NYISO Compliance Support for F.1 NYCA System Restoration Plan

NYSRC Rule F.1 R1	References to NYISO *System Restoration Manual*, April 2017
R1. The *NYISO* shall develop and maintain a NYCA SRP that provides assurance that the NYCA system will be restored in a safe and orderly manner and as promptly as reasonable possible following a major or total blackout. The NYCA SRP shall include system restoration at two integrated levels: restoration of the NYCA backbone system in accordance with a *NYISO* System Restoration Plan (*NYISO* SRP) and restoration of local areas in ccordance with *Transmission Owner* system restoration plans (TO SRPs). The NYISO shall develop and maintain an SRP that meets NERC and NPCC requirements. In addition, the NYCA SRP shall include the following more stringent and more specific requirements:	
R1.1. Procedures for coordinating the *NYISO* SRP and the *Transmission Owner* SRPs.	*The NYISO's System Restoration Manual, Sections 2 defines the two levels of procedure, NYISO and TO, which are included in the NYCA SRP.* *+A12. 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."*
R1.2. Required actions to be included in each *Transmission Owner's* restoration plan, consistent with *NYISO* procedures and *NYSRC*, NPCC, and NERC criteria.	*The NYISO requirement for the TO restorations plan actions to be consistent with NYSRC, NPCC, and NERC criteria can be found in the NYISO's System Restoration Manual, Section 2.2* *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."* *TO specific requirements relating to maintaining and validating restoration procedures, acquiring and testing black start resources, and personnel training are addressed in Sections 5.2, 3.1.2, and 6.2, respectively. These requirements are addressed in detail with regard to specific measures, later in this document.*
R1.3. Procedures for coordinating the SRPs of the *NYISO* and neighboring Reliability Coordinators, including restoration of interconnections.	The NYISO Emergency Operations Manual Section 6.3 and 6.4 addresses the elements of coordination with Neighboring Reliability Coordinators. As stated in Section 6.3 the NYISO and the neighboring Reliability Coordinators shall coordinate through NYISO Actions 3, 5, 6,8,10 & 11.
R1.4. Identification of black start facilities required for implementing the NYISO SRP, including the names, location, megawatt capabilities, megavar capabilities, and unit type.	The requirement for identification of the NYISO Black Start facilities and their characteristics are identified in the NYISO System Restoration Manual section 3.1.1. The list of NYISO Black Start facilities are included in the Attachment B of the NYISO Emergency Operations Manual, documents categorized as CEII, with restricted distribution. 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"
R1.5 Procedures for black start facility test requirements to verify that each black start unit in the NYISO and Transmission Owner SRPs is capable of meeting the requirements of these SRPs. These black start testing requirements shall include: **R1.5.1** Each black start facility shall be tested annually. The NYISO shall determine the time within the Capability Year that testing shall be completed. The NYISO shall determine the number of units within a black start facility that shall be tested annually.	The NYISO's System Restoration Manual, Section 3.1 specifies the testing requirements for all Black Start resources, both NYISO and the TOs.
R1.5.2 The *NYISO* procedures shall indicate that with due regard for *reliability* considerations and subject to approval by the *Transmission Owner* and the *NYISO*, a test performed by *black start facilities* in the *Transmission Owner's* SRP within one month beyond the *Capability Year* test period, or longer in force majeure cases, shall be considered a valid test for that *Capability Year*. On request by the *NYSRC*, the *NYISO* shall certify that *reliability* was considered when the NYISO and the *Transmission Owner* approved *black start facility* testing beyond the *Capability Year*.	The NYISO's System Restoration Manual, Section, 3.1.5 and 3.1.8 address the scheduling of Black Start testing.
R1.5.3 Each black start unit shall test the ability to start with no support from the transmission system or when designed to remain energized without connection to the remainder of the System. R1.5.4 Each black start unit shall test the ability to energize a bus. If it is not possible to energize a bus during the test, the testing facility must affirm that the unit has the capability to energize a bus such as verifying that the breaker close coil relay can be energized with the voltage and frequency monitor controls disconnected from the synchronizing circuits. R1.5.5 Each black start unit shall be tested such that once the unit has been started, it shall continue to demonstrate its capability to operate in a stable condition while isolated from the power system for a minimum of ten minutes.	The NYISO's System Restoration Manual, Section 3.1.4 requires each black start unit shall test the ability to start with no support from the transmission system, energizing a bus, and sustained stable operation for at least 10 minurtes
R1.6. Procedures requiring that each Transmission Owner identify black start resources that are necessary for implementing its SRP. These procedures shall also require Transmission Owners to identify the name, location, megawatt capacity, megavar capacity, and type of black start resource(s). The identity of transmission SRP black start facilities shall be made available to the NYISO and to affected Transmission Owners. In addition, NYISO procedures shall include a requirement that each Black Start Provider 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 requirement for identification of the NYISO Black Start facilities and their characteristics are identified in the NYISO System Restoration Manual section 3.1.1. The list of NYISO Black Start facilities are included in the Attachment B of the NYISO Emergency Operations Manual, documents categorized as CEII, with restricted distribution. 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"

R1.7. Identification of the necessary operating instructions and procedures to cover loss of telecommunications channels during a system disturbance.	The communication procedures associated with restoration are found in the NYISO's System Restoration Manual, Section .4. 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: http://www.nyiso.com/public/markets_operations/documents/manuals_guides/index.jsp). 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: http://www.nyiso.com/public/markets_operations/documents/manuals_guides/index.jsp). "
R1.8. Identification of protocols for disseminating information to operating entities identified in the plan during a system disturbance.	The communication protocols associated with disseminating restoration information are found in the NYISO's System Restoration Manual, Sections 1.4 and 4. 1.4 Coordination Under normal circumstances, the NYISO will coordinate system restoration among neighboring Reliability Coordinators and Transmission Owners (TOs) " 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: http://www.nyiso.com/public/markets_operations/documents/manuals_guides/index.jsp). 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: http://www.nyiso.com/public/markets_operations/documents/manuals_guides/index.jsp). 4.3 Incident Command Structure Protocol The NYISO has developed an internal procedure for establishing an Incident Command Structure (ICS) protocol in
R1.9. Procedures for ensuring that the coordination of NYISO and Transmission Owner SRPs be demonstrated by drill or by simulation.	Procedures ensuring coordination of NYISO and TO system restoration procedures is addressed in the NYISO restoration procedure review found in the NYISO System Restoration Manual section 5.1. • 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 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
R1.10. Procedures requiring Transmission Owners to notify the NYISO of any proposed changes to Transmission Owner SRP facilities or procedures that could affect the coordination of the NYISO and TO restoration plans at least two months prior to their implementation.	Procedures requiring the TOs to notify the NYISO at least two months prior to implementation of any TO restoration procedures that could effect coordination of the NYIS and TO Restoration procedures are addressed through the NYISO System Restoration Manual section 5.2.3 as follows: 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. "

R1.11. Procedures requiring that the NYISO and Transmission Owner SRPs be reviewed and updated annually and whenever changes are made in the NYS Power System. This review shall evaluate the impact of planned system expansion or reconfiguration on these SRPs, prior to implementation.	Restoration plan review and updates of the NYISO procedure is addressed through the NYISO System Restoration Manual section 5 as follows: 5.1.1 NYISO Procedure Review 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 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,
R1.12. Identification of guidelines which provide the basis for alternative restoration actions if normal restoration procedures cannot be executed due to system conditions.	The strategy identified in NYISO System Restoration Manual section 1.2, provide the guidelines for alternative restoration actions. 1.2 Strategy …… 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. …… 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 Dispatching Operations Manual
R1.13. Procedures for coordinating annual updates to the NYISO SRP and restoration plans of neighboring Reliability Coordinators.	The procedure for coordinating the NYISO restoration procedures with neighboring control areas is identified in NYISO System Restoration Manual section 5.1.1. 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.
R1.14. Procedures for training *NYISO* and *Market Participant* operating personnel for the effective implementation of the NYCA SRP. The NYISO shall maintain program records showing that operating personnel have been trained in the implementation of the *NYCA* SRP and participated in restoration exercises. These records shall be provided to the *NYSRC* upon request	The NYISO's System Restoration Manual, Section 6.1 addresses training *NYISO* and *Market Participant* operating personnel for the effective implementation of the NYCA SRP. This section also addresses the maintenance of restoration training records