



# Operating Procedures

ISO New England Operating Procedure No. 13

*Standards for Voltage Reduction and Load  
Shedding Capability*

Effective Date: June 22, 2010

Revision No. 5

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### Standards for Voltage Reduction and Load Shedding Capability

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#### References:

NERC Reliability Standard EOP-003 - Load Shedding Plans

Northeast Power Coordinating Council Inc. (NPCC) Regional Reliability Reference Directory #2 Emergency Operations (Directory D2)

Northeast Power Coordinating Council Inc. (NPCC) Regional Reliability Reference Directory #12 - Underfrequency Load Shedding Program Requirements (Directory D12)

Northeast Power Coordinating Council Inc. (NPCC) Regional Reliability Reference Directory #12 – Implementation Plan

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 Resources and Asset Related Demands (OP-14)

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

Market Rules and Procedures

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## **I. INTRODUCTION**

This document establishes standards for the installation and testing of Market Participants with control over transmission/distribution facilities voltage reduction and load shedding capability. These standards require that all Market Participants with control over transmission/distribution facilities have the capability to reduce load demand when directed to do so for bulk power supply dispatching purposes. These load reducing capabilities are used by the ISO New England (ISO) and/or the Local Control Centers (LCCs) to maintain system reliability during generating capacity deficiencies, energy deficiencies, and other emergency operating conditions as 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

Market Participants with control over transmission/distribution facilities are expected to comply with the standards established by this ISO New England Operating Procedure. Those not in compliance are expected to proceed immediately to achieve compliance.

Market Participants with control over transmission/distribution facilities may achieve compliance by arranging with another Market Participant 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 must be in a similar electrical location to the Market Participant for which service is provided. Such arrangements must yield equivalent support to transmission system load and voltage as would be obtained if the Market Participant 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) Market Participant with control over transmission/distribution facilities to provide voltage reduction and/or load shedding capability for another Market Participant with control over transmission/distribution facilities during a portion of the day or week. For example, a Market Participant 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 Market Participant 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. Market Participants providing voltage reduction and/or load shedding capability for another Market Participant with control over transmission/distribution facilities must not count the capability dedicated to another Market Participant with control over transmission/distribution facilities toward meeting its own requirements.

The details of arrangements between Market Participants with control over transmission/distribution facilities for voltage reduction and/or load shedding services to meet the standards of this ISO New England Operating Procedure must be submitted to and approved by ISO.

### III. REQUIREMENTS

#### A. VOLTAGE REDUCTION

1. Voltage reduction should 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 should not be implemented on the transmission system operating at 69 KV and above.
2. Ideally, voltage reduction capability should 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 Market Participant with control over transmission/distribution facilities must 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 Market Participants with control over transmission/distribution facilities to meet this requirement. In those circumstances, voltage reduction which can be implemented in thirty (30) minutes is permissible.
4. Each Market Participant with control over transmission/distribution facilities must be able to implement a voltage reduction on all non-holiday weekdays during the period between 0800 to 2300 hours. Holidays are those listed in Appendix A to this procedure.
5. 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 must be interruptible within ten (10) minutes of issuance of the voltage reduction order by ISO. Loads designated for this purpose must be dedicated to OP-4, must be under dispatch authority of ISO and/or the appropriate LCC, and do not qualify as ISO Demand Resources or Asset Related Demands under the provisions of ISO New England Operating Procedure No. 14 - Technical Requirements for Generators, Demand Resources and Asset Related Demands (OP-14).

## B. LOAD SHEDDING

1. Each Market Participant with control over transmission/distribution facilities must install underfrequency load shedding equipment to accomplish the following in an emergency characterized by rapid frequency decline:
  - Automatic load shedding of ten (10) percent of load initiated at a nominal set point of 59.3 Hertz.
  - Automatic load shedding of an additional fifteen (15) percent of load initiated at a nominal set point of 58.8 Hertz.

These load shedding steps are designed to return frequency to at least 58.5 Hertz in ten (10) seconds or less and to at least 59.5 Hertz in thirty (30) seconds or less, for a generation deficiency of up to twenty-five (25) percent of the load. These setpoints are **not valid** after June 26, 2010.

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

In accordance with the provisions of the Northeast Power Coordinating Council Inc. (NPCC) Regional Reliability Reference Directory #12 - Underfrequency Load Shedding Program Requirements (Directory D12), beginning on June 26, 2009 and continuing over the next six (6) years, each Market Participant with control over transmission/distribution facilities with an end use peak load equal to or greater than 100 MW is required to take action in converting/modifying its existing automatic UFLS capability to achieve the applicable number of load shedding stages, frequency setpoints, block sizing, and total operating times as detailed in Sections 5.2.1 of Directory #12 and to do so in accordance with the schedule defined by the Northeast Power Coordinating Council Inc. (NPCC) Regional Reliability Reference Directory #12 – Implementation Plan. (Refer to Appendices B and C of this procedure for UFLS Program Requirements and the UFLS Program Implementation Plans).

Further, all Market Participants with control over transmission/distribution facilities with an end use peak load of less than 100 MW shall implement the changes as prescribed in Sections 5.2.2 or 5.2.3 of Directory #12, as applicable, within 36 months of March 3, 2010. (Refer to Appendix B of this procedure for UFLS Program Requirements.)

Market Participants with control over transmission/distribution facilities with an end use peak load of less than 25 MW are exempt from providing UFLS in accordance with Section 5.2.4 of Directory #12.

Market Participants with control over transmission/distribution facilities with an end use peak load of less than 100 MW may collectively implement by mutual agreement with one or more entities within the same island, as identified by ISO, an aggregated automatic UFLS program that

sheds load on the frequency thresholds described in Directory #12, Section 5.2.1 as an alternative to implementing the applicable program in Directory #12, Section 5.2.2 or 5.2.3.

In accordance with Directory #12, Section 5.2.6, 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.

2. Each Market Participant 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. Insofar as practical, the first half of the load shed manually should not include that load which is part of any automatic load shedding plan (III.B.1. above).
3. Manual load shedding should not interrupt transmission paths. Market Participants with control over transmission/distribution facilities who 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 digital pager systems, outside of normal business hours, to notify Market Participants with control over transmission/distribution facilities personnel that manual load shedding has been requested. Market Participants 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, Market Participants with control over transmission/distribution facilities whose plans include use of a pager system will consider receipt of an Abnormal Conditions Alert, under Master/Local Control Center Procedure #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 a digital display pager 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 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 procedure 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 a Market Participant with control over transmission/distribution facilities, an equivalent amount of additional load must be included in the load shedding plans.

6. Each Market Participant 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 Market Participants 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, Market Participants 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. Market Participants 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 Market Participant 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 Market Participant 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. Market Participants 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.
4. Voltage reduction load relief capability shall be measured by each Market Participant with control over transmission/distribution facilities during system-wide voltage reduction tests.

**B. LOAD SHEDDING**

Every second month, ISO will conduct a simulated manual load shed test to train the ISO, LCC, and Market Participant 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 directives 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 a Market Participant with control over 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
Rev 1	08/20/98	
Rev 2	02/01/05	Updated to conform to RTO terminology
Rev 3	05/06/05	Update References for NERC Version 0 Standards
Rev 4	10/01/06	Updated for ASM 2
Rev 5	06/22/10	Biennial review by procedure owner; Reformatted entire document, changed font to Arial; Added disclaimer statement to 1 <sup>st</sup> page footer and added "Uncontrolled" to all page footers; In References section, changed NPCC A-3 to D2, added NPCC D12 and D12 Implementation Plan, deleted OP-8; Added Appendices B and C to Appendices list section; Globally: corrected various document titles, defined acronyms ISO & LCC; Updated to conform to new automatic UFLS program requirements as specified in NPCC Directory # 12