




# System Operating Procedures

SOP-RTMKTS.0200.0020

Administer System Operator Initial Training  
Program

Effective Date: February 18, 2009  
Revision No. 6


	© <i>ISO New England Inc. 2007</i>	<i>Procedure: Administer System Operator Initial Training Program</i>
	<i>Process Name: Perform Operations Training</i>	
	<i>Procedure Number: RTMKTS.0200.0020</i>	<i>Revision Number: 6</i>
	<i>Procedure Owner: Cheryl Robinson</i>	<i>Effective Date: February 18, 2009</i>
	<i>Approved By: VP Operations</i>	<i>Valid Through: February 18, 2011</i>

# SOP-RTMKTS.0200.0020

## Administer System Operator Initial Training Program

### Contents

<b>1.</b>	<b>Objective .....</b>	<b>2</b>
<b>2.</b>	<b>Background .....</b>	<b>2</b>
<b>3.</b>	<b>Responsibilities.....</b>	<b>2</b>
<b>4.</b>	<b>Controls .....</b>	<b>4</b>
<b>5.</b>	<b>Instructions.....</b>	<b>4</b>
	5.1 System Operator Initial Training Program Goals and Objectives .....	4
	5.2 Program Description.....	5
	5.3 Program Outline .....	6
<b>6.</b>	<b>Performance Measures.....</b>	<b>7</b>
<b>7.</b>	<b>References.....</b>	<b>7</b>
<b>8.</b>	<b>Revision History.....</b>	<b>7</b>
<b>9.</b>	<b>Attachments .....</b>	<b>8</b>
	Attachment A – SOIT Program Outline .....	9
	Attachment B – ISO System Operator Training Record Manual (Confidential) .....	16

	© ISO New England Inc. 2007	<b>Procedure: Administer System Operator Initial Training Program</b>
	<b>Process Name: Perform Operations Training</b>	
	<b>Procedure Number: RTMKTS.0200.0020</b>	<b>Revision Number: 6</b>
	<b>Procedure Owner: Cheryl Robinson</b>	<b>Effective Date: February 18, 2009</b>
	<b>Approved By: VP Operations</b>	<b>Valid Through: February 18, 2011</b>

## 1. Objective

The objective of this procedure is to define and document the process the Operations Performance and Training group uses for administering the System Operator Initial Training (SOIT) program.

## 2. Background

The Operations Performance and Training group is responsible for providing training for Operations personnel. Training Coordinators and Subject Matter Experts (SME) provide Initial Training required by trainees (prospective System Operators) to qualify as Control Room System Operators.

The System Operator Initial Training (SOIT) program provides the initial training to System Operator candidates. The program is designed to meet the training needs identified by evaluation of the System Operator job, NERC, NPCC, ISO requirements and industry criteria.


The SOIT program is designed for trainees who enter the program having met the hiring prerequisites as described in the System Operator job description.

The Operations Performance and Training group shall track trainee progress and ensure that it is documented in SOIT Manual.


The SOIT program is developed and executed in accordance with NERC Standards, Northeast Power Coordinating Council Inc. (NPCC) documentation, and ISO policy and procedures.

## 3. Responsibilities

1. The Manager, Operations Performance and Training is responsible for the oversight of the training program and is responsible for:
  - A. Providing leadership for the training personnel to effectively plan, develop, organize coordinate, evaluate and deliver training for the SOIT program.
  - B. Providing day-to day supervision of the following during the SOIT program:
    - Training Coordinator(s)
    - SME(s)
    - Senior Testing and Training Simulator Environment (TTSE) Coordinator(s)

	© <b>ISO New England Inc. 2007</b>	<b>Procedure: Administer System Operator Initial Training Program</b>
	<b>Process Name: Perform Operations Training</b>	
	<b>Procedure Number: RTMKTS.0200.0020</b>	<b>Revision Number: 6</b>
	<b>Procedure Owner: Cheryl Robinson</b>	<b>Effective Date: February 18, 2009</b>
	<b>Approved By: VP Operations</b>	<b>Valid Through: February 18, 2011</b>

- C. Reviewing SOIT program training development plans.
  - D. Establishing the responsibilities for Training Coordinators.
2. The Training Coordinators are responsible for:
  - A. Coordinating, scheduling and delivering the day-to-day training session.
  - B. Developing training for ISO System Operator trainees.
  - C. Maintaining records for trainees.
  - D. Maintaining resources (presentations) used for training.
3. The TTSE Coordinator(s) (or designee) is responsible for:
  - A. Maintaining the TTSE availability for the SOIT program.
  - B. Running the TTSE during training sessions.
  - C. Developing and delivering training using the TTSE for the SOIT program.
4. System Operators shall be responsible for providing On-The Job (OJT) training to the trainees.
5. Other ISO staff may be designated as Subject Matter Experts (SME) to develop and present SOIT as authorized by Director of Operations or the Manager, Operations Performance and Training (or designees).
6. System Operator trainees shall be responsible for attending the provided training and completing requirements set forth in this procedure.
7. Manager, Control Room Operations, Representative of Operations Performance and Training and/or Operations Shift Supervisor are responsible for conducting a proficiency assessment for each System Operator trainee periodically throughout the initial training and at the end of the OJT.

	© <i>ISO New England Inc. 2007</i>	<b>Procedure: Administer System Operator Initial Training Program</b>
	<b>Process Name: Perform Operations Training</b>	
	<b>Procedure Number: RTMKTS.0200.0020</b>	<b>Revision Number: 6</b>
	<b>Procedure Owner: Cheryl Robinson</b>	<b>Effective Date: February 18, 2009</b>
	<b>Approved By: VP Operations</b>	<b>Valid Through: February 18, 2011</b>


## 4. Controls

- The TTSE shall only be operated by qualified personnel
- Operations Performance and Training personnel or Subject Matter Experts shall provide designated training

## 5. Instructions


### 5.1 System Operator Initial Training Program Goals and Objectives

1. The SOIT program goal is to ensure that System Operator candidates are trained to safely, reliably, efficiently and competently operate the bulk power system of New England. This includes:
  - Reliable and economic dispatch of generation
  - Reliable analysis of system security
  - Knowledge of policies, procedures and guidelines
2. The Training Coordinators for the SOIT program shall ensure System Operator trainees understand that they can implement real-time actions only under the authority and direction of a qualified NERC Certified System Operator.
3. The SOIT program is designed to meet the following objectives:
  - Provide a sequence of training that builds on previous learning
  - Provide a personal record of each trainee's learning progress
  - Obtain consistency in training and provide guidance for the assessment of skills and knowledge
4. The SOIT program shall provide at least 6 months of training to prepare the trainees for independent operation of the bulk power system as a NERC Certified System Operator at the Reliability Authority level.
5. Course development, training delivery and record maintenance for the SOIT program shall be conducted in accordance with SOP-RTMKTS.0200.0010 – Administer Operations Training where not described specifically in this procedure.

	© ISO New England Inc. 2007	<b>Procedure: Administer System Operator Initial Training Program</b>
	<b>Process Name: Perform Operations Training</b>	
	<b>Procedure Number: RTMKTS.0200.0020</b>	<b>Revision Number: 6</b>
	<b>Procedure Owner: Cheryl Robinson</b>	<b>Effective Date: February 18, 2009</b>
	<b>Approved By: VP Operations</b>	<b>Valid Through: February 18, 2011</b>

## 5.2 Program Description


1. The SOIT program shall consist of two distinct parts, an Indoctrination Training Sequence and a System Operator Core Training Sequence.
2. The SOIT program shall provide a Training Record Manual which contains the following:
  - A System Operator Training Flow Chart and Progress Checklist which consists of the following:
    - A training overview, which contains a pictorial representation of the main branches and constituent parts of System Operator training programs
    - A training sequence and content which contains SOIT program sequence maps (flow charts) showing the sequence and content of the indoctrination training and the sequence, setting and content for the three System Operator training functions (Generation Desk, Load Desk and Security Desk)
    - A training checklist which documents progress of the trainee in completing the training required on core subjects, along with the training and OJT required for Generation Desk, Load Desk and Security Desk
  - A System Operator on-shift, On-The-Job (OJT) objectives and task list. This part of the Manual shall:
    - Outline the OJT portion of the SOIT program, which corresponds to the three operator positions in the Control Room
    - Outline the selected functions of the three Control Room positions and the steps required to perform these selected functions
    - Catalogue the trainee's progress and provide the on shift System Operator with a guide to perform selected functions
3. The Manager, Operations Performance and Training shall retain both sections of the completed Training Record Manual in a controlled location, as a record showing the trainee's completion of the System Operator Initial Training program.

	© ISO New England Inc. 2007	<b>Procedure: Administer System Operator Initial Training Program</b>
	<b>Process Name: Perform Operations Training</b>	
	<b>Procedure Number: RTMKTS.0200.0020</b>	<b>Revision Number: 6</b>
	<b>Procedure Owner: Cheryl Robinson</b>	<b>Effective Date: February 18, 2009</b>
	<b>Approved By: VP Operations</b>	<b>Valid Through: February 18, 2011</b>

4. The Testing and Training Simulator Environment (TTSE) shall be used to provide an environment to practice operational aspects of the System Operator position.
5. The TTSE shall be used to evaluate system conditions during normal and contingency conditions.
6. The TTSE shall be used to direct appropriate actions to evaluate and stabilize the transmissions system by using the following:
  - Energy Management System (EMS) alarms and indications
  - SCADA readings, including alarm conditions
  - Real-Time Network (RTNET) and Real-Time Contingency Analysis (RTCA)
  - PowerFlow and Study Time Contingency Analysis (STCA) Study Tools
  - Unit Dispatch System
7. When applicable the SOIT program shall provide and participate in off-site training consistent with above stated goals.

### 5.3 Program Outline

1. The System Operator Initial Training program shall meet the outline described in Attachment A – SOIT Program Outline.
2. Each System Operator trainee shall participate in at least two, six-week rotations of on-shift, OJT watchstanding.
3. The System Operator trainee shall perform on-shift OJT watchstanding, learning from qualified System Operators the associated System Operator duties and responsibilities required for the position while completing the OJT Guide.
4. The System Operator trainee shall perform, simulate and or discuss the training elements with a qualified System Operator or Trainer.
5. For procedure training the System Operator trainee shall:
  - A. Read through the procedure prior to discussing with a Training Coordinator or qualified System Operator.
  - B. Demonstrate the ability to use the procedure with a Training Coordinator or qualified System Operator.

	© ISO New England Inc. 2007	<b>Procedure: Administer System Operator Initial Training Program</b>
	<b>Process Name: Perform Operations Training</b>	
	<b>Procedure Number: RTMKTS.0200.0020</b>	<b>Revision Number: 6</b>
	<b>Procedure Owner: Cheryl Robinson</b>	<b>Effective Date: February 18, 2009</b>
	<b>Approved By: VP Operations</b>	<b>Valid Through: February 18, 2011</b>

6. When the System Operator trainee has demonstrated the knowledge necessary for the training element, the qualified System Operator or Trainer shall initial and date the training checklist.
7. The Operations Shift Supervisor, Manager, Operations Performance and Training and/or Manager, Control Room Operations shall conduct a proficiency assessment for each System Operator Trainee at the end of the SOIT OJT.

## 6. Performance Measures


- The System Operators shall receive a minimum of 6 months of SOIT
- The Training Record Manual shall be complete (unless certain proficiency has already been demonstrated through experience or performance) prior to the System Operator trainee being qualified to stand watch as a System Operator

## 7. References

SOP-RTMKTS.0200.0010 – Administer Operations Training

## 8. Revision History


Rev. No.	Date	Reason	Contact
Original	03/30/05	Original	Jerry Elliott
1	03/06/06	Revised for annual review and aligned to current organization	Jerry Elliott
2	07/27/06	Revised reference title for SOP	Jerry Elliott
3	02/02/07	Revised for clarity as a result of annual review	Jerry Elliott
4	09/14/07	Added additional training information to be reviewed	Jerry Elliott
5	12/17/07	Clerical changes to update training reference materials	Jerry Elliott
6	02/18/09	Periodic review by Procedure Owner; Global changes to reflect organizational change; Modified steps 5.2.3, 5.3.5.A, & 5.3.4B; Modified Attachment A	Cheryl Robinson

	© <i>ISO New England Inc. 2007</i>	<b><i>Procedure: Administer System Operator Initial Training Program</i></b>
	<b><i>Process Name: Perform Operations Training</i></b>	
	<b><i>Procedure Number: RTMKTS.0200.0020</i></b>	<b><i>Revision Number: 6</i></b>
	<b><i>Procedure Owner: Cheryl Robinson</i></b>	<b><i>Effective Date: February 18, 2009</i></b>
	<b><i>Approved By: VP Operations</i></b>	<b><i>Valid Through: February 18, 2011</i></b>

## 9. Attachments

Attachment A – SOIT Program Outline

Attachment B – ISO System Operator Training Record Manual

	© ISO New England Inc. 2007	<b>Procedure: Administer System Operator Initial Training Program</b>
	<b>Process Name: Perform Operations Training</b>	
	<b>Procedure Number: RTMKTS.0200.0020</b>	<b>Revision Number: 6</b>
	<b>Procedure Owner: Cheryl Robinson</b>	<b>Effective Date: February 18, 2009</b>
	<b>Approved By: VP Operations</b>	<b>Valid Through: February 18, 2011</b>

## Attachment A – SOIT Program Outline

### 1.0 ISO New Hire Orientation

#### 1.1.1 Tour of Sullivan Road Facilities

- Building Layout
- Building Facilities
- Building Security
- Control Room
- Access Rights Application
- Apply for O/S Certification
- ISO Intranet

#### 1.1.2 ISO Organizational Overview

- ISO Overview
- Organization Structure

#### 1.1.3 Industry Overview

- Electricity Market
- Legislation (Review FERC Orders 888, 889, 2000)


### 2.0 System Operator Core Training Sequence

#### 2.1.1 Power Fundamentals Training Sequence

- Introduction / Review
- Power Transmission
- System Voltage Control
- Frequency & Tie-Line Control
- Power Dispatch

#### 2.1.2 ASOC Computer Based Training (CBT)

- Energy Management System (EMS) Applications
- Voltage & Vars
- Powerflow
- System Frequency
- Resource Scheduling
- Automatic Generation Control
- Power System Monitoring & Control

	© <b>ISO New England Inc. 2007</b>	<b>Procedure: Administer System Operator Initial Training Program</b>
	<b>Process Name: Perform Operations Training</b>	
	<b>Procedure Number: RTMKTS.0200.0020</b>	<b>Revision Number: 6</b>
	<b>Procedure Owner: Cheryl Robinson</b>	<b>Effective Date: February 18, 2009</b>
	<b>Approved By: VP Operations</b>	<b>Valid Through: February 18, 2011</b>

- Voltage Dynamics & Control
- Frequency Dynamics & Control
- Power System Restoration

### 3.0 Generation Desk Training Sequence

#### 3.1.1 Power System Operation Text (self-study)

- Chapter #1, Basic Principles
- Chapter #2, Production and Transfer of Energy
- Chapter #5, Power System Control
- Chapter #9, SCADA

#### 3.1.2 SCADA Basics

- Software
- Man Machine Interface (MMI)
- Alarms
- Inter Control-Center Communications Protocol (ICCP)
- System Diagram Electronic Wall Board

#### 3.1.3 System Operator Responsibility and Authority


- System Operator Job Description

#### 3.1.4 Introduction to Electrical Markets

- Markets Support Training
- ISO New England Manual M-35 (Make aware of location for market terminology and abbreviations)
- NPCC A-7 (Make aware of location for bulk power system terminology and abbreviations)

#### 3.1.5 ISO Operating Procedures

- OP-1
- OP-2
- OP-5
- OP-11
- OP-14
- OP-18

	© <b>ISO New England Inc. 2007</b>	<b>Procedure: Administer System Operator Initial Training Program</b>
	<b>Process Name: Perform Operations Training</b>	
	<b>Procedure Number: RTMKTS.0200.0020</b>	<b>Revision Number: 6</b>
	<b>Procedure Owner: Cheryl Robinson</b>	<b>Effective Date: February 18, 2009</b>
	<b>Approved By: VP Operations</b>	<b>Valid Through: February 18, 2011</b>

### 3.1.6 Master Local Control Center Procedures

- #4
- #8
- #9

### 3.1.7 Applicable System Operations Procedures

## 3.2 Generation Desk TTSE Training / OJT Sequence

### 3.2.1 UDS/DMT Displays

- DMT Unit Status / Demand Status
- DMT Unit Limits / Demand Limits
- DMT Regulation Limits
- DMT Unit Details / Demand Details
- DMT SPD Delta

### 3.2.2 OIS Displays and other Systems & Applications


- Operator Logs 1 through 9
- Unit Redeclaration Hour 24
- Emergency Notification System (ENS)
- IPC Telephone Console
- ICU Auto Call

### 3.2.3 EMS Displays

- Markets Generation Unit Status Display
- System Summary

### 3.2.4 Internet Displays

- Control Room Electronic Log
- Log Server Actual Hourly Interchange Logs

	© <b>ISO New England Inc. 2007</b>	<b>Procedure: Administer System Operator Initial Training Program</b>
	<b>Process Name: Perform Operations Training</b>	
	<b>Procedure Number: RTMKTS.0200.0020</b>	<b>Revision Number: 6</b>
	<b>Procedure Owner: Cheryl Robinson</b>	<b>Effective Date: February 18, 2009</b>
	<b>Approved By: VP Operations</b>	<b>Valid Through: February 18, 2011</b>

#### 4.0 Load Desk Training Sequence

##### 4.1.1 ISO Operating Procedures

- OP-4
- OP-7
- OP-8
- OP-9
- OP-17
- OP-10
- OP-15
- OP-20
- OP-21

##### 4.1.2 Master Local Control Center Procedures

- #2
- #6

##### 4.1.3 Applicable System Operations Procedures

#### 5.0 Load Desk TTSE OJT Sequence

##### 5.1.1 Other Systems and Applications


- PCEC

##### 5.1.2 UDS/DMT Displays

- SPD Summary
- Scheduling
- Regulation
- Unit Details / Demand Details
- Unit Status / Demand Status
- RT Generation UDS
- UDS Solution Data

##### 5.1.3 OIS Displays

- Destacker to Emergency Min
- Destacker to Energy Min
- Energy Supply Time Curve
- Unit Commitment
- Unit Commitment by Unit
- RIG messages

	© <b>ISO New England Inc. 2007</b>	<b>Procedure: Administer System Operator Initial Training Program</b>
	<b>Process Name: Perform Operations Training</b>	
	<b>Procedure Number: RTMKTS.0200.0020</b>	<b>Revision Number: 6</b>
	<b>Procedure Owner: Cheryl Robinson</b>	<b>Effective Date: February 18, 2009</b>
	<b>Approved By: VP Operations</b>	<b>Valid Through: February 18, 2011</b>

#### 5.1.4 Power System Operation

- Chapter #6, Energy Accounting in Interconnected Operations
- Chapter #10, Power system Reliability Factors

### 5.2 Security Desk Training (OJT) Sequence

#### 5.2.1 ISO Operating Procedures

- OP-3
- OP-6
- OP-12
- OP-13
- OP-16
- OP-19


#### 5.2.2 Master Local Control Center Procedures

- #5
- #1
- #3
- #7
- #10
- #11
- #12
- #13
- #14

#### 5.2.3 Power System Operation (Self-study)

- Chapter #13, VAR Flows
- Chapter #11, Power System Protection
- Chapter #12, Power System Stability
- Chapter #13, EHV Operation

#### 5.2.4 Applicable System Operations Procedures

	© <b>ISO New England Inc. 2007</b>	<b>Procedure: Administer System Operator Initial Training Program</b>
	<b>Process Name: Perform Operations Training</b>	
	<b>Procedure Number: RTMKTS.0200.0020</b>	<b>Revision Number: 6</b>
	<b>Procedure Owner: Cheryl Robinson</b>	<b>Effective Date: February 18, 2009</b>
	<b>Approved By: VP Operations</b>	<b>Valid Through: February 18, 2011</b>

### 5.2.5 ISO Transmission Operating Guides (TOGs) and Text Documents

- Northern New England High Voltage Guide
- Northern New England Low Voltage Guide
- Northern Vermont Interface (NVI) Limit Guide
- Eastern Massachusetts and Rhode Island Low Voltage Guide
- Boston Import Area Operations Planning Guide and Operations Guide
- Orrington Capacitor Bank Control Operating Guide
- C-042 Common Operating Instructions for the Phase II Facilities
- CONVEX Forecasting Operating Guide

### 5.3 Security Desk TTSE Training / OJT Sequence

#### 5.3.1 Security Calculations


- Distribution Factor Calculation of Single, double and Multiple Terminal Contingencies
- Adjustment Factor Calculation

#### 5.3.2 ISO Transmission Operating Guides (TOGs)

- TOG Files
- Special Protection Systems (SPS) Document

#### 5.3.3 EMS Displays

- RTNET
- Topology
- Measurements
- CLOGGER
- EMS Out
- PowerFlow
- Contingency Analysis
- Interface Limits Calculation (ILC)
- DOUBLC
- Interconnection Monitor (ICM)

	© <b>ISO New England Inc. 2007</b>	<b>Procedure: Administer System Operator Initial Training Program</b>
	<b>Process Name: Perform Operations Training</b>	
	<b>Procedure Number: RTMKTS.0200.0020</b>	<b>Revision Number: 6</b>
	<b>Procedure Owner: Cheryl Robinson</b>	<b>Effective Date: February 18, 2009</b>
	<b>Approved By: VP Operations</b>	<b>Valid Through: February 18, 2011</b>

#### 5.3.4 Internet and UDS Displays

- LTS2005 Lightning Detection Application
- Voltage Summary Displays
- Demand Response
- Internet Based Communication System Open Solution (IBCS-OS)
- Satellite Web page
- Meteorlogix Weather Application
- RT Generation UDS

#### 5.4 On-shift Control Room OJT Sequence

##### 5.4.1 Generation Desk

- Generation Desk Objectives
- Generation Desk OJT Objective Tasks
- On-shift Generation Desk Training

##### 5.4.2 Load Desk


- Load Desk Objectives
- Load Desk OJT Objective Tasks
- On-shift Load Desk Training

##### 5.4.3 Transmission Desk

- Transmission Desk Objectives
- Transmission Desk OJT Objective Tasks
- ON-shift Transmission Desk Training

##### 5.4.4 End of SOIT On-shift as System Operator

- Proficiency Review by Manager, Control Room Operations, Representative of Operations Performance and Training and /or Operations Shift Supervisor

	© <i>ISO New England Inc. 2007</i>	<i>Procedure: Administer System Operator Initial Training Program</i>
	<i>Process Name: Perform Operations Training</i>	
	<i>Procedure Number: RTMKTS.0200.0020</i>	<i>Revision Number: 6</i>
	<i>Procedure Owner: Cheryl Robinson</i>	<i>Effective Date: February 18, 2009</i>
	<i>Approved By: VP Operations</i>	<i>Valid Through: February 18, 2011</i>

**Attachment B – ISO System Operator Training Record Manual (Confidential)**

**Confidential**

To access this manual contact the Operations Performance and Training Department.