



Facility Connection Requirements

(Version 2.2)

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FACILITY CONNECTION REQUIREMENTS

This document has been prepared to comply with the North American Electric Reliability Corporation (NERC) Facilities Connection Requirements standard FAC-001-0. Facility connection requirements are established to avoid adverse impacts on reliability. These requirements address connection requirements for generation facilities, transmission facilities, and end-user facilities. The paragraph headings in this document use the requirement numbers R2.1.1 thru R2.1.16 as set forth in FAC-001-0.

Rochester Public Utilities (RPU) is a member of the Midcontinent Area Power Pool (MAPP) for Planning Authority services. One of the functions of MAPP is to coordinate joint studies of new facilities and their impacts on the interconnected transmission system. RPU is also a member of the Midwest Reliability Organization (MRO), a standards and compliance organization. RPU receives Reliability Coordination Services from the Midwest Independent System Operator (MISO).

Acknowledgment

RPU acknowledges that portions of this document were based on the Facility Connection Requirements documents prepared by Idaho Power Company. RPU sincerely appreciates Idaho Power Companies permissions to use and customize portions of their documents as the basis for RPU's *Facility Connection Requirements*. This type of intercompany cooperation provides a substantial benefit to RPU's customers.

Requirements

R2.1.1. Procedures for Coordinated Joint Studies

The following procedures apply to generation facilities, transmission facilities, and end-user facilities.

RPU actively participates in the MAPP planning processes. The processes are described in a MAPP document entitled *MAPP Members Reliability Criteria and Study Procedures*.

R2.1.2. Procedures for Notification

The following procedures apply to generation facilities, transmission facilities, and end-user facilities.

Any additions or modifications to existing facilities that have the potential to affect an interconnection require the customer to notify RPU well in advance. RPU will assess the potential impact of the modifications and contact the appropriate affected parties. The significance of any impact has the potential to vary over a broad range. Changes that could

affect the operating limits on the interconnected system may require engineering studies and the involvement of various MAPP committees. The most significant impacts will trigger the processes described in the previous section (R2.1.1.). Less significant changes that still impact reliability will be forwarded to the Reliability Coordinator (MISO RC).

Covers Generator, Transmission, and End-User

It is the responsibility of the facility owner to provide all devices necessary to protect the customer's equipment from damage by abnormal conditions and operations that might occur on the interconnected power system. The facility owner shall protect its generator and associated equipment from over-voltage, under-voltage, overload, short circuits (including ground fault conditions), open circuits, phase unbalance, phase reversal, surges from switching and lightning, frequency deviation conditions, and other potentially harmful electrical conditions that may arise on the interconnected system.

It is the responsibility of the facility owner to provide for the orderly re-energization and synchronizing of their high-voltage equipment to other parts of the electric system. Appropriate operating procedures and equipment designs are needed to guard against out-of-sync closure or uncontrolled energization. Each owner is responsible to know and follow all applicable regulations, industry guidelines, safety requirements, and accepted practice for the design, operation and maintenance of the facility.

R2.1.3. Voltage Level and MW and Mvar Capacity or Demand

The following requirement applies to generation facilities, transmission facilities, and end-user facilities.

After the customer supplies RPU with the approximate geographic location and the desired megawatt (MW) and megavolt-amp reactive (Mvar) capacities at the point of interconnection, RPU will exercise engineering judgment and utilize the results of engineering studies to determine appropriate voltage levels, interconnection points, and system capabilities, since the most practical voltage and interconnection points are site and project-specific.

R2.1.4. Breaker Duty—Surge Protection

All facilities and equipment must equal or exceed the fault duty capability necessary to meet system short-circuit requirements as determined through short-circuit analyses and should fully comply with the latest American National Standards Institute (ANSI)/Institute for Electrical and Electronics Engineers (IEEE) C37 collection of standards for circuit breakers, switch gear, substations, and fuses.

In order to maintain transmission reliability, each fault-interrupting device must be rated for full fault interrupting capability to satisfy the short-circuit level requirements at the point of interconnection. Full fault interrupting capability is per the latest IEEE C37 and C57 collections of standards. As a general rule, neither party should depend on the other for the protection of their respective equipment.

R2.1.5. System Protection and Coordination

Generation, Transmission, and End-User Protective Relaying

Protective relaying systems and associated communications systems for all facility interconnections shall be planned, designed, constructed, and maintained in accordance with applicable RPU, NERC and MRO standards. Utility grade protective relays and fault clearing systems are to be provided on the interconnected power system. All protective relays shall meet or exceed ANSI/IEEE Standard C37.90. Adjoining power systems may share a common zone of protection between two parties. The design must provide coordination of speed and sensitivity in order to maintain power system security, stability, and reliability. The facility owner shall provide documentation showing all applicable facility ratings and impedance data to RPU to support coordination of protection systems.

The protection system (relay, control, and communications equipment) arrangement selected by the customer must be compatible with the protection system used by RPU to protect the transmission grid. Compatible relaying equipment must be used for a given zone of protection. Compatibility includes protection application, redundancy, operating speed, communication type, and communication medium.

A power source for tripping and control must be provided for the protection system by a DC storage battery system. The battery bank is to be sized with enough capacity to operate all tripping devices after twelve hours without a charger, per IEEE standards. An under voltage alarm and DC ground alarm must be provided for remote monitoring by the facilities owners, who shall take immediate action to restore power to the protective equipment.

Mechanical and electrical logic and interlocking mechanisms are required between interconnected facilities to ensure safe and reliable operation. These include, but are not limited to, breaker and switch auxiliary contacts, synch-check relays, and physical locking devices.

The facility owner (generator, transmission, and end-user) is responsible for providing a protection system that will protect its equipment against disturbances on RPU's system and minimize the effects of disturbances from its facilities on RPU's equipment and transmission system. Entities connecting to the RPU transmission system shall investigate and keep a log of all protective relay actions and mis-operations, as required by NERC and MRO. In addition, the interconnecting entities must have a maintenance program, compatible with and meeting NERC standards for their protection systems in accordance with MRO. Documentation of the protection maintenance program shall be supplied to RPU, MRO, and NERC upon request. As outlined in the maintenance program, test reports are to be made available for review by RPU. At intervals described in the documented maintenance program and following any apparent malfunction of the protection equipment, the entity shall perform both calibration and functional trip tests of its protection equipment as outlined by MRO.

Generator Protection Requirements

Generators connecting to the RPU transmission system are responsible for protecting those facilities from electrical faults and other hazardous conditions. Generator interconnections must be equipped with circuit breakers or other appropriate interrupting devices to protect those facilities. The generator owner must provide and own the primary circuit breaker or other interrupting device that protects the facility and disconnects it from the RPU transmission system. The primary purpose of this interrupting device is to protect the generating plant facility.

Synchronous or wind turbine generators connected to the RPU transmission system shall be able to withstand certain temporary excursions in voltage, frequency, and reactive and real power output without tripping. A system impact study will determine if additional reactive devices are required to maintain the generation during the temporary excursions. Maintaining the generation is required to support the grid and avoid cascading events. Generation protection and control shall be set in accordance with all applicable NERC and MRO requirements to coordinate with excitation limiters.

It is recognized that certain circumstances may exist that necessitate the imposition of performance criteria that is considered more stringent than the default criteria specified above. Such circumstances shall be identified during the conduct of the System Impact Study or operational study for each particular generator.

Additional requirements for generation interconnection are addressed in RPU's, Large Generator Interconnection Procedures and Large Generator Interconnection Application documents located on the RPU Web site.

Transmission Protection Requirements

All transmission power systems shall have a high-speed pilot primary relaying and a high-speed non-pilot secondary relaying scheme that provides backup coverage of the remote bus. Pilot communications redundancy may be required depending on critical clearing time. A transfer trip scheme is required for backup protection. Synchronism check relaying is required. Line reclosing is required.

Backup protective systems should provide additional coverage for breaker and relay failure outside the primary zone. Specific breaker failure protection schemes shall be applied as required to meet NERC requirements, and, where local/remote backup does not provide adequate sensitivity or speed, specific relay failure backup shall also be provided. Backup systems shall operate for failures on either side of an interconnection point. Time and sensitivity coordination must be maintained to prevent mis-operations.

Fiber optics are the preferred means of relay communications; however, power line carrier and audio tone over phone line are also used. Audio tone over phone line is the least preferred method because it may not meet requirements for speed and reliability.

Each fault-interrupting device must be rated for full fault-interrupting capability to satisfy the short-circuit level requirements at the point of interconnection. Neither party shall depend on the other for the protection of their respective equipment.

R2.1.6. Metering and Telecommunications

Generation Energy Metering

At the customer's expense, RPU will specify, design, install, own, and maintain all metering and metering devices (including instrument transformers) used to measure the delivery and receipt of energy for payment purposes. Metering shall be required for each point of delivery at each point where customer facilities interconnect with RPU facilities. Meter accuracy will be maintained within +/- 0.3%. RPU will test meters on an annual schedule; the customer will receive notification of test scheduling and copies of test results upon request. Requests for additional unscheduled testing will be honored at the expense of the requester unless the meters are found to be out of tolerance.

Generation, Transmission & End User Energy Metering Communications

The customer, at its expense, shall provide and maintain a voice telephone extension at each point of delivery dedicated for the purpose of accessing RPU's dial-up energy metering equipment.

Typical metering requirements include the following:

- 15-minute load profile data for:
 - Kilowatt hour (kWh) delivered to the customer
 - kWh received from the customer
 - Kilovolt amp reactive (kvar)—hours delivered and received

- Total accumulative registers for:
 - kWh delivered to the customer
 - kWh received from the customer
 - kvar—hours delivered and received

Sale for Resale Energy Metering

At the customer's expense, RPU will specify, design, install, own, and maintain all metering and metering devices (including instrument transformers) used to measure the delivery and receipt of energy for payment purposes. Metering shall be required for each point of delivery at each point where customer facilities interconnect with RPU facilities. Meter accuracy will be maintained within +/- 0.3%. RPU will test meters on an annual schedule; the customer will receive notification of test scheduling and copies of test results upon request. Requests for additional unscheduled testing will be honored at the expense of the requester unless the meters are found to be out of tolerance.

Typical metering requirements include the following:

- 15-minute load profile data for:
 - kWh delivered to the customer
 - kvar—hours delivered and received
- Total accumulative registers for:
 - kWh delivered to the customer
 - kvar—hours delivered and received

Transmission Interconnection Energy Metering

RPU will specify, design, install, own, and maintain all metering and metering devices (including instrument transformers) used to measure the delivery and receipt of energy for payment purposes. Meter accuracy will be maintained within +/- 0.3%. RPU will test meters on an annual schedule; the interconnecting utility will receive notification of test scheduling and copies of test results upon request. Requests for additional unscheduled testing will be honored at the expense of the requester unless the meters are found to be out of tolerance.

Metering equipment should be provided as close to the interconnect point as practicable.

Typical metering requirements include the following:

- 15-minute load profile data for:
 - kWh delivered to the customer
 - kWh received from the customer
 - kvar—hours delivered and received
- Total accumulative registers for:
 - kWh delivered to the customer
 - kWh received from the customer
 - kvar—hours delivered and received

End User Interconnection Energy Metering

RPU will specify, design, install, own, and maintain all metering and metering devices (including instrument transformers) used to measure the delivery and receipt of energy for payment purposes. Meter accuracy will be maintained within +/- 0.3%. RPU will test meters on an annual schedule; the interconnecting utility will receive notification of test scheduling and copies of test results upon request. Requests for additional unscheduled testing will be honored at the expense of the requester unless the meters are found to be out of tolerance.

Metering equipment should be provided as close to the interconnect point as practicable.

Typical metering requirements include the following:

- 15-minute load profile data for:
 - kWh delivered to the customer
 - kWh received from the customer
 - kvar—hours delivered and received
- Total accumulative registers for:
 - kWh delivered to the customer
 - kWh received from the customer
 - kvar—hours delivered and received

Supervisory Control and Data Acquisition (SCADA)

Generation Interconnection SCADA

RPU may require a Remote Terminal Unit (RTU) for the purpose of gathering customer load and equipment status information needed at RPU's appropriate operations center. When required, RPU shall own and maintain the SCADA devices at the customer's expense. The customer shall provide, at its expense, a telecommunications data circuit to the operations center designated by RPU. RPU shall specify the communications protocol for this data circuit(s). Instantaneous bi-directional analog real power and reactive power flow information must be telemetered directly to the location(s) specified by RPU.

Typical data requirements include the following:

- Status of interrupting devices
- MW flow
- Mvar flow
- Voltage at interconnection point

Transmission Interconnection SCADA

For the purpose of gathering interconnection load and equipment status information needed at RPU's appropriate operations center, RPU shall own and maintain the SCADA devices. RPU shall provide a telecommunications data circuit to the operations center designated by RPU. RPU shall specify the communications protocol for this data circuit(s). Instantaneous bi-directional analog real power and reactive power flow information must be telemetered directly to the location(s) specified by RPU.

Typical data requirements include the following:

- Status of interrupting devices
- MW flow
- Mvar flow
- Voltage at interconnection point

End User Interconnection SCADA

RPU may require a Remote Terminal Unit (RTU) for the purpose of gathering customer load and equipment status information needed at RPU's appropriate operations center. When required, RPU shall own and maintain the SCADA devices at the customer's expense. The customer shall provide, at its expense, a telecommunications data circuit to the operations center designated by RPU. RPU shall specify the communications protocol for this data circuit(s). Instantaneous bi-directional analog real power and reactive power flow information must be telemetered directly to the location(s) specified by RPU.

Typical data requirements include the following:

- Status of interrupting devices
- MW flow
- Mvar flow
- Voltage at interconnection point

R2.1.7. Grounding and Safety Issues

A safe grounding design must accomplish two basic functions:

1. Ensure that a person in the vicinity of grounded structures and facilities is not exposed to critical levels of step or touch potential, and
2. Provide a path for electric currents into the earth under normal and fault conditions without exceeding any operating and equipment limits or adversely affecting the continuity of service.

Accordingly, each electrical facility must have a grounding system or grid that solidly grounds all metallic structures and equipment in accordance with the standards outlined in ANSI/IEEE 80, IEEE Guide for Safety in AC Substation Grounding, ANSI/IEEE C2, National Electrical Safety Code (NESC).

Testing must be performed to ensure safe step and touch potential parameters have been met in accordance with IEEE 80.

When various switching devices are opened on an energized circuit, its ground reference may be lost if all sources are not effectively grounded. This situation may cause over voltages that can affect personnel safety and damage equipment. This is especially true when one phase becomes short-circuited to ground. Therefore, the interconnected transmission power system is to be effectively grounded from all sources. Interconnected generators should provide for effective system grounding of the high-side transmission equipment by means of a grounded high-voltage generation step-up transformer.

Covers Generator, Transmission, and End-User Facilities

Safety is of utmost importance. Strict adherence to established switching, tagging, and grounding procedures is required at all times for the safety of personnel. Any work carried out within a facility shall be performed in accordance with all applicable laws, rules, and regulations and in compliance with Occupational Safety and Health Administration (OSHA), NESC, and good utility practice. Automatic and manual disconnect devices are to be provided as a means of removing all sources of current to any particular element of the power system. Only trained operators are to perform switching functions within a facility under the direction of the responsible dispatcher or designated person as outlined in the NESC.

R2.1.8. Insulation and Insulation Coordination

Insulation coordination is the selection of insulation strength. Insulation coordination must be done properly to ensure electrical system reliability and personnel safety. Basic switching surge levels (BSL), surge arrester, conductor spacing and gap application, substation and transmission line insulation strength, protection, and shielding shall be documented and submitted for evaluation as part of the interconnection plan.

Equipment basic impulse surge levels (BIL) shielding and surge protection shall be designed to meet the latest IEEE C62 standards, along with RPU standards.

R2.1.9. Voltage, Reactive Power, and Power Factor Control

Generation Facilities

RPU's voltage, reactive power, and power factor control requirements for generators are described in its generator interconnection agreements. The requirements for generators are listed in section 9.6 of RPU's *Large Generator Interconnection Agreement (LGIA)*.

Transmission Facilities

The transmission system must be capable of moving electric power from areas of generation to areas of load under a wide variety of expected system conditions. Adequate reactive power supplies are of paramount importance to the capability of the transmission system to reliably support a wide variety of transfers. Transmission facilities must be designed to minimize excessively high voltages during light transmission loading conditions, yet have adequate reactive supplies to support system voltage during heavy transmission loading conditions.

End-User Facilities

RPU strives to supply end-user facilities with voltage that is +/- 5% from nominal. End-user facilities connected directly to the transmission system should plan and design their systems to

operate at or better than 98% power factor to minimize the reactive power burden on the transmission system.

R2.1.10 Power Quality Impacts

Interconnection Requirement for Harmonic Levels

Generation Facilities

Generation facilities shall not have harmonic current distortion levels exceeding the levels recommended in most recent revision of IEEE-519, *Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems*. Generation facilities must meet the stated current limits specified for generators as presented in the Current Distortion Limits tables for the applicable voltage levels.

Generation facilities shall not cause the harmonic voltage distortion levels to exceed the voltage distortion limits recommended in the most recent revision of IEEE-519.

Transmission Facilities

Transmission facilities shall not have harmonic current distortions levels exceeding the levels recommended in the most recent revision of IEEE-519.

End-User Facilities

End-user facilities shall not have harmonic current distortion levels exceeding the levels recommended in the most recent revision of IEEE-519. End-user facilities must meet the stated current limits specified in the Current Distortion Limits tables for the applicable voltage levels.

Interconnection Requirement for Flicker

Transmission Facilities and End-User Facilities

Transmission facilities and end-user facilities are required to limit voltage fluctuations to the limits specified in the most recent revision of IEEE-1423.

R2.1.11. Equipment Ratings

All circuit breakers and other fault-interrupting devices shall be capable of safely interrupting fault currents for any fault they may be required to interrupt. Application of circuit breakers shall be in accordance with the ANSI/IEEE C37 collection of standards.

All current-carrying equipment and devices shall be designed to carry the maximum loads that are predicted and used in load flow analysis. Loads exceeding nameplate or normal design capacities are acceptable only when allowed by manufacturers' design documentation or standard industry practices.

Equipment BILs, shielding, and surge protective device application must meet requirements as determined by the latest IEEE C62 standards. RPU will provide the BIL for the system in the interconnection area. Also, equipment must meet all applicable ANSI/IEEE standards and specifications communicated by RPU in pre-interconnection meetings.

R2.1.12. Synchronizing of Facilities

General

Synchronizing facilities consisting of potential transformers and associated protective relaying/controls are required at the point of interconnection on transmission facilities where energy can be sourced on both sides of an interconnection circuit breaker. These facilities verify that the voltages on both sides of a circuit breaker fall within certain tolerances of both magnitude and phase angle as established by system conditions, supervise the closing and automatic reclosing of the circuit breaker, and prevent the closing of the circuit breaker when the two systems are out of synchronism.

Voltage magnitudes, phase angles, and frequency constraints shall be determined on a case-by-case basis depending on system characteristics, conditions, interconnection location, etc.

Generation Facilities

Live line – dead bus (LLDB) control is used in the interconnection circuit breaker reclosing scheme when generation facilities are connected to transmission facilities. In summary, the circuit breaker cannot be closed unless the generation side has essentially zero voltage. The transmission facility interconnection circuit breaker shall not be used to synchronize a generator to the transmission system. Instead, the generation facilities shall have their own synchronizing facilities to synchronize to the system. In addition, the generation facility shall remain disconnected from RPU's system until system voltage and frequency are within an established range should a generation facility become disconnected from RPU's system.

Exceptions to this requirement will be considered on a case-by-case basis.

Transmission Facilities

Live line – dead bus (LLDB) and dead line – dead bus (DLDB) control is used in the interconnection circuit breaker reclosing scheme when transmission facilities are interconnected to transmission facilities. In summary, the circuit breaker cannot be closed unless the transmission sources on both sides of the open circuit breaker are essentially in phase. The transmission facility interconnection circuit breaker shall not be used to synchronize a generator to the transmission system. Instead, the generation facilities shall have their own synchronizing facilities to synchronize to the system. In addition, the transmission facility shall remain disconnected from RPU's system until system voltage and frequency are within an established range should the transmission facility become disconnected from RPU's system.

Exceptions to this requirement will be considered on a case-by-case basis.

End User Facilities

Live line – dead bus (LLDB) and dead line – dead bus (DLDB) control is used in the interconnection circuit breaker reclosing scheme when transmission facilities are interconnected to transmission facilities. In summary, the circuit breaker cannot be closed unless the transmission sources on both sides of the open circuit breaker are essentially in phase. The transmission facility interconnection circuit breaker shall not be used to synchronize a generator to the transmission system. Instead, the generation facilities shall have their own synchronizing facilities to synchronize to the system. In addition, the transmission facility shall remain disconnected from RPU's system until system voltage and frequency are within an established range should the transmission facility become disconnected from RPU's system.

Exceptions to this requirement will be considered on a case-by-case basis.

R2.1.13. Maintenance Coordination

Covers Generator, Transmission, and End-User Facilities

The maintenance of facilities is the responsibility of the owner of those facilities. Adjoining facilities on the interconnected power system are to be maintained in accordance with accepted industry practices and procedures. Each party is to have a documented maintenance program ensuring the proper operation of equipment. RPU will have the right to review maintenance reports and calibration records of equipment that could impact the RPU system if not properly maintained. RPU is to be notified as soon as practicable about any out-of-service equipment that might affect the protection, monitoring, or operation of interconnected facilities. In accordance with NERC Reliability Standard TOP-003, each Generator Operator shall provide outage information daily to RPU operations for scheduled generator outages planned for the next day for any generator greater than 50 MW.

Maintenance of facilities interconnected to the RPU transmission system shall be done in a manner that does not place the reliability and capability of the RPU transmission system, or other portions of the MRO transmission system, at risk. Planned maintenance must be coordinated and scheduled with RPU.

R2.1.14. Operational Issues (Abnormal Frequency and Voltages)

Covers Generator, Transmission, and End-User Facilities

Operational procedures are to be established in accordance with all applicable with NESC, OSHA, MRO, and NERC requirements. Each party shall designate operating representatives to address the following:

- Lines of communications
- Maintenance coordination
- Actions to be taken after de-energization of interconnected facilities
- Other required operating policies

All parties are to be provided with current station operating diagrams. Common, agreed-upon nomenclature is to be used for naming stations, lines, and switches. Updated diagrams are to be provided when changes occur to interconnected facilities.

The operator of facilities interconnecting to the RPU transmission system will not perform any switching that energizes or de-energizes portions of the RPU transmission system or that may adversely affect the RPU transmission system without prior notice to RPU or its designated operating representative. Operators of facilities interconnecting to the RPU transmission system will notify RPU, or its designated operating representative, before performing any switching that would significantly affect voltages, power flows, or reliability in the RPU transmission system. During emergency conditions, the facility operator shall raise or lower generation, adjust reactive power, switch facilities in or out, or reduce end-user load as directed by the RPU grid operator.

R2.1.15. Inspection Requirements for Existing or New Facilities

Covers Generator, Transmission, and End-User Facilities

Each party to the interconnection agreement shall perform routine inspection and testing of its facilities and equipment in accordance with good utility practice and regulatory requirements to ensure the continued interconnection of the facilities with RPU's transmission system.

Each party shall, at its own expense, have the right to observe the testing of any of the other party's facilities and equipment whose performance may reasonably be expected to affect the reliability of the observing parties' facilities and equipment. Each party shall notify the other party in advance of facility and equipment testing, and the other party may have a representative attend and be present during such testing. If a party observes any deficiencies or defects on—or becomes aware of a lack of scheduled maintenance and testing with respect to—the other party's facilities and equipment that might reasonably be expected to adversely affect the observing party's facilities and equipment, the observing party shall provide notice to the other party that is prompt under the circumstance, and the other party shall make any corrections required in accordance with good utility practices and as required by regulatory agencies. Where deficiencies or defects are not resolved in a reasonable and prompt manner, decisions will be made on a case by case basis whether the facility may remain in operation. Decisions will consider severity of the deficiency or defect and the resulting impact to reliability.

R2.1.16. Communications and Procedures During Normal and Emergency Operating Conditions

Covers Generator, Transmission, and End-User Facilities

Complete, precise, and timely communication is an essential element for maintaining reliability and security of a power system. Under normal operating conditions, the major link of communication with various interconnects shall be by telephone lines. RPU and its customer shall maintain communications that shall include, but not be limited to:

- system paralleling or separation.
- scheduled or unscheduled shutdowns.
- equipment clearances.
- periodic load reports.
- maintenance schedules.
- tagging of interconnection interrupting devices.
- meter tests.
- relay tests.
- billing.
- other routine communication.

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 connect date.

R3 - Review/Revision History

This document has been approved and revised according to the revision history recorded below. This document is reviewed and modified from time to time when needed or as required. This document is also available on RPU's website www.rpu.org.

REVISION HISTORY			
Date	Revision Description	Version #	Revised by
8/12/09	Draft Revision	1.0	RLA
9/14/09	Formatting and clean-up	1.1	RLA
10/1/09	Revisions to R2.1.5	1.2	RLA
6/23/10	Modified Section R2.1.6, modified Section R2.1.12, modified Section R2.1.15, modified Section R3, added the definition for End User	2.0	RLA
7/29/11	Modified format of Revision History section	2.1	RLA
12/5/11	Modified Revision History page & Title Page	2.2	RLA

Appendix A

Glossary

ANSI—American National Standards Institute

BIL—Basic Impulse Surge Level

BSL—Basic Switching Surge Level

DLLB—Dead line, live bus

End User – an RPU customer that takes transmission level voltage (100kV or greater) from the RPU transmission system and who owns and operates their own transmission facilities (100kV or greater) for serving load at their facility.

FAC—Facilities

IEEE—Institute of Electrical and Electronics Engineers

kvar—Kilovolt-Amp Reactive

kV—Kilovolt

kWh—Kilowatt-hour

LGIA—Large Generator Interconnection Agreement

LGIP -- Large Generator Interconnection Procedures

LLDB—Live line, dead bus

LLDB/DLLB—Live line, dead bus/dead line, live bus

MAPP – Midcontinent Area Power Pool

MRO – Midwest Reliability Organization

Mvar—Megavolt-Amp Reactive

MW—Megawatt

NERC—North American Electric Reliability Corporation

NESC—ANSI/IEEE C2, National Electrical Safety Code

OSHA—Occupational Safety and Health Administration

POTT—Permissive overreaching transfer trip

RTU—Remote Terminal Unit

RPU – Rochester Public Utilities

SCADA—Supervisory Control and Data Acquisition