The purpose of this addendum is to address and outline changes in National Grid's policy on reviewing and implementing protective practices in regards to the potential for unintentional islanding for distributed energy resources (DER).

1.0 GENERAL

1.1 National Grid (NG) may reclose at any distribution electric power system (EPS) segment at any time without checking for de-energized segments as normal system operations to maintain service reliability. It is important to identify this possibility to the DER operator as it is the responsibility of the DER operator to trip off within 2 seconds in the event the EPS utility source is not present.

1.2 During DER impact evaluation, when a DER on the circuit causes NG system protection to be unable to trip for end of line faults, appropriate measures will be taken to correct this protection gap. NG device setting adjustments, additional protection devices, and/or customer impedance grounding may be required.

1.3 The requirements outlined below in regards to unintentional islanding mitigation risks are not applicable for DER proposed to be interconnected to an NG network system. NG network systems are not designed for and cannot accept back feed.

1.4 Utility interactive inverters evaluated under these requirements shall not actively regulate voltage or provide var support functions. Any inverter type generation established as voltage regulating or var supportive will be reviewed under section 5.0 requirements.

1.5 DER threshold values shall be analyzed in aggregate where multiple DER projects are supplied from a single point of connection to the EPS. Individual DER projects on sub-divided or adjacent parcels may evaluated based upon total aggregate nameplate ratings as an equivalent single point connection to the EPS.

1.6 For cases where the line section aggregated DER is ≤ 33% of minimum load regardless of DER type mix and is connected to < 35 kV distribution EPS no additional requirements identified below shall be required.

1.7 For DER equipped with direct transfer trip (DTT), those DERs will not be factored into the 10 and 25% ratio screens identified within this document.

1.8 Where used within this document, reclose blocking is a voltage supervised reclose permissive feature required at any mid-line automated interrupting device identified through the steps outlined. Where this feature is required, each mid-line device is also required to be SCADA equipped through National Grid's distribution EMS cellular network.

2.0 TERMS

2.1 Line section: as used within this document a line section shall describe any EPS circuit segment that can be isolated via an automatic interrupting device such as a sectionalizer, recloser, or circuit breaker. A complete distribution feeder may contain multiple line

sections. Depending on the DER size to load ratio, multiple line sections may require review and be screened accordingly per the steps outlined.

2.2 Certified: the term certified shall mean UL 1741 certified where used throughout this document.

2.3 Non-certified: the term non-certified shall mean any non-UL 1741 inverter, induction or synchronous DER.

3.0 ISLANDING RISK MITIGATION METHODS REQUIRED

3.1 Special conditions outlined within this section are required at minimum, regardless of the screening outcomes applicable in the following sections.

3.2 Cases where NG point of common coupling (PCC) recloser is required

- 3.2.1 DER ≥ 300 kW and DER > 33% minimum load and is connected to < 5 kV EPS.
- 3.2.2 DER connected to > 15 kV and < 35 kV EPS where DER > 50% onsite minimum host load.

3.3 Cases where additional EPS protection schemes, including but not limited to transfer tripping, may be required[i]

- 3.3.1 If line faults (phase and ground where applicable) cannot be cleared by DER protective device or NG PCC recloser.[ii]
- 3.3.2 Unique arrangements not explicitly defined within this document at National Grid's discretion.
- 3.3.3 If the DER cannot be tripped off with utility-owned devices when automated sectionalizing schemes will operate.
- 3.3.4 DER connected to > 35 kV EPS where DER > 50% onsite minimum load and the connecting line is radially supplied.

4.0 CERTIFIED DER[iii]

4.1 All inverters must have an 88% voltage trip within 2 seconds to be considered in this section.

4.2 Proposed DER rated ≤ 50 kW

- 4.2.1 No requirements.

4.3 Proposed DER rated > 50 kW and < 1000 kW

- 4.3.1 Line section aggregated non-certified DER is ≤ 10% of mix.
  - 4.3.1.1 No additional requirements.
- 4.3.2 Line section aggregated non-certified DER is > 10% and ≤ 25% of aggregate DER.
  - 4.3.2.1 Sandia screening may be applicable depending on inverter models on segment.
  - 4.3.2.2 NG PCC recloser and reclose blocking required if Sandia screens not passed.
    - 4.3.2.2.1 Detailed risk of islanding (ROI) study may be performed at customer's request. If results of the detailed study show no

significant risk of islanding for a period greater than 2 seconds, then the recloser and reclose blocking is waived.

4.3.3 Line section aggregated non-certified DER is > 25% of all DER.

4.3.3.1 NG PCC recloser and reclose blocking required[iv]

4.3.3.1.1 Detailed ROI study may be performed at customer's request. If results of the detailed study show no significant risk of islanding for a period greater than 2 seconds, then reclose blocking is waived. NG PCC recloser is waived for DER ≤ 67% of line load to generation ratio or < 500 kW.

4.4 Proposed DER rated DER ≥ 1000 kW

4.4.1 NG PCC Recloser required.

4.4.2 Reclose blocking required if line segment aggregate DER > 50% of min load.

5.0 NON-CERTIFIED & VOLTAGE REGULATING INVERTERS, INDUCTION & SYNCHRONOUS MACHINES

5.1 Require ANSI C37.90 protective relay with IEEE 1547 voltage and frequency tripping and restoration functions.

5.2 DER > 33% minimum load

5.2.1 DTT required.

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[i] *While the intent of this unintentional islanding protection policy is to encourage DER installations while minimizing inhibitive impacts to the DER installation, National Grid reserves the right and flexibility to enforce protective measures deemed essential for the safety and reliability of the EPS.*

[ii] *Customers should be aware that >15kV class circuits typically involve more complex protection schemes, which can be more likely to require DTT due to inability to see and trip faults in an acceptable time frame, in addition to operational issues that may be present at these voltage classes (23kV and 34.5kV).*

[iii] *Inverter firmware derating is not acceptable for reduction of system size to satisfy thresholds within this document.*

[iv] *Where feasible, installing a PCC recloser in front of the non-certified DER may reduce or eliminate any further requirements to the subject applicant DER.*