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******Note:*** *Southern Illinois Power Cooperative shall maintain and update this document as required. This document shall also be made available to the users of the transmission system, the Regional Reliability Organization, and NERC within (five business days).****

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I. Summary

This document describes the requirements that must be met by those seeking to integrate generation, transmission and end-user facilities into the interconnected system without adverse impacts on reliability. It requires those who desire to design, construct, and operate new facilities to coordinate and cooperate to evaluate the reliability impact of the proposed facilities, as well as any changes or modifications to those facilities, on the interconnected transmission system. System performance of the proposed facilities is determined by conducting various studies including steady-state, short-circuit, and dynamics studies.

II. Introduction

This document outlines the minimum requirements for the Facility Connection (Connection) of generation, transmission, and end-use facilities to the SIPC electric system. Its purpose is to assure that Connection to the SIPC system results in

1) Maintaining the reliability of the interconnected electric system, safety of people and equipment, and maintaining the quality of service to SIPC Customers,
2) Compatibility between Customer facilities and SIPC facilities,
3) Compliance with applicable standards,
4) Ensure comparability in the requirements imposed upon entities seeking to connect to the SIPC Transmission System

When a Customer requests Connection to SIPC, it must comply with the requirements of this document, which is based on NERC Planning Standard FAC-001 “Facility Connection Requirements”. The Customer will also need to comply with appropriate NERC and Regional Reliability Organization Standards, all applicable codes, other standards, federal and state regulations, environmental regulations, siteing requirements, contracts, operating agreements, and SIPC Tariff requirements during the design, construction, and operation of the Customer Project (Project).

The topics included in this document establish guidance to probable or usual requirements and the attendant responsibilities to be observed and generally cover the issues addressed by the NERC Reliability Standard FAC-001. This Facilities Connection Requirements document is not intended to serve as a design standard nor as an operating agreement.

Requirements that are applicable to all Projects involving Customer generation, transmission, and end use facilities are described in the General Requirements section of this document. The General Facility Connection Requirements Document Topics section describes specific topics that should be considered for a given Customer Project (Project). The two Generator Interconnection Procedures sections outline additional requirements specific to Project(s) involving generating facilities.

All Connections will require an Interconnection Agreement (IA) that will include the legal rights and obligations of the Customer, SIPC and MISO as appropriate to the Project. All facilities designed and installed by Customer and SIPC must be designed, installed, maintained and operated in accordance with the IA, good utility practices, the National Electrical Code, the National Electrical

Safety Code, the practices and guidelines of SIPC, NERC, Regional Reliability Organization, and Midwest ISO (MISO), and all applicable laws and regulations.

It is recognized that certain information relating to the Project may be confidential, proprietary or have competitive value. The IA will include a confidentiality provision. SIPC will disclose Customer information designated as confidential only to its officers, directors, employees, agents and affiliates who need to know such information in order to address SIPC's rights and responsibilities related to the Project.

Additional disclosures may be made to the extent required by regulatory or legal authorities and proceedings, or as required for evaluations by NERC, the Regional Reliability Organization or MISO. If SIPC is required to disclose confidential information, SIPC will give the Customer prompt notice of such requirement

SIPC's Open Access Transmission Tariff (OATT) may govern the Customer's access to and conditions of use of the SIPC system for transmission service. In that event, a Request for Transmission Service must be made as required in the tariff and terms will be as specified in the Tariff. If applicable, Customer will comply with all practices, methods, policies, procedures, guidelines, criteria, tariffs and other requirements of SIPC's OATT and/or MISO with respect to the construction, installation, maintenance and operation of the Customer's Facility, delivery of energy to the SIPC System and access to and use of the SIPC system.

SIPC shall reserve the right to take such actions as deemed necessary to ensure the reliability of the interconnected transmission system.

The Customer will be responsible for any and all costs that SIPC incurs as a direct or indirect result of the Project. This includes installation, operating and maintenance expenses, study costs, and administrative costs which would not have been incurred but for the Customer's Project. Customer will reimburse SIPC for all costs incurred by SIPC resulting from the Project and will pay all other charges or amounts payable by Customer.

III. General Requirements

Generation facilities, transmission facilities, and electric end-user facilities shall be required to remain in compliance with all applicable NERC Reliability Standards and Regional Reliability Organization Supplements. In addition, these facilities shall comply with all reporting requirements as specified by the NERC Reliability Standards, Regional Reliability Organization Supplements, IA(s), and all applicable codes, standards, federal and state regulations, environmental regulations, siteing requirements, contracts, agreements, and FERC tariff requirements.
In general, the size, connection voltage level, and degree of complexity of the proposed Connection and Project will determine the procedures to be followed, the extent of detail and studies needed for approval, and other Requirements. For example, large loads and generators, and higher voltage interconnections will need more comprehensive study, facility design, system protection design, and operation requirements. SIPC will have the right of approval of aspects of a Project that may have a detrimental effect on SIPC's system and/or the interconnected system.

IV. General Design Requirements for Connection

The Customer is responsible for the design and installation of appropriate equipment and facilities so that the Facility does not degrade SIPCs safety and operating Requirements. The Customer is also responsible for meeting any applicable federal, state, and local codes along with any applicable NERC, the Regional Reliability Organization or MISO requirements. The Customer should consider each of the design requirements described in the following sections.

V. General Requirements for Operation

The Customer will be responsible for operating their Facility in a safe manner, and with full cooperation under the supervision of the SIPC System Operators and MISO Reliability Coordinators. The Customer will notify the SIPC System Operator before any planned startup or shutdown of generation at the Facility and as soon as practical after the onset of an unplanned shutdown or trip of the facilities. For generators, the Owner/Operator will also notify the SIPC System Operator as soon as practical regarding the removal of any faulted equipment from the Facility associated with the high voltage side of the step-up transformer. A Facility generator shall not synchronize to, nor supply power into, the SIPC Transmission System unless a specific agreement has been made to supply power to the Transmission System in accordance with appropriate open access transmission tariffs and tagging requirements.

Only under the direct supervision of the SIPC System Operator will the Facility at any time energize any part of the Transmission System facilities that have been de-energized. Failure to comply has the potential to cause hazard or injury to personnel or to the public as well as damage to equipment and thus make the Owner/Operator liable for such damages.

The Owner/Operator should consider each of the operational requirements described in the following sections.

VI. Specific Facility Connection Requirements

These Connection Requirements for facilities (generation, transmission, and end-user) not presently connected and modifications of facilities already connected are consistent in content and application to those requirements used by SIPC for connecting their own facilities.

1. Application

All Connections will require the Customer to file an application to SIPC for each Project as described in detail in this document. Receipt of the application by SIPC will determine the order in which SIPC responds to the application.

Customers must make application to SIPC for proposed generation, transmission, or end use Projects and associated connections to SIPC's system. Applications must include sufficient information for SIPC to conduct the necessary inspections, evaluations, studies and approvals, and for discussions and changes as necessary.

Sufficient lead-time, considering project scope (complexity, size, location, etc.) is required prior to starting construction to assure a thorough and orderly review process and construction schedule.

The Application will include:

- Customer name & address
- Contact person, with phone, fax, and e-mail
- Project and Connection site description
- Design and test specifications
- Schedule for the design and construction of Customer's Project and Connection
- Operation and maintenance plans, including staffing, to the extent coordination with SIPC is affected
- Electrical schematics, which will include but not be limited to:
    - One-line diagram showing the connections between the Customer Project and the SIPC System
    - Three-line diagrams showing current and potential circuits for protective relays;
    - Relay tripping and control schematic diagram
    - SIPC reserves the right to approve the proposed settings for relays. If requested by Customer, SIPC will provide system data needed to determine the relay settings.
- Communication and control schemes
- Generator and load specifications
    - Voltage at point of interconnection, MW and MVAR, and other characteristic of the load (e.g., arc furnace type, etc.),
- Schedules of intended generation, transfers, and load levels that will affect SIPC's system

Customer will also provide to SIPC any other information or documents related to the Project that are necessary for the purpose of ensuring the safety, reliability, security, and protection of the SIPC System and the interconnected electric system. Examples of such information are detailed in this document.

For small generators, protection requirements are outlined in the SIPC document "Protection Requirements for Customers with Small Generating Facilities Operating in Parallel with SIPC's System." This document may be obtained by contacting SIPC.

2. Impact Study Requirements

SIPC will evaluate the impact of the Customer's Project on its system, and on the interconnected transmission system in the region. Studies will be made before Project startup (connection to SIPC) and periodically during its operation. Studies may include load flow, transfer capability, short circuit, stability, torsional oscillations, and power quality impacts. These studies may involve coordinating joint studies with neighboring interconnected Transmission Operators and MISO necessary to completely evaluate the impact.

The studies may identify system problems and alternative solutions, and, as a result, modifications to the Project may be required. If SIPC system modifications are needed, these system facilities will be provided only if they are acceptable to the applicable regulatory authorities and SIPC believes

the improvements are a prudent business decision.

The Customer's Project may require other design, planning, or operational studies to assure the desired performance of the integrated facilities, depending upon the size, location, and type of facility characteristics and systems. Such studies may be done jointly with entities responsible for regional reliability, such as a Regional Reliability Organization or MISO.

Site-specific limitations affect the available transmission and subtransmission system capacities. These include the electrical characteristics and use of facilities already connected or being planned for connection to the transmission system. Other examples of site specific issues include: availability or proximity of SIPC facilities; local zoning and other ordinances; environmental regulations; availability of permits, easements and rights-of-way; customer electrical characteristics; pre-existing and projected line loading in the area; and margins to provide for abnormal system conditions.

For SIPC and regional planning purposes, historical and projected long-term future capability, output, availability, and other records may need to be compiled and reported.

Review of the Project's impact on the regional electric system may be required.

Studies, analyses, reviews, testing, witness checks or audits, requested by or required due to the Project, performed or contracted by SIPC will be at the Customer's expense.

3. Provision for Future Modification or Changes

The Customer will provide prior written notice to SIPC of any material modification or change to the Project during construction or operation, which may affect the SIPC System. SIPC may require modifications to the Project, when necessary for the reliability of its system. Customer will not make any major modifications to the Project without the prior written consent of SIPC. Proposed Customer modifications to existing facilities must be mutually planned, coordinated, and integrated into SIPC's system and the interconnected transmission system. Any such changes may require conducting (or updating) system studies relating to the facility changes/modifications. If so, Customer will have the responsibility to furnish data required by SIPC

4. Voltage and Power Factor Control

Transmission facility connection requirements are for balanced three phase 60 Hertz alternating current connections. The SIPC system includes nominal 161 kV and 138 kV transmission voltages and 69 kV subtransmission voltage.

The Customer should address all of the following design requirements that are applicable to the Project:

- Internal plant electrical system design (*e.g.*, transformers, tap settings, motors & other loads, generator/exciter, voltage regulator) should not restrict any mode of project operation within the transmission system's allowable voltage range and regulation.

- Transmission interconnected equipment should have the tap ranges and self-regulation necessary to operate within the transmission system's voltage range and regulation.
- Voltage regulator load compensation, if required, to control voltage at a point beyond the generator terminals.
- Voltage regulator droop compensation, if required, for generators whose terminals are directly connected (i.e., cross-compound, hydro).
- Coordination of excitation system settings with SIPC
- Transmission interconnection impact on adjacent areas' voltage or reactive compensation devices

The Customer should address all of the following operational requirements that are applicable to the Project:

- Load and/or generation operation within the acceptable voltage range and regulation as specified by SIPC
- Excitation system/voltage regulator allowable operating modes (*e.g.*, automatic/manual)
- Compliance with Generator voltage schedules provided by SIPC.
- Coordination of any reactive compensation devices

5. Generation Control

The Customer should address all of the following design requirements that are applicable to the Project:

- Load following capability
- AGC
- Reactive power output
- Minimum operating capability
- Remote control functions
- Coordination of generation control system settings
- Load shedding
- Black start capability

The Customer should address all of the following operational requirements that are applicable to the Project:

- Operation at 60Hz nominal
- Mode of frequency control
- Operation of generators during frequency decline conditions
- Coordination between generator controls and underfrequency load shedding programs
- Speed droop setting
- Responsibility for coordination with the appropriate operating entity.

6. Short Circuit Conditions

The Customer should address all of the following design requirements that are applicable to the Project:

- Short circuit capabilities of current carrying elements
- Ratings of interrupting devices
- Relay and device coordination with existing system protection
- Existing and planned future fault current levels
- Responsibility for required changes in existing facilities due to increased fault currents (Generator and Transmission Projects only)

7. System Protection and Other Controls

The Customer's protection and control systems must be designed, installed, operated and maintained to coordinate properly with SIPC protection and control systems for all normal and potential abnormal power system conditions and will be determined on a case-by-case basis. These systems must prevent or limit damage to the Project and to the SIPC system. They must provide acceptable redundancy; be easily maintained; accurate; fast; reliable (dependable and secure); sensitive; selective; meet SIPC, IEEE, Regional Reliability Organization and NERC guidelines; protect the general public; minimize damage to facilities; prevent cascading outages; minimize unnecessary outages; and provide the flexibility for rapid restoration of service.

The Customer's interconnection protective devices should conform to ANSI/IEEE Standard C37.90, "Relays and Relay Systems Associated with Electric Power Apparatus." have appropriate test plugs/switches for testing the operation of the relay, and have targets to indicate relay operation. Maintenance of the System Protection Systems must be compliant with NERC and Regional Reliability Organization Reliability Standards.

It is the sole responsibility of Customer to protect its equipment from excessive negative sequence currents, system faults, voltage or frequency excursions or other abnormal system conditions, and the Customer will indemnify SIPC for any consequence thereof.

Abnormal frequency relays may be required, and, if so, the relay type and settings will be provided to SIPC for their review and approval. It is the Customer's responsibility to consult with the turbine manufacturer to assure this capability.

SIPC will have the right to specify the protective relay type and manufacture and review and approve relay settings for the Customer's relays to assure coordination between the Customer's protective equipment and the SIPC system relays. It is the Customer's responsibility to determine that their other protective equipment coordinates with the required SIPC protective equipment and is adequate to meet all applicable standards to which the Project is subject.

SIPC further reserves the right to modify interconnection relay settings when deemed necessary. If at any time it is determined that the use of the planned or installed relay systems cannot provide

adequate protection to the SIPC system, the Owner/Operator shall, at their expense, furnish and install additional relaying as requested by SIPC.

Customer will install and maintain protective equipment that will open the connection of Customer's facilities to the SIPC System prior to the action of SIPC's protective equipment, upon the occurrence of a disturbance on or at the Project Facility.

SIPC will have the right to review and accept the Customer's proposed voltage transformations to avoid adverse impact upon SIPC and Customer facilities, operations and safety.

The Customer should address all of the following design and operational requirements that are applicable to the Project:

- Safety of the general public
- Dynamic stability and the use of power system stabilizers as required by a Regional Reliability Organization.
- Prevention/minimization of equipment damage
- Minimization of equipment outage time
- Minimization of system outage area
- Minimization of system voltage disturbances
- Maintenance of protective system coverage for abnormal conditions
- Performance of all appropriate studies: grounding, short circuit, stability, power quality, and coordination of protective devices
- Specification of RTU protocols and other communication channels
- Coordination of remote trip schemes, underfrequency load shedding schemes, undervoltage load shedding schemes and special protective systems should be required whether in the same Balancing Authority Area or different Balancing Authority Areas.

8. Telemetering and Metering

All electrical energy delivered at the Connection will be measured by suitable metering equipment. The metering interface equipment must be compatible with the data acquisition systems of both SIPC and the Customer. SIPC may install, own, operate and maintain all metering equipment at Customer's expense. Customer will provide suitable accessible space for the installation of the metering equipment at no cost to SIPC. These meters will measure and record peak and integrated real and reactive power in and out of the interconnection at a rate determined by SIPC.

Typical metering data requirements could include the following:

- kW
- kWh
- kVAR, leading and lagging
- kVAR-hour
- kV2-hour
- voltage (to monitor voltage schedule compliance)

Metering equipment installed by SIPC will be tested by SIPC at regular intervals and at any other reasonable time upon request by either Party, at the requesting Party's expense. Customer will have the right to witness all testing and will be furnished all test results on a timely basis.

Customer may, but will have no obligation, to install, own, operate and maintain at its own expense meters and associated equipment used to back up metering equipment maintained by SIPC.

If, for any reason, any metering equipment is out of service or malfunctioning, the electrical energy delivered during the period of outage will be estimated and agreed upon using the best data available. The correction and compensation for metering errors and losses will be covered contractually in the Agreement(s).

The Customer should address all of the following design requirements that are applicable to the Project:

- Loss compensation
- Bi-directionality
- Metering accuracy
- Ancillary equipment specifications (*e.g.*, CT's, PT's)
- Provisions for maintenance and calibration
- Data protocol
- Mode of data transmission (*e.g.* fiber optic cable, phone line)
- Provisions for maintaining continuity and meeting reliability criteria

9. Supervisory Control and Data Acquisition (SCADA)

If, at the discretion of SIPC, the Customer's Project necessitates real-time telemetry to the SIPC control center, the Customer will install and operate at its expense the necessary supervisory control and data acquisition equipment, communication channel, the telemetry equipment and all associated devices.

At the discretion of SIPC, generation control facilities and supervisory control and data acquisition of specific electrical devices may be necessary to integrate the Customer's generation into SIPC's control area. Such facilities, including required communication channels, will, if required, be furnished and installed at the Customer's expense. The requirement for data acquisition and control will depend on the generation capacity, system location and voltage, and the net generation delivered at the point of connection to SIPC's.

Telemetry equipment will include transducers, remote terminal units, modems, telecommunication lines, and any other equipment necessary to transmit information necessary for the proper operation of the SIPC system. The remote terminal unit, or equivalent device, may need to have multiple communication ports to allow simultaneous communications with third parties, such as MISO. That device will accommodate data communication requirements specified by each Parties' control center, including communication protocol, rate and mode (either synchronous or asynchronous).

All metered values provided to the telemetry equipment will originate from common metering equipment. All transducers used for telemetry will meet industry standard accuracy. As part of real-time data to be provided, SIPC has the right to require the status and remote control of switching devices at the Project.

Typical data requirements could include the following:

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

The Customer should address all of the following design requirements that are applicable to the Project:

- Communication protocol
- Mode of data transmission (*e.g.* fiber optic cable, phone line)
- Control functionality (breakers, switches, etc.)
- Provisions for maintaining continuity and meeting reliability criteria (*e.g.*, dual DC sources, dual port RTUs)

10. System Grounding

SIPC will have the right to review and accept the Customer's proposed grounding design to avoid adverse impact upon SIPC and Customer facilities, operations and safety.

The Customer should address all of the following design requirements that are applicable to the Project:

- Grounding study
- Compatibility with Transmission Owner's system
- Construction techniques and inspection requirements (if any) of the Transmission
- Testing
- Periodic maintenance
- Personnel safety considerations
- Interconnection of grounding system to Transmission Owner grounding system(s)
- Transmission line shielding provisions
- Arrester applications
- Cathodic protection

11. Equipment Ratings

Customers Facilities should be rated according to applicable industry standard methods and assumptions, including IEEE Standard 738-1993, ANSI/IEEE Standard C37.37-1979, and ANSI/IEEE Standard C37.37-1992. Maintenance of equipment must be compliant with NERC and Regional Reliability Organization Reliability Standards

The Customer's Project should be consistent with SIPC ratings, and be able to operate in its expected mode without undue maintenance or life reduction.

The Customer must coordinate its switching surge and lightning protection systems with SIPC lightning protection systems. Careful attention needs to be given to the proper insulation levels and grounding techniques employed. If switching surges are expected to be a problem, circuit breakers may need to be equipped with closing and/or opening resistors and/or zero crossing switching capability.

The Customer should address all of the following design requirements that are applicable to the Project:

- Identification of general design parameters and practices of Transmission Owner (*e.g.*, shielding, attachment details, surge protection, current-carrying elements, basic insulation levels, etc.)
- Provision for Transmission Owner review of facility design and specifications
- References to applicable industry standards (e.g., ANSI/IEEE) for equipment provided by applicant in connection with project
- Special requirements due to atmospheric, geological, seismic, or environmental conditions
- Responsibility for changes to existing transmission system made necessary by the project

12. Reactive Power Requirements

Requirements for Customers with generation are outlined below.

The Customer will provide Automatic Voltage Control and coordinate its control with SIPC's system.

Under normal conditions, the Facility's generating unit(s) will not cause voltage excursions outside of the range of 95% to 105% of nominal voltage and not exceed the range of 90% to 110% during emergency conditions. Customer will operate the Facility to maintain voltage schedules required by SIPC. Without limiting the generality of the foregoing, the generating units at the Facility will be capable of operating at a power factor of 90% lagging and 95% leading when the generating units are at full gross power output, as measured on the low side of the Facility's main transformer, it being understood that steady state stability limits may restrict leading power factor operation to levels higher than 95% leading power factor. So that voltage levels are maintained at the levels scheduled by SIPC, Customer will monitor and adjust the generator(s) at the Facility to maintain such voltage levels. Under certain conditions where a voltage schedule is inappropriate, SIPC may substitute adherence to a specified reactive output of the generator(s).

The Customer will not cause excessive voltage excursions and will remain within +/- 5% of nominal voltage ratings during normal and single contingency operation. Further restriction may be necessary to prevent harm to other customers' equipment.

All generating unit(s) on SIPC's system will conform to SIPC's Generating Control and Protection Requirements. These Requirements will be determined by the specific Project.

The Customer should address all of the following design requirements that are applicable to the Project:

- Internal plant systems design (*e.g.*, transformer rating/taps/impedance, cooling systems, generator/exciter rating) should not limit continuous reactive capability.
- Transmission interconnected equipment should have the tap ranges and self-regulation necessary to accommodate the transmission system's reactive power flow requirements.
- Load power factor
- Generator power factor
- Load equivalent sources of reactive power, if acceptable
- Generator equivalent sources of reactive power, if acceptable
- Transmission interconnections impact on adjacent areas' reactive power flow requirements

Operational requirements that should be addressed include:

- Testing to verify reactive support capability per NERC Reliability Standards
- Generator step-up transformer (GSU) tap changes as necessary to meet voltage
- Schedule and reactive support requirements
- Range of generator continuous rated MW output associated with reactive support capability (*e.g.*, > 10 MW)

13. Power Quality

The Facility Owner/Operator shall take responsibility for limiting Harmonic voltage and current distortion and/or voltage Flicker caused by their equipment. Specific SIPC Harmonics and Flicker criteria are given in Appendix II.

Customers with unusual load characteristics, which create damaging torsional oscillations on motors and generators, shall install the requisite electrical equipment (filtering and/or damping) needed to modify their load characteristic so their resulting load characteristic at the point of interconnection does not harm SIPC or its customers.

The Customer with generation will provide SIPC with immunity from consequences of torsional oscillations resulting from transmission system operations, and insure that the turbine-generator is not excited into resonance by normal system operations.

In cases where it is determined by SIPC in its sole reasonable judgment that starting of induction motors or load changes on other equipment at the Facility could have an adverse impact on the SIPC System voltage, Customer will take such action as reasonably required by SIPC to bring voltage changes to acceptable levels.

The Customer should address all of the following design requirements that are applicable to the Project:

- Power quality studies may be required to define acceptable operating ranges and limits. Studies may include, but not be limited to:
    - Voltage Unbalance
    - Voltage Flicker

- Voltage Fluctuation
- Harmonic Distortion
- Transient Overvoltage
- Temporary Overvoltage
- Temporary Undervoltage
- Insulation Coordination
- Operating Frequency
- Power Factor Range
- Interruption/Outage Frequency

Studies may identify additional equipment necessary to meet power quality standards.
The Customer should address all of the following operational requirements that are applicable to the Project:

- Connection of a generator, transmission facility, or end-user load to a Transmission Owner's system should not unacceptably compromise or degrade the power quality of existing customers.
- Installation of power quality monitoring equipment by SIPC to verify facility Owner/Operator compliance with power quality performance requirements

14. Synchronizing Facilities

Customer will be solely responsible for properly synchronizing with the SIPC System all generator(s) that are a part of the Facility in accordance with the synchronization procedures provided by Customer and approved by SIPC for generators interconnected to the SIPC System. SIPC will have the right to review, approve and monitor such synchronization procedures.

Customer will not energize a de-energized circuit owned by SIPC except as directed by SIPC in accordance with all SIPC safety and operational protocols, in effect from time to time.

The Facility will own, test, and maintain equipment that will synchronize the facilities to the Transmission System. The Facility Owner/Operator assumes all responsibility for properly synchronizing their facilities with the Transmission System. Upon loss of the SIPC supply, the Facility shall immediately be separated from the Transmission System. Synchronizing of facilities to the Transmission System may be, at SIPC's discretion, performed under the direction of the SIPC SOC.

The Customer should address all of the following design and operational requirements that are applicable to the Project:

- Required communications necessary between SIPC/Operator and the Customer.
- Synchronizing equipment
- Test plans
- Applicable reclosing requirements and prohibitions for generation and transmission facilities
- Remote synchronizing capability for facilities

15. Facility Equipment and System Protection Maintenance Coordination

The Customer's Project should be designed to permit safe routine and emergency maintenance on all components. Redundancy levels should be consistent with the Project's operational obligations.

Project maintenance schedules should be provided to SIPC with enough lead-time to resolve coordination issues.

Except in the case of an Emergency, the Parties will use Good Utility Practice to schedule planned and unplanned inspection and maintenance of interconnection facilities consistent with NERC and Regional Reliability Organization Standards. Planned and unplanned clearance and maintenance of equipment that requires disconnection of the Facility from the SIPC System will be, to the extent feasible, at mutually agreed upon times designed to avoid disruption of the operation of the Facility and SIPC's operations and service to its other customers.

The Customer should address all of the following operational requirements that are applicable to the Project:

- Definition of maintenance programs, responsibilities and performance objectives
- Authorization, notification and clearances for work
- Generation: Such planning should take into account unit commitment obligations, replacement power, and / or contractual obligations.
- End-Users: The maintenance practices of the end-user on their transmission-connected equipment should be performed at a level that ensures the reliability of the interconnected transmission system.
- Transmission Interconnections: Requirements (if any) for advanced publication of maintenance schedules, including any need to observe limitations imposed by generation maintenance and dispatch schedules, maintenance of associated facilities, transmission transaction schedules, and area protection or voltage requirements.

If the Customer's system protection equipment testing and maintenance program is not performed to the satisfaction of SIPC or at the required maintenance interval (i.e. in accordance with good utility practice), SIPC reserves the right to inspect, test, or maintain devices required for the protection of SIPC's system at the Customer's expense. If the Customer's protective equipment is determined to be unsatisfactory, SIPC reserves the right to disconnect the Customer from the SIPC System until the protective equipment is brought into conformance at the Customer's expense.

The Customer should address all of the following operational requirements that are applicable to the Project:

- The Facility Owner/Operator is responsible for the regularly scheduled calibration and/or maintenance of its equipment, including, but not limited to:
    - Circuit breakers
    - Generators
    - Power transformers
    - Protective relays

- Revenue metering
- Communications
- Trip circuits
- Interrupters
- Power DC sources
- Grounding system
- Transmission facilities

The maintenance practices of the generator and transmission Facility Owner/Operator, and end-user on their transmission-connected equipment shall be performed at a level that ensures the reliability and continuity of service of the interconnected transmission system. Maintenance programs and records that are compliant with NERC and Regional Reliability Standards should be maintained.

16. Abnormal Frequency and Voltage Operation

All Energy delivered at the Interconnection Point will be in the form of three-phase alternating current having a nominal frequency of sixty cycles per second, and a harmonic content consistent with the requirements of the Institute of Electrical and Electronic Engineers Standard No. 519.

Customer will provide and maintain operable governor systems that are responsive to system frequency deviations. Overspeed protection in the event of load rejection is the responsibility of the Customer.

The Customer should address all of the following design requirements that are applicable to the Project:

- Consideration for abnormal voltage conditions
- Consideration for abnormal frequency conditions
- Consideration for generators connected through a tapped transmission line (e.g., islanding)
- Relay coordination to maintain stability
- Load shedding implementation

The Customer should address all of the following operational requirements that are applicable to the Project:

- Provisions for abnormal voltage conditions
- Provisions for abnormal frequency conditions
- Provisions for load shedding
- Special procedures for coordination

17. Design, Inspection, and Operation Requirements

Within at least six (6) months prior to the proposed in-service date of the facility, the Owner/Operator is required to notify SIPC of its intent to install and operate the Project with all necessary attachments, which shall include:

1. A summary signed by the Facility Owner/Operator management that provides a general description of the intended manner of operation for the Facility.

2. Three copies of drawings and specifications prepared and approved by a registered professional engineer adequately detailing the Facility location and proposed location of the facilities with respect to the Facility Owner/Operator's Interconnection and the appropriate disconnecting devices.

Three copies of a comprehensive single-line diagram prepared and approved by a registered professional engineer. This information must comprehensively show the Facility Owner/Operator's intended configuration for operation including switching devices, transformers, protective devices, metering devices, capacitors, proposed conductor sizes, etc.

SIPC will review the information supplied and provide appropriate engineering and operational comments and/or concerns that must be addressed and jointly resolved with SIPC. This review will also include a summary addressing other tangible responsibilities and associated estimated costs the Facility Owner/Operator will incur.

Facility Data

At least three (3) months prior to the in-service date, SIPC shall receive the following data as listed below. If the data is not available three months prior to the in-service date, the Facility Owner/Operator shall provide estimates based on their design information. The Facility Owner/Operator shall identify such data, as "estimated" and replaced with actual data as it becomes available prior to installation. The purpose of Facility data to be provided to SIPC by the Facility Owner/Operator is to ensure proper coordination to protect against equipment or facility damage, to mitigate safety hazards to utility personnel and the public, and to minimize disturbances, impairment, or interference with SIPC's ability to serve other Transmission System users.

Data on Equipment to be installed:

a. Interrupting Devices and Relays - Complete manufacturer's data for interrupting devices and relays or fuses used for the protection of the SIPC system and the Facility.

b. Power Transformers - Complete nameplate or test sheet data, including manufacturer, serial number, high- and low-side voltage taps, kVA ratings, impedance, load loss and no load loss watts, high- and low-side voltage winding connections, low-side voltage winding grounding (if used), and high voltage inrush current.

c. Power Capacitors - Location, kV and kVAr rating of capacitor banks, number of units, and bank configuration.

d. Data on the Facility protection equipment, including make-before-break transfer switches, fuses, breakers, relays, relay settings associated with the proposed Facility, and detailed schematic diagrams of protective relaying proposed for the Transmission System. Complete manufacturer's data and specifications for make-before-break transfer switches, including

transfer times and conditions of transfer, testing procedures, equipment schematics, and backup protection.

Information on characteristics of load, such as initial and near future expected load (MW and MVAR), power factor of such load, voltage level at point of interconnection, and dynamic (Flicker, Harmonics, etc.) character of such load.

Minimum and maximum required operating voltages.

Generator Data (if applicable):

a. Type (synchronous, induction, dc with solid-state inverter, etc.)

b. Nameplate data and ratings, including any rectifying, regulating, or inverting equipment

c. Harmonic content at full rated output

d. Detailed Generation Dynamic Performance Data.

e. Real and reactive capabilities at scheduled voltages.

Electric one-lines and schematic diagrams showing the Facility, the Interconnection Facilities, the Transmission System, and the protective relaying.

SIPC personnel must inspect and approve the Facility before it can be energized. The inspection will consist of a visual inspection of all major equipment as well as review of required test results. Inspection and testing may include, but need not be limited to:

- The acceptance testing of all Protective Equipment according to SIPC minimum requirements;
- The placement of in-service relay taps according to settings
- The operability of the Protective Equipment; and
- The phasing and synchronizing checks of all related equipment.

During construction and start-up SIPC will monitor construction of the Customer's Facility to assure compliance with SIPC safety and construction standards. SIPC reserves the right during system start-up and operation to witness all service checks, protection and control device calibrations, settings and routine testing. SIPC's review process does not relieve the Customer of its obligation to perform and document these activities.

The Facility Owner/Operator will be responsible for operating their Facility in a safe manner, and with full cooperation under the supervision of the SIPC System Operator, Reliability Coordinator. For generators, the Facility Owner/Operator will also notify SIPC as soon as practical regarding the removal of any faulted equipment from the Facility associated with the high voltage side of the step-up transformer. A Facility generator shall not synchronize to, nor supply power into, the

Transmission System unless a specific agreement has been made to supply power to the Transmission System in accordance with appropriate open access transmission tariffs.

Only under the direct supervision of the SIPC System Operator will the Facility at any time energize any part of the Transmission System facilities that have been de-energized. Failure to comply has the potential to cause hazard or injury to personnel or to the public as well as damage to equipment and thus make the Facility Owner/Operator liable for such damages.

Customer will provide SIPC with test and maintenance data as reasonably required by SIPC.

The Customer should address all of the following operational requirements that are applicable to the Project:

- Initial (pre-operational) inspection and approval by SIPC and/or copies of pre-operational test reports to be provided to SIPC. Include any requirements for approval by SIPC prior to commercial operation and options of SIPC to specify additional testing.
- If applicable, required right of access to the facility by SIPC for purposes of conducting inspections, observing tests, and auditing records required by NERC standards and established reporting procedures
- Requirements for facility Owner/Operator to modify operations to reasonably comply with Transmission Owner testing requirements

18. Communications During Normal and Emergency Conditions

The Customer will establish voice communication channels with SIPC so that responsible and authorized personnel can issue requests and/or orders that may impact Project reliability as well as the security and stability of the SIPC System. The Customer will be expected to notify SIPC of the occurrence or expectation of any event that may affect the SIPC system.

The Customer will maintain redundant communication links to SIPC. Standard telephone lines may be used for communications.

Customer will notify SIPC as soon as possible of any disruption, malfunctioning or unavailability of the communication link.

The Customer should address all of the following operational requirements that are applicable to the Project:

- Provision for a point of contact

  Each generation and transmission facility operator and end-user facility shall include a provision for establishing a contact person for communications with the appropriate operating entity. This contact person shall have the authority and capability to operate the facilities according to the instructions of the appropriate operating entity.

- Provision to obtain required approval

All Generator Operators shall have provisions to obtain required approval from the appropriate operating entity prior to starting generation and connecting to the transmission system. All Transmission Operators shall obtain proper clearances from the appropriate operating entity before commencing any work on the transmission facilities.

19. Responsibilities During Normal Conditions

The IA between SIPC and Customers with generation will include normal operating procedures and switching responsibilities for generation connected to SIPC's transmission system. The IA will also specify coordination and Facility integration responsibilities during normal operation, and, if applicable, penalties resulting from differences between the Customer's actual and scheduled generation.

Customer will operate the Facility with its speed governors and voltage regulators in operation whenever the Facility is connected to or operated in parallel with the SIPC System. If the Facility's voltage regulators are out-of-service, the Customer will immediately notify SIPC's System Operator or its designated representative and will maintain voltage as prescribed by SIPC's System Operator or its designated representative and ensure that generator MVAr levels are within the capability of the Facility's generators and steady state stability limits.

The Customer should address all of the following design requirements that are applicable to Generation specific facility requirements:

- Synchronizing with the transmission system
- Parallel operation with the transmission system

Customer will report generation schedules to SIPC as needed for area operational control.

SIPC may periodically review pertinent aspects of the Project's operation, maintenance, and condition during the Project's life, in order to assure continuing safety and reliability of SIPC's system.

Large generating Facilities may be required to maintain some amount of spinning reserve during normal operation, to allow its participation in area load balancing.

20. Responsibilities During Emergency Conditions

The IA between SIPC and Customers with generation will include emergency operating procedures and switching responsibilities for generation connected to SIPC's transmission system. The IA will also specify coordination and Facility integration responsibilities during abnormal operation, and, if applicable, penalties resulting from differences between the Customer's actual and scheduled generation.

Upon loss of SIPC supply the Customer will separate from SIPC's transmission system. The customer will coordinate synchronization and operation of the Facility with SIPC. The Customer is solely

responsible for all synchronizing damages that may ensue from improperly synchronizing their generation to the SIP transmission system.

Customer will not cause the Facility to disconnect automatically or instantaneously from the SIPC System or trip any generating unit comprising the Facility for an under or over frequency condition unless the abnormal frequency condition persists in time beyond the limits set forth in ANSI/IEEE Standard C37.106.

Customer will not energize a de-energized circuit owned by SIPC except as directed by SIPC in accordance with SIPC safety and operational protocols, in effect from time to time.

SIPC reserves the right (without consultation when time doesn't permit) to open the interconnecting facilities or curtail flows for compliance with safety and reliability standards, abnormal operating conditions or characteristics (including system disturbances, open conductors, etc.), and operating emergencies until such time as compliance is achieved. In some instances the Customer may be required to interrupt or curtail service under the operating authority of SIPC to avoid injury to life or property.

Customer will not energize or maintain energization to disconnected SIPC facilities unless directed to do so by SIPC. Normal energization and manual restoration of service to SIPC and Customer interconnected facilities will be directed by SIPC. The Customer's protection and control schemes must recognize the loss of source(s) at the interconnection point and initiate automatic disconnection from the point of interconnection.

Customer will furnish a manual disconnect device whose open condition is visibly verifiable, to separate Customer's Connection and related equipment and facilities from interconnection with the SIPC system. This device will have a means for padlocking in the open position. The location of this device will be determined by mutual agreement and be readily accessible to SIPC at all times. Where the disconnect device is a part of or directly connected to the SIPC System the disconnect device will be operated only after authorization from SIPC's System Operator or its designated representative.

SIPC reserves the right without liability to open this disconnecting device or other devices under its control, isolating Customer's Connection and related equipment and facilities, if in its sole judgment an Emergency has occurred or is imminent.

Except in the case of an Emergency, SIPC will provide to Customer oral or written notice prior to any disconnection. As soon as reasonably practicable after occurrence of an Emergency, SIPC will provide to Customer oral or written notice of the nature thereof, together with the expected duration of the disconnection from the SIPC System.

Customer transactions may be curtailed if SIPC or regional facilities become overloaded, in accordance with established line loading relief practices.

The Customer shall communicate with and shall cooperate with SIPC to support the recovery efforts during emergency conditions. This may include, but may not be limited to (as appropriate):

- Switching operations
- VAR support
- Adjustments in real or reactive generation net output
- Tripping of generating unit(s)
- Starting of generating unit(s) including black start units
- Implementation of emergency communication procedures
- Transmission facility restoration efforts

The Customer should address all of the following design requirements that are applicable to Generation specific facility requirements:

- Islanding

VII. Small Generator Interconnection Procedures

This is based upon the MISO procedure and applies to generation interconnection requests that are 20 MW. Interconnections requesting SIPC OATT Network Resource status must use the Large Generator Interconnection Process. The purpose of this page is to provide a quick guide to the interconnection procedure.

An overview of the Small Generator Interconnection Procedure (SGIP) is shown in the table below.

Small Generator Interconnection Procedure (SGIP) Overview - Study Process			
No.	Procedure Stage	Required Submission	Notes
1	Application	Deposit Complete application form.	To avoid losing queue position, please make sure all requested technical data are provided using specified forms.
2	Feasibility Study	Technical data Executed study agreement Study deposit.	This study will identify potential adverse system impacts resulting from the interconnection and include, but not limited to a short circuit, thermal, and voltage analysis.
3	System Impact Study	Technical data Executed study agreement Study deposit.	This study will include, but not limited to, a power flow, short circuit, voltage, stability, and system protection analysis. Study results will include a preliminary indication of the cost and length of time that would be necessary to correct any problems identified in the analysis and implementation of the interconnection.
4	Facility Study	Executed study agreement Required technical data, if any. Study deposit.	This study will specify and estimate the cost and time schedule for the modifications needed to implement the conclusions from the system impact study.
5	Interconnection Agreement	Executed agreement.	

The Customer will provide to SIPC electrical static and dynamic characteristics of the Facility's generators and associated control systems and transformers, including generator capability curves and all turbine, generator step-up, voltage regulator and governor data, promptly after receipt

thereof by Customer. Customer will notify SIPC promptly in writing of any change to such characteristics.

SIPC may perform, or cause to be performed, stability analyses in order to verify that the generating units at the Facility meet SIPC system stability requirements. If any such analysis shows that such equipment loses or could lose synchronization under any reasonable scenario, Customer will install at its expense out-of-step protection or special generator trip schemes as reasonably required by SIPC. If detailed stability simulations are required, Customer will provide data pertaining to the generator(s) and related control systems. Stability studies performed by or for SIPC will not evaluate the risk to the Facility or equipment of Customer due to unstable operation of Customer's generator(s). It is the responsibility of Customer to assess these risks and protect accordingly.

VIII. Large Generator Interconnection Procedures

This is based on the MISO procedure and applies to generation interconnection requests that exceed 20MW or that are requesting Network Resource Interconnection Service (NRIS). A complete procedure is described in SIPC OATT. The purpose of this page is to provide a quick guide to the interconnection procedure.

An overview of Large Generator Interconnection Procedure (LGIP) is shown in the table below:

Large Generator Interconnection Procedure (LGIP) Overview			
No.	Procedure Stage	Required Submission	Notes
1	Application	Deposit Complete application form Demonstration of site control or additional deposit.	To avoid losing queue position, please make sure all requested technical data are provided using specified forms.
2	Feasibility Study	Technical data Executed study agreement. Study deposit.	Item 1 should be provided no later than item 2.
3	System Impact Study	Executed study agreement with necessary technical data. Demonstration of site control. Study deposit.	
4	Facility Study	Executed study agreement. Required technical data, if any. Study deposit.	May require monthly payment.
5	Optional Study	Executed study agreement. Necessary technical data, if any. Study deposit.	This step is optional and could occur only after system impact study.
6	Interconnection Agreement	Executed agreement. Evidence of site control or additional security. Evidence that certain milestones have been achieved.	Please refer to OATT attachment X for a list of example of milestones.

The Customer will provide to SIPC electrical static and dynamic characteristics of the Facility's generators and associated control systems and transformers, including generator capability curves and all turbine, generator step-up, voltage regulator and governor data, promptly after receipt

thereof by Customer. Customer will notify SIPC promptly in writing of any change to such characteristics.

SIPC may perform, or cause to be performed, stability analyses in order to verify that the generating units at the Facility meet SIPC system stability requirements. If any such analysis shows that such equipment loses or could lose synchronization under any reasonable scenario, Customer will install at its expense out-of-step protection or special generator trip schemes as reasonably required by SIPC. If detailed stability simulations are required, Customer will provide data pertaining to the generator(s) and related control systems. Stability studies performed by or for SIPC will not evaluate the risk to the Facility or equipment of Customer due to unstable operation of Customer's generator(s). It is the responsibility of Customer to assess these risks and protect accordingly.

IX. Provisions that apply to all Interconnection Requests

GENERAL

Agreement(s)will be required to specify the legal rights and responsibilities of the Customer and SIPC related to the Project. Agreement(s) will include: Cost and work responsibilities; reasonable security deposits, communications, liability, insurance, penalties for non-performance, responsibilities under normal and emergency conditions, and other provisions as required.

Filings at, and approvals from, regulatory agencies may be required for interconnection facilities associated with the Project. Possible agencies include FERC, RUS, the ICC, local governmental agencies, and environmental agencies, depending on the nature of the Project and associated SIPC facilities.

Customer and SIPC will assist one another and use all reasonable efforts in making necessary filings and obtaining any necessary approvals of the Agreement as promptly as practicable. In the event any agency requires changes in the Agreement as a condition to its acceptance or, if applicable, approval of the Agreement, the Parties will negotiate in good faith with respect to revising the Agreement to reflect such changes.

COSTS

The Facility Owner/Operator shall reimburse all costs incurred by SIPC to provide an interconnection of their Facility to the Transmission System. The costs include but are not limited to:

1. Each review of the engineering and engineering drawings associated with the Facility.
2. All metering not covered under the OATT of general applicability.
3. All necessary facility modifications on the Transmission System to adequately accommodate the interconnection of the Facility Owner/Operator’s facilities.
4. All communications circuits required for telemetering, protective relaying, and/or voice communications with the Facility.
5. All protective relaying and devices required for the protection of the Transmission System due to the addition of the Facility.

6. All protective relaying required for protecting the Facility from faults and abnormal system operating conditions.
7. SIPC equipment replacements or modifications due to an increase in available short circuit fault current directly caused by the addition of the Facility Owner/Operator's equipment.
8. Calibration, testing, and maintenance of relays and protective devices provided by the Facility Owner/Operator for the protection of the Transmission System.
9. All telemetering equipment to provide necessary telemetry to the SIPC SOC.
10. All studies performed by SIPC pertaining to the Facility.

INDEMNIFICATION

The Facility Owner/Operator, for itself, its successors, assigns and subcontractors will be required to pay, indemnify and save SIPC, its successors and assigns, harmless from and against any and all court costs and litigation expenses, including legal fees, incurred or related to the defense of any action asserted by any person or persons for bodily injuries, death or property damage arising or in any manner growing out of the use and reliance upon the information provided by SIPC. Reliance upon the information in this document shall not relieve the Facility Owner/Operator from responsibility for the protection and safety of the general public.

The use and reliance upon the information contained in this document shall in no way relieve the Facility Owner/Operator from the responsibility to meet NEC and NESC requirements governing their design, construction, operation, and materials.

APPENDIX I
Definitions

Agreement The document specifying the legal rights and responsibilities of the Parties regarding a particular Project.

ANSI American National Standards Institute

Application Customer information providing to SIPC, data necessary for the evaluation and coordination of a Project with SIPC's system

Control Area means the collection of generation, transmission, and loads within the metered boundaries of a Control Area with automatic generation control equipment that is used to maintain load-interchange-generation balance within that Area, and supports Interconnection frequency in real time.

Connection The electrical interconnection of the Project to SIPC's system, including auxiliary equipment such as controls and protective devices necessary for proper operation of the interconnection

Customer The entity owning and controlling a Project connected or proposed to be connected to SIPC's system

Emergency An event or condition in which safety or the reliability of the local or regional electric system has or may imminently be compromised

FERC Federal Energy Regulatory Commission

Flicker means low frequency voltage fluctuations that can be observed through changes in intensity or color of illumination. Flicker is measured using an IEC flicker meter.

Generation means the electrical capacity and energy produced at the Facility, if applicable.

Good Utility Practice means any of the practices, methods and acts engaged in or approved by a significant portion of the electric utility industry in the United States. These practices may occur during the relevant time period, or any of the practices, methods and acts, which, in the exercise of reasonable judgment in light of the facts known at the time the decision was made. They could have been expected to accomplish the desired result at a reasonable cost consistent with good business practices, reliability, safety and expedition. Good Utility Practice is not intended to be limited to the optimum practice, method, or act to the exclusion of all others, but rather includes all acceptable practices, method, or acts generally accepted in the region. Good Utility Practice shall include, but not be limited to, NERC, the Regional Reliability Organization, MISO, and National Electrical Safety Code criteria, rules and standards, as they may be amended from time to time, including the rules and guidelines and criteria of any successor organizations.

Harmonics means the content of a signal whose frequency is an integer multiple of the actual system frequency, i.e. the main frequency produced by the generators or for the United States, 60 cycles per second.

ICC Illinois Commerce Commission

IEEE Institute of Electrical and Electronic Engineers

Interconnection Agreement means the agreement that documents the physical interconnection between the Facility Owner/Operator (if a generator owner or transmission entity) and SIPC, and defines the continuing responsibilities and obligations of the Facility Owner/Operator and SIPC during the term of the agreement.

MISO means the Midwest Independent Transmission System Operator, Inc. or any other independent system operator or regional transmission organization or group to which the Transmission System becomes subject to or parts of, or any successor organization(s).

Metering Point means the point at which the amount of Generation delivered to the Transmission System is measured, or the amount of load delivered to the customer or the amount of power exchanged between SIPC and another transmission entity.

NERC means the North American Electric Reliability Council or any successor organization.

OATT means the SIPC Open Access Transmission Tariff which may be modified from time to time.

REGIONAL RELIABILITY ORGANIZATION. One of the regional entities with delegated authority from NERC.

NERC North American Electric Reliability Council, or its successors

Party(ies) The Customer and/or SIPC

ProjectA facility including an electrical interconnection to SIPC's system, generation and/or load, and associated auxiliary equipment including controls and protective devices

RUS Rural Utility Services. A Federal agency concerned with power Cooperatives, including SIPC

SIPC Southern Illinois Power Cooperative

SCADA means Supervisory Control and Data Acquisition system.

Transmission System means the transmission facilities owned, operated or controlled by SIPC, including conductors, circuit breakers, switches, transformers and other associated equipment used to control the transfer of energy from one place to another, and shall include any modifications, additions, or upgrades made to those facilities.

APPENDIX II

Harmonic Voltage and Flicker Requirements

Power output at the Facility will be in accordance with the power quality standards contained in the Institute of Electrical Engineers Standard 519, and the Facility will not introduce any distortion of SIPC's waveform, telephone or carrier interference that is inconsistent or conflicts with such standard.

Acceptance of Flicker emissions by the Facility Owner/Operator shall follow IEC 61000-3-7, "Assessment of emission limits for fluctuating loads in MV and HV power systems." Compatibility levels for LV (≤1 kV) Flicker are Pst = 1.0 and Plt = 0.8. Planning levels for MV (1kV<V≤35kV) Flicker are Pst = 0.9 and Plt 0.7. Planning levels for HV and EHV (>35kV) are Pst = 0.8 and Plt = 0.6.

Depending upon the nature of the Facility and its location, SIPC may require the installation of a monitoring system to permit 1 Flicker is low frequency voltage fluctuations that can be observed through changes in intensity or color of illumination. Flicker is measured using an IEC flickermeter. Ongoing assessment of compliance with these criteria may be required. The monitoring system, if required, will be installed at the Facility Owner/Operator's expense.

Situations where high voltage Flicker, high harmonic voltages and/or high harmonic currents originate from the Transmission System are to be addressed in the Interconnection Agreement.

The maximum voltage wave distortion caused by the Customer will be less than 5.0% (Including a 1.0% phase voltage unbalance). Voltage unbalance is defined as the maximum phase deviation from average as specified in ANSI C84.1, "American National Standard for Electric Power Systems and Equipment – Voltage Ratings, 60 Hertz."

The customer shall limit harmonic voltage and current distortion and/or voltage flicker (objectionable low voltage fluctuation) caused by the Project. Limits for harmonic distortion (including inductive telephone influence factors) are consistent with those published in the current version of ANSI/IEEE 519, "Recommended Practices and Requirements for Harmonic Control in Electrical Power Systems". Flicker occurring at the point of interconnection shall remain below the BorderLine of Visibility curve on the IEEE/GE curve for fluctuations less than 1 per second or greater than 10 per second. However, in the range of 1 to 10 fluctuations per second, voltage flicker shall remain below 0.4%. Depending upon the nature of the Project and its location, SIPC may require the installation of a monitoring system to permit ongoing assessment of compliance with these criteria. The monitoring system, if required, will be installed at the customer's expense.

Projects including inverters to convert DC output to AC connected to the SIPC system shall comply with the IEEE Standard 929-2000.