



Entergy®

ENERGY FACILITY CONNECTION REQUIREMENTS March 2007

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TABLE OF CONTENTS

1.	INTRODUCTION	3
2.	GENERAL REQUIREMENTS.....	4
	BOTH ENTERGY AND NON-ENTERGY REQUIREMENTS APPLY	4
	INSPECTIONS	4
3.	PLANNING REQUIREMENTS	4
	LARGE GENERATION CONNECTIONS, 20 MW AND GREATER	4
	SMALL GENERATION CONNECTIONS, LESS THAN 20 MW	ERROR! BOOKMARK NOT DEFINED.
	TRANSMISSION CONNECTIONS/MODIFICATIONS	5
	<i>Planning</i>	6
	<i>Design</i>	6
	<i>Operations and Maintenance</i>	7

1. INTRODUCTION

All new connections or modifications to existing connections to the Entergy bulk transmission system, including Entergy self-built facilities, at 69 kV or above, must be in compliance with all applicable Entergy Transmission Standards. Such connections must comply as well with all applicable Planning, Operations and Cyber Reliability Standards and Measurements of the Federal Regulatory Energy Commission's (FERC's) approved Electric Reliability Organization (ERO), which is currently the North American Electric Reliability Corporation (NERC), or its successor, and with all SERC Reliability Corporation (SERC) Supplements to the NERC Reliability standards. The NERC standards and SERC Supplements that are relevant to this document are primarily those which SERC classifies as Planning Standards.

NERC Standard FAC-001-3 states that its purpose is "To avoid adverse impacts on reliability, Transmission Owners must establish facility connection and performance requirements." The SERC Supplement to FAC-001-3 (SERC Supplement) further details the Requirements of FAC-001-3, presenting what information must or should be available to the interconnecting customer, and to the customer that is modifying facilities connected to Transmission, including Entergy's own facilities.

This document is linked to and is intended to be used in conjunction with the **Entergy Facility Connection Requirements Website** (the Website) along with the Excel file, *Entergy Facilities Connection Spreadsheet.xls* (the Excel Spreadsheet) which is linked to that website. Together, the website, the Excel file and this document address the full requirements of the NERC Standard and SERC Supplement. The Website explains the scope of the project and guides the reader to the relevant NERC and SERC sources. The Excel file lists the Entergy and other industry standard documents that provide the required, detailed interconnection information the SERC Supplement advises. Some documents referenced are confidential to Entergy, and instructions for accessing those Entergy confidential documents are included on the Website.

The purpose of this document is to fulfill the guidelines of the SERC Reliability Corporation (SERC) Supplement. The Supplement requires that Transmission Owners include a description of the procedures for the study of new facilities and their impacts on the interconnected transmission system including any Affected Systems external to Entergy's system. The Supplement also states that the Transmission Owner should address in its planning requirements the requirement for all facility owners or operators to notify Entergy Transmission of any modifications to the interconnected facilities and the requirement of facility owners to provide Entergy Transmission with updated data to be used for modeling the facility.

The required Self Application Statement, other required Statements and the references to the detailed sources of information are included on the Website or in the Excel file.

2. GENERAL REQUIREMENTS

These requirements and those of the documents listed in the Excel File shall apply to all new generation, transmission and end-use facilities connected to the Entergy Transmission System. Additionally, these requirements shall apply to all modifications of existing facilities in the categories mentioned above. These shall also apply to co-generation entities that perform changes in their normal operations, which result in a change in the transmission supplier's obligation to serve.

Both Entergy and Non-Entergy Requirements Apply

All new or modified generation, transmission, or end-use facilities shall comply with all applicable codes, standards, government regulations, environmental regulations, siting requirements, contracts, operating agreements, and tariff requirements related to the facilities identified above. These include, but are not limited to, all NERC Reliability Standards and Regional Reliability Organization Supplements to those standards that are applicable to the particular Functional Entity, as defined by NERC.

Inspections

Facilities which are connected to the Entergy transmission system must be inspected by appropriate Entergy personnel and certified as meeting these facility interconnection requirements prior to being placed in service. Facilities must be made available for subsequent inspections as needed.

The design, construction, and maintenance of newly built and of modified connected facilities must be coordinated with the facility owner.

3. PLANNING REQUIREMENTS

Generator Interconnections

The process of connecting generation facilities to the Entergy Transmission Systems is defined by FERC Orders.

Generator additions are controlled in detail by FERC Order 2003-A, -B,-C (Order 2003) and any successor revisions of the Order. Order 2003 contains two sections that are referred to as the LGIP, Large Generator Interconnection Process, and the LGIA, Large Generator Interconnection Agreement. MISO has incorporated the LGIP and LGIA into its Open Access Transmission Tariff (OATT) as Attachment X. See MISO's OASIS site, <http://www.oatiaoasis.com/MISO/index.html>

The Process of interconnection of generation to the Entergy system is administered by MISO; however, the responsibility to perform specific tasks will be shared by the MISO and Entergy. See Attachment X of the MISO OATT.

Entergy and the MISO will develop a Base Case model used in the analyses, which includes transfer capabilities of the system based on committed transmission service agreements as well as pending requests for transmission service and interconnection.

MISO will perform a Feasibility Study at the option of the interconnecting customer. This study is a preliminary evaluation of the system impact and cost of interconnecting the generation facility to the transmission system and includes a fault duty study and load flow study.

MISO will perform the System Impact Study which is an engineering study that evaluations the impact of the proposed interconnection on the transmission system and includes a fault duty analysis, stability analysis and a load flow analysis.

Entergy will perform a Facilities Study which is a study conducted to determine a list of facilities, the cost of those facilities and the time required to interconnect the generator to the transmission system.

Transmission Connections/Modifications

Entergy participates in the SERC Engineering Committee Near Term Power Flow Study Group (NTSG) and SERC Engineering Committee Long Term Power Flow Study Group (LTSG). The Entergy sub region is represented by AECI on the MRSWS (MRO-RFC-SERC West-SPP). This is a new study group under NERC Eastern Interconnection Reliability Assessment Group (ERAG). All regional studies (including SERC NTSG and SERC LTSG under ERAG are coordinated by using the same models. Entergy also participates on a SEAMS (with TVA, Southern Company & SMEPA) team for inter-sub regional studies, and participates on the SPP Transmission Working Group (similar to the SERC RRS).

Parties planning transmission additions that affect the Entergy Transmission system, whether or not they are directly connected to Entergy Transmission, are obligated to include Entergy in its planning process.

Entergy's additions of self-build Transmission facilities may be generated by reliability studies related to NERC Reliability Transmission Planning Standards TPL-001 to -004, or they may be studied at the request of an interconnecting Transmission Owner, by a Regulator, or by an Independent Power Producer, or end-user. Economic studies may also lead to transmission additions and/or modifications.

End-User Connections/Modifications

General

These requirements shall apply to all new and end-use facilities connected to the Entergy transmission system. Additionally, these requirements shall apply to all modifications of existing facilities or any change in the customer operations or facilities that result in a change in Entergy's obligation to serve.

The reference documents associated with this type of connection are identified in the Excel file.

Notification of the intent to connect new facilities or to modify existing facilities already connected to the Entergy transmission system should be provided through the Large Project Services Group otherwise the customer should visit <https://goentergy.com/contact-us/>

Planning

Entergy representatives will provide a list of data requirements needed from the customer regarding the new facility or modifications to the existing facility.

Transmission planning studies must be performed as necessary to determine the impact on the interconnected transmission system when connecting new and/or modified end-use facilities.

Load Flow Analysis

A load flow analysis is conducted by establishing a mathematical model of the power system and simulating certain specified operating conditions. The results predict power flow magnitudes and voltage levels under the loss of any individual system element. The load flow analysis enables the prediction of equipment overloads and the determination of excessive voltage drops, which may be encountered.

Short Circuit Analysis/Breaker Rating Analysis

A short circuit (i.e., fault current) analysis may be performed to determine the effect that the new generation will have on the system fault currents. These data will be used to evaluate the impact of the generation on the fault duty (i.e., interrupting capability or rating) of the previously installed equipment such as circuit breakers and switches.

Transient Stability Analysis

A transient stability analysis may be performed to determine the transmission system's response to a sudden change in the state of the system due to faults on the system and unit outages. Specifically, the analysis will evaluate the transmission system in the area of the added generation as well as the generator's response following faults in the system.

Design

The design for end-use facilities shall comply with all the requirements identified in the Facility Connection Requirements and must be in compliance with the aforementioned documents. Additionally, all the requirements identified, as a result of the transmission studies, shall be incorporated into the design process. These requirements may include the following issues:

- Supervisory control and data acquisition
- Telemetry and metering
- Equipment ratings
- Short circuit conditions

- System protection and other controls
- System grounding

These design criteria can be found in the Entergy transmission standard SL0002 rev 04, "User Designed and Built Substation Design Guide"

Operations and Maintenance

All interconnecting facilities shall be maintained and operationally tested in order to meet current requirements as specified by the System Operator.

These requirements may include the following issues:

- Communications during normal and emergency conditions
- Voltage and power factor control
- Reactive power requirements
- Maintenance coordination
- Responsibilities during emergency conditions
- Abnormal frequency and voltage operation
- Inspection requirements

These requirements are covered in the following documents:

- Typical Interconnection Agreement
- Typical Operating Agreement for Customer-Owned Substations
- Standard for Customer Built Substations

In addition to the above requirements, power quality concerns of end-use facilities are addressed by Entergy's transmission standard SL1904 rev 01, "Voltage Fluctuations Operations Guideline," which references the "Customer Equipment Specification Parameters" document.