



Order 881: Methodology Transparency, Electronic Update, Seasonal & AAR rating Set Use

Bilge Derin

Sr. Engineer II, EMS Support

Dave Hislop

Manager, Outage Analysis Technologies

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Further information around previous sessions can be found within the Appendix at the end of this slide deck.

- ❑ Facility Rating Methodologies Today:
 - Provided to PJM upon request
 - TO Facility Rating Methodologies: No posting/sharing today

- ❑ PJM thermal Ratings are shared Today and include:
 - OASIS [Ratings](#) Postings
 - Transmission Operational Procedures ([M-03B](#) - CEII)
 - [Day-Ahead Ratings](#) used in PJM DA Market
 - [Real-time Temperature Sets](#) in use
 - 5-minute interval [Constraint Limits](#)

[Order 881: p330] Ratings and methodologies must be:

1. Shared with their **transmission provider** and **market monitor**.
2. Shared with any other **transmission provider** upon request.
3. Transmission provider must maintain database(s) of ratings and methodologies which:
 - i. Is accessible by **all parties with access** to the database:
 - a. Either through OASIS;
 - b. Or, other password-protected website.
 - ii. Allows query of in-use ratings, and those utilized in past 5 years.
 - iii. Must note AAR & Seasonal Exceptions and safety/reliability temporary ratings, and reasons for same

See *also* 18 C.F.R. § 35.28(c)(5)(i) & (ii); Pro Forma Tariff, Attachment M

For a 5 year (minimum) period:

- Described in detail in Order [p339]
- DLR requirement is identical to AAR

Per Facility:

- Minimum of 1 AAR Set (NL, LTE, STE, LD) record, per time derived.
- 240 hours for 10 days with hourly forecasted updates.
- Seasonal Ratings require no less than 4, derived annually.



- **Order 881 Relevant Sections:**

- Paragraphs 179-182
- Paragraphs 252-255

- **Paragraph 179:**

[...] this final rule requires that electronic transmission line rating data be submitted by transmission owners directly into an RTO's/ISO's EMS through SCADA or similar communication systems.

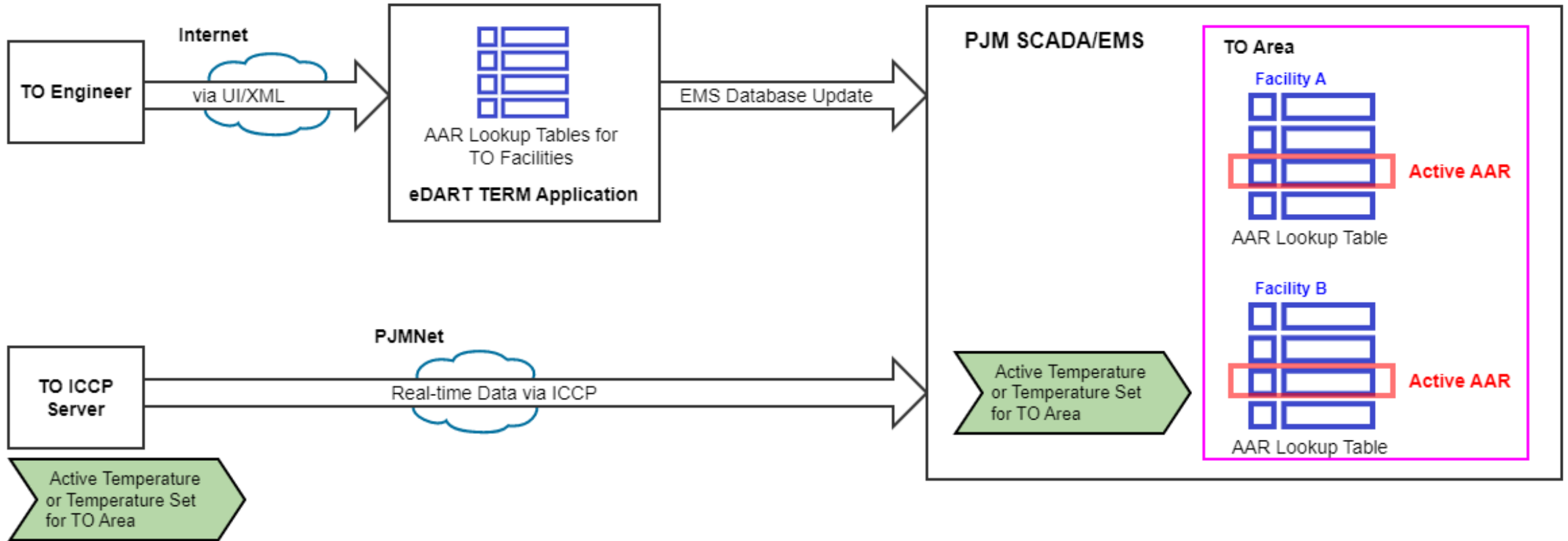
- FERC allows for lookup tables & TO Survey indicates desire to continue using them.
- Use of ratings in Real-time:
 1. AAR Lookup Tables
 2. Real-time Telemetered Ratings
 3. Conditional/Temporary Overrides

- Similar to existing PJM practice.
- Transmission Owner submits AAR lookup tables per monitored facility via eDART TERM.
 - Lookup table has ratings for pre-determined temperature values.

	Ratings			
	Normal	LTE	STE	Load Dump
Temperature Sets	[...]			
	95-Day			
	95-Night			
	90-Day			
	90-Night			
	85-Day			
	85-Night			
	[...]			

- Facilities in PJM SCADA are grouped in different geographical areas.
 - One or more areas per Transmission Owner
- Each area has an active Temperature Set, that determines which AAR Set will be the active ratings for facilities in that area.
- To comply with the electronic update of ratings rule in Order 881, PJM will need the active temperature or temperature set data from the Transmission Owner.

- Potential solutions with TO data incorporated:
 - Active **Temperature value** in degrees Fahrenheit (i.e. 78 F)
 - PJM EMS determines active Temperature Set based on the temperature and Day/Night definition.
 - Example: **78 F at 14:00** → PJM EMS will choose **80-Day** as the active temperature set.
 - Active **Temperature Set** (i.e. 80-Day)
 - PJM EMS will pick 80-Day AAR set as the active ratings for every facility in that geographical area.



- **Order 881 Paragraph 255:**
Finally, we adopt the Commission's proposal in the NOPR to require RTOs/ISOs **to establish and maintain systems and procedures necessary to allow transmission owners to electronically update transmission line ratings** (for each period for which transmission line ratings are calculated) at least hourly, **with such data submitted by transmission owners directly into the RTO's/ISO's EMS through SCADA or related systems.**

See also 18 C.F.R. § 35.28(g)(13)(i)

- Although PJM preference is lookup tables, TOs might choose to submit active rating values directly via ICCP (Real-time telemetered ratings).
- In this case:
 - TO sends 4 values per facility as the active ratings
 - Normal, LTE, STE, Load Dump
 - PJM uses these as the active rating for the equipment.

- If TO chooses to telemeter their ratings:
 - AAR Lookup tables must still be submitted in eDART.
 - To be used as a backup method in case ICCP comms fail.
 - Forecasted ratings (48h-240h) must be submitted.
- Note that telemetering ratings for every facility is not scalable in PJM's SCADA system, so the preference is to keep this functionality for DLRs or other special cases.

- In both AAR Lookup Table and Real-time Telemetered Ratings cases, PJM Dispatcher might override or use conditional ratings for any facility for system reliability or other reasons.
 - Coordinated with TO Dispatcher.
 - Temporary ratings documented in PJM EMS and eDART TERM.
 - Ratings database must document temporary safety/reliability rating

See Pro Forma Tariff, Attachment M



TO can supply any portion of the 10-day outlook on ratings per Facility:

- 48hrs Required for Telemetered (DLR or Real-time) Ratings
- Up to 240hrs can be provided
- PJM tools will project any forecasted hours not provided by TO leveraging Ratings or Lookup Table Ratings

Historical Temperatures / Lookup Tables

- For use within 10-Day AAR & Seasonal Use cases.
- Defining extremes.

- ❑ AARs must be valid for *at least* the local historical temperatures (over the entire period for which records are available) plus or minus a margin of 10 degrees Fahrenheit. [p185]
- ❑ Where a transmission provider uses pre-calculated AARs within a look-up table or similar database, such values must be calculated for all temperatures within a valid range. [p185]
- ❑ Where a transmission provider uses a formula or computer program to calculate AARs based on forecasted temperatures, such a formula/program must be accurate across such a valid range. [p185]
- ❑ Procedures in place if forecast temperatures fall outside of such a range of temperatures. [p185]
- ❑ Revise look-up tables if actual temperatures set new high/low records. [p185]

PJM will determine a single min/max range for the RTO consistent with the rules as outlined on previous slide leveraging historic weather data across the RTO footprint.

TOs will have an opportunity to provide feedback upon the ranges to ensure they are wide-enough to cover all Facility Ratings.



Must use AARs as the relevant Ratings when performing any of the following functions: [Full detail in 881 Attachment M / Appendix B and associated rationale in Order]

- Evaluating, Posting, Curtailing Transmission Service and AFC/ATC determinations.
- Redispatch.
- Contingency analysis & post-contingency simulations against Emergency Ratings. (LTE, STE & LD)
- OASIS or password-protected website OASIS postings.

Near-term (next 10-Day) use cases include:

Reliability Based

- Operational Planning Analyses
- Real-time Assessments & Real-time Monitoring
- Constraint mitigation, including off-cost determination
- Available Flowgate & Transfer Capability Calculations

Markets

- Day Ahead Market
- Real-time Market

Seasonal Use Cases:

Reliability Based

- Operational Planning Analyses
- Available Flowgate & Transfer Capability Calculations

Markets

- FTR



Presenters / SME:

Bilge Derin

Bilge.Derin@PJM.com

Dave Hislop

David.Hislop@PJM.com

Order881@pjm.com

FERC Order No. 881



Member Hotline

(610) 666 – 8980

(866) 400 – 8980

custsvc@pjm.com



APPENDIX

Session [1](#) & [2](#) covered:

- FERC Ambient Adjusted Rating [AAR] definition
- FERC Transmission Line Rating [TLR] definition
- FERC AAR applicability requirements
 - Thermal Rating applicability in PJM today
 - Associated Facilities AND Monitored Priorities
- FERC Exceptions and Temporary rating requirements
 - Thermal Rating Exceptions in PJM today
 - Conditional (Temporary) Ratings in PJM today
- PJM definitions for AAR & approach for AAR Exceptions & Temporary Ratings

- Post-881 Compliance PJM needs thermal *Facility Ratings*, as it does today.
 - Applicable to *reliability-based* (i.e., Monitored Priorities MP1, MP2, & MP6) *thermally-rated* Facilities (Line, Transformer, Series Device, PAR & Flow Device) which are composite facilities reflecting equipment amalgamated into a single Facility.
 - Today, Ratings for the above reliability facilities are publically posted via ambient rating sets, regardless of conformity to solar gain applicability (Day vs. Night ratings) and full use of PJM rating sets or time of use.
 - Cont. on next page

- Post-881 Compliance PJM needs thermal *Facility Ratings*, as it does today.
 - Cont. from previous page
 - Ratings determined by the Facility Owner and communicated to PJM. Exception process will align with that paradigm and be determined/set by the Facility Owner.
 - This includes determination as to applicability of Exceptions to non-Tariff equipment for which PJM has ratings.
 - Temporary (Conditional) Ratings are determined by Facility Owner and applied by PJM per the use-case or where needed to protect the safety and reliability of the system.

Q. Are transmission Tariff facilities not monitored by PJM for Markets & Reliability in scope?

A. Order No. 881 applies to “Transmission Facilities” as that term is defined in the Operating Agreement, unless thermal ratings are not appropriate for such facilities. Facility owners should consult with their legal counsel to determine if they feel they have additional Transmission Facilities that may be in scope of FERC Order No. 881.

Note: Per the Operating Agreement, “Transmission Facilities” shall mean facilities that: (i) are within the PJM Region; (ii) meet the definition of transmission facilities pursuant to FERC’s Uniform System of Accounts or have been classified as transmission facilities in a ruling by FERC addressing such facilities; and (iii) have been demonstrated to the satisfaction of the Office of the Interconnection to be integrated with the PJM Region transmission system and integrated into the planning and operation of the PJM Region to serve all of the power and transmission customers within the PJM Region.

Q. Will TERM allow for single facility ratings to be uploaded from Excel or CSV?

A. TOs have multiple options to provide ratings, including UI or bulk upload via XML.

Q. Are Facilities not under FERC jurisdiction, such as 69kV, however part of PJM markets with ratings in scope?

A. See FERC Order 881, paragraph 231 for some clarity here. FERC does not give a blanket exception for transmission facilities below a specific voltage threshold, especially with regard to facilities that may drive congestion. To exclude them would reduce the benefit of AAR. PJM leverages the same ratings framework for all thermal facilities. As to a Facility owner's application of AAR, Seasonal, or Exception declaration, the owner's internal counsel can best advise here.

Q. Will differences be required between all 4 ratings? (NL, LTE, STE, LD)

A. Requirements should be similar to data validation today. In addition, not anticipating STE expansion, covered under M-03B section 2.1.2 & Attachment F.

Q. Will Exception need to be documented for a Facility that is not FERC jurisdictional?

A. Exceptions will be at the determination of Facility Owners and their legal counsel. Market & reliability facilities within PJM fall under FERC jurisdiction. These include the MP1, MP2, & MP6 thermally rated facilities which require thermal ratings within PJM in order to reliably operate the facilities. See the earlier discussion in these Q/A regarding Transmission Facilities.

Q. How will ratings be submitted?

A. Default (Permanent) and Temporary (aka, Conditional) ratings submittals will flow through eDART TERM. DLR ratings would be telemetered, where the Facility Owner desires and notifies PJM of that desire. Each would then be tracked within eDART.

Subsequent to OC Special Session proceedings, PJM approach towards 881 Compliance can be found in the slides to follow:

- ✓ AAR
- ✓ AAR Exceptions
- ✓ Temporary (Conditional) ratings for safety/reliability

Being finalized, and thus not found in the following slides:

- Electronic Update of Ratings
- Facility Rating Methodology Transparency
- Seasonal Ratings
- Thermal Rating set use

PJM AAR Proposed Definition

Ambient-Adjusted Rating (AAR): a transmission Facility Rating that: (1) applies to a time period of not greater than one hour; (2) reflects an up-to-date forecast of ambient air temperature across the time period to which the rating applies; (3) reflects the absence of solar heating during nighttime periods where the local sunrise/sunset times used to determine daytime and nighttime periods are updated at least monthly, if not more frequently; and, (4) is calculated at least each hour, if not more frequently.

PJM AAR & Seasonal Rating Exceptions Proposed Process

AAR Exceptions: Where the Transmission Owner determines, consistent with Good Utility Practice, that a transmission Facility Rating is not affected by ambient air temperature or solar heating, the Transmission Provider may use a transmission Facility Rating that is not an AAR or Seasonal Facility Rating.