LONG ISLAND POWER AUTHORITY REQUIREMENTS
FOR INTERCONNECTION OF NEW DISTRIBUTED GENERATION UNITS
WITH CAPACITY OF 300 kVA OR LESS
TO BE OPERATED IN PARALLEL WITH RADIAL DISTRIBUTION LINES

A. Design Requirements

1. Common

The generator-owner shall provide appropriate protection and control equipment, including an interrupting device, that will disconnect[1] the generation in the event that the portion of the LIPA system that serves the generator is de-energized for any reason or for a fault in the generator-owner's system. The generator-owner's protection and control equipment shall be capable of disconnecting the generation upon detection of an islanding[2] condition and upon detection of a LIPA system fault.

The generator-owner's protection and control scheme shall be designed to allow the generation, at steady state, to operate only within the limits specified in this document for frequency and voltage. Upon request from LIPA, the generator-owner shall provide documentation detailing compliance with the requirements set forth in this document.

The specific design of the protection, control and grounding schemes will depend on the size and characteristics of the generator-owner's generation, as well the generator owner's load level, in addition to the characteristics of the particular portion of LIPA's system where the generator-owner is interconnecting.

The generator-owner shall have, as a minimum, an interrupting device(s) sized to meet all applicable local, state and federal codes and operated by over and under voltage protection on each phase. The interrupting device(s) shall also be operated by over and under frequency protection on at least one phase. All phases of a generator or inverter interface shall disconnect for a voltage or frequency trip on any phase. It is recommended that voltage protection be wired phase to ground.

- The interrupting device shall automatically initiate a disconnect sequence from the LIPA system within six (6) cycles if the voltage falls below 60 V rms phase to ground (nominal 120 V rms base) on any phase.

- The interrupting device shall automatically initiate a disconnect sequence from the LIPA system within two (2) seconds if the voltage rises above 132 V rms phase to ground or falls below 106 V rms phase to ground (nominal 120 V rms base) on any phase.

[1] See Glossary for definition
[2] Ibid

- The interrupting device shall automatically initiate a disconnect sequence from the LIPA system within two (2) cycles if the voltage rises above 165 V rms phase to ground (nominal 120 V rms base) on any phase.

- The interrupting device shall automatically initiate a disconnect sequence from the LIPA system within six (6) cycles if the frequency rises above 60.5 Hz or falls below 59.3 Hz.

The need for additional protection equipment shall be determined by LIPA on a case-by-case basis. The LIPA shall specify and provide settings for those relays that LIPA designates as being required to satisfy protection practices. Any protective equipment or setting specified by LIPA shall not be changed or modified at any time by the generator-owner without written consent from LIPA.

To avoid out-of-phase reclosing, the design of the generator-owner's protection and control scheme shall take into account LIPA’s practice of automatically reclosing the feeder without synchronism check as quickly as 12 cycles after being tripped.

The generator-owner shall be responsible for ongoing compliance with all applicable local, state and federal codes and standardized interconnection requirements as they pertain to the interconnection of the generating equipment.

Protection shall not share electrical equipment associated LIPA revenue metering.

A failure of the generator-owner's interconnection protection equipment, including loss of control power, shall open the interrupting device, thus disconnecting the generation from the LIPA system. A generator-owner's protection equipment shall utilize a nonvolatile memory design such that a loss of internal or external control power, including batteries, will not cause a loss of interconnection protection functions or loss of protection set points.

All interface protection and control equipment shall operate as specified independent of the calendar date.

2. Synchronous Generators

Synchronous generation shall require synchronizing facilities. These shall include automatic synchronizing equipment or manual synchronizing with relay supervision, voltage regulator and power factor control.

3. Induction Generators

Induction generation may be connected and brought up to synchronous speed (as an induction motor) if it can be demonstrated that the initial voltage drop measured at the point of common coupling (PCC)[3] is acceptable based on current inrush limits. The same requirements also apply to induction generation connected at or near synchronous speed because a voltage dip is present due to an inrush magnetizing current. The generator-owner shall submit the expected number of starts per specific time period and maximum starting kVA draw data to LIPA to verify that the voltage dip due to starting is within the visible flicker limits as defined by IEEE 519-1992, Recommended Practices and Requirements for Harmonic Control in Electric Power Systems (IEEE 519) .

Starting or rapid load fluctuations on induction generators can adversely impact LIPA's system voltage. Corrective step-switched capacitors or other techniques may be necessary. These measures can, in turn, cause ferroresonance. If these measures (additional capacitors) are installed on the customer's side of the PCC, LIPA will review these measures and may require the customer to install additional equipment.

4. DC Inverters

Direct current generation can only be installed in parallel with LIPA's system using a synchronous inverter. The design shall be such as to disconnect this synchronous inverter upon a LIPA system interruption.

Line-commutated inverters do not require synchronizing equipment if the voltage drop is determined to be acceptable, as defined in Section IV(E), Power Quality, of this document. Self-commutated inverters of the utility-interactive type shall synchronize to LIPA. Stand-alone, self-commutated inverters shall not be used for parallel operation with LIPA.

A line inverter can be used to isolate the customer from the LIPA system provided it can be demonstrated that the inverter isolates the customer from the LIPA system safely and reliably.

Voltage and frequency trip set points for inverters shall be accessible to service personnel only.

5. Metering

The need for additional revenue metering or modifications to existing metering will be reviewed on a case-by-case basis and shall be consistent with metering requirements adopted by LIPA.

B. Operating Requirements

The generator-owner shall provide a 24-hour telephone contact(s). This contact will be used by LIPA to arrange access for repairs, inspection or emergencies. LIPA will make such arrangements (except for emergencies) during normal business hours.

[3] See Glossary for definition

The generator-owner shall not supply power to LIPA during any outages of the system that serves the PCC. The generator-owner's generation may be operated during such outages only with an open tie to LIPA. Islanding will not be permitted. The generator-owner shall not energize a de-energized LIPA circuit for any reason.

Generation that does not operate in parallel with the LIPA's system is not subject to these requirements.

The disconnect switch[4] specified in Section IV(D) of this document may be opened by LIPA at any time for any of the following reasons:

a. To eliminate conditions that constitute a potential hazard to LIPA personnel or the general public;
b. Pre-emergency or emergency conditions on the LIPA system;
c. A hazardous condition is revealed by a LIPA inspection;
d. Protective device tampering.

The disconnect switch may be opened by LIPA for the following reasons, after notice to the responsible party has been delivered and a reasonable time to correct (consistent with the conditions) has elapsed:

a. A power producer has failed to make available records of verification tests and maintenance of its protective devices;
b. A power producer's system interferes with LIPA equipment or equipment belonging to other LIPA customers;
c. A power producer's system is found to affect quality of service of adjoining customers.

LIPA will provide a name and telephone number so that the customer can obtain information about the LIPA lock-out. The customer shall be allowed to disconnect from LIPA without prior notice in order to self-generate.

Following a generation facility disconnect as a result of a voltage or frequency excursion, the generation facility shall remain disconnected until LIPA's service voltage and frequency has recovered to LIPA's acceptable voltage and frequency limits for a minimum of five (5) minutes.

LIPA may require direct transfer trip (DTT)[5] whenever: 1) the minimum load to generation ratio on a circuit is such that a ferroresonance condition could occur; 2) it is determined that the customer's protective relaying may not operate for certain conditions or faults and/or 3) the installation could increase the length of outages on a distribution circuit or jeopardize the reliability of the circuit. LIPA will be required to demonstrate the need for DTT.

[4] See Glossary for definition.
[5] Ibid

C. Dedicated Transformer[6]

LIPA reserves the right to require a power producing facility to connect to the LIPA system through a dedicated transformer. The transformer shall either be provided by LIPA at the generator-owner's expense, purchased from LIPA, or provided by the generator owner in conformance with LIPA's specifications. The transformer may be necessary to ensure conformance with LIPA safe work practices, to enhance service restoration operations or to prevent detrimental effects to other LIPA customers. The dedicated transformer that is part of the normal electrical service connection of a generator-owner's facility may meet this requirement if there are no other customers supplied from it. A dedicated transformer is not required if the installation is designed and coordinated with LIPA to protect the LIPA system and its customers adequately from potential detrimental net effects caused by the operation of the generator.

If LIPA determines a need for a dedicated transformer, it shall notify the generator owner in writing of the requirements. The notice shall include a description of the specific aspects of the LIPA system that necessitate the addition, the conditions under which the dedicated transformer is expected to enhance safety or prevent detrimental effects, and the expected response of a normal, shared transformer installation to such conditions.

D. Disconnect Switch

Generating equipment shall be capable of being isolated from the LIPA system by means of an external, manual, visible, gang-operated, load break disconnecting switch. The disconnect switch shall be installed, owned and maintained by the owner of the power producing facility and located between the power producing equipment and its interconnection point with the LIPA system.

The disconnect switch must be rated for the voltage and current requirements of the installation.

The basic insulation level (BIL) of the disconnect switch shall be such that it will coordinate with that of LIPA's equipment. Disconnect devices shall meet applicable UL, ANSI and IEEE standards, and shall be installed to meet all applicable local, state and federal codes. (New York City Building Code may require additional certification.)

The disconnect switch shall be clearly marked, "Generator Disconnect Switch", with permanent 3/8 inch letters or larger.

The disconnect switch shall be located within 10 feet of LIPA's external electric service meter, or the location and nature of the distributed power disconnection switches shall be indicated in the immediate proximity of the electric service entrance.

The disconnect switch shall be readily accessible for operation and locking by LIPA personnel in accordance with Section IV(B) of this document.

The disconnect switch must be lockable in the open position with a standard LIPA padlock with a 3/8 inch shank.

[6] See Glossary for definition.

E. Power Quality

The maximum harmonic limits for electrical equipment shall be in accordance with IEEE 519. The objective of IEEE 519 is to limit the maximum individual frequency voltage harmonic to 3% of the fundamental frequency and the voltage Total Harmonic Distortion (THD) to 5% on the LIPA side of the PCC. In addition, any voltage flicker resulting from the connection of the customer's energy producing equipment to the LIPA system must not exceed the limits defined by the maximum permissible voltage fluctuations border line of visibility curve, Figure 10.3 identified in IEEE 519. This requirement is necessary to minimize the adverse voltage effect upon other customers on the LIPA system.

F. Power Factor

If the power factor, as measured at the PCC, is less than 0.9 (leading or lagging), the method of power factor correction necessitated by the installation of the generator will be negotiated with LIPA as a commercial item.

Induction power generators may be provided VAR capacity from the LIPA system at the generator-owner's expense. The installation of VAR correction equipment by the generator-owner on the generator-owner's side of the PCC must be reviewed and approved by LIPA prior to installation.

G. Islanding

Generation interconnection systems must be designed and operated so that islanding is not sustained on radial distribution circuits. The requirements listed in this document are designed and intended to prevent islanding.

H. Test Requirements

This section is divided into type testing and verification testing. Type testing is performed or witnessed once by an independent testing laboratory for a specific protection package. Once a package meets the type test criteria described in this section, the design is accepted by LIPA. If any changes are made to the hardware, software, firmware, or verification test procedures, the manufacturer must notify the independent testing laboratory to determine what, if any, parts of the type testing must be repeated. Failure of the manufacturer to notify the independent test laboratory of changes may result in withdrawal of approval and disconnection of units installed since the change was made. Verification testing is site-specific, periodic testing to assure continued acceptable performance.

Type testing results shall be reported to the New York State Department of Public Service. Department Staff shall review the test report to verify all the appropriate tests have been performed. The Department of Public Service will maintain a list of equipment that has been type tested and approved for interconnection in New York State. The list will contain discrete protective relays as well as inverters with integrated protection and control. The list will indicate specific model numbers and firmware versions approved. The equipment in the field must have a nameplate that clearly shows the model number and firmware version (if applicable).

These test procedures apply only to devices and packages associated with protection of the interface between the generating system and the LIPA system. Interface protection is usually limited to voltage relays, frequency relays, synchronizing relays, reverse current or power relays, and anti-islanding schemes. Testing of relays or devices associated specifically with protection or control of generating equipment is recommended, but not required unless they impact the interface protection.

At the time of production, all interconnecting equipment including inverters and discrete relays must meet or exceed the requirements of ANSI IEEE C62.41-1991 -Recommended Practices on Surge Voltages in Low Voltage AC Power Circuits or C37.90.1 1989, IEEE Standard Surge Withstand Capability (SEC) Tests for Protective Relays and Relay Systems. If C62.41-1991 is used, the surge types and parameters shall be applied, as applicable, to the equipment's intended insulation location. If the device is not tested to level C voltage, i.e., for an intended location on the LIPA side of the meter, the test report shall record the voltage level to which the device was tested and the Public Service Commission listing shall specify the location limitations of the device.

If after the application of the surge test, the unit is still functioning and has the capability to export power to the LIPA system, it shall be subjected to and comply with the manufacturer's verification test and the appropriate dielectric test as specified in UL 1741.

All single-phase and three phase test voltages shall be applied phase to ground.[7]

Isolation transformers specified as required or listed as optional must be connected. Each optional isolation transformer connection constitutes a separate type test. Generic isolation transformers may be substituted after type testing.

Three-phase isolation transformers connected wye-grounded/delta on the generator side are not permitted.

1. Type Testing

All interface equipment must include a verification test procedure as part of the documentation. Except for the case of small single-phase inverters discussed below, the verification test must determine if protection settings meet these requirements. The independent testing laboratory shall conduct the verification test prescribed by the manufacturer to determine if the verification test procedure adequately demonstrates compliance with these requirements.

Prior to testing, all batteries shall be disconnected or removed for a minimum of ten (10) minutes. This test is to verify the system has a non-volatile memory and that protection settings are not lost. A test shall also be performed to determine that failure of any battery not used to supply trip power will result in an automatic shutdown.

a. Single-Phase Inverters

[7] Test voltages are specified phase to ground for a 120 volt nominal system. Other system voltages require adjusting the test voltages by the appropriate percentage. Over and undervoltage protection should be wired phase to ground. Phase to phase voltage sensing results in less sensitive undervoltage detection and more sensitive overvoltage detection.

All single-phase inverters shall be non-islanding inverters as defined by IEEE P929. Inverters 10kW and below shall at the time of production meet or exceed the requirements of IEEE 929 and UL 1741. Specifically, the inverter shall automatically disconnect for an islanding condition with load quality factor of 2.5 within two (2) seconds. In addition, all single-phase inverters and single-phase voltage and frequency relay packages shall initiate a trip from a waveform generator for the waveforms listed below to verify they meet the requirements set forth in the design section of this document.

Waveform 1- A 120 V rms 60 Hz sinusoidal that drops in voltage to 59 V rms for six (6) cycles beginning and ending at a zero crossing and resuming to 120 V rms for five minutes.

Waveform 2- A 120 V rms 60 Hz sinusoidal that drops in voltage to 105 V rms for 120 cycles beginning and ending at a zero crossing and resuming to 120 V rms for five minutes.

Waveform 3- A 120 V rms 60 Hz sinusoidal that rises in voltage to 133 V rms for 120 cycles beginning and ending at a zero crossing and resuming to 120 V rms for five minutes.

Waveform 4- A 120 V rms 60 Hz sinusoidal that rises in voltage to 166 volts for two (2) cycles beginning and ending at a zero crossing and resuming to 120 V rms for five minutes.

Waveform 5- A 120 V rms 60 Hz sinusoidal that drops in frequency to 59.2 Hz for six (6) cycles beginning and ending at a zero crossing and resuming to 60 Hz for five minutes.

Waveform 6- A 120 V rms 60 Hz sinusoidal that rises in frequency to 60.6 Hz for six (6) cycles beginning and ending at a zero crossing and resuming to 60 Hz for five minutes.

Each waveform test shall be repeated ten (10) times. Failure to cease to export power for any one run constitutes failure of the test. These tests shall also verify the inverter or power producing facility shall not automatically reconnect to the waveform generator until after five (5) minutes of continuous normal voltage and frequency. The manufacturer may supply a special production sample with the five minute reset timer disabled to eliminate waiting time during type testing. At least one test must be performed on a sample with a five minute reset timer to verify the function and accuracy of the timer.

b. Three-Phase Inverters

Three-phase inverters and discrete three-phase voltage relays shall be type tested with three phase waveforms. The inverter shall disconnect or the protection equipment shall initiate a trip from the waveform generator for each of the waveforms described below:

Waveform 1- A three-phase sinusoidal operating at 60 Hz and 120 V rms interrupted by phase A voltage depressed to 59 V rms for six (6) cycles beginning and ending at a zero crossing while B and C phases continue at 120 V rms. Repeat the same test with B phase depressed, with C phase depressed, with A and B phases depressed, with B and C phases depressed, and finally with all phases depressed to 59 V for six cycles.

Waveform 2- A three-phase sinusoidal operating at 60 Hz and 120 V rms interrupted by phase A voltage depressed to 59 V rms for six (6) cycles beginning and ending at a zero crossing while B and C phases are increased to 150 V rms beginning and ending at the same point of discontinuity. Repeat the same test with B phase depressed and A and C phases increased and with C phase depressed and A and B phases increased.

Waveform 3- A three-phase sinusoidal operating at 60 Hz and 120 V rms interrupted by phase A voltage depressed to 105 V rms for two seconds (120 cycles) beginning and ending at a zero crossing while B and C phases continue at 120 V rms. Repeat the same test with B and C phases depressed to the same level and for the same duration.

Waveform 4- A three-phase sinusoidal operating at 60 Hz and 120 V rms interrupted by phase A voltage increased to 133 V rms for two seconds (120 cycles) beginning and ending at a zero crossing while B and C phases continue at 120 V rms. Repeat the same test with B and C phases increased to the same level and for the same duration.

Waveform 5- A three-phase sinusoidal operating at 60 Hz and 120 V rms interrupted by phase A voltage increased to 166 V rms for two seconds (120 cycles) beginning and ending at a zero crossing while B and C phases continue at 120 V rms. Repeat the same test with B and C phases increased to the same level and for the same duration.

Waveform 6- A three-phase sinusoidal operating at 60 Hz and 120 V rms interrupted by phase A voltage increased to 166 V rms for two cycles beginning and ending at a zero crossing while B and C phases are decreased to 100 V rms beginning and ending at the same point of discontinuity. Repeat the same test with B phases increased and A and C phases decreased and for C phase increased and A and B phases decreased to the same levels and for the same duration.

Waveform 7- A three phase sinusoidal operating at 60 Hz and 120 V rms interrupted with six (6) cycles of 59.2 Hz beginning and ending at the zero crossing on A phase.

Waveform 8- A three-phase sinusoidal operating at 60 Hz and 120 V rms interrupted with six (6) cycles of 59.2 Hz beginning and ending at the zero crossing on B phase and with A and C phase voltages depressed to 70 V rms beginning and ending at the same point of discontinuity.

Waveform 9- A three-phase sinusoidal operating at 60 Hz and 120 V rms interrupted with six (6) cycles of 60.6 Hz beginning and ending at the zero crossing on A phase.

Waveform 10- A three-phase sinusoidal operating at 60 Hz and 120 V rms interrupted with six (6) cycles of 60.6 Hz beginning and ending at the zero crossing on C phase and with A and B phase voltage depressed to 70 V rms beginning and ending at the same point of discontinuity.

Each three-phase waveform test shall be repeated ten (10) times. Failure to trip for any one run constitutes failure of the test. These tests shall also verify the inverter or power producing facility shall not automatically reconnect to the waveform generator until after five (5) minutes of continuous normal voltage and frequency. The manufacturer may supply a special production sample with the five minute reset timer disabled to eliminate waiting time during type testing. At least one test must be performed on a sample with a five minute reset timer to verify the function and accuracy of the timer.

Alternatively, three-phase inverters with integrated protection and control may be tested with a generator to simulate abnormal LIPA frequency and voltages. Abnormal LIPA voltage may also be simulated with an autotransformer/variac. The tests shall include:

Test 1: With the generator and inverter output stabilized at 60 Hz and 120 V rms and the inverter output between 0.5 and 1.0 per unit power, ramp the generator voltage up to 133 V rms at a rate no greater than 5 volts per second. Measure and record the frequency and voltage. The frequency must remain within 0.2 Hz of 60 Hz and the voltage may not exceed 137 V rms. The inverter must cease to export power within two seconds (120 cycles) of the first half-cycle reaching 188 V peak to neutral. Repeat the test with the inverter output below 0.1 per unit power.

Test 2: Insert a tapped transformer and a breaker between A phase of the generator and A phase of the inverter arranged such that when the breaker is opened or closed, A phase of the inverter receives half the voltage of the generator. With the generator and inverter output stabilized at 60 Hz and 119 V rms and the inverter output between 0.5 and 1.0 per unit power, operate the breaker so A phase of the inverter only receives 58 V rms. Measure and record the frequency and voltage. The frequency must remain within 0.2 Hz of 60 Hz and the voltage may not drop below 55 V rms on A phase of the inverter or below 110 V rms on B or C phases of the inverter. The inverter must cease to export power within six cycles of when the first half cycle of voltage on A phase of the inverter drops below 83 V peak to neutral. Repeat the test applying half voltage to B and C phases. And repeat the test for all phases with the inverter output below 0.1 per unit power.

Test 3: With the generator and inverter output stabilized at 60 Hz and 120 V rms and the inverter output between 0.5 and 1.0 per unit power, ramp the generator voltage down to 103 V rms at a rate no greater than 5 volts per second. Measure and record the frequency and voltage. The frequency must remain within 0.2 Hz of 60 Hz and the voltage must not drop below 99 V rms. The inverter must cease to export power within two seconds (120 cycles) of the first half-cycle reaching 145 V peak to neutral. Repeat the test with the inverter output below 0.1 per unit power.

Test 4: Insert a tapped transformer and a breaker between A phase of the generator and A phase of the inverter arranged such that when the breaker is opened or closed, A phase of the inverter receives four-fifths the voltage of the generator. With the generator and inverter output stabilized at 60 Hz and 128 V rms and the inverter output between 0.5 and 1.0 per unit power, operate the breaker so that A phase of the inverter only receives 103 V rms. Measure and record the frequency and voltage. The frequency must remain within 0.2 Hz of 60 Hz and the voltage may not drop below 99 V rms on A phase of the inverter, or below 110 V rms on B or C phases of the inverter. The inverter must cease to export power within two seconds (120 cycles) of when the first half cycle of voltage on A phase of the inverter drops below 145 V peak to neutral. Repeat the test applying low voltage to B and C phases. And repeat the test for all phases with the inverter output below 0.1 per unit power.

Test 5: With the generator and inverter output stabilized at 60 Hz and 120 V rms and the inverter output between 0.5 and 1.0 per unit power, ramp the generator frequency up to 60.6 Hz at a rate no greater than 0.5 Hz per second. Measure and record the frequency and voltage. The voltage must remain between 115 V rms and 125 V rms and the frequency must not exceed 60.8 Hz. The inverter must cease to export power within six cycles of the frequency exceeding 60.6 Hz (8.25 ms between zero crossings). Repeat the test with the inverter output below 0.1 per unit power.

Test 6: With the generator and inverter output stabilized at 60 Hz and 120 V rms and the inverter output between 0.5 and 1.0 per unit power, ramp the generator frequency down to 59.2 Hz at a rate no greater than 0.5 Hz per second. Measure and record the frequency and voltage. The voltage must remain between 115 V rms and 125 V rms and the frequency must not fall below 59.0 Hz. The inverter must cease to export power within six cycles of the frequency falling below 59.2 Hz (8.22 ms between zero crossings). Repeat the test with the inverter output below 0.1 per unit power.

Tests 1 through 6 above shall be repeated five (5) times. Failure to cease to export power for any one run where the frequency and voltage are recorded and fall outside of the accepted limits shall constitute failure of the test. Following at least one run of each test group, the generator is to remain running to verify that the inverter does not automatically reconnect until after five (5) minutes of continuous normal voltage and frequency.

It is not necessary to perform the 165 V rms test, the 132 V rms unbalanced voltage test, or the anti-islanding test on three phase inverters.

2. Verification Testing

Upon initial parallel operation of a generating system, or any time interface hardware or software is changed, a verification test must be performed. A licensed professional engineer or otherwise qualified individual must perform verification testing in accordance with the manufacturer's published test procedure. Qualified individuals include professional engineers, factory trained and certified technicians, and licensed electricians with experience in testing protective equipment. LIPA reserves the right to witness verification testing or require written certification that the testing was performed.

Verification testing shall be performed every four years. All verification tests prescribed by the manufacturer shall be performed. If wires must be removed to perform certain tests, each wire and each terminal must be clearly and permanently marked. The generator-owner shall maintain verification test reports for inspection by LIPA.

Single-phase inverters rated 15 kVA and below may be verified once per year as follows: once per year, the owner or his agent shall operate the load break disconnect switch and verify the power producing facility automatically shuts down and does not restart for five minutes after the switch is closed. The owner shall maintain a log of these operations for inspection by LIPA.

Any system that depends upon a battery for trip power shall be checked and logged once per. month for proper voltage. Once every four (4) years the battery must be either replaced or a discharge test performed.

Glossary of Terms:

Automatic Disconnect Device An electronic or mechanical switch used to isolate a circuit or piece of equipment from a source of power without the need for human intervention.

Coordinated Interconnection Review - Any studies performed by utilities to ensure that the safety and reliability of the electric grid with respect to the interconnection of distributed generation as discussed in this document.

Dedicated Service Transformer or Dedicated Transformer A transformer with a secondary winding that serves only one customer.

Direct Transfer Trip (DTT) - remote operation of a circuit breaker by means of a communication channel.

Disconnect (verb) - to isolate a circuit or equipment from a source of power. If isolation is accomplished with a solid state device, "Disconnect" shall mean to cease the transfer of power.

Disconnect Switch A mechanical device used for isolating a circuit or equipment from a source of power.

Energy Conversion Device A machine or solid state circuit for changing direct current to alternating current or a machine that changes shaft horsepower to electrical power.

Islanding A condition in which a portion of the LIPA system that contains both load and distributed generation is isolated from the remainder of the LIPA system. [Adopted from IEEE 929, draft 9].

Point of Common Coupling (PCC) The point at which LIPA and the customer interface occurs. Typically, this is the customer side of the LIPA revenue meter. [Adopted from IEEE 929, draft 9].

Radial Feeder A distribution line that branches out from a substation and is normally not connected to another substation or another circuit sharing the common supply.

Type Test - A test performed or witnessed once by a qualified independent testing laboratory for a specific protection package or device to determine whether the requirements of this document are met. The Type Test will typically be sponsored by equipment manufacturers.

Verification Test - A test performed upon initial installation and repeated periodically to determine that there is continued acceptable performance.