

**CENTRAL MAINE POWER COMPANY  
RESPONSE TO ORAL DATA REQUEST NO. 1  
DOCKET No. 2008-255**

**November 18, 2008**

**ODR-01-62**

**Q.** Is the generation in the large customer data set (behind the meter generators) available to ISO to use during a contingency event?

**A.** Behind the meter generation is available to be dispatched by the ISO under certain actions of ISO-NE Operating Procedure #4, *Action During a Capacity Deficiency* (OP4) (see attached). The following is a description of the conditions under which the ISO can and cannot dispatch these resources.

When ISO system operators are recovering from a system wide contingency, they generally restore system operating reserves to NPCC mandated levels by activating on-line dispatchable and off line fast start resources. If and only when those resources are insufficient, behind the meter generation can be dispatched under various actions of OP4. During system wide events, OP4 resources are dispatched unless they reside within export constrained areas.

Local system operators provide local contingency protection which means ensuring that transmission lines or interfaces are operated within limits proscribed in ISO-NE Operating Procedure #19, *Transmission Operations* (see attached). Mitigation plans fully utilize non- OP4 actions such as off cost dispatch and transaction curtailment. Once those actions are exhausted, actions of OP4 can be utilized. Unlike system wide contingencies, for local contingencies the system operators may elect not to implement actions of OP4 that activate behind the meter generation because they cannot readily determine the system impact of behind the meter generation to the transmission system. In other words, local system operators are unable to analyze whether activating *behind the meter* generation will mitigate or exacerbate a local transmission overload.

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**Attachment(s):**

1. ISO-NE Operating Procedure No. 4
2. ISO-NE Operating Procedure No. 19

**ISO** new england

# Operating Procedures

ISO New England Operating Procedure No. 4

*Action During a Capacity Deficiency*

Effective Date: March 5, 2008

Revision No. 8

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## ISO New England Operating Procedure No. 4 Action During A Capacity Deficiency

Effective Date: March 5, 2008

REFERENCES:        NERC Standard EOP-002 - Capacity and Energy Emergencies  
                          NERC Standard COM-002 – Communications and Coordination  
                          NPCC Emergency Operation Criteria A-03  
                          NPCC Operating Reserve Criteria A-06  
                          NPCC Procedures During Abnormal Operating Conditions C-20  
                          ISO New England Operating Procedure No. 7 - Action in an Emergency  
                          (OP 7)  
                          ISO New England Operating Procedure No. 8- Operating Reserve and  
                          Regulation (OP 8)  
                          ISO New England Operating Procedure No. 9 – Scheduling and Dispatch  
                          of External Transactions (OP 9)  
                          ISO New England Operating Procedure No. 10 – Analysis and Reporting  
                          of Power System Emergencies (OP 10)  
                          ISO New England Operating Procedure No. 14 – Technical Requirements  
                          for Generators, Demand Resources and Asset Related Demands (OP 14)  
                          Master/Local Control Center Procedure No. 2 - Abnormal Conditions  
                          Alert (M/LCC 2)  
                          ISO New England Manuals

Local Control Center Instructions:

CONVEX:            Operating Instruction 0004 - Action During A Capacity Deficiency  
MAINE:             Operating Procedure No. 4 - Action During A Capacity Deficiency  
NEW HAMPSHIRE: Operating Procedure No. 4 - NHSOP #4 - Capacity Deficiency Actions  
NSTAR              OP-4 Action During a Capacity Deficiency  
REMVEC II         Operating Procedure 4, Action During A Capacity Deficiency  
VELCO:             VELCO Operating Procedure OP-4

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## PART I - INTRODUCTION

This Procedure establishes criteria and guides for actions during capacity deficiencies, as directed by the ISO and as implemented by the ISO and the Local Control Centers (LCCs). This Procedure may be implemented any time one or more of the following events, or other similar events, occur or are expected to occur:

- The New England Control Areas / Balancing Authorities (CA/BA's) available Resources are insufficient to meet the anticipated load plus Operating Reserve Requirements. It will not be utilized to maintain Replacement Reserve Requirements.
- One or more contingencies have occurred resulting in an immediate deficiency in the New England CA/BA's available capacity resources required to meet the load plus Operating Reserve Requirements.
- Transmission facilities into a sub area of the New England CA/BA are loaded beyond established transfer capabilities.
- A sub area of the New England CA/BA is experiencing abnormal voltage and/or reactive conditions.
- The need to implement manual load shedding as required by ISO New England Operating Procedure No. 7 – ‘Action In An Emergency’ (OP 7) is imminent but load shedding may be avoided, or reduced in magnitude, by application of this Procedure.
- Another NPCC Area, or a remote system or pool, is experiencing a capacity deficiency and has requested assistance from the ISO, which, if provided, will reduce the New England CA/BA's actual Operating Reserve below the required levels.
- Any other serious threat to the integrity of the bulk power system for which the ISO determines that this Procedure will mitigate the impact.

Appendix A contains an estimate of the additional generation and load relief, which will be achieved through implementation of the Actions specified in this Procedure.

## **PART II - PROCEDURE**

### **I. IMPLEMENTATION BY ISO NEW ENGLAND**

The ISO will alert the LCCs and Market Participants promptly any time one or more of the above conditions are anticipated, or have actually been experienced, and application of this Procedure may be required. The ISO will also alert the surrounding CA/BAs and coordinate with these Areas in accordance with NPCC Document A-06 - Operating Reserve Criteria, and C-20 - Procedures During Abnormal Operating Conditions. The alert will be issued in accordance with Master/Local Control Center Procedure No. 2 - 'Abnormal Conditions Alert' (M/LCC 2). Upon implementation, the ISO will notify the LCCs of the Actions required by number. The ISO and the LCCs will initiate Actions according to the authority and responsibility assigned by this Procedure. To the extent possible, the ISO will continue to dispatch resources in accordance with Market Rule 1, while ensuring reliability in the New England CA/BA during implementation of OP 4.

Action 1 through 5 and Action 7 through 10 will be implemented to the extent required to maintain Operating Reserve Requirements, in accordance with ISO New England Operating Procedure No. 8 - 'Operating Reserve and Regulation' (OP 8) and/or to provide necessary dispatch options during abnormal conditions.

#### **ACTION 1 (An ISO responsibility)**

The ISO will inform all Resources that a capacity shortage exists. Each Resource will notify the ISO and prepare to provide any additional Operable Capability identified as being available under emergency conditions.

Implement a Power Caution.

#### **ACTION 2 (An ISO responsibility)**

Order on all Generators less than 5 MW requiring special treatment by the ISO under ISO New England Operating Procedure No. 14 - 'Technical Requirements for Generators, Demand Resources and Asset Related Demands,' (OP 14) Section II.D.2.

*Request all "Settlement Only" Generators under (5) MW to come on line via "Special Notices" on the ISO New England website.*

#### **ACTION 3 (An ISO responsibility)**

Interrupt Real-Time Demand Response – 2 hour or less notification Block A.

Interrupt Real-Time Profiled Response Resources.

**ACTION 4 (An ISO responsibility)**

Interrupt Real-Time Demand Response – 2 hour or less notification Block B.

**ACTION 5 (An ISO responsibility)**

Interrupt Real-Time Demand Response – 2 hour or less notification Block C.

**ACTION 6 (An ISO responsibility)**

Begin to allow the depletion of 30-minute reserve.

**ACTION 7 (An ISO responsibility)**

Interrupt Real-Time Demand Response – 2 hour or less notification Block D.

**ACTION 8 (An ISO responsibility)**

Interrupt Real-Time Demand Response – 2 hour or less notification Block E.

**ACTION 9 (ISO responsible for plants, LCCs for office complexes.)**

Request voluntary load curtailment of Market Participants' facilities in the New England CA/BA.

Interrupt Real-Time Demand Response – 30 Minutes or Less Notification (that does not require a voltage reduction to be implemented).

Implement a Power Watch.

**ACTION 10 (A Local Control Center responsibility)**

Request all of the customer generation contractually available to Market Participants.

**The ISO will normally implement Action 11 and beyond of this Procedure to maintain Ten-Minute Reserve.**

**ACTION 11 (An ISO responsibility)**

Arrange to purchase available emergency capacity and energy, or energy only, (if capacity backing is not available) from Market Participants or neighboring CA/BAs. CA/BA to CA/BA transactions will normally be used as a last resort, when market-based emergency energy transactions are not available, or not available in a timely fashion.

Action 12 may be implemented to the extent required to maintain 10-minute reserve, in accordance with OP 8, and to enable the ISO to better cope with possible continuing and deteriorating abnormal operating conditions.

**ACTION 12 (ISO responsible for Demand Response, LCCs for voltage reduction)**

Implement a voltage reduction of five percent (5%) of normal operating voltage requiring more than 10 minutes to implement.

Interrupt Real-Time Demand Response – 30 Minutes or Less Notification (that requires a voltage reduction to be implemented).

**(An ISO responsibility)**

Alert the New York Independent System Operator (NYISO) that sharing of reserves within Northeast Power Coordinating Council (NPCC) may be required.

Action 13 will be implemented to maintain adequate 10-minute synchronized reserve in the New England CA/BA. The amount of 10-minute synchronized reserve to be maintained will be determined based on actual system conditions at the time of the shortage or the need to aid another NPCC Area under the NPCC Operating Reserve Policy.

**ACTION 13 (LCC responsibility)**

Implement a voltage reduction of five percent (5%) of normal operating voltage that is attainable within 10 minutes.

Actions 14, 15 and 16 will normally be implemented by the ISO through the LCCs based upon advance projections made by the ISO that it will be necessary to implement Actions 1 through 13, and that it will not be possible to maintain adequate 10-minute synchronized reserve. When Actions 14 and 15 are requested, the particular hours that they are to be implemented will be specified by the ISO. Actions 14, 15, and 16 should be implemented as early as possible to achieve maximum benefit.

**ACTION 14 (LCC responsibility)**

Request all of the customer generation not contractually available to Market Participants. Request voluntary load curtailment by large industrial and commercial customers.

**ACTION 15 (An ISO and LCC responsibility)**

Initiate radio and television appeals for voluntary load curtailment.

Implement a Power Warning.

Depending on the circumstances and the time required to institute certain of the above Actions, it may be necessary to call for some Actions simultaneously, or to alter the order of initiations. When all of the above Actions have been taken, further action, if required, is covered under OP 7.

It may be necessary to implement OP 7, prior to the implementation of all of the above Actions. If, at any time during implementation of the above Actions, it appears that implementation of OP 7 will be required; the ISO shall so notify all LCCs.

Action 16 will be implemented by the ISO. When Action 16 is requested, the particular hours that this Action is to be implemented will be specified by the ISO.

**ACTION 16 (An ISO responsibility)**

Request New England state Governors to reinforce appeals for voluntary load curtailment and the declaration of a Power Warning, as initiated in Action 15.

## II. CANCELLATION OF ACTIONS

When the system conditions have improved sufficiently, the ISO will cancel the Actions instituted in Section I. above. Depending on system conditions, the order of cancellation may be different from the order of initiation.

## III. IMPLEMENTATION BY LCCS

Any of the Actions provided in this Procedure may be implemented by an LCC to deal with local conditions within that LCC. The severity of the condition will determine the Actions taken. The ISO will review LCC implementation of this Procedure to ensure the implementation is consistent with Market Rule 1 and the ISO Manuals.

## IV. COMMUNICATIONS

The ISO Control Room Staff will use the "party line" telephone circuit to implement this Procedure. The ISO will briefly inform all LCCs simultaneously of system conditions and issue an implementation message as illustrated below. Each LCC, in alphabetical order, will repeat back the directed action to provide acknowledgment. When each LCC completes a directed action, they will report back to the ISO they have completed the directed action and the implementation time of the action. These communications will be performed per the communications protocol required by NERC Standard COM-002 and as stated in SOP-RTMKTS.0125.0020 – Communicate With Internal and External Parties.

Typical Messages:

### Implementation

- ISO to all LCCs: "Implement ISO New England OP 4, Actions 1 and 2 at 0930."  
Each LCC to ISO: "Implement ISO New England OP-4 Actions 1 and 2 at 0930."  
ISO to each LCC: "That is correct."  
ISO to REMVEC II: "Implement ISO New England OP 4, Action 3 and Action 4 at 1030."  
REMVEC II to ISO: "Implement ISO New England OP-4 Actions 3 and 4 at 1030."  
ISO to REMVEC II: "That is correct."
- ISO to all LCCs: "Implement ISO New England OP 4, Action 6 at 1100."

Each LCC: “Implement ISO New England OP-4 Actions 6 at 1100.”

ISO to each LCC: “That is correct.”

Confirmation

- LCC (VELCO) to ISO: “ISO this is VELCO. OP 4 Actions 1 and 2 have been implemented at 1045.”

ISO to VELCO: “VELCO has implemented OP 4 Actions 1 and 2 at 1045.”

VELCO to ISO: “That is correct.”

Cancellation

- ISO to all LCCs: “Cancel ISO New England OP 4, Actions 2 and 1 at 1200.”

Each LCC to ISO: “Cancel ISO New England OP-4 Actions 1 and 2 at 1200.”

ISO to each LCC: “That is correct.”

- ISO to REMVEC II: “Cancel ISO New England OP 4, Actions 3 and 4 at 1300.”

REMVEC II to ISO: “Cancel ISO New England OP-4 Actions 3 and 4 at 1300.”

ISO to REMVEC II: “That is correct.”

- ISO to all LCCs: “Cancel ISO New England OP 4, Action 6 at 1400.”

Each LCC to ISO: “Cancel ISO New England OP-4 Actions 6 at 1400.”

ISO to each LCC: “That is correct.”

Each LCC shall be responsible for keeping its member companies and the ISO informed of all situations pertaining to implementation and cancellation of this Procedure. The ISO will make notifications to the Department of Energy as required by ISO New England Operating Procedure No.10 – Analysis and Reporting of Power System Emergencies (OP 10). The LCCs will make notifications to state regulatory agencies as required. The ISO will issue a report to the appropriate Technical Committee(s) following implementation of this Procedure within 3 business days of the implementation.

**V. IMPLEMENTATION OF AN ALERT**

The ISO Control Room staff will notify, as appropriate, the LCCs and the generation stations or designees and Dispatchable Asset Related Demands as soon as OP 4 conditions are anticipated or underway by executing its responsibilities as declared by M/LCC 2.

## VI. PUBLIC NOTIFICATIONS

Notifications associated with the forecasted or actual implementation of OP 4 will be conducted in accordance with OP 10 for Abnormal or Emergency Conditions. Power Advisories will be issued by the ISO via its external website. These Power Advisories will be triggered by the implementation of certain Actions of OP 4 as described below. These notifications are considered public information.

### Power Caution

A Power Caution is triggered by the initial implementation of OP 4 Action 1. A Power Caution is defined as a notification that electric reserves can no longer be maintained using normal measures. Although full reserves are being maintained, utility personnel will begin to take further steps to continue to maintain these reserves.

### Power Watch

A Power Watch is triggered by the implementation of OP 4 Action 9. A Power Watch is defined as a notification that further steps to manage capacity could affect the public.

### Power Warning

A Power Warning is triggered by the implementation of OP 4 Action 15. A Power Warning is defined as a notification for public appeals when an immediate reduction in power usage is necessary to avert overload of the electrical system. Public appeals are made when other efforts (e.g. emergency purchases, voluntary curtailment, contracted curtailment and voltage reduction) have been unsuccessful in bringing supply and demand back into balance.

## OP 4 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 0	8/21/98	
Rev 1	8/26/99	
Rev 2	11/1/02	
Rev 3	06/26/03	
Rev 4	02/01/05	Updated to conform to RTO terminology

ISO New England Operating Procedures

OP 4 – Action During A Capacity Deficiency

Rev 5	05/06/05	Update for initiation of VELCO Local Control Center and NERC Version 0 Standards
Rev 6	08/05/05	Clarified that EEA notifications are done by the ISO not the LCC
Rev 7	10/01/06	Updated for ASM 2
Rev 8	03/05/08	Update for NSTAR becoming an LCC; global change of Control Area to Control Area /Balancing Authority and defined acronym of CA/BA; global change for Local Control Center to defined acronym of LCC; revised reference documents; corrected document titles; re-worded comment prior to ACTION 11; added language addressing communication standards and procedures; added requirement for LCCs to confirm completion of Actions. Annual procedure review by Procedure Owner

**ISO** new england

# Operating Procedures

ISO New England Operating Procedure No. 19

*Transmission Operations*

Effective Date: April 13, 2007

Revision No. 4

## ISO New England Operating Procedure No. 19 Transmission Operations

Effective Date: April 13, 2007

### REFERENCES:

1. NPCC Basic Criteria for Design and Operation of Interconnected Power Systems
2. NPCC Emergency Operation Criteria
3. Capacity Rating Procedures - System Design Task Force
4. Master/Local Control Center Procedure No. 2 - Abnormal Conditions Alert (M/LCC 2)
5. ISO New England Operating Procedure No. 4 - Action During a Capacity Deficiency (OP 4)
6. ISO New England Operating Procedure No. 7 - Action In an Emergency (OP 7)
7. ISO New England Operating Procedure No. 8 - Operating Reserve and Regulation (OP 8)
8. ISO New England Transmission Operating Guides
9. ISO New England Operating Procedure No. 3 - Transmission Outage Scheduling (OP 3)

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### APPENDICES:

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- I. Bus Fault Contingencies That Can Have Unacceptable Inter-Area or Stability Impacts

## I. INTRODUCTION

This Operating Procedure describes reliability criteria for the analysis and operation of the New England Transmission System. The provisions contained herein are intended to be in accordance with Northeast Power Coordinating Council Inc. (NPCC) and ISO New England Operating Procedures listed as references for this document. Prescribed operator actions are further detailed in several ISO New England Transmission Operating Guides.

The provisions in this document are used to determine data, methods and limits for operation of the New England Transmission System (69 kV and above). The ISO and Local Control Centers use these data, methods and limits to operate the transmission system in accordance with this procedure.

Appendix F contains a summary of OP 19 Transmission Operations Procedure.

## II. RELIABILITY CRITERIA FOR TRANSMISSION OPERATIONS

The New England Transmission System is operated so that the most severe single contingency can be sustained without causing:

- Equipment damage due to thermal overload,
- Cascading thermal overloads,
- Excessively high or low voltage or voltage collapse,
- Unit or area instability,
- Undamped oscillations.

Any single contingency should not cause the loss of other critical facilities or portions of the bulk power system. Single contingencies within the New England Control Area should not result in violation of neighboring Areas' operating reliability criteria.

Two levels of transmission reliability are prescribed and define the condition of the bulk power system. During NORMAL (non-stressed) Conditions, the higher level of prescribed reliability is maintained. During stressed or EMERGENCY Conditions, a lower level of reliability is permitted to allow for increased operating flexibility and to minimize the impact on customers during power system emergencies.

Actions should be taken to establish and maintain NORMAL Conditions. Regular cycling between NORMAL and EMERGENCY Conditions should be avoided. Operations and Operations Planning should not intentionally position daily operations into EMERGENCY Conditions. Capacity deficiencies or the occurrences of multiple contingencies are some reasons why EMERGENCY Conditions might exist.

This Operating Procedure includes specific definitions and criteria for the two levels of reliability. Appendix A contains a flow chart that summarizes the methods and criteria contained in this document and provides an overview of its structure. Appendix B provides definitions of thermal capacity ratings for transmission facilities [NORMAL,

Long Time Emergency (LTE), Short Time Emergency (STE) and Drastic Action Limit (DAL)].

#### A. NORMAL CONDITIONS

The highest level of transmission reliability is achieved during non-stressed or NORMAL Conditions on the bulk power system. In general, this level of reliability is accomplished by satisfying NORMAL Criteria for a wide range of contingencies (NORMAL Contingencies) using a limited set of operator actions (NORMAL Actions). More specifically, for all stability related and Inter-Area thermal and voltage/reactive operations, all seven NORMAL Contingencies (in Section II.A.2.a-g) are applicable. For thermal and voltage/reactive operations within the New England Control Area that do not jeopardize the reliability of Areas outside New England, NORMAL Contingencies in Section II.A.2.f-g (loss of two circuits on a multiple circuit tower and loss of a single element with delayed clearing) and a permanent three-phase fault on a bus section described in Section II A.2.a. are not considered. This approach is consistent with the NPCC criteria philosophy that the basic criteria are not necessarily applicable in the portions of a member system where instability or overloads will not jeopardize the reliability of the bulk power system. The following sections describe these NORMAL Criteria, NORMAL Contingencies and NORMAL Actions.

##### 1. Normal Criteria

- a) Generation and transmission service is scheduled to provide the New England Control Area load and operating reserve as prescribed in OP 8 while covering NORMAL Contingencies.
- b) Pre-contingency loadings of transmission facilities should not exceed NORMAL ratings. Allowances can be made for scheduled switching activities that are typically completed within 15 minutes in accordance with OP 3.
- c) NORMAL Contingencies should not cause, or result in, loadings beyond STE ratings. Flows between LTE and STE must be reduced to or below LTE as soon as possible and definitely within 15 minutes. If studies show that operators would not be able to reduce flows to or below LTE within 15 minutes, action should be taken (if possible) such that NORMAL Contingencies would not cause, or result in, loadings above LTE ratings.

Previously established/provided DAL ratings may be used but only if authorized by the Transmission Owner whose transmission facilities would be affected and flows between STE and DAL can be reduced to or below LTE immediately and definitely within 5 minutes.

- d) Without prior approval to operate to STE ratings, NORMAL Contingencies should not cause, or result in, loadings on New York ISO (NYISO)

transmission facilities, including NYISO-the New England Control Area tie lines, beyond LTE ratings.

Underground cable circuits may be post contingency loaded to STE ratings provided generation and/or phase angle regulation are available to reduce the loadings to LTE ratings within 15 minutes and provided no other NYISO facility is loaded beyond its LTE rating. The 1385 Norwalk Harbor-Northport 138 kV cable and the CONED-PSE&G tie lines, which are cable circuits, are not included in this exception.

- e) NORMAL Contingencies should not cause instability, unacceptably high or low voltage or voltage collapse.
  - f) Any automatic reclosing and subsequent manual reclosing before adjusting generation should not cause instability of the transmission system.
2. Normal Contingencies

For all stability related and inter-Area operations, protection should be provided for ALL of the NORMAL Contingencies listed in a-g below.

For thermal and voltage/reactive operations within the New England Control Area, protection should be provided for the NORMAL Contingencies listed in a-e below with the exclusion of a permanent three-phase fault on a bus section (part of Section II.A.2.a.).

During typical conditions with all major transmission facilities in-service, NORMAL Contingencies f, g and a permanent three-phase fault on a bus section (part of Part of Section II.A.2.a.) should be covered in thermal and voltage/reactive operations if the occurrence of these contingencies could jeopardize the reliability of Areas outside of New England. (Appendix C lists stuck breaker contingencies and Appendix D lists double circuit tower line contingencies. Appendix G documents the procedure to be followed in determining if a stuck breaker contingency would have unacceptable Inter-Area impact. Appendix H provides a list of actions that may be utilized to reduce the cost of providing stuck breaker protection. Appendix I lists bus fault contingencies that can have unacceptable inter-Area impacts or cause single or multi-Generator instability).

During less frequent conditions when a major transmission facility is out-of-service NORMAL contingencies (f) and (g) need not be covered if the outage substantially reduces transfer limits based on NORMAL Contingencies f and g.

During less frequent conditions when a major transmission facility is out-of-service, a permanent three-phase fault on a bus section (part of Section II A.2.a.) should be covered for thermal and voltage/reactive operations if the occurrence of

this contingency could jeopardize the reliability of Areas outside of New England, and for single or multi-unit instability resulting from this contingency.

- a) A permanent three-phase fault on any Generator, transmission circuit, transformer or bus section with normal fault clearing.
- b) Loss of any element without a fault.
- c) A permanent phase to ground fault on a circuit breaker with normal fault clearing. (Normal fault clearing time for this condition may not always be high speed.)
- d) Simultaneous permanent loss of both poles of a direct current bipolar facility without an AC fault.
- e) The failure of a circuit breaker associated with an SPS to operate when required following: loss of any element without a fault; or a permanent phase to ground fault, with normal fault clearing, on any transmission circuit, transformer or bus section.
- f) Simultaneous permanent phase to ground faults on different phases of each of two adjacent transmission circuits on a multiple circuit tower, with normal fault clearing. If multiple circuit towers are used only for station entrance and exit purposes, and if they do not exceed five towers at each station, then this condition is an acceptable risk and, therefore, can be excluded. Other similar situations can be excluded on the basis of acceptable risk following appropriate Northeast Power Coordinating Council acceptance of each specific exclusion (Appendix D lists 345 kV multiple circuit towers in the New England Control Area).
- g) A permanent phase to ground fault on any transmission circuit, transformer, or bus section with delayed fault clearing. (Delayed fault clearing is consistent with correct operation of a breaker failure scheme and its associated breakers, or of a backup relay scheme with an intentional time delay.)

### 3. Normal Actions

The ISO and Local Control Centers will continuously assess system conditions and implement the NORMAL Actions described below to maintain or restore transmission reliability to NORMAL Conditions.

- a) Actions For Contingencies That Affect Small/Local Areas Within the New England Control Area

If a contingency will impact only a small/local area within the New England Control Area, the following NORMAL Actions should be implemented as required:

ISO initiated deviation from economic dispatch (notify appropriate Local Control Center)

- If the local area can be protected by deviation from economic dispatch, the ISO and Local Control Centers will provide such protection.

Transmission Owner waiver of contingency protection

- If a local area cannot be protected by deviation from economic dispatch, Transmission Owner may elect to waive contingency protection for the local area. When the local area involves two or more Transmission Owners, the appropriate Local Control Center will inform one of the involved Transmission Owners of the specific operating conditions. All coordination required with other impacted Transmission Owners to waive contingency protection for the local area is the responsibility of the Transmission Owner first contacted by the Local Control Center. All waivers granted under this provision must be communicated to the ISO electronically at the time that the waiver is granted.

When the local area involves more than one Local Control Center, one of the Local Control Centers will be designated to contact an involved Transmission Owner who will then follow the process outlined above.

- b) Use of Special Protection Systems or the Preplanned Opening of Circuit Breakers.
- (1) Where Possible, Arm Special Protection Systems.
  - (2) Manually set up tripping of Generator or Resources with pump storage capability. This preplanned option of opening circuit breakers is limited to situations where previously documented studies have demonstrated that such breaker openings reliably mitigate the specific existing operating conditions and do not result in the loss of single contingency protection for other contingencies/facilities.
- c) Weather Sensitive Transmission Facility Ratings

There are times when actual ambient conditions (temperatures and wind) are significantly different from those used to establish standard seasonal ratings. During those times, the use of temporary ratings based on actual ambient conditions may be warranted. Depending on the ambient conditions, the temporary ratings may be higher or lower than the standard seasonal ratings. When such weather conditions exist and a transmission facility is limiting, The ISO, the appropriate Local Control Center or appropriate Transmission Owner will identify the need for a temporary transmission facility rating based

on actual weather conditions. In cases where the Transmission Owner has supplied pre-defined weather sensitive ratings, such ratings will be used by the ISO and the Local Control Center after the Local Control Center and/or Transmission Owner has gathered/established the actual weather conditions. If pre-defined weather sensitive ratings are not available, the involved Transmission Owner will be informed of the circumstances. That Transmission Owner may elect to provide the appropriate Local Control Center with temporary ratings along with any pertinent qualifications for their use. The Local Control Center will forward all temporary rating information electronically to the ISO. Such temporary ratings will then be used in operations for the time period specified by the Transmission Owner or until rescinded by the Transmission Owner.

d) Deviation from Economic Dispatch

Deviate from economic dispatch and schedule Resources to maintain NORMAL transmission reliability. The ISO or appropriate Local Control Center may implement M/LCC 2 to declare an abnormal conditions alert if necessary.

e) Switch Transmission Circuits

Open or close circuits to relieve transmission constraints. This action can only be implemented when authorized by the ISO and when previously documented studies have demonstrated that such circuit openings reliably relieve the specific existing conditions and do not result in the loss of protection for other contingencies/facilities.

f) OP 4 Actions 1 through 11

Implement selected actions from OP 4, Actions 1 through 11. These Actions utilize Generator maximum capabilities, Demand Response Loads, voluntary load curtailment of Market Participant's facilities, capacity/energy purchases, contracted customer generation and depletion of 30 minute reserve.

## **B. EMERGENCY CONDITIONS**

The system is in an EMERGENCY Condition if NORMAL Criteria is violated. A lower level of reliability is permitted when operating under EMERGENCY Conditions provided that all appropriate NORMAL Actions have been initiated to restore NORMAL Criteria. This level of reliability meets EMERGENCY Criteria for a less stringent set of contingencies (EMERGENCY Contingencies) using EMERGENCY Actions. Exposure to reliability levels below EMERGENCY Conditions should not exist for more than 30 minutes.

### **1. Emergency Criteria**

- a) Generation and transmission facilities are adequate to supply the New England Control Area load and at least minimum reserve requirements (10 minute requirements) as prescribed in OP 8 while covering only EMERGENCY Contingencies.
- b) Pre-contingency facility loadings may be between NORMAL and LTE if EMERGENCY Contingencies would not cause loadings beyond LTE ratings. Loadings should be returned to or below the NORMAL rating after the daily load cycle.
- c) EMERGENCY Contingencies should not cause loadings beyond STE ratings. Flows between LTE and STE must be reduced to or below LTE as soon as possible and definitely within 15 minutes. Automatic devices (SPS), switching to set up a facility to trip upon occurrence of a specific contingency or preplanned post-contingency operator responses are required if DAL ratings are used.
- d) EMERGENCY Contingencies should not cause instability, unacceptably high or low voltage or voltage collapse.
- e) Any automatic reclosing should not cause instability of the transmission system.

### **2. Emergency Contingencies**

- a) A permanent three-phase fault on any Generator, transmission circuit, transformer or bus section, with normal fault clearing.
- b) The loss of any element without a fault.

### **3. Emergency Actions**

EMERGENCY Actions should be taken to maintain or restore power system conditions to at least those prescribed for operations under EMERGENCY Conditions. In general, all appropriate and timely NORMAL Actions should be exhausted before taking EMERGENCY Actions. EMERGENCY Actions should

be taken before NORMAL Actions if the NORMAL Actions cannot be completed in time to relieve a thermal overload above LTE, prevent voltage collapse, or restore protection for EMERGENCY Contingencies within 30 minutes. Any unused long term NORMAL Actions should be taken to allow for the cancellation of EMERGENCY Actions.

a) Transmission Circuit Switching

In very well defined situations where it is clear that opening a transmission facility will alleviate a problem existing for a specific emergency situation, consideration will be given to opening such facility. This action, without pre-determined studies, documentation, and authority will only be initiated to prevent more severe EMERGENCY Action and must be reported immediately to the Transmission Owner.

b) OP 4 and OP 7

OP 4 and OP 7 EMERGENCY Actions include:

OP 4 - Action 12 and 13; 5% voltage reduction, requiring more/less than 10 minutes.

OP 4 - Action 14 and 15; customer generation not contractually available to ISO. Voluntary load curtailment by large industrial and commercial customers. Radio and TV appeals for voluntary load curtailment. Voluntary load curtailment by customers.

OP 4 - Action 16; Request New England state Governors to reinforce appeals for voluntary load curtailment.

OP 7; Load shedding.

The following sections provide more detail on when it would be appropriate to take EMERGENCY Actions.

c) Pre-Contingency Emergency Actions

EMERGENCY Actions may be needed to meet EMERGENCY Criteria even though a contingency has not occurred. Such pre-contingency EMERGENCY Actions will be taken when NORMAL Actions are exhausted or can not be completed in a timely manner and there would be insufficient time after an EMERGENCY Contingency to contain the impact to a small/local area. Pre-contingency EMERGENCY Actions are to be initiated when a potential EMERGENCY Contingency threatens large portions of the New England Control Area load or could possibly cause a split of the bulk power system due to post-contingency voltage collapse, rapid cascading thermal overloads or, system instability. Pre-contingency EMERGENCY Actions should also be

taken when a potential EMERGENCY Contingency poses the same threats to Areas outside of New England or jeopardizes the reliability of the Northeast Interconnection.

Shift operators are responsible to keep appropriate Supervisors at the ISO and Local Control Centers advised as to conditions that might necessitate management review of the need to implement EMERGENCY Actions on a pre-contingency basis.

Management at the ISO and at the Local Control Centers, to the extent that time permits, should consult with affected Transmission Owners when developing pre-contingency strategies.

d) Planned Immediate Post-Contingency Emergency Actions

If an EMERGENCY Contingency does not risk system stability but would result in low or gradually declining voltages or thermal loadings between STE and DAL, specific voltage reduction or load shedding plans should be established before the contingency for implementation immediately after the contingency. Post-contingency EMERGENCY Action should be established and coordinated with the Local Control Centers before the need for implementation arises. If automatic devices are being used, their actions should be completed in a matter of cycles or seconds after the contingency. Manual actions should be completed as soon as possible after the contingency (seconds if possible) but definitely within the one-two minutes required to prevent voltage collapse or cascading thermal overloads. Post-contingent circuit loadings between STE and DAL must be reduced below LTE immediately and definitely within five (5) minutes.

**C. POST-CONTINGENCY OPERATION**

If a contingency involves the loss of a transmission circuit(s), operators should attempt to reclose the circuit(s) within 5 minutes unless otherwise specified in specific policies and/or procedures. If reclosure is successful, the system should be back to its original state and normal operation should resume. If reclosure is unsuccessful or the contingency involved the loss of generation or load, operators should assess system conditions and perform appropriate NORMAL and EMERGENCY Actions to restore NORMAL and EMERGENCY Conditions. When possible, coverage for NORMAL Contingencies should be restored using NORMAL Actions.

Post-contingency Actions should meet the following time requirements:

- Rapidly declining critical transmission voltages should be stabilized as quickly as possible (within one-two minutes) using pre-determined EMERGENCY Actions, including voltage reduction and/or load shedding.

- Post-contingent transmission facility loadings between STE and DAL should be reduced below LTE immediately and definitely within 5 minutes using pre-defined EMERGENCY Actions including voltage reduction and/or load shedding plans.
- Post-contingent transmission facility loadings between LTE and STE ratings should be reduced below LTE as soon as possible and definitely within 15 minutes using appropriate NORMAL and/or EMERGENCY Actions.
- Coverage for EMERGENCY Contingencies should be restored within 30 minutes using appropriate NORMAL and/or EMERGENCY Actions.

### III. TRANSMISSION SYSTEM ANALYSIS

#### A. SCOPE OF ANALYSIS

Transmission system analysis is required to:

- Identify significant contingencies and system conditions during which contingencies can adversely impact system operation and;
- Develop data, methods, operating guidelines and procedures which, when implemented, will provide reliable operation of the bulk power system per the criteria in this document.

Short term thermal analysis is performed on a continuous basis and coordinated with appropriate Local Control Centers and adjoining NPCC Areas. Long term thermal analysis is done on a seasonal, annual or as required basis and is coordinated with appropriate Transmission Owners, Local Control Centers, adjoining NPCC Areas and Task Forces.

Long term stability studies are reviewed with the Stability Task Force and appropriate Inter-Area study groups. Short-term stability analysis is coordinated with individual Transmission Owner representatives on the Stability Task Force.

Short-term voltage/reactive analysis is reviewed with appropriate Local Control Centers and NPCC Areas. Longer-term voltage/reactive analysis is reviewed with the Voltage Task Force and other appropriate Task Forces or Inter-Area study groups.

#### B. CLASSIFYING SYSTEM RESPONSES TO CONTINGENCIES

Contingencies fall into one of the following categories depending on their impact on system reliability:

##### 1. Contingencies Critical to Areas External to New England

This type of contingency either involves the loss of an inter-Area transmission facility (thereby reducing inter-Area transfer capability) or has more severe

consequences on an external Area than the most severe contingency in the external Area. The possibility of thermal overloads, excessive voltage drops, or undamped oscillations on the interconnection should be considered when assessing the impact of these contingencies. These contingencies are critical to interconnected system reliability.

2. Contingencies Critical to Large Areas of the New England Control Area or Bulk Power Transfers within the New England Control Area

This type of contingency can threaten large areas within the New England Control Area in two ways. In one case, the contingency could split an area away from the bulk power transmission system due to cascading thermal overloads, voltage collapse or system instability. Further breakup would likely occur in the islanded area. The remaining bulk power system would be left with a substantial deficiency or excess of power. In the other case, the contingency could cause the loss of another critical transmission facility, thereby significantly reducing transfer capability on the bulk power system and seriously impairing the ability to serve customer load. These contingencies are critical to the New England Control Area transmission reliability.

3. Contingencies that Affect Small/Local Areas within the New England Control Area

This type of contingency affects only a relatively small area within the New England Control Area and does not impair reliability of the bulk power system. The ISO will provide contingency protection, if possible, by deviating from economic dispatch. Otherwise, the Transmission Owner (s) involved will be contacted through the appropriate Local Control Center. The Transmission Owner (s) may elect to grant a waiver of contingency coverage. Multiple Transmission Owner waivers of first contingency protection require one of the affected Transmission Owners to communicate and coordinate waiver action with all other affected Transmission Owners.

**C. EXTREME CONTINGENCIES**

Recognizing that the bulk power system can be subject to events that are more severe than NORMAL or EMERGENCY Contingencies, EXTREME Contingencies will be assessed to determine their effect on system performance. After due analysis and assessment of EXTREME Contingencies, Transmission Owners may utilize measures, where appropriate, to reduce the frequency of occurrence or to mitigate the circumstances that are indicated as a result of testing for such contingencies.

Appendix E lists the EXTREME Contingencies to be considered.

### OP 19 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	07/22/98	
Rev 2	02/01/05	Updated to conform to RTO
Rev 3	02/03/06	Updated to clarify actions taken in OP 3 for scheduled switching activities that are typically completed within 15 minutes
Rev 4	04/13/07	Incorporated Appendix I for Bus Faults and made language clarifications