FACILITY CONNECTION REQUIREMENTS

Energy Delivery Transmission & Distribution Engineering

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1 PURPOSE

To avoid adverse impacts on reliability, Transmission Owners must establish facility connection and performance requirements.

2 APPLICABILITY

- TRANSMISSION OWNER

3 SCOPE

This document, referred to as the Facility Connection Requirements (or "FCR"), is intended to serve as a reference to Applicants that are either considering connecting to, or modifying facilities that are already connected to, the portion of the Bulk Electric System owned by Lakeland Electric ("LAK")

This FCR covers Generation, Transmission, and End User (subject to local law limitations) Facilities Connection and is offered in response to the North American Electric Reliability Corporation ("NERC") Standard FAC-001-0 dated April 1, 2005 that requires transmission owners to publish their requirements for such connections. A copy of this Standard is available on the Internet at ftp://www.nerc.com/pub/sys/all_updl/standards/rs/FAC-001-0.pdf.

NERC Standard FAC-001-0 states that its purpose is "To avoid adverse impacts on reliability, Transmission Owners must establish facility connection and performance requirements". It requires that each Transmission Owner document, maintain, and publish FCRs to ensure compliance with NERC Reliability Standards and applicable Regional Reliability Organization, sub-regional, Power Pool, and the individual Transmission Owner planning criteria and facility connection requirements. This FCR is intended to conform to those requirements.

All new connections or modifications to existing connections to the portion of the Bulk Electric System owned by LAK, including those to be constructed by its owner, must be in compliance with this FCR and all applicable construction standards of LAK. Such connections must also comply with all applicable NERC standards (or its successor), with all supplements thereto promulgated by the Florida Reliability Coordinating Council ("FRCC") such as a Regional Reliability Standard; PRC-024-FRCC-01, and all applicable industry standards and codes (e.g., OSHA, NEC, National Electric Safety Code, IEEE / ANSI Standards, etc.).

LAK reserves the right to modify and amend this FCR at any time. In addition, there may be future requirements established by NERC and FRCC that may require that this FCR be revised to incorporate such requirements.

4 REQUIREMENTS

4.1 FACILITY CONNECTION REQUIREMENTS FOR: (R1)

REQUIREMENT OWNER: ENERGY DELIVER TRANSMISSION & DISTRIBUTION ENGINEERING

THE TRANSMISSION OWNER SHALL DOCUMENT, MAINTAIN, AND PUBLISH FACILITY CONNECTION REQUIREMENTS TO ENSURE COMPLIANCE WITH NERC RELIABILITY STANDARDS AND APPLICABLE REGIONAL RELIABILITY ORGANIZATION, SUBREGIONAL, POWER POOL, AND INDIVIDUAL TRANSMISSION OWNER PLANNING CRITERIA AND FACILITY CONNECTION REQUIREMENTS. THE TRANSMISSION OWNER'S FACILITY CONNECTION REQUIREMENTS SHALL ADDRESS CONNECTION REQUIREMENTS FOR:

GENERAL CONNECTION REQUIREMENTS

These requirements apply to all new generation, transmission, and end user facilities to be connected to the portion of the Bulk Electric System owned by LAK and to modifications to any like facilities already connected.

CODES, STANDARDS, CONTRACTS, REGULATIONS, ETC.

All such facilities shall comply with all applicable codes, standards, government (Federal, State and Local) regulations, contracts, and operating agreements.

INTERCONNECTION AT A SUBSTATION

LAK will require all Interconnections, as defined in this document, to the Bulk Electric System owned by LAK must be at a substation. If no Interconnection substation exists at the point of interconnection, a new substation shall be constructed. This Interconnection substation shall be designed such that there are at least two (2) termination bays to allow the existing line to be looped through the station and the additional bays required for the new facilities. The new substation design shall be either a "breaker and a half" or a "ring bus" design. LAK will designate the appropriate design that will be required during the Application approval process.

4.1.1 GENERATOR FACILITIES (R1.1)

REQUIREMENT OWNER: ENERGY DELIVER TRANSMISSION & DISTRIBUTION ENGINEERING

GENERATION FACILITIES,

Generation facility Interconnection requirements are detailed in section 4.2

4.1.2 TRANSMISSION FACILITIES (R1.2)

REQUIREMENT OWNER: ENERGY DELIVER TRANSMISSION & DISTRIBUTION ENGINEERING

TRANSMISSION FACILITIES, AND

Transmission facility Interconnection requirements are detailed in section 4.2

4.1.3 END-USER FACILITIES (R1.3)

REQUIREMENT OWNER: ENERGY DELIVER TRANSMISSION & DISTRIBUTION ENGINEERING

END-USER FACILITIES

End-User facility connection shall be designed on an individual basis considering the facilities impact on the reliability of the Bulk Electric System and shall meet all the applicable requirements detailed in section 4.2

4.2 ITEMS TO BE ADDRESSED IN THE FACILITY CONNECTION REQUIREMENTS (R2)

REQUIREMENT OWNER: ENERGY DELIVER TRANSMISSION & DISTRIBUTION ENGINEERING

THE TRANSMISSION OWNER'S FACILITY CONNECTION REQUIREMENTS SHALL ADDRESS, BUT ARE NOT LIMITED TO, THE FOLLOWING ITEMS:

CONNECTION PROCEDURES, STUDIES AND AGREEMENT

It is the policy of LAK to permit any qualified Applicant to connect generation, transmission or end-use facilities ("Facilities") to its System and operate in parallel with its System (the "Connection") provided that there will be no adverse impacts on:

- The existing portion of the Bulk Electric System owned by LAK, and any sub-transmission systems (e.g., 69 kV system) owned by LAK (collectively referred to as the "Systems") and its safe and efficient operation;
- Neighboring utility systems;
- Planned connections and facilities with an earlier application date than that of the Applicant
- The general public
- On the tax-exempt status of any bond(s) issued to finance LAK facilities used in providing the facility connection service, etc.

The process for gaining interconnection to LAK's System is as follows:

- Application for Connection
- Connection Queue Assignment
- Feasibility Study
- System Impact Study
- Facilities Study
- Connection, Construction and Operations Agreement

These steps are laid out in more detail in the following sections.

4.2.1 Written Summary of Plans (R2.1)

Requirement Owner: Energy Deliver Transmission & Distribution Engineering

Provide a written summary of its plans to achieve the required system performance as described above throughout the planning horizon:

Step 1: Connection Application

All Applicants desiring to connect new facilities or to upgrade existing sites shall apply for a Facility Connection ("Application"). An Applicant shall submit a separate Application for each Connection and may submit multiple Applications for a single Facility. The Application must contain the following information, but is not limited to, dependent on the types of facilities the Applicant wishes to connect.

APPLICATION INFORMATION REQUIREMENTS

	Generation	Transmission	End-Use
Size	Maximum Gross and Net MW and MVAR Output	Project rating and voltage	Maximum MW and MVAR demand, projected load profile
Location of the proposed facility and Connection	Location of plant and proposed interconnection point	Proposed interconnection points (both ends), proposed line route	Location of End-Use Facilities and proposed interconnection point
Modeling Information for use in power flow, stability and short circuit models, including but not limited to	Ratings, impedances, time constants, gains, inertia constants; governor system, excitation system and power system stabilizer modeling information such plant type such as CT,GT and ST	Ratings, impedances, capacitance	Ratings, impedances
Construction Details	Projected in-service date, projected back-feed date, projected station service need date	Projected in-service date, projected construction schedule, construction type	Projected in-service date
Status of Site Acquisition	Status of site acquisition	Projected routing, status of ROW acquisition	Status of site acquisition
Permitting Status	Status of air permit, any other permits required	Status of siting approval, environmental permits, etc.	Status of any permits, including environmental

STEP 2: CONNECTION QUEUE ASSIGNMENT

The date and time at which LAK determines that the Application is complete ("valid") will be the official date of the Application. LAK shall assign a queue position based upon the date and time of the valid Application. The queue position of each Application will be used to determine the order of performing the studies and cost responsibility for facilities. A higher queued Application is one that has been placed "earlier" in the queue in relation to another Application that is lower queued.

LAK shall receive, process, and analyze all Applications for Connection on an equal basis, including Applications made by LAK. Applications will be processed in the order of Connection Queue priority.

WITHDRAWING FROM THE QUEUE

The Applicant may withdraw its Application at any time by written notice of such withdrawal to LAK.

Withdrawal shall result in the loss of the Applicant's Connection Queue position. An Applicant that withdraws its Application shall pay LAK all costs that LAK incur with respect to that Application. LAK will stop all work associated with the Application once notice is received. The Applicant must pay all monies due to the LAK before it is allowed to obtain any study data or results.

MODIFICATIONS TO CONNECTION APPLICATION

Changes can be made to the Connection Application as long as the changes are not significant at any time before the start of the System Impact Study. Allowable changes include:

- Minor reconfiguration of the Connection. Changes in Connection location, including a different voltage level at the same substation would require a new Application.
- Reduction in the facility size (e.g., generation capacity or peak load forecast) by up to 50%. Any increase in size, or a reduction of more than 50% decrease in size would require a new Application
- Changes recommended by LAK to improve the proposed Connection.
- Other changes deemed minor at the sole discretion of LAK.

Only minor changes are allowed once the System Impact Study is complete, such as:

- Changes in equipment as long as equipment modeling constants do not change significantly. The significance of such change to be determined at LAK's sole discretion.
- Changes in substation layouts that do not significantly impact the results of various studies performed. The significance of such change to be determined at LAK's sole discretion.

- Minor delays in the projected schedule for construction of the Facilities.
- Changes recommended by LAK to improve the proposed Connection.
- Any other changes deemed minor at the sole discretion of the LAK.

Any other changes would require a new application.

The Applicant must meet certain milestones to remain in the Connection Queue, including:

- Signing any study agreement within 30 days and providing the appropriate fee / deposit
- Proof of site control before execution of the Connection and Operations Agreement.
- The Facility must be commercially in-service and operational no more than 3 years after the projected in service date forecasted at the completion of the Facilities Study.

If the Applicant fails to adhere to all the provisions of this FCR, LAK shall deem the Application to be withdrawn and shall provide written notice to the Applicant of the deemed withdrawal and explanation of the reasons for such deemed withdrawal. Withdrawal shall result in the loss of the Applicant's Connection Queue position. An Applicant that withdraws or is deemed to have withdrawn its Application shall pay LAK all costs that LAK incur with respect to that Application. LAK will stop all work associated with the Application once notice is received. The Applicant must pay all monies due to LAK before it is allowed to obtain any study data or results.

4.2.1.1 Procedures for Coordinated Joint Studies (R2.1.1)

Requirement Owner: Energy Deliver Transmission & Distribution Engineering

Procedures for coordinated joint studies of new facilities and their impacts on the interconnected transmission systems.

Once all required information has been provided, LAK will initiate planning and engineering studies to assure that all NERC, FRCC and LAK mandated reliability standards are met. If the proposed Connection causes a violation of standards on the Systems, then the studies will also determine what additions and/or improvements to the Systems will be required to accommodate the Connection.

In the event that studies show that portions of the Bulk Electric System or sub-transmission systems owned by others are affected by the Connection ("Affected Systems"), LAK will contact those Affected Systems and the FRCC immediately and continue studies in coordination with all Affected Systems to resolve it.

If the Connection meets certain criteria established by the FRCC and LAK, LAK will contact the FRCC to set up a joint study. A review of the project will then be initiated per FRCC Procedures. If the Connection does not meet the level of FRCC Review, LAK may still contact Affected Systems and give them the opportunity to review the studies.

The following types of analyses will generally be performed. All analyses will be conducted with and without the Connection and will test all reasonable contingencies deemed necessary to model the overall systems' response.

- Power flow analysis
- Short circuit analysis
- Stability analysis
- Protection analysis

In general, for all Applications, there will be three studies performed:

- Connection Feasibility Study
- Connection System Impact Study
- Connection Facility Study

The Applicant can choose to forgo the Connection Feasibility Study and proceed directly to the Connection System Impact Study. Coordination with Affected Systems can occur during any and all of these three studies. The three studies are described in more detail in the following sections.

LAK will coordinate the conduct of any studies required to determine the impact of the Application on Affected Systems with affected third parties and, if possible, include those results (if available) in its applicable study.

The Applicant will cooperate with LAK in all matters related to the conduct of studies.

STEP 3: CONNECTION FEASIBILITY STUDY

Within 10 days of the acknowledgement of a valid Application, LAK shall provide the Applicant a Connection Feasibility Study Agreement that specifies the study/studies to be performed, the responsibilities of the parties, and a good faith estimate of the cost for completing the study. The estimate for performing the study may be based on the type of Connection and size of the Facility. Study fees will be paid as a deposit equal to the good faith estimate before any study work is performed. The final fee will be reconciled at the completion of the study.

A Connection Feasibility Study is a quick/preliminary assessment of the proposed project, which may include, but is not limited to, preliminary field assessment of the connection site, Right of Way feasibility, and power flow analysis based on general knowledge of transmission system performance requirements. The purpose of this study is to provide a quick initial assessment of the Connection impacts and if changes to the transmission system may be required. The documentation of this study may be informal or formal.

STEP 4: CONNECTION SYSTEM IMPACT STUDY

Within 10 days of the completion of the Connection Feasibility Study, LAK shall provide the Applicant a Connection System Impact Study Agreement that specifies the study/studies to be performed, the responsibilities of the parties, and a good faith estimate of the cost for completing the study. The estimate for performing the study may be based on the type of Connection and size of the Facility. Study fees will be paid as a deposit equal to the good faith estimate before any study work is performed. The final fee will be reconciled at the completion of the study.

The Connection System Impact Study is a detailed study that looks at the impact of the proposed Connection on the Bulk Electric System and sub-transmission systems. The study identifies transmission system changes that might be required to accommodate the Connection and keep the Systems and Affected Systems compliant with industry standards. This study will likely include power flow, short circuit, and stability analyses, and other types of analyses as required.

STEP 5: CONNECTION FACILITIES STUDY

Within 10 days of with the completion of the Connection System Impact Study, LAK shall provide the Applicant a Connection Facilities Study Agreement that specifies the study to be performed, the responsibilities of the parties, and a good faith estimate of the cost for completing the study. The estimate for performing the study may be based on the type of Connection and size of the Facility. Study fees will be paid as a deposit equal to the good faith estimate before any study work is performed. The final fee will be reconciled at the completion of the study.

The Connection Facilities Study develops the actual physical implementation plans for the Connection (interconnection facilities) and any system upgrades necessary based on the results of the Connection System Impact Study. During the Connection Facility Study, additional analyses may occur, such as power quality and protective device coordination. Depending on the number of Affected Systems involved, there may not be a single document labeled "Facilities Study", but instead the collection of design, estimate and supplemental studies may be considered the Facilities Study.

STEP 6: INTERCONNECTION AND OPERATIONS AGREEMENT

At the completion of the Facilities Study, a Connection and Operations Agreement will be negotiated between the Applicant and LAK. Construction of Connection facilities or system upgrade facilities will not begin until there is agreement among the parties and there is an executed Connection and Operations Agreement. The Applicant will not be allowed to connect its Facility until Connection facilities and system upgrades are completed, although it may be possible to allow for back-feed and test power. The Connection and Operations Agreement will address:

- Responsibilities, including cost responsibilities for design, construction, commissioning, operations, etc. of facilities required for Connection

- Allocation of ownership of facilities and responsibilities for ongoing operations and maintenance
- Milestones established to facilitate the Connection
- Responsibilities and liabilities in efforts to comply with NERC Mandatory reliability Standards.
- Technical requirements, as appropriate, that are included in this FCR

4.2.1.2 Procedure for Notification (R2.1.2)

Requirement Owner: Energy Deliver Transmission & Distribution Engineering

Procedures for notification of new or modified facilities to others (those responsible for the reliability of the interconnected transmission systems) as soon as feasible.

See Section 4.2.1.1 second paragraph "Procedures for Coordinated Joint Studies".

4.2.1.3 Voltage Level and Capacity/Demand (R2.1.3)

Requirement Owner: Energy Deliver Transmission & Distribution Engineering

Voltage level and MW and MVAR capacity or demand at point of connection.

Generation, Transmission and End Use

Nominal BES voltages for LAK is 230 kV. This system is typically operated between +/- 5% of nominal and during emergency conditions.

Generators

Generator Step-Up Units (GSUs) must have tap changers capable of changing the ratio of the transformer by at least +/- 5% with a maximum tap step size of 2.5%. The nominal voltage of the GSU shall be equal to the nominal voltage of the point in the System that the Applicant wishes to Connect, unless otherwise specified by LAK.

All generators must contribute reactive power and regulate voltage on the Bulk Electric System in order to maintain the Bulk Electric System's reliability in accordance with NERC Standard VAR-002 or its successor and FRCC supplements. The Automatic Voltage Regulator (AVR) must be capable of regulating voltage on the high side of the GSU. All generators must be capable of continuous operation at voltages of +/- 5% of nominal at the generator terminal. The generator shall be capable of continuous operation at 0.9 power factor lagging (supplying MVARs into the System) and 0.95 power factor leading (absorbing MVARs from the System) net, as measured at the Connection.

The MW and MVA capacity of the generator may be limited to the MW and MVA capacity provided by the applicant for the Connection System Impact and Connection Facilities Studies and specified in the Connection and Operations Agreement. The generator will not be allowed to exceed the specified capacity except: 1) during emergency conditions as determined by LAK; and 2) if the Applicant makes a second Application for Connection for an incremental increase

in capacity of the plant. Depending upon the amount of a requested capacity increase, Connection Feasibility, System Impact and Facilities Studies may need to be performed for the additional capacity.

The Applicant may be required to test MW and MVAR capabilities in accordance with applicable NERC MOD Standards and their successors and supplements.

TRANSMISSION

All Transmission Facilities must be constructed with a capacity that meets the requirements of NERC's TPL standards and their successors and supplements for at least a 10 year planning horizon. Based on the results of the studies required above, a new facility may be significantly larger than is contemplated initially.

END USE

The MW and MVA capacity of the End Use Facility will be determined as a result of the Connection System Impact and Connection Facilities Studies and specified in the Connection and Operations Agreement. The Applicant will not be allowed to exceed the specified capacity unless the Applicant makes a second Application for Connection for an incremental increase in capacity of the Facility. An automatic interruption device shall be provided to separate the radial End Use customer from the BES.

4.2.1.4 BREAKER DUTY AND SURGE PROTECTION (R2.1.4)

REQUIREMENT OWNER: SYSTEM PROTECTION & SUBSTATION ENGINEERING

BREAKER DUTY AND SURGE PROTECTION.

GENERATORS, TRANSMISSION AND END USE

The Connection System Impact Study and the Connection Facilities Study will determine the minimum requirements for breaker interrupting capability. All equipment required for the Connection and Facilities shall be sized at a commercial rating that exceeds the maximum available fault current by at least 20%.

AC high voltage circuit breakers are specified by operating voltage, continuous current, interrupting current, and operating time in accordance with ANSI/IEEE Standards C37 series for breakers rated on a "Symmetrical Current Basis." When calculating breaker duty, asymmetrical fault current and other factors will be taken into account in accordance with ANSI / IEEE C37 standards.

All equipment must be designed to withstand temporary overvoltages (swells) caused by ground faults. The level of overvoltage and the duration will be determined as part of the Connection Facilities Study and specified in the Connection and Operations Agreement.

The Applicant shall design the protection systems of the Facility and its ownership share of the Connection to remove ground faults from the System promptly such that no equipment that

makes up the System exceeds its capabilities of withstanding swells. The allowable magnitude of voltage swell and the allowable duration shall be determined as part of the Connection Facilities Study and specified in the Connection and Operations Agreement.

4.2.1.5 System Protection and Coordination (R2.1.5)

Requirement Owner: System Protection

System protection and coordination.

Generation, Transmission and End Use

Utility grade, transmission level protective relays and fault clearing systems are to be provided. All protective relays should meet or exceed ANSI/IEEE Standard C37.90. All major pieces of equipment shall be protected in their own protection zone with redundant and independent protection systems.

Adjoining power systems may share a common zone of protection between two parties (e.g., a jointly owned transmission line). Compatible relaying equipment must be used on each side of the point of ownership within a given zone of protection. The design must provide coordination for speed and sensitivity in order to maintain power system security and reliability.

All Bulk Electric System equipment is to have primary protective relaying that operates with no intentional time delay for 100% of the specified zone of coverage. On transmission lines, this is accomplished through the use of a communication channel. A second high-speed protection system may be required depending on critical clearing times.

Backup protective systems should provide additional coverage for breaker and relay failure outside the primary zone. Specific breaker failure protection schemes and relay failure backup schemes must always be applied at the Bulk Electric System level. Time and sensitivity coordination must be maintained to prevent misoperations.

At least one power source for tripping and control must be provided at substations by a DC storage battery. The battery is to be sized with enough capacity to operate all tripping devices after eight hours without a charger. An undervoltage alarm must be provided for remote monitoring by the Applicant who shall take immediate action to restore power to the protective equipment. Redundant battery systems and redundant breaker trip coils may be required depending on critical clearing times and the importance of the Facility and Connection to the Bulk Electric System.

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, undervoltage and synch-check relays, and physical locking devices.

A transfer trip is required for many installations. It is used for backup protection and islanding schemes. For new installations, fiber optics is the preferred means of communication. Power line carrier schemes may also be used.

Applicants connecting to the System shall investigate and keep a log of all protective relay actions and misoperations as required by the FRCC in compliance with applicable NERC PRC Standards and its successors and supplements.

If NERC Standard PRC-005 applies to the Applicant, the Applicant connecting to the System must have a maintenance and testing program for their protection systems, and have evidence that the maintenance and testing program is being carried out according to plan. Documentation of the protection maintenance and testing program shall be supplied to LAK, the FRCC, and NERC on request in accordance with NERC Standard PRC-005 and its successors and supplements. At intervals described in the documented maintenance and testing program, and following any apparent malfunction of the protection equipment, the Applicant shall perform both calibration and functional trip tests of its protection equipment.

LAK shall review and approve any protection system design of the Facility and the Connection.

LAK, Applicant and neighboring utilities shall work together to perform protection system coordination studies and set protection system relays accordingly in accordance with applicable NERC PRC Standards and their successors and supplements.

GENERATION PROTECTION

Protection requirements for generators shall include at minimum:

- Overvoltage
- Undervoltage
- Overload
- Phase and ground fault protection
- Open circuit
- Phase unbalance and reversal
- Overfrequency
- Underfrequency
- Loss of source (e.g. transfer trip)
- Isolated operating conditions
- Prevention of dead-line reclosing

Additional protection schemes may be required at the sole discretion of LAK (e.g., Loss of Excitation, Out-Of-Step).

Facility protection devices shall include a circuit breaker to be located at the high side of each generator step up transformer prior to the point of interconnection. The Applicant shall be solely responsible to disconnect the Facility from the System if System conditions are such that continued connection would damage the Facility.

TRANSMISSION AND END-USE PROTECTION

Facility protection devices shall include a circuit breaker to be located on the Facility side of the Connection. The Facility operator shall be solely responsible to disconnect the Facility from the System if System conditions are such that continued connection would damage the Facility.

Acceptable transmission line relaying:

- Differential Relaying using high speed communication between ends of the line for primary relaying
- Impedance relaying (Zone 1, Zone 2 and Zone 3) with high speed transfer trip schemes (permissive over-reaching, stuck breaker transfer trip) for primary relaying (and possibly back-up relaying if critical clearing times require it)
- Ground directional overcurrent relaying

Typical transformer and bus protection schemes:

- Differential schemes
- Directional overcurrent and directional ground overcurrent

Other relaying schemes may be required at the sole discretion of LAK (e.g., underfrequency load shedding schemes (UFLS) for End Use Connection). Reclosing of overhead transmission lines may be allowed as determined solely by LAK.

4.2.1.6 METERING AND TELECOMMUNICATION (R2.1.6)

REQUIREMENT OWNER: SYSTEM PROTECTION

METERING AND TELECOMMUNICATIONS.

GENERATION, TRANSMISSION AND END-USE

LAK and Applicant shall install required metering equipment at the point of Connection prior to any operation of the Facility and shall own, operate, test and maintain all such equipment. Each installation needs to be evaluated separately for metering requirements because of the many possible contractual agreements and interconnection configurations. In general, however, the following quantities are to be provided for each supply point. MW-hours received, MW-hours delivered, KQ-hours received, KQ-hours delivered, MVAR-hours received, MVAR-hours delivered, Three Phase Voltage, Three Phase Current, +/- MW, and +/- MVAR. These quantities may need to be provided to various parties through various information/communication

systems. Specific designs will be developed to meet those requirements. All metering devices are to be pre-approved by the LAK prior to installation.

Revenue meters are to have an accuracy class of 0.3% or better. Transducers are to be accurate to +/- 0.2% of full scale. Three element meters are to be used on all effectively grounded power systems. Both primary and backup revenue meters are to be provided. Backup current transformers (CTs) and potential transformers (PT's) are not required.

Instrument transformers are to have an accuracy class of 0.3% or better with 0.15% being preferred. Metering accuracy CTs and PTs are to be installed as close to the delivery point as practical. CT ratios are to be selected just above the expected full load. Using multi-ratio CT's are not advisable since accuracy is lost when using lower taps. Metering CT's and PT's should not be used to feed non-metering equipment such as protective relays. Metering CT's are not to be connected in parallel. Auxiliary CT's are not to be used in metering circuits. When more than one point is to be monitored, individual metering is to be used. The impedance of the CT and PT cable leads is to be kept low and not impose burdens above that of the instrument transformer rating.

When the metering location is different from the delivery point, compensation for losses is required. Compensation should be performed internally by the installed metering equipment rather than by after-the-fact calculations.

Revenue meters are to remain sealed during operation and following maintenance or calibration testing. All parties are to be notified prior to removing seals. Calibration testing is to be performed annually and is to include all associated parties. Test equipment must be certified and traceable to the National Bureau of Standards.

LAK will provide metered quantities in a mutually agreed upon form to the Applicant upon request.

The Applicant may, at its sole option and expense, install check meters on its premises and on its side of the Connection to verify the LAK's meters. Check meters shall not be used for the measurement of power flows unless specifically authorized by this FCR. The check meters shall be subject to inspection by LAK at all reasonable times.

LAK shall inspect and test all of its metering equipment upon installation and thereafter at intervals not to exceed two (2) years. At the request of the Applicant, LAK will inspect and test its metering equipment at any time within the two (2) year period and/or on a more frequent standard interval. LAK will strive to notify the Applicant a minimum of twenty four (24) hours prior to any inspection or test so that the Applicant may witness the work if deemed necessary. If, at any time, LAK's metering equipment is found to be inaccurate or defective, it shall be adjusted, repaired or replaced as required.

If the metering equipment fails to register or reads more than 2% different from standard test meters, LAK will adjust all readings taken since the last verified test by using the Applicant's

check meter, if installed. If no check meter was installed, LAK will estimate the adjustment using industry accepted engineering methods.

All metered data will be sent electronically to locations designated by LAK and the Applicant. This data will be used as the official measurement of the amount of energy delivered to or withdrawn from the System by the Facility.

Prior to initial connection to the System, the Applicant shall establish the following minimum voice and data communications with the LAK.

VOICE

The voice communications listed below shall be sufficiently redundant so that a failure of a single phone cable/switch/etc. will not render all inoperable. Communication systems shall be in accordance with applicable NERC COM Standards and other standards, successors and supplements.

- Standard dial up phone service to Facility control room.
- Facsimile communications to the Facility control room using a separate phone line.
- Dedicated phone connection between Facility control room and LAK's dispatch center

DATA

A remote terminal unit ("RTU") compatible with LAK's Supervisory Control and Data Acquisition System ("SCADA") shall be installed and be fully operational prior to the initial connection of the Facility to the System. The RTU shall be connected to LAK's SCADA by a dedicated method with equal or better redundancy than for voice circuits. The data required from the RTU will be negotiated and specified in the Connection and Operations Agreement.

Bi-directional real and reactive power flow information including magnitude and direction shall be communicated instantaneously and continuously to LAK via the data circuits.

4.2.1.7 GROUNDING AND SAFETY ISSUES (R2.1.7)

REQUIREMENT OWNER: ENERGY DELIVERY ENGINEERING

GROUNDING AND SAFETY ISSUES.

GENERATION, TRANSMISSION AND END-USE

The Facility shall conform in all ways to all applicable government and industry standards including but not limited to the National Electrical Safety Code, OSHA, National Electrical Code, IEEE Guides and Standards, ANSI Standards, NERC Standards, and to LAK safety and installation standards. Strict adherence to established switching, tagging and grounding procedures will be required at all times. Under no circumstances shall the Facility attempt to energize a "dead" transmission line unless agreed to in advance by LAK, with the potential exception of transmission Connection automatic reclosing scheme.

4.2.1.8 Insulation and Insulation Coordination (R2.1.8)

Requirement Owner: Substation Engineering

Insulation and insulation coordination.

Generation, Transmission and End-Use

The Protection studies, conducted after the Connection and Operations Agreement is executed and design is underway, will determine the insulation levels and surge protection required for all connecting facilities including those on the Facility side of the Connection and at the Facility. Requirements will vary by LAK and by location. Additional insulation beyond normal industry requirements may be required due to isokeraunic levels of Florida and the potential for salt build-up on insulators. Depending on the location of the Facility and the Connection in proximity to the shoreline, it may be necessary to wash insulators periodically to eliminate salt accumulation on the insulators. The necessity and frequency of this maintenance practice will be negotiated in the Connection, Construction and Operations Agreement, in addition to insulation and surge protection specifications.

4.2.1.9 Voltage, Reactive Power, and Power Factor Control (R2.1.9)

Requirement Owner: Energy Deliver Transmission & Distribution Engineering

Voltage, Reactive Power, and power factor control.

Generation

All generators must contribute reactive power to the Bulk Electric System in order to maintain the Bulk Electric System's reliability. NERC Standards require that generator owners and operators and transmission operators work jointly to optimize the use of reactive power capability (applicable NERC VAR Standards and/or any standards that supersede or supplement these). Therefore, all generation owners and operators that desire to Connect to the System shall be required to operate its Automatic Voltage Regulator in voltage control mode to maintain a proscribed voltage schedule to support voltage and VAR requirements in their local area. A study will be performed after the Connection and Operations Agreement is executed to determine a voltage schedule and GSU no-load tap settings for the Facility in accordance with applicable NERC VAR standards and their successors and supplements.

Generator owners connecting to LAK System shall try to maintain the voltage schedules as directed by LAK Transmission Operators.

Transmission

The Connection System Impact Study will identify voltage issues and reactive power issues associated with new transmission connections in accordance with applicable NERC VAR Standard and its successors and supplements. If the Facility, Connection and the System do not perform within criteria limits (e.g., no continuous voltage excursions beyond +/- 5%, no danger of voltage collapse, etc.), the Applicant will need to install reactive compensation (active and/or

passive) to cause the Facility, Connection and System to perform within criteria limits, and the System to perform no worse than before the Facility's Connection.

END USE

Power Factor of the Facility at the Connection must be maintained between:

POWER FACTOR REQUIREMENTS

	Lagging	Leading
On Peak Hours (6 AM to 10PM Winter 10 AM to 10 PM Summer)	**0.97**	0.98

It is the Applicant's responsibility to regulate voltage and power factor of its facilities. It is recommended that the Applicant install step-down transformers with On-Load Tap Changers capable of regulating voltage +/- 10% of nominal in 33 steps, and a no-load tap changer capable of +/- 5% of nominal in 5 steps.

4.2.1.10 POWER QUALITY IMPACTS (R2.1.10)

REQUIREMENT OWNER: SUBSTATION ENGINEERING

POWER QUALITY IMPACTS.

GENERATION, TRANSMISSION AND END USE

The Facility shall not degrade the quality of the System's voltage or current and shall operate within limits as established by the following standards and guidelines:

POWER QUALITY REQUIREMENTS:

Continuous Voltage Variations

- ANSI C84.1

Harmonics

- IEEE Standard 519

Voltage Flicker

- IEC 61000-2-2, IEEE 1453

Voltage Balance, Negative Sequence Voltage and Current

- ANSI / NEMA MG1, IEEE 112, ANSI C84.1

Switching Transients

- Within the applicable limits of surge arrestors and insulation as determined through study

Additional analysis may be necessary (e.g., harmonics studies, transient studies) at the Facilities Study Stage to determine whether Power Quality criteria are met. If not, additional equipment may need to be installed as part of the connection (e.g., harmonic filters, additional surge protection, higher insulation levels, etc.)

4.2.1.11 Equipment Ratings (R2.1.11)

Requirement Owner: Substation Engineering

Equipment Ratings.

Generation, Transmission and End Use

All new equipment associated with the Facility and the Connection shall be rated a minimum of 20% above the maximum loading determined by the studies referenced above for a 10 year planning horizon (except the GSU for a generator, which needs to be sized to the capacity of the generator). The Applicant is responsible for developing ratings methodologies and ratings for equipment owned by the Applicant. LAK is responsible for developing rating methodologies and ratings for equipment owned by LAK (e.g., NERC Standards FAC-008 and FAC-009).

4.2.1.12 Synchronizing of Facilities (R2.1.12)

Requirement Owner: Substation Engineering

Synchronizing of facilities.

Generation, Transmission and End Use

The Applicant shall be responsible for the proper synchronization of the Facility to the System. All synchronization of the Facility to the System shall be with the circuit breaker on the high side of the Facility or on the Applicant's side of the Connection. Under no circumstances shall the LAK's circuit breakers be used for this task.

All facilities with synchronous generation or synchronous motors that intend to connect to the grid with their synchronous machines operating will be required to have at least one functional synchronizing check relay (IEEE Device 25) that supervises the connection and prevents asynchronous closing. Additional synchronizing requirements will be negotiated in the Connection and Operations Agreement.

4.2.1.13 Maintenance Coordination (R2.1.13)

Requirement Owner: Electric System Control

Maintenance coordination.

GENERATION AND TRANSMISSION

The Applicant is solely responsible for all maintenance of the Facility and the Connection equipment owned by the Applicant unless LAK has reserved for themselves specific maintenance items as part of the Connection and Operations Agreement.

The removal of the Facility from service for routine maintenance shall be scheduled with LAK a minimum of six (6) months prior to beginning, and LAK shall have the right to modify said schedule if maintenance planning projects potential issues that may compromise the reliability of the Bulk Electric System. No removal for routine maintenance will be allowed if the Facility's capacity is required to meet projected demands during the projected outage period.

END USE

The Facility owner is solely responsible for all maintenance of the Facility and the Connection equipment owned by the Applicant unless LAK has reserved for themselves specific maintenance items as part of the Connection and Operations Agreement

4.2.1.14 OPERATIONAL ISSUES (R2.1.14)

REQUIREMENT OWNER: ELECTRIC SYSTEM CONTROL

OPERATIONAL ISSUES (ABNORMAL FREQUENCY AND VOLTAGES).

GENERATION, TRANSMISSION AND END USE

The Connection and Operations Agreement will have within it provisions for LAK to direct the operation of the Applicant's Facility in accordance with applicable NERC IRO and TOP Standards and, their successors and supplements.

NERC PRC Standards, and its successors and supplements, may require the Applicant to install Disturbance Monitoring Equipment. The Applicant will install such monitoring equipment if it is deemed necessary by the standards. Installation, maintenance, testing and operations of the Disturbance Monitoring Equipment will be addressed in the Connection and Operations Agreement, including provisions to install such equipment at a later date

GENERATION

New Generation units larger than 50 MVA may be required to install a power system stabilizer (PSS) if required by the System Impact Study.

All new synchronous generators connected to the System with a nameplate rating greater than 20 MVA shall be equipped with a speed/load governing control that has a speed droop characteristic in the 3 to 6% range. The preferred droop characteristic setting is 5% as this is the typical setting for generators in peninsular Florida.

The generator and its protection systems shall be designed to meet the performance requirements of FRCC Standard PRC-024-FRCC-01 and its successor and supplements to ensure

that the Facility can "ride through" frequency deviations of pre-determined magnitudes. The term "ride through" refers to the ability of the generator to remain connected to and synchronized with the Bulk Electric System during frequency excursions of pre-determined size and duration.

Generating facilities must be designed to remain on line for normal clearing system faults within the close proximity to the plant switchyard. Voltage may approach zero at the switchyard bus for six cycles for some types of faults. Control systems, contactors, motors and auxiliary loads that might otherwise cause a generator trip if lost must not drop out under these conditions. Critical contactors must be provided with ride-through capability where required. Additionally, generator protection systems such as the Load Drop Anticipator, Early Valve Actuator or Power Load Unbalance should not be designed to trip a generator for normal clearing external faults or stable swings.

TRANSMISSION

In the course of studies described above (e.g., Connection System Impact Study), and in the course of annual planning studies, there may come a time when it is determined that the Applicant's Transmission Facility may require specialized protection systems, to maintain the reliability of the Bulk Electric System. If such specialized protection is deemed to be necessary, then the Applicant will be required to install the relaying. Installation, maintenance, testing and operations of the specialized protection system equipment will be addressed in the Connection and Operations Agreement, including provisions to install such equipment at a later date.

END USE

Under-Frequency Load Shedding (UFLS) and/or Under-Voltage Load Shedding (UVLS) equipment may need to be installed at the Connection or at the Facility to meet the LAK's obligations for applicable NERC PRC Standards. Installation, maintenance, testing and operations of the UFLS or UVLS equipment will be addressed in the Connection and Operations Agreement, including provisions to install such equipment at a later date.

4.2.1.15 INSPECTION REQUIREMENTS (R2.1.15)

REQUIREMENT OWNER: SUBSTATION ENGINEERING

INSPECTION REQUIREMENTS FOR EXISTING OR NEW FACILITIES.

GENERATION, TRANSMISSION AND END USE

LAK shall have the right to inspect any and all portions of new or upgraded Facility and Connection that in any way actually or potentially impact the System. Inspection rights will be negotiated as part of the Connection and Operations Agreement.

4.2.1.16 COMMUNICATIONS AND PROCEDURES (R2.1.16)

REQUIREMENT OWNER: ELECTRIC SYSTEM CONTROL

COMMUNICATIONS AND PROCEDURES DURING NORMAL AND EMERGENCY OPERATING CONDITIONS.

GENERATION, TRANSMISSION AND END USE

During normal and emergency operating conditions, the Florida Municipal Power Pool (FMPP) (who is the LAK's Balancing Authority), the Transmission Operator and the Reliability Coordinator are responsible for maintaining a safe and reliable Bulk Electric System system. All facilities connected to the System shall immediately follow directives issued by any of these and/or their designee in accordance with applicable NERC IRO and TOP Standards. Specific details regarding these functions will be included in the Connection and Operations Agreement.

4.3 MAINTAIN AND UPDATE FACILITY CONNECTION REQUIREMENTS (R3)

REQUIREMENT OWNER: ENERGY DELIVER TRANSMISSION & DISTRIBUTION ENGINEERING

THE TRANSMISSION OWNER SHALL MAINTAIN AND UPDATE ITS FACILITY CONNECTION REQUIREMENTS AS REQUIRED. THE TRANSMISSION OWNER SHALL MAKE DOCUMENTATION OF THESE REQUIREMENTS AVAILABLE TO THE USERS OF THE TRANSMISSION SYSTEM, THE REGIONAL RELIABILITY ORGANIZATION, AND NERC ON REQUEST (FIVE BUSINESS DAYS).

Lakeland Electric will maintain and update its facilities connection requirements as required and will make documentation of these requirements available to users of the transmission system, the FRCC, and NERC within 5 business days of request.

5 DEFINITIONS

AFFECTED SYSTEMS

- Portions of the Bulk Electric System or sub-transmission systems owned by others that are affected by the proposed Connection

APPLICANT(S)

- Parties (or their agents) that are either considering connecting to, or modifying facilities that are already connected to, the portion of the Bulk Electric System owned by the Florida Municipal Power Agency ("FMPA") or its All Requirements Project Participants

BULK ELECTRIC SYSTEM

- As defined by the North American Electric Reliability Corp. (NERC), i.e.: "As defined by the Regional Reliability Organization, the electrical generation resources, transmission lines, interconnections with neighboring systems, and associated equipment, generally operated at voltages of 100 kV or higher. Radial transmission facilities serving only load with one transmission source are generally not included in this definition."

CONNECTION

- The Applicants proposed connection with the Owners System

FACILITY

- The facility, equipment, etc., which the Applicant wishes to connect to the System

FCR

- Facility Connection Requirements

FRCC

- The Florida Reliability Coordinating Council

IEEE / ANSI

- Institute of Electrical and Electronic Engineers / American National Standards Institute

INTERCONNECTION – IN THIS DOCUMENT INTERCONNECTION SHALL BE THE TERM USED FOR ANY CONNECTION TO THE BES OF A TRANSMISSION LINE OR A GENERATOR.

NERC

- The North American Electric Reliability Corp.

LAK

- Lakeland Electric.

SYSTEMS

- The existing portion of the Bulk Electric System and any sub-transmission systems (e.g., 69 kV system) owned by Lakeland Electric.

6 REFERENCE DOCUMENTS/NOTES

Title/Description	Number

Date	Notes	Author

7 AUDIT HISTORY

Date	Type	Response	Findings
2010.10.29	On-Site Audit	Compliant	No Findings

8 REVISION HISTORY

Version	Date	Action	Reviewed/Approved By
1.0	2005.04.00	Document created	Paul Elwing
2.0	2007.05.18	Grammatical updates, added reference to FERC Order 890, updated index/check off list, updated references to current NERC Reliability Standards	Paul Elwing
3.0	2007.05.23	Added hyperlink to End-user document	Paul Elwing
4.0	2007.08.29	Added hyperlink references to Generator Interconnection Requirements documents	Paul Elwing
5.0	2010.04.09	Transitioned from original RES V4.0 document to a new format better aligned with the standard and good engineering practices, assigned requirement owner responsibilities	Ganesh Velummylum
6.0	2010.07.15	Replaced Requirement Owners in various section	Ganesh Velummylum
7.0	2010.07.20	Added reference to section 4.2.1.2 second paragraph; Changed classification from Sensitive to Public; Changed Cover page to Electric System Planning	Ganesh Velummylum
8.0	2010.08.10	Replaced Requirement owners with departments	Becky Rinier
9.0	2011.06.13	Change responsible division to ED T&D Engineering, added the term Interconnection to Definitions, added clarifying language to section 4.1 & 4.2	Tran Phuong Harianto Suryo Dwight Odom