April 1, 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 Nos. ER08-1178-000 and EL08-88-000
December 2018 Exceptional Dispatch Report (Chart 2 Data)

Dear Secretary Bose:

Pursuant to the orders issued in the above-referenced dockets on September 2, 2009 and May 4, 2010, the California Independent System Operator Corporation (CAISO) submits the attached report. The report provides Exceptional Dispatch information that the Commission directed be included in "Chart 2," which is set forth in Appendix A to the September 2, 2009 order, as modified by the May 4, 2010 order.

The attached report provides Chart 2 data for the month of December 2018. The report also includes the price impact analysis as required by paragraph 44 of the September 2, 2009 order, as well as the degree of mitigation analysis required by CAISO tariff section 34.11.4 for December 2018.

Respectfully submitted,

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Exceptional Dispatch Report

Table 2: December 2018

Market Quality and Renewable Integration April 1, 2019

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Introduction

This report is filed pursuant to FERC's September 2, 2009, and May 4, 2010, orders in ER08-1178. These orders require two monthly Exceptional Dispatch reports—one issued on the 15th of each month and one issued on the 30th of each month. This report provides data on the frequency, reasons and costs for Exceptional Dispatches issued in December 2018.

This report contains a price impact analysis as prescribed by FERC in its September 2 order. The price impact analysis for December 2018 is presented in Appendix B. This report also includes mitigation analysis for December 2018 required by section 34.11.4 of the CAISO tariff. This analysis compares those Exceptional Dispatches subject to bid mitigation (i.e. Exceptional Dispatches to address noncompetitive constraints and Delta Dispatch), and determines the cost difference between the Exceptional Dispatch bid mitigation settlement rules and what the settlement amount would have been had the Exceptional Dispatches not been subject to bid mitigation. The Exceptional Dispatch bid mitigation analysis for December 2018 is presented in Appendix C.

The Nature of Exceptional Dispatch

The CAISO can issue exceptional dispatch instructions for a resource as a pre-day-ahead unit commitment, a post day-ahead unit commitment, or a real-time exceptional dispatch. A pre-day-ahead unit commitment is an exceptional dispatch instruction committing a resource at or above its physical minimum (Pmin) operating level in the day-ahead market. A post-day-ahead unit commitment is an exceptional dispatch instruction committing a resource at or above its (Pmin) operating level in the real-time market. A real-time exceptional dispatch instructs a resource to operate at or above its physical minimum operating point. A real-time exceptional dispatch above the resource's day-ahead award is an incremental exceptional dispatch instruction and a real-time exceptional dispatch below the day-ahead award is considered a decremental dispatch instruction. The CAISO issues exceptional dispatch instructions to maintain the reliability of the grid when the market software cannot do so. Whenever the CAISO issues an exceptional dispatch instruction, the operator logs the dispatch and the associated reason. Reliability requirements are calculated for both local area and the system wide needs, and are classified into various requirements including local generation, transmission management, non-modeled transmission outages, ramping and intertie emergency assistance. Whenever the CAISO issues an exceptional dispatch instruction, the operators log these instructions and the associated reason for each instruction.

Most of the generation procedures are internal to the CAISO and not available publically on the CAISO website; however, all of the transmission procedures are available on the CAISO website.[1]

Additional reasons for exceptional dispatch instructions in 2018 include Software Limitation. Software Limitation is used when an exceptional dispatch instruction was issued to bridge schedules across days for resources with a minimum down time of 24 hours, as the CAISO software does not handle multi-day commitment. For instance, a resource has a day-ahead schedule from 0600 till 2300, and then is shut down in 2400. If this resource had a minimum down time of 24 hours and it is required the following day, then the CAISO issues an exceptional dispatch to commit this resource in 2400 so it can be dispatched economically in the following day. Software Limitation was also used for exceptional dispatches to manually issue shut down instructions to a resource because of a temporary Automatic Dispatch System ("ADS") failure, or similar issues. There were a few other reasons used to explain exceptional dispatch instructions in December 2018, which are self explanatory.

The data in Table 1 is based on a template specified in the September 2009 order.[2] This table contains all the information published in Table 1 of the first report for December 2018. In addition, it contains volume (MWh) and cost information. Each entry in Table 1 is a summary of exceptional dispatches classified by (1) the reason for the exceptional dispatch; (2) the location of the resource by Participating Transmission Owner (PTO) service area; (3) the Local Reliability Area (LRA) where applicable; (4) the market in which the exceptional dispatch occurred (day-ahead vs. real-time); and (5) the date of the exceptional dispatch. For each classification the following information is provided: (1) Megawatts (MW); (2) Commitment; (3) Inc or Dec; (4) Hours; (5) Begin Time; (6) End Time; (7) Total Volume (MWh); (8) Min Load Cost; (9) Start Up Cost; (10) CC6470; (11) ED Volume (MWh INC/DEC); (12) CC6470 INC; (13) CC6470 DEC; (14) CC6482; (15) CC6488; and (16) CC6620. Each column is defined:

- The MW column shows the range of exceptional dispatch instruction in MW for the classification.
- The Commitment column specifies if there was a unit commitment for the classification.
- The INC/DEC/NA column specifies if there was an incremental dispatch (INC), a decremental dispatch (DEC), or only a unit commitment (NA). The Begin Time and End Time columns show the start and end time of exceptional dispatch for the classification respectively.

[1] A list of all of the CAISO's Operating Procedures and all the publicly available Operating Procedures are available at the following link: http://www.caiso.com/thegrid/operations/opsdoc/index.html

[2] The data in Table 1 is principally SLIC information supplemented with data from the Market Quality System (MQS) and Settlements database. The volume and cost information is based on t+51B Recalculation Statements.

- The Hours column is the time difference between begin time and end time rounded up to the next hour.
- The total volume column shows the total MWh dispatch quantity dispatched for that classification. This quantity includes the minimum load quantity, the imbalance energy quantity, and the exceptional dispatch quantity.
- The Min-Load Cost column shows eligible minimum load cost for the classification.
- The Start-Up Cost column shows the eligible start up cost for the classification. The CAISO does not explicitly pay resources for its start up and minimum load costs; however, it ensures that resources are compensated adequately through its bid cost recovery.[3]
- The CC6470 column shows the total imbalance energy costs for the classification. This cost contains the portion of exceptional dispatch instruction settled as optimal energy due to its bid price being less than the LMP in the relevant settlement interval.
- The ED Volume MWh (MWh INC/DEC) column shows the incremental or the decremental portion of the real-time exceptional dispatch MWh for the classification. The CC6470-INC shows that portion of incremental exceptional dispatch instruction settled at the resource LMP.
- The CC6470-DEC column shows that portion of decremental exceptional dispatch instruction settled at the resource specific LMP. Both these charge codes are portions of the real-time instructed imbalance energy charge code (6470). [4]
- The CC6482 column shows the real-time excess cost for the classification.[5]
- The CC6488 column shows the real-time exceptional dispatch uplift settlement for the classification.[6] The CC6620 shows the bid cost recovery payment for the classification. This cost is shown for all pre-day-ahead unit commitments only.

Charge codes 6470, 6470 INC, 6470 DEC, 6482 and 6488 are shown in Table 1 because all these charge codes pertain to real-time exceptional dispatch MWH quantities. The classification of data is further explained for example in Attachment A. Many of the exceptional dispatches with the reason “Other Reliability Requirement” were due to Real Time Contingency Analysis.

[3] For further details regarding the Bid Cost Recovery process please refer to section 11.8 of the CAISO tariff.

[4] For further details please refer to the BPM configuration Guide: Real-Time Instructed Imbalance Energy Settlement published on the CAISO’s website.

[5] For further details please refer to the BPM configuration Guide: Real Time Excess Cost for Instructed Energy Settlement published on the CAISO’s website.

[6] For further details please refer to the BPM configuration Guide: Real Time Exceptional Dispatch Uplift Settlement published on the CAISO’s website.

Table 1: Exceptional Dispatches in December 2018

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Chart 2: Table of Exceptional Dispatches for Period 01/December/2018 - 31/December/2018

Number	Market Type	Reason	Location	Local Reliability Area	Trade Date	MW	Commitment	INC_DEC	Hours	Begin Time	End Time	Total MWH	Min Load Cost	Start Up Cost	CC6470	ED MWH (INC/DEC)	CC6470 INC	CC6470 DEC	CC6482	CC6488	CC6620
1	RT	Fast Start Unit Management	PGAE	NA	12/6/2018	307	No	DEC	1	15:00	16:00	84.69	0.00	0.00	-4172.51	1.43	-79.02	0.00	0.00	0.00	0.00
2	RT	Fast Start Unit Management	PGAE	NA	12/6/2018	47 - 307	No	INC	5	10:15	15:00	190.17	76550.02	1271.72	-13585.67	0.00	0.00	0.00	0.00	0.00	0.00
3	RT	Fast Start Unit Management	PGAE	NA	12/17/2018	46.78	No	INC	6	10:30	16:00	32.78	17666.50	343.03	-1819.12	0.00	0.00	0.00	0.00	0.00	0.00
4	RT	Incomplete or Inaccurate Transmission	PGAE	Humboldt	12/27/2018	28	No	INC	5	10:15	15:15	-6.13	-3859.99	0.00	246.08	0.00	0.00	0.00	0.00	0.00	0.00
5	RT	Incomplete or Inaccurate Transmission	SDGE	San Diego-IV	12/7/2018	100	No	INC	1	11:00	11:30	31.50	0.00	0.00	-1530.32	0.00	0.00	0.00	0.00	0.00	0.00
6	RT	Load Forecast Uncertainty	PGAE	Bay Area	12/1/2018	120 - 175	Yes	INC	12	10:05	22:00	1564.51	221625.72	48153.48	-122716.37	837.50	-67460.02	0.00	-642.00	0.00	0.00
7	RT	Load Forecast Uncertainty	PGAE	NA	12/2/2018	140	Yes	INC	13	11:30	0:00	2.47	159940.75	29825.29	-611.69	0.00	0.00	0.00	0.00	0.00	0.00
8	RT	Load Forecast Uncertainty	PGAE	NA	12/10/2018	200 - 380	No	INC	2	8:10	10:00	187.61	9293.67	0.00	-30488.13	5.00	-304.72	0.00	-429.15	0.00	0.00
9	RT	Load Forecast Uncertainty	SCE	LA Basin	12/1/2018	48.27 - 194	No	INC	11	10:05	21:00	137.02	3528.70	0.00	-6884.24	70.34	-5942.51	0.00	-510027.00	0.00	0.00
10	RT	Load Forecast Uncertainty	SCE	LA Basin	12/2/2018	190 - 194	No	INC	7	14:15	21:00	27.84	0.00	0.00	-1282.18	38.65	-1788.76	0.00	-610913.98	0.00	0.00
11	RT	Load Forecast Uncertainty	SCE	LA Basin	12/3/2018	190 - 194	No	INC	6	14:05	20:00	83.49	0.00	0.00	-3567.81	82.85	-3454.75	0.00	-559055.49	0.00	0.00
12	RT	Load Forecast Uncertainty	SCE	NA	12/1/2018	125	No	INC	8	14:00	22:00	307.87	86343.70	0.00	-20605.90	0.00	0.00	0.00	0.00	0.00	0.00
13	RT	Load Forecast Uncertainty	SDGE	San Diego-IV	12/1/2018	225	No	INC	10	14:00	0:00	-52.80	197802.70	48299.21	4077.86	0.00	0.00	0.00	0.00	0.00	0.00
14	RT	Load Forecast Uncertainty	SDGE	San Diego-IV	12/2/2018	20 - 225	No	INC	24	0:00	0:00	314.65	271657.91	48299.21	-33048.83	1.74	-199.45	0.00	-78.74	0.00	0.00
15	RT	Load Forecast Uncertainty	SDGE	San Diego-IV	12/3/2018	155 - 225	Yes	INC	24	0:00	0:00	-30.27	283575.96	0.00	3053.62	0.00	0.00	0.00	0.00	0.00	0.00
16	RT	Operating Procedure Number and Constraint (7110)	PGAE	Humboldt	12/6/2018	32	No	DEC	1	22:40	23:00	3.37	0.00	0.00	-187.81	0.00	0.00	0.00	0.00	0.00	0.00

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Chart 2: Table of Exceptional Dispatches for Period 01/December/2018 - 31/December/2018

Number	Market Type	Reason	Location	Local Reliability Area	Trade Date	MW	Commitment	INC_DEC	Hours	Begin Time	End Time	Total MWH	Min Load Cost	Start Up Cost	CC6470	ED MWH (INC/DEC)	CC6470 INC	CC6470 DEC	CC6482	CC6488	CC6620
17	RT	Operating Procedure Number and Constraint (7110)	PGAE	Humboldt	12/6/2018	32	No	INC	1	23:00	0:00	15.97	0.00	0.00	-1005.51	0.00	0.00	0.00	0.00	0.00	0.00
18	RT	Operating Procedure Number and Constraint (7110)	PGAE	Humboldt	12/7/2018	16	No	DEC	8	1:00	8:15	43.41	-8296.18	0.00	-2564.63	0.00	0.00	0.00	0.00	0.00	0.00
19	RT	Operating Procedure Number and Constraint (7110)	PGAE	Humboldt	12/7/2018	32	No	INC	13	0:00	12:15	17.81	-5435.43	0.00	-736.25	1.83	-119.90	0.00	0.00	0.00	0.00
20	RT	Operating Procedure Number and Constraint (7110)	PGAE	Humboldt	12/8/2018	42	No	INC	2	22:00	0:00	13.53	0.00	0.00	-791.64	0.00	0.00	0.00	0.00	0.00	0.00
21	RT	Operating Procedure Number and Constraint (7110)	PGAE	Humboldt	12/9/2018	16 - 32	No	INC	15	0:00	15:00	34.63	0.00	0.00	-1569.71	2.47	-110.84	0.00	0.00	0.00	0.00
22	RT	Operating Procedure Number and Constraint (7110)	PGAE	Humboldt	12/10/2018	30	No	INC	2	22:00	23:30	0.56	-1544.10	0.00	-26.89	1.50	-109.74	0.00	0.00	0.00	0.00
23	RT	Operating Procedure Number and Constraint (7110)	PGAE	Humboldt	12/12/2018	32 - 42	No	INC	17	7:35	0:00	32.27	-7855.57	0.00	-1232.49	14.22	-475.59	0.00	0.00	0.00	0.00
24	RT	Operating Procedure Number and Constraint (7110)	PGAE	Humboldt	12/13/2018	28 - 42	No	INC	24	0:00	0:00	8.99	-2571.57	0.00	-390.47	0.00	0.00	0.00	0.00	0.00	0.00
25	RT	Operating Procedure Number and Constraint (7110)	PGAE	Humboldt	12/14/2018	14	No	DEC	1	0:15	0:45	-6.55	-221.68	0.00	356.51	-0.50	0.00	8.09	0.00	0.00	0.00
26	RT	Operating Procedure Number and Constraint (7110)	PGAE	Humboldt	12/14/2018	28	No	INC	1	0:00	0:15	-2.33	-221.68	0.00	88.05	-0.29	0.00	0.00	0.00	0.00	0.00
27	RT	Operating Procedure Number and Constraint (7110)	PGAE	Humboldt	12/15/2018	30	No	INC	8	16:50	0:00	13.24	-5901.63	0.00	-650.07	8.14	-395.89	0.00	0.00	0.00	0.00
28	RT	Operating Procedure Number and Constraint (7110)	PGAE	Humboldt	12/16/2018	32	No	INC	13	11:40	0:00	29.35	-10273.59	0.00	-1731.90	22.32	-1115.70	0.00	0.00	0.00	0.00
29	RT	Operating Procedure Number and Constraint (7110)	PGAE	Humboldt	12/17/2018	15	No	DEC	9	0:45	9:30	13.50	-7338.27	0.00	-581.48	0.00	0.00	0.00	0.00	0.00	0.00
30	RT	Operating Procedure Number and Constraint (7110)	PGAE	Humboldt	12/17/2018	28 - 32	No	INC	15	0:00	15:00	7.38	-5241.62	0.00	-282.10	1.16	-51.86	0.00	0.00	0.00	0.00
31	RT	Operating Procedure Number and Constraint (7110)	PGAE	Humboldt	12/18/2018	32	No	INC	1	6:55	7:00	0.11	-69.71	0.00	-4.41	0.11	-4.28	0.00	0.00	0.00	0.00
32	RT	Operating Procedure Number and Constraint (7110)	PGAE	Humboldt	12/19/2018	42	No	DEC	1	21:25	22:00	1.34	0.00	0.00	-46.44	0.00	0.00	0.00	0.00	0.00	0.00
33	RT	Operating Procedure Number and Constraint (7110)	PGAE	Humboldt	12/19/2018	42	No	INC	2	22:00	0:00	4.58	-1669.22	0.00	-178.55	0.00	0.00	0.00	0.00	0.00	0.00
34	RT	Operating Procedure Number and Constraint (7110)	PGAE	Humboldt	12/20/2018	30 - 42	No	INC	20	0:00	20:00	-2.56	-5274.50	0.00	105.41	0.50	-18.65	0.00	0.00	0.00	0.00

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Number	Market Type	Reason	Location	Local Reliability Area	Trade Date	MW	Commitment	INC_DEC	Hours	Begin Time	End Time	Total MWH	Min Load Cost	Start Up Cost	CC6470	ED MWH (INC/DEC)	CC6470 INC	CC6470 DEC	CC6482	CC6488	CC6620
35	RT	Operating Procedure Number and Constraint (7110)	PGAE	Humboldt	12/22/2018	32	No	INC	14	8:15	22:00	27.83	-11016.95	0.00	-1027.88	26.85	-992.00	0.00	0.00	0.00	0.00
36	RT	Operating Procedure Number and Constraint (7110)	PGAE	Humboldt	12/23/2018	32	No	INC	7	17:35	23:55	14.70	-5023.55	0.00	-605.65	13.64	-564.40	0.00	0.00	0.00	0.00
37	RT	Operating Procedure Number and Constraint (7110)	PGAE	Humboldt	12/26/2018	15	No	DEC	2	22:10	0:00	-0.98	-67.89	0.00	93.77	0.00	0.00	0.00	0.00	0.00	0.00
38	RT	Operating Procedure Number and Constraint (7110)	PGAE	Humboldt	12/26/2018	30	No	INC	6	16:45	22:00	4.72	2443.89	0.00	-182.81	0.50	-20.33	0.00	0.00	0.00	0.00
39	RT	Operating Procedure Number and Constraint (7110)	PGAE	Humboldt	12/28/2018	32	No	INC	6	7:50	13:00	22.15	-3787.75	0.00	-644.33	11.23	-313.31	0.00	0.00	0.00	0.00
40	RT	Operating Procedure Number and Constraint (7110)	PGAE	Humboldt	12/29/2018	14	No	INC	13	7:00	20:00	22.74	0.00	0.00	-646.55	0.00	0.00	0.00	0.00	0.00	0.00
41	RT	Operating Procedure Number and Constraint (7110)	PGAE	Humboldt	12/30/2018	15	No	INC	4	17:45	21:00	12.51	0.00	0.00	-385.79	0.83	-26.97	0.00	0.00	0.00	0.00
42	RT	Operating Procedure Number and Constraint (7110)	PGAE	Humboldt	12/31/2018	15	No	INC	4	17:20	21:00	1.59	2789.78	0.00	-62.52	0.00	0.00	0.00	0.00	0.00	0.00
43	RT	Operating Procedure Number and Constraint (7720)	SCE	NA	12/2/2018	455	No	DEC	5	18:25	23:00	-17.17	0.00	0.00	1492.65	-11.46	0.00	866.59	0.00	0.00	0.00
44	RT	Operating Procedure Number and Constraint (7720)	SCE	NA	12/2/2018	455	No	INC	3	21:00	0:00	19.07	0.00	0.00	-1489.95	0.00	0.00	0.00	0.00	0.00	0.00
45	RT	Operating Procedure Number and Constraint (7720)	SCE	NA	12/12/2018	450 - 475	No	DEC	4	17:00	21:00	-30.92	0.00	0.00	863.77	-23.69	0.00	841.61	0.00	0.00	0.00
46	RT	Operating Procedure Number and Constraint (7720)	SCE	NA	12/12/2018	450	No	INC	1	16:15	17:00	-61.11	1636.92	0.00	2326.50	0.00	0.00	0.00	0.00	0.00	0.00
47	RT	Operating Procedure Number and Constraint (7720)	SCE	NA	12/13/2018	465 - 475	No	DEC	4	17:25	21:00	87.51	-34573.29	0.00	-3298.94	0.00	0.00	0.00	0.00	0.00	0.00
48	RT	Operating Procedure Number and Constraint (7720)	SCE	NA	12/13/2018	465	No	INC	1	21:00	21:45	-0.88	0.00	0.00	43.62	0.00	0.00	0.00	0.00	0.00	0.00
49	RT	Operating Procedure Number and Constraint (7720)	SCE	NA	12/15/2018	475	No	INC	6	15:55	21:30	23.40	152.29	0.00	-884.96	0.00	0.00	0.00	0.00	0.00	0.00
50	RT	Operating Procedure Number and Constraint (7720)	SCE	NA	12/16/2018	475	No	DEC	4	17:00	21:00	-4.72	-9911.32	0.00	315.96	0.00	0.00	0.00	0.00	0.00	0.00
51	RT	Operating Procedure Number and Constraint (7720)	SCE	NA	12/16/2018	475	No	INC	6	16:00	22:00	-18.94	4835.81	0.00	811.39	0.00	0.00	0.00	0.00	0.00	0.00
52	RT	Operating Procedure Number and Constraint (7720)	SCE	NA	12/19/2018	430 - 470	No	DEC	7	16:00	23:00	-46.88	-17379.42	0.00	1425.19	-19.69	0.00	676.23	0.00	0.00	0.00

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Chart 2: Table of Exceptional Dispatches for Period 01/December/2018 - 31/December/2018

Number	Market Type	Reason	Location	Local Reliability Area	Trade Date	MW	Commitment	INC_DEC	Hours	Begin Time	End Time	Total MWH	Min Load Cost	Start Up Cost	CC6470	ED MWH (INC/DEC)	CC6470 INC	CC6470 DEC	CC6482	CC6488	CC6620
53	RT	Operating Procedure Number and Constraint (7720)	SCE	NA	12/19/2018	430 - 470	No	INC	8	15:30	23:30	-2.87	2752.68	0.00	116.85	0.00	0.00	0.00	0.00	0.00	0.00
54	RT	Operating Procedure Number and Constraint (7720)	SCE	NA	12/20/2018	450 - 460	No	DEC	5	17:35	22:00	-14.91	-11536.70	0.00	290.96	-2.84	0.00	112.10	0.00	0.00	0.00
55	RT	Operating Procedure Number and Constraint (7720)	SCE	NA	12/21/2018	450 - 475	No	INC	7	17:05	0:00	13.94	0.00	0.00	-431.71	0.00	0.00	0.00	0.00	0.00	0.00
56	RT	Operating Procedure Number and Constraint (7720)	SCE	NA	12/23/2018	460	No	INC	4	16:00	20:00	-23.04	2748.71	0.00	610.66	0.00	0.00	0.00	0.00	0.00	0.00
57	RT	Operating Procedure Number and Constraint (7720)	SCE	NA	12/27/2018	460	No	INC	5	17:25	21:30	14.79	0.00	0.00	-524.80	0.00	0.00	0.00	0.00	0.00	0.00
58	RT	Operating Procedure Number and Constraint (7720)	SCE	NA	12/29/2018	465	No	DEC	4	17:00	21:00	-35.77	0.00	0.00	1820.58	-0.50	0.00	17.40	0.00	0.00	0.00
59	RT	Other Reliability Requirement	PGAE	Humboldt	12/4/2018	84	No	DEC	6	2:50	8:00	-8.80	0.00	0.00	188.79	-8.94	0.00	194.58	0.00	0.00	0.00
60	RT	Other Reliability Requirement	PGAE	Humboldt	12/10/2018	32	No	DEC	1	15:00	16:00	-0.03	0.00	0.00	8.26	0.00	0.00	0.00	0.00	0.00	0.00
61	RT	Other Reliability Requirement	PGAE	Humboldt	12/10/2018	32	No	INC	8	7:45	15:00	16.24	-7205.80	0.00	-4435.57	13.32	-1885.72	0.00	0.00	0.00	0.00
62	RT	Other Reliability Requirement	PGAE	Humboldt	12/11/2018	32	No	DEC	2	16:00	18:00	0.35	0.00	0.00	-7.32	0.00	0.00	0.00	0.00	0.00	0.00
63	RT	Other Reliability Requirement	PGAE	Humboldt	12/11/2018	32	No	INC	9	7:25	16:00	32.46	-7398.26	0.00	-1453.83	17.80	-774.31	0.00	0.00	0.00	0.00
64	RT	Other Reliability Requirement	PGAE	Humboldt	12/14/2018	32	No	INC	2	22:00	0:00	8.30	-1330.07	0.00	-417.02	4.39	-202.63	0.00	0.00	0.00	0.00
65	RT	Other Reliability Requirement	PGAE	Humboldt	12/15/2018	32	No	INC	2	0:00	2:00	3.29	-1686.18	0.00	-119.16	3.29	-119.16	0.00	0.00	0.00	0.00
66	RT	Other Reliability Requirement	SDGE	San Diego-IV	12/4/2018	155	No	INC	10	14:00	0:00	-28.44	230365.29	33601.57	1828.09	0.00	0.00	0.00	0.00	0.00	0.00
67	RT	Planned Transmission Outage	PGAE	Bay Area	12/20/2018	175	No	INC	8	7:00	15:00	194.27	72117.20	38920.05	-7071.39	0.00	0.00	0.00	0.00	0.00	0.00
68	RT	Planned Transmission Outage	PGAE	Fresno	12/11/2018	134	No	DEC	1	21:10	22:00	-7.60	0.00	0.00	384.56	-7.60	0.00	384.56	0.00	-187.83	0.00
69	RT	Planned Transmission Outage	PGAE	Humboldt	12/7/2018	64	No	DEC	3	14:00	16:45	0.10	-1036.48	0.00	-2.02	0.00	0.00	0.00	0.00	-289.90	0.00
70	RT	Planned Transmission Outage	PGAE	Humboldt	12/7/2018	64	No	INC	2	12:15	14:00	33.95	-2574.67	0.00	-1702.02	9.54	-471.46	0.00	0.00	0.00	0.00

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Chart 2: Table of Exceptional Dispatches for Period 01/December/2018 - 31/December/2018

Number	Market Type	Reason	Location	Local Reliability Area	Trade Date	MW	Commitment	INC_DEC	Hours	Begin Time	End Time	Total MWH	Min Load Cost	Start Up Cost	CC6470	ED MWH (INC/DEC)	CC6470 INC	CC6470 DEC	CC6482	CC6488	CC6620
71	RT	Planned Transmission Outage	PGAE	Humboldt	12/8/2018	45	No	DEC	2	15:00	16:15	-0.19	0.00	0.00	31.33	0.00	0.00	0.00	0.00	0.00	0.00
72	RT	Planned Transmission Outage	PGAE	Humboldt	12/8/2018	45	No	INC	8	7:00	15:00	20.26	-7960.80	0.00	-857.30	7.44	-305.18	0.00	0.00	-10.20	0.00
73	RT	Planned Transmission Outage	PGAE	Humboldt	12/17/2018	32	No	DEC	1	21:25	22:00	0.67	0.00	0.00	-22.89	0.00	0.00	0.00	0.00	0.00	0.00
74	RT	Planned Transmission Outage	PGAE	Humboldt	12/17/2018	32	No	INC	2	22:00	0:00	6.01	-838.66	0.00	-205.67	6.01	-205.45	0.00	0.00	0.00	0.00
75	RT	Planned Transmission Outage	PGAE	Humboldt	12/18/2018	32	No	INC	8	0:00	7:15	17.09	-6064.99	0.00	-568.92	16.10	-524.42	0.00	0.00	0.00	0.00
76	RT	Planned Transmission Outage	SCE	NA	12/4/2018	10 - 55	No	DEC	2	22:45	0:00	-3.12	0.00	0.00	149.60	-3.08	0.00	147.81	0.00	-347.77	0.00
77	RT	Planned Transmission Outage	SCE	NA	12/5/2018	10 - 55	No	DEC	5	0:00	5:00	88.84	0.00	0.00	-5126.17	0.00	0.00	0.00	0.00	-992.06	0.00
78	RT	Planned Transmission Outage	SCE	NA	12/7/2018	125	No	DEC	24	0:00	0:00	69.10	4906.56	0.00	-3707.28	0.00	0.00	0.00	0.00	0.00	0.00
79	RT	Planned Transmission Outage	SCE	NA	12/8/2018	125	No	DEC	24	0:00	0:00	-46.65	10622.04	0.00	1583.92	0.00	0.00	0.00	0.00	0.00	0.00
80	RT	Planned Transmission Outage	SCE	NA	12/8/2018	125	No	INC	7	8:00	15:00	-50.67	0.00	0.00	1770.91	0.00	0.00	0.00	0.00	0.00	0.00
81	RT	Planned Transmission Outage	SDGE	San Diego-IV	12/6/2018	225	No	INC	2	22:00	0:00	-0.64	33743.58	1751.68	35.41	0.00	0.00	0.00	0.00	0.00	0.00
82	RT	Planned Transmission Outage	SDGE	San Diego-IV	12/7/2018	20 - 225	No	INC	22	0:00	22:00	704.55	206824.20	0.00	-45851.99	0.00	0.00	0.00	0.00	0.00	0.00
83	RT	Planned Transmission Outage	SDGE	San Diego-IV	12/8/2018	165	No	DEC	7	9:00	16:00	-48.68	-35242.16	0.00	-1419.94	-11.59	0.00	-36.74	0.00	-5146.56	0.00
84	RT	Planned Transmission Outage	SDGE	San Diego-IV	12/8/2018	44 - 96	No	INC	9	7:30	16:00	50.37	87854.99	0.00	-4261.34	31.37	-2759.57	0.00	0.00	-21787.04	0.00
85	RT	Planned Transmission Outage	SDGE	San Diego-IV	12/9/2018	20 - 63	No	INC	16	5:00	20:30	13.06	154176.67	0.00	-935.44	0.00	0.00	0.00	0.00	-6.29	0.00
86	RT	Software Limitation	PGAE	Bay Area	12/1/2018	140	No	INC	2	0:00	2:00	-1.79	18609.74	0.00	119.22	0.00	0.00	0.00	0.00	0.00	0.00
87	RT	Software Limitation	PGAE	Bay Area	12/18/2018	140 - 290	No	DEC	3	16:15	19:15	236.55	0.00	0.00	-8128.43	0.00	0.00	0.00	0.00	0.00	0.00
88	RT	Software Limitation	PGAE	Humboldt	12/27/2018	14	No	DEC	1	15:35	16:00	8.44	-135.44	0.00	-396.56	0.00	0.00	0.00	0.00	0.00	0.00

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Chart 2: Table of Exceptional Dispatches for Period 01/December/2018 - 31/December/2018

Number	Market Type	Reason	Location	Local Reliability Area	Trade Date	MW	Commitment	INC_DEC	Hours	Begin Time	End Time	Total MWH	Min Load Cost	Start Up Cost	CC6470	ED MWH (INC/DEC)	CC6470 INC	CC6470 DEC	CC6482	CC6488	CC6620
89	RT	Software Limitation	PGAE	NA	12/10/2018	0	No	INC	2	9:05	10:40	27.89	0.00	0.00	-2963.36	0.00	0.00	0.00	0.00	0.00	0.00
90	RT	Software Limitation	SCE	NA	12/11/2018	2	No	DEC	12	12:20	0:00	76.64	0.00	0.00	-2760.29	0.00	0.00	0.00	0.00	0.00	0.00
91	RT	Software Limitation	SDGE	San Diego-IV	12/7/2018	0	No	INC	2	22:50	0:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
92	RT	Unit Testing	Intertie	NA	12/19/2018	15 - 52	No	INC	9	7:00	16:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
93	RT	Unit Testing	Intertie	NA	12/20/2018	13 - 43	Yes	INC	9	7:00	16:00	18.00	0.00	0.00	-521.22	18.00	-521.22	0.00	0.00	0.00	0.00
94	RT	Unit Testing	Intertie	NA	12/21/2018	13 - 24	No	INC	7	8:00	15:00	141.86	0.00	0.00	-3919.15	141.69	-3914.59	0.00	0.00	0.00	0.00
95	RT	Unit Testing	Intertie	NA	12/22/2018	13 - 24	No	INC	7	8:00	15:00	141.86	0.00	0.00	-2631.54	141.69	-2631.46	0.00	0.00	0.00	0.00
96	RT	Unit Testing	Intertie	NA	12/23/2018	15 - 36	No	INC	8	8:00	16:00	242.74	0.00	0.00	-6869.52	242.41	-6869.37	0.00	0.00	0.00	0.00
97	RT	Unit Testing	Intertie	NA	12/24/2018	10 - 42	No	INC	9	7:00	16:00	300.95	0.00	0.00	-4616.44	300.32	-4616.19	0.00	0.00	0.00	0.00
98	RT	Unit Testing	Intertie	NA	12/25/2018	10 - 39	No	INC	9	7:00	16:00	285.95	0.00	0.00	-4249.56	285.44	-4249.43	0.00	0.00	0.00	0.00
99	RT	Unit Testing	Intertie	NA	12/26/2018	12 - 45	No	INC	9	7:00	16:00	325.94	0.00	0.00	-8364.82	325.36	-8364.56	0.00	0.00	0.00	0.00
100	RT	Unit Testing	Intertie	NA	12/27/2018	10 - 42	No	INC	9	7:00	16:00	304.79	0.00	0.00	-7879.02	304.19	-7878.75	0.00	0.00	0.00	0.00
101	RT	Unit Testing	Intertie	NA	12/28/2018	13 - 52	No	INC	9	7:00	16:00	376.93	0.00	0.00	-8585.43	376.19	-8585.10	0.00	0.00	0.00	0.00
102	RT	Unit Testing	Intertie	NA	12/29/2018	13 - 51	No	INC	9	7:00	16:00	373.93	0.00	0.00	-4993.98	373.19	-4993.72	0.00	0.00	0.00	0.00
103	RT	Unit Testing	Intertie	NA	12/30/2018	12 - 45	No	INC	9	7:00	16:00	327.94	0.00	0.00	-3293.87	327.31	-3293.67	0.00	0.00	0.00	0.00
104	RT	Unit Testing	PGAE	Fresno	12/22/2018	-304	No	DEC	4	1:00	4:45	-152.05	0.00	0.00	5265.81	0.00	0.00	0.00	0.00	0.00	0.00
105	RT	Unit Testing	PGAE	Sierra	12/7/2018	16	No	INC	1	0:45	1:20	5.83	0.00	0.00	-466.67	5.83	-466.67	0.00	0.00	0.00	0.00
106	RT	Unit Testing	PGAE	Sierra	12/18/2018	16	No	INC	1	0:20	1:00	9.83	0.00	0.00	-292.30	9.83	-292.30	0.00	0.00	0.00	0.00

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Chart 2: Table of Exceptional Dispatches for Period 01/December/2018 - 31/December/2018

Number	Market Type	Reason	Location	Local Reliability Area	Trade Date	MW	Commitment	INC_DEC	Hours	Begin Time	End Time	Total MWH	Min Load Cost	Start Up Cost	CC6470	ED MWH (INC/DEC)	CC6470 INC	CC6470 DEC	CC6482	CC6488	CC6620
107	RT	Unit Testing	SCE	LA Basin	12/11/2018	45	No	INC	1	10:05	11:00	32.40	950.78	0.00	-2771.55	22.40	-2373.96	0.00	0.00	0.00	0.00
108	RT	Unit Testing	SDGE	San Diego-IV	12/1/2018	105 - 422	No	INC	6	15:00	20:15	543.54	0.00	0.00	-42069.36	422.63	-32714.45	0.00	0.00	0.00	0.00
109	RT	Unit Testing	SDGE	San Diego-IV	12/2/2018	105 - 422	No	INC	5	6:10	10:30	948.63	0.00	0.00	-49463.72	722.55	-37762.39	0.00	0.00	0.00	0.00
110	RT	Unit Testing	SDGE	San Diego-IV	12/3/2018	100 - 400	Yes	INC	10	6:00	16:00	881.77	0.00	0.00	-41235.18	672.58	-31431.95	0.00	0.00	0.00	0.00
111	RT	Unit Testing	SDGE	San Diego-IV	12/4/2018	105 - 422	No	INC	14	6:10	19:30	174.95	0.00	0.00	-12031.66	214.45	-13937.12	0.00	0.00	0.00	0.00
112	RT	Unit Testing	SDGE	San Diego-IV	12/5/2018	105 - 422	Yes	INC	7	9:00	16:00	457.08	0.00	0.00	-29097.69	350.11	-21540.92	0.00	0.00	0.00	0.00
113	RT	Unit Testing	SDGE	San Diego-IV	12/6/2018	105 - 422	No	INC	10	8:00	18:00	1131.38	0.00	0.00	-95027.43	836.86	-68109.47	0.00	0.00	0.00	0.00
114	RT	Unit Testing	SDGE	San Diego-IV	12/7/2018	100 - 422	Yes	INC	11	8:00	18:30	1007.74	0.00	0.00	-53775.55	712.05	-37682.63	0.00	0.00	0.00	0.00
115	RT	Unit Testing	SDGE	San Diego-IV	12/8/2018	105 - 316	No	INC	8	8:00	16:00	412.12	0.00	0.00	-19860.34	382.03	-18421.93	0.00	0.00	0.00	0.00
116	RT	Unit Testing	SDGE	San Diego-IV	12/11/2018	105.5 - 211	No	INC	1	21:30	22:30	85.56	0.00	0.00	-4883.23	41.21	-2622.84	0.00	0.00	0.00	0.00
117	RT	Unplanned Outage	PGAE	NA	12/7/2018	305	No	INC	9	7:00	16:00	-192.01	224591.21	18580.71	9553.01	0.00	0.00	0.00	0.00	0.00	0.00
118	RT	Voltage Support	PGAE	Fresno	12/22/2018	-0.09	No	DEC	20	4:30	0:00	4.34	0.00	0.00	-214.39	0.00	0.00	0.00	0.00	0.00	0.00
119	RT	Voltage Support	PGAE	Fresno	12/23/2018	-304.09	No	DEC	8	0:00	8:00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
120	RT	Voltage Support	PGAE	Fresno	12/30/2018	-303	No	DEC	24	0:00	0:00	11.43	0.00	0.00	-501.23	0.00	0.00	0.00	0.00	0.00	0.00
121	RT	Voltage Support	PGAE	Fresno	12/31/2018	-303	No	DEC	16	0:00	15:30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
122	RT	Voltage Support	PGAE	Fresno	12/31/2018	83	No	INC	4	20:00	0:00	-4.33	25002.40	0.00	199.74	0.00	0.00	0.00	0.00	0.00	0.00
123	RT	Voltage Support	PGAE	Humboldt	12/18/2018	31 - 42	No	INC	17	7:00	0:00	58.02	-1673.15	0.00	-1868.69	0.37	-19.21	0.00	0.00	0.00	0.00
124	RT	Voltage Support	PGAE	Humboldt	12/19/2018	28 - 42	No	INC	15	0:00	15:00	12.93	-12866.90	0.00	-410.64	1.09	-53.52	0.00	0.00	0.00	0.00

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Chart 2: Table of Exceptional Dispatches for Period 01/December/2018 - 31/December/2018

Number	Market Type	Reason	Location	Local Reliability Area	Trade Date	MW	Commitment	INC_DEC	Hours	Begin Time	End Time	Total MWH	Min Load Cost	Start Up Cost	CC6470	ED MWH (INC/DEC)	CC6470 INC	CC6470 DEC	CC6482	CC6488	CC6620
125	RT	Voltage Support	PGAE	Sierra	12/8/2018	42	No	INC	1	23:30	0:00	21.50	0.00	0.00	-921.92	0.00	0.00	0.00	0.00	0.00	0.00
126	RT	Voltage Support	PGAE	Sierra	12/9/2018	42	No	INC	24	0:00	0:00	1023.25	0.00	0.00	-54811.55	0.00	0.00	0.00	0.00	0.00	0.00
127	RT	Voltage Support	PGAE	Sierra	12/10/2018	42	Yes	INC	7	0:00	7:00	298.22	0.00	0.00	-13252.15	0.00	0.00	0.00	0.00	0.00	0.00
128	RT	Voltage Support	PGAE	Sierra	12/15/2018	20	No	INC	2	3:20	4:40	3.33	-334.11	0.00	-117.02	0.00	0.00	0.00	0.00	0.00	0.00
129	RT	Voltage Support	PGAE	Sierra	12/21/2018	45	No	INC	4	14:30	18:00	11.25	0.00	0.00	-378.17	0.00	0.00	0.00	0.00	0.00	0.00
130	RT	Voltage Support	PGAE	NA	12/1/2018	140 - 220	Yes	INC	5	19:30	0:00	99.07	85067.73	24403.41	-10027.32	4.52	-339.91	0.00	0.00	-87.80	0.00
131	RT	Voltage Support	PGAE	NA	12/2/2018	185	No	DEC	1	19:40	20:00	3.24	0.00	0.00	-292.77	0.00	0.00	0.00	0.00	0.00	0.00
132	RT	Voltage Support	PGAE	NA	12/2/2018	140 - 213	Yes	INC	21	0:00	21:00	-2.29	494849.03	0.00	1040.47	0.00	0.00	0.00	0.00	-744.70	0.00
133	RT	Voltage Support	SCE	NA	12/3/2018	125	No	DEC	24	0:00	0:00	-58.10	0.00	0.00	3535.66	0.00	0.00	0.00	0.00	0.00	0.00
134	RT	Voltage Support	SCE	NA	12/4/2018	125	No	DEC	24	0:00	0:00	63.56	-1173.97	0.00	-2818.16	0.00	0.00	0.00	0.00	0.00	0.00
135	RT	Voltage Support	SCE	NA	12/5/2018	125	No	DEC	24	0:00	0:00	71.82	-8408.44	0.00	-4927.21	0.00	0.00	0.00	0.00	0.00	0.00
136	RT	Voltage Support	SCE	NA	12/6/2018	125	No	DEC	24	0:00	0:00	178.50	4499.70	0.00	-20671.62	0.00	0.00	0.00	0.00	0.00	0.00

Appendix A: Explanation by Example

All examples listed below are based on fictitious data. Many simplified assumptions are made to explain settlement charge codes, and not all assumptions are explicitly stated in these examples. For instance, settlement charge codes are calculated based on metered quantities, whereas in these examples, the dispatch quantities are assumed to be equal to metered quantities. These assumptions have been made to simplify the understanding of settlements calculations.

Example 1: Exceptional Dispatch Instructions Prior to DAM

In this fictitious example, the CAISO issued an exceptional dispatch instruction for resource A to be committed at its Pmin of 50 MW from hours ending 5 through 10 for a generation procedure 7630. Similarly, the CAISO issued additional instructions to resources B and C for the same reason in Table 2. Exceptional dispatches prior to the day-ahead market are commitments to minimum load. Here the dispatch levels are all at minimum load. Table 2 below also shows the commitment costs and the total volume (MWh) of exceptional dispatch instruction for each resource. The minimum load costs and start up costs, shown in Table 2 are the eligible minimum load and start up costs different from the bid-in minimum load and start up costs[7]. Only those quantities which relate to pre-day-ahead unit commitments are shown in this table.

Table 2: Instructions Prior to Day-Ahead Market

Date	Market	Resource	Location	Local Reliability Area (LRA)	Begin Time	End Time	Dispatch level (MW)	Reason	Total Volume (MWh)	Min-Load Cost	Start- Up Cost	CC6620 (BCR)
01-Jul-09	DA	A	SCE	LA BASIN	05:00	10:00	50	7630	300	$5000	$0	0
01-Jul-09	DA	B	SCE	LA BASIN	08:00	20:00	30	7630	390	$6000	$500	$4000
01-Jul-09	DA	C	SCE	LA BASIN	09:00	23:00	20	7630	300	$400	$1000	$1000

This data is summarized as shown in Table 3, which is the prescribed format specified in the FERC order on September 02, 2009. This summary classifies the data by reason, resource location, local reliability area, and trade date. The MW column in Table 3 is the range of MW; in this case the minimum instruction MW is 20 MW for resource C which occurs from hours ending 21 through 23. The maximum instruction occurs in hour ending 10. In this hour resource A is committed at 50 MW, resource B is committed at 30 MW and resource C is committed at 20 MW. This adds up to 100 MW. The MW column shows the minimum and maximum of the overlaps of all the exceptional dispatch instructions. The Commitment column shows whether a resource was committed between the begin time and end time. Commitments are broken out separately from energy dispatches. In the day-ahead however, the exceptional dispatches are nearly always just commitments, as in this example. The Begin Time column shows hour ending 5 as this was the hour ending for first dispatch of the day, and the End Time column shows hour ending 23, as this was the hour with last dispatch. It is also possible there might be hours between the begin time and the end time where there might not be exceptional dispatch instructions for the reason, meaning that the range between the begin time and end time can include null hours with no dispatch. The total volume (MWh) is the MWh quantity for each resource, which adds up to 990 MWh. Similarly, all cost information is sum of individual resource costs. Some resources bid-in zero start-up cost; as seen in this example, resource A bid in zero for its start up cost. Since the CAISO does not explicitly pay a resource for bid-in minimum load costs and start-up costs; these costs are recovered through the charge code CC6620 (Bid Cost Recovery), this table shows the summary of CC6620 for the classification. Here, it is the CC6620 for all three resources which adds up to $5000. This column shows the impact of exceptional dispatch on bid cost recovery for all pre-day-ahead exceptional dispatch commitments.

Table 3: FERC Summary of Instructions Prior to DAM

Number	Market Type	Reason	Location	Local Reliability Area (LRA)	Trade Date	MW	Commitment	INC/DEC	Hour	Begin Time	End Time	Total Volume (MWh)	Min-Load Cost	Start-Up Cost	CC6620
1	DA	7630	SCE	LA Basin	1-Jul-09	20-100	Yes	N/A	19	05:00	23:00	990	$11,400	$1,500	$5000

Example 2: Incremental Exceptional Dispatch Instructions in RTM

In this fictitious example the CAISO issued an exceptional dispatch instruction to resource A to be committed at its Pmin of 30 MW from hours 6:00 through 11:00 after completion of the day-ahead market for the transmission procedure 7110. This resource had no day-ahead award in those hours. The CAISO issued another exceptional dispatch instruction to resource B, to be dispatched at 40 MW from hours 7:00

[7] Please refer to the BPM configuration Guide: Bid Cost Recovery Settlements published on the CAISO's website for details about eligible minimum load and start up costs.

through 9:00 in real-time for the transmission procedure 7110. This resource had a day-ahead schedule of 20 MW from the day-ahead market, which implies this exceptional dispatch instruction was an incremental instruction and the exceptional dispatch MW was 20 MW. Similarly, the details of exceptional dispatch (ED) instruction for resource C are shown in Table 4. This table also shows volume (MWh) and various real-time charge codes associated with the exceptional dispatch instructions. The total MWh column for each resource shows all types of imbalance energy quantities for this resource between the begin time and end time which includes both the exceptional dispatch energy quantities and optimal energy quantities.

Resource A was committed at its Pmin so its total volume (MWh) is equal to its Pmin times the number of hours, which is calculated as 30 MW times 6 hours and is equal to 180 MWh. The resource Minimum load costs and the start up costs are its eligible commitment costs for that period. LMP at this resource is $10/MWh, so the charge code CC6470 is calculated at (180 MWh *$10/MWh) and is equal to $1,800. Since this resource is not dispatched above its Pmin, it has a zero volume (MWh) of exceptional dispatch. All charge codes associated with the exceptional dispatch increment or decrement quantities are zero.

Resource B is dispatched 20 MW above its day-ahead schedule, so its total volume (MWH) is calculated as 20 MW times 3 hours which is equal to 60 MWh. Since the resource was committed in the Day-Ahead Market there are no minimum load quantity and start up costs associated with this resource. The resource had a bid price of $100/MWh and the LMP at that resource was $10/MWh. All of 60 MWh is considered as exceptional dispatch incremental quantity shown in ED Volume (MWH INC/DEC) column. The charge code CC6470 INC is calculated as 60 MWh * resource LMP ($10/MWh) which is equal to $600. Since the only imbalance energy in this timeframe was the exceptional dispatch volume, the charge code CC6470 is equal to CC6470 INC. The charge code CC6488 is calculated as MWH quantity *(bid price – LMP), which is equal to $5400 (60 MWh *($10/MWh-$100/MWh)). Similarly, volumes and real-time charge codes are calculated for resource C.

Table 4: Incremental Exceptional Dispatch Instructions in RTM

Date	Market	Resource	Location	Local Reliability Area (LRA)	Begin Time	End Time	Dispatch level (MW)	Day-Ahead Award (MW)	Commitment	INC/DEC	ED (MW)	Reason	Total MWH	Min Load Cost	Start Up Cost	CC6470	ED MWH (INC/DEC)	CC6470 INC	CC6470 DEC	CC6482	CC6488
1-Jul-09	RT	A	PG&E	Humboldt	6:00	11:00	30	0	Yes	INC	30	7110	180	1000	50	1800	0	0	0	0	0
1-Jul-09	RT	B	PG&E	Humboldt	7:00	9:00	40	20	No	INC	20	7110	60	0	0	600	60	600	0	0	5400
1-Jul-09	RT	C	PG&E	Humboldt	12:00	15:00	50	50	No	INC	0	7110	0	0	0	0	0	0	0	0	0
1-Jul-09	RT	C	PG&E	Humboldt	16:00	20:00	50	40	No	INC	10	7110	50	0	0	300	20	300	0	0	200

This data is summarized as shown in Table 5 and is classified by reason, resource location, local reliability area, and trade date. The MW column in Table 5 is the range of MW; in this case the minimum instruction MW is 0 MW for resource C which occurs from hours ending 13 through 15. The maximum instruction occurs in hours ending 8 & 9, as during these two hours both resources A and B have an ED MW of 30MW and 20MW, respectively. This adds up to 50 MW. The MW column shows the minimum and maximum of the overlaps of all the exceptional dispatch instructions. The Commitment column shows whether a resource was committed between the begin time and end time. This column shows a commitment if there was a single commitment in the entire interval of exceptional dispatch. The Begin Time column shows the time of the first dispatch of the day. This is a time not a range. Similarly, the End Time column shows a time and not a range. Exceptional dispatches occurred between these two times. Since there was a commitment between the begin time and end time, the Commitment column displays yes for the summary. Similarly, the INC/DEC column shows an INC, as there was an incremental dispatch between the begin time and end time. As mentioned in the previous example, it is possible there might be hours between the begin time and end time where there were no exceptional dispatch instructions for the reason. Both volume and cost information columns are the summation for all the respective columns for resources A, B and C. For instance, the Total volume (MWh) column is calculated as summation of 180,60,0 and 50, which are the individual volumes (MWh) for resources A, B and C for time periods shown in Table 4.

Table 5: FERC Summary of ED Instructions in RTM

Number	Market Type	Reason	Location	Local Reliability Area (LRA)	Trade Date	MW	Commitment	INC/DEC	Hour	Begin Time	End Time	Total MWH	Min Load Cost	Start Up Cost	CC6470	ED MWH (INC/DEC)	CC6470 INC	CC6470 DEC	CC6482	CC6488
1	RT	7110	PG&E	Humboldt	1-Jul-09	0-50	Yes	INC	15	6:00	20:00	290	1000	50	1700	140	1500	0	0	11000

It is possible that the CAISO would dispatch a particular resource, for instance at 10 MW from hours ending 1 through 4, and all or part of its energy might settle as optimal energy. This situation occurs when the LMP at the resource pricing node is above the resource bid price. This cost will only be captured in charge code 6470. It is also possible that CAISO issues an exceptional dispatch for the resource to operate at a minimum of 10 MW which is its Pmin; however the market application might dispatch this resource above Pmin because the resource is economical. When this occurs, the charge code CC6470 and the total MWh quantity might overstate the actual exceptional dispatch MWh quantities. So, to best estimate the cost and volume (MWH) of exceptional dispatch, it is appropriate to consider only the following columns: ED MWh (INC/DEC), CC6470 INC, CC6470 DEC, CC6482, CC6488.

Example 3: Decremental Exceptional Dispatch Instructions in RTM

This example highlights decremental exceptional dispatch instructions in the real-time market. In this fictitious example, the CAISO issued an exceptional dispatch instruction to resource A to be committed at its Pmin of 20 MW from hours ending 15 through 20 after completion of the day-ahead market for the transmission procedure 7430. The CAISO issued additional exceptional dispatch instructions for resources B and C; details of those instructions are shown in Table 6. This table also includes volume (MWh) and cost information.

Resource A is committed in real-time at its Pmin, its total volume (MWh) is 20MW *6 hours which is equal to 120 MWh. This resource has a zero MW of incremental dispatch in all hours, so all other relevant cost and volume columns result in zeros. Resource B has a decremental MW of 20 MW in 3 hours, which results in 60 MWh of decremental volume. Since this resource is not committed in real-time, both the minimum load cost and start up costs are zero. This resource had a bid price of $50/MWh and LMP at the resource pricing node is $10/ MWh. Based on this information CC6470-Dec is calculated as 60 MWh *$10/MWh which is equal to $600. Since this resource has its ED volume (MWh) equal to its Total volume, CC6470 is equal to CC6470- DEC. The CC6488 is calculated as (60 MWh * ($50/MWh - $10/MWh)), which is equal to $2400. Resource C had a bid price of $10/MWh and the LMP at its pricing node is $50/MWh. Based on this information, volume and cost information is calculated for resource C.

Table 6: Decremental Exceptional Dispatch Instructions in RTM

Date	Market Type	Resource	Location	Local Reliability Area (LRA)	Begin Time	End Time	Dispatch level (MW)	Day-Ahead Award (MW)	Commitment	INC/DEC	ED (MW)	Reason	Total MWH	Min Load Cost	Start Up Cost	CC6470	ED MWH (INC/DEC)	CC6470 INC	CC6470 DEC	CC6482	CC6488
1-Jul-09	RT	A	PG&E	Fresno	15:00	20:00	20	0	Yes	INC	20	7430	120	$ 120	$ 100	$ -	0	$ -	$ -	$ -	$ -
1-Jul-09	RT	B	PG&E	Fresno	7:00	9:00	40	60	No	DEC	20	7430	(60)	$ -	$ -	$ 600	-60	$ -	$ 600	$ -	$2,400
1-Jul-09	RT	C	PG&E	Fresno	10:00	14:00	40	50	No	DEC	10	7430	(50)	$ -	$ -	$ 500	-50	$ -	$ 500	$ -	$2,000

This data is summarized according to FERC convention in Table 7. This summary classifies the data by reason, resource location, local reliability area, and trade date. Incs and decs are broken out separately. The inc entry is self-explanatory and similar to the previous example. Regarding the dec entry the MW column is the range of MW; in this case the minimum dec instruction is 10 MW (actually -10MW as it is a dec) for resource C which occurs from hours ending 10 through 14. The maximum instruction occurs from hours ending 7 through 9, when resource B was issued a dec instruction of 20 MW. The MW column shows the minimum and maximum of the overlaps of all the exceptional dispatch instructions. The Commitment column shows whether a resource was committed between the begin time and end time. The volume and cost information are summarized by INC and DEC classification.

Table 7: FERC Summary of Decremental ED Instructions in RTM

Number	Market Type	Reason	Location	Local Reliability Area (LRA)	Trade Date	MW	Commitment	INC/DEC	Hour	Begin Time	End Time	Total MWH	Min Load Cost	Start Up Cost	CC6470	ED MWH (INC/DEC)	CC6470 INC	CC6470 DEC	CC6482	CC6488
1	RT	7430	PG&E	Fresno	1-Jul-09	20	Yes	INC	6	15:00	20:00	120	$ 120	$ 100	$ -	0	$ -	$ -	$ -	$ -
2	RT	7430	PG&E	Fresno	1-Jul-09	10-20	Yes	DEC	8	7:00	14:00	(110)	$ -	$ -	$ (1,100)	$ (110)	$ -	$ (1,100)	$ -	$ (4,400)

Appendix B: Price Impact Analysis

In the September 2 FERC order, FERC requested the CAISO to perform price impact analysis on two distinct pricing nodes for the entire reporting period. The order also mentioned that the CAISO must pick two pricing nodes for the entire reporting period that are most affected by the exceptional dispatch instructions, and the two pricing nodes must belong to two load aggregation points (LAPs).

Based on this requirement the CAISO implemented a methodology to perform price impact analysis. First, the CAISO identified a heavily affected pricing node from each of the Pacific Gas & Electric (PGAE) LAP and Southern California Edison (SCE) LAP. These two pricing nodes had the maximum amount of exceptional dispatch volume (MWh) in their respective LAP. Point A is in PGAE LAP and point B is in SCE LAP. Please note these two points correspond to an actual pricing node in the CAISO system. Only one resource was connected to each of these pricing nodes. For each resource the following input parameters were obtained to perform the analysis:

Exceptional dispatch information: constrained level, constraint type, start of exceptional dispatch instruction and end of exceptional dispatch instruction.
Real-Time LMPs for each of the five minute intervals for the month.
Real-Time hourly bid set for each trade hour.
Day-Ahead award for the resources.

The exceptional dispatch intervals have a begin time and an end time which can span as small as one minute to as large as 24 hours. Since the market application dispatches resources on five-minute basis, the exceptional dispatch instructions for each of these resources were broken down into five-minute intervals. If the begin time or end time for an instruction was in the middle of the five-minute interval, that instruction was rounded up to the next five-minute interval. These five-minute intervals were then coupled with resource five-minute LMPs calculated by the real-time market application. Also, the hourly bid information and the hourly day-ahead schedule were put together to create a dataset that had all the information to perform price impact analysis.

An exceptional dispatch instruction can be classified as a start up instruction, an instruction to be dispatched at or above the constrained level, an instruction to be dispatched at or below a constrained level, an instruction to be dispatched at a fixed constrained level, or a shut down instruction. The Locational Marginal Price (LMP) is set by a resource which can provide the next incremental MW of energy. Based on this definition of LMP and the classification of exceptional dispatches based on constraint type, a resource may set the LMP in only those intervals in which the resource is eligible to move either up or down from its constrained level. Hence, in those intervals in which the resource was constrained up at its Pmax or the resource was exceptionally dispatched to its Pmax and forced to generate at that level, the resource was ineligible to set the price as it had no room to move up. Similarly, if the resource was constrained down at its Pmin, then the resource was not eligible to set the price. All those intervals in which the resource was ineligible to set the price were dropped from the dataset under consideration. From this dataset of only eligible intervals, for both pricing nodes A and B, LMPs were calculated for all intervals based on the resource dispatch level and the its bid set. The calculated LMP is equal to that bid price corresponding to the constrained MW segment.

Table 8 shows the price impact analysis information for node A, which is in the PGAE area. This table shows all the five minute intervals in which the resource at PNode A was issued an exceptional dispatch instruction. Out of the 8,064 five-minute intervals in December, this resource was issued exceptional dispatch instructions in 262 five-minute intervals. This resource was eligible to set the LMP in 262 intervals. Out of the 262 intervals, resource calculated LMP was larger than the market LMP in 246 intervals. In the 246 intervals, the average increase in five minute LMP was $45.74/MWh. Out of the 262 intervals, resource calculated LMP was less than the market LMP in 16 intervals. In the 16 intervals, the average decrease in five minute LMP was $45.14/MWh. This implies that if the CAISO could model the constraint for this exceptional dispatch, then this resource and all other pricing nodes associated with that constraint would observe an average increase of $40.18/MWh

Table 9 shows the price impact analysis information for node B, which is in the SCE area. This table shows all the five minute intervals in which the resource at PNode B was issued an exceptional dispatch instruction. Out of the 8,064 five-minute intervals in December, this resource was issued exceptional dispatch instructions in 223 five-minute intervals. This resource was eligible to set the LMP in 223 intervals. Out of the 223 intervals, resource calculated LMP was larger than the market LMP in 223 intervals. In the 223 intervals, the average increase in five minute LMP was $313.65/MWh. Out of the 223 intervals, resource calculated LMP was less than the market LMP in 0 intervals. This implies that if the CAISO could model the constraint for this exceptional dispatch, then this resource and all other pricing nodes associated with that constraint would observe an average increase of $313.65/MWh

Table 8: Price Impact Analysis Information for Pricing Node A in PGAE LAP

Number	Trade Date	Trade Hour	Interval	Market LMP	Eligible Flag	Calculated LMP	Change in LMP
1	12/1/2018	20	7	87.09	Yes	98.52	11.43
2	12/1/2018	20	8	82.43	Yes	98.52	16.09
3	12/1/2018	20	9	80.50	Yes	98.52	18.02
4	12/1/2018	20	10	77.16	Yes	98.52	21.36
5	12/1/2018	20	11	77.16	Yes	98.52	21.36
6	12/1/2018	20	12	74.78	Yes	98.52	23.74
7	12/1/2018	21	1	75.26	Yes	98.52	23.26
8	12/1/2018	21	2	76.90	Yes	98.52	21.62
9	12/1/2018	21	3	80.14	Yes	98.52	18.38
10	12/1/2018	21	4	80.03	Yes	98.52	18.49
11	12/1/2018	21	5	79.53	Yes	98.52	18.99
12	12/1/2018	21	6	65.01	Yes	98.52	33.51
13	12/1/2018	21	7	67.39	Yes	98.52	31.13
14	12/1/2018	21	8	77.25	Yes	98.52	21.27
15	12/1/2018	21	9	116.22	Yes	98.52	-17.70
16	12/1/2018	21	10	104.86	Yes	98.52	-6.34
17	12/1/2018	21	11	93.32	Yes	98.52	5.20
18	12/1/2018	21	12	89.80	Yes	98.52	8.72
19	12/1/2018	22	1	88.48	Yes	98.52	10.04
20	12/1/2018	22	2	104.89	Yes	98.52	-6.37
21	12/1/2018	22	3	109.14	Yes	98.52	-10.62
22	12/1/2018	22	4	303.40	Yes	98.52	-204.88
23	12/1/2018	22	5	192.67	Yes	98.52	-94.15
24	12/1/2018	22	6	85.82	Yes	98.52	12.70
25	12/1/2018	22	7	79.59	Yes	98.52	18.93
26	12/1/2018	22	8	80.21	Yes	98.52	18.31
27	12/1/2018	22	9	79.51	Yes	98.52	19.01
28	12/1/2018	22	10	71.25	Yes	98.52	27.27
29	12/1/2018	22	11	74.80	Yes	98.52	23.72
30	12/1/2018	22	12	79.62	Yes	98.52	18.90
31	12/1/2018	23	1	99.38	Yes	98.52	-0.86
32	12/1/2018	23	2	196.59	Yes	98.52	-98.07
33	12/1/2018	23	3	165.14	Yes	98.52	-66.62
34	12/1/2018	23	4	115.66	Yes	98.52	-17.14

Number	Trade Date	Trade Hour	Interval	Market LMP	Eligible Flag	Calculated LMP	Change in LMP
35	12/1/2018	23	5	96.78	Yes	98.52	1.74
36	12/1/2018	23	6	101.44	Yes	98.52	-2.92
37	12/1/2018	23	7	192.25	Yes	98.52	-93.73
38	12/1/2018	23	8	186.69	Yes	98.52	-88.17
39	12/1/2018	23	9	109.71	Yes	98.52	-11.19
40	12/1/2018	23	10	86.49	Yes	98.52	12.03
41	12/1/2018	23	11	83.54	Yes	98.52	14.98
42	12/1/2018	23	12	75.85	Yes	98.52	22.67
43	12/1/2018	24	1	85.11	Yes	98.52	13.41
44	12/1/2018	24	2	91.92	Yes	98.52	6.60
45	12/1/2018	24	3	80.79	Yes	98.52	17.73
46	12/1/2018	24	4	90.99	Yes	98.52	7.53
47	12/1/2018	24	5	75.40	Yes	98.52	23.12
48	12/1/2018	24	6	72.90	Yes	98.52	25.62
49	12/1/2018	24	7	73.04	Yes	98.52	25.48
50	12/1/2018	24	8	70.31	Yes	98.52	28.21
51	12/1/2018	24	9	70.31	Yes	98.52	28.21
52	12/1/2018	24	10	66.69	Yes	98.52	31.83
53	12/1/2018	24	11	66.51	Yes	98.52	32.01
54	12/1/2018	24	12	62.95	Yes	98.52	35.57
55	12/2/2018	2	1	64.01	Yes	98.45	34.44
56	12/2/2018	2	2	64.04	Yes	98.45	34.41
57	12/2/2018	2	3	68.16	Yes	98.45	30.29
58	12/2/2018	2	4	66.99	Yes	98.45	31.46
59	12/2/2018	2	5	64.57	Yes	98.45	33.88
60	12/2/2018	2	6	67.71	Yes	98.45	30.74
61	12/2/2018	2	7	69.23	Yes	98.45	29.22
62	12/2/2018	2	8	67.75	Yes	98.45	30.70
63	12/2/2018	2	9	65.77	Yes	98.45	32.68
64	12/2/2018	2	10	62.10	Yes	98.45	36.35
65	12/2/2018	2	11	59.18	Yes	98.45	39.27
66	12/2/2018	2	12	58.75	Yes	98.45	39.70
67	12/2/2018	3	1	57.63	Yes	98.45	40.82
68	12/2/2018	3	2	57.03	Yes	98.45	41.42
69	12/2/2018	3	3	57.50	Yes	98.45	40.95
70	12/2/2018	3	4	57.50	Yes	98.45	40.95
71	12/2/2018	3	5	64.57	Yes	98.45	33.88
72	12/2/2018	3	6	62.76	Yes	98.45	35.69

Number	Trade Date	Trade Hour	Interval	Market LMP	Eligible Flag	Calculated LMP	Change in LMP
73	12/2/2018	3	7	61.82	Yes	98.45	36.63
74	12/2/2018	3	8	61.53	Yes	98.45	36.92
75	12/2/2018	3	9	59.63	Yes	98.45	38.82
76	12/2/2018	3	10	61.55	Yes	98.45	36.90
77	12/2/2018	3	11	61.89	Yes	98.45	36.56
78	12/2/2018	3	12	66.41	Yes	98.45	32.04
79	12/2/2018	4	1	64.43	Yes	98.45	34.02
80	12/2/2018	4	2	63.22	Yes	98.45	35.23
81	12/2/2018	4	3	68.19	Yes	98.45	30.26
82	12/2/2018	4	4	60.52	Yes	98.45	37.93
83	12/2/2018	4	5	61.73	Yes	98.45	36.72
84	12/2/2018	4	6	61.08	Yes	98.45	37.37
85	12/2/2018	4	7	60.90	Yes	98.45	37.55
86	12/2/2018	4	8	60.14	Yes	98.45	38.31
87	12/2/2018	4	9	60.14	Yes	98.45	38.31
88	12/2/2018	4	10	60.11	Yes	98.45	38.34
89	12/2/2018	4	11	61.91	Yes	98.45	36.54
90	12/2/2018	4	12	61.78	Yes	98.45	36.67
91	12/2/2018	5	1	61.81	Yes	98.45	36.64
92	12/2/2018	5	2	67.45	Yes	98.45	31.00
93	12/2/2018	5	3	67.45	Yes	98.45	31.00
94	12/2/2018	5	4	67.23	Yes	98.45	31.22
95	12/2/2018	5	5	67.80	Yes	98.45	30.65
96	12/2/2018	5	6	67.85	Yes	98.45	30.60
97	12/2/2018	5	7	69.48	Yes	98.45	28.97
98	12/2/2018	5	8	69.48	Yes	98.45	28.97
99	12/2/2018	5	9	69.48	Yes	98.45	28.97
100	12/2/2018	5	10	72.74	Yes	98.45	25.71
101	12/2/2018	5	11	78.36	Yes	98.45	20.09
102	12/2/2018	5	12	79.68	Yes	98.45	18.77
103	12/2/2018	6	1	67.85	Yes	98.45	30.60
104	12/2/2018	6	2	63.82	Yes	98.45	34.63
105	12/2/2018	6	3	67.91	Yes	98.45	30.54
106	12/2/2018	6	4	67.83	Yes	98.45	30.62
107	12/2/2018	6	5	70.78	Yes	98.45	27.67
108	12/2/2018	6	6	70.40	Yes	98.45	28.05
109	12/2/2018	6	7	73.69	Yes	98.45	24.76
110	12/2/2018	6	8	78.77	Yes	98.45	19.68

Number	Trade Date	Trade Hour	Interval	Market LMP	Eligible Flag	Calculated LMP	Change in LMP
111	12/2/2018	6	9	81.07	Yes	98.45	17.38
112	12/2/2018	6	10	86.72	Yes	98.45	11.73
113	12/2/2018	6	11	83.03	Yes	98.45	15.42
114	12/2/2018	6	12	84.73	Yes	98.45	13.72
115	12/2/2018	7	1	71.56	Yes	98.45	26.89
116	12/2/2018	7	2	53.15	Yes	98.45	45.30
117	12/2/2018	7	3	53.75	Yes	98.45	44.70
118	12/2/2018	7	4	53.14	Yes	98.45	45.31
119	12/2/2018	7	5	55.73	Yes	98.45	42.72
120	12/2/2018	7	6	59.55	Yes	98.45	38.90
121	12/2/2018	7	7	58.03	Yes	98.45	40.42
122	12/2/2018	7	8	58.01	Yes	98.45	40.44
123	12/2/2018	7	9	57.78	Yes	98.45	40.67
124	12/2/2018	7	10	57.32	Yes	98.45	41.13
125	12/2/2018	7	11	57.11	Yes	98.45	41.34
126	12/2/2018	7	12	65.55	Yes	98.45	32.90
127	12/2/2018	8	1	73.71	Yes	98.45	24.74
128	12/2/2018	8	2	79.01	Yes	98.45	19.44
129	12/2/2018	8	3	85.18	Yes	98.45	13.27
130	12/2/2018	8	4	68.14	Yes	98.45	30.31
131	12/2/2018	8	5	68.71	Yes	98.45	29.74
132	12/2/2018	8	6	64.10	Yes	98.45	34.35
133	12/2/2018	8	7	60.27	Yes	98.45	38.18
134	12/2/2018	8	8	52.08	Yes	98.45	46.37
135	12/2/2018	8	9	49.34	Yes	98.45	49.11
136	12/2/2018	8	10	44.40	Yes	98.45	54.05
137	12/2/2018	8	11	39.53	Yes	98.45	58.92
138	12/2/2018	8	12	42.50	Yes	98.45	55.95
139	12/2/2018	9	1	47.04	Yes	98.45	51.41
140	12/2/2018	9	2	47.57	Yes	98.45	50.88
141	12/2/2018	9	3	42.47	Yes	98.45	55.98
142	12/2/2018	9	4	41.81	Yes	98.45	56.64
143	12/2/2018	9	5	33.45	Yes	98.45	65.00
144	12/2/2018	9	6	33.64	Yes	98.45	64.81
145	12/2/2018	9	7	-0.01	Yes	98.45	98.46
146	12/2/2018	9	8	0.01	Yes	98.45	98.44
147	12/2/2018	9	9	0.01	Yes	98.45	98.44
148	12/2/2018	9	10	14.62	Yes	98.45	83.83

Number	Trade Date	Trade Hour	Interval	Market LMP	Eligible Flag	Calculated LMP	Change in LMP
149	12/2/2018	9	11	20.57	Yes	98.45	77.88
150	12/2/2018	9	12	19.02	Yes	98.45	79.43
151	12/2/2018	10	1	3.12	Yes	98.45	95.33
152	12/2/2018	10	2	0.00	Yes	98.45	98.45
153	12/2/2018	10	3	8.72	Yes	98.45	89.73
154	12/2/2018	10	4	35.11	Yes	98.45	63.34
155	12/2/2018	10	5	19.00	Yes	98.45	79.45
156	12/2/2018	10	6	32.44	Yes	98.45	66.01
157	12/2/2018	10	7	14.04	Yes	98.45	84.41
158	12/2/2018	10	8	14.13	Yes	98.45	84.32
159	12/2/2018	10	9	23.00	Yes	98.45	75.45
160	12/2/2018	10	10	35.00	Yes	98.45	63.45
161	12/2/2018	10	11	32.04	Yes	98.45	66.41
162	12/2/2018	10	12	35.71	Yes	98.45	62.74
163	12/2/2018	11	1	-0.01	Yes	98.45	98.46
164	12/2/2018	11	2	19.14	Yes	98.45	79.31
165	12/2/2018	11	3	42.58	Yes	98.45	55.87
166	12/2/2018	11	4	35.32	Yes	98.45	63.13
167	12/2/2018	11	5	34.06	Yes	98.45	64.39
168	12/2/2018	11	6	14.95	Yes	98.45	83.50
169	12/2/2018	11	7	18.75	Yes	98.45	79.70
170	12/2/2018	11	8	0.00	Yes	98.45	98.45
171	12/2/2018	11	9	13.84	Yes	98.45	84.61
172	12/2/2018	11	10	-0.01	Yes	98.45	98.46
173	12/2/2018	11	11	14.34	Yes	98.45	84.11
174	12/2/2018	11	12	14.05	Yes	98.45	84.40
175	12/2/2018	12	1	19.31	Yes	98.45	79.14
176	12/2/2018	12	2	26.41	Yes	98.45	72.04
177	12/2/2018	12	3	21.44	Yes	98.45	77.01
178	12/2/2018	12	4	14.66	Yes	98.45	83.79
179	12/2/2018	12	5	16.70	Yes	98.45	81.75
180	12/2/2018	12	6	18.05	Yes	98.45	80.40
181	12/2/2018	12	7	20.84	Yes	98.45	77.61
182	12/2/2018	12	8	18.47	Yes	98.45	79.98
183	12/2/2018	12	9	14.58	Yes	98.45	83.87
184	12/2/2018	12	10	14.58	Yes	98.45	83.87
185	12/2/2018	12	11	14.58	Yes	98.45	83.87
186	12/2/2018	12	12	15.25	Yes	98.45	83.20

Number	Trade Date	Trade Hour	Interval	Market LMP	Eligible Flag	Calculated LMP	Change in LMP
187	12/2/2018	13	1	17.36	Yes	98.45	81.09
188	12/2/2018	13	2	19.76	Yes	98.45	78.69
189	12/2/2018	13	3	18.83	Yes	98.45	79.62
190	12/2/2018	13	4	14.39	Yes	98.45	84.06
191	12/2/2018	13	5	17.58	Yes	98.45	80.87
192	12/2/2018	13	6	13.93	Yes	98.45	84.52
193	12/2/2018	13	7	18.91	Yes	98.45	79.54
194	12/2/2018	13	8	22.95	Yes	98.45	75.50
195	12/2/2018	13	9	22.95	Yes	98.45	75.50
196	12/2/2018	13	10	22.79	Yes	98.45	75.66
197	12/2/2018	13	11	21.31	Yes	98.45	77.14
198	12/2/2018	13	12	23.01	Yes	98.45	75.44
199	12/2/2018	14	1	14.53	Yes	98.45	83.92
200	12/2/2018	14	2	18.69	Yes	98.45	79.76
201	12/2/2018	14	3	26.20	Yes	98.45	72.25
202	12/2/2018	14	4	14.20	Yes	98.45	84.25
203	12/2/2018	14	5	13.95	Yes	98.45	84.50
204	12/2/2018	14	6	14.82	Yes	98.45	83.63
205	12/2/2018	14	7	14.03	Yes	98.45	84.42
206	12/2/2018	14	8	15.45	Yes	98.45	83.00
207	12/2/2018	14	9	22.96	Yes	98.45	75.49
208	12/2/2018	14	10	23.16	Yes	98.45	75.29
209	12/2/2018	14	11	21.52	Yes	98.45	76.93
210	12/2/2018	14	12	22.91	Yes	98.45	75.54
211	12/2/2018	15	1	14.16	Yes	98.45	84.29
212	12/2/2018	15	2	18.32	Yes	98.45	80.13
213	12/2/2018	15	3	14.42	Yes	98.45	84.03
214	12/2/2018	15	4	16.25	Yes	98.45	82.20
215	12/2/2018	15	5	17.04	Yes	98.45	81.41
216	12/2/2018	15	6	26.13	Yes	98.45	72.32
217	12/2/2018	15	7	39.32	Yes	98.45	59.13
218	12/2/2018	15	8	44.31	Yes	98.45	54.14
219	12/2/2018	15	9	46.42	Yes	98.45	52.03
220	12/2/2018	15	10	49.45	Yes	98.45	49.00
221	12/2/2018	15	11	49.45	Yes	98.45	49.00
222	12/2/2018	15	12	52.42	Yes	98.45	46.03
223	12/2/2018	16	1	38.80	Yes	98.45	59.65
224	12/2/2018	16	2	23.53	Yes	98.45	74.92

Number	Trade Date	Trade Hour	Interval	Market LMP	Eligible Flag	Calculated LMP	Change in LMP
225	12/2/2018	16	3	36.09	Yes	98.45	62.36
226	12/2/2018	16	4	32.77	Yes	98.45	65.68
227	12/2/2018	16	5	40.41	Yes	98.45	58.04
228	12/2/2018	16	6	49.45	Yes	98.45	49.00
229	12/2/2018	16	7	55.38	Yes	98.45	43.07
230	12/2/2018	16	8	59.23	Yes	98.45	39.22
231	12/2/2018	16	9	62.49	Yes	98.45	35.96
232	12/2/2018	16	10	64.01	Yes	98.45	34.44
233	12/2/2018	16	11	71.04	Yes	98.45	27.41
234	12/2/2018	16	12	83.73	Yes	98.45	14.72
235	12/2/2018	17	1	55.91	Yes	98.45	42.54
236	12/2/2018	17	2	53.24	Yes	98.45	45.21
237	12/2/2018	17	3	53.55	Yes	98.45	44.90
238	12/2/2018	17	4	55.70	Yes	98.45	42.75
239	12/2/2018	17	5	57.33	Yes	98.45	41.12
240	12/2/2018	17	6	59.68	Yes	98.45	38.77
241	12/2/2018	17	7	59.32	Yes	98.45	39.13
242	12/2/2018	17	8	59.90	Yes	98.45	38.55
243	12/2/2018	17	9	71.99	Yes	98.45	26.46
244	12/2/2018	17	10	80.38	Yes	98.45	18.07
245	12/2/2018	17	11	83.33	Yes	98.45	15.12
246	12/2/2018	17	12	90.00	Yes	98.45	8.45
247	12/2/2018	20	9	83.79	Yes	98.45	14.66
248	12/2/2018	20	10	90.04	Yes	98.45	8.41
249	12/2/2018	20	11	88.12	Yes	98.45	10.33
250	12/2/2018	20	12	91.30	Yes	98.45	7.15
251	12/2/2018	21	1	93.81	Yes	98.45	4.64
252	12/2/2018	21	2	100.73	Yes	98.45	-2.28
253	12/2/2018	21	3	99.67	Yes	98.45	-1.22
254	12/2/2018	21	4	90.01	Yes	98.45	8.44
255	12/2/2018	21	5	88.18	Yes	98.45	10.27
256	12/2/2018	21	6	84.86	Yes	98.45	13.59
257	12/2/2018	21	7	84.28	Yes	98.45	14.17
258	12/2/2018	21	8	83.84	Yes	98.45	14.61
259	12/2/2018	21	9	77.28	Yes	98.45	21.17
260	12/2/2018	21	10	74.97	Yes	98.45	23.48
261	12/2/2018	21	11	74.97	Yes	98.45	23.48
262	12/2/2018	21	12	81.15	Yes	98.45	17.30

Table 9: Price Impact Analysis Information for Pricing Node B in SCE LAP

Number	Trade Date	Trade Hour	Interval	Market LMP	Eligible Flag	Calculated LMP	Change in LMP
1	12/1/2018	16	1	62.48	Yes	405.35	342.87
2	12/1/2018	16	2	56.87	Yes	405.35	348.48
3	12/1/2018	16	3	57.64	Yes	405.35	347.71
4	12/1/2018	16	4	57.88	Yes	405.35	347.47
5	12/1/2018	16	5	62.98	Yes	405.35	342.37
6	12/1/2018	16	6	67.49	Yes	405.35	337.86
7	12/1/2018	16	7	80.46	Yes	405.35	324.89
8	12/1/2018	16	8	100.16	Yes	405.35	305.19
9	12/1/2018	16	9	107.35	Yes	405.35	298.00
10	12/1/2018	16	10	96.27	Yes	405.35	309.08
11	12/1/2018	16	11	107.23	Yes	405.35	298.12
12	12/1/2018	16	12	119.73	Yes	405.35	285.62
13	12/1/2018	17	1	76.03	Yes	405.35	329.32
14	12/1/2018	17	2	76.37	Yes	405.35	328.98
15	12/1/2018	17	3	55.85	Yes	405.35	349.50
16	12/1/2018	17	4	62.81	Yes	405.35	342.54
17	12/1/2018	17	5	74.11	Yes	405.35	331.24
18	12/1/2018	17	6	81.19	Yes	405.35	324.16
19	12/1/2018	17	7	78.04	Yes	405.35	327.31
20	12/1/2018	17	8	82.08	Yes	405.35	323.27
21	12/1/2018	17	9	83.19	Yes	405.35	322.16
22	12/1/2018	17	10	82.58	Yes	405.35	322.77
23	12/1/2018	17	11	71.98	Yes	405.35	333.37
24	12/1/2018	17	12	80.70	Yes	405.35	324.65
25	12/1/2018	18	1	63.77	Yes	405.35	341.58
26	12/1/2018	18	2	62.83	Yes	405.35	342.52
27	12/1/2018	18	3	78.32	Yes	405.35	327.03
28	12/1/2018	18	4	69.33	Yes	405.35	336.02
29	12/1/2018	18	5	63.11	Yes	405.35	342.24
30	12/1/2018	18	6	63.76	Yes	405.35	341.59
31	12/1/2018	18	7	70.23	Yes	405.35	335.12
32	12/1/2018	18	8	75.07	Yes	405.35	330.28
33	12/1/2018	18	9	76.15	Yes	405.35	329.20
34	12/1/2018	18	10	76.50	Yes	405.35	328.85

Number	Trade Date	Trade Hour	Interval	Market LMP	Eligible Flag	Calculated LMP	Change in LMP
35	12/1/2018	18	11	77.26	Yes	405.35	328.09
36	12/1/2018	18	12	78.49	Yes	405.35	326.86
37	12/1/2018	19	1	75.08	Yes	405.35	330.27
38	12/1/2018	19	2	78.60	Yes	405.35	326.75
39	12/1/2018	19	3	84.12	Yes	405.35	321.23
40	12/1/2018	19	4	83.98	Yes	405.35	321.37
41	12/1/2018	19	5	82.93	Yes	405.35	322.42
42	12/1/2018	19	6	81.71	Yes	405.35	323.64
43	12/1/2018	19	7	79.84	Yes	405.35	325.51
44	12/1/2018	19	8	77.35	Yes	405.35	328.00
45	12/1/2018	19	9	79.99	Yes	405.35	325.36
46	12/1/2018	19	10	79.02	Yes	405.35	326.33
47	12/1/2018	19	11	78.20	Yes	405.35	327.15
48	12/1/2018	19	12	78.20	Yes	405.35	327.15
49	12/1/2018	20	1	82.37	Yes	405.35	322.98
50	12/1/2018	20	2	83.48	Yes	405.35	321.87
51	12/1/2018	20	3	87.11	Yes	405.35	318.24
52	12/1/2018	20	4	87.47	Yes	405.35	317.88
53	12/1/2018	20	5	87.47	Yes	405.35	317.88
54	12/1/2018	20	6	100.99	Yes	405.35	304.36
55	12/1/2018	20	7	88.72	Yes	405.35	316.63
56	12/1/2018	20	8	83.97	Yes	405.35	321.38
57	12/1/2018	20	9	82.01	Yes	405.35	323.34
58	12/1/2018	20	10	78.55	Yes	405.35	326.80
59	12/1/2018	20	11	78.55	Yes	405.35	326.80
60	12/1/2018	20	12	76.13	Yes	405.35	329.22
61	12/1/2018	21	1	76.62	Yes	405.35	328.73
62	12/1/2018	21	2	78.30	Yes	405.35	327.05
63	12/1/2018	21	3	81.59	Yes	405.35	323.76
64	12/1/2018	21	4	81.83	Yes	405.35	323.52
65	12/1/2018	21	5	81.31	Yes	405.35	324.04
66	12/1/2018	21	6	66.46	Yes	405.35	338.89
67	12/1/2018	21	7	68.80	Yes	405.35	336.55
68	12/1/2018	21	8	78.87	Yes	405.35	326.48
69	12/1/2018	21	9	118.66	Yes	405.35	286.69
70	12/1/2018	21	10	106.98	Yes	405.35	298.37
71	12/1/2018	21	11	95.21	Yes	405.35	310.14
72	12/1/2018	21	12	91.62	Yes	405.35	313.73

Number	Trade Date	Trade Hour	Interval	Market LMP	Eligible Flag	Calculated LMP	Change in LMP
73	12/2/2018	15	5	17.15	Yes	405.35	388.20
74	12/2/2018	15	6	26.31	Yes	405.35	379.04
75	12/2/2018	15	7	39.68	Yes	405.35	365.67
76	12/2/2018	15	8	44.72	Yes	405.35	360.63
77	12/2/2018	15	9	46.85	Yes	405.35	358.50
78	12/2/2018	15	10	49.91	Yes	405.35	355.44
79	12/2/2018	15	11	49.91	Yes	405.35	355.44
80	12/2/2018	15	12	52.91	Yes	405.35	352.44
81	12/2/2018	16	1	39.15	Yes	405.35	366.20
82	12/2/2018	16	2	23.74	Yes	405.35	381.61
83	12/2/2018	16	3	36.42	Yes	405.35	368.93
84	12/2/2018	16	4	33.22	Yes	405.35	372.13
85	12/2/2018	16	5	40.97	Yes	405.35	364.38
86	12/2/2018	16	6	50.14	Yes	405.35	355.21
87	12/2/2018	16	7	56.19	Yes	405.35	349.16
88	12/2/2018	16	8	60.10	Yes	405.35	345.25
89	12/2/2018	16	9	63.40	Yes	405.35	341.95
90	12/2/2018	16	10	65.15	Yes	405.35	340.20
91	12/2/2018	16	11	72.30	Yes	405.35	333.05
92	12/2/2018	16	12	85.21	Yes	405.35	320.14
93	12/2/2018	17	1	57.04	Yes	405.35	348.31
94	12/2/2018	17	2	54.32	Yes	405.35	351.03
95	12/2/2018	17	3	54.64	Yes	405.35	350.71
96	12/2/2018	17	4	56.96	Yes	405.35	348.39
97	12/2/2018	17	5	58.63	Yes	405.35	346.72
98	12/2/2018	17	6	61.03	Yes	405.35	344.32
99	12/2/2018	17	7	60.88	Yes	405.35	344.47
100	12/2/2018	17	8	61.47	Yes	405.35	343.88
101	12/2/2018	17	9	73.87	Yes	405.35	331.48
102	12/2/2018	17	10	80.38	Yes	405.35	324.97
103	12/2/2018	17	11	83.33	Yes	405.35	322.02
104	12/2/2018	17	12	90.00	Yes	405.35	315.35
105	12/2/2018	18	1	91.63	Yes	405.35	313.72
106	12/2/2018	18	2	90.32	Yes	405.35	315.03
107	12/2/2018	18	3	94.66	Yes	405.35	310.69
108	12/2/2018	18	4	98.84	Yes	405.35	306.51
109	12/2/2018	18	5	99.49	Yes	405.35	305.86
110	12/2/2018	18	6	111.44	Yes	405.35	293.91

Number	Trade Date	Trade Hour	Interval	Market LMP	Eligible Flag	Calculated LMP	Change in LMP
111	12/2/2018	18	7	103.23	Yes	405.35	302.12
112	12/2/2018	18	8	105.03	Yes	405.35	300.32
113	12/2/2018	18	9	105.64	Yes	405.35	299.71
114	12/2/2018	18	10	108.33	Yes	405.35	297.02
115	12/2/2018	18	11	112.52	Yes	405.35	292.83
116	12/2/2018	18	12	108.99	Yes	405.35	296.36
117	12/2/2018	19	1	97.22	Yes	405.35	308.13
118	12/2/2018	19	2	99.35	Yes	405.35	306.00
119	12/2/2018	19	3	110.88	Yes	405.35	294.47
120	12/2/2018	19	4	117.02	Yes	405.35	288.33
121	12/2/2018	19	5	119.48	Yes	405.35	285.87
122	12/2/2018	19	6	129.04	Yes	405.35	276.31
123	12/2/2018	19	7	120.12	Yes	155.83	35.71
124	12/2/2018	19	8	133.14	Yes	155.83	22.69
125	12/2/2018	19	9	124.34	Yes	155.83	31.49
126	12/2/2018	19	10	133.45	Yes	405.35	271.90
127	12/2/2018	19	11	130.43	Yes	405.35	274.92
128	12/2/2018	19	12	133.61	Yes	405.35	271.74
129	12/2/2018	20	1	113.09	Yes	155.83	42.74
130	12/2/2018	20	2	111.59	Yes	155.83	44.24
131	12/2/2018	20	3	112.18	Yes	155.83	43.65
132	12/2/2018	20	4	129.84	Yes	405.35	275.51
133	12/2/2018	20	5	115.54	Yes	405.35	289.81
134	12/2/2018	20	6	108.96	Yes	405.35	296.39
135	12/2/2018	20	7	98.37	Yes	405.35	306.98
136	12/2/2018	20	8	102.86	Yes	405.35	302.49
137	12/2/2018	20	9	90.27	Yes	155.83	65.56
138	12/2/2018	20	10	108.42	Yes	155.83	47.41
139	12/2/2018	20	11	111.49	Yes	155.83	44.34
140	12/2/2018	20	12	98.34	Yes	155.83	57.49
141	12/2/2018	21	1	101.97	Yes	405.35	303.38
142	12/2/2018	21	2	104.04	Yes	405.35	301.31
143	12/2/2018	21	3	102.95	Yes	405.35	302.40
144	12/2/2018	21	4	92.87	Yes	405.35	312.48
145	12/2/2018	21	5	90.98	Yes	405.35	314.37
146	12/2/2018	21	6	87.56	Yes	405.35	317.79
147	12/2/2018	21	7	86.83	Yes	405.35	318.52
148	12/2/2018	21	8	86.38	Yes	405.35	318.97

Number	Trade Date	Trade Hour	Interval	Market LMP	Eligible Flag	Calculated LMP	Change in LMP
149	12/2/2018	21	9	79.62	Yes	405.35	325.73
150	12/2/2018	21	10	80.11	Yes	405.35	325.24
151	12/2/2018	21	11	79.49	Yes	405.35	325.86
152	12/2/2018	21	12	84.04	Yes	405.35	321.31
153	12/3/2018	15	2	41.17	Yes	405.35	364.18
154	12/3/2018	15	3	41.17	Yes	405.35	364.18
155	12/3/2018	15	4	40.14	Yes	405.35	365.21
156	12/3/2018	15	5	39.50	Yes	405.35	365.85
157	12/3/2018	15	6	41.35	Yes	405.35	364.00
158	12/3/2018	15	7	41.58	Yes	405.35	363.77
159	12/3/2018	15	8	41.58	Yes	405.35	363.77
160	12/3/2018	15	9	48.61	Yes	405.35	356.74
161	12/3/2018	15	10	52.31	Yes	405.35	353.04
162	12/3/2018	15	11	52.31	Yes	405.35	353.04
163	12/3/2018	15	12	51.60	Yes	405.35	353.75
164	12/3/2018	16	1	15.61	Yes	405.35	389.74
165	12/3/2018	16	2	22.51	Yes	405.35	382.84
166	12/3/2018	16	3	15.77	Yes	405.35	389.58
167	12/3/2018	16	4	15.42	Yes	405.35	389.93
168	12/3/2018	16	5	26.40	Yes	405.35	378.95
169	12/3/2018	16	6	40.40	Yes	405.35	364.95
170	12/3/2018	16	7	51.39	Yes	405.35	353.96
171	12/3/2018	16	8	55.95	Yes	405.35	349.40
172	12/3/2018	16	9	58.04	Yes	405.35	347.31
173	12/3/2018	16	10	56.88	Yes	405.35	348.47
174	12/3/2018	16	11	58.85	Yes	405.35	346.50
175	12/3/2018	16	12	66.10	Yes	405.35	339.25
176	12/3/2018	17	1	58.63	Yes	405.35	346.72
177	12/3/2018	17	2	61.12	Yes	405.35	344.23
178	12/3/2018	17	3	54.90	Yes	405.35	350.45
179	12/3/2018	17	4	58.66	Yes	405.35	346.69
180	12/3/2018	17	5	72.40	Yes	405.35	332.95
181	12/3/2018	17	6	72.41	Yes	405.35	332.94
182	12/3/2018	17	7	80.60	Yes	405.35	324.75
183	12/3/2018	17	8	87.23	Yes	405.35	318.12
184	12/3/2018	17	9	102.99	Yes	405.35	302.36
185	12/3/2018	17	10	122.88	Yes	405.35	282.47
186	12/3/2018	17	11	123.19	Yes	405.35	282.16

Number	Trade Date	Trade Hour	Interval	Market LMP	Eligible Flag	Calculated LMP	Change in LMP
187	12/3/2018	17	12	155.18	Yes	155.83	0.65
188	12/3/2018	18	1	90.05	Yes	405.35	315.30
189	12/3/2018	18	2	88.36	Yes	405.35	316.99
190	12/3/2018	18	3	85.33	Yes	405.35	320.02
191	12/3/2018	18	4	85.35	Yes	405.35	320.00
192	12/3/2018	18	5	89.94	Yes	405.35	315.41
193	12/3/2018	18	6	88.10	Yes	405.35	317.25
194	12/3/2018	18	7	92.29	Yes	405.35	313.06
195	12/3/2018	18	8	91.25	Yes	405.35	314.10
196	12/3/2018	18	9	87.37	Yes	405.35	317.98
197	12/3/2018	18	10	88.82	Yes	405.35	316.53
198	12/3/2018	18	11	87.08	Yes	405.35	318.27
199	12/3/2018	18	12	84.34	Yes	405.35	321.01
200	12/3/2018	19	1	82.94	Yes	405.35	322.41
201	12/3/2018	19	2	82.94	Yes	405.35	322.41
202	12/3/2018	19	3	86.74	Yes	405.35	318.61
203	12/3/2018	19	4	92.00	Yes	405.35	313.35
204	12/3/2018	19	5	90.66	Yes	405.35	314.69
205	12/3/2018	19	6	91.93	Yes	405.35	313.42
206	12/3/2018	19	7	81.64	Yes	405.35	323.71
207	12/3/2018	19	8	82.16	Yes	405.35	323.19
208	12/3/2018	19	9	81.19	Yes	405.35	324.16
209	12/3/2018	19	10	83.08	Yes	405.35	322.27
210	12/3/2018	19	11	86.13	Yes	405.35	319.22
211	12/3/2018	19	12	86.54	Yes	405.35	318.81
212	12/3/2018	20	1	85.76	Yes	405.35	319.59
213	12/3/2018	20	2	85.76	Yes	405.35	319.59
214	12/3/2018	20	3	91.56	Yes	405.35	313.79
215	12/3/2018	20	4	96.56	Yes	405.35	308.79
216	12/3/2018	20	5	95.11	Yes	405.35	310.24
217	12/3/2018	20	6	96.56	Yes	405.35	308.79
218	12/3/2018	20	7	85.63	Yes	405.35	319.72
219	12/3/2018	20	8	85.97	Yes	405.35	319.38
220	12/3/2018	20	9	85.63	Yes	405.35	319.72
221	12/3/2018	20	10	84.19	Yes	405.35	321.16
222	12/3/2018	20	11	82.59	Yes	405.35	322.76
223	12/3/2018	20	12	78.19	Yes	405.35	327.16

Appendix C: Exceptional Dispatch Bid Mitigation Analysis

The ISO did not have any cost savings for the exceptional dispatch bid mitigation for December 2018.

Table 10: Bid Mitigation Analysis for December 2018

Type	Number of Resources	Costs without Bid Mitigation	Costs with Bid Mitigation	Cost Saving
NONTMOD	0	$ 0	$ 0	$ 0
Total	0	$ 0	$ 0	$ 0

CERTIFICATE OF SERVICE

I hereby certify that I have served the foregoing document upon the parties listed on the official service lists in the above-referenced 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 1st day of April, 2019.

/s/ Anna Pascuzzo
Anna Pascuzzo