



## **ISO New England Operating Procedure No. 6 System Restoration**

**Effective Date:** May 21, 2008

**REFERENCE:**

1. NERC Standard EOP-005 - System Restoration Plans
2. NPCC Emergency Operation Criteria
3. NPCC Document C35 – Inter-Area Power System Restoration Procedure
4. ISO New England Operating Procedure No. 4 — Action During a Capacity Deficiency
5. ISO New England Operating Procedure No. 7 — Action in an Emergency
6. ISO New England Operating Procedure No. 8 — Operating Reserve and Regulation
7. ISO New England Operating Procedure No. 12 — Voltage and Reactive Control
8. ISO New England Operating Procedure No. 19 — Transmission Operations

**Local Control Center Instruction No:**

CONVEX:	Operating Instruction No. 6 - System Restoration
MAINE:	Operating Procedure No. 6 - System Restoration
NEW HAMPSHIRE:	OP-0006 System Restoration
NSTAR:	NSTAR Operating Procedure OP-6
REMVEC II:	Operating Procedure No. 6 – System Restoration
VELCO:	VELCO Operating Procedure OP-6

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Appendix G – 345 KV Restoration Event Log

## I. INTRODUCTION

This procedure addresses restoration of the bulk power system (115 kV and above) after a partial or complete system blackout. Expeditious restoration of the bulk power system depends on independent actions and interactions by Market Participants, Local Control Centers and the ISO. Depending on the expanse of the blackout (local area or widespread) numerous Market Participant and Local Control Center restoration procedures, and this procedure, may need to be implemented simultaneously. NPCC Document C35 – Inter-Area Power System Restoration Procedure provides more detailed information on how system operators should establish and maintain Inter-Area tie lines.

During system restoration, a high priority must be given to the restoration of off-site AC power sources to nuclear Generators. Also, technical aspects of system restoration (i.e. Resource startups, load pickups, switching surges, voltages, frequency, synchronization of islands, etc.) will be crucial. Recognizing these concerns, this procedure and all Local Control Center and Market Participant restoration procedures have been developed in a coordinated fashion. This document:

1. Outlines the responsibilities of the Local Control Centers and the ISO (including independent actions and interactions between these organizations) and,
2. Provides technical guidelines for the restoration of transmission and generation facilities. Appendix G - 345 KV Restoration Event Log should be used to assist in system restoration.

Responsibilities are outlined in the body of this procedure. Each Local Control Center relationship to the ISO is the same; therefore, their responsibilities during system restoration are the same. Details on the interactions of the Local Control Centers and their companies can be found in the individual Local Control Center restoration procedures.

Technical guidelines for restoration are provided in Appendix A.

## II. RESPONSIBILITIES

### A. LOCAL CONTROL CENTERS

1. Determine the extent of the blackout within the Local Control Center areas and inform the ISO as soon as possible of existing generation and transmission capabilities. (The ISO will determine the extent of the blackout within the New England Control Area and adjacent power systems and inform the Local Control Centers.)
2. Assign scribes to key positions in the control room to help System Operators document events related to system restoration.
3. Implement the Local Control Center restoration procedures (including necessary coordination with the ISO and adjacent Local Control Centers).
4. If the blackout is severe and Resource dispatch must be temporarily shared with the Local Control Center(s), assign a loader to direct the startup and loading of Resources. The loader must;
  - a) Follow the technical guidelines which relate to Resource startups, synchronizations and loading and,
  - b) Closely coordinate Resource operations with switching operations. If Resource loading by a Local Control Center is warranted, the Local Control Center can request assistance from the ISO operator for Resource loading. Once the Local Control Center is sufficiently restored and interconnected, the ISO will resume Resource dispatch.

5. Assign Local Control Center restoration coordinators to perform the following duties:
  - a) Establish communications with restoration coordinators at the ISO and adjacent Local Control Centers to provide a flow of information that promotes coordinated system restoration.
  - b) Monitor, advise and help coordinate with the ISO and adjacent Local Control Centers, the following:
    - (1) Energizations of 345 kV circuits,
    - (2) Energizations of inter-Local Control Center and inter-Area ties
    - (3) Resource startups, load pickups, generation reserves and load shedding within interconnected systems after an inter-Local Control Center or inter-Area tie has been established.
  - c) Maintain records of work done to coordinate restoration.
  - d) Provide updates on Local Control Center status.
6. Monitor transmission and generation facilities and, as practical, take action to promote system reliability.
7. Should communications with the ISO fail, 345 kV circuits and inter-Local Control Center and inter-Area ties may be energized if prudent to total system restoration and communications between the affected parties exist.
8. Conduct regular meetings to keep operations staff apprised of system conditions and restoration activities.

#### **B. ISO NEW ENGLAND**

1. Determine the extent of the blackout throughout the New England Control Area and adjacent power systems and inform all Local Control Centers of existing generation and transmission capabilities.
2. Assign scribes to key positions in the control room to help System Operators document events related to system restoration.
3. Implement the ISO restoration procedure (including necessary coordination with the Local Control Centers and adjacent power systems).
4. If the blackout is severe and Resource dispatch responsibility must be temporarily shared with the Local Control Centers then the ISO shall assist with the loading function if the Local Control Centers request such assistance. Loaders must ensure that;
  - a) The technical guidelines which relate to Resource startups, synchronizations and loadings are followed.
  - b) Resource dispatch instructions are communicated between the Local Control Centers and the ISO to ensure that ISO maintains over all Area coordination, balance between load and generation occurs and area reliability concerns are met.
  - c) Resource operations are closely coordinated with switching operations. Once the Local Control Centers are sufficiently restored and interconnected, Resource dispatch will be resumed by the ISO.
  - d) Resource dispatch will be resumed by the ISO when mutually agreed upon by the Local Control Center and the ISO restoration coordinators. After a widespread blackout, Resource dispatch should be resumed by the ISO when total New England load has reached approximately 9000 MW or when reliable dispatch can be obtained.

5. Assign a restoration coordinator to perform the following duties:
  - a) Establish communications with restoration coordinators in the Local Control Centers and adjacent power systems and a flow of information that promotes coordinated system restoration.
  - b) Monitor, advise and help coordinate with the Local Control Centers and adjacent power systems, the following;
    - (1) Energizations of 345 kV circuits,
    - (2) Energizations of inter-Local Control Center and inter-Area ties,
    - (3) Resource startups, load pickups, generation reserves and load shedding within interconnected systems after an inter-Local Control Center or inter-Area tie has been established.
  - c) Maintain records of work done to coordinate restoration.
  - d) Provide updates on the status of the New England Control Area to the Local Control Centers and adjacent power systems.
6. Authorize the closing of inter-Local Control Center and inter-Area transmission lines.
7. Once inter-Local Control Center or inter-Area tie lines are energized, oversee and coordinate load pickups within the interconnected parties.
8. Select priority for start-up power supply to generating stations when the choice is to supply a station in one Local Control Center or a station in another Local Control Center from the same source.
9. Direct load shedding, if necessary, to enable continued reliable restoration of interconnected parties or the closing of inter-Local Control Center or inter-Area ties.
10. Monitor bulk power system transmission and generation facilities and, as practical, take action to promote system reliability.
11. Conduct regular meetings to keep operations staff apprised of system conditions and restoration activities.

**OP 6 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.)

<b>Rev. No.</b>	<b>Date</b>	<b>Reason</b>
Rev 1	07/22/98	
Rev 2	06/11/2004	
Rev 3	02/01/2005	Updated to conform to RTO terminology
Rev 4	05/06/05	Update for initiation of VELCO Local Control Center and NERC Version 0 Standards
Rev 5	10/13/06	Deleted Appendices D and E since the material is duplicated in OP 12 Appendix B
Rev 6	04/13/07	Revised to clarify terminology and comply with NERC audit findings
Rev 7	05/21/08	Updated for NSTAR Local Control Center status, which results in all LCCs performing similar functions