

Sierra Pacific Resources

Technical Requirements for Interconnection to the Transmission Grid

A. Introduction

The Sierra Pacific Resources Transmission Business Line (TBL) has prepared this **Technical Requirements For Interconnection To The Sierra Pacific Resource's (either Nevada Power or Sierra Pacific Power (Sierra)) Transmission Grid (Grid)** document to identify technical requirements for connecting transmission lines, loads and generation resources into the Grid. The purpose of these requirements is to assure the safe operation, integrity and reliability of the Grid. Contractual matters, such as costs, ownership, scheduling, and billing are not the focus of this document. Transmission Services are not addressed by this document either. All requests for transmission services must be made independent of the interconnection requests pursuant to the terms of Sierra Pacific Resources' prevailing Transmission tariffs. Please refer to the Sierra's web site, www.sierrapacific.com or contact TBL Account Executive for more information on the interconnection process, business practices, contractual matters or transmission services.

In this document, the terms Sierra, Nevada Power, Control Area, Grid, Company, Company's, TBL, etc. all refer only to the Sierra Pacific Resources Transmission Business Line (TBL) and transmission system, not to the Sierra Pacific Resources' Power Business Line (PBL). Interconnection proposals from the PBL are handled in the same manner as those from any other Requester. The term 'Requester' describes the utility, developer or other entity that requests a new or modified connection for a line, load or generation resource.

Requests to interconnect generating resources or loads (Projects) are typically submitted by the Requester but may be in conjunction with an interconnecting utility. Sierra evaluates and studies each Project individually, as it was described in the request and determines impacts to the Grid facilities. Specific interconnection requirements are then provided back to the Requester. In general, costs for integrating the project are borne by the Requester.

Interconnection evaluations and studies may include a preliminary plan of service for physical and communications interconnections. Physical laws that govern the behavior of electric systems do not recognize boundaries of electric facility ownership. Therefore the electric power systems must be studied, without regard to ownership, to develop a properly designed interconnection. The completed review may include studies of short-circuit fault duties, transient voltages, reactive power requirements, stability requirements, harmonics, safety, operations, maintenance and prudent electric utility practices. This document also addresses interconnection through another utility that may not result in a direct interconnection to the Grid. Through telemetering and communications interconnections, Sierra can incorporate loads, generators or transmission lines into the Control Area. This type of interconnection, which uses dynamic signals and telemetering, may transfer ancillary services from one party to another.

This document is not intended as a design specification or an instruction manual and the information presented is expected to change periodically based on industry events and evolving standards. Technical requirements stated herein are consistent with Sierra's current internal practices for system additions and modifications. These requirements are generally consistent with principles and practices of the **North American Electric Reliability Council (NERC)**, **Western Electric Coordinating Council (WECC)**, **Northwest Power Pool (NWPP)**, **Institute of Electrical and Electronics Engineers (IEEE)** and **American National Standards Institute (ANSI)**. Standards of the above listed organizations are also subject to change. The most recent version of such standards shall apply to each interconnection request.

Much of the information in this document refers to the Sierra Resources' Large Generator Interconnection Procedures (LGIP) as outlined in the Company's Open Access Transmission Tariff (OATT). These standards are used as a basis for completing the required work with specifics for each installation developed.

Requesting Interconnection of New Facilities

Interested parties may request interconnection of a transmission line, load or generation facility to the Grid. Inclusion of such facilities within the Control Area may also be requested. For any of these requests, the Company should be contacted as early as possible in the planning process. An interconnection study must be performed to determine the required additions and modifications to Sierra's substations, transmission lines, control and communications circuits to accommodate the proposed interconnection.

Requests for transmission services are addressed by the Company's current OATT and are not included in this document.

1. Requesting an Interconnection

Requests for new interconnections should be made through as outlined in the Company's OATT. Requests should be accompanied by connection related information as listed in OATT.

More information about the generation interconnection process and necessary forms are available in the Company's business practices found on the OASIS web site.

2. Interconnection Studies

The Company's personnel perform technical studies to determine the feasibility of the interconnection request. The studies required will vary depending upon the type of interconnection requested. These studies can require considerable time and effort, depending on the size of the Project and its potential system impacts.

The studies will investigate the impact on system performance of the interconnecting project. This may include analysis of equipment thermal overloads, voltage stability, transient stability, and short circuit interrupting requirements. Technical issues directly associated with the project, such as voltage regulation, machine dynamics, metering requirements, protective relaying, and substation grounding will also be addressed as required in development of the preferred plan of service.

The Company's facility connection requirements address, but are not limited to, the following items:

1. Coordination of joint studies of new facilities and their impacts on the interconnected transmission systems.
2. Notification of new or modified facilities to others (those responsible for the reliability of the interconnected transmission systems) as soon as feasible.
3. Voltage level and MW and MVAR capacity or demand at point of connection.
4. Breaker duty and surge protection.

5. System protection and coordination.
6. Metering and telecommunications.
7. Grounding and safety issues.
8. Insulation and insulation coordination.
9. Voltage, Reactive Power, and power factor control.
10. Power quality impacts.
11. Equipment Ratings.
12. Synchronizing of facilities.
13. Maintenance coordination.
14. Operational issues (abnormal frequency and voltages).
15. Inspection requirements for existing or new facilities.
16. Communications and procedures during normal and emergency operating conditions.

Each of the above items are addressed in detail as applicable to the specific interconnection request; however, some general requirements are detailed as follows below.

Transmission and Substation Facilities

Interconnections to the Company's transmission system may require that one or more of the Company's transmission lines be looped through the Requester's facilities or to be sectionalized with the addition of switching equipment. The design and ratings of these facilities shall not restrict the capability of the lines and the Company's contractual transmission path rights.

Transmission line designs shall meet the requirements of the Company's transmission line design standards including, but not limited to, satisfaction of the requirements of NESC and OSHA.

Substation facilities that interconnect with the Company's transmission facilities must meet the Company's substation design and construction standards and must be designed to the applicable requirements of NESC, NEC, ANSI and IEEE Standards. Electrical equipment in the substation must be sized to carry the full current rating of the intercepted transmission path, and all interrupting devices, such as circuit breakers shall have interrupting capability sufficient to satisfactorily interrupt the maximum short circuit currents that may occur at the location of the interconnection including margin for circuit breaker duty and DC offset.

System protection and control schemes are coordinated to provide for safety and equipment protection and to minimize disruption of services during disturbances. Interconnections generally require the addition or modification of such protection and control schemes. The new protection must be compatible with the existing protective relay schemes and shall not degrade the dependability or security of existing protective relay schemes.

Insulation Coordination

Power system equipment is designed to withstand voltage stresses associated with expected operation. Adding or connecting new facilities may change equipment duty, and may require that equipment be replaced or switchgear, telecommunications, shielding, grounding, or surge protection added to control voltage stress to acceptable levels. Voltage stresses, such as lightning or switching surges, and temporary overvoltages may affect equipment duty. Remedies will depend upon the equipment capability and the type and magnitude of the stress.

Inspection, Testing, Calibration and Maintenance

All transmission elements (ie lines, line rights-of-way, circuit breakers, control and protection equipment, metering, and telecommunications) shall be inspected and maintained in conformance with regional standards. The Company may request an annual certification that the Requester has documented and implemented an adequate transmission maintenance and inspection plan for its interconnecting facilities.

Pre-energization testing and inspection is the responsibility of the Requester in accordance with a documented Inspection and Test Plan. Requester shall make available to the Company all drawings, specifications, equipment settings, and test records of the interconnecting facilities.

Ongoing maintenance and inspection planning shall be conducted by the Requester, and the Requester shall include in its inspection plans the specific scheduled maintenance and inspection intervals and/or conditions that trigger maintenance and inspection. Such plans shall also describe the maintenance methods and the criteria to be used to assess the condition of facility components.

Station Grounding

Each interconnecting station must have a ground grid that is solidly connected to all metallic structures and other non-energized metallic equipment. The grid shall limit the ground potential gradients to such voltage and current levels that will not endanger the safety of people or damage equipment which are in, or immediately adjacent to, the station under normal and short circuit conditions. Ground grid size and type are dependent upon local soil conditions and available

electrical fault current magnitudes, among other factors. In areas where ground grid voltage rises would not be within acceptable and safe limits, grounding rods and grounding wells may be required to reduce the ground grid resistance to acceptable levels.

Transformers and Shunt Reactors

Transformer tap settings and voltage ratings and the setpoints and sizes of shunt-connected reactor equipment shall be coordinated with the Company to optimize reactive flows and voltage profiles. Automatic controls may be necessary to maintain these profiles on the interconnected system.

Key Reliability and Availability Considerations

The new interconnection shall meet all applicable requirements of the WECC and NERC operating and planning standards.

Tools and spare equipment must be readily available at the Requester's disposal to accomplish foreseeable operations and maintenance tasks.

Standardized design, planning and operating practices and procedures should be used so that the new connection may be readily incorporated into the existing transmission network.

For reliable operation, certain telecommunications, control, and protection equipment may need to be provided with redundancy.

The equipment for the new connection shall have sufficient capabilities for both the initial operation and for the long range operation.

Operations and maintenance personnel must be properly trained for both normal and emergency conditions.

Power Factor Considerations

The Company and Requester shall jointly plan and operate their systems, including reactive devices, so as not to place an undue burden on either Party to supply or absorb reactive power.