



SOUTH TEXAS ELECTRIC COOPERATIVE, INC.

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Transmission Interconnection Requirements

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- I. Introduction
 - A. Purpose and Scope
 1. This document guides any proposed generation or transmission connection capable of bi-directional flows with South Texas Electric Cooperative, Inc. (STEC) transmission facilities. STEC is a Generation and Transmission cooperative and does not provide electric services to End-Users.
 2. Any proposed interconnection with STEC transmission will be in compliance with NERC and Texas RE Reliability Standards, ERCOT Requirements, and STEC's Transmission Planning Criteria and planning procedures.
 3. Any information contained herein is subject to change from time to time at the sole discretion of STEC.
 4. When transmission interconnections, or ties that have individual characteristics that this document cannot adequately address STEC shall make decisions on a case by case basis, and Utility facilities shall be installed in accordance with applicable laws and regulations, the National Electric Safety Code, and Good Utility Practice.
 5. This document is available upon request and the latest version shall be published on the website www.stec.org.
 - B. Definitions
 1. ANSI Standards (Std.) – American National Standards Institute Standards
 2. CCN – PUC Certificate of Convenience and Necessity
 3. End-User – a retail consumer of electricity
 4. ERCOT – Electric Reliability Council of Texas
 5. ERCOT Requirements – Protocols, Operating Guides, Planning Guide, Charters, Procedures, sample forms, etc. published and approved by ERCOT
 6. FERC – Federal Electric Reliability Council

7. Good Utility Practice – Defined in PUC Substantive Rule 25.5
8. IEEE Std. – Institute of Electrical and Electronic Engineers Standards
9. NERC – North American Electric Reliability Corporation
10. NESC – National Electric Safety Code for existing facilities, the version in use at the time of installation for new facilities, the latest version, C2-2007
11. OCP – Ownership change point(s)
12. PUC – Public Utility Commission of Texas
13. Tariff – The latest PUC approved STEC’s Wholesale Transmission Service tariff is available upon request.
14. Texas RE – Texas Reliability Entity, the NERC Regional Entity for the ERCOT region.
15. Transmission interconnection or “tie” – This includes any connection with another Utility made at voltage greater than 60kV nominal phase to phase that is capable of bi-directional flow including normally open and normally closed facilities.
16. Utility – Entity that owns generation or transmission facilities which are presently connected or requests to be connected to STEC facilities.
17. Other definitions may be found in NERC glossary of terms.

II. Interconnection Agreement

- A. Any interconnection with STEC transmission facilities shall be made according to an Interconnection Agreement executed by STEC and Utility. Upon the initial proposed tie between STEC and Utility, an Interconnection Agreement must be developed and executed.
- B. Interconnect Agreements with generators are based on the ERCOT Standard Generation Interconnect Agreement (SGIA). The SGIA is available from the ERCOT website.
- C. For each transmission interconnection, a facility schedule shall be attached or amended to the Interconnection Agreement. Facility schedules shall establish the following:
 1. Name - A name shall be established for a tie that generally, but not always, coordinates with a station name.
 2. Location – The physical location of the tie shall be adequately defined.
 3. Delivery Voltage – The voltage of the interconnected facilities which shall be made at STEC’s standard transmission voltages; nominally 69kV, 138kV or 345kV measured phase to phase.
 4. MW and MVAR – capacity or demand at the point of connection.
 5. One-line Diagram – A typical electrical one-line diagram indicating the tie facilities to the degree necessary to identify the following:
 - (a) OCP
 - (b) Device identification numbers
 6. Ownership Responsibilities – A summary addressing ownership of tie facilities which may or may not be indicated on the one-line.

7. Operation Responsibilities – A summary addressing operating responsibilities if not performed by the facility owner.
 8. Maintenance Responsibilities – A summary addressing maintenance responsibilities.
 9. Other Terms and Conditions – Ties frequently have unique characteristics that are summarized as agreed upon between STEC and the Utility.
- C. Interconnection agreements may require regulatory filing and such filing shall be made by the party obligated by regulation.
- D. Documentation of interconnection requirements will be made available to users of the transmission system, TexasRE and NERC upon approval of STEC’s General Manager.
- E. South Texas Electric Cooperative is registered with the NERC as a Transmission Operator pursuant to a Coordinated Functional Registration. As such, STEC has a reliability-related need for operational data to perform real-time monitoring. STEC is responsible for monitoring facilities over which it has operational control for facility rating and system voltage limit exceedances and performing operations according to ERCOT protocols and guidelines. To support real-time monitoring of STEC facilities, STEC may require metering and device status information from Utility. The metering and any necessary coordination of Supervisory Control and Data Acquisition (SCADA) is established between STEC and Utility and described in the interconnection agreements. STEC requires at a minimum the following data be provided at the time of interconnection.
- Status of sectionalizing devices and any requested associated alarms
 - Megawatts (MW)
 - Megavars (Mvar)
 - Kilovolts (kV)
 - Frequency (Hz)

All data shall be provided continuously by design. In instances where data exchange capability is lost, STEC and Utility will communicate and coordinate a mutually agreeable resolution until the data exchange capability can be re-established. In addition, at any time, if proposals to make equipment changes or additions to its equipment at an interconnection (including its system protection equipment) or system protection equipment at any other location that may affect the operation or performance of STEC’s facilities at an interconnection the Utility will notify and coordinate with STEC in advance of making such proposed changes. STEC and Utility will communicate with each other with respect to other equipment changes or additions in accordance with the ERCOT Requirements and NERC Reliability Standards. This notification, the interconnection agreements, the facility schedule and ERCOT requirements serve as STEC’s data requirements.

- III. Facility Requirements
- A. Facilities at ties shall, at minimum, be designed and utilized in a manner consistent with National Electric Safety Code and industry standard practices. Responsibility for proper design and utilization is typically held by the facility owner.
 - B. Circuit breakers shall be adequately rated for the expected voltage level, duty cycle, continuous current capacity, and fault interrupting capacity.
 - C. Arrestors shall have the necessary voltage and energy ratings to provide adequate surge protection. Arrestor maximum continuous over-voltage ratings shall be coordinated with the ratings of the protected equipment and other arrestors at the same site. Arrestors typically are applied to:
 - 1. Gas Circuit Breakers – Line side arrestors protecting circuit.
 - 2. Transformers – Arrestors should be installed on all transmission voltage rated windings as close to the transformer as is practical.
 - D. Shielding shall be installed to protect facilities from direct lightning strikes.
 - E. System protection shall include relaying and necessary communications equipment capable of isolating faulted and abnormally operating facilities in a manner that protects the integrity of the transmission network.
 - 1. System protection schemes and settings shall be developed and coordinated by joint effort of STEC and Utility
 - 2. All protection schemes shall be set and function tested during facility commissioning. Testing of relay schemes that encompass equipment owned by both parties shall be coordinated between STEC and Utility.
 - 3. Utility design of system protection must meet or exceed performance in accordance with ERCOT Nodal Operating Guides Section 6.2 and NERC Reliability Standard PRC-001 or other requirements as determined.
 - F. Metering and telecommunications equipment shall be installed as necessary to comply with the Facility Schedule, Interconnection Agreement, ERCOT Nodal Operating Guides Section 7, and as needed by system protection schemes. Maintenance and operational responsibility of devices and equipment shall be defined in the facility schedule. Transmission Service Customer shall coordinate maintenance of metering and telecommunications equipment with STEC.
 - G. Grounding of facilities shall be designed and installed by the facility owner and shall be in compliance with the NESC.
 - H. STEC and Utility are responsible for their own safe work programs. Device switching procedures shall be mutually agreed upon with dispatch responsibilities designated in compliance with the Facility Schedule operating responsibilities or as mutually agreed upon between STEC and Utility.
 - I. Insulators and equipment insulation shall be of appropriate Basic Insulation Level (BIL) rating to coordinate with protective arrestors and the actual or operating conditions.
 - J. Control of voltage, reactive power, and power factor shall be limited to the ratings of the facilities and typically are the responsibility of the facility owner unless mutually agreed upon otherwise and defined in the Facility Schedule.
 - K. Synchronizing of facilities – ERCOT, as regional Reliability Coordinator, directs the physical operation of the transmission system, including circuit breakers, switches, voltage control equipment, and protective relays during

synchronization in accordance with ERCOT Nodal Operating Guides Section 2. STEC may require local and remote synchronization-check indication.

- L. Maintenance shall be scheduled in cooperation between STEC and Utility in compliance with the interconnection agreement and comply with ERCOT Nodal Operating Guides Section 24, Outage Coordination.
- M. Operational issues such as abnormal frequency and voltage shall be addressed by the party responsible for operating the facilities as assigned in the Facility Schedule. Power quality impacts shall be mitigated by the owner of the facility determined to be the root cause of abnormal conditions. Equipment ratings shall be consistent with and capable of the loadings and voltages resulting from analyses performed prior to installation of the tie.
- N. Communications during normal and emergency operating conditions shall be made as necessary between the respective operations centers and the ERCOT Operations Center. Procedures shall comply with directives from ERCOT and ERCOT Nodal Operating Guides Section 2 and Section 4.

IV. Interconnection Initiation

- A. To initiate studies for a tie with another transmission entity, Utility must provide the information required by Section II.B. To initiate studies for a tie with a generation entity, Utility must follow ERCOT Planning Guide Section 5: Generation Resource Interconnection or Change Request.
- B. For a tie with another transmission entity STEC and transmission entity together shall assign responsibility of notifying ERCOT of the tie by including its model in the appropriate ERCOT planning and operational databases and, if required by
ERCOT Regional Planning Group Charter and Procedures, presenting the proposed tie to the ERCOT Regional Planning Group or its successor in practice. For a tie with a generation entity, notification to ERCOT, and any required modeling, will be in accordance ERCOT planning guide section 5: Generation Resource Interconnection or Change Request, and Section 6: Data/Modeling
- C. STEC and Utility shall coordinate load flow and fault analyses necessary to determine proper equipment ratings and determine reliability impact to the transmission network. Results of the analyses shall anticipate voltage levels, and expected real and reactive power flows through the facilities and the connected transmission network. Results of such studies, including dynamic and sub-synchronous resonance studies if deemed necessary by the parties or ERCOT, shall be jointly approved by STEC and Utility prior to executing and attaching a Facility Schedule to an interconnection agreement. The results of any dynamic and sub-synchronous resonance analyses shall be subject to STEC's approval prior to the execution of a Facility Schedule.
- D. Studies and notification of a proposed tie with another transmission entity shall be in accordance with ERCOT Planning Guide Section 3: Regional Planning, Section 4: Transmission Planning Criteria, and the STEC Planning Procedure. Studies for generation interconnections shall be conducted in accordance with ERCOT Planning Guide Section 5: Generation Resource Interconnection or Change Request.

Version History

version	date	action	change	reviewed / approved
0	10/10/10	new	New: initial draft prepared – open for review	CA
1	1/31/2011	new	Revised draft approved FAC-001	CA
2	1/11/2016	revision	Revised applicable ERCOT Planning and Operating Guide references	CA
3	12/30/2016	revision	Revised adding data specifications TOP-003	CA