



## TRANSMISSION STANDARDS

### 520-107 Guideline - Facility Interconnection Requirements for Bi-Directional Points of Interconnection at Transmission Voltages with Electric Utilities

**INITIAL RELEASE DATE:** July 28, 2010  
**LAST REVISION DATE:** November 21, 2023  
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#### 1.0 Scope

- 1.1 This guide applies to the interconnection of a Utility with the Oncor Electric Delivery Company LLC ("Company" or "Oncor") transmission system (69 kV and above) via a new or existing interconnection at which electric power may flow in either direction, in compliance with the latest version of NERC Reliability Standard FAC-001.
- 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 Qualified Change – This term is defined by ERCOT. If the work requested by the Utility meets the definition of "Qualified Change" that is in effect in ERCOT at the time of the Utility's request, then the Company will treat the requested work as a "Qualified Change" for purposes of this document.
- 2.11 Regulations – Laws, regulations, Tariff, and agreements between Company and Utility applicable to the services provided under this guide.
- 2.12 Tariff – Oncor Tariff for Transmission Service approved by the Public Utility Commission of Texas. Such Tariff is available on the Company website at <http://www.oncor.com/EN/Pages/Transmission-Facility-Connection-Requirements.aspx>.



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- 2.13 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 studies of new interconnections or existing interconnections seeking to make a Qualified Change and their impacts on affected systems

Company will perform assessments of the reliability impacts of new Points of Interconnection, or a requested Qualified Change to existing Points of Interconnection, in accordance with the Oncor Assets Planning Processes Procedures Guide. Such procedures are available upon request.

##### 3.2 Procedures for notifying those responsible for the reliability of affected system(s) of new interconnections or existing interconnections seeking to make a Qualified Change.

3.2.1 Utility and Company will notify ERCOT of new interconnections or existing interconnections seeking to make a Qualified Change to 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 a Qualified Change in accordance with Oncor Transmission Standard 100-001, NOMCR Process. At the time such Qualified Change is to be made, Company will obtain approval from ERCOT for the Qualified Change and will notify ERCOT when a Qualified Change is implemented, both in accordance with Company's SOP-200 New or Modified Equipment and Facilities.

##### 3.3 Procedures for confirming with those responsible for the reliability of affected systems that new transmission facilities or existing transmission facilities seeking to make a Qualified Change are within a Balancing Authority Area's metered boundaries

3.3.1 The ERCOT Nodal Operating Guides Section 5.1, System Modeling Information, requires each Transmission Service Provider, or its Designated Agent, to provide accurate modeling information for all transmission facilities owned or planned by the Transmission Service Provider, including, but not limited to, information necessary to represent the Transmission Service Provider's transmission facilities in any model of the ERCOT Transmission Grid whose creation has been approved by ERCOT.

3.3.2 The ERCOT Nodal Protocols Section 3.10, Network Operations Modeling and Telemetry, provides that ERCOT shall use the physical characteristics, ratings, and operational limits of all Transmission Elements of the ERCOT Transmission Grid and other information from Transmission Service Providers and Resource Entities to specify limits within which the transmission network is defined in the network models that are made available to market participants and used to operate the ERCOT Transmission Grid. ERCOT uses a Network Operations Model Change Request (NOMCR) process to control all information entering the Network Operations Model.



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Any request for any change in system topology or telemetry must receive approval from ERCOT before connecting a new transmission facility or an existing transmission facility that has undergone a Qualified Change.

**3.3.3** Company will provide modeling changes to ERCOT in accordance with ERCOT Nodal Operating Guides Section 5, Network Operations Modeling Requirements, to request changes in system topology or telemetry for a new transmission facility or an existing transmission facility seeking to make a Qualified Change. Company will provide such modeling changes in accordance with Oncor Transmission Standard 100-001, NOMCR Process. ERCOT's approval of a Qualified Change to the Network Operations Model will serve as Company's confirmation that a new transmission facility or an existing transmission facility seeking to make a Qualified Change is within the ERCOT metered boundaries.

#### **3.4 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.

#### **3.5 Breaker Duty and Surge Protection**

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

**3.5.2** 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 limited to, the latest version of IEEE Standards 998 and C62.22.

#### **3.6 System Protection and Coordination**

**3.6.1** 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 limited to, Section 6 of the ERCOT Nodal Operating Guides and NERC Reliability Standard PRC-001.

**3.6.2** 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.

**3.6.3** 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.

#### **3.7 Metering and Telecommunications**



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3.7.1 Utility and Company will install metering associated with the POI to the extent required to do so by the ERCOT Requirements.

3.7.2 Telecommunications equipment will be installed as specified in the interconnection agreement between Company and Utility ("Interconnection Agreement").

#### 3.8 Grounding and Safety Issues

3.8.1 Utility will ground its transmission voltage equipment at the POI in accordance with applicable IEEE Standards, including, but not limited to, the latest version of IEEE Standard 80.

3.8.2 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.

#### 3.9 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 limited to, the latest version of IEEE Standards 1313.1, 1313.2, and 1427.

#### 3.10 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 limited to, ERCOT Nodal Operating Guide 2.7 and ERCOT Nodal Protocol 3.15.2.

#### 3.11 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.

#### 3.12 Equipment Ratings

Utility's equipment will be rated in accordance with applicable ANSI Standards, including, but not limited to, the latest version of 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.

#### 3.13 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.

#### 3.14 Operational Issues (abnormal frequency and voltages)



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

**3.14.2** 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 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.

#### **3.15 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.

#### **3.16 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.

#### **3.17 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 that provide visible open indication as a means of isolating such facilities from ERCOT.

#### **3.18** In conjunction with Section 3.1 above, Utility will provide the following information to Company:

**3.18.1** Desired in-service date for requested POI or for a Qualified Change to POI.

**3.18.2** Physical location of a new proposed POI or the location of the transmission facility that is subject to the requested Qualified Change.

**3.18.3** If not at an existing station, Company's transmission line structure number for each structure on either side of the proposed POI if (1) Utility is requesting a POI that is to an existing transmission circuit, or (2) Utility is requesting a Qualified Change to an existing transmission circuit.

**3.18.4** Voltage at which interconnection is being requested.

**3.18.5** One-line electrical diagram of proposed Utility facilities, both initial and ultimate.

**3.18.6** 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.

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- 3.18.7** Drawings of proposed physical facilities, including initial installation and any anticipated future additions.
- 3.18.8** Surveyed or detailed site plan showing proposed Utility facilities in proximity to existing Company facilities.
- 3.18.9** As built drawings of facilities at the POI.
- 3.19** 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, or 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.
- 3.20** 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:
  - 3.20.1** ERCOT Requirements
  - 3.20.2** NERC Reliability Standards
  - 3.20.3** ANSI Standards
  - 3.20.4** IEEE Standards
  - 3.20.5** NESC
  - 3.20.6** Tariff
  - 3.20.7** Laws and regulations
  - 3.20.8** Good Utility Practice
  - 3.20.9** Interconnection Agreement
- 3.21** 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.
- 3.22** All references herein to other documents shall mean the latest approved version of such documents.
- 3.23** 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.

**Oncor Proprietary Information**



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**Document History**

Change Request Number	Changes Made by	Summary of Changes		
CR-3	Matt Tovar	Minor revision to update language to reflect changes to FAC-001-2 and FAC-002-2 incorporating the 'Qualified Change' definition. Collaborative effort from Transmission Planning, Transmission Services, the RSC team, Transmission Standards, and Legal (Jo Ann Biggs).		
Date	Signature	Name	Title	Department
11/28/2023   2:06 PM PST		Matt Tovar	Manager	Transmission Planning
11/29/2023   3:28 PM PST		Jacob Lewis	Manager	Transmission Services
11/30/2023   10:57 AM PST		Dennis Johnson	Manager II	Transmission Engineering
12/1/2023   8:37 AM PST		Matthew Morrison	Manager	Transmission Standards
12/15/2023   11:52 AM PST		Lance Spross	Director	NERC Compliance

Date	Change Request Number	Changes Made by	Summary of Changes	Approval/Background Information
12/28/2018	S-00292	Robert Holt	Modified the titles in Sections 3.1 and 3.2 to match the wording in NERC Standard FAC-001, Requirements 3.1 and 3.2 and added Section 3.3, Procedures for confirming with those responsible for the reliability of affected systems of new or materially modified transmission facilities are within a Balancing Authority Area's metered boundaries to address NERC Reliability Standard FAC-001, Requirement 3.3 which will become effective on 1-1-19. Revised reference to NERC Reliability Standard FAC-001-1 to read "the latest version of" NERC Reliability Standard FAC-001.	Approved by stakeholders – 12/28/2018.

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09/05/2017		Linsey Ray	Template update and standard number updated from 500-252 to 520-107	
9/10/2014		T. Preuninger	Revised NERC Reliability Standard to FAC-001-1	
9/6/2011	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.	9/6/2011 – Key manager approval; officer approval not required for this revision.
7/28/2010	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.

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