



Working to Perfect the Flow of Energy

PJM/Transmission Owner NERC Standards Compliance Matrix

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Introduction

NERC Reliability Standards

NERC reliability standards define the reliability requirements for planning and operating the North American bulk electric system. The *Reliability Functional Model* defines the functions that need to be performed to ensure the bulk electric system operates reliably, and also explains the relationship between and among the entities responsible for performing the tasks within each function. This Model provides the foundation and framework upon which NERC develops and maintains the applicability of its reliability standards. These reliability standards establish the requirements that the responsible entities performing the functions defined in this model are measured against to ensure reliable operation of the bulk electric system is maintained.

Functional Registration

PJM has registered with RFC and SERC, in accordance with the registration process, as the entity responsible for the obligations of the following functions defined within the NERC Reliability Functional Model:

- Balancing Authority (BA)
- Planning Coordinator (PC)
- Reliability Coordinator (RC)
- Resource Planner (RP)
- Transmission Operator (TOP)
- Transmission Planner (TP)
- Transmission Service Provider (TSP)

PJM Member companies have registered themselves with RFC and SERC in accordance with the registration process, based on their own determination of their responsibilities for the obligations of NERC Reliability Functional Model entities in ensuring the reliable operation of the bulk electric system. Most PJM Member Transmission Owners¹ (Member TOs) have registered with RFC and/or SERC, in accordance with the registration process, as Transmission Owner (TO), and may have also registered for other functions as they deemed appropriate.

The following sections summarize the roles of the TP, TOP and TO as defined in the *NERC Reliability Functional Model*² and the applicable NERC reliability standards.

Transmission Planner Responsibilities

The registered TP is responsible for the development of a plan (generally one year and beyond) for the reliability of the interconnected Bulk Electric System within its portion of the Planning Coordinator Area. This includes maintenance of transmission system models; collection of

¹ Member TO for the purpose of this document is defined as PJM Member companies who are signatories to the Transmission Owners Agreement. These companies are listed in Attachment 1.

² *NERC Reliability Functional Model*, Version 3, Approved by Board of Trustees February 13, 2007



transmission and generation facility ratings and load characteristics; identification of potential transmission system deficiencies and alternative plans that mitigate those deficiencies; and monitoring/reporting on implementation of the transmission expansion plan.

The TP coordinates with its Planning Coordinator, other Planning Coordinators, and other Transmission Planners within its Planning Coordinator Area on transmission expansion plans. This coordination includes the evaluation of transmission expansion plans with Transmission Service Providers, Transmission Owners, Reliability Coordinators, Planning Coordinators, Resource Planners, and other Transmission Planners as well as the coordination with Distribution Providers, Transmission Owners, Generator Owners and Load Serving Entities in the evaluation and plans for all requests required to integrate new (End-use Customer, generation, and transmission) facilities into the Bulk Electric System.

Transmission Operator Responsibilities

The registered TOP is responsible for ensuring that the real-time operating reliability of the transmission assets within a Transmission Operator Area is monitored for all reliability-related parameters within the Transmission Operator Area; monitoring the status of transmission line protective relaying systems, under-frequency load shedding systems, and under-voltage load shedding systems. The function also requires that system operating limits are developed and that the system is operated within those limits including any established Interconnection Reliability Operating Limits.

In addition, the TOP must ensure that emergency procedures are developed and implemented when required and that restoration plan be implemented if and when needed. This necessitates that the TOP perform reliability analysis (actual and contingency) for the Transmission Operator Area and that the system be adjusted to control devices within the transmission area for those interchange transactions that include these facilities in the transmission path. The TOP also deploys reactive resources to maintain transmission voltage within defined limits. The Transmission Operator is responsible for the real-time operating reliability of the transmission assets under its purview and must take controlling actions to ensure that its Transmission Operator Area operates reliably. The Transmission Operator must determine the amount required and must arrange for reliability-related services from Generator Operators to ensure voltage is supported (e.g., reactive supply from generation resources) in coordination with or at the direction of the Reliability Coordinator.

Transmission Owner Responsibilities

The registered Transmission Owner owns and maintains transmission facilities; develops interconnection agreements; establishes ratings of transmission facilities; and installs and maintains transmission facilities and rights-of-way according to good utility practice. The TO coordinates transmission facility changes with Transmission Planners and the Planning Coordinator. The TO coordinates requests from Generator Owners, other Transmission Owners, and Load-Serving Entities desiring to connect with the bulk electric system. The TO



develops operating agreements and procedures with the Transmission Operators and Reliability Coordinators. The TO may recommend transmission expansion plans and changes to the Planning Coordinator and Transmission Planners and provides construction plans and schedules to the Transmission Operator and Transmission Planner for transmission facilities identified in the transmission expansion plan.

Purpose and Use of the Assignment Matrix

The duties and responsibilities of PJM and its member companies are defined in the PJM Operating Agreement (OA), the Transmission Owners Agreement (TOA), the Open Access Transmission Tariff (OATT) and various PJM Manuals. PJM has the responsibility for planning and directing the operation of PJM Transmission Facilities in accordance with applicable NERC, Regional, and PJM standards.

The PJM/TO Assignment Matrix (“the Matrix”) includes requirements from the NERC Standards that apply to the TP, TOP and TO functions. This matrix applies only to the facilities for which PJM is the registered TOP and TP. The Matrix shows the tasks performed by the Member TO in order for PJM to fulfill the requirements and cites the specific agreement or manual where those tasks are prescribed. Where the TO is shown as a responsible entity the matrix shows the tasks PJM will perform in order for the Member TO to be compliant. The Matrix does not apply to facilities planned and/or operated by entities other than PJM.

The Matrix is intended to clarify the assignment of tasks based on the unique relationship between PJM and its Member TOs as defined in the TOA and OA and described in detail in various PJM Manuals. The Matrix does not create any new obligations for PJM or its members, but is simply a cross-reference to indicate where the assignment of various reliability tasks is documented.

Both PJM and its Member companies have many obligations under the NERC standards that are not included in the Matrix. The scope of this document is limited to the TP, TOP and TO functions based on the unique relationship between PJM and its Member TOs under the TOA. It is not intended to define assigned or supporting responsibilities for the other functional model entities. PJM accepts the accountability for the requirements for BA, PC, RC, and RP in their entirety, with no assignment of any of these requirements back to the member transmission owners. However, in performing these other functions, PJM may require support from the registered Distribution Provider, Load Serving Entity, Purchasing/Selling Entity, Generation Owner, Generation Operator, and others, within PJM. Nothing within this document or the attached matrix relieves a PJM member of their responsibilities under the OA, TOA, or PJM Manuals.

This document and any future revisions thereto will be posted on the [Transmission Owners Agreement-Administrative Committee](#) page of the PJM website.



Applicability

The NERC Functional Model requires that “all transmission elements of the bulk electric system are the responsibility and under the control of one and only one transmission planner, planning authority, and transmission operator.”³ Thus it is essential to clearly define for which facilities PJM is the registered TOP and TP for the purpose of meeting NERC criteria.

PJM directs and controls the planning and operation of PJM Transmission Facilities as defined in the Transmission Owners Agreement⁴ and the PJM Operating Agreement⁵.

NERC defines the bulk electric system as follows: “As defined by the Regional Reliability Organization, the electrical generation resources, transmission lines, interconnections with neighboring systems, and associated equipment, generally operated at voltages of 100 kV or higher.”⁶ FERC Order 693 endorses the NERC definition and directs NERC to provide by June 14, 2007 “a complete set of regional definitions of the bulk electric system and any regional documents that identify critical facilities to which the Reliability Standards apply.”⁷

Once the ReliabilityFirst and SERC definitions of the bulk electric system are established, PJM, in concert with its Member TOs, will create a list of PJM Compliance Facilities which will define the specific PJM Transmission Facilities that are considered part of the bulk electric system. This list will reflect the facilities for which PJM is the registered TOP and TP.

Two Member TOs, AEP and Dayton, have registered as TOP and TP in RFC; Allegheny Power has registered as TOP in RFC; Dominion has registered as TP in SERC. Where there is overlap between the responsibilities assumed by PJM and one of these Member TOs, PJM will work with that member to ensure that all compliance obligations are met and that compliance activities are properly coordinated.

³ *NERC Rules of Procedure*; Effective January 18, 2007; Section 500, Organization Registration and Certification

⁴ *PJM Consolidated Transmission Owners Agreement*; Article 1 – Definitions; Paragraph 1.27, Transmission Facilities

⁵ Amended and Restated Operating Agreement of PJM Interconnection, LLC; Article 1 – Definitions; Paragraph 1.44, Transmission Facilities

⁶ *NERC Glossary of Terms Used in Reliability Standards*; Approved by NERC Board of Trustees November 1, 2006

⁷ Mandatory Reliability Standards for the Bulk-Power System, Order No. 693, 18 CFR Part 40 (March 16, 2006) at ¶ 75-77.



Description of Matrix Content

The Matrix provides the following information:

Column Headings

The matrix is organized into the following columns:

- Column A - Standard number (including version number)
- Column B - Requirement number
- Column C - Requirement text
- Columns D thru F – Functional Entity Responsible for Requirement
- Column G – Assigned Tasks
- Column H – Reference Documents

Requirements Included

The matrix includes requirements found in currently approved NERC standards and, *Reliability First* standards for which the TO, TOP and/or TP have responsibility. Within the SERC region, the SERC organization has developed interpretations of selected NERC standards which are called SERC Supplements. These interpretations provide regional guidelines for the implementation of the NERC standards. In and of themselves, the SERC Supplements do not add additional standards or requirements. The NERC requirements matrix found on the [Reliability Standards](#) page of the NERC website was used as the source document.

Assigned Tasks and References

The information contained in the “Assigned Tasks” column describes specific tasks for which either PJM or the Member TO is responsible to ensure the other’s compliance with the corresponding standard requirement. The corresponding reference cites the specific OA, TOA or PJM Manual reference documenting each party’s commitment to perform those actions for the other. An “N/A” in this column means that PJM’s compliance with the requirement is not dependent on a specific Member action. References to PJM documents that describe PJM and Member TO responsibilities are provided in the “Reference Documents” column.



Overview of Applicable Standards

The following groups of standards are included in the matrix. This section describes the general intent of the standards groups and how they apply to PJM and its Member TOs.

Standard Group		Summary
BAL	Resource & Demand Balancing	Most of the standards in the BAL group apply to the Balancing Authority (BA) function. BAL-005 requires the TOP to ensure that transmission facilities are included within the metered boundary of the BA area.
CIP	Critical Infrastructure Protection	The CIP standards define the requirements for protection of critical assets including physical and information assets. Each entity is responsible for its own requirements and there is no assignment within these standards.
COM	Communications	The COM standards define the required communication systems and protocols. While the requirements apply to the TOP, the Member TO's must maintain the systems and follow the protocols defined in PJM Manual 1, Control Center Requirements.
EOP	Emergency Preparedness and Operations	The EOP standards establish requirements for planning and response to system emergencies. The requirements apply to the TOP and PJM Manual 36, Emergency Operations requires Member TOs to maintain restoration plans and follow PJM directives.
FAC	Facilities Design, Connection & Maintenance	The FAC standards apply primarily to the TO function. Coordination of interconnection activities is assigned to PJM by virtue of the PJM OATT and as defined in Manual 14A-E.
INT	Interchange Scheduling and Coordination	Most of the INT standards apply to the BA function. INT-004 assigns responsibilities to the TOP for which the Member TO must follow PJM directives in accordance with Manual 3, Transmission Operations.
IRO	Interconnection Reliability Operation and Coordination	The IRO standards apply primarily to the Reliability Coordinator function but do have requirements of the TOP for which the Member TO must follow PJM directives in accordance with Manual 3, Transmission Operations.
MOD	Modeling, Data and Analysis	Most of the MOD standards apply to the Regional Reliability Organization (RRO) function. MOD-010 and MOD-012 require both the TO and TP to provide information to the RRO.
PER	Personnel Performance, Training and Qualification	The training and qualification requirements defined in the PER standards apply to PJM as the TOP, BA and RC. Member TOs are required to meet PJM System Operator Certification as defined in Manual 1.



Standard Group		Summary
PRC	Protection & Control	The PRC standards define the requirements for coordination of protection schemes. Requirements are assigned to both the TO and the TOP and there is no assignment of tasks within these requirements.
TOP	Transmission Operation	The TOP standards apply to PJM as the TOP. Member TOs must follow PJM directives in accordance with Manual 3, Transmission Operations and various other PJM Manuals.
TPL	Transmission Planning	The TPL standards require the TP to perform analysis of the base case using data provided by the TO under the MOD standards. There is no assignment of tasks within these standards.
VAR	Voltage & Reactive Control	The VAR standards apply to PJM as the TOP. Member TOs must follow PJM directives in accordance with Manual 3, Transmission Operations.



Link to PJM/TO NERC Standards Compliance Matrix

The current version of the Matrix can be found on the PJM website on the [Transmission Owners Agreement-Administrative Committee](#) page of the PJM website under “Postings”.

Maintenance of the Matrix

The original version of the Matrix was developed based on the NERC Reliability Standards, Reliability *First* standards and SERC Supplements in effect as of March 1, 2007. The Matrix will be revised under the procedure set forth below to ensure it remains current as new standards continue to be developed and existing standards are revised. Likewise, as revisions are made to PJM documents (TOA, OA, Manuals, etc.) the references in the Matrix may need to be updated. The PJM NERC & Regional Coordination Department will be responsible to maintain the Matrix as a current reference document.

Changes and Additions to Standards and/or PJM Manuals

When new NERC standards are issued or existing standards are revised, or when revisions to PJM documents are issued, the Manager – NERC & Regional Coordination will ensure that these changes are tracked and on a semi-annual basis will:

- Ensure that the Matrix is reviewed and changes identified since the last revision are incorporated
- Review the proposed changes with the TOA-AC
- Obtain TOA-AC approval of the proposed change
- Post the updated matrix to the [Transmission Owners Agreement-Administrative Committee](#) page of the PJM website
- Notify the PJM Operating Committee and Planning Committee of the update

Periodic Review

To ensure the Matrix remains current, the TOA-AC will initiate a review of the Matrix and this basis document by a team of PJM and TO representatives on a frequency to be determined by the TOA-AC.



Attachment 1 – Signatories to the Transmission Owners Agreement

Monongahela Power Company, The Potomac Edison Company and West Penn Power Company, all doing business as Allegheny Power

American Electric Power Service Corporation on behalf of its operating companies: Appalachian Power Company, Columbus Southern Power Company, Indiana Michigan Power Company, Kentucky Power Company, Kingsport Power Company, Ohio Power Company and Wheeling Power Company

Commonwealth Edison Company and Commonwealth Edison Company of Indiana, Inc.

Dayton Power and Light Company

Virginia Electric and Power Company (Dominion Virginia Power)

Public Service Electric and Gas Company

PECO Energy Company

PPL Electric Utilities Corporation

Baltimore Gas and Electric Company

Jersey Central Power & Light Company

Metropolitan Edison Company

Pennsylvania Electric Company

Potomac Electric Power Company

Atlantic City Electric Company

Delmarva Power & Light Company

UGI Utilities, Inc.

Allegheny Electric Cooperative, Inc.

CED Rock Springs, LLC

Old Dominion Electric Cooperative

Rockland Electric Company

Duquesne Light Company

Neptune Regional Transmission System, LLC