## 1.0 Purpose:

1.1 This procedure establishes facility ratings to meet certain requirements established by NERC Standard FAC-008. This procedure ensures that Energy Supply develops and applies a facility rating methodology that complies with the NERC Reliability Standards. Energy Supply Technical Services policy EPR 5.200, Facility Rating and Reporting, establishes responsibilities and requirements for utilizing this procedure.

## 2.0 Applicability:

2.1 This procedure is applicable to all generating facilities including hydro units and Energy Supply-owned synchronous condensers connected to the Bulk Electric System.

2.2 The facility ratings determined from this procedure shall equal the most limiting applicable equipment rating of the individual equipment that comprises the facility.

If Emergency ratings have not been provided by the original equipment manufacturer, the only ratings used will be Normal ratings. Peak and Reserve ratings and Winter/Summer ratings may be used for combustion turbine units that have been assigned such ratings by the original equipment manufacturer.

Facility ratings for jointly owned units will be determined by the generating unit operator.

## 3.0 Responsibilities:

3.1 Performance Optimization Fleet Engineering management is responsible to compile the Normal and Emergency electrical ratings for the generators, transformers, relay protective devices, and terminal equipment, as applicable, for each Bulk Electric System unit.

3.1.1 The point of interconnect between Energy Supply and Xcel Energy Transmission Owners is agreed upon with the Transmission Owner per the XEL-PRO-Facility Rating Coord bet TO and GO.docx.

3.1.2 The point of interconnection between Energy Supply and other Transmission Owners is determined by agreement between the two parties.

## 4.0 Requirements:

4.1 NERC Facility Rating Methodology

4.1.1 The following methodology is to be used to determine the Facility Rating used for compliance with NERC Standard FAC-008-3.

4.1.2 The facility ratings determined from this procedure shall equal the most limiting applicable equipment rating of the individual equipment that comprises the facility.

4.1.3 To determine the limiting piece of equipment for a facility it is necessary to determine the electrical current (ampere) rating of the following pieces of equipment for conventional generating stations:

- Generator
- Generator Current Transformers
- Generator Disconnect
- Bus or cable conductors that connect the Generator, Generator Breaker (if applicable) and the GSU Transformer.
- Generator Circuit Breaker
- Generator Breaker Current Transformers
- Generator Circuit Breaker Disconnects
- Generator Step-Up (GSU) Transformer – use primary (low voltage) winding current rating for comparison purposes.
- Generator Step-Up Transformer Current Transformers
- Generator Step-Up Transformer Disconnect
- Bus or cable conductors that connect the GSU Transformer or GSU Transformer Disconnect (if applicable) to the Transmission Substation.
- Overcurrent relay minimum pick-up setpoint

4.1.4 The following scope of equipment shall be used for wind farms:

- The combined kVA rating of individual turbines connected to a collector feeder.
- Collector Feeder cable or conductor rating.
- Collector Feeder circuit breaker.
- Collector Feeder circuit breaker disconnects.
- Collector Feeder circuit breaker current transformers.
- Step-Up Transformer
- Step-Up Transformer Disconnects
- Step-Up Transformer Current Transformers
- Conductors that connect the Step-Up Transformer to the Transmission Substation.
- Overcurrent Relay minimum pick-up setpoint.
- Series and Shunt compensation devices

4.1.5 For equipment operating at a voltage other than the generator voltage (or collector feeder voltage for wind farms), for comparison purposes, its current rating shall be adjusted to the equivalent of its rating at the generator (or collector feeder) for the same MVA power level. For example, for a generator rated 10 kV, connected to a generator breaker installed on the high side of the GSU Transformer operating at 100 kV, if the nameplate current rating of the breaker is 1,000 amperes, for the facility rating evaluation, use 100 kV/10 kV times 1,000 amperes = 10,000 amperes.

4.1.6 The rating normally is the manufacturer's nameplate rating. The rating for the nominal generator voltage, normal operating coolant pressure and ambient temperature during summer peak should be used.

4.1.7 For units where the bus or cable does not have a nameplate rating, the current rating of the generator may be substituted.

4.1.8 For bus or conductors in air, use ratings developed based on IEEE 738 for overhead conductors and IEEE 605 for bus. The assumptions used in calculating the ratings are contained in the 'Transmission Line Rating Methodology' and 'Bus Conductors and Equipment Jumpers' sections of Transmission System Policy **XEL-POL-Facility Rating Methodology.doc.** For units with a separate summer and winter rating, the appropriate summer or winter "Normal" current rating should be used. For units with only one seasonal rating, use the appropriate summer "Normal" current rating.

4.1.9 Operating limitations (such as temporary deratings) will be captured in the ratings determination and will be used in finding the most limiting and next most limiting equipment. Temporary operating limitations will be noted as such in the rating documentation.

4.1.10 The identity of the most limiting equipment and the next most limiting equipment shall be identified.

## 5.0 Required Records:

5.1 Performance Optimization Fleet Engineering shall have evidence it provided the Reliability Coordinator, Transmission Operator, Transmission Planner, and Planning Coordinator the facility rating methodology requested within 21 calendar days of receipt of a request.

5.2 Performance Optimization Fleet Engineering shall have evidence it responded, in writing, to comments from the Reliability Coordinator, Transmission Operator, Transmission Planner, and Planning Coordinator within 45 calendar days of receipt of those comments The response shall indicate whether a change will be made to the facility ratings methodology and, if no change will be made to the facility ratings methodology, the reason why.

5.3 Performance Optimization Fleet Engineering shall have evidence it provided the Reliability Coordinator, Transmission Operator, Transmission Planner, and Planning Coordinator the facility ratings as scheduled by such requesting entities.

5.4 Performance Optimization Fleet Engineering shall have evidence it provided the Reliability Coordinator, Planning Coordinator, Transmission Planner, Transmission Owner, and Transmission Operator with the identity and thermal rating of the next most limiting equipment within 30 calendar days of a request.

## 6.0 References & Definitions:

6.1 References

6.1.1 EPR 5.200 Facility Ratings and Reporting Policy (found on the XpressNet Energy Supply Performance Optimization Policies Index)

6.1.2 IEEE 738 IEEE Standard for Calculating the Current-Temperature of Bare Overhead Conductors

6.1.3 IEEE 605 IEEE Guide for Design of Substation Rigid-Bus Structures

6.1.4 XEL-POL-Facility Rating Methodology

6.1.5 XEL-PRO-Facility Rating Coord bet TO and GO.docx

6.2 Definitions

6.2.1 North American Electric Reliability Corporation (NERC) -The organization charged with establishing standards for the reliable operation of the North American electric power grids.

6.2.2 NERC Reliability Standard FAC 008 – NERC Standard applicable to Facility Ratings

6.2.3 Bulk Electric System – See NERC Glossary of Terms for definition: https://www.nerc.com/pa/Stand/Glossary%20of%20Terms/Glossary_of_Terms.pdf

## 7.0 Revision History

| Date | Revision | Change |
|---|---|---|
| 05/31/2007 | Draft | Draft for FERC Reliability Standard – FAC 008, 009 |
| 06/07/07 | Rev 0 | Added reference to EPR – 5.200P |
| 06/21/07 | Rev 1 | Revised Applicability "Facility ratings for jointly owned units will be determined by the generating unit operator." |
| 9/13/07 | Rev 2 | Revised Section 3 "producing for an eight (8) hour period for three (3) consecutive days during the summer or winter months at reference ambient conditions as defined in PPT – MC – 01." |
| 11/09/07 | Rev 3 | If Emergency ratings have not been provided by the Original Equipment Manufacturer, the only ratings used will be Normal ratings. Peak and Reserve ratings and Winter/Summer ratings may be used for combustion turbine units that have been assigned such ratings by the original equipment manufacturer. |
| 8/15/08 | 4.0 | Administrative change only. Modified numbering to match Documentum version. |
| 10/2/08 | 5.0 | Clarification of capacity terms |
| 6/17/10 | 6.0 | Added generator disconnects, generator breakers (and associated disconnects and CT's), and GSU CT's to the scope of Facility Rating equipment to be evaluated. Added a procedure to evaluate wind farms. |
| 10/01/12 | 7.0 | Revised the procedure to align with NERC Standard FAC-008-3 which replaces FAC-008-1 and FAC-009-1. Changed Maintenance Resources to Technical Resources and Compliance. Changed Production Resources to Technical Services in the header. Removed references to Performance Monitoring. |
| 01/01/13 | 7.1 | Removed Energy Supply specification from section 2.1 and clarified that only Energy Supply-owned synchronous condensers are covered by this policy. Added section to explicitly call out for consideration of operating limitations in section 4 of the methodology. |
| 08/05/2013 | 7.2 | Changed title wording from "determination" to "methodology". Modified header and footer to reflect current standardized format. Updated author to current responsible employee. Corrected effective date to reflect the most recent major revision. |
| 09/15/2014 | 7.3 | Updated section 4.1.8 to included a statement about the assumptions used in calculating the ratings of bus and conductors in air. Added reference to Transmission's facility rating methodology. |

| Date | Revision | Change |
|---|---|---|
| 10/10/2016 | 7.4 | Added section 6.1.5 and added sections 3.1.1 and 3.1.2 to the Responsibility section to include policy reference XEL-PRO-Facility Rating Coord bet TO and GO.docx. Added "Series and shunt compensation devices" to wind farm scope section 4.1.4. |
| 10/07/2019 | 7.5 | Changed all references of Technical Resources and Compliance to Performance Optimization Fleet Engineering to reflect department name changes. Added link to the NERC Glossary of Terms for the new definition of Bulk Electric System. Added link to Energy Supply Performance Optimization Policy Index. |