

NX Application Transition to FERC Order 881

Participant Training Services Webinar

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Training Disclaimer

ISO New England (ISO) provides training to enhance participant and stakeholder understanding.

Because not all issues and requirements are addressed by the training, participants and other stakeholders should not rely solely on this training for information but should consult the effective [Transmission, Markets and Services Tariff](#) (“Tariff”) and the relevant [Market Manuals](#), [Operating Procedures](#) and [Planning Procedures](#) (“Procedures”).

In case of a discrepancy between training provided by ISO and the Tariff or Procedures, the meaning of the Tariff and Procedures shall govern.

*Training examples are provided for illustrative purposes only.
Company names and numerical values used are fictitious.*

Topics Covered

- FERC Order 881 Overview
- NX Application Changes
 - Removal of equipment ratings from NX-9; now hosted by Limit Exchange Portal (LEP)
 - Primarily impacts the *Ratings* tab and *Equipment* search in NX
- NX-LEP Mapping
- OP 16 Updates
- Data Migration Instructions
- Project Timeline



FERC Order 881 Overview

- Requires Ambient Adjusted Ratings (AARs) based on real-time and forecast air temperature (replacing static seasonal ratings)
- AARs must be updated hourly, reflecting daytime and nighttime conditions
- Forecasted AARs required up to 10 days ahead (ISO-NE approved for 72-hour / 3-day horizon)
- Requires minimum of four seasons; ISO-NE implemented 12 seasonal ratings with transmission owner (TO) coordination
- Reference: [E-1-RM20-16-000 | Federal Energy Regulatory Commission](#)
- ISO Participant Readiness Project Outlook web page: [Participate > Support > Participant Readiness Project Outlook \[FERC Order No. 881: Managing Transmission Line Rating \(MTLR\)\]](#)



NX Application Changes

NX Application

- Hosts data representing the physical characteristics, ratings, and operational data of transmission and generation equipment needed to develop accurate system models and maintain reliable operations of New England power system
- All data provided to the NX application (and LEP) shall be consistent with Attachment Q of ISO-NE OATT, [OP 16](#), [OP 18](#), [PP7](#), and applicable industry standards
- PP7 revision, published 2/7/25, addresses requirements for FERC 881
- OP 16 revised and approved, to be published 10/21/2026

Ratings Transition

- Entry system for all rating data after FERC Order 881 implementation is the Limit Exchange Portal (aka LEP)
 - Hourly, forecast, seasonal
- Certain characteristic information is needed to prepare LEP and ISO Energy Management System (EMS) applications to receive ratings
 - Ratings tab of NX application has been modified to receive necessary modeling information
 - Conditional rating data, supervisory control and data acquisition (SCADA) ratings, and nominal ratings
- Redesigned application available to view in NX Sandbox as of 12/1/2025



Current Ratings Tab

Ratings

Equipment Notes

File Attachments

Admin Comments

ISO Review

Revisions

History

Delete

Season: Summer

Temperature(F): 100

☒ Default

Wind Speed(ft/s): 3

Condition:

Type	MVA	Limiting Device	Device Location	Device Description
Normal	96	Conductor	Line Conductor	Line Conductor
LTE	104	Conductor	Line Conductor	Line Conductor
STE	122	Conductor	Line Conductor	Line Conductor
DAL	137	Conductor	Line Conductor	Line Conductor

Delete

Season: Winter

Temperature(F): 50

☒ Default

Wind Speed(ft/s): 3

Condition:

Type	MVA	Limiting Device	Device Location	Device Description
Normal	119	Conductor	Line Conductor	Line Conductor
LTE	125	Conductor	Line Conductor	Line Conductor
STE	139	Conductor	Line Conductor	Line Conductor
DAL	157	Conductor	Line Conductor	Line Conductor

Add

New Ratings Tab

The screenshot shows a web application interface for the 'New Ratings Tab'. At the top, there are tabs: 'Ratings' (selected), 'Equipment Notes', 'File Attachments', 'Admin Comments', 'ISO Review', 'Revisions', and 'History'. Below the tabs, a red message states: 'All ratings must be provided in the Limit Exchange Portal (LEP); Pre-881 ratings available using Equipment Search.'

The interface is divided into several sections:

- Equipment Data:** Contains a checkbox labeled 'Ratings provided via telemetry' (callout 1).
- ISO-NE Data:** Contains a checkbox labeled 'LEP Only Equipment' (callout 2) and a text field for 'LEP Implementation Date:'.
- Conditional Rating Data:** Contains two checkboxes: 'Bi-Directional - Select when ratings are dependent on flow direction' (callout 5) and 'Conditional - Select when conditional rating sets will be provided. Each Conditional Rating Set record must identify a line in/out condition or a specific switching device that affects the primary equipment's rating.' (callout 6).
- Initial Nominal Ratings for New Equipment (MVA):** Contains a table with columns 'Normal', 'LTE', 'STE', and 'DAL'. The values are 348, 525, 627, and 797 respectively. Below the table, it states: 'Nominal ratings are provided for initial model creation only' and 'Nominal ratings will be maintained by equipment owners in LEP'.
- Rating Comments:** A large text area (callout 4).
- Conditional Rating Set:** A section with a checkbox and a list area (callout 3).

At the bottom right, there are 'Add' and 'Delete' buttons.

1. **Ratings provided via telemetry** – Optional flag set by participant when current-hour ratings (Normal, long-term emergency (LTE), short-term emergency (STE) and drastic action limit (DAL)) will be provided via SCADA — used for dynamic line rating (DLR) equipment and external tie lines in accordance with OP 18 requirements
2. **LEP Only Equipment** – Flag maintained by ISO-NE for equipment not in ISO EMS
3. **Initial Nominal Ratings for New Equipment (MVA)** – Required for initial modeling in the ISO EMS; any updates once equipment is in service must be provided in LEP
 - The lower of the facility's minimum seasonal, ambient-adjusted, or DLR that provides for reliable operation of the New England Transmission System

New Ratings Tab, *continued*

The screenshot shows a web-based interface for equipment ratings. At the top is a navigation bar with tabs: Ratings, Equipment Notes, File Attachments, Admin Comments, ISO Review, Revisions, and History. Below the tabs is a red warning message: "All ratings must be provided in the Limit Exchange Portal (LEP); Pre-881 ratings available using Equipment Search." The main content area is divided into three sections. The "Equipment Data" section on the left contains a checkbox (1) for "Ratings provided via telemetry". The "ISO-NE Data" section in the middle contains a checkbox (2) for "LEP Only Equipment" and a date field for "LEP Implementation Date:". The "Conditional Rating Data" section on the right contains two checkboxes: (5) "Bi-Directional - Select when ratings are dependent on flow direction" and (6) "Conditional - Select when conditional rating sets will be provided. Each Conditional Rating Set record must identify a line in/out condition or a specific switching device that affects the primary equipment's rating." Below these is a table for "Initial Nominal Ratings for New Equipment (MVA)" with columns for Normal, LTE, STE, and DAL, and rows for values 348, 525, 627, and 797. To the right of the table is explanatory text. At the bottom left is a text area (4) for "Rating Comments:". At the bottom right is a table for "Conditional Rating Set" with "Add" and "Delete" buttons.

Ratings | Equipment Notes | File Attachments | Admin Comments | ISO Review | Revisions | History

All ratings must be provided in the Limit Exchange Portal (LEP); Pre-881 ratings available using Equipment Search.

Equipment Data

1 ☐ Ratings provided via telemetry

ISO-NE Data

2 ☐ LEP Only Equipment

LEP Implementation Date:

Conditional Rating Data

5 ☐ Bi-Directional - Select when ratings are dependent on flow direction

6 ☐ Conditional - Select when conditional rating sets will be provided. Each Conditional Rating Set record must identify a line in/out condition or a specific switching device that affects the primary equipment's rating.

Initial Nominal Ratings for New Equipment (MVA)

Normal	LTE	STE	DAL
348	525	627	797

Nominal ratings are provided for initial model creation only
Nominal ratings will be maintained by equipment owners in LEP

4 Rating Comments:

☐ Conditional Rating Set

Add Delete

4. **Rating Comments** – Optional field for clarifying information about the data provided on the ratings tab

5. **Bi-Directional flag**

- Indicates ratings are dependent on the direction of flow
- Alerts ISO-NE to prepare the ISO EMS model for LEP to receive rating sets for flows in each direction

6. **Conditional flag**

- Indicates ratings are dependent on other conditions (i.e., companion cable in/out, breaker open/closed, heat exchanger in/out)
- Used only for conditions that can be identified by the Dynamic Ratings Model
- Alerts ISO-NE to prepare LEP in the next model release to receive rating sets for each listed condition



Conditional Rating Set – Companion Cables

Text for Cable Pair with Companion Cable In or Out

☒ Conditional - Select when conditional rating sets will be provided. Each Conditional Rating Set record must identify a line in/out condition or a specific switching device that affects the primary equipment's rating.

☐	Conditional Rating Set ▲
☐	Cable 1 with Cable 2 IN
☐	Cable 1 with Cable 2 OUT

Text for Multiple Cables with Companion Cables In or Out

☒ Conditional - Select when conditional rating sets will be provided. Each Conditional Rating Set record must identify a line in/out condition or a specific switching device that affects the primary equipment's rating.

☐	Conditional Rating Set ▲
☐	Cable 1 with Cable 2 In AND Cable 3 In
☐	Cable 1 with Cable 2 In AND Cable 3 Out
☐	Cable 1 with Cable 2 Out AND Cable 3 In
☐	Cable 1 with Cable 2 Out AND Cable 3 Out



LEP refers to conditional rating sets as “**altering conditions**”



Conditional Rating Set – Heat Exchanger

Text for Cable Pair with Companion Cable In or Out and Heat Exchanger On or Off

☒ Conditional - Select when conditional rating sets will be provided. Each Conditional Rating Set record must identify a line in/out condition or a specific switching device that affects the primary equipment's rating.

☐	Conditional Rating Set ▲
☐	Cable 1 with Cable 2 In AND HX Off
☐	Cable 1 with Cable 2 Out AND HX Off
☐	Cable 1 with Cable 2 In AND HX On
☐	Cable 1 with Cable 2 Out AND HX On



LEP refers to conditional rating sets as “**altering conditions**”



Conditional Rating Set – Breaker Open

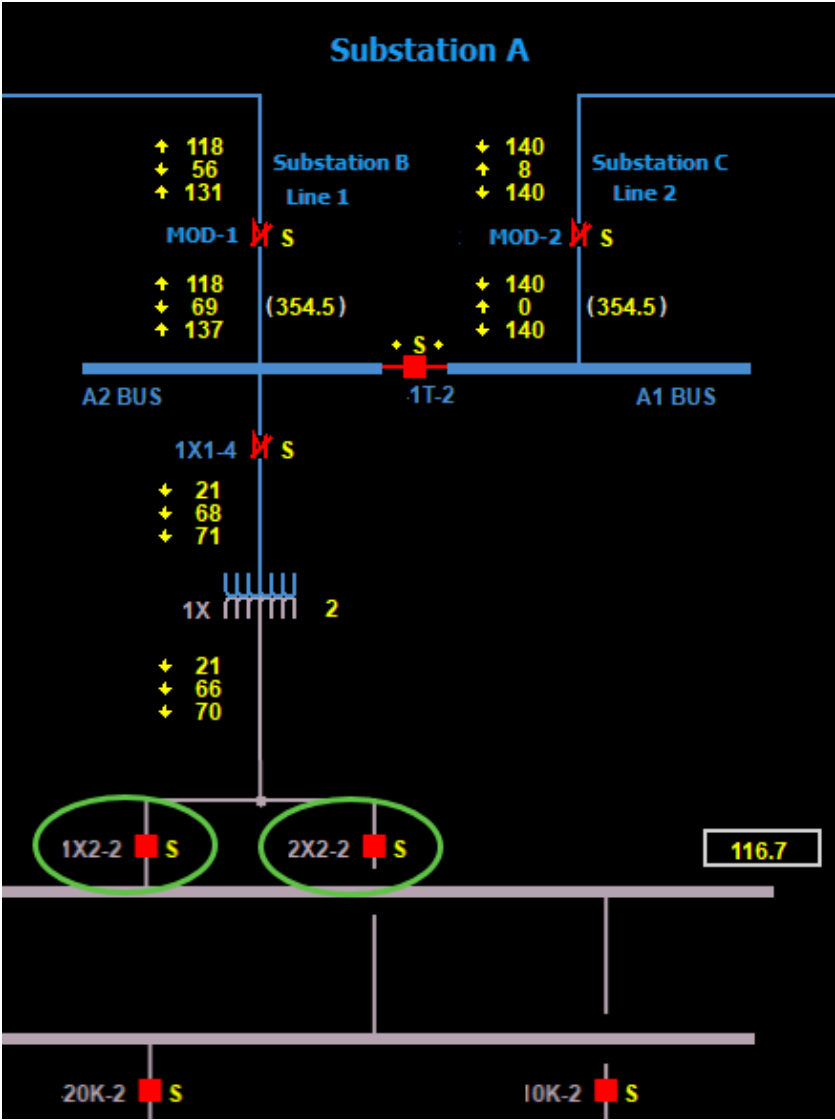
Substation A 1X Configuration

- ISO EMS model configuration drives the required conditions
- **Before implementation of FERC Order 881:**
One (1) rating set per season for either breaker open or closed

Condition:	Terminal breakers closed; ISO-NE Guide: Breaker Out Facility Rating
Condition:	Breaker open: SubstationA 1X2 or 2X2

- **After implementation of FERC Order 881:**
Enter conditional definitions in NX for each device needed to determine topology

☐	Conditional Rating Set ▲
☐	SubstationA_CB_1X2-2
☐	SubstationA_CB_2X2-2



Conditional Rating Set – Breaker Open, *continued*

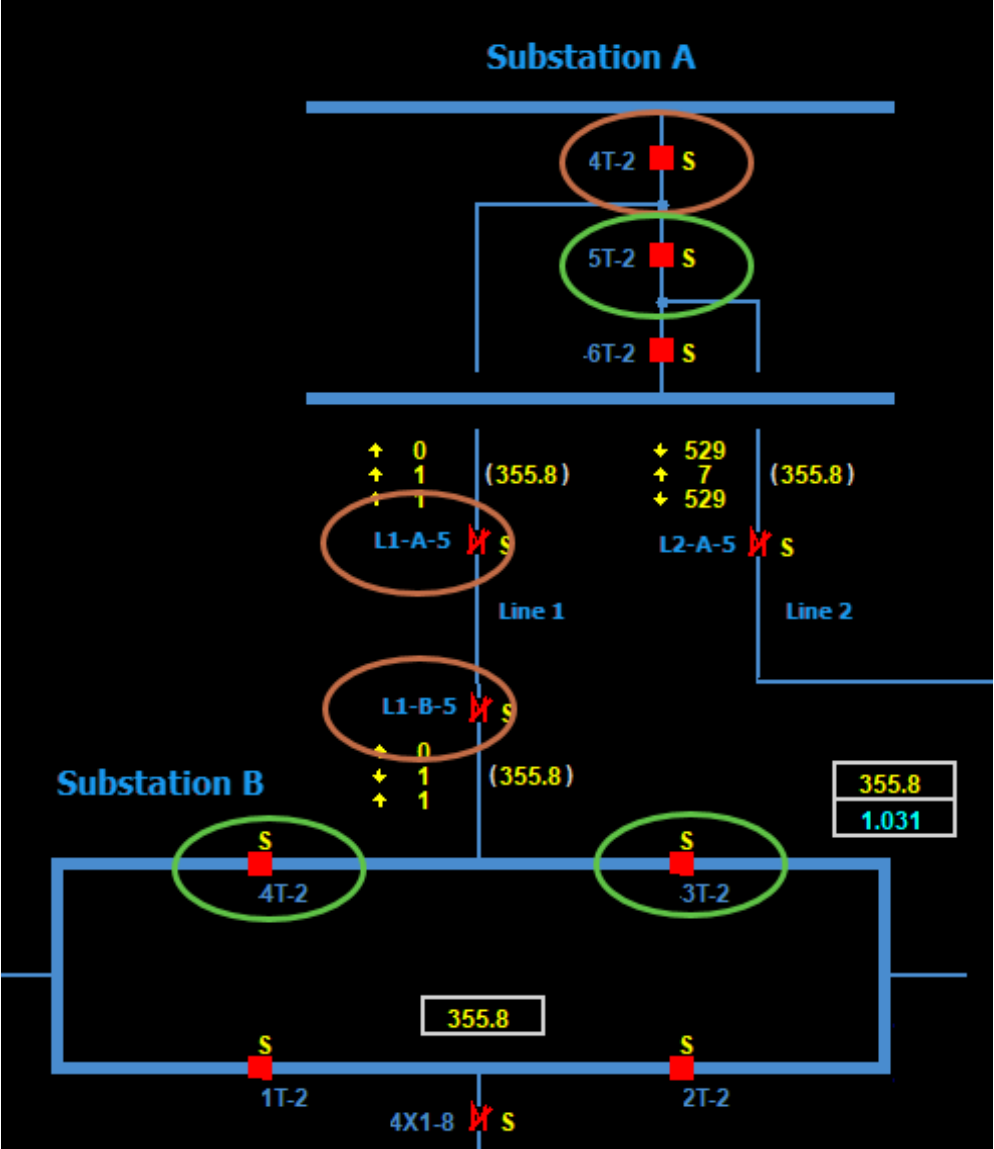
Line 1 Configuration

- ISO EMS model configuration drives the required conditions
- **Before implementation of FERC Order 881:**
One (1) rating set per season for multiple breakers open or closed

Condition:	Terminal breakers closed; ISO-NE Guide: Breaker Out Facility Rating
Condition:	Breaker open: SubstationA 5T or SubstationB 3T or 4T

- **After implementation of FERC Order 881:**
Enter conditional definitions in NX for each device needed to determine topology

☐	Conditional Rating Set ▾
☐	SubstationA_CB_4T-2
☐	SubstationA_CB_3T-2
☐	SubstationA_MOD_L1-A-5
☐	SubstationB_CB_4T-2
☐	SubstationB_CB_3T-2
☐	SubstationB_MOD_L1-B-5



Changes to Equipment Searches, *continued*

- **Pre-881** ratings fields available as *Search* criteria and *Output* columns

Pre-881 Rating Set / Default Rating
Pre-881 Rating Set / Season
Pre-881 Rating Set / Special Condition
Pre-881 Rating Set / Temp
Pre-881 Rating Set / Wind
Pre-881 Rating Set / Limit / Device Description
Pre-881 Rating Set / Limit / Device Location
Pre-881 Rating Set / Limit / Limiting Device / Name
Pre-881 Rating Set / Limit / MVA
Pre-881 Rating Set / Limit / Rating Type

- **Post-881** new form fields available as *Search* criteria and *Output* columns

Rating Provided via Telemetry
Rating LEP Only
Rating LEP Implementation Date
Rating 1 Nominal Normal
Rating 2 Nominal LTE
Rating 3 Nominal STE
Rating 4 Nominal DAL
Rating Comments
Rating Bi-Directional
Rating Conditional
Rating Set / LEP Condition

Changes to Equipment Searches, *continued*

- **Pre-881 Ratings** still available to view from *Equipment Search* results only
- No longer hosted on *Equipment* forms

ISO new england

Contains Critical Energy Infrastructure Information (CEII)

Tasks Equipment Terminals Certification Reports System Help

Task List Equipment Search

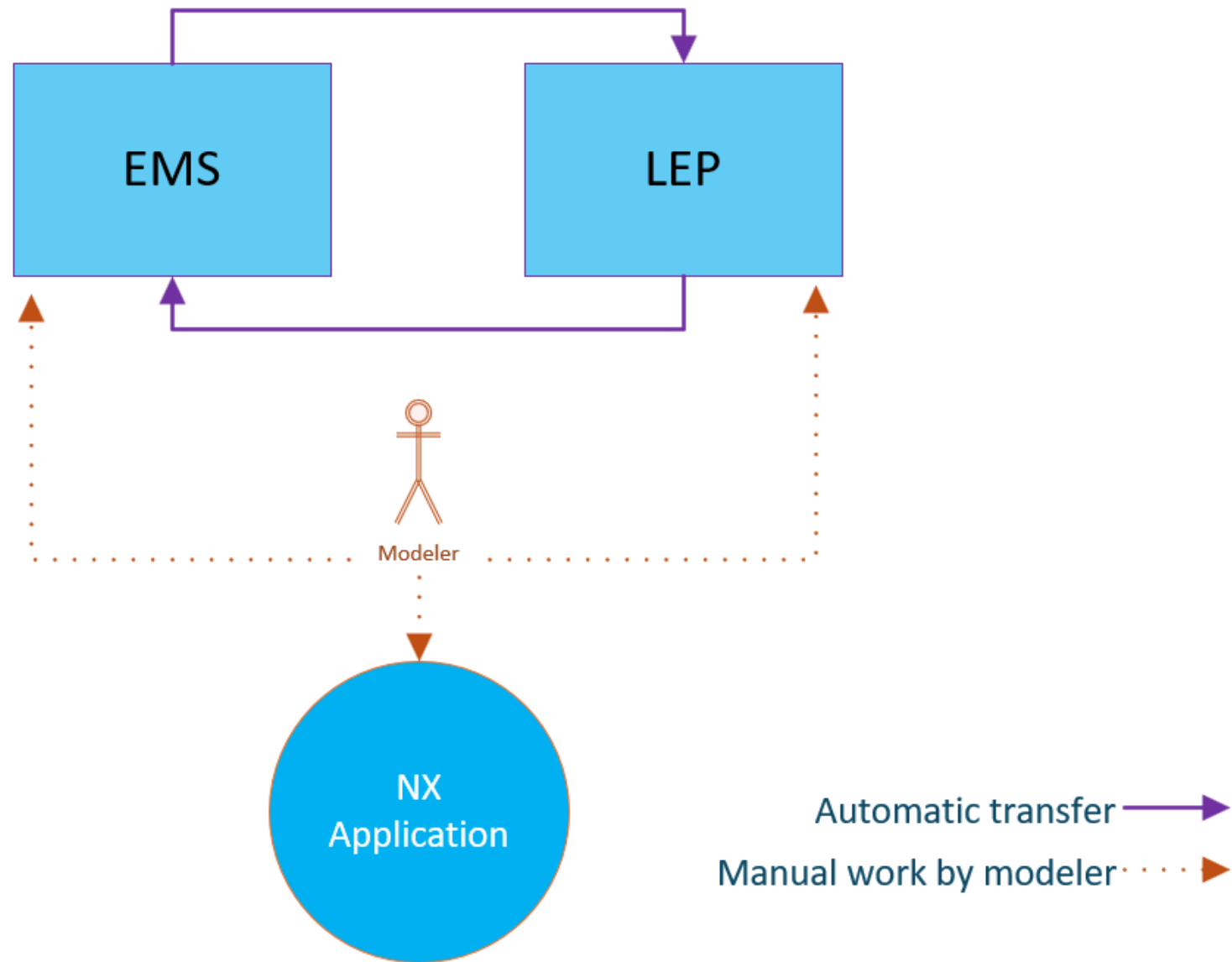
Pre-881 Rating Set 1 / Limit 1 / MVA	Pre-881 Rating Set 1 / Limit 2 / MVA	Pre-881 Rating Set 1 / Limit 3 / MVA	Pre-881 Rating Set 1 / Limit 4 / MVA	Pre-881 Rating Set 2 / Limit 1 / MVA	Pre-881 Rating Set 2 / Limit 2 / MVA	Pre-881 Rating Set 2 / Limit 3 / MVA	Pre-881 Rating Set 2 / Limit 4 / MVA
283	325	352	442	344	376	413	526
70	70	73	87	124	124	127	145
226	226	238	287	275	275	292	357
70	70	73	88	184	184	195	237
226	226	238	287	275	275	292	357
283	325	352	442	344	376	413	526
133	133	136	154	162	162	166	190
59	59	59	62	72	72	72	76
1429	1429	1500	1801	1738	1738	1842	2242
466	535	570	701	567	620	668	801
179	194	200	200	179	194	200	200
179	194	200	200	179	194	200	200
70	70	73	88	184	184	195	236
226	226	238	287	275	275	292	320
169	169	178	214	235	235	249	304
159	159	159	159	159	159	159	159
225	225	236	283	274	274	290	352
159	159	159	159	159	159	159	159

Print Export Refresh

Query Results (394)

NX – LEP Mapping

Basic System Interaction



NX-LEP Mapping: Equipment Parameters in NX

NX9A: 2511141698

Reference Number: 987654321 Participant: NSTAR Electric Company

Form State: Approved

Participant Equip ID: 100

ISO Equip ID: 100

Related To:

ISO EMS ID: 100

EMS ID2:

ISO Line Name: 100

Equip Reference #: 11111

Form is Valid

External Tie Line ☐ External Equip ☐

Circuit: 1 Nominal System Voltage (kV): 345.0

Series Device ☐ Cable Type: Underground

Impedance Data (%) (100MVA Base)

Conductor Type: 2500 CU PTC Conductor Length (mi.): 4.99

R: 0.05 X: 0.125 B: 100

Terminal A: Station 1 345kV | 100001 | STATION1 Bus #: 100001 Station: STATION1

Terminal B: Station 2 345kV | 100002 | STATION2 Bus #: 100002 Station: STATION2

Ratings Equipment Notes File Attachments Admin Comments ISO Review Revisions History

All ratings must be provided in the Limit Exchange Portal (LEP); Pre-881 ratings available using Equipment Search.

Equipment Data ISO-NE Data

☐ Ratings provided via telemetry ☐ LEP Only Equipment

LEP Implementation Date:

Initial Nominal Ratings for New Equipment (MVA)

Normal	LTE	STE	DAL
200	200	200	200

Nominal ratings are provided for initial model creation only
Nominal ratings will be maintained by equipment owners in LEP

Rating Comments:

Conditional Rating Data

☐ Bi-Directional - Select when ratings are dependent on flow direction

☒ Conditional - Select when conditional rating sets (e.g., cable xyz OUT, cable xyz IN, or Breaker xyz CLOSED, Breaker xyz OPEN) will be provided. Add a Conditional Rating Set record with text identifying the condition the rating applies to.

Conditional Rating Set

100 with 200 In

100 with 200 Out

Add Delete

Original Requested Effective Date: 11/15/2025

Equipment In Service Start: 01/01/2000

Revision Comments: Revision to migrate 11111 to new FERC 881 format on 202-11-14 12:00:00

Requested Effective Date: 11/15/2025

Equipment In Service End:

Actual Effective Date: 11/14/2025

ISO EMS Implementation Date: 11/14/2025

Data Revision: 9

NX Expiration Date:

ISO EMS Expiration Date:

Remove Equipment from Service: ☐

Form Open New Save Cancel

NX-LEP Mapping: Equipment Parameters in LEP

GridOS

LEP

Transmission Equipm...

←

→

↺

🏠

STATION1.100.A.100

< Go

Network Segment | 8d0e7e9e | 3, Ratings provider

Transmission FacilitySubstationsVoltage levels
STATION1.100.A → STATION1-STATION2345 kV - 345 kV

DetailsSeasonal RatingsScenario RatingsForecast Ratings

Basic Information

ID

8d0e7e9e-f90e-426c-9a5e-dd162761f0f7

Name

STATION1.100.A.100

CIM Type

ACLineSegment

Nominal Voltage

345 kV

Reasonability Limit

* From (lower bound)

340

MVA

* To (upper bound)

1245

MVA

Nominal Ratings

* Normal

200

MVA

* STE

400

MVA

* LTE

300

MVA

* DAL

500

MVA

AAR Exemption

Re-approve

Update

ⓘ

Aliases

NX_ERN

11111

ParticipantEquipID

100

CIMMRID

43gdfs46v723fwsfasvsdfg

DYNRTGName1

DYNRTGName2

A

CIMName

A

ISOEquipId

100

NETMOMCompositeld

STATION1.100.A.100

EMSName

100

Ratings Flags

Forecast Ratings (EMS)

Disabled

Real-time Ratings (EMS)

Disabled

Real-time Ratings (SCADA)

1

2

3

4

5

6

ISO-NE PUBLIC

20

OP 16 Update

OP 16 Update

- Draft has received full committee approval as of June 16, 2026
- Expected publication date: October 21, 2026
- Updates include:
 - Changes to address modeling paradigm shifts
 - New section for LEP data submittal requirements and schedule
 - Revised language on ratings requirements in the NX application

Reference:

[Participate > Support > Participant Readiness Project Outlook \[FERC Order No. 881: Managing Transmission Line Rating \(MTLR\)\]](#)



NX-9 Submittal Schedule Changes

Modified OP 16 language:

- Market participants (MPs) and transmission owners (TOs) shall submit required advanced notice NX-9 data to ISO for new facilities, including planned transformer replacements
- Equipment must have an approved NX-9 form to be included in the ISO EMS model
- Submittals must be completed at least 120 calendar days in advance of the new facility's expected in-service date or by one of the following deadlines:
 - By March 1 for inclusion in the May EMS model release
 - By July 1 for inclusion in the September EMS model release
 - By November 1 for inclusion in the February EMS model release



One-Line Submittal Schedule Changes

Modified OP 16 language:

- MPs and TOs shall submit preliminary individual substation one-lines with **final nomenclature** to ISO for new facilities or changes to existing facilities
- **Equipment must have an approved NX one-line form to be included in the ISO EMS model**
- Submittals must be completed at least 180 calendar days in advance of the expected in-service date or by one of the following deadlines:
 - By **March 1** for inclusion in the May EMS model release
 - By **July 1** for inclusion in the September EMS model release
 - By **November 1** for inclusion in the February EMS model release



Lead Market Participant Transfers

New OP 16 language:

- Modifications to transfer lead market participant (LMP):
 - Notification to ISO New England of a transfer in LMP for existing equipment is required at least fifteen (15) business days prior to the effective date of transfer
 - ISO will create the initial NX-9 form to transfer the LMP and make the change in LEP
 - New LMP must review, update if necessary, and submit the NX-9 form at least five (5) business days prior to the effective date of transfer



New Rating Requirements

New OP-16 language:

III. Rating Data Instructions

- All ratings for equipment shall be provided via the Limit Exchange Portal (LEP). Requirements for ratings data provided in LEP are in the ISO New England Operating Procedure No.16, Transmission System Data document section IV. LEP Data Submittal Requirements.
- Certain characteristics of equipment ratings must be indicated on the NX-9 form to allow for accurate equipment modeling in LEP.

Required characteristic data includes:

– Nominal Ratings

- For new equipment, the initial nominal ratings shall be provided on the NX-9 form. Any future revisions to these nominal ratings shall be provided only in LEP.
- Nominal ratings shall be the lowest of the real-time, forecast or seasonal ratings for a network segment that provides for reliable operation of the New England Transmission System.
- Initial nominal ratings data shall be provided in MVA (rounded down to the nearest whole number) and must meet nesting requirements: Normal $\leq$ LTE $\leq$ STE $\leq$ DAL
- Nominal ratings are only enterable on the NX-9 form until the form is effective and approved.

– Bi-directional checkbox

- Selected to indicate ratings are dependent on flow direction.

– Conditional checkbox

- Selected to indicate conditional rating sets will be provided for breaker(s) in/out or companion cable(s) in/out.



New Rating Requirements, *continued*

- **Conditional Rating Set**

- Add a conditional rating set record with text that identifies the condition the rating applies to.
- For breaker in/out – each conditional rating set represents a switching device that directly affects the status of the line.

- Example:

- STATION1 Line Disconnect A
 - STATION1 Line Terminal Breaker B
 - STATION1 Line Terminal Breaker C
 - STATION2 Line Disconnect D
 - STATION2 Line Terminal Breaker E
 - STATION2 Line Terminal Breaker F

- A completed sample NX-9A form showing conditional rating sets for breaker in/out conditions is shown in Example 2 of this document.

- For cable in/out – each condition rating set represents the cable or the combination of cables that are in or out of service

- Example:

- LINE1 with LINE2 In AND LINE3 In
 - LINE1 with LINE2 In AND LINE3 Out
 - LINE1 with LINE2 Out AND LINE3 In
 - LINE1 with LINE2 Out AND LINE3 Out

- A completed sample NX-9A form showing conditional ratings sets for cable(s) in/out conditions is shown in Example 3 of ISO New England Operating Procedure No.16, Appendix A.

- Ratings provided via telemetry checkbox

- Select for equipment with ratings being determined more frequently than an hourly basis that will be provided via SCADA telemetry as defined by ISO New England Operating Procedure No.18.



Transitioning Data to Post-881 Format

Migration Spreadsheet Instructions

- Reminder: By 7/15/26, Participants must submit all new equipment NX-9s with an expected in-service date (ISD) before 03/01/27
- ISO will provide each individual participant's NX9 admins all their existing data as of 6/26/26 in Post-881 format in a spreadsheet template **tomorrow, 7/1/2026**
 - Example Sandbox data templates were sent to all NX9 admins 10/17/2025
- On the spreadsheet, Participants must review and provide:
 - Nominal ratings
 - Any changes to the data listed in the ISO-NE controlled columns
 - All new equipment added to the NX application between 6/26/26 and 7/15/26 with identification and FERC Order 881 related fields
 - If providing new equipment, Participants must ensure the associated NX9 form has been submitted
- Spreadsheets must be returned via email by **7/15/26**
 - nx9admin@iso-ne.com



Timeline

Date	Event
07/01/26	ISO emails each participant their preliminary NX-9 migration data in the spreadsheet template
07/01/26 – 07/15/26	Participants determine appropriate FERC Order 881 parameters and provide any changes to preliminary data in the spreadsheet’s Participant Entry columns
By 07/15/26	• Participants must submit all new equipment NX-9s with an expected in-service date (ISD) before 03/01/27 • Each new equipment form added to the NX Application between 6/26/26 and 7/15/26 must also be added as a row to the <i>New Equipment</i> tab of the migration spreadsheet with all data parameters provided • Participants must submit any changes to conditions; there will not be another opportunity until the February release • Participants must return final NX migration data spreadsheet by email to ISO
10/01/26	Deadline to submit any revisions to existing equipment forms* <i>*no changes to conditions accepted after 7/15/26</i>
10/06/2026	Last planned NX implementation prior to application transition
10/02/26 – 10/21/26	Blackout – NX application unavailable during FERC Order 881 transition
10/02/26 – 11/18/26	Rating changes must be communicated via control rooms
10/22/26	NX application available in FERC Order 881 format, no longer hosts ratings
11/19/26	FERC Order 881 full implementation



Questions

Contact Participant Support & Solutions



Submit a request via Ask ISO *(preferred)*
<https://askiso.iso-ne.com>

Email AskISO@iso-ne.com

Phone

(413) 540-4220 (call center)

(833) 248-4220

Pager *(for emergency inquiries outside of business hours)*

(877) 226-4814

**Business hours and
additional contact details
are available from the
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