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		Revision Number: 2 Revision Date: March 12, 2009
Contact: ISO Director, Operations		Approved by: M/LCC Heads
		Review Due Date: March 12, 2011

Master/Local Control Center Procedure No. 11

(M/LCC 11)


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1. References

FERC Order No. 693 Requirements – Restoration of Nuclear Power Plant Offsite Power Sources

NERC Reliability Standard EOP-005, System Restoration Plan

NERC Reliability Standard EOP-006, Reliability Coordination, System Restoration

NPCC Regional Reliability Reference Directory # 8, System Restoration

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

ISO New England Operating Procedure No. 11, Black Start Capability Testing Requirements (OP-11)

ISO New England Operating Procedure No. 6, System Restoration (OP-6)

ISO New England SOP-RTMKTS.0180.0080 - Process Black Start Unit Testing

CONVEX Operating Instruction #0006, System Restoration

Maine Operating Procedure No. 6, System Restoration

New Hampshire OP-0006, System Restoration

REMVEC Operating Procedure No. 6, System Restoration

VELCO Operating Procedure No. 6, System Restoration


NSTAR Operating Procedure No. 6, System Restoration

2. Purpose

The purpose of this procedure is to define the process for verifying the adequacy of the ISO New England (ISO) System Restoration plans/resources and performing the annual simulation test of the ISO New England System Restoration Plan.

This procedure documents the responsibilities of ISO New England System Restoration Working Group (SRWG). The objective of the SRWG is to achieve power system restoration within the New England area that is effective and coordinated.

The SRWG coordinates the Restoration Plan between ISO and Local Control Centers (LCCs) and reports to the Master/Local Control Center (M/LCC) Heads.


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3. Scope of Activities and Responsibilities

ISO and LCCs are required per North American Electric Reliability Corporation (NERC) Emergency Preparedness and Operations (EOP) Standards to ensure plans, procedures, and resources are available to restore the bulk power electric system to a normal condition in the event of a partial or total shutdown of the electric system. These plans, procedures, and resources are required to be tested annually by simulation or actual testing to verify their ability to effectively restore the ISO Bulk Power System (BPS) following a partial or total shutdown of the electric system. The M/LCC Heads have directed the SRWG in accordance with their Scope document, to be responsible for developing, maintaining and testing system restoration plans and procedures.

The SRWG is responsible to perform the following activities:

- Ensure Black Start Generation Capability is adequate to implement the ISO New England System Restoration Plan
- Request the M/LCC Heads provide technical support when a transmission transient analyst study is required for new or existing Black Start Generators
- Review and evaluate applications for generating units to be included in the black start program and develop recommendations to the M/LCC Heads regarding the inclusion of such generating units. Where these generating units render existing black start units unnecessary, recommend their removal to the M/LCC Heads.
- Conduct an annual review of all existing Black Start Generators and, as necessary, develop recommendations to the M/LCC Heads regarding the removal of any non-essential Black Start Generators from the black start program
- Review and assist ISO in the annual update of ISO's list of key facilities and associated critical component categories, in accordance with Northeast Power Coordinating Council, Inc. (NPCC) Directory # 8
- Verify the adequacy of the ISO New England System Restoration Plan through Annual Simulation/Testing
- Recommend enhanced procedures for the coordination of ISO and LCC system restoration plans
- Identify areas where mutual LCC assistance in system restoration can be provided and the extent to which each LCC can rely on its neighboring LCCs for assistance in system restoration
- Identify and recommend changes in the System Operator system restoration training plan to the M/LCC Trainers
- When changes occur in system topology within the operational footprint of an LCC, the SRWG representative for that LCC area shall identify/submit modeling inaccuracies or proposed enhancements to the System Restoration Plan for review by the SRWG
- Review relevant contingency events and system disturbances to determine if there are any implications for system restoration plans and make recommendations for improving coordinated system restoration
- Monitor evolving NERC and NPCC system restoration activities standards and directives

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- Verify the adequacy of the M/LCC Training Simulator model to support the annual system restoration plan testing and training
- During any system restoration plan simulation or drill that includes the restoration of one or more offsite power sources to a nuclear power plant, the SRWG member for an LCC with a nuclear power plant within its operational footprint shall record the time it takes to restore auxiliary power to such nuclear power plant by completion of M/LCC 11 Attachment B – NERC Restoration of Nuclear Power Plant Offsite Power Source Data Request Form and report such information to NPCC in accordance with NPCC requirements and Federal Energy Regulatory Commission (FERC) Order No. 693


In addition, the SRWG shall support the M/LCC Trainers in conducting the Annual System Restoration Seminar for Market Participants, including Black Start Generator Operators.

As requested by the M/LCC Trainers, the SRWG shall assist in the Annual Joint ISO/LCC System Restoration Training. This system restoration exercise simulates a New England Blackout and is designed to:

- test the adequacy of the ISO New England System Restoration Plan
- meet the requirements of NERC Standard EOP-005, System Restoration Plans
- train ISO and LCC System Operators.

SRWG shall monitor the Annual System Restoration Exercise to:

- Evaluate the effectiveness of the exercise to test the System Restoration Plan
- Evaluate/critique the implementation of the System Restoration Plan
- Determine the effectiveness and make recommendations for revisions to the System Restoration Plan
- Document the performance of the annual system restoration exercise/training by having SRWG members for ISO and each LCC complete Attachment C – Restoration Exercise Checklist for each system restoration exercise conducted, including those conducted during scheduled ISO / LCC Joint Restoration Training and the Annual System Restoration Exercise (These exercise results are documented in compliance with NERC System Restoration requirements for testing)
- Evaluate/critique/record, on the behalf of the Transmission Owner(s)/Operator(s), the timeframe to restore auxiliary power to nuclear power plant(s) following a simulated blackout as determined during joint ISO/LCC simulations/drills of the ISO New England Restoration Plan

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4. Procedure

4.1 Master Local Control Center Training Simulator

- The SRWG shall normally use the M/LCC Training Simulator to test the New England System Restoration Plan.

NOTE

The fidelity of the M/LCC Training Simulator model is essential to performing a representative test of the ISO New England System Restoration Plan. Black Start Generators, Key Facilities, and Critical Components identified by the SRWG must be accurately modeled in the M/LCC Training Simulator.


The SRWG shall assist the M/LCC Trainers verification of the accuracy of the M/LCC Training Simulator model approximately two months prior to the Annual System Restoration Exercise.

When changes occur in system topology, the SRWG representatives shall identify/submit modeling inaccuracies and/or proposed enhancements for the M/LCC Training Simulator.

The SRWG will validate the M/LCC Training Simulator model against the ISO New England System Restoration Plan and coordinate/initiate any required model changes to the M/LCC Training Simulator approximately one month prior to the Annual System Restoration Exercise.

4.2 System Restoration Plans

- The SRWG shall maintain the New England System Restoration Plan by performing the following:
 - A. Review and revise the New England System Restoration Plan based on the following:
 - A significant change to the New England transmission system
 - A significant change in a neighboring system that affects the New England System Restoration Plan
 - Annual review prior to the system restoration exercise and restoration training
 - B. Following the annual system restoration training/exercises, meet and perform the following:
 - Review the evaluations/assessments of the operator training/exercises
 - Identify areas for improvement, provide feedback to M/LCC Trainers and incorporate any required changes in the New England System Restoration Plan
 - Review and prepare the next year ISO Key Facilities/Critical Components list for submittal to the ISO Compliance Group

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- C. Verify the cranking paths between Black Start Generator(s) and the Generator(s) to be started are documented for each Black Start Generator, including initial switching requirements, that is designated in the ISO System Restoration Plan to perform the function of enabling the startup of one or more generating units
 - D. Verify critical load requirements (i.e. minimum load requirements for stability and station service) for both the Black Start Generator(s) and the Generator(s) to be started.
 - E. Provide the ISO Control Room System Operators with current and valid copies of each LCC System Restoration procedures.
2. During any system restoration plan simulation or drill that includes the restoration of one or more offsite power sources to a nuclear power plant, the SRWG member for an LCC with a nuclear power plant within its operational footprint will perform the following:
 - A. Document the timeframe to restore auxiliary power to the nuclear power plant following a simulated blackout as determined during such simulation or drill by completing M/LCC 11 Attachment B – NERC Restoration of Nuclear Power Plant Offsite Power Source Data Request Form.
 - B. Report the timeframe to restore auxiliary power to the nuclear power plant following a simulated blackout during such simulation or drill to the NPCC in accordance with NPCC requirements and Federal Energy Regulatory Commission (FERC) Order No. 693.

4.3 System Restoration Black Start Capability

- The SRWG shall ensure adequate Black Start Capability for the New England System Restoration Plan by performing the following:
 - Annual review of the results of Black Start Testing performed in accordance with ISO New England Operating Procedure No. 11, Black Start Capability Testing, Appendix B
 - As necessary, seek additional Black Start Generators to replace or augment the existing Black Start Generators in the New England System Restoration Plan
 - Review and recommend for approval submittals of new Black Start Generators to be added the New England System Restoration Plan using Attachment A - New Black Start Generator (BSG) Capability, Assessment and Selection check list
 - Verify minimum fuel resource levels needed to satisfy the cranking path requirements

4.4 System Restoration Key Facilities/Critical Components

- The SRWG shall maintain the ISO Key Facilities/Critical Components List for the New England System Restoration Plan by performing the following actions:
 - Review and prepare the next year ISO Key Facilities/Critical Components list for submittal to the ISO Compliance Group by January 1st
 - Review the result of the previous year Key Facilities/Critical Components testing by February 15th

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4.5 System Restoration Plan Training


- The SRWG shall support the M/LCC Trainers preparation and delivery of the New England System Restoration Plan training by performing the following actions:
 - Maintain the M/LCC Training Simulator in accordance with Step 4.1
 - Develop a blackout scenario to be used during the annual System Restoration Training
 - Work with the M/LCC Trainers to validate the Blackout Scenario using the M/LCC Training Simulator
 - During the Annual System Restoration Training, observe, evaluate and record the effectiveness of the System Restoration Training and the New England System Restoration Plan
 - Complete Attachment C – Restoration Exercise Checklist

4.6 System Restoration Plan Exercise

- The SRWG shall coordinate the testing of the New England System Restoration Plan by performing the following actions:
 - Annually schedule a System Restoration Exercise that allows Transmission System Operators/Owners, Distribution System Operators/Owners, Generator Operators/Owners and other Market Participants to participate in a New England System Restoration exercise
 - Coordinate the implementation of the Annual System Restoration Exercise with the M/LCC Trainers
 - With the M/LCC Trainers, conduct the Annual System Restoration Exercise using the M/LCC Training Simulator
 - Solicit feedback from all participants, observe, evaluate and record the effectiveness of the System Restoration Exercise and the New England System Restoration Plan during the Annual System Restoration Exercise using Attachment B and Attachment C..

5. Performance Measures

- System Restoration Plan(s) are reviewed annually and revised to reflect changes in the power system network to correct deficiencies identified during the annual system restoration exercise
- System Restoration Plan(s) are verified annually by actual testing or by simulation
- The number, size, availability, and location of system Black Start Resources are verified to meet the NPCC restoration plan requirements for ISO
- Cranking paths are verified, including initial switching requirements between Black Start Generator(s) and the Generator(s) to be started are documented for each Black Start Generator that is designated in the ISO System Restoration Plan to perform the function of enabling the startup of one or more generating units
- Restoration training is conducted annually and results recorded using Attachment B and Attachment C.

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6. Revision History

Rev. No.	Date	Reason
0	05/25/07	Original Procedure
1	12/14/07	Revised to reflect NSTAR LCC status
2	03/12/09	Changed header, from Manager to Director; Changed header Review Due Date: from a fixed calendar date to 24 months from the Revision Date;; Added Attachments B and C; Clarified responsibilities regarding development of key facilities list; Made general editorial corrections.

7. Attachments

Attachment A - New Black Start Generator (BSG) Capability, Assessment and Selection check list

Attachment B – NERC Restoration of Nuclear Power Plant Offsite Power Source Data Request Form

Attachment C – Restoration Exercise Checklist