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**Compliance Audit Report
NSTAR Electric Company
(NSTAR ELECTRIC)
December 20, 2007**

Public Version

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Executive Summary

The offsite compliance audit of NSTAR Electric Company (NSTAR ELECTRIC) was conducted on December 20, 2007. The audit team evaluated NSTAR ELECTRIC compliance with nineteen reliability standards identified in the NERC 2007 Implementation Plan for the period of the last twelve months or monitoring timeframes specified in each reliability standard. Of the nineteen standards audited three were judged to be not applicable and the remaining sixteen were judged to be compliant. NSTAR ELECTRIC provided subject matter experts as required for each standard resulting in a more clear understanding of the NSTAR ELECTRIC business model and accelerated the audit process. The evidence provided to demonstrate compliance was complete, thorough and well organized.

In the area of relay misoperation reporting there was some confusion around reporting events. The confusion was mainly due to weakness in the NPCC documentation on the report due date. NSTAR was compliant with standard PRC-004 but we advise both NSTAR and NPCC to improve the documentation of the reporting timeline associated with relay misoperations. An additional area of concern was the absence of some documentation based on the assumption that auditors would have access to the information through other sources. I would advise for future audits that all documentation be provided as part of the audit package.

The audit team would like to thank the NSTAR ELECTRIC audit preparation team for the support offered through the audit. The preparation of summary papers associated with each of the standard groups was a valuable tool in performing the audit. The practice would be welcomed on future audits.

Audit Process

The compliance audit process steps are detailed in the NERC CMEP. The NERC CMEP generally conforms to the United States Government Accountability Office Government Auditing Standards and other generally accepted audit practices.

Objectives

All registered entities are subject to audit for compliance with all reliability standards applicable to the functions for which the registered entity is registered.¹ The audit objectives are:

- Independently review NSTAR ELECTRIC compliance with the requirements of the reliability standards that are applicable to NSTAR ELECTRIC based on the NSTAR ELECTRIC registered functions.
- Validate compliance with applicable reliability standards from the NERC 2007 Implementation Plan list of actively monitored standards.

¹ North American Electric Reliability Corporation CMEP, paragraph 3.1, Compliance Audits

Scope

The audit team consisted of one independent contractor and the support of the NPCC Manager Compliance Audit Program. Confidentiality agreements executed by the independent contractor and code of conduct documentation for the regional entity staff were provided to the audited entity in advance of the audit. NSTAR ELECTRIC was given an opportunity to object to an audit team member on the basis of a possible conflict of interest or the existence of other circumstances that could interfere with the audit team member's impartial performance of duties. NSTAR ELECTRIC accepted the audit team member participants with no objections.

The audit team reviewed standards and their associated documentation with three NSTAR ELECTRIC employees representing subject matter expertise for the standards audited. These NSTAR ELECTRIC employees represented all of its registered functions.

Compliance audits of NSTAR ELECTRIC are scheduled on a periodic basis of six-year intervals. The reliability standards reviewed in the NSTAR ELECTRIC audit included all of the standards in the NERC 2007 Implementation Plan. For the 2007 program, reliability standards are monitored based on the retention periods and monitoring timeframes specified in each reliability standard. The list of reliability standards along with the corresponding monitoring timeframes is listed in Appendix 1. The audit team leader provided a list of reliability standards and an audit agenda to NSTAR ELECTRIC before the audit.

Methodology

The auditor worked off site and provided questions to the NSTAR experts as required when data was unclear or incomplete. The NSTAR audit team was flexible with the availability of the NSTAR ELECTRIC audit participants when conducting the audit.

The auditor conducted interviews as necessary for each applicable reliability standard with NSTAR ELECTRIC subject matter experts and reviewed documented evidence. If after reviewing the submitted evidence, the auditor had additional questions, the NSTAR ELECTRIC subject matter expert was asked to respond to the questions.

The auditor would take time to go through submitted evidence to determine if the evidence meets the requirements of the reliability standard. If the evidence was inadequate or did not cover all of the requirements in the reliability standard, the auditor asked for additional evidence. During the course of the audit NSTAR ELECTRIC subject matter experts provided additional evidence to support their compliance. Examples of the evidence provided are ICCP screen shots; Arborists certifications and vegetation management plan approvals. Throughout the audit, the auditor took notes on findings of evidence of compliance.

At the end of the audit a draft report of the audit was sent to the main contact at NSTAR for questions and or comment.

Audit Considerations

No audit process or procedure can define every possible aspect, situation or scenario encountered by auditors when conducting a compliance audit. Auditors are expected to use their best professional judgment. The following paragraphs describe considerations when conducting bulk electric system reliability compliance audits.

Compliance audits of the bulk electric system reliability are based on newly defined mandatory reliability standards. Implementation of the reliability standards involves some risk for compliance audits due to the inherent learning curve of registered entities. This risk is mitigated by educating registered entities via regional compliance seminars, providing reliability standard information on the regional and NERC websites, encouraging industry involvement in the standards development process and by training compliance auditors.

The bulk electric system contains many variables, which require skilled personnel to plan and operate in a reliable manner. Many requirements in the NERC reliability standards specify or are dependent on reliability studies depicting both the planning and operational time horizons. To mitigate this risk the audit team must make professional judgments in its assessment of compliance based on 1) the interview with the registered entity's subject matter experts, 2) documented reports and policies, 3) tools/programs used to perform the studies, 4) results of the studies.

Company Profile

NSTAR ELECTRIC is a wholly owned subsidiary of NSTAR serving 1.1 million customers with a peak load of 4995 MW. NSTAR Electric is an investor owned electric and gas headquartered in Boston Massachusetts, serving load in the Boston, Plymouth, New Bedford and Cape Cod areas.

Audit Specifics

The compliance audit was conducted over a period of two weeks and a draft report was completed and distributed to NSTAR on December 20, 2007.

Audit Team

Audit Team Role	Name	Title	Company
Lead	Garth Arnott	Contracted Consultant	NPCC-Compliance Audit Program
Member	Sal Buffamante	Manager Compliance Audit Program	NPCC-Compliance Audit Program

NSTAR ELECTRIC Audit Participants

Name	Title
Greg Sullivan	Director, System Planning
John McLaughlin	Senior Engineer, System Planning
Bob Andrew	Manager, Bulk Power System Operations

Audit Results

The auditor documented the evidence reviewed for compliance with each applicable reliability standard. When necessary, the auditor would ask the NSTAR ELECTRIC subject matter expert to go through a scenario of explaining a representative set of data and how that data was derived and stored.

Findings

The following table details the summarized auditor notes relating to evidence reviewed for compliance with the reliability standards.

Reliability Standard	Auditor Notes	Finding
CIP-001-1	NSTAR ELECTRIC provided a procedure on how sabotage events will be identified and reported to local and federal officials, neighboring entities and to regulatory bodies.	Compliant
CIP-002-1 through CIP-009-1	NSTAR ELECTRIC is aware that compliance will be required in the future	Begin Work
FAC-008-1	Compliance was demonstrated through ratings applications and compliance filings with NPCC	Compliant
FAC-009-1	Compliance was demonstrated through ratings applications and compliance filings with NPCC	Compliant

Reliability Standard	Auditor Notes	Finding
IRO-001-1	Since NSTAR ELECTRIC is not a reliability coordinator, only R8 in this standard applies. NSTAR ELECTRIC provided evidence to show compliance with this standard.	Compliant
IRO-004-1	Since NSTAR ELECTRIC is not a reliability coordinator, only R3, R4 and R7 apply. All the NSTAR ELECTRIC documentation provided plus EMS screen shots indicated their compliance to the applicable requirements in this standard.	Compliant
PRC-004-1	NSTAR ELECTRIC analyzes all relay operations and identifies any misoperations. In addition to annual reporting, exception reporting of misoperation events is expected by NPCC but the NPCC documentation is not clear about this requirement. NSTAR was prepared to do annual reporting but was unaware of the exception-reporting requirement. I have found NSTAR compliant but recommend both NPCC and NSTAR to improve the reporting requirement documentation.	Compliant
PRC-005-1	NSTAR ELECTRIC provided documentation of its relay maintenance and testing program.	Compliant
PRC-008-0	NSTAR ELECTRIC provided documentation of its UFLS maintenance and testing program	Compliant
PRC-010-0	NSTAR ELECTRIC does not have UVLS on its system.	N/A
PRC-011-0	NSTAR ELECTRIC does not have UVLS on its system.	N/A
PRC-016-0	NSTAR ELECTRIC analyzes all SPS relay operations and identifies any misoperations. In addition to annual reporting, exception reporting of misoperation events is expected by NPCC but the NPCC documentation is not clear about this requirement. NSTAR was prepared to do annual reporting but was unaware of the exception-reporting requirement. Since NSTAR had no SPS misoperations there were no exceptions to report. I have found NSTAR compliant but recommend both NPCC and NSTAR to improve the reporting requirement documentation.	Compliant
PRC-017-0	NSTAR ELECTRIC provided documentation of its SPS relay maintenance and testing program	Compliant
PRC-021-1	NSTAR ELECTRIC does not have UVLS on its system.	NA

Reliability Standard	Auditor Notes	Finding
VAR-001-1	Only R5 is applicable, in the ISONE market all LSE's are required to purchase reactive through the market	Compliant
TPL-001-0	Transmission in the ISONE footprint is a collaborative process between the ISO and the TO's. NSTAR demonstrated compliance with this standard through its contribution to the joint process	Compliant
TPL-002-0	Transmission in the ISONE footprint is a collaborative process between the ISO and the TO's. NSTAR demonstrated compliance with this standard through its contribution to the joint process	Compliant
TPL-003-0	Transmission in the ISONE footprint is a collaborative process between the ISO and the TO's. NSTAR demonstrated compliance with this standard through its contribution to the joint process	Compliant
TPL-004-0	Transmission in the ISONE footprint is a collaborative process between the ISO and the TO's. NSTAR demonstrated compliance with this standard through its contribution to the joint process	Compliant

Conclusions

Of the nineteen reliability standards audited, three were judged not applicable and the remaining sixteen were found to be compliant. NSTAR ELECTRIC provided evidence of compliance with all of the applicable monitored reliability standards. The documentation and employee support afforded the audit team by NSTAR ELECTRIC was precise and excellent.

Appendix I – Applicable Reliability Standards

Std #	Requirements	Standard	Who	Purpose	Monitoring Timeframe	Applicable to NSTAR ELECTRIC ?
BAL-001-0	All	Real Power Balancing Control Performance	BA	To maintain Interconnection steady-state frequency within defined limits by balancing real power demand and supply in real-time.	The data that supports the calculation of CPS1 and CPS2 (Attachment 1-BAL-001-0) are to be retained in electronic form for at least a one-year period. If the CPS1 and CPS2 data for a Balancing Authority Area are undergoing a review to address a question that has been raised regarding the data, the data are to be saved beyond the normal retention period until the question is formally resolved. Each Balancing Authority shall retain for a rolling 12-month period the values of: one-minute average ACE (ACEi), one-minute average Frequency Error, and, if using variable bias, one-minute average Frequency Bias.	No
BAL-002-0	All	Disturbance Control Performance	BA, RSG, RRO	To ensure the Balancing Authority is able to utilize its Contingency Reserve to balance resources and demand and return Interconnection frequency within defined limits.	Compliance for DCS will be evaluated for each reporting period. Reset is one calendar quarter without a violation. The data that support the calculation of DCS are to be retained in electronic form for at least a one-year period.	No

Std #	Requirements	Standard	Who	Purpose	Monitoring Timeframe	Applicable to NSTAR ELECTRIC ?
BAL-003-0	All	Frequency Response and Bias	BA	This standard provides a consistent method for calculating the Frequency Bias component of ACE.	Yearly or by request.	No
CIP-001-1	All	Sabotage Reporting	RC, BA, TOP, GOP, LSE	Disturbances or unusual occurrences, suspected or determined to be caused by sabotage, shall be reported to the appropriate systems, governmental agencies, and regulatory bodies.	By request and any events in the last year.	Yes
CIP-002-1 through CIP-009-1	All	Critical Infrastructure Protection Standards	BA, GO, GOP, IA, LSE, NERC, RC, RRO, TO, TOP, TSP	Cyber Security Standards-Follow revised Implementation Plan for Cyber Security Standards CIP-002-1 through CIP-009-1	By request.	No
COM-001-1	R2 and R5	Telecommunications	TO, BA, RC, NERCNet User Organizations.	Each Reliability Coordinator, Transmission Operator and Balancing Authority needs adequate and reliable telecommunications facilities internally and with others for the exchange of Interconnection and operating information necessary to maintain reliability.	By request.	No

Std #	Requirements	Standard	Who	Purpose	Monitoring Timeframe	Applicable to NSTAR ELECTRIC ?
EOP-001-0	All	Emergency Operations Planning	BA, TOP	Each Transmission Operator and Balancing Authority needs to develop, maintain, and implement a set of plans to mitigate operating emergencies. These plans need to be coordinated with other Transmission Operators and Balancing Authorities, and the Reliability Coordinator.	By request.	No
EOP-003-1	All	Load Shedding Plans	BA, TOP	A Balancing Authority and Transmission Operator operating with insufficient generation or transmission capacity must have the capability and authority to shed load rather than risk an uncontrolled failure of the Interconnection.	R1, R5, R6 - Event Driven. Has an event occurred in the past year? R2, R3, R4, R7, R8 – By request	No
EOP-005-1	All	System Restoration Plans	BA, TOP	To ensure plans, procedures, and resources are available to restore the electric system to a normal condition in the event of a partial or total shut down of the system	By request. Note: entity must follow the timelines specified in the standard: show that the plan is reviewed annually; simulation or testing must be done every 5 years.	No
EOP-006-1	All	Reliability Coordination – System Restoration	RC	The Reliability Coordinator must have a coordinating role in system restoration to ensure reliability is maintained during restoration and priority is placed on restoring the Interconnection.	By request.	No

Std #	Requirements	Standard	Who	Purpose	Monitoring Timeframe	Applicable to NSTAR ELECTRIC ?
EOP-008-0	All	Plans for Loss of Control Center Functionality	BA, RC, TOP	Each reliability entity must have a plan to continue reliability operations in the event its control center becomes inoperable.	By request.	No
EOP-009-0	All	Documentation of Blackstart Generating Unit Test Results	GO, GOP	To ensure that the quantity and location of system blackstart generators are sufficient and that they can perform their expected functions.	By request. Note entity must meet testing frequency specified in EOP-007-0.	No
FAC-003-1	All	Vegetation Management	RRO, TO	To improve the reliability of the electric transmission systems by preventing outages from vegetation located on transmission rights-of-way (ROW) and minimizing outages from vegetation located adjacent to ROW, maintaining clearances between transmission lines.	By request – program documentation and last 4 quarterly outage reports.	Yes
FAC-008-1	All	Facility Ratings Methodology	GO, TO	To ensure that Facility Ratings used in the reliable planning and operation of the Bulk Electric System (BES) are determined based on an established methodology.	By request the current methodology and any superseded portions of the methodology within the past 12 months.	Yes

Std #	Requirements	Standard	Who	Purpose	Monitoring Timeframe	Applicable to NSTAR ELECTRIC ?
FAC-009-1	All	Establish and Communicate Facility Ratings	GO, TO	To ensure that Facility Ratings used in the reliable planning and operation of the Bulk Electric System (BES) are determined based on an established methodology or methodologies.	By request.	Yes
IRO-001-1	All	Reliability Coordination – Responsibilities and Authorities	BA, GOP, LSE, PSE, RC, RRO, TOP, TSP	Reliability Coordinators must have the authority, plans, and agreements in place to immediately direct reliability entities within their Reliability Coordinator Areas to re-dispatch generation, reconfigure transmission, or reduce load to mitigate critical conditions to return the system to a reliable state. If a Reliability Coordinator delegates tasks to others, the Reliability Coordinator retains its responsibilities for complying with NERC and regional standards. Standards of conduct are necessary to ensure the Reliability Coordinator does not act in a manner that favors one market participant over another.	By request.	Yes

Std #	Requirements	Standard	Who	Purpose	Monitoring Timeframe	Applicable to NSTAR ELECTRIC ?
IRO-004-1	All	Reliability Coordination — Operations Planning	BA, GO, GOP, LSE, RC, TO, TOP, TSP	Each Reliability Coordinator must conduct next-day reliability analyses for its Reliability Coordinator Area to ensure the Bulk Electric System can be operated reliably in anticipated normal and Contingency conditions.	By request.	Yes
IRO-014-1	All	Procedures, Processes, or Plans to Support Coordination Between Reliability Coordinators	RC	To ensure that each Reliability Coordinator's operations are coordinated such that they will not have an Adverse Reliability Impact on other Reliability Coordinator Areas and to preserve the reliability benefits of interconnected operations.	By request.	No
IRO-015-1	All	Notifications and Information Exchange Between Reliability Coordinators	RC	To ensure that each Reliability Coordinator's operations are coordinated such that they will not have an Adverse Reliability Impact on other Reliability Coordinator Areas and to preserve the reliability benefits of interconnected operations.	Rolling 12 months of information provided on request.	No
IRO-016-1	All	Coordination of Real-time Activities Between Reliability Coordinators	RC	that they will not have an Adverse Reliability Impact on other Reliability Coordinator Areas	Rolling 12 months of information provided on request.	No

Std #	Requirements	Standard	Who	Purpose	Monitoring Timeframe	Applicable to NSTAR ELECTRIC ?
PER-002-0	All	Operating Personnel Training	BA, TOP	Each Transmission Operator and Balancing Authority must provide their personnel with a coordinated training program that will ensure reliable system operation.	By request training program and training records.	No
PER-003-0	All	Operating Personnel Credentials	BA, RC, TOP	Certification of operating personnel is necessary to ensure minimum competencies for operating a reliable Bulk Electric System.	By request latest certification information and present calendar year plus previous calendar year staffing plan.	No
PER-004-1	All	Reliability Coordination — Staffing	RC	Reliability Coordinators must have sufficient, competent staff to perform the Reliability Coordinator functions.	By request - Each Reliability Coordinator shall keep evidence of compliance for the previous two calendar years plus the current year.	No
PRC-004-1	All	Analysis and Mitigation of Transmission and Generation Protection System Misoperations	DP*, GO, TO	Provide trip operation / misoperation information per regional process.	By request – last 12 months of protection system Misoperation analysis.	Yes
PRC-005-1	All	Transmission and Generation Protection System Maintenance and Testing	DP*, GO, TO	Document/implement transmission protection system maintenance/testing/monitoring PROGRAM	By request - maintenance and testing program and testing records to show that testing intervals are on schedule.	Yes

Std #	Requirements	Standard	Who	Purpose	Monitoring Timeframe	Applicable to NSTAR ELECTRIC ?
PRC-008-0	All	Implementation and Documentation of Underfrequency Load Shedding Equipment Maintenance Program	DP, TO	Document/implement UFLS maintenance/testing PROGRAM	By request - maintenance and testing program and testing records to show that testing intervals are on schedule.	Yes
PRC-010-0	All	Technical Assessment of the Design and Effectiveness of Undervoltage Load Shedding Program.	DP, LSE, TO, TOP	ASSESS design and effectiveness of UVLS programs	By request – current assessment.	Yes
PRC-011-0	All	UVLS System Maintenance and Testing	DP, TO	Document/implement UVLS maintenance/testing PROGRAM	By request - maintenance and testing program and testing records to show that testing intervals are on schedule.	Yes
PRC-016-0	All	Special Protection System Misoperations	DP, GO, TO	DOCUMENT/analyze misoperations	By request – last 12 months of special protection system Misoperation analysis.	Yes
PRC-017-0	All	Special Protection System Maintenance and Testing	DP, GO, TO	Document/implement SPS maintenance/testing PROGRAM	By request - maintenance and testing program and testing records to show that testing intervals are on schedule.	Yes
PRC-021-1	All	Under-Voltage Load Shedding Program Data	DP, TO	DOCUMENTATION of undervoltage load shedding program	By request – latest UVLS data.	Yes

Std #	Requirements	Standard	Who	Purpose	Monitoring Timeframe	Applicable to NSTAR ELECTRIC ?
TOP-003-0	All	Planned Outage Coordination	BA, GOP, RC, TOP	Scheduled generator and transmission outages that may affect the reliability of interconnected operations must be planned and coordinated among Balancing Authorities, Transmission Operators, and Reliability Coordinators.	By request.	No
TOP-004-1	R6	Transmission Operations	TOP	To ensure that the transmission system is operated so that instability, uncontrolled separation, or cascading outages will not occur as a result of the most severe single Contingency and specified multiple Contingencies.	By request - Each Transmission Operator shall keep 90 days of historical data for Measure 1. Each Transmission Operator shall have current, in-force policies and procedures, as evidence of compliance to Measure 2.	No
TOP-005-1	All	Operational Reliability Information	BA, PSE, RC, TOP	To ensure reliability entities have the operating data needed to monitor system conditions within their areas.	By request.	No
TOP-007-0	All	Reporting System Operating Limit (SOL) and Interconnection Reliability	RC, TOP	Ensure SOL and IROL violations are being reported to the Reliability Coordinator so that the Reliability Coordinator may evaluate actions being taken and direct additional corrective actions as needed.	Event driven.	No
TPL-001-0	All	System Performance Under Normal (No Contingency) Conditions	PA, TPL	System performance under normal conditions	By request – latest annual assessment.	Yes

Std #	Requirements	Standard	Who	Purpose	Monitoring Timeframe	Applicable to NSTAR ELECTRIC ?
TPL-002-0	All	System Performance Following Loss of a Single Bulk Electric System Element	PA, TPL	System performance under single contingency	By request – latest annual assessment.	Yes
TPL-003-0	All	System Performance Following Loss of Two or More Bulk Electric System Elements	PA, TPL	System performance under multiple contingencies	By request – latest annual assessment.	Yes
TPL-004-0	All	System Performance Following Extreme Events Resulting in the Loss of Two or More Bulk Electric System Elements	PA, TPL	System performance under extreme contingencies	By request – latest annual assessment.	Yes
VAR-001-1	All	Voltage and Reactive Control	PSE, TOP	To ensure voltage levels, reactive flows, and reactive resources are monitored, controlled, and maintained within limits in real time to protect equipment and the reliable operation of the Interconnection.	By request – last 12 months of data.	Yes

Appendix 2: Confidential Security Sensitive Information

[This section contains confidential security sensitive information, which is not included with the public version, but retained by NERC and the regional organization and is sent privately to the audited entity.]