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|  | © ISO New England Inc. 2003           | <b>Procedure: Perform Complex Studies</b> |
|   | Process Name: Perform Complex Studies |   |
|   | Procedure Number: OUTSCH.0050.0020    | Revision Number: 6                        |
|   | Procedure Owner: Ed Rappold           | Effective Date: October 1, 2006           |
|   | Approved By: VP Operations            | Review Due Date: October 1, 2007          |

# SOP-OUTSCH.0050.0020


## Perform Complex Studies

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## 1. Objective

The objective of this procedure is to perform a special complex study of the power system. This procedure documents the responsibilities of ISO New England (ISO) staff.

Compliance with this procedure is necessary to ensure the reliable operation of the power system in accordance with ISO New England Operating Procedure No. 3 – Transmission Outage Scheduling (OP-3), ISO New England Operating Procedure No. 5 – Generator and Dispatchable Asset Related Demand Maintenance and Outage Scheduling (OP-5), and ISO New England Operating Procedure No. 19 – Transmission Operations (OP-19). This procedure does not in any way change the intent of OP-3, OP-5, or OP-19 but rather is intended to clarify some of the responsibilities delegated to ISO staff by those procedures. This procedure also supports the cost-effective operation of the power system. This procedure can affect Market operation and settlement.


## 2. Background

Many things including system demand, generation and transmission outages, generation and load patterns, new facilities, and unusual operating configurations can affect the reliability of the power system. These same issues can also affect the cost-effective operation of the power system.

Operating guides and thermal analysis of the power system adequately address a broad range of operating conditions. However, when actual or planned operating conditions are determined to potentially exceed the capability of operating guides and thermal analysis, a special complex study should be performed. The need to perform a complex study is determined in accordance with SOP-OUTSCH.0050.0010 - Determine Study Requirements. This procedure describes how a complex study is performed.

## 3. Responsibilities

1. The assigned Operations Support staff person is responsible for executing this procedure.

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## 4. Controls

- ISO personnel performing a special complex study of the power system shall be authorized by the Manager, Transmission Operations Planning

## 5. Instructions


### 5.1 Notification and Response Time

1. The assigned staff person shall perform this procedure when requested by the Manager, Transmission Operations Planning or their designee in accordance with SOP-OUTSCH.0050.0010 - Determine Study Requirements.
2. The assigned staff person shall perform the complex study:
  - A. In the case of an actual operating condition, as soon as possible.
  - B. In the case of a planned condition, in a timely manner that permits ISO to meet its various overall timing requirements.

### 5.2 Conducting a Complex Study

#### 5.2.1 Review Relevant Information


1. Review the ISO New England Outage Application Summary Report and/or other relevant documentation.
2. Determine anticipated system conditions during the study period:
  - A. System configuration.
  - B. Generation pattern.
  - C. System demand.
3. Consider the following:
  - A. Relevant existing operating guides and their applicability under the study conditions.
  - B. The results of previous studies.
  - C. The extent to which the actual or planned conditions are non-typical.
  - D. Unusual or unmodeled contingencies.

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- E. The potential for abnormal voltage or voltage collapse.
- F. The potential for instability or oscillatory behavior.
- G. The potential for system protection problems.
- H. The potential for overstressing equipment due to excessive fault current duty.
- I. The needs of nuclear power plants.

### 5.2.2 Perform Complex Study


1. Determine the studies and analyses necessary to ensure that the power system can be reliably operated in accordance with the criteria set forth in OP -19, giving consideration to the following:
  - Load flow analysis
  - Contingency analysis
  - Transient stability study
  - Special protective study
  - Voltage/reactive study
  - Control system transient performance study
  - Short circuit and equipment duty study
2. Appropriately model anticipated conditions during the study period.
3. Perform the studies determined to be appropriate in Section 5.2.2.1 utilizing the appropriate guides and tools including:
  - Power System Simulator for Engineers (PSS/E)
  - EMS Powerflow
  - EMS Interface Limits Calculator (ILC)
  - Study Contingency Analysis (STCA)
4. Determine any new or special interface limits.
5. If requested, have an economic analysis performed by the Operations Coordinators.

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### 5.3 Reporting Results

1. If appropriate, notify the Short-Term Outage Specialist designated D1 to:
  - A. Prepare an updated Generators Required for Transmission (GRT) spreadsheet to include updated limits resulting from the complex Study and an explanation for the new limits.
  - B. Provide a printed copy of the updated GRT to the Security Operator along with explanation for the new limits.
  - C. Update the GRT on the RTSMDB Server and email the changes using the 'GRT' email group listing in Outlook.
2. Prepare as appropriate:
  - A. A new operating guide in accordance with the Develop, Revise & Control Transmission Operating Guides process.
  - B. An interim operating guide in accordance with the Develop, Revise & Control Transmission Operating Guides process.
  - C. A memo providing system operation guidance under the studied conditions.
  - D. Standing Instructions, which provides system operating guidance until terminated by Operations Support staff.
3. If study pertains to a transmission application (such as non-standard, pre-contingency breaker openings), then perform the following:
  - A. Complete Attachment A – Non-Standard Transmission Application Instructions and obtain required signatures.
  - B. Have the Short-Term Outage Coordinator enter a notation in the 'Notes to Participant' data field in the Outage Scheduler software indicating a special study has been performed and that instructions are posted to the web.
  - C. Post the instructions to the appropriate monthly folder on the following web location:

[http://isoweb.iso-ne.com/satellite/transmission\\_procedures/Transmission%20Outage%20Information/](http://isoweb.iso-ne.com/satellite/transmission_procedures/Transmission%20Outage%20Information/)


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- D. Email notification of the special instructions pertaining to the transmission application to the following:
- OPER - all groups
  - Market Admin Grp
  - Appropriate external contacts (Local Control Centers, TO, etc.)
4. If study does not pertain to current operations, provide:
- A. GRT spreadsheet to the party requesting the study in addition to all parties which normally receive the GRT spreadsheet including Market Administration, Manager, Control Room Operations and the Forecasters.
- B. New or updated operating guide or memo to:
- (1) Party requesting the study.
  - (2) Control room.
5. Studied conditions resulting in changes to system operations should be reviewed on a periodic basis to determine if they are still pertinent. When studied conditions no longer apply then Operations Support shall notify appropriate parties including Operations and Market Administrators.
6. Studied conditions resulting in change to system operations shall be archived and retrievable.
7. Studies pertaining to a transmission application, which are no longer in effect, shall be archived in the appropriate Archive Folder, located on the ISO Intranet, by the Transmission Operations Planning group.

## 6. Performance Measures

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

- Goal for Corporate performance in CPS1, CPS2 and DCS (Disturbance Control Standard) compliance met

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## 7. References

SOP-OUTSCH.0050.0010 - Determine Study Requirements

ISO New England Operating Procedure No. 3 – Transmission Outage Scheduling (OP-3)

ISO New England Operating Procedure No. 5 – Generator and Dispatchable Asset Related Demand Maintenance and Outage Scheduling (OP-5)

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


Develop, Revise & Control Transmission Operating Guides

## 8. Revision History

| Rev. No. | Date     | Reason  | Contact        |
|----------|----------|---|----------------|
| A        | 05/24/02 | Initial draft procedure   |                |
| B        | 07/18/02 | Revised to incorporate sign off comments  |                |
| C        | 08/01/02 | Revised per Integration Testing   |                |
| 0        | 02/12/03 | Initial procedure for SMD   | Tom Dutkiewicz |
| 1        | 6/16/03  | Update procedure to current practice  | Tad Witowski   |
| 2        | 11/14/03 | Modified Controls and Performance Measures to align with ISO 9001 standards   | Tad Witowski   |
| 3        | 12/16/03 | Added Standing Instructions as communication method for Complex Studies and that Studies should be archived and retrievable | Tad Witowski   |
| 4        | 02/01/05 | Updated SOP for RTO terminology   | Tad Witowski   |
| 5        | 05/26/05 | Clarify process of communicating non standard transmission application studies  | Tad Witowski   |
| 6        | 09/20/06 | Revised for ASM Phase 2   | Ed Rappold     |

## 9. Attachments

Attachment A – Non-Standard Transmission Application Instructions

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**Attachment A – Non-Standard Transmission Application Instructions**

Date:

To:

From:

Subject: (Application # / Equipment)

Instructions:

*(Use additional pages if necessary)*

Acknowledgements:

ISO New England Transmission  
Operations Planning Engineer:

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ISO New England Control Room Shift  
Supervisor:

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ISO New England Forecast Office  
Representative:

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