ISO NEW ENGLAND PLANNING PROCEDURE NO. 7

PROCEDURES FOR DETERMINING AND IMPLEMENTING TRANSMISSION FACILITY RATINGS IN NEW ENGLAND

EFFECTIVE DATE: Month day, 2024

REFERENCES: ISO New England Operating Procedure No. 16, Transmission System Data

ISO New England Operating Procedure No. 19, Transmission Operations

NERC Standard FAC-008 – Facilities Rating Methodology

ISO New England Open Access Transmission Tariff

Transmission Operating Agreement

HVDC Transmission Operating Agreement

FERC Order 881

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# Introduction

In support of Attachment Q of the Open Access Transmission Tariff (Attachment Q) and ISO New England Operating Procedure No. 16 – Transmission System Data (OP-16), this ISO New England Planning Procedure No. 7 – ISO New England Procedure for Determining and Implementing Transmission Facility Ratings in New England (PP7 or Procedure) describes the provisions for the determination of transmission facility ratings by Market Participants and submittal and review of any transmission facility ratings methodologies that vary from this Procedure by ISO New England (ISO)[[1]](#footnote-1).

This Procedure describes the Seasonal[[2]](#footnote-2) and Ambient-Adjusted Rating methodology for transmission facilities for which the Market Participant is required to provide data to ISO, as described in OP-16.

The Market Participants and the ISO are responsible for collaborating in the development of the transmission facility ratings methodologies described in this Procedure.

A Market Participant is an entity that owns or operates transmission equipment or Generator Asset step up transformers (transmission equipment) connected at 69 kV or greater that are located in the New England Control Area and are required to report transmission facility ratings to the ISO[[3]](#footnote-3).

Pursuant to Federal Energy Regulatory Commission (FERC) Order 881, ISO and the Market Participants shall implement Ambient-Adjusted Ratings (AAR) on the transmission equipment that makes up a transmission line. These AAR ratings will not be used for transmission planning and will be utilized as described in the ISO Tariff. Additionally, ISO will support dynamic line ratings (DLRs), as required in the FERC Order 881 should any Market Participant provide such ratings to ISO. DLR ratings methodology shall be provided to ISO as a non-conforming transmission facility rating methodology as described in Section 2.4.

# Transmission Facility Rating Procedures (or Methodology)

Market Participants shall, consistent with Attachment Q of the Open Access Transmission Tariff (Attachment Q), utilize this Section 2.0 to determine new and revised transmission facility ratings of their transmission facilities for which ISO requires ratings as described in OP-16.

The rating of an overall transmission facility shall equal the rating of the most limiting individual piece of equipment, including but not limited to relay equipment and settings, comprising the facility.

## Transmission Equipment To Be Rated

This procedure establishes methodologies for rating the following components, as applicable:

Conductors

Cables

Transformers

Series and Shunt Reactive Elements

Circuit Breakers

Switches

Current Transformers

Line Traps

Buses

Current Transformer Circuits

VAR Compensators

HVDC Systems

As described in Section 2.4 below, guidelines representative of “Best Rating Practices” for each of the above components are provided in the Appendices.

## Ratings and Limits To Be Assigned

### Seasonal and Study Case Ratings

Market Participants are responsible for developing and submitting monthly Seasonal and Study Case Ratings for Transmission Facilities. Seasonal Ratings include Normal, LTE, STE, and DAL ratings for a transmission facility for each of the defined seasons, as determined through the annual seasonal assumption calculation process. Study Case Ratings include Normal, LTE, STE, and DAL ratings for a transmission facility for each required Study Case set of assumptions as defined by the ISO.

The Seasonal and Study Case ratings are determined using the input assumptions of Appendix A, General Rating Parameters or using an approved non-conforming methodology as described in Section 2.4. These assumptions are recalculated at least annually using up-to-date historical weather data. The input assumptions shall, if necessary based upon the methodology described in Appendix A, be updated to reflect that weather data. Market Participants shall recalculate the Seasonal Ratings for a transmission facility at least annually and whenever the input assumptions are modified.

### Ambient-Adjusted Ratings

Ambient-Adjusted Ratings shall, consistent with Attachment Q of the Open Access Transmission Tariff, be calculated at least hourly for a transmission facility that is not excepted from Ambient-Adjusted Ratings pursuant to Attachment Q. Ambient-Adjusted Ratings must be valid for at least, but not limited to, the range of historical temperatures plus or minus a margin of ten degrees Fahrenheit (e.g., if the historical actual temperatures range from -30F to 105F, then a valid Ambient-Adjusted Rating must be available for the temperature range from -40F to 115F). In the event that the forecast temperature is outside of the Market Participants’ pre-determined high and low calculation temperatures, the Market Participants shall use the pre-determined high and low temperatures to set the transmission facility rating.

### Determination of Normal Ratings and Emergency Ratings:

The criteria are described in Appendix A, General Rating Parameters for Seasonal Ratings. Equipment-specific rating methodology is described in subsequent Appendices. The conditions in which the Normal Ratings and Emergency Ratings are applied, actions to be taken to maintain equipment loadings within ratings and limits, and the associated allowable durations of time associated with operation at each rating are described in OP-19. These conditions and times must be consistent with those used to determine the corresponding ratings. Thus,

* The Normal Rating is the rating which will allow maximum loading under the conditions defined in Appendix A without incurring loss of life at design criteria. No time limit applies.
* Emergency Ratings are ratings that may be used at any time on an emergency, non-scheduled basis within appropriate time limits for conditions as defined in Appendix A. Emergency ratings shall be equal to or greater than Normal ratings and may involve loss of life or loss of tensile strength in excess of nominal design criteria. The emergency ratings shall be calculated using the time durations as specified in ISO New England Operating Procedure No. 19 – Transmission Operations OP-19.

### Determination of Drastic Action Limits:

Drastic Action Limits (DAL), unlike Normal and Emergency Ratings, are limits that require immediate action be taken to prevent damage to equipment. For purposes of calculation, the Drastic Action Limit is defined as the current flow which would cause the circuit component to reach its Short Time Emergency (STE) rating, as defined in OP-19, if allowed to flow for five minutes, assuming the following conditions:

1. The monthly seasonal conditions as described in Section 2.0 of Appendix A, General Rating Parameters for the Seasonal Ratings; and
2. A pre-disturbance circuit loading of 75% of the Normal transmission facility rating.

The use of five minutes in computing the DAL does not indicate that five minutes, or any other time increment, exists for which current of the calculated magnitude may safely be allowed to flow. A prescribed emergency action is required to return the circuit loading to the LTE rating.

## Responsibility of Market Participants and the ISO

The individual Market Participant is responsible for adhering to the ratings methodologies identified in this Procedure. Where adherence is not possible, the Market Participant shall:

1. Submit documentation to ISO describing ratings methodologies that are not in conformance with this Procedure; and
2. When required, support ISO technical reviews of such methodologies and changes to them.

The ISO is responsible for:

1. Initiating improvements in rating methodologies identified in this Procedure to gain consistency and implement best practices;
2. Reviewing and maintaining a record of documentation describing any Market Participant’s non-conforming rating methodologies; and
3. Administering technical reviews of such methodologies described in this Procedure and changes to them.

## Conformance of Transmission Facility Rating Methodologies

### This Procedure provides the general methodology to be used in the calculation of transmission facility ratings. A Market Participant may choose to use a different rating methodology than what is specified in this procedure for elements on their system. Such methodology is deemed a non-conforming transmission facility rating methodology. In order to ensure that non-conforming transmission facility rating methodology is reviewed and is acceptable for the region, the methodology must be reviewed and approved as described in this Section 2.4.

### Non-conforming transmission facility ratings are separate and distinct from Temporary Ratings, described in Section 2.5 of this Procedure, as non-conforming transmission facility ratings do not revert back but instead become the method a Market Participant uses to rate transmission elements. Non-conforming transmission facility rating methodologies are required to be provided to and reviewed by ISO.

### Submittal of Non-Conforming Transmission Facility Ratings Methodology

Prior to making a change to its non-conforming transmission facility ratings methodology, or within 15 business days of an ISO request to do so, the Market Participant shall provide the non-conforming transmission facility rating methodologies it uses to develop its transmission facility ratings to the ISO by emailing: [PP7ratings@iso-ne.com](mailto:PP7ratings@iso-ne.com). Such non-conforming transmission facility rating methodologies shall:

1. describe and include the reasoning for the non-conforming ratings practice, and
2. be submitted to the ISO prior to any associated transmission facility rating being applied in the operation of the facility.

### Review and Determination of Non-Conforming Transmission Facility Ratings Methodology

The Market Participant requesting a review of a non-conforming transmission facility rating methodology and ISO shall follow the following steps in order to submit and review the non-conforming transmission facility rating methodology in a timely manner.

1. Prior to implementing the rating, the Market Participant shall provide to the ISO documentation that describes, including the reasoning for, the non-conforming Transmission Facility Rating Methodology.
2. Within 30 days of receiving the written documentation, the ISO will convene an ad-hoc group of transmission facility Owners/Market Participants to review and seek input from on the non-conforming transmission facility rating methodology.
3. The ad-hoc group of transmission facility owners /Market Participants will consider any justification for the non-conforming practice and evaluate its continued use, providing a recommendation to the ISO within 60 days.
4. Within 60 days from the recommendation in step 3, written comments regarding the conformance of a Market Participant’s practices will be provided to the Market Participant by the ISO.

* Those differences deemed justifiable will be formalized by letter and the non-conforming methodology will be recorded in Attachment 1 to this PP7 as an "Accepted Alternative Rating Practice" specific to Market Participant.
* Those differences determined to be unjustified will be identified and accompanied with a request they be modified to either 1) conform to the ratings methodology in this Procedure or 2) be updated to another non-conforming methodology which must then be reviewed as described in Section 2.4 of this Procedure.
* Communication with the Market Participant will be posted on the ISO webpage at the following location: (location under review).

1. Market Participant shall provide a written response to the ISO within 45 days, indicating:

* Acknowledgement that an “Accepted Alternative Rating Practice” will be included in Attachment 1 of PP7, or
* Acceptance of a request to modify the rating practice and a scope and schedule for introducing such modifications,
* Submittal of a new non-conforming rating methodology, or
* No change to that methodology will be forthcoming and the reasoning for the lack of change. If there is disagreement between the ISO and any Market Participant regarding non-conforming Transmission Facility Ratings Methodology determinations, then the dispute resolution provisions contained within the ISO New England Open Access Transmission Tariff and associated transmission operating agreement, if applicable, shall govern.

### Documentation Retention

ISO determination notices and Market Participant communications will be posted on the ISO external website.

The ISO shall maintain the Appendices and Attachments to this Procedure in a manner consistent with the determinations resulting from Section 2.4.

## Temporary Ratings

As necessary, the Market Participant shall provide ISO with temporary transmission facility ratings, as described in Attachment Q of the ISO Open Access Transmission Tariff[[4]](#footnote-4). Temporary ratings that will become permanent because of a non-conforming Transmission Facility Rating Methodology shall follow the processes outlined in OP-16 and Section 2.4 of this Procedure.

# Appendices

The practices and methodologies described in these appendices have been developed through a collaborative consultation that includes Market Participants, the ISO and other stakeholders. The methodologies are based on good utility practices in the New England region and any updates to the methodologies are conducted through the collaborative process described in this Procedure. The safety of equipment and personnel associated with the uses of these facilities remains the responsibility of the Market Participant (s). The appendices below describe the accepted practices for determining ratings of the indicated equipment types in the New England Region.

* **Appendices:**

Appendix A - General Rating Parameters for Seasonal Ratings

Appendix B - Bare Stranded Conductors

Appendix C - Underground Cables

Appendix D - Power Transformers

Appendix E - Series and Shunt Reactive Elements

Appendix F - Circuit Breakers

Appendix G - Disconnect Switches

Appendix H - Current Transformers

Appendix I - Line Traps

Appendix J - Rigid Buses

Appendix K - CT Circuit

Appendix L - VAR Compensators

Appendix M - HVDC Systems

Appendix N - AAR - PRACTICES FOR CALCULATION OF AMBIENT ADJUSTED RATINGS

* **Attachments:**

Attachment 1 - Accepted Alternative Rating Practices

Attachment 2 - Ambient Temperatures and Wind Velocity for Rating Calculations

Attachment 3 - Analysis of Wind-Temperature Data and Effect on Current-Carrying Capacity of Overhead Conductors

Attachment 5 - Report of the Ad Hoc Line Trap Rating Procedure Working Group of the System Design Task Force

# Document Revision History

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| Revision No. | Revision Date | Revision Description |
| Rev. 0 | 8/31/05 | Original document |
| Rev. 1 | 4/11/06 | Editorial changes to maintain consistency with Appendices |
| Rev. 2 | 2/14/07 | Sections 2.4 and 2.5 modified to conform with NERC Standard FAC-008-1 |
| Rev. 3 | 8/10/10 | Update on entire Planning Procedure to conform with new IEEE standards and NERC Standard FAC-008-2 |
| Rev. 4 | 11/7/2014 | Document body cleanup |
| Rev. 5 | XX/XX/2024 | Update and reorganization of entire document and updated for FERC Order No. 881 |

1. ISO New England Operating Procedure No. 16, Transmission System Data (OP-16), requires Transmission Facility Owner/ Market Participants to determine equipment ratings and provide them to the ISO. Ratings for new facilities and changes to ratings of existing facilities shall be determined in a manner consistent with the ratings methodologies described in Section 2 to this Procedure and, as required, shall be reviewed in accordance with Section 2.3.1 to this Procedure. [↑](#footnote-ref-1)
2. Seasonal shall have the meaning as defined in Appendix A [↑](#footnote-ref-2)
3. OP-16 applies to Transmission Owners (TOs) and Market Participants, i.e., Market Participants who own the equipment or Lead Market Participants for Generator Assets (collectively MPs) to determine and submit the required data for new, reconductored, and reconfigured facilities for all their transmission equipment [↑](#footnote-ref-3)
4. https://www.iso-ne.com/static-assets/documents/regulatory/tariff/sect\_2/oatt/sect\_ii.pdf [↑](#footnote-ref-4)