

June 16, 2023

The Honorable Kimberly D. Bose
Secretary
Federal Energy Regulatory Commission
888 First Street, NE
Washington, DC 20426

**Re: California Independent System Operator Corporation
CAISO Tariff Revisions to Comply with Order No. 881 –
Managing Transmission Line Ratings**

Docket No. ER22-2362-_____

Dear Secretary Bose:

The California Independent System Operator Corporation (CAISO) submits this tariff amendment to comply with the Commission's Order on Compliance Filing issued on April 20, 2023 in the above-referenced proceeding.¹ The Commission's Order on Compliance Filing accepts the CAISO's tariff revisions to comply with Order No. 881² and directs the CAISO to make two additional changes to its tariff. In this filing, the CAISO addresses these two directives. The CAISO respectfully requests that the Commission accept this filing in compliance with the requirements of Order No. 881.

In its Order on Compliance Filing, the Commission directs the CAISO to revise the definition of *Transmission Line Ratings* to specify that relevant transmission equipment may include, but is not limited to, circuit breakers, line traps, and transformers.³ The Commission included this language as part of its definition of Transmission Line Ratings it adopted in Order No. 881. The CAISO proposes to revise the definition of Transmission Line Ratings in Appendix A of its tariff to read as follows (underlined language reflects additions):

¹ *Cal. Indep. Sys. Operator Corp.*, 183 FERC ¶ 61,037 (2023) (Order on Compliance Filing).

² *Managing Transmission Line Ratings* 177 FERC ¶ 61,179 (2021); *Order Addressing Arguments Raised on Rehearing and Clarification*, 179 FERC ¶ 61,125 (Order No. 881-A) (2022).

³ Order on Compliance Filing at P 13.

- Transmission Line Rating

The maximum transfer capability of a transmission line, computed in accordance with a written Transmission Line Rating methodology and consistent with Good Utility Practice, considering the technical limitations on conductors and relevant transmission equipment (such as thermal flow limits), as well as technical limitations of the transmission system (such as system voltage and stability limits).

Relevant transmission equipment may include, but is not limited to, circuit breakers, line traps, and transformers.

In its Order on Compliance Filing, the Commission also directs the CAISO to incorporate language in its tariff to state exceptions to the use of ambient adjusted ratings will be reevaluated at least every five years.⁴ Order No. 881 included a requirement for transmission providers to evaluate any exceptions to ambient adjusted ratings at least every five years.⁵

In its underlying compliance filing, the CAISO included language in new Appendix JJ to its tariff to explain it will coordinate with participating transmission owners in their development of transmission line methodologies as well as any exceptions to account for the elements required by FERC Order No. 881. The CAISO proposes to augment this language as follows (underlined text reflects additions):

The CAISO will also coordinate with Participating Transmission Owners in their development of exceptions, which must be reevaluated at least every five years, or alternate ratings identified

⁴ Order on Compliance Filing at P 26.

⁵ Order No. 881, 177 FERC ¶ 61,179 at PP 233, 342:

“[W]e modify proposed pro forma OATT Attachment M to require transmission providers to reevaluate any exceptions taken under the “Exceptions” paragraph of pro forma OATT Attachment M at least every five years to ensure that longstanding exceptions continue to be valid. However we clarify that if the technical basis for such an exception goes away, the transmission line must be re-rated in a timely manner, and that the five-year reevaluation requirement is just to ensure that any exceptions do not inadvertently grow stale (*i.e.*, the five-year reevaluation is not a justification for waiting five years to re-rate a transmission line). [footnote omitted]”

“[P]ostings of exceptions will support the fulfillment of and verification of compliance with the requirement, discussed above in Section IV.D.3, that exceptions be re-evaluated at least every five years.”

by their Transmission Line Rating methodologies, consistent with the following:

- Where a Participating Transmission Owner determines, consistent with Good Utility Practice, that the Transmission Line Rating of a transmission line is not affected by ambient air temperature or solar heating.
- Where a Participating Transmission Owner reasonably determines, consistent with Good Utility Practice that the temporary use of an alternate Transmission Line Rating is necessary to ensure the safety and reliability of the Transmission System, then the Transmission Provider may use such an alternate rating.

The CAISO has included clean and redlined tariff sheets as Attachments A and B, respectively, to this filing. The CAISO respectfully requests the Commission accept this filing.

Respectfully submitted,

/s/ Andrew Ulmer

Roger E. Collanton

General Counsel

Anthony Ivancovich

Deputy General Counsel

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Asst. General Counsel

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*Counsel for the California Independent System
Operator Corporation*

CERTIFICATE OF SERVICE

I certify that I have served the foregoing document upon the parties listed on the official service list in the captioned proceedings, in accordance with the requirements of Rule 2010 of the Commission's Rules of Practice and Procedure (18 C.F.R. § 385.2010).

Dated at Folsom, California this 16th day of June, 2023.

/s/ Jacqueline Meredith

Jacqueline Meredith
An employee of the California ISO

Attachment A – Clean Tariff

Revisions to Comply with Order No. 881 – Managing Transmission Line Ratings

California Independent System Operator Corporation

June 16, 2023

Appendix A

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- Transmission Line Rating

The maximum transfer capability of a transmission line, computed in accordance with a written Transmission Line Rating methodology and consistent with Good Utility Practice, considering the technical limitations on conductors and relevant transmission equipment (such as thermal flow limits), as well as technical limitations of the transmission system (such as system voltage and stability limits). Relevant transmission equipment may include, but is not limited to, circuit breakers, line traps, and transformers.

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Appendix JJ

Transmission Line Ratings

Part 1: Transmission Line Rating Methodologies

The CAISO will coordinate with Participating Transmission Owners in their development of Transmission Line Rating methodologies to ensure these methodologies account for the following elements:

- Calculation of temperatures at which there is sufficient confidence that the actual temperature will not be greater than that temperature (i.e., expected temperature plus an appropriate forecast margin).
- For Ambient Adjusted Ratings, including separate daytime and nighttime ratings.
- For Ambient Adjusted Ratings, updating the sunrise and sunset times used to calculate at least monthly.
- Ensuring Ambient Adjusted Ratings are valid for at least the range of local historical temperatures plus or minus a margin of 10 degrees Fahrenheit.
- Establishing procedures to handle a situation where forecast temperatures fall outside of such a range of temperatures, to ensure the use of safe and reliable Transmission Line Ratings, and in the event that actual temperatures set new high or low records, revising their look-up tables/databases or formulas/programs, as necessary and within a timely manner, to maintain a 10 degree Fahrenheit margin.
- Updating Ambient Adjusted Ratings with every five degree Fahrenheit increment of temperature change.
- Addressing how Ambient Adjusted Ratings for Transmission Lines interact with system voltage

and stability limits, Remedial Action Schemes and system operating limits.

- For Seasonal Line Ratings, including not fewer than four seasons in each year, and reflecting portions of the year where expected high temperatures are relatively consistent.
- For Seasonal Line Ratings, reflecting an up-to-date forecast of ambient air temperature across the relevant season over which the rating applies.
- Calculating Seasonal Line ratings at least annually, for each season in the future for which transmission service can be requested under the CAISO Tariff.
- Developing forecasts of ambient air temperature for Ambient Adjusted Ratings and Seasonal Line Ratings, consistent with Good Utility Practice and on a non-discriminatory basis.
- For Emergency Ratings, reflecting an acceptable loss of equipment life or other physical or safety limitations for the equipment involved.
- For Emergency Ratings, incorporating an adjustment for ambient air temperature and daytime and nighttime solar heating,
- For Emergency ratings, incorporating a set of electrical equipment ratings that collectively operate as a single electric system element (e.g., transformers, relay protective devices, terminal equipment, and series and shunt compensation devices), and using the most limiting component from that set to determine the Transmission Line Rating

In undertaking this coordination, the CAISO will seek to promote implementation consistency to the greatest extent possible.

The CAISO will also coordinate with Participating Transmission Owners in their development of exceptions, which must be reevaluated at least every five years, or alternate ratings identified by their Transmission Line Rating methodologies, consistent with the following:

- Where a Participating Transmission Owner determines, consistent with Good Utility Practice, that the Transmission Line Rating of a transmission line is not affected by ambient air temperature or solar heating.
- Where a Participating Transmission Owner reasonably determines, consistent with Good Utility Practice that the temporary use of an alternate Transmission Line Rating is necessary to ensure the safety and reliability of the Transmission System, then the Transmission Provider may use such an alternate rating.

Part 2 – CAISO Use of Transmission Line Ratings

Day-Ahead Market

Unless an exception applies, the CAISO will use Ambient Adjusted Ratings, Dynamic Line Ratings, or alternate ratings validated and submitted by Participating Transmission Owners no later than 9:00 a.m. Pacific Time on the day before a Trading Day as the relevant Transmission Line Ratings in its Base Market Model for the Day-Ahead Market. Ambient Adjusted Ratings should reflect hourly values for each Trading Hour of the Trading Day. Participating Transmission Owners may submit Ambient Adjusted Ratings using SCADA, ICCP or similar communication systems as described in the applicable Business Practice Manual or Operating Procedures. If, for any reason, communications between a Participating Transmission Owner and the CAISO are disrupted and prevent a Participating Transmission Owner from submitting or the CAISO receiving the applicable Transmission Line Rating, or a data input failure occurs, or a hardware or software failure occurs, the CAISO will use the Seasonal Rating for the relevant

Transmission Line for the applicable Trading Hour. If the CAISO detects an apparent inaccurate transmission line rating, the CAISO will inform the Participating Transmission Owner and take appropriate actions to resolve any inaccuracy, including use of an alternate rating specified by the Participating Transmission Owner.

Real-Time Market

Unless an exception applies, the CAISO will use Ambient Adjusted Ratings, Dynamic Line Ratings, or alternate ratings validated and submitted by Participating Transmission Owners and EIM Entities no later than 5 (five) hours before a Trading Hour as the relevant Transmission Line Ratings in its Base Market Model for the Real-Time Market. Ambient Adjusted Ratings should reflect equal values across each fifteen-minute interval of a Trading Hour. Participating Transmission Owners may submit Ambient Adjusted Ratings using SCADA, ICCC or similar communication systems as described in the applicable Business Practice Manual or Operating Procedures. If, for any reason, communications with the CAISO are disrupted and prevent a Participating Transmission Owner or EIM Entity from submitting or the CAISO receiving the applicable Transmission Line Rating, or a data input failure occurs, or a hardware or software failure occurs, the CAISO will use the applicable Seasonal Rating for the relevant Transmission Line for the applicable Trading Hour. If the CAISO detects an apparent inaccurate transmission line rating, the CAISO will inform the Participating Transmission Owner or EIM Entity and take appropriate actions to resolve any inaccuracy, including use of an alternate rating specified by the Participating Transmission Owner or EIM Entity.

Longer-Term Transmission Service

The CAISO will use Seasonal Line Ratings in connection with evaluation of any transmission service authorized under the CAISO Tariff ending more than 10 days from the date of the request.

Emergency Ratings

Consistent with Appendix L of the CAISO Tariff, the CAISO will use uniquely determined Emergency Ratings for contingency analysis in the operations horizon and in post-contingency simulations of constraints.

Attachment B – Marked Tariff

Revisions to Comply with Order No. 881 – Managing Transmission Line Ratings

California Independent System Operator Corporation

June 16, 2023

Appendix A

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- Transmission Line Rating

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- For Ambient Adjusted Ratings, updating the sunrise and sunset times used to calculate at least monthly.
- Ensuring Ambient Adjusted Ratings are valid for at least the range of local historical temperatures plus or minus a margin of 10 degrees Fahrenheit.
- Establishing procedures to handle a situation where forecast temperatures fall outside of such a range of temperatures, to ensure the use of safe and reliable Transmission Line Ratings, and in the event that actual temperatures set new high or low records, revising their look-up tables/databases or formulas/programs, as necessary and within a timely manner, to maintain a 10 degree Fahrenheit margin.
- Updating Ambient Adjusted Ratings with every five degree Fahrenheit increment of temperature change.

- Addressing how Ambient Adjusted Ratings for Transmission Lines interact with system voltage and stability limits, Remedial Action Schemes and system operating limits.
- For Seasonal Line Ratings, including not fewer than four seasons in each year, and reflecting portions of the year where expected high temperatures are relatively consistent.
- For Seasonal Line Ratings, reflecting an up-to-date forecast of ambient air temperature across the relevant season over which the rating applies.
- Calculating Seasonal Line ratings at least annually, for each season in the future for which transmission service can be requested under the CAISO Tariff.
- Developing forecasts of ambient air temperature for Ambient Adjusted Ratings and Seasonal Line Ratings, consistent with Good Utility Practice and on a non-discriminatory basis.
- For Emergency Ratings, reflecting an acceptable loss of equipment life or other physical or safety limitations for the equipment involved.
- For Emergency Ratings, incorporating an adjustment for ambient air temperature and daytime and nighttime solar heating,
- For Emergency ratings, incorporating a set of electrical equipment ratings that collectively operate as a single electric system element (e.g., transformers, relay protective devices, terminal equipment, and series and shunt compensation devices), and using the most limiting component from that set to determine the Transmission Line Rating

In undertaking this coordination, the CAISO will seek to promote implementation consistency to the greatest extent possible.

The CAISO will also coordinate with Participating Transmission Owners in their development of exceptions, which must be reevaluated at least every five years, or alternate ratings identified by their Transmission Line Rating methodologies, consistent with the following:

- Where a Participating Transmission Owner determines, consistent with Good Utility Practice, that the Transmission Line Rating of a transmission line is not affected by ambient air temperature or solar heating.
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Unless an exception applies, the CAISO will use Ambient Adjusted Ratings, Dynamic Line Ratings, or alternate ratings validated and submitted by Participating Transmission Owners no later than 9:00 a.m. Pacific Time on the day before a Trading Day as the relevant Transmission Line Ratings in its Base Market Model for the Day-Ahead Market. Ambient Adjusted Ratings should reflect hourly values for each Trading Hour of the Trading Day. Participating Transmission Owners may submit Ambient Adjusted Ratings using SCADA, ICCP or similar communication systems as described in the applicable Business Practice Manual or Operating Procedures. If, for any reason, communications between a Participating Transmission Owner and the CAISO are disrupted and prevent a Participating Transmission Owner from submitting or the CAISO receiving the applicable Transmission Line Rating, or a data input failure occurs,

or a hardware or software failure occurs, the CAISO will use the Seasonal Rating for the relevant Transmission Line for the applicable Trading Hour. If the CAISO detects an apparent inaccurate transmission line rating, the CAISO will inform the Participating Transmission Owner and take appropriate actions to resolve any inaccuracy, including use of an alternate rating specified by the Participating Transmission Owner.

Real-Time Market

Unless an exception applies, the CAISO will use Ambient Adjusted Ratings, Dynamic Line Ratings, or alternate ratings validated and submitted by Participating Transmission Owners and EIM Entities no later than 5 (five) hours before a Trading Hour as the relevant Transmission Line Ratings in its Base Market Model for the Real-Time Market. Ambient Adjusted Ratings should reflect equal values across each fifteen-minute interval of a Trading Hour. Participating Transmission Owners may submit Ambient Adjusted Ratings using SCADA, ICCC or similar communication systems as described in the applicable Business Practice Manual or Operating Procedures. If, for any reason, communications with the CAISO are disrupted and prevent a Participating Transmission Owner or EIM Entity from submitting or the CAISO receiving the applicable Transmission Line Rating, or a data input failure occurs, or a hardware or software failure occurs, the CAISO will use the applicable Seasonal Rating for the relevant Transmission Line for the applicable Trading Hour. If the CAISO detects an apparent inaccurate transmission line rating, the CAISO will inform the Participating Transmission Owner or EIM Entity and take appropriate actions to resolve any inaccuracy, including use of an alternate rating specified by the Participating Transmission Owner or EIM Entity.

Longer-Term Transmission Service

The CAISO will use Seasonal Line Ratings in connection with evaluation of any transmission service authorized under the CAISO Tariff ending more than 10 days from the date of the request.

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