




System Operating Procedures

SOP-RTMKTS.0120.0030

Implement Transmission Remedial Action

Effective Date: August 9, 2010
Revision No. 19

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	Process Name: Implement Emergency Operations	
	Procedure Number: RTMKTS.0120.0030	Revision Number: 19
	Procedure Owner: Steve Weaver	Effective Date: August 9, 2010
	Approved By: Director, Operations	Valid Through: June 1, 2012


SOP- RTMKTS.0120.0030 Implement Transmission Remedial Action

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1. Objective

The objective of this procedure is to document the responsibilities of ISO New England (ISO) staff while making decisions involving transmission contingencies. Compliance with this procedure supports area reliability in real time and directly impacts market operations.


2. Background

Operation of the ISO Reliability Coordinator Area/Balancing Authority (RCA/BAA) is intended to be in accordance with the various guidelines set by North American Electric Reliability Corporation (NERC), Northeast Power Coordinating Council Inc. (NPCC) and ISO New England Operating Procedures (OPs) to maintain system reliability. ISO system operations are also intended to be in accordance with ISO New England Inc. FERC Electric Tariff No. 3 Section III - Market Rule 1 - Standard Market Design (MR1). Some prescribed operator actions are also further detailed in ISO OPs, Transmission Operating Guides (TOGs) and System Operating Procedures (SOPs) which are available to ISO System Operators.

The system operated by ISO is monitored by security applications in the Energy Management System (EMS) and is divided into a number of sub-areas for the purpose of managing reliability. Software and system knowledge provides ISO personnel with information for solutions to mitigate transmission security violations.

The ISO RCA/BAA Generators, Dispatchable Asset Related Demands (DARDs) and Demand Response are controlled in real time to ensure that the interface limits, Reserve Zone requirements or line ratings are not exceeded and conform to ISO New England Operating Procedure No. 19 – Transmission Operations (OP-19) criteria.

Transmission contingencies are abnormal conditions limiting the ability to transfer power over the bulk power system. These contingencies may require remedial actions including the possibility of implementing Master/Local Control Center Procedure No. 2 Abnormal Conditions Alert (M/LCC 2) to ensure reliability of the bulk power system. M/LCC 2 is a procedure used by ISO and the Local Control Centers (LCCs) to alert power system operations, maintenance, and test personnel that abnormal power system conditions exist or are anticipated. Once notified, these personnel are expected to take precautions that do not further jeopardize the reliability of the power system.


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3. Responsibilities

NOTE

Any NERC Certified System Operator, certified at the RC level, has the authority to take action(s) required to comply with NERC Reliability Standards.


1. The Security Operator is responsible for taking actions necessary to preclude or alleviate transmission security problems.
2. The Loader Operator/Generator Operator and Security Operator are responsible for staying within the area interface limits in the dispatch of Generators, DARDs and Demand Response.
3. The Security Operator determines the transmission restrictions in real time using the EMS advanced applications, TOGS and system operating experience.
4. The Manager, Control Room Operations is responsible for convening a conference call, if warranted and as time permits, to discuss the need for implementation of M/LCC 2 with the Master Local Control Center (M/LCC) Heads during normal business hours.
5. The Operations Shift Supervisor is responsible for identifying situations when M/LCC 2 might be appropriately implemented or cancelled, making the decision to implement or cancel M/LCC 2 during non-business hours, and assigning system operators the task of communicating the alert to other parties.
6. Control Room Management and Operations Support Services are responsible to determine if a System Operating Limit (SOL) event would have caused an Interconnection Reliability Operating Limit (IROL) violation.
7. The Manager, Control Room Operations (or designee) is responsible to report IROL violations to NERC and NPCC within 72 hours.
8. The Operations Shift Supervisor is responsible for making Department of Energy (DOE) notifications if an event requires reporting within 1 hour.

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4. Controls

Transmission contingencies are recovered from within respective time limitations

- Only NERC Certified System Operators, certified at the RC level, shall be allowed to take real-time actions involving system security required to comply with NERC Reliability Standards.

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5. Instructions


5.1 Identify Security Constraints

1. The Security Operator shall respond to automatic alarms indicating potential or actual transmission violations.
2. The Security Operator shall use the following criteria to evaluate transmission contingencies and whether remedial action is needed:
 - A. ISO New England Operating Procedure No. 19 – Transmission Operations (OP-19) criteria.
 - B. TOG criteria.
 - C. Real-Time Network (RTNET) and Real-Time Contingency Analysis (RTCA) results.
 - D. Interface Limits Calculator (ILC) limit violations.

NOTE

SOP-RTMKTS.0060.0020 - Monitor System Security describes the methods used to determine transmission security violations.

3. The Security Operator shall perform manual calculations to determine potential or actual transmission violations when security system software malfunctions.
4. The Security Operator shall respond to LCC and neighboring Reliability Coordinator Area/Balancing Authority Area (RCA/BAA) requests involving transmission security and identify the need to take action.

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5.2 Determine Required Remedial Actions

1. The Security Operator shall determine the necessary actions to prevent violation of OP-19 or other determined security constraints.
2. If a contingency occurs in an area limited by the DOUBLCL proxy limit, the Security Operator shall perform the following to adjust limits for 1st contingency.
 - A. Ensure the DOUBLCL proxy limit is ignored in ILC.
 - B. Recalculate ILC limits to determine the 1st contingency limit.
3. When an actual or potential security violation is recognized, the System Operators shall perform the following applicable actions to determine the proper resolution:
 - A. Notify the Operations Shift Supervisor, Senior System Operator and other control room staff about the transmission contingency
 - B. If necessary notify the appropriate LCCs and RCAs/BAAAs to verify and validate the transmission contingency
 - C. Perform applicable actions contained in the TOGs


NOTE

In the following bullet, the term pre-approved and identified transmission topology either refers to a Temporary Guide or has been approved in a transmission application.

- D. Determine if any of the following no cost solution exists:
 - changing pre- approved and identified transmission topology by opening or closing breakers,
 - changing cap bank status,
 - using temporary weather sensitive ratings,
 - reliance on Special Protection System (SPS) operation
 - moving phase shifters to provide a solution

NOTE

Marginal capability includes what is available in on-line Generators and in off-line fast-start Generators.

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NOTE

The curtailment actions are made in accordance with:

- Section VI of ISO New England Operating Procedure No. 9 - Scheduling and Dispatch of External Contracts (OP-9).
- SOP-RTMKTS.0090.0010 - Schedule Next-Hour External Transactions
- SOP-RTMKTS.0100.0010 - Curtail External Transactions

The action to reduce the external inter-area interface limit should be sufficient in magnitude to ensure that the resulting external contract curtailment alleviates any internal transfer limit violation

E. In conjunction with the Senior System Operator and Generation Operator, determine if curtailing or scheduling of external transactions provides a solution and perform the appropriate following action(s).

(1) If an internal transmission constraint is impacted by External Transaction sales to a point where no marginal capability is available to offload the internal constraint, reduce the external inter-area interface limit to a level that results in curtailment of External Transaction that will alleviate the internal constraint.

a. The exception to this curtailment practice is when both of the following conditions exist:


i. A local area capacity deficient conditions occurs or is projected to occur

NOTE

External Transactions that meet the criteria for exports that are backed as defined in MR1 III.1.10.7(f) i, ii or iii, are labeled as “CT Backed Exp” on the “Control Room Hourly Detail” display in the EES-MOI.

ii. External Transactions labeled as “CT Backed Exp” on “Control Room Hourly Detail” display in the EES-MOI are present within that local area.

b. When this exception is applicable, OP-4 actions up to and including the activation of Real-Time Demand Response shall be considered prior to reducing these External Transactions.

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(2) If a contingency creates or worsens energy transfer on an internal interface to a level that violates the transfer limit, and the only mitigating action available to alleviate the overload is curtailment of External Transactions (all marginal internal capability in this example is dispatched), reduce the inter-area transfer limit to effect External Transaction curtailments to relieve the internal constraint.

- a. In this case, ISO is not required to implement ISO New England Operating Procedure No. 4 (OP-4)

F. Do not commit non-fast start Generators to support internal congestion made worse by increasing External Transaction flow.

NOTE

The Constraints Logger (CLOGGER) software will present sensitivities for off line fast start Generators and online Generators, which may alleviate a contingency and UDS will only dispatch online and fast start Generators when the constraint is activated.


G. Account for any transmission constraints for use within CLOGGER

4. The Security Operator shall validate any transmission constraints using the following tools for analysis:
 - Available security software
 - Appropriate TOGs
 - Real-time area protection requirements

NOTE

UDS will not account for the newly activated constraint until the UDS case is approved and executed.

5. The Security Operator shall respond to valid transmission constraints produced by RTNET and RTCA using CLOGGER. Refer to SOP-RTMKTS.0060.0020 - Monitor System Security for guidance on using CLOGGER.


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6. If execution of the UDS case results in an “invalid solution” (i.e., per the EMS User Guide it turns red), the Loader Operator shall consider increasing the UDS “Look Ahead” from 15 minutes to 25 minutes to provide increased Generator ramping capability and a valid solution.
 - A. The “Look Ahead” value shall not be increased to a value which jeopardizes the 30-minute criteria for resolving SOL or IROL violations.

NOTE

The % rating applied for the constraint will determine the response of UDS in providing security constrained dispatch. The default (a blank data field) is 100%. During periods of large load ramps, the % rating may require a value less than 100% to ensure SOLs are not violated. If actual line flows are lower than the values RTCA and CLOGGER are using, using a % rating above 100% is acceptable.

7. The Loader Operator shall approve and execute the UDS case that provides security constrained dispatch for the newly activated constraint.

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NOTE


Constraints are developed in units of MVA however, UDS solves in units of MW. In cases of high VARs, the % rating applied for the constraint response may need to be changed.

Security constraint software does not account for all contingencies (Example: A Generator may be limited to a certain MW output due to certain transmission breaker configuration) and therefore, requires the manual redeclaration of unit limits in order to dispatch Generators to maintain system reliability. When a re-declaration is performed for this reason the Generator should be given a scheduled Maintenance Outage for scheduling purposes.

The Reserve Monitor/Capacity Analysis flags should be applied when the Generator cannot utilize its reserve as determined by the System Operator. (Example: A Generator that is being constrained down due to an active transmission constraint and is below its Eco Max. If the dispatch software will never move the Generator up due to it being constrained down, the reserve should not be counted.

The Reserve Monitor/Capacity Analysis flag should be applied to provide an accurate reserve status.

8. If CLOGGER provides a solution, determine if a Reserve Monitor/Capacity Analysis flag, located on the “Unit Status” display, shall be applied to account for the operating reserves being unavailable.
9. Inform Control Room personnel of the selected constraints that may adversely limit Generators and desired operating levels.
10. If security software does not provide a solution or is not responding in a timely manner, manually calculate distribution and adjustment factors, determine a MW value which provides a solution and request the Loader Operator/Generator Operator to dispatch Generators as required by performing the following:
 - A. Contact the Designated Entity (DE) and manually dispatch Generators by entering the desired MW value in the “Comm DDP” well using either the “Unit Status” display or the “Unit Detail” display to meet OP-19 criteria.

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- B. Make necessary log entries in the Control Room Logserver per SOP-RTMTKS.0125.0040 - Update Control Room Logs.
- C. Apply the Reserve Monitor/Capacity Analysis flag, located on the “Unit Details” display, to constrained Generators with unavailable Reserve.

11. When the manual dispatch is no longer required remove the “Comm DDP” entry and applicable Reserve Monitor/Capacity Analysis flag.

5.2.1 Interrupt Firm Load

NOTE

If time allows, the Operations Shift Supervisor and System Operators should discuss efforts to satisfy an event prior to shedding load. If time does not allow this discussion, System Operators, certified at the RC level, have the authority to take individual action(s) required to comply with NERC Reliability Standards to satisfy the emergency independent of higher level approvals.


- 1. When all other efforts have been exhausted to satisfy the event in a timely fashion, the Operations Shift Supervisor and / or System Operators shall take actions up to and including the interruption of firm customer load to alleviate an emergency condition in accordance with OP-19, ISO New England Operating Procedure No. 4 - Action During a Capacity Deficiency (OP-4) and ISO New England Operating Procedure No.7 - Action in an Emergency (OP-7) criteria.

NOTE

Manual DDP entries affect ex-post pricing and should be immediately removed when no longer needed and cannot be used for greater than 15 minutes unless system reliability dictates otherwise.

Depending on conditions, such as a loss of a large Generator, Generators/DARDs may be responding to the contingency by the use of contingency SPD.

Generator/DARD DDP MW values change to magenta color for manually entered Comm. DDP values.

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NOTE

Generators/DARDs in Unit Control Mode 3 (UCM 3) may be dispatched if necessary to alleviate emergency conditions.


ILC limits that are violated (Noted in red) are possible SOL and/or IROL violations and must be corrected within 30 minutes. When an ILC limit turns red, a pop up clock will be initiated to provide the System Operator with the elapsed time for the violation. When violations exceed 30 minutes, the Operation Shift Supervisor and Operations management are sent an automatic page notification.

2. The Operations Shift Supervisor and Senior System Operator shall resolve any inadequate reserve problems resulting from the transmission contingency by committing additional Generators as necessary in accordance with SOP-RTMKTS.0050.0010- Perform Reserve Adequacy Run.
3. If the review of transmission system conditions results in inadequate reserves while taking into account the risks involved with the transmission contingency, the Senior System Operator shall report the need for remedial actions to the Operations Shift Supervisor.
4. If taking the actions of M/LCC 2 is being considered, the Operations Shift Supervisor shall refer to SOP-RTMKTS.0120.0010 - Implement Operations During Abnormal Conditions.
5. If an IROL violation has occurred, the Operations Shift Supervisor shall refer to SOP- RTMKTS.0125.0020 - Communicate With Internal and External Parties.

NOTE

Some mandatory reporting is required in 1 hour or less.

6. If a SOL violation occurs, the Operations Shift Supervisor shall log the event in the Control Room Logserver and include details describing the event and actions taken per SOP-RTMKTS.0125.0040 - Update Control Room Logs.
7. The Operations Shift Supervisor shall provide a brief summary of the event to the Manager, Control Room Operations for reporting and auditing purposes.


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NOTE

When an ILC limit turns red and exceeds 30 minutes:

- The Director, Operations and Manager, Control Room Operations will be paged.
- The Manager, Control Room Operations (or designee) is responsible for recording the data, compiling the reports and making those reports available for audits including the record keeping for NERC or NPCC audits.

8. When the conditions causing a potential or actual violation of OP-19 criteria or other security constraint has been corrected, the Security Operator shall continue to perform the directed actions required by SOP-RTMKTS.0060.0020 - Monitor System Security.

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5.3 Communications

1. When there is a transmission problem, the Security Operator shall:
 - A. Inform the Loader Operator/Generator Operator of Generators/DARDs to be manually dispatched due to a transmission problem
 - B. Notify Control Room personnel
 - C. Make a corresponding log entry in the Control Room Logserver per SOP-RTMKT.S.0125.0040 - Update Control Room Logs.
2. The Security Operator shall notify Control Room personnel when a constraint has been activated in CLOGGER.
3. The Security Operator shall inform the applicable LCC Operator of corrective actions taken for security problems in a local area.


NOTE

Whenever a contingency event occurs that would have caused instability, uncontrolled separation, or cascading outages that would adversely impact the reliability of the bulk power transmission system (i.e., would have an Inter-Area impact outside of the New England Area following next contingency), that contingency event will be classified as an IROL violation.

4. When any SOL or IROL violation has lasted for more than 30 minutes, the Operations Shift Supervisor shall:
 - A. Notify the Manager, Control Room Operations
 - B. Make a Control Room log entry per SOP-RTMKT.S.0125.0040 - Update Control Room Logs noting the details of the SOL or IROL event including the time and the reason for its occurrence.
5. Whenever Control Room Management and Operations Support Services staff determines an event classified as an IROL violation has occurred:
 - A. The Manager, Control Room Operations (or designee) shall report this IROL violation in accordance with NERC Reliability Standard TOP-007 - Reporting SOL and IROL Violations and NERC Reliability Standard EOP-004 - Disturbance Reporting.

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- B. The Operations Shift Supervisor shall perform any necessary Reliability Coordinator Information System (RCIS), NERC and DOE notifications per SOP-RTMKTS.0125.0020 - Communicate With Internal and External Parties.

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6. Performance Measures

This procedure is deemed to be properly followed as evidenced by the following:

All SOL and IROL violations are mitigated

7. References

NERC Reliability Standard EOP-004- Disturbance Reporting

NERC Reliability Standard TOP-007- Reporting SOL and IROL Violations

ISO New England Inc. FERC Electric Tariff No. 3 Section III - Market Rule 1 - Standard Market Design

ISO New England Operating Procedure No. 4 – Action During a Capacity Deficiency (OP-4)

ISO New England Operating Procedure No.7 – Action in an Emergency (OP-7)

ISO New England Operating Procedure No. 9 – Scheduling and Dispatch of External Contracts (OP-9)

ISO New England Operating Procedure No.12 – Voltage and Reactive Control

Master Local Control Center Procedure No. 2 – Abnormal Conditions Alert (M/LCC 2)

ISO New England Operating Procedure – No. 19 – Transmission Operations (OP-19)

SOP-RTMKTS.0050.0010- Perform Reserve Adequacy Run

SOP-RTMKTS.0060.0020 - Monitor System Security


SOP-RTMKTS.0090.0010 - Schedule Next-Hour External Transactions

SOP-RTMKTS.0100.0010 - Curtail External Transactions

SOP-RTMKTS.0120.0010 - Implement Operations During Abnormal Conditions


SOP- RTMKTS.0125.0020 - Communicate With Internal and External Parties

SOP-RTMTKS.0125.0040 - Update Control Room Logs

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8. Revision History

Rev. No.	Date	Reason	Contact
0	2/12/03	Initial procedure for SMD	Don Gates
1	4/16/03	Revised for reporting requirements	Don Gates
2	7/23/03	Provide additional guidance on the use of the Reserve Flags	Don Gates
3	9/13/03	Added guidance on the use of manual DDPs when in use for transmission emergencies	Don Gates
4	10/10/03	Added guidance on the fact that NERC needs to be notified of OSL violations	Don Gates
5	10/22/03	Added guidance on how to handle external ties during a transmission constraint and added changes to incorporate revised NERC Policy 5F	Don Gates
6	11/16/03	Modified Controls and Performance Measures to align with ISO 9001 standards	Don Gates
7	11/14/03	Added guidance on OSL violations	Don Gates
8	12/16/03	Added specific ways to relieve transmission problems	Don Gates
9	4/22/04	Changed NERC reporting time from 72 to 24 hours per NERC	Don Gates
10	9/27/04	Added additional guidance for new software dealing with manual DDPs	Don Gates
11	10/20/04	Deleted additional guidance for new software dealing with manual DDPs recently made because software found defective	Don Gates
12	02/01/05	Updated SOP to RTO terminology	Steve Weaver
13	03/29/05	Update to NERC Version 0 Standard	Steve Weaver
14	07/31/06	Revised SOP title referenced in this SOP	Steve Weaver
15	09/28/06	Revised for ASM Phase 2	Steve Weaver
16	12/20/07	Minor clerical changes made to reference documents and defined terms	Steve Weaver
17	03/17/09	Periodic review, deleted redundant steps contained in other SOPs, added the SOP reference in their place	Steve Weaver
18	06/01/10	Biennial review by procedure owner; Global made editorial changes to improve clarity, improve grammar punctuation, format, etc.; Through out document procedure and terminology updates for FCM/DRI conformance; 5.2 changed to include consideration of RTDR during localOP-4 prior to reducing "CT Backed EXP" for FCM/DRI compliance	Steve Weaver
19	08/09/10	Relocated NOTE from prior to Step 5.2.E.(1) to before sub-step 5.2.E.(1).a.ii.; Modified sub-steps 5.2.E.(1).a.ii. & 5.2.E.(1).a.ii.a)	Steve Weaver

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