

Additions, changes and clarifications from IEEE Standard 1547

0 – 2 MW

2-10 MW Radial

2-10 MW Network

4.1.1	Voltage Regulation	None.	Placeholder - allow for mutual agreement by parties. PJM Market consideration ?	Placeholder - allow for mutual agreement by parties. PJM Market consideration ?
4.1.2	Integration with Area EPS Grounding	<p><u>AP, PPL and UGI Exception:</u> AP, PP&L and UGI require a wye-grounded connection on the T.O. side of the DG step up transformer for all new installations. Other T.O.s within PJM will accept a delta or ungrounded wye connection provided that adequate protection is provided by the DG to detect a ground and limit any overvoltage to an acceptable level on the T.O system. This protection requires voltage monitoring on the high side of the DG transformer using phase to ground connected PTs.</p> <p>Also see Note² for AEP additional requirement for isolating device.</p>	Same. Chris Cook may comment?	Same. Chris Cook may comment ?

4.1.3	Synchronization	None.	None.	None.
4.1.4.1	Distribution Secondary Grid Networks (Under development)	See Note ¹ Interconnection to Distribution Secondary Grid Networks only allowed on an exception basis or where state commission regulations specify requirements.	N/A - Too large for sec. grid. Chris Cook to provide list of current connections to sec grids. Jim Daley to draft guidance language (white paper).	N/A - Too large for sec. grid. Chris Cook to provide list of current connections to sec grids. Jim Daley to draft guidance language (white paper).
4.1.4.2	Distribution Secondary Spot Networks	Interconnection to Distribution Secondary spot Networks only allowed on an exception basis or where state commission regulations specify requirements.	Same as 0-2 MW.	Same as 0-2 MW.
4.1.5	Inadvertent Energization of the Area EPS	None	None	None

4.1.6

<p>Monitoring</p>	<p>Local monitoring provisions are acceptable to meet 4.1.6 requirements. In addition see 4.1.2 additions and the following additions:</p> <p>(1) PJM requires real-time telemetering for Capacity Generating Resources able to set LMP.</p> <p>(2) Pepco and Conectiv require revenue quality metering with dial-up capability for all generators at 2 of the 3 locations as depicted on the single line drawing in Notes item #3. For facilities with multiple supplies and for generators less than 1MW, the requirements for metering will be determined on a case-by-case basis.</p> <p>(3) Conectiv may require real-time telemetering for certain interconnections above 1 MW.</p>	<p>(1) PJM requires real-time telemetering for all Capacity Resources, Energy Resources > 10 MW and any other Generating Resource able to set LMP.</p>	<p>(1) PJM requires real-time telemetering for all Capacity Resources, Energy Resources > 10 MW and any other Generating Resource able to set LMP.</p>
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		(4) PSEG may require real-time telemetering for any interconnection depending on location.		
4.1.7	Isolation Device	None. NEC interpretation is that Red + Green lights may be OK.	None. See NEC note !	None. See NEC note !
4.1.8.1	Protection from EMI	None.	None.	None.
4.1.8.2	Surge Withstand Performance	None.	None.	None.
4.1.8.3	Paralleling Device Withstand	None²	None²	None²
4.2.1	Area EPS Faults	None³	See Typical One Line for Radial.³	See typical One Line for Network.

4.2.2	Area EPS Reclosing Coordination	None	Add note "ComEd requires sync-check at line terminal unless min load to max gen ratio is >2. PP&L may also have a similar requirement ?	Add note "ComEd requires sync-check at line terminal unless min load to max gen ratio is >2. PP&L may also have a similar requirement ?
4.2.3	Voltage	None	None.	None.
4.2.4	Frequency	None	None	None
4.2.5	Loss of Synchronism	None	None.	None.
4.2.6	Reconnection to Area EPS	Clarification: In cases where the DG interface is via an ungrounded transformer connection at the PCC, the voltage sensing must be done on the T.O. side of the transformer. This voltage sensing must be Ph -Gnd. connected and be on all three phases.	Same as 0-2 MW	Same as 0-2 MW
	(a) Voltage Requirement	None	None.	None.

	(b) Frequency Requirement	None	None.	None.
4.3.1	Limitation of DC Injection	None.	None.	None.
4.3.2	Limitation of Flicker induced by the DR	None	None.	None.
4.3.4	Harmonics	None	None.	None.
4.4.1	Unintentional Islanding	None	Probably the same as 0-2 MW. Open for further discussion.	Probably the same as 0-2 MW. Open for further discussion. See typical one line for Network.
5.1	Design Test	None	None.	None.
5.2	Production Tests	None ⁴	None ⁴	None ⁴
5.3	Interconnection Installation Evaluation	Addition to IEEE 1547 Requirement⁵	Addition to IEEE 1547 Requirement ⁵	Addition to IEEE 1547 Requirement ⁵

5.4	Commissioning Tests	See Note ⁶	See Note ⁶	See Note ⁶
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5.5	Periodic Tests	See Attachment A <u>Exception for all:</u> – Periodic Testing is covered by PJM Tariff 55.1, 55.4, and ISA standard T&Cs which include the same PJM Tariff paragraphs.	See Attachment A <u>Exception</u> <u>for all:</u> – Periodic Testing is covered by PJM Tariff 55.1, 55.4, and ISA standard T&Cs which include the same PJM Tariff paragraphs.	See Attachment A <u>Exception</u> <u>for all:</u> – Periodic Testing is covered by PJM Tariff 55.1, 55.4, and ISA standard T&Cs which include the same PJM Tariff paragraphs.
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Below is a definition for "isolating switch" from IEEE dictionary 1996 version, that references the National Electric Code.

isolating switch. (A) A switch intended for isolating an electric circuit from the source of power. It has no interrupting rating, and it is intended (NEC/NESC) 1020-1988r

Note in Std 1547, we purposely refrained from stating switches or breakers or relays, etc. to purposely address the requirements functionally

----- NEC 2005 Handbook definitions in Article 100, follow. -----

Accessible, Readily (Readily Accessible). Capable of being reached quickly for operation, renewal, or inspections without requiring those to

Switch, Isolating: A switch intended for isolating an electric circuit from the source of power. It has no interrupting rating, and it is intended to

----- visible-break thoughts follow -----

As I thought, I couldn't find "visible-break" in the NEC 2005 edition. If you refer to "2005 NEC Article 690.17 Switch or Circuit Breaker" I belie

Other insight on "plainly indicating" and combined "disconnection/isolation" functionality can be garnered from Article 430 Motors, Motor Circu

And, in the Article 430 section IX Disconnecting Means Article 430.109 (A) General (7) System Isolation Equipment paragraph interpretation

PPL - Monitoring Required on 69 kV

Chris Cook to get back. ComEd 138 kV also requires an exception.

Jim Daley to draft guidance language (white paper)

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Add to note 2 visible disconnect "or drawout breaker with indicator"

Reference See IEEE 1547.1) ANSI standard for higher voltages

PPL does not have an exception for load vs. gen size

Clarification - PPL may require verbal communication with System Operator at 69 kV

Exception for PPL (See Note 5 on present 0-2 PJM Standard)
Dave Bassett will refine !!!! Talking about Voltage rather than current limits.

See PPL note for >2MW only ! PPL Reclosing time is 1.5 sec. therefore must be off in 1 s

to be operated only after the circuit has been opened by some other means. (B) Device used to isolate plant electrical equipment from the rest of the

r. Also, for discussion, consider Clause 4.1.7 Isolation Device as well as Clause 4.1.8.3 Paralleling Device. The point is that 4.1.8.3 is meant to addre

whom ready access is requisite to climb over or remove obstacles or to resort to portable ladders, and so forth. (NEC guidance interpretation further states that such equipment shall be operated only after the circuit has been opened by some other means.

Where the equivalent "visible-break" wording is stated therein in 690.17 requirement "(3) Plainly indicating whether in the open or closed position." (Notes for 430.109, Isolating Switches, and Controllers) For instance, 430.109 (E) Isolating Switches (for > 40hp dc or 100 hp ac) ... "permits a general-use or isolating switch where plainly visible break is not provided." (NEC guidance, "safe condition indication" is addressed wherein indicator lights are allowable. I personally read that to mean a code official would likely be

ec vs 2 sec to coordinate with PPL reclosing. Can say " or otherwise as required with 4.2.2"

circuit.

pass voltage-bearing functionality.)

states "readily accessible" does not preclude the use of a locked door for service equipment or ...).

that Article 690.17 specifies an interrupting rating requirement, whereas "isolating switch" definition does not include that.)

nly marked 'Do not operate under load.'

is satisfied with "indicator lights" satisfying "Plainly indicating whether in the open or closed position" for an isolation device.