remote' control switch in the circuit breaker. However, if a circuit breaker comes from the manufacturer with a 'local/remote' control switch installed in the circuit breaker, then the 'remote' contact of the control switch that is wired in series with the close and trip circuits must be 'shorted out' or 'by-passed'.

7.3. The requirements for air break switches are as follows:

7.3.1. Transmission line disconnect switches and all disconnect switches in the customer-owned substation 'loop' shall be of the outdoor, three pole, gang operated type rated 138 kV nominal, and shall have a continuous current rating of 4000 A , an overload capability of 110 percent of rated current for 2 hours and a rated minimum withstand capability of 164 kA peak. Disconnect switches that are not in the substation 'loop' (i.e., transformer high-side disconnect switch) may be rated for less than 4000 A continuous, but must have a rated minimum withstand capability of 164 kA peak. The switch air gap BIL shall coordinate with the BIL rating of the switch insulators. For customer-owned substations connecting to four or more CenterPoint Energy 138 kV transmission lines, contact CenterPoint Energy for the required rating of switches.

7.3.2. Transmission line disconnect switches are required for "full loop" substations or "loop tap" substations converted to "full loop".

7.3.3. "Loop tap" substations must be configured and designed with equipment to permit switching for the scheduled outage of either transmission line section without interrupting service to the customer's load. An interrupting device attached to a disconnect switch in a "loop tap" substation for transmission line load breaking, loop switching or line dropping is not acceptable.

7.3.4. CenterPoint Energy does not require any 138 kV disconnect switch to be motor operated.

7.3.5. CenterPoint Energy does not require any 138 kV disconnect switch auxiliary contacts except as indicated in Sub-Article 9.1.5 of this specification.

7.3.6. Grounding switches are not permitted on 138 kV equipment. A 'grounding stud' or fabricated attachment for the application of temporary grounding cables may be installed if desired.

7.4. The requirements for surge arresters are as follows:

7.4.1. Surge arresters must be installed on 138 kV power transformers and in the substation on the incoming transmission line positions to protect substation 138 kV equipment including 138 kV coupling capacitors, line traps, instrument transformers, circuit breakers, etc.

7.4.2. All surge arresters shall be metal oxide type, 108 kV class minimum, with a minimum required maximum continuous over-voltage (MCOV) rating of 88 kV. The minimum required energy absorption capability is 7 kilojoules/ kV of MCOV rating. The surge arrester must have a minimum required pressure relief capability of 63 kA rms symmetrical (or short circuit current rating of 63 kA rms symmetrical). In addition to meeting the CenterPoint Energy minimum requirements, a surge arrester with well-designed directional pressure relief ports can provide a

benefit. In the event of a surge arrester internal short circuit, a surge arrester with well-designed directional pressure relief vent ports, and with the vent ports pointed in the appropriate direction, can minimize the possibility that the ionized gas emitted from the surge arrester will propagate into a multiphase fault and can minimize the possibility of the ionized gas, and possibly other materials emitted from the surge arrester from causing damage to other equipment.

7.4.3. All 138 kV surge arresters must be connected with a copper bond wire from the bottom flange of the arrester to the substation ground mat. If the customer desires to allow for grading / leakage current monitoring, the surge arresters may be mounted on plates using insulated spacers and associated hardware. The insulated copper ground conductor from the bottom flange of the arrester must be isolated from any other ground until it passes the point where a tong ammeter reading can be taken. The independent, insulated ground leads should be adequately marked to indicate A, B, and C phases.

7.5. The requirements for coupling capacitors or CVTs and line tuners are as follows:

7.5.1. CenterPoint Energy shall specify vendor and vendor style number for the coupling capacitor or CVT devices that are used for transmission line protective relaying or CenterPoint Energy supervisory control and data acquisition (SCADA) remote telemetry monitoring of CenterPoint Energy transmission lines according to CenterPoint Energy provided bill of materials. CenterPoint Energy shall specify vendor and vendor style number for the line tuners that are used for transmission line protective relaying according to CenterPoint Energy provided bill of materials.

7.5.2. The line tuner must be mounted at a level suitable for making adjustments and tests while standing on the ground. The line tuner must be mounted at the base of the coupling capacitor stand in order to minimize the length of the carrier lead-in conductor connected between the line tuner and the coupling capacitor to reduce the stray capacitance and leakage to ground that will increase the losses of the tuner and affect the bandwidth.

7.5.3. The coupling capacitor or CVT shall not be used to structurally support the line trap. Refer to Sub-Article 7.6.3 of this specification.

7.6. The requirements for line traps are as follows:

7.6.1. CenterPoint Energy shall specify vendor and vendor style number for line trap devices that are used for transmission line protective relaying according to CenterPoint Energy provided bill of materials.

7.6.2. The line trap shall have a continuous current rating of 4,000 A, and an overload capability of 110 percent of the rated current for 2 hours.

7.6.3. The line trap shall not be structurally supported by a coupling capacitor or CVT. Refer to Sub-Article 7.5.3 of this specification.

8. CONTROL CUBICLE

8.1. The control cubicle shall be a permanent, weatherproof structure constructed on a concrete foundation and scheduled for completion well in advance of the remainder of the substation to allow for adequate check out and testing. The ambient conditions inside the control cubicle shall not exceed 32°C (90°F) and 85% relative humidity. Adequate lighting shall be provided.

8.2. The requirements for telephone circuits are as follows:

8.2.1 The customer is responsible for arrangements with the telephone service provider to establish the telephone service up to a demarcation point on the customer's site for any telephone circuits terminating in the control cubicle. The customer is responsible for providing any equipment required by the telephone service provider for telephone service to the demarcation point. The customer is responsible for providing any equipment (e.g., telephone cable, conduit, etc.) from the telephone service provider demarcation point to the control cubicle telephone board, for all control cubicle communication circuits.

8.2.2 Refer to CenterPoint Energy 007-400-02 Specification for Remote Telemetry of a Customer-Owned Facility for details pertaining to required telephone circuits (i.e., voice communication, CenterPoint Energy SCADA remote telemetry unit (RTU) communication, and CenterPoint Energy revenue meter communication requirements).

8.3. Wall space for metering boxes shall be provided in accordance with Sub-Article 9.1.3.1 of this specification.

8.4. If CenterPoint Energy has specified that transmission line protective relaying with power line carrier and/or fiber optic communication is utilized, power line carrier transmitter/receiver sets shall be procured by the customer according to CenterPoint Energy provided bill of material and/or the customer will provide wall space or floor space for a CenterPoint Energy provided fiber optic cable distribution box.

8.5. The customer shall provide space for the CenterPoint Energy remote telemetry equipment that will be installed in accordance with Sub-Article 12.1 of this specification.

8.6. A separate 120 V AC, 20 A circuit shall be provided to each of the following: (a) one of the metering boxes, (b) the power line carrier equipment location, and (c) the SCADA RTU cabinet (see CenterPoint Energy 007-400-02 Specification for Remote Telemetry of a Customer-Owned Facility).

8.7. One 120 V AC, 20 A outlet for protective relay testing equipment shall be located near the transmission line protective relays in the substation control cubicle.

8.8. A separate 130 V DC, 15 A circuit shall be provided to each of the following: (a) one of the metering boxes, and (b) the SCADA RTU cabinet (see CenterPoint Energy 007-400-02 Specification for Remote Telemetry of a Customer-Owned Facility).

8.9. If CenterPoint Energy transmission line fault location traveling wave system (TWS) equipment is to be installed, CenterPoint Energy will provide requirements.

9. METERING EQUIPMENT

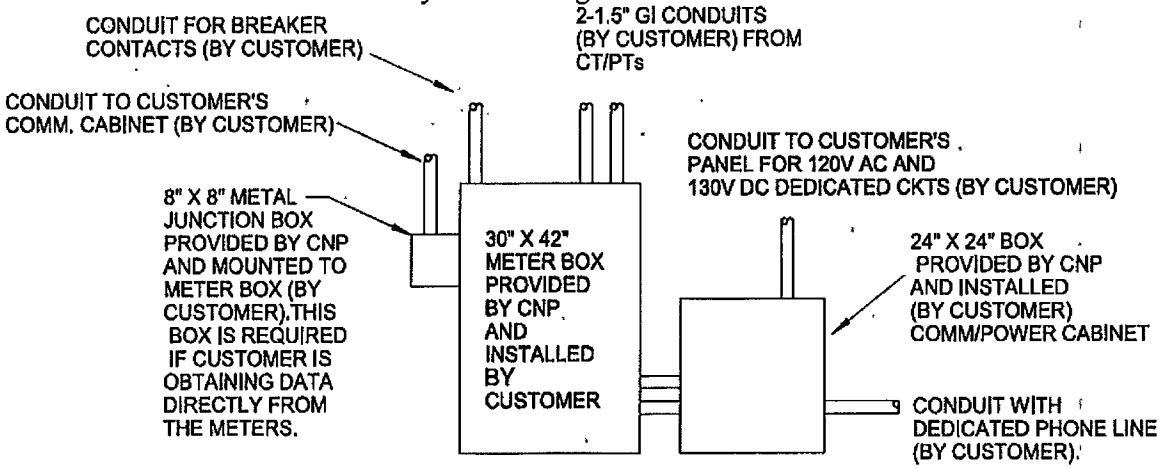
9.1. The requirements for metering are as follows:

9.1.1. Any part of the metering system that is installed by the customer or his agent shall conform to ANSI C12.1 at minimum, unless otherwise specified by CenterPoint Energy.

9.1.2. The customer shall submit a one-line diagram of the proposed substation configuration to CenterPoint Energy in accordance with Article 14 of this specification. CenterPoint Energy will designate on the one-line diagram the location of all metering instrument transformers (including, without limitation, quantity, transformation ratios, voltage class - high-side or low-side and ratings). The metering instrument transformers shall be connected to the transformer low-side or to the 138 kV substation bus by the customer as specified by CenterPoint Energy.

9.1.3. Metering boxes shall be located inside an environmentally controlled cubicle.

9.1.3.1. Each metering box is 30 inches wide, 42 inches high, 12 inches deep, wall mounted and approximately 36 inch from the floor. Wall space 3.0 ft. wide and 8.0 ft. high measured from the floor with 4.0 ft. (from wall) front clearance shall be provided for installation and maintenance of each metering box as illustrated in Figure 11. Metering boxes will be furnished by CenterPoint Energy and installed by the customer. The number of metering boxes will be determined by the metering scheme to be used.



Typical Layout of Meter Boxes

Figure 11

9.1.3.2. A customer requesting metering data shall provide all conduits and wiring necessary to connect to a meter data junction box provided by CenterPoint Energy and mounted on the metering installation.

9.1.3.3. The customer shall provide a conduit from the telephone board to the metering box.

9.1.4. CenterPoint Energy personnel will make all meter connections. For metering equipment details, consult the CenterPoint Energy project representative.

9.1.5. When high-side metering is used in a "full loop" alternative 'c' or alternative 'd' type substation (see Figure 4 and Figure 5), the customer shall provide and wire two auxiliary '52a' contacts from the circuit breaker between the two transmission lines ('A' circuit breaker) and a single auxiliary '52a' contact for each of the other two transmission line circuit breakers ('B' and 'C' circuit breakers) to the CenterPoint Energy high voltage metering box. Also, in a "full loop" alternative 'c' type substation (see Figure 4) with two transformer substation, two auxiliary '89a' contacts shall be provided on the disconnect switch between transformers and wired to the CenterPoint Energy high voltage metering box. When high-side metering is used in a "full loop" alternative 'e' type substation (see Figure 6), the customer shall provide and wire a single auxiliary '52a' contact for each of the other two transmission line circuit breakers ('A', 'B', 'C' and 'D' circuit breakers) to the CenterPoint Energy high voltage metering box. When high-side metering is used in a "loop tap" alternative 'b' type substation (see Figure 3), the customer shall provide two auxiliary '89a' contacts from the disconnect switch located in the substation bus between the transmission line connections and a single auxiliary '52a' contact from each of the circuit breakers. The customer shall provide and install cable from these contacts to the metering location (routed via the protective relay panels) for 'rollover' of the metering potential to a second set of potential transformers.

9.1.6. When low-side metering is utilized, as determined by CenterPoint Energy, customer shall provide and install 138 kV CVT devices in accordance with Sub-Article 7.5 of this specification.

9.2. The requirements for switchgear mounted metering instrument transformers are as follows:

9.2.1. Where low-side metering is used, as determined by CenterPoint Energy, the customer shall install CenterPoint Energy specified metering instrument transformers in their switchgear.

9.2.1.1. The customer shall purchase and install the CenterPoint Energy specified metering instrument transformers.

9.2.1.2. Original certified test data shall be provided to CenterPoint Energy for each metering instrument transformer installed.

9.2.2. Metering current transformers shall be located in the incoming main breaker cubicle. The metering current transformers shall be installed by the customer.

9.2.3. Metering potential transformers shall be located in roll-out boxes. The potential transformers shall be installed by the customer.

9.2.3.1. The secondary windings shall be used only for CenterPoint Energy metering.

9.2.3.2. Potential transformers shall be equipped with 1 A, current limiting primary fuses.

9.2.4. The customer shall install a 1.5 in. rigid galvanized steel conduit from each instrument transformer cubicle to the meter box.

9.2.5. CenterPoint Energy shall supply cable for all metering instrument transformer secondary connections. The customer shall pull the CenterPoint Energy provided cable. CenterPoint Energy shall make all metering instrument transformer secondary connections.

9.2.6. The customer shall supply copper ground wire from the customer's switchgear to the CenterPoint Energy meter box.

9.3. The requirements for 138 kV metering instrument transformers are as follows:

9.3.1. When 138 kV metering is used, CenterPoint Energy will furnish all 138 kV metering instrument transformers (i.e., separate 138 kV 'free-standing' current and potential transformers) required for CenterPoint Energy revenue metering or ERCOT Polled Settlement metering ("EPS").

9.3.2. CenterPoint Energy will mount the instrument transformers on stands provided by the customer in accordance with Sub-Article 5.6 of this specification. The substation layout and location of the 138 kV metering instrument transformers shall incorporate the requirement of vehicle access up to the instrument transformers for installation, testing and future replacement (i.e., vehicle access not obstructed by substation bus, cable tray, etc.). The customer shall furnish flexible connections from the substation bus to the instrument transformers with NEMA CC 1 standard four-hole terminals (0.5625 in. diameter holes on 1.75 in. centers). CenterPoint Energy personnel will bolt the flexible connections to the instrument transformers.

9.3.3. The customer shall utilize rigid galvanized steel conduit, flexible metallic conduit and pull boxes, including pull string, for the cables/conductors from the metering instrument transformers to the metering box location.

9.3.3.1. For each set of current or potential transformer stands, 1.50 in. rigid galvanized steel conduit shall be used to connect the individual instrument transformers to a common junction box for this set of instrument transformers (i.e., one common junction box for each set of current or potential transformer stands) located on or near the base of one of the instrument transformer stands. The 1.50 in. conduit shall terminate within 12 in. from the top of each instrument transformer stand. A 2.00 in. rigid galvanized steel conduit shall be used from the each common junction box located at the base of one of the instrument transformer stands to the metering box.

9.3.3.2. All 2.00 in. rigid galvanized steel conduit shall terminate at the base of the primary metering box. No more than four conduits are to be terminated in a metering box. Contact CenterPoint Energy if additional conduits are required.

9.3.3.3. Flexible metallic conduit shall be used as needed to complete the installation to the instrument transformers, common junction boxes, and the metering box(es).

9.3.4. Potential transformers for revenue metering located in the 138 kV substation yard shall be furnished and installed by CenterPoint Energy on instrument transformer stands provided by the customer. The potential transformers will be rated 80,500/115-67.08 V for use on 138 kV grounded neutral system in accordance with IEEE C57.13.

9.3.4.1. The potential transformers will have three secondary windings (i.e., "X", "Y", and "Z"). The "X" and "Z" windings will be used for transmission line protective relaying, SCADA and the customer's equipment. The "Y" winding will be used exclusively for CenterPoint Energy metering.

9.3.4.2. A minimum 16 inches wide, 14 inches high, 6 inches deep potential transformer common junction box and secondary fuses shall be provided and installed by the customer and located at the base of one of the potential transformer stands. Each secondary winding shall be separately fused at the potential transformer junction box to provide circuit isolation and short circuit protection; except that neutrals shall not be fused (brass or copper dummy fuses required).

9.3.4.3. CenterPoint Energy shall supply cable/conductors for the potential transformers "Y" winding secondary connections. The customer shall supply cable/conductors for the potential transformers "X" and "Z" windings secondary connections. The customer shall pull the CenterPoint Energy provided cable/conductors and customer supplied cable/conductors. CenterPoint Energy shall make the potential transformers "Y" winding secondary connections. The customer shall make the potential transformers "X" and "Z" windings secondary connections. The potential transformer cables/conductors shall be connected as shown on CenterPoint Energy drawing 581-500-01 138 kV Potential Transformer Schematic and Wiring Diagram.

9.3.4.4. The potential transformer primary shall be wye connected with a solid ground connection at the potential transformer location. The potential transformer secondary windings shall be wye connected with one neutral conductor per set of "X" and "Z" windings carried to the transmission line protective relay panel and another neutral conductor for the "Y" winding will be carried to the meter box, as shown on CenterPoint Energy Drawing 581-500-01 138 kV Potential Transformer Schematic and Wiring Diagram. These neutral conductors shall be grounded at the transmission line protective relay panel and meter box only.

9.3.4.5. If any 138 kV potential transformer "X" or "Z" winding of any phase is not used for any relaying, SCADA or customer's equipment, the secondary "3" terminal of any unused winding must connected to a conductor that is grounded at a panel in the control cubicle.

9.3.5. Metering current transformers located in the 138 kV substation yard shall be furnished and installed by CenterPoint Energy on instrument transformer stands provided by customer.

9.3.5.1. CenterPoint Energy shall supply cable for the metering current transformer's secondary connections. The customer shall pull the CenterPoint Energy provided cable. CenterPoint Energy shall make the metering current transformer's secondary connections.

9.3.5.2. A minimum 16 inches wide, 14 inches high, 6 inches deep current transformer common junction box shall be provided and installed by the customer and located at the base of one of the current transformer stands.

9.3.6. The customer shall provide a copper bond wire from the ground mat to the case of each instrument transformer. The wire shall be sized equal to the ground mat. CenterPoint Energy will terminate and connect the wire at the instrument transformer case.

10. FUSING AND CONNECTION OF PROTECTION AND CONTROL AND METERING CIRCUITS

10.1. Mersen Ferraz Shawmut type A2Y, A2K or A2D or Littelfuse type KLNR fuses shall be used for fusing of the 138 kV potential transformers secondary relaying and metering circuits of less than 250 V AC as follows:

10.1.1. 138 kV potential transformers secondary "X" winding and "Z" winding shall be fused with 30 A fuses at the potential transformer junction box in the yard except that neutrals shall not be fused (brass or copper dummy fuses required).

10.1.2. 138 kV potential transformers secondary "Y" windings shall be fused with 60 A fuses at the potential transformer junction box in the yard except that neutrals shall not be fused (brass or copper dummy fuses required).

10.1.3. 15 A fuses shall be used for protective relaying potential branch circuits.

10.1.4. 6 A fuses shall be used for instrumentation potential branch circuits.

10.2. Mersen Ferraz Shawmut type A2Y, A2K or A2D or Littelfuse type KLNR fuses shall be used for fusing of 138 kV coupling CVT secondary relaying and instrumentation circuits of less than 250 V AC as follows:

10.2.1. CVT secondary windings shall be fused with 6 A secondary fuses at the CVT junction box in the yard except that neutrals shall not be fused.

10.2.2. 3 A fuses shall be used for protective relaying potential branch circuits.

10.3. Mersen Ferraz Shawmut type A2Y, A2K or A2D or Littelfuse type KLNR fuses shall be used for fusing of relaying DC circuits of less than 250 V DC as follows:

10.3.1. The trip circuit connection from the control cubicle panel to each 138 kV breaker trip coil shall be fused with a 15 A panel mounted fuse located on the appropriate control cubicle panel.

10.3.2. 30 A fuses shall be used for the CenterPoint Energy SCADA control positive.

10.4. The voltage drop from the control cubicle to the trip circuit at the circuit breakers shall not exceed 10% of rated battery voltage under normal expected operating conditions.

10.4.1. With outdoor circuit breakers and indoor protective relay and control panels, a routing method herein called "radial", shall be used since the dc circuitry to the circuit breakers radiates outward from the control cubicle. Routing of the conductors is from the dc supply to the protective relay and control panels or switchboards and then on to the circuit breakers. Positive and negative conductors are carefully routed together so that sudden changes in current, such as those from tripping a circuit breaker, do not result in large magnetic coupling to other control and measuring conductors. The effects of external magnetic fields tend to cancel when the "go" and "return" conductors are in close proximity. All wires of a circuit should be contained in the same cable so that all are affected similarly by any inductive coupling

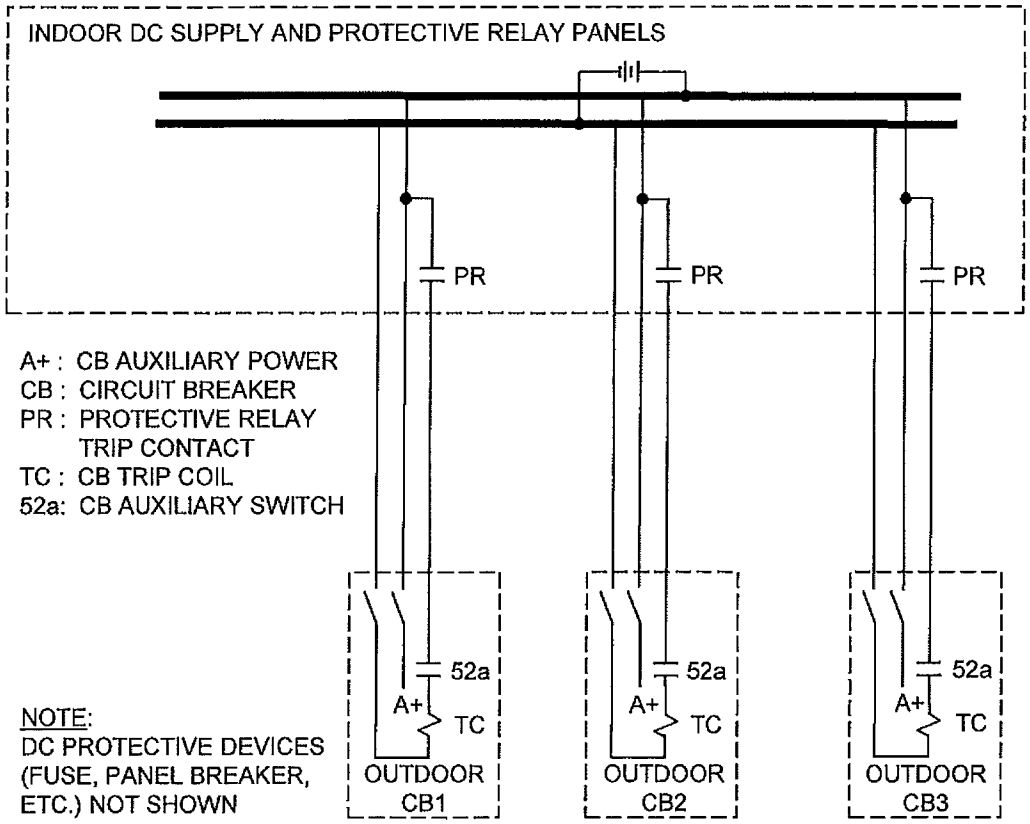


Figure 12

11. PROTECTIVE RELAYING FOR HIGH VOLTAGE (138 KV)

11.1. The customer will procure and own all the protective relays in the substation. A "full loop" substation configuration requires 138 kV transmission line protective relaying (including transmission line protective relay communication channels), 138 kV transmission line automatic reclosing and local breaker failure relaying for all 138 kV circuit breakers. CenterPoint Energy will specify in a bill of materials, as indicated in Sub-Article 11.3 of this specification, the protective relay style numbers for the multifunction (i.e., 138 kV transmission line protective relaying, circuit breaker automatic reclosing and local breaker failure relaying) microprocessor 138 kV transmission line protective relays. If the customer desires to install single function protective relays that are dedicated for breaker failure relaying then the customer must consult CenterPoint Energy during the development of the relaying and metering one line diagram regarding which relays CenterPoint Energy personnel will calculate relay settings, apply the settings and test. CenterPoint Energy will specify in a bill of materials, as indicated in Sub-Article 11.3 of this specification, the manufacturer and protective relay type for the single function protective relays that are dedicated for breaker failure relaying. CenterPoint Energy will calculate and implement relay settings for customer-owned 138 kV transmission line protective relays, for single function protective relays that are dedicated for breaker failure relaying for only the circuit breakers that switch the CenterPoint Energy transmission lines and for customer-owned relays installed to prevent back-energizing CenterPoint Energy's transmission system from generation installed on the low-side of customer power transformers. CenterPoint Energy will not consider customer requests for programing additional items in the transmission line protective relay for customers use (i.e., relay elements, inputs or outputs, etc.). The customer may request information be

exported from the transmission line protective relay that are CenterPoint Energy's standard programing of the relay (i.e., metering values, events, relay elements, inputs or outputs, etc.) via a communication port to the CenterPoint Energy SCADA RTU. On a case-by-case basis, CenterPoint Energy may issue settings for other customer-owned relays. In accordance with Sub-Articles 11.2 and 11.3, and 11.5 of this specification, the customer will propose 138 kV bus, 138 kV transformer protective relay schemes and, for "full loop" substation configurations, breaker failure relaying for all circuit breakers that do not switch the CenterPoint Energy transmission lines. The customer shall submit to CenterPoint Energy the customer calculated relay settings for, and allow CenterPoint Energy to observe the functional testing of, the 138 kV bus and 138 kV transformer protective relay schemes and breaker failure relaying for all circuit breakers that do not switch the CenterPoint Energy transmission lines.

11.2. Protective relaying for elements that compose the 138 kV facilities (i.e., 138 kV transmission lines, 138 kV buses, 138 kV power transformers, etc.) shall consist of two independent schemes for the protection of each element. The protective relays associated with the first scheme shall be connected to a different set of current transformers than the relays associated with the second scheme. The DC branch circuit associated with one relaying scheme (i.e., relay power supply, input, outputs, etc.) shall be a different DC branch circuit than the DC branch circuit associated with the second relaying scheme (i.e., independent DC branch circuit). Each of the two schemes shall energize both trip coils of a circuit breaker using appropriate DC separation and separate output contacts.

11.3. To ensure coordination with other transmission system protective relaying for a "full loop" substation configuration, CenterPoint Energy will furnish typical AC and DC schematics and a minimum required bill of materials for the protective relay style numbers for the multifunction (i.e., 138 kV transmission line protective relaying, circuit breaker automatic reclosing and local breaker failure relaying) microprocessor 138 kV transmission line protective relays including protective relay communication channel equipment. The customer shall indicate the CenterPoint Energy specified transmission line protective relaying schemes and proposed relaying schemes for each 138 kV bus (including 138 kV transformer high-side bus) and transformer protection on a substation relaying and metering one line diagram. Once CenterPoint Energy has reviewed these schemes, the customer shall submit the appropriate relaying drawings and customer's bill of materials to CenterPoint Energy for functional review. After these drawings and the bill of materials are reviewed by CenterPoint Energy, the customer shall order the appropriate equipment and install these schemes. CenterPoint Energy personnel will calculate set points for the multifunction microprocessor 138 kV transmission line protective relays, apply the settings and test the transmission line protection relays after the customer has completed point-to-point wiring checks of protective relaying and control panels and verified protective relaying control circuits by performing functional trip and close testing as described in Article 16 of this specification. The customer shall calculate set points for the 138 kV bus and transformer protection relays and submit this information to CenterPoint Energy for review. After CenterPoint Energy has reviewed the 138 kV bus and transformer protection set points, the customer will apply the settings and test the relays after the customer has completed point-to-point wiring checks of protective relaying and control panels and verified protective relaying control circuits by performing functional trip and close testing as described in Article 16 of this specification. IT SHALL BE THE CUSTOMER'S RESPONSIBILITY TO INSTALL ALL WIRING AND PEFORM ALL POINT-TO-POINT WIRING CHECKS AND CORRECT ANY WIRING ERRORS.

11.4. A 'Sync Panel' is required only for a "full loop" substation configuration. The Sync Panel consists of a synchroscope, a voltmeter and three sync lights. The 'Sync Panel' typically consists of a small subpanel mounted on hinges to one of the substation protection and control panels and must be visible from the location of the 138 kV circuit breaker control switches. Other arrangements may be

acceptable (i.e., 'Sync Panel' components mounted on the same protection and control panel that all of the 138 kV circuit breaker control switches are mounted on). CenterPoint Energy will specify the 'Sync Panel' requirements in a bill of materials referenced in Sub-Article 14.1.2 of this specification.

11.5. For "full loop" substations equipped with transmission line protective relaying, the current carrying capability of the components in the protective relaying schemes (relay devices, auxiliary current transformers, monitoring devices, current test switches, terminal connectors, switchboard panel wiring, cable, etc.) shall meet a minimum continuous secondary current rating equivalent to a primary continuous ampere rating of 4,000A and 2-hr emergency ampere rating of 4,400A, unless otherwise specified by CenterPoint Energy. For substations with four or more 138kV transmission lines, the continuous and 2-hr emergency ratings of this equipment may be required to be greater than these values.

11.6. The following are minimum requirements for138 kV bus and transformer protection:

11.6.1. Bus protection shall include two independent instantaneous bus differential protective relays (device function 87). A power transformer connected to a bus position will utilize the same two sets of power transformer high-side BCTs (Sub-Article 7.1.2) for both the bus differential protective relays and the power transformer protective relays (Sub-Article 11.6.2). For a Figure 2 substation configuration, instantaneous overcurrent protective relays (device function 50) may be utilized for protection of the bus between the 138 kV circuit breaker and the 138 kV transformer high-side.

11.6.2. Each power transformer shall be protected by two protective relays. As a minimum, one of the power transformer protective relays shall be a transformer differential relay (device function 87T), which shall be connected to one of the two sets of power transformer high-side BCTs and the other power transformer protective relay shall have instantaneous and time overcurrent relay (device function 50/51) which shall be connected to a different set of power transformer high-side BCTs than the transformer differential relay. If two multifunction microprocessor current differential protective relays are utilized, CenterPoint Energy does not object to the implementation of both a transformer differential function and a transformer instantaneous/time overcurrent function in each of the two protective relays.

11.6.3. The three-line AC schematic drawing(s) showing bus differential protective relay connections and transformer protective relay connections should clearly indicate polarity markings on all current transformers and all protective relay current inputs.

11.6.4. Power transformer sudden pressure relay and oil level device(s) should be connected for alarming and tripping. The sudden pressure relay and oil level device(s) should be connected to a different, independent DC branch circuit than the transformer differential relay.

11.6.5. If auxiliary relays (device function 94) or lockout relays (device function 86) are used for tripping, then two independent relays are required for each tripping zone. The auxiliary relays or lockout relays should be connected to different, independent DC branch circuits.

11.7. All 138 kV circuit breakers connected to a new 138 kV "full loop" substation are required to incorporate local breaker failure relaying. Local breaker failure relaying may be required for each 138 kV circuit breaker at existing substations when deemed necessary by CenterPoint Energy. When practical, the protective relay performing the breaker failure function shall directly trip all appropriate

138 kV circuit breakers (i.e., not utilize an auxiliary relay, a lockout relay or another protection relay to trip the appropriate 138 kV circuit breakers). CenterPoint Energy personnel will calculate set points, apply the settings and test the breaker failure scheme if it is incorporated in transmission line protective relays. If the customer desires to install single function protective relays that are dedicated for breaker failure relaying, then the customer must consult CenterPoint Energy during the development of the relaying and metering one line diagram (described in Sub-Article 14.1.2 of this specification) regarding which relays CenterPoint Energy personnel will calculate set points, apply the settings and test. CenterPoint Energy personnel will calculate set points, apply the settings and test the breaker failure scheme if it is incorporated in single function protective relays that are dedicated for breaker failure relaying but only for the circuit breakers that switch the CenterPoint Energy transmission lines. Testing of the breaker failure scheme in relays set by CenterPoint Energy will occur after the customer has completed the installation and has satisfactorily performed the system operational tests provided in Article 16 of this specification. IT SHALL BE THE CUSTOMER'S RESPONSIBILITY TO INSTALL ALL WIRING AND PEFORM ALL POINT-TO-POINT WIRING CHECKS AND CORRECT ANY WIRING ERRORS.

11.8. The following are specified for connections pertaining to protection and control cables:

11.8.1. Connections from one panel to another panel should be made from the terminal blocks on one panel to terminal blocks on the other panel (rather than directly from a device on one panel to a device on a different panel).

11.8.2. Protection and control cables should be color-coded and clearly marked to facilitate wire checking and troubleshooting.

11.8.3. Current transformer secondary cables shall be grounded only at the relay panels on the non-polarity side of the wye-connected current transformer.

11.9. CenterPoint Energy encourages the use of sequence of events recorders (SERs) and digital fault recorders (DFRs). The application of these systems involves trade-offs between the desire to monitor and record as much information as possible and the need to minimize the number of devices in protective relaying circuits to ensure reliable operation. Any customer planning to install one of these systems is encouraged to discuss their application philosophy with CenterPoint Energy early in the project and to show these devices in the appropriate relaying and SCADA AC and DC schematics when those drawings are submitted for CenterPoint Energy review.

11.10. An electronic device that can directly or indirectly trip a circuit breaker connected to a CenterPoint Energy transmission circuit (i.e., transmission line protective relay, transformer bus protective relay, local breaker failure relay, etc.) is <u>not allowed</u> to be monitored via routable protocol communication (i.e., Ethernet), serial or dial-up communication by customers connection directly to the device. Data from these electronic devices can be provided to the customer via the CenterPoint Energy SCADA RTU (refer to Article 12 of this specification) or the customer may install separate devices for monitoring purposes.

11.11. The following are specified for protective relay communication channels:

11.11.1. If the transmission line protective relaying utilized requires power line carrier communication, the power line carrier transmitter/receiver sets shall be located inside the substation control cubicle. The associated power line carrier coaxial cable utilized for making the connection

from the substation control cubicle to the line tuner located near the 138 kV coupling capacitor shall be type RG-8/U, 11 AWG, stranded (7/19) bare copper, polyethylene dielectric, 50 ohm nominal impedance, with polyethylene outer jacket. (Note: If an alternate cable is used, an outer jacket with "Excellent" or "Outstanding" water resistance characteristic is required – PVC jacket is not acceptable). The line turner requires separate mounting at the base of the coupling capacitor stand. A single conductor must be run as directly as possible between this line turner and the coupling capacitor base housing. The single conductor must be 4 AWG stranded, 5 kV, non-shielded, XLP insulation. The single conductor must be mounted on insulators and fed through bushings at each end. The single conductor insulation should be unbroken between its ends to maintain low leakage. The single conductor must not be directly up against or touching the coupling capacitor support column or other metal components. The insulated single conductor lead-in can be installed in a PVC or other plastic conduit which should be supported on stand-offs or insulators.

11.11.2. When power line carrier communication is utilized, CenterPoint Energy shall determine the frequency for the power line carrier communication. The customer shall procure the power line carrier transmitter/receiver set with an automatic carrier tester according to CenterPoint Energy provided bill of material as indicated in Sub-Article 7.5 and 7.6 of this specification.

11.11.3. If transmission line protective relaying with fiber optics communication is utilized, the customer is required to provide a raceway for the fiber optic cable installation from the transmission line protective relay that requires the fiber optic communication (i.e., relay located in the substation control cubicle) to the base of the first CenterPoint Energy transmission line structure outside the substation. See Sub-Article 5.5.4 of this specification for cases where fiber optic cable comes in overhead. A dedicated raceway (conduit) is required for the fiber optic cable, however a dedicated inner duct installed in a cable trench or a dedicated conduit in a duct bank is acceptable. CenterPoint Energy shall be responsible for supplying, pulling and splicing of the fiber optic cable.

The following guidelines are for the customer provided raceway:

11.11.3.1. Flexible steel conduit 1.50 in. diameter, from the splice box, that is provided and mounted by CenterPoint Energy at the base of the first CenterPoint Energy transmission structure outside of the substation, to the end of the underground conduit provided by the customer.

11.11.3.2. Below grade conduit shall be a minimum 1.50 in. diameter PVC, Schedule 40 with "pull line" (continuous fiber polyolefin, 200 lbs. tensile strength) installed. Conduit shall be at least 18.00 in. below grade, with a protective concrete barrier. Minimum bending radius shall be 24.00 in.

11.11.3.3. Pull boxes at grade level shall be provided along the cable raceway route at intervals not more than 300 ft. or two 90° bends. A cable pull box in the raceway route is required just inside the substation fence. Pull box shall be 30 in. x 60 in. x 30 in. (Quazite Style No. PG3060BB30 and PG3060HA).

11.11.3.4. The customer shall provide 5 in. x 19 in. x 12 in. rack space close to the transmission line protective relaying that utilizes fiber optics communication to accommodate a fiber

optic cable distribution box. CenterPoint Energy will provide and install the fiber optic cable distribution box.

11.11.3.5. In cases where railroad tracks exist between the substation and the first CenterPoint Energy transmission structure outside of the substation, CenterPoint Energy will give site-specific requirements.

11.11.3.6. Customer shall submit drawings and other documents as necessary showing the raceway routing and construction details of the conduit according to Article 14 of this specification.

11.11.3.7. Actual designs shall be reviewed by CenterPoint Energy before construction starts.

12. REMOTE TELEMETRY

12.1. For remote telemetry requirements (i.e., SCADA), refer to CenterPoint Energy 007-400-02 Specification for Remote Telemetry of a Customer-Owned Facility.

13. GENERATION

13.1. Customers desiring to install and/or operate generation rated more than 10 MW shall make application with ERCOT as outlined at the ERCOT website (www.ercot.com). Generators shall comply with ERCOT Nodal Operating Guides and Protocols, ERCOT Planning Guides, and CenterPoint Energy engineering specifications and requirements.

13.2. For customers desiring to install and/or operate generation less than or equal to the customer's load (i.e., 'self-serve'), the requirements for relay and generation/load islanding schemes are as follows:

13.2.1. The transmission customer shall be responsible for installing protective relays to ensure the customer's generators do not sustain a fault on the CenterPoint Energy transmission system. In addition, customer generation shall not keep any portion of the CenterPoint Energy transmission system energized in the event that a portion of the CenterPoint Energy transmission system along with the customer's facilities becomes isolated from the rest of the CenterPoint Energy system. The transmission customer shall be responsible for installing protective relays to ensure the customer's generation does not interfere with the automatic reclosing system associated with the CenterPoint Energy transmission system (i.e., The first automatic reclosing attempt on CenterPoint Energy transmission line will occur a minimum of one second after the fault has cleared. See Sub-Article 3.6). CenterPoint Energy will inform the customer of required changes to the automatic reclosing system at other substations associated with the CenterPoint Energy transmission system as a result of the operation of the customer's generators in parallel with the CenterPoint Energy transmission system. CenterPoint Energy will calculate and implement all settings for customer-owned relays installed for the protection and automatic reclosing of CenterPoint Energy transmission lines and for customer-owned relays installed to prevent back-energizing a fault on the CenterPoint Energy's system from generation installed on the low-side of customer's power transformers.

13.2.2. The transmission customer shall be responsible for installing controls to synchronize the customer's generators with the CenterPoint Energy's system.

13.2.3. The customer shall not intentionally impose additional load on the CenterPoint Energy transmission network during an under frequency disturbance (i.e., between 59.95 to 57.5 Hz).

13.2.4. Customer may island their load and generation from CenterPoint Energy transmission system in one of the following manners:

13.2.4.1. Customer may island their generation and load from the CenterPoint Energy transmission system if the frequency exceeds 61.8 Hz or goes below 57.5 Hz.

13.2.4.2. Customer may island generation and a portion of load from the CenterPoint Energy transmission system at any frequency, provided provisions are installed to ensure the any remaining load imposed on the CenterPoint Energy transmission system is not greater than the load prior to the beginning of the disturbance.

13.2.5. Verification of the implementation of the above requirements shall be in accordance with Article 14 of this specification.

14. DRAWING AND DOCUMENTATION COMPLIANCE REVIEW AND COMMENTS

14.1. The following completed engineering documents shall be submitted in the order shown below for CenterPoint Energy comments, functional review, and compliance with CenterPoint Energy specifications in accordance with Sub-Articles 14.2 through 14.6 of this specification:

14.1.1. Site preparation and plot plan drawings shall be submitted to CenterPoint Energy for comment. Facilities that must be shown on this drawing include the dimensions of the substation site, dead-end structure location, access roadways to substation, space around the outside of the substation, (roadways, railroad tracks, walks, pipe racks, etc.), drainage features such as culverts, ditches and detention facilities (if required). Additionally, the elevation of the substation site should be indicated on these drawings (See Article 6 of this specification).

14.1.2. Relaying and metering one-line diagram of high voltage relaying and including generator protection one-line diagram for customers with parallel generation. The diagram shall indicate the maximum current transformer ratio and the current transformer tap ratio being utilized. The diagram shall indicate whether the 138 kV circuit breaker low SF6 gas pressure wiring is set to 'BLOCK TRIP' or to 'AUTO TRIP' the circuit breaker.

CenterPoint Energy shall indicate incoming 138 kV transmission lines designation, power line carrier frequencies (if applicable), location and ratings of metering instrument transformers (high-side or low-side), CenterPoint Energy designations for circuit breakers, switches, power transformers, generators (if applicable) and the CenterPoint Energy assigned 6-character substation identification. CenterPoint Energy will provide a bill of materials as indicated in Sub-Article 11.3 of this specification.

The drawing shall then be revised to show the information provided by CenterPoint Energy and resubmitted to the CenterPoint Energy designated representative. (See Articles 9 and 11 of this specification).

14.1.3. Substation plan, profile and section view drawings, including bus and bus supports, with material callouts. The plan and profiles must indicate the geographical base lines, center line of dead-end structure and height of static wire and phase wire pull off on the dead-end structure with coordinates and CenterPoint Energy circuit name and circuit number for incoming 138 kV transmission lines Material callouts including conductor size, type, and quantity shall be provided in sufficient detail to allow for determination of the continuous and emergency substation facility ratings (See Articles 4 and 5 of this specification).

14.1.4. Final/complete relaying and metering one-line diagrams, including generator protection one-line diagram for customers with parallel generation.

14.1.5. When the interconnection agreement indicates that the customer must install equipment (i.e., motor soft start, variable frequency drive (VFD), etc.) in order to satisfy the CenterPoint Energy interconnection requirements of Sub-Article 4.7 of this specification, drawings and documentation of equipment to be installed shall be submitted for CenterPoint Energy review.

14.1.6. Equipment specification for all major pieces of equipment such as power transformers, 138 kV circuit breakers, surge arresters, disconnect switches, coupling capacitors and line traps. (See Articles 4 and 7 of this specification).

14.1.7. Foundation location plan. (See Articles 5 and 6 of this specification).

14.1.8. Design calculations, drawings and associated documents for the substation dead-end structures, instrument transformer stands, and foundations. These documents shall be submitted 30 days prior to the scheduled fabrication start.

14.1.9. AC and DC schematics of high voltage relaying, control and SCADA schemes. AC and DC panel board drawings. These drawings shall be submitted after the documents required in Sub-Article 14.1.2 of this specification have been approved.

14.1.10. Where low-side metering is used, as determined by CenterPoint Energy, original certified test data in PDF electronic file shall be provided to CenterPoint Energy for each metering instrument transformer installed (See Sub-Articles 9.2.1.2of this specification).

14.1.11. Power transformer AC schematic, breaker schematics and BCT curves.

14.1.12. Power transformer and 138 kV circuit breaker nameplate drawings, line trap instruction book and drawings and line tuner instruction book and drawings.

14.1.13. Relaying, control and SCADA bill of materials. These documents shall be submitted after the documents required in Sub-Article 14.1.4 of this specification have been approved.

14.1.14. Cable and conduit list and routing layout.

14.1.15. Front and Back View of high voltage relay and control panels including interconnections.

14.1.16. Substation control cubicle layout drawing. (See Article 8 of this specification).

14.1.17. Detail (point-to-point) wiring diagrams shall be submitted, not for approval, but for use in accordance with Article 11 of this specification.

14.1.18. The customer calculated relay settings for the 138 kV bus and 138 kV transformer protective relay schemes and 138 kV circuit breaker failure relaying.

14.2. A PDF electronic file of each of the drawings indicated in Sub-Article 14.1 of this specification shall be sent, for review/comments, to the CenterPoint Energy designated representative unless a different format is specifically requested by CenterPoint Energy. Certain types of engineering documents depend upon finalization of other documents. For example, relay panel drawings cannot be prepared until the relaying AC and DC schematics are finalized. Therefore, engineering documents shall be submitted for CenterPoint Energy comments or approval in the proper sequence.

14.3. Customer drawings should be 100% complete when given to CenterPoint Energy to review. If a functional review cannot be done, CenterPoint Energy shall comment on compliance with CenterPoint Energy specifications and return to customer. The drawings shall then be resubmitted with CenterPoint Energy comments incorporated when 100% complete. The customer shall then proceed with drawing submittal in accordance with Sub-Article 14.4 of this specification.

14.4. Customer drawings that are 100% complete and marked "For Approval" shall be functionally reviewed by CenterPoint Energy for compliance with CenterPoint Energy specifications. If additional comments are made by CenterPoint Energy on the 100% complete drawings, the customer may:

14.4.1. Incorporate the CenterPoint Energy comments and resubmit these drawings for further review of compliance with CenterPoint Energy specifications, or

14.4.2. Send a letter to the CenterPoint Energy designated representative acknowledging that CenterPoint Energy comments were received and shall be incorporated into the "For Construction" drawings.

14.5. Should the customer disagree with comments by CenterPoint Energy, the customer shall send a letter to the CenterPoint Energy designated representative explaining why revisions are not necessary.

14.6. Once all issues are resolved, the final set of drawings shall be marked "For Construction." After, the substation is energized a PDF electronic file of each of the drawings indicated in Sub-Article 14.1 of this specification, "As Built" drawings of the substation shall be sent to the CenterPoint Energy designated representative within 90 days.

15. EQUIPMENT INSTALLATION

15.1. The protective enclosure around the substation including gates and grounding shall be installed in accordance with the National Electrical Safety Code (IEEE C2), IEEE 1119 and IEEE 80.

15.2. CenterPoint Energy shall assign a 6-character substation identification to the customer-owned substation. CenterPoint Energy shall post the 6-character substation identification on the door of the

substation control cubicle and on the entrance gate of the substation. The 6-character substation identification shall be used to identify the customer-owned substation for any communications or correspondence.

15.3. The customer shall install all substation equipment and make all connections, except as otherwise noted in this specification. The customer shall make all equipment installation checks required by Article 16 of this specification and shall make all required measurements and readings available to CenterPoint Energy personnel if requested.

15.4. CenterPoint Energy will verify that the 138 kV switches operate correctly.

15.5. CenterPoint Energy will have the sole responsibility for calculating relay set points, applying relay settings and "out of case" testing of the following relays:

15.5.1. Transmission line relaying and tuning components of the associated power line carrier equipment communication channel,

15.5.2. Relays for 138 kV transmission line automatic reclosing, and

15.5.3. Relays for 138 kV breaker failure protection when specified by CenterPoint Energy.

Note: The appropriate operation of protective relays and control circuits by performing trip and close testing from devices of Sub-Articles 15.5.1 through 15.5.3 of this specification above shall be conducted with CenterPoint Energy present to direct and observe test (24 hr. advance notice required).

15.6. CenterPoint Energy will furnish locks which shall remain in series with customer locks for all 138 kV disconnect switches, substation control cubicle doors and gates(s) to and from the substation.

15.7. The 138 kV circuit breakers, air switches and power transformers will be assigned numbers in accordance with CenterPoint Energy dispatching numbers. The numbers are to be shown on the one-line diagram and shall be marked on the circuit breaker tanks, switch handles and power transformers.

15.8. CenterPoint Energy will coordinate and provide the procedures for energizing the customer-owned substation 138 kV equipment.

16. REQUIRED TESTS AND INSPECTIONS

16.1. During installation but prior to energizing the equipment, the customer shall perform the following tests and inspections. CenterPoint Energy will observe the tests below that are marked with an asterisk (*).

16.1.1. Diagnostic testing (e.g., insulation power factor ("Doble testing", etc.), insulation resistance ("Megger", etc.) of all equipment (e.g., arresters, coupling capacitors, etc.), including all tests as specified by manufacturer.

16.1.2. The required tests and inspections for control cables and panels are as follows:

16.1.2.1. Check continuity and perform insulation resistance test conductor-to-ground and conductor-to-conductor.

16.1.2.2. Perform a point-to-point wiring check of protective relaying and control panels.

16.1.2.3. Verify protective relaying control circuits by performing functional trip and close testing.*

16.1.2.4. Inject current from current transformers through relays.*

16.1.2.5. CenterPoint Energy personnel will calculate the set points, apply the settings and test the multi-function transmission line protection relays after the customer has completed point-to-point wiring checks of protective relaying and control panels and verified protective relaying control circuits by performing functional trip and close testing.

16.1.3. The required tests and inspections for power cables are as follows:

16.1.3.1. Check continuity and phasing sequence.

16.1.3.2. Perform insulation resistance test of cables.

16.1.3.3. High-pot.

16.1.4. The required tests and inspections for circuit breakers are as follows:

16.1.4.1. Inspect and adjust main auxiliary switch assembly per manufacturer's instructions.

16.1.4.2. Inspect, adjust, and lubricate operating mechanism per manufacturer's instructions.

16.1.4.3. Ratio check, excitation test, insulation resistance test, and polarity on all current transformers. Leave un-used current transformers shorted and grounded on secondary terminals.

16.1.4.4. Check resistance of close, trip and trip free coils.

16.1.4.5. Perform insulation resistance test of main contact assembly and bushings. Measure main contact resistance ("Ductor").

16.1.4.6. Make dielectric insulation and power factor tests on main contact assembly and bushings.

16.1.4.7. Perform insulation resistance test of control circuits conductor-to-ground and conductor-to-conductor.

16.1.4.8. Record all measurements and readings.

16.1.4.9. Make time-travel recordings to verify proper opening speed.

16.1.5. The required tests and inspections for disconnects and switches are as follows:

16.1.5.1. Check and adjust contact alignment and wipe.

16.1.5.2. Adjust operating linkage to obtain full open and close positions and tighten all clamps and set screws.

16.1.5.3. Check and tighten all electrical connections.

16.1.5.4. Lubricate linkage and bearings, if required.

16.1.5.5. Clean all grease from contacts.

16.1.6. The required tests and inspections for batteries and charger are as follows:

16.1.6.1. Assemble batteries per manufacturer's instructions.

16.1.6.2. Coat all connections on battery terminals with no-oxide grease.

16.1.6.3. Install, connect, and adjust charger per manufacturer's instructions.

16.1.6.4. Put batteries on equalize charge until the specific gravity of all cells is within the limits set by manufacturer.

16.1.6.5. Read and record the float voltage and specific gravity of each cell.

17. RECOMMENDED TESTS AND INSPECTIONS

17.1. During installation but prior to energizing the equipment, CenterPoint Energy recommends that the customer perform the following tests and inspections, as a minimum. This list is not considered to be exhaustive or all-inclusive.

17.1.1. For low-side equipment, test relays, check transformer and bus automatic reclosing and check operations indicators when tripping through the panel with current.

Note: CenterPoint Energy will calculate and implement all settings for customer-owned relays installed for the protection and automatic reclosing of CNP transmission lines and for customer-owned relays installed to prevent back-energizing CNP's system from generation installed on the low-side of customer power transformers. On a case-by-case basis, CNP may issue settings for other customer-owned relays.

17.1.2. The recommended tests and inspections for all substation equipment are as follows:

17.1.2.1. Clean rusted surfaces, prime all bare metal surfaces, and touch up with paint matching the finish coat.

17.1.3. The recommended tests and inspections for control work are as follows:

17.1.3.1. Wire check all cables to current transformers and perform insulation resistance test of cables.

17.1.3.2. In the following order:

17.1.3.2.1. Polarity check current transformers.

17.1.3.2.2. Ratio check current transformers.

17.1.3.2.3. Excitation test current transformers.

17.1.3.2.4. Insulation resistance test current transformers.

17.1.3.3. Check cable connections to panels.

17.1.3.4. Wires check panels.

17.1.4. The recommended tests and inspections for switchgear are as follows:

17.1.4.1. Check bus work for continuity, phase sequence, and adequate clearance.

17.1.4.2. Check all bolted bus connections.

17.1.4.3. High-pot cable with 25 kV DC.

17.1.4.4. Insure that all exposed bus work is properly insulated.

17.1.4.5. Bridge all bus work.

17.1.4.6. Perform dielectric insulation and power factor tests on all bus work.

17.1.4.7. Check breaker-lifting devices for alignment and adjust limit switches, if necessary.

17.1.4.8. Adjust auxiliary and cell switches.

17.1.4.9. Check continuity for all AC, DC control, and current transformer circuits.

17.1.5. The recommended tests and inspections for transformers are as follows:

17.1.5.1. Visually inspect for internal shipping damage and check all internal connections.

17.1.5.2. Install bushing and accessories per manufacturer's instructions.

17.1.5.3. Inspect load tap changer (LTC) compartment and adjust per manufacturer's instruction and check LTC operation, if applicable.

17.1.5.4. Bridge primary and secondary windings on all tap positions and a final check on the tap position that will be used.

17.1.5.5. Ratio check, excitation test, perform insulation resistance test, and check polarity on all current transformers. Leave unused current transformers shorted and grounded on the secondary.

17.1.5.6. Vacuum fill per manufacturer's instructions.

17.1.5.7. Check for oil and gas leaks. (This may be done prior to vacuum filling).

17.1.5.8. Test oil before and after filling. (Maximum power factor, minimum dielectric strength, color, acidity, and interfacial tension).

17.1.5.9. Test oil for dissolved combustible gas and moisture content (Note: This test is to be performed 24 to 48 hours after the substation has been energized)..

17.1.5.10. Check voltage regulating relay and controls.

17.1.5.11. Check cooling equipment and controls.

17.1.5.12. Check nitrogen-regulating equipment and adjust per manufacturer's instructions.

17.1.5.13. Check sudden pressure relay and associated circuits.

17.1.5.14. Check and connect desired alarm circuits.

17.1.5.15. Perform insulation resistance test and insulation power factor test of bushing and windings (e.g., "Doble testing").

17.1.5.16. Check all bushings to bus connections.

17.1.5.17. Check all current transformers and control circuit connections.

17.1.5.18. Record all measurements and readings.

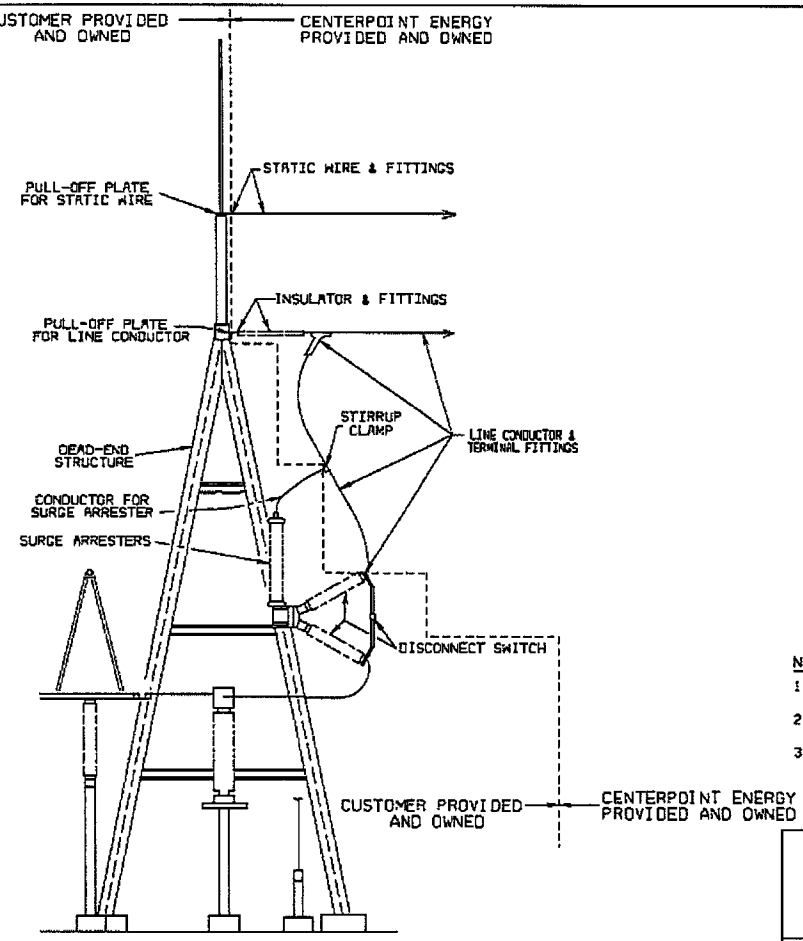
17.1.5.19. Check core ground.

REFERENCE DRAWINGS

NO	DATE	ITEMS REVISED	BY	CH	APP
15	11-16-2015	Updates	Var	Var	DRS
14	7-22-2005	Change to 4000A and other updates	Var	Var	DRS

CENTERPOINT ENERGY HOUSTON, TEXAS		
WRITTEN	4/9/74	E. C. Reid
CHECKED	4/10/74	L. G. Pond
APPROVED	7/17/74	C. S. Kayser

SPECIFICATION NO. 007 231 14 Page 42 of 45



ELEVATION

NOTES:

1. DRAWING INDICATES TERMINATION OF CENTERPOINT ENERGY LINE & SERVICE TO CUSTOMER SUBSTATION.
2. THIS DRAWING NOT INTENDED TO SHOW THE LOCATION OR TYPE OF CUSTOMER EQUIPMENT.
3. NUMBER & TYPE OF INSULATORS TO BE DETERMINED BY STATION VOLTAGE.

NO.	DATE	JOB NO.	REVISION	BY	CH	COR	APP
2	4-18-2012	----	REDRAWN & CONVERTED TO CAD	BC	BC	----	BC
1	4-24-63	----	ADDED 3RD LINE NOTE & SHEET 2	LHE	----	----	RES
----	3-6-63	----	REVISED DRAWING NUMBER FROM HD-24574	LHE	----	----	----

CUSTOMER OWNED SUBSTATION LINE TERMINATION STANDARD

CENTERPOINT ENERGY, INC.
HOUSTON, TEXAS

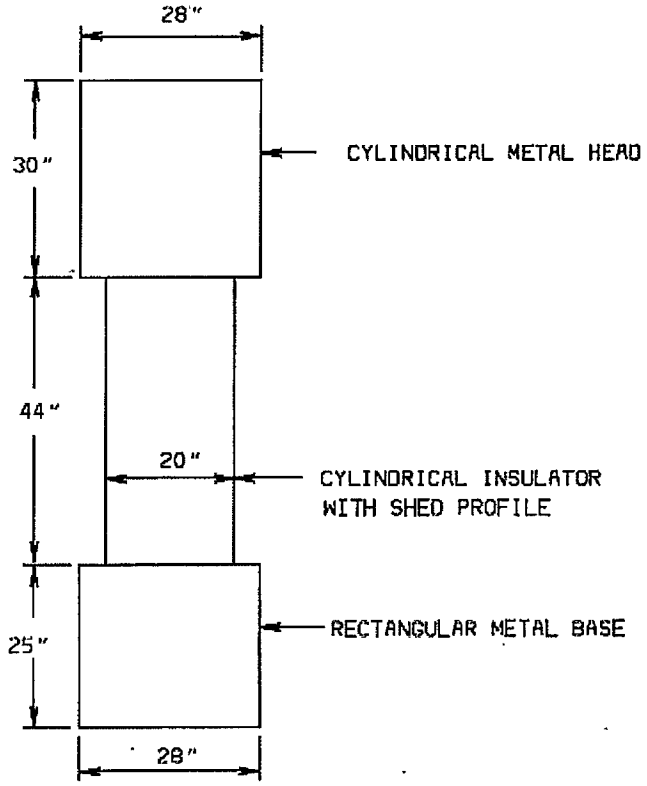
DRAWN 4-18-2012	B. CHATMAN	SCALE NTS
CHECKED		SHEET 1 OF 2 SHEETS
CORRECT		DRAWING NUMBER
APPROVED 4-18-2012	D. SEVCIK	004 241 04

THIS DIAGRAM REPRESENTS THE MAXIMUM DIMENSIONS, AND MAXIMUM WEIGHT OF POSSIBLE 138 KV CT'S OR PT'S THAT CENTERPOINT ENERGY WILL PROVIDE FOR THE 138 KV BILLING METER.

THIS DIAGRAM PROVIDES THE NECESSARY STRUCTURAL AND MECHANICAL DESIGN PARAMETERS TO BE USED FOR THE INSTRUMENT TRANSFORMER FOUNDATIONS AND STANDS THAT WILL SUPPORT 138 KV CT'S OR PT'S THAT CENTERPOINT ENERGY WILL PROVIDE.

THIS DIAGRAM MUST ALSO BE USED, IN CONJUNCTION WITH SUBSTATION BUS PROFILE DIMENSIONS, TO DETERMINE THE HEIGHT OF THE STANDS THAT WILL SUPPORT THE INSTRUMENT TRANSFORMERS THAT CNP WOULD PROVIDE FOR THE 138 KV BILLING METERING.

AFTER THE INSTRUMENT TRANSFORMER STAND HEIGHT HAS BEEN DETERMINED BASED ON THE ABOVE INFORMATION, THE MANUFACTURER'S OUTLINE DRAWING FOR THE ACTUAL 138 KV CT'S AND PT'S THAT CENTERPOINT ENERGY WILL PROVIDE MUST BE USED TO DETERMINE THE DETAILS OF THE PRIMARY CONNECTION(S) AND SECONDARY TERMINAL BOX CONDUIT CONNECTION.



WEIGHT = 1500 LBS

NO.	DATE	JOB NO.	REVISION	BY	CH	CON	APP
1	7-3-14		CHANGED DESIGN PARAMETERS	DRS			BC

DESIGN CRITERIA
138KV STANDARD INSTRUMENT TRANSFORMER STAND

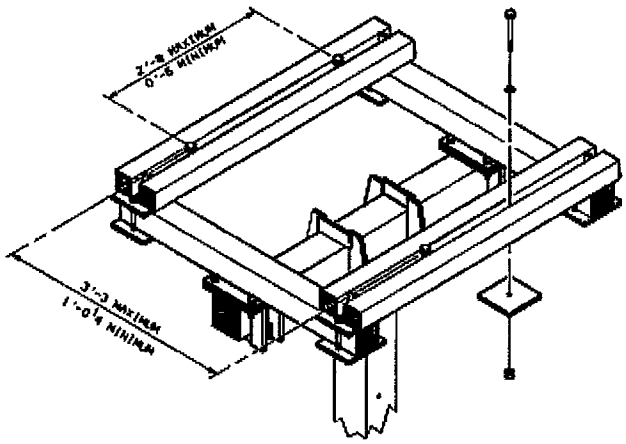
CENTERPOINT ENERGY, INC.
HOUSTON, TEXAS

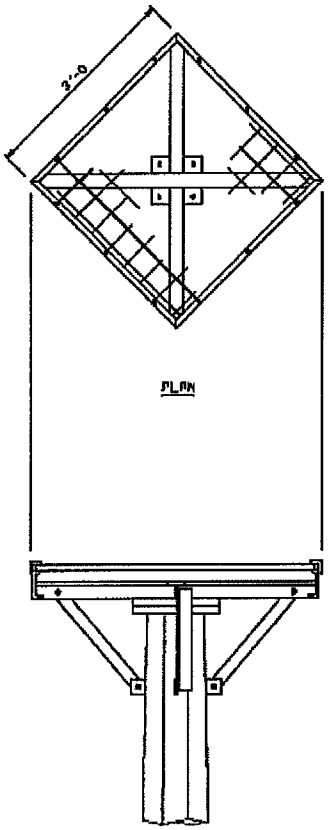
DRAWN 1-24-94	REK	SCALE NTS
CHECKED 1-24-94	REK	SHEET 1 OF 2 SHEETS
CORRECT		DRAWING NUMBER
APPROVED		171 190 06

CENTERPOINT ENERGY HOUSTON, TEXAS		
WRITTEN	4/9/74	E. C. Reid
CHECKED	4/10/74	L. G. Pond
APPROVED	7/17/74	C. S. Kayser

NO	DATE	ITEMS REVISED	BY	CH	APP
15	11-16-2015	Updates	Var	Var	DRS
14	7-22-2005	Change to 4000A and other updates	Var	Var	DRS

SPECIFICATION NO. 007 : 231 14





THE INSTRUMENT TRANSFORMER STAND MOUNTING SURFACE FOR THE 138 KV CT & PT THAT CENTERPOINT ENERGY WILL PROVIDE FOR THE 138 KV BILLING METERING MUST BE ADJUSTABLE OR USE GRATING TO ACCOMMODATE DIVERSE INSTRUMENT TRANSFORMER MOUNTING BOLT PATTERNS.

NO.	DATE	JOB NO.	REVISION	DRS BY	CH	COR	BC APP
1	7-3-14		CHANGED MOUNTING BASE OPTIONS				

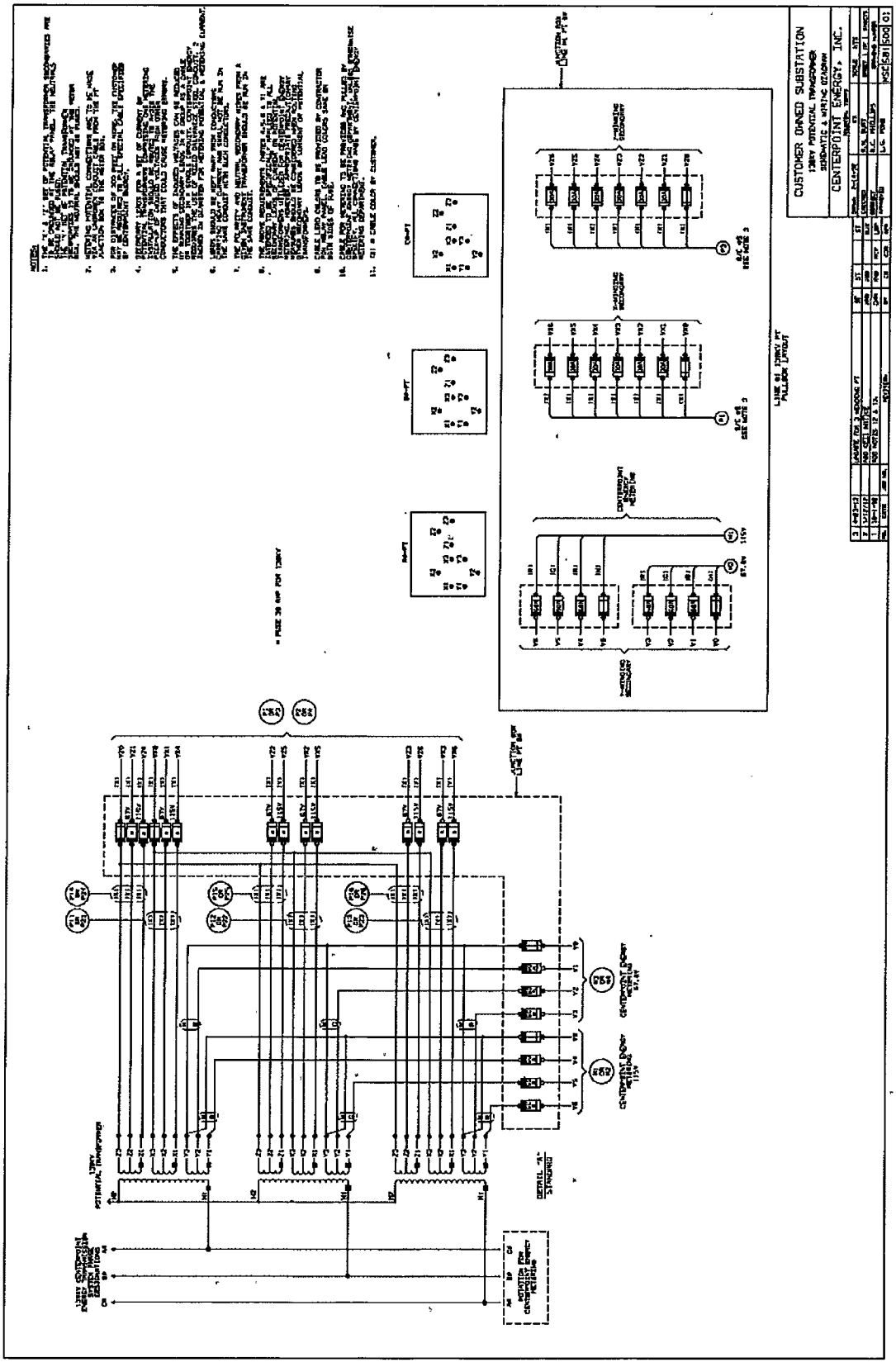
DESIGN CRITERIA
138KV STANDARD INSTRUMENT TRANSFORMER STAND

CENTERPOINT ENERGY, INC.
HOUSTON, TEXAS

DRAWN 1-24-94	REK	SCALE NTS
CHECKED 1-24-94	REK	SHEET 2 OF 2 SHEETS
CORRECT		DRAWING NUMBER
APPROVED		171 190 06

CENTERPOINT ENERGY HOUSTON, TEXAS		
WRITTEN	4/9/74	E. C. Reid
CHECKED	4/10/74	L. G. Pond
APPROVED	7/17/74	C. S. Kayser
	Page 44 of 45	
SPECIFICATION NO.	007 231	14

NO	DATE	ITEMS REVISED	BY	CH	APP
15	11-16-2015	Updates	Var	Var	DRS
14	7-22-2005	Change to 4000A and other updates	Var	Var	DRS



CENTERPOINT ENERGY HOUSTON, TEXAS		
WRITTEN	4/9/74	E. C. Reid
CHECKED	4/10/74	L. G. Pond
APPROVED	7/17/74	C. S. Kayser
	Page **45** of **45**	
SPECIFICATION NO. 007 231 I4		

NO	DATE	ITEMS REVISED	BY	CH	APP
15	11-16-2015	Updates	Var	Var	DRS
14	7-22-2005	Change to 4000A and other updates	Var	Var	DRS

Exhibit "G"
Outage and Clearance Coordination Procedure

Transmission & Substation Outage and Clearance Coordination Procedures

Real Time Operations Department
Revised May 3, 2016

CenterPoint Energy Telephone Numbers

Real Time Operations Department (RTO)

RTO System Controller	281-894-0491 (24 hours)
RTO HOTLINE (Emergency)	281-894-1625 (24 hours)

Outage Scheduling:

Submit request to: OutageRequest@centerpointenergy.com

Outage Questions call 713/207-2714 (Primary) or 713-207-2196

Metering Department:

High Voltage Metering	713-945-6689
Metering Engineering	713-207-7507

Transmission Accounts Representatives:

Gary Dwyer	713-207-3621
Arodi Gonzalez	713-207-3512
Joe (Cliff) Teaster	713-207-2263
Gary Shadwell	713-207-3538
Kevin Sarvis	713-207-5639

1 Introduction

1.1 Applicability

1.1.1 This procedure applies to entities ("the Customers") who own high voltage transmission and/or generation facilities interconnected to CenterPoint Energy Houston Electric, LLC's ("CNP") 69 kV, 138 kV, or 345 kV transmission system. Customer, as used in this document, includes the Customer's authorized contractors or agents. The Customer shall ensure that the provisions in this document are applied to facilities that may be owned by others and that are interconnected to the Customer's facility at the same voltage at which the Customer's facility is interconnected to CNP's transmission system.

1.2 Purpose

1.2.1 The purpose of this document is to facilitate the coordinated operation, outage coordination, maintenance, design, and modification of the Customer's high voltage transmission or generation facilities with CNP facilities.

1.3 Copies of This Procedure

1.3.1 The Customer shall keep copies of this procedure in applicable Customer substation control houses and plant operating centers. This procedure, including forms, may be reproduced.

1.4 Facility Ownership or Name Change

1.4.1 The Customer shall inform CNP of any change in ownership or name of their interconnected facilities or facilities owned by others that are interconnected to their facilities.

1.5 Procedure Conflicts

1.5.1 Any conflicts between this procedure and the Customer's procedures shall be thoroughly discussed with appropriate CNP representatives and resolved before beginning any work.

1.6 Maintenance Responsibility

1.6.1 As specified in Section 10 (Equipment Maintenance) of this document, the Customer is responsible for the operation and periodic preventive maintenance of all substation facilities owned by the Customer except for equipment designated by CNP to be maintained by CNP. The Customer shall not perform preventive maintenance on equipment maintained by CNP.

1.6.2 The Customer shall not perform preventive maintenance on equipment maintained by CNP.

1.6.3 The Customer shall provide necessary equipment outages to allow CNP to perform periodic maintenance on equipment that CNP owns, to repair or

replace equipment that CNP owns, or for testing of certain Customer equipment.

1.7 Equipment Changes

1.7.1 The Customer shall provide all equipment, in accordance with CNP specifications, whenever changes in CNP transmission system, including monitoring and protection devices, require changes in the Customer's interconnected facilities to maintain compatibility.

1.7.2 The Customer shall provide sufficient notice to CNP of any proposed changes to their facilities as specified in Section 9 (Equipment Additions, Replacement, Upgrades and Removal) of this document. This notification shall include providing necessary details, so that CNP can provide comments based upon a general, functional review. The Customer shall not procure any equipment or materials or begin any work until all CNP comments are incorporated or resolved.

1.8 Generation Installation and Operation

1.8.1 Customers desiring to connect generation that will operate in parallel to CNP's transmission system shall file an application with the Electric Reliability Council of Texas ("ERCOT") requesting interconnection in accordance with ERCOT's Generation Interconnection Procedure.

1.8.2 The Customer's generation facility shall be operated in accordance with the ERCOT Protocols and Operating Guides available at:

http://www.ercot.com/mktrules/nprotocols

http://www.ercot.com/mktrules/guides/noperating/cur

1.9 Power Factor

1.9.1 The Customer shall provide suitable apparatus to maintain power factor consistent with the requirements of CNP's Tariff for Retail Delivery Service.

1.10 Voltage Fluctuations

1.10.1 The Customer shall provide suitable apparatus to mitigate voltage fluctuations to reasonable limits should the Customer's equipment cause voltage fluctuations that interfere with CNP's transmission system.

1.11 Emergency Response

1.11.1 In an emergency, the Customer shall switch substation equipment, reduce MW output, change reactive output, or perform other measures as directed by ERCOT or CNP's Real Time Operations Department ("RTO"), to help alleviate the emergency.

1.11.2 CNP may interrupt transmission service to and deliveries from the Customer in the event of an emergency.

1.12 Unplanned Outage Restoration

1.12.1 Customer substations are an integral part of the interconnected transmission system, and CNP personnel may need to perform switching activities in a Customer substation to restore service to other customers in a timely manner. Customer actions that delay such switching activities can result in economic and/or environmental impacts for neighboring customers and pricing impacts for electricity market participants.

1.12.2 The Customer shall follow the applicable provisions as specified in Section 6 (Unplanned Outages) of this document.

1.12.3 Following evaluation of available information, the RTO System Controller shall issue switching orders to restore CNP transmission lines. Available information may include Customer reports, CNP field inspections of transmission lines and substations, lightning data, digital fault recorder data, protective relay data, fault location analysis, and Traveling Wave System ("TWS") fault location.

2 CNP Access to the Customer's Facilities

2.1 Authorized Representative of CNP

2.1.1 An authorized representative of CNP shall have access to the Customer's premises for the purpose of performing switching orders, inspecting CNP's wiring and apparatus, repairing, erecting, removing, or replacing CNP owned equipment, reading CNP meters, performing routine testing of certain Customer equipment, performing inspections of CNP apparatus and switching following an unplanned outage of CNP transmission lines, and for all other purposes related to the interconnection.

3 Communications with CNP

3.1 Real Time Operations Department

3.1.1 RTO operates CNP's transmission system and coordinates the operation of interconnected high voltage facilities. RTO provides routine and emergency switching instructions, issues clearances, and dispatches CNP personnel in response to electrical outages and problems. The Customer shall schedule planned outages with RTO and obtain from RTO switching instructions for any equipment at the Customer's substation that is directly interconnected with CNP's transmission system. Switching in the Customer's facilities that are remote to the Customer's substation directly interconnected with CNP's transmission system does not need to be scheduled. CNP will notify the Customer one or more days in advance if switching is required in the Customer's substation for planned transmission line outages or if the Customer's substation will be placed in a single-ended condition.

3.2 Scheduling Transmission Equipment Outages

3.2.1 CNP's substation equipment outage scheduling and reporting requirements have been developed to support ERCOT requirements for scheduling outages on circuit breakers, bus sections, transmission lines, and transformers that have an operating voltage of 60 kV and higher and to support requirements for scheduling outages of ERCOT Polled-Settlement ("EPS") metering equipment.

3.2.2 The Customer shall contact the RTO Outage Scheduler as shown in Table 1 at the end of this section to coordinate outages in the substation that is directly interconnected with CNP's transmission system. Requests are considered in the order they are received.

3.2.3 Switching Orders, Clearances - The Customer shall follow switching instructions provided by the RTO System Controller prior to initiating any switching to remove equipment from service or return equipment to service in the Customer's facilities. The Customer shall request a clearance from the RTO System Controller when required. A "Switching Order" form and a "Transmission Switching Check List" form are included in this document. The RTO System Controller can be contacted at 281-894-0491.

3.2.4 Unplanned Outages, Emergencies - The Customer shall contact the RTO System Controller as soon as possible whenever any unplanned tripping of any circuit breaker operating at a voltage of 60 kV and higher occurs. An "Unplanned Outage Check List" form is included in this document. In the event of an unplanned generation outage, the Customer or his designated representative shall advise CNP's RTO System Controller as soon as possible. In emergency situations, switching may be performed by a qualified person, which is authorized by the Customer, based upon switching instructions provided by the RTO System Controller. An "Emergency Switching Check List" form is included in this document. The RTO System

Controller can be contacted at 281-894-0491 or at the RTO HOTLINE 281-894-1625.

3.2.5 ERCOT Approvals - The RTO System Scheduler will coordinate a review and notify the Customer whether the outage can be scheduled for the desired day. Transmission line outages and the energization of new equipment require the approval of ERCOT. The Customer shall notify the RTO System Scheduler as soon as possible if an outage is canceled prior to the outage date. The Customer shall immediately notify the RTO System Controller if an outage is canceled on the day of the outage. CNP endeavors to notify the Customer as soon as possible when it is deemed necessary to cancel an outage.

3.2.6 Customer Substation Evacuations – During emergencies requiring evacuation of the Customer's facility, the Customer shall contact RTO prior to the evacuation and provide information regarding the operational status of their substation and associated support facilities, such as substation station service power, battery and battery charger, and ability for CNP to access the substation. The Customer's substation is an integral part of the interconnected transmission system and disabling them has an impact on the electrical grid.

3.3 Transmission Accounts Division

3.3.1 CNP's Transmission Accounts Division ("Transmission Accounts") is responsible for coordinating the Customer's service needs within CNP. Transmission Accounts representatives endeavor to inform the Customer of long range planned switching and projects that may affect the Customer's facility.

3.3.2 The Customer shall notify the Transmission Accounts representative as specified in Section 9 (Equipment Additions, Replacement, Upgrades and Removal) when equipment additions or removals are planned or when high voltage equipment 60 kV and higher or associated equipment requires modification or replacement. The Customer shall contact a Transmission Accounts representative to request current CNP specifications and applicable bills of material for substation equipment additions and replacement.

3.3.3 Transmission Accounts representatives may be contacted for any questions concerning the operation of the Customer's substation. The Transmission Accounts representatives are listed on the CenterPoint Energy Telephone Numbers page in this document.

3.4 Substation and Equipment Identification

3.4.1 CNP assigns a substation name, or a Substation ID of six characters or less, to identify the Customer's substation facility. The Substation ID is also referred to as the six character mnemonic name in which some characters may be blank. CNP mounts signs with the substation name or the Substation