



NORTHEAST POWER COORDINATING COUNCIL, INC.
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Compliance Audit Report Public Version

**NEW BRUNSWICK SYSTEM OPERATOR
(NBSO)
NCR07155**

October 14 to October 17, 2008

**Confidential Information (including Privileged and
Critical Energy Infrastructure Information)
Has Been Removed**

November 4, 2008

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Executive Summary

This final compliance audit report is the public version. Confidential information (including privileged and critical energy infrastructure information) has been redacted from this report. The full final compliance audit report was submitted to the audited entity and NERC.

The onsite compliance audit of New Brunswick System Operator (NBSO) was conducted between October 14 and October 17, 2008. The audit was completed using data submitted by NBSO prior to the audit team arriving at the site, material provided at the NBSO Control Centre and data provided as a result of questions raised during the audit.

The audit team evaluated NBSO compliance with forty reliability standards identified in the NERC 2008 Implementation Plan for the period of the last twelve months or monitoring timeframes specified in each, reliability standard. Of the forty standards audited, thirty-seven were judged to be compliant and three were judged to be not applicable. Not all of the requirements of the thirty-seven standards were applicable to the functions, for which NBSO is registered as, and some requirements were deemed not applicable for this audit period as no events or disturbances had taken place pertaining to those requirements. NBSO provided subject matter experts for each standard resulting in a more clear understanding of the NBSO business model and accelerated the audit process. The evidence provided to demonstrate compliance was complete and well organized. The audit team would like to thank the NBSO audit preparation team for the support offered through the audit.

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 NBSO compliance with the requirements of the reliability standards that are applicable to NBSO based on the NBSO registered functions.
- Validate compliance with applicable reliability standards from the NERC 2008 Implementation Plan list of actively monitored standards.

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

- Validate evidence of self-reported violations and previous self-certifications, confirm compliance with other requirements of the reliability standard, and review the status of associated mitigation plans.
- Document the NBSO compliance culture.

Scope

The audit included all standards identified in the August 13, 2008 audit letter for the previous year. The audit was a regularly scheduled audit and no self reported violations or compliance investigations were involved.

Confidentiality and Conflict of Interest

The audited entity was informed in advance of the audit that NPCC staff and the independent contractors executed NPCC Code of Conduct forms, NERC Confidentiality Agreements, and NERC Non-Disclosure Agreements. Confidentiality agreements and code of conduct documentation was in place for the NERC representative. These documents are on file in the NPCC corporate offices and available if requested. Work history and biographies of each audit team member were also sent to the entity prior to the audit. The audited entity 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. The audited entity accepted the audit team member participants with no objections.

On-site Audit

NBSO were provided with a pre-audit request letter identifying the standards and requirements subject to audit. The audit letter was sent to NBSO more than 60 days in advance of the scheduled audit. This is an on-site audit conducted every three years or as determined to be necessary by the region. NBSO had not self reported any violations

The audit team leader requested interviews with NBSO employees representing subject matter expertise regarding all of their registered functions. These interviews in conjunction with evidence provide the audit team with a basis for professional judgment when validating compliance with reliability standards.

Methodology

The audit team prepared reliability standards auditor worksheets (RSAWs) to evaluate each standard. The RSAW's are used to ensure consistency and to document evidence of compliance or non-compliance with the standards. All relevant documents are considered and to the extent they form portion of the audit trail are included in the RSAW's.

Audit Overview

The audit overview was started at 9:00 AM October 14, 2008 at the NBSO Control Centre. The audit team reviewed the proposed audit schedule to insure appropriate NBSO staff was available to resolve questions as they arose. There were minor changes to the schedule on-site. Each audit team member reviewed his or her career and noted they had signed confidentiality agreements. A brief explanation of the audit process was given and the timelines were discussed. NBSO was given the opportunity to reject any auditor should they feel that there was a possible conflict of interest or they thought the auditor would not be impartial. NBSO accepted the audit team. The New Brunswick Energy and Utilities Board (NBEUB) and NERC observers were introduced and provided brief comment on their role.

Audit

In advance of the on-site portion of the audit the lead auditor held a conference call with the audited entity to review the audit process and expectations of the audit team for the on-site portion of the audit. The early receipt of the data helped the audit staff become familiar with the data and to more precisely focus their questions to make the audit more efficient.

Prior to arrival at the site the lead auditor, assigned standards to each of the audit team members. Each member, prior to arriving at the site, reviewed all data submitted for the standards assigned to them and produced a set of questions that required subject matter experts responses. That team member then lead the on-site questioning and produced the RSAW for the standard. All other team members participated in the question process. The audit team was split up into two sub groups to more effectively utilize the team. Some questions were resolved using the data provided and others were answered by follow up emails and data submittals.

Exit Briefing

The exit briefing was conducted at the NBSO Energy Control Centre on October 17/08. The entire team of NPCC auditors, NBEUB and NERC observers, and selected NBSO staff attended. An audit presentation summarized the initial results of the audit, NBSO was given an opportunity to provide feedback on the audit and commented it was a very positive experience. The final results of the audit could not be provided at the exit briefing as the Audit team needed time to complete their RSAWs using the additional evidence provided at the end of the audit and in subsequent emails. The initial results did not change significantly and NBSO was still in compliance for all applicable standards.

Company Profile

The New Brunswick System Operator (NBSO) is an independent, not for profit, corporation, created on October 1, 2004, by the Province of New Brunswick *Electricity Act*. The NBSO is responsible for:

- Directing the operation of the transmission system
- Maintaining the reliability of the transmission grid and the integrated electricity system
- Administering the Market Rules
- Coordinating system planning to ensure present and future adequacy
- Operating and developing a competitive electricity market
- Monitoring compliance to Reliability Standards

The NBSO has its own Board of Directors, President & Chief Executive Officer, Secretary & General Counsel, Controller and Director of Market Development & Settlement. In addition, the NB Power Transmission staff responsible for controlling the operation of the New Brunswick transmission system from the Energy Control Centre building in Fredericton, NB, have been seconded to NBSO to assist in carrying out the duties mandated to the NBSO.

The footprint of the NBSO *Reliability Coordinator* area is located on the Atlantic coast of Canada. It consists of the three Canadian 'Maritimes' Provinces of New Brunswick, Nova Scotia and Prince Edward Island as well as small portions of the United States in the State of Maine that are radially connected to New Brunswick. These small utilities in the Aroostook and Washington counties of Maine have a market which is collectively managed by the Northern Maine Independent System Administrator (NMISA).

The NBSO Energy Control Centre in Fredericton, NB is the location from which the NBSO RC, BA and TOP activities are carried out. The Nova Scotia Power Incorporated (NSPI) Ragged Lake control centre in Halifax, NS is the location from which the NSPI BA and TOP activities are carried out. The non-Bulk Power System transmission and generation resources in Prince Edward Island are operated locally by the Maritime Electric Company Limited (MECL) control centre in Charlottetown, PEI and those in northern Maine are operated by Maine Public Service Company Limited (MPS) in Presque Isle, ME and by Eastern Maine Electrical Cooperative (EMEC) in Calais, ME.

Technical Details

The combined all time peak load for the entire NBSO footprint was 5,716 MW on January 16, 2004, of which 3,300 MW was in New Brunswick.

The NBSO Maritimes Area is synchronously connected to the Eastern Interconnection by a 150-mile 345 kV transmission line connecting Keswick, NB to Orrington ME, and a second 345 kV transmission line (145 miles) from Point Lepreau, NB to Orrington ME in the Independent System Operator-New England (ISO-NE) reliability coordinator area. The Maritimes are also asynchronously connected to the Hydro-Quebec/TransEnergie reliability coordinator area by two back-to-back HVDC stations located near the border between the Provinces of New Brunswick and Quebec. Within the NBSO footprint, New Brunswick serves as the hub for interconnections between the various operating entities. NSPI is connected by one 345 kV and two 138 kV lines, NMISA by two 138 kV and three 69 kV lines while MECL is connected by two 138 kV submarine cables.

The total capacity of company-owned generation in the Maritimes is 6,662 MW (as of January 2008), broken down by the following fuel types (excluding an additional 200 MW of oil-fired generation, due to a firm capacity sale to Hydro-Québec/TransEnergie):

Coal – 26%

Oil – 25%

Hydro – 20%

Nuclear – 9% Natural

Gas – 8%

Oil/Gas – 6%

Orimulsion®/

Oil – 4%

Other – 2% (Wind, Biomass, Diesel)

Regional Reliability Organization Affiliation:

The NBSO Reliability Coordinator area is part of the larger Northeast Power Coordinating Council (NPCC) region consisting of the electric power systems in New York, New England, Ontario, Quebec and the Maritimes. The NBSO is registered with NERC as the *Reliability Coordinator* for the Maritimes Area. In addition, the NBSO is the *Transmission Operator*,

Resource Planner, Transmission Service Provider and Planning Authority for New Brunswick and the *Balancing Authority* for the Provinces of New Brunswick and Prince Edward Island as well as the radially connected portions of northern Maine. NSPI is registered as the *Balancing Authority* and *Transmission Operator* for the Province of Nova Scotia. New Brunswick Power Transmission and NSPI are both registered as *Transmission Planners*. Transmission voltages in the NBSO footprint include 345, 230, 138, 69 and 33 kV. Most of the bulk power transmission is at the higher voltage levels, of which there are 1220 miles of 345 kV (930 miles NB and 290 miles NS) and 1114 miles of 230 kV (388 miles NB and 776 miles NS).

Audit Specifics

The compliance audit was conducted on October 14 to October 17, 2008 at the NBSO Energy Control Centre in Fredericton, New Brunswick, Canada.

Audit Team Role	Title	Company
Lead	Contracted Consultant	NPCC-Compliance Audit Program
Member	Manager Compliance Audit Program	NPCC-Compliance Audit Program
Auditor	Contracted Consultant	NPCC-Compliance Audit Program
Auditor	Contracted Consultant	NPCC-Compliance Audit Program
Auditor	Contracted Consultant	NPCC-Compliance Audit Program
Observer	Regional Compliance Program Coordinator	NERC
Observer	Regional Compliance Program Coordinator	NERC
Observer	Director-Regulatory and Finance	New Brunswick Energy and Utilities Board
Observer	Senior Advisor	New Brunswick Energy and Utilities Board

Title	Organization
Director Power System Engineering Director Power System Operations SME - Technical Writer Director Infrastructure System Support SME - Outage Planning Coordinator Transmission SME - Senior Power Systems Engineer SME - Control Room Manager SME - IT Systems Engineer SME - Planning Coordinator Generation SME - IT Specialist SME - IT Specialist SME - IT Professional SME - Energy Coordinator SME - Power System Operator Senior System Operator	NBSO
Director Market Development and Settlement NBSO Controller Secretary and General Counsel Vice President Development and Government Affairs Senior Compliance Engineer Senior Power Systems Engineer	NBSO
Manager of Training	NBSO

Audit Results

Prior to arrival at the site the lead auditor, assigned standards to each of the audit team members. Each member, prior to arriving at the site, reviewed all data submitted for the standards assigned to them and produced a set of questions that required subject matter experts responses. That team member then lead the on-site questioning and produced the RSAW for the standard. All other team members participated in the question process. At times the documentation initially provided did not provide sufficient detail and additional evidence was requested. Evidence was provided using the data provided and others were answered by follow up emails and data submittals.

Findings

The following table details the summarized auditor notes relating to evidence reviewed for compliance with the reliability standards listed in the NERC 2008 Implementation Plan. This table can also include details summarizing auditor notes relating to evidence reviewed for reliability standard requirements for self-reported violations, ongoing mitigation plans, and other discussions.

NA+: indicates not applicable for this audit period

Reliability Standard	Requirement	Finding
BAL-001-0	R1.	Compliant
BAL-001-0	R2.	Compliant
BAL-001-0	R3.	Compliant
BAL-001-0	R4.	NA
BAL-002-0	R1.	Compliant
BAL-002-0	R2.	Compliant
BAL-002-0	R3.	Compliant
BAL-002-0	R4.	Compliant
BAL-002-0	R5.	Compliant
BAL-002-0	R6.	Compliant
BAL-003-0	R1.	Compliant
BAL-003-0	R2.	Compliant
BAL-003-0	R3.	Compliant
BAL-003-0	R4.	NA
BAL-003-0	R5.	Compliant
BAL-003-0	R6.	Compliant
BAL-004-0	R1.	NA
BAL-004-0	R2.	NA
BAL-004-0	R3.	Compliant
BAL-004-0	R4.	NA+
BAL-005-0	R1.	Compliant
BAL-005-0	R2.	Compliant
BAL-005-0	R3.	NA
BAL-005-0	R4.	NA
BAL-005-0	R5.	NA
BAL-005-0	R6.	Compliant
BAL-005-0	R7.	Compliant
BAL-005-0	R8.	Compliant
BAL-005-0	R9.	Compliant
BAL-005-0	R10.	NA

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Reliability Standard	Requirement	Finding
BAL-005-0	R11.	Compliant
BAL-005-0	R12.	Compliant
BAL-005-0	R13.	Compliant
BAL-005-0	R14.	Compliant
BAL-005-0	R15.	Compliant
BAL-005-0	R16.	Compliant
BAL-005-0	R17.	Compliant
BAL-006-1	R1.	Compliant
BAL-006-1	R2.	Compliant
BAL-006-1	R3.	Compliant
BAL-006-1	R4.	Compliant
BAL-006-1	R5.	Compliant
CIP-001-1	R1.	Compliant
CIP-001-1	R2.	Compliant
CIP-001-1	R3.	Compliant
CIP-001-1	R4.	Compliant
COM-001-1	R1.	Compliant
COM-001-1	R2.	Compliant
COM-001-1	R3.	Compliant
COM-001-1	R4.	Compliant
COM-001-1	R5.	Compliant
COM-002-2	R1.	Compliant
COM-002-2	R2.	Compliant
EOP-001-0	R1.	Compliant
EOP-001-0	R2.	Compliant
EOP-001-0	R3.	Compliant
EOP-001-0	R4.	Compliant
EOP-001-0	R5.	Compliant
EOP-001-0	R6.	Compliant
EOP-001-0	R7.	Compliant
EOP-002-2	R1.	Compliant
EOP-002-2	R2.	NA+
EOP-002-2	R3.	NA+
EOP-002-2	R4.	NA+
EOP-002-2	R5.	NA+
EOP-002-2	R6.	NA+
EOP-002-2	R7.	NA+
EOP-002-2	R8.	Compliant

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Reliability Standard	Requirement	Finding
EOP-002-2	R9.	NA
EOP-003-1	R1.	NA+
EOP-003-1	R2.	Compliant
EOP-003-1	R3.	Compliant
EOP-003-1	R4.	Compliant
EOP-003-1	R5.	Compliant
EOP-003-1	R6.	Compliant
EOP-003-1	R7.	Compliant
EOP-003-1	R8.	Compliant
EOP-004-1	R2.	Compliant
EOP-004-1	R3.	Compliant
EOP-005-1	R1.	Compliant
EOP-005-1	R2.	Compliant
EOP-005-1	R3.	Compliant
EOP-005-1	R4.	Compliant
EOP-005-1	R5.	Compliant
EOP-005-1	R6.	Compliant
EOP-005-1	R7.	Compliant
EOP-005-1	R8.	Compliant
EOP-005-1	R9.	Compliant
EOP-005-1	R10.	Compliant
EOP-005-1	R11.	Compliant
EOP-006-1	R1.	Compliant
EOP-006-1	R2.	Compliant
EOP-006-1	R3.	Compliant
EOP-006-1	R4.	Compliant
EOP-006-1	R5.	Compliant
EOP-006-1	R6.	Compliant
EOP-008-0	R1.	Compliant
FAC-008-1	R1.	NA
FAC-008-1	R2.	NA
FAC-008-1	R3.	NA
FAC-013-1	R1.	Compliant
FAC-013-1	R2.	Compliant
INT-001-2	R1.	NA
INT-001-2	R2.	Compliant
INT-003-2	R1.	Compliant
INT-004-1	R1.	NA

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Reliability Standard	Requirement	Finding
INT-004-1	R2.	NA
IRO-001-1	R1.	NA
IRO-001-1	R2.	Compliant
IRO-001-1	R3.	Compliant
IRO-001-1	R4.	NA
IRO-001-1	R5.	NA
IRO-001-1	R6.	NA
IRO-001-1	R7.	Compliant
IRO-001-1	R8.	Compliant
IRO-001-1	R9.	Compliant
IRO-004-1	R1.	Compliant
IRO-004-1	R2.	Compliant
IRO-004-1	R3.	Compliant
IRO-004-1	R4.	Compliant
IRO-004-1	R5.	Compliant
IRO-004-1	R6.	Compliant
IRO-004-1	R7.	Compliant
IRO-005-1	R1.	Compliant
IRO-005-1	R2.	Compliant
IRO-005-1	R3.	Compliant
IRO-005-1	R4.	Compliant
IRO-005-1	R5.	Compliant
IRO-005-1	R6.	Compliant
IRO-005-1	R7.	Compliant
IRO-005-1	R8.	Compliant
IRO-005-1	R9.	Compliant
IRO-005-1	R10.	Compliant
IRO-005-1	R11.	Compliant
IRO-005-1	R12.	Compliant
IRO-005-1	R13.	Compliant
IRO-005-1	R14.	Compliant
IRO-005-1	R15.	Compliant
IRO-005-1	R16.	Compliant
IRO-005-1	R17.	Compliant
IRO-006-3	R1.	Compliant
IRO-006-3	R2.	Compliant
IRO-006-3	R3.	Compliant
IRO-006-3	R4.	Compliant

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Reliability Standard	Requirement	Finding
IRO-006-3	R5.	NA+
IRO-006-3	R6.	Compliant
IRO-014-1	R1.	Compliant
IRO-014-1	R2.	Compliant
IRO-014-1	R3.	Compliant
IRO-014-1	R4.	Compliant
IRO-015-1	R1.	Compliant
IRO-015-1	R2.	Compliant
IRO-015-1	R3.	Compliant
IRO-016-1	R1.	Compliant
IRO-016-1	R2.	Compliant
PER-002-0	R1.	Compliant
PER-002-0	R2.	Compliant
PER-002-0	R3.	Compliant
PER-002-0	R4.	Compliant
PER-003-0	R1.	Compliant
PER-004-1	R1.	Compliant
PER-004-1	R2.	Compliant
PER-004-1	R3.	Compliant
PER-004-1	R4.	Compliant
PER-004-1	R5.	Compliant
PRC-010-0	R1.	NA
PRC-010-0	R2.	NA
TOP-002-2	R1.	Compliant
TOP-002-2	R2.	Compliant
TOP-002-2	R3.	NA
TOP-002-2	R4.	Compliant
TOP-002-2	R5.	Compliant
TOP-002-2	R6.	Compliant
TOP-002-2	R7.	Compliant
TOP-002-2	R8.	Compliant
TOP-002-2	R9.	Compliant
TOP-002-2	R10.	Compliant
TOP-002-2	R11.	Compliant
TOP-002-2	R12.	Compliant
TOP-002-2	R13.	NA
TOP-002-2	R14.	NA
TOP-002-2	R15.	NA

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Reliability Standard	Requirement	Finding
TOP-002-2	R16.	Compliant
TOP-002-2	R17.	Compliant
TOP-002-2	R18.	Compliant
TOP-002-2	R19.	Compliant
TOP-003-0	R1.	Compliant
TOP-003-0	R2.	Compliant
TOP-003-0	R3.	Compliant
TOP-003-0	R4.	Compliant
TOP-004-1	R1.	NA+
TOP-004-1	R2.	Compliant
TOP-004-1	R3.	Compliant
TOP-004-1	R4.	NA+
TOP-004-1	R5.	NA+
TOP-004-1	R6.	Compliant
TPL-001-0	R1.	Compliant
TPL-001-0	R2.	Compliant
TPL-001-0	R3.	Compliant
TPL-002-0	R1.	Compliant
TPL-002-0	R2.	Compliant
TPL-002-0	R3.	Compliant
TPL-003-0	R1.	Compliant
TPL-003-0	R2.	Compliant
TPL-003-0	R3.	Compliant
TPL-004-0	R1.	Compliant
TPL-004-0	R2.	Compliant
VAR-001-1	R1.	Compliant
VAR-001-1	R2.	Compliant
VAR-001-1	R3.	NA
VAR-001-1	R4.	Compliant
VAR-001-1	R5.	NA
VAR-001-1	R6.	Compliant
VAR-001-1	R7.	Compliant
VAR-001-1	R8.	Compliant
VAR-001-1	R9.	Compliant
VAR-001-1	R10.	NA+
VAR-001-1	R11.	NA+
VAR-001-1	R12.	NA+

Compliance Culture

The audit team reviewed NBSO compliance culture. The regional entity compliance staff may review additional aspects of NBSO compliance culture. During all contacts NBSO staff was professional in their approach to compliance and understood the importance of the compliance and its role in maintaining reliability. The director responsible for NBSO compliance and his staff, as well as all staff interviewed expressed a strong commitment to compliance.