ISO New England Operating Procedure No. 13

Standards for Voltage Reduction and Load Shedding Capability

Effective Date: April 3, 2024

Review By Date: April 3, 2026

References:

ISO New England Inc. Transmission, Markets, and Services Tariff

ISO / PTO Transmission Operating Agreement

NERC Reliability Standard EOP-011 - Emergency Operations

NERC Reliability Standard PRC-006-NPCC Automatic Underfrequency Load Shedding

Northeast Power Coordinating Council Inc. (NPCC) Regional Reliability Reference Directory #2 Emergency Operations (Directory #2)

ISO New England Operating Procedure No. 4 - Action During a Capacity Deficiency (OP-4)

ISO New England Operating Procedure No. 7 - Action in an Emergency (OP-7)

ISO New England Operating Procedure No. 14 - Technical Requirements for Generators, Demand Response Resources, Asset Related Demands and Alternative Technology Regulation Resources (OP-14)

Master/Local Control Center Procedure No. 2 - Abnormal Conditions Alert (M/LCC 2)

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Appendices:

I. INTRODUCTION

This Operating Procedure (OP) establishes standards for the installation and testing for Market Participants (MPs)/Transmission Owners (TOs) that control transmission/distribution facilities with voltage reduction and load shedding capability. These standards require that all MPs/TOs that have control over transmission/distribution facilities have the capability to reduce load demand when directed to do so for Bulk Electric System (BES) dispatching purposes. ISO New England (ISO) and/or the Local Control Centers (LCCs) use this load reducing capability to maintain system reliability during generating capacity deficiencies, energy deficiencies, and other emergency operating conditions described in ISO New England Operating Procedure No. 4 - Action During a Capacity Deficiency (OP-4) and ISO New England Operating Procedure No. 7 - Action in an Emergency (OP-7).

II. COMPLIANCE

MPs/TOs with control over transmission/distribution facilities shall comply with the standards established by this OP. MPs/TOs **not** in compliance shall immediately take actions to achieve compliance.

A MP/TO with control over transmission/distribution facilities may achieve compliance by arranging with another MP/TO with control over transmission/distribution facilities to provide on its behalf, voltage reduction and/or load shedding capability. The voltage reduction and/or load shedding capability provided by such arrangements shall be in a similar electrical location to the MP/TO for which service is provided. Such arrangements shall yield equivalent support to transmission system load and voltage as would be obtained if the MP/TO with control over transmission/distribution facilities had installed voltage reduction and load shedding capability on its own system.

Arrangements may also be made for one (1) MP/TO with control over transmission/distribution facilities to provide voltage reduction and/or load shedding capability for another MP/TO with control over transmission/distribution facilities during a portion of the day or week. For example, an MP/TO with control over transmission/distribution facilities **not** able to reduce voltage or shed load during the entire period of time that such capability is required may arrange for another MP/TO with control over transmission/distribution facilities, subject to the requirements of the previous paragraph, to provide such capability on its behalf during the deficient periods. A MP/TO providing voltage reduction and/or load shedding capability for another MP/TO with control over transmission/ distribution facilities shall **not** count the capability dedicated to another MP/TO with control over transmission/distribution facilities toward meeting its own requirements.

The details of arrangements between MPs/TOs with control over transmission/distribution facilities for voltage reduction and/or load shedding services to meet the standards of this OP must be submitted to and approved by ISO.

A MP/TO with control over transmission/distribution facilities that is not a Participating Transmission Owner, as that term is defined in the Transmission Operating Agreement, shall establish all necessary arrangements with an appropriate LCC to facilitate the implementation of ISO directives with respect to voltage reduction or load shedding.

III. REQUIREMENTS

A. Voltage Reduction

1. Voltage reduction shall take place on the distribution system wherever possible. It is recognized that in certain areas, voltage reduction is implemented on the subtransmission system. Voltage reduction shall **not** be implemented on the transmission system operating at 69 kV and above.
2. Ideally, voltage reduction capability shall be installed so that all loads are subject to a five (5) percent voltage reduction. However, it is recognized that it may **not** be practical to subject some loads to voltage reduction (e.g., loads served from the transmission system, voltage sensitive loads, etc.). It may be desirable to subject some loads to a voltage reduction of less than five (5) percent. However, each MP/TO with control over transmission/distribution facilities shall have the capability to reduce system load demand at the time a voltage reduction is initiated by at least one and one-half (1.5) percent through implementation of a voltage reduction.
3. It is intended that voltage reductions be fully implemented within ten (10) minutes from the time ordered. However, it is recognized that it may **not** be practical for some MPs/TOs with control over transmission/distribution facilities to meet this requirement. In those circumstances, voltage reduction that can be implemented in thirty (30) minutes is permissible.
4. Each MP/TO responsible for providing voltage reduction capabilities within ten (10) minutes shall make this capability available for use seven days a week during the period between 0800 to 2300 hours.
5. Each MP/TO responsible for providing voltage reduction capabilities that require longer than ten (10) minutes shall be able to implement this voltage reduction on all non-holiday weekdays during the period between 0800 to 2300 hours. Holidays are those listed in Appendix A to this OP.
6. Upon application to and approval by ISO, the requirement for voltage reduction capability may be satisfied by an equivalent amount of interruptible loads. Such loads shall be interruptible within ten (10) minutes of issuance of ISO's voltage reduction operating instruction. Loads designated for this purpose shall be dedicated to OP-4, shall be under dispatch authority of ISO and/or the appropriate LCC, and do **not** qualify as Demand Response Resources or Asset Related Demands under the provisions of ISO New England Operating Procedure No. 14 - Technical Requirements for Generators, Demand Response Resources, Asset Related Demands and Alternative Technology Regulation Resources (OP-14).

B. Load Shedding

1. In accordance with the provisions of the NERC Reliability Standard PRC-006-NPCC – Automatic Underfrequency Load Shedding, each Distribution Provider (DP)/Transmission Owner (TO) with 100 MW or more of peak net Load shall implement an Underfrequency Load Shedding (UFLS) program with attributes that include load shedding stages, frequency setpoints, block sizing, and total operating times as detailed in Attachment C, Table 1 of PRC-006-NPCC.

   All DPs/TOs with 50 MW or more and less than 100 MW of peak net Load shall implement a UFLS program as prescribed in Attachment C, Table 2 of PRC-006-NPCC.

   All DPs/TOs with 25 MW or more and less than 50 MW of peak net Load shall implement a UFLS program as prescribed in Attachment C, Table 3 of PRC-006-NPCC.

   DPs/TOs with less than 25 MW of peak net load connected to their facilities are exempt from providing UFLS.

   MPs/TOs may collectively implement and provide, by mutual agreement with one or more DPs/TOs within the same island and acting as a single DP/TO, an aggregated automatic UFLS program that sheds their coincident peak aggregated net Load, based on the frequency thresholds, total nominal operating time and amounts specified in PRC-006-NPCC, Attachment C, Tables 1 through 3.

   Load shed automatically by underfrequency relays shall **not** be automatically restored.

   Under frequency threshold relays shall be set to a nominal total operating time of 300 ms, from the time when frequency passes through the set point to the time of circuit breaker contact opening (including any communications time delay), with a minimum relay operating time to be **no** less than 100 ms when the rate of frequency decay is 0.2 Hz per second. This is consistent with the requirements of NERC Reliability Standard PRC-006-NPCC Attachment C.

2. Each MP/TO with control over transmission/distribution facilities must be capable of manually shedding at least fifty (50) percent of load in ten (10) minutes or less. The first half of the load shed manually should **not** include load which is part of any automatic load shedding plan unless following manual load shedding, the requirements of NERC Reliability Standard PRC-006-NPCC - Automatic Underfrequency Load Shedding, Attachment C can still be met.
3. Manual load shedding should **not** interrupt transmission paths. MPs/TOs with control over transmission/distribution facilities that include such interruptions in load shedding plans must demonstrate from system simulations that transmission interruptions will **not** degrade interconnected system reliability.
4. Manual load shedding plans may incorporate the use of electronic notification systems, outside of normal business hours, to notify MPs/TOs with control over transmission/distribution facilities personnel that manual load shedding has been requested. MPs/TOs with control over transmission/distribution facilities whose

plans include the use of such a system must coordinate those plans with the appropriate LCC. In addition, MPs/TOs with control over transmission/distribution facilities whose plans include use of an electronic notification system will consider receipt of an Abnormal Conditions Alert, under Master/Local Control Center Procedure No. 2 - Abnormal Conditions Alert (M/LCC 2), as notification that their substations are to be staffed for possible implementation of manual load shedding during the period that the Alert is in effect.

This provision for the use of an electronic notification system is subject to review by the Reliability Committee relative to the overall manual load shedding capability of the New England Reliability Coordinator Area / Balancing Authority Area (RCA/BAA) and the extent to which such systems are being used to provide coverage outside of normal business hours. The compliance surveys performed in accordance with Section IV of this OP will serve as the basis for such Reliability Committee reviews.

5. The plan should include the capability of shedding load proportionately over the whole system; however, it is recognized that this may **not** be practical in some areas.

   Generation connected to sub-transmission or distribution systems will have an ever-increasing impact on load shedding plans. If a Generator is interrupted as part of a load shedding plan by an MP/TO with control over transmission/distribution facilities, an equivalent amount of additional load must be included in the load shedding plans.

6. Each MP/TO with control over transmission/distribution facilities must be capable of implementing automatic and manual load shedding twenty-four (24) hours a day.
7. Once manual load shedding has been implemented, the appropriate LCC will inform the MPs/TOs with control over transmission/distribution facilities of the estimated length of time that the load is expected to be interrupted. Depending on the time estimate, MPs/TOs with control over transmission/distribution facilities may choose to initiate feeder rotations. During the rotation process, load must be interrupted before an equivalent load can be restored.

IV. TESTING

A. Voltage Reduction

At the discretion of ISO, a system-wide voltage reduction test will be conducted. An actual voltage reduction will be implemented. MPs/TOs with control over transmission/distribution facilities will record the load reduction attained within ten (10) minutes and/or thirty (30) minutes in the test. If such records are **not** possible, LCC load relief data may be used. Each MP/TO with control over transmission/distribution facilities will complete a questionnaire that will record load relief attained and identify operational, or customer problems that were encountered and should be resolved. The data will be used by ISO to update load relief estimates contained in OP-4, and to help verify each MP/TO with control over transmission/distribution facilities voltage reduction capability.
Voltage reduction tests will be conducted in accordance with the following parameters:

1. A date will be established for the test.
2. MPs/TOs with control over transmission/distribution facilities will be given a written notice four (4) weeks in advance of the test date.
3. If system operating conditions force cancellation of the test, a new date will be set in accordance with the above parameters.

B. Load Shedding

Every second month, ISO will conduct a simulated manual load shed test to train the ISO, LCC, and MPs/TOs with control over transmission/distribution facilities personnel in all aspects of manual load shedding procedures. These tests will be conducted in accordance with OP-7 to the maximum extent possible. Tests will deviate from actual load shed operations in the following manner.

1. All verbal load-shedding operating instructions issued will be preceded and concluded with the statement, “This is a test. Do **not** shed load”.
2. Operators will **not** open breakers or disconnect actual load, but instead, will observe or estimate the amount of load that would have been shed on the circuit had it been an actual load shedding operation. These tests may be used to help verify an MP/TO with control over any transmission/distribution facility capability to reduce system load by as much as fifty (50) percent.
3. Operators will report the amount of load that would have been shed and the length of time to do it to their next highest dispatching authority. ISO will issue reports on each simulated manual load shedding test. The report will specify the amount of load relief attained and the time interval to attain the load shed during the test.

OP-13 REVISION HISTORY

Document History (This Document History documents action taken on the equivalent NEPOOL Procedure prior to the RTO Operations Date as well revisions made to the ISO New England Procedure subsequent to the RTO Operations Date.)

Rev. No.	Date	Reason
- -	04/03/24	For previous revision history, refer to Rev 10 available through Ask ISO.
Rev 10.1	12/02/20	Periodic review by procedure owner with no changes required; Made administrative changes required to publish a Minor Revision.
Rev 10.2	11/29/22	Biennial review by procedure owner; Removed reference to retired NPCC Directory #12; Removed from the footer "In addition, a Controlled Copy is available in the Master Control Room procedure binders at the ISO"; Minor grammatical edits in Sections II, III, and IV.
Rev 11	06/15/23	Added References to Tariff and TOA; Clarify that Market Participants that are not PTOs (i.e. distribution companies) shall respond to an LCC instruction for voltage reduction.
Rev 11.1	04/03/24	Biennial review performed by procedure owner requiring no intent changes; Section II: Minor grammar edits; Section III.B.4: Replaced pager with electronic notification; Section IV.A.4: Deleted step as the language was already included in the above discussion in Section IV.A; Made administrative changes required to publish a Minor Revision.