

# *Emergency Operations Manual*

*April 2016*

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## 4. MONITORED CONDITIONS

This section describes all monitored conditions.

### 4.1 Transmission Rating Exceedance

A Major Emergency may exist due to a transmission rating exceedance for one of the following reasons:

- Actual Long-Term Emergency (LTE) rating exceedance for greater than five (5) minutes
- Actual Long Term Emergency (LTE) rating exceedance with no time delay at the NYISO's discretion
- Actual Short-Term Emergency (STE) Rating Exceedances
- Post-Contingency STE Rating Exceedance

#### 4.1.1 Actual LTE and STE Rating Exceedance

If a transmission facility that constitutes a part of the NYISO Controlled Transmission System (as defined in the *NYISO Outage Scheduling Manual*, available from <http://www.nyiso.com/public/documents/manuals/operations.jsp?maxDisplay=20>) becomes overloaded, the NYISO shall apply relief measures immediately to bring the flow within established ratings.

- a. When a facility becomes loaded above its LTE rating but below its STE rating, corrective action, which may include Voltage Reduction and/or Load Shedding, must be taken to return loading on the facility to its LTE rating within 15 minutes.
- b. When a facility becomes loaded at or above its STE rating, immediate corrective action, which may include Voltage Reduction and/or Load Shedding must be initiated to reduce the loading on the facility to below its STE rating within 5 minutes and furthermore, to continue to reduce the loading on the facility to below its LTE rating within 10 minutes from the initial overload.

If the loading is substantially above the STE rating, Load Relief should be considered as the initial action to be taken.

- c. After the loading on a facility has been reduced below its LTE rating, additional corrective action, excluding further Voltage Reduction and/or Load Shedding should be taken to reduce the loading on the facility below its Normal rating within 30 minutes of the initial overload.

In the event this cannot be accomplished, the NYISO shall invoke Emergency Transfer Criteria (ETC).

#### ***Emergency Transfer Criteria (ETC)***

When there is insufficient capacity or voltage support to maintain facilities within Normal Transfer Capabilities, facilities may, within the guidelines set forth in this document, be

allowed to operate to their Emergency Transfer Capabilities. Facilities operating outside their Normal Transfer Capabilities are operating under “Emergency Transfer Criteria.”

- d. When a facility has been loaded for four continuous hours (or such longer period as may be established by the Rating Authority) above its Normal rating, but at or below its LTE rating, corrective action, which may include Voltage Reduction and/or Load Shedding, must be taken to return the facility to its Normal rating within 30 minutes.

#### **4.1.2 Post-Contingency STE Rating Exceedances**

If a transmission facility which constitutes a part of the NYISO Controlled Transmission System is being operated under ETC and becomes loaded to a level which would cause its Post-Contingency loading to exceed its STE rating, and corrective action could not be taken rapidly enough to meet the requirements of this policy once the contingency occurs (under STE in 5 minutes and under LTE within 10 minutes of initial overload), then immediate corrective action, which may include Voltage Reduction and Load Shedding must be taken to reduce the loading such that sufficient time will be available to apply corrective action following the contingency, this will be classified as an IROL exceedance. To prevent an IROL Violation, pre-contingency action is required to be taken so that the IROL exceedance is not greater than 30 minutes.

#### **4.2 High or Low Voltage**

Voltage control of the NYISO Controlled Transmission System as defined in Attachment A, Table A.2, shall be coordinated by the NYISO to provide adequate voltage at all times to maintain power transfer capability. When there is a Major Emergency due to voltage problems, the NYISO shall notify all TOs of the condition and shall direct the necessary corrective action.

- a. If, having taken the actions above, the actual voltage at any bus listed in Attachment A, table A.2, remains below its pre-contingency low limit for 30 minutes or declines to a level below the mid-point between the pre and post contingency low limits and remains there for 15 minutes, then the NYISO shall discuss the situation with the TO(s) to determine if corrective action could be taken following a contingency to prevent a System Voltage Collapse.
- b. If it is anticipated that adequate time will not exist to prevent a Voltage Collapse following a contingency, then the NYISO shall direct the necessary corrective action, up to and including Load Shedding, to maintain a minimum voltage equal to the pre-contingency low limit.
- c. If the actual voltage at any bus listed in Attachment A, Table A.2, declines below the post-contingency low limit and is indicative of a System Voltage Collapse, then the NYISO shall immediately order Load Shedding in the amount and at the locations deemed necessary to maintain a minimum voltage equal to the pre-contingency low limit.

## 4.3 Post-Contingency Voltage IROL Exceedances

### *Less Than 5%*

- a. If the post-contingency loading of an internal NYCA IROL interface or the post-contingency flow towards the NYCA on an inter-Reliability Coordinator interface exceeds the IROL limits associated with a voltage collapse by less than 5%, then measures shall be applied immediately to bring the loading to established limits within 15 minutes.
- b. If, after taking corrective action, loadings are not below the limit within 15 minutes, then a Major Emergency shall be declared and corrective measures, which may include Load Relief, shall be initiated to bring the loading to established limits within 15 minutes.
- c. NERC standards state the IROL flows must be below the limits within 30 minutes. In the event Load Shedding is required, to prevent a IROL violation, it must be ordered and implemented prior to 30 minutes from initial overload to ensure that limits have not been exceeded for greater than 30 minutes.

### *By 5% or More*

- a. If the post-contingency loading of an internal NYCA IROL interface or the post-contingency flow towards the NYCA of an inter-Reliability Coordinator interface exceeds the IROL limits associated with a voltage collapse by 5% or more, then a Major Emergency shall be declared immediately and corrective measures, which may include Load Relief, shall be initiated to bring the loading to established limits.
- b. If loads are not below 105% of the limit within 15 minutes from the initial overload, then Load Relief measures must be instituted. NERC standards state the IROL flows must be below the limits within 30 minutes. In the event Load Shedding is required, to prevent a IROL violation, it must be ordered and implemented prior to 30 minutes from initial overload to ensure that limits have not been exceeded for greater than 30 minutes.

## 4.4 Operating Reserve Deficiency

### *Daily Operation*

It is the responsibility of the NYISO to monitor Operating Reserve, both in a forecasted mode for the expected system peak for the day-ahead, in day, and as the day progresses.

#### Shortage Operating Reserve – Day-Ahead Forecast

If the Security Constrained Unit Commitment (SCUC) program indicates that NYISO will be short of Operating Reserves in the DAM, or if SCUC has already been completed and conditions then change such that the forecast indicates there will be an Operating Reserve deficiency, the NYISO will determine the action(s) listed below that are necessary:

In all of the following steps where additional capacity resources are being evaluated, the NYISO shall determine if each step is sufficient to eliminate the deficiency. In addition, all notifications made to TOs shall include approximate next-day starting time and duration associated with each curtailment step.

1. Initiate an e-mail to all Market Participants requesting additional (bids) generation for the specific category required.
2. Perform a Supplemental Resource Evaluation (SRE) Request from the Market Information System (MIS) database of unaccepted/uncommitted bids for additional Reserve for the hours specified and commit/schedule the generation.
3. Determine the amount of energy available from external NYCA Installed Capacity (ICAP) providers that were not selected in the DAM. Count energy associated with these ICAP providers from other Balancing Authorities to NYCA and NYISO Operating Reserve. Advise the affected external Reliability Coordinator accordingly.
4. Count energy associated with external energy sales by NYCA ICAP providers as NYISO Operating Reserve. Advise the affected external Reliability Coordinator accordingly.
5. Notify NYISO Stakeholder Services of predicted day-ahead system conditions.
6. Direct the TOs to notify the appropriate Market Participants to be prepared for the potential dispatch to UOLe for the next day.
7. Notify the appropriate Market Participants to prepare to make Special Case Resources (ICAP) resources available for the next day and count expected relief.
8. Notify the appropriate Market Participants to prepare to make the EDRP resources available for the next day and count expected relief.
9. Initiate an Emergency Energy Alert in accordance with NERC Standard EOP 002 for the next day via the RCIS; follow NPCC notification requirement, and notify NYISO External Affairs, PSC, and the NYS Department of Environmental Conservation (DEC).
10. Request the TOs to prepare to curtail non-essential company loads for the next day and to notify appropriate Market Participants to prepare to curtail non-essential company load for the next day.
  - Request the TOs to notify interruptible customers in accordance with contractual agreements to prepare to make interruptible load available for curtailment for the next day.
  - Request the TOs with Manual Voltage Reduction equipment to prepare to initiate procedures to reduce voltage by 5% for the next day.
  - Request the TOs to contact large industrial and commercial customers to request voluntary curtailment of load the next day.
  - Request the TOs to make general radio and TV appeals to the public to request voluntary curtailment of electric power.
11. Count Load Relief that can be implemented within 10 minutes using Quick Response Voltage Reduction as NYISO 10-minute reserve.

#### 4.4.1 Shortage Operating Reserve New York City – Day-Ahead Forecast

##### ***New York State Reliability Council Reliability Rules***

I-R2. Locational Reserves (New York City) Sufficient *ten (10) minute operating reserves* shall be maintained in the New York City (NYC) *zone* as follows:

- a. The *ten (10) minute operating reserve* for NYCA shall be determined in accordance with Reliability Rules.
- b. A percentage of the *ten (10) minute NYCA operating reserves* equal to the ratio of the NYC *zone peak load* to the statewide peak Load shall be required to be selected from *resources* located within the NYC *zone*.
- c. NYC *zone ten (10) minute operating reserves* shall be maintained at all levels of dispatch, except as necessary to alleviate *emergency* conditions.

SCUC produces a daily report provided to the NYISO which indicates if the NYC zone is deficient in 10-Minute Reserve. The report is distributed with the daily SCUC documents within the NYISO. In the event that the NYISO sees a deficiency, the NYISO will notify Consolidated Edison of the operating day and hours that SCUC indicates a shortage of NYC 10-Minute reserve.

Actions that may be taken to establish NYC reserves for the hours of the deficiency:

- Initiate an SRE request e-mail soliciting bids for 10-Minute Reserve or energy for the hours deficient in NYC reserve.
- Determine if neighboring Reliability Coordinators have sufficient reserve and energy to support transaction to NYCA so that NYC reserves can be reestablished.
- Once bids are received, contact Consolidated Edison and have them SRE any additional units necessary to meet requirements.
- In the case there are insufficient bids to meet the NYC reserve requirement, make appropriate notifications to SCR and EDRP resources for the operating day in the NYC Zone to allow these resources to be counted.
- If the actions above do not satisfy the NYC reserve requirement, notify Consolidated Edison that Voltage Reduction is being counted to meet the NYC reserve requirement.

#### 4.4.2 Shortage Operating Reserve – In Day

The NYISO will monitor the total operating capacity in day. The NYISO shall prepare the NYISO daily status report twice daily in anticipation of the morning peak and evening peak load. If deficiency in Operating Reserves is still forecasted, or if Real-Time Commitment (RTC) forecasts a shortage of reserve or energy for the next hour, the NYISO will take the steps not taken in the DAM that time permits to meet reserve requirements. Additionally, the NYISO will take any or all of the following actions as required based on the category of Operating Reverse Shortage:

In all of the following steps where additional capacity resources are being evaluated, the NYISO shall determine if each step is sufficient to eliminate the deficiency. In addition, all notifications made to TOs shall include approximate starting time and duration associated with each curtailment step.

1. Initiate an e-mail to all Market Participants requesting additional (bids) generation for the specific category required.
2. Perform an SRE Request from the MIS database of unaccepted/uncommitted bids for additional Reserve for the hours specified and commit/schedule the generation.

**Declare Warning State**

1. Determine the amount of energy recallable from external ICAP resources that was not selected in the DAM. Count energy available from external NYCA ICAP providers from other Reliability Coordinators to NYCA as NYISO Operating Reserve. Advise the affected Reliability Coordinators accordingly.
2. Count energy associated with exports from NYCA to other Reliability Coordinators by NYISO ICAP providers as NYISO Operating Reserve. Advise the affected Reliability Coordinators accordingly.
3. Notify NYISO Special Case Resources (ICAP) that they are counted toward NYISO Operating Reserves, and may be required to be activated during a specified period of time. (Estimated start and end time as announced.)
4. Notify EDRP participants that they are counted toward NYISO Operating Reserves, and may be requested to be activated during a specified period of time. (Estimated start and end time as announced.)
5. Notify NYISO Market Relations of predicted system conditions.
6. Notify the Market Participants to be prepared for the potential of using UOLE operation for the day and direct all Market Participants to follow basepoints.
7. Initiate an Emergency Energy Alert in accordance with NERC Standard EOP 002 for today via the Reliability Coordinators Information System (RCIS); Notify natural gas pipelines via notification requirements, follow DOE and NPCC notification requirements, notify NYISO External Affairs, PSC, and DEC.
8. Notify Market Participants to activate Special Case Resources (ICAP) to start at XXXX hrs and end at XXXX hrs.
9. Notify Market Participants to activate EDRP to start at XXXX hrs and end at XXXX hrs.

**Declare Alert State**

1. Request the TOs, via Emergency Hot Line, to curtail non-essential company loads and to notify appropriate Market Participants to curtail non-essential company loads.
  - Request the TOs, via Emergency Hot Line, to curtail interruptible customers in accordance with contractual agreements.
  - Request the TOs with Manual Voltage Reduction equipment, via Emergency Hot Line, to begin procedures to reduce voltage by 5%.

- Request the TOs, via Emergency Hot Line, to contact large industrial and commercial customers to request voluntary curtailment of load.
  - Request the TOs, via Emergency Hot Line, to make general radio and TV appeals to public to request voluntary curtailment of electric power.
2. Count Load Relief that can be implemented within 10 minutes using Quick Response Voltage Reduction as NYISO 10-minute reserve.

#### 4.4.3 Shortage Operating Reserve – Real Time

The NYISO will monitor the total Operating Reserve using the reserve monitor programs. If an operating shortage occurs, the NYISO will count SCR and EDRP available from prior notification and take any of the following steps that have not already been taken. Additionally, the NYISO will take any or all of the following actions as required based on the category of reserve shortage:

##### ***Following a Contingency***

*Based on the New York State Reliability Council rules:*

Following a *contingency*, the *ten (10) minute operating reserve* shall be restored within thirty (30) minutes of the time that the *contingency* occurred or sooner if possible.

##### ***A Non-Contingency Based Shortage***

*Based on NPCC policy:*

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*.

Each *Area* shall restore its *thirty-minute reserve* within four hours if it becomes deficient.

##### ***Declare Alert State***

1. If deficient of 10-minute synchronized reserve direct all Market Participants to convert 30-minute non-synchronized reserve or 10-minute non-synchronized reserve to energy or 10-minute synchronized reserve.
2. If deficient of 10-minute reserve:
  - Direct all Market Participants to convert 30-minute reserve to energy or 10-minute reserve.
  - Count or curtail energy associated with exports from NYCA to other Reliability Coordinators by NYISO ICAP providers as NYISO Operating Reserve based on the Reliability Coordinator's ability to have the transaction curtailed. Advise the affected external Reliability Coordinator accordingly.
  - Count the load reduction available from Quick Response Voltage Reduction as 10-minute reserve.
  - Activate use of UOLe limits,



- Direct TOs, via Emergency Hot Line, to notify the appropriate Market Participants that the NYISO is dispatching to UOLe and that they are to follow basepoints and to make all generator capability available
  - Purchase Emergency Energy from sources outside NYISO.
- 3. If deficient of 30-minute reserve:
  - Count or curtail energy associated with exports from NYCA to other Reliability Coordinators by NYISO ICAP providers as NYISO Operating Reserve based on the Reliability Coordinator's ability to have the transaction curtailed. Advise the affected external Reliability Coordinator accordingly.
  - Count the load reduction available from Quick Response Voltage Reduction as 10-minute reserve to increase 10 minute reserve thus increasing 30 minute reserve.
  - Activate use of UOLe Limits
  - Direct TOs, via Emergency Hot Line, to notify the appropriate Market Participants that the NYISO is dispatching to UOLe and that they are to follow basepoints and to make all generator capability available
  - Purchase Emergency Energy from sources outside NYISO

***Declare Major Emergency***

Initiate an Emergency Energy Alert in accordance with NERC standard EOP 002 for today via the RCIS; follow NPCC notification requirement notify NYISO External Affairs, PSC, DEC, Gas Pipelines, and the Department of Energy(DOE) with form OE 417.

1. Notify the TOs via Emergency Hot Line and the appropriate Market Participants via the NYISO notification manager software that the NYISO has activated Special Case Resources (ICAP) if possible.
2. Notify the TOs via Emergency Hot Line and the appropriate Market Participants via the NYISO notification manager software that the NYISO has activated EDRP.
3. Alert other TOs, and Reliability Coordinators if applicable, that a sharing of reserves may be required.

**4.4.4 Shortage of Meeting Load (Including the Inability to Reach a "0" ACE) – Real Time**

***Declare Major Emergency***

1. Initiate an Emergency Energy Alert in accordance with NERC Standard EOP 002 for today via the RCIS; follow NPCC notification requirement notify NYISO External Affairs, PSC, DEC, Gas Pipelines, and the Department of Energy(DOE) with form OE 417
2. Direct TOs, via Emergency Hot Line, to notify the appropriate Market Participants to go to UOLe limits, follow basepoints, and that the NYISO is in a generation alert.
3. Recall external energy sales provided by NYCA ICAP providers.

4. Notify the appropriate Market Participants to activate NYISO Special Case Resources, if possible.
5. Notify the appropriate Market Participants to activate EDRP, if possible.
6. Direct TOs, via Emergency Hot Line, to notify the appropriate Market Participants to go to UOLe limits and to continue to follow basepoints
7. Purchase Emergency Energy from sources outside NYISO.
8. Direct TOs, via Emergency Hot Line, to implement 5% Quick Response Voltage Reduction on a system wide basis.
9. Request neighboring Reliability Coordinators to implement Voltage Reduction to supply Emergency Energy, provided transmission loading permits.
10. Direct all TOs, via Emergency Hot Line, to notify appropriate Market Participants that the NYSDEC air emissions waiver is in effect and to go to generator maximum capability even if it may result in temporary exceedance of NOx RACT air emission limits and opacity requirements.
11. Direct all TOs, via Emergency Hot Line, to shed load immediately in sufficient amounts to maintain tie loadings within limits, return the NYCA ACE to zero within 10 minutes attempting to return the system frequency to 60 hertz in accordance with NYISO criteria.

## 4.5 IROL Stability Limit Violation

### ***Less Than 5%***

- a. If the loading of an internal NYCA IROL interface or the power flow towards the NYCA on an inter-Reliability Coordinator IROL interface exceeds the NYCA IROL stability limit by less than 5%, then measures shall be applied immediately to bring the loading to established limits within 15 minutes.
- b. If, after taking corrective action, loadings are not below the IROL stability limit within 15 minutes, then a Major Emergency shall be declared and corrective measures, which may include Load Relief, shall be initiated to bring the loading to established limits within 15 minutes.
- c. NERC standards state the IROL flows must be below the limits within 30 minutes. In the event Load Shedding is required, to prevent a IROL violation, it must be ordered and implemented prior to 30 minutes from initial overload to ensure that limits have not been exceeded for greater than 30 minutes.

### ***By 5% or More***

- a. If the loading of an internal NYCA IROL interface or the power flow towards the NYCA on an inter-Reliability Coordinator IROL interface exceeds NYCA IROL stability limit by 5% or more, then a Major Emergency shall be declared immediately and corrective measures, which may include Load Relief, shall be initiated to bring the loading to established limits.
- b. If loadings are not below 105% of the IROL stability limit within 15 minutes from the initial overload, then Load Relief measures must be instituted. NERC

standards state the IROL flows must be below the limits within 30 minutes. In the event Load Shedding is required, to prevent a IROL violation, it must be ordered and implemented prior to 30 minutes from initial overload to ensure that limits have not been exceeded for greater than 30 minutes.

## 4.6 High/Low Frequency

### *Low Frequency*

A sustained low frequency of 59.90 Hz is an indication of major load generation imbalance, in which case the NYISO shall declare a Major Emergency. The NYISO will take appropriate action, to correct any under-generation and bring the NYISO ACE back to zero

If during a Major Emergency resulting from a low frequency condition caused by load-generation imbalance within the NYCA, additional NYISO generation is lost, the NYISO shall immediately order Load Shedding to alleviate the imbalance.

When the frequency decline is so rapid as to preclude analysis and communication amongst the NYISO and TOs, then the following procedures will apply up to permissible LTE ratings:

- a. Under Frequency Load Shed (UFLS)
  1. In the following approximate percentages:
    - a) 7% - 59.5 Hz (fast)
    - b) 7% - 59.3 Hz (fast)
    - c) 7% - 59.1 Hz (fast)
    - d) 7% - 58.9 Hz (fast)
    - e) 2% - 59.5 Hz (10 s)
  - b. 58.5 Hz – If frequency is still declining, then all TOs shall take such steps as are necessary, including separating units to preserve generation, minimize damage and service interruption.

### *Rapid Frequency Decline*

In the event that the frequency decline is so rapid as to prevent operator action, automatic facilities exist to achieve the required Load Shedding as described above, without regard to transmission loading.

### *High Frequency*

A sustained high frequency of 60.10 Hz is an indication of major load generation imbalance, in which case the NYISO shall declare a Major Emergency. The NYISO will take appropriate action to correct any over generation and bring the NYISO ACE back to zero.