UNITED STATES OF AMERICA
BEFORE THE
FEDERAL ENERGY REGULATORY COMMISSION

Managing Transmission Line Ratings	)))	**Docket No. AD19-15-000**

POST-TECHNICAL CONFERENCE COMMENTS
OF POTOMAC ECONOMICS, LTD.

Pursuant to the Notice dated October 2, 2019 issued in the above-captioned proceedings by the Federal Energy Regulatory Commission (the "Commission" or "FERC"), Potomac Economics hereby submits these comments on issues raised during the technical conference on September 10 – 11, 2019 on best practices and Commission policy alternatives regarding transmission line ratings. Potomac Economics respectfully submits these comments.

Potomac Economics is the Independent Market Monitor ("IMM") for Midcontinent ISO ("MISO") and ERCOT, the Market Monitoring Unit for the New York ISO ("NYISO"), and the External Market Monitoring Unit ("EMMU") for ISO New England. In these roles, we are responsible for monitoring and evaluating the performance of each RTO's energy and operating reserve markets. We also recommend market design changes to improve the performance of the markets and evaluate design changes proposed by the RTOs or market participants.

I. NOTICE AND COMMUNICATIONS

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II. BACKGROUND

Potomac Economics appreciates the opportunity to have participated in this conference and we are encouraged by the steps the Commission has taken to examine the current policies and practices among Transmission Owners and Transmission Providers[1] on adjusting transmission line ratings for ambient conditions. We believe this is one of the most important issues before the Commission and one of the best opportunities to make significant improvements to the efficiency of wholesale electricity markets in the U.S.

Overall, we are strongly supportive of the Commission's efforts to implement policies on transmission line ratings because of the potential to significantly increase transmission utilization and thereby reduce overall market production costs and ultimately costs to the consumer. We believe the record from the Technical Conference strongly supports a requirement that TOs provide Ambient Adjusted Ratings (AARs) and Short-Term Emergency Ratings (STEs). Specifically, the record shows that AARs and STEs can and indeed have been implemented reliably while enhancing grid and market efficiency. But critically, the record also shows that without a requirement, AARs/STEs will not be voluntarily adopted broadly or consistently.

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1 In these comments, RTOs refers to both RTOs and ISOs. In MISO nearly all Transmission Owners are also the Transmission Operators responsible for providing ratings to the RTOs. Transmission Operators communicate with MISO directly and provide ratings given to them by Transmission Owners (again most often but not always the same entity). MISO communicates with Transmission Operators to verify ratings.

To the extent there are legitimate concerns, we believe a requirement and the associated implementation processes and procedures can accommodate those concerns. Indeed, the implementation of AARs and STEs will enhance transparency, market efficiency and reliability, and the requirement need not be a "one size fits all" approach.

Potomac Economics also looks forward to further Commission action related to the Notice of Inquiry on Transmission Policy and Incentives (Docket No. PL19-3-000) that would enable efficient investments and increase the use of dynamic line ratings advanced transmission technologies.

Potomac Economics' role as market monitor for several RTOs has provided us with unique insight regarding the transmission ratings issues the Commission addressed in the technical workshops. As discussed herein, our work on these topics is particularly advanced in MISO. Over the last several years we have worked with MISO and Entergy on a program to provide AARs and STEs, which has provided significant benefits. We have conducted extensive analyses on the benefits of AARs and STEs and have made a formal recommendation that the RTO work with TOs to develop programs to provide AARs and STEs. While much of our analyses are based on the MISO market, the comments we provide below are applicable to all four of the markets that we monitor, unless otherwise noted.

III. AARS AND STES SHOULD BE A REQUIREMENT FOR TRANSMISSION OWNERS

1. Economic Benefits of a Requirement

For most transmission facilities, the ratings are limited by the temperature of the conductor or other components. The conductor temperature increases with increased power flow and over time is greatly impacted by the ability to dissipate the heat caused by the power flow. The ability to dissipate heat (or heat transfer) is greatly impacted by the ambient conditions in which the facility operates. Therefore, when the ambient conditions are cooler than assumed when calculating the seasonal ratings for the facilities, additional power flows can be reliably accommodated.[2]

STEs used on "contingency constraints" are also very important. Most constraints that bind in real-time dispatch models, causing generators to redispatch and causing congestion costs (and increased production costs) are based on "contingencies". To ensure reliable operation and avoid equipment damage after the loss of one or more facilities, these constraints model the additional flow that instantaneously occurs on the monitored facility following the contingency. Following an actual contingency, the dispatch model or other operator actions bring the flows down to the normal (lower) continuous ratings (and to prepare for the next contingency) within a defined time-period. Unless defined, this is typically 30 minutes. However, STEs may enable operating at higher levels for longer periods (e.g. 2-4 hours) while redispatch or other post-contingent actions are taken.[3]

As noted, Potomac Economics has been evaluating issues relating to transmission line ratings over the past few years. This work has mainly been in MISO where some of our key analyses of AARs have demonstrated that improved calculation of line ratings can achieve substantial benefits. Ratings in MISO, and most other areas of the US, generally do not reflect changes in ambient conditions. Only nine percent of the ratings in MISO are adjusted for changes in ambient temperatures and the vast majority of these adjusted ratings are submitted by only two TOs in MISO. Additionally, most TOs do not provide short-term emergency ratings.

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2 Temperature is one common dynamic factor. Ratings are also dependent on other factors, such as ambient wind speed and humidity.

3 In MISO, most transmission owners provide both normal and emergency limits as called for under the Transmission Owner's Agreement. The Transmission Owners Agreement calls for transmission owners to submit normal transmission ratings on base (non-contingency) constraints and emergency ratings on contingency constraints ("temporary" flow levels that can be reliably accommodated for two to four hours).

Sixty-three percent of the ratings provided for temporary use following a contingency are actually "normal" ratings rather than time-limited emergency ratings. As noted, short-term emergency ratings are appropriate for most contingency constraints because the flow will only reach this level if the contingency actually occurs. When contingencies do occur, the market dispatch and/or operators will then take actions to quickly reduce the flow back to normal continuous ratings. Hence, the use of normal ratings for contingency constraints significantly reduces the utilization of the network.

We have estimated the value of operating to higher transmission limits that would result from consistent use of temperature-adjusted and emergency ratings for MISO's transmission facilities. To estimate the congestion savings of using temperature-adjusted ratings, we performed a study using NERC/IEEE estimates of ambient temperature effects on transmission ratings. Using the formulae and data from IEEE Standards (IEEE Std C37.30.1™-2011), we derived ratios of allowable continuous facility current (flow) at prevailing ambient temperatures to the Rated Continuous Current for different classes of transmission elements (e.g., Forced Air-Cooled Transformers and Transmission Lines).

We used the most conservative class of permissible ratings increase under the Standard for the type of element (Line or Transformer). We then used the ambient temperatures prevailing in the transmission area to estimate the temperature-adjusted rating. The value of increasing the transmission limits was then calculated by multiplying the increase in the limit by the real-time shadow price of the constraint. To estimate the effects of using emergency ratings for facilities for which only normal rates have been provided, we assume that the emergency ratings are 10 percent higher than the normal ratings. This is consistent with the data for other facilities for which TOs submit emergency ratings. We then estimate the value of these increases (both the temperature-based increases and the emergency rating increases) based on the shadow prices of the constraints. Our findings are summarized in Table 1.

Table 1: Benefits of Temperature-Adjusted and Emergency Ratings 2017-2018

		Savings ($ Millions)				
		Temp. Adj. Ratings	Emergency Ratings	Total	# of Facilities for 2/3 Savings	Share of Congestion
Total Estimated Benefits						
2018	Midwest	$70.9	$50.92	$121.8	22	12.4%
	South	$7.0	$16.86	$23.9	2	6.7%
	Total	**$77.9**	**$67.8**	**$145.7**	**24**	**10.9%**
2017	Midwest	$83.8	$38.83	$122.7	20	11.7%
	South	$10.0	$23.07	$33.1	3	8.9%
	Total	**$93.9**	**$61.9**	**$155.8**	**23**	**10.9%**

The results across the two years show consistent benefits equal to 11 percent of the real-time congestion value, including between $78 and $94 million per year for temperature-adjusting the ratings and $60 to $70 million per year for using emergency ratings. The benefits of temperature adjustments accrue primarily outside the summer months when static ratings are most understated.

We verified the results above by comparing our estimated potential increases in ratings with the subset of MISO constraints that are included in the program implemented by Entergy. Under this program, for a portion of its facilities, Entergy provides temperature-adjusted and short-term emergency ratings. Over time, the program has expanded to include additional Entergy facilities and has yielded clear benefits without causing reliability issues. As the analytical results in Table 1 show, further expansion of the program to other transmission owners would generate considerable congestion management savings throughout MISO.

In addition to Entergy, we evaluated the benefits of another transmission owner who currently utilizes temperature-adjusted ratings on many of its transmission facilities. Neither transmission owner adjusts their ratings on an hourly basis to maximize the benefits, but the benefits are still substantial, as shown in Table 2. These benefits are estimated by multiplying the rating increases (from the static rating level) by the prevailing shadow prices. This methodology is a conservative estimate of savings, given that the shadow price would increase if the market was controlling to a lower, non-adjusted rating.

Table 2: Estimated Achieved Savings by Two Transmission Owners
2017-2018

	Savings ($ Millions)	Share of Congestion
Midwest	$14.0	5.4%
South	$37.3	9.0%
Total	**$51.3**	**7.6%**

From 2017 to 2018, the actual savings totaled over $50 million – approximately 8 percent of the congestion on the transmission facilities. Over $37 million of the savings were on Entergy's transmission facilities in the South – 9 percent of congestion on those facilities. These estimates are conservative because the costs operating to a lower limit would be higher.

Our estimates were based on just two utility owners because, due to TOs having little or no economic incentive to provide temperature-adjusted ratings, only these two utilities actively provide temperature-adjusted ratings. One means to address this issue is to provide an economic incentive to the TOs that is related to the benefits of the additional transmission capability. Although we proposed financial incentive for TOs to provide AARs in Docket No. PL19-3-000, we believe a requirement is more reasonable and equitable given that transmission customers have fully covered the embedded costs of the system.

Our estimated benefits support our recommendation for a Commission-mandated requirement to provide AARs and STEs to reduce real-time congestion management costs, reliability and transparency.

2. Reliability Benefits

In addition to the economic benefits through more efficient use of the transmission system, a requirement to develop and provide AARs/STEs and the related processes will enhance reliability by increasing the operational awareness of the RTOs and other Transmission Providers regarding the capability of the transmission facilities. As described in more detail in Section IV below, these RTOs as Transmission Providers rarely verify or validate rating methodologies or rating calculations. Developing these procedures and the accompanying databases of methodologies and limiting elements will improve the RTOs' operational awareness and ability to maintain the reliability of the system in the short-run, and their ability to identify economic transmission upgrades that will improve reliability in the long run.

3. The Need for a Requirement

As noted by several panelists, existing NERC and IEEE standards do not require AARs or STEs. Open Access Transmission Tariffs similarly do not address any requirement for AARs/STEs. Transmission Owner agreements do not require AARs. The MISO Transmission Owner Agreement does anticipate that Transmission Owners provide STEs that are greater than the normal continuous rating, though this is not enforced or required.[4] Importantly, existing NERC and IEEE standards do not prohibit AARs/STEs. Very few Transmission Owners in MISO provide AARs voluntarily. As described above, essentially only two Transmission Owners provide AARs on a significant number of facilities.

We surmise that one of the reasons Transmission Owners do not adjust their ratings is that they generally lack incentives to do so. When existing transmission investment is recovered

[4] See Transmission Owner Agreement cited in footnote 3, above.

through embedded-cost transmission rates, there is little direct economic benefit for adjusting the ratings upward to account for ambient temperatures.[5]

One way to address this is to implement a financial incentive to ensure that the Transmission Owner will benefit from providing the AARs. We proposed such an incentive in Docket No. PL19-3-000. The drawback of this approach is that transmission customers that have fully paid the embedded costs of the system could reasonably argue that this additional incentive is unwarranted and that they should be receiving the full capability of the transmission system without additional compensation. We agree with this argument and, therefore, believe that the Commission requiring Transmission Owners to provide AARs is more reasonable and equitable.

We emphasize that the requirement to provide AARs and STEs should extend to non-RTO Transmission owners and the non-RTO Transmission Providers in these areas should be required to implement ambient adjustments prior to calling TLRs. Some of the most significant congestion events in MISO are driven by external TLRs and reducing or eliminating TLRs through AARs/STEs would likely have sizable benefits.

4. Recommended Approach for the Requirement

Based on our experience in analyzing these policies in MISO, we recommend that FERC require Transmission Owners to provide AARs in real time on all facilities to the extent that they are adjustable with ambient temperatures and STE ratings for use on all contingency constraints except in areas where the RTO's post-contingent response is limited. Facilities that are adjustable with ambient temperatures are not limited to transmission lines but may also include transformers and substation equipment. However, due to the costs of testing or analyzing transformers and the consequences of transformer failures, we find it reasonable for application

[5] There may be indirect benefits if the TO is affiliated with a Load-Serving Entity that is a net buyer in a load pocket, but this would be case-specific.

of ARRs to transformers (that have not been previously tested and adjusted) to be selective and prioritized.

To ensure that the day-ahead ratings are consistent with real-time ratings, Transmission Owners should develop the processes and data necessary to calculate predicted AARs for use in the day-ahead market and day-ahead reliability commitment processes. Other details related to the design and implementation of such a requirement are provided below in response to the Commission's questions.

In addition, we also recommend the Commission continue to pursue policies in the concurrent NOI on transmission incentives, which could be used to incent investment in cost-effective Dynamic Line Ratings (DLRs) and other grid enhancing technologies.

IV. ANSWERS TO THE COMMISSION'S SPECIFIC QUESTIONS CONCERNING AARS AND DLRS

In this Section we list and address the questions relating to the technical conference that the Commission specified in its October 2, 2019 Notice calling for post-conference comments

1. Discussion of a Requirement for Transmission Owners to Implement AARs

a. Should transmission owners be required to implement AARs? If so, to which lines would the requirement apply? What criteria (e.g., congestion, facility age) and process would be used to determine to which lines the requirement would apply? What would be the benefits or drawbacks to such a requirement?

Yes, as we explain above, transmission owners should be required to implement:

- AARs in real time for all transmission facilities (not limited to overhead lines) to the extent that they are adjustable with ambient temperatures; and
- STE ratings for use on all contingency constraints except in areas where the RTO's post-contingent response is limited.

A broad requirement is appropriate because which constraints will be binding and how congestion patterns may change in the future is unpredictable. For practical reasons, however, Transmission Owners may have to prioritize which facilities will be actively adjusted first. Hence, allowing Transmission Owners to prioritize facilities would be appropriate based on historic or projected congestion (e.g., to account for upcoming outages or derates).

The potential benefits of such a requirement are quantified and discussed in Sections III above. These benefits include both economic benefits and the secondary reliability benefits that will result as RTOs improve their operational awareness of the capabilities of the transmission system. We do not see any significant drawbacks of such a requirement, but we discuss some of the concerns raised by others at the Technical Conference in Section V.

b. If AARs are required, should they be required for modeling in both the day-ahead and real-time markets?

Ideally, the AARs should be established for both the day-ahead and real-time markets and we advocate for the implementation of AARs in both timeframes. However, implementing the processes needed to calculated predictive AARs for the day-ahead market may be more difficult and time-consuming. If this is true in some areas, we recommend that Transmission Owners move forward to implement AARs in the real-time horizon while the additional work necessary to calculate expected AARs for the day-ahead market is undertaken.

c. What type of forecasting (e.g., how frequently, how granularly, and of what variables) is needed to incorporate AARs and DLRs into both real-time and day-ahead markets? If forecasts submitted in day-ahead markets differ from the real-time rating, how should the difference be treated by the transmission system operator? Who is liable if forecasted ratings are wrong?

The Commission may wish to refrain from issuing specific directives in this area, allowing Transmission Owners and RTOs to implement the best approaches possible for their areas. To the extent that a Transmission Owner's or RTO's forecasting or metering data is less granular or precise, the ratings can include an allowance for uncertainty. As is the case today in calculating ATC, the industry recognizes that uncertainly may justify the maintenance of a Transmission Reserve Margin (TRM), which would hold out some of the transmission capability on a facility. A similar concept could be applied in calculating AARs/STEs which would enable transparency and inform investment/upgrade targets.

Differences between the day-ahead and real-time ratings are not problematic, it simply reduces the efficiency of the day-ahead commitment and can result in balancing congestion. Nonetheless, effort should be taken to minimize these differences.

With regard to the liability for forecast errors, ultimately the customers incur the costs of understated ratings. As described above, Transmission Owners should be conservative in calculating AARs to ensure that there is enough margin to account for forecast uncertainties. Hence, the AARs will tend to be understated, but they will be less understated than today where most ratings are seasonal ratings with no adjustment for ambient conditions. Therefore, the Commission should not be concerned with forecast errors.

d. Aside from ambient air temperature, are there other ambient conditions that can be forecasted or calculated without need for local sensors that should be considered in AARs? Should maximum possible solar irradiance intensity (conservatively calculated or forecast assuming no cloud cover) be included in calculation of any required AARs? Are there any instances where wind can be conservatively forecast without local sensors, such that wind should be considered in AARs for such lines?

We do not believe these other factors are important for implementing AARs, but rather conservative assumptions can be used when calculating the AARs that would ensure they are set at reliable levels. These factors, however, are likely the factors that would be captured in DLRs and allow the DLR levels to exceed the AAR levels.

AARs are likely to increase between the day-ahead horizon and the real-time, causing surplus transmission capacity in real time. And even to the limited extent they would create short-falls this would be enhancing reliability and would be no different than any other real-time derates or outage not modeled in the longer horizons.

2. Reducing Barriers to DLRs

a. *Can RTOs/ISOs currently accept and use a DLR data stream from a transmission owner in both real-time and day-ahead markets? Can transmission owners outside of RTO/ISOs currently automatically implement a DLR data stream in operations? Are there limits on what type and amount of data can be received and incorporated into dispatch? Would a transmission owner's or RTO/ISO's implementation of AARs be sufficient to also implement DLRs? If not, what additional changes would be necessary and how feasible are such changes?*

DLR technologies and the resulting data streams could be received and used by the RTOs to calculate ratings. Alternatively, the ratings could be calculated upstream of RTO processes and then submitted to RTOs. We believe that today most RTOs have the ability to make AAR adjustments for temperature, but no other ambient factors. Most do not have any systematic (other than manual) ability to accept and apply data from DLR data streams to calculate ratings. Further, we believe given the likely variance in approaches for DLR, it is a better system design to have Transmission Owners apply the DLR data streams to calculate ratings and to provide the final ratings to RTOs. Responses in Panel 1 indicated that accurate forecasted ratings could be provided up to a week in advance.

b. *Would a requirement for transmission owners or other entities (e.g., RTOs/ISOs) to study the cost effectiveness of DLRs on their most congested lines be appropriate? If so, what metrics for congestion (e.g., congestion cost, hours of congestion) would be appropriate for determining the most congested lines?*

We are not opposed to such a requirement, however working to implement AARs should be a much higher priority in the near term. It would be reasonable to address DLRs in a second phase after AARs have been implemented broadly.

3. AARs/DLRs in Available Transmission Capacity (ATC) Calculations

a. *In the non-RTO/ISO regions, a transmission owner's use of AARs could affect ATC for transmission customers. ATC could also be affected at RTO/ISO seams. Given the importance of ATC calculations, should AARs/DLRs be incorporated into the determination of ATC?*

Yes, AARs should be utilized in the determination of ATC in non-RTO areas. In the context of RTOs, nearly all the benefit of AARs is achieved through the day-ahead and real-time markets. Further, the increased use of Spot-In transmission service in MISO and other markets (SPP has an analogous Market Import Service for example) which do not require reservations or ATC means there may be limited benefits to including AARs in ATC calculations. Hence, we find incorporating AARs in daily or hourly ATCs for non-firm service is unnecessary in these RTO markets but we do believe it is essential to incorporate AARs in the non RTO areas since they have no such analog to Spot-In or real-time/day-ahead energy markets and all economic transactions require ATC. It is also important that the AAR requirement be extended to TLR evaluations in these areas. Invoking TLRs and potentially cutting firm-transactions when use of a reliable AAR or STE could avoid doing so would not be efficient or reasonable.

The benefits of including AARs in the calculation of longer-term ATCs or FTRs (e.g., monthly or yearly reservations or products) would be limited since the longer horizons necessarily need to assume worst case, or near-worst case assumptions on ambient conditions. RTOs. Because temperature and other ambient conditions are variable and uncertain, AARs are most accurate within the day.

4. Discussion of Transparency of Transmission Line Rating Methodologies

a. Should transmission owners' transmission line rating methodology be made more transparent? If so, how and how much additional transparency? Should underlying assumptions be made available? Should transmission line ratings be made more transparent? If so, how? For both transmission line rating methodologies and resulting ratings, who should have access to such information?

Additional transparency regarding rating methodologies is essential for administering an AAR requirement. Our experience in advancing these issues in MISO indicates that very little information is shared with MISO on Transmission Owner rating methodologies or calculations. While MISO may have the authority to request such information, in practice it does not and no structured database or validation process exists. We believe, with a few exceptions, most RTOs also do not have databases or routine validation processes. RTOs may have the authority and may on occasion request and receive rating methodologies. However, they have no requirement or structured process to do so, and most do not maintain structured or comprehensive records on rating methodologies.

Should implementation of AARs be a requirement, independent oversight is needed to ensure that the requirement is being met. This oversight requires much greater levels of transparency than exists today. Validation of rating methodologies and calculations by RTOs and other transmission providers would enhance reliability by increasing situational awareness and identifying incorrect ratings (too high and potentially unreliable). A FERC requirement to produce this information would make it possible for RTOs to administer and oversee compliance with a requirement to provide AARs and validate the ratings.

If FERC issues a requirement, it should include the submission of rating methodologies and relevant data to the RTO, including the limiting element or factor. The limiting factor in rating a transmission facility is varied. For example, it may be one of the following:

- Maximum design conductor operating temperature (70-140 ºC) depending on the type of conductor
- Conductor sag limitations;
- Substation equipment; or
- Voltage or stability (rather than thermal limits).

There is a variety of differences between the ratings methodologies used by the Transmission Owners. Some use nameplate, others use tested values. Hence, the first step in achieving transparency is to document the ratings methodology utilized by the Transmission Operator and provide it to the RTO or other Transmission Provider.

This information should also be available to the RTOs' market monitors. As the market monitor for MISO, we are responsible for monitoring for the withholding of transmission, which can occur by submitting understated ratings. Hence, we need the same information as the RTO to carry out our function and help enforce the AAR requirement. Additionally, market monitors are well-positioned to monitor for non-compliance or transmission withholding more broadly. Hence, at a minimum, full transparency regarding ratings methodologies and calculations should be provided by Transmission Owners to RTOs (and non-RTOs) and market monitors.

In general, this information should also be shared between RTOs (and non-RTOs) on facilities that may impact reliability and transmission planning. Facility-specific databases containing rating methodologies, including limiting elements should be maintained and shared between Transmission planners and Reliability Coordinators to enhance both interregional planning studies as well as real-time reliability.

A requirement to provide AARs and the associated processes as we recommend (validation by Transmission Providers and identification of limiting elements) will also enhance longer-term, planning processes with identification of limiting elements enabling identification of the most cost-effective upgrades. Today these are not available on a consistent basis and so limiting elements that could otherwise be upgraded economically to increase line ratings would not necessarily be identified.

As noted, the transparency provided through the AAR/STE and associated requirements for validation and data would enable better identification of cost-effective opportunities for DLR investments.

b. Should transmission owners or other entities (e.g., NERC regional entities or RTOs/ISOs) be required to develop a database to document each transmission facility's most limiting element? Should limiting elements consider first and second contingency operating conditions? Please describe the burden associated with reporting and maintaining such a database. Who should have access to such a database and what levels of confidentiality protections would need to exist for such a limiting elements database?

A database is needed and should be available to all RTOs, other Transmission Providers, and Transmission Planners to know whether the limiting element is the conductor or some other device. This information is needed to assess whether a facility could be upgraded at minimal cost where the limit is other than the conductor. While NERC may assist in developing standards, such a database must be maintained by Transmission Providers based on input from Transmission Owners. That database would be subject to constant revisions based on discussions and transmittals between Transmission Owners and RTOs.

RTO staff would use the database to support real-time operations, as well as interregional planning processes. The databases would contain CEII level data so would need to be maintained confidentially, but information should be shared for regional planning processes and for reliability as appropriate. Market monitors would also use these or related databases to evaluate transmission under their authorities.

c. If a transmission system operator contacts a transmission owner to request an ad hoc increase in transmission line ratings above static or seasonal ratings, should information about the request be publicly posted? If so, where, when, and how often should such information be posted?

Ideally, an AAR requirement being contemplated would largely do away with the need to make such ad hoc requests and ratings and ratings methodologies would be much more transparent to RTOs or other Transmission Providers. More than one commenter at the conference noted that ad hoc updates are time consuming and error prone.

While documentation is critical for internal use by RTOs or other Transmission Providers and market monitors and for audits by regulatory bodies, public postings would likely be unnecessary and counter-productive and would also need to consider security concerns. As noted at the Technical Conference, AARs are likely to produce surpluses as they would increase ratings generally compared to the necessarily conservative assumptions on ratings (and outages) employed in models used for allocating financial transmission rights.

5. Review and Audit Procedures for Transmission Line Rating Practices

Questions a. through c.

In general, transmission rating requirements should be enforced through continuous validation and verification by RTOs or other transmission providers, rather than through periodic audit processes. Review, validation and maintenance of rating methodologies must be a real-time reliability coordination function. This process would be to support real-time operations and longer-term planning processes.

We note that currently the FAC-008 includes requirements R4 and R5 that allow Reliability Coordinators, Transmission Operators, and Transmission Planners to have access to their Transmission Owner rating methodology. However, these two requirements were retired effective January 21, 2014. Additionally, FAC-008 does not require AARs and supports use of Nameplate ratings. Also, individual RTOs may also have authority under separate agreements to request methodologies, but these authorities are not presently used broadly to collect or maintain databases on methodologies.

As noted, while the MISO Transmission Owner Agreement includes a provision that the Transmission Owners provide the method Transmission Owners use to calculate equipment ratings, this provision has been rarely implemented. Similar provisions may exist for other RTOs but we do not believe this responsibility should be primarily vested with NERC.

d. *Where should any non-reliability criteria (e.g., economic) for transmission line ratings be established (e.g., regulations, tariff, policy statement)? What should these criteria be, and how would the Commission ensure that such criteria for transmission line ratings are consistent with reliability criteria?*

We are not aware of any economic criteria that would be applicable to transmission line ratings. Ratings should be set as accurately as possible and withholding of transmission capability should not be allowed. FERC should require that OATTs and associated market monitoring provisions should treat transmission facilities in a manner similar to generating resources, with similar or parallel concepts for evaluating conduct and determining whether market power mitigation should be imposed. The MISO Tariff (Module D), for example, tasks the IMM with monitoring and implementing mitigation measures for physical withholding of transmission facilities. To determine if the ratings are based on verifiable technical reasons, the IMM needs access to:

- the methodologies and assumptions, and
- the calculation detail associated with the limiting elements that set the ratings on the branch.

The market power mitigation provisions may include the ability to apply sanctions and/or to refer potential tariff or market violations to FERC.

6. NERC Reliability Standards

a. *Are there security concerns associated with implementing AARs and DLRs with respect to communicating line ratings and field measurements?*

Assuming the detailed data from the field would be used by Transmission Owners to calculate ratings provided to RTOs, then an AAR requirement would not necessarily change the existing processes or protocols for communicating ratings. Ratings are already communicated from Transmission Owners to RTOs through secure processes.

V. DISCUSSION OF ISSUES RAISED BY OTHERS REGARDING AARS

A concern expressed by panelists was that a requirement should not assume there is a "One Size Fits All " solution. However, an AAR/STE requirement would not be such an approach since it is ultimately applied on a facility specific basis by each Transmission Owner, subject to verification. What should be standard and non-discriminatory is the broad requirement for every Transmission Owner subject to the FPA to make such determinations consistently.

There was some concern expressed that AARs would create new legal obligations, liabilities and uncertainties. The broad requirement would not require Transmission Owners to do anything that is in violation of any rule or standard. Indeed, the additional transparency would help alleviate any such concerns.

VI. CONCLUSIONS AND RECOMMENDATIONS

This concludes comments in response to the Commission's questions regarding transmission line ratings. We appreciate the Commission's focus on these issues because increasing the utilization of the transmission system through widespread adoption of AARs will improve reliability and achieve sizable economic savings.

Respectfully submitted,

/s/ David B. Patton

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November 1, 2019

CERTIFICATE OF SERVICE

I hereby certify that I have this day e-served a copy of this document upon all parties listed on the official service list compiled by the Secretary in the above-captioned proceeding, in accordance with the requirements of Rule 2010 of the Commission's Rules of Practice and Procedure (18 C.F.R. § 385.2010).

Dated this 1st day of November 2019 in Fairfax, VA.

/s/ David B. Patton

Document Content(s)