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Independent System Operator

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System Restoration Manual

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Revision History

Version	Date	Revisions
1.0	06/06/2007	Initial Release
2.0	04/21/2009	Global ➢ Reformatted per new template to standardize presentation ➢ Implemented minor stylistic changes Revision History Table ➢ Changed column headings as follows: • "Revision" changed to "Version" • "Changes" changed to "Revisions" Section 1.1 ➢ Replaced reference to NPCC Document A-3 with reference to NPCC Directory 8 – System Restoration. Section 1.2 ➢ Clarified the black start resources used to energize the 345-kV transmission backbone during restoration as being at Niagara, Moses, and Gilboa. ➢ Added text defining restoration priorities with regard to the major transmission ties and lines in local TO areas. Section 3.0 ➢ Changed section name from "Black Start Capability Plan" to "Restoration-Related Facilities." Section 3.1.4 ➢ Changed the trigger for initiation of the 30-day timeframe for supplying testing documentation to the NYISO, from the date of test completion to the date that the NYISO requests the documentation. ➢ Added megavar capacity as a parameter tracked in the NYISO database of black start resources. Section 3.1.5 ➢ Deleted text stating that black start units are not subject to NPCC or NERC testing requirements. Section 3.2 ➢ Replaced reference to NPCC Document A-3 with reference to NPCC Directory 8 – System Restoration. Section 5 ➢ Existing text edited to further detail the variables that the annual review of the NYISO System Restoration Plan shall verify. ➢ Added text outlining requirements related to (1) TO restoration-plan reviews, including NYISO review of such plans, and (2) post-event analysis and reporting.

3.0	07/15/2010	Global ➢ Revised external-document links to explicitly cite URLs from which documents may be accessed. Revision History Table ➢ Changed column headings as follows: • "Revision" changed to "Version" • "Changes" changed to "Revisions" Section 1 • Added text to differentiate a restoration procedure as a subset of the overall restoration plan. Section 1.1 ➢ Replaced reference to NPCC Document A-3 with reference to NPCC Directory 8 – System Restoration. Section 1.2 ➢ Added text to clarify objective of the restoration plan. ➢ Adjusted description of the restoration paths to reflect the priorities ➢ Added text to address how the referenced resources are employed to address unanticipated situations. Section 1.3 ➢ Added text to define the priority of establishing paths to Staten Island and Long island. ➢ Added text relating to load restoration consistent with the EO Manual Section 2 ➢ Added text to require the restoration plan be designed to ensure prompt NYCA system restoration. Section 2.1 ➢ Added text to provide an overview of the reference documents that constitute the restoration procedure. Section 2.2 ➢ Added text to require that TO restoration procedures be coordinated with their neighboring TOs. Section 2.3 ➢ Added a new section addressing Black Start Facility Restoration Procedures. Section 3.1.1 ➢ Added text to specify the level of Black Start Facility detail to be included in NYISO restoration procedures. Section 3.1.2 ➢ Separated TO Black Start Facility requirements into a new subsection. ➢ Added text to specify the level of Black Start Facility detail to be included in TO restoration procedures.

		Section 3.13 ➢ Added text to identify the Generator Operator requirements for Black Start Facility testing procedures. ➢ Added text to identify NPCC Directory #8 as the minimum for required black start testing requirements. Section 3.1.5 ➢ Deleted text stating that black start units are not subject to NPCC or NERC testing requirements. ➢ Redirected Black Start testing to be reported on *ISO Market Administration and Control Area Services Tariff* (*Services Tariff*), Rate Schedule 5, Appendix II form, to eliminate redundancy with Attachment B. Section 3.2.1 ➢ Added text to identify NYISO Basic Minimum Power System as the list of Key Facilities identified in Attachment A. ➢ Added text to clarify that the TO defines and maintains the list of Critical Components associated with Key Facilities. Section 3.2.2 ➢ Replaced reference to NPCC Document A-3 with reference to NPCC Directory 8 – System Restoration. Section 5 ➢ Add text to clarify NYISO restoration procedure review, verification, update, and distribution requirements. ➢ Add a new section to clarify TO restoration procedure review, verification, update, and distribution requirements. ➢ Add text to clarify annual review versus 5-year verification. Section 5.1.1 ➢ Eliminated the requirement to document review and verification of the restoration plan on the form Attachment C in lieu of instead maintaining documentation in the format applicable. Section 6 ➢ Added text addressing training requirements. ➢ Defined training requirements for the NYISO, TO, and Generators with Black Start facilities. ➢ Defined specific training time requirements for TO field switching personnel. ➢ Defined specific training time requirements for Black Start facility operators. ➢ Defined training record requirements. ➢ Defined the obligation to participate in NYISO training events, when requested. Attachment B ➢ Deleted in light of updating section 3.1.5 to reflect that Black Start testing is to be reported on *Services Tariff,* Rate Schedule 5, Appendix II form. Attachment C

		➢ Deleted in light of updating section 5.1.1 to specify that rather than having to document review and verification of the restoration plan on the form in this attachment, documentation shall be maintained in the format applicable.
4.0	09/06/2012	Section 2.2 ➢ Added elaboration on the relation of Nuclear Plant Interface Requirement (NPIR) to the local transmission owner restoration plans. Section 3.1.3 ➢ Revised black start testing text to align with NYSRC PRR 112 Section 3.2.4 ➢ Added new section to address NPCC Directory #8 Sect 5.1.8
4.1	03/27/2015	Section 3.1.3 ➢ Added section as reference to NYSRC Reliability Rule G-R4 requirement in section 15.5.4 of the Market Services Tariff
4.2	04/27/2016	Section 1.1 ➢ Updated reference material hyperlinks Section 3.1.4 ➢ Added section for TO black start generation testing
4.3	04/12/2017	Section 2.3 ➢ Simplified text to address testing requirements in general terms Section 3.1.2 ➢ Deleted the sentence on testing procedures, and addressed it in the beginning of the test procedures section ➢ Removed the Con Ed specific testing requirements from this NYISO document. They are addressed in the Con Ed SRP Section 3.1.3 renumbered to Section 3.1.7 Section 3.1.4 renumbered to Section 3.1.3 ➢ Re-title "Black Start Testing Procedures" ➢ Moved and revised sentence on testing procedures from 3.1.2 to this section. Added reference to number of units to be tested & the SRP role in setting testing procedure requirements ➢ Deleted paragraph on testing requirement. Addressed in new "Black Start Testing Requirements" section. ➢ Removed paragraph on steam black start ➢ Moved text on reporting on maintaining critical components to the Documentation of Black Start Testing section. Section 3.1.4 redefined ➢ Add new section "Black Start Testing Requirements" ➢ Revised entire section to address minimum requirements for universal testing Section previous 3.1.4 renumbered to Section 3.1.5 ➢ Re-title "Black Start Testing Frequency" ➢ Removed second paragraph for which units shall be tested. This is now captured in the first paragraph of section 3.1.3

		Section previous 3.1.5 renumbered to Section 3.1.6 ➢ Re-title "Documentation of Black Start Testing" ➢ Update Appendix reference from II to I Section 3.1.7 ➢ Previous section 3.1.3 renumbered. Section 3.1.8 ➢ Added "Scheduling a Test for Consolidated Edison" which was previously included in Rate Schedule 5. Appendix I. Section 3.1.9 ➢ Added "Consolidated Edison Black Start Resource Testing Requirements"
4.4	11/26/2019	Section 1.1 ➢ Updated NERC EOP-005-3 and link ➢ Updated NERC EOP-006-3 and link ➢ Updated links to NPCC and NYSRC references Section 1.2 ➢ Updated Link to NYISO Operations Manuals Section 2.1 ➢ Updated Link to NYISO Operations Manuals Section 3.1.1 ➢ Updated Link to NYISO Operations Manuals Section 3.1.6 ➢ Updated Link to NYISO Service Tariff Section 3.1.7 ➢ Updated Link to NYISO Service Tariff Section 3.2 ➢ Updated Link to NPCC Directory 8 ➢ Updated Link to NPCC Glossary of Terms Section 3.2.2 ➢ Updated Link to NPCC Directory 8 Section 4.1 ➢ Updated Link to NYISO Operations Manuals Section 4.2 ➢ Updated Link to NYISO Operations Manuals
4.5	8/15/2023	Recertified Global ➢ Updated logos and formatting to current branding guidelines ➢ Updated broken hyperlinks

1. Overview

This Manual addresses the restoration plan for the New York Reliability Coordinator Area, including the procedures, documentation, training, and testing for the New York Independent System Operator (NYISO) and its Market Participants, to ensure the NYISO Reliability Coordinator Area capability for reliable system restoration following a major or total blackout.

1.1 References

This Manual was written to adhere to and support the following standards:

- NERC Standard EOP-005-3 – System Restoration from Blackstart Resources (available from https://www.nerc.com/pa/Stand/Reliability%20Standards/EOP-005-3.pdf)
- NERC Standard EOP-006-3 – System Restoration Coordination (available from https://www.nerc.com/pa/Stand/Reliability%20Standards/EOP-006-3.pdf)
- NPCC Directory 8 – System Restoration (available from https://www.npcc.org/content/docs/public/program-areas/standards-and-criteria/regional-criteria/directories/directory-08.pdf)
- NPCC Document– Glossary of Terms (available from https://www.npcc.org/content/docs/public/program-areas/standards-and-criteria/regional-criteria/directories/npcc-glossary-of-terms.pdf
- NYSRC Reliability Rules - Section F – System Restoration & Section G – Local Area Operation (available from https://www.nysrc.org/wp-content/uploads/2023/07/RRC-Manual-V46-final.pdf)

1.2 Strategy

The strategy for prompt restoration of the NYISO's Reliability Coordinator Area rests on three main principles:

1. Restoration procedures are based on restoration of a backbone of high voltage lines, but allowing operators flexibility to adjust the restoration path for actual system conditions;
2. Periodic training on restoration concepts and procedures; and
3. Periodic drills on restoration procedures to exercise details of procedures and reinforce restoration concepts and strategy.

The objective of the New York Control Area (NYCA) restoration plan is to energize the 345-KV transmission backbone from Black Start Facilities. This transmission backbone consists of four paths: Albany into New York City; Massena to Utica; Buffalo to Utica to Albany, and Buffalo to Binghamton to

Albany. From this backbone there are a multitude of options to restore transmission, access available generation, and coordinate the restoration efforts with the New York Transmission Owners (TOs) and neighboring areas.

Since the exact extent or nature of a disturbance cannot be predicted, procedures are prepared as general guidelines. The NYISO restoration procedure has been developed in conjunction with the NYISO Restoration Diagram and supporting documents. These common references provide the operator with guidelines for bulk power system restoration within the NYISO. These guidelines also provide the basis for alternative restoration actions if normal restoration procedures cannot be executed due to system conditions.

Prompt restoration of the NYISO total customer load is best accomplished by the restoration of the NYS Power System. Although some customer load may be picked up during this procedure in order to maintain stability and voltage levels, priority must be assigned to the restoration of the major transmission ties. Each TO may restore load within its area in accordance with its own restoration procedure, but load restoration must not delay the NYISO-coordinated restoration of the NYS Power System.

Throughout the restoration process, the restored facilities shall be operated in accordance with the operating procedures and criteria in the *NYISO Emergency Operations Manual* and *NYISO Transmission and Dispatch Operations Manual*, both of which are posted as Operations manuals on the NYISO Web site at the following URL: (https://www.nyiso.com/manuals-tech-bulletins-user-guides).

1.3 Priorities

The following operations shall have the highest restoration priority:

- Energizing the backbone of the New York State (NYS) Power System. (Priority shall be given to energizing the Albany to Staten Island and Long Island path, while simultaneously restoring from Buffalo and Massena Black Start Facilities.)
- Synchronizing the NYS Power System with the interconnection.
- Restoring off-site power supplies to nuclear power plants.

The next priority shall be load restoration. If there is limited energy available within the NYCA, preference shall be given to generating station start-up, followed by the restoration of the high-density load portions of the system.

1.4 Coordination

Under normal circumstances, the NYISO will coordinate system restoration among neighboring Reliability Coordinators and Transmission Owners (TOs).

2. Restoration Procedures

System restoration will take place at two levels: restoration of the NYISO Reliability Coordinator Area's backbone system in accordance with a NYISO restoration procedure and restoration of local areas in accordance with TO restoration procedures. These procedures shall be designed to restore the NYCA system in a safe, orderly, and prompt manner following a major or total blackout. Since the exact extent or nature of a disturbance cannot be predicted, the procedures are prepared as general guidelines.

2.1 NYISO System Restoration Procedure

The NYISO's procedures for system restoration are contained in the Restoration State section of the *NYISO Emergency Operations Manual* (posted as an Operations manual on the NYISO Web site at the following URL: https://www.nyiso.com/manuals-tech-bulletins-user-guides).

The NYISO Restoration Procedure has been developed by the NYISO and TOs and is contained in Attachment B of the *NYISO Emergency Operations Manual*. The contents of Attachment B constitute Critical Electric Infrastructure Information, therefore distribution is limited. The restoration procedure includes reference documents, which shall be employed by system operators during a restoration event. These include the following:

a. A Restoration Diagram, which provides a common network configuration reference for all NYCA transmission and substations stations 230 kV and above, identifies available synchronization points on the system, and identifies the preferred energization path to establish the transmission backbone.
b. A Restoration Procedure, which identifies the Black Start Facilities, the switching operations required to establish the transmission backbone, preferred synchronization points between the Black Start Facilities, guidance on voltage levels to be maintained, locations and magnitudes of load to be restored to maintain system voltage, and brief notes addressing procedure implementation.
c. A Black Start Facilities List, identifying their location, capabilities, and fuel sources
d. A Line Charging List associated with all lines 230 kV and above identified in the Restoration Diagram.
e. A set of Restoration Guidelines, which provides detailed guidance beyond that included in the Restoration Procedure.
f. An Inter-Area Restoration Coordination table, which provides the elements of coordination in restoring the Interconnection with the neighboring Reliability Coordinators.

2.2 Transmission Owner System Restoration Procedures

Transmission Owners within the NYISO's Reliability Coordinator Area shall maintain local system restoration plans (SRPs) for their transmission districts consistent with NYSRC, NPCC, and NERC standards. These restoration procedures shall be coordinated with the restoration procedures of neighboring TOs. The TOs must maintain current copies of these procedures at the NYISO.

Procedures and protocols for off-site power requirements of nuclear power plants, including priority of restoration, are described in Nuclear Plant Interface Requirement (NPIR) documents maintained by the local transmission owners and the interconnected nuclear power plant.

2.3 Black Start Resource Restoration Procedures

Each Generator Operator with a Black Start Resource shall have documented procedures for starting each Black Start Resource and fulfilling its requirements in the SRP without the availability of an outside electric supply.

3. Restoration-Related Facilities

The NYISO and the TOs within the NYISO's Reliability Coordinator Area shall secure adequate Black Start Facilities to meet the requirements of the NYISO's System Restoration Procedure. Black Start Resources are individual units that have the capability, following a system-wide blackout, to start up and energize a bus without the availability of an outside electric supply. Black Start Facilities are multi-unit plants, containing at least one Black Start Resource, where the entire plant can be restarted without the availability of an outside electric supply. All Black Start Facilities must incorporate at least one Black Start Resource. It is not required that all units at a Black Start Facility be Black Start Resources.

3.1 Black Start Resources

3.1.1 NYISO Black Start Service Resources

The NYISO determines the need and adequacy of Black Start Facilities for the NYISO's restoration procedure through operating studies and simulation. The NYISO restoration procedure shall include identification of any Black Start Facility and the characteristics of such units, including but not limited to the following: the name of the Black Start Facility, location, megawatt and megavar capacity, and type of unit. Procedures for acquiring the necessary Black Start Resources as identified in NYISO studies are in Section 7, Black Start Capability Service, of the *NYISO Ancillary Services Manual* (posted as an Operations manual on the NYISO Web site at the following URL: https://www.nyiso.com/manuals-tech-bulletins-user-guides).

3.1.2 Transmission Owner Black Start Service Resources

Transmission Owners within the NYISO's Reliability Coordinator Area are responsible for determining the need and adequacy of Black Start Facilities to meet the requirements of their local restoration procedure. The TO restoration procedure shall include identification of any Black Start Facilities and the characteristics of such units, including but not limited to the following: the name of the Black Start Facility, location, megawatt and megavar capacity, and type of unit. The identity of TO Black Start Facilities shall be made available to the NYISO and to affected TOs. Transmission Owners are responsible for procuring any required local Black Start Resources.

3.1.3 Black Start Testing Procedures

Black Start Testing procedure requirements shall be designed by the Transmission Operator to ensure Black Start Facilities are able to perform their intended function in the SRP. The number of units to be

included in the Black Start Resource test procedures shall be determined by the SRP requirements to control voltage and frequency.

Each Generator Operator with a Black Start Resource shall prepare Black Start Resource specific testing procedures, perform Black Start Resource tests, and maintain records of such testing, in accordance with the testing requirements set by the Transmission Owner to verify the unit's ability to, following a system-wide blackout, start up and fulfill its requirements in the SRP without the availability of an outside electric supply.

The most current test procedure shall be provided to the NYISO, and in the case of local Black Start Resources, to the appropriate TO, upon request.

3.1.4 Black Start Resource Testing Requirements

The annual test requirements for each Black Start Resource shall include the ability to:

1. Start with no support from the Bulk Electric System.
2. Energize a transmission bus or a generating station switchyard element
3. Operate in a stable condition while isolated from the Bulk Electric System for a minimum of ten minutes.

The Transmission Owner may specify additional testing requirements.

3.1.5 Black Start Testing Frequency

At least once each capability year each Black Start Facility in the NYISO's Reliability Coordinator Area must successfully test or demonstrate the ability of their Black Start unit(s) to perform their intended function as required by the NYISO's or local TO's SRP.

The NYISO shall determine the time within the capability year that the testing shall be completed.

Tests must be coordinated with the NYISO and the TO in whose service territory the unit is located.

3.1.6 Documentation of Black Start Testing

Generator Operators of Black Start Resources shall document the date, start-time, and duration of all tests, and indicate if the tests meet the criteria in the unit's Black Start test procedure. Testing will be certified to the NYISO through the form found in the *Services Tariff*, Rate Schedule 5, Appendix I (available from the NYISO Web site at the following URL: https://www.nyiso.com/regulatory-viewer). This documentation must be provided to the NYISO within 30 calendar days following a request from the NYISO.

Each Generator Operator, for each Black Start unit, shall annually provide a letter to the NYISO confirming that it identifies and maintains a list of critical components in its facilities (i.e., batteries, diesel back-up generators, inverters, etc.) to verify the condition of these critical components in accordance with good industry practice.

The NYISO shall maintain a database of all units identified as Black Start Resources for use in the SRP. This database shall include the name, location, megawatt capacity, megavar capacity, type of unit, latest date of test, and starting method for each unit.

3.1.7 Inclusion of Black Start Resources in the Con Edison SRP

NYSRC Reliability Rule G-R4 requires that the NYISO have procedures and implement actions to provide for the inclusion or continued inclusion of an eligible Black Start Resource in the Con Edison SRP if it would provide a material benefit to the Con Edison SRP. The NYISO procedures adopted to satisfy NYSRC Reliability Rule G-R4 are found in the Services Tariff, Rate Schedule 5, Section 15.5.4 (available from the NYISO Web site at the following URL: https://www.nyiso.com/regulatory-viewer).

3.1.8 Scheduling a Test for Consolidated Edison

1. A Generator shall perform the annual Black Start Capability Test for its unit(s) between May 1st to April 30th, as may be reasonably extended by mutual agreement among the Generator, Consolidated Edison and the ISO, without financial penalty; provided, however, that the Generator shall not perform a Black Start Capability Test in June, July, or August.
2. The test date must be agreed upon by Consolidated Edison, the Generator and the ISO. The agreed upon test date shall be deemed firm as of 48 hours prior to the scheduled beginning of the test. A firm test may not be called off or deferred except by the ISO for system or local reliability reasons. As is the case for any ISO-approved outage, the Generator shall not offer the unit into the Day-Ahead Market for operation during the Black Start Capability Test that day, and such non-offering into the market shall be deemed not to diminish the unit's availability.
3. An annual Black Start Capability Test may be performed prior to a maintenance outage only if there is no other scheduling option within the test period.
4 If the annual Black Start Capability Test is unable to be completed during the test period due to a forced outage or force majeure event, Consolidated Edison and the Generator will conduct the test outside the test period without a pro rata reduction in annual payments.
5. If a Black Start Capability Test is not successful, the Generator will have a reasonable opportunity to reschedule and conduct a subsequent test.

6. Consolidated Edison and the ISO may have representatives present to witness the annual Black Start Capability Test. However, witnesses are not required for the Generator to perform the test.

3.1.9 Consolidated Edison Black Start Resource Testing Requirements

NERC System Restoration Standard EOP-005 requires that each Transmission Operator shall have Blackstart Resource testing requirements to verify that each NERC Blackstart Resource is capable of meeting the requirements of its restoration plan. Con Edison, as a NERC registered Transmission Operator, has established the following testing requirements to verify that that each NERC Blackstart Resource is capable of meeting the requirements of the Con Edison System Restoration Plan:

1. The Blackstart Resource must start with no support from the Bulk Electric System.
2. The Blackstart Resource must energize a transmission bus.
3. The Blackstart Resource must operate in a stable condition while isolated from the Bulk Electric System for a minimum of ten minutes.

Additionally, consistent with the NERC EOP-005 requirement that each Transmission Operator have Blackstart Resource testing requirements which verify that each NERC Blackstart Resource is capable of meeting the requirements of its restoration plan, Con Edison has established duration requirements for completing the NERC Blackstart Resource test. The overall time to complete the test is a function of the type of a generating unit requesting Black Start service. A Gas Turbine unit (individually or as part of a group of units) must complete the test in no more than 90 minutes. A Steam Turbine unit must complete the test in no more than 8 hours.

The NERC-compliant Blackstart Resource testing requirements described above do not supersede any conflicting Black Start Capability Test requirements contained in NYISO MST Rate Schedule 5, Appendix I, so long as they remain in effect, for purposes of determining eligibility for compensation. However, successful completion of the testing requirements described above will constitute successful completion of the Black Start Capability Test requirements identified in NYISO MST Rate Schedule 5, Appendix I.

3.2 Key Facilities, Critical Components and Basic Minimum Power System

The Northeast Power Coordinating Council's (NPCC's) Document Directory 8 – System Restoration (https://www.npcc.org/content/docs/public/program-areas/standards-and-criteria/regional-criteria/directories/directory-08.pdf), specifies the testing requirements for key facilities and critical components for system restoration. The NPCC Document A-7 – Glossary of Terms (available from the following URL: https://www.npcc.org/content/docs/public/program-areas/standards-and-criteria/regional-

criteria/directories/npcc-glossary-of-terms.pdf) defines the Basic Minimum Power System required for system restoration.

3.2.1 Identification

The NYISO's Basic Minimum Power System is defined by the list of Key Facilities found in Attachment B of the *NYISO Emergency Operations Manual*. The TOs establish and maintain the lists of Critical Components associated with these Key Facilities.

3.2.2 Testing requirements for Critical Components Associated with Key Facilities

The four categories of key facilities subject to testing are:

- Black Start generating stations;
- Underground transmission cables;
- Substation and Telecommunication sites; and
- Control Center and Telecommunication Center facilities

The NPCC Document Directory 8 – System Restoration (https://www.npcc.org/content/docs/public/program-areas/standards-and-criteria/regional-criteria/directories/directory-08.pdf), provides test procedures, test frequency and duration, criteria for success, and required reports for testing critical components associated with Key Facilities.

3.2.3 Failure of Critical Components

Loss of functionality at a key facility is defined as the loss of control of the facility or the loss of AC or DC service. Where multi-redundant systems are installed for a critical component, all redundant systems must fail to result in loss of functionality. An example of this is a battery system with both A and B batteries. In this case, both the A and the B battery systems must fail to lose functionality.

The failure of critical components associated with key facilities discovered during a test or otherwise that would result in the loss of functionality of the key facility shall be communicated to the NYISO within 24 hours.

3.2.4 TO Supplemental Generation Supporting Key Facilities

Restoration participants with supplemental generation units that support key facilities must annually self-certify to the NYISO that they:

- Are able to place these generation units in service for their intended purpose, consistent with restoration plan priorities

- Maintain provisions to replenish fuel

4. Communications During Restoration

4.1 Normal and Emergency Communications Procedures

Normal and emergency communications procedures and protocols for use during Restoration State recovery actions are found in the Communications section of the *NYISO Emergency Operations Manual* (posted as an Operations manual on the NYISO Web site at the following URL: (https://www.nyiso.com/manuals-tech-bulletins-user-guides)

4.2 Loss of Communications with the NYISO

If all communication is lost between the Power Control Center and TOs, the TOs shall proceed to restore the NYS Power System using inter-company communication facilities to coordinate all aspects of the restoration according to the procedures in the Restoration State section of the *NYISO Emergency Operations Manual* (posted as an Operations manual on the NYISO Web site at the following URL: (https://www.nyiso.com/manuals-tech-bulletins-user-guides).

4.3 Incident Command Structure Protocol

The NYISO has developed an internal procedure for establishing an Incident Command Structure (ICS) protocol in order to manage and prioritize off-floor communications during bulk power disturbances. Key elements of this protocol have been shared with appropriate entities for coordination of communication during system recovery.

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5. Reviewing and Updating the System Restoration Procedure

5.1 NYISO Procedure Review, Verification, Update, and Distribution

5.1.1 NYISO Procedure Review

NYISO's SRP review is conducted annually by the NYISO and TOs. This review will incorporate feedback from simulation exercises, restoration training, and an annual NYISO Restoration Drill. The simulation exercises and restoration training shall exercise the coordination between the NYISO restoration procedure and the procedures of the TOs and the neighboring Reliability Coordinators. The annual restoration drill will also include testing telecommunication facilities and protocols, as well as confirming the specific procedures identified in the plan are adequate to implement the restoration strategy.

Additional reviews of the NYISO's procedure should be performed if the NYISO or TOs deem it necessary due to significant changes to the power system network or modeling. Review of the restoration procedures of the TOs and neighboring Reliability Coordinators shall be incorporated into the annual review of the NYISO SRP. Following the review, the NYISO and TOs will update the procedure, if required.

Feedback and recommended updates to the NYISO procedure should be documented.

5.1.2 NYISO Procedure Verification

The NYISO shall verify through analysis of actual events, steady state and dynamic simulations, or testing that its restoration procedure accomplishes its intended function. This shall be completed every five years at a minimum. Such analysis, simulations, or testing shall verify:

- The capability of Black Start Facilities to meet the Real and Reactive Power requirements of the Cranking Paths and the dynamic capability to supply initial Loads,
- The location and magnitude of Loads required to control voltages and frequency within acceptable operating limits, and
- The capability of generating resources required to control voltages and frequency within acceptable operating limits.

Following an event where the system restoration procedure was invoked, both the NYISO and the TOs shall analyze and report on the performance of their restoration procedures.

5.1.3 NYISO Procedure Update

Following the annual review addressed in Section 5.1.1, the NYISO and TOs will update the NYISO restoration procedure, if required. The NYISO shall update its restoration procedure within 90 calendar

days after identifying any unplanned permanent System modifications, or prior to implementing a planned BES modification that would change the implementation of its restoration procedure.

5.1.4 NYISO Procedure Distribution

The NYISO shall distribute its most recent restoration procedure to the TOs within 30 calendar days of creation or revision. The NYISO shall provide the entities identified in its approved restoration procedure with a description of any changes to their roles and specific tasks prior to the implementation date of the procedure.

5.2 Transmission Owner Procedure Review, Verification, Update, and Distribution

5.2.1 Transmission Owner Procedure Review

The TOs shall review their local restoration procedures annually and prior to implementing any planned system modification that could affect the coordination of the NYISO and TO restoration procedures. These reviews shall evaluate the impact of procedure changes, system expansion, or system reconfiguration.

5.2.2 Transmission Owner Procedure Verification

Each TO shall verify through analysis of actual events, steady state and dynamic simulations, or testing that its restoration procedure accomplishes its intended function. This shall be completed every five years at a minimum. Such analysis, simulations, or testing shall verify:

- The capability of Black Start Facilities or ties from neighboring systems to meet the Real and Reactive Power requirements of the Cranking Paths and the dynamic capability to supply initial Loads,
- The location and magnitude of Loads required to control voltages and frequency within acceptable operating limits, and
- The capability of generating resources required to control voltages and frequency within acceptable operating limits.

Following an event where the system restoration procedure was invoked, TOs shall analyze and report on the performance of their restoration procedures.

5.2.3 Transmission Owner Procedure Update

The TOs shall update their restoration procedures within 90 calendar days after identifying any unplanned permanent System modifications. The TOs shall update their restoration procedures prior to

implementing a planned BES modification that would change the implementation of their restoration procedures. In the event of any proposed changes to TO facilities or procedures that could affect the coordination of the NYISO and TO restoration procedures, the TOs shall provide notification at least two months prior to implementation.

5.2.4 Transmission Owner Procedure Distribution

Each TO shall distribute its most recent restoration procedure to the NYISO within 30 calendar days of creation or revision. The TO shall provide the entities identified in its approved restoration procedure with a description of any changes to their roles and specific tasks prior to the implementation date of the procedure.

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6. Restoration Training

6.1 NYISO Restoration Training

The NYISO shall provide for training NYISO and Market Participant operating personnel for the effective implementation of the NYCA SRP in the following area:

- Annual coordinated restoration training for NYISO and TO system operators, including:
  - Energization paths and initial switching requirements exiting the Black Start Facilities
  - Identification of acceptable voltage and frequency limits during restoration,
  - Operating Processes to reestablish connections between restored systems,
  - Simulation exercises that include modeling of each transmission owner's SRP, and
  - Annual simulations of full or partial system shutdowns and restoration, including the issuance of critique as input to the annual review of the restoration procedure.

Black Start Providers and other generator owners shall be invited to participate in training sessions and exercises as appropriate.

The NYISO shall maintain training program records showing that operating personnel have been trained in the implementation of the NYCA SRP and participated in restoration exercises.

6.2 Transmission Owner Restoration Training

Each TO shall provide for training of operating personnel for the effective implementation of the NYCA SRP in the following areas:

- Annual restoration training for its operating personnel on the local system restoration procedure
- A minimum of two hours of System restoration training every two calendar years to its field switching personnel identified as performing unique tasks associated with the TO's restoration procedure that are outside of their normal tasks.

Each TO shall participate in NYISO restoration drills, exercises, or simulations as requested by the NYISO.

The TOs shall maintain training program records showing that operating personnel have been trained in the implementation of the local system restoration procedure. These records shall be made available to the NYISO upon request.

6.3 Generator Operator Restoration Training

Each Generator Operator shall participate in NYISO restoration drills, exercises, or simulations as requested by the NYISO.

Each Generator Operator with a Black Start Resource shall provide a minimum of two hours of training every two calendar years to each of its operating personnel responsible for the startup of its Black start Resource generation units and energizing a bus. The training program shall include training on the following:

- System restoration procedure elements requiring coordination with the TO
- Procedures for starting each Black Start Resource and energizing a bus

Each Generator Operator with a Black Start Resource shall maintain training program records showing that operating personnel have been trained in the implementation of Black Start procedures. These records shall be made available to the NYISO upon request.