

September 2, 2014

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

**Re: California Independent System Operator Corporation
Compliance Filing
Docket No. ER14-2017-_____**

Dear Secretary Bose:

The California Independent System Operator Corporation (CAISO)¹ submits this filing in compliance with the Commission's "Order Conditionally Accepting Tariff Revisions," issued in the captioned proceeding on July 31, 2014.²

The CAISO respectfully requests that the Commission accept this compliance filing effective October 1, 2014.

I. Background

On May 22, 2014, the CAISO filed revisions to its tariff to implement modeling enhancements that included the authority to model unscheduled flow in the CAISO's day-ahead market, the enforcement of power flow constraints in the day-ahead market, and the expansion of the full network model topology to include information on resources, load, and interchange schedules in other balancing authority areas (May 22 Tariff Filing). The CAISO requested a September 8, 2014, effective date for its proposed tariff revisions to reflect

¹ Capitalized terms not otherwise defined herein have the meanings set forth in appendix A to the CAISO tariff. References to numbered sections are references to sections of the CAISO tariff as revised by this compliance filing unless otherwise indicated.

² *California Independent System Operator Corp.*, 148 FERC ¶ 61,089 (2014) (July 31 Order).

improvements in the CAISO's base market model and use of transaction identifiers, and requested an October 1, 2014, effective date for the balance of the tariff revisions.

On June 27, 2014, the CAISO filed an answer to comments and a limited protest submitted in response to the May 22 Tariff Filing (June 27 Answer). The June 27 Answer explained that the Commission should accept the May 22 Tariff Filing, subject to (1) the agreement of the CAISO in the answer in response to certain comments to implement an accuracy metric as a transitional measure that would trigger the temporary suspension of modeling of unscheduled flow on the interties in the day-ahead market when such modeling is not sufficiently accurate,³ and (2) certain minor clarifications the CAISO committed to make in the answer in response to various comments.

In the July 31 Order, the Commission accepted the May 22 Tariff Filing subject to a compliance filing as discussed further in Section II below.⁴

II. Compliance with the July 31 Order

A. Implementation of Transitional Accuracy Metric

In the July 31 Order, the Commission found that, based on its review of the "tentative outline" of the accuracy metric contained in the June 27 Answer, the CAISO's "offer in its answer to implement an accuracy metric as a transitional measure will provide a further safeguard against inaccurate modeling once the consideration of unscheduled flows is implemented."⁵ Therefore, the Commission directed the CAISO to submit a compliance filing that included the final version of the accuracy metric, with a detailed description of the metric's characteristics.⁶ The Commission stated that the accuracy metric should be made effective "such that following the transitional period of one year after October 1, 2014, the mechanism will cease to be effective once the standard [*i.e.*, the performance standard under the metric] has been met for 12 consecutive months."⁷

³ June 27 Answer at 7-8.

⁴ See July 31 Order at Ordering Paragraphs (A)-(B).

⁵ *Id.* at PP 58, 61.

⁶ *Id.* at P 59.

⁷ *Id.* at P 60.

To satisfy the Commission's directives, the CAISO has developed the accuracy metric contained in proposed tariff section 27.5.1.2 in this compliance filing. This accuracy metric also reflects stakeholder comments on a draft version of tariff section 27.5.1.2 that the CAISO discussed with stakeholders on a conference call held on August 26, 2014.⁸ The enclosed accuracy metric includes the following components:

- Calculation methodology and scenarios for the accuracy metric. For each day-ahead market, the CAISO will calculate the external unscheduled flow accuracy metric as a comparison of the magnitude of the difference between the following two amounts under two scenarios: (1) the actual unscheduled flows on the interties caused by external balancing authority area generation, load, and interchanges; and (2) the CAISO's modeled day-ahead external unscheduled flow on the interties per hour in megawatts. In the first scenario, the CAISO models the external unscheduled flow impacts of external balancing authority area schedules in the day-ahead market; in the second scenario, the CAISO does not model such impacts.⁹ As explained in the June 27 Answer, under the accuracy metric, the CAISO will compare the magnitude of the difference between actual unscheduled flow on the interties and the CAISO's modeled unscheduled flow per hour under the two scenarios.¹⁰
- Definition of external unscheduled flow. For purposes of the accuracy metric, the external unscheduled flow is defined as the flow impact over the CAISO interties of supply, demand, and area-to-area net scheduled interchanges between external balancing authority areas.¹¹ These tariff provisions detail the proposal in the June 27 Answer that unscheduled flow measured for the accuracy metric is the flow due to external base schedules.¹²
- Details regarding the calculation methodology and scenarios. The external unscheduled flow will be derived based on a power flow solution

⁸ The CAISO posted the draft tariff section for stakeholder review pursuant to a market notice issued on August 21, 2014. See <http://www.aiso.com/informed/Pages/StakeholderProcesses/FullNetworkModelExpansion.aspx> (page on CAISO website regarding modeling enhancements stakeholder initiative).

⁹ Proposed tariff section 27.5.1.2.1.

¹⁰ June 27 Answer at 8, 10-11.

¹¹ Proposed tariff section 27.5.1.2.1.

¹² June 27 Answer at 8.

and will be calculated separately for the day-ahead and actual network conditions on an average hourly basis for each intertie. For the day-ahead, the CAISO will rerun a solved case and isolate the flow impact of external balancing authority areas, if modeled, to derive the modeled unscheduled flow. For the actual network conditions, the CAISO will use the actual external area-to-area net scheduled interchange and the State Estimator solution to capture the actual supply, demand, and topology, and will isolate the flow impact of external balancing authority areas to derive the actual external unscheduled flow. To calculate the external unscheduled flow accuracy metric, the CAISO will compare the day-ahead modeled external unscheduled flow and the actual external unscheduled flow for each of the scenarios. For the first scenario, the CAISO will take the difference per intertie, per trading hour of the actual external unscheduled flow and the modeled day-ahead external unscheduled flow. For the second scenario, the CAISO will also take the difference per intertie, per trading hour of the actual external unscheduled flow and the modeled day-ahead external unscheduled flow. Under the second scenario, the modeled day-ahead external unscheduled flow is zero, so the resulting difference is the absolute value of the actual external unscheduled flow. The CAISO will sum the absolute value of these sets of differences under the two scenarios.¹³ These tariff provisions build upon the explanation provided in the June 27 Answer that the accuracy metric will use the absolute value of differences between projected and actual as compared to actual and the total capacity of each intertie.¹⁴

- Application of the accuracy metric across the interties. To determine whether or not the CAISO has met the accuracy metric, the CAISO will calculate the accuracy metric on an intertie basis per trading hour and then sum the absolute value of the differences per intertie, per trading hour across all interties and all trading hours to calculate a three-week rolling average per the scenarios described above.¹⁵ Thus, consistent with the explanation provided in the June 27 Answer, the metric will be calculated hourly on an intertie-by-intertie basis and summed up across all interties over a three-week rolling average.¹⁶

¹³ Proposed tariff section 27.5.1.2.1.

¹⁴ June 27 Answer at 13.

¹⁵ Proposed tariff section 27.5.1.2.2.

¹⁶ June 27 Answer at 9, 13.

- Exclusion of the impact of unforeseen events from the accuracy metric. The CAISO will exclude from the accuracy metric the impact of the following unforeseen real-time events: the loss of direct current transmission lines, unexpected outages of generators over 1,000 MW, or a derate of over 1,000 MW at any intertie.¹⁷ These tariff provisions are consistent with the explanation in the June 27 Answer that the CAISO will exclude from the metric the impact of these same unforeseen real-time events.¹⁸
- Suspension of consideration of external unscheduled flow in the day-ahead market. If the three-week rolling average of the aggregated accuracy metric shows that the magnitude of the difference under the first scenario is greater than the magnitude of the difference under the second scenario, the CAISO will suspend its consideration of external unscheduled flow due to external balancing authority area schedules in the day-ahead market by disabling the impact of the net scheduled interchange between external balancing authority areas.¹⁹ These tariff provisions are consistent with the explanation in the June 27 Answer: Data will be compared over a rolling three-week period. If the accuracy metric shows that the scenario where the CAISO models unscheduled flow is not closer to actual flow than the scenario where the CAISO does not model unscheduled flow (*i.e.*, does not satisfy the accuracy standard), the CAISO will suspend the consideration of external unscheduled flow as described above.²⁰
- Circumstances for lifting suspension. The suspension of consideration of external unscheduled flow in the day-ahead market will be in place until the CAISO demonstrates that the three-week rolling average of the aggregated accuracy metric under the first scenario is less than it is under the second scenario. Even when the accuracy metric threshold is met, if the CAISO determines that the consideration of the external unscheduled flow is hampering the CAISO's ability to operate the system reliably, the CAISO may elect to suspend the consideration of the unscheduled flow in the day-ahead market until it has determined that considering the external unscheduled flow no longer hampers its ability to operate the system reliably. Any suspension and return of the CAISO's consideration of

¹⁷ Proposed tariff section 27.5.1.2.2.

¹⁸ June 27 Answer at 9, 13.

¹⁹ Proposed tariff section 27.5.1.2.2.

²⁰ June 27 Answer at 8-9, 11-12.

external unscheduled flow in the day-ahead market will be conducted as soon as practicable, consistent with and as permitted by the CAISO's market timelines and processes. During any period of suspension, the CAISO will continue to calculate the accuracy metric offline and will base its reinstatement of external unscheduled flow consideration in the day-ahead market on the accuracy metric being met based on the three-week rolling average.²¹ These tariff provisions are consistent with and build upon the explanation provided in the June 27 Answer that the CAISO will need to show that the three-week rolling average satisfies the accuracy standard before the CAISO will reintroduce the modeling of unscheduled flow in the day-ahead market within the CAISO's timeline and process requirements.²² Further, the tariff provisions are consistent with the explanation in the June 27 Answer of the CAISO's proposed methodology for calculating the accuracy metric during a suspension period.²³

- Transition period for the accuracy metric. As directed in the July 31 Order, the CAISO will stop calculating and applying the accuracy metric no sooner than 12 months after one year from the October 1, 2014, effective date of tariff section 27.5.1.2, once the accuracy metric has been met for 12 consecutive months.²⁴

In addition, the CAISO proposes to add new tariff section 6.5.3.2.4 to provide notice to market participants. Under the new section, the CAISO will post the aggregate accuracy metric three business days after the applicable trading day. The CAISO needs three business days to post the accuracy metric because the metric requires that the CAISO collect data that is only available after the real-time market is completed, and once the data is available, the CAISO must calculate and analyze the metric and prepare the reports for posting. These tariff provisions are consistent with the explanation provided in the June 27 Answer that, to promote transparency, the CAISO will publish daily updates on its metric calculations for interties and on an aggregate basis.²⁵ As set forth in revised tariff section 6.5.10.1.5, the CAISO also proposes to provide the accuracy metric information at a more detailed level to parties entitled to receive protected data because they have executed the required non-disclosure

²¹ Proposed tariff section 27.5.1.2.2.

²² June 27 Answer at 9, 12-13.

²³ June 27 Answer at 12.

²⁴ Proposed tariff section 27.5.1.2.3.

²⁵ June 27 Answer at 9, 13.

agreements as specified in Section 6.5.10. Further, new tariff section 6.5.3.2.4 states that, if the CAISO must suspend the consideration of external unscheduled flow in the day-ahead market. The CAISO will notify market participants as soon as practicable prior to implementing the suspension and reinstating its consideration of external unscheduled flow in the day-ahead market. These tariff provisions are consistent with the explanation in the June 27 Answer that the CAISO will provide market participants with advance notice when the CAISO disables or enables the consideration of unscheduled flow in the day-ahead market.²⁶

B. Addition to Report on Unscheduled Flow Estimates

In the July 31 Order, the Commission directed that, as part of the report on hourly unscheduled flow at the interties to be provided pursuant to tariff section 6.5.10.1.5, the CAISO should include a summary of whether it enforced physical flow constraints on the interties pursuant to tariff section 31.8.2, and, if it did not, a short description of the reasons for non-enforcement.²⁷ The CAISO proposes to revise tariff section 6.5.10.1.5 in accordance with these directives.

C. Clarification Regarding Obligation to Sign WECC Universal Non-Disclosure Agreement

In its comments, Imperial Irrigation District (IID) expressed concern that the tariff revisions in the May 22 Tariff Filing would result in breach of the Western Electricity Coordinating Council (WECC) Universal Non-Disclosure Agreement because the CAISO proposed to disclose unscheduled flow estimates reflecting data provided to the CAISO under that agreement.²⁸

The CAISO explained in the June 27 Answer that IID's concerns were unwarranted. As part of that explanation, the CAISO stated that it only intended to provide unscheduled flow data under tariff section 6.5.10.1.5 to those parties that have also signed the WECC Universal Non-Disclosure Agreement. The CAISO went on to state that it intended to implement that requirement through existing provisions in tariff section 6.5.10, but that upon further consideration of the matter, the existing provisions in section 6.5.10 may not be sufficiently specific about the requirement to sign the WECC Universal Non-Disclosure Agreement. Therefore, the CAISO stated that, if directed by the Commission, the CAISO was prepared to clarify in a compliance filing that unscheduled flow data

²⁶ June 27 Answer at 9, 13-14.

²⁷ July 31 Order at P 63.

²⁸ IID comments at 9-10.

is only available to parties that have also signed the WECC Universal Non-Disclosure Agreement.²⁹

In the July 31 Order, the Commission described IID's concerns about the WECC Universal Non-Disclosure Agreement and a portion of the CAISO's response in the June 27 Answer regarding those concerns,³⁰ but the Commission did not state whether or not it concurred with the clarification regarding the agreement that the CAISO proposed in the June 27 Answer. Thus, the Commission did not make it clear whether it intended to permit the CAISO to make the proposed clarification on compliance.

To address this matter, the CAISO proposes in this compliance filing to add new tariff section 6.5.10.2(e). The section states that, to obtain access to the protected data specified in tariff section 6.5.10.1, each market participant or non-market participant that otherwise qualifies to obtain the protected data pursuant to the requirements of tariff section 6.5.10.2, must also certify in writing to the CAISO that it has executed the WECC Universal Non-Disclosure Agreement. This new tariff provision will implement the clarification set forth in the June 27 Answer, assuming the Commission intended to permit the CAISO to make that clarification.³¹

During the preparation of this compliance filing, the CAISO became aware of an issue involving the discussion of WECC non-disclosure agreements in existing CAISO tariff provisions. The existing tariff includes a number of references to a "WECC Non-Member Confidentiality Agreement for WECC Data." The CAISO understands that WECC no longer uses a separate non-disclosure agreement for non-members. Updating these references, however, goes beyond the scope of this compliance filing. The CAISO therefore will evaluate this matter further and will prepare tariff revisions at a later time so that the CAISO tariff will reflect WECC's currently effective non-disclosure agreements.

III. Materials Provided in this Compliance Filing

In addition to this transmittal letter, this compliance filing includes Attachments A and B. Attachment A contains clean CAISO tariff sheets reflecting the tariff revisions described above. Attachment B shows these revisions in black-line format.

²⁹ June 27 Answer at 15-16.

³⁰ July 31 Order at PP 39, 43.

³¹ To the extent necessary, the CAISO requests that the Commission clarify this matter pursuant to 18 C.F.R. § 385.212.

If there are any questions regarding this filing, please contact the undersigned.

Respectfully submitted,

Roger E. Collanton
General Counsel
Anthony Ivancovich
Deputy General Counsel
Anna McKenna
Assistant General Counsel
California Independent System
Operator Corporation
250 Outcropping Way
Folsom, CA 95630
Tel: (916) 351-4400
Fax: (916) 608-7222
E-mail: amckenna@caiso.com

Sean Atkins
Bradley R. Miliauskas
Alston & Bird LLP
The Atlantic Building
950 F Street, NW
Washington, DC 20004
Tel: (202) 239-3300
Fax: (202) 654-4875
E-mail: sean.atkins@alston.com
bradley.miliauskas@alston.com

Counsel for the California Independent System Operator Corporation

CERTIFICATE OF SERVICE

I hereby certify that I have served the foregoing document upon all of the parties listed on the official service list for the above-referenced 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 at Folsom, California this 2nd day of September, 2014.

/s/ Sarah Garcia
Sarah Garcia

Attachment A – Clean Tariff Sheets

FNM Expansion Compliance – ER14-2017

California Independent System Operator Corporation

6.5.3.2.4 External Unscheduled Flow Metric

Three Business Days after the applicable Trading Day the CAISO will post the aggregate accuracy metric calculated as specified in Section 27.5.1.2. If the CAISO must suspend the consideration of external unscheduled flow in the Day-Ahead Market, the CAISO will notify Market Participants as soon as practicable prior to implementing the suspension. The CAISO will also notify Market Participants as soon as practicable prior to reinstating its consideration of external unscheduled flow in the Day-Ahead Market.

* * *

6.5.10.1.5 Intertie Flow Information

After the results of the Day-Ahead Market are posted, the CAISO will provide: 1) the hourly unscheduled flow at each Intertie considered in the Day-Ahead Market; and 2) a summary of whether the CAISO enforced physical flow constraints on the Interties pursuant to Section 31.8.2, and if it did not, a short description of the reasons for non-enforcement. After the results of the Real-Time Market are posted, the CAISO will provide the unscheduled flow at each Intertie considered in the Real-Time Market. At the same time that the CAISO posts the information specified in Section 6.5.3.2.4, the CAISO will also provide the accuracy metric by Intertie for each Trading Hour as Protected Data. To the extent that the CAISO fails to provide any of these reports on any given Operating Day, the CAISO will endeavor to provide any of these reports within the next thirty (30) days for the applicable Day-Ahead Market and Real-Time Market, after which the information will not be provided.

6.5.10.2 Requirements to Obtain the Protected Data

The CAISO shall provide the Protected Data only to those Market Participants and non-Market Participants that satisfy the following requirements.

- (a) To obtain access to the Protected Data, a Market Participant that is a member of the WECC that requests the Protected Data must: (i) execute and submit to the CAISO the Non-Disclosure Agreement for Protected Data that is posted on the CAISO Website; and (ii) provide to the CAISO a non-disclosure

statement, the form of which is attached as an exhibit to the Non-Disclosure Agreement executed by the Market Participant, executed by each employee and consultant of the Market Participant who will have access to the Protected Data.

- (b) To obtain access to the Protected Data, a Market Participant that is not a member of the WECC that requests the Protected Data must: (i) execute and submit to the CAISO the Non-Disclosure Agreement for Protected Data that is posted on the CAISO Website, (ii) provide to the CAISO a fully executed WECC Non-Member Confidentiality Agreement for WECC Data, and (iii) provide to the CAISO a non-disclosure statement, the form of which is attached as an exhibit to the Non-Disclosure Agreement executed by the non-WECC Market Participant, executed by each employee and consultant of the non-WECC Market Participant who will have access to the Protected Data.
- (c) To obtain access to the Protected Data a non-Market Participant that is a member of the WECC that requests the Protected Data must: (i) reasonably demonstrate a legitimate business or governmental interest in the CAISO Markets, (ii) execute the Non-Disclosure Agreement for Protected Data posted on the CAISO Website, and (iii) provide to the CAISO a non-disclosure statement, the form of which is attached as an exhibit to the Non-Disclosure Agreement executed by the non-Market Participant, executed by each employee and consultant of the non-Market Participant who will have access to the Protected Data.
- (d) To obtain access to the Protected Data, a non-Market Participant that is not a member of the WECC that requests the Protected Data must: (i) reasonably demonstrate a legitimate business or

governmental interest in the CAISO Markets, (ii) execute the Non-Disclosure Agreement for Protected Data that is posted on the CAISO Website, (iii) provide to the CAISO a fully executed WECC Non-Member Confidentiality Agreement for WECC Data, and (iv) provide to the CAISO a non-disclosure statement, the form of which is attached as an exhibit to the Non-Disclosure Agreement executed by the non-Market Participant, executed by each employee and consultant of the non-Market Participant who will have access to the Protected Data.

- (e) To obtain access to the Protected Data specified in Section 6.5.10.1.5, all Market Participants or non-Market Participants that otherwise qualify to obtain the Protected Data pursuant to the requirements in this Section 6.5.10.2, must also certify in writing to the CAISO that the Market Participant or non-Market Participant has executed the WECC Universal Non-Disclosure Agreement.

* * *

27.5.1.1 Base Market Model used in the CAISO Markets

Based on the FNM the CAISO creates the Base Market Model, which is used as the basis for formulating, as described in section 27.5.6, the individual market models used in each of the CAISO Markets to establish, enforce, and manage the enforced internal and Intertie Transmission Constraints associated with network facilities. The Base Market Model is derived from the FNM by (1) introducing locations for modeling Intertie Schedules; and (2) introducing market resources that do not currently exist in the FNM due to their size and lack of visibility. In the Base Market Model, external Balancing Authority Areas and external transmission systems are modeled to the extent necessary to 1) improve the accuracy of the CAISO Market solutions for purposes of reliable operations, and 2) support the commercial requirements of the CAISO Markets. For those portions of the FNM that are external to the CAISO Balancing Authority

Area, the Base Market Model may model the resistive component for accurate modeling of Transmission Losses, but accounts for losses in the external portions of the market model separately from Transmission Losses within the CAISO Balancing Authority Area. As a result, the Marginal Cost of Losses in the LMPs is not affected by external losses. For portions of the Base Market Model that are external to the CAISO Balancing Authority Area, the CAISO Markets only enforce Transmission Constraints that reflect limitations of the transmission facilities and Entitlements turned over to the Operational Control of the CAISO by a Participating Transmission Owner, or that affect Congestion Management within the CAISO Balancing Authority Area or on Interties. External connections are retained between Intertie branches within Transmission Interfaces. Certain external loops are modeled, which allows the CAISO to increase the accuracy of the Congestion Management process. The CAISO Markets' optimizations also factor in forecasted unscheduled flow at the Interties consistent with the requirements specified in the Business Practice Manuals. Resources are modeled at the appropriate network Nodes. The pricing Location (PNode) of a Generating Unit generally coincides with the Node where the relevant revenue quality meter is connected or corrected, to reflect the point at which the Generating Unit is connected to the CAISO Controlled Grid. The Dispatch, Schedule, and LMP of a Generating Unit refers to a PNode, but the Energy injection is modeled in the Base Market Model for network analysis purposes at the corresponding Generating Unit's physical interconnection point), taking into account any losses in the non-CAISO Controlled Grid leading to the point where Energy is delivered to CAISO Controlled Grid. Based on the Base Market Model, the market models used in each of the CAISO Markets incorporate physical characteristics needed for determining Transmission Losses and model Transmission Constraints within the CAISO Balancing Authority Area, which are then reflected in the Day-Ahead Schedules, AS Awards and RUC Awards, FMM Schedules, Dispatch Instructions, and LMPs resulting from each CAISO Markets Process. The Dispatch, Schedule, and LMP of a Dynamic System Resource or Pseudo-Tie of a Generating Unit to the CAISO Balancing Authority Area refer to a PNode, or Aggregated Pricing Node, if applicable, of the resource at its physical location in the external transmission systems that are modeled in the

Base Market Model, subject to the modeling of Transmission Losses in the portions of the FNM and exclusion of such Transmission Losses' effects on the LMPs that are external to the CAISO Balancing Authority Area described in this Section 27.5.1.1. The LMP price thus associated with a Dynamic System Resource or Pseudo-Tie Generating Unit will be used for Settlement of Energy and will include the Marginal Cost of Congestion and Marginal Cost of Losses components of the LMP to that Dynamic System Resource or Pseudo-Tie Generating Unit point, excluding losses and congestion external to the CAISO Balancing Authority Area, in accordance with this Section 27.5.1.1. Further, in formulating the market models for the CAISO Market processes, except for specific Intertie locations as specified in the BPM, power flow parameters developed from applicable data sources, including available outage information, system status data, and the State Estimator for the Real-Time Dispatch, are applied to the Base Market Model.

27.5.1.2 Accuracy Metric for Modeled External Unscheduled Flow in the Day-Ahead Market

27.5.1.2.1 Accuracy Metric

For each Day-Ahead Market, the CAISO will calculate the external unscheduled flow accuracy metric as described further in this Section 27.5.1.2. The accuracy metric is a comparison of the magnitude of the difference between the following two amounts under two scenarios: 1) the actual unscheduled flows on the Interties caused by external Balancing Authority Area generation, load, and interchanges; and 2) the CAISO's modeled Day-Ahead external unscheduled flow on the Interties per hour in MW. In the first scenario, the CAISO models the external unscheduled flow impacts of external Balancing Authority Area schedules in the Day-Ahead Market. In the second scenario, the CAISO does not model these flow impacts. For purposes of the accuracy metric, the external unscheduled flow is defined as the flow impact over the CAISO Interties of supply, demand, and area-to-area net scheduled interchanges between external Balancing Authority Areas. The external unscheduled flow will be derived based on a power flow solution and will be calculated separately for the Day-Ahead and actual network conditions on an average hourly basis for each Intertie. For the Day-Ahead, the CAISO will rerun a solved case and isolate the flow impact of external Balancing Authority Areas, if modeled, to derive the modeled external unscheduled flow. For the actual network conditions, the CAISO will

use the actual external area-to-area net scheduled Interchange and the State Estimator solution to capture the actual supply, demand, and topology, and will isolate the flow impact of external Balancing Authority Areas to derive the actual external unscheduled flow. To calculate the external unscheduled flow accuracy metric, the CAISO will compare the Day-Ahead modeled external unscheduled flow and the actual external unscheduled flow for each of the scenarios. For the first scenario, the CAISO will take the difference per Intertie, per Trading Hour of the actual external unscheduled flow and the modeled Day-Ahead external unscheduled flow. For the second scenario, the CAISO will also take the difference per Intertie, per Trading Hour of the actual external unscheduled flow and the modeled Day-Ahead external unscheduled flow. Under the second scenario, the modeled Day-Ahead external unscheduled flow is zero, so the resulting difference is the absolute value of the actual external unscheduled flow. The CAISO will sum the absolute value of these sets of differences under the two scenarios.

27.5.1.2.2 Accuracy Metric Threshold and Suspension

To determine whether or not the CAISO has met the accuracy metric, the CAISO calculates the accuracy metric on an Intertie basis per Trading Hour and then sums the absolute value of the differences per Intertie, per Trading Hour across all Interties and all Trading Hours to calculate a three-week rolling average per the scenarios described in Section 27.5.1.2.1. The CAISO excludes from the accuracy metric the impact of the following unforeseen Real-Time events: the loss of direct current transmission lines, unexpected outages of generators over 1,000 MW, or a derate of over 1,000 MW at any Intertie. If the three-week rolling average of the aggregated accuracy metric shows that the magnitude of the difference under the first scenario is greater than the magnitude of the difference under the second scenario, as described in Section 27.5.1.2.1, the CAISO will suspend its consideration of external unscheduled flow due to external Balancing Authority Area schedules in the Day-Ahead Market by disabling the impact of the net scheduled interchange between external Balancing Authority Areas. The suspension will be in place until the CAISO demonstrates that the three-week rolling average of the aggregated accuracy metric under the first scenario is less than it is under the second scenario. Even when the accuracy metric threshold is met, if the CAISO determines that the

consideration of the external unscheduled flow is hampering the CAISO's ability to operate the system reliably, the CAISO may elect to suspend the consideration of the unscheduled flow in the Day-Ahead Market until it has determined that considering the external unscheduled flow no longer hampers its ability to operate the system reliably. Any suspension and return of the CAISO's consideration of external unscheduled flow in the Day-Ahead Market will be conducted as soon as practicable, consistent with and as permitted by the CAISO Markets timelines and the CAISO's processes. During any period of suspension, the CAISO will continue to calculate the accuracy metric offline and will base its reinstatement of external unscheduled flow consideration in the Day-Ahead Market on the accuracy metric being met based on the three-week rolling average.

27.5.1.2.3 Sunset

Section 27.5.1.2 and its subsections will no longer be effective, if the CAISO has not failed the metric described therein for twelve (12) consecutive months after the first twelve months that this section is effective.

Attachment B – Marked Tariff Sheets

FNM Expansion Compliance – ER14-2017

California Independent System Operator Corporation

6.5.3.2.4 External Unscheduled Flow Metric

Three Business Days after the applicable Trading Day the CAISO will post the aggregate accuracy metric calculated as specified in Section 27.5.1.2. If the CAISO must suspend the consideration of external unscheduled flow in the Day-Ahead Market, the CAISO will notify Market Participants as soon as practicable prior to implementing the suspension. The CAISO will also notify Market Participants as soon as practicable prior to reinstating its consideration of external unscheduled flow in the Day-Ahead Market.

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6.5.10.1.5 Intertie Unscheduled Flow Information Estimates

After the results of the Day-Ahead Market are posted, the CAISO will provide: 1) the hourly unscheduled flow at each Intertie considered in the Day-Ahead Market; and 2) a summary of whether the CAISO enforced physical flow constraints on the Interties pursuant to Section 31.8.2, and if it did not, a short description of the reasons for non-enforcement. After the results of the Real-Time Market are posted, the CAISO will provide the unscheduled flow at each Intertie considered in the Real-Time Market. At the same time that the CAISO posts the information specified in Section 6.5.3.2.4, the CAISO will also provide the accuracy metric by Intertie for each Trading Hour as Protected Data. To the extent that the CAISO fails to provide any of these~~this~~ reports on any given Operating Day, the CAISO will endeavor to provide any of these~~this~~ reports within the next thirty (30) days for the applicable Day-Ahead Market and Real-Time Market, after which the information will not be provided.

6.5.10.2 Requirements to Obtain the Protected Data

The CAISO shall provide the Protected Data only to those Market Participants and non-Market Participants that satisfy the following requirements.

- (a) To obtain access to the Protected Data, a Market Participant that is a member of the WECC that requests the Protected Data must: (i) execute and submit to the CAISO the Non-Disclosure Agreement for Protected Data that is posted on the CAISO Website; and (ii) provide to the CAISO a non-disclosure

statement, the form of which is attached as an exhibit to the Non-Disclosure Agreement executed by the Market Participant, executed by each employee and consultant of the Market Participant who will have access to the Protected Data.

- (b) To obtain access to the Protected Data, a Market Participant that is not a member of the WECC that requests the Protected Data must: (i) execute and submit to the CAISO the Non-Disclosure Agreement for Protected Data that is posted on the CAISO Website, (ii) provide to the CAISO a fully executed WECC Non-Member Confidentiality Agreement for WECC Data, and (iii) provide to the CAISO a non-disclosure statement, the form of which is attached as an exhibit to the Non-Disclosure Agreement executed by the non-WECC Market Participant, executed by each employee and consultant of the non-WECC Market Participant who will have access to the Protected Data.
- (c) To obtain access to the Protected Data a non-Market Participant that is a member of the WECC that requests the Protected Data must: (i) reasonably demonstrate a legitimate business or governmental interest in the CAISO Markets, (ii) execute the Non-Disclosure Agreement for Protected Data posted on the CAISO Website, and (iii) provide to the CAISO a non-disclosure statement, the form of which is attached as an exhibit to the Non-Disclosure Agreement executed by the non-Market Participant, executed by each employee and consultant of the non-Market Participant who will have access to the Protected Data.
- (d) To obtain access to the Protected Data, a non-Market Participant that is not a member of the WECC that requests the Protected Data must: (i) reasonably demonstrate a legitimate

business or governmental interest in the CAISO Markets, (ii) execute the Non-Disclosure Agreement for Protected Data that is posted on the CAISO Website, (iii) provide to the CAISO a fully executed WECC Non-Member Confidentiality Agreement for WECC Data, and (iv) provide to the CAISO a non-disclosure statement, the form of which is attached as an exhibit to the Non-Disclosure Agreement executed by the non-Market Participant, executed by each employee and consultant of the non-Market Participant who will have access to the Protected Data.

(e) To obtain access to the Protected Data specified in Section 6.5.10.1.5, all Market Participants or non-Market Participants that otherwise qualify to obtain the Protected Data pursuant to the requirements in this Section 6.5.10.2, must also certify in writing to the CAISO that the Market Participant or non-Market Participant has executed the WECC Universal Non-Disclosure Agreement.

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27.5.1.1 Base Market Model used in the CAISO Markets

Based on the FNM the CAISO creates the Base Market Model, which is used as the basis for formulating, as described in section 27.5.6, the individual market models used in each of the CAISO Markets to establish, enforce, and manage the enforced internal and Intertie Transmission Constraints associated with network facilities. The Base Market Model is derived from the FNM by (1) introducing locations for modeling Intertie Schedules; and (2) introducing market resources that do not currently exist in the FNM due to their size and lack of visibility. In the Base Market Model, external Balancing Authority Areas and external transmission systems are modeled to the extent necessary to 1) improve the accuracy of the CAISO Market solutions for purposes of reliable operations, and 2) support the commercial requirements of the CAISO Markets. For those portions of the FNM that are external to the CAISO Balancing Authority

Area, the Base Market Model may model the resistive component for accurate modeling of Transmission Losses, but accounts for losses in the external portions of the market model separately from Transmission Losses within the CAISO Balancing Authority Area. As a result, the Marginal Cost of Losses in the LMPs is not affected by external losses. For portions of the Base Market Model that are external to the CAISO Balancing Authority Area, the CAISO Markets only enforce Transmission Constraints that reflect limitations of the transmission facilities and Entitlements turned over to the Operational Control of the CAISO by a Participating Transmission Owner, or that affect Congestion Management within the CAISO Balancing Authority Area or on Interties. External connections are retained between Intertie branches within Transmission Interfaces. Certain external loops are modeled, which allows the CAISO to increase the accuracy of the Congestion Management process. The CAISO Markets' optimizations also factor in forecasted unscheduled flow at the Interties consistent with the requirements specified in the Business Practice Manuals. Resources are modeled at the appropriate network Nodes. The pricing Location (PNode) of a Generating Unit generally coincides with the Node where the relevant revenue quality meter is connected or corrected, to reflect the point at which the Generating Unit is connected to the CAISO Controlled Grid. The Dispatch, Schedule, and LMP of a Generating Unit refers to a PNode, but the Energy injection is modeled in the Base Market Model for network analysis purposes at the corresponding Generating Unit's physical interconnection point), taking into account any losses in the non-CAISO Controlled Grid leading to the point where Energy is delivered to CAISO Controlled Grid. Based on the Base Market Model, the market models used in each of the CAISO Markets incorporate physical characteristics needed for determining Transmission Losses and model Transmission Constraints within the CAISO Balancing Authority Area, which are then reflected in the Day-Ahead Schedules, AS Awards and RUC Awards, FMM Schedules, Dispatch Instructions, and LMPs resulting from each CAISO Markets Process. The Dispatch, Schedule, and LMP of a Dynamic System Resource or Pseudo-Tie of a Generating Unit to the CAISO Balancing Authority Area refer to a PNode, or Aggregated Pricing Node, if applicable, of the resource at its physical location in the external transmission systems that are modeled in the

Base Market Model, subject to the modeling of Transmission Losses in the portions of the FNM and exclusion of such Transmission Losses' effects on the LMPs that are external to the CAISO Balancing Authority Area described in this Section 27.5.1.1. The LMP price thus associated with a Dynamic System Resource or Pseudo-Tie Generating Unit will be used for Settlement of Energy and will include the Marginal Cost of Congestion and Marginal Cost of Losses components of the LMP to that Dynamic System Resource or Pseudo-Tie Generating Unit point, excluding losses and congestion external to the CAISO Balancing Authority Area, in accordance with this Section 27.5.1.1. Further, in formulating the market models for the CAISO Market processes, except for specific Intertie locations as specified in the BPM, power flow parameters developed from applicable data sources, including available outage information, system status data, and the State Estimator for the Real-Time Dispatch, are applied to the Base Market Model.

27.5.1.2 Accuracy Metric for Modeled External Unscheduled Flow in the Day-Ahead Market

27.5.1.2.1 Accuracy Metric

For each Day-Ahead Market, the CAISO will calculate the external unscheduled flow accuracy metric as described further in this Section 27.5.1.2. The accuracy metric is a comparison of the magnitude of the difference between the following two amounts under two scenarios: 1) the actual unscheduled flows on the Interties caused by external Balancing Authority Area generation, load, and interchanges; and 2) the CAISO's modeled Day-Ahead external unscheduled flow on the Interties per hour in MW. In the first scenario, the CAISO models the external unscheduled flow impacts of external Balancing Authority Area schedules in the Day-Ahead Market. In the second scenario, the CAISO does not model these flow impacts. For purposes of the accuracy metric, the external unscheduled flow is defined as the flow impact over the CAISO Interties of supply, demand, and area-to-area net scheduled interchanges between external Balancing Authority Areas. The external unscheduled flow will be derived based on a power flow solution and will be calculated separately for the Day-Ahead and actual network conditions on an average hourly basis for each Intertie. For the Day-Ahead, the CAISO will rerun a solved case and isolate the flow impact of external Balancing Authority Areas, if modeled, to derive the modeled external unscheduled flow. For the actual network conditions, the CAISO will

use the actual external area-to-area net scheduled Interchange and the State Estimator solution to capture the actual supply, demand, and topology, and will isolate the flow impact of external Balancing Authority Areas to derive the actual external unscheduled flow. To calculate the external unscheduled flow accuracy metric, the CAISO will compare the Day-Ahead modeled external unscheduled flow and the actual external unscheduled flow for each of the scenarios. For the first scenario, the CAISO will take the difference per Intertie, per Trading Hour of the actual external unscheduled flow and the modeled Day-Ahead external unscheduled flow. For the second scenario, the CAISO will also take the difference per Intertie, per Trading Hour of the actual external unscheduled flow and the modeled Day-Ahead external unscheduled flow. Under the second scenario, the modeled Day-Ahead external unscheduled flow is zero, so the resulting difference is the absolute value of the actual external unscheduled flow. The CAISO will sum the absolute value of these sets of differences under the two scenarios.

27.5.1.2.2 Accuracy Metric Threshold and Suspension

To determine whether or not the CAISO has met the accuracy metric, the CAISO calculates the accuracy metric on an Intertie basis per Trading Hour and then sums the absolute value of the differences per Intertie, per Trading Hour across all Interties and all Trading Hours to calculate a three-week rolling average per the scenarios described in Section 27.5.1.2.1. The CAISO excludes from the accuracy metric the impact of the following unforeseen Real-Time events: the loss of direct current transmission lines, unexpected outages of generators over 1,000 MW, or a derate of over 1,000 MW at any Intertie. If the three-week rolling average of the aggregated accuracy metric shows that the magnitude of the difference under the first scenario is greater than the magnitude of the difference under the second scenario, as described in Section 27.5.1.2.1, the CAISO will suspend its consideration of external unscheduled flow due to external Balancing Authority Area schedules in the Day-Ahead Market by disabling the impact of the net scheduled interchange between external Balancing Authority Areas. The suspension will be in place until the CAISO demonstrates that the three-week rolling average of the aggregated accuracy metric under the first scenario is less than it is under the second scenario. Even when the accuracy metric threshold is met, if the CAISO determines that the

consideration of the external unscheduled flow is hampering the CAISO's ability to operate the system reliably, the CAISO may elect to suspend the consideration of the unscheduled flow in the Day-Ahead Market until it has determined that considering the external unscheduled flow no longer hampers its ability to operate the system reliably. Any suspension and return of the CAISO's consideration of external unscheduled flow in the Day-Ahead Market will be conducted as soon as practicable, consistent with and as permitted by the CAISO Markets timelines and the CAISO's processes. During any period of suspension, the CAISO will continue to calculate the accuracy metric offline and will base its reinstatement of external unscheduled flow consideration in the Day-Ahead Market on the accuracy metric being met based on the three-week rolling average.

27.5.1.2.3 Sunset

Section 27.5.1.2 and its subsections will no longer be effective, if the CAISO has not failed the metric described therein for twelve (12) consecutive months after the first twelve months that this section is effective.