NEW YORK INDEPENDENT SYSTEM OPERATOR

MANUAL 24

Reliability Analysis Data Manual

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Table of Contents

Table of Figures

Table of Tables

Revision History

Version	Date	Revisions
3.2	**12/01/2016**	**Attachment Only Revision** **Attachment E** ➢ Updated list of dynamic ratings
3.1	**07/01/2016**	**Global** ➢ Changed case references to be consistent with MOD-032-1 (steady state, dynamic, and short circuit) ➢ Implemented minor stylistic changes ➢ Updated references to NYSRC Reliability Rules **Section 1.1** ➢ Added additional NERC and NPCC reliability criteria and removed references to retired reliability criteria **Section 1.4.1** ➢ Updated list of cases and contingency definitions maintained in the NYISO database **Section 1.5** ➢ Added new section on Bulk Power Transmission Facilities **Section 2.1** ➢ Updated the annual database update process **Section 2.2** ➢ Updated section to reflect changes to communications for power system model changes **Section 2.5** ➢ Added new section to address new NERC MOD standards and Technical Bulletin 233 **Section 3.3** ➢ Updated section to require Generator Owners to provide station service auxiliary load data **Section 3.5** ➢ Added new section to address contingency reporting requirements **Section 3.6** ➢ Added Lowest Circuit Breaker ratings to short circuit data reporting requirements **Attachment A** ➢ Updated list of generating plant unit types ➢ Removed requirement for the reporting of three-winding transformers as a grouping of three two-winding transformers
3.0	**11/22/2013**	**Section 2.3.1** ➢ Changed Directory#9 Section 5.4 reference to Directory#9 Section D.1.4 reference. **Section 2.3.1.1** ➢ Added an additional exemption criterion to be consistent with

		Directory#9 Section D.1.5. **Section 2.3.2.1** ➢ Added additional exemption criteria to be consistent with Directory#10 Section D.1.5.
2.0	**11/07/2011**	**Global** ➢ Changed the title of the manual from System Analysis Data Manual to Reliability Analysis Data Manual ➢ Reformatted per new template to standardize presentation. ➢ Implemented minor stylistic changes. ➢ Standardized labeling and numbering of graphical and tabular material. ➢ Implemented programmatic linking for internal cross-references to facilitate navigation within the document. ➢ Added external-document links that explicitly cite URLs from which documents may be accessed and that reflect changes in location secondary to NYISO Web site redesign. ➢ Performed a major rewrite and reorganization of content. ➢ Technical Bulletins merged: o 160, Market Participant Notification of NYISO Network Power System Model Updates (Created new Section 2.2) o 190, Reactive Power Testing for Non-VSS Generators (Created new Section 2.3.2) o 191, Non-ICAP NYCA Generators Must Report Capacity Data as Required by NPCC Directory #9 (Created new Section 2.3.1) **Front Matter** ➢ Reformatted Revision History as tabular material.
1.0	**09/24/1999**	**Initial Release** ➢ Changed all instances of *Transmission Provider*/*Provider's* to *Transmission Owners*.

1. OVERVIEW

This section provides a general description of the purpose of this manual, the types of data used in the NYISO planning and operations, and guidelines on safeguarding that critical energy infrastructure information and confidential data.

1.1 Purpose and Scope

This manual describes data required by the NYISO to carry out technical analysis to support its mission of preserving the reliability of the New York State bulk power system.

This manual identifies the data users and defines how data is to be submitted to the NYISO including schedules for data collection.

Three major groups use the data defined by this manual:

1) NYISO Staff
2) Suppliers of data, including:
   - Reliability Organizations:
     - North American Electric Reliability Corporation (NERC)
     - Northeast Power Coordination Council (NPCC)
     - New York State Reliability Council (NYSRC)
   - Reliability Coordinators
   - Planning Coordinators
   - Transmission Planners
   - Transmission Operators
   - Transmission Owners
   - Generator Owners
   - Load Serving Entities
   - Other NYISO Market Participants
3) Receivers of data:
   - Government Agencies:
     - New York Public Service Commission (PSC)
     - U.S. Department of Energy (DOE)
     - Federal Energy Regulatory Commission (FERC)
   - Reliability Organizations
     - NERC
     - NPCC
     - NYSRC
   - Reliability Coordinators
   - Planning Coordinators
   - Transmission Planners

- Transmission Operators
- Transmission Owners
- Other NYISO Market Participants

This data is collected by the NYISO to comply with the following requirements, standards, criteria, rules, and procedures:

- Federal Power Act, Sections 213(b), 307(a) and 311
  - FERC Form No. 715: Annual Transmission Planning and Evaluation Report
- NERC MOD-032-1: Data for Power System Modeling and Analysis
- NERC MOD-025-2: Verification and Data Reporting of General Real and Reactive Power Capability and Synchronous Condenser Reactive Power Capability
- NERC MOD-026-1: Verification of Models and Data for Generator Excitation Control System or Plant Volt/Var Control Functions
- NERC MOD-027-1: Verification of Models and Data for Turbine/Governor and Load Control or Active Power/Frequency Control Functions
- NERC MOD-033-1: Steady-State and Dynamics System Model Validation
- Eastern Interconnection Reliability Assessment Group (ERAG) Multiregional Modeling Working Group (MMWG) Procedural Manual
- NPCC Directory #1: Design and Operation of the Bulk Power System
- NPCC Directory #9: Verification of Generator Gross and Net Real Power Capability
- NPCC Directory #10: Verification of Generator Gross and Net Reactive Power Capability
- NPCC Document C-29: Procedures for System Modeling
- NYSRC Reliability Rules

Actual and forecast data of all the components, including load, are required to analyze, study, and plan the interconnected electric system. Detailed data of system components must be maintained and updated by the facility owners and load-serving entities and provided to the NYISO accurately and as needed for system analysis and distribution.

Complete, accurate, and timely data is needed by the NYISO to prepare system analyses to assess reliability of the New York State bulk power system.

System analyses include steady-state, transient, and dynamic simulations of the electrical networks. Data requirements for these system analyses include information on system components, system configuration, facility ratings, customer demands, and electric power transactions. This manual describes specific data supplied by the New York Control Area (NYCA) facility owners and collected by the NYISO for these purposes.

1.2 NYISO Data Classification

In order to perform reliability analysis, various databases are developed by the NYISO for use in computer simulations. These computer simulations include steady state, dynamic, and fault current programs.

The NYISO reliability analysis data described in this manual is divided into:

- Data for reliability assessment:
  - Steady State Data
  - Dynamics Data
  - Short Circuit Data
- Data for Real-time security monitoring:
  - Real-time System Representation Data
  - Ratings of Facilities

1.3 Treatment of Data

This section summarizes guidelines for the treatment and disclosure of NYISO data classified as critical energy infrastructure information (CEII) or confidential and proprietary. Treatment of CEII and confidential data is governed by NYISO policies. Detailed rules and procedures concerning the confidentiality of data are covered in Attachment F to the *NYISO Open Access Transmission Tariff*[1] and Section 6.3 of the *NYISO Market Administration and Control Area Services Tariff*[2].

1.3.1 Critical Energy Infrastructure Information (CEII)

The CEII classification was created by FERC to assure that critical infrastructure information is protected in the event of Freedom of Information Act (FOIA) or other requests to the FERC for access. FERC Regulations (contained in 18 CFR§ 388.113(c)) identifies CEII information as "specific engineering, vulnerability, or detailed design information about proposed or existing critical infrastructure that: (1) relates details about the production, generation, transportation, transmission, or distribution of energy; (2) could be useful to a person in planning an attack on critical infrastructure; (3) is exempt from mandatory disclosure under the Freedom of Information Act, 5 U.S.C. 552 (2000); and (4) does not simply give the general location of the critical infrastructure."

The NYISO reliability analysis databases containing electric system network data, including steady state, dynamic, and short circuit data, are classified as CEII. Interested parties with a legitimate need to access CEII may receive such CEII only if they request it in writing, as described in Section 1.3.3, specifying the information sought, the planning process to which the information relates, and demonstrating their need related to the specified planning process to have access to that information. The NYISO will review such requests and, if approved in the NYISO's sole discretion, the interested party may receive that CEII only after it signs an appropriate non-disclosure agreement prescribed by the NYISO.

[1] http://www.nyiso.com/public/markets_operations/documents/tariffs/index.jsp
[2] http://www.nyiso.com/public/markets_operations/documents/tariffs/index.jsp

1.3.2 Confidential Data

The NYISO databases containing electric system network data may contain data considered confidential, such as market-related data.

Distribution or disclosure of confidential data to any other party by any means including verbal, graphic, and/or electronic is strictly prohibited without the prior approval of the Market Participant who owns the data.

1.3.3 Data Requests

Requests for FERC Form No. 715 – Part 2 databases, reliability analysis databases, or any other CEII should be submitted to the NYISO using the CEII Request Form posted at:

http://www.nyiso.com/public/markets_operations/services/planning/planning_resources/index.jsp

Release of the NYISO reliability analysis databases is managed through the NYISO ePlanning system. Access to ePlanning is granted on an as-needed basis.

1.4 Reliability Analysis Databases

This section describes the NYISO processes used to maintain the necessary network representation data to comply with FERC, NERC, NPCC, and NYSRC requirements.

1.4.1 NYISO Database

The NYISO database serves as the NYISO's main repository of reliability analysis data required in order to simulate thermal, voltage, and dynamic responses to contingencies, and to determine interface transfer limits and fault current levels.

The NYISO database is the basis for steady state, dynamic, and short circuit cases as required for regularly scheduled studies, reviews, and reports. Regularly scheduled studies include, but not limited to:

- FERC Form 715: Annual Transmission Planning and Evaluation Report
- ERAG MMWG Power Flow Base Case Development process
- NPCC SS-37 Modeling Working Group Base Case update
- NPCC & NYSRC Area Transmission Reviews
- NERC Planning Assessment
- NYISO Reliability Needs Assessments
- NYISO Transmission Expansion and Interconnection studies
- NYISO Seasonal Operating Studies

The following base cases and associated contingency definitions are maintained in the NYISO database:

- Steady State
  1) As-found system Summer peak load

2) As-found system Winter peak load
3) 1st year off-peak (Spring) light load
4) 1st year Summer peak load
5) 1st year Summer peak load based on a 90/10 statewide forecast
6) 1st year Winter peak load
7) 5th year off-peak (Spring) light load
8) 5th year Summer peak load
9) 5th year Summer peak load based on a 90/10 statewide forecast
10) 5th year Winter peak load
11) 10th year Summer peak load
12) 10th year Summer peak load based on a 90/10 statewide forecast

- Dynamics
  1) As-found system Summer peak load
  2) 5th year off-peak light load
  3) 5th year Summer peak load
- Short Circuit
  1) As-found system Summer peak load
  2) 5th year Summer peak load

The "as-found system" cases represent the existing transmission system and system conditions as are expected to occur at the time of the respective seasonal peak load of the current year. In general, the NYCA representations in the future-year cases include only those future new or modified generation and transmission facilities that: (1) have met the qualifications to be included in a NYISO Interconnection Facilities Study (IFS); or (2) have been proposed by Transmission Owners, consistent with the *NYISO Load & Capacity Data* report. Other proposed new or modified generation and transmission facilities that may be under study are not represented.

1.4.2 FERC Form 715: Annual Transmission Planning and Evaluation Report

The FERC Form 715, Annual Transmission Planning and Evaluation Report, is required pursuant to Sections 213(b), 307(a), and 311 of the Federal Power Act to provide information adequate to inform potential transmission customers, state regulatory authorities and the public of potential transmission capacity and known constraints, to support the FERC expanded responsibilities under Sections 211, 212, and 213(a) of the Federal Power Act (as amended by the Energy Policy Act), and to assist in rate or other regulatory proceedings.

The NYISO, as designated agent of the Transmission Owners of New York State, is responsible for preparing the FERC Form 715 – Part 2 report every year, which includes the NYISO database steady state cases.

1.4.3 ERAG MMWG Steady State Base Cases

The purpose of the Eastern Interconnection Reliability Assessment Group (ERAG) is to further augment the reliability of the bulk power system in the Eastern Interconnection through periodic studies of forecasted transmission system conditions.

The Multiregional Modeling Working Group (MMWG) has responsibility for developing all Eastern Interconnection power flow and dynamic base case models, including seasonal updates to summer and winter power flow study cases.

1.4.4 NPCC Steady State Base Cases

In addition to the NYISO database, the NYISO is also responsible as an Area Coordinator for compiling NYCA information to develop the NPCC SS-37 Working Group Base Cases. The data requirements are documented in *NPCC Document C-29: Procedure for System Modeling*. These NPCC steady state base cases are used by all NPCC members to perform transmission planning and operating studies, and are input to the ERAG MMWG base cases. The NPCC SS-37 Working Group has representation from all interested parties including Transmission Owners.

1.5 Bulk Power Transmission Facilities

The New York State Bulk Power Transmission Facilities (BPTF) are defined in Section 31.1 of the NYISO Open Access Transmission Tariff (OATT) as the facilities identified as the New York State Bulk Power Transmission Facilities in the annual Area Transmission Review submitted to NPCC by the ISO pursuant to NPCC requirements.

The BPTF include (i) all NYCA transmission facilities 230 kV and above, (ii) all NYCA facilities identified by the NYISO to be part of the Bulk Power System, as defined by NPCC and the NYSRC, and (iii) select 115 kV and 138 kV facilities that are considered to be bulk power transmission in accordance with the 2004 FERC Order.[3]

The BPTF list is reviewed annually as part of the Area Transmission Review. A new facility will be considered BPTF if (i) the nominal operating voltages of both terminals of the facility are 230 kV and above, (ii) the facility is classified as a Bulk Power System element, (iii) the facility modifies existing BPTF (*e.g.*, creates transmission line segments from a single BPTF), or (iv) a facility is directly in parallel with existing BPTF and has a nominal operating voltage greater than or equal to the existing parallel BPTF. A facility will be removed from the BPTF if (i) the facility is retired, (ii) the nominal operating voltage of the facility is reduced below 115 kV and the facility is not classified as a Bulk Power System element, or (iii) the facility is no longer classified as a Bulk Power System element and the facility is not considered to be bulk power transmission in accordance with the 2004 FERC Order.

[3] In its December 28, 2004 Order, the FERC found that the scope of facilities considered to be bulk power transmission facilities, which included facilities "primarily composed of 765, 345 and 230 kV transmission [and] a portion of the 138 and 115 kV transmission" as provided in the NYISO's 2002 *Area Transmission Review of the Bulk Power Transmission System in the Year 2007*, was adequate to meet the reliability needs of New York. *See New York Independent System Operator, Inc.*, Order Accepting in Part and Reject in Part Tariff Amendments, 109 FERC ¶ 61,372 (December 28, 2004).

2. NYISO DATABASE UPDATE PROCEDURES

This section describes the NYISO processes for maintaining the necessary system representation data to comply with FERC, NERC, NPCC, and NYSRC requirements.

2.1 Annual Database Update Process

The following procedure describes the annual process followed by the NYISO, Transmission Owners, and Generator Owners to collect the required steady state, dynamic, and short circuit base case data for the NYCA. In accordance with MOD-032-1, each Market Participant responsible for providing steady state, dynamic, and short circuit database updates to the NYISO shall provide a written response to the NYISO confirming completion of all applicable tasks listed below. With the exception of the date by which the NYISO will establish the firm schedule for the annual database update process and the due date for the FERC Form 715 report, all targeted completion dates and ranges of dates for each task identified below are for illustrative purposes only and are subject to change. The database update shall be consistent with the current year *NYISO Load & Capacity Data* report.

NYISO Actions

1) Establish the firm schedule for the submission of steady state, dynamic, and short circuit data to be followed by the NYISO and the Transmission Owners' and Generator Owners' data contacts. This schedule will be presented at the November Transmission Planning Advisory Subcommittee (TPAS) meeting.

2) Prepare the steady state cases and as-found system short circuit case for review by updating the models with the most recent available ERAG MMWG and NPCC data by the beginning of December.

3) Review and incorporate all steady state, dynamic, and short circuit model updates, including Generator Owners' data, associated steady state and dynamic contingency definition file updates, and lowest circuit breaker (LCB) ratings received since the previous issuance of the most recent database update by the beginning of December.

4) Request steady state and dynamic model updates to the MMWG case from PJM by the 1st week of January. Upon receipt of the updates from PJM, the NYISO will incorporate any changes into the model.

5) Request short circuit data updates from neighboring systems by 3rd week of December. Upon receipt of the updates from neighboring systems, the NYISO will incorporate any changes into the model.

6) Using the most recent data, prepare the as-found system short circuit case for review during the month of December.

7) Issue the steady state cases (as developed from the steady state model database), as found system short circuit case, steady state and dynamic contingency definition files, and LCB ratings to the Transmission Owners' data contacts by the 3rd week of December.

Transmission Owners Action

8) Provide initial changes to the steady state model database, as-found system short circuit case, steady state and dynamic contingency definition files, LCB ratings, and station one-line diagrams to the NYISO by the last week of January.

NYISO Action

9) Update the steady state model database, as-found system short circuit case, steady state and dynamic contingency definition files, and LCB ratings. Send revised steady state cases (as developed from the update to the steady state model database), as-found system short circuit case, steady state and dynamic contingency definition files, and LCB ratings to the Transmission Owners' data contacts by the 2nd week of February for further review.

Transmission Owners Actions

10) Provide final updates to the steady state model database, as-found system short circuit case, steady state and dynamic contingency definition files, LCB ratings, and station one-line diagrams to the NYISO by the 1st week of March.

11) Provide short circuit modeling data to create the 5th year short circuit model by the last week of March.

    Note that the starting point for the 5th year representation is the as-found system short circuit model with firm planned system modifications that are included in the 5th year steady state model.

NYISO Actions

12) Issue final steady state cases by the last week of March.

Transmission Owners Action

13) Certify accuracy of steady state information and data provided to the NYISO for the FERC Form 715 Report by the last week of March.

NYISO Actions

14) File the FERC Form 715 report, including the steady state cases, with FERC by April 1st.

15) Issue final steady state and dynamic contingency files to Transmission Owners' data contacts by the 1st week of April.

16) Issue the 5th year short circuit case to the Transmission Owners' data contacts by 1st week of April.

Transmission Owners Action

17) Provide written confirmation to the NYISO that the steady state and dynamic contingencies are accurate by the 2nd week of April.

NYISO Actions

18) Issue final as-found system short circuit case to the Transmission Owners' data contacts by the 2nd week of April.

Transmission Owners Action

19) Provide final updates to the 5th year short circuit case by the 3rd week of April.

NYISO Actions

20) Issue final 5th year short circuit case to Transmission Owners' data contacts by the first week of May.

21) Prepare the dynamics data for review using the most recent available ERAG MMWG, NPCC, and NYISO databases, during the months of April and May.

22) Submit steady state cases to NPCC SS-37 in accordance with the schedule established by NPCC (typically by early June).

23) Finalize dynamics cases and issue to NPCC and the Transmission Owners' data contacts by the end of June.

24) Collaborate with NPCC SS-37 to update and finalize the regional steady state cases for submittal by NPCC to ERAG MMWG by the end of July.

25) Prepare the as-found system short circuit case using the most recent available data, and provide the case to the Transmission Owners' data contacts for review during the first week of September.

26) Collaborate with NPCC SS-37 to review ERAG MMWG steady state cases in accordance with the schedule established by NPCC (typically by the end of September).

27) Collaborate with NPCC SS-37 to initialize and test the NPCC regional dynamics cases in accordance with the schedule established by NPCC (typically by the end of September).

28) Provide current generator data to the Generator Owners' data contacts by the end of September and request update and certification of generator data from Generator Owners.

Transmission Owners Actions

29) Provide initial changes to the as-found system short circuit case to the NYISO by the last week of September.

30) Provide, if applicable, changes that are found during review of the Seasonal Operating Study steady state base case to the NYISO during the months of July through October.

NYISO Action

31) Update the as-found system short circuit case and send to Transmission Owners' data contacts for review by the 2rd week of October.

Transmission Owners Action

32) Provide final changes to the as-found system short circuit case to the NYISO by the third week of October.

NYISO Action

33) Update and send the finalized as-found system short circuit case to Transmission Owners by the end of October.

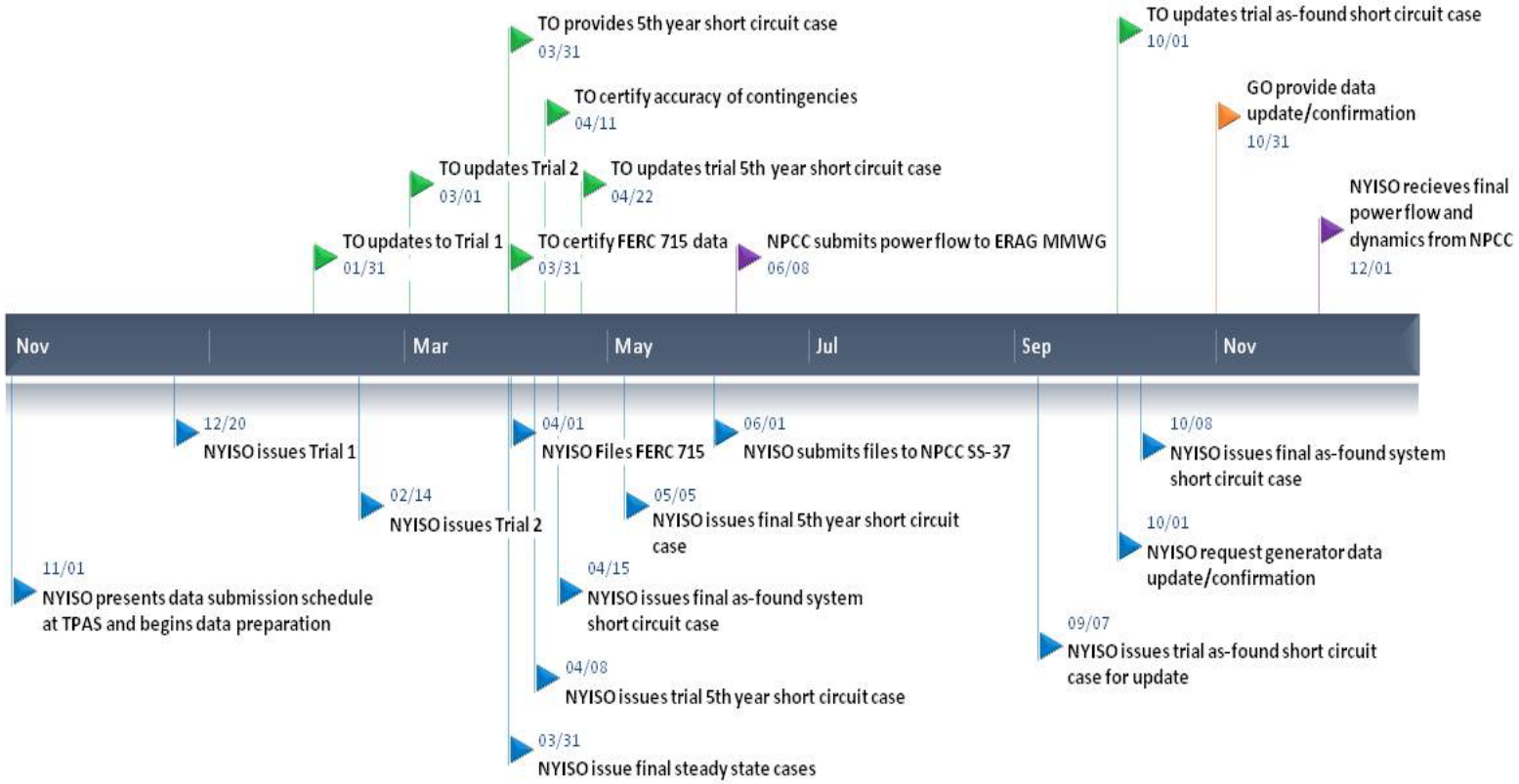
Generator Owners Action

34) Provide requested generator data and certify the accuracy of that data to the NYISO by the requested deadline by the last week of October.

NYISO Action

35) Receive from NPCC final ERAG MMWG and NPCC steady state and dynamics cases by the last week of December.

Figure 2-1: Illustrative timeline for the NYISO Database update process



2.2 Facility Owner Updates

In addition to requirements set forth in Attachments P, X and Z of the NYISO OATT regarding modifications to facilities and notice to the NYISO regarding such modifications, each Market Participant that owns or operates facilities within or interconnected to the NYCA, including Transmission Owners and Generator Owners, shall inform the NYISO, and interconnecting New York Transmission Owner, as necessary, of all planned power system equipment additions or modifications or modeling discrepancies of existing power system equipment, as listed in Section 3.1 of this manual that can result in modeling changes as described in Attachment A. Market Participants shall provide to the NYISO and the interconnecting Transmission Owner, as identified by the NYISO, the required modeling data pursuant to the notification procedures provided in this manual. The data shall be provided in a timely manner as specified below.

1) Updates to Seasonal Ratings: the Market Participant shall provide updated data at least seven (7) days ahead of the power system equipment's expected in-service date. This applies to existing equipment as well as new equipment already incorporated in the NYISO model.

2) Updates to Metering Data: the Market Participant shall provide updated data at least fourteen (14) days ahead of the power system equipment's expected in-service date. These updates are limited to the metering data transfer identifiers (Inter-control Center Communication Protocol Object Identifiers or ICCP OIDs). This applies to existing equipment as well as new equipment already incorporated in the NYISO model.

3) Equipment Additions or Modifications Resulting in Topology Changes:[4] the Market Participant shall provide data as specified in Attachment A, or other notification that includes, at a minimum, the specific topology changes, at least sixty (60) days ahead of the power system equipment's expected in-service date to the NYISO.[5]

4) All Other Equipment Modifications: the Market Participant shall inform the NYISO and interconnecting New York Transmission Owner of all changes to the parameters of existing modeled power system facilities at least seven (7) days ahead of the expected in-service date. These modifications comprise all data that is not covered under items 1, 2 and 3, including as-built data for new generator and merchant transmission interconnections.

5) Modeling Discrepancies: upon discovery of a modeling discrepancy, in addition to the other review, submission, and correction obligations contained in this manual, each Market Participant that owns or operates facilities shall inform the NYISO and interconnecting New York Transmission Owner of all changes to parameters of

[4] A topology change is a permanent modification to the physical arrangement of the system elements.

[5] For those additions or modifications that require a System Reliability Impact Study or System Impact Study, submission of those studies (i.e. study approved by the Operating Committee) meet the notification requirement. Notifications of subsequent changes will be reported to the NYISO at least 60 days ahead of the expected in-service date.

existing modeled power system facilities or modeling discrepancies within seven (7) days after identifying the change or discrepancy.

2.2.1 Data Notification Requirements

The following information shall be provided for each power system modeling update:

Change Description: A short description of the power system modeling update.

Facility: The power system facility to be added/modified such as transmission line, transformer, shunt, series reactor, breaker, disconnect, generator, and any associated data identified in this manual.

Station One-Line Diagram: A switching one-line station diagram which indicates the updated facilities before and after the change.

Effective Date and Expected Duration: The expected date and duration of the change. Please note that the request for changes must be provided in writing to the NYISO as soon as possible and no later than sixty (60) days prior to the effective date of the change.

Cut-Over Requirement: If there is any temporary configuration change required for implementation of the new configuration, the NYISO needs to be informed of such temporary operating configuration changes.

2.2.2 New York Transmission Owner Data Coordinator Requirements

The NYISO Control Center Requirements Manual[6] establishes the requirements for Transmission Owner Data Coordinators to provide power system network modeling data and associated real-time measurement data to ensure the proper operation of the NYISO and Transmission Owner computer control energy management systems. These data requirements and the process for periodic updates are described in Section 3.4 of that manual.

In addition to these periodic reporting requirements, Transmission Owner Data Coordinators shall inform the NYISO within the applicable timeline specified above when New York Transmission Owners' real-time system representation data, as described in Section 4 of this manual, require ad-hoc updates.

Notification of changes to real-time system representation data as described in Section 4 should be sent via e-mail to the NYISO Data Coordinator Mailbox: Data_Coordinator@nyiso.com.

2.2.3 NYCA Facility Owner Requirements

In addition to the periodic reporting requirements described in Section 2.1, NYCA Facility Owners shall inform the NYISO and any affected New York Transmission Owners within the applicable timeline specified in this Section 2.2 of any changes to their facilities described in Section 3 that could affect NYISO operations and planning of the Bulk Power

[6] Operations folder at http://www.nyiso.com/public/markets_operations/documents/manuals_guides/index.jsp

System or the affected Transmission Owners operations and planning of non-Bulk Power System facilities.

Notification of changes to system network representation data as described in Section 3 should be submitted via e-mail to the NYISO System Analysis Data mailbox: System_Analysis_Data@nyiso.com.

2.3 Generation Capability Reporting

NPCC Directory #9: Verification of Generator Gross and Net Real Power Capability and *NPCC Directory #10: Verification of Generator Gross and Net Reactive Power Capability* require the NYISO, as the Transmission Operator, and Generator Owners to comply with NPCC criteria to assure the accuracy of information used in the system network representation to assess the reliability of the NPCC Bulk Power System.

Generators actively participating in the Installed Capacity (ICAP) market are in compliance with Directory #9, in accordance with the NYISO ICAP Manual[7], Section 4.2. Some generators in the system network representation are not participating in the ICAP market and must come into compliance with Directory #9 by reporting Real Power Capacity to the NYISO as described in Section 2.3.1 of this manual.

Generators that participate in the Voltage Support Service (VSS) program have no additional testing requirements beyond those required for participation in the VSS program in accordance with Section 3 of the NYISO Ancillary Services Manual[8]. Generators that do not participate in the VSS program must come into compliance with Directory #10 by reporting reactive power capabilities as described in Section 2.3.2 of this manual.

2.3.1 Real Power Capability

Generators operating in the NYCA that do not participate in the ICAP market must submit Dependable Maximum Net Capability (DMNC) data per the specifications in NPCC Directory #9 and in the NYISO ICAP Manual Section 4.2 in order to initially come into compliance. The interval for subsequent reporting of DMNC data for system network representation generators that do not participate in the ICAP market is three (3) years; for example: a DMNC report for Summer 2009 submitted by November 15, 2009 must be followed by a DMNC report for Summer 2012 submitted by November 15, 2012.

Generators in the system network representation will be notified when found non-compliant with Directory #9 requirements and shall report DMNC data as required. Verification criteria for the various generator types to report are detailed in Directory #9 Section D.1.4. The NYISO has determined per Directory #9 that verification will be required for only the Net Real Power Capability (i.e., DMNC).

DMNC data must be reported electronically to the NYISO on the Real Power Capability Reporting Form (Attachment B). The results must be submitted to the NYISO via email at icap_info@nyiso.com.

[7] Operations folder at http://www.nyiso.com/public/markets_operations/documents/manuals_guides/index.jsp
[8] Operations folder at http://www.nyiso.com/public/markets_operations/documents/manuals_guides/index.jsp

2.3.1.1 Real Power Capability Demonstration Exemptions

NPCC Directory #9 provides the following exemptions from its reporting requirements related to seasonal capability testing on a generator or generation facility:

1) Adverse impact on transmission system reliability
2) Potential damage to transmission system or generator equipment
3) Environment conditions
4) Governmental regulatory or operating license limitations
5) An extended outage to the generator or generation facility

Requests for exemption for the above listed reasons may be e-mailed to icap_info@nyiso.com. Within 30 days of receiving notification by a Generator Owner that it cannot perform verification testing for the required seasonal period, the NYISO will respond to the Generator Owner's request.

2.3.2 Reactive Power Capability

Generators are required to demonstrate their gross leading and lagging reactive power capabilities at least once every five years.[9] This demonstration can be in the form of a scheduled test or operational data. For new units, commissioning data can be used.

The following demonstration rules apply:

- Both leading and lagging reactive power capability must be demonstrated during the summer capability period (May 1 through October 31, inclusive).
- Leading reactive power must be demonstrated for a 15 consecutive minute period.
- Lagging reactive power must be demonstrated for a 60 consecutive minute period.
- Lagging and Leading tests must be performed at the real power levels described in Table 2-1.
- Small units at the same site may apply demonstration results from one unit to another unit at the same site. In order to qualify for this treatment, the units must be electrically identical and must be less than 60 MW nameplate capacity.
- Reactive power demonstration for multiple generator facilities when limited by common elements must be based on the reactive power capability of the facility and not the sum of the capabilities of the individual generators.

[9] For the testing requirements applicable to Generators in the NYISO Voltage Support Service Program, please see the NYISO Ancillary Services Manual.

Table 2-1: Real Power Level Requirements for Reactive Power Capability Testing

	Intermittent and Limited Control Run-of-River Hydro Resources		All Other Generators	
	Lagging	Leading	Lagging	Leading
ICAP Suppliers[1] and Non-ICAP Suppliers with a Valid DMNC Test[2]	≥ 90% of UCAP[3]	≥ 10% of UCAP[3]	≥ 90% of DMNC[4]	≥ 10% of DMNC[4]
All Other Non-ICAP Suppliers	≥ 90% of Generator Nameplate MW	≥ 10% of Generator Nameplate MW	≥ 90% of Generator Nameplate MW	≥ 10% of Generator Nameplate MW

1 *ICAP Supplier* refers to resources qualified to supply UCAP as defined in the *NYISO Services Tariff*.

2 DMNC tests cannot be used for Intermittent or Limited Control Run-of-River Hydro Resources that are not ICAP Suppliers.

3 *Unforced Capacity* (*UCAP*) refers to the rating assigned to ICAP Suppliers as defined in the *NYISO Services Tariff*. The UCAP value that is tested to must correspond to the Available UCAP recorded in the NYISO ICAP Automated Market System.

4 *DMNC* refers to the Dependable Maximum Net that is in effect at the time of the test. The DMNC value that is tested to must correspond to the DMNC recorded in the NYISO ICAP Automated Market System.

Demonstration results, including reactive power auxiliary loads, must be reported electronically to the NYISO on the form in Attachment C and should be reported within ten business days of the date of the demonstration. The results must be submitted to the NYISO at vss_test_results@nyiso.com.

If a generator is unable to achieve its reactive power capability for 30 days or more during a capability period, it must report that reduction to the NYISO at vss_test_results@nyiso.com within 30 days after the end of that capability period. The summer capability period is May 1 through October 31, and the winter capability period is November 1 through April 30.

If requested by the NYISO, generators must submit supporting documentation associated with reactive power demonstrations within 30 days of the request.

Demonstration results must be retained by the Generator Owner for the current and most recent prior verification period. Any supplemental engineering analysis to support data for the current and most recent prior verification period must be retained.

2.3.2.1 Reactive Power Capability Demonstration Exemptions

NPCC Directory #10 provides the following exemptions from its reporting requirements related to the requirement to demonstrate leading or lagging reactive power capability:

- Adverse impact on transmission system reliability
- Potential damage to transmission system or generator equipment
- Environmental conditions

- Governmental regulatory or operating license limitations
- An extended outage to the generator or generation facility

If an exemption is given, existing generators must submit certified generator operation records, manufacturer data, or performance tracking for the same previous seasonal verification period. For new generators only, commissioning data must be submitted.

2.4 NYISO Data Screening Procedure

In accordance with NYSRC Reliability Rule I.4(R1), upon receipt of system network representation model data from a facility owner or Developer, NYISO will screen the data to determine if it is reasonable, as outlined in Attachment D. If suspect data is identified, the results of that screen will be sent electronically to the data owner for their review. The data owner shall respond to the NYISO by the specified deadline and shall either confirm the data is accurate or provide modified data accordingly.

2.5 NYISO Model Validation Procedure

This section describes various NERC modeling, data, and analysis (MOD) validation standards.

2.5.1 NERC MOD-025-2

NERC MOD-025-2, Verification and Data Reporting of Generator Real and Reactive Power Capability and Synchronous Condenser Reactive Power Capability, effective July 1, 2016, requires generator owners to report the real power capability of their generating units, and the generator owners or owners of synchronous condensers to report the reactive power capability of their units. The steps below provide guidance on how to report to the verification of real and reactive power capability to the NYISO:

1. Generator owners shall conduct real power capability verification in accordance with the requirements of NERC Standard MOD-025-2.
2. Generator owners or owners of synchronous condensers shall conduct reactive power capability verification in accordance with the requirements of MOD-025-2.
3. Real power capability verification data must be reported on Attachment 2 of MOD-025-2.
4. Reactive power capability verification data must be reported on Attachment 2 of MOD-025-2.
5. Real and reactive power capability verification reports must be sent to the NYISO through the VSS test mailbox at vss_test_results@nyiso.com.

2.5.2 NERC MOD-026-1 and NERC MOD-027-1

NERC MOD-026-1, Verification of Models and Data for Generator Excitation Control System or Plant Volt/VAr Control Functions, requires generator owners to verify their generator excitation control system or plant volt/VAr control function model. NERC

MOD-027-1, Verification of Models and Data for Turbine/Governor and Load Control or Active Power/Frequency Control Functions, requires generator owners to verify their generator turbine/governor and load control or active power/frequency control model. Below steps provide guidance on how to report to NYISO:

1. As documented in Section 3.4 of this manual, models directly supported by the PSS/e program and described in the Siemens Power Technologies, Inc. (PTI) *PSS/e Manual* are acceptable to be used in dynamic simulation. Upon request, the NYISO will send the model library block diagrams and/or data sheets. For a few specialized devices, a computer simulation module for the implementation of the model included the model library block diagrams and/or data sheets shall be maintained and provided by the equipment owner to the NYISO upon request.
2. To obtain the current model of a plant/generator, send a request included a plant/generator name and PTID to the NYISO.
3. Generator owners shall conduct model verification for their generators in accordance with the R2 through R5 requirements of NERC MOD-026-1.
4. Generator owners shall conduct model verification for their generators in accordance with the R2 through R4 requirements of NERC MOD-027-1.
5. All correspondents related to NERC MOD-026-1 or MOD-027-1 must be sent to the NYISO via email at system_analysis_data@nyiso.com.

2.5.3 NERC MOD-033-1

NERC MOD-033-1, Steady-State and Dynamic System Model Validation, effective July 1, 2017, establishes requirements for the planning steady state and dynamics models to be validated based on comparisons to actual system behavior. Upon request by the NYISO, Transmission Operators shall provide actual system behavior data to the NYISO.

3. SYSTEM NETWORK REPRESENTATION

This section describes the data requirements for system studies. Data for conducting planning and operating studies includes the steady state and short circuit network representations, dynamic model data for performing stability analysis, steady state and dynamic contingency events, LCB ratings, as well as network configuration information, such as station one-line diagrams that provide clarity to system modifications. The NYISO collects this data from all Transmission Owners and Generation Owners with facilities connected to the NYCA. Facility owners must develop and maintain data for their facilities suitable for performing the steady state, dynamic, and short circuit analyses. All facility owners must provide this data to the NYISO in accordance with these procedures. All system network representation data is subject to the NYISO Data Screening Procedure, as described in Section 2.4 and Attachment D of this manual.

3.1 Network Model Data

The NYISO requires all Transmission Owners, Generator Owners, and Load Serving Entities with facilities connected to the NYCA to provide the NYISO with the appropriate network modeling information. To maintain an accurate network model in accordance with NERC and NPCC requirements, the NYISO requires data for the following facilities, as described in Attachment A:

- AC transmission facilities
- HVDC transmission facilities
- Shunt devices
- Transformers
- Substation and switching station bus configurations
- Substation loads, including generator station service auxiliary load
- Generating stations and units
- Static VAr compensators or synchronous condensers
- Flexible Alternating Current Transmission System (FACTS) devices
- Voltage Source Converter (VSC) devices

3.2 Facility Ratings

Electrical facilities used in the production, transmission, storage, and delivery of electricity shall be rated in compliance with *NYPP Tie-Line Ratings Report*[10]. These criteria apply to all ratings data required for network modeling and for real-time applications. The base facility rating criteria is described below:

- Facility owners shall document the methodology for determining facility ratings, including delineation and justification of assumptions, standards, and practices used

[10] Planning Data and Reference folder at http://www.nyiso.com/public/markets_operations/services/planning/documents/index.jsp

in establishing the ratings. The documentation submitted to the NYISO must state the ratings and their basis applicable to each of the base case models described Section 1.4.1 of this manual.

- Facility owners shall provide facility ratings (applicable normal, long-term emergency, and short-term emergency) for all facilities required for system modeling as defined in this manual.
- The rating of a system facility (e.g., transmission line, transformer, etc.) shall not exceed the rating of the most limiting series element in the circuit or path of the facility, including terminal connections and associated equipment.
- In cases where protection systems and control settings constitute a loading limit on a facility, this limit shall become the rating for that facility.
- Ratings of jointly owned facilities shall be coordinated and provided on a consistent basis. The ratings submitted shall be agreed to through the consensus of the facility owners.
- Facility ratings should be based on or adhere to applicable national electrical codes and electric industry rating practices consistent with good engineering practice.

3.3 Load Data

The NYISO requires that all Load Serving Entities and Transmission Owners provide actual and forecast demand data for their respective customers for steady state modeling at the bus load level (MW and MVAr), consistent with the *NYISO Load & Capacity Data* report[11].

The NYISO database bus load data provides for forecast loads for ten (10) years. Upon request and in accordance with Section 2.1, data representing the following loads shall be provided for each of the summer and winter capability periods:

- Coincident (NYISO) peak (MW and MVAr)
- Independent peak (MW and MVAr)
- Off-peak (light) load (MW and MVAr)
- Nominal peak (MW and MVAr)

The off-peak load is defined as the minimum load expected on the day of the system peak, and is generally 40–45% of the season peak. The nominal load is the typical load level expected during Spring or Fall, and is generally 70–75% of the season peak.

Generator Owners shall provide their station service auxiliary load for normal plant configuration and when the plant is out-of-service. The station service auxiliary load shall be provided by the Generator Owners as described in Attachment A and in accordance with the schedule in Section 2.1 of this manual.

[11] Planning Data and Reference folder at http://www.nyiso.com/public/markets_operations/services/planning/documents/index.jsp

3.4 Dynamics Model Data

Many dynamics models are developed by the Institute of Electrical and Electronics Engineers (IEEE); however, many other models are not. Upon request, the NYISO will provide data sheets for any standard dynamic model in the dynamics software used by the NYISO. Submission of dynamics data in the form of raw data files for the dynamics software used by the NYISO is also accepted and encouraged (*e.g.* PSS/e dyr file). For a few specialized devices, a computer simulation module for the implementation of the model may also be needed and shall be maintained and provided by the equipment owner to the NYISO upon request. The NYISO uses the PTI PSS/e power system analysis program. Models directly supported by the PSS/e program are described in the PTI *PSS/e Manual*.

The dynamics data required by the NYISO includes detailed equipment-specific data for:

- generators and power generating facilities,
- excitation systems and voltage regulators,
- turbine-governor systems,
- power system stabilizers,
- relays and protection equipment (out of step, over-speed, etc.), and
- other control equipment or dynamic devices.

Equipment-specific data includes complete and accurate models of controls suitable for integration with the analytical software. Unit-specific data shall be used for all generator units installed after 1990. Typical manufacturer's dynamics data, based on units of similar design and characteristics, may be used when unit-specific dynamics data cannot be obtained.

3.4.1 Generator Dynamics Data

The NYISO requires a dynamic model for each generator connected to the NYCA. The model for dynamic studies must be in a form usable by the dynamics software used by the NYISO. For most generators, the following data items constitute a complete dynamic model:

- Rotor type (solid or salient pole)
- Unsaturated values of synchronous, transient, and subtransient reactances [X_{di}, X_{qi}, X_{di}', X_{qi}' (for solid rotors), X_{di}"] in per unit on machine base
- Unsaturated value of leakage reactance (X_{li}) in per unit on machine base
- Transient and subtransient time constants [T_{do}', T_{qo}' (for solid rotors), T_{do}", T_{qo}"] in seconds
- Combined turbine/generator/exciter inertia constant (H) in per unit on machine base
- Shape of saturation curve (quadratic or exponential)
- Saturation factors ($S_{1.0}$, $S_{1.2}$)

Some generators or power generating facilities may require a model which is not supported by an available model in the PSS/e model library. For such generators, the model must include all data and be in a form compatible with the dynamics software used by the NYISO.

3.4.2 Generator Controls Dynamics Data

Generators have many associated control systems, including excitation systems, voltage regulators, turbine-governors, and power system stabilizers. The number of different types of models for each category of control system is large, and each model has different parameters associated with it. Generator Owners must supply all modeling data for each control system on the generator, and must also supply all network dynamics data (e.g., SVCs, synchronous condensers, and monitoring relays) associated with the generator or the generating plant, in a form compatible with the dynamics software used by the NYISO.

3.4.3 Network Dynamics Data

Transmission Owners must supply the NYISO with the models for dynamic devices on the transmission network. Examples of such devices include static VAr compensators (SVCs), synchronous condensers, FACTS controls, HVDC and VSC devices, and monitoring relays. For each such dynamic device, the Transmission Owner must supply the NYISO with a dynamic model and all associated data in a form compatible with the dynamics software used by the NYISO.

3.4.4 Load Dynamics Model Data

Some large loads include synchronous or induction motors or other equipment or characteristics that may have a significant impact on the dynamic response of the New York State Power System. For each such device on the system, the Load Serving Entity must provide the NYISO with a dynamics model and all associated data in a form usable by the dynamics software used by the NYISO. Load Serving Entities may consult their host Transmission Owner for guidance on which loads, if any, need to be included in the NYISO dynamic studies.

3.5 Contingency Data

3.5.1 Steady State Contingency Modeling Data

The steady state contingency definition files shall include design criteria (planning) and extreme events. Each Transmission Owner shall maintain the definition files of design criteria and extreme contingencies for its facilities that impact the Bulk Electric System (BES). The NYISO will coordinate and compile a database of steady state contingency events that impact the New York BPTF. In accordance with the schedule in Section 2.1, the NYISO will request from each Transmission Owner contingency definitions that impact the BPTF and the Transmission Owners shall provide the NYISO with all design criteria contingencies and extreme contingencies for the requested portions of the NYCA

transmission system. The Transmission Owners shall periodically review and update the steady state contingency definitions at stations within their service territories in accordance with Section 2.

3.5.2 Dynamic Contingency Modeling Data

The dynamic contingency definition files shall include design criteria (planning) and extreme events. Each Transmission Owner shall maintain the definition files of stability design criteria and extreme events for its service territory that impact the BES, and shall provide the NYISO the definition files in accordance with the schedule in Section 2.1 of this manual. The NYISO will coordinate and compile a database of dynamic contingency definitions that impact the NYCA BES, as provided by the Transmission Owners.

The Transmission Owners shall periodically review and update the dynamic contingency definitions at stations within their service territories, incorporating the information coordinated by the NYISO with neighboring Transmission Owners, in accordance with Section 2.1. The Transmission Owners Shall also periodically review and update the dynamic contingency definitions by incorporating information obtained from Generator Owners. The Transmission Owners shall indicate any clearing times associated with Generator Owner facilities within the dynamic contingency definition files. Upon request by the NYISO, Generator Owners shall provide to the NYISO a statement verifying the accuracy of their facilities' clearing times that are included in the dynamic contingency definitions.

3.6 Short Circuit Data

The NYISO shall maintain a uniform short circuit representation for fault analysis. The Transmission Owners shall periodically review and update their respective portions of the representation in accordance with Section 2 of this manual.

It is necessary for the NYISO to maintain a current short circuit representation to ensure availability of this data for any necessary analyses required in a system impact study in accordance with the *NYISO Transmission Expansion and Interconnection Manual*[12]. Voltage and dynamic stability studies for either system reliability or operating security also require accurate short circuit data.

Specific data necessary for fault current analysis includes:

- LCB rating at the station(s) being evaluated
- transmission line and transformer positive, negative, and zero sequence impedances
- transmission line mutual impedances
- synchronous machine saturated values of synchronous, transient, and subtransient reactances [X_{dv}, X_{qv}, X_{dv}', X_{qv}' (for solid rotors), X_{dv}"] in per unit on machine base
- synchronous machine zero-sequence reactance X_{0v}

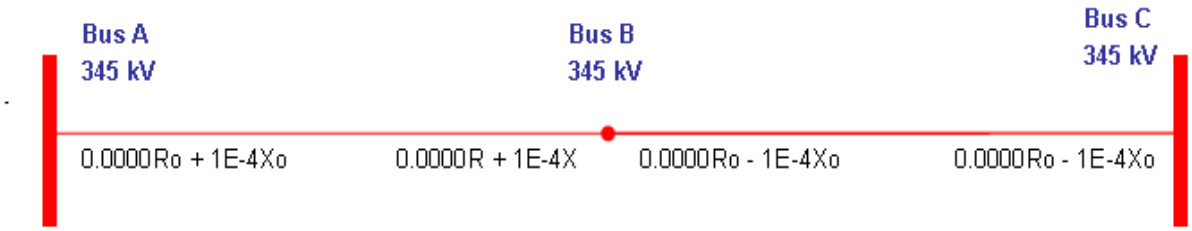
[12] Planning folder at http://www.nyiso.com/public/markets_operations/documents/manuals_guides/index.jsp

To the extent possible, bus names and numbers in the short circuit representation should be consistent with the steady state network model and line names should be consistent with the Facility Owner's line identification number.

Zero-impedance lines shall be represented in the short circuit representation as two line segments in series: one with an impedance of 0.0000+j0.0001 per-unit and the second with an impedance of 0.0000-j0.0001 per-unit, as shown in Figure 3-1.

The LCB ratings provided to the NYISO shall be the nameplate symmetrical rating, the de-rated symmetrical value as determined by the Transmission or Generator owner, or the approximate symmetrical value converted from a total current basis.

Figure 3-1: Zero Impedance Line from Bus A to Bus C



The NYISO uses the ASPEN One-Liner program; however, new data or modifications to existing data may be submitted in any of the standard data formats used by the industry which are compatible with ASPEN.

4. REAL-TIME SYSTEM REPRESENTATION

This section describes the data requirements, formats, and procedures used in modeling and maintaining the NYISO/NYCA system representation used for real-time analysis. The Energy Management System (EMS) model is also used in the day-ahead Security Constrained Unit Commitment (SCUC) and Real Time Commitment (RTC) and Real Time Dispatch (RTD) processes.

4.1 Real-Time System Representation Data

The NYISO EMS representation data includes the following data groups:

- Substation data
- Busbar data
- Synchronous Machine data
- Conductor data
- Transformer data
- Energy Consumer data (Load)
- Compensator data (Shunts)
- Switch data
- Static VAr Compensator data
- Facility Rating data

Attachment F of this manual contains a sample of each of these data groups and the EMS Data Specifications.

4.1.1 System Network Representation Data

The representational data in each of the data groups cited in Section 4.1 must be provided to model the NYISO-secured facilities to ensure accurate modeling in real-time system operation. In addition, all applicable real-time metering for facilities must be provided to the NYISO (MW, MVAr, Tap position, kV, breaker or switch status points, facility seasonal ratings and dynamic ratings). The exact location of metering should be indicated on the substation one line diagram where the corresponding instrument transformer(s) is located.

Whenever possible, the data exchange Inter-Control Center Communications Protocol (ICCP) should be pre-assigned by the Transmission Owner Data Coordinator so that the NYISO can implement metering database updates in advance of the actual metering becoming available.

4.1.2 Facilities Ratings Data

All facilities represented in the NYISO-secured system must be provided with thermal rating data in accordance with the *NYPP Tie-Line Ratings Report*[13]. Included in these ratings are the Normal, Long-Term Emergency, and Short-Term Emergency ratings for each of the summer and winter capability periods. It is the responsibility of the Facility Owner to provide timely updates of these facility ratings to NYISO staff in accordance with Section 2.2.

Where a facility involves multiple-party ownership, each owning party shall provide their respective ratings of their owned portion of the facility. NYISO staff shall coordinate the data to ensure that the proper ratings are used.

4.1.3 Dynamic Rating Updates

All transmission lines and power transformers included in the NYISO-secured facilities system representation and those that have real power (megawatt) telemetering transmitted to the NYISO Control Center are reviewed by the NYISO Data Coordinator to determine which facilities are critical to system security.

These facilities are included on the Dynamic Rating List as shown in Attachment E of this manual.

Dynamic ratings are normally updated by coded messages sent to the NYISO Control Center via computer to computer data links. (See the *NYISO Control Center Requirements Manual*[14])

Updated ratings entered in the NYISO Control Center computer are used immediately. The rating of a facility may be changed only by the Rating Authority (see Attachment E).

If computer facilities are not available, the NYISO Shift Supervisor may manually enter dynamic ratings into the NYISO Control Center computer upon receipt of verbal instruction from the Rating Authority only.

A message is returned to the rating authority, reporting the status of each update. For jointly owned facilities within the NYISO, all involved parties receive notice of all rating changes.

4.2 Operating System Representation

The NYCA operating system representation is used for short-term and mid-range system studies. These studies include the following:

- Operating Studies including:
  - interface thermal limit analysis,
  - system studies for voltage limits, and
  - system dynamic analysis

[13] Planning Data and Reference folder at http://www.nyiso.com/public/markets_operations/services/planning/documents/index.jsp
[14] Operations folder at http://www.nyiso.com/public/markets_operations/documents/manuals_guides/index.jsp

4.2.1 Operating System Representation Definitions

The following terms are used to describe different components of or references to the operating system representation:

- ***Detailed System Representation***: A steady state that contains the full extent of detail available from the NYISO database for the appropriate season (summer or winter) represented and is most suitable for Market Participant review.
- ***Reduced System Representation***: A steady state reduction of the Detailed System Representation which is employed for inter-regional analysis, such as the MMWG representations addressed in Section 1.4.3. The Reduced System Representation is approximately one half the size of the Detailed System Representation. The Reduced System Representation employs a network equivalent for the network below 100 kV.
- ***Seasonal Operating Studies Base Case***: The steady state base case used for establishing seasonal transfer limits, day-ahead analysis, and stability transfer and voltage limit development analysis.

4.2.2 System Representation Review Procedure

The following procedure describes the process followed to review and edit the NYISO Seasonal Operating Study Base case System Representation.

1) The NYISO Operating Studies Task Force (OSTF) shall review the Detailed System Representation steady state base case prior to the start of each Seasonal Operating Study.
2) If changes are applicable to the NYISO database base cases, members of the OSTF shall communicate these changes to the Transmission Owner Data Coordinators, and the Transmission Owner Data Coordinators shall submit these changes to the NYISO Data Coordinator.
3) The NYISO Operations Engineering staff shall review and update the Seasonal Operating Study Base case representation as necessary for changes corresponding to revisions to the EMS representation.

4.2.3 Review of Real-time Contingencies and Monitored Lines

Upon completion of the annual review, the following actions are required.

1) The NYISO sends a copy of the real-time contingencies and monitored lines to the OSTF for review. This includes the lists of multiple-circuit tower, bus-fault, and delayed clearing contingencies, thunderstorm watch multiple element contingencies, and any exceptions to the criteria.
2) OSTF approves the new list of real-time contingencies and monitored lines.
3) NYISO Operations Engineering staff modifies the contingency and monitored lines to reflect any corrections.

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Attachment A. NYISO Steady State Database Forms

The attached forms describe the network model data contained in the NYISO Steady State Database, as described in Section 3.1.

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Attachment B. Real Power Capability Reporting Form

In accordance with Section 2.3.1, DMNC data must be reported electronically to the NYISO on the Real Power Capability Reporting Form spreadsheet, posted with this manual. The results must be submitted to the NYISO via email at icap_info@nyiso.com.

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Attachment C. Reactive Power Capability Reporting Form

In accordance with Section 2.3.2, reactive power capability demonstration results, including reactive power auxiliary loads, must be reported electronically to the NYISO on the Reactive Power Capability Reporting Form spreadsheet, posted with this manual. The results must be submitted within ten business days of the date of the demonstration. The results must be submitted to the NYISO at vss_test_results@nyiso.com.

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Attachment D. NYISO Data Screening Procedure

In accordance with NYSRC Reliability Rule I.4(R1), upon receipt of system network representation model data from a facility owner or Developer, NYISO will screen the data to determine if it is reasonable. If suspect data is identified, the results of that screen will be sent electronically to the data owner for their review. The data owner shall respond to the NYISO by the specified deadline and shall either confirm the data is accurate or provide modified data accordingly.

If any model data meets the following conditions, that data will be identified as suspect data:

A. Steady State

1. Generator data checks:
   - PGEN < PMIN
   - PGEN > PMAX
   - PGEN < 0
   - PMAX < PMIN
   - QMAX < QMIN
   - Machine with MBASE < PMAX
   - Machine with MBASE = 0
   - Small X"d impedance (less than 0.05 p.u. on machine MVA base)
   - Large X"d impedance (greater than 0.50 p.u. on machine MVA base)

2. Non-Transformer Branch data checks:
   - Small impedance (less than 0.0001 p.u. on 100 MVA base)
   - Large impedance (greater than 3.0 p.u. on 100 MVA base)
   - High R/X ratio (absolute value of R greater than absolute value of X)
   - High X/R ratio (X/R ratio greater than 12)
   - Low X/R ratio (X/R ratio less than 3)
   - High charging (greater than 5.0 or negative)
   - Branch long-term emergency ratings (RATE B) or short-term emergency ratings (RATE C) less than the normal ratings (RATE A)
   - Branch long-term emergency ratings (RATE B) greater than the short-term emergency ratings (RATE C)

3. Transformer data checks:
   - Small impedance (less than 0.01 p.u. on transformer base)
   - Large impedance (greater than 0.30 p.u. on transformer base)
   - High R/X ratio (absolute value of R greater than absolute value of X)
   - High X/R ratio (X/R ratio greater than 40)
   - Low X/R ratio (X/R ratio less than 10)
   - Tap step = 0.0

- Small tap steps (less than 0.00625)
- RMAX, RMIN, VMAX, or VMIN = 0.0
- High tap ratios (greater than 1.20)
- Low tap ratios (less than 0.90)

B. Dynamics

1. Generator data checks:

   - X”d > X’d
   - X’d > Xd
   - Xl > X”d
   - T’d0 < T”d0
   - Machine with MBASE < PMAX
   - Machine with MBASE = 0
   - Small X”d impedance (less than 0.05 p.u. on machine MVA base)
   - Large X”d impedance (greater than 0.50 p.u. on machine MVA base)
   - Does it have the exciter model?
   - Does it have the governor model?
   - Does it have the stabilizer model?

C. Short Circuit

1. Generator data checks:

   - X”d > X’d
   - X’d > Xd
   - Machine with MBASE < PMAX
   - Machine with MBASE = 0
   - Small X”d impedance (less than 0.05 p.u. on machine MVA base)
   - Large X”d impedance (greater than 0.50 p.u. on machine MVA base)

2. Non-Transformer Branch data checks:

   - Small impedance (less than 0.0001 p.u. on 100 MVA base)
   - Large impedance (greater than 3.0 p.u. on 100 MVA base)
   - High R/X ratio (absolute value of R greater than absolute value of X)
   - High X/R ratio (X/R ratio greater than 12)
   - Low X/R ratio (X/R ratio less than 3)

3. Transformer data checks:

   - Small impedance (less than 0.01 p.u. on transformer base)
   - Large impedance (greater than 0.30 p.u. on transformer base)
   - High R/X ratio (absolute value of R greater than absolute value of X)
   - High X/R ratio (X/R ratio greater than 40)
   - Low X/R ratio (X/R ratio less than 10)

Attachment E. NYISO Dynamic Rating Facilities

Table E-1 designates those facilities that can be updated and designates which Transmission Owner is the Rating Authority for each facility.

When a facility is to be updated, the Rating Authority must address the facility consistent with the form in which it is listed and shown in the operating system representation. If a facility is listed as a combination (those parallel facilities bussed at both ends and metered as a net), the combination rating must be updated; if the facility is listed individually, the individual facility must be updated.

Rating reductions caused by abnormal operating conditions, such as a breaker out of service in a breaker-and-a-half scheme, cooling reduced on a facility normally forced cooled, etc., must also be reflected in the updated rating.

Combinations

In the case of a combination, the updating should address the combination for the condition of all facilities in service. Programs at the NYISO modify that combination rating to reflect the current status of relevant facilities that are out of service.

Series Elements between the Two Terminals Listed

Ratings entered for a metered facility must reflect the most limiting element(s) in the series path between the two terminals listed.

Table E-1: Table of Facilities That Can Be Updated Dynamically (Listing by Rating Authority)

Transmission Owner	Circuit Name	PTID
CE	RAMAPO___345_345_PAR4500	25371
CE	DUNWODIE-DUNWOODS_345_W73	326211
CE	DUNWODIE-DUNWOODN_345_W74	326212
CE	RAMAPO__-SUGARLOF_345_76	326219
CE	ASTORIAW-QUENBRDG_138_28244	25318
CE	RAMAPO__-LADENTWN_345_W72	25233
CE	HUDS_AVE-JAMAICA__138_701	25294
CE	LONG_MTN-PLSNTVLY_345_398	25033
CE	ASTANNEX-E13THSTA_345_Q35L	25134
CE	ASTANNEX-E13THSTA_345_Q35M	25142
CE	ASTENRG2-ASTANNEX_345_G13	325744
CE	ASTORIAE-CORONA___138_34181	25277
CE	ASTORIAE-CORONA___138_34182	25278
CE	ASTORIAE-CORONA___138_34183	25279

Transmission Owner	Circuit Name	PTID
CE	ASTORIAE-CORONA___138_34184	25280
CE	ASTORIAE-CORONA___138_34185	25281
CE	ASTORIAE-CORONA___138_34186	25282
CE	ASTORIAW-QUENBRDG_138_28241	25315
CE	ASTORIAW-QUENBRDG_138_28242	25316
CE	ASTORIAW-QUENBRDG_138_28243	25317
CE	BUCHAN_N-BUCHANAN_138_95891	25568
CE	BUCHAN_N-EASTVIEW_345_W93	25133
CE	BUCHAN_S-MILLWOOD_345_W97	25146
CE	BUCHAN_S-MILLWOOD_345_W98	25247
CE	BUCHANAN-MILLWOOD_138_96951	25283
CE	BUCHANAN-MILLWOOD_138_96952	25284
CE	CORONA__-JAMAICA__138_18001	25285
CE	CORONA__-JAMAICA__138_18002	25286
CE	DUNWODIE-MOTTHAVN_345_71	25151
CE	DUNWODIE-MOTTHAVN_345_72	25191
CE	DUNWODIE-SHORE_RD_345_Y50	25091
CE	DUNWOODN-SHERMCRK_138_99031	25193
CE	DUNWOODN-SHERMCRK_138_99032	25239
CE	DUNWOODS-E179THST_138_99153	25287
CE	E13THSTA_345_138_BK 10	25467
CE	E13THSTA_345_138_BK 11	25468
CE	E13THSTA_345_138_BK 12	25463
CE	E13THSTA_345_138_BK 13	25464
CE	E13THSTA_345_138_BK 14	25465
CE	E13THSTA_345_138_BK 15	25466
CE	E13THSTA_345_138_BK 16	25469
CE	E13THSTA_345_69__BK 17	25459
CE	E13THSTA-FARRAGUT_345_45	25190
CE	E13THSTA-FARRAGUT_345_46	25251
CE	E13THSTA-FARRAGUT_345_48	25252
CE	E13THSTA-FARRAGUT_345_B47	25177
CE	E179THST-HELLGATE_138_15053	25289
CE	E179THST-HELLGATE_138_15054	25290

Transmission Owner	Circuit Name	PTID
CE	E179THST-HELLGATE_138_15055	25288
CE	E179THST-PARKCHTR_138_38X01	25327
CE	E179THST-PARKCHTR_138_38X02	25328
CE	E179THST-PARKCHTR_138_38X03	25329
CE	E179THST-PARKCHTR_138_38X04	25330
CE	EASTVIEW_345_138_BK 1N	25472
CE	EASTVIEW_345_138_BK 1S	25373
CE	EASTVIEW_345_138_BK 2N	25471
CE	EASTVIEW_345_138_BK 2S	25470
CE	EASTVIEW-SPRNBRK__345_W64	25143
CE	EASTVIEW-SPRNBRK__345_W65	25144
CE	EASTVIEW-SPRNBRK__345_W78	25346
CE	EASTVIEW-SPRNBRK__345_W79	25153
CE	EFISHKCH_345_115_BK 1	25724
CE	EFISHKIL-WOOD_ST__345_F38	25367
CE	EFISHKIL-WOOD_ST__345_F39	25368
CE	FARRAGUT-GOWANUS__345_41	25141
CE	FARRAGUT-GOWANUS__345_42	25140
CE	FARRAGUT-HUDS_AVE_138_32077	25291
CE	FARRAGUT-HUDS_AVE_138_32078	25292
CE	FARRAGUT-HUDS_AVE_138_32711	25293
CE	FOXHILLS-WILLWBRK_138_29211	25771
CE	FOXHILLS-WILLWBRK_138_29212	25772
CE	FRESHKLS_345_138_TA 1	25457
CE	FRESHKLS_345_138_TB 1	25458
CE	GOETHALS-FRESHKLS_345_21	25138
CE	GOETHALS-FRESHKLS_345_22	25137
CE	GOETHALS-LINDN_CG_345_G23L	26000
CE	GOETHALS-LINDN_CG_345_G23M	325203
CE	GOWANUS_-GOETHALS_345_25	25139
CE	GOWANUS_-GOETHALS_345_26	25571
CE	GOWANUS_-GREENWD__138_42231	25214
CE	GOWANUS_-GREENWD__138_42232	25215
CE	GREENWD_-FOXHILLS_138_29231	25321

Transmission Owner	Circuit Name	PTID
CE	GREENWD_-FOXHILLS_138_29232	25322
CE	HELLGATE-ASTORIAE_138_34051	25323
CE	HELLGATE-ASTORIAE_138_34052	25324
CE	HELLGATE-ASTORIAW_138_24051	25210
CE	HELLGATE-ASTORIAW_138_24052	25211
CE	HELLGATE-ASTORIAW_138_24053	25212
CE	HELLGATE-ASTORIAW_138_24054	25213
CE	HOPATCON-RAMAPO___500_5018	25019
CE	HUDS_AVE-JAMAICA__138_702	25295
CE	HUDSONP_-FARRAGUT_345_B3402	25020
CE	JAMAICA_-LAKSUCSS_138_903	25090
CE	JAMAICA_-VALLYSTR_138_901 L_M	25048
CE	KENTAVE_-GREENWD__138_31232	25299
CE	LADENTWN-BOWLINE__345_68	25249
CE	LADENTWN-BUCHAN_S_345_Y88	25185
CE	LADENTWN-WHAVSTRW_345_67	25248
CE	LINDEN__-GOETHALS_230_A2253	25017
CE	MARION__-FARRAGUT_345_C3403	25038
CE	MILLWOOD-EASTVIEW_345_W82	25147
CE	MILLWOOD-EASTVIEW_345_W85	25258
CE	MILLWOOD-EASTVIEW_345_W99	25255
CE	MOTTHAVN-RAINEY___345_Q11	325430
CE	MOTTHAVN-RAINEY___345_Q12	325431
CE	PLSNTVLE_345_13__BK 1	25477
CE	PLSNTVLE_345_13__BK 2	25478
CE	PLSNTVLY-EFISHKIL_345_F36	25256
CE	PLSNTVLY-EFISHKIL_345_F37	25257
CE	PLSNTVLY-WOOD_ST__345_F30	25237
CE	PLSNTVLY-WOOD_ST__345_F31	25238
CE	QUENBRDG-VERNON___138_31281	25159
CE	QUENBRDG-VERNON___138_31282	25160
CE	RAINEY__-FARRAGUT_345_61	25152
CE	RAINEY__-FARRAGUT_345_62	25253
CE	RAINEY__-FARRAGUT_345_63	25254

Transmission Owner	Circuit Name	PTID
CE	RAINEY__-VERNON___138_36311	25296
CE	RAINEY__-VERNON___138_36312	25297
CE	RAMAPO___345_345_PAR3500	25370
CE	RAMAPO__-BUCHAN_N_345_Y94	25184
CE	ROCKTVRN-RAMAPO___345_77	25183
CE	SHERMCRK-ACADEMY__138_331	325755
CE	SHERMCRK-ACADEMY__138_332	325754
CE	SHERMCRK-E179THST_138_15031	25156
CE	SHERMCRK-E179THST_138_15032	25157
CE	SMAHWAH_-RAMAPO___345_69	25021
CE	SMAHWAH_-RAMAPO___345_70	25259
CE	SPRNBRK_-ACADEMY__345_M29	325756
CE	SPRNBRK_-DUNWODIE_345_W75	25071
CE	SPRNBRK_-DUNWOODN_138_99941	25245
CE	SPRNBRK_-DUNWOODS_138_99942	25246
CE	SPRNBRK_-TREMONT__345_X28	25175
CE	SPRNBRK_-W49TH_ST_345_M51	25053
CE	SPRNBRK_-W49TH_ST_345_M52	25223
CE	TREMONT__138A_138B_BK 11	25649
CE	TREMONT__138C_138D_BK 12	25650
CE	VERNON__-GREENWD__138_31231	25337
CE	W49TH_ST-E13THSTA_345_M54	25228
CE	W49TH_ST-E13THSTA_345_M55	25222
CE	WALDWICK-SMAHWAH__345_J3410	25032
CE	WALDWICK-SMAHWAH__345_K3411	25039
CE	WILLWBRK-FRESHKLS_138_29211	25319
CE	WILLWBRK-FRESHKLS_138_29212	25320
CE	WOOD_ST_-MILLWOOD_345_W80	25148
CE	WOOD_ST_-PLSNTVLE_345_Y86	25358
CE	WOOD_ST_-PLSNTVLE_345_Y87	25132
CE	DUNWOODS_345_138_BK S1	25208
CE	DUNWOODN_345_138_BK N1	25209
CH	ROSETON_-EFISHKIL_345_RFK305	25108
CH	COOPERS_-MIDDLETP_345_CCRT-34	25110

Transmission Owner	Circuit Name	PTID
CH	COOPERS_-ROCKTVRN_345_CCRT-42	25111
CH	FISHKPLN-SYLVANLK_115_FP/990	25066
CH	HURLYAVE_345_115_BK 1	25419
CH	HURLYAVE-ROSETON__345_303	25218
CH	LEEDS___-HURLYAVE_345_301	25055
CH	PLSTVYCH_345_115_BK S1	25382
CH	ROCKTVRN_345_115_BK TR1	25406
CH	ROSETON_-ROCKTVRN_345_311	25069
LI	EGRDNCTY_345_138_AT1	25551
LI	EGRDNCTY_345_138_AT2	25552
LI	EGRDNCTY-NEWBRDGE_138_462	25303
LI	EGRDNCTY-NEWBRDGE_138_463	25304
LI	FREEPORT-NEWBRDGE_138_461	25155
LI	LOCUSTGR-NEWBRDGE_138_558	25158
LI	NEWBRDGE-RULAND___138_561	25305
LI	NEWBRDGE-RULAND___138_562	25306
LI	NRTH1385-NRTHPORT_138_1385	25035
LI	NRTHPORT-ELWOOD___138_678	25543
LI	NRTHPORT-ELWOOD___138_681	25544
LI	NRTHPORT-PILGRIM__138_672	25307
LI	NRTHPORT-PILGRIM__138_677	25308
LI	NRTHPORT-PILGRIM__138_679	25309
LI	RULAND__-PILGRIM__138_661	25310
LI	RULAND__-PILGRIM__138_662	25311
LI	SHORE_RD_345_138_BK 1	25439
LI	SHORE_RD_345_138_BK 2	25440
LI	SHORE_RD-GLENWOOD_138_365	25205
LI	SHORE_RD-GLENWOOD_138_366	25154
LI	SHORE_RD-LAKSUCSS_138_367	25145
LI	SHORE_RD-LAKSUCSS_138_368	25150
LI	SPRNBRK_-EGRDNCTR_345_Y49	25105
LI	VALLYSTR-BARRETT__138_291	25312
LI	VALLYSTR-BARRETT__138_292	25313
LI	VALLYSTR-EGRDNCTY_138_262	25244

Transmission Owner	Circuit Name	PTID
NG	ROTTRDAM-EASTOVER_230_38	25030
NG	LOCKPORT-SWEDEN___115_111	25262
NG	SANBORN_-LOCKPORT_115_101	25267
NG	TELGRAPH-SHELBY76_115_114	25349
NG	N.SCTLND-FEURABSH_115_3	25495
NM	ELBRIDGE-STATE_ST_115_5-972	25107
NM	N.SCTLND-OWENSCRN_115_9	25490
NM	N.SCTLND-OWENSCRN_115_7	25491
NM	CLAY____-WOODARD__115_17	25515
NM	CLAY____-HOPKINS__115_11	25516
NM	CLAY____-WETZEL___115_14	25517
NM	BRISTLHL-CLAY_____115_4	25518
NM	CLAY____-DEWITT___115_3	25519
NM	CLAY____-TEALLAVE_115_10	25520
NM	CLAY____-DEWITT___115_5	25522
NM	MALONE__-WILLIS___115_1-910	25586
NM	CLAY____-INDPDNCE_345_26	25858
NM	ALBANY__-GREENBSH_115_1	25860
NM	LONGLANE-LAFARGE__115_6	25864
NM	ALBANY__-GREENBSH_115_2	25868
NM	PACKARD_-MILTR209_115_129	25906
NM	DUNKIRK_-SILVRCRK_115_142	26018
NM	DUNKIRK_-SILVRCRK_115_141	26026
NM	GARDNVLB-CLVRBANK_115_142	26037
NM	GARDNVLB-CLVRBANK_115_141	26038
NM	BUFALO78-HUNTLEY__115_130	26043
NM	PACKARD_-NIAGB130_115_181-922	26055
NM	PACKARD_-MILTR209_115_130	26059
NM	BOONVLLE-BNVLMUNI_115_2	26073
NM	BOONVLLE-PORTER___115_1	26074
NM	BROWNFLS-TAYLORVL_115_3	26076
NM	BROWNFLS-TAYLORVL_115_4	26077
NM	FLATROCK-BROWNFLS_115_2	26079
NM	COLTON__-FLATROCK_115_2	26088

Transmission Owner	Circuit Name	PTID
NM	N.TROY__-REYNOLDS_115_16	26139
NM	WALCK_RD-BUFALO78_115_133	26153
NM	WYNTKLNM-WYNTKLNY_115_BK 2	26489
NM	YAHNUNDA-PORTER___115_3	26515
NM	CAVANARD-PORTER___115_7	325214
NM	BULYMO__-BOONVLLE_115_6	325265
NM	ROTTRDAM-EASTOVER_230_38	326094
NM	MORTIMER-SHELBY76_115_114	326129
NM	NIAGARA_-SANBORN__115_101	326180
NM	ATHENS__-PLSNTVLY_345_91	25054
NM	CLAY_____345_115_BK 2	25421
NM	CLAY_____345_115_BK 1	25387
NM	LOCKPORT-N.AKRON__115_108	25266
NM	ADIRNDCK-CHASLAKE_230_13	325233
NM	ADIRNDCK-PORTER___230_12	25082
NM	ALCOA___-DENNISON_115_12	25227
NM	ALCOA___-NOGDNBRG_115_13	25230
NM	ALCOA_PA-ALCOA____115_R8105	25202
NM	BECK____-PACKARD__230_BP76	25024
NM	BERKSHIR-ALPS_____345_393	25034
NM	BLISSVIL-WHITEHAL_115_K7	25028
NM	BNNINGTN-HOOSICK__115_K6	25029
NM	CHASLAKE-PORTER___230_11	25051
NM	CLAY____-DEWITT___345_13	25168
NM	DENNISON-LAWRNCAV_115_4	25225
NM	DENNISON-LAWRNCAV_115_5	25226
NM	DEWITT___345_115_BK 1	325221
NM	DEWITT___345_115_BK 2	25418
NM	DUNKIRK__230_115_BK 31	25386
NM	DUNKIRK__230_115_BK 41	25430
NM	EDIC_____345_115_BK3	25424
NM	EDIC_____345_115_BK4	25454
NM	EDIC_____345_230_BK2	25422
NM	EDIC____-FRASER___345_EF24-40	25112

Transmission Owner	Circuit Name	PTID
NM	EDIC____-N.SCTLND_345_14	25170
NM	ELBRIDGE_345_115_BK 1	25448
NM	ELBRIDGE-LAFAYTTE_345_17-LE	25149
NM	ERIE E__-S.RIPLEY_230_69	25016
NM	FEURABSH-NCATSKLL_115_2	25067
NM	GARDNVLB_230_115_BK 2	25385
NM	GARDNVLB_230_115_BK 3	25416
NM	GARDNVLB_230_115_BK 4	25417
NM	GARDNVLB-DUNKIRK__230_73	25166
NM	GARDNVLB-DUNKIRK__230_74	25197
NM	HUNTLEY_-SAWYER___230_79	25127
NM	HUNTLEY_-SAWYER___230_80	25128
NM	INGHAM_C_115_115_PAR 2	25242
NM	INGHAM_C-INGHAM_E_115_R81	25243
NM	INGHAM_E-ESPRGFLD_115_7-942	25061
NM	LAFAYTTE-CLRKSCRN_345_4-46	25049
NM	LAFAYTTE-DEWITT___345_22	25174
NM	LEEDS___-ATHENS___345_95	25789
NM	LEEDS___-PLSNTVLY_345_92	25056
NM	LOCKPORT-HINMAN___115_100	25087
NM	LOCKPORT-OAKFIELD_115_112	25300
NM	LOCKPORT-SHELBY76_115_113	25263
NM	LOCKPORT-TELGRAPH_115_107	25265
NM	LOCKPORT-TELGRAPH_115_114	25264
NM	MARCY___-N.SCTLND_345_18	25276
NM	MORTIMER-FAIRPORT_115_1	25163
NM	MORTIMER-FAIRPORT_115_2	25240
NM	MORTIMER-STA_56___115_24	25096
NM	MORTIMER-STA_56___115_25	25095
NM	N.AKRON_-BATAVIA__115_107	25124
NM	N.AKRON_-BATAVIA__115_108	25125
NM	N.SCTLND_345_115_BK 1	25445
NM	N.SCTLND_345_115_BK 2	25460
NM	N.SCTLND-ALPS_____345_2	25217

Transmission Owner	Circuit Name	PTID
NM	N.SCTLND-LEEDS____345_93	25171
NM	N.SCTLND-LEEDS____345_94	25203
NM	NIAGARA_-LNGRD209_115_180	25104
NM	NIAGARA_-MOUNTAIN_115_120	25135
NM	NIAGARA_-PACKARD__115_191	25075
NM	NIAGARA_-PACKARD__115_192	25099
NM	NIAGARA_-PACKARD__115_193	25100
NM	NIAGARA_-PACKARD__115_194	25101
NM	NIAGARA_-PACKARD__115_195	25102
NM	NIAGARA_-PACKARD__230_61	25186
NM	NIAGARA_-PACKARD__230_62	25220
NM	NINEMILE-CLAY_____345_8	25167
NM	NINEMILE-SCRIBA___345_9	25359
NM	OAKFIELD-BATAVIA__115_112-2	25126
NM	OSWEGO__-ELBRIDGE_345_17	25234
NM	OSWEGO__-VOLNEY___345_11	25199
NM	OSWEGO__-VOLNEY___345_12	25201
NM	PACKARD__230_115_BK 3	25414
NM	PACKARD__230_115_BK 4	25415
NM	PACKARD_-SAWYER___230_77	25164
NM	PACKARD_-SAWYER___230_78	25195
NM	PANNELRG-FARMGTN__115_4-977	25080
NM	PARISHVL-COLTON___115_3	25241
NM	PORTER___230_115_BK 1P	25389
NM	PORTER___230_115_BK 2P	25423
NM	PORTER__-ROTTRDAM_230_30	25173
NM	PORTER__-ROTTRDAM_230_31	25194
NM	PORTER__-VALLEY___115_4	25231
NM	PORTER__-WATKINRD_115_5	25232
NM	REYNOLDS_345_115_BK 2	25403
NM	ROTTRDAM_230_115_BK 6	25407
NM	ROTTRDAM_230_115_BK 7	25392
NM	ROTTRDAM_230_115_BK 8	25413
NM	S.RIPLEY-DUNKIRK__230_68	25045

Transmission Owner	Circuit Name	PTID
NM	SCRIBA__-FITZPTRK_345_FS-10	25076
NM	SCRIBA__-VOLNEY___345_20	25204
NM	SCRIBA__-VOLNEY___345_21	25314
NM	SHAWNERD-LOCKPORT_115_102	26052
NM	SHAWNERD-LOCKPORT_115_103	26051
NM	SUNY_BUF-GARDNVLB_230_79	25165
NM	SUNY_BUF-GARDNVLB_230_80	25196
NM	SWEDEN__-MORTIMER_115_111	25347
NM	SWEDEN__-MORTIMER_115_113	25348
NM	VOLNEY__-CLAY_____345_6	25198
NM	VOLNEY__-MARCY____345_19	25345
NM	WARREN__-FALCONER_115_171	25015
NM	WATKINRD-INGHAM_C_115_2	25805
OH	BECK____-NIAGARA__345_PA301	25040
OH	BECK____-NIAGARA__345_PA302	25041
OR	SUGRLOAF-RAMAPOOR_138_26	25326
OR	LOVETT__-BOWLINOR_138_56	25877
OR	BURNS___-N.HEMPST_138_531	25878
OR	BURNS___-WHAVSTOR_138_541	25879
OR	RAMAPOOR-TALLMAN__138_60	25880
OR	CORPDRIV-HARNGCRN_138_703	25881
OR	HILLBURN-RAMAPOOR_138_52	25882
OR	WHAVSTOR-LOVETT___138_53	25884
OR	LOVETT__-STONYPNT_138_54	25885
OR	CONGERS_-SNKEHLRD_138_563	25887
OR	S.MAHWAH-RAMAPOOR_138_51	25888
OR	SHOEMAKR-CHESTROR_138_27	26466
OR	MIDDLEOR-SHOEMAKR_138_29	26468
OR	N.HEMPST-WHAVSTOR_138_530	26506
OR	BOWLINOR-CONGERS__138_561	26723
OR	CHESTROR-SUGRLOAF_138_271	325424
OR	MONSEY__-BURNS____138_601	325608
OR	TALLMAN_-MONSEY___138_602	325609
OR	BURNS___-CORPDRIV_138_702	325812

Transmission Owner	Circuit Name	PTID
OR	W.NYACK_-SNKEHLRD_138_562	325906
OR	WHAVSTOR-STONYPNT_138_542	326049
OR	RAMAPO___345_138_BK 1300	25441
OR	RAMAPO___345_138_BK 2300	25442
OR	SMAHWAH__345_138_BK 258	25393
OR	WHAVSTOR_345_138_BK 194	25447
PA	SAND_BAR-PLATSBRG_115_PV20	25027
PA	STLAWRNC-MOSES____230_L33P	25026
PA	STLAWRNC-MOSES____230_L34P	25037
RG	CLYDE____115_34__TR1	25221
RG	GINNA___-PANNELRG_115_912	25260
RG	PANNELL__345_115_BK 1	25396
RG	PANNELL__345_115_BK 2	25431
RG	PANNELL__345_115_BK 3	25572
RG	QUAKERRD-PANNELRG_115_914	25261
RG	ROCHESTR_345_115_BK 1	25412
RG	ROCHESTR_345_115_BK 2	25432
RG	ROCHESTR_345_115_BK 3	25446
RG	STA_162_-S.PERRY__115_906- 7X	25062
RG	STA_82__-MORTIMER_115_7X8272	25098
RG	STA_251_-MORTIMER_115_901	25097

Attachment F. NYISO EMS Common Information Model Data Base

The following tables describe the NYISO EMS representation data groups, as described in Section 4.1.

Table F-1: Substation data

Substation Data

Attribute Name	Example
Busbar Name	ASTORIAE
Substation	Substation
FK_SubControlArea	CENY
FK_Company	C E
FK_LoadArea	N.Y.C.

Data Supplier Key:
TO/GO supplies
NYISO determines

Table F-2: Busbar data

BusBar Data

Attribute Name	Example
Name	ASTORIAE_138____6_____ND
Description	330021
SubtypeCode	Busbar Section
Phases	ABC
D_ConnectivityNode_rdfID	ConnectivityNode-7451
FK_Substation	ASTORIAE
FK_VoltageLevel	138

Data Supplier Key:
TO/GO supplies
NYISO determines

Table F-3: Synchronous Machine data

Synchronous Machine Data

Attribute Name	Example
name	ARTHUR_KILL_2
description	23512
SubtypeCode	Generator
phases	ABC
FK_Substation	FRESHKLS
FK_VoltageLevel	20
FK_AggGeneratingUnit	
FK_GeneratingUnit	ARTHUR_KILL_2
FK_Measurement	Measurement-BB-KV4
maximumMVAR	312
minimumMVAR	-186
rDemandAccOutputLimitHigh	350
rDemandAccOutputLimitLow	0

Data Supplier Key:
TO/GO supplies
NYISO determines

Table F-4: Conductor data

Conductor Data

Attribute Name	Example
name	ASTORIAE-CORONA___138_34186
description	25282
SubtypeCode	AC Line Segment
phases	ABC
FK_Company_RatingsAuthority	C E
baseVoltage	138
bch	0.22
r	0.00159
x	0.00688
rDaysReqForNotification	2

Data Supplier Key:
TO/GO supplies
NYISO determines

Table F-5: Transformer data

Transformer Data

Attribute Name	Example
name	ASTORIA3_138_20__BK 3N
description	70124
SubtypeCode	Two Winding
phases	ABC
FK_Substation	ASTORIA3
transformer Type	Fix
rPhaseShiftController	No
rTapData	Yes
SubtypeCode	TransformerWinding
VoltagLevelHighSide	138
VoltagLevelLowSide	20
bch	0
r	0
x	0.0644
highStep	33
lowStep	1
neutralAngle	0
newtralKV	125.44
newtralStep	1
normalStep	17
stepPhaseShifterIncremental	0.775

Data Supplier Key:
TO/GO supplies
NYISO determines

Table F-6: Energy Consumer data

Energy Consumer Data (Load)

Attribute Name	Example
name	ASTORIAE_138KV_NQ_38Q11
description	335517
SubtypeCode	Equivalent Load
phases	ABC
FK_Substation	ASTORIAE
FK_VoltageLevel	138
conformingLoadFlag	Yes
pFixed	70.30000305
qFixed	18.5

Data Supplier Key:
TO/GO supplies
NYISO determines

Table F-7: Compensator data

Compensator Data (Shunts)

Attribute Name	Example
name	EFISHKIL_345KV_CAP_CAP _1
description	31334
SubtypeCode	Shunt Capacitor
phases	ABC
FK_Substation	EFISHKIL
FK_VoltageLevel	345
FK_Measurement	Measurement-BB-KV1016
Compensator Type	Shunt
nominalMVAR	135
mVARperSection	135
MaximumSections	1
nominalKV	345

Data Supplier Key:
TO/GO supplies
NYISO determines

Table F-8: Switch data

Switch Data

Attribute Name	Example
name	ASTORIAE_138KV_F6E
description	14755
SubtypeCode	Breaker
phases	ABC
FK_Substation	ASTORIAE
FK_VoltageLevel	138

Data Supplier Key:
TO/GO supplies
NYISO determines

Table F-9: Static Var Compensator data

Static Var Compensator Data

Attribute Name	Example
name	LEEDS____345_LEEDS SVC
description	31327
SubtypeCode	Static Var Compensator
phases	ABC
FK_Substation	LEEDS
FK_VoltageLevel	345
FK_Measurement	Measurement-BB-KV3528
capacitiveRating	270
inductiveRating	-300
rDaysReqForNotification	30

Data Supplier Key:
TO/GO supplies
NYISO determines

Table F-10: Facility Ratings Update data

Facility Rating Data

Attribute Name	Example
equipName	ROSETON_-EFISHKIL_345_305
description	25108
company	CH
equipType	LN
lineID	305
powerfactor	100
voltageLevel	345
summerNOR*	1936
summerNORCode	D - Disconnect
summerLTE*	2743
summerLTECode	D - Disconnect
summerSTE*	3407
summerSTECode	A - Conductor
winterNOR*	2528
winterNORCode	D - Disconnect
winterLTE*	3191
winterLTECode	D - Disconnect
winterSTE*	3585
winterSTECode	D - Disconnect

Data Supplier Key:
TO/GO supplies
NYISO determines

* Facility ratings are provided in megawatts.