TP-8100-0

Performance Requirements for Inverter-Based Generation

Effective Date: August 2019
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Revision History

Version	Date	Revisions
0	08/01/2019	**Global** ➢ New Specification

1.0 Introduction

In conjunction with Specification TP-7100 *Transmission Planning Criteria* this specification describes Con Edison's Performance Requirements for Inverter-Based Generation interconnected with Con Edison's transmission system at 69 kV and above.

It is paramount that all resources connected to the Transmission System are capable of providing Frequency and Voltage control that support the reliability of the Transmission System.

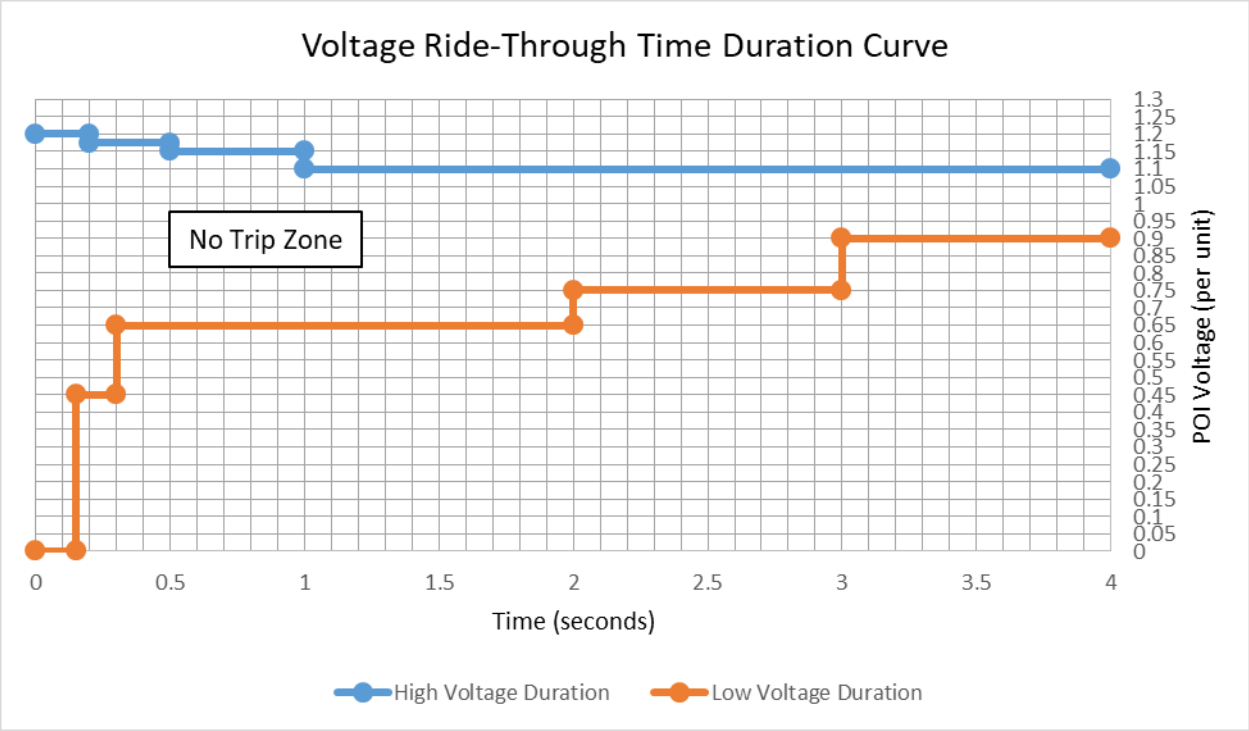
This procedure is relied upon for compliance with Public Service laws, rules, and/or regulations as documented in connection with the PSL §65(15) CEO Certification Project.

2.0 Momentary Cessation

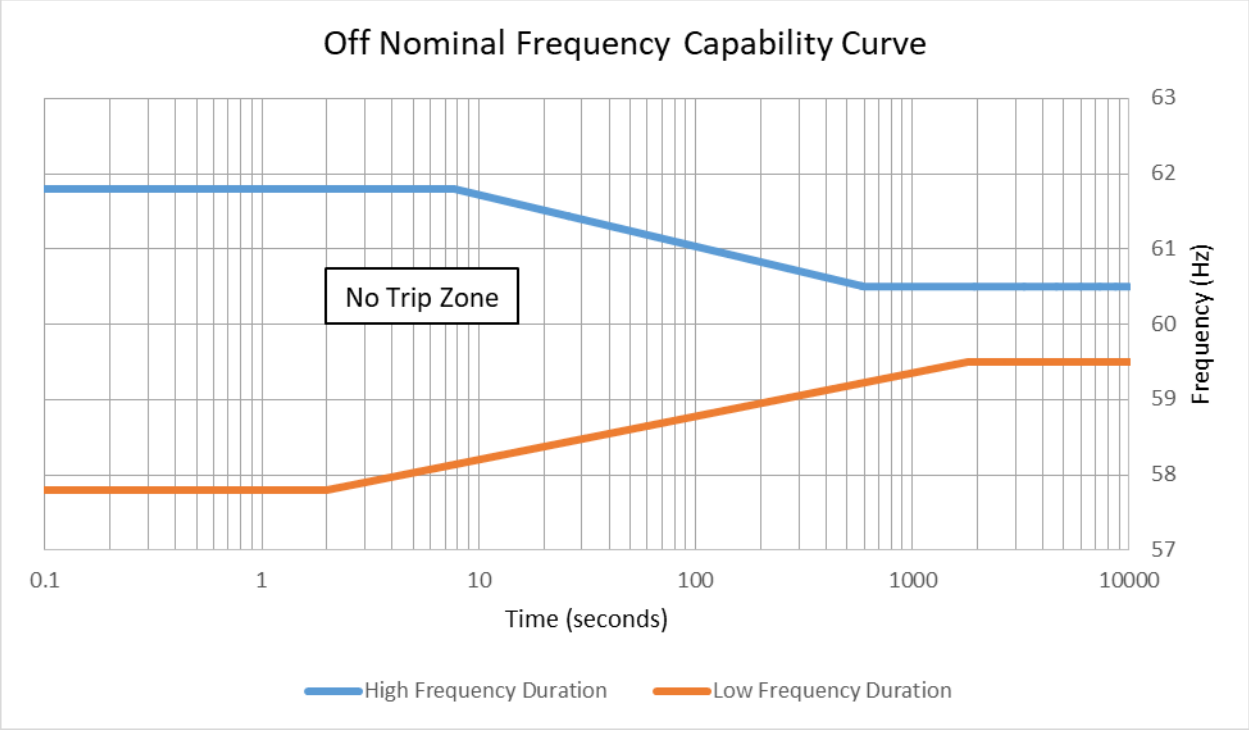
Momentary Cessation is when no current is injected into the Transmission System by the inverter during low or high voltage or frequency conditions outside the continuous operating range. Momentary Cessation is also known as "blocking".

Inverter-Based generation resources which are interconnected to Con Edison's Transmission System shall continue to inject current at the Point of Interconnection inside the "No Trip" zone of the frequency and voltage ride through curves of NERC Standard PRC-024 Attachment 1 (See Graph 1 and Graph 2).

Graph 1: NERC Standard PRC-024 Voltage Ride-Through Requirements



Graph 2: NERC Standard PRC-024 Frequency Ride-Through Requirements



3.0 Frequency Control

Inverter-Based generation resources which are interconnected to Con Edison's Transmission System shall have the capability to provide immediate and sustained primary frequency response. The primary frequency response control functions shall be enabled at all times.

The inverter-Based generation resources shall provide 5% droop characteristics and, at a minimum, be responsive to frequency deviations exceeding ±0.036 Hz.

3.1 Over-frequency events

For over-frequency events exceeding 60.036 Hz, the real power output of the Inverter-Based generation resources shall be lesser of the available real power and a power output limit that decreases at the rate of 0.33 per unit of the pre-disturbance power level per 1 Hz of frequency deviation above 60.036 Hz.

3.2 Under-frequency events

For under-frequency events wherein the frequency is less than 59.964 Hz, the real power output of the Inverter-Based generation resources shall be lesser of the available real power and a power output limit that increases at the rate of 0.33 per unit of the pre-disturbance power level per 1 Hz of frequency deviation below 59.964 Hz

4.0 Voltage Control

Inverter-Based generation resources shall support voltage regulation and voltage stability at the Point of Interconnection and as such shall have the capability to operate in automatic voltage control at all times[1]. The automatic voltage control shall be continuously acting to control reactive power injection across all expected planning conditions (e.g., N-1, N-1/-1).

Inverter-Based generation resources shall follow NYISO's Default Generator Voltage Schedule.

Inverter-Based generation resources shall be designed to provide reactive power 0.85 lagging to 0.95 leading at all active power outputs down to 0 MW at the Point of Interconnection.

[1] For Energy Storage Systems this requirement is applicable to both charging and discharging modes of operation.