PUBLIC SERVICE COMPANY OF NEW MEXICO

1st Revised Rule No. 23
REPLACING ORIGINAL RULE NO. 23

INTERCONNECTION AND SAFETY STANDARDS FOR GENERATORS
SIZED GREATER THAN 10 MW

INTRODUCTION:

These Interconnection and Safety Standards have been prepared by Public Service Company of New Mexico ("PNM") consistent with NMAC 17.9.569, Sections I, J and K, for those generating facilities sized greater than 10 MW that will operate in parallel with PNM. These Interconnection and Safety Standards have been separated into the following areas:

1. IMPORTANT CONSIDERATIONS FOR INTERCONNECTION
2. GENERAL SAFETY REQUIREMENTS
3. SPECIFIC INTERCONNECTION REQUIREMENTS
4. OPERATING REQUIREMENTS

IMPORTANT CONSIDERATIONS FOR INTERCONNECTION:

A generating facility desiring to interconnect with the PNM system must meet certain interconnection and safety standards. PNM will review the generating facility's interconnection design and make necessary corrective recommendations consistent with NMAC 17.9.569 and these Interconnection and Safety Standards. x x

These Interconnection and Safety Standards are designed to assure system, personnel, and customer safety, including: x

1. The integrity of the PNM electric system,
2. The quality of service to all PNM customers,
3. The safety of PNM employees and customers, and x
4. The generating facility does not interfere with PNM primary responsibility of providing safe and reliable electric service to all its customers. x

PNM will endeavor to aid and assist the generator in any reasonable way to ensure the generating facility's interconnection design is adequate for connection to the utility system. This may include consultations with the generator and its engineering representative to coordinate the design, operation, maintenance, and protection of the PNM system interface with that of the generating facility. x

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/s/ Henry Monroy
Henry Monroy
Vice President, PNM Regulatory

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The generator should allow adequate time in the design and construction schedule for design interface meetings with PNM and for material procurement by PNM. This time will vary depending on the generating facility's location, size, design, specific operating and system requirements, and the availability of materials needed to accomplish the interconnection.

PNM will review all protection equipment associated with the interface, operational procedures, relay settings, and power transfer modes for acceptability. PNM personnel authorized to accept the design and installation of the generating facility's interconnection protection system will inspect and check all interconnection equipment. x x x x

If it is discovered that any equipment connected to the PNM system is in PNM judgment problematic or unsafe it will be disconnected from the PNM system. x

Generating facilities that generate electrical energy for on-site use only and are interlocked or otherwise prevented from feeding energy into the PNM system are special cases that may not be required to meet all of the requirements of these Interconnection and Safety Standards. However, any such generating facility will be required to demonstrate by design and by operation that the generating facility cannot feed energy into the PNM system.

The generating facility's design should include provisions to allow for the proper operation of the generator under unusual or adverse conditions. Conditions that should be considered are:

1. The sudden return of the utility system as a result of normal PNM system breaker operation.
2. Utility system transients (interference with normal utility system power flow, e.g., lightning and switching surges).
3. Manual disconnect operation by the utility (under emergency conditions, the utility may need to disconnect the generator without prior notice).

GENERAL SAFETY REQUIREMENTS:

The generating facility shall separate from the PNM power system in the event of:

1. A fault on the generating facility's system,

2. A generating facility's contribution to a PNM system emergency,
3. Abnormal frequency or voltage conditions on PNM's system,
4. Any occurrence or condition that will endanger PNM employees or customers, x
5. A generating facility's problem that would otherwise interfere with PNM's ability to provide safe and reliable electric service to other customers and
6. The sudden loss of power by the PNM system.

The generating facility shall be capable of protecting itself from damage resulting from impact loading and/or overloading under both normal operating conditions and emergency conditions.

SPECIFIC INTERCONNECTION REQUIREMENTS:

The specific interconnection safety requirements are the minimum requirements for generating facilities with a design capacity greater than 10 MW. However, each installation, regardless of size, will be evaluated on a case-by-case basis.

All relays, current transformers, voltage transformers, breakers, and interconnection power transformers shall be utility grade that meet or exceed the quality of the equipment that PNM would normally use in a similar application. The trip energy source for the x interconnection breaker must be of a stored energy type (i.e., battery) that will be available under circumstances when the alternating current source is unavailable. The interconnection and all costs associated with the interconnection will comply with all relevant provisions of NMAC 17.9.569.

The generator must ensure that the generating facility and all equipment connected therewith comply with the National Electrical Code, the National Electrical Safety Code, and/or any applicable local, state, and Federal government requirements, whichever are stricter.

The generating facility will be required to install at locations approved by PNM, the following:

1. A lockable, visible-open, load break disconnect between the generating facility and the PNM system that is visibly marked "Generation Disconnect." This disconnect will be accessible to and lockable by PNM.

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2. A fully rated breaker, that is visibly marked " Generation Breaker," to isolate the facility's generation from the PNM system in the event of a PNM system disturbance.
3. A permanent and weatherproof one-line electrical diagram of the generating facility located at the point of service connection to PNM. A permanent and weatherproof map of the generating facility showing the location of all major equipment including the PNM meter point, the Generation Disconnect, and the Generation Breaker. Included with or attached to this map will be the names and current telephone numbers of at least two persons that are authorized to provide access to the generating facility and who have authority to make decisions regarding its interconnection and operation. This telephone listing shall be updated as needed to maintain its usefulness.
4. A synchronizing or synchro-check relay (for self-excited or self-commutated sources only) to provide for proper synchronization of the generating facility with the PNM system.
5. A frequency relay to disconnect the generating facility from PNM's system under abnormal frequency conditions.
6. A set of voltage supervised directional overcurrent relays or impedance relays to disconnect the generating facility from PNM in the event of a fault on the PNM system. These are to be three-phase devices or three single-phase devices connected to sense the current in each of the three phases of the power system.
7. A voltage relay (three phase relay for three phase generating facilities) to disconnect from the PNM system in the event of an abnormal voltage condition. x
8. A Generation Breaker lockout or interlock to prevent the generating facility from closing into or energizing any de-energized PNM power system equipment.
9. A directional, instantaneous, overcurrent relay or directional, instantaneous power relay to supervise and control the trip output of the voltage and frequency relays referred to above. These are to be three-phase devices or three single-phase devices connected to sense the current in each of the three phases of the power system. Single-phase generating facility interconnections will require only one relay to sense the current. However, it must be a directional relay.
10. All generating facilities with an aggregated capacity 10 MW or larger will be required to have an isolation transformer. The power connections of these isolation transformers (wye or delta) will be determined by PNM.
11. Generators sized at 10 MW or larger will be required to interconnect with PNM at the sub transmission voltage level.

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12. The maximum total capacity that the generating facility will be allowed to interconnect with any PNM feeder is 60 percent of that feeder's power rating.

Additional PNM Interconnection Requirements

At the generating facility's expense and as necessary to protect PNM's systems, PNM will install as determined on a case-by-case basis: x

1. Additional protective relays to disconnect the generating facility or to trip the PNM substation breaker for generating facility system faults.
2. Additional breakers to isolate the generating facility from the PNM system.
3. Any special relays or transfer trip equipment necessary to protect the PNM system from problems that are or may be caused by or are the result of the attachment to the generating facility. This may include but is not limited to high side potential transformers on the PNM substation transformer and the necessary relays and fault interrupters needed to clear PNM substation transformer or transmission line faults.
4. Special transformers needed for ground fault sensing.
5. Dead-line supervised reclosing at the PNM substation.
6. Any modifications to the PNM system required to accommodate the generating facility to solve problems that are discovered after it is operational.

For generating facilities with a design capacity greater than 10 MW installation and the electrical protection of the generating facility must be designed or approved by a Professional Electrical Engineer engaged by the generator and be currently licensed in the state of New Mexico. The details of the design, protection, operation and maintenance of the generating facility's equipment are the responsibility of the generator and its licensed Professional Electrical Engineer. PNM will accept the proposed generating facility's interconnection design if it is adequate for interconnection with PNM's system. PNM's acceptance of the generating facility's interconnection design shall not constitute PNM's agreement with generating facility's proposed interconnection design relative to its completeness or its effectiveness for the protection of the generating facility.

OPERATING REQUIREMENTS:

1. Quality of Power:

The generating facility is responsible for the quality of power that is transmitted into the PNM system and is responsible for all damage that is caused by or that is a result of the generating facility's interconnection to the PNM system or its operation.

If other PNM customers are influenced or affected by flicker or harmonic distortion caused by the generating facility, PNM will require the generating facility to make changes to the facility to correct the problem. If such changes do not correct the problem or if the original problem is severe, PNM will require the generating facility to disconnect the disrupting machine or equipment from the PNM system until the problem has been resolved.

The maximum allowable voltage flicker (rapid change in voltage) caused by the generating facility is as shown below:

FREQUENCY OF VOLTAGE FLICKER	PERCENT OF VOLTAGE
1 per hour to 6 per hour	2.5%
7 per hour to 30 per hour	1.5%
31 per hour to 6 per minute	1.0%
7 per minute to 1 per second	0.7%
2 per second to 15 per second	0.5%

The above data is derived from charts and data in the Distribution Data Book by General Electric and from the Westinghouse Transmission and Distribution Book.

The total harmonic distortion of the generating facility's voltage and/or current shall not exceed 5 percent of the fundamental 60 Hz frequency for the square root of the sum of the squares of the harmonics, and 2 percent of the fundamental 60 Hz frequency for any individual harmonic as measured at the customer service connection point.

2. Maintenance:

The owner of the generating facility is responsible for the maintenance and upkeep of the interconnection protection equipment. All interconnection protection equipment will be maintained on an annual basis. x

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