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**Compliance Audit Report  
Northeast Utilities Services Company  
Connecticut Valley Electric Exchange  
(CONVEX)  
June 26/27, 2007**

**Public Version**

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# Executive Summary

The onsite compliance audit of Northeast Utilities Services Company (NU) was conducted on June 26/27, 2007. The Connecticut Valley Electric Exchange (CONVEX) provides the transmission operator duties for the NU facilities, as well as other member companies within their jurisdiction. For simplicity the two entities will be referred to as NU-CONVEX. The audit team evaluated NU-CONVEX compliance with 16 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. The audit team interviewed five NU-CONVEX employees representing subject matter expertise and reviewed accompanying documentation NU-CONVEX presented as evidence of compliance.

One of the reliability standards applicable only to Transmission Operators was classified as not applicable to NU-CONVEX, see Audit Results Findings. NU-CONVEX provided adequate evidence of compliance with of the remaining standards.

## 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.<sup>1</sup> The audit objectives are:

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

## Scope

The compliance audit was performed by an audit team consisting of regional entity staff, independent contractors, and a NERC representative. Confidentiality agreements executed by the independent contractors and code of conduct documentation for the NERC representative and regional entity staff were provided to the audited entity in advance of the audit. NU-CONVEX 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. NU-CONVEX accepted the audit team member participants with no objections.

The audit team interviewed five NU-CONVEX employees representing subject matter expertise and reviewed accompanying documentation NU-CONVEX presented as evidence of compliance. These NU-CONVEX employees represented all of its registered functions from the NU-CONVEX Transmission Operations organization.

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<sup>1</sup> North American Electric Reliability Corporation CMEP, paragraph 3.1, Compliance Audits

Compliance audits of NU-CONVEX are scheduled on a periodic basis of three year intervals. The reliability standards reviewed in the NU-CONVEX 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 their corresponding monitoring timeframes are listed in Appendix 1. The audit team leader provided a list of reliability standards and an audit agenda to NU-CONVEX before the audit.

## ***Methodology***

The audit team generally followed an agenda that was provided in advance to NU-CONVEX. The audit team was flexible with the availability of the NU-CONVEX audit participants when conducting the audit. The audit team worked in one group for the audit process.

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

The audit team would take time to go through submitted evidence and discuss findings as a team 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 audit team asked for additional evidence. If NU-CONVEX could not find or submit additional evidence then the audit team determined that a possible violation exists. NU-CONVEX was not asked to create documentation in these instances only to submit existing evidence in addition to what was already submitted. The audit team reviewed NU-CONVEX documentation at the NU-CONVEX facilities and did not remove any original NU-CONVEX documentation from the NU-CONVEX facilities during the audit. NU-CONVEX subject matter experts provided additional evidence to support their compliance in the form of photocopies. Examples of the photocopied material are Operator log extracts, Outage Plans, NERC operator certificates, Training records, etc. Throughout the audit, the audit team members took notes on findings of evidence of compliance or if evidence was not sufficient to show compliance.

The audit team conducted an exit briefing immediately following the audit with NU-CONVEX compliance audit participants and higher level NU-CONVEX management personnel. The audit team shared its preliminary results verbally and via a presentation. The NU-CONVEX audit participants asked questions and commented on the audit team's findings.

The exit briefing was also a forum for the audit team to offer informal recommendations for process improvement. These recommendations are not included in this audit report but were documented in the exit presentation and will be sent to NU-CONVEX with the draft Audit Report.

## ***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. It is difficult to audit the validity of the multitude of studies that are performed to ensure registered entities meet these requirements. The audit difficulty is comprised of time constraints of the audit team, number of variables in the studies, and the auditor's lack of detailed knowledge of the registered entity's system. For example, it would take an auditor a period of weeks to validate the studies referred to in the TPL-001-0 through TPL-004-0 reliability standards. 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***

Northeast Utilities (NU) is the owner of Transmission and Distribution electric systems within the three-state region of Connecticut, New Hampshire and Western Massachusetts. Northeast Utilities is a Fortune 500 energy company, which operates New England's largest energy distribution system. It serving more than 2 million electricity and natural gas customers. NU owns and operates one natural gas and three electric utility companies, the Connecticut Light and Power Company (CL&P), Western Massachusetts Electric Company (WMECO) and Public Service Company of New Hampshire (PSNH). Each electric utility owns transmission and distribution facilities in their respective states and PSNH owns and operates regulated electric generating facilities in New Hampshire.

As a Local Control Center in the ISO-New England footprint, the Connecticut Valley Electric Exchange (CONVEX) functions as a Transmission Operator for Northeast Utilities' subsidiaries CL&P and WMECO and the other member company transmission facilities which serve all of Connecticut and western Massachusetts. By sharing these facilities, the more than 1.7 million customers of all CONVEX member companies benefit through increased reliability, efficiency and economy of electric service. CL&P and WMECO do not own generating facilities in Connecticut or western Massachusetts.

The system peak load for CONVEX occurred last year. On August 3, 2006, CONVEX reached a peak load of 8,878 MW.

The electrical system operated by CONVEX includes five (5) Interconnection points.

- Alps-Berkshire 393 line tie with Niagara Mohawk at 345kV,
- Pleasant Valley-Long Mountain line tie with Consolidated Edison at 345kV
- Salisbury-Smithfield 690 line tie with Central Hudson Gas and Electric at 69kV
- Norwalk Harbor-Northport 1385 line tie with Long Island Power Authority at 138kV
- Halversson-Tomson 481 line DC tie with Long Island Power Authority

CONVEX operates 393 miles of 345kV lines, 1,176 miles of 115kV lines, 162 miles of 69kV lines, and serves as an interconnection point for 24 miles of DC cable to LIPA and 12 miles of 138kV cable to LIPA.

### **Audit Specifics**

The compliance audit was conducted on June 26-27, 2007 at the CONVEX office in Newington, Connecticut.

### **Audit Team**

<b>Audit Team Role</b>	<b>Name</b>	<b>Title</b>	<b>Company</b>
Lead	Kim Pitchell	Contracted Consultant	NPCC-Compliance Audit Program
Member	Sal Buffamante	Manager	NPCC-Compliance Audit Program
Observer	Ellen Oswald	Program Coordinator	NERC-Regional Compliance

### **NU-CONVEX Audit Participants**

<b>Name</b>	<b>Title</b>	<b>NU-CONVEX Organization</b>
Trey Kirkpatrick	Manager	Compliance Program
Barry Bruun	Manager	CONVEX Operations
Roger McBeth	Sr. Administrator	CONVEX Operations and Procedures
Tom Mulinski	Manager	CONVEX Systems
Doug McCracken	Director	Transmission Operations

### **Audit Results**

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

An overview of the NU-CONVEX control room was provided to the Audit Team from the viewing gallery. This did assist in confirming that procedures and other documentation presented as evidence are readily available to the system operators.

### **Findings**

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

<b>Reliability Standard</b>	<b>Auditor Notes</b>	<b>Finding</b>
BAL-001-0	NU-CONVEX is not a BA, ISO-NE holds this responsibility	N/A
BAL-002-0	NU-CONVEX is not a BA; ISO-NE holds this responsibility.	N/A

Reliability Standard	Auditor Notes	Finding
BAL-003-0	NU-CONVEX is not a BA; ISO-NE holds this responsibility.	N/A
CIP-001-1	NU-CONVEX provided a procedure on how sabotage events will be identified and reported to local and federal officials, neighboring entities and to regulatory bodies. Interviews with NU-CONVEX operations employees revealed that the employees are aware and have been trained on the procedure.	Compliant
CIP-002-1 through CIP-009-1	NU-CONVEX is aware that compliance will be required in the future	Begin Work
COM-001-1	NU-CONVEX provided drawings of its communication systems and the procedures identifying critical communications equipment and written operating instructions and procedures to enable continued operation of the system during the loss of telecommunications facilities. The testing and maintenance logs of communication equipment were provided to the audit team as evidence.	Compliant
EOP-001-0	<p>NU-CONVEX provided the following:            Operating agreements and procedures with ISO-NE (RC+BA) and other Local Control Centers (LCC).            The documents included plans to mitigate operating emergencies on the transmission system and load shedding and other emergencies as defined in the requirements of EOP-001-0.            Evidence of coordination in the NU-CONVEX emergency plans was provided. The documents are parent/child format with ISO-NE ensuring that all LCC's in their jurisdiction have a common understanding of procedure and protocol. ISO-NE provides the coordination with neighboring RC's, and BA's.            NU-CONVEX provided documentation proving their operators has the authority to act independently or in conjunction with other LCC's or entities outside of ISO-NE jurisdiction if contact is lost with ISO-NE.</p>	Compliant
EOP-003-1	<p>R1, R5, and R6 - No events have occurred in the last 12 months. Simulated tests have been run and documentation was provided.            R2 – NU-CONVEX does not have an UVLS. NU-CONVEX showed evidence of their UFLS scheme.            R3 – ISO-NE requires that NU-CONVEX have a load shedding plan and participates on regional coordination activities. The evidence is in the form of the ISO-NE documentation for UFLS.            R4 – NU-CONVEX UFLS schemes are based on NPCC criteria. NU-CONVEX compliance to the criteria is reported to ISO-NE who holds the overall responsibility for their jurisdiction.            R7 – This is ISO-NE's responsibility and NU-CONVEX provided ISO-NE documentation supporting coordination of the items listed in R7 with their UFLS.            R8 – NU-CONVEX provided documentation and screen captures of the operators displays and tools which support their compliance.</p>	Compliant

Reliability Standard	Auditor Notes	Finding
EOP-005-1	<p>R1 – NU-CONVEX provided evidence of the necessary plans to meet this requirement.</p> <p>R2 – ISO-NE System Restoration Plan is updated annually and NU-CONVEX is part of that plan.</p> <p>R3 – NU-CONVEX plan states it will follow orders from its reliability coordinator in the restoration effort.</p> <p>R4 – NU-CONVEX showed evidence that ISO-NE coordinated its restoration plan with the entities specified in the requirement.</p> <p>R5 – NU-CONVEX tests its backup communications in conjunction with ISO-NE testing.</p> <p>R6, R7 – NU-CONVEX operating personnel participate in its reliability coordinator sponsored restoration training and simulation activities on an annual basis. The last simulation was dated 2006.</p> <p>R8 – ISO-NE is responsible for Blackstart capability testing. This requirement was also specified in the ISO-NE System Restoration Plan.</p> <p>R9 – ISO-NE and its LCC's are responsible for providing documentation of Cranking Paths, including initial switching requirements, between each blackstart generating unit and the unit(s) to be started. NU-CONVEX provided documentation indicating such for the equipment in their area.</p> <p>R10 – ISO-NE is responsible for this requirement. All documentation resides with them.</p> <p>R11 – NU-CONVEX has not experienced an isolation event in the last 12 months. NU-CONVEX supplied documentation for the August 2003 blackout and indicated their actions would meet their responsibilities under this requirement.</p>	Compliant
EOP-006-1	Not applicable – NU-CONVEX is not a reliability coordinator.	NA
EOP-008-0	<p>The NU-CONVEX Loss of Control Center Functionality Plan is covered under their Business Continuity, Disaster Recovery Plan, and Evacuation of NU-CONVEX Control Room plans. NU-CONVEX provided other procedures to indicate their compliance to the requirements of this standard applicable to them.</p>	Compliant
EOP-009-0	Not applicable to NU-CONVEX	N/A
FAC-003-1	Not applicable to NU-CONVEX	N/A
FAC-008-1	Not applicable to NU-CONVEX	N/A
FAC-009-1	Not applicable to NU-CONVEX	N/A
IRO-001-1	<p>Since NU-CONVEX is not a reliability coordinator, only R8 in this standard applies. NU-CONVEX provided evidence (operator logs) to show compliance with this standard.</p>	Compliant
IRO-004-1	<p>Since NU-CONVEX is not a reliability coordinator, only R3, R4 and R7 apply. All the NU-CONVEX documentation provided indicated their compliance to the applicable requirements in this standard.</p>	Compliant
IRO-014-1	Not applicable – NU-CONVEX is not a reliability coordinator.	NA
IRO-015-1	Not applicable – NU-CONVEX is not a reliability coordinator.	NA
IRO-016-1	Not applicable – NU-CONVEX is not a reliability coordinator.	NA

<b>Reliability Standard</b>	<b>Auditor Notes</b>	<b>Finding</b>
PER-002-0	Individual training records were provided for each operator. The operators are all NERC certified and they all receive restoration training and refresher training. Records indicate they all receive at least the minimum hours mandated by NERC.	Compliant
PER-003-0	A spreadsheet was provided that lists the names and certification of the operators. The audit team verified the certification numbers with NERC. Copies of shift schedules verified the operators are covered with NERC Certification.	Compliant
PER-004-1	Not applicable – NU-CONVEX is not a reliability coordinator.	NA
PRC-004-1	Not applicable to NU-CONVEX	NA
PRC-005-1	Not applicable to NU-CONVEX	NA
PRC-008-0	Not applicable to NU-CONVEX	NA
PRC-010-0	NU-CONVEX does not have UVLS on its system.	NA
PRC-011-0	Not applicable to NU-NU-CONVEX	NA
PRC-016-0	Not applicable to NU-CONVEX	NA
PRC-017-0	Not applicable to NU-CONVEX	NA
PRC-021-1	Not applicable to NU-CONVEX	NA
TOP-003-0	NU-CONVEX sends data to its reliability coordinator via the outage scheduler and by fax. NU-CONVEX provided printouts of snapshots from this tool. All transmission owners in the ISO-NE footprint have access to the outages on this tool.	Compliant
TOP-004-1	Only R6 requirement is applicable to NU-CONVEX. ISO-NE and its LCC's coordinate the functions to meet this requirement. NU-CONVEX provided documentation supporting their role in meeting this standard.	Compliant
TOP-005-1	Only R1 requirement is applicable to NU-CONVEX. NU-CONVEX provided documentation indicating their compliance. NU-CONVEX does not have access to the NERC ISN. NU-CONVEX data is provided to ISO-NE, its reliability coordinator who then distributes it as necessary to other entities.	Compliant
TOP-007-0	ISO-NE and its LCC's coordinate their actions in responding to SOL and IROL violations. NU-CONVEX provided documentation indicating their actions for past events comply with this standard.	Compliant
TPL-001-0	Not applicable to NU-CONVEX	NA
TPL-002-0	Not applicable to NU-CONVEX	NA
TPL-003-0	Not applicable to NU-CONVEX	NA
TPL-004-0	Not applicable to NU-CONVEX	NA
VAR-001-1	Only R1, R4, R6, R7, R8, R9, R10 and R12 are applicable to NU-CONVEX. ISO-NE and its LCC's coordinate functions to meet the majority of the requirements. NU-CONVEX provided documentation indicating compliance to these requirements. The documentation was comprised of voltage schedules, screenshots of operator's displays, operating guides and incident reports from past events.	Compliant

## **Conclusions**

NU-CONVEX provided evidence of compliance with all of the applicable monitored reliability standards. The documentation and employee support afforded the audit team by NU-CONVEX was precise and excellent.

## **Summary of NU-CONVEX Response to the Audit Findings**

**Northeast Utilities and CONVEX management concur with the report as written. We appreciate the professionalism demonstrated by the Audit Team.**

## Appendix I – Applicable Reliability Standards

Std #	Requirements	Standard	Who	Purpose	Monitoring Timeframe	Applicable to NU-CONVEX?
BAL-001-0	All	<b>Real Power Balancing Control Performance</b>	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	<b>Disturbance Control Performance</b>	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

<b>Std #</b>	<b>Requirements</b>	<b>Standard</b>	<b>Who</b>	<b>Purpose</b>	<b>Monitoring Timeframe</b>	<b>Applicable to NU-CONVEX?</b>
BAL-003-0	All	<b>Frequency Response and Bias</b>	BA	This standard provides a consistent method for calculating the Frequency Bias component of ACE.	Yearly or by request.	No
CIP-001-1	All	<b>Sabotage Reporting</b>	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	<b>Critical Infrastructure Protection Standards</b>	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.	Yes
COM-001-1	R2 and R5	<b>Telecommunications</b>	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.	Yes

<b>Std #</b>	<b>Requirements</b>	<b>Standard</b>	<b>Who</b>	<b>Purpose</b>	<b>Monitoring Timeframe</b>	<b>Applicable to NU-CONVEX?</b>
EOP-001-0	All	<b>Emergency Operations Planning</b>	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.	Yes
EOP-003-1	All	<b>Load Shedding Plans</b>	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	Yes
EOP-005-1	All	<b>System Restoration Plans</b>	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.	Yes
EOP-006-1	All	<b>Reliability Coordination – System Restoration</b>	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

<b>Std #</b>	<b>Requirements</b>	<b>Standard</b>	<b>Who</b>	<b>Purpose</b>	<b>Monitoring Timeframe</b>	<b>Applicable to NU-CONVEX?</b>
EOP-008-0	All	<b>Plans for Loss of Control Center Functionality</b>	BA, RC, TOP	Each reliability entity must have a plan to continue reliability operations in the event its control center becomes inoperable.	By request.	Yes
EOP-009-0	All	<b>Documentation of Blackstart Generating Unit Test Results</b>	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	<b>Vegetation Management</b>	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.	No
FAC-008-1	All	<b>Facility Ratings Methodology</b>	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.	No
FAC-009-1	All	<b>Establish and Communicate Facility Ratings</b>	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.	No

Std #	Requirements	Standard	Who	Purpose	Monitoring Timeframe	Applicable to NU-CONVEX?
IRO-001-1	All	<p align="center"><b>Reliability Coordination – Responsibilities and Authorities</b></p>	BA, GOP, LSE, PSE, RC, RRO, TOP, TSP	<p>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.</p>	By request.	Yes
IRO-004-1	All	<p align="center"><b>Reliability Coordination — Operations Planning</b></p>	BA, GO, GOP, LSE, RC, TO, TOP, TSP	<p>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.</p>	By request.	Yes

<b>Std #</b>	<b>Requirements</b>	<b>Standard</b>	<b>Who</b>	<b>Purpose</b>	<b>Monitoring Timeframe</b>	<b>Applicable to NU-CONVEX?</b>
IRO-014-1	All	<b>Procedures, Processes, or Plans to Support Coordination Between Reliability Coordinators</b>	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	<b>Notifications and Information Exchange Between Reliability Coordinators</b>	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	<b>Coordination of Real-time Activities Between Reliability Coordinators</b>	RC	that they will not have an Adverse Reliability Impact on other Reliability Coordinator Areas	Rolling 12 months of information provided on request.	No
PER-002-0	All	<b>Operating Personnel Training</b>	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.	Yes
PER-003-0	All	<b>Operating Personnel Credentials</b>	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.	Yes

<b>Std #</b>	<b>Requirements</b>	<b>Standard</b>	<b>Who</b>	<b>Purpose</b>	<b>Monitoring Timeframe</b>	<b>Applicable to NU-CONVEX?</b>
PER-004-1	All	<b>Reliability Coordination — Staffing</b>	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	<b>Analysis and Mitigation of Transmission and Generation Protection System Misoperations</b>	DP*, GO, TO	Provide trip operation / misoperation information per regional process.	By request – last 12 months of protection system Misoperation analysis.	No
PRC-005-1	All	<b>Transmission and Generation Protection System Maintenance and Testing</b>	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.	No
PRC-008-0	All	<b>Implementation and Documentation of Underfrequency Load Shedding Equipment Maintenance Program</b>	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.	No
PRC-010-0	All	<b>Technical Assessment of the Design and Effectiveness of Undervoltage Load Shedding Program.</b>	DP, LSE, TO, TOP	ASSESS design and effectiveness of UVLS programs	By request – current assessment.	No
PRC-011-0	All	<b>UVLS System Maintenance and Testing</b>	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.	No
PRC-016-0	All	<b>Special Protection System Misoperations</b>	DP, GO, TO	DOCUMENT/analyze misoperations	By request – last 12 months of special protection system Misoperation analysis.	No

<b>Std #</b>	<b>Requirements</b>	<b>Standard</b>	<b>Who</b>	<b>Purpose</b>	<b>Monitoring Timeframe</b>	<b>Applicable to NU-CONVEX?</b>
PRC-017-0	All	<b>Special Protection System Maintenance and Testing</b>	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.	No
PRC-021-1	All	<b>Under-Voltage Load Shedding Program Data</b>	DP, TO	DOCUMENTATION of undervoltage load shedding program	By request – latest UVLS data.	No
TOP-003-0	All	<b>Planned Outage Coordination</b>	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.	Yes
TOP-004-1	R6	<b>Transmission Operations</b>	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.	Yes
TOP-005-1	All	<b>Operational Reliability Information</b>	BA, PSE, RC, TOP	To ensure reliability entities have the operating data needed to monitor system conditions within their areas.	By request.	Yes

<b>Std #</b>	<b>Requirements</b>	<b>Standard</b>	<b>Who</b>	<b>Purpose</b>	<b>Monitoring Timeframe</b>	<b>Applicable to NU-CONVEX?</b>
TOP-007-0	All	<b>Reporting System Operating Limit (SOL) and Interconnection Reliability</b>	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.	Yes
TPL-001-0	All	<b>System Performance Under Normal (No Contingency) Conditions</b>	PA, TPL	System performance under normal conditions	By request – latest annual assessment.	No
TPL-002-0	All	<b>System Performance Following Loss of a Single Bulk Electric System Element</b>	PA, TPL	System performance under single contingency	By request – latest annual assessment.	No
TPL-003-0	All	<b>System Performance Following Loss of Two or More Bulk Electric System Elements</b>	PA, TPL	System performance under multiple contingencies	By request – latest annual assessment.	No
TPL-004-0	All	<b>System Performance Following Extreme Events Resulting in the Loss of Two or More Bulk Electric System Elements</b>	PA, TPL	System performance under extreme contingencies	By request – latest annual assessment.	No
VAR-001-1	All	<b>Voltage and Reactive Control</b>	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.]