NPCC, Inc.

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

ONTARIO INDEPENDENT ELECTRICITY SYSTEM OPERATOR
IESO
NCR07184

June 17 to July 14, 2008

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

July 14, 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 the Independent Electricity System Operator (IESO) was conducted between June 17th and July 14th, 2008. The audit was completed using data submitted by the IESO prior to the onsite audit being completed, and data provided by way of follow-up emails and phone calls as a result of questions raised during and after the on-site audit. Due to the very large amount of supporting documentation and the short time onsite, the auditors needed a lengthy period of time off site to finalize their preliminary findings and accurately document those findings.

The audit team evaluated the IESO's compliance with thirty-nine reliability standards and one hundred ninety-three requirements 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 thirty-nine standards and one hundred ninety-three requirements audited, one standard and its two requirements were judged to be not applicable and twenty-three requirements from the remaining thirty-eight standards were judged to be not applicable for this audit period for various reasons. The IESO was found to be compliant with thirty-eight standards and their one hundred sixty-eight requirements for this audit period. The IESO provided subject matter experts as necessary resulting in a more clear understanding of the IESO business model and accelerated the audit process. The evidence provided to demonstrate compliance was excellently presented and well organized. The audit team would like to thank the IESO 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:

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

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

Scope

The audit included all standards identified in the April 15th, 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 the independent contractors executed confidentiality agreements and code of conduct documentation was in place for the NERC representative and regional entity staff. Work history and conflict of interest forms submitted by each audit team member are on file in the NPCC corporate offices. 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

IESO was provided with a pre-audit request letter identifying the standards and requirements subject to audit. The audit letter was sent to IESO 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. IESO had not self reported any violations

If necessary, the audit team leader would request interviews with IESO employees representing subject matter expertise regarding all of registered functions of IESO. These interviews in conjunction with evidence would provide the audit team with a basis for professional judgment when validating compliance with reliability standards.

Methodology

[Methodology: the auditing standards and best practices that are to be followed by compliance auditors in carrying out their work as described in the Compliance Auditor Manual. The criteria should be objective, measurable, complete and relevant to the audit objectives. The auditor

should identify potential sources of audit evidence and consider the amount and type of evidence needed given the risk and significance when defining the audit methodology.]

Audit Overview

The audit overview was conducted by way of an onsite presentation by Sal Buffamante on June 17th, 2008. An explanation of the audit process was given and the timelines were discussed.

Audit

The audit was performed onsite by the auditors- Kim Pitchell, Anthony Giasi, John Brannan, and Garth Arnott with Sal Buffamante of NPCC assisting and with Rosanna Jimenez and Mark Vastano of NERC observing and assisting as required. Additional questions were provided to the IESO by way of emails and phone calls after leaving the site and the IESO then took the time necessary to develop the answers and submitted them by way of email and phone calls to the auditors.

Exit Briefing

The exit briefing was led by Sal Buffamante on June 19th, 2008 and was attended be the audit team and several IESO staff. NPCC reviewed the audit process and summarized the preliminary findings of the audit. The results of the audit were that of the thirty-nine standards and one hundred ninety-three requirements audited, one standard and its two requirements were judged to be not applicable and twenty-three requirements from the remaining thirty-eight standards were judged to be not applicable for this audit period for various reasons. The IESO was found to be compliant with thirty-eight standards and their one hundred sixty-eight requirements for this audit period. Due to the very large amount of supporting documentation, the audit team needed extra time off-site to finalize their preliminary findings and accurately document those findings. The IESO was given an opportunity to question the audit findings and provide comment on the audit. IESO accepted the preliminary findings and said they found the process to be very informative. They have a much better appreciation of how the audit process works and what it entails to be fully compliant to all standards.

Company Profile

The IESO is a not-for-profit corporation without share capital having statutory responsibility for developing and administering the wholesale electricity markets and directing the operation and maintaining the reliability of the integrated power system within the province of Ontario. The IESO was established on April 1, 1999 as the Independent Electricity Market Operator under the Electricity Act, 1998 (Ontario) and was continued under its current name on January 1, 2005. The IESO's responsibilities include a broad range of integrated operations, including planning, security assessment and scheduling, administration of the wholesale electricity market and

Ancillary services and real time coordination of the power system. The IESO's statutory responsibilities include making and enforcing market rules that govern the IESO-controlled grid and the wholesale electricity market, subject to regulatory oversight by the Ontario Energy Board (OEB).
The IESO, under the *Electricity Act, 1998* (Ontario), is authorized to establish and enforce Standards and criteria relating to the reliability of transmission systems through regulation (O. Reg. 452/06, s.1). Ontario's mandatory province wide reliability framework predates the establishment of the ERO.

Installed Transmission Capacity
28,900 km of high voltage transmission circuits.
11,080 km of 115 kV
13,936 km of 230 kV
7 km of 345 kV
3,877 km of 500 kV
• ~ 400 substations in the IESO Controlled Grid (ICG), ranging from 500 kV to 50 kV
• ~ 4,000 MW of coincident interconnection capacity with Manitoba, Quebec, New York, Michigan and Minnesota via:
• 17 synchronous interconnections.
• 9 non-synchronous interconnections (Segregated mode of operation).

The IESO is the RC, TOP, BA, TSP and RP for the province of Ontario and it interacts with the following neighbouring entities:

New York Independent System Operator (NYISO);
Mid-West Independent System Operator (MISO);
Hydro Quebec TransÉnergie;
International Transmission Company,
Manitoba Hydro
Minnesota Power.

Ontario's summer peak hour demand of 27,005 MW, occurred on August 1, 2006
Ontario's winter peak hour demand of 24,979 MW occurred December 20, 2004
Ontario's peak daily energy demand of 566,098 MWh occurred August 1, 2006

All generation is independent and registered as market participants in the IESO administered Markets (IAM).
Ontario Generation Summary
Installed Generation Resources in Ontario (forming part of the IMO-administered Markets)
Note: These are all independently owned by the various market participants that make up the IESO-administered markets (IAM)

Fuel Type	Total Capacity (MW)	Number of Stations	Percentage of Total
Nuclear	11,426	5	36.5%
Coal	6,434	4	20.6%
Oil / Gas	5,103	22	16.3%
Hydroelectric	7,788	68	24.88%
Wind	471	5	1.5%
Miscellaneous Biomass/Landfill	75	5	0.24%
Total	31,297	109	

Audit Specifics

The compliance audit was conducted on-site between June 17th and June 19th, 2008. The long delay in producing the report was directly attributed to the extensive correspondence between the auditors and the IESO SME's following the on-site audit in seeking clarification for the finalization of the compliance assessment. Scheduled vacation of some SMEs also contributed to the delay. The audit team members and the IESO staff did an excellent job in completing the audit considering the large number of applicable requirements and huge amount of supporting documentation.

Audit Team Role	**Title**	**Company**
Lead	Contracted Consultant	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
Regional staff	Manager Compliance Audit Program	NPCC-Compliance
Observer	Regional Coordinator	NERC Regional Compliance Program
Observer	Regional Coordinator	NERC Regional Compliance Program

IESO

Name and Title		Audited Entity's Organization
Senior Engineer/Technical Officer: Reliability Standards & Assessments		IESO
Engineer/Technical Officer: Reliability Standards & Assessments		
Engineer/Technical Officer: Reliability Standards & Assessments		
Engineer/Technical Officer: Market Analysis		
Senior Exchange Officer: Training & Emergency Preparedness		
Senior Engineer/Technical Officer: Training & Emergency Preparedness		
Senior Exchange Officer: Training & Emergency Preparedness		
Senior Engineer/Technical Officer: Forecasts & Integration		
Senior Engineer/Technical Officer: Forecasts & Integration		
Senior Engineer/Technical Officer: Forecasts & Integration		
Senior Operations Officer: Shift Operations		
Senior Operations Officer: Shift Operations		
Assistant Operations Officer: Shift Operations (BCC Tour)		
Section Head: Grid Assessments		
Manager:Technology Support		
Chief Operating Officer		
Director-Planning and Assessments		
Manager-Forecasts and Integration		
Manager-Shift Operations		

Audit Results

The audit team evaluated IESO's compliance with thirty-nine reliability standards and one hundred ninety-three requirements identified in the NERC 2008 Implementation Plan for the period of the last twelve months or monitoring timeframes specified in each, reliability standard. The results of the audit were that of the thirty-nine standards and one hundred ninety-three requirements audited, one standard and its two requirements were judged to be not applicable and twenty-three requirements from the remaining thirty-eight standards were judged to be not applicable for this audit period for various reasons. The IESO was found to be compliant with thirty-eight standards and their one hundred sixty-eight requirements for this audit period. IESO provided subject matter experts as necessary resulting in a more clear understanding of the IESO business model and accelerated the audit process. The evidence provided to demonstrate compliance was excellently presented and well organized. The audit team would like to thank the IESO audit preparation team for the support offered through the audit.

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.

Reliability Standard	Requirement	Finding
BAL-001-0	R1.	Compliant
BAL-001-0	R2.	NA
BAL-001-0	R3.	NA
BAL-001-0	R4.	NA
BAL-002-0	R1.	Compliant
BAL-002-0	R2.	NA
BAL-002-0	R3.	Compliant
BAL-002-0	R4.	Compliant
BAL-002-0	R5.	NA
BAL-002-0	R6.	Compliant
BAL-003-0	R1.	Compliant
BAL-003-0	R2.	Compliant

Reliability Standard	Requirement	Finding
BAL-003-0	R3.	Compliant
BAL-003-0	R4.	NA
BAL-003-0	R5.	Compliant
BAL-003-0	R6.	NA
BAL-004-0	R1.	NA
BAL-004-0	R2.	NA
BAL-004-0	R3.	Compliant
BAL-004-0	R4.	NA
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
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	R2.	Compliant
COM-001-1	R5.	Compliant
COM-002-2	R1.	Compliant
COM-002-2	R2.	Compliant
EOP-001-0	R1.	Compliant

Reliability Standard	Requirement	Finding
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	R6.	Compliant
EOP-002-2	R7.	Compliant
EOP-002-2	R8.	Compliant
EOP-002-2	R9.	Compliant
EOP-003-1	R1.	Compliant
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	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-013-1	R1.	Compliant

Reliability Standard	Requirement	Finding
FAC-013-1	R2.	Compliant
INT-001-2	R2.	Compliant
INT-003-2	R1.	Compliant
INT-004-1	R1.	Compliant
INT-004-1	R2.	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-003-2	R1.	Compliant
IRO-003-2	R2.	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.	NA
IRO-005-1	R15.	NA
IRO-005-1	R16.	Compliant

Reliability Standard	Requirement	Finding
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
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

Reliability Standard	Requirement	Finding
TOP-002-2	R11.	Compliant
TOP-002-2	R12.	Compliant
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	R6.	Compliant
TOP-005-1	R1.	Compliant
TOP-005-1	R2.	Compliant
TOP-005-1	R3.	Compliant
TOP-007-0	R1.	NA
TOP-007-0	R2.	Compliant
TOP-007-0	R3.	Compliant
TOP-007-0	R4.	Compliant
VAR-001-1	R1.	Compliant
VAR-001-1	R2.	Compliant
VAR-001-1	R3.	Compliant
VAR-001-1	R4.	Compliant
VAR-001-1	R6.	Compliant
VAR-001-1	R7.	Compliant
VAR-001-1	R8.	Compliant
VAR-001-1	R9.	Compliant
VAR-001-1	R10.	Compliant
VAR-001-1	R11.	Compliant
VAR-001-1	R12.	Compliant

Compliance Culture

During the audit, the NPCC audit team reviewed the IESO's compliance culture. The NPCC team came to the conclusion that Ontario IESO takes compliance very seriously and understands the overall goal of the compliance program; namely to strive for a more reliable interconnected bulk power system. During all contact with NPCC compliance staff, IESO staff was professional in their approach to compliance and understood its importance and its role in maintaining reliability.