

## **I.A. INTRODUCTION**

The PJM TSDS Technical Requirements (“Technical Requirements”) were formalized by the PJM Transmission and Substation Design Subcommittee (“TSDS”) to conform in part to NERC’s Planning Standard I.C, which was issued in September 1997. They are intended to apply to facilities proposed/requested in accordance with the process defined in the Open Access Transmission Tariff (“OATT”). They are intended to provide common PJM transmission provider criteria concerning design philosophy, design requirements and operating practices for Generation Facility, Transmission Facility, and End-User Facility (Collectively referred to herein as the “Interconnection Customer”) connection requirements and to allow an Interconnection Customer to evaluate the requirements, as applicable to the Transmission System, on a consistent basis. Transmission Owners (“TO’s”) will have additional more specific requirements based on the needs of their systems and to ensure the reliability of the Transmission System that must also be met and that shall not be limited by these Technical Requirements.

The user of these Technical Requirements must also look to other documents, including PJM Manuals, such as Manual M-14 “Generator Interconnections and Operations”, for guidance in certain topics identified in NERC’s Planning Standard I.C and for completion of their facility’s connection requirements. For example, the Interconnection Customer should refer to the PJM Relay Subcommittee Philosophy and Design Standards document for guidance concerning “System Protection and Other Controls”. In addition the Interconnection Customer’s facility connection must comply with all applicable codes, standards, federal and state regulations, environmental regulations, siting requirements, contracts, operating agreements, FERC tariff requirements and Good Utility Practices. While this document contains certain technical requirements for electrical power apparatus (Section V), the Interconnection Customer should use the TO’s detailed electrical power apparatus specifications for purchase of equipment that will be owned and/or operated and maintained by the TO.

The Technical Requirements, which address both substations and transmission lines, are organized in the following major sections. Transmission System Design Criteria (Section II) provides specific design criteria applicable to 230kV and above. Section III provides factors to consider in determining acceptable Transmission System bus configurations. Spare Equipment Philosophy (Section IV) addresses the impact of spare equipment on reliability and availability. Section V provides general requirements for the design, application, operation and maintenance, and commissioning of high-voltage equipment and systems and Section VI provides detailed rating guides for high-voltage electrical equipment.

Capitalized terms not defined in the body of the PJM TSDS Technical Requirements shall have the meanings set forth in Annex B or in the Open Access Transmission Tariff.

## **I.B. DESIGN PHILOSOPHY**

All facility connection designs must, as a minimum, account for single contingency (N-1) failures and:

- Minimize the magnitude and duration of system outages in the event of a component failure,
- Minimize widespread system effects on voltage, dynamic stability, etc., that occur as a result of an unplanned event,
- Facilitate the isolation of failed component(s) while maximizing the amount of transmission system equipment that can remain in service.

- Include plans for expeditious restoration of failed facilities/components (dedicated spare equipment, etc.)

Some less specifically defined, but important factors that are to be considered in determining the overall acceptability of a proposed design include, but are not limited to:

- Constructability (minimizing number and duration of construction outages)
- Criticality of existing facilities impacted by the proposed interconnection
- Operational complexity
- Reliability for loads (locally and elsewhere)
- Reliability for lines and power flow
- Component reliability
- Generation interfaces
- Line maintenance
- Substation zone and component maintenance
- Capital cost
- O&M cost
- Safety in construction, operation and maintenance
- Adaptability/Expandability