California Independent
System Operator Corporation

July 18, 2016

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

Re: California Independent System Operator Corporation
Docket No. ER16-1483
Frequency Response – Phase 1

Dear Secretary Bose:

The California Independent System Operator Corporation (CAISO) submits this filing in response to the letter dated June 17, 2016 from the Office of Energy Market Regulation requesting additional information about the CAISO's tariff revisions in this proceeding. The CAISO requests that the Commission issue an order no later than August 15, 2016 accepting the CAISO's tariff revisions, with the modifications the CAISO proposes in this response. The CAISO also requests waiver of the 60 days' notice requirement under Federal Power Act section 205,[1] so that the CAISO can undertake and complete a competitive solicitation process to contract for transferred frequency response prior to December 1, 2016.[2]

I. Introduction

On April 21, 2016, the CAISO submitted tariff revisions to facilitate compliance with the new frequency response requirements of North American Electric Reliability Corporation (NERC) Reliability Standard BAL-003-1 – *Frequency Response and Frequency Bias Setting*. Reliability Standard BAL-003-1 established new frequency response requirements for balancing authority

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[1] 16 U.S.C. § 824d (d).

[2] Pursuant to Section 35.11 of the Commission's regulations, 18 C.F.R. § 35.11, the CAISO requests waiver of Section 35.3(a)(1) of the Commission's regulations, 18 C.F.R. § 35.3(a)(1), to permit the requested August 15, 2016 effective date.

areas.[3] Requirement 1 of Reliability Standard BAL-003-1 requires each balancing authority to achieve an annual frequency response measure that equals or exceeds its frequency response obligation. Under BAL-003-1, a balancing authority's frequency response obligation is determined each year and reflects its proportionate share - based on annual generation and load - of the interconnection's frequency response obligation. Compliance with the annual frequency response obligation begins December 1, 2016.

The CAISO's April 21, 2016 tariff filing includes measures to help ensure initial compliance with BAL-003-1 while the CAISO considers longer-term solutions. The CAISO proposed, among other things, to require generators with governors that already must comply with Western Electricity Coordinating Council (WECC) criteria to meet requirements set forth in industry guidance provided by NERC. The CAISO also proposed to procure transferred frequency response from other balancing authorities in the western interconnection. Transferred frequency response will allow a purchasing balancing authority to adjust its frequency response performance upward in response to a disturbance event identified by NERC by the amount of transferred frequency response it has procured. Simultaneously, the selling balancing authority will adjust its frequency response performance downward in response to a disturbance event identified by NERC by the amount of transferred frequency response sold. On June 17, 2016, the Commission's Office of Energy Market Regulation issued a letter requesting more information regarding the CAISO's proposal. The CAISO responds to each of the Commission's questions below.

1. CAISO proposes certain requirements for generators with governor controls that it states are in accordance with Western Electricity Coordinating Council (WECC) criteria and NERC reliability guidelines. The NERC Reliability Guideline for Primary Frequency Control provides "recommended settings for governors or equivalent frequency control devices" and the recommended settings are not limited to synchronous generators. Please explain why CAISO's proposed tariff revisions only apply to resources with governor controls rather than to all participating generators equipped to provide primary frequency response, including non-synchronous resources.

As part of the CAISO's April 21, 2016 tariff filing, the CAISO proposed to clarify requirements for participating generators operating generating units with governor controls. The CAISO's existing tariff contains language that states:

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[3] *Frequency Response and Frequency Bias Setting Reliability Standard*, Order No. 794, 146 FERC ¶ 61,024 (2014).

> "Participating Generators shall, in relation to each of their Generating Units, meet all Applicable Reliability Criteria, including any standards regarding governor response capabilities."[4]

Under the CAISO tariff, applicable reliability criteria include regional criteria established by the WECC.[5] Among WECC's approved regional criteria is WECC Criterion PRC-001-WECC-CRT-1.2.[6] This criterion applies to generating owners and generating units with governor functions and requires a droop setting within a specified range, *i.e*. three to five percent. This WECC criterion does not expressly apply to resources with frequency control devices that are not governors.

In its April 21, 2016 tariff filing, the CAISO explained that it is seeking to leverage recent guidance from NERC regarding droop settings to change its tariff for generating units with governor functions.[7] NERC's guidance document recommended "settings for governors or equivalent frequency control devices, subject to legitimate technical, operational, or regulatory considerations that would prevent governors from achieving the maximum governor settings."[8] These recommended settings for generating units with governors are within the range of droop settings set forth in WECC criterion PRC-001-WECC-CRT-1.2. As explained in the CAISO's tariff filing, the CAISO has observed a decrease in performance by resources on its system over the last few years in response to frequency disturbances.[9] Clarifying droop setting requirements for generators with governor controls as a tariff obligation will help facilitate compliance with BAL-003-1.

As part of stakeholder process leading to its April 21, 2016 tariff filing, the CAISO decided not to explore requirements for resources with frequency control devices other than governors (*e.g*. non-synchronous resources with modern inverters) as part of its short-term compliance strategy with BAL-003-1. Instead,

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4 CAISO tariff section 4.6.5.1

5 *See* definition of Applicable Reliability Criteria set forth in Appendix A to the CAISO Tariff, Master Definitions Supplement.

6 https://www.wecc.biz/Reliability/PRC-001-WECC-CRT-1.2.pdf

7 NERC Operating Committee Reliability Guideline Primary Frequency Control http://www.nerc.com/comm/OC/Reliability%20Guideline%20DL/Primary_Frequency_Control_final.pdf

8 *Id.* at 9.

9 CAISO tariff filing in ER16-1483 dated April 21, 2016 at 3-5.

the CAISO determined that it would examine these requirements in phase 2 of its initiative as part of long-term compliance strategy with BAL-003-1. Specifically, the CAISO stated that it would consider designing and implementing a market constraint or market product defined in a technology-neutral way that would allow all certified resources, including non-conventional resources, to provide primary frequency response.[10] The Commission itself has opened a notice of inquiry to examine, among other things, questions involving appropriate settings for frequency responsive devices other than governors.[11] The CAISO plans to examine the record of this proceeding as it develop applicable requirements in phase 2 of its frequency responsive initiative.

The CAISO notes, however, that under its existing Commission-approved tariff a resource with a frequency responsive device other than a governor that seeks to provide spinning reserve in the CAISO markets must be frequency responsive and meet specific criteria.[12] These criteria include the following requirements that effectively simulate governor controls for the resource to respond to a drop in frequency:

> a. If frequency is less than or equal to 59.92 Hz, the resource must reach ten (10) percent of its awarded spinning capacity within eight (8) seconds; and

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[10] *See* Frequency Response Draft Final Proposal dated February 4, 2016 at 17 and 24-25. http://www.caiso.com/Documents/DraftFinalProposal_FrequencyResponse.pdf

[11] *Essential Reliability Services and the Evolving Bulk-Power System—Primary Frequency Response* RM16-6 154 FERC ¶ 61,117 (2016) at P 45._ http://ferc.gov/whats-new/comm-meet/2016/021816/E-2.pdf

[12] CAISO tariff section 8.4.4 provides:

> The providers of Spinning Reserve and Non-Spinning Reserve under this CAISO Tariff must comply with the following availability standards. Each Ancillary Service Provider shall ensure: (i) that its resources scheduled to provide Spinning Reserve and Non-Spinning Reserve are available for Dispatch throughout the Settlement Period for which they have been scheduled; and (ii) that its *resources scheduled to provide Spinning Reserve are responsive to frequency deviations throughout the Settlement Period for which they have been scheduled*. [Emphasis added.]

See also the definition of Spinning Reserve in Appendix A of the CAISO tariff, Master Definitions Supplement, which reads:

> The portion of unloaded synchronized resource capacity that is *immediately responsive to system frequency* and that is capable of being loaded in ten (10) minutes, and that is capable of running for at least thirty (30) minutes from the time it reaches its award capacity." [Emphasis added.]

> b. The resources must change the power it delivers or consumes in one (1) second if system frequency is less than or equal to 59.92 Hz.[13]

In addition, the CAISO is currently working with a non-synchronous resource to test its capability to provide primary frequency response after a disturbance event. The CAISO plans to use the results of this test to inform phase 2 of its frequency response initiative in which it will examine, among other issues, minimum requirements for non-synchronous resources with the necessary capability to provide primary frequency response.

2. Please provide a detailed explanation of any CAISO discussions with WECC and NERC regarding transferred frequency response as well as the outcome of these discussions. Describe any feedback WECC and NERC provided regarding the potential implications of CAISO's proposed actions for BAL-003-1 compliance, including any indications of the effect on NERC's analysis and risk assessment supporting its initial allocations of frequency response obligations to all balancing authorities or any indications of potentially adverse impacts on Western Interconnection frequency response. Please provide any supporting documents reflecting these discussions.

During phase 1 of the CAISO's frequency response initiative, the CAISO conducted outreach to representatives of WECC and NERC to explain the CAISO's planned tariff filing, including its proposal to procure transferred frequency response as a short-term strategy to comply with BAL-003-1.

- On December 16, 2015, representatives of the CAISO held a telephone conference with a WECC representative to discuss how WECC would conduct a compliance audit under BAL-003-1, including how WECC would view transferred frequency response in any such audit. The CAISO sought WECC's interpretation of the meaning, purpose, and appropriate use of the transferred frequency response entry in the NERC Frequency Response Standard Forms 1 and 2 reports. WECC's representative committed to undertake additional research and follow-up with the CAISO. The CAISO provides documents marked CAISO 000001 – CAISO 000003 as part of Attachment C hereto in response to this question. These documents reflect that the telephone conference occurred as well as information exchanges leading up to the telephone conference.

- On February 8, 2016, representatives of the CAISO held a telephone conference with a WECC representative to discuss questions the CAISO

[13] Appendix K to the CAISO tariff, Part B 1.2.

compiled related to how WECC would conduct a compliance audit under BAL-003, including how WECC would view transferred frequency response in any such audit. The CAISO provided a description of its frequency response draft final proposal issued on February 4, 2016. In response to the CAISO's questions, WECC's representative provided informal guidance on how WECC may approach an audit of BAL-003, including its review of agreements for transferred frequency response. WECC's representative did not discuss the effect of the CAISO's proposal on NERC's analysis and risk assessment supporting its initial allocations of frequency response obligations to all balancing authorities. WECC's representative did not express any compliance concerns over the CAISO's use of transferred frequency response to meet the requirements of BAL-003-1 or any concerns with reliability impacts to the Western Interconnection. The CAISO provides documents marked CAISO 000004 – CAISO 000007 as part of Attachment C hereto in response to this question. These documents reflect that the telephone conference occurred as well as information exchanges leading up to the telephone conference.

- On March 18, 2016, representatives of the CAISO held a telephone conference with representatives of NERC and WECC to provide an overview of the CAISO's frequency response proposal. NERC and WECC's representatives did not discuss the effect of the CAISO's proposal on NERC's analysis and risk assessment supporting its initial allocations of frequency response obligations to all balancing authorities. During the conversation, the CAISO discussed its proposed strategy to procure transferred frequency response from neighboring balancing authorities as a short-term measure to comply with BAL-003-1. The CAISO explained that it would seek to enter into a contract for transferred frequency response in advance of the applicable BAL-003-1 compliance period and that any contract would need to provide for transferred frequency response for all disturbance events identified by NERC for reporting purposes under BAL-003-1. NERC and WECC's representatives did not express any compliance concerns over the CAISO's use of transferred frequency response to meet the requirements of BAL-003-1 or any concerns with reliability impacts to the Western Interconnection. The CAISO provides documents marked CAISO 000008 – CAISO 000023 as part of Attachment C hereto in response to this question. These documents reflect that the telephone conference occurred as well as information exchanges leading up to the telephone conference.[14]

[14] The CAISO notes that these documents suggest that the CAISO, NERC and WECC also held a telephone conversation in February 2016, but the entities rescheduled the telephone conversation and it occurred on March 18, 2016.

3. CAISO states in its transmittal letter that it proposes to procure transferred frequency response in advance of the BAL-003-1 compliance year; however, the proposed tariff provisions do not specify the timing of this procurement. Please explain the timing of CAISO's procurement of transferred frequency response and explain step-by-step how CAISO will adjust frequency response values on NERC Frequency Response Standard Forms 1 and 2. Would CAISO obtain transferred frequency response in advance of the compliance period or after-the-fact? If the latter, please explain the anticipated impact of an after-the-fact adjustment on frequency response performance during the year.

As explained in its April 21, 2016 tariff filing, the CAISO is planning to initiate a solicitation process to procure transferred frequency response through a competitive process upon the issuance of an order accepting the tariff provisions proposed in this proceeding. As indicated in the transmittal letter, the CAISO planned to commence a competitive solicitation for frequency response in June 2016 and file by October 2016, for the Commission's review and approval, any contract arising out of that solicitation. [15]

The CAISO initially planned to request that bidders submit responses to the CAISO's request for proposal by July 1, 2016.[16] Under the CAISO's anticipated process, the CAISO would have identified any successful bidders in mid-July. The CAISO proposed to negotiate and file an agreement during the third quarter of 2016. The CAISO has published a draft contract for transferred frequency response in the hopes of expediting the process of negotiating any changes with neighboring balancing authorities.[17] In addition, the CAISO will ask bidders to identify any issues or concerns with the draft agreement.

The CAISO still plans to undertake a competitive solicitation process once it receives an order accepting its tariff filing in this proceeding. If the CAISO receives an order by August 15, 2016, the CAISO will attempt to complete its solicitation process and negotiate any contracts by the end of the third quarter.

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[15] CAISO tariff filing in ER16-1483 dated April 21, 2016 at 24.

[16] A copy of the CAISO's request for proposals conditioned on FERC acceptance of the CAISO tariff revisions is available at the following website: http://www.caiso.com/Documents/TransferredFrequencyResponseConditionalRequestForProposal.pdf

[17] A copy of the CAISO's draft contract to procure transferred frequency response conditioned on FERC acceptance of the CAISO tariff revisions is available at the following website http://www.caiso.com/Documents/TransferredFrequencyResponseConditionalAgreement.pdf

The CAISO would then submit those contracts to the Commission for review and acceptance as soon as possible thereafter.

The CAISO plans to enter into a contract or contracts for transferred frequency response in advance of the compliance period under BAL-003-1 that begins December 1, 2016. Any contract for transferred frequency response would apply to all disturbance events identified by NERC as reportable events on NERC Frequency Response Standard Forms 1 and 2 during the reporting year of December 1, 2016 to November 30, 2017.

In terms of compliance with BAL-003-1, the CAISO would include an adjustment on NERC Frequency Response Standard Forms 1 and 2 associated with transferred frequency response to reflect an increase in the CAISO's performance as measured in MW/Hertz. The CAISO would increase this amount by the amount of transferred frequency response the CAISO procured for each event during a compliance year from another balancing authority or the authorized seller for that balancing authority. The providing balancing authority would decrease its reported performance in MW/Hz for each event by the amount of transferred frequency response the CAISO procured from that entity. Specifically, on the NERC Frequency Response Standard Form 1 adjustments tab, the CAISO would include a positive number in Column P that reflects the aggregate amount of transferred frequency response it procured pursuant to an approved contract or contracts.[18] Balancing authorities providing transferred frequency response to the CAISO would enter a negative number in column O, reflecting the amount they have provided to the CAISO. The CAISO would also incorporate these numbers on Frequency Response Standard Form 2. (*See* Frequency Response Standard Form 2, Form 1 summary tab, column M; *see also* Frequency Response Standard Form 2, Evaluation tab, lines 19 and 27).[19]

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[18] A copy of NERC Frequency Response Standard Form 1 is available at the following link: http://www.nerc.com/pa/Stand/Project%20200712%20Frequency%20Response%20DL/FRS_FORM_1%209_Multi_BA_Interconnection.xlsm.

[19] A copy of NERC Frequency Response Standard Form 2 is available at the following link: http://www.nerc.com/pa/Stand/Project%20200712%20Frequency%20Response%20DL/MyBA_FRS_Form2%209_MultiBAInterconnection.xlsm.

4. In its May 19 Answer, CAISO states that "transferred frequency response will not adjust a balancing authority's obligation itself." This statement appears to contradict the example presented in its April 21 filing, as well as the assertion that CAISO intends "to procure the right to adjust its performance obligation in connection with selected frequency response events for purposes of NERC compliance." Clarify whether CAISO proposes to place a claim on the frequency response performance of another balancing authority or other balancing authorities or, in contrast, if CAISO seeks to transfer all or a portion of the initially allocated frequency response obligation under BAL-003-1.

As explained in response to question 3, the CAISO is proposing to contract for the right to adjust its frequency response performance upward for reportable disturbance events under BAL-003-1 by the amount of transferred frequency it procures from other balancing authority areas. Pursuant to a contract between the CAISO and another balancing authority or its authorized seller, this adjustment would be the same for each reportable disturbance event. Any balancing authority area providing transferred frequency response to the CAISO pursuant to a contract would adjust its frequency response performance downward for reportable disturbance events under BAL-003-1 by the amount of transferred frequency it provides. Pursuant to the contract between the CAISO and another balancing authority or its authorized seller, this adjustment would be the same for each reportable disturbance event during the contract period. The contract for transferred frequency response would not actually change the balancing authorities' frequency response obligations as that term is defined by NERC. Rather, it would allow primary frequency response capability from one balancing authority area to meet the obligation of another balancing authority area. As such, the CAISO could "procure the right to adjust its performance obligation in connection with selected frequency response events for purposes of NERC compliance." NERC's allocation of each balancing authority area's frequency response obligation would remain unchanged. Instead, transferred frequency response would inform the recorded performance of each balancing authority in response to a disturbance event. NERC would use this recorded performance to assess whether a balancing authority met its annual frequency response measure. The following example clarifies how transferred frequency response would inform reported performance in response to a disturbance event.

Table 1 – Example of Transferred Frequency Response

Compliance Entity	Frequency Response Performance	Adjusted Frequency Response Performance
Balancing Authority 1	200 MW/0.1Hz	180 MW/0.1Hz
Balancing Authority 2	100 MW/0.1Hz	120 MW/0.1Hz

In this example, Balancing Authority 1 has contracted sell 20MW/0.1Hz of transferred frequency response to Balancing Authority 2 for each disturbance event during a compliance period. For purposes of the example, assume NERC has calculated the frequency response obligation under BAL-003-1 for Balancing Authority 1 as 150 MW/0.1 Hz and Balancing Authority 2 as 110 MW/0.1 Hz. Balancing Authority 1 has ample primary frequency response and still meets its obligation with a downward adjustment. Balancing Authority 2 relies on the upward adjustment to meet its frequency response obligation.

5. What, if any, analysis has CAISO performed to assess the potential impact of the proposed adjustments to CAISO's frequency response obligation on the Western Interconnection's overall frequency response requirement?

The CAISO has not performed any specific studies to quantify the impact that transferred frequency response may have on the overall Western Interconnection's frequency response requirement. However, transferred frequency response should not affect the Western Interconnection's overall frequency response capabilities. Transferred frequency response will not change the interconnection's frequency response obligation, will not change the actual frequency response provided in response to a disturbance event, and will not change the frequency response capabilities of the resources in the Western Interconnection. Instead, it will simply allow balancing authorities to contract for the right to enter a performance adjustment on NERC Frequency Response Standard Forms 1 and 2 and allow one balancing area to receive compensation from another balancing authority for supplying more frequency response than it is obligated to do under BAL-003-1.

The CAISO has performed three studies on the Western Interconnection's overall frequency response capability that reflect that Western Interconnection has a surplus of frequency response capability. These studies include the following:

- CAISO Frequency Response Study, 2011
  https://www.caiso.com/Documents/Report-FrequencyResponseStudy.pdf

- Overgeneration Assessment, Transmission Planning Process, 2014-2015
  http://www.caiso.com/Documents/Board-Approved2014-2015TransmissionPlan.pdf

- Frequency Response Study, Transmission Planning Process, 2015-2016
  http://www.caiso.com/Documents/Board-Approved2015-2016TransmissionPlan.pdf

For the 2011 frequency response study, the CAISO contracted with

General Electric Energy to evaluate frequency response capability if the CAISO and WECC were to experience large generation outages under a variety of spring and winter load conditions under high penetration of wind and solar generation. The study examined base case scenarios to evaluate the response to losing two Palo Verde units and the expected response within WECC. The base case scenario reflected the following expected results:

- Winter Low Load – High CAISO Wind: 968 MW/0.1Hz
- Weekend morning – High CAISO Wind and Solar: 1,440 MW/0.1Hz
- Winter Off-Peak – High Wind base case: 1,045 MW/0.1Hz
- Spring Peak – High Hydro and Wind Base Case: 1,663 MW/0.1Hz

Two additional cases focusing primarily on higher renewable penetration across WECC as a sensitivity analysis. These cases presented the following results:

- Winter Low Load – High WECC Wind Case: 1,024 MW/0.1Hz
- Weekend Morning – High WECC Wind and Solar: 1,158 MW/0.1Hz

Although this study focused on the frequency response performance of the CAISO, the modeled results reflect that overall that WECC's frequency response was more than sufficient to meet the requirements set by the BAL-003-1 standard.

Given the increasing levels of renewable penetration in the CAISO balancing authority, the CAISO has continued to study its system's ability to arrest frequency decline following a disturbance. In 2014, the CAISO's transmission planning studies added a frequency response model with projected estimates of frequency response capability across WECC. This model included the CAISO's balancing authority area's share of estimated capability to respond to losing two Palo Verde units. The modeled scenarios for the 2014-2015 and 2015-2016 transmission plan used power flow base cases that reflected production simulations for 2024 and 2025, respectively. While these studies assess future years, the results suggest that WECC has sufficient frequency response capability to meet its interconnection frequency response obligation.[20]

These study results informed phase 1 of the CAISO's frequency response initiative. Across the Western Interconnection, there is a surplus of frequency response capability. Based on these results, balancing authority areas have surplus primary frequency response they can provide without altering their

[20] *Cf* estimated interconnection frequency response obligation for WECC of 858 MW/01.Hz in 2016 identified in NERC's Informational Filing dated December 16, 2015, Frequency Response Annual Analysis, Docket No. RM13-11: http://elibrary.ferc.gov/idmws/common/opennat.asp?fileID=14073734

current operations. Accordingly, there are opportunities to explore contractual arrangements between balancing authority areas or their authorized sellers for transferred frequency response. These contractual arrangements should not affect the Western Interconnection meeting its overall frequency response requirements as contemplated by BAL-003-1.

6. CAISO states in its transmittal letter that through its proposed competitive solicitation process, it may either select a winning bidder or rely on manual commitments through exceptional dispatches. Explain how CAISO intends to estimate the cost of using exceptional dispatch to satisfy its frequency response obligation. When evaluating whether to secure transferred frequency response through a competitive solicitation process, please note any other short-term compliance methods, if any, CAISO considered. Also explain the efforts CAISO has made to evaluate if resources within its balancing authority are providing any frequency response.

In phase 1 of its frequency response initiative, the CAISO proposed short-term measures to ensure compliance with BAL-003-1. The CAISO proposed primary frequency response requirements for participating generators equipped with governors as well as entering into contracts with another balancing authorities or their authorized seller for transferred frequency response as an insurance mechanism.

The CAISO also proposed to undertake a competitive solicitation process for transferred frequency response and evaluate bids against an estimate of costs incurred if the CAISO were to employ interventions to ensure compliance with BAL-003-1 based on the cost of using its exceptional dispatch mechanism to ensure it does not enter into contractual agreements at an excessive cost. The CAISO stated that to the extent the estimated cost of using exceptional dispatches was less than a bid for transferred frequency response, the CAISO would reject the bid. In the CAISO's April 21, 2016 transmittal letter, the CAISO also stated that it would rely on manual commitments through exceptional dispatches as necessary to ensure it has sufficient frequency response capability on the system to meet the requirements of BAL-003-1. The CAISO corrects this earlier statement. The CAISO planned to use the estimated cost of exceptional dispatches as a cap for its procurement of transferred frequency response not to introduce new authority allowing for the use of exceptional dispatches to obtain frequency response capability as its April 21, 2016 letter stated. Based on subsequent review, the CAISO is concerned that its current tariff may not provide clear authority to use and settle exceptional dispatches for this purpose.

As a result, subsequent to the April 21 tariff filing, the CAISO has assessed alternative methods to evaluate the cost of procuring frequency response to benchmark proposals from potential providers of transferred

frequency response. The CAISO identified an additional means to evaluate bids for transferred frequency response, namely comparing the bid to the estimated cost of procuring additional regulation up service. This market mechanism would avoid starting-up additional generation beyond that committed by the market. The CAISO also has existing authority to procure additional regulation capacity. The CAISO notes, however, that procuring additional regulation capacity could increase the costs of regulation up in its market and may exacerbate over supply conditions during some operating intervals. Nevertheless, the CAISO believes this is a preferable method to assess the cost of any bid for transferred frequency response and, consistent with its answer filed on May 19, 2016, the CAISO is willing to revise proposed section 42.2.1 its tariff on compliance as follows (underlined language reflects additions):

> The CAISO shall select the bids that permit the CAISO to satisfy Applicable Reliability Criteria at lowest cost consistent with the seller's capability to provide Transferred Frequency Response and not to exceed the estimated cost of satisfying Applicable Reliability Criteria using additional procurement of Regulation Up.

To assess whether a bid for transferred frequency response exceeds the estimated cost of meeting the requirements of BAL-003-1 by procuring additional regulation up, the CAISO will perform an initial analysis to assess whether the CAISO believes it would be prudent to procure transferred frequency response to comply with BAL-003-1 for the upcoming compliance year. The CAISO would compare CAISO's actual frequency response performance after disturbance events in the two-year period prior to its estimated frequency response obligation for the upcoming compliance period. If there is a projected deficiency, then the CAISO will estimate the additional required frequency response needed, subject to a margin of error, so that the CAISO's performance by event exceeds the estimated frequency response obligation as well as to address the year-over-year observed deterioration of the CAISO's frequency response performance. This estimated deficiency in frequency response would serve as a procurement target for the transferred frequency response for each NERC identified disturbance event during the compliance year. The CAISO would then translate the estimated procurement target into an hourly regulation capacity requirement.

The CAISO will use a two-part approach to estimate the costs of procuring this additional capacity. The first step is to build a statistical model that estimates annual increased market costs based on the increased hourly procurement requirements for regulation up and additional contributing variables such as seasonality and natural gas prices. The second step is to validate the model through CAISO day-ahead markets reruns. The statistical model will estimate costs of procuring the frequency response capability by means of procuring

additional regulation for a small subset of recent market results. The CAISO will then compare the results of the model to the increased costs observed by rerunning CAISO's day ahead market (integrated forward market and residual unit commitment) with the additional regulation capacity requirement.

The results from the statistical model will depend on the relationship of the contributing variables to the costs associated with procuring increased quantities of regulation capacity. The CAISO will isolate the relationship between the dependent variable and the independent variables and evaluate various market variables such as time of day, day of the week, season of the year, natural gas prices, wind and solar production, demand, energy and congestion costs and make adjustments as needed. Finally, the CAISO will perform sensitivity analyses to identify how sensitive the models are to the input variables. The results should provide a range of outcomes that will permit the CAISO to assess the cost effectiveness of bids for transferred frequency response. If the CAISO enters into a contract for transferred frequency response, the CAISO will justify any contract-related costs it proposes to allocate to scheduling coordinators by comparing them to the potential costs of procuring additional regulation up capacity to meet the requirements of BAL-003-1. The CAISO will explain any analysis it undertakes to evaluate these costs as part of a filing seeking Commission acceptance of a contract for transferred frequency response.

With respect to other efforts the CAISO is taking to evaluate whether resources within its balancing authority are providing any frequency response, the CAISO has begun reaching out to scheduling coordinators for generating units with governor controls to inquire whether these generating units can comply with the CAISO's proposed tariff rules. The CAISO plans to send a request to scheduling coordinators to confirm in writing either that they can comply or will identify physical operational constraints that require the generator owner to inhibit the governor response of the unit. The CAISO will strive before December 1, 2016 to validate whether participating generators have set their governor parameters consistent with the requirements in this filing. An order accepting the CAISO's tariff filing by August 15, 2016 will provide time for the CAISO to confer with scheduling coordinators and inventory any plant level controls that may inhibit governor performance based on the criteria set forth in the tariff.

V. Effective Date

The CAISO requests that the Commission approve the tariff revisions contained in this filing effective August 15, 2016 to provide the CAISO sufficient time to implement them and conduct a solicitation for transferred frequency response prior to December 1, 2016, the date compliance with requirement 1 of Reliability Standard BAL-003-1 begins. The CAISO will commence a competitive solicitation for transferred frequency response as soon as possible after the

Commission accepts the proposed tariff revisions. If possible, the CAISO plans to file, for the Commission's review and acceptance, any contract arising out of that solicitation by October 2016. Accepting these tariff revisions by August 15, 2016 will provide sufficient regulatory certainty that the CAISO may timely proceed with the competitive solicitation process for transferred frequency response. In addition, an August 15, 2016 effective date will provide the CAISO with tariff authority to work with participating generators to ensure they have configured their governors consistent with the guidelines developed by NERC.

VI. Communications

Please provide communications regarding this filing to the following individuals, whose names should appear on the official service list established by the Commission with respect to this submittal:

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* Individuals designated for service pursuant to Rule 203(b)(3), 18 C.F.R. § 385.203(b)(3).

VII. Service

The CAISO has served copies of this transmittal letter, and all attachments, on the CPUC, the California Energy Commission, and all parties with effective scheduling coordinator service agreements under the CAISO tariff. In addition, the CAISO is posting this transmittal letter and all attachments on its public website.

VIII. Attachments

The following attachments, in addition to this transmittal letter, support the instant filing:

Attachment A	Clean tariff record with proposed changes to section 42.2.1 to comply with requirements of Electronic Tariff Filings.

Attachment A	Marked tariff record with proposed changes to section 42.2.1 to comply with requirements of Electronic Tariff Filings.
Attachment C	Records of communications between representative of CAISO and representatives of NERC and WECC (CAISO 000001-CAISO 000023).

IX. Conclusion

The CAISO requests that the Commission accept the proposed tariff revisions with the modifications the CAISO agree to make in this response. These revisions will increase the CAISO's tools to comply with NERC Reliability standard BAL-003-1. In order to complete a solicitation and contracting process for transferred frequency response advance December 1, 2016 – the date compliance with Requirement 1 of BAL-003-1 begins - the CAISO requests an order no later than August 15, 2016.

Please contact the undersigned if you have any questions regarding this matter.

Dated: July 18, 2016

Respectfully submitted,

/s/ Andrew Ulmer
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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 18th day of July, 2016.

/s/ Grace Clark
Grace Clark

Attachment A – Clean Tariff Records

Response to Deficiency Letter Regarding Frequency Response Requirements

California Independent System Operator Corporation

4.6.4 Identification Of Generating Units

Each Participating Generator shall provide data identifying each of its Generating Units and such information regarding the capacity and the operating characteristics of the Generating Unit as may be reasonably requested from time to time by the CAISO. Each Participating Generator shall provide information on its governor setting and certify that it has not inhibited the real power response of any Generating Unit by any means that would override the governor response except as necessary to address physical operational constraints for reasons that include ambient temperature limitations, outages of mechanical equipment or regulatory considerations. In the event there is a need to inhibit the real power response of any Generating Unit, the Participating Generators shall provide a written description of this limitation with its certification. All information provided to the CAISO regarding the operational and technical constraints in the Master File shall be accurate and actually based on physical characteristics of the resources except for the Pump Ramping Conversion Factor, which is configurable.

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4.6.5 NERC and WECC Requirements

4.6.5.1 Participating Generator Performance Standard

Participating Generators shall, in relation to each of their Generating Units, meet all Applicable Reliability Criteria, including any standards regarding governor response capabilities, use of power system stabilizers, voltage control capabilities and hourly Energy delivery.

Participating Generators with governor controls that are synchronized to the CAISO Controlled Grid must respond immediately and automatically outside a deadband in proportion to frequency deviations through the action of a governor to help restore frequency to the scheduled value. Participating Generators shall set the governor droop for each Generating Unit with governor controls no higher than 4 percent droop for combustion turbines and 5 percent droop for other technology types; with a deadband no larger than +/- 0.036 Hz. Participating Generators will not inhibit the real power response of their Generating Units with governor controls by any means that would override the governor response except as necessary to address physical operational constraints for reasons that include ambient temperature limitations,

outages of mechanical equipment or regulatory considerations. For each Generating Unit with governor controls, Participating Generators shall coordinate all plant control systems, locally or remotely controlled, so that they include frequency bias to ensure that each Generating Unit can respond immediately and automatically in proportion to frequency deviations to help restore frequency to the scheduled value. Unless otherwise agreed by the CAISO, a Generating Unit must be capable of operating at capacity registered in the CAISO Controlled Grid interconnection data, and shall follow the voltage schedules issued by the PTO or, from time to time, the CAISO.

4.6.5.2 [Not Used]

4.6.5.3 [Not Used]

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8.2.3 Quantities Of Ancillary Services Required; Use Of AS Regions

For each of the Ancillary Services, the CAISO shall determine the quantity and location of the Ancillary Service which is required using Ancillary Service Regions as described in Section 8.3.3. For each of the Ancillary Services, the CAISO shall determine the required locational dispersion in accordance with CAISO Controlled Grid reliability requirements. The Ancillary Services provided must be under the direct Dispatch control of the CAISO on a Real-Time Dispatch Interval basis. The CAISO shall determine the quantities it requires as provided for in Sections 8.2.3.1 to 8.2.3.3.

8.2.3.1 Regulation Service

The CAISO shall maintain sufficient resources immediately responsive to the CAISO's EMS control in order to provide sufficient Regulation service to allow the CAISO Balancing Authority Area to meet NERC and WECC reliability standards and any requirements of the NRC by continuously balancing resources to meet deviations between actual and scheduled Demand and to maintain Interchange Schedules. The quantity of Regulation Down and Regulation Up capacity needed for each Settlement Period of the Day-Ahead Market and in each fifteen (15) minute period in Real-Time shall be determined by the CAISO as a percentage of the applicable CAISO Forecast Of CAISO Demand for the Day-Ahead and Real-Time Markets. In HASP, the amount of advisory Regulation from Dynamic System Resources required for each Settlement Period in the next Trading Hour is also determined based on the CAISO Forecast Of

CAISO Demand. The advisory awards of Regulation from Dynamic System Resources in HASP are not binding and are re-optimized through the FMM and RTD processes in the Real-Time Market. The CAISO's determination is based upon its need to meet the NERC and WECC reliability standards and any requirements of the NRC. The CAISO will take into account the speed and accuracy of regulation resources in its determination of Regulation requirements, including as it qualifies self-provided Regulation. Upon request of a Scheduling Coordinator, the CAISO will share with the Scheduling Coordinator its reasoning and any related data used to make the determination of whether the Scheduling Coordinator's self-provided Regulation capacity meets its regulation obligation.

The requirement for Regulation Down or Regulation Up needed for each Settlement Period of the Day-Ahead Market and in each fifteen (15) minute period in Real-Time shall each be accompanied by a requirement for Mileage as determined by the CAISO. The CAISO shall determine the Mileage requirements in any Settlement Period based on Regulation capacity requirements as well as the Bid-in Regulation capacity for that Settlement Period. Subject to operator adjustment, the Mileage requirement for either Regulation Up or Regulation Down will reflect the minimum of (a) the product of the respective Regulation capacity requirement and the System Mileage Multiplier; (b) the average Instructed Mileage for the applicable Trading Hour from the prior seven (7) days; or (c) the product of each resource's resource specific Mileage multiplier(s) and its Bid-in Regulation capacity summed for all resources.

The CAISO will publish on OASIS the estimated quantity, or the percentage used to determine the estimated quantity, of Regulation Reserves required for each hour of the Day-Ahead Market and in each fifteen (15) minute period in Real-Time for the Trading Day. The CAISO will publish on OASIS the Mileage requirements for each hour of the Day-Ahead Market and each fifteen (15) minute period in Real-Time for the Trading Day. The CAISO will also publish on OASIS the average Instructed Mileage from the prior seven (7) days for each hour of a Trading Day no later than seven (7) calendar days after the applicable Trading Day.

8.2.3.1.1 Regulation Performance

The CAISO will measure the accuracy of a resource's response to CAISO EMS signals. The CAISO will sum a resource's Automatic Generation Control set points for each four (4) second Regulation interval every fifteen (15) minutes and then sum the total deviations from the Automatic Generation Control set

point for each four (4) second regulation interval during that fifteen (15) minute period. The CAISO will divide the sum of the resource's Automatic Generation Control set points less the sum of the resource's total deviations by the sum of the resource's Automatic Generation Control set points. The CAISO will apply the resulting percentage to a resource's Instructed Mileage to calculate the resource's Regulation performance payments. The CAISO will adjust a resource's Automatic Generation Control set point deviations when the CAISO EMS signal sent to a resource changes direction and the resource under-responds in the prior interval. The adjusted Automatic Generation Control set point will reflect the Automatic Generation Control set point to which the EMS signal directed the resource to move in the prior interval.

The CAISO will use a resource's Historic Regulation Performance Accuracy and certified ramp capability to determine a resource-specific expected Mileage for purposes of awarding Regulation Up and Regulation Down capacity. The CAISO will calculate *a* separate Historic Regulation Performance Accuracy for both Regulation Up and Regulation Down.

A minimum performance threshold of twenty-five (25) percent will apply for a resource to offer Regulation Up and Regulation Down capacity. If a resource's measured accuracy, based on a weighted average of fifteen (15) minute intervals during a calendar month using Instructed Mileage as the weight, is less than twenty-five (25) percent for Regulation Up or Regulation Down, the resource must re-certify to provide the respective service within ninety (90) days from the date the CAISO provides notice to the resource's Scheduling Coordinator of the resource's failure to meet the minimum performance threshold. In the event of lost accuracy data, the CAISO will not use data from these intervals to calculate the resource's Historic Regulation Performance Accuracy or to assess the minimum performance threshold.

8.2.3.2 Spinning and Non-Spinning Reserves

The CAISO shall maintain minimum contingency Operating Reserve made up of Spinning Reserve and Non-Spinning Reserve in accordance with NERC and WECC reliability standards, including any requirements of the NRC. The CAISO from time to time may determine to use more stringent criteria.

8.2.3.3 Voltage Support

The CAISO shall determine on an hourly basis for each day the quantity and location of Voltage Support required to maintain voltage levels and reactive margins within NERC and WECC reliability standards, and any requirements of the NRC using a power flow study based on the quantity and location of scheduled Demand. The PTO or, from time to time, the CAISO shall issue daily voltage schedules (Dispatch Instructions) to Participating Generators, Participating TOs and UDCs, which are required to be maintained for CAISO Controlled Grid reliability. All other Generating Units shall comply with the power factor requirements set forth in contractual arrangements in effect on the CAISO Operations Date, or, if no such contractual arrangements exist and the Generating Unit exists within the system of a Participating TO, the power factor requirements applicable under the Participating TO's TO Tariff or other tariff on file with the FERC.

All Participating Generators that operate Asynchronous Generating Facilities subject to the Large Generator Interconnection Agreement set forth in Appendix BB or CC shall maintain the CAISO specified voltage schedule if required under Appendix H of the Large Generator Interconnection Agreement, while operating within the power factor range specified in their interconnection agreements. For all other Generating Units, Participating Generators shall maintain the CAISO specified voltage schedule at the Generating Unit terminals to the extent possible, while operating within the power factor range specified in their interconnection agreements, or, for Regulatory Must-Take Generation with Existing QF Contracts or Amended QF Contracts, Regulatory Must-Run Generation and Reliability Must-Run Generation, consistent with existing obligations. For Generating Units that do not operate under one of these agreements, the minimum power factor range will be within a band of 0.90 lag (producing VARs) and 0.95 lead (absorbing VARs) power factors. Participating Generators with Generating Units existing at the CAISO Operations Date that are unable to meet this operating power factor requirement may apply to the CAISO for an exemption. Prior to granting such an exemption, the CAISO shall require the Participating TO, UDC or other utility to whose system the relevant Generating Units are interconnected to notify it of the existing contractual requirements for Voltage Support established prior to the CAISO Operations Date for such Generating Units. Such requirements may be contained in CPUC Electric Rule 21 or the Interconnection Agreement with the Participating TO, UDC or other utility. The CAISO shall not grant any exemption under this Section from such existing contractual requirements. The CAISO shall be entitled

to instruct Participating Generators to operate their Generating Units at specified points within their power factor ranges. Participating Generators shall receive no compensation for operating within these specified ranges.

If the CAISO requires additional Voltage Support, it shall procure this either through Reliability Must-Run Contracts or, if no other more economic sources are available**,** by instructing a Generating Unit to move its MVar output outside its mandatory range. Only if the Generating Unit must reduce its MW output in order to comply with such an instruction will it be eligible to recover its opportunity cost in accordance with Section 11.10.1.4.

All Loads directly connected to the CAISO Controlled Grid shall maintain reactive flow at grid interface points within a specified power factor band of 0.97 lag to 0.99 lead. Loads shall not be compensated for the service of maintaining the power factor at required levels within the bandwidth. A UDC interconnecting with the CAISO Controlled Grid at any point other than a Scheduling Point shall be subject to the same power factor requirement.

The CAISO will establish voltage control standards with UDCs and the operators of other Balancing Authority Areas and will enter into operational agreements providing for the coordination of actions in the event of a voltage problem occurring.

8.2.3.4 Black Start Capability

The CAISO shall determine the amount and location of Black Start Generation it requires through a system restoration plan that meets the requirements of Applicable Reliability Criteria. In making this determination, the CAISO shall consult with Participating Transmission Owners.

Participating Transmission Owners with their own system restoration plans that include transmission lines and associated facilities that are part of the CAISO Controlled Grid shall upon the request of the CAISO provide the CAISO with these system restoration plans. The CAISO shall consider Participating Transmission Owners' system restoration plans in developing a system restoration plan for the CAISO system and may identify Black Start Generation needs for the CAISO system not identified in Participating Transmission Owners' system restoration plans.

Scheduling Coordinators shall notify the CAISO of their Load restoration time requirements for any Loads that provide emergency services. This notice shall include the MW amount of Load, required restoration time, and associated Node on the CAISO Controlled Grid. For purposes of preparing system restoration plans, the CAISO shall consult with applicable Participating Transmission Owners concerning any Load restoration information provided by Scheduling Coordinators.

8.2.3.4.1 Black Start Units

The CAISO will select Black Start capacity in locations where adequate transmission capacity can be made readily available (assuming no transmission damage) to connect the Black Start Generating Unit to the station service bus of a Generating Unit designated by the CAISO. Black Start Generating Units:

(a) must be located in the CAISO Balancing Authority Area;

(b) may be located anywhere in the CAISO Balancing Authority Area provided that the Black Start resource is capable of meeting the CAISO performance requirements for starting and interconnection to the CAISO Controlled Grid; but

(c) must be dispersed throughout the CAISO Balancing Authority Area.

8.2.3.4.2 Black Start Services

(a) All Participating Generators with Black Start Generating Units must satisfy technical requirements specified by the CAISO.

(b) The CAISO shall from time to time undertake performance tests, with or without prior notification.

(c) The CAISO shall have the sole right to determine when the operation of Black Start Generating Units is required to respond to conditions on the CAISO Controlled Grid.

(d) If the CAISO has intervened in the market for Energy and/or Ancillary Services pursuant to Section 7.7.4, the price paid by the CAISO for Black Start services

shall be sufficient to permit the relevant Participating Generator to recover its costs over the period that it is directed to operate by the CAISO.

(e) If a Black Start Generating Unit fails to achieve a Black Start when called upon by the CAISO, or fails to pass a performance test administered by the CAISO, the Market Participant that has contracted to supply Black Start service from the Generating Unit shall re-pay to the CAISO any reserve payment(s) that it has received since the administration of the last performance test or the last occasion upon which it successfully achieved a Black Start when called upon by the CAISO, whichever is the shorter period.

8.2.3.5 Ancillary Service Substitution

The CAISO, whenever possible, will increase its purchases of an Ancillary Service that can substitute for another Ancillary Service, when doing so is expected to reduce its total cost of procuring Ancillary Services while meeting reliability requirements. Prior to making these purchases, the CAISO will first substitute Self-Provided Ancillary Services for another Ancillary Service consistent with the principles set forth in this Section. The CAISO will make such adjustments in accordance with the following principles:

(a) The Regulation requirement must be satisfied only by Regulation Bids for resources qualified to provide Regulation;

(b) Additional Regulation Up capacity can be used to satisfy requirements for Spinning Reserve, or Non-Spinning Reserve;

(c) Regulation Up and Spinning Reserve requirements must be collectively satisfied by the combination of Regulation Up and Spinning Reserve Bids. Spinning Reserve and Regulation may be provided as separate services from the same resource, provided that the sum of Spinning Reserve and Regulation Up provided is not greater than the maximum Ramp Rate of the resource (MW/minute) times ten (10);

(d) Additional Regulation Up and Spinning Reserve capacity can be used to satisfy requirements for Non-Spinning Reserve.

(e) Regulation Up, Spinning Reserve, and Non-Spinning Reserve requirements must be collectively satisfied by the combination of Regulation Up, Spinning Reserve and Non-Spinning Reserve Bids;

(f) Total MW purchased from the Regulation Up, Spinning Reserve, and Non-Spinning Reserve markets will not be changed by this Section 8.2.3.5; and

(g) Regulation Energy resulting from Regulation that substituted for another Ancillary Service continues to be treated as Regulation Energy regardless of what service it substituted.

* * * *

11.34 Invoice Charges for Transferred Frequency Response

The CAISO will invoice charges as specified in this Section 11.34 for all legitimate costs invoiced to the CAISO by a Balancing Authority under a contract for Transferred Frequency Response.

* * * *

11.34.1 Charge Allocation Basis

Each Scheduling Coordinator's responsibility for the Transferred Frequency Response charges shall be allocated based on the most recent Scheduling Coordinator's NERC/WECC Metered Demand determined under Section 11.20.4.

* * * *

11.34.2 Calculation and Assessment

(a) Within five (5) Business Days after receiving an invoice for legitimate Transferred Frequency Response costs, the CAISO shall issue a market notice setting forth the Transferred Frequency Response rate, which shall be calculated using the total charges invoiced to the CAISO divided by the most recent total NERC/WECC Metered Demand determined under Section 11.20.4.

(b) The CAISO shall calculate the Transferred Frequency Response charges allocable to each Scheduling Coordinator by using the Transferred Frequency Response rate determined under Section 11.34.2(a), multiplied by the most recent NERC/WECC Metered Demand for that Scheduling Coordinator determined under Section 11.20.4.

(c) Within 10 Business Days after receiving the invoice for legitimate Transferred Frequency Response costs, the CAISO shall issue an invoice to each Scheduling Coordinator for its allocable share of the costs determined under Section 11.34.2(b).

(d) Scheduling Coordinators shall make timely payment to the CAISO within fifteen (15) Business Days of the date the invoices were issued pursuant to Section 11.34.2(c).

* * * *

11.34.3 Responsibility to Pay Charges

(a) Each Scheduling Coordinator shall be obligated to pay the CAISO the charges the Scheduling Coordinator is invoiced by the CAISO for Transferred Frequency Response.

(b) The CAISO's calculation of collateral requirements and other credit requirements under the CAISO Tariff shall include an adjustment for the Scheduling Coordinator's allocable share of the charge for transferred Frequency Response, if applicable, except that the Estimated Aggregated Liability calculated for the Scheduling Coordinator shall not include extrapolated amounts for the charge under Section 12.1.3.1.1(d).

* * * *

11.34.4 Validation

(a) Each Scheduling Coordinator shall have the opportunity to review the terms of the invoice for the charge for Transferred Frequency Response and shall be deemed to have validated that invoice unless it raises a dispute within five (5) Business Days of the date of issuance.

(b) Once validated, an invoice for the charge under this Section shall be binding on the Scheduling Coordinator to which it relates.

* * * *

11.34.5 Disputes and Corrections

(a) Scheduling Coordinators shall be prohibited from disputing any charge invoiced under this Section, except on grounds that an error in the invoice is due to a mere typographical or other ministerial error by the CAISO.

(b) Any dispute of an invoice on the grounds specified in Section 11.34.5 (a) shall be submitted and processed in accordance with the dispute procedure related to the charges for Transferred Frequency Response set forth in the Business Practice Manual,

(c) If the CAISO determines that an invoice contains a typographical or other ministerial error, and the resolution of the dispute makes correction necessary, the CAISO will issue a corrected invoice within 15 Business Days of the date the initial invoice was issued.

(d) Each Scheduling Coordinator that receives an invoice for a charge under this Section shall pay any net debit and shall be entitled to receive any net credit specified on a corrected invoice. Payment of any net debit shall be due within 10 business days of the date the corrected invoice was issued.

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11.34.6 Payment Default

(a) In the event a Scheduling Coordinator defaults on the payment of all or any portion of the charge invoiced under this Section, the CAISO shall have the right under Section 11.29.13.3 to enforce the financial security provided by the defaulting Scheduling Coordinator, and to take any such other action under Sections 11.29.12 or 11.29.13, as necessary, to obtain payment for the default amount.

(b) To the extent all or any portion of the default amount remains unpaid, the CAISO:

(1) may at its discretion issue an invoice for the unpaid portion of the charge invoiced under this Section; and

(2) if such invoice is issued for a payment default, shall allocate responsibility for the unpaid amount to Scheduling Coordinators using the same allocation basis for the charge as identified in section 11.34.1, but excluding the CAISO Debtor that has not paid the payment default amount, based on the most recent data of the allocation basis for the charge.

(c) Scheduling Coordinators shall make timely payment to the CAISO within 15 Business Days of the date the default invoices were issued pursuant to Section 11.34.6.

* * * *

11.34.7 Modification to Schedule.

Notwithstanding the provisions in Section 11.34, the CAISO may issue a Market Notice informing Scheduling Coordinators that the CAISO will implement a temporary modification to the billing and payment schedule for the charge and setting forth the reasons for such modification, in which case the modified schedule described in that Market Notice shall govern.

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34.10 Dispatch Of Energy From Ancillary Services

The CAISO may issue Dispatch Instructions to Participating Generators, Participating Loads, Proxy Demand Resources, (via communication with the Scheduling Coordinators of Demand Response Providers) System Units and System Resources contracted to provide Ancillary Services (either procured through the CAISO Markets, Self-Provided by Scheduling Coordinators, or dispatched in accordance with the RMR Contract) for the Supply of Energy. During normal operating conditions, the CAISO may Dispatch those Participating Generators, Participating Loads, Proxy Demand Resources, System Units and System Resources that have contracted to provide Spinning and Non-Spinning Reserve, except for

those reserves designated as Contingency Only, in conjunction with the normal Dispatch of Energy. Contingency Only reserves are Operating Reserve capacity that have been designated, either by the Scheduling Coordinator or the CAISO, as available to supply Energy in the Real-Time only in the event of the occurrence of an unplanned Outage, a Contingency or an imminent or actual System Emergency. During normal operating conditions, the CAISO may also elect to designate any reserve not previously identified as Contingency Only by Scheduling Coordinator as Contingency Only reserves. In the event of an unplanned Outage, a Contingency or a threatened or actual System Emergency, the CAISO may dispatch Contingency Only reserves. If Contingency Only reserves are dispatched through the RTCD, which as described in Section 34.5.2 only Dispatches in the event of a Contingency, such Dispatch and pricing will be based on the original Energy Bids. If Contingency Only reserves are dispatched in response to a System Emergency that has occurred because the CAISO has run out of Economic Bids when no Contingency event has occurred, the RTED will Dispatch such Contingency Only reserves using maximum Bid prices as provided in Section 39.6.1 as the Energy Bids for such reserves and will set prices accordingly. If a Participating Generator, Participating Load, System Unit or System Resource that is supplying Operating Reserve is dispatched to provide Energy, the CAISO shall replace the Operating Reserve as necessary to maintain NERC and WECC reliability standards, including any requirements of the NRC. If the CAISO uses Operating Reserve to meet Real-Time Energy requirements, and if the CAISO needs Operating Reserves to satisfy NERC and WECC reliability standards, including any requirements of the NRC, the CAISO shall restore the Operating Reserves to the extent necessary to meet NERC and WECC reliability standards, including any requirements of the NRC through either the procurement of additional Operating Reserve in the RTM or the Dispatch of other Energy Bids in SCED to allow the resources that were providing Energy from the Operating Reserve to return to their Dispatch Operating Point. The Energy Bid Curve is not used by the AGC system when Dispatching Energy from Regulation. For Regulation Up capacity, the upper portion of the resource capacity from its Regulation Limit is allocated to Regulation regardless of its Energy Bid Curve. For a resource providing Regulation Up or Operating Reserves the remaining Energy Bid Curve shall be allocated to any RTM AS Awards in the following order from higher to lower capacity where applicable: (a) Spinning Reserve; and (b) Non-Spinning Reserve. For resources providing Regulation Up, the applicable upper Regulation Limit shall be

used as the basis of allocation if it is lower than the upper portion of the Energy Bid Curve. The remaining portion of the Energy Bid Curve, if there is any, shall constitute a Bid for RTM Energy. For Regulation Down capacity, the lower portion of the resource capacity from its applicable Regulation Limit is allocated to Regulation regardless of its Energy Bid Curve.

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42 Adequacy Of Facilities To Meet Applicable Reliability Criteria

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42.2 Transferred Frequency Response

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42.2.1 Procurement of Transferred Frequency Response

If the CAISO concludes that it may be unable to provide sufficient frequency response consistent with Applicable Reliability Criteria, the CAISO may, acting in accordance with Good Utility Practice, negotiate contracts for Transferred Frequency Response. The CAISO will solicit bids for contracts for Transferred Frequency Response. The CAISO shall select the bids that permit the CAISO to satisfy Applicable Reliability Criteria at lowest cost consistent with the seller's capability to provide Transferred Frequency Response and not to exceed the estimated cost of satisfying Applicable Reliability Criteria using additional procurement of Regulation Up.

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42.2.2 Allocation of Transferred Frequency Response Costs Incurred by CAISO

The costs incurred by the CAISO for any contract for Transferred Frequency Response entered into under Section 42.2.1 are recovered from Scheduling Coordinators pursuant to Section 11.34.

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Transferred Frequency Response

A frequency response performance obligation under Applicable Reliability Criteria expressed in MW/0.1 Hz that a receiving Balancing Authority may acquire under an arrangement whereby another Balancing Authority increases its performance obligation by the same amount, or that a delivering Balancing Authority may provide under an arrangement whereby another Balancing Authority reduces its performance obligation by the same amount. Transferred Frequency Response is a compliance instrument and there is no exchange of physical services between Balancing Authorities.

Transferred Frequency Response is reported on applicable NERC/WECC forms, and applied consistently to each reported frequency disturbance event. On these forms, the delivering Balancing Authority increases its performance obligation and the receiving Balancing Authority decreases its performance obligation by the same amount.

Transferred Frequency Response may reflect an aggregate amount from multiple contracts.

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Appendix K Ancillary Service Requirements Protocol (ASRP)

PART A
CERTIFICATION FOR REGULATION

A 1 An Ancillary Service Provider wishing to provide Regulation as an Ancillary Service from a resource whether pursuant to a CAISO award or as part of a self-provision arrangement must meet the following operating characteristics and technical requirements in order to be certified by the CAISO to provide Regulation service unless granted a temporary exemption by the CAISO in accordance with criteria which the CAISO shall publish on the CAISO Website;

A 1.1 **Operating Characteristics**

A 1.1.1 the rated capacity of the resource must be 500 KW or greater (i.e. the resource must be capable of providing at least 500 KW of Regulation) unless the resource is participating in an aggregation arrangement approved by the CAISO;

A 1.1.2 the maximum amount of Regulation to be offered must be reached within a period of ten (10) minutes;

A 1.1.3 the resource must be able to increase or decrease real power levels immediately in response to signals from the CAISO's EMS control;

A 1.1.4 Regulation capacity offered by a resource must be dispatchable on a continuous basis for at least sixty (60) minutes in the Day Ahead Market and at least thirty (30) minutes in the Real Time Market after issuance of the Dispatch Instruction, including (if necessary) attaining this capability using Regulation Energy Management. The CAISO will measure continuous Energy from the time a resource reaches its award capacity. Scheduling Coordinators for Non-Generator Resources located within the CAISO Balancing Authority Area that require Energy from the Real-Time Market to offer their full capacity as Regulation Energy Management may request the use of Regulation Energy Management as described in Section 8.4.1.2. The Scheduling Coordinators for a resource using Regulation Energy Management may submit a Regulation Bid for capacity (MW) of up to four (4) times the maximum Energy (MWh) the resource can generate or curtail for fifteen (15) minutes after issuance of the Dispatch Instruction.

A 1.1.5 the resource’s measured accuracy in responding to the CAISO’s EMS signal must meet or exceed twenty-five (25) percent.

A 1.2 **Technical Requirements**

A 1.2.1 **Control**

A 1.2.1.1 a direct, digital, unfiltered control signal generated from the CAISO EMS through a standard CAISO direct communication and direct control system, must meet the minimum performance standards for communications and control which will be developed and posted by the CAISO on the CAISO Website;

A 1.2.1.2 the resource response (in MW) to a control signal must meet the minimum performance standards for control and response which will be developed and posted by the CAISO on the CAISO Website. As indicated by the resource response (in MW), the resource must respond immediately, without manual operator intervention, to control signals and must sustain its specified Ramp Rate, within specified Regulation Limits, for each minute of control response (MW/minute);

A 1.2.1.3 Ancillary Service Providers for Non-Generator Resources may define a Ramp Rate for operating as Generation and a Ramp Rate for operating as Load, respectively.

A 1.2.2 **Monitoring:**

the resource must have a standard CAISO direct communication and direct control system to send signals to the CAISO EMS to dynamically monitor, at a minimum the following:

A 1.2.2.1 actual real power level (MW);

A 1.2.2.2 high limit, low limit and rate limit values as selected by the resource operator; and

A 1.2.2.3 in-service status indication confirming availability of Regulation service.

A 1.2.2.4 Ancillary Service Providers for Non-Generator Resources (whether or not the resource uses Regulation Energy Management) shall provide CAISO the following additional telemetry data:

- Resource Ramp Rate when operating as Generation (MW/min);
- Resource Ramp Rate when operating as Load (MW/min);
- The maximum instantaneous ability to produce or consume Energy in MW; and
- The maximum capability to provide Energy as expressed in MWh over a fifteen (15) minute interval.

A 1.2.3 **Voice Communications:**

CAISO approved communication must be in place between the CAISO Control Center and the operator controlling the resource.

A 2 An Ancillary Service Provider wishing to be considered for certification for Regulation service by the CAISO must make a written request to the CAISO, giving details of the technical capability of the resource concerned and identifying the Scheduling Coordinator through whom the Ancillary Service Provider intends to offer Regulation service. The Ancillary Service Provider shall at the same time send a copy of its request to that Scheduling Coordinator. Technical review request forms will be available from the CAISO.

A 3 No later than one week after receipt of the Ancillary Service Provider's request, the CAISO shall provide the Ancillary Service Provider with a listing of required interface equipment for Regulation, including a standard CAISO direct communication and direct control system. The CAISO shall send a copy of the listing to the resource's Scheduling Coordinator.

A 4 The Ancillary Service Provider may propose alternatives that it believes may provide an equivalent level of communication and control for consideration by the CAISO. Such proposals shall be in writing and contain sufficient detail for the CAISO to make a determination of suitability. The CAISO may request additional information, if required, to assist in its evaluation of the proposal.

A 5 The CAISO shall respond by accepting the alternative proposal, rejecting the alternative proposal, or suggesting modifications to the alternative proposal. Such acceptance, rejection, or suggested revision must be provided not later than six (6) weeks after the proposal is received by the CAISO. The Ancillary Service Provider and the CAISO shall keep the Scheduling Coordinator informed of this process by each sending to the Scheduling Coordinator a copy of any written communication which it sends to the other.

A 6 Upon agreement as to any alternative method of communication and control to be used by the Ancillary Service Provider, the CAISO shall provisionally approve the proposal in writing providing a copy to the Ancillary Service Provider's Scheduling Coordinator at the same time. If agreed by the CAISO, the Ancillary Service Provider may then proceed to procure and install the equipment and make arrangements for the required communication and control.

A 7 Design, acquisition, and installation of the CAISO-approved communication and control equipment shall be under the control of the CAISO. The CAISO shall bear no cost responsibility or functional responsibility for such equipment, except that the CAISO shall arrange for and monitor the maintenance of the communication and control system at the Ancillary Service Provider's expense, unless otherwise agreed by the CAISO and the Ancillary Service Provider. The CAISO shall be responsible for the design, acquisition and installation of any necessary modifications to the CAISO EMS at its own cost.

A 8 The CAISO, in cooperation with the Ancillary Service Provider shall perform testing of the communication and control equipment to ensure that the communication and control system performs to meet the CAISO requirements.

A 9 When the CAISO is satisfied that the communication and control systems meet the CAISO's requirements, the Ancillary Service Provider shall request in writing that the CAISO conduct a certification test with a suggested primary date and time and at least two (2) alternative dates and times. The CAISO shall, within two (2) Business Days of receipt of the Ancillary Service Provider's request, accept a proposed time if possible or suggest at least three (3) alternatives to the Ancillary Service Provider. If the CAISO responds by suggesting alternatives, the Ancillary Service Provider shall, within two (2) Business Days of receipt of the CAISO's response, respond in turn by accepting a proposed alternative if possible or suggesting at least three (3) alternatives, and this procedure shall continue until agreement is reached on the date and time of the test. The Generator shall inform its Scheduling Coordinator of the agreed date and time of the test.

A 10 Testing shall be performed by the CAISO, with the cooperation of the Ancillary Service Provider. Such tests shall include, but not be limited to, the following:

(a) confirmation of control communication path performance;

(b) confirmation of voice circuit for receipt of Dispatch Instructions;

(c) confirmation of the resource's control performance; and

(d) confirmation of the CAISO EMS control to include changing the resource operating level over the range of Regulation proposed at different set points, from minimum to maximum, and at different rates of change from the minimum to the maximum permitted by the design of the resource.

A 10.1 Testing for Non-Generator Resources requesting the use of Regulation Energy Management shall include a market simulation as described in the CAISO's Operating Procedures.

A 11 Upon successful completion of the test, the CAISO shall certify the resource as being permitted to provide Regulation as an Ancillary Service Provider and shall provide a copy of the certificate to the Scheduling Coordinator at the same time. The Scheduling Coordinator shall request the CAISO to update its database to reflect the ability of the resource to provide Regulation.

A 12 The Scheduling Coordinator may submit Bids for Regulation service from the certified resource into the CAISO Markets starting with the Day-Ahead Market for the hour ending 0100 on the second Trading Day after the CAISO's database reflects the resource's certificate.

A 13 The certification to provide Regulation shall remain in force until:

(a) withdrawn by the Scheduling Coordinator or the Ancillary Service Provider by written notice to the CAISO to take effect at the time notified in the notice, which must be the end of a Trading Day; or

(b) if the resource obtained CAISO certification on the basis of a prior communication and control technology, until revoked by the CAISO for failure to comply with the requirement set forth in A 13.1 that the resource install a CAISO-specified standard CAISO direct communication and direct control system (unless exempted by the CAISO).

A 13.1 Unless exempted by the CAISO, if the resource obtained CAISO certification on the basis of a prior communication and control technology, the CAISO shall provide written notice to the Ancillary Service Provider of the Ancillary Service Provider's obligation to install a CAISO-specified standard direct communication and direct control system along with a required date for said work to be completed as mutually agreed upon by the CAISO and the Ancillary Service Provider. Failure to meet the completion date shall be grounds for the revocation of certification, provided that the CAISO must provide the Ancillary Service Provider with at least ninety (90) days advance notice of the proposed revocation.

A 14 The certification may be revoked by the CAISO only under provisions of the CAISO Tariff.

PART B
CERTIFICATION FOR SPINNING RESERVE

B 1 An Ancillary Service Provider wishing to provide Spinning Reserve as an Ancillary Service from a resource whether pursuant to a CAISO award or as part of a self-provision arrangement must meet the following requirements in order to be certified by the CAISO to provide Spinning Reserve service:

B 1.1 the rated capacity of the resource must be 500 KW or greater (i.e. the resource must be capable of providing at least 500 KW of Spinning Reserve) unless the resource is participating in an aggregation arrangement approved by the CAISO;

B 1.2 For a resource with a governor**,** the resource must respond immediately and automatically in proportion to frequency deviations to help restore frequency to the scheduled value in accordance with the following requirements:

Minimum Governor Performance:

a. 5 percent droop (4 percent droop in the case of combustion turbines);

b. +/- 0.036 Hz deadband;

c. Power output changes in one second for any frequency deviation outside of the deadbandd. Participating Generators will not inhibit the real power response of their Generating Units with governor controls by any means that would override the governor response except as necessary to address physical operational constraints for reasons that include ambient temperature limitations, outages of mechanical equipment or regulatory considerations; and

e. For each Generating Unit with governor controls, Participating Generators shall coordinate all plant control systems, locally or remotely controlled, so that they include frequency bias to ensure that each Generating Unit can respond immediately and automatically in proportion to frequency deviations to help restore frequency to the scheduled value.

For a resource without a governor but with a frequency responsive control system, the resource must respond immediately and automatically in proportion to frequency deviations to help restore frequency to the scheduled value in accordance with the following requirements:

Minimum Frequency Responsive Device Performance:

a. If frequency is less than or equal to 59.92 Hz, the resource must reach ten (10) percent of its awarded spinning capacity within eight (8) seconds; and

b. The resources must change the power it delivers or consumes in one (1) second if system frequency is less than or equal to 59.92 Hz

B 1.3 the operator of the resource must have a means of receiving Dispatch Instructions to initiate an increase or decrease in real power (MW) within one (1) minute of the CAISO Control Center determination that Energy from Spinning Reserve capacity must be dispatched;

B 1.4 the resource must be able to increase or decrease its real power (MW) by the maximum amount of Spinning Reserve to be offered within ten (10) minutes and be capable of maintaining its real power for thirty (30) minutes from the time the resource reaches its award capacity;

B 1.5 CAISO approved voice communications services must be in place to provide both primary and alternate voice communication between the CAISO Control Center and the operator controlling the resource; and

B 1.6 The communication system and the resource must pass a qualification test to demonstrate the overall ability to meet the performance requirements of the ASRP for Spinning Reserve.

B 2 An Ancillary Service Provider wishing to be considered for certification for Spinning Reserve service by the CAISO must make a written request to the CAISO, giving details of the technical capability of the resource concerned and identifying the Scheduling Coordinator through whom the Ancillary Service Provider intends to offer Spinning Reserve service. The Ancillary Service Provider shall at the same time send a copy of its request to that Scheduling Coordinator. Technical review request forms will be available from the CAISO.

B 3 No later than one week after receipt of the request, the CAISO shall provide the Ancillary Service Provider with a listing of acceptable communication options and interface equipment options for Spinning Reserve. The CAISO shall send a copy of the listing to the Ancillary Service Provider's Scheduling Coordinator.

B 4 The Ancillary Service Provider may elect to implement any of the approved options defined by the CAISO, and, if it wishes to proceed with its request for certification, shall give written notice to the CAISO of its selected communication option, with a copy to its Scheduling Coordinator.

B 5 When it receives the Ancillary Service Provider notice, the CAISO shall notify the Ancillary Service Provider and the Scheduling Coordinator in writing no later than two weeks after receipt of the notice confirming receipt of the notice and issuing provisional approval of the selected options. Upon receipt of the CAISO acknowledgment, the Ancillary Service Provider may proceed as indicated below to secure the necessary facilities and capabilities required.

B 6 The Ancillary Service Provider may also propose alternatives that it believes may provide an equivalent level of control for consideration by the CAISO. Such proposals shall be in writing and contain sufficient detail for the CAISO to make a determination of suitability. The CAISO may request additional information, if required, to assist in its evaluation of the proposal.

B 7 The CAISO shall respond by accepting the alternative proposal, rejecting the alternative proposal, or suggesting modifications to the alternative proposal. Such acceptance, rejection, or suggested revision must be provided not later than six weeks after the proposal is received by the CAISO. The Ancillary Service Provider and the CAISO shall keep the Scheduling Coordinator informed of this process by each sending to the Scheduling Coordinator a copy of any written communication which it sends to the other.

B 8 Upon agreement as to the method of communication and control to be used by the resource, the CAISO shall provisionally approve the Ancillary Service Provider's proposal in writing providing a copy to the resource's Scheduling Coordinator at the same time.

The Ancillary Service Provider may then proceed to procure and install the equipment and make arrangements for the required communication.

B 9 Design, acquisition, and installation of the resource's equipment shall be under the control of the respective Ancillary Service Provider. The CAISO shall bear no cost responsibility or functional responsibility for such equipment. The CAISO shall be responsible for the design, acquisition and installation of any necessary modifications to its own equipment at its own cost.

B 10 The Ancillary Service Provider shall perform its own testing of its equipment to ensure that the control system performs to meet the CAISO requirements.

B 11 When it is satisfied that its plant, equipment and communication systems meet the CAISO's requirements, the Ancillary Service Provider shall request in writing that the CAISO conduct a certification test with a suggested primary date and time and at least two alternative dates and times. The CAISO shall, within two Business Days of receipt of the request, accept a proposed time if possible or suggest at least three alternatives to the Ancillary Service Provider. If the CAISO responds by suggesting alternatives, the Ancillary Service Provider shall, within two Business Days of receipt of the CAISO's response, respond in turn by accepting a proposed alternative if possible or suggesting at least three alternatives, and this procedure shall continue until agreement is reached on the date and time of the test. The Ancillary Service Provider shall inform its Scheduling Coordinator of the agreed date and time of the test.

B 12 Testing shall be performed under the direction of the CAISO. Such tests shall include, but not be limited to, the following:

B 12.1 confirmation of control communication path performance for Dispatch Instruction;

B 12.2 confirmation of primary and secondary voice circuits for receipt of Dispatch Instructions;

B 12.3 confirmation of the resource performance to include changing the resource's real power over the range of Spinning Reserve proposed from minimum to maximum, and at different rates of change from the minimum to the maximum permitted by the design of the resource; and

B 12.4 testing the resource's governor or other control system performance characteristics by simulating frequency excursions outside the allowed deadband and measuring the response of the resource.

B 13 Upon successful completion of the test the CAISO shall certify the resource as being permitted to provide Spinning Reserve as an Ancillary Service Provider and shall provide a copy of the certificate to the Scheduling Coordinator at the same time. The Scheduling Coordinator shall request the CAISO to update its database to reflect the ability of the resource to provide Spinning Reserve.

B 14 The Scheduling Coordinator may bid Spinning Reserve from the certified resource into the CAISO Markets starting with the Day-Ahead Market for the hour ending 0100 on the Second Trading Day after the CAISO's database reflects the resource's certificate.

B 15 The certification to provide Spinning Reserve shall remain in force until withdrawn by the Scheduling Coordinator or the Ancillary Service Provider by written notice to the CAISO to take effect at the time notified in the notice, which must be the end of a Trading Day.

B 16 The certification may be revoked by the CAISO only under provisions of the CAISO Tariff.

PART C
CERTIFICATION FOR NON-SPINNING RESERVE

C 1 An Ancillary Service Provider wishing to provide Non-Spinning Reserve as an Ancillary Service from a resource whether pursuant to the CAISO's auction or as part of a self-provision arrangement must meet the following requirements in order to be certified by the CAISO to provide Non-Spinning Reserve service:

C 1.1 the rated capacity of the resource must be 500 KW or greater (i.e. the resource must be capable of providing at least 500 KW of Non-Spinning Reserve) unless the resource is participating in an aggregation arrangement approved by the CAISO;

C 1.2 the resource must be able to increase or decrease its real power (MW) as soon as possible to the value indicated in a Dispatch Instruction, reaching the indicated value within ten (10) minutes after issue of the instruction and be capable of maintaining output for thirty (30) minutes from the time the resource reaches its award capacity.

C 2 An Ancillary Service Provider wishing to provide Non-Spinning Reserve as an Ancillary Service, whether pursuant to a CAISO award or as part of a self-provision arrangement, must also meet the following requirements in order to be certified by the CAISO to provide Non-Spinning Reserve service:

C 2.1 the operator of the resource must have a means of receiving a Dispatch Instruction to initiate an increase or decrease in its real power (MW) within one (1) minute of the CAISO Control Center's determination that Non-Spinning Reserve capacity must be dispatched; and

C 2.2 the communication system and the resource must pass a qualification test to demonstrate the overall ability to meet the performance requirements for Non-Spinning Reserve.

C 3 An Ancillary Service Provider wishing to be considered for certification for Non-Spinning Reserve service must make a written request to the CAISO, giving details of the technical capability of the resource concerned and identifying the Scheduling Coordinator through whom the Ancillary Service Provider intends to offer Non-Spinning Reserve. The Ancillary Service Provider shall at the same time send a copy of the request to that Scheduling Coordinator. Technical review request forms will be available from the CAISO.

C 4 No later than one week after receipt of the Ancillary Service Provider's request, the CAISO shall provide the Ancillary Service Provider with a listing of acceptable communication options and interface equipment options for Non-Spinning Reserve. The CAISO shall send a copy of the listing to the Ancillary Service Provider's Scheduling Coordinator.

C 5 The Ancillary Service Provider may elect to implement any of the acceptable communication options and interface equipment options. The Ancillary Service Provider shall give written notice to the CAISO of its selected communication option and interface equipment option, with a copy to its Scheduling Coordinator.

C 6 When it receives the Ancillary Service Provider's notice, the CAISO shall notify the Ancillary Service Provider and the Scheduling Coordinator in writing no later than two weeks after receipt of the notice confirming receipt of the notice and issuing provisional approval of the selected options. Upon receipt of the CAISO acknowledgment the Ancillary Service Provider may proceed as indicated below to secure the necessary facilities and capabilities required.

C 7 The Ancillary Service Provider may also propose alternatives that it believes may provide an equivalent level of control for consideration by the CAISO. Such proposals shall be in

writing and contain sufficient detail for the CAISO to make a determination of suitability. The CAISO may request additional information, if required, to assist in its evaluation of the proposal.

C 8 The CAISO shall respond by accepting the alternative proposal, rejecting the alternative proposal, or suggesting modifications to the alternative proposal. Such acceptance, rejection, or suggested revision must be provided not later than six weeks after the proposal is received by the CAISO. The Ancillary Service Provider and the CAISO shall keep the Scheduling Coordinator informed of this process by each sending to the Scheduling Coordinator a copy of any written communication which it sends to the other.

C 9 Upon agreement as to the method of communication and control to be used by the Ancillary Service Provider, the CAISO shall provisionally approve the proposal in writing providing a copy to the Ancillary Service Provider's Scheduling Coordinator at the same time. The Ancillary Service Provider may then proceed to procure and install the equipment and make arrangements for the required communication.

C 10 Design, acquisition, and installation of the Ancillary Service Provider's equipment shall be under the control of the Ancillary Service Provider. The CAISO shall bear no cost responsibility or functional responsibility for such equipment. The CAISO shall be responsible for the design, acquisition and installation of any necessary modifications to the CAISO's equipment at its own cost.

C 11 The Ancillary Service Provider shall perform its own testing of its equipment to ensure that the control system performs to meet the CAISO requirements.

C 12 When it is satisfied that its plant, equipment and communication systems meet the CAISO's requirements, the Ancillary Service Provider shall request in writing that the CAISO conduct a certification test with a suggested primary date and time and at least two alternative dates and times. The CAISO shall, within two Business Days of receipt of the Ancillary Service Provider's request, accept a proposed time if possible or suggest at least three alternatives. If the CAISO responds by suggesting alternatives, the Ancillary Service Provider shall, within two Business Days of receipt of the CAISO's response, respond in turn by accepting a proposed alternative if possible or suggesting at least three alternatives, and this procedure shall continue until agreement is reached on the date and time of the test. The Ancillary Service Provider shall inform its Scheduling Coordinator of the agreed date and time of the test.

C 13 Testing shall be performed under the direction of the CAISO. Such tests shall include, but not be limited to, the following:

C 13.1 confirmation of control communication path performance;

C 13.2 confirmation of primary and secondary voice circuits for receipt of Dispatch Instructions;

C 13.3 confirmation of the resource control performance; and

C 13.4 confirmation of the range of resource control to include changing the real power (MW) over the range of Non-Spinning Reserve proposed.

C 14 Upon successful completion of the test, the CAISO shall certify the resource as being permitted to provide Non-Spinning Reserve as an Ancillary Service and shall provide a copy of the certificate to the Scheduling Coordinator at the same time. The Scheduling Coordinator shall request the CAISO to update its database to reflect the permission for the resource to provide Non-Spinning Reserve.

C 15 The Scheduling Coordinator may bid Non-Spinning Reserve service from the certified resource into the CAISO Markets starting with the Day-Ahead Market for the hour ending 0100 on the second Trading Day after the CAISO database reflects the resource's certificate.

C 16 The certification to provide Non-Spinning Reserve shall remain in force until withdrawn by the Scheduling Coordinator or the Ancillary Service Provider by written notice to the CAISO to take effect at the time notified in the notice, which must be the end of a Trading Day.

C 17 The certification may be revoked by the CAISO only under provisions of the CAISO Tariff.

PART D
[NOT USED]

PART E
CERTIFICATION FOR BLACK START

E 1 A Generator wishing to provide Black Start capacity from a Generating Unit as an Ancillary Service must meet the requirements stated in Appendix D of the CAISO Tariff in order to be certified by the CAISO to provide Black Start capacity. In addition, the Generating Unit must have a rated capacity 1 MW or greater unless the Generating Unit is participating in an aggregation arrangement approved by the CAISO.

E 2 A Generator wishing to be considered for certification for Black Start service by the CAISO must make a written request to the CAISO. Such request must clearly identify the facilities related to the Generating Unit from which the Generator wishes to provide Black Start and shall identify the Scheduling Coordinator through whom the Generator wishes to offer Black Start service. The Generator shall send a copy of its request to its Scheduling Coordinator at the same time as it sends it to the CAISO. The Generator's written request must include at least the following:

E 2.1 identification of the Generating Unit including Location Code;

E 2.2 a single-line electrical diagram of the Generating Unit connections including auxiliary power busses and the connection to the station switchyard;

E 2.3 a description of the fuel supply used for Black Start including on-site storage and resupply requirements;

E 2.4 a single-line electrical diagram showing the transmission connection from the Generating Unit station switchyard to a connection point on the CAISO Controlled Grid;

E 2.5 a description of the Generating Unit capability to provide both real and reactive power, any Start-Up and Shut-Down requirements, any staffing limitations; and

E 2.6 a description of the primary, alternate and emergency back-up communications systems currently available to the Generator for communications to the CAISO Control Center.

E 3 Upon receipt of the Generator's written request the CAISO shall review the information provided and respond in writing within two weeks of receipt of the request, providing a copy of its response to the Generator's Scheduling Coordinator. The CAISO response may be any of the following:

E 3.1 acceptance of the proposal as presented;

E 3.2 rejection of the proposal as presented with a rationale for such rejection; or

E 3.3 a request for additional information needed by the CAISO to properly evaluate the request.

E 4 A Generator receiving a rejection may submit a written request for reconsideration by the CAISO within 60 days of the date of the rejection notice. A request for reconsideration must address the rationale provided by the CAISO. The CAISO shall respond to a request for reconsideration within 60 days of the date of that request.

E 5 A Generator receiving a request for additional information shall provide such information within 60 days of such request providing a copy at the same time to its Scheduling Coordinator. The CAISO shall review the information and respond within 120 days of the date of the CAISO's request for additional information providing a copy at the same time to the Generator's Scheduling Coordinator.

E 6 Upon acceptance by the CAISO of the Generator's request and agreement as to the method of communication and control to be used by the Generator, the CAISO shall provisionally approve the proposal in writing providing a copy at the same time to the Generator's Scheduling Coordinator. The Generator may then proceed to procure and install the equipment and make arrangements for the required communication.

E 7 Design, acquisition, and installation of the Generator's equipment shall be under the control of the Generator. The CAISO shall bear no cost responsibility or functional responsibility for such equipment. The CAISO shall be responsible for the design, acquisition and installation of any necessary modifications to its own equipment at its own cost.

E 8 The Generator shall perform its own testing of its equipment to ensure that the Black Start system performs to meet the CAISO requirements.

E 9 When it is satisfied that its plant, equipment and communication systems meet the CAISO's requirements, the Generator shall request in writing that the CAISO conduct a certification test with a suggested primary date and time and at least two alternative dates and times. The CAISO shall, within two Business Days of receipt of the Generator's request, accept a proposed time if possible or suggest at least three alternatives to the Generator. If the CAISO responds by suggesting alternatives, the Generator shall, within two Business Days of receipt of the CAISO's response, respond in turn by accepting a proposed alternative if possible or suggesting at least three alternatives, and this procedure shall continue until agreement is reached on the date and time of the test. The Generator shall inform its Scheduling Coordinator of the agreed date and time of the test.

E 10 Testing shall be performed under the direction of the CAISO. Such tests shall include, but not be limited to, the following:

E 10.1 confirmation of control communication path performance;

E 10.2 confirmation of primary, secondary, and emergency voice circuits for receipt of Dispatch Instructions;

E 10.3 confirmation of the Generating Unit performance; and

E 10.4 simulation of a Black Start event.

E 11 Upon successful completion of the test, the CAISO shall certify the Generating Unit as being permitted to provide Black Start capacity as an Ancillary Service and shall provide a copy of the certificate to the Scheduling Coordinator at the same time. The CAISO shall change its Generating Unit data base to reflect the permission for the Generating Unit to provide Black Start service.

E 12 The certification to provide Black Start shall remain in force until withdrawn by the Scheduling Coordinator or the Generator by written notice to the CAISO to take effect at the time noticed in the notice, which must be the end of a Trading Day.

E 13 The certification may be revoked by the CAISO only under provisions of the ASRP or other provisions of the CAISO Tariff.

Attachment B – Marked Tariff Records

Response to Deficiency Letter Regarding Frequency Response Requirements

California Independent System Operator Corporation

4.6.4 Identification Of Generating Units

Each Participating Generator shall provide data identifying each of its Generating Units and such information regarding the capacity and the operating characteristics of the Generating Unit as may be reasonably requested from time to time by the CAISO. Each Participating Generator shall provide information on its governor setting and certify that it has not inhibited the real power response of any Generating Unit by any means that would override the governor response except as necessary to address physical operational constraints for reasons that include ambient temperature limitations, outages of mechanical equipment or regulatory considerations. In the event there is a need to inhibit the real power response of any Generating Unit, the Participating Generators shall provide a written description of this limitation with its certification. All information provided to the CAISO regarding the operational and technical constraints in the Master File shall be accurate and actually based on physical characteristics of the resources except for the Pump Ramping Conversion Factor, which is configurable.

* * * *

4.6.5 NERC and WECC Requirements

4.6.5.1 Participating Generator Performance Standard

Participating Generators shall, in relation to each of their Generating Units, meet all Applicable Reliability Criteria, including any standards regarding governor response capabilities, use of power system stabilizers, voltage control capabilities and hourly Energy delivery.

Participating Generators with governor controls that are synchronized to the CAISO Controlled Grid must respond immediately and automatically outside a deadband in proportion to frequency deviations through the action of a governor to help restore frequency to the scheduled value. Participating Generators shall set the governor droop for each Generating Unit with governor controls no higher than 4 percent droop for combustion turbines and 5 percent droop for other technology types; with a deadband no larger than +/- 0.036 Hz. Participating Generators will not inhibit the real power response of their Generating Units with governor controls by any means that would override the governor response except as necessary to address physical operational constraints for reasons that include ambient temperature limitations,

outages of mechanical equipment or regulatory considerations. For each Generating Unit with governor controls, Participating Generators shall coordinate all plant control systems, locally or remotely controlled, so that they include frequency bias to ensure that each Generating Unit can respond immediately and automatically in proportion to frequency deviations to help restore frequency to the scheduled value. Unless otherwise agreed by the CAISO, a Generating Unit must be capable of operating at capacity registered in the CAISO Controlled Grid interconnection data, and shall follow the voltage schedules issued by the PTO or, from time to time, the CAISO.

4.6.5.2 [Not Used]

4.6.5.3 [Not Used]

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8.2.3 Quantities Of Ancillary Services Required; Use Of AS Regions

For each of the Ancillary Services, the CAISO shall determine the quantity and location of the Ancillary Service which is required using Ancillary Service Regions as described in Section 8.3.3. For each of the Ancillary Services, the CAISO shall determine the required locational dispersion in accordance with CAISO Controlled Grid reliability requirements. The Ancillary Services provided must be under the direct Dispatch control of the CAISO on a Real-Time Dispatch Interval basis. The CAISO shall determine the quantities it requires as provided for in Sections 8.2.3.1 to 8.2.3.3.

8.2.3.1 Regulation Service

The CAISO shall maintain sufficient resources immediately responsive to the CAISO's EMS control in order to provide sufficient Regulation service to allow the CAISO Balancing Authority Area to meet NERC and WECC reliability standards and any requirements of the NRC by continuously balancing resources to meet deviations between actual and scheduled Demand and to maintain Interchange Schedules. The quantity of Regulation Down and Regulation Up capacity needed for each Settlement Period of the Day-Ahead Market and in each fifteen (15) minute period in Real-Time shall be determined by the CAISO as a percentage of the applicable CAISO Forecast Of CAISO Demand for the Day-Ahead and Real-Time Markets. In HASP, the amount of advisory Regulation from Dynamic System Resources required for each Settlement Period in the next Trading Hour is also determined based on the CAISO Forecast Of

CAISO Demand. The advisory awards of Regulation from Dynamic System Resources in HASP are not binding and are re-optimized through the FMM and RTD processes in the Real-Time Market. The CAISO's determination is based upon its need to meet the NERC and WECC reliability standards and any requirements of the NRC. The CAISO will take into account the speed and accuracy of regulation resources in its determination of Regulation requirements, including as it qualifies self-provided Regulation. Upon request of a Scheduling Coordinator, the CAISO will share with the Scheduling Coordinator its reasoning and any related data used to make the determination of whether the Scheduling Coordinator's self-provided Regulation capacity meets its regulation obligation.

The requirement for Regulation Down or Regulation Up needed for each Settlement Period of the Day-Ahead Market and in each fifteen (15) minute period in Real-Time shall each be accompanied by a requirement for Mileage as determined by the CAISO. The CAISO shall determine the Mileage requirements in any Settlement Period based on Regulation capacity requirements as well as the Bid-in Regulation capacity for that Settlement Period. Subject to operator adjustment, the Mileage requirement for either Regulation Up or Regulation Down will reflect the minimum of (a) the product of the respective Regulation capacity requirement and the System Mileage Multiplier; (b) the average Instructed Mileage for the applicable Trading Hour from the prior seven (7) days; or (c) the product of each resource's resource specific Mileage multiplier(s) and its Bid-in Regulation capacity summed for all resources.

The CAISO will publish on OASIS the estimated quantity, or the percentage used to determine the estimated quantity, of Regulation Reserves required for each hour of the Day-Ahead Market and in each fifteen (15) minute period in Real-Time for the Trading Day. The CAISO will publish on OASIS the Mileage requirements for each hour of the Day-Ahead Market and each fifteen (15) minute period in Real-Time for the Trading Day. The CAISO will also publish on OASIS the average Instructed Mileage from the prior seven (7) days for each hour of a Trading Day no later than seven (7) calendar days after the applicable Trading Day.

8.2.3.1.1 Regulation Performance

The CAISO will measure the accuracy of a resource's response to CAISO EMS signals. The CAISO will sum a resource's Automatic Generation Control set points for each four (4) second Regulation interval every fifteen (15) minutes and then sum the total deviations from the Automatic Generation Control set

point for each four (4) second regulation interval during that fifteen (15) minute period. The CAISO will divide the sum of the resource's Automatic Generation Control set points less the sum of the resource's total deviations by the sum of the resource's Automatic Generation Control set points. The CAISO will apply the resulting percentage to a resource's Instructed Mileage to calculate the resource's Regulation performance payments. The CAISO will adjust a resource's Automatic Generation Control set point deviations when the CAISO EMS signal sent to a resource changes direction and the resource under-responds in the prior interval. The adjusted Automatic Generation Control set point will reflect the Automatic Generation Control set point to which the EMS signal directed the resource to move in the prior interval.

The CAISO will use a resource's Historic Regulation Performance Accuracy and certified ramp capability to determine a resource-specific expected Mileage for purposes of awarding Regulation Up and Regulation Down capacity. The CAISO will calculate *a* separate Historic Regulation Performance Accuracy for both Regulation Up and Regulation Down.

A minimum performance threshold of twenty-five (25) percent will apply for a resource to offer Regulation Up and Regulation Down capacity. If a resource's measured accuracy, based on a weighted average of fifteen (15) minute intervals during a calendar month using Instructed Mileage as the weight, is less than twenty-five (25) percent for Regulation Up or Regulation Down, the resource must re-certify to provide the respective service within ninety (90) days from the date the CAISO provides notice to the resource's Scheduling Coordinator of the resource's failure to meet the minimum performance threshold. In the event of lost accuracy data, the CAISO will not use data from these intervals to calculate the resource's Historic Regulation Performance Accuracy or to assess the minimum performance threshold.

8.2.3.2 Spinning and Non-Spinning Reserves

The CAISO shall maintain minimum contingency Operating Reserve made up of Spinning Reserve and Non-Spinning Reserve in accordance with NERC and WECC reliability standards, including any requirements of the NRC. The CAISO from time to time may determine to use more stringent criteria.

8.2.3.3 Voltage Support

The CAISO shall determine on an hourly basis for each day the quantity and location of Voltage Support required to maintain voltage levels and reactive margins within NERC and WECC reliability standards, and any requirements of the NRC using a power flow study based on the quantity and location of scheduled Demand. The PTO or, from time to time, the CAISO shall issue daily voltage schedules (Dispatch Instructions) to Participating Generators, Participating TOs and UDCs, which are required to be maintained for CAISO Controlled Grid reliability. All other Generating Units shall comply with the power factor requirements set forth in contractual arrangements in effect on the CAISO Operations Date, or, if no such contractual arrangements exist and the Generating Unit exists within the system of a Participating TO, the power factor requirements applicable under the Participating TO's TO Tariff or other tariff on file with the FERC.

All Participating Generators that operate Asynchronous Generating Facilities subject to the Large Generator Interconnection Agreement set forth in Appendix BB or CC shall maintain the CAISO specified voltage schedule if required under Appendix H of the Large Generator Interconnection Agreement, while operating within the power factor range specified in their interconnection agreements. For all other Generating Units, Participating Generators shall maintain the CAISO specified voltage schedule at the Generating Unit terminals to the extent possible, while operating within the power factor range specified in their interconnection agreements, or, for Regulatory Must-Take Generation with Existing QF Contracts or Amended QF Contracts, Regulatory Must-Run Generation and Reliability Must-Run Generation, consistent with existing obligations. For Generating Units that do not operate under one of these agreements, the minimum power factor range will be within a band of 0.90 lag (producing VARs) and 0.95 lead (absorbing VARs) power factors. Participating Generators with Generating Units existing at the CAISO Operations Date that are unable to meet this operating power factor requirement may apply to the CAISO for an exemption. Prior to granting such an exemption, the CAISO shall require the Participating TO, UDC or other utility to whose system the relevant Generating Units are interconnected to notify it of the existing contractual requirements for Voltage Support established prior to the CAISO Operations Date for such Generating Units. Such requirements may be contained in CPUC Electric Rule 21 or the Interconnection Agreement with the Participating TO, UDC or other utility. The CAISO shall not grant any exemption under this Section from such existing contractual requirements. The CAISO shall be entitled

to instruct Participating Generators to operate their Generating Units at specified points within their power factor ranges. Participating Generators shall receive no compensation for operating within these specified ranges.

If the CAISO requires additional Voltage Support, it shall procure this either through Reliability Must-Run Contracts or, if no other more economic sources are available**,** by instructing a Generating Unit to move its MVar output outside its mandatory range. Only if the Generating Unit must reduce its MW output in order to comply with such an instruction will it be eligible to recover its opportunity cost in accordance with Section 11.10.1.4.

All Loads directly connected to the CAISO Controlled Grid shall maintain reactive flow at grid interface points within a specified power factor band of 0.97 lag to 0.99 lead. Loads shall not be compensated for the service of maintaining the power factor at required levels within the bandwidth. A UDC interconnecting with the CAISO Controlled Grid at any point other than a Scheduling Point shall be subject to the same power factor requirement.

The CAISO will establish voltage control standards with UDCs and the operators of other Balancing Authority Areas and will enter into operational agreements providing for the coordination of actions in the event of a voltage problem occurring.

8.2.3.4 Black Start Capability

The CAISO shall determine the amount and location of Black Start Generation it requires through a system restoration plan that meets the requirements of Applicable Reliability Criteria. In making this determination, the CAISO shall consult with Participating Transmission Owners.

Participating Transmission Owners with their own system restoration plans that include transmission lines and associated facilities that are part of the CAISO Controlled Grid shall upon the request of the CAISO provide the CAISO with these system restoration plans. The CAISO shall consider Participating Transmission Owners' system restoration plans in developing a system restoration plan for the CAISO system and may identify Black Start Generation needs for the CAISO system not identified in Participating Transmission Owners' system restoration plans.

Scheduling Coordinators shall notify the CAISO of their Load restoration time requirements for any Loads that provide emergency services. This notice shall include the MW amount of Load, required restoration time, and associated Node on the CAISO Controlled Grid. For purposes of preparing system restoration plans, the CAISO shall consult with applicable Participating Transmission Owners concerning any Load restoration information provided by Scheduling Coordinators.

8.2.3.4.1 Black Start Units

The CAISO will select Black Start capacity in locations where adequate transmission capacity can be made readily available (assuming no transmission damage) to connect the Black Start Generating Unit to the station service bus of a Generating Unit designated by the CAISO. Black Start Generating Units:

(a) must be located in the CAISO Balancing Authority Area;

(b) may be located anywhere in the CAISO Balancing Authority Area provided that the Black Start resource is capable of meeting the CAISO performance requirements for starting and interconnection to the CAISO Controlled Grid; but

(c) must be dispersed throughout the CAISO Balancing Authority Area.

8.2.3.4.2 Black Start Services

(a) All Participating Generators with Black Start Generating Units must satisfy technical requirements specified by the CAISO.

(b) The CAISO shall from time to time undertake performance tests, with or without prior notification.

(c) The CAISO shall have the sole right to determine when the operation of Black Start Generating Units is required to respond to conditions on the CAISO Controlled Grid.

(d) If the CAISO has intervened in the market for Energy and/or Ancillary Services pursuant to Section 7.7.4, the price paid by the CAISO for Black Start services

shall be sufficient to permit the relevant Participating Generator to recover its costs over the period that it is directed to operate by the CAISO.

(e) If a Black Start Generating Unit fails to achieve a Black Start when called upon by the CAISO, or fails to pass a performance test administered by the CAISO, the Market Participant that has contracted to supply Black Start service from the Generating Unit shall re-pay to the CAISO any reserve payment(s) that it has received since the administration of the last performance test or the last occasion upon which it successfully achieved a Black Start when called upon by the CAISO, whichever is the shorter period.

8.2.3.5 Ancillary Service Substitution

The CAISO, whenever possible, will increase its purchases of an Ancillary Service that can substitute for another Ancillary Service, when doing so is expected to reduce its total cost of procuring Ancillary Services while meeting reliability requirements. Prior to making these purchases, the CAISO will first substitute Self-Provided Ancillary Services for another Ancillary Service consistent with the principles set forth in this Section. The CAISO will make such adjustments in accordance with the following principles:

(a) The Regulation requirement must be satisfied only by Regulation Bids for resources qualified to provide Regulation;

(b) Additional Regulation Up capacity can be used to satisfy requirements for Spinning Reserve, or Non-Spinning Reserve;

(c) Regulation Up and Spinning Reserve requirements must be collectively satisfied by the combination of Regulation Up and Spinning Reserve Bids. Spinning Reserve and Regulation may be provided as separate services from the same resource, provided that the sum of Spinning Reserve and Regulation Up provided is not greater than the maximum Ramp Rate of the resource (MW/minute) times ten (10);

(d) Additional Regulation Up and Spinning Reserve capacity can be used to satisfy requirements for Non-Spinning Reserve.

(e) Regulation Up, Spinning Reserve, and Non-Spinning Reserve requirements must be collectively satisfied by the combination of Regulation Up, Spinning Reserve and Non-Spinning Reserve Bids;

(f) Total MW purchased from the Regulation Up, Spinning Reserve, and Non-Spinning Reserve markets will not be changed by this Section 8.2.3.5; and

(g) Regulation Energy resulting from Regulation that substituted for another Ancillary Service continues to be treated as Regulation Energy regardless of what service it substituted.

* * * *

11.34 Invoice Charges for Transferred Frequency Response

The CAISO will invoice charges as specified in this Section 11.34 for all legitimate costs invoiced to the CAISO by a Balancing Authority under a contract for Transferred Frequency Response.

* * * *

11.34.1 Charge Allocation Basis

Each Scheduling Coordinator's responsibility for the Transferred Frequency Response charges shall be allocated based on the most recent Scheduling Coordinator's NERC/WECC Metered Demand determined under Section 11.20.4.

* * * *

11.34.2 Calculation and Assessment

(a) Within five (5) Business Days after receiving an invoice for legitimate Transferred Frequency Response costs, the CAISO shall issue a market notice setting forth the Transferred Frequency Response rate, which shall be calculated using the total charges invoiced to the CAISO divided by the most recent total NERC/WECC Metered Demand determined under Section 11.20.4.

(b) The CAISO shall calculate the Transferred Frequency Response charges allocable to each Scheduling Coordinator by using the Transferred Frequency Response rate determined under Section 11.34.2(a), multiplied by the most recent NERC/WECC Metered Demand for that Scheduling Coordinator determined under Section 11.20.4.

(c) Within 10 Business Days after receiving the invoice for legitimate Transferred Frequency Response costs, the CAISO shall issue an invoice to each Scheduling Coordinator for its allocable share of the costs determined under Section 11.34.2(b).

(d) Scheduling Coordinators shall make timely payment to the CAISO within fifteen (15) Business Days of the date the invoices were issued pursuant to Section 11.34.2(c).

* * * *

11.34.3 Responsibility to Pay Charges

(a) Each Scheduling Coordinator shall be obligated to pay the CAISO the charges the Scheduling Coordinator is invoiced by the CAISO for Transferred Frequency Response.

(b) The CAISO's calculation of collateral requirements and other credit requirements under the CAISO Tariff shall include an adjustment for the Scheduling Coordinator's allocable share of the charge for transferred Frequency Response, if applicable, except that the Estimated Aggregated Liability calculated for the Scheduling Coordinator shall not include extrapolated amounts for the charge under Section 12.1.3.1.1(d).

* * * *

11.34.4 Validation

(a) Each Scheduling Coordinator shall have the opportunity to review the terms of the invoice for the charge for Transferred Frequency Response and shall be deemed to have validated that invoice unless it raises a dispute within five (5) Business Days of the date of issuance.

(b) Once validated, an invoice for the charge under this Section shall be binding on the Scheduling Coordinator to which it relates.

* * * *

11.34.5 Disputes and Corrections

(a) Scheduling Coordinators shall be prohibited from disputing any charge invoiced under this Section, except on grounds that an error in the invoice is due to a mere typographical or other ministerial error by the CAISO.

(b) Any dispute of an invoice on the grounds specified in Section 11.34.5 (a) shall be submitted and processed in accordance with the dispute procedure related to the charges for Transferred Frequency Response set forth in the Business Practice Manual,

(c) If the CAISO determines that an invoice contains a typographical or other ministerial error, and the resolution of the dispute makes correction necessary, the CAISO will issue a corrected invoice within 15 Business Days of the date the initial invoice was issued.

(d) Each Scheduling Coordinator that receives an invoice for a charge under this Section shall pay any net debit and shall be entitled to receive any net credit specified on a corrected invoice. Payment of any net debit shall be due within 10 business days of the date the corrected invoice was issued.

* * * *

11.34.6 Payment Default

(a) In the event a Scheduling Coordinator defaults on the payment of all or any portion of the charge invoiced under this Section, the CAISO shall have the right under Section 11.29.13.3 to enforce the financial security provided by the defaulting Scheduling Coordinator, and to take any such other action under Sections 11.29.12 or 11.29.13, as necessary, to obtain payment for the default amount.

(b) To the extent all or any portion of the default amount remains unpaid, the CAISO:

(1) may at its discretion issue an invoice for the unpaid portion of the charge invoiced under this Section; and

(2) if such invoice is issued for a payment default, shall allocate responsibility for the unpaid amount to Scheduling Coordinators using the same allocation basis for the charge as identified in section 11.34.1, but excluding the CAISO Debtor that has not paid the payment default amount, based on the most recent data of the allocation basis for the charge.

(c) Scheduling Coordinators shall make timely payment to the CAISO within 15 Business Days of the date the default invoices were issued pursuant to Section 11.34.6.

* * * *

11.34.7 Modification to Schedule.

Notwithstanding the provisions in Section 11.34, the CAISO may issue a Market Notice informing Scheduling Coordinators that the CAISO will implement a temporary modification to the billing and payment schedule for the charge and setting forth the reasons for such modification, in which case the modified schedule described in that Market Notice shall govern.

* * * *

34.10 Dispatch Of Energy From Ancillary Services

The CAISO may issue Dispatch Instructions to Participating Generators, Participating Loads, Proxy Demand Resources, (via communication with the Scheduling Coordinators of Demand Response Providers) System Units and System Resources contracted to provide Ancillary Services (either procured through the CAISO Markets, Self-Provided by Scheduling Coordinators, or dispatched in accordance with the RMR Contract) for the Supply of Energy. During normal operating conditions, the CAISO may Dispatch those Participating Generators, Participating Loads, Proxy Demand Resources, System Units and System Resources that have contracted to provide Spinning and Non-Spinning Reserve, except for

those reserves designated as Contingency Only, in conjunction with the normal Dispatch of Energy. Contingency Only reserves are Operating Reserve capacity that have been designated, either by the Scheduling Coordinator or the CAISO, as available to supply Energy in the Real-Time only in the event of the occurrence of an unplanned Outage, a Contingency or an imminent or actual System Emergency. During normal operating conditions, the CAISO may also elect to designate any reserve not previously identified as Contingency Only by Scheduling Coordinator as Contingency Only reserves. In the event of an unplanned Outage, a Contingency or a threatened or actual System Emergency, the CAISO may dispatch Contingency Only reserves. If Contingency Only reserves are dispatched through the RTCD, which as described in Section 34.5.2 only Dispatches in the event of a Contingency, such Dispatch and pricing will be based on the original Energy Bids. If Contingency Only reserves are dispatched in response to a System Emergency that has occurred because the CAISO has run out of Economic Bids when no Contingency event has occurred, the RTED will Dispatch such Contingency Only reserves using maximum Bid prices as provided in Section 39.6.1 as the Energy Bids for such reserves and will set prices accordingly. If a Participating Generator, Participating Load, System Unit or System Resource that is supplying Operating Reserve is dispatched to provide Energy, the CAISO shall replace the Operating Reserve as necessary to maintain NERC and WECC reliability standards, including any requirements of the NRC. If the CAISO uses Operating Reserve to meet Real-Time Energy requirements, and if the CAISO needs Operating Reserves to satisfy NERC and WECC reliability standards, including any requirements of the NRC, the CAISO shall restore the Operating Reserves to the extent necessary to meet NERC and WECC reliability standards, including any requirements of the NRC through either the procurement of additional Operating Reserve in the RTM or the Dispatch of other Energy Bids in SCED to allow the resources that were providing Energy from the Operating Reserve to return to their Dispatch Operating Point. The Energy Bid Curve is not used by the AGC system when Dispatching Energy from Regulation. For Regulation Up capacity, the upper portion of the resource capacity from its Regulation Limit is allocated to Regulation regardless of its Energy Bid Curve. For a resource providing Regulation Up or Operating Reserves the remaining Energy Bid Curve shall be allocated to any RTM AS Awards in the following order from higher to lower capacity where applicable: (a) Spinning Reserve; and (b) Non-Spinning Reserve. For resources providing Regulation Up, the applicable upper Regulation Limit shall be

used as the basis of allocation if it is lower than the upper portion of the Energy Bid Curve. The remaining portion of the Energy Bid Curve, if there is any, shall constitute a Bid for RTM Energy. For Regulation Down capacity, the lower portion of the resource capacity from its applicable Regulation Limit is allocated to Regulation regardless of its Energy Bid Curve.

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42 Adequacy Of Facilities To Meet Applicable Reliability Criteria

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42.2 Transferred Frequency Response

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42.2.1 Procurement of Transferred Frequency Response

If the CAISO concludes that it may be unable to provide sufficient frequency response consistent with Applicable Reliability Criteria, the CAISO may, acting in accordance with Good Utility Practice, negotiate contracts for Transferred Frequency Response. The CAISO will solicit bids for contracts for Transferred Frequency Response. The CAISO shall select the bids that permit the CAISO to satisfy Applicable Reliability Criteria at lowest cost consistent with the seller's capability to provide Transferred Frequency Response and not to exceed the estimated cost of satisfying Applicable Reliability Criteria using additional procurement of Regulation Up.

* * * *

42.2.2 Allocation of Transferred Frequency Response Costs Incurred by CAISO

The costs incurred by the CAISO for any contract for Transferred Frequency Response entered into under Section 42.2.1 are recovered from Scheduling Coordinators pursuant to Section 11.34.

* * * *

Transferred Frequency Response

A frequency response performance obligation under Applicable Reliability Criteria expressed in MW/0.1 Hz that a receiving Balancing Authority may acquire under an arrangement whereby another Balancing Authority increases its performance obligation by the same amount, or that a delivering Balancing Authority may provide under an arrangement whereby another Balancing Authority reduces its performance obligation by the same amount. Transferred Frequency Response is a compliance instrument and there is no exchange of physical services between Balancing Authorities.

Transferred Frequency Response is reported on applicable NERC/WECC forms, and applied consistently to each reported frequency disturbance event. On these forms, the delivering Balancing Authority increases its performance obligation and the receiving Balancing Authority decreases its performance obligation by the same amount.

Transferred Frequency Response may reflect an aggregate amount from multiple contracts.

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Appendix K Ancillary Service Requirements Protocol (ASRP)

PART A
CERTIFICATION FOR REGULATION

A 1 An Ancillary Service Provider wishing to provide Regulation as an Ancillary Service from a resource whether pursuant to a CAISO award or as part of a self-provision arrangement must meet the following operating characteristics and technical requirements in order to be certified by the CAISO to provide Regulation service unless granted a temporary exemption by the CAISO in accordance with criteria which the CAISO shall publish on the CAISO Website;

A 1.1 **Operating Characteristics**

A 1.1.1 the rated capacity of the resource must be 500 KW or greater (i.e. the resource must be capable of providing at least 500 KW of Regulation) unless the resource is participating in an aggregation arrangement approved by the CAISO;

A 1.1.2 the maximum amount of Regulation to be offered must be reached within a period of ten (10) minutes;

A 1.1.3 the resource must be able to increase or decrease real power levels immediately in response to signals from the CAISO's EMS control;

A 1.1.4 Regulation capacity offered by a resource must be dispatchable on a continuous basis for at least sixty (60) minutes in the Day Ahead Market and at least thirty (30) minutes in the Real Time Market after issuance of the Dispatch Instruction, including (if necessary) attaining this capability using Regulation Energy Management. The CAISO will measure continuous Energy from the time a resource reaches its award capacity. Scheduling Coordinators for Non-Generator Resources located within the CAISO Balancing Authority Area that require Energy from the Real-Time Market to offer their full capacity as Regulation Energy Management may request the use of Regulation Energy Management as described in Section 8.4.1.2. The Scheduling Coordinators for a resource using Regulation Energy Management may submit a Regulation Bid for capacity (MW) of up to four (4) times the maximum Energy (MWh) the resource can generate or curtail for fifteen (15) minutes after issuance of the Dispatch Instruction.

A 1.1.5 the resource’s measured accuracy in responding to the CAISO’s EMS signal must meet or exceed twenty-five (25) percent.

A 1.2 **Technical Requirements**

A 1.2.1 **Control**

A 1.2.1.1 a direct, digital, unfiltered control signal generated from the CAISO EMS through a standard CAISO direct communication and direct control system, must meet the minimum performance standards for communications and control which will be developed and posted by the CAISO on the CAISO Website;

A 1.2.1.2 the resource response (in MW) to a control signal must meet the minimum performance standards for control and response which will be developed and posted by the CAISO on the CAISO Website. As indicated by the resource response (in MW), the resource must respond immediately, without manual operator intervention, to control signals and must sustain its specified Ramp Rate, within specified Regulation Limits, for each minute of control response (MW/minute);

A 1.2.1.3 Ancillary Service Providers for Non-Generator Resources may define a Ramp Rate for operating as Generation and a Ramp Rate for operating as Load, respectively.

A 1.2.2 **Monitoring:**

the resource must have a standard CAISO direct communication and direct control system to send signals to the CAISO EMS to dynamically monitor, at a minimum the following:

A 1.2.2.1 actual real power level (MW);

A 1.2.2.2 high limit, low limit and rate limit values as selected by the resource operator; and

A 1.2.2.3 in-service status indication confirming availability of Regulation service.

A 1.2.2.4 Ancillary Service Providers for Non-Generator Resources (whether or not the resource uses Regulation Energy Management) shall provide CAISO the following additional telemetry data:

- Resource Ramp Rate when operating as Generation (MW/min);
- Resource Ramp Rate when operating as Load (MW/min);
- The maximum instantaneous ability to produce or consume Energy in MW; and
- The maximum capability to provide Energy as expressed in MWh over a fifteen (15) minute interval.

A 1.2.3 **Voice Communications:**

CAISO approved communication must be in place between the CAISO Control Center and the operator controlling the resource.

A 2 An Ancillary Service Provider wishing to be considered for certification for Regulation service by the CAISO must make a written request to the CAISO, giving details of the technical capability of the resource concerned and identifying the Scheduling Coordinator through whom the Ancillary Service Provider intends to offer Regulation service. The Ancillary Service Provider shall at the same time send a copy of its request to that Scheduling Coordinator. Technical review request forms will be available from the CAISO.

A 3 No later than one week after receipt of the Ancillary Service Provider's request, the CAISO shall provide the Ancillary Service Provider with a listing of required interface equipment for Regulation, including a standard CAISO direct communication and direct control system. The CAISO shall send a copy of the listing to the resource's Scheduling Coordinator.

A 4 The Ancillary Service Provider may propose alternatives that it believes may provide an equivalent level of communication and control for consideration by the CAISO. Such proposals shall be in writing and contain sufficient detail for the CAISO to make a determination of suitability. The CAISO may request additional information, if required, to assist in its evaluation of the proposal.

A 5 The CAISO shall respond by accepting the alternative proposal, rejecting the alternative proposal, or suggesting modifications to the alternative proposal. Such acceptance, rejection, or suggested revision must be provided not later than six (6) weeks after the proposal is received by the CAISO. The Ancillary Service Provider and the CAISO shall keep the Scheduling Coordinator informed of this process by each sending to the Scheduling Coordinator a copy of any written communication which it sends to the other.

A 6 Upon agreement as to any alternative method of communication and control to be used by the Ancillary Service Provider, the CAISO shall provisionally approve the proposal in writing providing a copy to the Ancillary Service Provider's Scheduling Coordinator at the same time. If agreed by the CAISO, the Ancillary Service Provider may then proceed to procure and install the equipment and make arrangements for the required communication and control.

A 7 Design, acquisition, and installation of the CAISO-approved communication and control equipment shall be under the control of the CAISO. The CAISO shall bear no cost responsibility or functional responsibility for such equipment, except that the CAISO shall arrange for and monitor the maintenance of the communication and control system at the Ancillary Service Provider's expense, unless otherwise agreed by the CAISO and the Ancillary Service Provider. The CAISO shall be responsible for the design, acquisition and installation of any necessary modifications to the CAISO EMS at its own cost.

A 8 The CAISO, in cooperation with the Ancillary Service Provider shall perform testing of the communication and control equipment to ensure that the communication and control system performs to meet the CAISO requirements.

A 9 When the CAISO is satisfied that the communication and control systems meet the CAISO's requirements, the Ancillary Service Provider shall request in writing that the CAISO conduct a certification test with a suggested primary date and time and at least two (2) alternative dates and times. The CAISO shall, within two (2) Business Days of receipt of the Ancillary Service Provider's request, accept a proposed time if possible or suggest at least three (3) alternatives to the Ancillary Service Provider. If the CAISO responds by suggesting alternatives, the Ancillary Service Provider shall, within two (2) Business Days of receipt of the CAISO's response, respond in turn by accepting a proposed alternative if possible or suggesting at least three (3) alternatives, and this procedure shall continue until agreement is reached on the date and time of the test. The Generator shall inform its Scheduling Coordinator of the agreed date and time of the test.

A 10 Testing shall be performed by the CAISO, with the cooperation of the Ancillary Service Provider. Such tests shall include, but not be limited to, the following:

(a) confirmation of control communication path performance;

(b) confirmation of voice circuit for receipt of Dispatch Instructions;

(c) confirmation of the resource's control performance; and

(d) confirmation of the CAISO EMS control to include changing the resource operating level over the range of Regulation proposed at different set points, from minimum to maximum, and at different rates of change from the minimum to the maximum permitted by the design of the resource.

A 10.1 Testing for Non-Generator Resources requesting the use of Regulation Energy Management shall include a market simulation as described in the CAISO's Operating Procedures.

A 11 Upon successful completion of the test, the CAISO shall certify the resource as being permitted to provide Regulation as an Ancillary Service Provider and shall provide a copy of the certificate to the Scheduling Coordinator at the same time. The Scheduling Coordinator shall request the CAISO to update its database to reflect the ability of the resource to provide Regulation.

A 12 The Scheduling Coordinator may submit Bids for Regulation service from the certified resource into the CAISO Markets starting with the Day-Ahead Market for the hour ending 0100 on the second Trading Day after the CAISO's database reflects the resource's certificate.

A 13 The certification to provide Regulation shall remain in force until:

(a) withdrawn by the Scheduling Coordinator or the Ancillary Service Provider by written notice to the CAISO to take effect at the time notified in the notice, which must be the end of a Trading Day; or

(b) if the resource obtained CAISO certification on the basis of a prior communication and control technology, until revoked by the CAISO for failure to comply with the requirement set forth in A 13.1 that the resource install a CAISO-specified standard CAISO direct communication and direct control system (unless exempted by the CAISO).

A 13.1 Unless exempted by the CAISO, if the resource obtained CAISO certification on the basis of a prior communication and control technology, the CAISO shall provide written notice to the Ancillary Service Provider of the Ancillary Service Provider's obligation to install a CAISO-specified standard direct communication and direct control system along with a required date for said work to be completed as mutually agreed upon by the CAISO and the Ancillary Service Provider. Failure to meet the completion date shall be grounds for the revocation of certification, provided that the CAISO must provide the Ancillary Service Provider with at least ninety (90) days advance notice of the proposed revocation.

A 14 The certification may be revoked by the CAISO only under provisions of the CAISO Tariff.

PART B
CERTIFICATION FOR SPINNING RESERVE

B 1 An Ancillary Service Provider wishing to provide Spinning Reserve as an Ancillary Service from a resource whether pursuant to a CAISO award or as part of a self-provision arrangement must meet the following requirements in order to be certified by the CAISO to provide Spinning Reserve service:

B 1.1 the rated capacity of the resource must be 500 KW or greater (i.e. the resource must be capable of providing at least 500 KW of Spinning Reserve) unless the resource is participating in an aggregation arrangement approved by the CAISO;

B 1.2 For a resource with a governor**,** the resource must respond immediately and automatically in proportion to frequency deviations to help restore frequency to the scheduled value in accordance with the following requirements:

Minimum Governor Performance:

a. 5 percent droop (4 percent droop in the case of combustion turbines);

b. +/- 0.036 Hz deadband;

c. Power output changes in one second for any frequency deviation outside of the deadbandd. Participating Generators will not inhibit the real power response of their Generating Units with governor controls by any means that would override the governor response except as necessary to address physical operational constraints for reasons that include ambient temperature limitations, outages of mechanical equipment or regulatory considerations; and

e. For each Generating Unit with governor controls, Participating Generators shall coordinate all plant control systems, locally or remotely controlled, so that they include frequency bias to ensure that each Generating Unit can respond immediately and automatically in proportion to frequency deviations to help restore frequency to the scheduled value.

For a resource without a governor but with a frequency responsive control system, the resource must respond immediately and automatically in proportion to frequency deviations to help restore frequency to the scheduled value in accordance with the following requirements:

Minimum Frequency Responsive Device Performance:

a. If frequency is less than or equal to 59.92 Hz, the resource must reach ten (10) percent of its awarded spinning capacity within eight (8) seconds; and

b. The resources must change the power it delivers or consumes in one (1) second if system frequency is less than or equal to 59.92 Hz

B 1.3 the operator of the resource must have a means of receiving Dispatch Instructions to initiate an increase or decrease in real power (MW) within one (1) minute of the CAISO Control Center determination that Energy from Spinning Reserve capacity must be dispatched;

B 1.4 the resource must be able to increase or decrease its real power (MW) by the maximum amount of Spinning Reserve to be offered within ten (10) minutes and be capable of maintaining its real power for thirty (30) minutes from the time the resource reaches its award capacity;

B 1.5 CAISO approved voice communications services must be in place to provide both primary and alternate voice communication between the CAISO Control Center and the operator controlling the resource; and

B 1.6 The communication system and the resource must pass a qualification test to demonstrate the overall ability to meet the performance requirements of the ASRP for Spinning Reserve.

B 2 An Ancillary Service Provider wishing to be considered for certification for Spinning Reserve service by the CAISO must make a written request to the CAISO, giving details of the technical capability of the resource concerned and identifying the Scheduling Coordinator through whom the Ancillary Service Provider intends to offer Spinning Reserve service. The Ancillary Service Provider shall at the same time send a copy of its request to that Scheduling Coordinator. Technical review request forms will be available from the CAISO.

B 3 No later than one week after receipt of the request, the CAISO shall provide the Ancillary Service Provider with a listing of acceptable communication options and interface equipment options for Spinning Reserve. The CAISO shall send a copy of the listing to the Ancillary Service Provider's Scheduling Coordinator.

B 4 The Ancillary Service Provider may elect to implement any of the approved options defined by the CAISO, and, if it wishes to proceed with its request for certification, shall give written notice to the CAISO of its selected communication option, with a copy to its Scheduling Coordinator.

B 5 When it receives the Ancillary Service Provider notice, the CAISO shall notify the Ancillary Service Provider and the Scheduling Coordinator in writing no later than two weeks after receipt of the notice confirming receipt of the notice and issuing provisional approval of the selected options. Upon receipt of the CAISO acknowledgment, the Ancillary Service Provider may proceed as indicated below to secure the necessary facilities and capabilities required.

B 6 The Ancillary Service Provider may also propose alternatives that it believes may provide an equivalent level of control for consideration by the CAISO. Such proposals shall be in writing and contain sufficient detail for the CAISO to make a determination of suitability. The CAISO may request additional information, if required, to assist in its evaluation of the proposal.

B 7 The CAISO shall respond by accepting the alternative proposal, rejecting the alternative proposal, or suggesting modifications to the alternative proposal. Such acceptance, rejection, or suggested revision must be provided not later than six weeks after the proposal is received by the CAISO. The Ancillary Service Provider and the CAISO shall keep the Scheduling Coordinator informed of this process by each sending to the Scheduling Coordinator a copy of any written communication which it sends to the other.

B 8 Upon agreement as to the method of communication and control to be used by the resource, the CAISO shall provisionally approve the Ancillary Service Provider's proposal in writing providing a copy to the resource's Scheduling Coordinator at the same time.

The Ancillary Service Provider may then proceed to procure and install the equipment and make arrangements for the required communication.

B 9 Design, acquisition, and installation of the resource's equipment shall be under the control of the respective Ancillary Service Provider. The CAISO shall bear no cost responsibility or functional responsibility for such equipment. The CAISO shall be responsible for the design, acquisition and installation of any necessary modifications to its own equipment at its own cost.

B 10 The Ancillary Service Provider shall perform its own testing of its equipment to ensure that the control system performs to meet the CAISO requirements.

B 11 When it is satisfied that its plant, equipment and communication systems meet the CAISO's requirements, the Ancillary Service Provider shall request in writing that the CAISO conduct a certification test with a suggested primary date and time and at least two alternative dates and times. The CAISO shall, within two Business Days of receipt of the request, accept a proposed time if possible or suggest at least three alternatives to the Ancillary Service Provider. If the CAISO responds by suggesting alternatives, the Ancillary Service Provider shall, within two Business Days of receipt of the CAISO's response, respond in turn by accepting a proposed alternative if possible or suggesting at least three alternatives, and this procedure shall continue until agreement is reached on the date and time of the test. The Ancillary Service Provider shall inform its Scheduling Coordinator of the agreed date and time of the test.

B 12 Testing shall be performed under the direction of the CAISO. Such tests shall include, but not be limited to, the following:

B 12.1 confirmation of control communication path performance for Dispatch Instruction;

B 12.2 confirmation of primary and secondary voice circuits for receipt of Dispatch Instructions;

B 12.3 confirmation of the resource performance to include changing the resource's real power over the range of Spinning Reserve proposed from minimum to maximum, and at different rates of change from the minimum to the maximum permitted by the design of the resource; and

B 12.4 testing the resource's governor or other control system performance characteristics by simulating frequency excursions outside the allowed deadband and measuring the response of the resource.

B 13 Upon successful completion of the test the CAISO shall certify the resource as being permitted to provide Spinning Reserve as an Ancillary Service Provider and shall provide a copy of the certificate to the Scheduling Coordinator at the same time. The Scheduling Coordinator shall request the CAISO to update its database to reflect the ability of the resource to provide Spinning Reserve.

B 14 The Scheduling Coordinator may bid Spinning Reserve from the certified resource into the CAISO Markets starting with the Day-Ahead Market for the hour ending 0100 on the Second Trading Day after the CAISO's database reflects the resource's certificate.

B 15 The certification to provide Spinning Reserve shall remain in force until withdrawn by the Scheduling Coordinator or the Ancillary Service Provider by written notice to the CAISO to take effect at the time notified in the notice, which must be the end of a Trading Day.

B 16 The certification may be revoked by the CAISO only under provisions of the CAISO Tariff.

PART C
CERTIFICATION FOR NON-SPINNING RESERVE

C 1 An Ancillary Service Provider wishing to provide Non-Spinning Reserve as an Ancillary Service from a resource whether pursuant to the CAISO's auction or as part of a self-provision arrangement must meet the following requirements in order to be certified by the CAISO to provide Non-Spinning Reserve service:

C 1.1 the rated capacity of the resource must be 500 KW or greater (i.e. the resource must be capable of providing at least 500 KW of Non-Spinning Reserve) unless the resource is participating in an aggregation arrangement approved by the CAISO;

C 1.2 the resource must be able to increase or decrease its real power (MW) as soon as possible to the value indicated in a Dispatch Instruction, reaching the indicated value within ten (10) minutes after issue of the instruction and be capable of maintaining output for thirty (30) minutes from the time the resource reaches its award capacity.

C 2 An Ancillary Service Provider wishing to provide Non-Spinning Reserve as an Ancillary Service, whether pursuant to a CAISO award or as part of a self-provision arrangement, must also meet the following requirements in order to be certified by the CAISO to provide Non-Spinning Reserve service:

C 2.1 the operator of the resource must have a means of receiving a Dispatch Instruction to initiate an increase or decrease in its real power (MW) within one (1) minute of the CAISO Control Center's determination that Non-Spinning Reserve capacity must be dispatched; and

C 2.2 the communication system and the resource must pass a qualification test to demonstrate the overall ability to meet the performance requirements for Non-Spinning Reserve.

C 3 An Ancillary Service Provider wishing to be considered for certification for Non-Spinning Reserve service must make a written request to the CAISO, giving details of the technical capability of the resource concerned and identifying the Scheduling Coordinator through whom the Ancillary Service Provider intends to offer Non-Spinning Reserve. The Ancillary Service Provider shall at the same time send a copy of the request to that Scheduling Coordinator. Technical review request forms will be available from the CAISO.

C 4 No later than one week after receipt of the Ancillary Service Provider's request, the CAISO shall provide the Ancillary Service Provider with a listing of acceptable communication options and interface equipment options for Non-Spinning Reserve. The CAISO shall send a copy of the listing to the Ancillary Service Provider's Scheduling Coordinator.

C 5 The Ancillary Service Provider may elect to implement any of the acceptable communication options and interface equipment options. The Ancillary Service Provider shall give written notice to the CAISO of its selected communication option and interface equipment option, with a copy to its Scheduling Coordinator.

C 6 When it receives the Ancillary Service Provider's notice, the CAISO shall notify the Ancillary Service Provider and the Scheduling Coordinator in writing no later than two weeks after receipt of the notice confirming receipt of the notice and issuing provisional approval of the selected options. Upon receipt of the CAISO acknowledgment the Ancillary Service Provider may proceed as indicated below to secure the necessary facilities and capabilities required.

C 7 The Ancillary Service Provider may also propose alternatives that it believes may provide an equivalent level of control for consideration by the CAISO. Such proposals shall be in

writing and contain sufficient detail for the CAISO to make a determination of suitability. The CAISO may request additional information, if required, to assist in its evaluation of the proposal.

C 8 The CAISO shall respond by accepting the alternative proposal, rejecting the alternative proposal, or suggesting modifications to the alternative proposal. Such acceptance, rejection, or suggested revision must be provided not later than six weeks after the proposal is received by the CAISO. The Ancillary Service Provider and the CAISO shall keep the Scheduling Coordinator informed of this process by each sending to the Scheduling Coordinator a copy of any written communication which it sends to the other.

C 9 Upon agreement as to the method of communication and control to be used by the Ancillary Service Provider, the CAISO shall provisionally approve the proposal in writing providing a copy to the Ancillary Service Provider's Scheduling Coordinator at the same time. The Ancillary Service Provider may then proceed to procure and install the equipment and make arrangements for the required communication.

C 10 Design, acquisition, and installation of the Ancillary Service Provider's equipment shall be under the control of the Ancillary Service Provider. The CAISO shall bear no cost responsibility or functional responsibility for such equipment. The CAISO shall be responsible for the design, acquisition and installation of any necessary modifications to the CAISO's equipment at its own cost.

C 11 The Ancillary Service Provider shall perform its own testing of its equipment to ensure that the control system performs to meet the CAISO requirements.

C 12 When it is satisfied that its plant, equipment and communication systems meet the CAISO's requirements, the Ancillary Service Provider shall request in writing that the CAISO conduct a certification test with a suggested primary date and time and at least two alternative dates and times. The CAISO shall, within two Business Days of receipt of the Ancillary Service Provider's request, accept a proposed time if possible or suggest at least three alternatives. If the CAISO responds by suggesting alternatives, the Ancillary Service Provider shall, within two Business Days of receipt of the CAISO's response, respond in turn by accepting a proposed alternative if possible or suggesting at least three alternatives, and this procedure shall continue until agreement is reached on the date and time of the test. The Ancillary Service Provider shall inform its Scheduling Coordinator of the agreed date and time of the test.

C 13 Testing shall be performed under the direction of the CAISO. Such tests shall include, but not be limited to, the following:

C 13.1 confirmation of control communication path performance;

C 13.2 confirmation of primary and secondary voice circuits for receipt of Dispatch Instructions;

C 13.3 confirmation of the resource control performance; and

C 13.4 confirmation of the range of resource control to include changing the real power (MW) over the range of Non-Spinning Reserve proposed.

C 14 Upon successful completion of the test, the CAISO shall certify the resource as being permitted to provide Non-Spinning Reserve as an Ancillary Service and shall provide a copy of the certificate to the Scheduling Coordinator at the same time. The Scheduling Coordinator shall request the CAISO to update its database to reflect the permission for the resource to provide Non-Spinning Reserve.

C 15 The Scheduling Coordinator may bid Non-Spinning Reserve service from the certified resource into the CAISO Markets starting with the Day-Ahead Market for the hour ending 0100 on the second Trading Day after the CAISO database reflects the resource's certificate.

C 16 The certification to provide Non-Spinning Reserve shall remain in force until withdrawn by the Scheduling Coordinator or the Ancillary Service Provider by written notice to the CAISO to take effect at the time notified in the notice, which must be the end of a Trading Day.

C 17 The certification may be revoked by the CAISO only under provisions of the CAISO Tariff.

PART D
[NOT USED]

PART E
CERTIFICATION FOR BLACK START

E 1 A Generator wishing to provide Black Start capacity from a Generating Unit as an Ancillary Service must meet the requirements stated in Appendix D of the CAISO Tariff in order to be certified by the CAISO to provide Black Start capacity. In addition, the Generating Unit must have a rated capacity 1 MW or greater unless the Generating Unit is participating in an aggregation arrangement approved by the CAISO.

E 2 A Generator wishing to be considered for certification for Black Start service by the CAISO must make a written request to the CAISO. Such request must clearly identify the facilities related to the Generating Unit from which the Generator wishes to provide Black Start and shall identify the Scheduling Coordinator through whom the Generator wishes to offer Black Start service. The Generator shall send a copy of its request to its Scheduling Coordinator at the same time as it sends it to the CAISO. The Generator's written request must include at least the following:

E 2.1 identification of the Generating Unit including Location Code;

E 2.2 a single-line electrical diagram of the Generating Unit connections including auxiliary power busses and the connection to the station switchyard;

E 2.3 a description of the fuel supply used for Black Start including on-site storage and resupply requirements;

E 2.4 a single-line electrical diagram showing the transmission connection from the Generating Unit station switchyard to a connection point on the CAISO Controlled Grid;

E 2.5 a description of the Generating Unit capability to provide both real and reactive power, any Start-Up and Shut-Down requirements, any staffing limitations; and

E 2.6 a description of the primary, alternate and emergency back-up communications systems currently available to the Generator for communications to the CAISO Control Center.

E 3 Upon receipt of the Generator's written request the CAISO shall review the information provided and respond in writing within two weeks of receipt of the request, providing a copy of its response to the Generator's Scheduling Coordinator. The CAISO response may be any of the following:

E 3.1 acceptance of the proposal as presented;

E 3.2 rejection of the proposal as presented with a rationale for such rejection; or

E 3.3 a request for additional information needed by the CAISO to properly evaluate the request.

E 4 A Generator receiving a rejection may submit a written request for reconsideration by the CAISO within 60 days of the date of the rejection notice. A request for reconsideration must address the rationale provided by the CAISO. The CAISO shall respond to a request for reconsideration within 60 days of the date of that request.

E 5 A Generator receiving a request for additional information shall provide such information within 60 days of such request providing a copy at the same time to its Scheduling Coordinator. The CAISO shall review the information and respond within 120 days of the date of the CAISO's request for additional information providing a copy at the same time to the Generator's Scheduling Coordinator.

E 6 Upon acceptance by the CAISO of the Generator's request and agreement as to the method of communication and control to be used by the Generator, the CAISO shall provisionally approve the proposal in writing providing a copy at the same time to the Generator's Scheduling Coordinator. The Generator may then proceed to procure and install the equipment and make arrangements for the required communication.

E 7 Design, acquisition, and installation of the Generator's equipment shall be under the control of the Generator. The CAISO shall bear no cost responsibility or functional responsibility for such equipment. The CAISO shall be responsible for the design, acquisition and installation of any necessary modifications to its own equipment at its own cost.

E 8 The Generator shall perform its own testing of its equipment to ensure that the Black Start system performs to meet the CAISO requirements.

E 9 When it is satisfied that its plant, equipment and communication systems meet the CAISO's requirements, the Generator shall request in writing that the CAISO conduct a certification test with a suggested primary date and time and at least two alternative dates and times. The CAISO shall, within two Business Days of receipt of the Generator's request, accept a proposed time if possible or suggest at least three alternatives to the Generator. If the CAISO responds by suggesting alternatives, the Generator shall, within two Business Days of receipt of the CAISO's response, respond in turn by accepting a proposed alternative if possible or suggesting at least three alternatives, and this procedure shall continue until agreement is reached on the date and time of the test. The Generator shall inform its Scheduling Coordinator of the agreed date and time of the test.

E 10 Testing shall be performed under the direction of the CAISO. Such tests shall include, but not be limited to, the following:

E 10.1 confirmation of control communication path performance;

E 10.2 confirmation of primary, secondary, and emergency voice circuits for receipt of Dispatch Instructions;

E 10.3 confirmation of the Generating Unit performance; and

E 10.4 simulation of a Black Start event.

E 11 Upon successful completion of the test, the CAISO shall certify the Generating Unit as being permitted to provide Black Start capacity as an Ancillary Service and shall provide a copy of the certificate to the Scheduling Coordinator at the same time. The CAISO shall change its Generating Unit data base to reflect the permission for the Generating Unit to provide Black Start service.

E 12 The certification to provide Black Start shall remain in force until withdrawn by the Scheduling Coordinator or the Generator by written notice to the CAISO to take effect at the time noticed in the notice, which must be the end of a Trading Day.

E 13 The certification may be revoked by the CAISO only under provisions of the ASRP or other provisions of the CAISO Tariff.

Attachment C – Records of communications between representative of CAISO and representatives of NERC and WECC

Response to Deficiency Letter Regarding Frequency Response Requirements

California Independent System Operator Corporation

From: O'Connell, Darcy
Sent: Thursday, December 10, 2015 11:16 AM
To: podonnell@wecc.biz
Cc: Colbert, Cathleen
Subject: BAL-003 Frequency Response

Hi Phil,
I'm reaching out to you regarding the implementation of BAL-003-1, specifically Frequency Response and the potential for transferred frequency response. The ISO has been approached by other entities offering to provide transferred frequency response. "Transferred frequency response" is a column in the NERC FRS form, however it's not a defined term and not mentioned in the standard. We are exploring this option, but want to ensure we are taking into account any potential compliance risks since the standard doesn't address the transfer of frequency response.

I'm including Cathleen Colbert from our Market Design and Regulatory Policy department on this email, as she is coordinating a call on Monday 12/14 to further discuss the proposals we have received from other entities. We would like to include WECC in these discussions to help provide guidance so that we are not misinterpreting the standard as we explore these options. Would you or someone else at WECC be willing to attend the call, or if not available, have a discussion with us outside of the call? The call is Monday 12/14 from 9am-12pm PST. If you're available, we can forward the invite to you.

Hope you're not impacted by all the flooding in the Pacific Northwest.

Thanks,
Darcy

Darcy O'Connell
Sr Compliance Analyst
California ISO
(916) 608-5788
doconnell@caiso.com

Subject: BAL-003-1 Background Call
Location: OB - 3220 - Q2 Napa Valley

Start: Wed 12/16/2015 2:00 PM
End: Wed 12/16/2015 2:30 PM
Show Time As: Tentative

Recurrence: (none)

Meeting Status: Not yet responded

Organizer: O'Connell, Darcy
Required Attendees: Colbert, Cathleen; podonnell@wecc.biz
Optional Attendees: Vine, Richard
Resources: OB - 3220 - Q2 Napa Valley

866-528-2256
Access code: 3512172

From: O'Connell, Darcy
Sent: Wednesday, December 16, 2015 12:56 PM
To: 'podonnell@wecc.biz'
Cc: Colbert, Cathleen; Vine, Richard
Subject: RE: BAL-003 Frequency Response

Hi Phil,
Hope you are doing well. I was wondering if you would be available to participate on a conference call with the ISO to discuss the upcoming BAL-003-1. We have a few questions that we would like guidance on to ensure we interpret and implement the standard correctly.

If you are willing to have a conference call with us, we could send a list of questions to you in advance, and set up the meeting for a time when you're available. If you aren't the correct contact at WECC, can you let me know who we should reach out to?

Thanks,
Darcy

From: O'Connell, Darcy
Sent: Thursday, December 10, 2015 11:16 AM
To: podonnell@wecc.biz
Cc: Colbert, Cathleen
Subject: BAL-003 Frequency Response

Hi Phil,
I'm reaching out to you regarding the implementation of BAL-003-1, specifically Frequency Response and the potential for transferred frequency response. The ISO has been approached by other entities offering to provide transferred frequency response. "Transferred frequency response" is a column in the NERC FRS form, however it's not a defined term and not mentioned in the standard. We are exploring this option, but want to ensure we are taking into account any potential compliance risks since the standard doesn't address the transfer of frequency response.

I'm including Cathleen Colbert from our Market Design and Regulatory Policy department on this email, as she is coordinating a call on Monday 12/14 to further discuss the proposals we have received from other entities. We would like to include WECC in these discussions to help provide guidance so that we are not misinterpreting the standard as we explore these options. Would you or someone else at WECC be willing to attend the call, or if not available, have a discussion with us outside of the call? The call is Monday 12/14 from 9am-12pm PST. If you're available, we can forward the invite to you.

Hope you're not impacted by all the flooding in the Pacific Northwest.

Thanks,
Darcy

Darcy O'Connell
Sr Compliance Analyst
California ISO
(916) 608-5788
doconnell@caiso.com

From: O'Donnell, Phil <podonnell@wecc.biz>
Sent: Monday, February 08, 2016 10:09 AM
To: Vine, Richard
Subject: RE: Discuss BAL-003-1 R1 Questions

< EXTERNAL email. Evaluate before clicking. >

Got it, Thanks

From: Vine, Richard [mailto:rvine@caiso.com]
Sent: Monday, February 08, 2016 9:29 AM
To: Colbert, Cathleen; Karg, Michael; Ulmer, Andrew; Gross, Burt; O'Connell, Darcy; O'Donnell, Phil; Loutan, Clyde; Milanes, Lisa
Subject: RE: Discuss BAL-003-1 R1 Questions

All,

Just resending the call-in number for the BAL-003-1 discussion this afternoon at 4pm PST.

Rich

From: Vine, Richard
Sent: Tuesday, February 02, 2016 1:51 PM
To: Colbert, Cathleen <ccolbert@caiso.com>; Karg, Michael <MKarg@caiso.com>; Ulmer, Andrew <aulmer@caiso.com>; Gross, Burton <bgross@caiso.com>; O'Connell, Darcy <DOCONNELL@caiso.com>; 'podonnell@wecc.biz' <podonnell@wecc.biz>
Subject: RE: Discuss BAL-003-1 R1 Questions

I have attached the questions for this phone conference into the meeting invite.

For those desiring to call into this conference, here is the call-in information:

Toll-Free Number: 866-528-2256
Access Code: 3512172#

Rich

-----Original Appointment-----
From: Vine, Richard
Sent: Tuesday, February 02, 2016 1:30 PM
To: Vine, Richard; Colbert, Cathleen; Karg, Michael; Ulmer, Andrew; Gross, Burton; O'Connell, Darcy; podonnell@wecc.biz

Subject: Discuss BAL-003-1 R1 Questions
When: Monday, February 08, 2016 4:00 PM-4:30 PM (UTC-08:00) Pacific Time (US & Canada).
Where: OB - 3210 - Q4 San Diego

Placeholder for conference call with Phil O'Donnell from WECC. I'll add the questions to this meeting invite in the next day or two.

Rich

<< File: Audit Approach Questions for BAL-003-1 R1.docx >>

Subject:	Discuss BAL-003-1 R1 Questions
Location:	OB - 3210 - Q4 San Diego
Start:	Mon 2/8/2016 4:00 PM
End:	Mon 2/8/2016 4:30 PM
Recurrence:	(none)
Meeting Status:	Meeting organizer
Organizer:	Vine, Richard
Required Attendees:	Vine, Richard; Colbert, Cathleen; Karg, Michael; Ulmer, Andrew; Gross, Burton; O'Connell, Darcy; 'podonnell@wecc.biz'
Optional Attendees:	Loutan, Clyde
Resources:	OB - 3103; OB - 3104 - HR; OB - 3107 - Q3 Mono Lake; OB - 3108 - Q3 Mono Lake; OB - 3123 - Q3 Mono Lake; OB - 3137 - Q1 Joshua Tree; OB - 3220 - Q2 Napa Valley; OB - 3221 - Q4 San Diego; OB - 3251 - Q2 Napa Valley; OB - 3254 - Q4 San Diego; OB - 3255 - Q2 Napa Valley; OB - 3258 - Executive; OB - 3262 - Legal; OB - 3210 - Q4 San Diego

Adding Questions attachment

_____

Placeholder for conference call with Phil O'Donnell from WECC. I'll add the questions to this meeting invite in the next day or two.

Rich

Audit Approach Questions for BAL-003-1 R1

1. BAL-003-1 Attachment A states that a BA's annual Frequency Response Measure (FRM) will be automatically calculated as the median of the responses for all events during a year. This would imply that a BA need only provide single-event FRM above its Frequency Response Obligation (FRO) for just over half the events during a year. However, is it WECC's expectation that a BA plan on having available frequency response equal to or greater than its FRO at all times?

2. Assuming a BA intends to achieve, either solely or through bi-lateral contracts, enough frequency response to meet or exceed its FRO, there is still a question of how many total MW of Frequency Responsive Reserves (FRR) the BA should plan to procure. Is a BA expected to plan for and procure 24/7, 365 days a year:
    a. Enough MW of FRR to meet the anticipated "average" event size (based on historical event averages) plus a conservative margin, say 20 – 30%? For the Western Interconnection this might require enough FRR to meet a frequency drop of ~ 0.12 Hz.
    b. Enough MW of FRR to meet the worst case event? For the Western Interconnection this would be the loss of 2 Palo Verde units with an anticipated frequency drop of 0.291 Hz.

3. As a follow-on to Question 2, how will WECC treat events that are greater than the worst case events on which the standard is based (Loss of 2 Palo Verde units)? Will these events still be included in a BA's annual FRM calculation, or are these events excluded by NERC from the candidate events?

4. Can the Transferred Frequency Response column in the FRS Form 2 be used to reflect bilateral contracts between BAs transferring their FROs? If so:
    a. Must these offsets be done consistently for each event or is there potential discretion?
    b. Is it expected that these bi-lateral agreements will be in place up-front annually, or can "after-the-fact" transfers be arranged depending on actual BA performance during each event? Our informal conversations with WECC indicated that they did not see any prohibition against entering into such bi-lateral contracts either prior to or after-the-fact.

5. There appears to be an error in the VSL tables in BAL-003-1.1 for R1 in that the "Lower VSL" and "High VSL" are duplicates, as are the "Medium VSL" and "Severe VSL". Which VSLs will WECC be using to evaluate the potential penalty associated with non-compliance? Our informal conversation with WECC indicated that they will utilize only the "Lower VSL" and "Medium VSL" values for evaluating associated non-compliance with R1.

6. BAL-003-1 Attachment 1 makes references which imply that the BA's Energy Management System (EMS) is generally used to determine intertie flow changes, and ultimately FRM, for events. Does WECC see any problem with the BA using intertie data obtained directly from the Participating Transmission Owners who own the measurement equipment when calculating single-event FRM for an event?

From: Holly Hawkins <Holly.Hawkins@nerc.net>
Sent: Thursday, March 17, 2016 6:21 PM
To: Ulmer, Andrew
Cc: Vine, Richard
Subject: Re: BAL-003-1 Question

Thanks again.

Holly A. Hawkins
Associate General Counsel
North American Electric Reliability Corporation
(202) 644-8055

> On Mar 17, 2016, at 7:26 PM, Ulmer, Andrew <aulmer@caiso.com> wrote:
>
> Holly,
>
> Here is a link to the memo we will present to our Board of Governors
> next week:
> https://urldefense.proofpoint.com/v2/url?u=http-3A__www.caiso.com_Docu
> ments_DecisionPhase1FrequencyResponseProposal-2DMemo-2DMar2016.pdf&d=B
> QIFAg&c=V-P6fVLioYKRHZf22ixqTA&r=I9qIaTLdPE5vYnfE30hIcg&m=qsAunMN-_s5L
> fpmlJCK_UWLi7wxf5YffVZ8t1HOlvl4&s=9jwA3KGl35s3btedt4b_dPi5THK0qHiRhs9g
> UyzerIY&e=
>
> This will help guide the reader t through the tariff revisions we plan to propose.
>
> Talk to you tomorrow.
>
> Best,
>
> Andrew
>
> -----Original Message-----
> From: Holly Hawkins [mailto:Holly.Hawkins@nerc.net]
> Sent: Thursday, March 17, 2016 2:58 PM
> To: Ulmer, Andrew <aulmer@caiso.com>
> Cc: Vine, Richard <rvine@caiso.com>
> Subject: RE: BAL-003-1 Question
>
> Thanks so much. I will forward to the NERC and WECC group. We look forward to the call tomorrow.
>
> _____
> Holly A. Hawkins
> Associate General Counsel
> North American Electric Reliability Corporation
> 1325 G Street NW Suite 600

> Washington, DC 20005
> 202-400-3000 office | 202-644-8055 direct holly.hawkins@nerc.net
> Reliability | Accountability
>
>
> -----Original Message-----
> From: Ulmer, Andrew [mailto:aulmer@caiso.com]
> Sent: Thursday, March 17, 2016 5:09 PM
> To: Holly Hawkins <Holly.Hawkins@nerc.net>
> Cc: Vine, Richard <rvine@caiso.com>
> Subject: RE: BAL-003-1 Question
>
> Holly:
>
> Here's the market notice we issued today that contains a link to the
> draft tariff language I referenced yesterday:
> https://urldefense.proofpoint.com/v2/url?u=http-3A__www.caiso.com_docu
> ments_FrequencyResponseDraftTariffLanguageCall4116.htm&d=BQIFAg&c=V-P6
> fVLioYKRHZf22ixqTA&r=I9qIaTLdPE5vYnfE30hIcg&m=2lVQCWfGS_GEn-SHWSAyJcmH
> QBo1NaPuXUuFTF1zX8Y&s=qP4K9qbqU7kmHQiVmyYMMGE5UZEH6GLB-Dh_E4eUeCw&e=
>
> We don't want to take up time on tomorrow's call with this draft language, but after our conversation folks at NERC/WECC may want to review. Of course, any feedback is appreciated.
>
> Andrew
>
>
> -----Original Message-----
> From: Holly Hawkins [mailto:Holly.Hawkins@nerc.net]
> Sent: Wednesday, March 16, 2016 2:36 PM
> To: Ulmer, Andrew <aulmer@caiso.com>
> Cc: Vine, Richard <rvine@caiso.com>
> Subject: Re: BAL-003-1 Question
>
> Great. Thanks so much. We look forward to the call on Friday.
>
> Holly A. Hawkins
> Associate General Counsel
> North American Electric Reliability Corporation
> (202) 644-8055
>
>
>> On Mar 16, 2016, at 5:17 PM, Ulmer, Andrew <aulmer@caiso.com> wrote:
>>
>> Holly:
>>
>> In the context of our stakeholder process addressing frequency response issues, we plan to issue draft tariff language tomorrow for stakeholder review that will touch on some of the issues we will discuss on Friday. I will provide you a copy of that language so you can circulate to folks at NERC/WECC.
>>
>> I don't think we will need to discuss the tariff language on the call but we would welcome feedback after the call.
>>

>> Andrew
>>
>> -----Original Message-----
>> From: Holly Hawkins [mailto:Holly.Hawkins@nerc.net]
>> Sent: Friday, March 11, 2016 1:46 PM
>> To: Ulmer, Andrew <aulmer@caiso.com>
>> Cc: Vine, Richard <rvine@caiso.com>
>> Subject: RE: BAL-003-1 Question
>>
>> Thanks. I went ahead and scheduled it. Please feel free to forward to the CAISO people you want to be included. I have not heard from Mike Moon, so unless you hear differently, I am going to assume he will make himself available. We look forward to speaking with you all. Have a great weekend!
>>
>> _____
>> Holly A. Hawkins
>> Associate General Counsel
>> North American Electric Reliability Corporation
>> 1325 G Street NW Suite 600
>> Washington, DC 20005
>> 202-400-3000 office | 202-644-8055 direct holly.hawkins@nerc.net
>> Reliability | Accountability
>>
>>
>> -----Original Message-----
>> From: Ulmer, Andrew [mailto:aulmer@caiso.com]
>> Sent: Friday, March 11, 2016 4:10 PM
>> To: Holly Hawkins <Holly.Hawkins@nerc.net>
>> Cc: Vine, Richard <rvine@caiso.com>
>> Subject: RE: BAL-003-1 Question
>>
>> That would be great. We will make ourselves available.
>>
>> Andrew
>>
>> -----Original Message-----
>> From: Holly Hawkins [mailto:Holly.Hawkins@nerc.net]
>> Sent: Friday, March 11, 2016 1:09 PM
>> To: Ulmer, Andrew <aulmer@caiso.com>
>> Cc: Vine, Richard <rvine@caiso.com>
>> Subject: RE: BAL-003-1 Question
>>
>> Andrew,
>>
>> I am trying to set up a call for next Friday at 2:00 Eastern Time. Once I hear back from WECC on whether that time works, we can confirm it if it works for you all. Please let me know. Thanks!
>>
>> _____
>> Holly A. Hawkins
>> Associate General Counsel
>> North American Electric Reliability Corporation
>> 1325 G Street NW Suite 600
>> Washington, DC 20005

>> 202-400-3000 office | 202-644-8055 direct holly.hawkins@nerc.net
>> Reliability | Accountability
>>
>>
>> -----Original Message-----
>> From: Ulmer, Andrew [mailto:aulmer@caiso.com]
>> Sent: Friday, March 11, 2016 12:14 PM
>> To: Holly Hawkins <Holly.Hawkins@nerc.net>
>> Cc: Vine, Richard <rvine@caiso.com>
>> Subject: RE: BAL-003-1 Question
>>
>> Holly:
>>
>> I wanted to check on the status pulling together a phone call with NERC/WECC to discuss BAL-003 compliance. We can make ourselves available next week with the exception of Monday.
>>
>> I am asking again because we are working on draft tariff language relating to compliance with BAL-003 that we will likely share with stakeholders in the near term. We also plan to discuss our initiative examining mechanisms to comply with BAL-003 at our Board of Governors meeting on March 24.
>>
>> Andrew
>>
>> Andrew Ulmer
>> Director, Federal Regulatory Affairs
>> California Independent System Operator Corp.
>> Tel. 202.239.3947
>> Cell. 916.673.7797
>>
>>
>>
>> -----Original Message-----
>> From: Holly Hawkins [mailto:Holly.Hawkins@nerc.net]
>> Sent: Friday, February 26, 2016 12:08 PM
>> To: Ulmer, Andrew <aulmer@caiso.com>
>> Subject: RE: BAL-003-1 Question
>>
>> Thanks so much. Have a great weekend!
>>
>> _____
>> Holly A. Hawkins
>> Associate General Counsel
>> North American Electric Reliability Corporation
>> 1325 G Street NW Suite 600
>> Washington, DC 20005
>> 202-400-3000 office | 202-644-8055 direct holly.hawkins@nerc.net
>> Reliability | Accountability
>>
>> -----Original Message-----
>> From: Ulmer, Andrew [mailto:aulmer@caiso.com]
>> Sent: Friday, February 26, 2016 3:07 PM
>> To: Holly Hawkins <Holly.Hawkins@nerc.net>
>> Subject: RE: BAL-003-1 Question

>>
>> Holly:
>>
>> Here is the link to the California ISO's draft final proposal related
>> to frequency response: DFP:
>> https://urldefense.proofpoint.com/v2/url?u=http-3A__www.caiso.com_Doc
>> u
>> ments_DraftFinalProposal-5FFrequencyResponse.pdf&d=BQIFAg&c=V-P6fVLio
>> Y
>> KRHZf22ixqTA&r=I9qIaTLdPE5vYnfE30hIcg&m=O_0aLl4RGsHrnkUSFZy3SsNPv_Xbl
>> Z wb0x3ImdZdqWs&s=tPiP60_Gw7ozSEc44r0jjBBpPdH9rNWc7QK_WrJuF5g&e=
>>
>> Here is a link to a PPT presentation that we shared with our
>> stakeholder about the draft final proposal:
>> https://urldefense.proofpoint.com/v2/url?u=http-3A__www.caiso.com_Doc
>> u
>> ments_Agenda-5FPresentation-5FFrequencyResponseDraftFinalProposal.pdf
>> &
>> d=BQIFAg&c=V-P6fVLioYKRHZf22ixqTA&r=I9qIaTLdPE5vYnfE30hIcg&m=O_0aLl4R
>> G
>> sHrnkUSFZy3SsNPv_XblZwb0x3ImdZdqWs&s=NqIqpRmdLSKUqSEPsDIKLO068jEWa7Fn
>> E
>> h1anNE7vV0&e=
>>
>> Have a great weekend.
>>
>> Andrew
>>
>> -----Original Message-----
>> From: Holly Hawkins [mailto:Holly.Hawkins@nerc.net]
>> Sent: Thursday, February 04, 2016 6:42 PM
>> To: Ulmer, Andrew <aulmer@caiso.com>
>> Subject: RE: BAL-003-1 Question
>>
>> Great. Thanks again.
>>
>>
>> _____
>> Holly A. Hawkins
>> Associate General Counsel
>> North American Electric Reliability Corporation
>> 1325 G Street NW Suite 600
>> Washington, DC 20005
>> 202-400-3000 office | 202-644-8055 direct holly.hawkins@nerc.net
>> Reliability | Accountability
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>>
>> -----Original Message-----
>> From: Ulmer, Andrew [mailto:aulmer@caiso.com]
>> Sent: Thursday, February 04, 2016 9:41 PM

>> To: Holly Hawkins <Holly.Hawkins@nerc.net>
>> Subject: RE: BAL-003-1 Question
>>
>> Holly:
>>
>> I will send specific discussion items before the call. CAISO attendees:
>>
>> Mike Karg - Shift Supervisor, Real-Time Operations Brad Cooper -
>> Manager, Market Design and Regulatory Policy Rich Vine - Manager,
>> Operations and Planning Compliance Lorenzo Kristov - Principal,
>> Market and Infrastructure Policy Andrew Ulmer - Director, Fed. Reg.
>> Affairs
>>
>> Andrew
>>
>> -----Original Message-----
>> From: Holly Hawkins [mailto:Holly.Hawkins@nerc.net]
>> Sent: Thursday, February 04, 2016 6:25 PM
>> To: Ulmer, Andrew <aulmer@caiso.com>
>> Subject: RE: BAL-003-1 Question
>>
>> Great! Next Friday works for everybody we need from NERC too. I can circulate a call-in number that you can forward to your team. I will send it shortly. Thanks again for getting this scheduled on your end.
>>
>>
>> _____
>> Holly A. Hawkins
>> Associate General Counsel
>> North American Electric Reliability Corporation
>> 1325 G Street NW Suite 600
>> Washington, DC 20005
>> 202-400-3000 office | 202-644-8055 direct holly.hawkins@nerc.net
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>>
>>
>> -----Original Message-----
>> From: Ulmer, Andrew [mailto:aulmer@caiso.com]
>> Sent: Thursday, February 04, 2016 7:18 PM
>> To: Holly Hawkins <Holly.Hawkins@nerc.net>
>> Subject: RE: BAL-003-1 Question
>>
>> Holly,
>>
>> We can confirm for next Friday at 2.30 Eastern. Thank you. Do you want me to circulate a call-in number?
>>
>> Andrew
>>
>> -----Original Message-----
>> From: Ulmer, Andrew
>> Sent: Thursday, February 04, 2016 9:01 AM
>> To: 'Holly Hawkins' <Holly.Hawkins@nerc.net>

>> Subject: RE: BAL-003-1 Question
>>
>> Sounds good. I will push for that time on our side and will confirm later today, I hope.
>>
>> -----Original Message-----
>> From: Holly Hawkins [mailto:Holly.Hawkins@nerc.net]
>> Sent: Thursday, February 04, 2016 9:00 AM
>> To: Ulmer, Andrew <aulmer@caiso.com>
>> Subject: RE: BAL-003-1 Question
>>
>> Andrew,
>>
>> My apologies again for the delay. I can't seem to make Tuesday work after all on my end. We have meetings next week with our Board, and that generally ties up me and a couple of others who need to be on the call until Thursday. It looks like next Friday at 2:30 Eastern could work for all of us here. Would that work for you all? Thanks again. We'll get this scheduled eventually!
>>
>>
>> _____
>> Holly A. Hawkins
>> Associate General Counsel
>> North American Electric Reliability Corporation
>> 1325 G Street NW Suite 600
>> Washington, DC 20005
>> 202-400-3000 office | 202-644-8055 direct holly.hawkins@nerc.net
>> Reliability | Accountability
>>
>>
>>
>> -----Original Message-----
>> From: Ulmer, Andrew [mailto:aulmer@caiso.com]
>> Sent: Wednesday, February 03, 2016 3:59 PM
>> To: Holly Hawkins <Holly.Hawkins@nerc.net>
>> Subject: Re: BAL-003-1 Question
>>
>> Holly,
>>
>> No worries. It would be great if we can arrange something on Tuesday but that may be a challenge on this end. I'll check schedules and get back in touch.
>>
>> Best,
>>
>> Andrew
>>
>> Sent from my iPhone
>>
>> On Feb 3, 2016, at 12:49 PM, Holly Hawkins <Holly.Hawkins@nerc.net<mailto:Holly.Hawkins@nerc.net>> wrote:
>>
>> Hi Andrew,
>>
>> My apologies again for the delay. Unfortunately I cannot get either one of our real frequency response experts on the phone tomorrow. One is on vacation and the other will be on an airplane. We might be able to work something out

for next week. I am looking at calendars for Tuesday afternoon. Let me know if that could work on your end. If not, I will look for times the following week. Thanks for your patience. Things are never easy around here right before a Board meeting!
>>
>>
>> _____
>> Holly A. Hawkins
>> Associate General Counsel
>> North American Electric Reliability Corporation
>> 1325 G Street NW Suite 600
>> Washington, DC 20005
>> 202-400-3000 office | 202-644-8055 direct
>> holly.hawkins@nerc.net<mailto:holly.hawkins@nerc.net>
>> Reliability | Accountability
>>
>>
>>
>> From: Ulmer, Andrew [mailto:aulmer@caiso.com]
>> Sent: Wednesday, February 03, 2016 11:39 AM
>> To: Holly Hawkins
>> <Holly.Hawkins@nerc.net<mailto:Holly.Hawkins@nerc.net>>
>> Subject: RE: BAL-003-1 Question
>>
>> Holly:
>>
>> Do you think we can have a call tomorrow at 4 p.m. Eastern? If so, I can send a calendar request with a conference bridge.
>>
>> I anticipate folks from our market design, compliance and operation departments will join.
>>
>> Thank you again for your help scheduling this discussion.
>>
>> Andrew
>>
>> Andrew Ulmer
>> Director, Federal Regulatory Affairs
>> California Independent System Operator Corp.
>> Tel. 202.239.3947
>> Cell. 916.673.7797
>>
>>
>>
>> From: Holly Hawkins [mailto:Holly.Hawkins@nerc.net]
>> Sent: Tuesday, February 02, 2016 3:27 PM
>> To: Ulmer, Andrew <aulmer@caiso.com<mailto:aulmer@caiso.com>>
>> Subject: RE: BAL-003-1 Question
>>
>> Andrew,
>>
>> I am trying to confirm Thursday at 4:00 with my team. Could you hold that time for us? I will try to get back to you in the morning. Thanks so much!
>>

>>
>> _____
>> Holly A. Hawkins
>> Associate General Counsel
>> North American Electric Reliability Corporation
>> 1325 G Street NW Suite 600
>> Washington, DC 20005
>> 202-400-3000 office | 202-644-8055 direct
>> holly.hawkins@nerc.net<mailto:holly.hawkins@nerc.net>
>> Reliability | Accountability
>>
>>
>>
>> From: Ulmer, Andrew [mailto:aulmer@caiso.com]
>> Sent: Tuesday, February 02, 2016 1:00 PM
>> To: Holly Hawkins
>> <Holly.Hawkins@nerc.net<mailto:Holly.Hawkins@nerc.net>>
>> Subject: RE: BAL-003-1 Question
>>
>> Holly:
>>
>> Could we schedule a call on Thursday, February 4 at either 2 p.m. or 4 p.m. Eastern? I think we can cover our questions/topics in 30 minutes.
>>
>> Thank you again for helping facilitate this discussion.
>>
>> Andrew
>>
>> From: Holly Hawkins [mailto:Holly.Hawkins@nerc.net]
>> Sent: Friday, January 29, 2016 8:59 AM
>> To: Ulmer, Andrew <aulmer@caiso.com<mailto:aulmer@caiso.com>>
>> Subject: RE: BAL-003-1 Question
>>
>> Thanks, Andrew. Yes, please send some potential times, and I will check on my end too for dates that may work. If we can have a call next week, that might work. Otherwise, we'll probably have to wait until after our Board meeting, which is the week after next. Thanks again for helping get this organized.
>>
>> Have a safe trip back to CA. I am a little jealous. :)
>>
>>
>> _____
>> Holly A. Hawkins
>> Associate General Counsel
>> North American Electric Reliability Corporation
>> 1325 G Street NW Suite 600
>> Washington, DC 20005
>> 202-400-3000 office | 202-644-8055 direct
>> holly.hawkins@nerc.net<mailto:holly.hawkins@nerc.net>
>> Reliability | Accountability
>>
>>
>>

>> From: Ulmer, Andrew [mailto:aulmer@caiso.com]
>> Sent: Friday, January 29, 2016 11:55 AM
>> To: Holly Hawkins
>> <Holly.Hawkins@nerc.net<mailto:Holly.Hawkins@nerc.net>>
>> Subject: RE: BAL-003-1 Question
>>
>> Holly:
>>
>> I hope you and others at NERC are finally dug-out. I am headed back to California tomorrow and will try and send some suggested times/dates for a call. I know our folks are interested in exploring a mechanism to secure the ability to rely on frequency response capability from other BAs within the interconnection as a possible insurance mechanism. The idea would be to contract for that right upfront as opposed to contracting for it after-the fact. I think a discussion will help us.
>>
>> Best,
>>
>> Andrew
>>
>> From: Holly Hawkins [mailto:Holly.Hawkins@nerc.net]
>> Sent: Monday, January 25, 2016 11:19 AM
>> To: Ulmer, Andrew <aulmer@caiso.com<mailto:aulmer@caiso.com>>
>> Subject: RE: BAL-003-1 Question
>>
>> A call sounds great. I may not be able to get things coordinated until I get back to the office, which I hoped would be tomorrow. But I think you are right, looks like another snow day, especially considering that there are no plows anywhere near our street yet.
>>
>> I hope you are recovering from the snow shoveling. Be safe. We'll touch base soon.
>>
>> _____
>> Holly A. Hawkins
>> Associate General Counsel
>> North American Electric Reliability Corporation
>> 1325 G Street NW Suite 600
>> Washington, DC 20005
>> 202-400-3000 office | 202-644-8055 direct
>> holly.hawkins@nerc.net<mailto:holly.hawkins@nerc.net>
>> Reliability | Accountability
>>
>>
>>
>> From: Ulmer, Andrew [mailto:aulmer@caiso.com]
>> Sent: Monday, January 25, 2016 2:16 PM
>> To: Holly Hawkins
>> <Holly.Hawkins@nerc.net<mailto:Holly.Hawkins@nerc.net>>
>> Subject: RE: BAL-003-1 Question
>>
>> Thank you. I think we will want to have a call.
>>
>> Storm went well. I spent a fair amount of time with my neighbors digging out. I found new pain I had not imagined feeling. :)
>>

>> I expect we might see another snow day tomorrow but I will send you a note with some possible times.
>>
>> Andrew
>>
>> From: Holly Hawkins [mailto:Holly.Hawkins@nerc.net]
>> Sent: Monday, January 25, 2016 11:12 AM
>> To: Ulmer, Andrew <aulmer@caiso.com<mailto:aulmer@caiso.com>>
>> Subject: RE: BAL-003-1 Question
>>
>>
>> < EXTERNAL email. Evaluate before clicking. > Hi Andrew,
>>
>> My apologies for not responding sooner. I've been on and off email while stuck at home. I hope you weathered the storm okay - and even better if you were back in CA for all of this.
>>
>> I ran your question by some of our technical people to see what they think. Here is a summary of some of the answers I received.
>>
>> It is true that if an entity's annual Frequency Response Measure (FRM) is equal to or more negative than its Frequency Response Obligation (FRO), then the entity is in compliance with the standard. However, the intent of the standard is that an entity should have its FRO at all times since you never know when it will be needed and which FRM will be used to check for compliance. Our compliance people also said that they believe FERC would pretty obviously expect FROs to be met 24/7, and additionally, that NERC and the standard drafting team never contemplated after-the-fact exchanges of FR, although FR sharing groups probably could do so undetected.
>>
>> That being said, while there may be no penalty if you meet your annual FRM, there would likely be other consequences if the IFRO (Interconnection Frequency Response Obligation) was not met during an event.
>>
>> Let me know if this helps. We are happy to have a call. I can try to get something set up for later this week or next week with a couple of our technical guys who helped developed the standard as well as a compliance person or two. And feel free to email or call with any more questions. Thanks. Stay safe in the snow!
>>
>> _____
>> Holly A. Hawkins
>> Associate General Counsel
>> North American Electric Reliability Corporation
>> 1325 G Street NW Suite 600
>> Washington, DC 20005
>> 202-400-3000 office | 202-644-8055 direct
>> holly.hawkins@nerc.net<mailto:holly.hawkins@nerc.net>
>> Reliability | Accountability
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>>
>>
>> From: Ulmer, Andrew [mailto:aulmer@caiso.com]
>> Sent: Friday, January 22, 2016 1:05 PM
>> To: Holly Hawkins
>> <Holly.Hawkins@nerc.net<mailto:Holly.Hawkins@nerc.net>>
>> Subject: BAL-003-1 Question
>>
>> Holly,
>>

>> I hope you are well-provisioned and stay safe during this storm.
>>
>> If you're still reading email, I thought I would ask if you received any feedback on the BAL-003-1 question. As we continue our work more questions are developing, so I thought I would also ask if we might explore setting up a clarification discussion.
>>
>> Best,
>>
>> Andrew
>>
>> Andrew Ulmer
>> Director, Federal Regulatory Affairs
>> California Independent System Operator Corp.
>> Tel. 202.239.3947
>> Cell. 916.673.7797
>>
>>
>> **********
>> *
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>> with any attachments thereto, is confidential and may be legally privileged against disclosure other than to the intended recipient. It is intended solely for the addressee(s) and access to the message by anyone else is unauthorized. If you are not the intended recipient of this electronic message, you are hereby notified that any dissemination, distribution, or any action taken or omitted to be taken in reliance on it is strictly prohibited and may be unlawful. If you have received this electronic message in error, please delete and immediately notify the sender of this error.
>> **********
>> *
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Subject: CAISO/NERC/WECC Call to Discuss BAL-003
Location: (866) 740-1260 Passcode: 7948637 Security 031816

Start: Fri 3/18/2016 11:00 AM
End: Fri 3/18/2016 12:00 PM

Recurrence: (none)

Meeting Status: Accepted

Organizer: Holly Hawkins

< EXTERNAL email. Evaluate before clicking. >

The purpose of this call is to follow-up on CAISO's questions regarding BAL-003. Please contact me with any questions before next Friday. Otherwise, we look forward to speaking with you all then. Thanks.

Holly

From: Ulmer, Andrew
Sent: Tuesday, February 09, 2016 1:59 PM
To: 'Holly Hawkins'; Howard Gugel; Bob Cummings; Darrel Richardson; Steven Noess; Ed Kichline
Cc: Vine, Richard; Karg, Michael; Cooper, Bradford; O'Connell, Darcy; Gross, Burton
Subject: Call with CAISO to discuss BAL-003 Standard

Dear all:

For purposes of our call this Friday, below are some of the questions we are considering and would value the opportunity to discuss. Thank you in advance for making the time for this discussion.

Andrew

Andrew Ulmer
Director, Federal Regulatory Affairs
California Independent System Operator Corp.
Tel. 202.239.3947
Cell. 916.673.7797

Questions related to BAL-003-1 R1

1. BAL-003-1 Attachment A states that a BA's annual Frequency Response Measure (FRM) will be automatically calculated as the median of the responses for all events during a year. This would imply that a BA need only provide single-event FRM above its Frequency Response Obligation (FRO) for just over half the events during a year. However, is it NERC's expectation that a BA plan on having available frequency response equal to or greater than its FRO at all times?

2. Assuming a BA intends to achieve, either solely or through bi-lateral contracts, enough frequency response to meet or exceed its FRO, there is still a question of how many total MW of Frequency Responsive Reserves (FRR) the BA should plan to procure. Is a BA expected to plan for and procure 24/7, 365 days a year:

   a. Enough MW of FRR to meet the anticipated "average" event size (based on historical event averages) plus a conservative margin, say 20 – 30%? For the Western Interconnection this might require enough FRR to meet a frequency drop of ~ 0.12 Hz.
   b. Enough MW of FRR to meet the worst case event? For the Western Interconnection this would be the loss of 2 Palo Verde units with an anticipated frequency drop of 0.291 Hz.

3. As a follow-on to Question 2, how will NERC treat events that are greater than the worst case events on which the standard is based (Loss of 2 Palo Verde units)? Will these events still be included in a BA's annual FRM calculation, or are these events excluded by NERC from the candidate events?

4. Can the Transferred Frequency Response column in the FRS Form 2 be used to reflect bilateral contracts between BAs transferring their FROs? If so:

a. Must these offsets be done consistently for each event or is there potential discretion?

b. Is it expected that these bi-lateral agreements will be in place up-front annually, or can "after-the-fact" transfers be arranged depending on actual BA performance during each event?

5. BAL-003-1 Attachment 1 makes references which imply that the BA's Energy Management System (EMS) is generally used to determine intertie flow changes, and ultimately FRM, for events. Does NERC see any problem with the BA using intertie data obtained directly from the Participating Transmission Owners who own the measurement equipment when calculating single-event FRM for an event?

-----Original Appointment-----
From: Holly Hawkins [mailto:Holly.Hawkins@nerc.net]
Sent: Thursday, February 04, 2016 6:27 PM
To: Holly Hawkins; Howard Gugel; Bob Cummings; Darrel Richardson; Steven Noess; Ed Kichline; Ulmer, Andrew
Subject: Confirmed: Call with CAISO to discuss BAL-003 Standard
When: Friday, February 12, 2016 2:30 PM-3:30 PM (UTC-05:00) Eastern Time (US & Canada).
Where: (866) 740-1260 Passcode: 7948637 Security: 021216

< EXTERNAL email. Evaluate before clicking. >