

GLACIER ELECTRIC COOPERATIVE FACILITY

CONNECTION REQUIREMENTS

Policy No. 516-1

I. INTRODUCTION AND SUMMARY

These Facility Connection Requirements address North American Electric Reliability Corporation (NERC), Western Electric Coordinating Council (WECC), and GEC requirements for interconnection of generation facilities, transmission facilities and end-user facilities. Specifically, the Facility Connection Requirements identify technical requirements and other applicable regulatory requirements for connecting transmission lines, large loads and generation resources to the GEC Transmission System.

Purpose. The primary purpose of these connection requirements is to ensure the safe operation, integrity, and reliability of the GEC Transmission System. These requirements are also intended to prohibit interconnecting facilities from having any adverse impacts on the reliability of the interconnected transmission system. These Facility Connection Requirements do not specifically address contractual matters, such as costs, ownership, scheduling, and billing.

Defined Terms. In these Facility Connection Requirements, the term ‘Requester’ refers to a utility, developer or other entity that requests a new or modified connection for a line, load or generation resource. The term “Project” refers to a request to interconnect a new or modify an existing generating resource, transmission line, or load that may impact the GEC Transmission System.

Submission of Interconnection Projects. Projects are generally submitted by a Requester. GEC evaluates and studies each Project individually, as it was described in the request and determines impacts to the GEC transmission system facilities. For generation interconnections, the Requester must follow the GEC Large Generator Interconnection Policy (LGIP). Specific interconnection requirements for a Project resulting from the study process will be provided to the Requester when the study is finalized. Generally, all costs for integrating the Project are borne by the Requester.

Interconnection Studies. Interconnection 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 the boundaries of electric facility ownership. Therefore, the electric power systems must be studied without regard to ownership to develop a properly designed interconnection that can assure safe operation, integrity and reliability of the GEC Transmission System. The final study may include analysis of short-circuit fault duties, transient voltages, reactive power requirements, stability requirements, harmonics, safety, operations, maintenance and prudent electric utility practices.

Other Applicable Standards. These Facility Connection Requirements are not intended to be design specifications or an instruction manual, and the information presented may change periodically based on industry events, regulatory requirements, changing standards and practices, or for other reasons. The technical requirements stated herein are consistent with GEC's current internal practices for system additions and modifications. These requirements are generally consistent with principles and practices of the NERC, WECC, Institute of Electrical and Electronics Engineers (IEEE) and American National Standards Institute (ANSI). The standards of the above-listed organizations are also subject to change and when applicable, the most recent version of such standards shall apply to each interconnection request.

II. REQUESTING AN INTERCONNECTION OF NEW FACILITIES

A Requester may request interconnection of a transmission line, load, or generation facility to the GEC Transmission System. For any of these requests, GEC 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 GEC equipment (substations, transmission lines, control and communications circuits, etc.) to accommodate the proposed interconnection.

A. Requesting an Interconnection

1. Generation Request

Requests for new generation interconnections will be consistent with the process for interconnection outlined in GEC's Large Generator Interconnection Policy (LGIP), which is available on GEC's website by following the Member Policies link. Where applicable for generation interconnection requests, the specific timeline, queuing, and submission requirements in the LGIP will be followed. Requests for interconnection require significant information regarding the Project. Specifics of required information as well as more information about the generation interconnection process and necessary forms are found in the LGIP.

2. Transmission Request

Requests for new transmission interconnections are initiated by completion of the request form which can be found as Attachment A at the end of this document. A scoping meeting will be held to fully discuss the request and all aspects of the proposed interconnection. A study agreement will follow which will require a deposit of 50% of the estimated study cost.

3. End-User (Load) Request

Requests for new transmission interconnections are initiated by completion of the request form which can be found as Attachment A at the end of this document. A scoping meeting will be held to fully discuss the request and all aspects of the proposed interconnection. Additional information regarding GEC's electric service requirements for new load connections may be found on GEC's Line Extension Policy available on the GEC website.

III. GENERAL FACILITY CONNECTION REQUIREMENTS

A. Coordination of Joint Studies of New Facilities and Their Impacts on the Interconnected Transmission Systems

System impact studies are an important first step in the determination of interconnection feasibility. The system impact studies will identify impacts, deficiencies, available capacity, operational problems or interconnection facility concerns and evaluate potential solutions. A proposed interconnection must not degrade the reliability or operating flexibility of the existing power system. The proposed interconnection must comply with any applicable NERC and WECC reliability and planning criteria.

GEC will conduct or review system impact studies required to evaluate the system impact of a proposed interconnection on the reliability and capability of the transmission system. These studies shall be coordinated with NorthWestern Energy (NWE- the Area Coordinator and Balancing Authority) and the Western Area Power Administration (WAPA- the Transmission Operator for GEC's transmission facilities). These studies can require considerable time and effort, depending on the size of the Project and its potential system impacts. Any costs to conduct or review system impact studies are the responsibility of the Requester. The system impact studies may include, but are not limited to powerflow, dynamic stability, short circuit studies, Sub-synchronous Resonance (SSR), and Electro-magnetic Transients Program (EMTP) studies. Evaluation of alternatives to the proposed interconnection, such as lower voltage construction, alternative interconnection points, reactive support facilities, or upgraded facilities, may be requested. Powerflow analysis will require 10-year load and resource growth projections and the planned facilities needed to satisfy all long term transmission service requirements. If the studies indicate that additions or upgrades to the existing transmission system are necessary, GEC will conduct or review facilities studies, at the expense of the Requester, to determine the cost of additions or upgrades and the time frame for implementing system additions or upgrades. Costs for identified system upgrades are the responsibility of the Requester.

B. Notification of New or Modified Facilities to Those Responsible for the Reliability of the Interconnected Transmission Systems

The Requester shall notify the neighboring entities who are responsible for the reliability of the interconnected transmission system as soon as feasible. Entities to be notified include NorthWestern Energy as the Area Coordinator and Balancing Authority over the GEC system and the Western Area Power Administration as the Transmission Operator of GEC transmission facilities. Additionally, GEC will notify the Bonneville Power Administration (BPA – GEC's power supplier) of any proposed End-User Projects that will connect to GEC's transmission system.

C. Voltage level and MW and MVAR Capacity or Demand at Point of Connection

MW and MVAR capacity limits will be determined through the system studies process. The Requester shall operate its facilities within the MW and MVAR limits determined by the system studies. Generation Projects shall operate within a voltage bandwidth as specified by GEC.

D. Breaker Duty and Surge Protection

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 over-voltages may affect equipment duty. Remedies will depend upon the equipment capability and the type and magnitude of the stress. Requester shall make available to GEC all drawings, specifications, test plans, application documents, and equipment settings.

E. System Protection and Coordination

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. The protection scheme will also ensure there are no problems with being out of synchronization when closing breakers. Costs associated with protection and control scheme modifications are borne by the Requester.

F. Metering and Telecommunications

All connections to the GEC electrical system at transmission voltage levels will require metering. The following paragraphs discuss typical requirements for metering and telecommunications associated with these connections.

Metering equipment shall be installed whenever possible at the point-of-connection between GEC and the customer. If the *Metering Point* and the *Point-of-Connection* are not at the same location, GEC reserves the right to require transformer losses and/or line losses to be considered. Metering equipment shall include a solid-state meter for each individual load capable of measuring MW demand, MVAR demand, MWh, MVARh, and both leading or lagging power factor. If power flow is capable of being bi-directional the metering system shall be designed to capture delivered and received MWh and MVARh in separate registers. These registers may be included in a single meter approved by GEC. All metering packages used on the GEC system will be required to use revenue-accuracy-metering equipment, including the meter, instrument transformers, and associated devices. In some cases, the metering equipment may be under the jurisdiction of the Bonneville Power Administration (BPA). In those cases, all BPA's metering requirements shall be followed.

SCADA will likely be required for an interconnection Project. An RTU is required at minimum to supply the following SCADA information to GEC:

- Breaker Status
- Voltage, MW, and MVAR at the point-of-connection
- Substation transmission line MW and MVAR flow

Depending on the Project, additional SCADA information may be required.

Voice communication and communication requirements for protection purposes will be determined on a case-by-case basis. If required, a compatible and reliable communication media shall be provided for voice, SCADA, and remote access to metering data. Additionally, the Bonneville Power Administration, the Western Area Power Administration, and NorthWestern Energy may have telecommunications requirements that the Requester will be expected to meet as well.

G. Grounding and Safety Issues

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 substation 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. All grounding will follow the guidelines established in IEEE 80-2000 and IEEE 837-2002. Design review and testing may be required to ensure these guidelines are met.

H. Insulation and Insulation Coordination

All equipment to be interconnected shall be insulated for appropriate voltage levels. Requester shall provide to GEC all drawings, specifications, and equipment ratings.

I. Voltage, Reactive Power, and Power Factor Control

Transformer tap settings, voltage set points, sizes of shunt-connected capacitor and/or reactor equipment as well as other voltage control devices shall be coordinated with Requester, GEC, WAPA, and NWE to optimize reactive flows and voltage profiles. Automatic controls may be necessary to maintain these profiles on the interconnected system.

End-User (load) Projects are required to maintain a power factor between 0.95 leading and 0.95 lagging. Any loads that operate beyond these boundaries shall be subject to power factor penalties.

J. Power Quality Impacts

Projects will be required to meet the guidelines established in IEEE 1453-2004 for voltage flicker and IEEE 519-1992 for harmonic distortion and interference.

K. Equipment Ratings

1. Transmission Line Ratings

Transmission lines interconnecting into GEC's transmission system shall meet the requirements of any GEC transmission line design specifications, which could include but are not limited to MVA, operating voltage, ampacity, insulation critical flashover, insulation clearances, shielding, tower grounding, and short circuit withstand requirements. These specifications will be determined during the system and facilities studies process. In all cases, NESC and OSHA requirements shall be satisfied. Requester shall make available to GEC all drawings and specifications, terminations plans, and line ratings.

2. Substation Facility Ratings

Substation facilities must be designed to the applicable requirements of NESC, NEC, ANSI, and IEEE Standards. Additionally, GEC may require additional design specifications based on results from the system and facilities studies. Electrical equipment in the substation must be sized to carry the full continuous and short time current ratings of the intercepted transmission path. 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.

L. Synchronizing of Facilities

Interconnection stations shall be equipped with appropriate synchronization equipment to ensure the Project can connect safely and reliably to the transmission system grid.

M. Maintenance Coordination

Each Party shall provide the other with reasonable notification for routine maintenance, operational tests, inspection activities, and meter testing. For such activities that do not require major equipment or system outages, the Party performing the same shall provide the other Party notice at least twenty-four hours before scheduled outage. For such activities that will require major equipment or system outages, the Party performing the same activities shall provide the other Party notice at least seventy-two hours before scheduled outage.

N. Operational Issues (Abnormal Frequency and Voltages)

Generation Projects shall include protective measures that prohibit the Project from creating an island with itself and the GEC system. The generation Project shall monitor system frequency and voltage for abnormal conditions that could indicate islanding.

O. Inspection Requirements for Existing or New Facilities

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

1. Pre-Energization Testing and Inspection

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 GEC all drawings, specifications, equipment settings, and test records of the interconnecting facilities.

2. Ongoing Maintenance and Inspection Planning

Ongoing maintenance and inspection planning of Requester's facilities 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.

P. Communications and Procedures During Normal and Emergency Operating Conditions

Complete, precise, and timely communication is required for maintaining the reliability and security of a power system. Under normal operating conditions, the major link of communication with various interconnectors shall be by telephone lines. In case of emergency or abnormal operating conditions, various communication channels may be used. Emergency telephone numbers should be agreed upon by both Parties prior to the actual interconnection date.

Q. Key Reliability and Availability Considerations

The new interconnection shall meet all applicable requirements of any applicable WECC and NERC operating and planning standards. In addition, the following requirements apply to all Projects:

- 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.
- Because of increased risks and potential hazards inherent with operating Requester's facilities connected with GEC' facilities, overall safety for life, quality of service and property is paramount. GEC shall disconnect Requester's facilities anytime Requester's facilities pose a dangerous condition, and such disconnection is appropriate to protect safety of GEC employees, customers, general public, or to maintain integrity of the GEC's facilities.

IV. REVISION TABLE

Effective Date	Version Number	Revised By:	Revision History
10/15/2009	1.0	J. Dellinger	Compilation of several GEC policies, requirements, and forms into one concise document.

Date: 11-3-2009

President: Miles Lewis

ATTACHMENT A

Transmission Facility or End-User (Load) Interconnection Request

1. The undersigned Interconnection Customer submits this request to interconnect its Transmission Facility or End-User Facility (Load) with Electric Cooperative's (GEC) transmission system pursuant to the Cooperative's Facility Connection Requirements.
2. This interconnection request is for (check one):
 - A proposed new Transmission Facility
 - An increase in the capacity or a material modification of an existing Transmission Facility.
 - A proposed new End-User Facility
 - An increase in the capacity or a material modification of an existing End-User Facility.
3. Interconnection Customer provides the following information:
 - a. Address or location of the proposed new interconnection facility site (to the extent known) or, in the case of an existing facility, the name and specific location of the existing facility;
 - b. For End-User requests, maximum expected KW demand, average expected KW demand, and expected annual KWH usage;
 - c. General description of the equipment configuration;
 - d. Commercial Operation Date (Day, Month and Year);
 - e. Name, address, telephone number, and email address of the Interconnection Customer's contact person.
 - f. Full legal name, address, telephone number, email address, and state of incorporation of Interconnection Customer;
 - g. Approximate location of the proposed Point of Interconnection; and
4. This Interconnection Request shall be submitted to

Glacier Electric Cooperative
410 East Main Street
Cut Bank, MT 59427
406-873-5566

5. Representative of Interconnection Customer to contact:

6. This Interconnection Request is submitted by:

Name of Interconnection Customer _____

By: _____

Name (type or print) _____

Title: _____

Date: _____