**Order No. 881 *pro forma* tariff language**

**Transmission Line Ratings**

General:

The Transmission Provider will implement Transmission Line Ratings on the transmission lines over which it provides Transmission Service, as provided below.

Definitions:

The following definitions apply for purposes of this Attachment:

(1) “Transmission Line Rating” means 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.

(2) “Ambient-Adjusted Rating” (AAR) means a Transmission Line Rating that:

(a) Applies to a time period of not greater than one hour.

(b) Reflects an up-to-date forecast of ambient air temperature across the time period to which the rating applies.

(c) 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.

(d) Is calculated at least each hour, if not more frequently.

 (3) “Seasonal Line Rating” means a Transmission Line Rating that:

(a) Applies to a specified season, where seasons are defined by the Transmission Provider to include not fewer than four seasons in each year, and to reasonably reflect portions of the year where expected high temperatures are relatively consistent.

(b) Reflects an up-to-date forecast of ambient air temperature across the relevant season over which the rating applies.

(c) Is calculated annually, if not more frequently, for each season in the future for which Transmission Service can be requested.

(4) “Near-Term Transmission Service” means Transmission Service which ends not more than 10 days after the Transmission Service request date. When the description of obligations below refers to either a request for information about the availability of potential Transmission Service (including, but not limited to, a request for ATC), or to the posting of ATC or other information related to potential service, the date that the information is requested or posted will serve as the Transmission Service request date. “Near-Term Transmission Service” includes any Point-To-Point Transmission Service, Network Resource designations, or secondary service where the start and end date of the designation or request is within the next 10 days.

(5) “Emergency Rating” means a Transmission Line Rating that reflects operation for a specified, finite period, rather than reflecting continuous operation. An Emergency Rating may assume an acceptable loss of equipment life or other physical or safety limitations for the equipment involved.

System Reliability:

If the Transmission Provider reasonably determines, consistent with Good Utility Practice, that the temporary use of a Transmission Line Rating different than would otherwise be required by this Attachment is necessary to ensure the safety and reliability of the Transmission System, then the Transmission Provider may use such an alternate rating. The Transmission Provider must document in its database of Transmission Line Ratings and Transmission Line Rating methodologies on OASIS or another password-protected website, as required by this Attachment, the use of an alternate Transmission Line Rating under this paragraph, including the nature of and basis for the alternate rating, the date and time that the alternate rating was initiated, and (if applicable) the date and time that the alternate rating was withdrawn and the standard rating became effective again.

Obligations of Transmission Provider:

The Transmission Provider will have the following obligations.

The Transmission Provider must use AARs as the relevant Transmission Line Ratings when performing any of the following functions: (1) evaluating requests for Near-Term Transmission Service; (2) responding to requests for information on the availability of potential Near-Term Transmission Service (including requests for ATC or other information related to potential service); or (3) posting ATC or other information related to Near-Term Transmission Service to the Transmission Provider’s OASIS site or another password-protected website.

The Transmission Provider must use AARs as the relevant Transmission Line Ratings when determining whether to curtail (under section 13.6) Firm Point-To-Point Transmission Service or when determining whether to curtail and/or interrupt (under section 14.7) Non-Firm Point-To-Point Transmission Service if such curtailment and/or interruption is both necessary because of issues related to flow limits on transmission lines and anticipated to occur (start and end) within
10 days of such determination. For determining whether to curtail or interrupt Point-To-Point Transmission Service in other situations, the Transmission Provider must use Seasonal Line Ratings as the relevant Transmission Line Ratings.

The Transmission Provider must use AARs as the relevant Transmission Line Ratings when determining whether to curtail (under section 33) or redispatch (under sections 30.5 and/or 33) Network Integration Transmission Service or secondary service if such curtailment or redispatch is both necessary because of issues related to flow limits on transmission lines and anticipated to occur (start and end) within 10 days of such determination. For determining the necessity of curtailment or redispatch of Network Integration Transmission Service or secondary service in other situations, the Transmission Provider must use Seasonal Line Ratings as the relevant Transmission Line Ratings.

The Transmission Provider must use Seasonal Line Ratings as the relevant Transmission Line Ratings when evaluating requests for and whether to curtail, interrupt, or redispatch any Transmission Service not otherwise covered above in this section (including, but not limited to, requests for non-Near-Term Transmission Service or requests to designate or change the designation of Network Resources or Network Load), when developing any ATC or other information posted or provided to potential customers related to such services. The Transmission Provider must use Seasonal Line Ratings as a recourse rating in the event that an AAR otherwise required to be used under this Attachment is unavailable.

The Transmission Provider must use uniquely determined Emergency Ratings for contingency analysis in the operations horizon and in post-contingency simulations of constraints. Such uniquely determined Emergency Ratings must also include separate AAR calculations for each Emergency Rating duration used.

In developing forecasts of ambient air temperature for AARs and Seasonal Line Ratings, the Transmission Provider must develop such forecasts consistent with Good Utility Practice and on a non-discriminatory basis.

Postings to OASIS or another password-protected website: The Transmission Provider must maintain on the password-protected section of its OASIS page or on another password-protected website a database of Transmission Line Ratings and Transmission Line Rating methodologies. The database must include a full record of all Transmission Line Ratings, both as used in real-time operations, and as used for all future periods for which Transmission Service is offered. Any postings of temporary alternate Transmission Line Ratings or exceptions used under the System Reliability section above or the Exceptions section below, respectively, are considered part of the database. The database must include records of which Transmission Line Ratings and Transmission Line Rating methodologies were in effect at which times over at least the previous five years, including records of which temporary alternate Transmission Line Ratings or exceptions were in effect at which times during the previous five years. Each record in the database must indicate which transmission line the record applies to, and the date and time the record was entered into the database. The database must be maintained such that users can view, download, and query data in standard formats, using standard protocols.

Sharing with Transmission Providers: The Transmission Provider must share, upon request by any Transmission Provider and in a timely manner, the following information:

(1) Transmission Line Ratings for each period for which Transmission Line Ratings are calculated, with updated ratings shared each time Transmission Line Ratings are calculated, and

(2) Written Transmission Line Rating methodologies used to calculate the Transmission Line Ratings in (1) above.

Exceptions: Where the Transmission Provider 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, the Transmission Provider may use a Transmission Line Rating for that transmission line that is not an AAR or Seasonal Line Rating. Examples of such a transmission line may include (but are not limited to): (1) a transmission line for which the technical transfer capability of the limiting conductors and/or limiting transmission equipment is not dependent on ambient air temperature or solar heating; or (2) a transmission line whose transfer capability is limited by a Transmission System limit (such as a system voltage or stability limit) which is not dependent on ambient air temperature or solar heating. The Transmission Provider must document in its database of Transmission Line Ratings and Transmission Line Rating methodologies on OASIS or another password-protected website any exceptions to the requirements contained in this Attachment initiated under this paragraph, including the nature of and basis for each exception, the date(s) and time(s) that the exception was initiated, and (if applicable) the date(s) and time(s) that each exception was withdrawn and the standard rating became effective again. If the technical basis for an exception under this paragraph changes, then the Transmission Provider must update the relevant Transmission Line Rating(s) in a timely manner. The Transmission Provider must reevaluate any exceptions taken under this paragraph at least every five years.

**CAISO draft tariff language**

**New Section 6.5.17**

The CAISO will maintain on the password-protected section of its OASIS page or on another password-protected website a database of Transmission Line Ratings and Transmission Line Rating methodologies. The database will include a record of all Transmission Line Ratings used in real-time operations and all future periods. Any postings of temporary alternate Transmission Line Ratings or exceptions will be part of this database. The database will include records of which Transmission Line Ratings and Transmission Line Rating methodologies were in effect at which times over the previous five years, including records of which temporary alternate Transmission Line Ratings or exceptions in effect during the previous five years. Each record in the database will reflect which transmission line the record applies to, and the date and time the record was entered into the database.

The database will document the nature of and basis for each exception, the date(s) and time(s) that the exception was initiated, and (if applicable) the date(s) and time(s) that each exception was withdrawn and the standard rating that became effective again. The database will also document the use of an alternate Transmission Line Rating, including the nature of and basis for the alternate rating, the date and time that the alternate rating was initiated, and, if applicable, the date and time that the alternate rating was withdrawn and the standard rating became effective again.

The CAISO will maintain the database so that users can view, download, and query data in a standard formats, using standard protocols. Upon request, the CAISO will provide other transmission providers with access to the database.

**Appendix A - Master Definition Supplement**

**Ambient Adjusted Rating**

A Transmission Line 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

**Emergency Rating**

A Transmission Line Rating that reflects operation for a specified, finite period, rather than reflecting continuous operation. An Emergency Rating may assume an acceptable loss of equipment life or other physical or safety limitations for the equipment involved.

**Seasonal Ratings**

A Transmission Line Rating that (a) applies to a specified season; and (b) reflects an up-to-date forecast of ambient air temperature across the relevant season over which the rating applies.

**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).

**New 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 required by FERC Order No. 881:

* 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.
* 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 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**

The CAISO will use Ambient Adjusted Ratings validated and submitted by Participating Transmission Owners no later than 09:00 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. 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 Ambient Adjusted Ratings; 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.

**Real-Time Market**

The CAISO will use Ambient Adjusted Ratings validated and submitted by Participating Transmission Owners and EIM Entities no later than 75 minutes 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. 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 Ambient Adjusted Ratings; 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.

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

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.