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## Operating Reserve Criteria

Adopted by the Members of the Northeast Power Coordinating Council March 30, 1972, based on recommendation by the Operating Procedure Coordinating Committee and the System Design Coordinating Committee, in accordance with paragraph IV, subheading (a), of NPCC's *Memorandum of Agreement* dated January 19, 1966 as amended to date.

Revised:	September 24, 1976
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## 1.0 Purpose

In the continuous operation of electric power systems, **operating capacity** is required to meet forecast load, including an allowance for error, to provide protection against equipment failure which has a reasonably high probability of occurrence, and to provide adequate regulation of frequency and **tie line** power flow. The **operating capacity** in excess of that required for actual load is commonly referred to as **operating reserve**.

This document establishes standard terminology and minimum requirements governing the amount, availability, distribution, and shared activation of **operating reserve**.

The objective is to ensure a high level of **reliability** in the NPCC Region that is, as a minimum, consistent with the Operating Policies and Standards specified by the North American Electric Reliability Council (NERC).

## 2.0 Definitions

Please refer to the *NPCC Glossary of Terms* (NPCC Document A-07). Terms found in the Glossary are bolded here.

## 3.0 Minimum Requirements

### 3.1 Ten-Minute Reserve Requirement

The **ten-minute reserve** available to each **Area** shall at least equal **its first contingency loss** multiplied by the **Contingency Reserve Adjustment Factor** for the most recently completed quarter. **Ten-minute reserve** shall be sustainable as specified in section 3.7 below.

Each **Area** shall restore its **ten-minute reserve** within 105 minutes if it becomes deficient as a result of a contingency that is a **reportable event**, as defined in NPCC Document C-09, *Monitoring Procedures For Operating Reserve Criteria*. Each **Area** shall restore its **ten-minute reserve** as soon as possible, and within 90 minutes if it becomes deficient and the deficiency is not a result of a contingency that is a **reportable event**. If an **Area** foresees that it cannot restore its **ten-minute reserve** within the times specified above, or extends beyond these times during operations, a NERC Energy Emergency Alert of the appropriate level shall be declared. This requirement shall be maintained at all times, except as noted in NPCC Document C-19, *Procedures During Shortages of Operating Reserve*.

### 3.2 Thirty-Minute Reserve Requirement

The **thirty-minute reserve** available to each **Area** shall at least equal one-half its **second contingency loss**. **Thirty-minute reserve** shall be sustainable as specified in section 3.7 below.

Each **Area** shall restore its **thirty-minute reserve** within four hours if it becomes deficient. If an **Area** forecasts a deficiency in **thirty-minute reserve** for more than four hours into the future, the **Area** shall take corrective actions to eliminate the deficiency. This requirement shall be maintained at all times, except as noted in NPCC Document C-19, *Procedures During Shortages of Operating Reserve*.

### 3.3 Regulating Reserve Requirement

The **reserve** on **Automatic Generation Control** in each **Area** shall be sufficient to meet NERC control performance standards CPS1 and CPS2.

Except during significant frequency excursions as provided in NPCC Document A-3, *Emergency Operation Criteria*, **automatic generation control** equipment shall remain in service at all possible times to provide immediate response to sudden load changes or loss of generating equipment.

### 3.4 Synchronized Reserve Requirement

100 percent of an **Area's ten-minute reserve** requirement shall be **synchronized reserve** except as described below. An **Area** shall adjust its **synchronized reserve** requirement based on its ability to recover from **reportable events** within fifteen minutes.

This **synchronized reserve** requirement may be decreased to a minimum of 25 percent of the **ten-minute reserve** requirement based upon the **Area's** past performance in returning its **Area Control Error (ACE)** to precontingency values, or to zero, within fifteen minutes following loss of **resource**, in accordance with the following relationship:

The **synchronized reserve** requirement shall be decreased by 10 percent of the ten-minute requirement for every time a **control area** successfully returns its ACE to precontingency values, or to zero, following a **reportable event** where the **resource** loss is equal to or less than the magnitude of the **first contingency loss**. Successful recoveries that occur in the same month as a failure shall not be counted that month towards a reduced **synchronized reserve** requirement. However, successful recoveries subsequent to a failure can be counted in the next month provided there are no failures in that month.

The **synchronized reserve** requirement shall increase by 20 percent of the **ten-minute reserve** requirement for every time a **control area** fails to return its ACE to precontingency values or to zero within fifteen minutes following a **reportable event** where the **resource** loss is equal to or less than the magnitude of the **first contingency loss**. The maximum

**synchronized reserve** requirement shall be 100 percent of the **Area's ten-minute reserve** requirement.

Changes in **synchronized reserve** requirement shall be calculated at the end of each month and shall be applied at the beginning of the next month.

3.5 Compliance with NERC Disturbance Control Standard (DCS)

**Areas** within NPCC shall calculate and report compliance with the Disturbance Control Standard as stipulated in Document C-09, *Monitoring Procedures for Operating Reserve Criteria*. The evaluation of DCS compliance for an **Area** shall utilize the NERC Disturbance Recovery Period of fifteen minutes and shall meet the DCS requirement 100% of the time for reportable disturbances. Each Control **Area** not meeting the DCS during a given quarter shall increase its **ten-minute reserve** requirement for the calendar quarter (offset by a month) by the **Contingency Reserve Adjustment Factor**.

3.6 Distribution of Reserve

**Operating reserve** available to an **Area** shall be distributed so as to ensure that it can be utilized without exceeding individual **element** ratings or transfer limitations.

3.7 Sustainability of Reserve

**Operating reserve** available to an **Area**, if activated, shall be sustainable for at least one hour from the time of activation.

3.8 Activation Of Inter-Area Reserve

When an **Area** acquires **operating reserve** from another **Area**, the provider of the **operating reserve** shall deliver an increase in energy equal to the amount of **operating reserve** acquired when the acquiring **Area** requests its activation. Unless the provider experiences its own contingency, the provider shall not initiate the curtailment of an existing or planned energy sale to any **Area** to support the activation of the **operating reserve** that was acquired until the contingent **Area** has recovered from the contingency. Under normal conditions, the recovery time of the contingent **Area** should not exceed the DCS requirement. **Operating reserve** acquired from another **Area** shall be sustainable as specified in section 3.7 above.

3.9 Shared Activation Of Ten-Minute Reserve

Recovery from a sudden large loss of **generation** can be achieved faster by jointly activating **reserve** in several areas. NPCC and PJM have implemented such an arrangement in order to:

- more quickly relieve the initial stress placed on the interconnected transmission system following a large loss of **generation** or energy purchase
- effect an improvement in **reliability** achieved by the faster recovery
- assist in achieving compliance with the NERC Disturbance Control Standard (DCS)

Implementation of Shared Activation of **Ten-Minute Reserve** is described in NPCC document C-12, *Procedure for Shared Activation of Ten-Minute Reserve*. The provision for assistance via the Shared Activation Of Ten-Minute Reserve Procedure shall be a **reportable event**, except as noted in NPCC Document C-12.

#### 4.0 Procedures

##### 4.1 Scheduling

- 4.1.1 Each **Area** shall ensure that sufficient **resources** are available such that its requirements for **operating reserve** are met at all times.
- 4.1.2 An **Area** shall meet its requirement for **operating reserve** using **resources** within the **Area** or obtain deliverable **capacity** from outside the **Area**.
- 4.1.3 Additional resources shall be made available to ensure the adequacy of operating reserve considering various sources of uncertainty such as, but not limited to, errors in the load forecast.

##### 4.2 Daily Operation

- 4.2.1 Energy associated with **operating reserve** may be interchanged with the understanding that it is immediately recallable. The energy associated with reserve that is utilized to meet **AGC** requirements to provide satisfactory system regulation shall not be sold.

An **Area** acquiring energy sold out of the operating reserve of another **Area**:

- will not use this energy to augment its reserve. Resources displaced by the energy must remain available to cover for the curtailment of said energy at any time.
- must adjust its **ten-minute reserve** requirement to cover the larger of the **Area's first contingency loss**, or the largest sum

of such energy purchases, which could be withdrawn at the same time due to a single contingency or event.

An **Area** acquiring energy not sold out of the **operating reserve** of another **Area**:

- is the only **Area** that can use this energy to augment its reserve. The providing **Area** is obligated to advise the acquiring **Area** of any change in the surplus status of the energy.

- 4.2.2 When an **Area** foresees it will be unable to provide its **operating reserve** requirements, appropriate measures, as contained in NPCC Document C-19, *Procedures During Shortages of Operating Reserve*, shall be implemented.
- 4.2.3 When an **Area** experiences a **contingency** in excess of its **first contingency loss**, it may request other **Areas**, via the NYISO Shift Supervisor, to activate an appropriate amount of their **ten-minute reserve**.
- 4.2.4 When **ten-minute reserve** in NPCC is fully utilized, appropriate measures by the deficient **Area**, as contained in NPCC Document A-03, *Emergency Operation Criteria*, shall be implemented.

## 5.0 Responsibilities

- 5.1 Each **Area** is responsible for observing the criteria and procedures contained herein, identifying a loss of **capacity** within its **Area** and activating **operating reserve** available to that **Area**.
- 5.2 Each **Area** is responsible for periodically auditing **operating reserve** status and availability to ensure proper response at all times.
- 5.3 The NPCC Task Force on Coordination of Operation (TFCO) is responsible for monitoring the application of these criteria.
- 5.4 The NPCC Control Performance Working Group (CO-1) shall monitor total NPCC reserves as part of the ongoing **Area** Trouble Report process detailed in Procedure C-09, *Monitoring Procedures for Operating Reserve Criteria*, and report to the TFCO if levels drop below the norm of other NERC regions.
- 5.5 The NPCC Control Performance Working Group (CO-1) shall monitor compliance with the Control Performance Standards on a monthly basis and report its findings to the TFCO and NERC.

- 5.6 For reportable frequency deviation events, the NPCC Control Performance Working Group (CO-1) shall initiate the required data collection and reporting as required by NPCC Procedure C-11, *Monitoring Procedures for Interconnected System Frequency Response* and NERC Frequency Response Characteristic Surveys.

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Lead Task Force: Task Force on Coordination of Operation

Review frequency: 3 years

References: *Emergency Operation Criteria* (NPCC Document A-03)

*NPCC Glossary of Terms* (NPCC Document A-07)

*Monitoring Procedures for Operating Reserve Criteria* (NPCC Document C-09)

*Monitoring Procedures for Interconnected System Frequency Response* (NPCC Document C-11)

*Procedure for Shared Activation of Ten-Minute Reserve* (NPCC Document C-12)

*Procedures During Shortages of Operating Reserve* (NPCC Document C-19)

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*NERC Operating Policy 1, "Generation Control and Performance"*

*NERC Performance Standard Reference Document*