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Appendix K – Instructions for Submission of Short Circuit Data

ISO New England Transmission Equipment Rating, Characteristic, and Operational Data

Transmission Equipment Short Circuit Data

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I. EQUIPMENT REQUIREMENTS

Each North American Electric Reliability Corporation (NERC)-registered Transmission Owner (TO) in New England listed in Table 1 shall provide a short circuit model for all transmission equipment connected within their service territory designated as part of the Bulk Electric System¹ (BES) or at 69 kV or above. The model shall also include generators over 5MW and synchronous machines along with associated step up equipment to ISO New England (ISO) based on the schedule shown in Section III.

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Each TO listed in Table 2 (and any other TO that registers with NERC in the future) shall report the following to its interconnecting TO in Table 1 as requested by ISO for equipment designated as part of the BES or a Pool Transmission Facility (PTF):

- Updates to positive and zero sequence impedances, mutual line impedance data and generator and transformer grounding impedance
- Updates to 69 kV and higher breaker characteristics
- Updates to generator information within their service territory.
- Include interconnecting equipment impedance for generators

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Each Lead Market Participant (Lead MP) for each NERC-registered Generator Owner (GO) and generators over 5 MW shall notify its interconnecting TO listed in Table 1 annually that either the generator and generator step up equipment short circuit information has not changed or provide the revised data as requested by ISO. Lumped short circuit models may be used for dispersed generation that provides short circuit capability, for example, to represent a seven turbine wind farm and collector.

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- Deleted: (GSU) transformer
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Table 1 - Transmission Owners reporting to ISO (interconnecting TOs) ²
Emera Maine
Central Maine Power
Eversource Energy
National Grid USA
United Illuminating Company, The
Vermont Transco LLC

Table 2 - Transmission Owners reporting to interconnecting TOs listed in Table 1
Connecticut Transmission Municipal Electric Energy Cooperative
Cross Sound Cable Company, LLC.
Entergy Nuclear Generation Company
Mass. Municipal Wholesale Electric Company
New Hampshire Transmission, LLC
The City of Holyoke Gas and Electric Department

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¹ Bulk Electric System (BES) as defined in Glossary of Terms Used in NERC Reliability Standards

² Entities in Table 1 shall report data for company subsidiaries registered with NERC

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II. GENERAL DATA INSTRUCTIONS **FOR TABLE 1 RESPONDENTS**

To facilitate the data collection process, the latest version of the current year master short-circuit case, in ASPEN OneLiner (OLR) format, is posted on the Short Circuit Working Group (SCWG) SFTP site.

Each TO in Table 1 is initially provided with a New England case that includes their area facilities.

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• When revising the provided all New England case, each TO shall provide an OLR file representing the short circuit model for the current system and ASPEN change files (CHF) as defined in Section III. Each TO shall verify all of the changes are made within their area only and that no changes are made to the facilities of another TO.

• To the extent possible, each TO should not change the coordinates of facilities

• Each TO shall make any hidden buses visible.

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• Each TO shall include change files that compare the revised case to the original case.

• Each TO shall submit a document that identifies corrections listed separately from system topology changes associated with new projects or retirements.

• Each TO shall use the range of bus numbers allocated to it, use of a number outside their area will show that a TO has changed something outside their area.

• Each TO shall use border buses that are assigned to ISO (these are in the base data provided for updates).

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• Include branch impedance for interconnecting generator equipment as applicable

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• Include parallel branch impedance for distribution ties as applicable

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Revised or new files shall be submitted electronically via the TP subdirectory on the SCWG SFTP site.

Short circuit data for the required equipment shall be submitted in OLR format. This file, updated with all changes noted above, is used for ongoing transmission system studies for the area of jurisdiction and when combined by ISO with similar files from other TOs, will form the basis for the updated New England Short Circuit Model.

Each TO in Table 1 shall provide bus numbering that matches the latest bus numbering developed by the New England Base Case Working Group for buses that are common to both the short-circuit and power flow models.

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III. SHORT CIRCUIT DATA SUBMISSION SCHEDULE

In early November, ISO will issue a data request to the TOs listed in Table 2 and Lead MPs for GOs. ISO will copy the TOs listed in Table 1 on this information request. The TOs and Lead MPs for GOs shall provide updated information or an indication that information has not changed to the interconnecting TOs listed in Table 1 by the date specified in the ISO request, which will be at least 30 calendar days but not more than 45 calendar days from the date of the request

Three weeks after issuing the data request to the TOs included in Table 2 and Lead MPs for GOs, ISO will initiate a collection process of short circuit data from the TOs in Table 1. This ISO-initiated collection request will be made only to the TOs listed in Table 1.

Each TO listed in Table 1 shall respond with an updated short circuit model for their respective systems which meets the requirements within this Appendix K. Each TO listed in Table 1 shall submit the required information for all transmission equipment connected within their service territory, including data collected from a TO in Table 2, and for all generation equipment information from Lead MPs for GOs for which they act as the interconnecting TO. Each TO in Table 1 shall submit the updated OLR file data within six (6) weeks of the ISO request.

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Submitted models shall include a verification of facilities placed in service in the current year, and ASPEN CHF files representing all facilities expected to be added, deleted or modified through the end of Year One as defined in the NERC Glossary of Terms³. For example, a request sent out in November 2015 would require a verification of model changes for facilities expected to be in service as of the end of 2015 and change files for facilities expected to be in service by December 31, 2017. The timeframe for Year One will be specified in the data request.

Questions regarding ISO-specific short circuit data requirements covered by this Operating Procedure should be directed to the ISO Customer Support Department and should reference the NERC Reliability Standard MOD-032 (MOD-032).

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³ Year One is defined in the NERC Glossary as the first twelve month period that a Planning Coordinator or a Transmission Planner is responsible for assessing. For an assessment started in a given calendar year, Year One includes the forecasted peak Load period for one of the following two calendar years. For example, if a Planning Assessment was started in 2011, then Year One includes the forecasted peak Load period for either 2012 or 2013.

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IV. SHORT CIRCUIT DATA INSTRUCTIONS

TOs shall provide short circuit data which includes:

- Line data including sequence impedances and mutual impedances with other coupled lines
- Transformer and phase-angle regulator data based on nameplate and test reports including winding configuration and taps
- Shunt capacitor and reactor data based on nameplate and test reports
- New circuit breaker data or changes to previously supplied breaker data for breakers 69 kV and above or as requested, including:
 - Operating voltage (kV)
 - Interrupting current (amperes or MVA for older breakers rated on a total current basis)
 - Interrupting time (cycles)
 - Contact parting time (cycles)
 - Reclosing sequences and time delays, if any (this affects de-rating i.e. reclosing times are needed only for oil and air magnetic breakers. The interrupting capabilities of oil and air magnetic breakers need to be derated if the reclosing sequence differs from the standard duty cycle defined in IEEE Std C37.04-1999 IEEE Standard Rating Structure for AC High-Voltage Circuit Breakers. Refer to IEEE Std C37.010-1999 IEEE Application Guide for AC High-Voltage Circuit Breakers Rated on a Symmetrical Current Basis. If a breaker is set to reclose only for live-line/live-bus then it will not be possible to reclose into a fault. In such cases the breaker does not need to be de-rated regardless of the reclosing sequence.)
 - The ISO MOD-032 Compliance Bulletin provides further details on short circuit characteristics.
- The inclusion of lower voltage facilities is acceptable but not mandatory

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V. EXPLANATION OF DATA CHANGES

With each annual submission of short circuit data, each TO shall include a list of major system changes that have been completed in the current calendar year as well as those projects that are expected to be in service by the end of Year One. To allow cross checks of In-Service Dates, each TO can opt to include Regional System Plan (RSP) Project Identification Numbers. The RSP Listing is available at <http://www.iso-ne.com/system-planning/system-plans-studies/rsp>.

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VI. ANNUAL SHORT CIRCUIT DATA CERTIFICATION

Through the submission of the annual short circuit data, the submitting entity is affirming that the short circuit model provided accurately represents the equipment as installed at the time of certification.⁴

The data that TOs and Lead MPs for GOs provide is required to effectively model the interconnected transmission system for the Near-Term Transmission Planning Horizon as defined in the NERC Glossary.

VII. ISO NEW ENGLAND SHORT CIRCUIT MODEL CASE DETAILS

ISO compiles the New England short circuit model based on the submissions received from the TOs in Table 1.

- The ISO compiled case includes updates to neighboring Balance Authority, New York and New Brunswick equivalents.
- ISO will generally release the New England short circuit model within six weeks of obtaining all data from the TOs listed in Table 1. When completed, the model will be posted to the Planning Advisory Committee (PAC) Website.

VIII. OP-16 APPENDIX K REVISION HISTORY

Document History

Rev. No.	Date	Reason
Rev 0	11/06/15	Initial document
<u>Rev 1</u>	<u>draft</u>	<u>Updated equipment requirements to include BES equipment, added detail to the Table 1 TO data submittals, and added Section VII;</u>

⁴ Entities reporting data directly to ISO are only responsible for the accuracy of information reported for equipment that is owned by those entities or for which those entities are Lead Market Participant. Lead Market Participants that have taken on the obligation of providing data to ISO for certain Transmission Owners (i.e., entities in Table 1 are not responsible for the accuracy of information provided to them by TOs listed in Table 2 or Lead MPs for GOs).

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