



TRANSMISSION ENGINEERING STANDARDS SUBSTATIONS

500-252 Guideline - Facility Connection Requirements for Bi-Directional Points of Interconnection at Transmission Voltages with Electric Utilities

INITIAL RELEASE DATE: July 28, 2010
LAST REVISION DATE: September 6, 2011

This standard was reviewed and approved by key managers on September 6, 2011. Officer approval of this revision is not required.

1.0 SCOPE

- 1.1 This guide applies to the interconnection of a Utility with the Oncor Electric Delivery Company LLC ("Company") transmission system (69 kV and above) via a new or existing interconnection at which electric power may flow in either direction, in compliance with NERC Reliability Standard FAC-001-0.
- 1.2 This guide is subject to revision at the sole discretion of Company. It is Utility's responsibility to request and comply with the latest revision of this guide.

2.0 DEFINITIONS

- 2.1 ANSI Standards – American National Standards Institute Standards.
- 2.2 ERCOT – Electric Reliability Council of Texas.
- 2.3 ERCOT Requirements - ERCOT Nodal Protocols, ERCOT Nodal Operating Guides, ERCOT Regional Planning Group Charter and Procedures, as well as any other binding documents adopted by ERCOT relating to the interconnection and operation of Utilities in ERCOT. These documents are available on the ERCOT website at <http://www.ercot.com/>.
- 2.4 Good Utility Practice – Shall have the meaning as specified in the PUCT Substantive Rules section 25.5.
- 2.5 IEEE Standards– Institute of Electrical and Electronic Engineers Standards.
- 2.6 NERC Reliability Standards – North American Electric Reliability Corporation Reliability Standards.
- 2.7 NESC – National Electrical Safety Code, approved by the American National Standards Institute.
- 2.8 Point of Interconnection (POI) – The point where the Company's conductors are connected to the Utility's conductors and a change of ownership occurs.
- 2.9 PUCT – Public Utility Commission of Texas.
- 2.10 Regulations – Laws, regulations, Tariff, and agreements applicable to the services provided under this guide.
- 2.11 Tariff – Oncor Tariff for Transmission Service approved by the Public Utility Commission of Texas. Such Tariff is available on the Company website at <http://oncor.com/electricity/tariffs/transrates/>.



TRANSMISSION ENGINEERING STANDARDS SUBSTATIONS

500-252 Guideline - Facility Connection Requirements for Bi-Directional Points of Interconnection at Transmission Voltages with Electric Utilities

INITIAL RELEASE DATE: July 28, 2010

LAST REVISION DATE: September 6, 2011

- 2.12 Utility - Investor-owned electric utility, municipally-owned electric utility, electric cooperative, or river authority owning or operating transmission facilities in ERCOT.

3.0 CONNECTION REQUIREMENTS

3.1 Procedures for Coordinated Joint Studies

Company will perform assessments of the reliability impacts of new Points of Interconnection, or changes to existing Points of Interconnection, in accordance with the Oncor Electric Delivery Transmission Planning Procedures. Such procedures are available upon request.

3.2 Procedures for Notification of New or Modified Facilities

3.2.1 Utility and Company will notify ERCOT of new or modified transmission facilities as required by the ERCOT Nodal Protocols section 3.10.

3.2.2 Company will provide advance notice to ERCOT of its future plans to make such changes in accordance with Company Standard 0107 NOMCR Process. At the time such changes are to be made, Company will obtain approval from ERCOT for such changes and will notify ERCOT when such changes are implemented, both in accordance with Company's Transmission Grid Management Guide T-011 System Change Process.

3.3 Voltage Level

Company's transmission voltages are 69 kV, 138 kV, and 345 kV. The actual voltage for the interconnection will be determined through joint planning discussions between Company and Utility as referenced in Section 3.1 above.

3.4 Breaker Duty and Surge Protection

3.4.1 Utility's transmission voltage breakers on transmission circuits connecting to the POI shall be fully rated to interrupt available fault current.

3.4.2 Utility's transmission voltage facilities directly connecting to the POI should meet the applicable IEEE Standards for direct lightning stroke shielding and surge arrester protection including but not necessarily limited to IEEE Standards 998 and C62.22.

3.5 System Protection and Coordination

3.5.1 Utility will design its facilities to isolate any fault, and to correct or isolate any abnormality that would negatively affect Company's system or other entities connected to Company's system in accordance with ERCOT Requirements, including but not necessarily limited to Section 6 of the ERCOT Nodal Operating Guides, and NERC Reliability Standard PRC-001.



TRANSMISSION ENGINEERING STANDARDS SUBSTATIONS

500-252 Guideline - Facility Connection Requirements for Bi-Directional Points of Interconnection at Transmission Voltages with Electric Utilities

INITIAL RELEASE DATE: July 28, 2010
LAST REVISION DATE: September 6, 2011

- 3.5.2 The protection schemes used at the POI will be determined by Utility and Company based on the topology of the system at the POI in a cooperative effort to achieve system coordination.
- 3.5.3 Prior to commissioning the POI, Utility and Company shall perform a complete calibration test and functional trip test of their respective system protection equipment including communication circuits between facilities.
- 3.6 Metering and Telecommunications
 - 3.6.1 Utility and Company will install metering associated with the POI to the extent required to do so by the ERCOT Requirements.
 - 3.6.2 Telecommunications equipment will be installed as specified in the interconnection agreement.
- 3.7 Grounding and Safety Issues
 - 3.7.1 Utility will ground its transmission voltage equipment at the POI in accordance with applicable IEEE Standards including but not necessarily limited to IEEE Standard 80.
 - 3.7.2 Utility and Company will coordinate switching and tagging of switches at a POI in accordance with a formal procedure to be adopted by the parties.
- 3.8 Insulation and Insulation Coordination

Utility will meet the applicable requirements of the applicable IEEE Standards with respect to insulation, insulation coordination, and electrical clearances for its facilities at the POI, including but not necessarily limited to IEEE Standards 1313.1, 1313.2, and 1427.
- 3.9 Voltage, Reactive Power, and Power Factor Control

Utility will comply with the provisions of the ERCOT Requirements, as they relate to a Utility's obligations with respect to voltage, reactive power, and power factor control, including but not necessarily limited to the following sections of the ERCOT Nodal Operating Guides: 2.7 and the following sections of the ERCOT Nodal Protocols: 3.15.2.
- 3.10 Power Quality Impacts

Utility will comply with section 4.6.2.2 of the Tariff with respect to Electrical Disturbances and any applicable provisions of the interconnection agreement.



TRANSMISSION ENGINEERING STANDARDS SUBSTATIONS

500-252 Guideline - Facility Connection Requirements for Bi-Directional Points of Interconnection at Transmission Voltages with Electric Utilities

INITIAL RELEASE DATE: July 28, 2010
LAST REVISION DATE: September 6, 2011

3.11 Equipment Ratings

Utility's equipment will be rated in accordance with applicable ANSI Standards, including but not necessarily limited to ANSI Standards C84.1 and C92.2, and in accordance with ERCOT Requirements including but not limited to section 3.7.4 of the ERCOT Nodal Operating Guides.

3.12 Maintenance Coordination

Utility and Company will coordinate maintenance of transmission facilities in accordance with the ERCOT Requirements, including but not limited to section 3.1 of the ERCOT Nodal Protocols.

3.13 Operational Issues (abnormal frequency and voltages)

3.13.1 Regarding abnormal voltage issues, Utility will comply with the applicable provisions of the ERCOT Requirements including but not necessarily limited to section 2.7 of the ERCOT Nodal Operating Guides.

3.13.2 ERCOT is responsible for managing frequency, and Utility will participate in the shedding of firm load to support frequency to the extent it is required to do so by the applicable requirements of the ERCOT Requirements including but not necessarily limited to sections 2.6 and 4.5 of the ERCOT Nodal Operating Guides and section 6.5.9.4 of the ERCOT Nodal Protocols.

3.14 Inspection Requirements

Utility shall have the responsibility for inspecting facilities it owns to determine if such facilities have been constructed in accordance with all requirements applicable to such facilities.

3.15 Communications and Procedures during normal and emergency operating conditions

Utility shall have a control center that is staffed on a 24/7 basis with personnel capable of making operating decisions and possessing the ability to effect control of its facilities at each POI.

3.16 Connections with other systems outside ERCOT

If the Utility has facilities that enable it to connect its transmission or distribution system to the Southwest Power Pool (or any other reliability council other than ERCOT), Utility will utilize devices which provide visible open indication as a means of isolating such facilities from ERCOT.

3.17 In conjunction with section 3.1 above, Utility will provide the following information to Company:

3.17.1 Desired in-service date for POI or change to POI.



TRANSMISSION ENGINEERING STANDARDS SUBSTATIONS

500-252 Guideline - Facility Connection Requirements for Bi-Directional Points of Interconnection at Transmission Voltages with Electric Utilities

INITIAL RELEASE DATE: July 28, 2010
LAST REVISION DATE: September 6, 2011

- 3.17.2 Physical location of a new proposed POI.
- 3.17.3 If not at an existing station, Company's transmission line structure number for each structure on either side of the proposed POI if Utility's requested POI is to an existing transmission circuit.
- 3.17.4 Voltage at which interconnection is being requested.
- 3.17.5 One line electrical diagram of proposed Utility facilities, both initial and ultimate.
- 3.17.6 Relay functional diagram of Utility's facilities for Company's review. Relay functional will specifically include all facilities that may impact Company's system and relaying performance.
- 3.17.7 Drawings of proposed physical facilities, including initial installation and any anticipated future additions.
- 3.17.8 Surveyed or detailed site plan showing proposed Utility facilities in proximity to existing Company facilities.
- 3.17.9 As built drawings of facilities at the POI.
- 3.18 In order to establish an interconnection with Company, Utility is required to enter an interconnection agreement with Company. Company will have no obligation to begin design, procurement of materials, construction of Company's facilities, nor make other project specific improvements until Utility and Company have entered an interconnection agreement for the POI or completed other mutually satisfactory contractual arrangements, except as required by a regulatory authority having jurisdiction.
- 3.19 Utility will design and construct its facilities at the POI, and those Utility-owned facilities having an impact on facilities owned by Company, in accordance with the applicable provisions of the following:
 - 3.19.1 ERCOT Requirements
 - 3.19.2 NERC Reliability Standards
 - 3.19.3 ANSI Standards
 - 3.19.4 IEEE Standards
 - 3.19.5 NESC
 - 3.19.6 Tariff
 - 3.19.7 Laws and regulations
 - 3.19.8 Good Utility Practice
 - 3.19.9 Interconnection Agreement



TRANSMISSION ENGINEERING STANDARDS SUBSTATIONS

500-252 Guideline - Facility Connection Requirements for Bi-Directional Points of Interconnection at Transmission Voltages with Electric Utilities

INITIAL RELEASE DATE: July 28, 2010
LAST REVISION DATE: September 6, 2011

- 3.20 Utility may be required to make a contribution in aid of construction to Company for new or modified Company facilities in accordance with the Tariff.
- 3.21 All references herein to other documents shall mean the latest approved version of such documents.
- 3.22 Interconnections will be provided in accordance with the Regulations specified herein. In the event of a conflict between this guide and the Regulations, the Regulations will control.



TRANSMISSION ENGINEERING STANDARDS SUBSTATIONS

500-252 Guideline - Facility Connection Requirements for Bi-Directional Points of Interconnection at Transmission Voltages with Electric Utilities

INITIAL RELEASE DATE: July 28, 2010
LAST REVISION DATE: September 6, 2011

REVISION HISTORY (most recent listed first)

Revision Date	Revision Request Number	Changes Made by	Summary of Changes	Background/Historical Information
9-6-11	S-00175	Jeff Herring	Updated guideline to reflect the transition from ERCOT Operating Guides and ERCOT Protocols to ERCOT Nodal Operating Guides and ERCOT Nodal Protocols.	9-6-11 -- key manager approval; officer approval not required for this revision.
7-28-10	N/A	B. Dietzman	Guidelines created to comply with NERC Standard FAC-001-0 - Facility Connection Requirements.	Initial release and officer approval - 7-28-2010.