

Panels 3 and 5: Discussion of Possible Requirements for Transmission Owners to Implement AARs/Discussion of Transparency of Transmission Line Rating Methodologies

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Opening Statement**

The Entergy Operating Companies thank the Commission for holding this Technical Conference and these panels on how Ambient Adjusted Ratings (AARs) for transmission facilities are established.

The Entergy Operating Companies (as owners of transmission assets in MISO) are responsible for determining the ratings of their equipment using established calculation methods and in compliance with NERC standards and requirements. Entergy originally began gaining experience with AARs in the 2009-2010 timeframe. Based on this experience, Entergy began a formal program with MISO using both AARs and short-term emergency ratings on certain transmission facilities in 2016.

A. Entergy's Use of AARs or Temperature Adjusted Ratings (TARs)

- An AAR/TAR considers weather conditions that may differ on a day-to-day basis and can help to increase the maximum current carrying capability above the static line rating for a transmission facility.
- Entergy has found that ambient temperature rating adjustments are the most predictable and efficient to implement. Entergy does not adjust any transmission facility ratings based on projected or actual wind conditions.
- Entergy has adopted the use of TARs to gain more efficiency during off peak periods. Entergy calculates and provides hourly, daily and 2 day ahead temperature adjusted ratings for use in real time operations and in the MISO markets.
- There can be a large swing in ambient temperatures in the Entergy region regardless of season. As a result, Entergy does not use seasonal ratings but instead uses the more granular temperature adjusted ratings.

B. AARs – Current Status on Entergy System

- There are over 2,300 Entergy transmission facilities (69 kV or above) in Entergy’s short term operational planning models. These facilities generally include transmission lines and autotransformers.
- Of the 2,300 transmission facilities in Entergy’s short term operational planning models, roughly 1,000 Entergy transmission facilities are included in the internal database utilized to calculate temperature adjusted ratings. It is worth noting that Entergy does not adjust the rating of autotransformers based on ambient temperature but can adjust the ratings of facilities connected to autotransformers.
- Entergy uses a commercial weather service to obtain weather zip code level temperature data for substations around transmission lines, and this temperature information is utilized in the calculation of TARs. Entergy also uses publicly-available weather information to provide a back-up source for temperature information. In addition, Entergy has safeguards in place to identify and mitigate large temperature swings across its system in the calculation of AARs.
- The following chart provides a summary of the average and maximum increase over the static facility rating realized through the application of TARs for selected Entergy transmission lines. All TARs implemented from January 2018 through July 2019 on transmission elements included in the temperature adjustment rating database are considered in the analysis below.

kV	Average Temperature Adjusted Rating (TAR) increase over Static Facility Rating	Maximum Temperature Adjusted Rating (TAR) over Static Facility Rating
69	25%	33%
115	14%	31%
138	12%	27%
161	14%	31%
230	13%	26%
500	5%	8%

C. Entergy’s Use of Short-Term Emergency Ratings

- Short-term emergency ratings allow for the operation of a given transmission facility for a short period of time at a level that exceeds the continuous rating of the facility. The use of short-term emergency ratings carries a higher degree of risk due to the potential to degrade the applicable transmission facility or reduce its operating life.

- Entergy is implementing short-term emergency ratings on a limited scale to minimize the risk of potential load shed while balancing the risk of potential equipment damage.
- Use of the short-term emergency ratings on a very limited number of transmission facilities allows for the careful monitoring that is needed to ensure that the operational life and capabilities of the applicable facility are maintained.
- Entergy acknowledges that the continued use of short-term emergency ratings may deliver additional value to the MISO markets, but Entergy is concerned about the potential to prioritize market needs over transmission reliability. As such, Entergy continues to evaluate the use of short-term emergency ratings.

D. Coordination with MISO

- MISO and Entergy engage in two-way communication relating to AARs. Both Entergy and MISO identify facilities for which the use of AARs may provide benefits, whether in real time operations or to the MISO market. Entergy calculates AARs and communicates this information to MISO.
- For facilities on which AARs are used, Entergy provides AARs to MISO on an hourly, daily, and 2-day ahead basis.
- Because the conditions that allow for the use of AARs are not readily predictable on a long-term basis, AARs are more useful in operations and day-ahead/real-time markets rather than in long-term planning. Entergy does not support the use of temperature adjusted ratings for transmission planning or generator interconnection studies.
- In economic planning, the PROMOD model utilized by MISO does not assume the use of ambient adjusted line ratings on any Entergy facilities.

E. Transparency

- Entergy believes that there is no one-size-fits all approach to the calculation of transmission facility ratings.
- Entergy understands that some transparency may be necessary relating to transmission facility ratings and supports further discussion around the development of publicly available guidelines.