



June 21, 2019

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. ER15-2565-\_\_\_\_  
April 2019 Informational Report  
Energy Imbalance Market – Transition Period Report – Balancing  
Authority of Northern California/Sacramento Municipal Utility District**

Dear Secretary Bose:

The California Independent System Operator Corporation (CAISO) hereby submits its report on the transition period of Powerex Canadian EIM Entity during its first six months of participation in the Energy Imbalance Market (EIM) for April 2019. The Commission also directed the Department of Market Monitoring (DMM) to submit an independent assessment of the CAISO's report, which the CAISO's DMM will seek to file within approximately 15 business days.

Please contact the undersigned with any questions.

Respectfully submitted

**By: /s/ Anna A. McKenna**

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# California ISO

**Energy Imbalance Market  
April 3 – April 30, 2019**

**Transition Period Report  
BANCSMUD EIM Entity**

June 21, 2019

## I. Introduction and Background

On October 29, 2015, the Federal Energy Regulatory Commission (Commission) approved the California Independent System Operator Corporation's (CAISO) proposed tariff amendments to allow a transition period for new Energy Imbalance Market (EIM) entities during the first six months of EIM participation, effective November 1, 2015.<sup>1</sup> Sacramento Municipal Utility District (SMUD), which is part of the Balancing Authority of Northern California (BANC), began participating in the EIM on April 3, 2019, and the transition period will apply to the BANC-SMUD balancing authority area (BAA) until October 3, 2019.

During the six-month transition period, the price of energy in the new EIM entity's BAA is not subject to the pricing parameters that normally apply when the market optimization relaxes a transmission constraint or the power balance constraint. Instead, during the six-month transition period, the CAISO will clear the market based on the marginal economic energy bid (referred to herein as "transition period pricing"). In addition, during the six-month transition period, the CAISO sets the flexible ramping constraint relaxation parameter for the new EIM entity's BAA between \$0 and \$0.01, but only when the power balance or transmission constraints are relaxed in the relevant EIM BAA. This is necessary to allow the market software to determine the marginal energy bid price.

Consistent with the Commission's October 29 Order, the CAISO and the Department of Market Monitoring (DMM) will file informational reports at 30-day intervals during the six-month transition period for any new EIM entity. The CAISO provides this report for BANC-SMUD to comply with the Commission's requirements in the October 29 Order. The CAISO anticipates filing these reports on a monthly basis. However, because the complete set of data is not available immediately at the end of the applicable month,<sup>2</sup> and depending on the market performance each month, along with the need to coordinate with the EIM entity, the CAISO expects to continue to file the monthly reports approximately 25 days after the end of each month in order to provide the prior full month's data.

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<sup>1</sup> *Cal. Indep. Sys. Operator Corp.*, 153 FERC ¶ 61,104 (2015) (October 29 Order).

<sup>2</sup> The earliest the CAISO can start gathering the data is 10 business days after the last day for the reporting month since this is when the price correction window expires.

## II. Highlights

Overall, BANC-SMUD's transition into the EIM was smooth and observed some transitional data issues after the activation. The first month's market performance highlights are as follows:

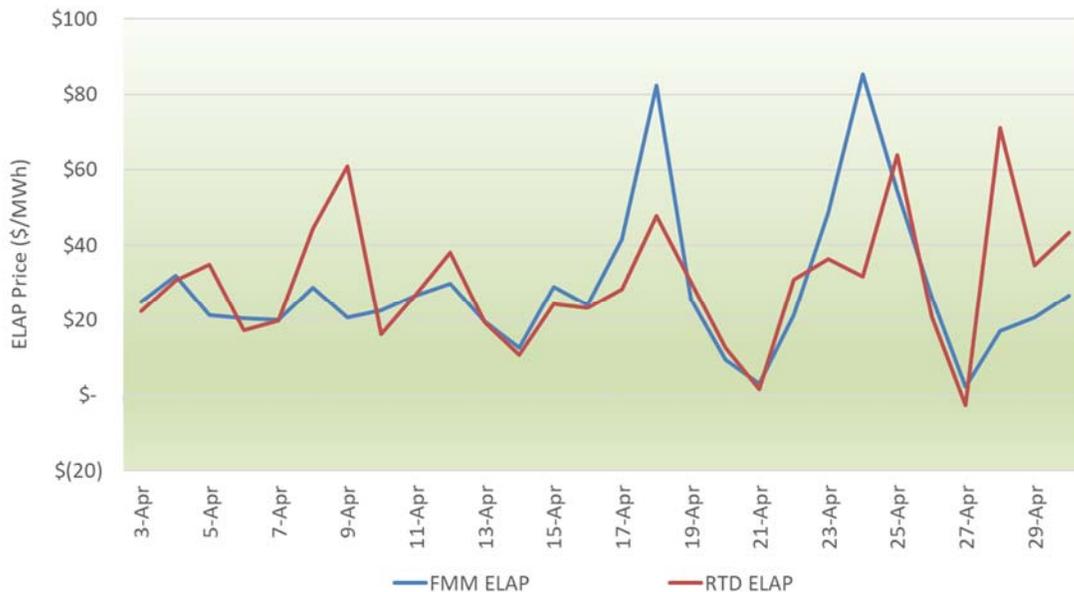
- In April, prices were stable and within reasonable ranges, with the monthly average BANC-SMUD BAA prices being \$28.41/MWh in the fifteen-minute market (FMM) and \$29.93/MWh in the real-time dispatch (RTD).
- Power balance constraint infeasibilities for the under-supply conditions were minimal for the BANC-SMUD BAA with 0.037 percent of the total intervals in the FMM, and with 0.11 percent of the total intervals in the RTD.
- As part of the resource sufficiency test performed for each EIM entity prior to the real-time markets, BANC-SMUD successfully passed over 97.62 percent of its balancing tests in April.
- Also as part of the resource sufficiency test, BANC-SMUD successfully passed over 99.55 percent of its upward flexible ramping sufficiency tests in April.
- The price for upward flexible ramping capacity in the FMM for the BANC-SMUD BAA averaged \$1.65/MWh in April, while prices for the downward flexible ramping product were \$0.40/MWh.

### III. Market Performance Related to the Transitional Period

#### a. Prices

Figure 1 shows that average prices in the BANC-SMUD EIM Load Aggregation Point (ELAP) for the period of April 3, 2019 through April 30, 2019. The monthly average price for April was \$28.41/MWh in the FMM and \$29.31/MWh in the RTD. On April 18 and April 24, the daily average BANC-SMUD ELAP price was \$82.29/MWh in the FMM and \$85.33/MWh in the RTD; these prices were driven by conditions in the CAISO BAA. On April 18, 2019, the BANC-SMUD ELAP locational marginal prices (LMPs) were above \$900/MWh for five FMM intervals between hours ending 20 and 21. During these intervals, BANC-SMUD had passed the upward flexible ramping sufficiency test, thus it had its full EIM transfer capabilities available in both the import and export directions.

**Figure 1: Daily average prices for the BANC-SMUD BAA.**



The BANC-SMUD and CAISO footprints observed high prices during these intervals due to an increase in upward ancillary services requirement, which are calculated based on the Western Electricity Coordinating Council (WECC) and the North American Electric Reliability Corporation (NERC) reliability standards. The CAISO procures 100 percent of its upward ancillary services requirement in the day-ahead market. If the real-time requirement is higher than what was procured in the day-ahead market, then the additional capacity from resources in the CAISO’s footprint is procured for ancillary services, thereby reducing the available bid-capacity for energy that resulted in higher price. Similarly, for April 24, 2019, the increase in the real-time upward ancillary services requirement drove the FMM price for the entire EIM footprint. In addition, forced outages on certain generating resources and variable energy

resources created a deviation in the CAISO footprint, which also contributed to the high prices system-wide.

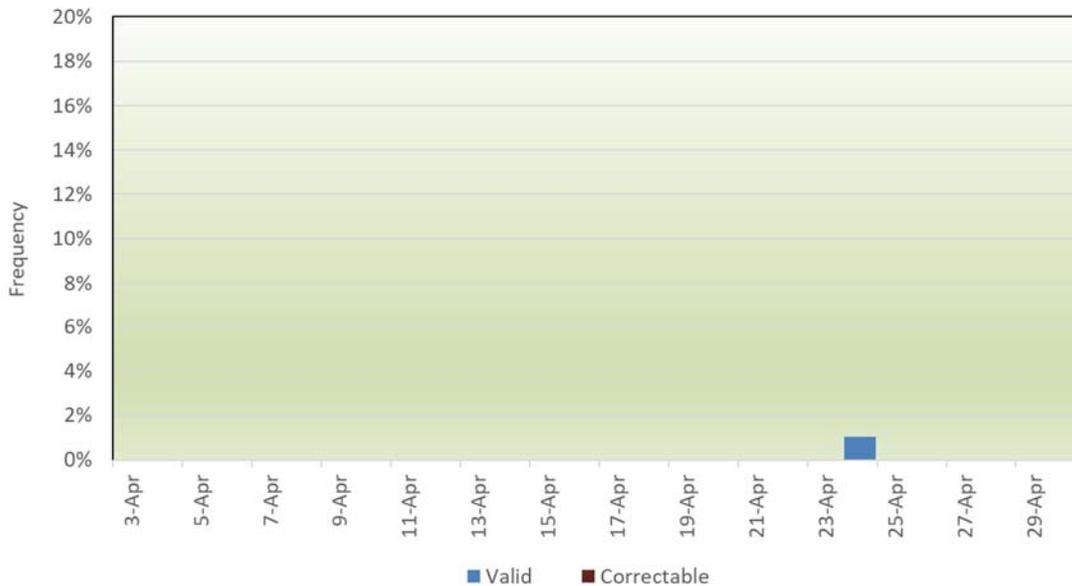
Under the CAISO’s price correction authority in Section 35 of the CAISO tariff, the CAISO may correct prices posted on its Open Access Same-Time Information System (OASIS) if it finds: (1) that the prices were the product of an invalid market solution; (2) the market solution produced an invalid price due to data input failures, hardware or software failures; or (3) a result that is inconsistent with the CAISO tariff. The prices presented in Figure 1 include all prices produced by the CAISO consistent with its tariff requirements. That is, the trends represent: (1) prices as produced in the market that the CAISO deemed valid; (2) prices that the CAISO could, and did, correct pursuant to Section 35 of the CAISO tariff; and (3) any prices the CAISO adjusted pursuant to the transition period pricing reflected in Section 29.27 of the CAISO tariff.

**b. Frequency of Power Balance Constraint Infeasibilities**

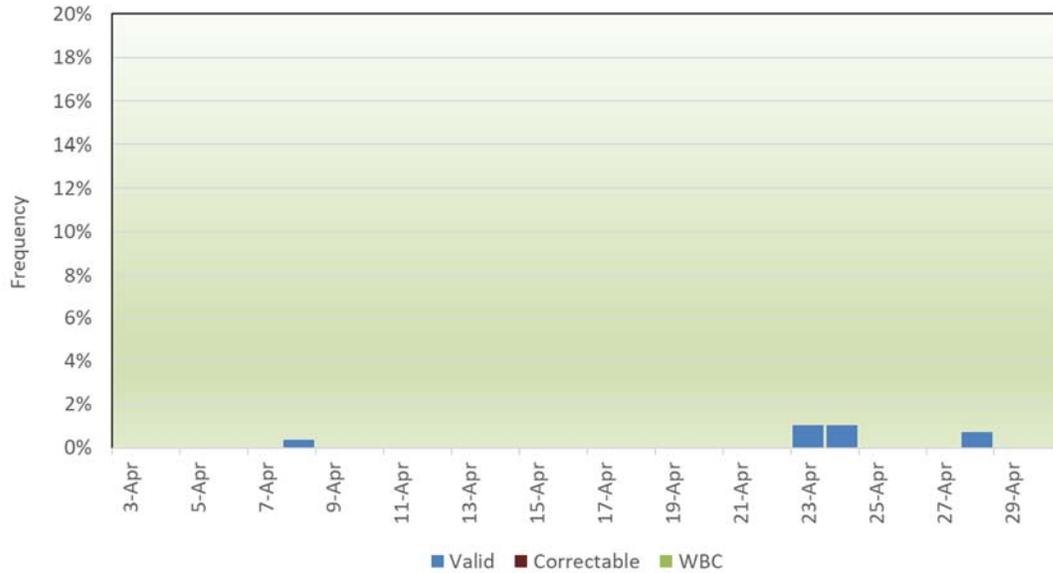
Figures 2 and 3 show the frequency of intervals in which the power balance constraint was relaxed for under-supply conditions in the BANC-SMUD BAA for the FMM and RTD, respectively.

The under-supply infeasibilities are categorized into “valid” and “correctable” instances. Prices for the intervals that fell in the “valid” category are instances with under-supply infeasibilities that were not in error and are subject to the transitional period pricing. The infeasibilities that fell in the “correctable” category had a correction based on the provisions of Section 35 of the CAISO tariff due to either a software or a data error.

**Figure 2: Frequency of FMM under-supply power balance infeasibilities in the BANC-SMUD BAA.**



**Figure 3: Frequency of RTD under-supply power balance in feasibilities in the BANC-SMUD BAA.**



In the BANC-SMUD BAA, there was one under-supply infeasibility in the FMM and there were nine valid under-supply infeasibilities in the RTD. Tables 1 and 2 list the FMM and RTD intervals with infeasibilities observed in April, including the amount of load conformance.

**Table 1: List of valid FMM under-supply infeasibilities in the BANC-SMUD BAA.**

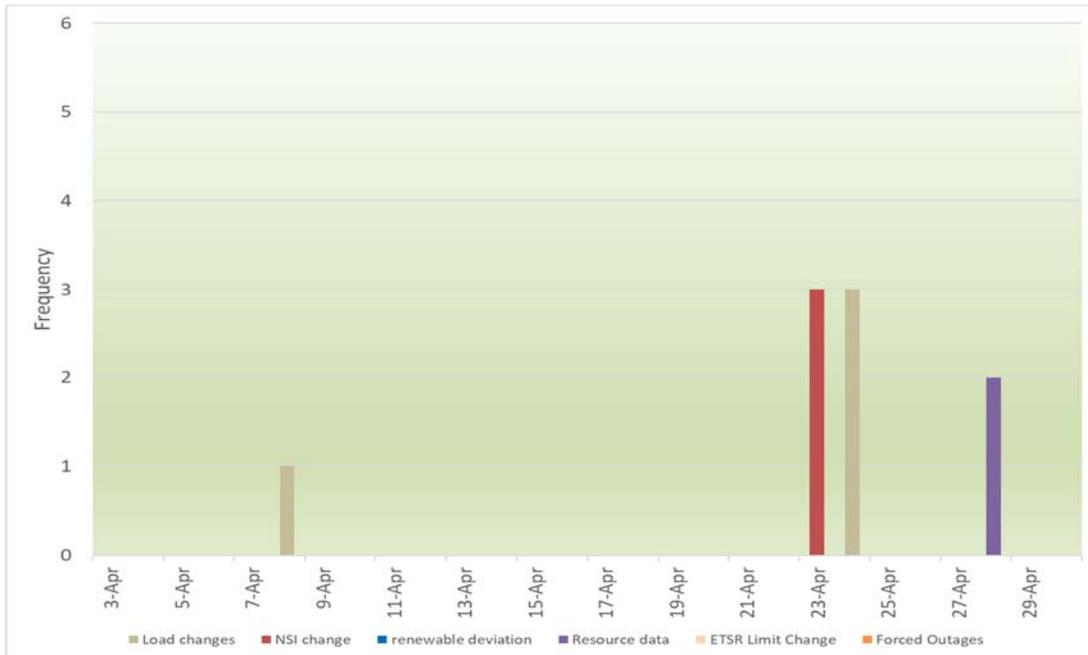
Trade Date	Trade Hour	Trade Interval	MW Infeasibility	Load Conformance
24-Apr-19	23	1	16.53	0

**Table 2: List of valid RTD under-supply infeasibilities in the BANC-SMUD BAA.**

Trade Date	Trade Hour	Trade Interval	MW Infeasibility	Load Conformance
8-Apr-19	18	9	4.21	0
23-Apr-19	21	3	7.88	0
23-Apr-19	21	4	4.09	0
23-Apr-19	21	5	2.05	0
24-Apr-19	23	2	8.55	0
24-Apr-19	23	3	0.26	0
24-Apr-19	23	4	0.01	0
28-Apr-19	16	8	60.49	0
28-Apr-19	16	9	59.23	0

Figure 4 displays frequency of RTD under-supply power balance infeasibilities by reason for the BANC-SMUC BAA in April 2019. There were nine under-supply power balance infeasibilities in the RTD. Four of these instances were driven by load forecast changes, two instances were related to resources data and, and two cases were driven by changes in net-schedule interchanges (NSI). The single under-supply power balance infeasibility in the fifteen-minute market was driven by Load forecast change.

**Figure 4: Count of RTD under-supply power balance infeasibilities by reason.**



The intervals captured under “resource data” were impacted by a slow response to the increase in resource dispatch operating target (DOT). As a result, the BANC-SMUD BAA was unable to meet its power balance requirement for a few intervals. Once the resource output caught up with the DOT, the BAA power balance constraint was no longer infeasible. The infeasibility classified as “load change” captures those intervals in which the five-minute load forecast increased above the fifteen-minute load forecast, such that the BANC-SMUD BAA was short of the ramp needed to meet the increase in requirement. Similar to the instance related to “load change,” for the intervals listed under “NSI change,” the BANC-SMUD BAA was short of the ramp needed to meet the increase in the imbalance requirement due to the reduction in net-imports.

**c. Balancing and Sufficiency Test Failures**

The EIM provides an opportunity to various BAAs to serve its load while realizing the benefits of increased resource diversity. Since the EIM does not include resource adequacy requirements or obligations for resources to submit bids, the CAISO performs a series of resource sufficiency tests comprised of: (i) a balancing test; (ii) a capacity test; and (iii) a flexible ramping sufficiency test. These tests occur prior to the real-time market.

Performance of a balancing test prior to each trading hour ensures that each BAA participating in the EIM submits a balanced base schedule of generation and a net schedule interchange to meet its demand. In addition, the BAA participating in the EIM is required to submit bids with enough ramping capability to meet its net load forecast uncertainty and its net load movement requirements.

**Figure 5: Frequency of Balancing test failures in the BANC-SMUD BAA.**



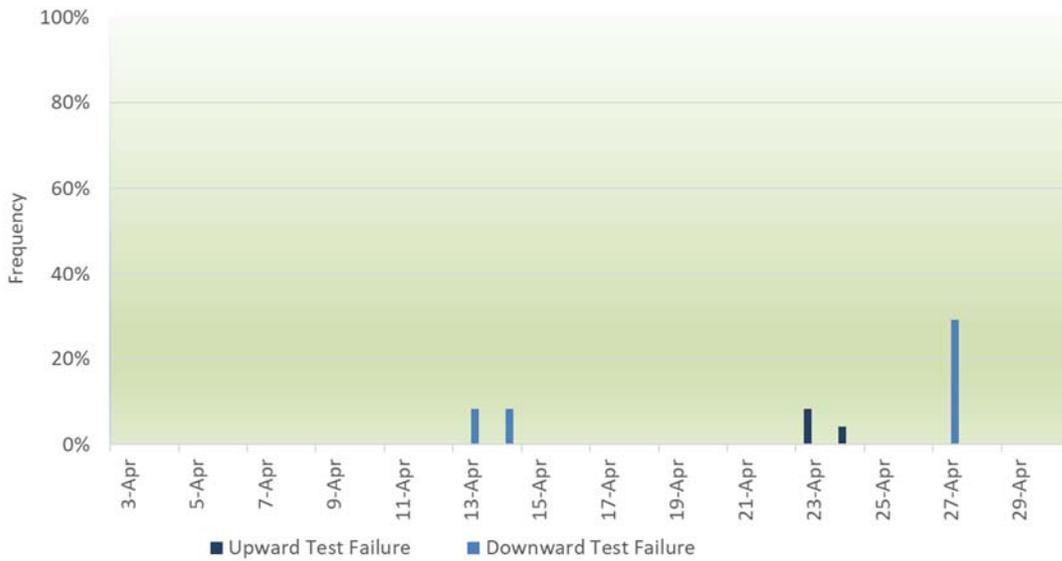
Figure 5 shows the trend of balancing test outcomes for the period of April 3, 2019, through April 30, 2019.<sup>3</sup> During this period, the BANC-SMUD BAA passed the balancing test in 97.62 percent of the intervals. The frequency of these failures is within expected performance tolerances for balancing tests.

The CAISO also performs the flexible ramping sufficiency test as specified in Section 29.34(m) of the CAISO tariff. Figure 6 shows the trend of the test failures for flexible ramping for the period of April 3, 2019, through April 30, 2019. During this period, the BANC-SMUD BAA passed the upward flexible ramping test in 99.95 percent of the intervals in, and it passed the downward flexible

<sup>3</sup> The CAISO performs resource sufficiency tests pursuant to Section 29.34(k) of the CAISO tariff.

ramping test in 98.36 percent of the intervals.

**Figure 6: Frequency of flexible ramping sufficiency test failures in the BANC-SMUD BAA.**



**d. Flexible Ramping Product**

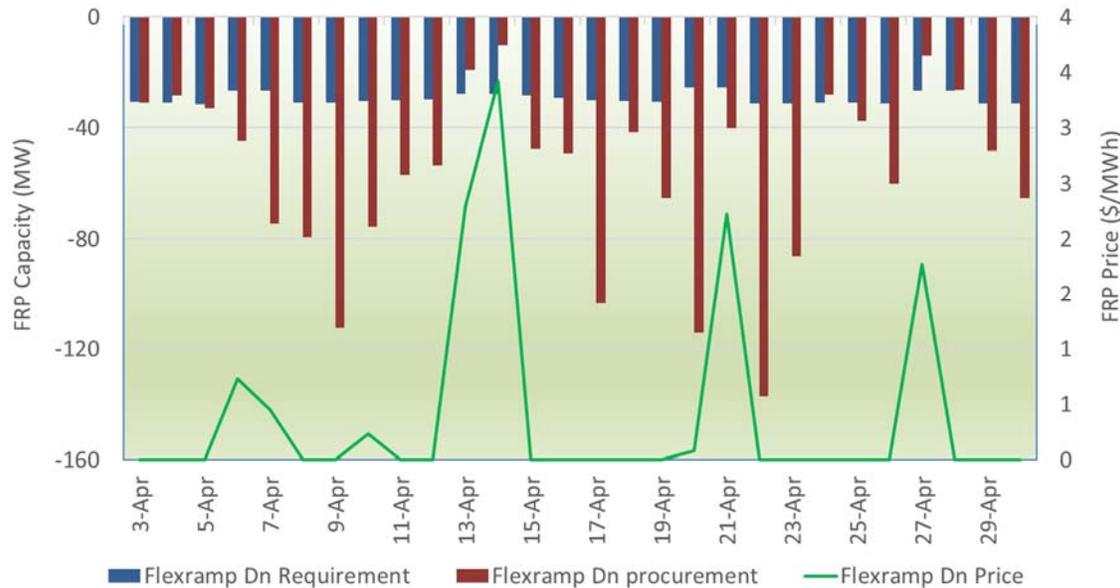
Figure 7 shows the daily average of the upward flexible ramping constraint requirement, procurement, and prices in the FMM for the period of April 3, 2019, through April 30, 2019. Figure 8 shows the daily average of the downward flexible ramping constraint requirement, procurement, and prices in the FMM during this same period. With the implementation of the flexible ramping product on November 1, 2016, calculation of the requirements consists of historical data for uncertainty with any applicable net import/export capability or credit. This effectively reduces the amount of flexible ramping the BANC-SMUD BAA has to procure and, generally, the entire EIM footprint, which includes all the BAAs in the EIM, including the CAISO BAA, will drive the requirements. The market clearing process may result in procuring the BANC-SMUD BAA capacity towards meeting the overall EIM footprint requirement. This is the main reason why the individual BANC-SMUD procurement may generally fall below or be above the individual BANC-SMUD flex ramp requirement.

**Figure 7: Daily Average requirement, procurement, and price of upward flexible ramping in the FMM in the BANC-SMUD BAA.**



In addition, the price trend provided in Figures 7 and 8 is the nested price determined by the summation of the shadow price individually of the BANC-SMUD BAA, plus the shadow price of the entire EIM footprint.

**Figure 8: Daily Average requirement, procurement, and price of downward flexible ramping in the FMM in the BANC-SMUD BAA.**



For the period of April 3, 2019, through April 30, 2019, the average upward flexible ramping capacity price was \$1.65/MWh and the average downward flexible ramping capacity price was \$0.40/MWh. Most of the time, the flexible ramping procurement was above the BANC-SMUD BAA’s requirements.

## CERTIFICATE OF SERVICE

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

Dated at Folsom, California, this 21<sup>st</sup> day of June, 2019.

*/s/ Grace Clark*  
Grace Clark