California Independent System Operator

January 30, 2017

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
August, September and October 2016 Exceptional Dispatch Reports
(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 reports. The reports provide 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.

On December 19, 2016, the CAISO filed a motion to delay the filing of the Chart 2 reports due to a software problem that prevented the CAISO from generating the data that is included in Chart 2 version of the monthly reports. The problem has been rectified and, therefore, the CAISO is filing the August 2016 Chart 2 report, originally due on November 30, 2016; the September 2016 Chart 2 report, originally due on December 30, 2016; and the October 2016 report, due today.

The reports also includes monthly settlement data, the price impact analysis required by paragraph 44 of the September 2, 2009 order, as well as the degree of mitigation analysis required by CAISO tariff section 34.9.4 for each month.

Respectfully submitted,

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Exceptional Dispatch Report

Table 2: August 2016

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Table 2: August 2016

Market Quality and Renewable Integration January 30, 2017

CAISO
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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 August 2016.

This report contains a price impact analysis as prescribed by FERC in its September 2 order. The price impact analysis for the month of August is presented in Appendix B. This report also includes mitigation analysis for August 2016 required by section 34.9.4 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 August 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]

The following additional reason for exceptional dispatch instructions in 2016 includes Software Limitation. When an exceptional dispatch instruction was used 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 reason 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 August, 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 August 2016. 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 “Conditions Beyond the Control of the CAISO” and “Other Reliability Requirement” were due to the Blue Cut Fire. Other reasons for “Other Reliability Requirement” include 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 August 2016

California Independent System Operator Corporation
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Chart 2: Table of Exceptional Dispatches for Period 01/August/2016 - 31/August/2016

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	Bridging Schedules	SCE	Big Creek-Ventura	8/13/2016	100	No	INC	2	22:00	23:59	19.65	26049.42	0.00	-827.27	0.00	0.00	0.00	0.00	0.00	0.00
2	RT	Bridging Schedules	SCE	LA Basin	8/13/2016	10	Yes	INC	3	21:00	23:59	-49.61	4045.56	0.00	1833.43	0.00	0.00	0.00	0.00	0.00	0.00
3	RT	Bridging Schedules	SCE	LA Basin	8/17/2016	50	Yes	INC	2	22:00	23:59	25.71	21276.94	0.00	-964.51	0.00	0.00	0.00	0.00	0.00	0.00
4	RT	Bridging Schedules	SCE	LA Basin	8/30/2016	40	Yes	INC	1	23:00	23:59	0.00	4340.93	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
5	RT	Bridging Schedules	SCE	LA Basin	8/31/2016	40	No	INC	2	0:00	1:59	-0.18	2490.18	0.00	4.54	0.00	0.00	0.00	0.00	0.00	0.00
6	RT	Conditions beyond the control of the CAISO	SCE	Big Creek-Ventura	8/17/2016	50	No	INC	24	0:00	23:59	455.73	443194.53	0.00	-24351.45	5.00	-268.13	0.00	-0.88	0.00	0.00
7	RT	Conditions beyond the control of the CAISO	SCE	Big Creek-Ventura	8/18/2016	50	No	INC	24	0:00	23:59	103.72	201844.28	0.00	-11368.66	0.00	0.00	0.00	-0.54	0.00	0.00
8	RT	Conditions beyond the control of the CAISO	SCE	LA Basin	8/16/2016	70	No	INC	1	23:00	23:59	12.17	5383.04	0.00	-318.84	0.00	0.00	0.00	0.00	0.00	0.00
9	RT	Conditions beyond the control of the CAISO	SCE	LA Basin	8/17/2016	90-270	Yes	INC	24	0:00	23:59	710.57	280055.53	0.00	-40958.14	130.95	-6482.34	0.00	-4.92	0.00	0.00
10	RT	Conditions beyond the control of the CAISO	SCE	LA Basin	8/18/2016	230	Yes	INC	24	0:00	23:59	551.91	435927.93	0.00	-127957.49	0.00	0.00	0.00	-1.18	0.00	0.00
11	RT	Conditions beyond the control of the CAISO	SCE	LA Basin	8/19/2016	50	Yes	INC	24	0:00	23:59	333.42	223984.80	0.00	-43278.75	0.00	0.00	0.00	0.00	0.00	0.00
12	RT	Conditions beyond the control of the CAISO	SDG&E	San Diego-IV	8/17/2016	20-60	Yes	INC	15	9:00	23:59	1.46	121104.34	0.00	-4681.10	0.00	0.00	0.00	0.00	0.00	0.00
13	RT	Contingency Dispatch	SCE	LA Basin	8/1/2016	25	Yes	INC	21	1:00	21:59	-116.21	100601.55	0.00	-15405.43	0.00	0.00	0.00	0.00	0.00	0.00
14	RT	Contingency Dispatch	SDG&E	San Diego-IV	8/1/2016	20	No	INC	20	2:00	21:59	-0.19	73399.00	0.00	3.86	0.00	0.00	0.00	-1.22	0.00	0.00
15	RT	Fast Start Unit Management	SCE	LA Basin	8/11/2016	0	No	INC	1	23:45	23:59	-14.50	981.25	0.00	82.55	-14.50	0.00	82.55	0.00	0.00	0.00
16	RT	Fast Start Unit Management	SCE	LA Basin	8/12/2016	0	No	INC	1	0:00	0:44	-11.38	0.00	0.00	0.00	-11.38	0.00	0.00	0.00	0.00	0.00
17	RT	Fast Start Unit Management	SCE	LA Basin	8/31/2016	0	No	INC	1	13:10	14:09	-5.65	-318.83	0.00	89.32	-3.73	0.00	0.00	0.00	0.00	0.00

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Chart 2: Table of Exceptional Dispatches for Period 01/August/2016 - 31/August/2016

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
18	RT	Fast Start Unit Management	SDG&E	San Diego-IV	8/2/2016	0	No	INC	1	16:45	17:44	-15.00	464.23	33.39	0.00	-15.00	0.00	0.00	0.00	0.00	0.00
19	RT	Incomplete or Inaccurate Transmission	N/A	N/A	8/26/2016	24-32	No	INC	4	20:07	23:59	26.66	-2076.81	0.00	-809.22	19.36	-587.44	0.00	0.00	-431.97	0.00
20	RT	Intertie Emergency Assistance	Intertie	N/A	8/16/2016	100	No	INC	1	12:35	12:59	-41.67	0.00	0.00	616.11	-41.67	0.00	616.11	0.00	0.00	0.00
21	RT	Load Forecast Uncertainty	PG&E	Bay Area	8/13/2016	45	No	INC	21	3:00	23:59	57.08	84729.96	50307.52	-5324.74	0.00	0.00	0.00	-2.57	0.00	0.00
22	RT	Load Forecast Uncertainty	PG&E	Bay Area	8/14/2016	90	No	INC	24	0:00	23:59	62.25	211151.43	0.00	-4252.55	0.00	0.00	0.00	-6.75	0.00	0.00
23	RT	Load Forecast Uncertainty	PG&E	Bay Area	8/15/2016	90	No	INC	24	0:00	23:59	-82.75	210751.01	0.00	3654.16	0.00	0.00	0.00	-6.42	0.00	0.00
24	RT	Load Forecast Uncertainty	PG&E	Bay Area	8/16/2016	90-175	No	INC	24	0:00	23:59	2.32	351473.34	0.00	-86.19	0.00	0.00	0.00	-11.54	0.00	0.00
25	RT	Load Forecast Uncertainty	PG&E	N/A	8/13/2016	52	No	INC	16	8:00	23:59	-134.54	70600.64	143199.48	5520.06	0.00	0.00	0.00	-0.83	0.00	0.00
26	RT	Load Forecast Uncertainty	PG&E	N/A	8/14/2016	52	No	INC	16	8:00	23:59	-99.83	131064.04	0.00	4399.45	0.00	0.00	0.00	-0.04	0.00	0.00
27	RT	Load Forecast Uncertainty	PG&E	N/A	8/15/2016	52	No	INC	24	0:00	23:59	23.67	178275.60	0.00	-958.39	0.00	0.00	0.00	-0.39	0.00	0.00
28	RT	Load Forecast Uncertainty	PG&E	N/A	8/16/2016	52	No	INC	24	0:00	23:59	1.86	107057.77	0.00	-190.79	0.00	0.00	0.00	-0.13	0.00	0.00
29	RT	Load Forecast Uncertainty	SCE	Big Creek-Ventura	8/12/2016	100	No	INC	9	15:00	23:59	-211.36	107397.00	0.00	7431.28	0.00	0.00	0.00	0.00	0.00	0.00
30	RT	Load Forecast Uncertainty	SCE	Big Creek-Ventura	8/14/2016	100	No	INC	24	0:00	23:59	0.02	321873.84	0.00	-0.48	0.00	0.00	0.00	-1.37	0.00	0.00
31	RT	Load Forecast Uncertainty	SCE	Big Creek-Ventura	8/15/2016	100	No	INC	24	0:00	23:59	-217.39	333956.80	0.00	10670.05	0.00	0.00	0.00	-1.56	0.00	0.00
32	RT	Load Forecast Uncertainty	SCE	Big Creek-Ventura	8/16/2016	100	No	INC	24	0:00	23:59	-1.03	120162.27	0.00	28.73	0.00	0.00	0.00	-0.50	0.00	0.00
33	RT	Load Forecast Uncertainty	SCE	LA Basin	8/11/2016	10-30	No	INC	19	5:00	23:59	-160.15	41956.91	0.00	3898.87	0.00	0.00	0.00	-0.34	0.00	0.00
34	RT	Load Forecast Uncertainty	SCE	LA Basin	8/12/2016	30-40	No	INC	24	0:00	23:59	-722.92	101700.44	0.00	41220.95	0.00	0.00	0.00	-0.61	0.00	0.00
35	RT	Load Forecast Uncertainty	SCE	LA Basin	8/14/2016	20	Yes	INC	24	0:00	23:59	-165.90	95306.60	0.00	9645.62	0.00	0.00	0.00	-4.56	0.00	0.00

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Chart 2: Table of Exceptional Dispatches for Period 01/August/2016 - 31/August/2016

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
36	RT	Load Forecast Uncertainty	SCE	LA Basin	8/15/2016	10-190	Yes	INC	14	10:00	23:59	-132.74	95767.84	0.00	-12605.36	0.00	0.00	0.00	-0.16	0.00	0.00
37	RT	Load Forecast Uncertainty	SCE	LA Basin	8/16/2016	20	Yes	INC	24	0:00	23:59	30.75	85604.64	0.00	878.70	77.86	-3974.11	0.00	-301.87	0.00	0.00
38	RT	Load Forecast Uncertainty	SDG&E	San Diego-IV	8/12/2016	20	No	INC	11	13:00	23:59	-318.59	41754.82	0.00	13479.24	0.00	0.00	0.00	0.00	0.00	0.00
39	RT	Load Forecast Uncertainty	SDG&E	San Diego-IV	8/14/2016	20	No	INC	1	20:30	21:14	3.30	0.00	0.00	-146.30	0.00	0.00	0.00	0.00	0.00	0.00
40	RT	Load Forecast Uncertainty	SDG&E	San Diego-IV	8/15/2016	20-40	No	INC	24	0:25	23:59	52.74	19335.05	22177.39	-10645.82	0.00	0.00	0.00	0.00	0.00	0.00
41	RT	Load Forecast Uncertainty	SDG&E	San Diego-IV	8/22/2016	20	No	INC	13	11:00	23:59	-0.06	45180.98	26498.04	1.22	0.00	0.00	0.00	-0.56	0.00	0.00
42	RT	Load Pull	SCE	LA Basin	8/2/2016	130	No	INC	10	12:30	21:59	-500.01	-5238.81	0.00	15401.97	0.00	-0.06	0.00	0.00	0.00	0.00
43	RT	Market Disruption	PG&E	NCNB	8/17/2016	24	No	INC	8	16:40	23:59	-6.00	0.00	0.00	0.00	-6.00	0.00	0.00	0.00	0.00	0.00
44	RT	Operating Procedure Number and Constraint	SCE	LA Basin	8/17/2016	384	No	INC	4	18:45	21:59	-372.92	0.00	0.00	20460.62	0.00	0.00	0.00	0.00	0.00	0.00
45	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	8/1/2016	16-36	No	INC	24	0:00	23:59	-9.92	-32697.69	0.00	195.40	26.99	-984.60	0.00	0.00	0.00	0.00
46	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	8/2/2016	24-48	No	INC	24	0:00	23:59	95.73	-12682.99	0.00	-2985.44	12.82	-468.86	0.00	0.00	0.00	0.00
47	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	8/3/2016	15-36	No	INC	24	0:00	23:59	81.75	-11344.52	0.00	-2812.77	24.46	-877.65	0.00	0.00	0.00	0.00
48	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	8/4/2016	16-36	No	INC	24	0:00	23:59	46.56	-17981.75	0.00	-1875.26	35.28	-1404.24	0.00	0.00	0.00	0.00
49	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	8/5/2016	10-14	No	INC	10	9:15	19:14	-7.38	0.00	0.00	208.02	1.00	-35.33	0.00	0.00	0.00	0.00
50	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	8/17/2016	10-24	No	INC	24	0:00	23:59	17.74	-21746.84	0.00	-463.93	7.88	-313.59	0.00	0.00	0.00	0.00
51	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	8/18/2016	36-48	No	INC	16	8:50	23:59	-0.98	-3091.76	0.00	-352.23	45.99	-1896.70	0.00	0.00	0.00	0.00
52	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	8/19/2016	24-76	No	INC	24	0:00	23:59	86.92	-11849.95	0.00	-3260.29	35.10	-1455.05	0.00	0.00	0.00	0.00
53	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	8/20/2016	15-36	No	INC	24	0:00	23:59	177.32	-15997.85	0.00	-5596.18	25.44	-1002.25	0.00	0.00	0.00	0.00

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Chart 2: Table of Exceptional Dispatches for Period 01/August/2016 - 31/August/2016

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
54	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	8/21/2016	24	No	INC	24	0:00	23:59	44.06	-9704.82	0.00	-1369.52	15.61	-660.81	0.00	0.00	0.00	0.00
55	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	8/22/2016	12-36	No	INC	24	0:00	23:29	49.99	-1923.86	0.00	-1495.94	11.06	-490.81	0.00	0.00	0.00	0.00
56	RT	Operating Procedure Number and Constraint (7110)	PG&E	Humboldt	8/5/2016	10-15	No	INC	18	6:55	23:59	84.76	0.00	0.00	-2787.34	31.07	-1145.78	0.00	0.00	0.00	0.00
57	RT	Operating Procedure Number and Constraint (7110)	PG&E	Humboldt	8/6/2016	15	No	INC	24	0:00	23:04	68.86	0.00	0.00	-1821.29	80.74	-2135.00	0.00	0.00	0.00	0.00
58	RT	Operating Procedure Number and Constraint (7110)	PG&E	Humboldt	8/18/2016	24-70	No	INC	2	21:55	23:44	13.17	0.00	0.00	-646.90	5.16	-181.64	0.00	0.00	0.00	0.00
59	RT	Operating Procedure Number and Constraint (7110)	PG&E	Humboldt	8/19/2016	16-36	No	INC	17	7:00	23:59	33.40	0.00	0.00	-1105.00	4.95	-199.78	0.00	0.00	0.00	0.00
60	RT	Operating Procedure Number and Constraint (7110)	PG&E	Humboldt	8/20/2016	15-24	No	INC	24	0:00	23:59	85.69	-736.14	0.00	-2287.43	0.00	0.00	0.00	0.00	0.00	0.00
61	RT	Operating Procedure Number and Constraint (7110)	PG&E	Humboldt	8/21/2016	15-30	No	INC	24	0:00	23:59	159.87	769.55	0.00	-3567.65	0.00	0.00	0.00	0.00	0.00	0.00
62	RT	Operating Procedure Number and Constraint (7110)	PG&E	Humboldt	8/22/2016	12-30	No	INC	24	0:00	23:59	54.41	0.00	0.00	-1587.14	15.27	-637.67	0.00	0.00	0.00	0.00
63	RT	Operating Procedure Number and Constraint (7230)	PG&E	Sierra	8/13/2016	20-40	No	INC	8	15:30	23:29	53.54	11472.79	0.00	-2871.54	5.00	-234.95	0.00	0.00	0.00	0.00
64	RT	Operating Procedure Number and Constraint (7230)	PG&E	Sierra	8/14/2016	20	No	INC	10	13:30	23:29	-29.08	14077.48	0.00	1207.47	0.00	-0.16	0.00	0.00	0.00	0.00
65	RT	Operating Procedure Number and Constraint (7430)	PG&E	Fresno	8/2/2016	83	No	INC	4	20:25	23:44	-50.84	26153.82	0.00	907.11	0.00	0.00	0.00	0.00	0.00	0.00
66	RT	Operating Procedure Number and Constraint (7430)	PG&E	Fresno	8/4/2016	40	No	INC	1	13:02	13:19	1.06	0.00	0.00	-122.57	3.33	-188.57	0.00	0.00	0.00	0.00
67	RT	Operating Procedure Number and Constraint (7430)	PG&E	Fresno	8/5/2016	83	No	INC	1	17:40	17:59	-2.77	0.00	0.00	115.70	0.00	0.00	0.00	0.00	0.00	0.00
68	RT	Operating Procedure Number and Constraint (7430)	PG&E	Fresno	8/6/2016	70	No	INC	2	16:10	17:29	0.43	0.00	0.00	-158.03	0.00	0.00	0.00	0.00	0.00	0.00
69	RT	Operating Procedure Number and Constraint (7430)	PG&E	Fresno	8/7/2016	70	No	INC	5	14:20	18:59	-2.84	0.00	0.00	132.52	0.00	0.00	0.00	0.00	0.00	0.00
70	RT	Operating Procedure Number and Constraint (7430)	PG&E	Fresno	8/8/2016	75-158	Yes	INC	4	19:08	22:44	21.03	5119.73	0.00	-915.58	-1.83	-0.54	74.19	0.00	0.00	0.00
71	RT	Operating Procedure Number and Constraint (7430)	PG&E	Fresno	8/10/2016	70	No	INC	5	19:50	23:59	-15.18	0.00	0.00	-227.19	0.00	0.00	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
72	RT	Operating Procedure Number and Constraint (7430)	PG&E	Fresno	8/11/2016	70	No	INC	3	0:00	2:44	5.54	0.00	0.00	-103.53	0.00	0.00	0.00	0.00	0.00	0.00
73	RT	Operating Procedure Number and Constraint (7430)	PG&E	Fresno	8/16/2016	8-83	No	INC	24	0:15	23:59	35.89	638.14	0.00	-1258.08	0.00	0.00	0.00	0.00	0.00	0.00
74	RT	Operating Procedure Number and Constraint (7430)	PG&E	Fresno	8/17/2016	83	No	INC	1	0:00	0:44	41.50	1727.14	0.00	-1231.12	0.00	0.00	0.00	0.00	0.00	0.00
75	RT	Operating Procedure Number and Constraint (7430)	PG&E	Fresno	8/21/2016	75	No	INC	3	21:25	23:59	7.69	0.00	0.00	-283.27	-2.14	0.00	24.17	0.00	0.00	0.00
76	RT	Operating Procedure Number and Constraint (7430)	PG&E	Fresno	8/22/2016	75	No	INC	24	0:00	23:59	28.39	0.00	0.00	-3053.67	-1.00	0.00	0.01	0.00	0.00	0.00
77	RT	Operating Procedure Number and Constraint (7430)	PG&E	Fresno	8/29/2016	300	No	INC	1	19:27	19:39	-16.40	0.00	0.00	524.53	0.00	0.00	0.00	0.00	0.00	0.00
78	RT	Operating Procedure Number and Constraint (7450)	PG&E	Kern	8/15/2016	32	Yes	INC	7	17:15	23:59	11.32	7091.65	6845.40	-300.65	0.00	0.00	0.00	0.00	0.00	0.00
79	RT	Operating Procedure Number and Constraint (7450)	PG&E	Kern	8/16/2016	32	No	INC	6	16:20	21:59	-1.13	9367.62	6783.31	3.95	0.00	0.00	0.00	0.00	0.00	0.00
80	RT	Operating Procedure Number and Constraint (7450)	PG&E	Kern	8/17/2016	44	No	INC	6	17:00	22:14	7.53	6562.04	0.00	-395.15	0.00	0.00	0.00	0.00	0.00	0.00
81	RT	Operating Procedure Number and Constraint (7450)	PG&E	Kern	8/18/2016	32	No	INC	5	16:30	20:59	-2.65	6534.05	5873.13	630.36	0.00	0.00	0.00	0.00	0.00	0.00
82	RT	Operating Procedure Number and Constraint (7450)	PG&E	Kern	8/19/2016	32	Yes	INC	4	19:45	23:44	-0.62	5563.92	6870.08	25.72	0.00	0.00	0.00	0.00	0.00	0.00
83	RT	Operating Procedure Number and Constraint (7450)	PG&E	Kern	8/25/2016	32	No	INC	6	18:42	23:59	0.17	5618.60	0.00	319.36	0.00	0.00	0.00	0.00	0.00	0.00
84	RT	Operating Procedure Number and Constraint (7450)	PG&E	Kern	8/26/2016	32	Yes	INC	4	16:30	20:29	0.01	5611.24	6947.39	-0.28	0.00	0.00	0.00	0.00	0.00	0.00
85	RT	Operating Procedure Number and Constraint (7500)	SCE	Big Creek-Ventura	8/6/2016	180	No	INC	2	16:10	17:29	-76.48	0.00	0.00	2208.69	0.00	0.00	0.00	0.00	0.00	0.00
86	RT	Operating Procedure Number and Constraint (7500)	SCE	Big Creek-Ventura	8/10/2016	275	No	INC	8	16:00	23:59	-187.86	0.00	0.00	5063.33	30.16	-1150.75	0.00	0.00	0.00	0.00
87	RT	Operating Procedure Number and Constraint (7500)	SCE	Big Creek-Ventura	8/11/2016	200-275	No	INC	20	0:00	19:59	-149.62	0.00	0.00	4386.50	0.00	0.00	0.00	0.00	0.00	0.00
88	RT	Operating Procedure Number and Constraint (7500)	SCE	Big Creek-Ventura	8/19/2016	250	No	INC	1	14:10	14:59	39.74	0.00	0.00	-2048.11	33.27	-1715.71	0.00	0.00	0.00	0.00
89	RT	Operating Procedure Number and Constraint (7570)	SCE	LA Basin	8/16/2016	1594-5101	No	INC	13	11:40	23:59	-314.00	143358.98	0.00	-40921.21	363.93	-19447.67	0.00	-298.11	0.00	0.00

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90	RT	Operating Procedure Number and Constraint (7570)	SCE	LA Basin	8/18/2016	245	No	INC	4	18:30	21:59	17.10	15304.00	0.00	-648.79	0.00	0.00	0.00	0.00	0.00	0.00
91	RT	Operating Procedure Number and Constraint (7570)	SDG&E	San Diego-IV	8/16/2016	131	No	INC	10	14:00	23:59	-313.28	0.00	0.00	13151.89	0.00	0.00	0.00	0.00	0.00	0.00
92	RT	Other Reliability Requirement	PG&E	N/A	8/31/2016	20	No	INC	7	13:25	19:59	-1.74	0.00	0.00	-10.38	0.00	0.00	0.00	0.00	0.00	0.00
93	RT	Other Reliability Requirement	PG&E	Stockton	8/3/2016	41-45	No	INC	4	18:50	21:59	0.39	0.00	0.00	-71.96	-3.24	0.00	19.21	0.00	0.00	0.00
94	RT	Other Reliability Requirement	PG&E	Stockton	8/14/2016	22	No	INC	5	17:25	21:35	33.86	0.00	0.00	-6431.52	22.76	-1390.59	0.00	0.00	0.00	0.00
95	RT	Other Reliability Requirement	PG&E	Stockton	8/17/2016	22	No	INC	2	16:12	17:59	14.49	0.00	0.00	-639.81	3.49	-88.37	0.00	0.00	0.00	0.00
96	RT	Other Reliability Requirement	SCE	Big Creek-Ventura	8/17/2016	400	No	INC	8	14:30	21:59	403.62	262875.75	0.00	-22499.45	5.00	-268.13	0.00	0.00	0.00	0.00
97	RT	Other Reliability Requirement	SCE	LA Basin	8/16/2016	96	No	INC	3	17:45	19:59	10.83	0.00	0.00	-7257.37	0.00	0.00	0.00	0.00	0.00	0.00
98	RT	Other Reliability Requirement	SCE	LA Basin	8/17/2016	382-817	Yes	INC	8	14:00	21:59	1062.54	103878.43	0.00	-57688.76	212.88	-10133.43	0.00	0.00	0.00	0.00
99	RT	Other Reliability Requirement	SCE	LA Basin	8/30/2016	0	No	INC	10	14:00	23:59	120.93	0.00	0.00	-4426.52	0.00	0.00	0.00	0.00	0.00	0.00
100	RT	Other Reliability Requirement	SCE	LA Basin	8/31/2016	0	No	INC	2	0:00	1:59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
101	RT	Other Reliability Requirement	SCE	N/A	8/17/2016	240	No	INC	9	14:58	22:59	117.52	-89493.33	0.00	-6737.40	-26.38	0.00	0.00	0.00	0.00	0.00
102	RT	Other Reliability Requirement	SDG&E	San Diego-IV	8/2/2016	0	No	INC	3	11:00	13:04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
103	RT	Other Reliability Requirement	SDG&E	San Diego-IV	8/31/2016	40	No	INC	1	17:00	17:59	-4.17	0.00	0.00	279.31	0.00	-0.08	0.00	0.00	0.00	0.00
104	RT	Planned Transmission Outage and Constraint	N/A	N/A	8/6/2016	32-96	No	INC	19	5:10	23:59	132.15	-6833.24	0.00	-3364.30	100.59	-2589.86	0.00	0.00	-3317.30	0.00
105	RT	Planned Transmission Outage and Constraint	N/A	N/A	8/7/2016	30-48	No	INC	24	0:00	23:59	171.88	-13333.58	0.00	-20265.59	74.59	-6758.12	0.00	0.00	-2196.25	0.00
106	RT	Planned Transmission Outage and Constraint	N/A	N/A	8/8/2016	30-46	No	INC	24	0:05	23:59	121.02	-11904.95	0.00	-2928.92	39.39	-1222.87	0.00	0.00	-1066.67	0.00
107	RT	Planned Transmission Outage and Constraint	N/A	N/A	8/9/2016	20-80	No	INC	24	0:00	23:59	94.67	-17885.63	0.00	-4457.55	19.08	-542.32	0.00	0.00	-579.70	0.00

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108	RT	Planned Transmission Outage and Constraint	N/A	N/A	8/10/2016	25-40	No	INC	24	0:00	23:59	33.55	-8355.39	0.00	-941.46	4.25	-213.26	0.00	0.00	-691.58	0.00
109	RT	Planned Transmission Outage and Constraint	N/A	N/A	8/11/2016	15-72	No	INC	24	0:00	23:59	19.07	-7744.54	0.00	-656.40	8.66	-274.43	0.00	0.00	-1142.25	0.00
110	RT	Planned Transmission Outage and Constraint	N/A	N/A	8/12/2016	20-280	No	INC	24	0:00	23:59	121.71	-38065.91	0.00	-4852.18	51.47	-2283.73	875.27	0.00	-1591.00	0.00
111	RT	Planned Transmission Outage and Constraint	N/A	N/A	8/13/2016	24-128	No	INC	24	0:00	23:59	138.93	-15339.09	0.00	-4533.76	47.83	-1612.14	0.00	0.00	-1381.94	0.00
112	RT	Planned Transmission Outage and Constraint	N/A	N/A	8/14/2016	10-60	No	INC	24	0:00	23:59	89.16	-15505.70	0.00	-3654.24	11.70	-499.30	0.00	0.00	-2163.50	0.00
113	RT	Planned Transmission Outage and Constraint	N/A	N/A	8/15/2016	30-90	No	INC	24	0:00	23:59	150.24	-9273.06	0.00	-5057.62	63.30	-2443.75	0.00	0.00	-1984.29	0.00
114	RT	Planned Transmission Outage and Constraint	N/A	N/A	8/16/2016	15-40	No	INC	24	0:00	23:59	34.41	-2341.89	0.00	-827.89	1.25	-32.02	0.00	0.00	-144.76	0.00
115	RT	Planned Transmission Outage and Constraint	N/A	N/A	8/23/2016	15-25	No	INC	24	0:35	23:59	21.14	-1681.42	0.00	-515.38	9.11	-238.66	0.00	0.00	-424.89	0.00
116	RT	Planned Transmission Outage and Constraint	N/A	N/A	8/24/2016	24-36	No	INC	24	0:00	23:59	62.12	-9756.79	0.00	-1786.26	16.70	-463.38	0.00	0.00	-825.95	0.00
117	RT	Planned Transmission Outage and Constraint	N/A	N/A	8/25/2016	24-36	No	INC	24	0:00	23:59	76.60	-7526.86	0.00	-2611.48	18.29	-708.42	0.00	0.00	-92.22	0.00
118	RT	Planned Transmission Outage and Constraint	N/A	N/A	8/26/2016	15	No	INC	1	23:45	23:59	-0.61	-132.56	0.00	13.02	0.00	0.00	0.00	0.00	-53.75	0.00
119	RT	Planned Transmission Outage and Constraint	N/A	N/A	8/27/2016	15-30	No	INC	24	0:00	23:59	32.84	-3429.53	0.00	-871.97	21.33	-571.75	0.00	0.00	-1956.70	0.00
120	RT	Planned Transmission Outage and Constraint	N/A	N/A	8/28/2016	30	No	INC	24	0:00	23:59	76.74	-7260.69	0.00	-2412.75	66.15	-1977.06	0.00	0.00	-3048.18	0.00
121	RT	Planned Transmission Outage and Constraint	N/A	N/A	8/29/2016	24-30	No	INC	24	0:00	23:59	92.80	-12453.18	0.00	-3691.77	80.52	-2909.95	0.00	0.00	-2166.63	0.00
122	RT	Planned Transmission Outage and Constraint	N/A	N/A	8/30/2016	24-65	No	INC	24	0:00	23:59	221.88	-13466.75	0.00	-7807.12	89.84	-3204.69	0.00	0.00	-1192.12	0.00
123	RT	Planned Transmission Outage and Constraint	N/A	N/A	8/31/2016	40-130	No	INC	24	0:00	23:59	63.93	-5784.85	0.00	-2057.12	20.69	-678.03	0.00	0.00	-394.62	0.00
124	RT	Planned Transmission Outage and Constraint	PG&E	Bay Area	8/27/2016	175-363	No	INC	4	20:30	23:59	71.14	53238.42	0.00	-2282.61	0.00	0.00	0.00	0.00	0.00	0.00
125	RT	Planned Transmission Outage and Constraint	PG&E	Bay Area	8/28/2016	363	No	INC	6	0:00	5:44	-12.99	91078.97	0.00	287.64	0.00	0.00	0.00	0.00	0.00	0.00

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126	RT	Planned Transmission Outage and Constraint	PG&E	Humboldt	8/7/2016	10-15	No	INC	4	19:45	22:59	6.60	519.49	0.00	-210.89	0.84	-28.66	0.00	0.00	-7.49	0.00
127	RT	Planned Transmission Outage and Constraint	PG&E	Humboldt	8/8/2016	25-30	No	INC	3	21:12	23:59	20.52	0.00	0.00	-658.21	10.00	-285.85	0.00	0.00	-407.61	0.00
128	RT	Planned Transmission Outage and Constraint	PG&E	Humboldt	8/9/2016	15-30	No	INC	24	0:00	23:59	29.62	-2948.66	0.00	-744.15	5.00	-140.05	0.00	0.00	-1165.92	0.00
129	RT	Planned Transmission Outage and Constraint	PG&E	Humboldt	8/10/2016	15-40	No	INC	24	0:00	23:59	33.28	-1292.09	0.00	-2963.77	8.94	-660.40	0.00	0.00	-1330.12	0.00
130	RT	Planned Transmission Outage and Constraint	PG&E	Humboldt	8/11/2016	15-40	No	INC	24	0:00	23:59	8.18	-1369.20	0.00	-283.77	3.75	-114.60	0.00	0.00	-1256.59	0.00
131	RT	Planned Transmission Outage and Constraint	PG&E	Humboldt	8/12/2016	15-96	No	INC	24	0:00	23:59	-6.45	-6424.98	0.00	160.33	0.00	0.00	0.00	0.00	-28.08	0.00
132	RT	Planned Transmission Outage and Constraint	PG&E	Humboldt	8/13/2016	30-76	No	INC	9	15:25	23:59	-15.55	-15712.46	0.00	691.91	-13.96	-89.90	727.75	0.00	-660.17	0.00
133	RT	Planned Transmission Outage and Constraint	PG&E	Humboldt	8/14/2016	24-32	No	INC	20	0:00	19:59	41.25	-6740.14	0.00	-1178.92	43.07	-1265.60	0.00	0.00	-1689.39	0.00
134	RT	Planned Transmission Outage and Constraint	PG&E	Humboldt	8/15/2016	15	No	INC	16	8:40	23:59	14.51	515.17	0.00	-507.44	4.11	-158.59	0.00	0.00	-227.09	0.00
135	RT	Planned Transmission Outage and Constraint	PG&E	Humboldt	8/16/2016	15	No	INC	3	0:00	2:59	5.60	0.00	0.00	-138.28	1.25	-31.57	0.00	0.00	-369.33	0.00
136	RT	Planned Transmission Outage and Constraint	PG&E	Humboldt	8/23/2016	15-30	No	INC	24	0:05	23:59	55.10	517.36	0.00	-1583.30	25.02	-725.08	0.00	0.00	-1393.16	0.00
137	RT	Planned Transmission Outage and Constraint	PG&E	Humboldt	8/24/2016	10-20	No	INC	23	0:00	22:29	74.92	2081.28	0.00	-4232.14	0.00	0.00	0.00	0.00	-16.10	0.00
138	RT	Planned Transmission Outage and Constraint	PG&E	Humboldt	8/25/2016	15	No	INC	5	19:45	23:59	0.50	0.00	0.00	-14.18	0.00	0.00	0.00	0.00	-113.95	0.00
139	RT	Planned Transmission Outage and Constraint	PG&E	Humboldt	8/26/2016	15-24	No	INC	24	0:00	23:59	33.97	0.00	0.00	-1082.96	9.42	-289.58	0.00	0.00	-1095.97	0.00
140	RT	Planned Transmission Outage and Constraint	PG&E	Humboldt	8/27/2016	12-30	No	INC	24	0:00	23:59	71.72	0.00	0.00	-1776.49	22.77	-621.60	0.00	0.00	-2788.80	0.00
141	RT	Planned Transmission Outage and Constraint	PG&E	Humboldt	8/28/2016	12-30	No	INC	24	0:00	23:59	30.09	0.00	0.00	-870.78	16.68	-516.46	0.00	0.00	-1333.41	0.00
142	RT	Planned Transmission Outage and Constraint	PG&E	Humboldt	8/29/2016	15-30	No	INC	24	0:00	23:59	40.25	0.00	0.00	-1720.66	32.36	-1264.65	0.00	0.00	-1916.61	0.00
143	RT	Planned Transmission Outage and Constraint	PG&E	Humboldt	8/30/2016	15-20	No	INC	24	0:00	23:59	14.29	0.00	0.00	-561.98	1.25	-40.59	0.00	0.00	-65.07	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
144	RT	Planned Transmission Outage and Constraint	PG&E	Humboldt	8/31/2016	12-56	No	INC	24	0:00	23:59	50.40	0.00	0.00	-2817.19	19.38	-1625.50	0.00	0.00	-897.87	0.00
145	RT	Planned Transmission Outage and Constraint	PG&E	Kern	8/1/2016	32-64	No	INC	6	16:35	21:59	19.40	13193.10	0.00	-571.67	0.00	0.00	0.00	0.00	0.00	0.00
146	RT	Planned Transmission Outage and Constraint	PG&E	Kern	8/2/2016	32	No	INC	6	16:10	21:59	15.33	7943.81	6114.80	-550.18	0.00	0.00	0.00	0.00	0.00	0.00
147	RT	Planned Transmission Outage and Constraint	PG&E	Kern	8/3/2016	32	No	INC	7	14:45	20:59	-4.28	7099.05	0.00	92.57	0.00	0.00	0.00	0.00	0.00	0.00
148	RT	Planned Transmission Outage and Constraint	PG&E	Sierra	8/31/2016	8-10	No	INC	5	5:55	10:29	176.02	0.00	0.00	-4822.84	-11.28	0.00	384.88	0.00	-6756.61	0.00
149	RT	Planned Transmission Outage and Constraint	SCE	LA Basin	8/16/2016	91	No	INC	3	19:22	21:59	2.84	5224.00	0.00	282.33	0.07	3.15	0.00	0.00	-16797.59	0.00
150	RT	Planned Transmission Outage and Constraint	SCE	N/A	8/4/2016	240	No	INC	11	5:35	16:14	-1.39	-129635.56	0.00	-23.16	-65.61	0.00	1532.86	0.00	-51288.51	0.00
151	RT	Planned Transmission Outage and Constraint	SCE	N/A	8/29/2016	410-450	No	INC	7	17:15	23:59	94.48	-64311.55	0.00	-2067.95	-9.68	0.00	349.58	0.00	-6941.06	0.00
152	RT	Planned Transmission Outage and Constraint	SCE	N/A	8/30/2016	410	No	INC	8	14:05	21:59	121.03	-87893.70	0.00	-4075.73	-3.23	0.00	97.60	0.00	-6525.20	0.00
153	RT	Planned Transmission Outage and Constraint	SDG&E	San Diego-IV	8/1/2016	40	Yes	INC	2	6:45	7:59	8.18	3146.71	0.00	-214.43	0.78	-20.55	0.00	0.00	-79.86	0.00
154	RT	Pump Management	PG&E	Fresno	8/2/2016	83	No	INC	2	17:50	19:04	-4.17	-4358.97	0.00	159.69	0.00	0.00	0.00	0.00	0.00	0.00
155	RT	Software Limitation	Intertie	N/A	8/5/2016	0	No	INC	4	20:05	23:59	-11.67	0.00	0.00	4.43	-11.67	0.00	4.43	0.00	0.00	0.00
156	RT	Software Limitation	N/A	N/A	8/13/2016	33	No	INC	1	23:30	23:59	2.49	0.00	0.00	-70.50	2.41	-67.60	0.00	0.00	0.00	0.00
157	RT	Software Limitation	N/A	N/A	8/14/2016	16	No	INC	1	0:15	0:59	-2.22	0.00	0.00	80.44	0.00	0.00	0.00	0.00	-30.57	0.00
158	RT	Software Limitation	N/A	N/A	8/16/2016	16	No	INC	1	23:30	23:59	5.17	0.00	0.00	-141.21	0.00	0.00	0.00	0.00	0.00	0.00
159	RT	Software Limitation	PG&E	Bay Area	8/16/2016	480	No	INC	1	12:10	12:50	315.42	10130.02	1994.91	-8078.50	0.00	0.00	0.00	0.00	0.00	0.00
160	RT	Software Limitation	PG&E	Fresno	8/2/2016	83	No	INC	2	18:15	19:49	-15.81	-5880.50	0.00	94.75	-13.83	0.00	0.00	0.00	0.00	0.00
161	RT	Software Limitation	PG&E	Fresno	8/4/2016	0	No	INC	21	3:50	23:59	-133.62	-1446.46	0.00	405.33	-120.00	0.00	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
162	RT	Software Limitation	PG&E	Fresno	8/5/2016	0	No	INC	4	18:55	21:59	-34.27	-2362.82	0.00	850.80	-29.51	0.00	595.08	0.00	0.00	0.00
163	RT	Software Limitation	PG&E	Fresno	8/12/2016	166	No	INC	3	19:00	21:59	61.75	-79.50	0.00	-2878.05	0.00	-0.24	0.00	0.00	0.00	0.00
164	RT	Software Limitation	PG&E	Fresno	8/20/2016	0	No	INC	4	20:40	23:59	-35.93	0.00	0.00	741.83	-23.12	0.00	275.38	0.00	0.00	0.00
165	RT	Software Limitation	PG&E	Fresno	8/22/2016	-317	No	DEC	3	1:10	3:14	-79.25	0.00	0.00	1957.21	0.00	0.00	0.00	0.00	0.00	0.00
166	RT	Software Limitation	PG&E	Fresno	8/24/2016	0	No	INC	3	21:25	23:59	-5.00	0.00	0.00	0.00	-5.00	0.00	0.00	0.00	0.00	0.00
167	RT	Software Limitation	PG&E	Fresno	8/25/2016	0	No	INC	4	20:10	23:59	-21.50	0.00	0.00	346.25	-17.67	0.00	209.70	0.00	0.00	0.00
168	RT	Software Limitation	PG&E	Fresno	8/27/2016	-315	No	DEC	3	1:45	3:59	-236.25	0.00	0.00	6719.35	0.00	0.00	0.00	0.00	0.00	0.00
169	RT	Software Limitation	PG&E	Fresno	8/28/2016	-315	No	DEC	3	9:45	11:59	-590.63	0.00	0.00	19664.69	0.00	0.00	0.00	0.00	0.00	0.00
170	RT	Software Limitation	PG&E	Fresno	8/29/2016	-315	No	DEC	1	4:30	5:29	-236.25	0.00	0.00	6679.16	0.00	0.00	0.00	0.00	0.00	0.00
171	RT	Software Limitation	PG&E	Humboldt	8/27/2016	16	No	INC	1	23:00	23:59	-2.54	0.00	0.00	69.47	0.00	0.00	0.00	0.00	0.00	0.00
172	RT	Software Limitation	PG&E	Humboldt	8/31/2016	16	No	INC	1	22:30	22:59	1.51	0.00	0.00	-46.86	1.50	-46.39	0.00	0.00	0.00	0.00
173	RT	Software Limitation	PG&E	N/A	8/5/2016	122	No	INC	1	19:00	19:59	12.67	-7233.72	0.00	-579.80	2.84	-111.84	0.00	0.00	0.00	0.00
174	RT	Software Limitation	PG&E	Stockton	8/10/2016	0	No	INC	2	16:40	17:44	-215.13	7845.56	0.00	70.89	-213.58	0.00	0.00	0.00	0.00	0.00
175	RT	Software Limitation	SCE	Big Creek-Ventura	8/7/2016	0	No	INC	1	22:25	23:24	-9.33	480.00	0.00	0.00	-9.33	0.00	0.00	0.00	0.00	0.00
176	RT	Software Limitation	SCE	Big Creek-Ventura	8/16/2016	16	No	INC	1	12:10	12:39	8.00	207.50	0.00	-211.20	0.00	0.00	0.00	0.00	0.00	0.00
177	RT	Software Limitation	SCE	Big Creek-Ventura	8/18/2016	0	No	INC	1	19:20	20:14	-45.33	0.00	0.00	0.00	-45.33	0.00	0.00	0.00	0.00	0.00
178	RT	Software Limitation	SCE	Big Creek-Ventura	8/21/2016	0	No	INC	11	13:50	23:59	-51.00	472.46	0.00	0.00	-51.00	0.00	0.00	0.00	0.00	0.00
179	RT	Software Limitation	SCE	Big Creek-Ventura	8/23/2016	0	No	INC	4	15:00	18:59	-51.00	0.00	0.00	0.00	-51.00	0.00	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
180	RT	Software Limitation	SCE	Big Creek-Ventura	8/24/2016	0	No	INC	15	9:50	23:59	-11.33	1011.50	0.00	0.00	-11.33	0.00	0.00	0.00	0.00	0.00
181	RT	Software Limitation	SCE	Big Creek-Ventura	8/25/2016	0	No	INC	18	6:50	23:59	6.17	0.00	0.00	-311.00	0.00	0.00	0.00	0.00	0.00	0.00
182	RT	Software Limitation	SCE	Big Creek-Ventura	8/26/2016	0	No	INC	13	11:35	23:59	-1.58	0.00	0.00	46.54	0.00	0.00	0.00	0.00	0.00	0.00
183	RT	Software Limitation	SCE	Big Creek-Ventura	8/27/2016	0	No	INC	9	15:45	23:59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
184	RT	Software Limitation	SCE	Big Creek-Ventura	8/28/2016	0	No	INC	10	14:45	23:59	-17.00	0.00	0.00	0.00	-17.00	0.00	0.00	0.00	0.00	0.00
185	RT	Software Limitation	SCE	Big Creek-Ventura	8/29/2016	0	No	INC	15	9:40	23:59	-85.00	736.90	0.00	0.00	-85.00	0.00	0.00	0.00	0.00	0.00
186	RT	Software Limitation	SCE	Big Creek-Ventura	8/30/2016	0	No	INC	13	11:35	23:59	-17.00	0.00	0.00	0.00	-17.00	0.00	0.00	0.00	0.00	0.00
187	RT	Software Limitation	SCE	LA Basin	8/15/2016	130	No	INC	1	20:00	20:59	26.46	0.00	0.00	-1255.95	0.00	0.00	0.00	0.00	0.00	0.00
188	RT	Software Limitation	SCE	LA Basin	8/16/2016	706-710	No	INC	1	12:10	12:50	389.38	11025.63	0.00	4576.79	0.82	11.05	0.00	-35.57	0.00	0.00
189	RT	Software Limitation	SCE	LA Basin	8/23/2016	0	No	INC	1	23:30	23:59	-11.39	0.00	0.00	0.00	-11.39	0.00	0.00	0.00	0.00	0.00
190	RT	Software Limitation	SCE	LA Basin	8/24/2016	0	No	INC	1	0:00	0:29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
191	RT	Software Limitation	SCE	LA Basin	8/31/2016	0	No	INC	3	21:00	23:54	-48.32	0.00	0.00	791.52	-48.32	0.00	791.52	0.00	0.00	0.00
192	RT	Software Limitation	SDG&E	San Diego-IV	8/2/2016	0	No	INC	2	12:50	14:29	-21.62	265.70	0.00	135.09	-21.50	0.00	107.28	0.00	0.00	0.00
193	RT	Software Limitation	SDG&E	San Diego-IV	8/14/2016	20	No	INC	4	20:30	23:59	25.44	0.00	0.00	-1047.64	0.00	0.00	0.00	0.00	0.00	0.00
194	RT	Software Limitation	SDG&E	San Diego-IV	8/15/2016	0	No	INC	1	0:00	0:24	1.83	0.00	0.00	-52.09	0.00	0.00	0.00	0.00	0.00	0.00
195	RT	Software Limitation	SDG&E	San Diego-IV	8/16/2016	20	No	INC	4	0:00	3:59	10.75	0.00	0.00	-243.58	0.00	0.00	0.00	0.00	0.00	0.00
196	RT	Software Limitation	SDG&E	San Diego-IV	8/29/2016	0	No	INC	1	20:35	21:34	-23.97	0.00	0.00	166.89	-21.32	0.00	58.57	0.00	0.00	0.00
197	RT	Software Limitation	SDG&E	San Diego-IV	8/14/2016	0	No	INC	4	20:55	23:59	15.31	0.00	0.00	-573.90	0.00	0.00	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
198	RT	Software Limitation	SDG&E	San Diego-IV	8/15/2016	0	No	INC	14	0:00	13:14	-62.82	0.00	0.00	480.97	-60.17	0.00	0.00	0.00	0.00	0.00
199	RT	Start-Up Instructions	PG&E	Fresno	8/22/2016	150-265	No	INC	2	19:35	21:29	289.47	15681.31	0.00	-13789.23	54.55	-2397.78	0.00	0.00	0.00	0.00
200	RT	Start-Up Instructions	PG&E	N/A	8/16/2016	200-380	No	INC	3	0:25	2:44	104.50	25075.74	0.00	-2654.81	40.31	-1022.59	0.00	0.00	0.00	0.00
201	RT	Unit Testing	N/A	N/A	8/19/2016	100-300	No	INC	1	9:35	10:29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
202	RT	Unit Testing	PG&E	Bay Area	8/25/2016	120	No	INC	1	20:40	21:30	4.60	12351.39	0.00	-1000.53	-22.00	0.00	0.00	0.00	0.00	0.00
203	RT	Unit Testing	PG&E	Stockton	8/10/2016	220	No	INC	10	7:20	16:59	-9.38	55623.85	0.00	-698.40	-10.03	-1902.46	0.00	0.00	0.00	0.00
204	RT	Unit Testing	SCE	LA Basin	8/31/2016	45	No	INC	1	12:30	13:00	14.91	2869.50	0.00	-442.67	0.00	0.00	0.00	0.00	0.00	0.00
205	RT	Unit Testing	SDG&E	San Diego-IV	8/29/2016	560	No	INC	2	14:30	16:30	73.07	3107.05	0.00	-3214.99	37.17	-1782.23	0.00	0.00	0.00	0.00
206	RT	Unplanned Outage	PG&E	NCNB	8/9/2016	164-179	No	INC	5	19:34	23:59	-25.19	0.00	0.00	-1954.94	-23.83	0.00	-905.67	0.00	0.00	0.00
207	RT	Unplanned Outage	PG&E	NCNB	8/14/2016	98-154	No	INC	7	17:45	23:59	-70.84	0.00	0.00	-7550.96	-133.60	0.00	-5076.87	0.00	0.00	0.00
208	RT	Unplanned Outage	PG&E	NCNB	8/15/2016	86-308	No	INC	24	0:00	23:59	-112.01	0.00	0.00	-7440.69	-141.31	0.00	-5369.66	0.00	0.00	0.00
209	RT	Unplanned Outage	PG&E	NCNB	8/16/2016	119-152	No	INC	24	0:00	23:59	-82.04	0.00	0.00	-3412.12	-87.08	0.00	-3309.14	0.00	0.00	0.00
210	RT	Unplanned Outage	PG&E	NCNB	8/17/2016	75-149	No	INC	24	0:00	23:59	-11.21	0.00	0.00	-2972.28	-53.50	0.00	-1805.00	0.00	0.00	0.00
211	RT	Unplanned Outage	PG&E	NCNB	8/18/2016	60-150	No	INC	21	0:20	20:59	-145.20	0.00	0.00	-14882.82	-224.08	0.00	-7796.37	0.00	0.00	0.00
212	RT	Voltage Support	PG&E	Fresno	8/25/2016	-314	No	DEC	1	5:15	6:14	-78.50	0.00	0.00	2768.68	0.00	0.00	0.00	0.00	0.00	0.00
213	RT	Voltage Support	PG&E	Sierra	8/6/2016	20	Yes	INC	9	14:00	22:59	0.00	13432.50	0.00	0.01	0.00	0.00	0.00	0.00	-1.78	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 through

[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.

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 then 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 resource 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 August, this resource was issued exceptional dispatch instructions in 117 five-minute intervals. This resource was eligible to set the LMP in 43 intervals. Out of the 43 intervals, resource calculated LMP was larger than the market LMP in 35 intervals. In the 35 intervals, the average increase in five minute LMP was $9.15/MWh. Out of the 43 intervals, resource calculated LMP was less than the market LMP in 8 intervals. In the 8 intervals, the average decrease in five minute LMP was $5.71/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 $6.38/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 August, this resource was issued exceptional dispatch instructions in 108 five-minute intervals. This resource was eligible to set the LMP in 96 intervals. Out of the 96 intervals, resource calculated LMP was larger than the market LMP in 92 intervals. In the 92 intervals, the average increase in five minute LMP was $16.06/MWh. Out of the 96 intervals, resource calculated LMP was less than the market LMP in 4 intervals. In the 4 intervals, the average decrease in five minute LMP was $132.36/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 $9.88/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	8/8/2016	22	1	43.76	Yes	48.19	4.43
2	8/8/2016	22	2	43.73	Yes	48.19	4.46
3	8/8/2016	22	3	43.76	Yes	48.19	4.43
4	8/8/2016	22	4	43.66	Yes	48.19	4.53
5	8/8/2016	22	5	43.74	Yes	48.19	4.45
6	8/8/2016	22	6	43.72	Yes	48.19	4.47
7	8/8/2016	22	7	43.71	Yes	48.19	4.48
8	8/8/2016	22	8	30.40	Yes	48.19	17.79
9	8/8/2016	22	9	31.08	Yes	48.19	17.11
10	8/8/2016	22	10	31.48	Yes	48.19	16.71
11	8/8/2016	22	11	31.83	Yes	48.19	16.36
12	8/8/2016	22	12	32.11	Yes	48.19	16.08
13	8/12/2016	22	2	43.41	Yes	50.94	7.53
14	8/12/2016	22	3	46.60	Yes	50.94	4.34
15	8/12/2016	22	4	46.32	Yes	50.94	4.62
16	8/12/2016	22	5	43.17	Yes	50.94	7.77
17	8/12/2016	22	6	42.96	Yes	50.94	7.98
18	8/12/2016	22	7	46.55	Yes	50.94	4.39
19	8/12/2016	22	8	46.56	Yes	50.94	4.38
20	8/12/2016	22	9	46.59	Yes	50.94	4.35
21	8/12/2016	22	10	46.49	Yes	50.94	4.45
22	8/12/2016	22	11	43.18	Yes	50.94	7.76
23	8/12/2016	22	12	43.19	Yes	50.94	7.75
24	8/22/2016	2	1	41.98	No	45.27	3.29
25	8/22/2016	2	2	34.58	No	45.27	10.69
26	8/22/2016	2	3	34.60	No	45.27	10.67
27	8/22/2016	2	4	32.20	No	45.27	13.07
28	8/22/2016	2	5	31.62	No	45.27	13.65
29	8/22/2016	2	6	25.81	No	45.27	19.46
30	8/22/2016	2	7	25.16	No	45.27	20.11
31	8/22/2016	2	8	25.60	No	45.27	19.67
32	8/22/2016	2	9	25.16	No	45.27	20.11
33	8/22/2016	2	10	25.73	No	45.27	19.54
34	8/22/2016	2	11	25.20	No	45.27	20.07
35	8/22/2016	2	12	24.86	No	45.27	20.41
36	8/22/2016	3	1	24.30	No	45.27	20.97
37	8/22/2016	3	2	24.72	No	45.27	20.55
38	8/22/2016	3	3	25.07	No	45.27	20.20
39	8/22/2016	3	4	25.19	No	45.27	20.08
40	8/22/2016	3	5	25.19	No	45.27	20.08
41	8/22/2016	3	6	24.90	No	45.27	20.37
42	8/22/2016	3	7	24.87	No	45.27	20.40

Number	Trade Date	Trade Hour	Interval	Market LMP	Eligible Flag	Calculated LMP	Change in LMP
43	8/22/2016	3	8	24.44	No	45.27	20.83
44	8/22/2016	3	9	24.07	No	45.27	21.20
45	8/22/2016	3	10	24.04	No	45.27	21.23
46	8/22/2016	3	11	24.04	No	45.27	21.23
47	8/22/2016	3	12	23.74	No	45.27	21.53
48	8/22/2016	20	1	40.71	Yes	48.74	8.03
49	8/22/2016	20	2	35.30	Yes	48.74	13.44
50	8/22/2016	20	8	34.54	Yes	48.74	14.20
51	8/22/2016	20	9	33.85	Yes	48.74	14.89
52	8/22/2016	20	12	34.72	Yes	48.74	14.02
53	8/22/2016	21	1	37.69	Yes	48.74	11.05
54	8/22/2016	21	2	34.85	Yes	48.74	13.89
55	8/22/2016	21	3	37.87	Yes	48.74	10.87
56	8/22/2016	21	4	38.23	Yes	48.74	10.51
57	8/22/2016	21	5	35.00	Yes	48.74	13.74
58	8/22/2016	21	6	34.04	Yes	48.74	14.70
59	8/22/2016	21	7	51.82	Yes	48.74	-3.08
60	8/22/2016	21	8	51.82	Yes	48.74	-3.08
61	8/22/2016	21	9	51.48	Yes	48.74	-2.74
62	8/22/2016	21	10	60.45	Yes	48.74	-11.71
63	8/22/2016	21	11	60.46	Yes	48.74	-11.72
64	8/22/2016	21	12	58.16	Yes	48.74	-9.42
65	8/22/2016	22	4	51.84	Yes	48.74	-3.10
66	8/22/2016	22	5	49.55	Yes	48.74	-0.81
67	8/22/2016	22	6	48.58	Yes	48.74	0.16
68	8/25/2016	6	1	27.53	No	41.7	14.17
69	8/25/2016	6	2	27.61	No	41.7	14.09
70	8/25/2016	6	3	27.86	No	41.7	13.84
71	8/25/2016	6	4	28.84	No	41.7	12.86
72	8/25/2016	6	5	29.88	No	41.7	11.82
73	8/25/2016	6	6	31.84	No	41.7	9.86
74	8/25/2016	6	7	32.00	No	41.7	9.70
75	8/25/2016	6	8	33.74	No	41.7	7.96
76	8/25/2016	6	9	35.05	No	41.7	6.65
77	8/25/2016	6	10	37.18	No	41.7	4.52
78	8/25/2016	6	11	36.78	No	41.7	4.92
79	8/25/2016	6	12	37.90	No	41.7	3.80
80	8/27/2016	2	1	28.41	No	37.87	9.46
81	8/27/2016	2	2	28.41	No	37.87	9.46
82	8/27/2016	2	3	28.41	No	37.87	9.46
83	8/27/2016	2	4	27.38	No	37.87	10.49
84	8/27/2016	2	5	27.38	No	37.87	10.49
85	8/27/2016	2	6	27.40	No	37.87	10.47
86	8/27/2016	2	7	28.27	No	37.87	9.60
87	8/27/2016	2	8	28.05	No	37.87	9.82

Number	Trade Date	Trade Hour	Interval	Market LMP	Eligible Flag	Calculated LMP	Change in LMP
88	8/27/2016	2	9	27.76	No	37.87	10.11
89	8/27/2016	2	10	27.76	No	37.87	10.11
90	8/27/2016	2	11	27.66	No	37.87	10.21
91	8/27/2016	2	12	27.53	No	37.87	10.34
92	8/27/2016	3	1	27.30	No	37.87	10.57
93	8/27/2016	3	2	28.28	No	37.87	9.59
94	8/27/2016	3	3	30.42	No	37.87	7.45
95	8/27/2016	3	4	30.37	No	37.87	7.50
96	8/27/2016	3	5	28.15	No	37.87	9.72
97	8/27/2016	3	6	27.59	No	37.87	10.28
98	8/27/2016	3	7	26.94	No	37.87	10.93
99	8/27/2016	3	8	28.08	No	37.87	9.79
100	8/27/2016	3	9	28.84	No	37.87	9.03
101	8/27/2016	3	10	28.53	No	37.87	9.34
102	8/27/2016	3	11	28.08	No	37.87	9.79
103	8/27/2016	3	12	27.46	No	37.87	10.41
104	8/29/2016	5	1	25.17	No	37.87	12.70
105	8/29/2016	5	2	25.10	No	37.87	12.77
106	8/29/2016	5	3	25.37	No	37.87	12.50
107	8/29/2016	5	7	27.31	No	37.87	10.56
108	8/29/2016	5	8	27.29	No	37.87	10.58
109	8/29/2016	5	9	27.46	No	37.87	10.41
110	8/29/2016	5	10	28.43	No	37.87	9.44
111	8/29/2016	5	11	29.43	No	37.87	8.44
112	8/29/2016	5	12	29.45	No	37.87	8.42
113	8/29/2016	6	2	28.23	No	37.87	9.64
114	8/29/2016	6	3	29.39	No	37.87	8.48
115	8/29/2016	6	4	28.59	No	37.87	9.28
116	8/29/2016	6	5	30.31	No	37.87	7.56
117	8/29/2016	6	6	32.89	No	37.87	4.98

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	8/15/2016	11	1	27.93	Yes	50.98	23.05
2	8/15/2016	11	2	27.59	Yes	50.98	23.39
3	8/15/2016	11	3	27.46	Yes	50.98	23.52
4	8/15/2016	11	4	26.97	Yes	50.98	24.01
5	8/15/2016	11	5	27.27	Yes	50.98	23.71
6	8/15/2016	11	6	27.78	Yes	50.98	23.20
7	8/15/2016	11	7	27.99	Yes	50.98	22.99
8	8/15/2016	11	8	28.23	Yes	50.98	22.75
9	8/15/2016	11	9	28.37	Yes	50.98	22.61
10	8/15/2016	11	10	28.96	Yes	50.98	22.02
11	8/15/2016	11	11	28.96	Yes	50.98	22.02
12	8/15/2016	11	12	28.96	Yes	50.98	22.02
13	8/16/2016	12	1	28.68	Yes	55.20	26.52
14	8/16/2016	12	2	28.05	Yes	55.20	27.15
15	8/16/2016	12	3	28.66	Yes	55.20	26.54
16	8/16/2016	12	4	32.07	Yes	55.20	23.13
17	8/16/2016	12	5	34.15	Yes	55.20	21.05
18	8/16/2016	12	6	34.36	Yes	55.20	20.84
19	8/16/2016	12	7	32.95	Yes	55.20	22.25
20	8/16/2016	12	8	31.29	Yes	55.20	23.91
21	8/16/2016	12	9	32.77	Yes	55.20	22.43
22	8/16/2016	12	10	47.12	Yes	55.20	8.08
23	8/16/2016	12	11	47.12	Yes	55.20	8.08
24	8/16/2016	12	12	47.12	Yes	55.20	8.08
25	8/16/2016	13	1	47.12	Yes	55.20	8.08
26	8/16/2016	13	2	47.12	Yes	55.20	8.08
27	8/16/2016	13	3	18.22	Yes	55.20	36.98
28	8/16/2016	13	4	27.03	Yes	55.20	28.17
29	8/16/2016	13	5	28.76	Yes	55.20	26.44
30	8/16/2016	13	6	34.92	Yes	55.20	20.28
31	8/16/2016	13	7	40.69	Yes	55.20	14.51
32	8/16/2016	13	8	39.81	Yes	55.20	15.39
33	8/16/2016	13	9	39.41	Yes	55.20	15.79
34	8/16/2016	13	10	48.84	Yes	55.20	6.36
35	8/16/2016	13	11	49.92	Yes	55.20	5.28

Number	Trade Date	Trade Hour	Interval	Market LMP	Eligible Flag	Calculated LMP	Change in LMP
36	8/16/2016	13	12	42.92	Yes	55.20	12.28
37	8/16/2016	14	1	56.66	Yes	55.20	-1.46
38	8/16/2016	14	2	51.98	Yes	55.20	3.22
39	8/16/2016	14	3	45.71	Yes	55.20	9.49
40	8/16/2016	14	4	49.29	Yes	55.20	5.91
41	8/16/2016	14	5	52.25	Yes	55.20	2.95
42	8/16/2016	14	6	55.20	Yes	55.20	0.00
43	8/16/2016	14	7	31.46	Yes	55.20	23.74
44	8/16/2016	14	8	34.78	Yes	55.20	20.42
45	8/16/2016	14	9	34.13	Yes	55.20	21.07
46	8/16/2016	14	10	32.47	Yes	55.20	22.73
47	8/16/2016	14	11	32.66	Yes	55.20	22.54
48	8/16/2016	14	12	35.18	Yes	55.20	20.02
49	8/16/2016	15	1	33.56	Yes	55.20	21.64
50	8/16/2016	15	2	35.14	Yes	55.20	20.06
51	8/16/2016	15	3	36.54	Yes	55.20	18.66
52	8/16/2016	15	4	38.57	Yes	55.20	16.63
53	8/16/2016	15	5	41.56	Yes	55.20	13.64
54	8/16/2016	15	6	40.42	Yes	55.20	14.78
55	8/16/2016	15	7	42.77	Yes	55.20	12.43
56	8/16/2016	15	8	41.86	Yes	55.20	13.34
57	8/16/2016	15	9	39.16	Yes	55.20	16.04
58	8/16/2016	15	10	39.19	Yes	55.20	16.01
59	8/16/2016	15	11	38.67	Yes	55.20	16.53
60	8/16/2016	15	12	42.03	Yes	55.20	13.17
61	8/16/2016	16	1	39.94	Yes	55.20	15.26
62	8/16/2016	16	2	37.47	Yes	55.20	17.73
63	8/16/2016	16	3	39.39	Yes	55.20	15.81
64	8/16/2016	16	4	39.39	Yes	55.20	15.81
65	8/16/2016	16	5	39.39	Yes	55.20	15.81
66	8/16/2016	16	6	39.39	Yes	55.20	15.81
67	8/16/2016	16	7	39.39	Yes	55.20	15.81
68	8/16/2016	16	8	45.00	Yes	55.20	10.20
69	8/16/2016	16	9	52.04	Yes	55.20	3.16
70	8/16/2016	16	10	239.17	Yes	55.20	-183.97
71	8/16/2016	16	11	283.25	Yes	55.20	-228.05
72	8/16/2016	16	12	171.16	Yes	55.20	-115.96
73	8/16/2016	19	1	128.97	No	55.20	-73.77

Number	Trade Date	Trade Hour	Interval	Market LMP	Eligible Flag	Calculated LMP	Change in LMP
74	8/16/2016	19	2	124.01	No	55.20	-68.81
75	8/16/2016	19	3	113.85	No	55.20	-58.65
76	8/16/2016	19	4	125.18	No	55.20	-69.98
77	8/16/2016	19	5	128.10	No	55.20	-72.90
78	8/16/2016	19	6	137.57	No	55.20	-82.37
79	8/16/2016	19	7	95.99	No	55.20	-40.79
80	8/16/2016	19	8	95.23	No	55.20	-40.03
81	8/16/2016	19	9	92.82	No	55.20	-37.62
82	8/16/2016	19	10	90.13	No	55.20	-34.93
83	8/16/2016	19	11	88.67	No	55.20	-33.47
84	8/16/2016	19	12	64.92	No	55.20	-9.72
85	8/16/2016	22	1	53.35	Yes	55.20	1.85
86	8/16/2016	22	2	52.24	Yes	55.20	2.96
87	8/16/2016	22	3	54.82	Yes	55.20	0.38
88	8/16/2016	22	4	53.67	Yes	55.20	1.53
89	8/16/2016	22	5	51.09	Yes	55.20	4.11
90	8/16/2016	22	6	51.06	Yes	55.20	4.14
91	8/16/2016	22	7	50.60	Yes	55.20	4.60
92	8/16/2016	22	8	49.14	Yes	55.20	6.06
93	8/16/2016	22	9	46.54	Yes	55.20	8.66
94	8/16/2016	22	10	44.35	Yes	55.20	10.85
95	8/16/2016	22	11	44.79	Yes	55.20	10.41
96	8/16/2016	22	12	37.12	Yes	55.20	18.08
97	8/17/2016	23	1	36.89	Yes	53.87	16.98
98	8/17/2016	23	2	36.89	Yes	53.87	16.98
99	8/17/2016	23	3	38.82	Yes	53.87	15.05
100	8/17/2016	23	4	38.71	Yes	53.87	15.16
101	8/17/2016	23	5	38.56	Yes	53.87	15.31
102	8/17/2016	23	6	38.56	Yes	53.87	15.31
103	8/17/2016	23	7	34.89	Yes	53.87	18.98
104	8/17/2016	23	8	35.33	Yes	53.87	18.54
105	8/17/2016	23	9	34.45	Yes	53.87	19.42
106	8/17/2016	23	10	32.21	Yes	53.87	21.66
107	8/17/2016	23	11	29.29	Yes	53.87	24.58
108	8/17/2016	23	12	29.13	Yes	53.87	24.74

Appendix C: Exceptional Dispatch Bid Mitigation Analysis

In August 2016, the ISO applied the exceptional dispatch bid mitigation to the exceptional dispatches. **Error! Reference source not found.** shows the costs by instruction type in August. With exceptional dispatch bid mitigation, the costs for these types of exceptional dispatches were $ 19,215. Without the exceptional dispatch bid mitigation, the costs for these types of exceptional dispatches would be $ 98,327. The cost saving from the exceptional dispatch bid mitigation was $ 79,112.

Table 10: Bid Mitigation Analysis for August 2016

Type	Number of Resources	Costs without Bid Mitigation	Costs with Bid Mitigation	Cost Saving
NONTMOD	26	$98,327	$19,215	$79,112
Total	26	$98,327	$19,215	$79,112

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Table 2: September 2016

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Table 2: September 2016

Market Quality and Renewable Integration January 31, 2017

CAISO
250 Outcropping Way
Folsom, California 95630
(916) 351-4400

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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 September 2016.

This report contains a price impact analysis as prescribed by FERC in its September 2 order. The price impact analysis for the month of September is presented in Appendix B. This report also includes mitigation analysis for September 2016 required by section 34.9.4 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 September 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]

The following additional reason for exceptional dispatch instructions in 2016 includes Software Limitation. When an exceptional dispatch instruction was used 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 reason 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 September, 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 September 2016. 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 September 2016

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Chart 2: Table of Exceptional Dispatches for Period 01/September/2016 - 30/September/2016

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	Contingency Dispatch	SCE	LA Basin	9/29/2016	364-455	No	INC	2	15:35	16:44	89.96	15806.83	234.42	-4504.06	0.00	0.00	0.00	0.00	0.00	0.00
2	RT	Fast Start Unit Management	SCE	Big Creek-Ventura	9/6/2016	0	No	INC	2	16:00	17:29	-11.92	-477.17	164.00	0.00	-11.92	0.00	0.00	0.00	0.00	0.00
3	RT	Fast Start Unit Management	SCE	LA Basin	9/6/2016	0	No	INC	1	16:55	17:54	-14.91	159.42	0.00	0.00	-14.91	0.00	0.00	0.00	0.00	0.00
4	RT	Fast Start Unit Management	SCE	LA Basin	9/13/2016	0	No	INC	1	0:45	1:44	-11.38	0.00	0.00	0.00	-11.38	0.00	0.00	0.00	0.00	0.00
5	RT	Fast Start Unit Management	SCE	LA Basin	9/17/2016	0	No	INC	1	22:00	22:59	-11.39	0.00	0.00	0.00	-11.39	0.00	0.00	0.00	0.00	0.00
6	RT	Fast Start Unit Management	SCE	LA Basin	9/25/2016	0	No	INC	1	0:50	1:49	-30.33	720.21	0.00	0.00	-30.33	0.00	0.00	0.00	0.00	0.00
7	RT	Fast Start Unit Management	SDG&E	San Diego-IV	9/6/2016	0	No	INC	1	16:00	16:29	-15.00	503.08	86.85	0.00	-15.00	0.00	0.00	0.00	0.00	0.00
8	RT	Fast Start Unit Management	SDG&E	San Diego-IV	9/21/2016	0	No	INC	1	16:30	17:29	-7.50	0.00	0.00	0.00	-7.50	0.00	0.00	0.00	0.00	0.00
9	RT	Incomplete or Inaccurate Transmission	N/A	N/A	9/25/2016	32	No	INC	4	16:50	19:59	-3.46	-11254.38	0.00	369.07	-4.45	0.00	229.84	0.00	-171.24	0.00
10	RT	Incomplete or Inaccurate Transmission	PG&E	Humboldt	9/2/2016	15	No	INC	19	0:20	18:59	17.25	0.00	0.00	-674.55	4.17	-130.56	0.00	0.00	-834.35	0.00
11	RT	Incomplete or Inaccurate Transmission	PG&E	Humboldt	9/7/2016	20	No	INC	1	0:00	0:14	1.00	0.00	0.00	-35.11	1.00	-35.11	0.00	0.00	-9.27	0.00
12	RT	Incomplete or Inaccurate Transmission	PG&E	Humboldt	9/8/2016	30-45	No	INC	24	0:00	23:59	7.87	-1049.77	0.00	-293.91	7.32	-234.49	0.00	0.00	-2001.77	0.00
13	RT	Incomplete or Inaccurate Transmission	PG&E	Humboldt	9/9/2016	15-60	No	INC	24	0:00	23:59	-10.50	0.00	0.00	202.86	16.38	-548.63	0.00	0.00	-1060.95	0.00
14	RT	Incomplete or Inaccurate Transmission	PG&E	Humboldt	9/10/2016	24	No	INC	2	0:00	1:59	8.08	0.00	0.00	-246.97	1.00	-30.94	0.00	0.00	-134.70	0.00
15	RT	Intertie Emergency Assistance	Intertie	N/A	9/5/2016	180	No	INC	1	20:30	20:59	-90.00	0.00	0.00	2898.07	0.00	0.00	0.00	0.00	0.00	0.00
16	RT	Intertie Emergency Assistance	Intertie	N/A	9/10/2016	222	No	INC	1	11:00	11:59	-619.33	0.00	0.00	12683.86	-582.00	0.00	11894.04	0.00	0.00	0.00
17	RT	Intertie Emergency Assistance	Intertie	N/A	9/12/2016	30	No	INC	1	2:28	2:59	-16.00	0.00	0.00	466.98	-16.00	0.00	466.98	0.00	0.00	0.00

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Chart 2: Table of Exceptional Dispatches for Period 01/September/2016 - 30/September/2016

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
18	RT	Load Forecast Uncertainty	PG&E	Bay Area	9/19/2016	54	No	INC	14	10:30	23:59	38.26	28578.92	0.00	-4743.78	0.00	0.00	0.00	-0.04	0.00	0.00
19	RT	Load Forecast Uncertainty	PG&E	N/A	9/19/2016	141	No	INC	11	13:00	23:59	-76.17	66759.00	18790.00	-53310.24	0.00	0.00	0.00	0.00	0.00	0.00
20	RT	Load Forecast Uncertainty	PG&E	N/A	9/26/2016	52	No	INC	10	14:00	23:59	-313.80	99864.64	149787.84	10945.55	0.00	-0.07	0.00	-0.12	0.00	0.00
21	RT	Load Forecast Uncertainty	PG&E	Stockton	9/19/2016	90	No	INC	14	10:05	23:59	-68.41	59187.40	0.00	5291.15	0.00	0.00	0.00	0.00	0.00	0.00
22	RT	Load Forecast Uncertainty	SCE	Big Creek-Ventura	9/19/2016	20	No	INC	11	11:00	21:59	34.76	12129.00	0.00	-7526.23	0.00	0.00	0.00	-0.01	0.00	0.00
23	RT	Load Forecast Uncertainty	SCE	LA Basin	9/26/2016	120-240	No	INC	12	12:00	23:59	236.78	163232.22	50817.70	-47424.72	0.00	0.00	0.00	0.00	0.00	0.00
24	RT	Load Forecast Uncertainty	SDG&E	San Diego-IV	9/19/2016	20-60	Yes	INC	13	11:00	23:59	-339.57	53363.70	42431.27	1652.97	0.00	0.00	0.00	-0.73	0.00	0.00
25	RT	Load Forecast Uncertainty	SDG&E	San Diego-IV	9/26/2016	40	No	INC	16	6:00	21:59	34.69	91411.52	0.00	-3388.09	0.00	0.00	0.00	-0.61	0.00	0.00
26	RT	Load Forecast Uncertainty	SDG&E	San Diego-IV	9/27/2016	40	No	INC	1	11:00	11:59	-0.04	7351.66	0.00	2.20	0.00	0.00	0.00	0.00	0.00	0.00
27	RT	Load Forecast Uncertainty	SDG&E	San Diego-IV	9/29/2016	20	No	INC	1	23:00	23:59	-8.00	5908.02	0.00	195.25	0.00	0.00	0.00	0.00	0.00	0.00
28	RT	Load Forecast Uncertainty	SDG&E	San Diego-IV	9/30/2016	20	No	INC	24	0:00	23:59	897.88	147508.52	0.00	-33176.22	0.12	-4.79	0.00	0.00	0.00	0.00
29	RT	Load Pull	SCE	LA Basin	9/29/2016	144-338	No	INC	7	14:05	20:59	-1963.86	55042.90	0.00	81127.98	8.50	-472.71	0.00	0.00	0.00	0.00
30	RT	Market Disruption	N/A	N/A	9/28/2016	0	No	INC	1	23:01	23:34	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
31	RT	Market Disruption	PG&E	Bay Area	9/21/2016	480	No	INC	1	14:30	15:29	330.58	14327.73	0.00	-8657.47	0.00	0.00	0.00	0.00	0.00	0.00
32	RT	Market Disruption	PG&E	Bay Area	9/28/2016	370	No	INC	1	23:43	23:59	-34.93	0.00	0.00	1031.13	0.00	0.00	0.00	0.00	0.00	0.00
33	RT	Market Disruption	PG&E	Bay Area	9/29/2016	370	No	INC	1	0:00	0:04	-9.70	0.00	0.00	286.38	0.00	0.00	0.00	0.00	0.00	0.00
34	RT	Market Disruption	PG&E	Bay Area	9/30/2016	135-1000	No	INC	2	22:08	23:59	209.41	23953.54	0.00	-5554.46	27.20	-721.35	0.00	-24.79	0.00	0.00

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Chart 2: Table of Exceptional Dispatches for Period 01/September/2016 - 30/September/2016

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	Market Disruption	PG&E	Fresno	9/30/2016	332-2843	No	INC	2	22:02	23:59	6.33	23532.27	0.00	-175.63	344.02	-9544.92	0.00	-7162.68	0.00	0.00
36	RT	Market Disruption	PG&E	Fresno	10/1/2016	332-1782	No	INC	1	0:00	0:59	-45.42	9307.36	0.00	234.42	56.06	-3116.65	651.30	-2111.74	0.00	0.00
37	RT	Market Disruption	PG&E	N/A	9/28/2016	10	No	INC	1	23:34	23:59	-56.43	0.00	0.00	1604.78	0.00	0.00	0.00	0.00	0.00	0.00
38	RT	Market Disruption	PG&E	N/A	9/29/2016	10	No	INC	4	0:00	3:09	-36.84	0.00	0.00	1044.53	0.00	0.00	0.00	0.00	0.00	0.00
39	RT	Market Disruption	PG&E	Sierra	9/28/2016	0	No	INC	2	22:59	23:59	0.46	0.00	0.00	-18.29	-0.18	0.00	0.17	0.00	0.00	0.00
40	RT	Market Disruption	PG&E	Sierra	9/29/2016	0	No	INC	24	0:00	23:59	-2.64	0.00	0.00	72.57	0.00	0.00	0.00	0.00	0.00	0.00
41	RT	Market Disruption	PG&E	Sierra	9/30/2016	0	No	INC	1	0:00	0:59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
42	RT	Market Disruption	SCE	Big Creek-Ventura	9/28/2016	275	No	INC	2	22:47	23:59	-48.19	0.00	0.00	1306.17	-61.81	0.00	1675.45	0.00	0.00	0.00
43	RT	Market Disruption	SCE	Big Creek-Ventura	9/29/2016	275	No	INC	1	0:00	0:04	5.88	0.00	0.00	-162.14	-4.33	0.00	114.83	0.00	0.00	0.00
44	RT	Market Disruption	SCE	Big Creek-Ventura	9/30/2016	444	No	INC	1	22:09	22:34	16.08	0.00	0.00	-412.11	18.17	-465.91	0.00	-0.75	0.00	0.00
45	RT	Market Disruption	SCE	LA Basin	9/21/2016	154	No	INC	1	14:30	15:29	174.09	4511.02	611.43	-9194.97	0.00	0.00	0.00	0.00	0.00	0.00
46	RT	Market Disruption	SCE	LA Basin	9/28/2016	380	No	INC	2	22:56	23:59	-51.10	0.00	0.00	1511.43	0.00	0.00	0.00	0.00	0.00	0.00
47	RT	Market Disruption	SCE	LA Basin	9/29/2016	96-380	No	INC	17	0:00	16:04	-4.16	0.00	0.00	133.51	0.00	0.00	0.00	0.00	0.00	0.00
48	RT	Market Disruption	SCE	N/A	9/28/2016	485	No	INC	1	23:29	23:59	-86.94	0.00	0.00	2492.21	0.00	0.00	0.00	0.00	0.00	0.00
49	RT	Market Disruption	SCE	N/A	9/29/2016	485	No	INC	1	0:00	0:09	-32.50	0.00	0.00	931.67	0.00	0.00	0.00	0.00	0.00	0.00
50	RT	Market Disruption	SCE	N/A	9/30/2016	475	No	INC	2	22:30	23:59	17.09	12000.27	0.00	-436.28	0.01	-0.31	0.00	-0.09	0.00	0.00
51	RT	Market Disruption	SCE	N/A	10/1/2016	475	No	INC	3	0:00	2:29	-3.79	35917.95	0.00	105.08	0.00	0.00	0.00	-0.01	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
52	RT	Market Disruption	SDG&E	San Diego-IV	9/21/2016	30	No	INC	1	14:30	15:29	23.69	1050.55	305.72	-883.11	0.00	0.00	0.00	0.00	0.00	0.00
53	RT	Market Disruption	SDG&E	San Diego-IV	9/28/2016	600	No	INC	1	23:32	23:59	-3.91	0.00	0.00	-257.13	-12.89	0.00	0.00	0.00	0.00	0.00
54	RT	Market Disruption	SDG&E	San Diego-IV	9/30/2016	68	No	INC	2	22:13	23:44	28.05	4341.69	0.00	-795.11	0.01	-0.24	0.00	0.00	0.00	0.00
55	RT	Operating Procedure Number and Constraint	PG&E	Bay Area	9/6/2016	0	No	INC	2	21:30	22:34	-105.70	0.00	0.00	421.14	-105.70	0.00	421.14	0.00	0.00	0.00
56	RT	Operating Procedure Number and Constraint	SDG&E	San Diego-IV	9/19/2016	580	No	INC	3	9:42	11:59	-2.08	-11257.90	0.00	0.47	-18.64	0.00	420.61	0.00	0.00	0.00
57	RT	Operating Procedure Number and Constraint (6110)	Intertie	N/A	9/7/2016	200	No	INC	1	14:30	14:59	-6.75	0.00	0.00	276.58	0.00	0.00	0.00	0.00	0.00	0.00
58	RT	Operating Procedure Number and Constraint (6510)	SCE	LA Basin	9/26/2016	496	No	INC	6	14:35	19:59	-77.87	55356.67	6587.48	-3372.23	0.00	0.00	0.00	0.00	0.00	0.00
59	RT	Operating Procedure Number and Constraint (6510)	SCE	N/A	9/29/2016	485	No	INC	2	15:18	16:44	-99.87	0.00	0.00	1274.75	-129.12	0.00	2660.43	0.00	0.00	0.00
60	RT	Operating Procedure Number and Constraint (6610)	SCE	LA Basin	9/29/2016	90	No	INC	2	15:22	17:14	-1.59	-483.33	0.00	59.05	0.00	0.00	0.00	0.00	0.00	0.00
61	RT	Operating Procedure Number and Constraint (6610)	SCE	LA Basin	9/29/2016	1210-1220	No	INC	3	15:20	17:29	-218.18	20244.35	455.84	9509.21	14.33	-749.21	0.00	0.00	0.00	0.00
62	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	9/5/2016	22	No	INC	3	20:20	22:59	7.10	-1307.73	0.00	-277.86	2.64	-116.92	0.00	0.00	0.00	0.00
63	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	9/13/2016	15-30	No	INC	2	22:05	23:59	-0.26	-1376.76	0.00	25.61	7.92	-226.66	0.00	0.00	0.00	0.00
64	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	9/14/2016	14-24	No	INC	15	9:45	23:59	11.32	-4842.19	0.00	-528.60	15.55	-598.56	0.00	0.00	0.00	0.00
65	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	9/15/2016	10-25	No	INC	24	0:00	23:59	22.95	-7991.11	0.00	-960.95	17.68	-799.32	0.00	0.00	0.00	0.00
66	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	9/16/2016	15-28	No	INC	16	7:00	22:59	-12.82	-6816.28	0.00	213.04	23.48	-993.47	0.00	0.00	0.00	0.00
67	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	9/19/2016	15	No	INC	3	21:40	23:59	2.61	0.00	0.00	-88.89	1.25	-45.11	0.00	0.00	0.00	0.00
68	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	9/20/2016	15	No	INC	8	0:00	7:59	5.56	0.00	0.00	-188.78	0.83	-30.68	0.00	0.00	0.00	0.00
69	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	9/23/2016	24	No	INC	5	7:45	11:59	9.84	-2214.72	0.00	-384.09	7.04	-309.08	0.00	0.00	0.00	0.00

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70	RT	Operating Procedure Number and Constraint (7110)	PG&E	Humboldt	9/2/2016	15	No	INC	3	19:40	21:59	6.56	0.00	0.00	-300.06	2.81	-132.87	0.00	0.00	0.00	0.00
71	RT	Operating Procedure Number and Constraint (7110)	PG&E	Humboldt	9/13/2016	15-26	No	INC	2	21:55	23:44	13.09	0.00	0.00	-446.92	6.25	-222.68	0.00	0.00	-40.23	0.00
72	RT	Operating Procedure Number and Constraint (7110)	PG&E	Humboldt	9/14/2016	15	No	INC	3	20:45	22:59	1.26	0.00	0.00	-70.54	0.00	0.00	0.00	0.00	0.00	0.00
73	RT	Operating Procedure Number and Constraint (7110)	PG&E	Humboldt	9/19/2016	15	No	INC	3	21:40	23:59	7.34	0.00	0.00	-263.14	2.50	-92.73	0.00	0.00	0.00	0.00
74	RT	Operating Procedure Number and Constraint (7230)	PG&E	Sierra	9/18/2016	20	No	INC	6	16:15	21:59	-6.61	5725.65	0.00	-405.91	0.00	-0.12	0.00	0.00	0.00	0.00
75	RT	Operating Procedure Number and Constraint (7430)	PG&E	Fresno	9/1/2016	325-400	No	INC	1	18:13	18:59	4.97	0.00	0.00	-1578.96	0.00	0.00	0.00	0.00	0.00	0.00
76	RT	Operating Procedure Number and Constraint (7430)	PG&E	Fresno	9/9/2016	6-15	No	INC	3	21:35	23:59	11.35	243.99	0.00	-938.48	9.09	-844.63	0.00	0.00	0.00	0.00
77	RT	Operating Procedure Number and Constraint (7430)	PG&E	Fresno	9/10/2016	6	Yes	INC	24	0:00	23:59	-2.43	1063.04	54.35	94.65	0.10	-9.14	0.00	0.00	0.00	0.00
78	RT	Operating Procedure Number and Constraint (7430)	PG&E	Fresno	9/13/2016	73	No	INC	2	21:35	22:59	-1.77	0.00	0.00	41.01	-2.88	0.00	70.86	0.00	0.00	0.00
79	RT	Operating Procedure Number and Constraint (7430)	PG&E	Fresno	9/19/2016	21	No	INC	3	21:45	23:59	15.04	658.94	0.00	-1150.53	10.85	-1007.12	0.00	0.00	0.00	0.00
80	RT	Operating Procedure Number and Constraint (7820)	SDG&E	San Diego-IV	9/30/2016	68-136	No	INC	10	10:45	19:59	512.36	38415.24	0.00	-18724.19	0.05	-2.16	0.00	0.00	0.00	0.00
81	RT	Other Reliability Requirement	PG&E	Fresno	9/5/2016	-315	No	DEC	4	9:30	12:59	-78.75	0.00	0.00	1431.24	0.00	0.00	0.00	0.00	0.00	0.00
82	RT	Other Reliability Requirement	PG&E	NCNB	9/25/2016	40	No	INC	6	18:15	23:59	-86.09	0.00	0.00	-3271.32	-86.09	0.00	-3271.44	0.00	0.00	0.00
83	RT	Other Reliability Requirement	PG&E	NCNB	9/26/2016	40-216	No	INC	20	0:00	19:59	5.26	0.00	0.00	-4184.70	-51.87	0.00	-1971.25	0.00	0.00	0.00
84	RT	Other Reliability Requirement	PG&E	Sierra	9/9/2016	100	No	INC	3	16:30	19:14	-4.75	0.00	0.00	-143.55	-9.50	0.00	0.09	0.00	0.00	0.00
85	RT	Other Reliability Requirement	SCE	LA Basin	9/23/2016	10-20	No	INC	11	13:22	23:59	8.65	1342.18	0.00	-327.16	0.00	0.00	0.00	0.00	0.00	0.00
86	RT	Other Reliability Requirement	SCE	LA Basin	9/24/2016	10-20	No	INC	24	0:00	23:59	-189.51	79583.77	0.00	4268.20	0.00	0.00	0.00	0.00	0.00	0.00

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87	RT	Other Reliability Requirement	SCE	LA Basin	9/25/2016	10	Yes	INC	24	0:00	23:59	-122.50	55528.92	0.00	-4405.49	0.00	0.00	0.00	0.00	0.00	0.00
88	RT	Other Reliability Requirement	SDG&E	San Diego-IV	9/25/2016	45	No	INC	4	15:20	18:59	2.09	0.00	0.00	-327.12	0.00	0.00	0.00	0.00	0.00	0.00
89	RT	Other Reliability Requirement	SDG&E	San Diego-IV	9/26/2016	208-317	No	INC	8	10:25	17:59	8.53	43325.25	0.00	-1067.16	0.00	0.00	0.00	0.00	0.00	0.00
90	RT	Other Reliability Requirement	SDG&E	San Diego-IV	9/28/2016	37	Yes	INC	7	9:30	15:59	20.08	19302.90	0.00	-1400.21	0.04	-2.18	0.00	0.00	0.00	0.00
91	RT	Other Reliability Requirement	SDG&E	San Diego-IV	9/29/2016	990-1090	No	INC	2	9:10	10:59	-23.62	0.00	0.00	-2872.03	10.00	-278.60	0.00	0.00	0.00	0.00
92	RT	Over Generation	PG&E	Fresno	9/2/2016	166	No	INC	1	19:12	19:29	-74.24	0.00	0.00	4236.46	-8.83	0.00	311.24	0.00	0.00	0.00
93	RT	Over Generation	SCE	LA Basin	9/2/2016	600-800	No	INC	1	19:25	19:59	-82.80	0.00	0.00	2325.39	-64.41	0.00	1731.35	0.00	0.00	0.00
94	RT	Planned Transmission Outage and Constraint	N/A	N/A	9/1/2016	15-86	No	INC	24	0:00	23:59	101.26	-15801.97	0.00	-3053.92	58.30	-1740.40	0.00	0.00	-2888.89	0.00
95	RT	Planned Transmission Outage and Constraint	N/A	N/A	9/2/2016	15-30	No	INC	19	0:00	18:59	55.61	-5898.64	0.00	-2229.91	44.64	-1803.58	0.00	0.00	-1321.49	0.00
96	RT	Planned Transmission Outage and Constraint	N/A	N/A	9/3/2016	20	No	INC	5	19:45	23:59	5.93	-1438.39	0.00	-174.02	0.01	-0.41	0.00	0.00	-0.27	0.00
97	RT	Planned Transmission Outage and Constraint	N/A	N/A	9/4/2016	20	No	INC	7	0:00	6:59	18.37	-3530.86	0.00	-524.76	0.02	-0.50	0.00	0.00	-0.73	0.00
98	RT	Planned Transmission Outage and Constraint	N/A	N/A	9/6/2016	28-168	No	INC	19	5:00	23:59	179.37	-13611.56	0.00	-5956.08	158.02	-5739.14	0.00	0.00	-171.00	0.00
99	RT	Planned Transmission Outage and Constraint	N/A	N/A	9/7/2016	20-96	No	INC	24	0:00	23:59	67.03	-18477.55	0.00	-7689.08	52.38	-3729.48	0.00	0.00	-1080.72	0.00
100	RT	Planned Transmission Outage and Constraint	N/A	N/A	9/8/2016	30-60	No	INC	24	0:00	23:59	8.23	-29262.55	0.00	-395.00	37.08	-1290.09	0.00	0.00	-2594.73	0.00
101	RT	Planned Transmission Outage and Constraint	N/A	N/A	9/9/2016	16-64	No	INC	24	0:00	23:59	-30.49	-7957.08	0.00	674.28	9.21	-305.52	0.00	0.00	-1088.78	0.00
102	RT	Planned Transmission Outage and Constraint	N/A	N/A	9/10/2016	12-49	No	INC	24	0:00	23:59	70.42	-8820.31	0.00	-2130.13	38.71	-1149.49	30.29	0.00	-1933.01	0.00
103	RT	Planned Transmission Outage and Constraint	N/A	N/A	9/11/2016	26-45	No	INC	24	0:00	23:59	114.94	-16971.24	0.00	-2897.91	74.66	-1930.90	0.00	0.00	-3365.17	0.00
104	RT	Planned Transmission Outage and Constraint	N/A	N/A	9/12/2016	14-42	No	INC	24	0:00	23:59	53.66	-8419.83	0.00	-1637.21	58.81	-1782.20	0.00	0.00	-2052.44	0.00

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105	RT	Planned Transmission Outage and Constraint	N/A	N/A	9/13/2016	20-96	No	INC	23	0:00	22:29	183.02	-14522.62	0.00	-5759.62	162.90	-4880.65	0.00	0.00	-2536.35	0.00
106	RT	Planned Transmission Outage and Constraint	N/A	N/A	9/15/2016	15	No	INC	2	6:20	7:29	1.00	-135.44	0.00	-51.38	1.51	-68.78	0.00	0.00	0.00	0.00
107	RT	Planned Transmission Outage and Constraint	N/A	N/A	9/23/2016	15-24	No	INC	4	20:20	23:59	14.05	-1430.34	0.00	-401.98	6.28	-188.63	0.00	0.00	-186.93	0.00
108	RT	Planned Transmission Outage and Constraint	N/A	N/A	9/24/2016	15	No	INC	7	0:00	6:59	-1.47	0.00	0.00	41.29	0.00	0.00	0.00	0.00	-92.55	0.00
109	RT	Planned Transmission Outage and Constraint	N/A	N/A	9/25/2016	28-150	No	INC	19	5:30	23:59	93.28	-35162.38	0.00	-1238.59	49.96	-698.69	448.17	0.00	-2330.37	0.00
110	RT	Planned Transmission Outage and Constraint	N/A	N/A	9/26/2016	28-44	No	INC	24	0:00	23:59	34.60	-31438.95	0.00	-1162.10	13.64	-469.09	0.00	0.00	-10341.18	0.00
111	RT	Planned Transmission Outage and Constraint	N/A	N/A	9/27/2016	10-40	No	INC	24	0:00	23:59	46.20	-20895.95	0.00	-1760.10	27.34	-964.61	0.00	0.00	-3511.90	0.00
112	RT	Planned Transmission Outage and Constraint	N/A	N/A	9/28/2016	12-40	No	INC	23	0:00	22:59	-15.07	-2451.37	0.00	402.64	11.17	-409.50	0.00	0.00	-271.45	0.00
113	RT	Planned Transmission Outage and Constraint	N/A	N/A	9/29/2016	15-24	No	INC	24	0:40	23:59	87.81	-8849.56	0.00	-3042.06	54.85	-1962.24	0.00	0.00	-597.23	0.00
114	RT	Planned Transmission Outage and Constraint	N/A	N/A	9/30/2016	24	No	INC	24	0:00	23:59	7.16	-7775.79	0.00	-112.83	18.00	-470.23	0.00	0.00	-845.20	0.00
115	RT	Planned Transmission Outage and Constraint	N/A	N/A	10/1/2016	24	No	INC	2	0:00	1:44	-3.18	-396.16	0.00	87.72	1.00	-29.23	0.00	0.00	-39.91	0.00
116	RT	Planned Transmission Outage and Constraint	PG&E	Bay Area	9/23/2016	180	No	INC	13	2:00	14:59	0.00	86161.01	0.00	0.00	0.00	0.00	0.00	0.00	-3.05	0.00
117	RT	Planned Transmission Outage and Constraint	PG&E	Humboldt	9/1/2016	10-30	No	INC	17	7:50	23:59	43.19	0.00	0.00	-1383.52	11.82	-397.38	0.00	0.00	-581.83	0.00
118	RT	Planned Transmission Outage and Constraint	PG&E	Humboldt	9/2/2016	30	No	INC	1	0:15	0:44	9.11	0.00	0.00	-275.60	2.19	-66.36	0.00	0.00	0.00	0.00
119	RT	Planned Transmission Outage and Constraint	PG&E	Humboldt	9/6/2016	10-84	No	INC	14	10:45	23:59	52.80	-741.04	0.00	-2402.81	22.55	-918.44	0.00	0.00	-1.72	0.00
120	RT	Planned Transmission Outage and Constraint	PG&E	Humboldt	9/7/2016	24-48	No	INC	24	0:00	23:59	27.54	-1055.86	0.00	-1158.63	30.32	-1154.24	0.00	0.00	-1705.47	0.00
121	RT	Planned Transmission Outage and Constraint	PG&E	Humboldt	9/10/2016	12-45	No	INC	19	5:15	23:59	39.71	-1539.55	0.00	-1064.27	22.74	-585.87	0.00	0.00	-1443.33	0.00
122	RT	Planned Transmission Outage and Constraint	PG&E	Humboldt	9/11/2016	11-36	No	INC	24	0:00	23:59	2.76	-1311.42	0.00	-40.60	10.48	-250.97	0.00	0.00	-455.83	0.00

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123	RT	Planned Transmission Outage and Constraint	PG&E	Humboldt	9/12/2016	14-28	No	INC	24	0:00	23:59	-19.59	-526.24	0.00	552.01	1.50	-57.63	0.00	0.00	-1056.24	0.00
124	RT	Planned Transmission Outage and Constraint	PG&E	Humboldt	9/13/2016	20-52	No	INC	23	0:00	22:29	261.94	-4552.42	0.00	-9603.74	9.56	-290.53	0.00	0.00	-133.21	0.00
125	RT	Planned Transmission Outage and Constraint	PG&E	Humboldt	9/26/2016	12-45	No	INC	18	6:45	23:59	27.81	-24196.15	0.00	-3887.43	-3.76	-209.61	475.52	0.00	-23620.95	0.00
126	RT	Planned Transmission Outage and Constraint	PG&E	Humboldt	9/27/2016	20-90	No	INC	24	0:00	23:59	65.88	-33633.73	0.00	-3029.68	17.17	-523.83	0.00	0.00	-7097.48	0.00
127	RT	Planned Transmission Outage and Constraint	PG&E	Humboldt	9/28/2016	28-30	No	INC	24	0:00	23:59	42.99	-6945.56	0.00	-1529.86	38.15	-1338.91	0.00	0.00	-2290.27	0.00
128	RT	Planned Transmission Outage and Constraint	PG&E	Humboldt	9/29/2016	24-44	No	INC	24	0:00	23:59	1132.87	431.02	0.00	-40626.87	281.57	-10060.52	0.00	0.00	-1411.53	0.00
129	RT	Planned Transmission Outage and Constraint	PG&E	Humboldt	9/30/2016	20-44	No	INC	24	0:00	23:59	113.83	0.00	0.00	-3351.28	5.60	-139.30	0.00	0.00	-1073.69	0.00
130	RT	Planned Transmission Outage and Constraint	PG&E	Humboldt	10/1/2016	24	No	INC	2	0:00	1:44	1.89	0.00	0.00	-64.31	1.00	-26.25	0.00	0.00	-42.63	0.00
131	RT	Planned Transmission Outage and Constraint	PG&E	Sierra	9/1/2016	8	No	INC	1	13:00	13:14	24.04	0.00	0.00	-728.46	0.00	0.00	0.00	0.00	-1739.87	0.00
132	RT	Planned Transmission Outage and Constraint	PG&E	Sierra	9/10/2016	20	No	INC	6	16:10	21:59	36.00	8818.60	0.00	-2135.37	0.00	0.00	0.00	0.00	0.00	0.00
133	RT	Planned Transmission Outage and Constraint	SCE	LA Basin	9/29/2016	50	No	INC	20	0:00	19:59	-1482.61	173252.28	0.00	61219.94	8.51	-473.12	0.00	0.00	-0.34	0.00
134	RT	Planned Transmission Outage and Constraint	SDG&E	San Diego-IV	9/10/2016	20-681	No	INC	11	9:00	19:59	-43.31	81096.39	63906.83	1441.10	14.55	-327.90	0.00	0.00	-248.73	0.00
135	RT	Planned Transmission Outage and Constraint	N/A	N/A	9/28/2016	40	No	INC	5	19:35	23:59	16.37	-1361.87	0.00	-619.69	8.17	-294.35	0.00	0.00	-152.34	0.00
136	RT	Planned Transmission Outage and Constraint	N/A	N/A	9/29/2016	40	No	INC	1	0:00	0:39	6.09	-136.19	0.00	-170.43	1.17	-32.73	0.00	0.00	-17.65	0.00
137	RT	Pump Management	PG&E	Fresno	9/4/2016	-630--315	No	DEC	14	3:55	17:29	-3583.13	0.00	0.00	68310.53	0.00	0.00	0.00	0.00	0.00	0.00
138	RT	Pump Management	PG&E	Fresno	9/5/2016	83	No	INC	2	20:55	21:59	25.43	0.00	0.00	-783.98	0.00	-0.12	0.00	0.00	0.00	0.00
139	RT	Software Limitation	N/A	N/A	9/29/2016	29-40	No	INC	2	3:00	4:59	10.50	-853.51	0.00	-265.29	1.25	-34.90	0.00	0.00	-29.97	0.00

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Chart 2: Table of Exceptional Dispatches for Period 01/September/2016 - 30/September/2016

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
140	RT	Software Limitation	PG&E	Bay Area	9/6/2016	360	No	INC	1	13:45	14:11	123.25	10043.23	0.00	-3319.58	0.00	0.00	0.00	0.00	0.00	0.00
141	RT	Software Limitation	PG&E	Fresno	9/8/2016	0	No	INC	1	14:30	15:29	-20.75	0.00	0.00	0.00	-20.75	0.00	0.00	0.00	0.00	0.00
142	RT	Software Limitation	PG&E	Fresno	9/9/2016	83	No	INC	6	15:35	21:29	-40.02	2398.80	0.00	1466.35	-1.67	0.00	0.00	0.00	0.00	0.00
143	RT	Software Limitation	PG&E	Fresno	9/21/2016	0	No	INC	1	17:00	17:44	4.17	0.00	0.00	-166.00	0.00	0.00	0.00	0.00	0.00	0.00
144	RT	Software Limitation	PG&E	Fresno	9/23/2016	-314	No	DEC	1	2:50	3:29	-78.50	0.00	0.00	910.80	0.00	0.00	0.00	0.00	0.00	0.00
145	RT	Software Limitation	PG&E	Fresno	9/28/2016	83-166	No	INC	2	14:35	15:59	81.62	1480.41	0.00	-11600.29	0.00	0.00	0.00	0.00	0.00	0.00
146	RT	Software Limitation	PG&E	N/A	9/28/2016	0	No	INC	1	23:09	23:59	11.75	0.00	0.00	-346.52	0.00	0.00	0.00	0.00	0.00	0.00
147	RT	Software Limitation	SCE	Big Creek-Ventura	9/6/2016	63	No	INC	1	13:45	14:11	15.77	1338.83	164.00	-399.97	0.00	0.00	0.00	0.00	0.00	0.00
148	RT	Software Limitation	SCE	LA Basin	9/1/2016	0	No	INC	5	19:45	23:59	-72.49	0.00	0.00	1128.32	-70.35	0.00	1061.37	0.00	0.00	0.00
149	RT	Software Limitation	SCE	LA Basin	9/6/2016	240	No	INC	1	13:45	14:11	58.83	5712.14	2136.02	-1523.48	0.00	0.00	0.00	0.00	0.00	0.00
150	RT	Software Limitation	SCE	LA Basin	9/10/2016	0	No	INC	1	0:00	0:59	-36.23	0.00	0.00	332.91	-32.20	0.00	222.97	0.00	0.00	0.00
151	RT	Software Limitation	SCE	LA Basin	9/12/2016	0	No	INC	5	17:50	21:54	-1.67	0.00	0.00	32.89	0.00	0.00	0.00	0.00	0.00	0.00
152	RT	Software Limitation	SCE	LA Basin	9/23/2016	10	No	INC	9	14:10	22:59	0.00	0.00	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	0.00
153	RT	Software Limitation	SCE	LA Basin	9/24/2016	0	Yes	INC	3	21:05	23:59	-78.70	718.75	0.00	406.56	-71.26	0.00	170.76	0.00	0.00	0.00
154	RT	Software Limitation	SCE	LA Basin	9/25/2016	0	No	INC	1	23:00	23:59	-48.22	0.00	0.00	729.35	-34.14	0.00	305.30	0.00	0.00	0.00
155	RT	Software Limitation	SCE	LA Basin	9/27/2016	18	No	INC	9	15:00	23:59	-18.00	0.00	0.00	517.80	0.00	0.00	0.00	0.00	0.00	0.00
156	RT	Software Limitation	SCE	LA Basin	9/28/2016	18	No	INC	24	0:00	23:59	-57.39	0.00	0.00	1721.70	0.00	0.00	0.00	0.00	0.00	0.00
157	RT	Software Limitation	SDG&E	San Diego-IV	9/6/2016	30	No	INC	1	13:45	14:11	7.50	1006.15	173.69	-192.94	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/September/2016 - 30/September/2016

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
158	RT	Start-Up Instructions	SDG&E	San Diego-IV	9/29/2016	200	No	INC	1	10:10	10:14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
159	RT	Unit Testing	Intertie	N/A	9/16/2016	50	No	INC	1	16:17	16:59	-37.50	0.00	0.00	1147.90	0.00	0.00	0.00	0.00	0.00	0.00
160	RT	Unit Testing	Intertie	N/A	9/26/2016	75	No	INC	1	19:16	19:59	-2.50	0.00	0.00	105.44	0.00	0.00	0.00	0.00	0.00	0.00
161	RT	Unit Testing	Intertie	N/A	9/26/2016	80	No	INC	1	21:20	21:59	0.00	0.00	0.00	0.00	53.33	-2081.31	0.00	0.00	0.00	0.00
162	RT	Unit Testing	PG&E	Bay Area	9/7/2016	120	No	INC	2	12:08	13:09	26.00	6215.34	0.00	-700.48	0.00	0.00	0.00	0.00	0.00	0.00
163	RT	Unit Testing	PG&E	Fresno	9/12/2016	10	No	INC	1	14:45	14:59	4.15	0.00	0.00	-83.77	1.42	-29.84	0.00	0.00	0.00	0.00
164	RT	Unit Testing	PG&E	N/A	9/12/2016	33-202	No	INC	4	9:48	12:54	14.07	0.00	0.00	-504.97	10.94	-423.31	0.00	0.00	0.00	0.00
165	RT	Unit Testing	PG&E	N/A	9/14/2016	60	No	INC	1	14:40	15:39	-4.84	0.00	0.00	159.75	5.55	-97.58	0.00	0.00	0.00	0.00
166	RT	Unit Testing	PG&E	Sierra	9/7/2016	10	No	INC	1	12:40	13:09	0.00	0.00	0.00	0.04	0.00	0.00	0.00	0.00	0.00	0.00
167	RT	Unit Testing	PG&E	Sierra	9/12/2016	23	No	INC	1	13:27	13:37	7.21	0.00	0.00	-155.11	0.00	0.00	0.00	0.00	0.00	0.00
168	RT	Unit Testing	SCE	Big Creek-Ventura	9/12/2016	120	No	INC	1	9:19	9:59	-9.44	0.00	0.00	210.28	1.54	-34.22	0.00	0.00	0.00	0.00
169	RT	Unit Testing	SCE	CAISO Import	9/12/2016	389	No	INC	1	11:28	11:39	-35.42	0.00	0.00	855.46	10.94	-126.94	0.00	0.00	0.00	0.00
170	RT	Unit Testing	SCE	LA Basin	9/12/2016	40	No	INC	1	22:18	22:35	14.41	1787.50	0.00	-420.84	0.00	0.00	0.00	0.00	0.00	0.00
171	RT	Unit Testing	SCE	LA Basin	9/28/2016	124	No	INC	1	11:10	11:19	-0.27	0.00	0.00	-29.79	1.33	-72.43	0.00	0.00	0.00	0.00
172	RT	Unit Testing	SCE	LA Basin	9/29/2016	40	No	INC	3	9:00	11:59	32.05	0.00	0.00	-836.64	0.00	0.00	0.00	0.00	0.00	0.00
173	RT	Unit Testing	SDG&E	San Diego-IV	9/15/2016	530	No	INC	1	14:30	14:59	42.25	0.00	0.00	-1766.61	41.42	-1745.87	0.00	0.00	0.00	0.00
174	RT	Voltage Support	PG&E	Fresno	9/11/2016	-313	No	DEC	3	8:45	10:59	-78.25	0.00	0.00	-20.97	0.00	0.00	0.00	0.00	0.00	0.00
175	RT	Voltage Support	PG&E	Fresno	9/12/2016	-313	No	DEC	6	1:55	6:59	-182.58	0.00	0.00	5826.16	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/September/2016 - 30/September/2016

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
176	RT	Voltage Support	PG&E	Fresno	9/13/2016	-313	No	DEC	3	4:30	6:59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
177	RT	Voltage Support	PG&E	Sierra	9/12/2016	20-58	Yes	INC	15	9:23	23:59	-14.71	38867.32	0.00	408.01	0.07	-1.59	0.00	0.00	-17.55	0.00
178	RT	Voltage Support	PG&E	Sierra	9/13/2016	58	Yes	INC	24	0:00	23:59	10.54	84110.88	0.00	-4043.12	0.00	0.00	0.00	0.00	-38.67	0.00
179	RT	Voltage Support	PG&E	Sierra	9/14/2016	58-66	Yes	INC	24	0:00	23:59	7.36	86710.22	0.00	-235.00	10.00	-309.14	0.00	0.00	-1136.61	0.00
180	RT	Voltage Support	PG&E	Sierra	9/15/2016	66	Yes	INC	24	0:00	23:59	-69.90	85601.04	0.00	2126.27	0.00	0.00	0.00	0.00	-1614.77	0.00
181	RT	Voltage Support	PG&E	Sierra	9/16/2016	66	Yes	INC	24	0:00	23:59	13.62	84392.88	0.00	-628.39	0.00	0.00	0.00	0.00	-1684.10	0.00
182	RT	Voltage Support	PG&E	Sierra	9/17/2016	66	No	INC	24	0:00	23:59	-75.71	85326.49	0.00	1936.58	0.00	0.00	0.00	0.00	-1437.54	0.00
183	RT	Voltage Support	PG&E	Sierra	9/20/2016	20	No	INC	6	2:05	7:59	12.96	0.00	0.00	-307.05	0.01	-0.15	0.00	0.00	-0.71	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 through

[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.

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 then 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 resource 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 September, this resource was issued exceptional dispatch instructions in 79 five-minute intervals. This resource was eligible to set the LMP in 63 intervals. Out of the 63 intervals, resource calculated LMP was larger than the market LMP in 41 intervals. In the 41 intervals, the average increase in five minute LMP was $10.37/MWh. Out of the 63 intervals, resource calculated LMP was less than the market LMP in 22 intervals. In the 22 intervals, the average decrease in five minute LMP was $43.67/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 decrease of $8.50/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 September, this resource was issued exceptional dispatch instructions in 60 five-minute intervals. This resource was eligible to set the LMP in 60 intervals. Out of the 60 intervals, resource calculated LMP was larger than the market LMP in 55 intervals. In the 55 intervals, the average increase in five minute LMP was $11.77/MWh. Out of the 55 intervals, resource calculated LMP was less than the market LMP in 5 intervals. In the 5 intervals, the average decrease in five minute LMP was $1.62/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 $10.66/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	9/1/2016	19	4	32.36	Yes	41.71	9.35
2	9/1/2016	19	5	34.31	Yes	41.71	7.40
3	9/1/2016	19	6	37.05	Yes	41.71	4.66
4	9/1/2016	19	7	166.68	Yes	41.71	-124.97
5	9/1/2016	19	8	212.03	Yes	44.18	-167.85
6	9/1/2016	19	9	108.86	Yes	44.18	-64.68
7	9/1/2016	19	10	103.43	Yes	44.18	-59.25
8	9/1/2016	19	11	96.30	Yes	44.18	-52.12
9	9/1/2016	19	12	101.36	Yes	44.18	-57.18
10	9/2/2016	20	3	89.57	No	35.25	-54.32
11	9/2/2016	20	4	62.46	No	35.25	-27.21
12	9/2/2016	20	5	48.20	No	35.25	-12.95
13	9/2/2016	20	6	226.45	No	35.25	-191.20
14	9/5/2016	21	1	39.14	Yes	38.85	-0.29
15	9/5/2016	21	2	32.69	Yes	38.85	6.16
16	9/5/2016	21	3	34.17	Yes	38.85	4.68
17	9/5/2016	21	4	35.19	Yes	38.85	3.66
18	9/5/2016	21	5	31.87	Yes	38.85	6.98
19	9/5/2016	21	6	29.73	Yes	38.85	9.12
20	9/5/2016	21	7	32.09	Yes	38.85	6.76
21	9/5/2016	21	8	38.16	Yes	38.85	0.69
22	9/5/2016	21	9	37.99	Yes	38.85	0.86
23	9/5/2016	21	10	40.88	Yes	38.85	-2.03
24	9/5/2016	21	11	32.15	Yes	38.85	6.70
25	9/5/2016	21	12	31.39	Yes	38.85	7.46
26	9/5/2016	22	7	32.67	Yes	38.85	6.18
27	9/5/2016	22	8	29.77	Yes	38.85	9.08
28	9/5/2016	22	9	29.76	Yes	38.85	9.09
29	9/5/2016	22	10	26.70	Yes	38.85	12.15
30	9/5/2016	22	11	26.08	Yes	38.85	12.77
31	9/5/2016	22	12	26.38	Yes	38.85	12.47
32	9/28/2016	15	1	42.15	Yes	39.95	-2.20
33	9/28/2016	15	2	41.14	Yes	39.95	-1.19
34	9/28/2016	15	3	49.52	Yes	39.95	-9.57
35	9/28/2016	15	4	49.54	Yes	39.95	-9.59
36	9/28/2016	15	5	59.48	Yes	39.95	-19.53
37	9/28/2016	15	6	59.48	Yes	39.95	-19.53
38	9/28/2016	15	7	43.38	Yes	39.95	-3.43
39	9/28/2016	15	8	48.73	Yes	39.95	-8.78
40	9/28/2016	15	9	51.56	Yes	39.95	-11.61
41	9/28/2016	15	10	50.28	Yes	39.95	-10.33
42	9/28/2016	15	11	48.80	Yes	39.95	-8.85
43	9/28/2016	15	12	352.45	Yes	39.95	-312.50

Number	Trade Date	Trade Hour	Interval	Market LMP	Eligible Flag	Calculated LMP	Change in LMP
44	9/28/2016	16	1	51.45	Yes	42.89	-8.56
45	9/28/2016	16	2	42.33	Yes	42.89	0.56
46	9/28/2016	16	3	49.52	Yes	42.89	-6.63
47	9/28/2016	16	4	36.17	Yes	42.89	6.72
48	9/28/2016	16	5	38.47	Yes	42.89	4.42
49	9/28/2016	16	6	37.46	Yes	42.89	5.43
50	9/28/2016	16	7	37.53	Yes	42.89	5.36
51	9/28/2016	16	8	38.82	Yes	42.89	4.07
52	9/28/2016	16	9	38.83	Yes	42.89	4.06
53	9/28/2016	16	10	40.84	Yes	42.89	2.05
54	9/28/2016	16	11	40.21	Yes	42.89	2.68
55	9/28/2016	16	12	38.44	Yes	42.89	4.45
56	9/30/2016	23	1	27.75	No	65.91	38.16
57	9/30/2016	23	2	27.75	No	65.91	38.16
58	9/30/2016	23	3	27.75	No	65.91	38.16
59	9/30/2016	23	4	27.75	No	65.91	38.16
60	9/30/2016	23	5	27.75	No	65.91	38.16
61	9/30/2016	23	6	27.75	No	65.91	38.16
62	9/30/2016	23	7	27.75	No	65.91	38.16
63	9/30/2016	23	8	27.75	No	65.91	38.16
64	9/30/2016	23	9	27.75	No	65.91	38.16
65	9/30/2016	23	10	27.75	No	65.91	38.16
66	9/30/2016	23	11	27.75	No	65.91	38.16
67	9/30/2016	23	12	27.75	No	65.91	38.16
68	9/30/2016	24	1	27.75	Yes	65.91	38.16
69	9/30/2016	24	2	27.75	Yes	65.91	38.16
70	9/30/2016	24	3	27.75	Yes	36.09	8.34
71	9/30/2016	24	4	27.75	Yes	55.92	28.17
72	9/30/2016	24	5	27.75	Yes	55.92	28.17
73	9/30/2016	24	6	27.75	Yes	55.92	28.17
74	9/30/2016	24	7	27.75	Yes	36.09	8.34
75	9/30/2016	24	8	27.75	Yes	36.09	8.34
76	9/30/2016	24	9	27.75	Yes	36.09	8.34
77	9/30/2016	24	10	27.75	Yes	36.09	8.34
78	9/30/2016	24	11	27.75	Yes	36.09	8.34
79	9/30/2016	24	12	27.75	Yes	65.91	38.16

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	9/29/2016	1	1	29.05	Yes	43.41	14.36
2	9/29/2016	1	2	29.05	Yes	43.41	14.36
3	9/29/2016	1	3	29.05	Yes	43.41	14.36
4	9/29/2016	1	4	26.16	Yes	43.41	17.25
5	9/29/2016	1	5	26.16	Yes	43.41	17.25
6	9/29/2016	1	6	26.16	Yes	43.41	17.25
7	9/29/2016	1	7	26.16	Yes	43.41	17.25
8	9/29/2016	1	8	25.68	Yes	43.41	17.73
9	9/29/2016	1	9	25.29	Yes	43.41	18.12
10	9/29/2016	1	10	24.65	Yes	43.41	18.76
11	9/29/2016	1	11	24.55	Yes	43.41	18.86
12	9/29/2016	1	12	23.22	Yes	43.41	20.19
13	9/29/2016	15	1	37.75	Yes	48.52	10.77
14	9/29/2016	15	2	38.44	Yes	48.52	10.08
15	9/29/2016	15	3	40.10	Yes	48.52	8.42
16	9/29/2016	15	4	40.14	Yes	48.52	8.38
17	9/29/2016	15	5	43.23	Yes	48.52	5.29
18	9/29/2016	15	6	40.85	Yes	48.52	7.67
19	9/29/2016	15	7	43.40	Yes	48.52	5.12
20	9/29/2016	15	8	42.25	Yes	48.52	6.27
21	9/29/2016	15	9	43.29	Yes	48.52	5.23
22	9/29/2016	15	10	43.15	Yes	48.52	5.37
23	9/29/2016	15	11	43.29	Yes	48.52	5.23
24	9/29/2016	15	12	42.13	Yes	48.52	6.39
25	9/29/2016	16	1	37.72	Yes	55.78	18.06
26	9/29/2016	16	2	37.95	Yes	55.78	17.83
27	9/29/2016	16	3	41.10	Yes	55.78	14.68
28	9/29/2016	16	4	38.25	Yes	55.78	17.53
29	9/29/2016	16	5	39.18	Yes	55.78	16.60
30	9/29/2016	16	6	39.18	Yes	55.78	16.60
31	9/29/2016	16	7	39.18	Yes	55.78	16.60
32	9/29/2016	16	8	39.18	Yes	55.78	16.60
33	9/29/2016	16	9	39.18	Yes	55.78	16.60
34	9/29/2016	16	10	45.74	Yes	55.78	10.04

Number	Trade Date	Trade Hour	Interval	Market LMP	Eligible Flag	Calculated LMP	Change in LMP
35	9/29/2016	16	11	56.48	Yes	55.78	-0.70
36	9/29/2016	16	12	56.48	Yes	55.78	-0.70
37	9/29/2016	17	1	60.80	Yes	55.78	-5.02
38	9/29/2016	17	2	45.73	Yes	55.78	10.05
39	9/29/2016	17	3	34.59	Yes	55.78	21.19
40	9/29/2016	17	4	32.11	Yes	55.78	23.67
41	9/29/2016	17	5	31.65	Yes	55.78	24.13
42	9/29/2016	17	6	34.59	Yes	55.78	21.19
43	9/29/2016	17	7	35.23	Yes	55.78	20.55
44	9/29/2016	17	8	39.03	Yes	55.78	16.75
45	9/29/2016	17	9	44.33	Yes	55.78	11.45
46	9/29/2016	17	10	41.74	Yes	55.78	14.04
47	9/29/2016	17	11	47.40	Yes	55.78	8.38
48	9/29/2016	17	12	49.33	Yes	55.78	6.45
49	9/29/2016	20	1	49.42	Yes	48.52	-0.90
50	9/29/2016	20	2	49.31	Yes	48.52	-0.79
51	9/29/2016	20	3	48.28	Yes	48.52	0.24
52	9/29/2016	20	4	47.62	Yes	48.52	0.90
53	9/29/2016	20	5	48.52	Yes	48.52	0.00
54	9/29/2016	20	6	48.02	Yes	48.52	0.50
55	9/29/2016	20	7	48.18	Yes	48.52	0.34
56	9/29/2016	20	8	48.52	Yes	48.52	0.00
57	9/29/2016	20	9	44.11	Yes	48.52	4.41
58	9/29/2016	20	10	46.40	Yes	48.52	2.12
59	9/29/2016	20	11	45.30	Yes	48.52	3.22
60	9/29/2016	20	12	41.77	Yes	48.52	6.75

Appendix C: Exceptional Dispatch Bid Mitigation Analysis

In September 2016, the ISO applied the exceptional dispatch bid mitigation to the exceptional dispatches. **Error! Reference source not found.** shows the costs by instruction type in September. With exceptional dispatch bid mitigation, the costs for these types of exceptional dispatches were $ 1,570. Without the exceptional dispatch bid mitigation, the costs for these types of exceptional dispatches would be $ 7,179. The cost saving from the exceptional dispatch bid mitigation was $ 5,609.

Table 10: Bid Mitigation Analysis for September 2016

Type	Number of Resources	Costs without Bid Mitigation	Costs with Bid Mitigation	Cost Saving
NONTMOD	26	$7,179	$1,570	$5,609
Total	26	$7,179	$1,570	$5,609

Exceptional Dispatch Report

Table 2: October 2016

Exceptional Dispatch Report

Table 2: October 2016

Market Quality and Renewable Integration January 30, 2017

CAISO
250 Outcropping Way
Folsom, California 95630
(916) 351-4400

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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 October 2016.

This report contains a price impact analysis as prescribed by FERC in its September 2 order. The price impact analysis for the month of October is presented in Appendix B. This report also includes mitigation analysis for October 2016 required by section 34.9.4 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 October 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]

The following additional reason for exceptional dispatch instructions in 2016 includes Software Limitation. When an exceptional dispatch instruction was used 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 reason 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 October, 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 October 2016. 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 “Conditions Beyond the Control of the CAISO” were due to extreme weather conditions and dispatches with the reason “Other Reliability” Requirement were due to Real Time Contingenecy 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 October 2016

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Chart 2: Table of Exceptional Dispatches for Period 01/October/2016 - 31/October/2016

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	Conditions beyond the control of the CAISO	N/A	N/A	10/15/2016	30	No	INC	9	10:20	18:29	28.34	-4619.33	0.00	-1343.32	25.77	-1170.74	0.00	-718.62	0.00	0.00
2	RT	Conditions beyond the control of the CAISO	PG&E	Fresno	10/10/2016	166	No	INC	1	15:05	15:59	139.28	5901.06	0.00	-4692.24	0.00	0.00	0.00	0.00	0.00	0.00
3	RT	Conditions beyond the control of the CAISO	PG&E	Fresno	10/28/2016	0	No	INC	2	5:48	6:49	79.75	0.00	0.00	-2077.60	0.00	0.00	0.00	0.00	0.00	0.00
4	RT	Conditions beyond the control of the CAISO	PG&E	Humboldt	10/15/2016	30-40	No	INC	9	10:20	18:29	55.55	-1055.73	0.00	-1911.65	16.24	-515.61	0.00	-494.34	0.00	0.00
5	RT	Conditions beyond the control of the CAISO	PG&E	N/A	10/30/2016	175	No	INC	8	16:30	23:59	-40.50	54637.53	10266.51	1155.92	0.00	0.00	0.00	0.00	0.00	0.00
6	RT	Conditions beyond the control of the CAISO	SDG&E	San Diego-IV	10/17/2016	0	No	INC	4	16:00	19:59	-18.96	-24476.72	0.00	1093.11	0.00	0.00	0.00	0.00	0.00	0.00
7	RT	Conditions beyond the control of the CAISO	SDG&E	San Diego-IV	10/18/2016	0	No	INC	8	12:45	19:59	-18.79	-32608.23	0.00	6485.96	0.00	0.00	0.00	0.00	0.00	0.00
8	RT	Fast Start Unit Management	SCE	Big Creek-Ventura	10/14/2016	0	No	INC	1	23:45	23:59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9	RT	Fast Start Unit Management	SCE	Big Creek-Ventura	10/15/2016	0	No	INC	1	0:00	0:44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10	RT	Fast Start Unit Management	SCE	LA Basin	10/17/2016	0	No	INC	2	21:30	22:59	-32.53	718.75	0.00	-112.41	-36.67	0.00	0.00	0.00	0.00	0.00
11	RT	Incomplete or Inaccurate Transmission	SDG&E	San Diego-IV	10/3/2016	19-38	No	INC	5	12:57	16:59	2.76	0.00	0.00	-303.95	0.00	0.00	0.00	0.00	0.00	0.00
12	RT	Intertie Emergency Assistance	Intertie	N/A	10/3/2016	70	No	INC	1	3:00	3:59	2.33	0.00	0.00	-56.35	0.00	0.00	0.00	0.00	0.00	0.00
13	RT	Intertie Emergency Assistance	Intertie	N/A	10/15/2016	170	No	INC	1	17:00	17:59	51.00	0.00	0.00	-1970.55	-16.67	0.00	404.80	0.00	0.00	0.00
14	RT	Intertie Emergency Assistance	Intertie	N/A	10/17/2016	150	No	INC	2	16:47	17:59	-402.50	0.00	0.00	22796.92	-41.25	0.00	1149.62	0.00	0.00	0.00
15	RT	Load Forecast Uncertainty	SCE	LA Basin	10/30/2016	20-40	Yes	INC	24	0:00	23:59	441.07	69531.00	0.00	-412.62	0.00	0.00	0.00	-0.58	0.00	0.00
16	RT	Load Pull	PG&E	Fresno	10/22/2016	600	No	INC	2	16:47	17:59	45.71	0.00	0.00	476.91	86.67	-3755.90	0.00	0.00	0.00	0.00
17	RT	Load Pull	PG&E	Fresno	10/23/2016	83	No	INC	1	16:40	16:59	-0.05	0.00	0.00	1.44	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/October/2016 - 31/October/2016

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
18	RT	Load Pull	PG&E	Fresno	10/27/2016	83-249	No	INC	5	13:59	17:59	51.39	18004.72	0.00	-6358.56	0.00	0.00	0.00	0.00	0.00	0.00
19	RT	Load Pull	PG&E	N/A	10/23/2016	130	No	INC	3	16:35	18:59	78.76	2792.32	0.00	-1964.56	0.00	0.00	0.00	0.00	0.00	0.00
20	RT	Load Pull	SCE	LA Basin	10/22/2016	336	No	INC	2	16:51	17:59	44.25	9825.00	0.00	-2164.07	0.00	0.00	0.00	0.00	0.00	0.00
21	RT	Market Disruption	Intertie	N/A	10/24/2016	194	No	INC	2	13:00	14:59	-27.67	0.00	0.00	1260.08	-6.25	0.00	62.50	0.00	0.00	0.00
22	RT	Market Disruption	Intertie	N/A	10/25/2016	200	No	INC	1	8:00	8:59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-4253.35	0.00	0.00
23	RT	Market Disruption	Intertie	N/A	10/25/2016	172-237	No	INC	2	7:00	8:59	50.00	0.00	0.00	-5142.82	-50.00	0.00	0.00	-11242.69	0.00	0.00
24	RT	Market Disruption	Intertie	N/A	10/25/2016	37	No	INC	1	7:00	7:59	-4.00	0.00	0.00	210.50	0.00	0.00	0.00	0.00	0.00	0.00
25	RT	Market Disruption	N/A	N/A	10/24/2016	100	No	INC	2	13:00	14:59	-25.00	0.00	0.00	-575.00	-25.00	0.00	-575.00	0.00	0.00	0.00
26	RT	Market Disruption	N/A	N/A	10/25/2016	50	No	INC	2	7:00	8:59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
27	RT	Market Disruption	PG&E	Bay Area	10/17/2016	462	No	INC	2	20:30	21:44	5.42	-3778.25	0.00	-46.46	-16.75	0.00	452.75	0.00	0.00	0.00
28	RT	Market Disruption	PG&E	Bay Area	10/25/2016	1401	No	INC	4	6:53	10:49	-301.76	-1089.18	0.00	2785.37	-229.42	-503.86	4372.32	0.00	0.00	0.00
29	RT	Market Disruption	PG&E	Fresno	10/1/2016	166	No	INC	1	0:15	0:44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
30	RT	Market Disruption	PG&E	Fresno	10/12/2016	332-1628	No	INC	2	16:57	17:59	79.44	0.00	0.00	-2033.44	69.90	-1711.55	0.00	-998.87	0.00	0.00
31	RT	Market Disruption	PG&E	Fresno	10/17/2016	83-300	No	INC	2	20:35	21:44	-115.49	0.00	0.00	1900.83	-67.60	0.00	553.00	0.00	0.00	0.00
32	RT	Market Disruption	PG&E	Fresno	10/25/2016	-317	No	DEC	1	9:30	10:29	-147.93	0.00	0.00	1857.76	0.00	0.00	0.00	0.00	0.00	0.00
33	RT	Market Disruption	PG&E	N/A	10/17/2016	650	No	INC	2	20:25	22:24	21.63	-2614.50	0.00	-1059.14	-10.00	0.00	0.00	0.00	0.00	0.00
34	RT	Market Disruption	PG&E	N/A	10/25/2016	287-1305	No	INC	3	7:44	10:04	-624.34	0.00	0.00	12348.08	-544.98	0.00	13004.62	0.00	0.00	0.00

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Chart 2: Table of Exceptional Dispatches for Period 01/October/2016 - 31/October/2016

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	Market Disruption	SCE	Big Creek-Ventura	10/17/2016	0	No	INC	1	21:00	21:59	-23.60	0.00	0.00	1.33	-23.55	0.00	0.00	0.00	0.00	0.00
36	RT	Market Disruption	SCE	Big Creek-Ventura	10/25/2016	500	No	INC	3	8:41	11:29	69.77	-4771.30	0.00	-3413.00	0.00	0.00	0.00	0.00	0.00	0.00
37	RT	Market Disruption	SCE	LA Basin	10/17/2016	700-945	No	INC	2	20:40	21:59	47.29	0.00	0.00	-3302.38	-2.57	-1702.65	0.00	-98.94	0.00	0.00
38	RT	Market Disruption	SCE	LA Basin	10/25/2016	881	No	INC	5	6:51	11:29	-172.00	-5503.61	2751.00	-2635.81	-272.67	0.00	4252.25	0.00	0.00	0.00
39	RT	Market Disruption	SCE	N/A	10/25/2016	485	No	INC	1	8:39	9:04	-53.42	0.00	0.00	674.40	-19.82	0.00	391.99	0.00	0.00	0.00
40	RT	Operating Procedure Number and Constraint	N/A	N/A	10/27/2016	15-55	No	INC	14	7:48	20:59	-2.12	-1669.84	0.00	83.59	-1.95	-16.04	83.00	0.00	0.00	0.00
41	RT	Operating Procedure Number and Constraint	PG&E	Fresno	10/27/2016	430-1040	No	INC	3	18:05	20:44	-600.25	0.00	0.00	21051.11	-324.59	0.00	10516.61	0.00	0.00	0.00
42	RT	Operating Procedure Number and Constraint	PG&E	Humboldt	10/27/2016	24	No	INC	4	20:40	23:59	20.49	0.00	0.00	-842.39	0.33	-11.46	0.00	0.00	0.00	0.00
43	RT	Operating Procedure Number and Constraint	PG&E	Humboldt	10/28/2016	10-24	No	INC	6	0:00	5:44	18.18	0.00	0.00	-1114.53	0.00	0.00	0.00	0.00	0.00	0.00
44	RT	Operating Procedure Number and Constraint	SCE	LA Basin	10/4/2016	510	No	INC	1	8:50	8:59	-29.75	0.00	0.00	-479.62	-27.55	0.00	-444.14	0.00	0.00	0.00
45	RT	Operating Procedure Number and Constraint	SDG&E	San Diego-IV	10/1/2016	240-490	No	INC	2	8:30	9:59	-35.45	5788.94	0.00	1126.29	-11.78	0.00	0.00	0.00	0.00	0.00
46	RT	Operating Procedure Number and Constraint	SDG&E	San Diego-IV	10/4/2016	290	No	INC	2	8:50	9:59	-39.67	0.00	0.00	-2991.17	0.00	0.00	0.00	0.00	0.00	0.00
47	RT	Operating Procedure Number and Constraint (6110)	PG&E	Sierra	10/27/2016	60-150	No	INC	8	14:30	21:59	-96.22	0.00	0.00	-6245.77	-156.01	0.00	1727.56	0.00	0.00	0.00
48	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	10/1/2016	14	No	INC	9	15:30	23:59	-23.80	0.00	0.00	836.60	0.00	0.00	0.00	0.00	0.00	0.00
49	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	10/2/2016	14	No	INC	6	0:00	5:29	-2.22	0.00	0.00	62.71	0.00	0.00	0.00	0.00	0.00	0.00
50	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	10/13/2016	24	No	INC	17	7:55	23:59	34.89	-8324.43	0.00	-3388.03	18.32	-2078.80	0.00	0.00	0.00	0.00
51	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	10/14/2016	24	No	INC	6	0:00	5:29	-1.51	-2506.01	0.00	-67.39	5.00	-222.83	0.00	0.00	0.00	0.00
52	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	10/15/2016	21	No	INC	2	9:55	10:59	16.08	-527.87	0.00	-511.11	5.26	-234.81	0.00	0.00	0.00	0.00

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Chart 2: Table of Exceptional Dispatches for Period 01/October/2016 - 31/October/2016

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 (7110)	N/A	N/A	10/18/2016	14-72	No	INC	19	5:30	23:59	25.22	-6832.85	0.00	-682.87	17.72	-796.47	0.00	0.00	0.00	0.00
54	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	10/19/2016	24	No	INC	11	7:29	17:29	21.89	-3892.16	0.00	-700.49	9.62	-420.75	0.00	0.00	0.00	0.00
55	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	10/20/2016	15-33	No	INC	17	7:10	23:59	47.51	-7143.88	0.00	-2679.79	16.16	-1034.46	0.00	0.00	0.00	0.00
56	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	10/31/2016	24-36	No	INC	9	15:45	23:59	15.23	-4190.44	0.00	-3302.15	12.65	-531.50	0.00	0.00	0.00	0.00
57	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	11/1/2016	24	No	INC	1	0:00	0:44	1.73	-379.63	0.00	-51.13	0.67	-28.31	0.00	0.00	0.00	0.00
58	RT	Operating Procedure Number and Constraint (7110)	PG&E	Humboldt	10/1/2016	14	No	INC	7	15:30	22:14	-4.79	-3384.10	0.00	297.89	0.59	-18.39	0.00	0.00	0.00	0.00
59	RT	Operating Procedure Number and Constraint (7110)	PG&E	Humboldt	10/14/2016	12	No	INC	2	21:45	23:14	2.07	0.00	0.00	-134.19	0.00	0.00	0.00	0.00	0.00	0.00
60	RT	Operating Procedure Number and Constraint (7110)	PG&E	Humboldt	10/17/2016	12-72	No	INC	3	21:15	23:59	4.09	0.00	0.00	-145.29	3.16	-116.97	0.00	0.00	0.00	0.00
61	RT	Operating Procedure Number and Constraint (7110)	PG&E	Humboldt	10/18/2016	12-48	No	INC	22	0:05	21:59	43.15	-3034.32	0.00	-1595.65	7.64	-391.97	0.00	0.00	0.00	0.00
62	RT	Operating Procedure Number and Constraint (7110)	PG&E	Humboldt	10/24/2016	15	No	INC	2	22:55	23:59	3.22	0.00	0.00	-133.71	0.00	0.00	0.00	0.00	0.00	0.00
63	RT	Operating Procedure Number and Constraint (7110)	PG&E	Humboldt	10/25/2016	15	No	INC	3	0:00	2:44	-1.12	0.00	0.00	5.20	0.00	0.00	0.00	0.00	0.00	0.00
64	RT	Operating Procedure Number and Constraint (7440)	PG&E	Kern	10/14/2016	32	No	INC	8	10:53	17:59	-18.39	8544.72	0.00	365.30	0.00	0.00	0.00	0.00	0.00	0.00
65	RT	Operating Procedure Number and Constraint (7630)	SCE	LA Basin	10/3/2016	47	No	INC	3	14:45	16:59	11.77	1749.26	0.00	-1239.59	0.00	0.00	0.00	0.00	0.00	0.00
66	RT	Other Reliability Requirement	PG&E	Fresno	10/20/2016	31	No	INC	12	0:00	11:59	-2.22	0.00	0.00	13.42	-2.31	0.00	15.02	0.00	0.00	0.00
67	RT	Other Reliability Requirement	PG&E	Fresno	10/23/2016	0	No	INC	1	12:30	13:29	26.42	0.00	0.00	307.11	0.00	0.00	0.00	0.00	0.00	0.00
68	RT	Other Reliability Requirement	PG&E	Fresno	10/28/2016	83	No	INC	8	8:55	15:59	-16.65	37421.37	0.00	-10837.03	0.00	0.00	0.00	0.00	0.00	0.00
69	RT	Other Reliability Requirement	PG&E	Fresno	10/29/2016	5	No	INC	2	16:33	17:59	8.50	0.00	0.00	-263.60	7.24	-228.40	0.00	0.00	0.00	0.00
70	RT	Other Reliability Requirement	PG&E	Fresno	10/30/2016	35	No	INC	5	13:25	17:59	-4.79	0.00	0.00	-337.09	0.00	0.00	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
71	RT	Other Reliability Requirement	SDG&E	San Diego-IV	10/17/2016	350-400	No	INC	2	7:48	9:44	93.69	-7200.56	0.00	-2300.29	0.00	0.00	0.00	0.00	0.00	0.00
72	RT	Over Generation	PG&E	Fresno	10/14/2016	83	No	INC	1	11:02	11:09	-30.43	890.99	0.00	1238.49	-11.53	0.00	427.61	0.00	0.00	0.00
73	RT	Planned Transmission Outage and Constraint	N/A	N/A	10/1/2016	12-24	No	INC	15	1:25	15:29	25.79	-5194.16	0.00	-1039.59	14.34	-484.62	0.00	0.00	-395.17	0.00
74	RT	Planned Transmission Outage and Constraint	N/A	N/A	10/2/2016	14-36	No	INC	19	5:30	23:59	4.13	-6600.97	0.00	-529.26	4.39	-534.81	0.00	0.00	-1900.36	0.00
75	RT	Planned Transmission Outage and Constraint	N/A	N/A	10/3/2016	16-60	No	INC	24	0:00	23:59	26.92	-6689.00	0.00	-685.75	28.12	-1078.61	392.40	0.00	-1534.34	0.00
76	RT	Planned Transmission Outage and Constraint	N/A	N/A	10/4/2016	24-60	No	INC	24	0:00	23:59	164.23	-8925.57	0.00	-5610.92	67.21	-2590.61	0.00	0.00	-2141.41	0.00
77	RT	Planned Transmission Outage and Constraint	N/A	N/A	10/5/2016	30-120	No	INC	24	0:00	23:59	89.37	-14006.23	0.00	-2620.58	35.19	-986.22	0.00	0.00	-2039.02	0.00
78	RT	Planned Transmission Outage and Constraint	N/A	N/A	10/6/2016	29-96	No	INC	24	0:00	23:59	165.43	-26744.26	0.00	-3786.08	95.28	-2351.66	0.00	0.00	-5137.45	0.00
79	RT	Planned Transmission Outage and Constraint	N/A	N/A	10/7/2016	28-47	No	INC	24	0:00	23:59	98.90	-13938.22	0.00	-2722.90	69.02	-2058.50	0.00	0.00	-2803.75	0.00
80	RT	Planned Transmission Outage and Constraint	N/A	N/A	10/8/2016	20-40	No	INC	24	0:00	23:59	116.31	-15093.95	0.00	-3270.51	118.27	-3454.33	0.00	0.00	-3320.23	0.00
81	RT	Planned Transmission Outage and Constraint	N/A	N/A	10/9/2016	20	No	INC	20	0:00	19:59	33.28	-8037.60	0.00	-739.69	0.00	0.00	0.00	0.00	0.00	0.00
82	RT	Planned Transmission Outage and Constraint	N/A	N/A	10/10/2016	36-45	No	INC	17	7:35	23:59	59.12	-7144.53	0.00	-1766.28	41.52	-1088.66	0.00	0.00	-1577.59	0.00
83	RT	Planned Transmission Outage and Constraint	N/A	N/A	10/19/2016	48	No	INC	5	17:45	21:59	-7.73	-5883.34	0.00	243.94	-0.48	0.00	15.92	0.00	-262.98	0.00
84	RT	Planned Transmission Outage and Constraint	N/A	N/A	10/21/2016	24	No	INC	3	21:20	23:59	14.03	-1311.00	0.00	-589.84	5.24	-227.63	0.00	0.00	-43.44	0.00
85	RT	Planned Transmission Outage and Constraint	N/A	N/A	10/22/2016	16-31	No	INC	24	0:00	23:59	39.69	-3060.90	0.00	-1408.23	31.54	-1055.43	0.00	0.00	-892.50	0.00
86	RT	Planned Transmission Outage and Constraint	N/A	N/A	10/23/2016	12-32	No	INC	24	0:00	23:59	54.30	-9748.14	0.00	-1372.26	42.63	-1163.56	0.00	0.00	-1799.09	0.00
87	RT	Planned Transmission Outage and Constraint	N/A	N/A	10/24/2016	14-30	No	INC	22	0:00	21:44	0.21	0.00	0.00	-20.39	0.00	0.00	0.00	0.00	-191.94	0.00
88	RT	Planned Transmission Outage and Constraint	N/A	N/A	10/25/2016	24-28	No	INC	14	10:17	23:59	58.61	-7033.69	0.00	-2887.94	29.30	-1448.26	0.00	0.00	-422.04	0.00

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89	RT	Planned Transmission Outage and Constraint	N/A	N/A	10/26/2016	48-55	No	INC	17	7:30	23:59	8.43	-10608.51	0.00	-2541.70	0.70	-35.47	101.78	0.00	-668.43	0.00
90	RT	Planned Transmission Outage and Constraint	N/A	N/A	10/27/2016	15-16	No	INC	15	8:40	22:59	-6.58	-1669.84	0.00	232.76	-2.42	0.00	83.00	0.00	0.00	0.00
91	RT	Planned Transmission Outage and Constraint	N/A	N/A	10/28/2016	30-124	No	INC	18	6:00	23:59	9.29	-26133.66	0.00	-269.14	-4.31	-118.00	370.30	0.00	-1649.89	0.00
92	RT	Planned Transmission Outage and Constraint	PG&E	Humboldt	10/1/2016	12-24	No	INC	15	1:25	15:29	18.44	0.00	0.00	-864.43	1.48	-51.55	0.00	0.00	-159.42	0.00
93	RT	Planned Transmission Outage and Constraint	PG&E	Humboldt	10/2/2016	14-84	No	INC	19	5:30	23:59	15.12	0.00	0.00	-1205.00	12.94	-1142.64	0.00	0.00	-1299.09	0.00
94	RT	Planned Transmission Outage and Constraint	PG&E	Humboldt	10/3/2016	24-90	No	INC	24	0:00	23:59	80.62	-924.14	0.00	-3941.67	38.11	-2192.06	0.00	0.00	-1148.09	0.00
95	RT	Planned Transmission Outage and Constraint	PG&E	Humboldt	10/4/2016	12-32	No	INC	24	0:00	23:59	51.11	4220.96	0.00	-1554.41	54.75	-1558.34	0.00	0.00	-2785.10	0.00
96	RT	Planned Transmission Outage and Constraint	PG&E	Humboldt	10/5/2016	10-16	No	INC	16	0:00	15:59	17.44	1536.73	0.00	-394.61	13.16	-257.11	0.00	0.00	-973.99	0.00
97	RT	Planned Transmission Outage and Constraint	PG&E	Humboldt	10/6/2016	20-144	No	INC	20	4:30	23:59	155.18	-2118.34	0.00	-4578.63	53.73	-1752.62	0.00	0.00	-4299.45	0.00
98	RT	Planned Transmission Outage and Constraint	PG&E	Humboldt	10/7/2016	24-40	No	INC	24	0:00	23:59	75.21	-2598.02	0.00	-2252.15	16.56	-505.97	0.00	0.00	-1807.71	0.00
99	RT	Planned Transmission Outage and Constraint	PG&E	Humboldt	10/8/2016	20-40	No	INC	24	0:00	23:59	138.15	-1597.66	0.00	-3776.14	5.25	-164.13	0.00	0.00	-1630.11	0.00
100	RT	Planned Transmission Outage and Constraint	PG&E	Humboldt	10/9/2016	20	No	INC	20	0:00	19:59	28.63	0.00	0.00	-931.51	0.00	0.00	0.00	0.00	0.00	0.00
101	RT	Planned Transmission Outage and Constraint	PG&E	Humboldt	10/10/2016	12-48	No	INC	15	9:45	23:59	19.75	-2021.34	66.46	-1870.22	14.52	-130.59	0.00	0.00	-746.91	0.00
102	RT	Planned Transmission Outage and Constraint	PG&E	Humboldt	10/11/2016	16-24	No	INC	22	0:00	21:59	-22.55	-507.12	0.00	672.09	3.69	-152.17	0.00	0.00	-953.86	0.00
103	RT	Planned Transmission Outage and Constraint	PG&E	Humboldt	10/13/2016	15	No	INC	3	21:20	23:59	9.18	671.32	0.00	-298.24	1.25	-39.60	0.00	0.00	-81.58	0.00
104	RT	Planned Transmission Outage and Constraint	PG&E	Humboldt	10/14/2016	15	No	INC	6	0:00	5:29	-7.37	0.00	0.00	199.81	0.00	0.00	0.00	0.00	-267.17	0.00
105	RT	Planned Transmission Outage and Constraint	PG&E	Humboldt	10/16/2016	20-30	No	INC	4	20:40	23:59	7.94	0.00	0.00	-292.64	2.50	-80.18	0.00	0.00	-184.85	0.00
106	RT	Planned Transmission Outage and Constraint	PG&E	Humboldt	10/17/2016	14-20	No	INC	12	0:00	11:59	62.00	0.00	0.00	-1801.77	0.00	0.00	0.00	0.00	-108.89	0.00

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107	RT	Planned Transmission Outage and Constraint	PG&E	Humboldt	10/21/2016	12	No	INC	10	7:00	16:59	17.45	0.00	0.00	-587.88	1.13	-45.34	0.00	0.00	-238.89	0.00
108	RT	Planned Transmission Outage and Constraint	PG&E	Humboldt	10/24/2016	15-24	No	INC	12	8:37	19:44	25.63	0.00	0.00	-9384.98	34.13	-9064.80	0.00	0.00	0.00	0.00
109	RT	Planned Transmission Outage and Constraint	PG&E	Humboldt	10/25/2016	14-24	No	INC	5	19:55	23:59	14.49	0.00	0.00	-696.38	0.00	0.00	0.00	0.00	0.00	0.00
110	RT	Planned Transmission Outage and Constraint	PG&E	Humboldt	10/26/2016	14	No	INC	1	0:20	0:59	6.00	0.00	0.00	-156.92	2.30	-59.80	0.00	0.00	-34.21	0.00
111	RT	Planned Transmission Outage and Constraint	PG&E	Humboldt	10/27/2016	15	No	INC	8	9:00	16:29	5.75	-362.31	0.00	-1905.81	2.46	-667.91	0.00	0.00	-27.36	0.00
112	RT	Planned Transmission Outage and Constraint	PG&E	Kern	10/24/2016	32	No	INC	3	21:21	23:59	3.01	2805.62	0.00	-150.38	0.00	0.00	0.00	0.00	0.00	0.00
113	RT	Planned Transmission Outage and Constraint	PG&E	N/A	10/22/2016	920	No	INC	7	9:10	15:59	187.68	0.00	0.00	-7996.51	50.48	-1191.47	0.00	0.00	-90.81	0.00
114	RT	Planned Transmission Outage and Constraint	PG&E	N/A	10/31/2016	675-920	No	INC	6	18:10	23:59	-236.20	0.00	0.00	4931.01	-31.67	0.00	832.86	0.00	-298.62	0.00
115	RT	Planned Transmission Outage and Constraint	PG&E	N/A	11/1/2016	675	No	INC	3	0:00	2:59	-12.81	0.00	0.00	213.30	0.00	0.00	0.00	0.00	0.00	0.00
116	RT	Planned Transmission Outage and Constraint	PG&E	NCNB	10/11/2016	45-60	No	INC	19	5:10	23:59	-27.72	0.00	0.00	870.71	-43.71	0.00	1349.80	0.00	-51536.17	0.00
117	RT	Planned Transmission Outage and Constraint	PG&E	NCNB	10/12/2016	45-50	No	INC	24	0:00	23:59	3.70	0.00	0.00	-97.39	0.00	0.00	0.00	0.00	-63400.77	0.00
118	RT	Planned Transmission Outage and Constraint	PG&E	NCNB	10/13/2016	45-50	No	INC	24	0:00	23:59	-34.88	0.00	0.00	978.53	-34.67	0.00	973.66	0.00	-74951.62	0.00
119	RT	Planned Transmission Outage and Constraint	PG&E	NCNB	10/14/2016	45	No	INC	13	0:00	12:44	-3.07	0.00	0.00	-470.73	-15.73	0.00	507.03	0.00	-38268.68	0.00
120	RT	Planned Transmission Outage and Constraint	PG&E	NCNB	10/18/2016	120-715	No	INC	19	5:45	23:59	-116.71	0.00	0.00	7826.57	-225.35	0.00	8820.74	0.00	-286225.12	0.00
121	RT	Planned Transmission Outage and Constraint	PG&E	NCNB	10/19/2016	230-880	No	INC	24	0:00	23:59	-13.08	0.00	0.00	773.91	-112.50	0.00	3690.66	0.00	-159987.83	0.00
122	RT	Planned Transmission Outage and Constraint	PG&E	NCNB	10/20/2016	90-305	No	INC	24	0:00	23:59	22.94	0.00	0.00	-1615.45	-157.60	0.00	4037.19	0.00	-233052.58	0.00
123	RT	Planned Transmission Outage and Constraint	PG&E	NCNB	10/21/2016	155-224	No	INC	24	0:15	23:59	-78.15	0.00	0.00	2566.24	-93.00	0.00	3069.36	0.00	-141732.20	0.00

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124	RT	Planned Transmission Outage and Constraint	PG&E	NCNB	10/22/2016	150-270	No	INC	23	0:25	23:14	-16.25	0.00	0.00	4306.87	-137.60	0.00	7351.39	0.00	-182407.25	0.00
125	RT	Planned Transmission Outage and Constraint	PG&E	Sierra	10/14/2016	14	No	INC	18	2:13	19:59	-21.82	0.00	0.00	450.70	-2.06	0.00	56.35	0.00	-245.87	0.00
126	RT	Planned Transmission Outage and Constraint	PG&E	Sierra	10/16/2016	9-26	No	INC	15	9:20	23:44	-41.37	0.00	0.00	948.29	-7.42	0.00	237.30	0.00	-1514.32	0.00
127	RT	Planned Transmission Outage and Constraint	PG&E	Sierra	10/17/2016	10	No	INC	5	15:40	19:59	4.07	0.00	0.00	-507.16	0.00	0.00	0.00	0.00	-484.17	0.00
128	RT	Planned Transmission Outage and Constraint	PG&E	Sierra	10/27/2016	32	No	INC	1	22:25	23:14	-1.74	0.00	0.00	51.07	-4.08	0.00	114.50	0.00	0.00	0.00
129	RT	Planned Transmission Outage and Constraint	PG&E	Sierra	10/31/2016	10	No	INC	14	10:35	23:59	-10.95	0.00	0.00	-212.58	-1.13	0.00	12.10	0.00	-8.15	0.00
130	RT	Planned Transmission Outage and Constraint	PG&E	Sierra	11/1/2016	10	No	INC	3	0:00	2:59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
131	RT	Planned Transmission Outage and Constraint	PG&E	Stockton	10/7/2016	89-382	No	INC	6	10:20	15:44	55.88	26160.88	11236.82	-1378.98	0.01	-0.16	0.00	0.00	-0.37	0.00
132	RT	Planned Transmission Outage and Constraint	SCE	LA Basin	10/4/2016	47-185	No	INC	11	7:55	18:44	-5.13	4361.29	0.00	-303.16	0.00	0.00	0.00	0.00	-0.14	0.00
133	RT	Planned Transmission Outage and Constraint	SCE	LA Basin	10/5/2016	230	No	INC	10	8:10	17:14	-129.52	0.00	0.00	-46.69	0.00	0.00	0.00	0.00	0.00	0.00
134	RT	Planned Transmission Outage and Constraint	SCE	LA Basin	10/27/2016	91	No	INC	4	18:45	21:59	-34.79	17042.33	598.18	1085.27	-46.65	0.00	1454.05	0.00	-165.10	0.00
135	RT	Planned Transmission Outage and Constraint	SDG&E	San Diego-IV	10/3/2016	20	No	INC	20	4:00	23:59	0.04	49701.60	0.00	-36.20	0.00	0.00	0.00	0.00	0.00	0.00
136	RT	Planned Transmission Outage and Constraint	SDG&E	San Diego-IV	10/4/2016	20-53	No	INC	24	0:00	23:59	3.77	56854.08	0.00	-251.38	0.00	0.00	0.00	0.00	-9.87	0.00
137	RT	Planned Transmission Outage and Constraint	SDG&E	San Diego-IV	10/5/2016	20	No	INC	24	0:00	23:59	-0.05	87318.72	0.00	-6.48	0.00	0.00	0.00	0.00	0.00	0.00
138	RT	Planned Transmission Outage and Constraint	SDG&E	San Diego-IV	10/6/2016	20	No	INC	3	0:00	2:59	0.00	10798.68	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
139	RT	Planned Transmission Outage and Constraint	SDG&E	San Diego-IV	10/9/2016	20	No	INC	11	10:00	20:59	-248.80	34527.02	0.00	8262.64	0.00	0.00	0.00	0.00	0.00	0.00
140	RT	Planned Transmission Outage and Constraint	SDG&E	San Diego-IV	10/11/2016	310	No	INC	1	7:50	8:44	-89.40	4065.75	0.00	2647.96	-12.82	0.00	370.94	0.00	-128.30	0.00
141	RT	Planned Transmission Outage and Constraint	SDG&E	San Diego-IV	10/19/2016	0	No	INC	3	16:00	18:59	-12.54	-24394.53	0.00	425.34	0.00	0.00	0.00	0.00	-59579.56	0.00

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142	RT	Planned Transmission Outage and Constraint	SDG&E	San Diego-IV	10/30/2016	494	No	INC	7	10:15	16:59	-39.54	-5244.32	0.00	-524.90	0.00	0.00	0.00	0.00	-6.02	0.00
143	RT	Planned Transmission Outage and Constraint	N/A	N/A	10/6/2016	39	No	INC	5	18:45	22:59	10.61	-1985.95	0.00	-288.69	5.92	-160.37	0.00	0.00	-57.71	0.00
144	RT	Pump Management	PG&E	Fresno	10/27/2016	83	No	INC	1	6:00	6:44	-16.86	0.00	0.00	505.78	0.00	0.00	0.00	0.00	0.00	0.00
145	RT	Software Limitation	N/A	N/A	10/3/2016	29	No	INC	1	23:30	23:59	4.03	-132.02	0.00	-105.05	2.53	-69.57	0.00	0.00	-9.65	0.00
146	RT	Software Limitation	N/A	N/A	10/6/2016	29	No	INC	1	23:30	23:59	-3.27	-264.80	0.00	82.72	0.00	0.00	0.00	0.00	0.00	0.00
147	RT	Software Limitation	N/A	N/A	10/7/2016	30	No	INC	1	0:00	0:59	4.59	-541.29	0.00	-163.45	4.00	-142.87	0.00	0.00	-95.12	0.00
148	RT	Software Limitation	N/A	N/A	10/26/2016	50	No	INC	2	22:25	23:59	1.05	-1341.59	0.00	-38.23	0.95	-35.47	0.00	0.00	0.00	0.00
149	RT	Software Limitation	PG&E	Bay Area	10/3/2016	0	No	INC	4	12:00	15:29	-51.75	0.00	800.00	787.78	-34.50	0.00	109.37	0.00	0.00	0.00
150	RT	Software Limitation	PG&E	Bay Area	10/7/2016	360	No	INC	1	15:35	16:29	222.57	10539.06	4913.29	-6263.16	0.00	0.00	0.00	0.00	0.00	0.00
151	RT	Software Limitation	PG&E	Bay Area	10/14/2016	0	No	INC	2	17:55	19:24	-0.75	0.00	0.00	28.24	0.00	0.00	0.00	0.00	0.00	0.00
152	RT	Software Limitation	PG&E	Fresno	10/4/2016	-311	No	DEC	1	11:15	12:14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
153	RT	Software Limitation	PG&E	Fresno	10/22/2016	0	No	INC	1	9:00	9:59	0.71	0.00	0.00	-24.06	0.00	0.00	0.00	0.00	0.00	0.00
154	RT	Software Limitation	PG&E	Humboldt	10/3/2016	29	No	INC	1	22:30	23:29	-1.40	0.00	0.00	34.88	1.63	-57.13	0.00	0.00	-39.64	0.00
155	RT	Software Limitation	PG&E	Humboldt	10/4/2016	16	No	INC	1	1:00	1:59	-2.22	0.00	0.00	68.59	0.00	0.00	0.00	0.00	-17.86	0.00
156	RT	Software Limitation	PG&E	Humboldt	10/7/2016	30	No	INC	1	1:15	1:59	-0.24	0.00	0.00	6.91	0.00	0.00	0.00	0.00	0.00	0.00
157	RT	Software Limitation	PG&E	Humboldt	10/14/2016	16	No	INC	1	22:15	22:59	-2.71	0.00	0.00	133.87	0.00	0.00	0.00	0.00	0.00	0.00
158	RT	Software Limitation	PG&E	Humboldt	10/18/2016	0	No	INC	1	0:30	1:29	-1.63	0.00	0.00	-0.93	-1.67	0.00	0.00	0.00	0.00	0.00
159	RT	Software Limitation	PG&E	Humboldt	10/26/2016	48	No	INC	21	1:00	21:59	4.70	-971.67	0.00	-203.34	0.00	0.00	0.00	0.00	0.00	0.00

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160	RT	Software Limitation	PG&E	Kern	10/14/2016	0	No	INC	1	23:20	23:59	-6.58	0.00	0.00	27.10	-6.58	0.00	27.10	0.00	0.00	0.00
161	RT	Software Limitation	PG&E	Kern	10/15/2016	0	No	INC	2	0:00	1:14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
162	RT	Software Limitation	PG&E	N/A	10/31/2016	0	No	INC	2	10:45	12:44	-3.75	-350.00	0.00	0.00	-3.75	0.00	0.00	0.00	0.00	0.00
163	RT	Software Limitation	SCE	Big Creek-Ventura	10/13/2016	253	No	INC	1	23:30	23:59	-99.40	-2.48	0.00	1949.16	-99.40	0.00	1949.16	0.00	0.00	0.00
164	RT	Software Limitation	SCE	Big Creek-Ventura	10/14/2016	253	No	INC	1	0:00	0:29	-176.73	-1.04	0.00	2928.68	-148.83	0.00	1831.51	0.00	0.00	0.00
165	RT	Software Limitation	SCE	Big Creek-Ventura	10/28/2016	20-40	No	INC	2	16:18	17:59	-37.02	-2987.27	0.00	1841.90	0.00	0.00	0.00	0.00	0.00	0.00
166	RT	Software Limitation	SCE	LA Basin	10/3/2016	0	No	INC	1	22:00	22:29	-39.50	0.00	0.00	442.28	-39.50	0.00	442.28	0.00	0.00	0.00
167	RT	Software Limitation	SCE	LA Basin	10/4/2016	0	No	INC	2	18:35	20:34	-41.33	0.00	0.00	430.60	-41.33	0.00	430.60	0.00	0.00	0.00
168	RT	Software Limitation	SCE	LA Basin	10/6/2016	0	No	INC	3	21:45	23:59	-72.40	1459.50	0.00	1039.35	-68.39	0.00	927.29	0.00	0.00	0.00
169	RT	Software Limitation	SCE	LA Basin	10/7/2016	277	No	INC	1	15:35	16:29	158.61	4234.26	0.00	-4397.13	0.00	0.00	0.00	0.00	0.00	0.00
170	RT	Software Limitation	SCE	LA Basin	10/12/2016	0	No	INC	1	21:50	22:14	-23.72	722.25	0.00	371.80	-23.72	0.00	371.80	0.00	0.00	0.00
171	RT	Software Limitation	SDG&E	San Diego-IV	10/8/2016	0	No	INC	1	21:30	22:29	-7.50	0.00	0.00	0.00	-7.50	0.00	0.00	0.00	0.00	0.00
172	RT	Start-Up Instructions	N/A	N/A	10/17/2016	12	No	INC	1	23:10	23:14	0.42	0.00	0.00	-11.59	0.42	-11.59	0.00	0.00	0.00	0.00
173	RT	Start-Up Instructions	PG&E	Fresno	10/25/2016	83-166	No	INC	2	16:47	17:59	96.66	2919.69	0.00	-5000.67	0.00	0.00	0.00	0.00	0.00	0.00
174	RT	Unit Testing	PG&E	Bay Area	10/25/2016	1076	No	INC	1	23:05	23:34	9.24	0.00	0.00	-340.10	0.00	0.00	0.00	0.00	0.00	0.00
175	RT	Unit Testing	PG&E	N/A	10/10/2016	120	No	INC	1	9:30	9:49	25.92	0.00	0.00	-570.77	25.92	-570.77	0.00	0.00	0.00	0.00
176	RT	Unit Testing	PG&E	Sierra	10/5/2016	46	No	INC	1	14:30	15:29	11.33	0.00	0.00	1006.65	1.00	-6.37	0.00	0.00	0.00	0.00
177	RT	Unit Testing	SCE	LA Basin	10/4/2016	46	No	INC	2	11:08	12:17	6.98	3557.10	0.00	-4400.19	-11.38	0.00	0.00	0.00	0.00	0.00

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Chart 2: Table of Exceptional Dispatches for Period 01/October/2016 - 31/October/2016

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
178	RT	Voltage Support	PG&E	Fresno	10/2/2016	-317	No	DEC	6	2:20	7:59	-132.08	0.00	0.00	3875.26	0.00	0.00	0.00	0.00	0.00	0.00
179	RT	Voltage Support	PG&E	Fresno	10/3/2016	-317	No	DEC	6	1:00	6:59	-75.95	0.00	0.00	3148.34	0.00	0.00	0.00	0.00	0.00	0.00
180	RT	Voltage Support	PG&E	Fresno	10/4/2016	-317	No	DEC	4	3:35	6:59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
181	RT	Voltage Support	PG&E	Fresno	10/9/2016	-317	No	DEC	6	6:15	11:59	-156.50	0.00	0.00	4585.85	0.00	0.00	0.00	0.00	0.00	0.00
182	RT	Voltage Support	PG&E	Fresno	10/15/2016	-315	No	DEC	9	2:00	10:59	-157.50	0.00	0.00	4809.50	0.00	0.00	0.00	0.00	0.00	0.00
183	RT	Voltage Support	PG&E	Fresno	10/16/2016	-951--315	No	DEC	24	0:15	23:59	-159.01	0.00	0.00	4969.96	0.00	0.00	0.00	0.00	0.00	0.00
184	RT	Voltage Support	PG&E	Fresno	10/17/2016	-318--315	No	DEC	24	0:00	23:59	-79.49	0.00	0.00	1899.13	0.00	0.00	0.00	0.00	0.00	0.00
185	RT	Voltage Support	PG&E	Fresno	10/18/2016	-318	No	DEC	7	0:00	6:59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
186	RT	Voltage Support	PG&E	Fresno	10/19/2016	-314	No	DEC	2	4:15	5:59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
187	RT	Voltage Support	PG&E	Fresno	10/20/2016	-317	No	DEC	7	0:50	6:59	-68.68	0.00	0.00	2354.98	0.00	0.00	0.00	0.00	0.00	0.00
188	RT	Voltage Support	PG&E	Fresno	10/23/2016	-317	No	DEC	7	0:45	6:59	-79.25	0.00	0.00	2079.52	0.00	0.00	0.00	0.00	0.00	0.00
189	RT	Voltage Support	PG&E	Fresno	10/24/2016	-318	No	DEC	2	4:10	5:59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
190	RT	Voltage Support	PG&E	Fresno	10/25/2016	-317	No	DEC	7	1:15	7:59	-79.25	0.00	0.00	2239.25	0.00	0.00	0.00	0.00	0.00	0.00
191	RT	Voltage Support	PG&E	Fresno	10/26/2016	-310	No	DEC	10	0:50	9:59	-131.75	0.00	0.00	3125.10	0.00	0.00	0.00	0.00	0.00	0.00
192	RT	Voltage Support	PG&E	Fresno	10/27/2016	-317	No	DEC	5	1:00	5:29	-79.75	0.00	0.00	2166.45	0.00	0.00	0.00	0.00	0.00	0.00
193	RT	Voltage Support	PG&E	Fresno	10/28/2016	-319	No	DEC	1	23:15	23:59	-79.75	0.00	0.00	2257.87	0.00	0.00	0.00	0.00	0.00	0.00
194	RT	Voltage Support	PG&E	Fresno	10/29/2016	-320	No	DEC	24	0:00	23:59	3.33	0.00	0.00	-103.20	0.00	0.00	0.00	0.00	0.00	0.00
195	RT	Voltage Support	PG&E	Fresno	10/30/2016	-640--320	No	DEC	24	0:00	23:59	-1848.33	0.00	0.00	75601.10	0.00	0.00	0.00	0.00	-83.79	0.00

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Chart 2: Table of Exceptional Dispatches for Period 01/October/2016 - 31/October/2016

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
196	RT	Voltage Support	PG&E	Fresno	10/31/2016	-640--320	No	DEC	24	0:00	23:59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
197	RT	Voltage Support	PG&E	Sierra	10/18/2016	20-58	Yes	INC	21	3:15	23:59	-5.78	64088.53	2443.24	-43.81	0.00	-0.07	0.00	0.00	-40.42	0.00
198	RT	Voltage Support	PG&E	Sierra	10/19/2016	58	No	INC	7	0:00	6:59	9.41	24747.45	0.00	-404.39	0.00	0.00	0.00	0.00	-16.49	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 through

[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.

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 then 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 resource 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 October, this resource was issued exceptional dispatch instructions in 12 five-minute intervals. This resource was eligible to set the LMP in 12 intervals. Out of the 12 intervals, resource calculated LMP was larger than the market LMP in 11 intervals. In the 11 intervals, the average increase in five minute LMP was $5.62/MWh. Out of the 12 intervals, resource calculated LMP was less than the market LMP in 1 interval. In the 1 interval, the average decrease in five minute LMP was $1.26/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 $5.05/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 October, this resource was issued exceptional dispatch instructions in 12 five-minute intervals. This resource was eligible to set the LMP in 12 intervals. Out of the 12 intervals, resource calculated LMP was larger than the market LMP in 2 intervals. In the 2 intervals, the average increase in five minute LMP was $2.16/MWh. Out of the 12 intervals, resource calculated LMP was less than the market LMP in 10 intervals. In the 10 intervals, the average decrease in five minute LMP was $18.72/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 decrease of $15.24/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	10/29/2016	21	1	32.38	Yes	39.45	7.07
2	10/29/2016	21	2	32.38	Yes	39.45	7.07
3	10/29/2016	21	3	35.91	Yes	39.45	3.54
4	10/29/2016	21	4	40.71	Yes	39.45	-1.26
5	10/29/2016	21	5	38.56	Yes	39.45	0.89
6	10/29/2016	21	6	35.94	Yes	39.45	3.51
7	10/29/2016	21	7	35.18	Yes	39.45	4.27
8	10/29/2016	21	8	33.47	Yes	39.45	5.98
9	10/29/2016	21	9	32.34	Yes	39.45	7.11
10	10/29/2016	21	10	32.33	Yes	39.45	7.12
11	10/29/2016	21	11	32.33	Yes	39.45	7.12
12	10/29/2016	21	12	31.28	Yes	39.45	8.17

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	10/28/2016	17	1	27.39	Yes	25.85	-1.54
2	10/28/2016	17	2	21.61	Yes	25.85	4.24
3	10/28/2016	17	3	26.30	Yes	25.85	-0.45
4	10/28/2016	17	4	25.77	Yes	25.85	0.08
5	10/28/2016	17	5	27.68	Yes	25.85	-1.83
6	10/28/2016	17	6	27.54	Yes	25.85	-1.69
7	10/28/2016	17	7	29.16	Yes	25.85	-3.31
8	10/28/2016	17	8	72.22	Yes	25.85	-46.37
9	10/28/2016	17	9	74.00	Yes	25.85	-48.15
10	10/28/2016	17	10	49.99	Yes	25.85	-24.14
11	10/28/2016	17	11	53.64	Yes	25.85	-27.79
12	10/28/2016	17	12	57.79	Yes	25.85	-31.94

Appendix C: Exceptional Dispatch Bid Mitigation Analysis

In October 2016, the ISO applied the exceptional dispatch bid mitigation to the exceptional dispatches. **Error! Reference source not found.** shows the costs by instruction type in October. With exceptional dispatch bid mitigation, the costs for these types of exceptional dispatches were $ 336. Without the exceptional dispatch bid mitigation, the costs for these types of exceptional dispatches would be $ 952. The cost saving from the exceptional dispatch bid mitigation was $ 616.

Table 10: Bid Mitigation Analysis for October 2016

Type	Number of Resources	Costs without Bid Mitigation	Costs with Bid Mitigation	Cost Saving
NONTMOD	3	$70	$26	$44
TMODEL5	2	$882	$310	$572
Total	5	$952	$336	$616

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 30th day of January, 2017.

/s/ Anna Pascuzzo

Anna Pascuzzo