

ISO New England Operating Procedure No. 11

Blackstart Resource Administration

(OP-11)

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References:

North American Electric Reliability Corporation (NERC) Critical Infrastructure Protection (CIP) Reliability Standards

NERC Reliability Standard EOP-005 - System Restoration from Blackstart Resources

NPCC Directory #8 System Restoration

ISO New England Inc. Transmission, Markets and Services Tariff (ISO Tariff), Attachment D - ISO New England Information Policy (ISO Information Policy)

ISO New England Inc. Transmission, Markets and Services Tariff (ISO Tariff), Section II, Open Access Transmission Tariff (OATT), Schedule 16 - Blackstart Service (Schedule 16)

ISO New England Operating Procedure No. 5 - Resource Maintenance and Outage Scheduling (OP-5)

ISO New England Operating Procedure No. 23 - Resource Auditing (OP-23), Section IV - Reactive Capability Audits

I. INTRODUCTION

ISO New England (ISO), in consultation with the System Restoration Working Group (SRWG), develops, maintains, and evaluates the New England System Restoration Plan (Plan) for the New England Transmission System. The Plan is described in Master/Local Control Center Procedure No. 18 - New England System Restoration Plan (M/LCC 18).

Following a disturbance that causes a partial or total shutdown of the New England Transmission System, Designated Blackstart Resources (DBRs) may be used to begin system restoration.

ISO, in consultation with the SRWG, verifies that the quantity and location of DBRs are sufficient to meet North American Electric Reliability Corporation (NERC), Northeast Power Coordinating Council, Inc. (NPCC), and ISO restoration criteria in addition to the needs of the Plan. DBRs shall be appropriately sized and located to facilitate an expeditious restoration following the partial or total shutdown of the New England Transmission System.

A resource that meets, or may meet with conversion, the eligibility requirements contained in the ISO New England Inc. Transmission, Markets, and Services Tariff (ISO Tariff), Section II, Open Access Transmission Tariff (OATT), Schedule 16 - Blackstart Service (Schedule 16) and this OP may be evaluated by ISO and the SRWG to determine if that resource provides benefit to the Plan. Either the Blackstart Owner or ISO may initiate the evaluation process to determine whether a resource can provide a benefit to the Plan; however, regardless of the initiation of the evaluation process, participation in Blackstart Service is through voluntary mutual agreement between ISO and the Blackstart Owner through the terms of a Blackstart Service Commitment.

The evaluation criteria to determine benefit to the Plan include (but are **not** limited to) the resource:

- Real power capability,
- Reactive power capability,
- Frequency control capability,
- Voltage control capability,
- Interconnection voltage,
- Proximity to nuclear power plants,
- Proximity to inter-Local Control Center (LCC) interconnection points,
- Proximity to inter-Reliability Coordinator Area (RCA) interconnection points,

- Time between system shutdown and resource availability for electrical loading,
- Geographic location.

Based upon this evaluation, a resource may become a DBR and be included in the Plan.

This OP contains the requirements and procedures for the application, assessment, selection, and testing of DBRs in accordance with Schedule 16. A Blackstart Owner may obtain Blackstart Capability Test (Test) data for each DBR in its portfolio, including the date of the last successful Test, from the monthly updates on the ISO Market Information System (MIS).

II. BLACKSTART RESOURCE ADMINISTRATION

1. Eligibility Requirements for Providing Blackstart Service

In order to provide Blackstart Service, a Blackstart Owner and resource shall meet the Blackstart Service Minimum Criteria specified in Schedule 16 of the ISO New England Open Access Transmission Tariff (Schedule 16). Those criteria have been broken down into greater detail for implementation in the following list:

- The resource shall be located within the ISO New England RCA;
- The resource shall have real power (MW) and reactive power (MVar) Real-Time telemetry, applicable for restoration needs, transmitted to the ISO and LCC(s);
- The resource shall be dispatchable by ISO and the applicable LCC(s), or otherwise subject to operational control by ISO during the restoration of the New England Transmission System following a partial or complete shutdown of the New England Transmission System;
- The resource shall be capable of starting and remaining energized without support from either offsite power or another DBR until such time as additional load is directed to be picked up by ISO or an LCC;
- The resource shall be capable of closing its output circuit breaker to a de-energized bus;
- The resource shall be maintained and staffed in a manner that allows it to be brought online and available for loading as soon as possible but **no** later than the response time specification stated in each DBR OP-11, Appendix D - Application for Prospective Designated Blackstart Resource (App D) and measured from the time of the system shutdown;
- The resource shall have the ability to maintain a stable frequency, as directed, at any point within a range of 59.0-61.0 Hz;
- The resource shall be able to operate in a mode with zero governor droop or the equivalent;
- The resource shall have an automatic voltage regulator capable of being placed in automatic voltage control (controlling to a voltage setpoint)
 - The resource shall be able to operate within voltage limits as provided by the Blackstart Owner on the applicable NX-12D Generator Reactive Data form and agreed to by ISO;
- The resource shall have the ability to provide sufficient leading and lagging power factor capability and performs reactive capability testing at least every five years. The testing shall follow the protocol required for

generators in the ISO New England Operating Procedure No. 23 - Resource Auditing, Section IV - Reactive Capability Audits.

- The resource shall have access to a fuel supply that is independent of another DBR's fuel requirement and that will allow it to run at full capacity during a shutdown of the New England Transmission System for at least:
 - 2 hours for alternative energy resources (including hydro);
 - 12 hours for resources of all other fuel types.
- The startup, loading, and full capacity run of the resource shall **not** be impacted by the dispatch of any other DBR;
- The Blackstart Owner shall maintain an Iridium satellite phone system, providing up-to-date phone number to ISO, meeting the following conditions:
 - The Iridium satellite phone system shall be located at:
 - The physical DBR location; or
 - If the DBR is **not** continuously staffed, at both the DBR physical location and the Designated Entity (DE) location.

2. Application for Designation as a Blackstart Resource

A. Resource Requiring Conversion to Meet Blackstart Service Minimum Criteria

In order to provide Blackstart Service from a resource that does **not** meet the Blackstart Service Minimum Criteria, a Blackstart Owner shall submit an application for the resource to be converted to meet the Blackstart Service Minimum Criteria and be accepted, by ISO, into the Plan. The completed Initial Designated Blackstart Resource Application contained in OP-11, App D, Section II shall be submitted to ISO via the ISO Customer Support issue tracking system (ASK ISO).

- 1) Following receipt of the completed application:
 - a. ISO reviews the Blackstart Owner's application and an agenda item is created for inclusion at a regularly scheduled SRWG meeting to evaluate the application.
 - b. The Blackstart Owner receives confirmation of receipt of the application and the scheduled date of the SRWG meeting when the application is to be discussed. The Blackstart Owner is **not** required to attend this meeting.
- 2) ISO, in consultation with the SRWG, shall conduct an initial review of the application and determine if the proposed DBR is expected to

provide a benefit to the Plan. Following the completion of the review, ISO shall notify the Blackstart Owner of one of the following determinations:

- a. Preliminary Acceptance. ISO notifies the Blackstart Owner that the resource may provide a benefit to the Plan.
- b. Request Additional Information. If ISO or the SRWG require additional information to complete the initial review of the application, ISO shall notify the Blackstart Owner that insufficient data was submitted to render an assessment and request the necessary information. If the requested information is **not** provided within 30 calendar days or as otherwise agreed upon, ISO may reject the application.
- c. Rejection. ISO notifies the Blackstart Owner of the rejection of the application and provides the reason for the rejection. The explanation of the application rejection shall be bound by the constraints of the ISO New England Inc. Transmission, Markets and Services Tariff (ISO Tariff), Section I, Attachment D - ISO New England Information Policy (ISO Information Policy).

3) Following Preliminary Acceptance:

- a. The Transmission Owner (TO), through the appropriate LCC shall submit required technical data, as requested by the SRWG, to support detailed restoration studies.
- b. The Blackstart Owner shall submit technical data detailed in OP-11, App D Section III Follow-Up System Designated Blackstart Resource Application or as further directed by ISO.
- c. ISO, in conjunction with the LCCs, shall determine if the proposed DBR meets the needs of the Plan by conducting detailed technical restoration studies.
- d. If it is determined, through ISO and LCC studies, that the proposed DBR can meet the requirements of the Plan, ISO and the Blackstart Owner of the proposed DBR may enter into an agreement for the Blackstart Owner to perform conversion studies. This agreement is found in OP-11, Appendix G, - Designated Blackstart Resource Commitment (App G), Section II - ISO and Blackstart Owner Commitment Prior to Conversion Studies. The Blackstart Owner shall then conduct conversion feasibility studies to determine the technical requirements for blackstart conversion.

4) Upon completion of the feasibility studies:

- a. The Blackstart Owner shall provide copies of the study report to ISO;

- b. The SRWG shall discuss the feasibility study at the next regularly scheduled meeting. If necessary, ISO may schedule the Blackstart Owner to present and discuss the submitted data and information at that SRWG meeting.
- 5) The SRWG shall assess the submitted material and recommend to ISO whether to accept or reject the proposed DBR conversion to blackstart capability. ISO and/or the SRWG may request more information from the Blackstart Owner to complete this assessment. The additional data shall be provided by the Blackstart Owner prior to a mutually agreed upon date. The assessment shall be completed within 60 calendar days of the date of the SRWG meeting at which the feasibility study was discussed or from the date of receipt of any additional data requested, whichever is later. ISO shall accept or reject the application for conversion based upon the evaluation of all information provided by the Blackstart Owner and the assessment results of the SRWG.
 - 6) If the resource is accepted into the Plan, ISO shall notify the Blackstart Owner and the M/LCC Heads. To commence conversion, the Blackstart Owner and ISO shall enter into a Blackstart Service Commitment, in the form contained in OP-11, App G, Section III - Designated Blackstart Resource Commitment. The Blackstart Owner shall provide periodic updates of conversion progress to ISO. Following successful conversion, the Blackstart Owner shall follow Section 3.A of this OP to schedule the initial Test. The initial Test shall be observed by at least one member of the SRWG. Upon successful completion of this initial Test, the Blackstart Owner shall notify the LCC and ISO. The effective date of the Blackstart Service Commitment for both compensation and commitment length shall be the first day of the month following the successful Test.
 - 7) In the event that ISO determines that the resource will **not** be accepted into the Plan, ISO shall notify the Blackstart Owner and provide an explanation for the determination. The explanation shall be bound by the constraints of the ISO Information Policy. In this case, the Blackstart Owner shall be eligible to receive Non-DBR Study Cost reimbursement in accordance with Schedule 16.
 - 8) If the Blackstart Owner determines that the resource will **not** continue with blackstart conversion and provide Blackstart Service, the Blackstart Service Commitment shall be terminated and the Blackstart Owner shall **not** be eligible to receive Non-DBR Study Cost reimbursement in accordance with Schedule 16.
- B. Resource **Not** Requiring Conversion to Meet Blackstart Service Minimum Criteria

A Blackstart Owner, with a resource that meets the Blackstart Service Minimum Criteria and is offering that resource to provide Blackstart

Service, shall submit a completed OP-11, App D, Section II - Initial Designated Blackstart Resource Application to ISO via ASK ISO.

- 1) Following receipt of the completed application:
 - a. ISO shall review the Blackstart Owner's application and an agenda item shall be included at a regularly scheduled SRWG meeting to evaluate the application;
 - b. The Blackstart Owner shall receive confirmation of receipt of the application and the scheduled date of the SRWG meeting when the application is to be discussed. The Blackstart Owner is **not** required to attend this meeting.
- 2) ISO, in consultation with the SRWG, shall conduct an initial review of the application and determine if the proposed DBR is expected to provide a benefit to the Plan. Following the completion of the review, ISO shall notify the Blackstart Owner of one of the following determinations:
 - a. Preliminary Acceptance. ISO notifies the Blackstart Owner that the proposed DBR may provide a benefit to the Plan.
 - b. Request Additional Information. If ISO and/or the SRWG require additional information to complete the initial review of the application, ISO notifies the Blackstart Owner that insufficient data was submitted to render an assessment and requests the necessary information. If the requested information is **not** provided within 30 calendar days (unless otherwise agreed upon) ISO may reject the application.
 - c. Rejection. ISO notifies the Blackstart Owner of the rejection of the application and provides the reason for the rejection. The explanation of the application rejection shall be bound by the constraints of the ISO Information Policy.
- 3) Following Preliminary Acceptance:
 - a. The TO, through the appropriate LCC, shall submit required technical data, as requested by the SRWG, to support detailed restoration studies.
 - b. The Blackstart Owner shall submit technical data detailed in OP-11, App D Section III or as further directed by ISO.
 - c. ISO, in conjunction with the LCCs, shall determine whether the proposed DBR meets the needs of the Plan by conducting detailed technical restoration studies.
- 4) Upon completion of the technical restoration studies and, if necessary, ISO may schedule the Blackstart Owner to present and discuss the

submitted data and information at an SRWG meeting.

- 5) The SRWG shall assess the submitted material and recommend to ISO whether to accept or reject the proposed DBR into the Plan. ISO and/or the SRWG may request more information from the Blackstart Owner to complete this assessment. The additional data shall be provided, by the Blackstart Owner, on or before a mutually agreed upon date. The assessment shall be completed within 60 calendar days of the date of the SRWG meeting at which the feasibility study was discussed or from the date of receipt of any additional data requested, whichever is later. ISO shall accept or reject the proposed DBR based upon the evaluation of all information provided by the Blackstart Owner and the assessment results of the SRWG.
 - a. If the application is accepted, ISO shall notify the Blackstart Owner and the M/LCC Heads. A Blackstart Owner that chooses to enter the resource into the Plan shall follow Section 3.A of this OP to schedule the initial Test. The initial Test shall be observed by at least one member of the SRWG. Upon successful completion of the initial Test, the Blackstart Owner shall notify the LCC and ISO. ISO and the Blackstart Owner may enter into a Blackstart Service Commitment in the form contained in OP-11, App G. The effective date of the Blackstart Service Commitment shall be the first day of the month following the successful Test.
 - b. In the event that ISO determines that the resource will **not** be accepted into the Plan, ISO shall notify the Blackstart Owner and provide an explanation for the determination. The explanation shall be bound by the constraints of the ISO Information Policy.

3. Blackstart Resource Program Administration and Requirements

A. Testing and Reporting Requirements

Each DBR that provides Blackstart Service shall have completed a successful Test, and meet testing and reporting requirements, within the past 12 months.

To perform a successful Test, a Blackstart Owner shall:

- 1) Coordinate with the applicable TO to ensure that any required transmission outage requests for equipment necessary to isolate the DBR or equipment necessary to be energized during the testing are submitted through the transmission outage coordination process.
- 2) Submit an outage application in the ISO's outage scheduling software. Requests shall come through the generator outage request process. In the event that the Test would **not** impact generator startup or notification times, an informational application shall still be submitted through the ISO's outage scheduling software.

- The SRWG shall review the impact of outage applications for testing pursuant to M/LCC 11 - Verification of New England System Restoration Plan
- 3) Request and receive permission from ISO and applicable LCC control rooms prior to commencing the Test.
 - 4) Start the DBR without support from either offsite power or another DBR.
 - 5) Verify that the DBR is ready for electrical loading within the stated response time specification declared in OP-11, App D after Test initiation.
 - 6) Demonstrate stable operation of the DBR for a minimum of 10 minutes while it remains isolated.
 - 7) Test operating aids and auxiliary systems required for DBR operation.
 - 8) Verify that emergency communications circuits are operable by contacting ISO or the applicable LCC during the Test.
 - 9) Verify that the DBR output circuit breaker can be closed into a de-energized bus by energizing a de-energized transmission element or generating station switchyard element if that energization does **not** involve the disconnection of load that is **not** dedicated generating station load to conduct the test. ISO, the LCC, and the Blackstart Owner shall coordinate to determine the appropriate element to be energized. If the energization would require disconnection of load that is **not** dedicated generating station load, the output circuit breaker shall be verified as capable of closing to a de-energized bus. Verification may take the form of energizing the closing coil with the frequency and voltage monitoring circuits disconnected, or any other acceptable physical verification of breaker closing ability.
 - 10) Verbally report the result of the Test to ISO and applicable LCC control rooms within 15 minutes of the completion of the Test (this notification is typically performed at the same time that the outage application end time is provided to ISO and the LCC). Test failures require the submittal of an application reflecting loss of blackstart capability in the ISO's outage scheduling software. Failures shall be corrected as soon as possible.

ISO shall:

- 1) Study and respond to the Test request;
- 2) Verify that the DBR is declared out-of-service during the outage as necessary.

Within 30 calendar days following completion of the Test, the Lead Market Participant (Lead MP) shall submit the following by email to blackstart@iso-ne.com:

- 1) A complete OP-11, Appendix E - Designated Blackstart Resource Test Log (App E), using OP-11, Appendix F - Instructions for Completing the Designated Blackstart Resource Test Log (App F).
- 2) A copy of the local generator test procedure used to perform the blackstart test.

A Blackstart Owner may submit documented demonstration of actual blackstart performance that meets the requirements for a successful Test as documented in OP-11, App E. The Blackstart Owner shall comply with the audit testing verbal communication and audit documentation requirements for consideration of Test compliance.

ISO or the SRWG have the right to be present during the performance of a Test and to inspect aspects of the DBR, including procedures and records, that pertain to the operation and maintenance of Blackstart Service.

B. Requirements for Performance During a System Restoration

DBRs are an integral portion of any system restoration; therefore, any DBR that is **not** on an outage in accordance with ISO New England Operating Procedure No. 5 - Resource Maintenance and Outage Scheduling (OP-5), regardless of Capacity Supply Obligation (CSO) status, shall be maintained such that it can meet the Blackstart Service Minimum Criteria at all times.

During a system restoration, a DBR shall be able to:

- 1) Start up and remain energized without support from either offsite power or another DBR
- 2) Self-supply its own load for stable operation
- 3) Be ready to receive transmission load, at the direction of ISO or the LCC, as soon as possible but definitely within the stated response time specification from OP-11, App D and measured from the time of system shutdown
- 4) Close its output circuit breaker to a de-energized bus, as instructed
- 5) Support the process of energizing transmission by providing real power, reactive power, frequency support, and voltage support.

4. Failure to Meet Blackstart Service Obligations

DBRs are the cornerstone of the Plan. As such:

- 1) Any inability to provide Blackstart Service shall be reported to ISO and the applicable LCC control rooms by the DE within 15 minutes of identifying the inability to provide Blackstart Service.
- 2) Notification shall also be emailed by the Lead MP to ISO within 30 calendar days at: blackstart@iso-ne.com

ISO shall assess all information associated with a DBR inability to meet its Blackstart Service Minimum Criteria and Blackstart Service obligations. If ISO determines, based on that assessment that a Failure to Maintain Blackstart Capability or a Failure to Perform During a System Restoration event (collectively or individually a "Failure") has occurred, ISO shall notify the Blackstart Owner. A Planned Outage or Maintenance Outage (as defined in OP-5) that has been applied for and approved in accordance with OP-5 shall **not** be considered a Failure to Maintain Blackstart Capability, except for a Planned Outage or Maintenance Outage that extends past its original planned duration by more than five calendar days. If a Planned Outage or Maintenance Outage extends past its original planned duration by more than five calendar days, then, at 0001 of the sixth calendar day, the DBR shall be considered to be in a Failure to Maintain Blackstart Capability status. A Planned Outage, Maintenance Outage, or Forced Outage that is the direct result of a transmission outage shall **not** be considered a Failure to Maintain Blackstart Capability until the transmission outage has been completed. In addition to providing the outage details through the outage scheduling process of OP-5, the Blackstart Owner shall email notification of Forced Outages or extensions to Maintenance Outages or Planned Outages to ISO at blackstart@iso-ne.com.

Upon correction of the Failure:

- 1) The Blackstart Owner shall notify the ISO and each appropriate LCC control room of the correction.
- 2) The Blackstart Owner shall email notification of the correction to blackstart@iso-ne.com.
- 3) ISO shall promptly provide acknowledgement of the correction notification.

5. Blackstart Service Commitment Termination

A DBR Blackstart Service Commitment may be terminated either by mutual agreement or by unilateral termination by ISO or the Blackstart Owner. The termination notification shall be in accordance with Schedule 16 and shall be submitted to ISO through ASK ISO. Following the termination date, ISO and the resource shall **no** longer be obligated under Schedule 16, this OP or the Plan.

OP-11 REVISION HISTORY

Document History (This Document History documents action taken on the equivalent NEPOOL Procedure prior to the RTO Operations Date as well revisions made to the ISO New England Procedure subsequent to the RTO Operations Date.)

Rev. No.	Date	Reason
--	03/13/19	For previous revision history, refer to Rev 10 available through Ask ISO
Rev 11	03/13/19	Truncated the Revision History per SOP-RTMKTS.0210.0010 Section 5.6 Section II.1 Remove reference to Category A/B DBRs; Section II.5 Deleted CIP compensation requirements; Deleted II.5; Appendices Section, retired Appendix C;
Rev 12	02/11/20	Biennial review by procedure owner; Step 3.A.6, modified to clarify requirement to be consistent with NPCC D8;
Rev 12.1	09/17/21	Biennial review by procedure owner; no changes required
Rev 12.2	09/12/23	Biennial review performed by procedure owner requiring no intent changes; Minor grammar and formatting edits.
Rev 12.3	09/11/25	Biennial review performed by procedure owner with no intent changes required; Minor grammar edit; Made administrative changes required to publish a Minor Revision.

APPENDICES

- A. Retired (06/30/2013)
- B. Retired (01/04/2013)
- C. Retired (03/13/2019)
- D. Application for Prospective Designated Blackstart Resources
- E. Designated Blackstart Resource Test Log
- F. Instructions for Completing the Designated Blackstart Resource Test Log
- G. Designated Blackstart Resource Commitment