Operating Procedures

ISO New England Operating Procedure No. 6

System Restoration – Appendix E – Inter-Area Ties

Effective Date: November 17, 2010
Revision No. 10

Appendix E - Inter-RCA/BAA Ties

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TABLE 1 - NEW YORK - NEW ENGLAND

NOTE: *The following NY-NE intertie list is consistent with the filed FERC Electric Tariff No.3, Attachment F, Schedule A to the Coordination Agreement Between ISO-NE and the NYISO. The actual switching associated with an outage of any one of these transmission facilities may include additional transmission facilities not listed.*

PV-20	Plattsburgh - Sandbar	115 kV AC
K7	Whitehall - Blissville	115 kV AC
K6	Hoosick - Bennington	115 kV AC
E205W	Rotterdam - Bear Swamp	230 kV AC
393	Alps – Berkshire	345 kV AC
690	Smithfield - Salisbury	69 kV AC
398	Pleasant Valley - Long Mountain	345 kV AC
NNC (601,602,603)	Northport – Norwalk Harbor Cable	138 kV AC
CSC (481)	Tomson - Halvarsson	150 kV DC

TABLE 2 - NEW BRUNSWICK - NEW ENGLAND

NOTE: *The following NB-NE intertie list is consistent with the filed FERC Electric Tariff No. 3, Attachment F, Schedule A to the Coordination Agreement Between ISO-NE and the NBSO.*

3001	Keswick – Keene Rd	345 kV AC
390 (3016)	Pt Lepreau - Orrington	345 kV AC

TABLE 3 - HYDRO QUEBEC - NEW ENGLAND

NOTE: *The following HQ-NE intertie list is consistent with the filed Highgate Interconnection Operators Agreement Between ISO-NE and HQTÉ and the Interconnection Operators Agreement Between ISO-NE and HQTÉ.*

Highgate	Bedford - Highgate	120 kV AC 57 kV DC
Phase I/II HVDC	Radisson - Nicolet – Sandy Pond	450 kV DC

HVDC TIE RESTORATION GUIDELINES

The following are guidelines for when the HVDC ties can be reliably restored:

- New England has both old (e.g., Phase I/II, Highgate) and new (e.g., CSC) technology HVDC.
    - Older HVDC technologies require a strong AC system for support to operate (e.g.for short circuit requirements/commutation process and switching of large shunt devices).
    - Newer HVDC technologies can operate on a weak AC system.
- Each Reliability Coordinator Authority is required to define requirements for the restoration of their HVDC interconnections.

Requirements to restore each ISO HVDC tie are as follows:

Phase I/II HVDC:

- Must be able to reliably switch the following Sandy Pond shunt devices:
    - 180 MVAR Reactors
    - 90 MVAR Capacitors
- All Commutation support requirements must be met:
    - Several thousand MVA of synchronized generation/load for system strength
    - 115 kV feeds from Tewksbury and Pratts junction
    - At least three (3) 345 kV Lines
    - Operate Phase I/II HVDC at minimum/partial load

Highgate:

- Initially loop around Highgate with a jumper and switch blocks of Vermont load onto HQ
- Strong AC system (short circuit strength) needed for commutation process
- At least two (2) 115 kV feeds to Northwest VT
- At least 50 MW of Northwest VT generation
- Operate at minimum/partial load

Cross Sound Cable:

(New HVDC technology avoids commutation failure issue, can interconnect to and operate with weak AC systems and can provide voltage/reactive support and control)

- Scovill Rock - East Shore (387 line) 345 kV must be closed in (feeds CSC)
- Two or more 138 kV lines at Shoreham

OP 6 APPENDIX E 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
Rev 1	07/22/98	
Rev 2	09/01/2002	
Rev 3	06/11/2004	
Rev 4	11/09/2004	
Rev 5	02/01/05	Updated to conform to RTO terminology
Rev 6	10/13/06	Changed designator to Appendix E due to termination of other Appendices
Rev 7	08/30/07	Added Guidelines for when the HVDC ties can be reliably restored
Rev 8	12/20/07	Added NBSO 390 tie line
Rev 9	03/09/10	Annual review by procedure owner; Global reformatted by placing data in tables, changed font, and added a Table of Contents; Table 1 added NOTE updated data; Table 2 added NOTE, updated data; Table 3 Added NOTE, updated data; Corrected and clarified information provided for HVDC Guidelines and Requirements
Rev 10	11/17/10	Modified title replaced Inter-Area with RCA/BAA; Table 2 deleted 396 and replaced Orrington with Keene Rd (Construction of the Keene Rd Substation broke the 396 line at Keene Rd. The section of line crossing the border (the intertie) is now named 3001.)