



Exceptional Dispatch Report

Table 2: January 2017

Market Quality and Renewable Integration

April 28, 2017

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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 January 2017.

This report contains a price impact analysis as prescribed by FERC in its September 2 order. The price impact analysis for the month of January is presented in Appendix B. This report also includes mitigation analysis for January 2017 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 January 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 inertia 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 publicly 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 2017 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 January, 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 January 2017. 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. Exceptional dispatches with the reason “Conditions beyond the control of the CAISO” were due to gas uncertainty issues.

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 January 2017

California Independent System Operator Corporation Exceptional Dispatch Report April 28, 2017																					
Chart 2: Table of Exceptional Dispatches for Period 01/January/2017 - 31/January/2017																					
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	PG&E	N/A	1/23/2017	285	No	INC	16	6:00	21:59	-135.67	146228.00	17227.00	-36580.25	0.00	0.00	0.00	-420.72	0.00	0.00
2	RT	Conditions beyond the control of the CAISO	PG&E	Stockton	1/23/2017	96	No	INC	16	6:00	21:59	45.25	69343.60	8704.46	-11248.49	0.00	0.00	0.00	-0.46	0.00	0.00
3	RT	Contingency Dispatch	PG&E	Bay Area	1/18/2017	480	No	INC	2	20:35	21:59	253.77	27586.18	47926.99	-8311.84	0.00	0.00	0.00	0.00	0.00	0.00
4	RT	Contingency Dispatch	PG&E	Fresno	1/18/2017	330	No	INC	1	20:41	20:49	27.15	0.00	0.00	-865.42	27.15	-865.42	0.00	-141.86	0.00	0.00
5	RT	Contingency Dispatch	PG&E	Fresno	1/23/2017	83	No	INC	1	18:05	18:59	151.65	0.00	0.00	-7783.26	0.00	0.00	0.00	0.00	0.00	0.00
6	RT	Contingency Dispatch	SCE	LA Basin	1/18/2017	48	No	INC	2	20:35	21:59	42.81	3396.00	949.00	-1431.83	0.00	0.00	0.00	0.00	0.00	0.00
7	RT	Contingency Dispatch	SDG&E	San Diego-IV	1/18/2017	30	No	INC	2	20:35	21:59	19.48	2456.30	966.20	-625.74	0.00	0.00	0.00	0.00	0.00	0.00
8	RT	Fast Start Unit Management	PG&E	Bay Area	1/18/2017	0	No	INC	1	23:15	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	PG&E	Bay Area	1/19/2017	0	No	INC	1	0:00	0:19	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	1/28/2017	0	No	INC	4	20:30	23:59	-73.44	0.00	0.00	0.00	-73.44	0.00	0.00	0.00	0.00	0.00
11	RT	Fast Start Unit Management	SCE	LA Basin	1/29/2017	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
12	RT	Market Disruption	Intertie	N/A	1/3/2017	217	No	INC	1	15:00	15:59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
13	RT	Market Disruption	Intertie	N/A	1/5/2017	100	No	INC	1	0:00	0:59	25.00	0.00	0.00	-666.67	25.00	-666.67	0.00	-145.83	0.00	0.00
14	RT	Market Disruption	Intertie	N/A	1/5/2017	200-250	No	INC	1	0:00	0:59	37.50	0.00	0.00	-990.53	37.50	-990.53	0.00	-3685.09	0.00	0.00
15	RT	Market Disruption	N/A	N/A	1/3/2017	180	No	INC	1	15:00	15:59	16.83	0.00	0.00	-633.98	5.00	-190.19	0.00	0.00	0.00	0.00
16	RT	Market Disruption	N/A	N/A	1/5/2017	70	No	INC	1	0:15	0:59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17	RT	Market Disruption	PG&E	Bay Area	1/26/2017	136-240	No	INC	2	11:18	12:29	72.12	10349.03	1288.27	-3359.15	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
18	RT	Operating Procedure Number and Constraint (6310)	N/A	N/A	1/17/2017	20-65	No	INC	18	5:00	22:59	69.32	-4596.32	0.00	-2489.57	21.86	-1217.87	138.56	0.00	0.00	0.00
19	RT	Operating Procedure Number and Constraint (6310)	N/A	N/A	1/29/2017	27	No	INC	4	7:00	10:44	8.05	-277.04	0.00	-435.93	8.22	-383.61	0.00	0.00	0.00	0.00
20	RT	Operating Procedure Number and Constraint (6310)	PG&E	Humboldt	1/21/2017	30-112	No	INC	24	0:00	23:59	34.53	-2374.06	0.00	-502.68	36.95	-1561.53	0.00	0.00	0.00	0.00
21	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	1/1/2017	30	No	INC	15	8:30	22:59	46.30	-7175.04	0.00	-1790.25	37.33	-1754.21	0.00	0.00	0.00	0.00
22	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	1/2/2017	16-26	No	DEC	12	8:25	19:59	-17.68	0.00	0.00	645.43	3.42	-140.73	0.00	0.00	0.00	0.00
23	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	1/2/2017	16-45	No	INC	13	8:25	21:14	35.39	-4135.61	0.00	-1399.96	16.13	-820.70	0.00	0.00	0.00	0.00
24	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	1/5/2017	30-45	No	INC	5	19:50	23:59	177.67	-2144.85	0.00	-5483.91	13.33	-553.31	0.00	0.00	0.00	0.00
25	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	1/5/2017	45	No	DEC	4	19:50	22:59	1.52	0.00	0.00	-58.72	0.00	0.00	0.00	0.00	0.00	0.00
26	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	1/6/2017	32-96	No	INC	18	6:15	23:59	56.48	-3610.41	0.00	-2306.86	68.18	-2940.62	0.00	0.00	0.00	0.00
27	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	1/7/2017	24	No	DEC	3	18:30	20:59	-0.76	0.00	0.00	25.34	1.10	-40.52	0.00	0.00	0.00	0.00
28	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	1/7/2017	24-40	No	INC	24	0:00	23:59	90.04	-10738.27	0.00	-3926.60	54.92	-2582.54	0.00	0.00	0.00	0.00
29	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	1/8/2017	15-28	No	INC	23	0:00	22:59	61.06	-7372.48	0.00	-2327.17	30.05	-1301.26	0.00	0.00	0.00	0.00
30	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	1/9/2017	28-35	No	INC	18	6:10	23:59	83.38	-9800.01	0.00	-2981.72	32.71	-1408.94	0.00	0.00	0.00	0.00
31	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	1/9/2017	30	No	DEC	3	6:10	8:14	1.27	-269.73	0.00	-50.72	0.48	-20.86	0.00	0.00	0.00	0.00
32	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	1/10/2017	12-35	No	INC	17	0:00	16:59	18.53	-985.35	0.00	-263.21	3.13	-113.04	0.00	0.00	0.00	0.00
33	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	1/10/2017	35	No	DEC	7	10:30	16:59	1.98	0.00	0.00	-62.47	0.00	0.00	0.00	0.00	0.00	0.00
34	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	1/11/2017	14-30	No	DEC	11	12:20	23:14	-9.40	-583.04	0.00	327.60	2.56	-93.37	0.00	0.00	0.00	0.00
35	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	1/11/2017	16-30	No	INC	12	12:20	23:59	8.65	-1432.93	0.00	-292.86	9.60	-333.55	0.00	0.00	-217.67	0.00

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Chart 2: Table of Exceptional Dispatches for Period 01/January/2017 - 31/January/2017

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	Operating Procedure Number and Constraint (7110)	N/A	N/A	1/12/2017	16-98	No	INC	19	0:00	18:59	47.45	-2181.92	0.00	-1881.34	26.09	-1172.07	0.00	0.00	0.00	0.00
37	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	1/12/2017	49	No	DEC	5	14:30	18:59	-28.89	0.00	0.00	983.08	0.00	0.00	0.00	0.00	0.00	0.00
38	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	1/13/2017	15-33	No	DEC	12	12:10	23:59	0.04	0.00	0.00	-0.88	0.00	0.00	0.00	0.00	0.00	0.00
39	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	1/13/2017	15-33	No	INC	14	10:00	23:59	9.84	-2672.83	0.00	-367.13	2.42	-108.90	0.00	0.00	0.00	0.00
40	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	1/14/2017	16	No	DEC	13	0:50	12:59	-2.28	0.00	0.00	88.94	0.00	0.00	0.00	0.00	0.00	0.00
41	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	1/14/2017	16-30	No	INC	24	0:50	23:59	11.89	-556.50	0.00	-481.43	7.12	-292.86	0.00	0.00	0.00	0.00
42	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	1/15/2017	30	No	INC	2	0:00	1:29	8.52	-140.23	0.00	-387.70	7.65	-358.90	0.00	0.00	0.00	0.00
43	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	1/16/2017	16	No	DEC	2	5:35	6:59	3.02	0.00	0.00	-114.42	3.19	-121.47	0.00	0.00	0.00	0.00
44	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	1/16/2017	20-42	No	INC	15	8:15	22:59	59.35	-7892.69	0.00	-2643.10	20.43	-958.79	0.00	0.00	0.00	0.00
45	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	1/18/2017	31-62	No	INC	19	5:30	23:59	79.23	-8718.50	0.00	-3609.70	75.37	-3449.33	0.00	0.00	0.00	0.00
46	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	1/19/2017	25-60	No	INC	19	5:15	23:59	25.02	-3132.31	0.00	-1384.49	15.63	-689.65	0.00	0.00	0.00	0.00
47	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	1/20/2017	12-32	No	DEC	15	4:50	18:59	-3.57	0.00	0.00	124.96	4.18	-155.92	0.00	0.00	0.00	0.00
48	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	1/20/2017	12-84	No	INC	24	0:00	23:59	70.11	-3009.05	0.00	-6204.84	16.28	-566.38	0.00	0.00	0.00	0.00
49	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	1/21/2017	30-84	No	INC	24	0:00	23:59	89.23	-14426.98	0.00	-3467.39	63.31	-2814.32	0.00	0.00	0.00	0.00
50	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	1/22/2017	15-25	No	DEC	23	1:30	23:59	0.64	0.00	0.00	-23.27	0.37	-13.67	0.00	0.00	0.00	0.00
51	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	1/22/2017	15-146	No	INC	24	0:00	23:59	23.22	-822.09	0.00	-793.47	9.97	-347.46	0.00	0.00	0.00	0.00
52	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	1/23/2017	10-47	No	INC	24	0:00	23:59	124.44	-3102.81	0.00	-3784.36	16.82	-603.79	0.00	0.00	0.00	0.00
53	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	1/23/2017	15-47	No	DEC	23	1:10	23:29	-8.18	0.00	0.00	-3748.89	0.00	0.00	0.00	0.00	0.00	0.00

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54	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	1/24/2017	0	No	DEC	3	1:30	3:59	-25.00	0.00	0.00	0.00	-25.00	0.00	0.00	0.00	0.00	0.00
55	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	1/24/2017	10-35	No	INC	2	0:00	1:29	-2.66	0.00	0.00	90.45	0.00	0.00	0.00	0.00	0.00	0.00
56	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	1/25/2017	15-22	No	DEC	20	4:40	23:59	4.78	-184.71	0.00	-257.56	1.25	-47.28	0.00	0.00	0.00	0.00
57	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	1/25/2017	15-30	No	INC	20	4:35	23:59	21.82	-369.44	0.00	-1034.70	4.91	-206.78	0.00	0.00	0.00	0.00
58	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	1/26/2017	15-25	No	DEC	20	0:00	19:59	-2.12	-139.25	0.00	37.86	1.28	-53.53	0.00	0.00	0.00	0.00
59	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	1/26/2017	15-25	No	INC	20	0:00	19:59	5.10	-2645.66	0.00	-229.02	7.59	-350.16	0.00	0.00	0.00	0.00
60	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	1/27/2017	12-43	No	DEC	14	6:15	19:59	-2.98	0.00	0.00	31.61	1.69	-65.68	0.00	0.00	0.00	0.00
61	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	1/27/2017	16-106	No	INC	10	6:45	15:59	29.36	-2171.28	0.00	-306.16	6.85	-159.73	0.00	0.00	0.00	0.00
62	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	1/28/2017	16-31	No	INC	19	5:00	23:59	44.56	-4670.67	0.00	-2094.75	47.13	-2193.15	0.00	0.00	0.00	0.00
63	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	1/28/2017	26-31	No	DEC	17	5:00	21:59	-1.52	0.00	0.00	32.34	0.00	0.00	0.00	0.00	0.00	0.00
64	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	1/30/2017	20-25	No	DEC	2	22:50	23:59	-1.99	-184.69	0.00	49.99	2.50	-94.55	0.00	0.00	0.00	0.00
65	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	1/30/2017	20-41	No	INC	19	4:00	22:59	19.03	-1939.25	0.00	-867.94	4.15	-201.64	0.00	0.00	0.00	0.00
66	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	1/31/2017	15-86	No	INC	22	0:00	21:59	60.78	-4948.07	0.00	-2425.21	49.06	-2044.55	0.00	0.00	0.00	0.00
67	RT	Operating Procedure Number and Constraint (7110)	N/A	N/A	1/31/2017	28	No	DEC	6	16:30	21:59	-11.46	866.42	0.00	387.37	0.00	0.00	0.00	0.00	0.00	0.00
68	RT	Operating Procedure Number and Constraint (7110)	PG&E	Humboldt	1/2/2017	16-60	No	DEC	16	8:25	23:39	-5.44	0.00	0.00	874.03	4.82	-199.88	0.00	0.00	0.00	0.00
69	RT	Operating Procedure Number and Constraint (7110)	PG&E	Humboldt	1/2/2017	16-60	No	INC	16	8:25	23:39	21.65	-2815.21	0.00	-829.55	10.57	-452.15	0.00	0.00	0.00	0.00
70	RT	Operating Procedure Number and Constraint (7110)	PG&E	Humboldt	1/5/2017	45	No	DEC	5	19:55	23:59	1.00	0.00	0.00	-37.53	0.00	0.00	0.00	0.00	0.00	0.00
71	RT	Operating Procedure Number and Constraint (7110)	PG&E	Humboldt	1/5/2017	45	No	INC	5	19:55	23:59	12.10	0.00	0.00	-472.24	7.00	-303.78	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 (7110)	PG&E	Humboldt	1/6/2017	15	No	DEC	5	18:25	22:59	-2.98	1076.15	0.00	102.51	0.00	0.00	0.00	0.00	0.00	0.00
73	RT	Operating Procedure Number and Constraint (7110)	PG&E	Humboldt	1/6/2017	15-45	No	INC	23	0:00	22:59	231.53	2287.33	0.00	-9098.19	225.00	-8781.59	0.00	0.00	0.00	0.00
74	RT	Operating Procedure Number and Constraint (7110)	PG&E	Humboldt	1/7/2017	12-16	No	INC	5	18:40	23:29	15.91	1527.62	0.00	-677.52	0.96	-43.55	0.00	0.00	0.00	0.00
75	RT	Operating Procedure Number and Constraint (7110)	PG&E	Humboldt	1/7/2017	16-22	No	DEC	4	18:35	22:14	-1.36	0.00	0.00	47.57	0.00	0.00	0.00	0.00	0.00	0.00
76	RT	Operating Procedure Number and Constraint (7110)	PG&E	Humboldt	1/8/2017	15-16	No	INC	11	10:45	21:29	8.68	269.73	57.94	-200.26	2.49	-91.37	0.00	0.00	0.00	0.00
77	RT	Operating Procedure Number and Constraint (7110)	PG&E	Humboldt	1/9/2017	31	No	INC	5	19:17	23:59	9.12	0.00	0.00	-291.97	2.75	-100.93	0.00	0.00	0.00	0.00
78	RT	Operating Procedure Number and Constraint (7110)	PG&E	Humboldt	1/10/2017	35	No	DEC	7	10:30	16:59	0.80	0.00	0.00	-27.09	0.00	0.00	0.00	0.00	0.00	0.00
79	RT	Operating Procedure Number and Constraint (7110)	PG&E	Humboldt	1/10/2017	35	No	INC	7	10:30	16:59	28.56	-1003.34	0.00	-324.51	2.93	-121.17	0.00	0.00	0.00	0.00
80	RT	Operating Procedure Number and Constraint (7110)	PG&E	Humboldt	1/11/2017	15	No	DEC	1	22:40	23:14	1.46	0.00	0.00	-52.69	1.31	-47.70	0.00	0.00	0.00	0.00
81	RT	Operating Procedure Number and Constraint (7110)	PG&E	Humboldt	1/11/2017	16-33	No	INC	2	22:40	23:59	8.11	0.00	0.00	-279.56	4.43	-161.95	0.00	0.00	0.00	0.00
82	RT	Operating Procedure Number and Constraint (7110)	PG&E	Humboldt	1/12/2017	16-32	No	DEC	19	5:15	23:59	-4.52	0.00	0.00	153.02	0.00	0.00	0.00	0.00	0.00	0.00
83	RT	Operating Procedure Number and Constraint (7110)	PG&E	Humboldt	1/12/2017	16-33	No	INC	24	0:00	23:59	17.14	0.00	0.00	-716.06	12.26	-563.09	0.00	0.00	0.00	0.00
84	RT	Operating Procedure Number and Constraint (7110)	PG&E	Humboldt	1/13/2017	12-32	No	INC	16	0:00	15:59	12.99	-1705.08	0.00	-413.25	2.43	-106.25	0.00	0.00	0.00	0.00
85	RT	Operating Procedure Number and Constraint (7110)	PG&E	Humboldt	1/13/2017	15	No	DEC	5	11:15	15:59	-0.59	0.00	0.00	19.57	0.00	0.00	0.00	0.00	0.00	0.00
86	RT	Operating Procedure Number and Constraint (7110)	PG&E	Humboldt	1/15/2017	10-32	No	DEC	15	7:20	21:59	3.46	0.00	0.00	-137.89	0.00	0.00	0.00	0.00	0.00	0.00
87	RT	Operating Procedure Number and Constraint (7110)	PG&E	Humboldt	1/15/2017	10-32	No	INC	15	7:15	21:59	23.13	-557.13	64.82	-837.34	7.98	-369.88	0.00	0.00	0.00	0.00
88	RT	Operating Procedure Number and Constraint (7110)	PG&E	Humboldt	1/17/2017	14-16	No	DEC	17	6:00	22:59	-4.92	-232.14	0.00	208.71	-0.34	0.00	0.00	0.00	0.00	0.00
89	RT	Operating Procedure Number and Constraint (7110)	PG&E	Humboldt	1/17/2017	14-64	No	INC	14	10:22	23:59	24.41	-278.58	0.00	-869.68	13.34	-570.82	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
90	RT	Operating Procedure Number and Constraint (7110)	PG&E	Humboldt	1/18/2017	14	No	DEC	24	0:15	23:59	11.36	0.00	0.00	-402.47	8.16	-310.17	0.00	0.00	0.00	0.00
91	RT	Operating Procedure Number and Constraint (7110)	PG&E	Humboldt	1/18/2017	14-62	No	INC	24	0:00	23:59	34.59	-4452.00	0.00	-1661.81	36.38	-1640.57	0.00	0.00	0.00	0.00
92	RT	Operating Procedure Number and Constraint (7110)	PG&E	Humboldt	1/19/2017	12-16	No	INC	24	0:00	23:59	-0.77	0.00	0.00	12.21	4.26	-160.61	0.00	0.00	0.00	0.00
93	RT	Operating Procedure Number and Constraint (7110)	PG&E	Humboldt	1/19/2017	13	No	DEC	6	14:15	19:59	-5.36	0.00	0.00	1195.51	0.00	0.00	0.00	0.00	0.00	0.00
94	RT	Operating Procedure Number and Constraint (7110)	PG&E	Humboldt	1/20/2017	24-76	No	INC	20	4:50	23:59	121.50	-10622.86	0.00	-10714.15	50.95	-5829.82	0.00	0.00	0.00	0.00
95	RT	Operating Procedure Number and Constraint (7110)	PG&E	Humboldt	1/22/2017	14-20	No	DEC	9	15:05	23:59	-16.83	182.69	0.00	552.96	1.00	-30.70	0.00	0.00	0.00	0.00
96	RT	Operating Procedure Number and Constraint (7110)	PG&E	Humboldt	1/22/2017	14-30	No	INC	24	0:00	23:59	42.61	-137.02	0.00	-2130.03	8.55	-790.37	0.00	0.00	0.00	0.00
97	RT	Operating Procedure Number and Constraint (7110)	PG&E	Humboldt	1/23/2017	10-92	No	INC	24	0:00	23:59	81.43	-6759.41	0.00	-3159.49	52.32	-2170.51	0.00	0.00	0.00	0.00
98	RT	Operating Procedure Number and Constraint (7110)	PG&E	Humboldt	1/23/2017	20-46	No	DEC	15	8:55	23:29	1.26	0.00	0.00	-786.64	0.00	0.00	0.00	0.00	0.00	0.00
99	RT	Operating Procedure Number and Constraint (7110)	PG&E	Humboldt	1/24/2017	12-15	No	DEC	9	15:20	23:59	-8.40	0.00	0.00	273.54	0.00	0.00	0.00	0.00	0.00	0.00
100	RT	Operating Procedure Number and Constraint (7110)	PG&E	Humboldt	1/24/2017	103	No	INC	24	0:00	23:59	71.03	1866.03	0.00	-2115.21	-2.69	-202.72	0.00	0.00	0.00	0.00
101	RT	Operating Procedure Number and Constraint (7110)	PG&E	Humboldt	1/25/2017	15	No	DEC	20	4:40	23:59	4.36	304.92	0.00	-316.76	0.00	0.00	0.00	0.00	0.00	0.00
102	RT	Operating Procedure Number and Constraint (7110)	PG&E	Humboldt	1/25/2017	15-23	No	INC	24	0:00	23:59	63.00	-554.14	0.00	-609.53	5.27	-256.09	0.00	0.00	0.00	0.00
103	RT	Operating Procedure Number and Constraint (7110)	PG&E	Humboldt	1/26/2017	15-66	No	INC	24	0:00	23:59	62.66	2488.06	0.00	-2293.78	33.01	-1417.37	0.00	0.00	0.00	0.00
104	RT	Operating Procedure Number and Constraint (7110)	PG&E	Humboldt	1/26/2017	16-32	No	DEC	14	8:50	22:29	-10.44	-92.83	0.00	403.32	0.00	0.00	0.00	0.00	0.00	0.00
105	RT	Operating Procedure Number and Constraint (7110)	PG&E	Humboldt	1/27/2017	12	No	DEC	16	8:40	23:59	-14.36	-1404.13	0.00	560.93	0.00	0.00	0.00	0.00	0.00	0.00
106	RT	Operating Procedure Number and Constraint (7110)	PG&E	Humboldt	1/27/2017	12-46	No	INC	24	0:00	23:59	61.98	566.42	0.00	-1445.76	10.53	-386.43	0.00	0.00	0.00	0.00
107	RT	Operating Procedure Number and Constraint (7110)	PG&E	Humboldt	1/28/2017	12-26	No	DEC	22	0:00	21:14	3.84	0.00	0.00	-151.07	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
108	RT	Operating Procedure Number and Constraint (7110)	PG&E	Humboldt	1/28/2017	12-26	No	INC	24	0:00	23:29	-38.32	2630.63	0.00	1350.79	-4.49	-108.29	282.93	0.00	0.00	0.00
109	RT	Operating Procedure Number and Constraint (7110)	PG&E	Humboldt	1/29/2017	10-26	No	INC	13	11:40	23:59	42.19	0.00	0.00	-654.89	1.27	-47.20	0.00	0.00	0.00	0.00
110	RT	Operating Procedure Number and Constraint (7110)	PG&E	Humboldt	1/30/2017	10	No	INC	1	0:00	0:59	7.60	0.00	0.00	-239.59	0.10	-4.66	0.00	0.00	0.00	0.00
111	RT	Operating Procedure Number and Constraint (7110)	PG&E	Humboldt	1/31/2017	14-36	No	INC	16	8:01	23:59	50.91	1505.99	0.00	-221.07	18.53	-787.88	0.00	0.00	0.00	0.00
112	RT	Operating Procedure Number and Constraint (7110)	PG&E	Humboldt	1/31/2017	28	No	DEC	8	16:30	23:59	-12.89	0.00	0.00	475.37	2.00	-74.66	0.00	0.00	0.00	0.00
113	RT	Operating Procedure Number and Constraint (7110)	PG&E	Humboldt	2/1/2017	14	No	INC	2	0:00	1:59	1.05	539.28	0.00	-38.14	1.00	-36.68	0.00	0.00	0.00	0.00
114	RT	Other Reliability Requirement	PG&E	Fresno	1/10/2017	90	No	INC	1	6:00	6:29	20.75	3125.30	166.70	-434.22	0.00	-0.05	0.00	0.00	-0.07	0.00
115	RT	Other Reliability Requirement	SDG&E	San Diego-IV	1/10/2017	281	No	INC	1	0:25	0:59	-3.08	0.00	0.00	80.49	0.00	0.00	0.00	0.00	0.00	0.00
116	RT	Over Generation	SCE	LA Basin	1/20/2017	440	No	DEC	1	14:16	14:49	-148.23	0.00	0.00	2685.11	-144.52	0.00	2693.63	0.00	0.00	0.00
117	RT	Planned Transmission Outage and Constraint	N/A	N/A	1/10/2017	30-37	No	INC	2	22:30	23:59	30.21	1393.57	0.00	-379.04	3.80	-62.32	0.00	0.00	0.00	0.00
118	RT	Planned Transmission Outage and Constraint	N/A	N/A	1/11/2017	30	No	INC	12	0:00	11:44	31.27	-5955.63	0.00	-293.92	30.00	-285.68	0.00	0.00	-2983.63	0.00
119	RT	Planned Transmission Outage and Constraint	N/A	N/A	1/30/2017	15	No	DEC	6	10:55	15:59	-0.83	277.04	0.00	-39.77	0.00	0.00	0.00	0.00	-7.12	0.00
120	RT	Planned Transmission Outage and Constraint	N/A	N/A	1/30/2017	15-200	No	INC	9	7:15	15:59	109.92	-3232.08	0.00	-2349.20	66.29	-1937.03	0.00	0.00	-1010.09	0.00
121	RT	Planned Transmission Outage and Constraint	PG&E	Bay Area	1/10/2017	363-1690	No	INC	13	10:55	23:29	347.47	86721.78	0.00	-5599.76	106.27	1233.41	0.00	0.00	-	16706.36
122	RT	Planned Transmission Outage and Constraint	PG&E	Bay Area	1/10/2017	636	No	DEC	1	10:55	11:44	-4.55	0.12	0.00	964.51	42.59	575.34	0.00	0.00	-1870.85	0.00
123	RT	Planned Transmission Outage and Constraint	PG&E	Humboldt	1/10/2017	13-30	No	INC	2	22:30	23:59	6.93	0.00	0.00	-74.69	5.64	-60.72	0.00	0.00	-247.76	0.00
124	RT	Planned Transmission Outage and Constraint	PG&E	Humboldt	1/11/2017	15	No	INC	3	0:00	2:29	-0.16	0.00	0.00	-3.44	0.00	0.00	0.00	0.00	-308.25	0.00
125	RT	Planned Transmission Outage and Constraint	PG&E	Humboldt	1/17/2017	39	No	INC	1	7:15	7:44	-0.19	0.00	0.00	8.57	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
126	RT	Planned Transmission Outage and Constraint	PG&E	Humboldt	1/30/2017	15-26	No	DEC	9	7:15	15:59	-5.25	0.00	0.00	180.67	0.00	0.00	0.00	0.00	0.00	0.00
127	RT	Planned Transmission Outage and Constraint	PG&E	Humboldt	1/30/2017	15-195	No	INC	9	7:15	15:59	35.19	686.32	0.00	-898.07	17.93	-473.03	0.00	0.00	-254.35	0.00
128	RT	Planned Transmission Outage and Constraint	PG&E	N/A	1/17/2017	25	No	INC	2	18:30	20:24	31.25	0.00	0.00	-1214.29	28.23	-1095.21	0.00	0.00	0.00	0.00
129	RT	Planned Transmission Outage and Constraint	PG&E	Sierra	1/6/2017	20	No	INC	2	10:52	12:44	3.33	1163.12	0.00	-83.07	0.00	-0.05	0.00	0.00	-0.37	0.00
130	RT	Planned Transmission Outage and Constraint	PG&E	Sierra	1/21/2017	42	No	INC	3	5:15	7:29	66.50	1609.97	0.00	-1928.30	59.50	-1686.10	0.00	0.00	-306.65	0.00
131	RT	Planned Transmission Outage and Constraint	PG&E	Sierra	1/21/2017	58	No	DEC	1	18:35	19:29	-2.46	0.00	0.00	65.60	-9.54	0.00	314.00	0.00	-191.26	0.00
132	RT	Planned Transmission Outage and Constraint	PG&E	Sierra	1/23/2017	20-40	No	INC	22	2:55	23:59	59.67	32079.70	0.00	-9259.47	19.71	-435.60	0.00	0.00	-2272.20	0.00
133	RT	Planned Transmission Outage and Constraint	PG&E	Sierra	1/24/2017	20	No	INC	24	0:00	23:59	5.08	33019.14	0.00	-2418.35	0.00	-0.05	0.00	0.00	-2.48	0.00
134	RT	Planned Transmission Outage and Constraint	PG&E	Sierra	1/25/2017	20	No	INC	7	0:00	6:44	-4.86	10897.32	0.00	157.89	0.00	0.00	0.00	0.00	-0.33	0.00
135	RT	Planned Transmission Outage and Constraint	PG&E	Sierra	1/30/2017	20	Yes	INC	19	5:00	23:59	0.55	27107.01	0.00	-3018.32	0.00	0.00	0.00	0.00	0.00	0.00
136	RT	Planned Transmission Outage and Constraint	PG&E	Sierra	1/31/2017	20	No	DEC	9	0:00	8:29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
137	RT	Planned Transmission Outage and Constraint	PG&E	Sierra	1/31/2017	20-45	No	INC	24	0:00	23:59	19.19	0.00	0.00	-1021.26	25.00	-801.78	0.00	0.00	-830.32	0.00
138	RT	Planned Transmission Outage and Constraint	PG&E	Sierra	2/1/2017	20	No	INC	4	0:00	3:59	0.83	0.00	0.00	-22.22	0.00	0.00	0.00	0.00	-0.95	0.00
139	RT	Planned Transmission Outage and Constraint	SCE	Big Creek-Ventura	1/31/2017	301-387	No	DEC	2	8:15	9:29	-272.25	0.00	0.00	-2899.41	-250.73	0.00	-2599.78	0.00	-3784.86	0.00
140	RT	Planned Transmission Outage and Constraint	SCE	LA Basin	1/30/2017	138	No	DEC	11	7:45	18:29	-11.39	0.00	0.00	622.90	0.00	0.00	0.00	0.00	0.00	0.00
141	RT	Planned Transmission Outage and Constraint	SCE	LA Basin	1/30/2017	138-276	No	INC	11	7:40	18:29	108.78	129250.50	975.01	-4332.59	1.18	-26.13	0.00	0.00	-166.85	0.00
142	RT	Planned Transmission Outage and Constraint	SCE	N/A	1/30/2017	196-354	No	INC	14	5:30	18:44	1781.31	33686.00	0.00	-17320.91	1708.25	-14804.62	0.00	0.00	-7354.05	0.00
143	RT	Planned Transmission Outage and Constraint	SDG&E	San Diego-IV	1/5/2017	30	Yes	INC	1	14:00	14:59	-5.00	2456.30	966.20	132.05	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/January/2017 - 31/January/2017

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	N/A	N/A	1/11/2017	30	No	INC	2	11:20	12:44	4.56	-761.25	0.00	30.22	4.27	27.12	0.00	0.00	-711.04	0.00
145	RT	Pump Management	PG&E	Fresno	1/15/2017	0	No	INC	2	22:30	23:59	-14.03	0.00	0.00	-187.26	-20.75	0.00	0.00	0.00	0.00	0.00
146	RT	Pump Management	PG&E	Fresno	1/17/2017	0	No	INC	1	0:45	1:44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
147	RT	Pump Management	PG&E	Fresno	1/17/2017	83	No	DEC	1	5:00	5:59	1.47	0.00	0.00	-19.44	0.00	0.00	0.00	0.00	0.00	0.00
148	RT	Pump Management	PG&E	Fresno	1/29/2017	0	No	INC	1	15:45	16:44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
149	RT	Software Limitation	N/A	N/A	1/8/2017	16	No	INC	1	2:45	3:44	1.45	-269.73	0.00	-37.41	1.25	-45.88	0.00	0.00	0.00	0.00
150	RT	Software Limitation	PG&E	Fresno	1/21/2017	-303	No	DEC	5	10:30	14:59	-11.71	0.00	0.00	4840.58	0.00	0.00	0.00	0.00	0.00	0.00
151	RT	Software Limitation	PG&E	Fresno	1/29/2017	0	No	INC	1	16:00	16:59	-6.65	0.00	0.00	278.59	0.00	0.00	0.00	0.00	0.00	0.00
152	RT	Software Limitation	PG&E	Humboldt	1/12/2017	0	No	DEC	1	10:45	11:39	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	Humboldt	1/13/2017	32	No	INC	1	10:30	10:59	-0.89	-276.50	0.00	61.99	0.00	0.00	0.00	0.00	0.00	0.00
154	RT	Software Limitation	PG&E	N/A	1/16/2017	665	No	INC	1	1:20	2:14	443.08	-145.83	0.00	-11616.64	0.00	0.00	0.00	0.00	0.00	0.00
155	RT	Software Limitation	PG&E	N/A	1/28/2017	0	No	INC	3	12:00	14:59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
156	RT	Software Limitation	PG&E	Stockton	1/28/2017	0	No	INC	3	5:25	7:59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
157	RT	Software Limitation	SCE	LA Basin	1/3/2017	0	No	DEC	6	18:48	23:59	-2.17	-5094.35	0.00	91.12	0.00	0.00	0.00	0.00	0.00	0.00
158	RT	Software Limitation	SCE	LA Basin	1/3/2017	0	No	INC	6	18:48	23:59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
159	RT	Software Limitation	SCE	LA Basin	1/28/2017	0	No	INC	23	1:45	23:59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
160	RT	Software Limitation	SCE	LA Basin	1/29/2017	0	No	INC	23	0:00	22:59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
161	RT	Software Limitation	SCE	N/A	1/23/2017	0	No	INC	2	22:30	23:59	-95.83	1860.00	0.00	0.00	-95.83	0.00	0.00	0.00	0.00	0.00

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Chart 2: Table of Exceptional Dispatches for Period 01/January/2017 - 31/January/2017

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	SCE	N/A	1/28/2017	195-196	No	INC	24	0:05	23:59	6.00	29476.90	0.00	-280.05	-0.94	0.00	27.25	0.00	-1.74	0.00
163	RT	Software Limitation	SCE	N/A	1/31/2017	0	No	INC	1	4:55	5:29	-114.58	2449.36	0.00	0.00	-114.58	0.00	0.00	0.00	0.00	0.00
164	RT	Software Limitation	SDG&E	San Diego-IV	1/19/2017	0	No	DEC	3	20:00	22:59	-6.03	0.00	0.00	165.21	0.00	0.00	0.00	0.00	0.00	0.00
165	RT	Software Limitation	SDG&E	San Diego-IV	1/20/2017	0	No	INC	1	13:30	14:24	-15.00	614.08	120.78	0.00	-15.00	0.00	0.00	0.00	0.00	0.00
166	RT	Unit Testing	PG&E	Bay Area	1/4/2017	64	No	INC	1	16:30	17:29	39.66	5769.97	0.00	-22172.05	10.52	-496.60	0.00	0.00	0.00	0.00
167	RT	Unit Testing	PG&E	Bay Area	1/12/2017	145	No	INC	1	13:55	14:44	63.10	1347.53	0.00	-1865.57	2.71	-91.65	0.00	0.00	0.00	0.00
168	RT	Unit Testing	PG&E	Bay Area	1/18/2017	78	No	INC	1	18:50	19:19	13.89	0.00	0.00	-452.76	14.26	-466.88	0.00	0.00	0.00	0.00
169	RT	Unit Testing	PG&E	Fresno	1/10/2017	400	No	INC	1	20:35	20:59	209.29	0.00	0.00	-46076.97	203.66	-45939.81	0.00	0.00	0.00	0.00
170	RT	Unit Testing	PG&E	N/A	1/11/2017	101	No	DEC	1	19:30	19:59	13.12	-14163.96	0.00	-635.93	0.00	0.00	0.00	0.00	0.00	0.00
171	RT	Unit Testing	PG&E	N/A	1/17/2017	200	No	DEC	1	17:35	17:59	26.70	-10873.74	0.00	-1516.07	0.29	-10.29	0.00	0.00	0.00	0.00
172	RT	Unit Testing	SCE	LA Basin	1/11/2017	42	No	INC	1	20:45	20:59	6.10	0.00	0.00	-244.79	6.02	-242.26	0.00	0.00	0.00	0.00
173	RT	Unit Testing	SDG&E	San Diego-IV	1/11/2017	300	No	INC	1	18:30	18:59	46.33	0.00	0.00	-2633.74	46.33	-2633.74	0.00	0.00	0.00	0.00
174	RT	Unplanned Outage	N/A	N/A	1/2/2017	34-45	No	INC	4	20:00	23:59	13.57	-3089.25	0.00	-523.13	12.34	-483.37	0.00	-454.27	0.00	0.00
175	RT	Unplanned Outage	N/A	N/A	1/2/2017	45	No	DEC	4	20:00	23:59	8.16	0.00	0.00	-337.17	6.52	-267.78	0.00	-0.31	0.00	0.00
176	RT	Unplanned Outage	N/A	N/A	1/3/2017	45	No	DEC	24	0:00	23:59	-4.80	0.00	0.00	181.63	0.00	0.00	0.00	0.00	0.00	0.00
177	RT	Unplanned Outage	N/A	N/A	1/3/2017	45-48	No	INC	24	0:00	23:59	91.66	-11687.09	0.00	-2869.48	83.34	-2690.02	0.00	-3752.83	0.00	0.00
178	RT	Unplanned Outage	N/A	N/A	1/4/2017	15	No	DEC	1	6:40	7:29	16.43	-498.21	0.00	-538.02	2.54	-83.70	0.00	-30.22	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
179	RT	Unplanned Outage	N/A	N/A	1/4/2017	30-45	No	INC	24	0:00	23:59	115.65	-10967.49	0.00	-3174.32	88.97	-2370.94	0.00	-5592.28	0.00	0.00
180	RT	Unplanned Outage	N/A	N/A	1/5/2017	35-45	No	INC	16	0:00	15:59	84.38	-9902.80	0.00	-1717.10	39.96	-923.30	0.00	-2893.04	0.00	0.00
181	RT	Unplanned Outage	N/A	N/A	1/5/2017	44-45	No	DEC	17	0:00	16:59	0.71	0.00	0.00	-4.86	6.10	-193.24	0.00	-32.94	0.00	0.00
182	RT	Unplanned Outage	PG&E	Humboldt	1/2/2017	60	No	INC	1	23:40	23:59	20.00	0.00	0.00	-616.54	3.67	-113.03	0.00	-43.61	0.00	0.00
183	RT	Unplanned Outage	PG&E	Humboldt	1/3/2017	56-64	No	INC	24	0:00	23:59	317.13	-6950.83	0.00	-11663.06	307.00	-11317.19	0.00	-2965.81	0.00	0.00
184	RT	Unplanned Outage	PG&E	Humboldt	1/4/2017	60	No	INC	24	0:00	23:59	278.67	0.00	0.00	-9658.34	278.67	-9658.34	0.00	-3316.57	0.00	0.00
185	RT	Unplanned Outage	PG&E	Humboldt	1/5/2017	45-60	No	INC	16	0:00	15:59	83.64	-1095.24	0.00	-1916.26	75.67	-1725.60	0.00	-3712.03	0.00	0.00
186	RT	Unplanned Outage	PG&E	Humboldt	1/5/2017	48	No	DEC	13	3:35	15:59	9.27	0.00	0.00	-284.19	6.89	-218.29	0.00	-31.82	0.00	0.00
187	RT	Unplanned Outage	PG&E	Stockton	1/22/2017	22	No	INC	5	7:40	11:40	35.71	0.00	0.00	-1299.11	11.66	-395.98	0.00	0.00	0.00	0.00
188	RT	Voltage Support	PG&E	Fresno	1/1/2017	0	Yes	INC	19	5:15	23:59	-2.21	0.00	0.00	75.14	0.00	0.00	0.00	0.00	0.00	0.00
189	RT	Voltage Support	PG&E	Fresno	1/1/2017	-618--308	No	DEC	19	5:15	23:59	-150.96	0.00	0.00	4589.42	0.00	0.00	0.00	0.00	0.00	0.00
190	RT	Voltage Support	PG&E	Fresno	1/2/2017	0	No	INC	24	0:00	23:59	3.03	0.00	0.00	-97.44	0.00	-0.16	0.00	0.00	-0.02	0.00
191	RT	Voltage Support	PG&E	Fresno	1/2/2017	-313-0	No	DEC	24	0:00	23:59	10.19	0.00	0.00	-416.89	0.00	0.00	0.00	0.00	0.00	0.00
192	RT	Voltage Support	PG&E	Fresno	1/3/2017	0	No	INC	16	0:00	15:59	-0.44	0.00	0.00	14.60	0.00	-0.13	0.00	0.00	0.00	0.00
193	RT	Voltage Support	PG&E	Fresno	1/3/2017	-308-0	No	DEC	7	0:00	6:59	0.25	0.00	0.00	-7.93	0.00	0.00	0.00	0.00	0.00	0.00
194	RT	Voltage Support	PG&E	Fresno	1/4/2017	0	No	INC	13	10:45	23:44	-0.59	0.00	0.00	-63.22	0.02	-0.63	0.00	0.00	-0.03	0.00
195	RT	Voltage Support	PG&E	Fresno	1/4/2017	-308-0	No	DEC	24	0:30	23:59	-15.80	0.00	0.00	331.44	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
196	RT	Voltage Support	PG&E	Fresno	1/5/2017	0-83	Yes	INC	11	13:15	23:59	22.54	11843.24	0.00	-351.83	0.00	0.00	0.00	0.00	0.00	0.00
197	RT	Voltage Support	PG&E	Fresno	1/5/2017	-303-0	No	DEC	24	0:00	23:59	0.36	0.00	0.00	-11.64	0.00	0.00	0.00	0.00	0.00	0.00
198	RT	Voltage Support	PG&E	Fresno	1/6/2017	0	No	INC	2	0:00	1:29	0.01	0.00	0.00	-0.40	0.01	-0.40	0.00	0.00	0.00	0.00
199	RT	Voltage Support	PG&E	Fresno	1/6/2017	-310--303	No	DEC	15	0:30	15:29	-89.09	0.00	0.00	1684.85	0.00	0.00	0.00	0.00	0.00	0.00
200	RT	Voltage Support	PG&E	Fresno	1/7/2017	-303	No	DEC	24	0:00	23:59	-151.50	0.00	0.00	17472.66	0.00	0.00	0.00	0.00	0.00	0.00
201	RT	Voltage Support	PG&E	Fresno	1/8/2017	0	No	INC	1	23:40	23:59	0.00	0.00	0.00	0.07	0.00	0.07	0.00	0.00	0.00	0.00
202	RT	Voltage Support	PG&E	Fresno	1/8/2017	-303	No	DEC	16	0:00	15:29	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
203	RT	Voltage Support	PG&E	Fresno	1/9/2017	0-166	Yes	INC	20	0:00	19:59	63.24	62478.58	1974.71	-1401.65	0.01	-0.30	0.00	0.00	-1.20	0.00
204	RT	Voltage Support	PG&E	Fresno	1/9/2017	-606-83	No	DEC	14	1:30	14:59	-72.80	0.00	0.00	983.15	0.00	0.00	0.00	0.00	0.00	0.00
205	RT	Voltage Support	PG&E	Fresno	1/10/2017	167	No	INC	18	0:02	17:29	122.16	62506.00	3000.54	-2513.85	14.53	-245.48	0.00	0.00	-1.61	0.00
206	RT	Voltage Support	PG&E	Fresno	1/10/2017	-606-83	No	DEC	15	0:02	14:59	-153.32	-4194.48	0.00	4551.37	0.00	0.00	0.00	0.00	-716.38	0.00
207	RT	Voltage Support	PG&E	Fresno	1/11/2017	1-166	Yes	INC	15	9:47	23:59	72.40	20561.18	0.00	671.70	1.65	-44.86	0.00	0.00	-0.22	0.00
208	RT	Voltage Support	PG&E	Fresno	1/11/2017	-313-83	No	DEC	15	0:30	14:59	15.27	0.00	0.00	209.39	0.00	0.00	0.00	0.00	0.00	0.00
209	RT	Voltage Support	PG&E	Fresno	1/12/2017	1-84	No	INC	7	0:00	6:59	-14.75	6250.60	857.30	565.71	7.00	-199.03	0.00	0.00	-0.02	0.00
210	RT	Voltage Support	PG&E	Fresno	1/12/2017	-303	No	DEC	6	0:30	5:44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
211	RT	Voltage Support	PG&E	Fresno	1/13/2017	83	Yes	INC	11	5:15	15:59	6.29	32157.68	0.00	-364.37	0.00	0.00	0.00	0.00	0.00	0.00
212	RT	Voltage Support	PG&E	Fresno	1/13/2017	-303	No	DEC	5	0:30	4:59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
213	RT	Voltage Support	PG&E	Fresno	1/14/2017	0-1	No	INC	16	8:00	23:59	0.01	0.00	0.00	-0.25	0.00	-0.17	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
214	RT	Voltage Support	PG&E	Fresno	1/14/2017	-303	No	DEC	5	1:30	5:44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
215	RT	Voltage Support	PG&E	Fresno	1/15/2017	0-84	Yes	INC	24	0:00	23:59	141.34	2960.81	0.00	-4055.76	0.85	-31.24	0.00	0.00	-0.24	0.00
216	RT	Voltage Support	PG&E	Fresno	1/15/2017	-303-1	No	DEC	24	0:15	23:59	-5.82	0.00	0.00	171.12	0.00	0.00	0.00	0.00	0.00	0.00
217	RT	Voltage Support	PG&E	Fresno	1/16/2017	84	No	INC	4	10:00	13:44	41.73	20972.40	0.00	-965.53	0.75	-18.13	0.00	0.00	-11.56	0.00
218	RT	Voltage Support	PG&E	Fresno	1/16/2017	-303	No	DEC	16	0:00	15:44	-151.50	0.00	0.00	3292.16	0.00	0.00	0.00	0.00	0.00	0.00
219	RT	Voltage Support	PG&E	Fresno	1/17/2017	5-83	Yes	INC	6	0:00	5:59	32.17	7456.85	0.00	-926.01	6.25	-182.49	0.00	0.00	-55.59	0.00
220	RT	Voltage Support	PG&E	Fresno	1/17/2017	-303	No	DEC	4	1:15	4:44	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
221	RT	Voltage Support	PG&E	Fresno	1/18/2017	83	Yes	INC	1	5:15	5:59	-97.05	4194.48	0.00	3195.61	0.00	0.00	0.00	0.00	0.00	0.00
222	RT	Voltage Support	PG&E	Fresno	1/18/2017	-316	No	DEC	1	4:10	4:59	-1.08	0.00	0.00	31.66	0.00	0.00	0.00	0.00	0.00	0.00
223	RT	Voltage Support	PG&E	Fresno	1/19/2017	83	Yes	INC	1	5:15	5:59	-20.65	4194.48	0.00	741.08	0.00	0.00	0.00	0.00	0.00	0.00
224	RT	Voltage Support	PG&E	Fresno	1/20/2017	83	Yes	INC	11	5:15	15:59	-33.21	6058.69	0.00	792.78	0.00	-0.11	0.00	0.00	-0.05	0.00
225	RT	Voltage Support	PG&E	Fresno	1/20/2017	-320	No	DEC	2	22:00	23:59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
226	RT	Voltage Support	PG&E	Fresno	1/21/2017	-303-83	No	INC	8	7:50	15:44	-6.25	2604.42	1222.44	-1043.80	-41.50	-0.10	-555.83	0.00	0.00	0.00
227	RT	Voltage Support	PG&E	Fresno	1/21/2017	-320--303	No	DEC	24	0:00	23:59	45.88	-2796.32	0.00	-2587.62	0.00	0.00	0.00	0.00	-443.88	0.00
228	RT	Voltage Support	PG&E	Fresno	1/22/2017	-640--319	No	DEC	24	0:00	23:59	-79.75	0.00	0.00	2298.76	0.00	0.00	0.00	0.00	0.00	0.00
229	RT	Voltage Support	PG&E	Fresno	1/23/2017	83	No	INC	2	5:15	7:14	-46.88	4194.48	0.00	1580.59	0.00	0.00	0.00	0.00	0.00	0.00
230	RT	Voltage Support	PG&E	Fresno	1/23/2017	-319-83	No	DEC	24	0:00	23:59	-158.43	0.00	0.00	4365.16	0.00	0.00	0.00	0.00	0.00	0.00
231	RT	Voltage Support	PG&E	Fresno	1/24/2017	-319--308	No	DEC	24	0:00	23:59	-21.98	0.00	0.00	988.63	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
232	RT	Voltage Support	PG&E	Fresno	1/25/2017	-319--308	No	DEC	24	0:00	23:59	52.25	0.00	0.00	-1492.92	0.00	0.00	0.00	0.00	0.00	0.00
233	RT	Voltage Support	PG&E	Fresno	1/26/2017	-323--316	No	DEC	24	0:00	23:59	-14.24	0.00	0.00	438.02	0.00	0.00	0.00	0.00	0.00	0.00
234	RT	Voltage Support	PG&E	Fresno	1/27/2017	-316	No	DEC	6	0:00	5:44	-0.01	0.00	0.00	0.31	0.00	0.00	0.00	0.00	0.00	0.00
235	RT	Voltage Support	PG&E	Fresno	1/28/2017	-315	No	DEC	24	0:35	23:59	-52.50	0.00	0.00	1460.02	0.00	0.00	0.00	0.00	0.00	0.00
236	RT	Voltage Support	PG&E	Fresno	1/29/2017	83-84	No	INC	2	16:00	17:44	-33.29	4687.95	0.00	1704.36	0.00	0.00	0.00	0.00	0.00	0.00
237	RT	Voltage Support	PG&E	Fresno	1/29/2017	-628--313	No	DEC	24	0:00	23:59	-117.77	0.00	0.00	336.62	0.00	0.00	0.00	0.00	0.00	0.00
238	RT	Voltage Support	PG&E	Fresno	1/30/2017	-315--310	No	DEC	24	0:00	23:59	-78.75	0.00	0.00	3700.28	0.00	0.00	0.00	0.00	0.00	0.00
239	RT	Voltage Support	PG&E	Fresno	1/31/2017	-316--310	No	DEC	24	0:00	23:59	-58.67	0.00	0.00	-310.41	0.00	0.00	0.00	0.00	0.00	0.00
240	RT	Voltage Support	PG&E	Fresno	2/1/2017	-315	No	DEC	6	0:00	5:29	-16.50	0.00	0.00	421.01	0.00	0.00	0.00	0.00	0.00	0.00
241	RT	Voltage Support	PG&E	N/A	1/10/2017	350	No	DEC	2	22:55	23:59	15.24	0.00	0.00	-199.86	0.00	0.00	0.00	0.00	0.00	0.00
242	RT	Voltage Support	PG&E	N/A	1/10/2017	350	No	INC	2	22:55	23:59	-6.18	13417.04	0.00	141.61	0.01	-0.03	0.00	0.00	-0.01	0.00
243	RT	Voltage Support	PG&E	N/A	1/11/2017	350	No	DEC	24	0:00	23:59	-87.85	0.00	0.00	2998.68	0.00	0.00	0.00	0.00	0.00	0.00
244	RT	Voltage Support	PG&E	N/A	1/11/2017	350	No	INC	24	0:00	23:59	-19.58	56636.30	0.00	234.48	0.02	-0.23	0.00	0.00	-261.67	0.00
245	RT	Voltage Support	PG&E	N/A	1/12/2017	350	No	INC	7	0:00	6:59	34.43	61834.14	0.00	-941.09	0.03	-0.76	0.00	0.00	-0.10	0.00
246	RT	Voltage Support	PG&E	Sierra	1/1/2017	20	Yes	INC	17	0:00	16:59	11.45	11164.28	0.00	-438.41	0.00	0.00	0.00	0.00	0.00	0.00
247	RT	Voltage Support	PG&E	Sierra	1/11/2017	20	No	INC	1	23:35	23:59	8.37	0.00	0.00	-205.69	0.00	-0.10	0.00	0.00	-0.06	0.00
248	RT	Voltage Support	PG&E	Sierra	1/12/2017	20	No	INC	7	0:00	6:59	5.03	9737.42	716.38	-130.72	0.00	-0.06	0.00	0.00	-1.14	0.00
249	RT	Voltage Support	PG&E	Sierra	1/13/2017	20	No	INC	9	12:35	21:14	-3.62	10742.96	0.00	124.75	0.00	0.00	0.00	0.00	0.00	0.00

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Exceptional Dispatch Report
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Chart 2: Table of Exceptional Dispatches for Period 01/January/2017 - 31/January/2017

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
250	RT	Voltage Support	SCE	N/A	1/25/2017	172	No	INC	5	19:00	23:59	8.15	40321.20	0.00	-219.96	0.00	0.00	0.00	0.00	-0.32	0.00
251	RT	Voltage Support	SCE	N/A	1/26/2017	172	No	INC	24	0:00	23:59	58.50	167315.46	0.00	-1730.77	0.00	-0.15	0.00	0.00	-1.20	0.00
252	RT	Voltage Support	SCE	N/A	1/27/2017	172	No	INC	24	0:00	23:59	-21.47	156627.41	0.00	663.42	0.00	0.00	0.00	0.00	-2.31	0.00
253	RT	Voltage Support	SCE	N/A	1/28/2017	172	No	INC	24	0:00	23:59	4.43	29476.90	0.00	-242.81	-0.58	0.00	17.07	0.00	-1.74	0.00
254	RT	Voltage Support	SCE	N/A	1/29/2017	172	No	INC	24	0:00	23:59	23.48	157538.88	0.00	-670.74	0.00	0.00	0.00	0.00	-2.93	0.00
255	RT	Voltage Support	SCE	N/A	1/30/2017	172	No	INC	24	0:00	23:59	18.10	6564.12	0.00	-504.67	0.00	0.00	0.00	0.00	-0.24	0.00
256	RT	Voltage Support	SCE	N/A	1/31/2017	172	No	INC	24	0:00	23:59	-27.24	193565.49	0.00	-494.26	0.00	0.00	0.00	0.00	-1.04	0.00
257	RT	Voltage Support	SCE	N/A	2/1/2017	172	No	INC	24	0:00	23:59	2.57	148203.60	0.00	43.37	0.00	0.00	0.00	0.00	-1.75	0.00
258	RT	Voltage Support	PG&E	Fresno	1/19/2017	380	No	INC	1	9:08	9:19	47.67	0.00	0.00	-2052.69	49.42	-2110.01	0.00	0.00	0.00	0.00
259	RT	Voltage Support	PG&E	Fresno	1/26/2017	-312	No	DEC	1	14:35	14:59	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
260	RT	Voltage Support	SCE	N/A	1/30/2017	172	No	INC	6	18:30	23:59	8.40	6564.12	0.00	-257.68	0.00	0.00	0.00	0.00	-0.01	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 costs⁷. 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 (PG&E) 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 PG&E 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 PG&E 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 January, this resource was issued exceptional dispatch instructions in 938 five-minute intervals. This resource was eligible to set the LMP in 597 intervals. Out of the 597 intervals, resource calculated LMP was larger than the market LMP in 365 intervals. In the 365 intervals, the average increase in five minute LMP was \$10.31/MWh. Out of the 597 intervals, resource calculated LMP was less than the market LMP in 232 intervals. In the 232 intervals, the average decrease in five minute LMP was \$9.71/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 \$2.53/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 January, this resource was issued exceptional dispatch instructions in 252 five-minute intervals. This resource was eligible to set the LMP in 222 intervals. Out of the 222 intervals, resource calculated LMP was larger than the market LMP in 157 intervals. In the 157 intervals, the average increase in five minute LMP was \$12.18/MWh. Out of the 222 intervals, resource calculated LMP was less than the market LMP in 65 intervals. In the 65 intervals, the average decrease in five minute LMP was \$20.67/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 increase of \$2.56/MWh

Table 8: Price Impact Analysis Information for Pricing Node A in PG&E LAP

Department of Market Quality and Renewable Integration – California ISO

Number	Trade Date	Trade Hour	Interval	Market LMP	Eligible Flag	Calculated LMP	Change in LMP
1	1/2/2017	9	1	35.75	Yes	41.19	5.44
2	1/2/2017	9	2	36.26	Yes	41.19	4.93
3	1/2/2017	9	3	36.44	Yes	41.19	4.75
4	1/2/2017	9	4	37.35	Yes	41.19	3.84
5	1/2/2017	9	5	37.35	Yes	41.19	3.84
6	1/2/2017	9	6	37.19	Yes	41.19	4.00
7	1/2/2017	9	7	37.28	Yes	41.19	3.91
8	1/2/2017	9	8	37.37	Yes	41.19	3.82
9	1/2/2017	9	9	37.28	Yes	41.19	3.91
10	1/2/2017	9	10	35.73	Yes	41.19	5.46
11	1/2/2017	9	11	35.73	Yes	41.19	5.46
12	1/2/2017	9	12	33.97	Yes	41.19	7.22
13	1/2/2017	11	1	41.71	Yes	41.19	-0.52
14	1/2/2017	11	2	41.82	Yes	41.19	-0.63
15	1/2/2017	11	3	42.06	Yes	41.19	-0.87
16	1/2/2017	11	4	49.84	Yes	41.19	-8.65
17	1/2/2017	11	5	51.22	Yes	41.19	-10.03
18	1/2/2017	11	6	42.92	Yes	41.19	-1.73
19	1/2/2017	11	7	35.00	Yes	41.19	6.19
20	1/2/2017	11	8	37.67	Yes	41.19	3.52
21	1/2/2017	11	9	41.52	Yes	41.19	-0.33
22	1/2/2017	11	10	56.93	Yes	41.19	-15.74
23	1/2/2017	11	11	92.04	Yes	41.19	-50.85
24	1/2/2017	11	12	73.31	Yes	41.19	-32.12
25	1/2/2017	16	1	46.68	Yes	41.19	-5.49
26	1/2/2017	16	2	47.79	Yes	41.19	-6.60
27	1/2/2017	16	3	51.54	Yes	41.19	-10.35
28	1/2/2017	16	4	44.23	Yes	41.19	-3.04
29	1/2/2017	16	5	43.72	Yes	41.19	-2.53
30	1/2/2017	16	6	36.75	Yes	41.19	4.44
31	1/2/2017	16	7	31.52	Yes	41.19	9.67
32	1/2/2017	16	8	34.25	Yes	41.19	6.94
33	1/2/2017	16	9	37.21	Yes	41.19	3.98
34	1/2/2017	16	10	54.21	Yes	41.19	-13.02
35	1/2/2017	16	11	54.21	Yes	41.19	-13.02
36	1/2/2017	16	12	46.35	Yes	41.19	-5.16
37	1/2/2017	17	1	31.44	No	41.19	9.75
38	1/2/2017	17	2	31.48	No	41.19	9.71
39	1/2/2017	17	3	33.34	No	41.19	7.85
40	1/2/2017	17	4	32.25	No	41.19	8.94
41	1/2/2017	17	5	33.23	No	41.19	7.96
42	1/2/2017	17	6	34.31	No	41.19	6.88
43	1/2/2017	17	7	36.52	No	41.19	4.67
44	1/2/2017	17	8	37.65	No	41.19	3.54
45	1/2/2017	17	9	46.19	No	41.19	-5.00

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46	1/2/2017	17	10	62.60	No	41.19	-21.41
47	1/2/2017	17	11	1115.00	No	41.19	-1073.81
48	1/2/2017	17	12	1115.00	No	41.19	-1073.81
49	1/2/2017	20	1	46.08	Yes	41.19	-4.89
50	1/2/2017	20	2	43.98	Yes	41.19	-2.79
51	1/2/2017	20	3	37.92	Yes	41.19	3.27
52	1/2/2017	20	4	35.10	Yes	41.19	6.09
53	1/2/2017	20	5	35.10	Yes	41.19	6.09
54	1/2/2017	20	6	35.16	Yes	41.19	6.03
55	1/2/2017	20	7	35.16	Yes	41.19	6.03
56	1/2/2017	20	8	35.40	Yes	41.19	5.79
57	1/2/2017	20	9	35.40	Yes	41.19	5.79
58	1/2/2017	20	10	38.68	Yes	41.19	2.51
59	1/2/2017	20	11	38.83	Yes	41.19	2.36
60	1/2/2017	20	12	38.13	Yes	41.19	3.06
61	1/5/2017	8	1	36.94	No	37.32	0.38
62	1/5/2017	8	2	33.02	No	37.32	4.30
63	1/5/2017	8	3	31.63	No	37.32	5.69
64	1/5/2017	8	4	31.17	No	37.32	6.15
65	1/5/2017	8	5	32.04	No	37.32	5.28
66	1/5/2017	8	6	31.81	No	37.32	5.51
67	1/5/2017	8	7	34.87	No	37.32	2.45
68	1/5/2017	8	8	33.44	No	37.32	3.88
69	1/5/2017	8	9	32.31	No	37.32	5.01
70	1/5/2017	8	10	28.84	No	37.32	8.48
71	1/5/2017	8	11	28.84	No	37.32	8.48
72	1/5/2017	8	12	31.71	No	37.32	5.61
73	1/5/2017	20	1	39.28	Yes	37.32	-1.96
74	1/5/2017	20	2	37.32	Yes	37.32	0.00
75	1/5/2017	20	3	36.28	Yes	37.32	1.04
76	1/5/2017	20	4	38.47	Yes	37.32	-1.15
77	1/5/2017	20	5	36.50	Yes	37.32	0.82
78	1/5/2017	20	6	37.59	Yes	37.32	-0.27
79	1/5/2017	20	7	37.72	Yes	37.32	-0.40
80	1/5/2017	20	8	37.76	Yes	37.32	-0.44
81	1/5/2017	20	9	38.00	Yes	37.32	-0.68
82	1/5/2017	20	10	37.21	Yes	37.32	0.11
83	1/5/2017	20	11	40.88	Yes	37.32	-3.56
84	1/5/2017	20	12	37.72	Yes	37.32	-0.40
85	1/5/2017	21	1	35.51	Yes	37.32	1.81
86	1/5/2017	21	2	40.15	Yes	37.32	-2.83
87	1/5/2017	21	3	38.98	Yes	37.32	-1.66
88	1/5/2017	21	4	40.15	Yes	37.32	-2.83
89	1/5/2017	21	5	37.66	Yes	37.32	-0.34
90	1/5/2017	21	6	35.86	Yes	37.32	1.46
91	1/5/2017	21	7	33.75	Yes	37.32	3.57

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92	1/5/2017	21	8	33.25	Yes	37.32	4.07
93	1/5/2017	21	9	32.25	Yes	37.32	5.07
94	1/5/2017	21	10	32.25	Yes	37.32	5.07
95	1/5/2017	21	11	32.17	Yes	37.32	5.15
96	1/5/2017	21	12	31.89	Yes	37.32	5.43
97	1/6/2017	19	1	34.65	No	36.62	1.97
98	1/6/2017	19	2	34.18	No	36.62	2.44
99	1/6/2017	19	3	36.00	No	36.62	0.62
100	1/6/2017	19	4	37.66	No	36.62	-1.04
101	1/6/2017	19	5	33.10	No	36.62	3.52
102	1/6/2017	19	6	33.10	No	36.62	3.52
103	1/6/2017	19	7	44.49	No	36.62	-7.87
104	1/6/2017	19	8	39.77	No	36.62	-3.15
105	1/6/2017	19	9	41.14	Yes	36.62	-4.52
106	1/6/2017	19	10	34.82	No	36.62	1.80
107	1/6/2017	19	11	33.99	No	36.62	2.63
108	1/6/2017	19	12	33.15	No	36.62	3.47
109	1/7/2017	19	1	38.96	No	36.67	-2.29
110	1/7/2017	19	2	37.49	No	36.67	-0.82
111	1/7/2017	19	3	36.82	No	36.67	-0.15
112	1/7/2017	19	4	35.98	No	36.67	0.69
113	1/7/2017	19	5	35.69	No	36.67	0.98
114	1/7/2017	19	6	37.16	No	36.67	-0.49
115	1/7/2017	19	7	35.87	No	36.67	0.80
116	1/7/2017	19	8	35.62	Yes	36.67	1.05
117	1/7/2017	19	9	34.83	No	36.67	1.84
118	1/7/2017	19	10	35.84	No	36.67	0.83
119	1/7/2017	19	11	35.85	No	36.67	0.82
120	1/7/2017	19	12	35.84	No	36.67	0.83
121	1/7/2017	20	1	40.12	No	36.67	-3.45
122	1/7/2017	20	2	44.69	No	36.67	-8.02
123	1/7/2017	20	3	53.22	No	36.67	-16.55
124	1/7/2017	20	4	46.67	No	36.67	-10.00
125	1/7/2017	20	5	46.67	No	36.67	-10.00
126	1/7/2017	20	6	45.56	No	36.67	-8.89
127	1/7/2017	20	7	44.54	Yes	36.67	-7.87
128	1/7/2017	20	8	44.54	Yes	36.67	-7.87
129	1/7/2017	20	9	41.17	Yes	36.67	-4.50
130	1/7/2017	20	10	38.51	Yes	36.67	-1.84
131	1/7/2017	20	11	40.97	Yes	36.67	-4.30
132	1/7/2017	20	12	38.84	Yes	36.67	-2.17
133	1/7/2017	21	1	42.21	Yes	36.67	-5.54
134	1/7/2017	21	2	39.20	Yes	36.67	-2.53
135	1/7/2017	21	3	42.21	Yes	36.67	-5.54
136	1/7/2017	21	4	53.52	Yes	36.67	-16.85
137	1/7/2017	21	5	48.42	Yes	36.67	-11.75

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138	1/7/2017	21	6	48.42	Yes	36.67	-11.75
139	1/7/2017	21	7	44.06	Yes	36.67	-7.39
140	1/7/2017	21	8	39.87	Yes	36.67	-3.20
141	1/7/2017	21	9	36.28	Yes	36.67	0.39
142	1/7/2017	21	10	37.79	Yes	36.67	-1.12
143	1/7/2017	21	11	38.88	Yes	36.67	-2.21
144	1/7/2017	21	12	38.88	Yes	36.67	-2.21
145	1/7/2017	22	1	38.53	Yes	36.67	-1.86
146	1/7/2017	22	2	47.11	Yes	36.67	-10.44
147	1/7/2017	22	3	44.15	Yes	36.67	-7.48
148	1/7/2017	22	4	47.77	Yes	36.67	-11.10
149	1/7/2017	22	5	45.40	Yes	36.67	-8.73
150	1/7/2017	22	6	43.06	Yes	36.67	-6.39
151	1/7/2017	22	7	44.23	Yes	36.67	-7.56
152	1/7/2017	22	8	41.62	Yes	36.67	-4.95
153	1/7/2017	22	9	37.39	Yes	36.67	-0.72
154	1/7/2017	22	10	36.93	Yes	36.67	-0.26
155	1/7/2017	22	11	37.56	Yes	36.67	-0.89
156	1/7/2017	22	12	37.56	Yes	36.67	-0.89
157	1/8/2017	11	10	0.01	Yes	36.7	36.69
158	1/8/2017	11	11	0.10	Yes	36.7	36.60
159	1/8/2017	11	12	0.01	Yes	36.7	36.69
160	1/8/2017	12	1	24.68	Yes	36.7	12.02
161	1/8/2017	12	2	23.66	Yes	36.7	13.04
162	1/8/2017	12	3	24.46	Yes	36.7	12.24
163	1/8/2017	12	4	22.96	Yes	36.7	13.74
164	1/8/2017	12	5	0.01	Yes	36.7	36.69
165	1/8/2017	12	6	-9.93	Yes	36.7	46.63
166	1/8/2017	12	7	-10.03	Yes	36.7	46.73
167	1/8/2017	12	8	-14.23	Yes	36.7	50.93
168	1/8/2017	12	9	0.01	Yes	36.7	36.69
169	1/8/2017	12	10	0.01	Yes	36.7	36.69
170	1/8/2017	12	11	0.01	Yes	36.7	36.69
171	1/8/2017	12	12	0.01	Yes	36.7	36.69
172	1/8/2017	21	1	43.26	Yes	36.7	-6.56
173	1/8/2017	21	2	42.74	Yes	36.7	-6.04
174	1/8/2017	21	3	44.46	Yes	36.7	-7.76
175	1/8/2017	21	4	46.17	Yes	36.7	-9.47
176	1/8/2017	21	5	45.29	Yes	36.7	-8.59
177	1/8/2017	21	6	40.89	Yes	36.7	-4.19
178	1/8/2017	21	7	37.46	Yes	36.7	-0.76
179	1/8/2017	21	8	37.22	Yes	36.7	-0.52
180	1/8/2017	21	9	36.90	Yes	36.7	-0.20
181	1/8/2017	21	10	35.14	Yes	36.7	1.56
182	1/8/2017	21	11	37.89	Yes	36.7	-1.19
183	1/8/2017	21	12	37.89	Yes	36.7	-1.19

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184	1/8/2017	22	1	39.21	Yes	36.7	-2.51
185	1/8/2017	22	2	42.43	Yes	36.7	-5.73
186	1/8/2017	22	3	41.64	Yes	36.7	-4.94
187	1/8/2017	22	4	37.82	Yes	36.7	-1.12
188	1/8/2017	22	5	37.71	Yes	36.7	-1.01
189	1/8/2017	22	6	37.70	Yes	36.7	-1.00
190	1/9/2017	20	1	35.00	Yes	36.7	1.70
191	1/9/2017	20	2	35.00	Yes	36.7	1.70
192	1/9/2017	20	3	35.62	Yes	36.7	1.08
193	1/9/2017	20	4	36.73	Yes	36.7	-0.03
194	1/9/2017	20	5	32.99	Yes	36.7	3.71
195	1/9/2017	20	6	34.70	Yes	36.7	2.00
196	1/9/2017	20	7	32.34	Yes	36.7	4.36
197	1/9/2017	20	8	32.50	Yes	36.7	4.20
198	1/9/2017	20	9	34.70	Yes	36.7	2.00
199	1/9/2017	20	10	32.51	Yes	36.7	4.19
200	1/9/2017	20	11	34.70	Yes	36.7	2.00
201	1/9/2017	20	12	31.63	Yes	36.7	5.07
202	1/10/2017	23	1	21.46	Yes	35.78	14.32
203	1/10/2017	23	2	23.82	Yes	35.78	11.96
204	1/10/2017	23	3	24.70	Yes	35.78	11.08
205	1/10/2017	23	4	24.42	Yes	35.78	11.36
206	1/10/2017	23	5	24.42	Yes	35.78	11.36
207	1/10/2017	23	6	24.18	Yes	35.78	11.60
208	1/10/2017	23	7	22.07	Yes	35.78	13.71
209	1/10/2017	23	8	16.94	Yes	35.78	18.84
210	1/10/2017	23	9	5.01	Yes	35.78	30.77
211	1/10/2017	23	10	3.00	Yes	35.78	32.78
212	1/10/2017	23	11	5.01	Yes	35.78	30.77
213	1/10/2017	23	12	13.11	Yes	35.78	22.67
214	1/11/2017	23	1	39.73	No	36.54	-3.19
215	1/11/2017	23	2	39.73	No	36.54	-3.19
216	1/11/2017	23	3	39.73	No	36.54	-3.19
217	1/11/2017	23	4	40.39	No	36.54	-3.85
218	1/11/2017	23	5	34.84	No	36.54	1.70
219	1/11/2017	23	6	40.93	No	36.54	-4.39
220	1/11/2017	23	7	38.34	No	36.54	-1.80
221	1/11/2017	23	9	33.52	Yes	36.54	3.02
222	1/11/2017	23	11	32.49	No	36.54	4.05
223	1/11/2017	23	12	32.23	No	36.54	4.31
224	1/11/2017	24	1	30.79	Yes	36.54	5.75
225	1/11/2017	24	2	31.28	Yes	36.54	5.26
226	1/11/2017	24	3	32.95	Yes	36.54	3.59
227	1/11/2017	24	4	32.22	No	36.54	4.32
228	1/11/2017	24	5	30.49	No	36.54	6.05
229	1/11/2017	24	6	30.00	No	36.54	6.54

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230	1/11/2017	24	7	30.02	No	36.54	6.52
231	1/11/2017	24	8	29.21	No	36.54	7.33
232	1/11/2017	24	9	29.14	No	36.54	7.40
233	1/11/2017	24	10	27.87	No	36.54	8.67
234	1/11/2017	24	11	27.94	No	36.54	8.60
235	1/11/2017	24	12	28.90	No	36.54	7.64
236	1/12/2017	1	1	29.82	No	37.16	7.34
237	1/12/2017	1	2	30.19	No	37.16	6.97
238	1/12/2017	1	3	30.33	No	37.16	6.83
239	1/12/2017	1	4	30.67	No	37.16	6.49
240	1/12/2017	1	5	30.38	No	37.16	6.78
241	1/12/2017	1	6	30.32	No	37.16	6.84
242	1/12/2017	1	7	30.23	No	37.16	6.93
243	1/12/2017	1	8	29.62	No	37.16	7.54
244	1/12/2017	1	9	30.69	No	37.16	6.47
245	1/12/2017	1	10	30.04	No	37.16	7.12
246	1/12/2017	1	11	30.04	No	37.16	7.12
247	1/12/2017	1	12	30.26	No	37.16	6.90
248	1/12/2017	7	1	28.15	No	37.16	9.01
249	1/12/2017	7	2	27.80	No	37.16	9.36
250	1/12/2017	7	3	28.88	No	37.16	8.28
251	1/12/2017	7	4	30.08	No	37.16	7.08
252	1/12/2017	7	5	31.35	No	37.16	5.81
253	1/12/2017	7	6	31.71	No	37.16	5.45
254	1/12/2017	7	7	31.58	No	37.16	5.58
255	1/12/2017	7	8	33.03	No	37.16	4.13
256	1/12/2017	7	9	36.34	No	37.16	0.82
257	1/12/2017	7	10	34.97	No	37.16	2.19
258	1/12/2017	7	11	37.66	No	37.16	-0.50
259	1/12/2017	7	12	37.92	No	37.16	-0.76
260	1/12/2017	8	1	39.74	No	37.16	-2.58
261	1/12/2017	8	2	39.96	No	37.16	-2.80
262	1/12/2017	8	3	39.74	No	37.16	-2.58
263	1/12/2017	8	4	39.89	No	37.16	-2.73
264	1/12/2017	8	5	44.27	No	37.16	-7.11
265	1/12/2017	8	6	43.00	No	37.16	-5.84
266	1/12/2017	8	7	41.67	No	37.16	-4.51
267	1/12/2017	8	8	41.83	No	37.16	-4.67
268	1/12/2017	8	9	40.63	No	37.16	-3.47
269	1/12/2017	8	10	38.03	No	37.16	-0.87
270	1/12/2017	8	11	39.17	No	37.16	-2.01
271	1/12/2017	8	12	37.27	No	37.16	-0.11
272	1/12/2017	11	7	46.07	No	37.16	-8.91
273	1/12/2017	11	8	42.31	No	37.16	-5.15
274	1/12/2017	22	1	31.51	No	37.16	5.65
275	1/12/2017	22	2	30.52	No	37.16	6.64

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276	1/12/2017	22	3	31.09	No	37.16	6.07
277	1/12/2017	22	4	30.24	No	37.16	6.92
278	1/12/2017	22	5	30.59	No	37.16	6.57
279	1/12/2017	22	6	29.87	No	37.16	7.29
280	1/12/2017	22	7	28.31	No	37.16	8.85
281	1/12/2017	22	8	28.29	No	37.16	8.87
282	1/12/2017	22	9	28.29	No	37.16	8.87
283	1/12/2017	22	10	28.31	No	37.16	8.85
284	1/12/2017	22	11	28.51	No	37.16	8.65
285	1/12/2017	22	12	28.51	No	37.16	8.65
286	1/13/2017	12	8	40.06	Yes	37.74	-2.32
287	1/13/2017	12	10	36.31	Yes	37.74	1.43
288	1/13/2017	12	11	35.87	Yes	37.74	1.87
289	1/13/2017	12	12	35.87	Yes	37.74	1.87
290	1/15/2017	12	1	25.33	Yes	38.05	12.72
291	1/15/2017	12	2	25.69	Yes	38.05	12.36
292	1/15/2017	12	3	24.98	Yes	38.05	13.07
293	1/15/2017	12	4	24.98	Yes	38.05	13.07
294	1/15/2017	12	5	25.30	Yes	38.05	12.75
295	1/15/2017	12	6	25.67	Yes	38.05	12.38
296	1/15/2017	12	7	25.63	Yes	38.05	12.42
297	1/15/2017	12	8	25.39	Yes	38.05	12.66
298	1/15/2017	12	9	25.39	Yes	38.05	12.66
299	1/15/2017	12	10	25.42	Yes	38.05	12.63
300	1/15/2017	12	11	25.31	Yes	38.05	12.74
301	1/15/2017	12	12	25.18	Yes	38.05	12.87
302	1/15/2017	21	1	47.75	Yes	38.05	-9.70
303	1/15/2017	21	2	50.00	Yes	38.05	-11.95
304	1/15/2017	21	3	50.00	Yes	38.05	-11.95
305	1/15/2017	21	4	52.63	Yes	38.05	-14.58
306	1/15/2017	21	5	47.47	Yes	38.05	-9.42
307	1/15/2017	21	6	45.42	Yes	38.05	-7.37
308	1/15/2017	21	7	43.25	Yes	38.05	-5.20
309	1/15/2017	21	8	42.41	Yes	38.05	-4.36
310	1/15/2017	21	9	38.99	Yes	38.05	-0.94
311	1/15/2017	21	10	39.06	Yes	38.05	-1.01
312	1/15/2017	21	11	39.04	Yes	38.05	-0.99
313	1/15/2017	21	12	40.60	Yes	38.05	-2.55
314	1/17/2017	7	1	35.41	Yes	38.05	2.64
315	1/17/2017	7	2	39.72	Yes	38.05	-1.67
316	1/17/2017	7	3	39.61	Yes	38.05	-1.56
317	1/17/2017	7	4	39.68	Yes	38.05	-1.63
318	1/17/2017	7	5	56.22	Yes	38.05	-18.17
319	1/17/2017	7	6	54.28	Yes	38.05	-16.23
320	1/17/2017	7	7	46.59	Yes	38.05	-8.54
321	1/17/2017	7	8	47.57	Yes	38.05	-9.52

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322	1/17/2017	7	9	51.03	Yes	38.05	-12.98
323	1/17/2017	7	10	48.30	Yes	38.05	-10.25
324	1/17/2017	7	11	50.91	Yes	38.05	-12.86
325	1/17/2017	7	12	52.21	Yes	38.05	-14.16
326	1/17/2017	14	1	30.57	No	38.05	7.48
327	1/17/2017	14	2	19.08	No	38.05	18.97
328	1/17/2017	14	3	25.87	No	38.05	12.18
329	1/17/2017	14	4	20.44	No	38.05	17.61
330	1/17/2017	14	5	23.39	No	38.05	14.66
331	1/17/2017	14	6	26.92	No	38.05	11.13
332	1/17/2017	14	7	24.58	No	38.05	13.47
333	1/17/2017	14	8	24.58	No	38.05	13.47
334	1/17/2017	14	9	23.14	No	38.05	14.91
335	1/17/2017	14	10	24.50	No	38.05	13.55
336	1/17/2017	14	11	26.69	No	38.05	11.36
337	1/17/2017	14	12	24.69	No	38.05	13.36
338	1/17/2017	18	8	42.18	No	38.05	-4.13
339	1/17/2017	18	9	49.33	No	38.05	-11.28
340	1/17/2017	18	10	78.96	No	38.05	-40.91
341	1/17/2017	19	1	39.86	No	38.05	-1.81
342	1/17/2017	19	2	38.38	No	38.05	-0.33
343	1/17/2017	19	3	38.75	No	38.05	-0.70
344	1/17/2017	19	4	38.37	Yes	38.05	-0.32
345	1/17/2017	19	5	38.75	Yes	38.05	-0.70
346	1/17/2017	19	6	38.75	Yes	38.05	-0.70
347	1/17/2017	19	7	38.75	Yes	38.05	-0.70
348	1/17/2017	19	8	38.88	Yes	38.05	-0.83
349	1/17/2017	19	9	39.35	Yes	38.05	-1.30
350	1/17/2017	19	10	39.66	Yes	38.05	-1.61
351	1/17/2017	19	11	38.37	Yes	38.05	-0.32
352	1/17/2017	19	12	38.37	Yes	38.05	-0.32
353	1/17/2017	20	1	38.75	Yes	38.05	-0.70
354	1/17/2017	20	2	38.37	Yes	38.05	-0.32
355	1/17/2017	20	3	38.18	Yes	38.05	-0.13
356	1/17/2017	20	4	38.37	Yes	38.05	-0.32
357	1/17/2017	20	5	38.44	Yes	38.05	-0.39
358	1/17/2017	20	6	39.81	Yes	38.05	-1.76
359	1/17/2017	20	7	38.90	Yes	38.05	-0.85
360	1/17/2017	20	8	39.82	Yes	38.05	-1.77
361	1/17/2017	20	9	39.59	Yes	38.05	-1.54
362	1/17/2017	20	10	38.92	Yes	38.05	-0.87
363	1/17/2017	20	11	38.65	Yes	38.05	-0.60
364	1/17/2017	20	12	38.18	Yes	38.05	-0.13
365	1/17/2017	22	8	38.86	No	38.05	-0.81
366	1/17/2017	22	9	38.14	No	38.05	-0.09
367	1/17/2017	22	10	40.07	No	38.05	-2.02

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368	1/17/2017	22	11	39.61	No	38.05	-1.56
369	1/17/2017	22	12	38.93	No	38.05	-0.88
370	1/17/2017	24	1	32.56	Yes	38.05	5.49
371	1/17/2017	24	2	33.01	Yes	38.05	5.04
372	1/17/2017	24	3	33.22	Yes	38.05	4.83
373	1/17/2017	24	4	34.24	Yes	38.05	3.81
374	1/17/2017	24	5	33.77	Yes	38.05	4.28
375	1/17/2017	24	6	33.77	Yes	38.05	4.28
376	1/17/2017	24	7	33.17	Yes	38.05	4.88
377	1/17/2017	24	8	32.93	Yes	38.05	5.12
378	1/17/2017	24	9	32.61	Yes	38.05	5.44
379	1/17/2017	24	10	30.87	Yes	38.05	7.18
380	1/17/2017	24	11	30.76	Yes	38.05	7.29
381	1/17/2017	24	12	29.41	Yes	38.05	8.64
382	1/18/2017	1	1	31.44	Yes	38.01	6.57
383	1/18/2017	1	2	33.88	Yes	38.01	4.13
384	1/18/2017	1	3	36.49	Yes	38.01	1.52
385	1/18/2017	1	4	39.31	Yes	38.01	-1.30
386	1/18/2017	1	5	39.41	Yes	38.01	-1.40
387	1/18/2017	1	6	39.23	Yes	38.01	-1.22
388	1/18/2017	1	7	34.10	Yes	38.01	3.91
389	1/18/2017	1	8	34.10	Yes	38.01	3.91
390	1/18/2017	1	9	33.90	Yes	38.01	4.11
391	1/18/2017	1	10	32.85	Yes	38.01	5.16
392	1/18/2017	1	11	32.29	Yes	38.01	5.72
393	1/18/2017	1	12	31.96	Yes	38.01	6.05
394	1/18/2017	9	1	26.45	Yes	38.01	11.56
395	1/18/2017	9	2	25.78	Yes	38.01	12.23
396	1/18/2017	9	3	25.64	Yes	38.01	12.37
397	1/18/2017	9	4	24.88	Yes	38.01	13.13
398	1/18/2017	9	5	21.99	Yes	38.01	16.02
399	1/18/2017	9	6	20.80	Yes	38.01	17.21
400	1/18/2017	9	7	5.58	Yes	38.01	32.43
401	1/18/2017	9	8	0.01	Yes	38.01	38.00
402	1/18/2017	9	9	0.01	Yes	38.01	38.00
403	1/18/2017	9	10	-10.15	Yes	38.01	48.16
404	1/18/2017	9	11	-10.15	Yes	38.01	48.16
405	1/18/2017	9	12	-15.22	Yes	38.01	53.23
406	1/18/2017	12	1	34.20	Yes	38.01	3.81
407	1/18/2017	12	2	34.61	Yes	38.01	3.40
408	1/18/2017	12	3	34.85	Yes	38.01	3.16
409	1/18/2017	12	4	33.58	Yes	38.01	4.43
410	1/18/2017	12	5	33.55	Yes	38.01	4.46
411	1/18/2017	12	6	33.38	Yes	38.01	4.63
412	1/18/2017	12	7	33.90	Yes	38.01	4.11
413	1/18/2017	12	8	32.39	Yes	38.01	5.62

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414	1/18/2017	12	9	31.63	Yes	38.01	6.38
415	1/18/2017	12	10	30.07	Yes	38.01	7.94
416	1/18/2017	12	11	18.53	Yes	38.01	19.48
417	1/18/2017	12	12	27.84	Yes	38.01	10.17
418	1/18/2017	17	1	26.41	Yes	38.01	11.60
419	1/18/2017	17	2	25.40	Yes	38.01	12.61
420	1/18/2017	17	3	24.65	Yes	38.01	13.36
421	1/18/2017	17	4	24.99	Yes	38.01	13.02
422	1/18/2017	17	5	24.61	Yes	38.01	13.40
423	1/18/2017	17	6	25.76	Yes	38.01	12.25
424	1/18/2017	17	7	26.40	Yes	38.01	11.61
425	1/18/2017	17	8	28.55	Yes	38.01	9.46
426	1/18/2017	17	9	29.77	Yes	38.01	8.24
427	1/18/2017	17	10	37.45	Yes	38.01	0.56
428	1/18/2017	17	11	37.43	Yes	38.01	0.58
429	1/18/2017	17	12	38.90	Yes	38.01	-0.89
430	1/18/2017	18	1	26.39	Yes	38.01	11.62
431	1/18/2017	18	2	27.89	Yes	38.01	10.13
432	1/18/2017	18	3	29.81	Yes	38.01	8.20
433	1/18/2017	18	4	33.05	Yes	38.01	4.96
434	1/18/2017	18	5	40.28	Yes	38.01	-2.27
435	1/18/2017	18	6	38.18	Yes	38.01	-0.17
436	1/18/2017	18	7	40.47	Yes	38.01	-2.46
437	1/18/2017	18	8	39.17	Yes	38.01	-1.16
438	1/18/2017	18	9	33.85	Yes	38.01	4.16
439	1/18/2017	18	10	32.86	Yes	38.01	5.15
440	1/18/2017	18	11	32.86	Yes	38.01	5.15
441	1/18/2017	18	12	32.46	Yes	38.01	5.55
442	1/18/2017	19	1	32.03	Yes	38.01	5.98
443	1/18/2017	19	2	29.87	Yes	38.01	8.14
444	1/18/2017	19	3	29.87	Yes	38.01	8.14
445	1/18/2017	19	4	29.87	Yes	38.01	8.14
446	1/18/2017	19	5	29.16	Yes	38.01	8.85
447	1/18/2017	19	6	29.03	Yes	38.01	8.98
448	1/18/2017	19	7	40.58	Yes	38.01	-2.57
449	1/18/2017	19	8	45.44	Yes	38.01	-7.43
450	1/18/2017	19	9	48.25	Yes	38.01	-10.24
451	1/18/2017	19	10	38.18	Yes	38.01	-0.17
452	1/18/2017	19	11	36.77	Yes	38.01	1.24
453	1/18/2017	19	12	35.07	Yes	38.01	2.94
454	1/18/2017	20	1	30.62	Yes	38.01	7.39
455	1/18/2017	20	2	30.29	Yes	38.01	7.72
456	1/18/2017	20	3	30.29	Yes	38.01	7.72
457	1/18/2017	20	4	30.22	Yes	38.01	7.79
458	1/18/2017	20	5	29.72	Yes	38.01	8.29
459	1/18/2017	20	6	28.87	Yes	38.01	9.14

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460	1/18/2017	20	7	34.57	Yes	38.01	3.44
461	1/18/2017	20	8	34.43	Yes	38.01	3.58
462	1/18/2017	20	9	35.02	Yes	38.01	2.99
463	1/18/2017	20	10	35.68	Yes	38.01	2.33
464	1/18/2017	20	11	35.36	Yes	38.01	2.65
465	1/18/2017	20	12	34.67	Yes	38.01	3.34
466	1/18/2017	22	1	40.62	Yes	38.01	-2.61
467	1/18/2017	22	2	40.62	Yes	38.01	-2.61
468	1/18/2017	22	3	39.26	Yes	38.01	-1.25
469	1/18/2017	22	4	38.32	No	38.01	-0.31
470	1/18/2017	22	5	38.19	No	38.01	-0.18
471	1/18/2017	22	6	36.96	No	38.01	1.05
472	1/18/2017	22	7	35.17	Yes	38.01	2.84
473	1/18/2017	22	8	32.76	Yes	38.01	5.25
474	1/18/2017	22	9	32.19	Yes	38.01	5.82
475	1/18/2017	22	10	31.91	Yes	38.01	6.10
476	1/18/2017	22	11	32.12	Yes	38.01	5.89
477	1/18/2017	22	12	31.31	Yes	38.01	6.70
478	1/18/2017	23	1	33.36	No	38.01	4.65
479	1/18/2017	23	2	34.35	No	38.01	3.66
480	1/18/2017	23	3	45.69	No	38.01	-7.68
481	1/18/2017	23	4	39.10	Yes	38.01	-1.09
482	1/18/2017	23	5	40.37	Yes	38.01	-2.36
483	1/18/2017	23	6	39.10	Yes	38.01	-1.09
484	1/18/2017	23	7	36.10	Yes	38.01	1.91
485	1/18/2017	23	8	34.20	Yes	38.01	3.81
486	1/18/2017	23	9	33.21	Yes	38.01	4.80
487	1/18/2017	23	10	32.51	Yes	38.01	5.50
488	1/18/2017	23	11	32.51	Yes	38.01	5.50
489	1/18/2017	23	12	32.51	Yes	38.01	5.50
490	1/18/2017	24	1	34.68	Yes	38.01	3.33
491	1/18/2017	24	2	34.27	Yes	38.01	3.74
492	1/18/2017	24	3	34.68	Yes	38.01	3.33
493	1/18/2017	24	4	34.70	Yes	38.01	3.31
494	1/18/2017	24	5	36.35	Yes	38.01	1.66
495	1/18/2017	24	6	34.76	Yes	38.01	3.25
496	1/18/2017	24	7	31.65	Yes	38.01	6.36
497	1/18/2017	24	8	30.94	Yes	38.01	7.07
498	1/18/2017	24	9	29.46	Yes	38.01	8.55
499	1/18/2017	24	10	30.99	Yes	38.01	7.02
500	1/18/2017	24	11	30.96	Yes	38.01	7.05
501	1/18/2017	24	12	30.84	Yes	38.01	7.17
502	1/19/2017	1	1	30.44	Yes	37.72	7.28
503	1/19/2017	1	2	33.75	Yes	37.72	3.97
504	1/19/2017	1	3	35.01	Yes	37.72	2.71
505	1/19/2017	1	4	35.20	Yes	37.72	2.52

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506	1/19/2017	1	5	33.96	Yes	37.72	3.76
507	1/19/2017	1	6	33.96	Yes	37.72	3.76
508	1/19/2017	1	7	33.79	Yes	37.72	3.93
509	1/19/2017	1	8	34.01	Yes	37.72	3.71
510	1/19/2017	1	9	35.07	Yes	37.72	2.65
511	1/19/2017	1	10	34.03	Yes	37.72	3.69
512	1/19/2017	1	11	34.23	Yes	37.72	3.49
513	1/19/2017	1	12	34.03	Yes	37.72	3.69
514	1/19/2017	14	11	23.29	No	37.72	14.43
515	1/19/2017	14	12	21.06	No	37.72	16.66
516	1/19/2017	15	1	25.37	Yes	37.72	12.35
517	1/19/2017	15	2	26.30	Yes	37.72	11.42
518	1/19/2017	15	3	26.27	Yes	37.72	11.45
519	1/19/2017	15	4	24.64	Yes	37.72	13.08
520	1/19/2017	15	5	27.17	Yes	37.72	10.55
521	1/19/2017	15	6	25.09	Yes	37.72	12.63
522	1/19/2017	15	7	29.25	Yes	37.72	8.47
523	1/19/2017	15	8	28.60	Yes	37.72	9.12
524	1/19/2017	15	9	29.25	Yes	37.72	8.47
525	1/19/2017	15	10	29.17	Yes	37.72	8.55
526	1/19/2017	15	11	36.18	Yes	37.72	1.54
527	1/19/2017	15	12	34.62	Yes	37.72	3.10
528	1/19/2017	18	1	49.36	Yes	37.72	-11.64
529	1/19/2017	18	2	49.36	Yes	37.72	-11.64
530	1/19/2017	18	3	58.39	Yes	37.72	-20.67
531	1/19/2017	18	4	44.13	Yes	37.72	-6.41
532	1/19/2017	18	5	44.13	Yes	37.72	-6.41
533	1/19/2017	18	6	49.32	Yes	37.72	-11.60
534	1/19/2017	18	7	55.71	Yes	37.72	-17.99
535	1/19/2017	18	8	65.46	Yes	37.72	-27.74
536	1/19/2017	18	9	65.46	Yes	37.72	-27.74
537	1/19/2017	18	10	67.16	Yes	37.72	-29.44
538	1/19/2017	18	11	69.70	Yes	37.72	-31.98
539	1/19/2017	18	12	68.67	Yes	37.72	-30.95
540	1/19/2017	19	1	66.34	No	37.72	-28.62
541	1/19/2017	19	2	66.33	No	37.72	-28.61
542	1/19/2017	19	3	66.34	No	37.72	-28.62
543	1/19/2017	19	4	61.23	No	37.72	-23.51
544	1/19/2017	19	5	56.67	No	37.72	-18.95
545	1/19/2017	19	6	48.99	No	37.72	-11.27
546	1/19/2017	19	7	47.70	No	37.72	-9.98
547	1/19/2017	19	8	48.67	No	37.72	-10.95
548	1/19/2017	19	9	47.37	No	37.72	-9.65
549	1/19/2017	19	10	47.61	No	37.72	-9.89
550	1/19/2017	19	11	47.12	No	37.72	-9.40
551	1/19/2017	19	12	48.78	No	37.72	-11.06

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552	1/19/2017	22	1	38.32	Yes	37.72	-0.60
553	1/19/2017	22	2	41.12	Yes	37.72	-3.40
554	1/19/2017	22	3	42.11	Yes	37.72	-4.39
555	1/19/2017	22	4	40.07	Yes	37.72	-2.35
556	1/19/2017	22	5	39.86	Yes	37.72	-2.14
557	1/19/2017	22	6	37.80	Yes	37.72	-0.08
558	1/19/2017	22	7	37.61	Yes	37.72	0.11
559	1/19/2017	22	8	35.88	Yes	37.72	1.84
560	1/19/2017	22	9	35.53	Yes	37.72	2.19
561	1/19/2017	22	10	34.19	Yes	37.72	3.53
562	1/19/2017	22	11	34.19	Yes	37.72	3.53
563	1/19/2017	22	12	34.51	Yes	37.72	3.21
564	1/19/2017	24	5	34.16	Yes	37.72	3.56
565	1/19/2017	24	6	33.28	Yes	37.72	4.44
566	1/21/2017	23	9	31.58	Yes	37.34	5.76
567	1/21/2017	23	10	33.91	Yes	37.34	3.43
568	1/21/2017	23	11	32.95	Yes	37.34	4.39
569	1/21/2017	23	12	33.91	Yes	37.34	3.43
570	1/22/2017	18	1	23.28	Yes	37.36	14.08
571	1/22/2017	18	2	25.34	Yes	37.36	12.02
572	1/22/2017	18	3	28.56	Yes	37.36	8.80
573	1/22/2017	18	4	31.08	Yes	37.36	6.28
574	1/22/2017	18	5	31.61	Yes	37.36	5.75
575	1/22/2017	18	6	32.91	Yes	37.36	4.45
576	1/22/2017	18	7	33.77	Yes	37.36	3.59
577	1/22/2017	18	8	35.90	Yes	37.36	1.46
578	1/22/2017	18	9	38.03	Yes	37.36	-0.67
579	1/22/2017	18	10	39.53	Yes	37.36	-2.17
580	1/22/2017	18	11	40.88	Yes	37.36	-3.52
581	1/22/2017	18	12	41.80	Yes	37.36	-4.44
582	1/22/2017	20	1	41.47	No	37.36	-4.11
583	1/22/2017	20	2	41.47	No	37.36	-4.11
584	1/22/2017	20	3	40.30	No	37.36	-2.94
585	1/22/2017	20	4	38.91	No	37.36	-1.55
586	1/22/2017	20	5	38.91	No	37.36	-1.55
587	1/22/2017	20	6	38.81	No	37.36	-1.45
588	1/22/2017	20	7	38.60	No	37.36	-1.24
589	1/22/2017	20	8	37.40	No	37.36	-0.04
590	1/22/2017	20	9	36.62	No	37.36	0.74
591	1/22/2017	20	10	36.49	No	37.36	0.87
592	1/22/2017	20	11	36.64	No	37.36	0.72
593	1/22/2017	20	12	36.64	No	37.36	0.72
594	1/22/2017	22	1	40.71	Yes	37.36	-3.35
595	1/22/2017	22	2	41.87	Yes	37.36	-4.51
596	1/22/2017	22	3	42.95	Yes	37.36	-5.59
597	1/22/2017	22	4	45.17	Yes	37.36	-7.81

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598	1/22/2017	22	5	42.58	Yes	37.36	-5.22
599	1/22/2017	22	6	40.02	Yes	37.36	-2.66
600	1/22/2017	22	7	41.51	Yes	37.36	-4.15
601	1/22/2017	22	8	37.28	Yes	37.36	0.08
602	1/22/2017	22	9	36.92	Yes	37.36	0.44
603	1/22/2017	22	10	35.82	Yes	37.36	1.54
604	1/22/2017	22	11	36.58	Yes	37.36	0.78
605	1/22/2017	22	12	35.68	Yes	37.36	1.68
606	1/22/2017	23	1	40.02	No	37.36	-2.66
607	1/22/2017	23	2	40.40	No	37.36	-3.04
608	1/22/2017	23	3	38.77	No	37.36	-1.41
609	1/22/2017	23	4	36.49	No	37.36	0.87
610	1/22/2017	23	5	35.84	No	37.36	1.52
611	1/22/2017	23	6	31.04	No	37.36	6.32
612	1/22/2017	23	7	26.97	No	37.36	10.39
613	1/22/2017	23	8	32.28	No	37.36	5.08
614	1/22/2017	23	9	35.43	No	37.36	1.93
615	1/22/2017	23	10	29.57	Yes	37.36	7.79
616	1/22/2017	23	11	30.93	Yes	37.36	6.43
617	1/22/2017	23	12	31.60	Yes	37.36	5.76
618	1/23/2017	9	1	29.12	No	37.36	8.24
619	1/23/2017	9	2	28.08	No	37.36	9.28
620	1/23/2017	9	3	21.66	No	37.36	15.70
621	1/23/2017	9	4	27.99	No	37.36	9.37
622	1/23/2017	9	5	24.05	No	37.36	13.31
623	1/23/2017	9	6	24.54	No	37.36	12.82
624	1/23/2017	9	7	26.94	No	37.36	10.42
625	1/23/2017	9	8	26.82	No	37.36	10.54
626	1/23/2017	9	9	32.38	No	37.36	4.98
627	1/23/2017	9	10	32.44	No	37.36	4.92
628	1/23/2017	9	11	28.40	No	37.36	8.96
629	1/23/2017	9	12	26.76	No	37.36	10.60
630	1/23/2017	19	1	990.10	Yes	37.36	-952.74
631	1/23/2017	19	2	39.64	Yes	37.36	-2.28
632	1/23/2017	19	3	38.05	Yes	37.36	-0.69
633	1/23/2017	19	4	43.68	Yes	37.36	-6.32
634	1/23/2017	19	5	54.36	Yes	37.36	-17.00
635	1/23/2017	19	6	68.21	Yes	37.36	-30.85
636	1/23/2017	19	7	73.19	Yes	37.36	-35.83
637	1/23/2017	19	8	51.57	Yes	37.36	-14.21
638	1/23/2017	19	9	51.57	Yes	37.36	-14.21
639	1/23/2017	19	10	39.57	Yes	37.36	-2.21
640	1/23/2017	19	11	40.07	Yes	37.36	-2.71
641	1/23/2017	19	12	38.78	Yes	37.36	-1.42
642	1/23/2017	20	1	43.02	Yes	37.36	-5.66
643	1/23/2017	20	2	42.86	Yes	37.36	-5.50

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644	1/23/2017	20	3	42.86	Yes	37.36	-5.50
645	1/23/2017	20	4	52.08	Yes	37.36	-14.72
646	1/23/2017	20	5	42.98	Yes	37.36	-5.62
647	1/23/2017	20	6	42.98	Yes	37.36	-5.62
648	1/23/2017	20	7	41.41	Yes	37.36	-4.05
649	1/23/2017	20	8	41.93	Yes	37.36	-4.57
650	1/23/2017	20	9	41.30	Yes	37.36	-3.94
651	1/23/2017	20	10	35.58	Yes	37.36	1.78
652	1/23/2017	20	11	35.58	Yes	37.36	1.78
653	1/23/2017	20	12	32.28	Yes	37.36	5.08
654	1/23/2017	24	7	25.05	Yes	37.36	12.31
655	1/23/2017	24	8	25.36	Yes	37.36	12.00
656	1/23/2017	24	9	25.40	Yes	37.36	11.96
657	1/23/2017	24	10	29.93	Yes	37.36	7.43
658	1/23/2017	24	11	30.27	Yes	37.36	7.09
659	1/23/2017	24	12	30.07	Yes	37.36	7.29
660	1/24/2017	1	1	33.19	Yes	37.21	4.02
661	1/24/2017	1	2	33.44	Yes	37.21	3.77
662	1/24/2017	1	3	34.58	Yes	37.21	2.63
663	1/24/2017	1	4	36.60	Yes	37.21	0.61
664	1/24/2017	1	5	36.63	Yes	37.21	0.58
665	1/24/2017	1	6	36.60	Yes	37.21	0.61
666	1/24/2017	1	7	29.99	Yes	37.21	7.22
667	1/24/2017	1	8	29.53	Yes	37.21	7.68
668	1/24/2017	1	9	29.53	Yes	37.21	7.68
669	1/24/2017	1	10	35.00	Yes	37.21	2.21
670	1/24/2017	1	11	34.79	Yes	37.21	2.42
671	1/24/2017	1	12	34.72	Yes	37.21	2.49
672	1/24/2017	16	1	20.95	No	37.21	16.26
673	1/24/2017	16	2	16.26	No	37.21	20.95
674	1/24/2017	16	3	13.11	No	37.21	24.10
675	1/24/2017	16	4	18.93	No	37.21	18.28
676	1/24/2017	16	5	22.92	No	37.21	14.29
677	1/24/2017	16	6	23.19	No	37.21	14.02
678	1/24/2017	16	7	26.40	No	37.21	10.81
679	1/24/2017	16	8	28.86	No	37.21	8.35
680	1/24/2017	16	9	29.11	No	37.21	8.10
681	1/24/2017	16	10	28.00	No	37.21	9.21
682	1/24/2017	16	11	29.51	No	37.21	7.70
683	1/24/2017	16	12	27.40	No	37.21	9.81
684	1/24/2017	22	1	42.47	No	37.21	-5.26
685	1/24/2017	22	2	37.49	No	37.21	-0.28
686	1/24/2017	22	3	39.63	No	37.21	-2.42
687	1/24/2017	22	4	43.61	No	37.21	-6.40
688	1/24/2017	22	5	41.02	No	37.21	-3.81
689	1/24/2017	22	6	40.66	No	37.21	-3.45

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690	1/24/2017	22	7	40.84	No	37.21	-3.63
691	1/24/2017	22	11	32.56	No	37.21	4.65
692	1/24/2017	22	12	31.94	No	37.21	5.27
693	1/25/2017	7	5	41.00	Yes	37.82	-3.18
694	1/25/2017	7	6	43.88	Yes	37.82	-6.06
695	1/25/2017	16	1	-14.70	No	37.82	52.52
696	1/25/2017	16	2	-14.70	No	37.82	52.52
697	1/25/2017	16	3	-14.70	No	37.82	52.52
698	1/25/2017	16	4	-9.12	No	37.82	46.94
699	1/25/2017	16	5	-9.12	No	37.82	46.94
700	1/25/2017	16	6	11.88	No	37.82	25.94
701	1/25/2017	16	7	13.62	No	37.82	24.20
702	1/25/2017	16	8	16.01	No	37.82	21.81
703	1/25/2017	16	9	28.06	No	37.82	9.76
704	1/25/2017	16	10	28.31	No	37.82	9.51
705	1/25/2017	16	11	30.21	No	37.82	7.61
706	1/25/2017	16	12	30.66	No	37.82	7.16
707	1/25/2017	17	1	18.12	No	37.82	19.70
708	1/25/2017	17	2	8.87	No	37.82	28.95
709	1/25/2017	17	3	12.14	No	37.82	25.68
710	1/25/2017	17	4	19.39	No	37.82	18.43
711	1/25/2017	17	5	23.76	No	37.82	14.06
712	1/25/2017	17	6	28.59	No	37.82	9.23
713	1/25/2017	17	7	30.78	No	37.82	7.04
714	1/25/2017	17	8	31.58	No	37.82	6.24
715	1/25/2017	17	9	32.43	No	37.82	5.39
716	1/25/2017	17	10	32.05	No	37.82	5.77
717	1/25/2017	17	11	31.98	No	37.82	5.84
718	1/25/2017	17	12	32.44	No	37.82	5.38
719	1/25/2017	20	1	43.17	No	37.82	-5.35
720	1/25/2017	20	2	43.17	No	37.82	-5.35
721	1/25/2017	20	3	43.17	No	37.82	-5.35
722	1/25/2017	20	4	37.55	Yes	37.82	0.27
723	1/25/2017	20	5	36.38	Yes	37.82	1.44
724	1/25/2017	20	6	37.51	Yes	37.82	0.31
725	1/25/2017	20	7	38.84	Yes	37.82	-1.02
726	1/25/2017	20	8	37.98	Yes	37.82	-0.16
727	1/25/2017	20	9	34.83	Yes	37.82	2.99
728	1/25/2017	20	10	38.92	Yes	37.82	-1.10
729	1/25/2017	20	11	41.05	Yes	37.82	-3.23
730	1/25/2017	20	12	39.03	Yes	37.82	-1.21
731	1/25/2017	21	1	41.09	Yes	37.82	-3.27
732	1/25/2017	21	2	43.78	Yes	37.82	-5.96
733	1/25/2017	21	3	49.27	Yes	37.82	-11.45
734	1/25/2017	21	4	40.71	Yes	37.82	-2.89
735	1/25/2017	21	5	40.71	Yes	37.82	-2.89

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736	1/25/2017	21	6	40.10	Yes	37.82	-2.28
737	1/25/2017	21	7	40.66	Yes	37.82	-2.84
738	1/25/2017	21	8	40.65	Yes	37.82	-2.83
739	1/25/2017	21	9	40.49	Yes	37.82	-2.67
740	1/25/2017	21	10	41.89	Yes	37.82	-4.07
741	1/25/2017	21	11	42.13	Yes	37.82	-4.31
742	1/25/2017	21	12	35.93	Yes	37.82	1.89
743	1/26/2017	9	12	11.80	Yes	38.04	26.24
744	1/26/2017	10	1	28.85	Yes	38.04	9.19
745	1/26/2017	10	2	31.61	Yes	38.04	6.43
746	1/26/2017	10	3	31.77	Yes	38.04	6.27
747	1/26/2017	10	4	33.98	Yes	38.04	4.06
748	1/26/2017	10	5	33.12	Yes	38.04	4.92
749	1/26/2017	10	6	29.99	Yes	38.04	8.05
750	1/26/2017	10	7	29.37	Yes	38.04	8.67
751	1/26/2017	10	8	29.37	Yes	38.04	8.67
752	1/26/2017	10	9	27.08	Yes	38.04	10.96
753	1/26/2017	10	10	25.40	Yes	38.04	12.64
754	1/26/2017	10	11	26.90	Yes	38.04	11.14
755	1/26/2017	10	12	19.39	Yes	38.04	18.65
756	1/26/2017	12	1	32.18	Yes	38.04	5.86
757	1/26/2017	12	2	33.88	Yes	38.04	4.16
758	1/26/2017	12	3	33.88	Yes	38.04	4.16
759	1/26/2017	12	6	33.88	Yes	38.04	4.16
760	1/26/2017	12	7	33.88	Yes	38.04	4.16
761	1/26/2017	12	8	33.88	Yes	38.04	4.16
762	1/26/2017	12	9	33.88	Yes	38.04	4.16
763	1/26/2017	12	10	33.88	Yes	38.04	4.16
764	1/26/2017	12	11	33.28	Yes	38.04	4.76
765	1/26/2017	12	12	28.42	Yes	38.04	9.62
766	1/26/2017	13	1	33.14	Yes	38.04	4.90
767	1/26/2017	13	2	31.09	Yes	38.04	6.95
768	1/26/2017	13	3	0.23	Yes	38.04	37.81
769	1/26/2017	13	4	0.22	Yes	38.04	37.82
770	1/26/2017	13	5	0.01	Yes	38.04	38.03
771	1/26/2017	13	6	0.01	Yes	38.04	38.03
772	1/26/2017	13	7	0.01	Yes	38.04	38.03
773	1/26/2017	13	8	0.01	Yes	38.04	38.03
774	1/26/2017	13	9	10.79	Yes	38.04	27.25
775	1/26/2017	13	10	30.92	Yes	38.04	7.12
776	1/26/2017	13	11	32.89	Yes	38.04	5.15
777	1/26/2017	13	12	30.74	Yes	38.04	7.30
778	1/26/2017	21	1	38.43	No	38.04	-0.39
779	1/26/2017	21	2	38.39	No	38.04	-0.35
780	1/26/2017	21	3	38.43	No	38.04	-0.39
781	1/26/2017	21	4	38.27	No	38.04	-0.23

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782	1/26/2017	21	5	38.19	No	38.04	-0.15
783	1/26/2017	21	6	38.18	No	38.04	-0.14
784	1/26/2017	21	7	37.40	No	38.04	0.64
785	1/26/2017	21	8	35.92	No	38.04	2.12
786	1/26/2017	21	9	35.89	No	38.04	2.15
787	1/26/2017	21	10	37.09	No	38.04	0.95
788	1/26/2017	21	11	36.96	No	38.04	1.08
789	1/26/2017	21	12	38.04	No	38.04	0.00
790	1/27/2017	1	1	32.36	No	38.77	6.41
791	1/27/2017	1	2	35.89	No	38.77	2.88
792	1/27/2017	1	3	34.89	No	38.77	3.88
793	1/27/2017	1	4	36.46	No	38.77	2.31
794	1/27/2017	1	5	36.29	No	38.77	2.48
795	1/27/2017	1	6	35.83	No	38.77	2.94
796	1/27/2017	1	7	33.43	Yes	38.77	5.34
797	1/27/2017	1	8	32.59	Yes	38.77	6.18
798	1/27/2017	1	9	32.51	Yes	38.77	6.26
799	1/27/2017	1	10	32.37	Yes	38.77	6.40
800	1/27/2017	1	11	32.16	Yes	38.77	6.61
801	1/27/2017	1	12	32.10	Yes	38.77	6.67
802	1/27/2017	10	1	-15.50	Yes	38.77	54.27
803	1/27/2017	10	2	-15.41	Yes	38.77	54.18
804	1/27/2017	10	3	-12.57	Yes	38.77	51.34
805	1/27/2017	10	4	0.00	Yes	38.77	38.77
806	1/27/2017	10	5	10.55	Yes	38.77	28.22
807	1/27/2017	10	6	19.73	Yes	38.77	19.04
808	1/27/2017	10	7	-12.42	Yes	38.77	51.19
809	1/27/2017	10	8	-15.41	Yes	38.77	54.18
810	1/27/2017	10	9	-12.57	Yes	38.77	51.34
811	1/27/2017	10	10	-15.07	Yes	38.77	53.84
812	1/27/2017	10	11	-15.07	Yes	38.77	53.84
813	1/27/2017	10	12	-10.07	Yes	38.77	48.84
814	1/27/2017	22	10	32.84	Yes	38.77	5.93
815	1/27/2017	22	11	33.00	Yes	38.77	5.77
816	1/27/2017	22	12	32.87	Yes	38.77	5.90
817	1/28/2017	19	1	41.94	No	37.8	-4.14
818	1/28/2017	19	2	39.13	No	37.8	-1.33
819	1/28/2017	19	3	38.68	No	37.8	-0.88
820	1/28/2017	19	4	40.67	No	37.8	-2.87
821	1/28/2017	19	5	40.87	No	37.8	-3.07
822	1/28/2017	19	6	39.85	No	37.8	-2.05
823	1/28/2017	19	12	31.80	No	37.8	6.00
824	1/28/2017	20	4	37.28	Yes	37.8	0.52
825	1/28/2017	20	5	35.70	Yes	37.8	2.10
826	1/28/2017	20	6	35.02	Yes	37.8	2.78
827	1/28/2017	20	7	35.09	Yes	37.8	2.71

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828	1/28/2017	20	8	34.84	Yes	37.8	2.96
829	1/28/2017	20	9	35.51	Yes	37.8	2.29
830	1/28/2017	20	10	34.71	Yes	37.8	3.09
831	1/28/2017	20	11	37.80	Yes	37.8	0.00
832	1/28/2017	20	12	37.04	Yes	37.8	0.76
833	1/28/2017	21	1	36.41	Yes	37.8	1.39
834	1/28/2017	21	2	39.22	Yes	37.8	-1.42
835	1/28/2017	21	3	39.14	Yes	37.8	-1.34
836	1/28/2017	21	4	42.52	Yes	37.8	-4.72
837	1/28/2017	21	5	41.11	Yes	37.8	-3.31
838	1/28/2017	21	6	40.31	Yes	37.8	-2.51
839	1/28/2017	21	7	54.47	No	37.8	-16.67
840	1/28/2017	21	8	40.68	No	37.8	-2.88
841	1/28/2017	21	9	40.22	No	37.8	-2.42
842	1/28/2017	21	10	40.77	No	37.8	-2.97
843	1/28/2017	21	11	42.11	No	37.8	-4.31
844	1/28/2017	21	12	40.73	No	37.8	-2.93
845	1/28/2017	22	1	47.31	No	37.8	-9.51
846	1/28/2017	22	2	43.73	No	37.8	-5.93
847	1/28/2017	22	3	43.73	No	37.8	-5.93
848	1/28/2017	22	4	46.60	No	37.8	-8.80
849	1/28/2017	22	5	42.10	No	37.8	-4.30
850	1/28/2017	22	6	42.10	No	37.8	-4.30
851	1/28/2017	22	7	41.59	No	37.8	-3.79
852	1/28/2017	22	8	41.18	No	37.8	-3.38
853	1/28/2017	22	9	39.84	No	37.8	-2.04
854	1/28/2017	22	10	38.95	No	37.8	-1.15
855	1/28/2017	22	11	38.83	No	37.8	-1.03
856	1/28/2017	22	12	37.33	No	37.8	0.47
857	1/28/2017	23	1	39.76	No	37.8	-1.96
858	1/28/2017	23	2	40.06	No	37.8	-2.26
859	1/28/2017	23	3	39.76	No	37.8	-1.96
860	1/28/2017	23	4	38.18	No	37.8	-0.38
861	1/28/2017	23	5	36.55	No	37.8	1.25
862	1/28/2017	23	6	34.94	No	37.8	2.86
863	1/28/2017	23	7	29.86	No	37.8	7.94
864	1/28/2017	23	8	29.08	No	37.8	8.72
865	1/28/2017	23	9	28.28	No	37.8	9.52
866	1/28/2017	23	10	33.70	No	37.8	4.10
867	1/28/2017	23	11	33.52	No	37.8	4.28
868	1/28/2017	23	12	34.58	No	37.8	3.22
869	1/28/2017	24	1	36.55	No	37.8	1.25
870	1/28/2017	24	2	38.97	No	37.8	-1.17
871	1/28/2017	24	3	41.19	No	37.8	-3.39
872	1/28/2017	24	4	39.25	No	37.8	-1.45
873	1/28/2017	24	5	38.64	No	37.8	-0.84

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874	1/28/2017	24	6	34.11	No	37.8	3.69
875	1/29/2017	22	1	44.95	Yes	37.82	-7.13
876	1/29/2017	22	2	45.15	Yes	37.82	-7.33
877	1/29/2017	22	3	42.93	Yes	37.82	-5.11
878	1/29/2017	22	4	44.33	Yes	37.82	-6.51
879	1/29/2017	22	5	44.33	Yes	37.82	-6.51
880	1/29/2017	22	6	43.50	Yes	37.82	-5.68
881	1/29/2017	22	7	41.06	Yes	37.82	-3.24
882	1/29/2017	22	8	40.62	Yes	37.82	-2.80
883	1/29/2017	22	9	38.78	Yes	37.82	-0.96
884	1/29/2017	22	10	38.16	Yes	37.82	-0.34
885	1/29/2017	22	11	39.26	Yes	37.82	-1.44
886	1/29/2017	22	12	38.16	Yes	37.82	-0.34
887	1/30/2017	8	4	47.45	Yes	37.82	-9.63
888	1/30/2017	8	5	46.65	Yes	37.82	-8.83
889	1/30/2017	8	6	43.34	Yes	37.82	-5.52
890	1/30/2017	10	11	9.54	Yes	37.82	28.28
891	1/30/2017	11	1	24.75	Yes	37.82	13.07
892	1/30/2017	11	2	24.89	Yes	37.82	12.93
893	1/30/2017	11	3	31.18	Yes	37.82	6.64
894	1/30/2017	11	4	13.72	Yes	37.82	24.10
895	1/30/2017	11	5	13.72	Yes	37.82	24.10
896	1/30/2017	11	6	31.61	Yes	37.82	6.21
897	1/30/2017	11	7	29.42	Yes	37.82	8.40
898	1/30/2017	11	8	29.79	Yes	37.82	8.03
899	1/30/2017	11	9	-1.92	Yes	37.82	39.74
900	1/30/2017	11	10	13.94	Yes	37.82	23.88
901	1/30/2017	11	11	12.17	Yes	37.82	25.65
902	1/30/2017	11	12	13.69	Yes	37.82	24.13
903	1/31/2017	17	1	20.33	No	37.33	17.00
904	1/31/2017	17	2	11.33	No	37.33	26.00
905	1/31/2017	17	3	17.97	No	37.33	19.36
906	1/31/2017	17	4	22.14	No	37.33	15.19
907	1/31/2017	17	5	27.53	No	37.33	9.80
908	1/31/2017	17	6	30.06	No	37.33	7.27
909	1/31/2017	17	7	29.78	No	37.33	7.55
910	1/31/2017	17	8	32.16	No	37.33	5.17
911	1/31/2017	17	9	38.21	No	37.33	-0.88
912	1/31/2017	17	10	31.90	No	37.33	5.43
913	1/31/2017	17	11	32.09	No	37.33	5.24
914	1/31/2017	17	12	32.30	No	37.33	5.03
915	1/31/2017	20	1	34.99	No	37.33	2.34
916	1/31/2017	20	2	36.09	No	37.33	1.24
917	1/31/2017	20	3	49.61	No	37.33	-12.28
918	1/31/2017	20	4	42.78	No	37.33	-5.45
919	1/31/2017	20	5	40.92	No	37.33	-3.59

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920	1/31/2017	20	6	39.84	No	37.33	-2.51
921	1/31/2017	20	7	37.47	No	37.33	-0.14
922	1/31/2017	20	8	38.77	No	37.33	-1.44
923	1/31/2017	20	9	36.42	No	37.33	0.91
924	1/31/2017	20	10	34.99	No	37.33	2.34
925	1/31/2017	20	11	34.85	No	37.33	2.48
926	1/31/2017	20	12	34.40	No	37.33	2.93
927	1/31/2017	21	1	34.35	No	37.33	2.98
928	1/31/2017	21	2	34.35	No	37.33	2.98
929	1/31/2017	21	3	32.48	No	37.33	4.85
930	1/31/2017	21	4	32.51	No	37.33	4.82
931	1/31/2017	21	5	32.51	No	37.33	4.82
932	1/31/2017	21	6	32.51	No	37.33	4.82
933	1/31/2017	21	7	35.51	No	37.33	1.82
934	1/31/2017	21	8	35.51	No	37.33	1.82
935	1/31/2017	21	9	36.16	No	37.33	1.17
936	1/31/2017	21	10	35.07	No	37.33	2.26
937	1/31/2017	21	11	35.07	No	37.33	2.26
938	1/31/2017	21	12	34.56	No	37.33	2.77

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	1/25/2017	20	1	41.83	Yes	40.16	-1.67
2	1/25/2017	20	2	41.83	Yes	40.16	-1.67
3	1/25/2017	20	3	41.83	Yes	40.16	-1.67
4	1/25/2017	20	4	36.80	Yes	40.16	3.36
5	1/25/2017	20	5	35.71	Yes	40.16	4.45
6	1/25/2017	20	6	36.57	Yes	40.16	3.59
7	1/25/2017	20	7	32.53	Yes	40.16	7.63
8	1/25/2017	20	8	31.44	Yes	40.16	8.72
9	1/25/2017	20	9	28.99	Yes	40.16	11.17
10	1/25/2017	20	10	32.18	Yes	40.16	7.98
11	1/25/2017	20	11	33.84	Yes	40.16	6.32
12	1/25/2017	20	12	32.26	Yes	40.16	7.90
13	1/26/2017	4	1	28.71	Yes	33.10	4.39
14	1/26/2017	4	2	28.71	Yes	33.10	4.39
15	1/26/2017	4	3	29.10	Yes	33.10	4.00
16	1/26/2017	4	4	29.27	Yes	33.10	3.83
17	1/26/2017	4	5	29.27	Yes	33.10	3.83
18	1/26/2017	4	6	29.43	Yes	33.10	3.67
19	1/26/2017	4	7	29.49	No	33.70	4.21
20	1/26/2017	4	8	29.99	No	33.70	3.71
21	1/26/2017	4	9	29.99	No	33.70	3.71
22	1/26/2017	4	10	28.48	No	33.70	5.22
23	1/26/2017	4	11	28.54	No	33.70	5.16
24	1/26/2017	4	12	28.54	No	33.70	5.16
25	1/26/2017	18	1	27.67	Yes	33.10	5.43
26	1/26/2017	18	2	26.81	Yes	33.10	6.29
27	1/26/2017	18	3	27.00	Yes	33.10	6.10
28	1/26/2017	18	4	27.31	Yes	33.10	5.79
29	1/26/2017	18	5	29.34	Yes	33.10	3.76
30	1/26/2017	18	6	33.51	Yes	33.10	-0.41
31	1/26/2017	18	7	38.70	Yes	33.10	-5.60
32	1/26/2017	18	8	39.25	Yes	33.10	-6.15
33	1/26/2017	18	9	42.32	Yes	33.10	-9.22
34	1/26/2017	18	10	41.36	Yes	33.10	-8.26

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Number	Trade Date	Trade Hour	Interval	Market LMP	Eligible Flag	Calculated LMP	Change in LMP
35	1/26/2017	18	11	42.27	Yes	33.10	-9.17
36	1/26/2017	18	12	42.27	Yes	33.10	-9.17
37	1/27/2017	10	1	-15.50	Yes	33.36	48.86
38	1/27/2017	10	2	-15.41	Yes	33.36	48.77
39	1/27/2017	10	3	-12.57	Yes	33.36	45.93
40	1/27/2017	10	4	0.00	Yes	33.36	33.36
41	1/27/2017	10	5	10.55	Yes	33.36	22.81
42	1/27/2017	10	6	19.73	Yes	33.36	13.63
43	1/27/2017	10	7	-12.42	Yes	33.36	45.78
44	1/27/2017	10	8	-15.41	Yes	33.36	48.77
45	1/27/2017	10	9	-12.57	Yes	33.36	45.93
46	1/27/2017	10	10	-11.83	Yes	33.36	45.19
47	1/27/2017	10	11	-11.83	Yes	33.36	45.19
48	1/27/2017	10	12	-7.91	Yes	33.36	41.27
49	1/27/2017	16	1	-11.83	Yes	33.36	45.19
50	1/27/2017	16	2	-11.83	Yes	33.36	45.19
51	1/27/2017	16	3	-11.37	Yes	33.36	44.73
52	1/27/2017	16	4	0.00	Yes	33.36	33.36
53	1/27/2017	16	5	0.01	Yes	33.36	33.35
54	1/27/2017	16	6	9.72	Yes	33.36	23.64
55	1/27/2017	16	7	20.18	Yes	33.36	13.18
56	1/27/2017	16	8	20.44	Yes	33.36	12.92
57	1/27/2017	16	9	24.02	Yes	33.36	9.34
58	1/27/2017	16	10	23.34	Yes	33.36	10.02
59	1/27/2017	16	11	24.14	Yes	33.36	9.22
60	1/27/2017	16	12	21.10	Yes	33.36	12.26
61	1/27/2017	17	1	16.04	Yes	33.36	17.32
62	1/27/2017	17	2	10.11	Yes	33.36	23.25
63	1/27/2017	17	3	18.45	Yes	33.36	14.91
64	1/27/2017	17	4	19.55	Yes	33.36	13.81
65	1/27/2017	17	5	21.91	Yes	33.36	11.45
66	1/27/2017	17	6	23.56	Yes	33.36	9.80
67	1/27/2017	17	7	26.67	Yes	33.36	6.69
68	1/27/2017	17	8	29.65	Yes	33.36	3.71
69	1/27/2017	17	9	41.57	Yes	33.36	-8.21
70	1/27/2017	17	10	45.00	Yes	33.36	-11.64
71	1/27/2017	17	11	50.37	Yes	33.36	-17.01
72	1/27/2017	17	12	49.24	Yes	33.36	-15.88

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Number	Trade Date	Trade Hour	Interval	Market LMP	Eligible Flag	Calculated LMP	Change in LMP
73	1/28/2017	1	1	24.67	Yes	32.79	8.12
74	1/28/2017	1	2	25.84	Yes	32.79	6.95
75	1/28/2017	1	3	25.97	Yes	32.79	6.82
76	1/28/2017	1	4	26.71	Yes	32.79	6.08
77	1/28/2017	1	5	26.83	Yes	32.79	5.96
78	1/28/2017	1	6	26.83	Yes	32.79	5.96
79	1/28/2017	1	7	27.67	Yes	32.79	5.12
80	1/28/2017	1	8	27.67	Yes	32.79	5.12
81	1/28/2017	1	9	27.95	Yes	32.79	4.84
82	1/28/2017	1	10	26.53	Yes	32.79	6.26
83	1/28/2017	1	11	25.83	Yes	32.79	6.96
84	1/28/2017	1	12	25.78	Yes	32.79	7.01
85	1/28/2017	5	1	29.05	Yes	32.79	3.74
86	1/28/2017	5	2	28.01	Yes	32.79	4.78
87	1/28/2017	5	3	28.43	Yes	32.79	4.36
88	1/28/2017	5	4	28.47	Yes	32.79	4.32
89	1/28/2017	5	5	28.74	Yes	32.79	4.05
90	1/28/2017	5	6	29.09	Yes	32.79	3.70
91	1/28/2017	5	7	30.37	Yes	32.79	2.42
92	1/28/2017	5	8	30.66	Yes	32.79	2.13
93	1/28/2017	5	9	30.78	Yes	32.79	2.01
94	1/28/2017	5	10	30.98	Yes	32.79	1.81
95	1/28/2017	5	11	30.90	Yes	32.79	1.89
96	1/28/2017	5	12	30.44	Yes	32.79	2.35
97	1/28/2017	6	1	29.00	Yes	32.79	3.79
98	1/28/2017	6	2	28.04	Yes	32.79	4.75
99	1/28/2017	6	3	28.04	Yes	32.79	4.75
100	1/28/2017	6	4	30.12	Yes	32.79	2.67
101	1/28/2017	6	5	30.33	Yes	32.79	2.46
102	1/28/2017	6	6	31.95	Yes	32.79	0.84
103	1/28/2017	6	7	32.02	Yes	32.79	0.77
104	1/28/2017	6	8	33.41	Yes	32.79	-0.62
105	1/28/2017	6	9	35.28	Yes	32.79	-2.49
106	1/28/2017	6	10	34.64	Yes	32.79	-1.85
107	1/28/2017	6	11	34.04	Yes	32.79	-1.25
108	1/28/2017	6	12	32.35	Yes	32.79	0.44
109	1/29/2017	1	1	30.77	Yes	32.79	2.02
110	1/29/2017	1	2	31.16	Yes	32.79	1.63

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Number	Trade Date	Trade Hour	Interval	Market LMP	Eligible Flag	Calculated LMP	Change in LMP
111	1/29/2017	1	3	31.42	Yes	32.79	1.37
112	1/29/2017	1	4	31.63	Yes	32.79	1.16
113	1/29/2017	1	5	33.03	Yes	32.79	-0.24
114	1/29/2017	1	6	33.03	Yes	32.79	-0.24
115	1/29/2017	1	7	33.19	Yes	32.79	-0.40
116	1/29/2017	1	8	30.77	Yes	32.79	2.02
117	1/29/2017	1	9	30.35	Yes	32.79	2.44
118	1/29/2017	1	10	30.46	Yes	32.79	2.33
119	1/29/2017	1	11	29.84	Yes	32.79	2.95
120	1/29/2017	1	12	30.10	Yes	32.79	2.69
121	1/29/2017	21	1	38.15	Yes	32.79	-5.36
122	1/29/2017	21	2	37.93	Yes	32.79	-5.14
123	1/29/2017	21	3	37.36	Yes	32.79	-4.57
124	1/29/2017	21	4	37.31	Yes	32.79	-4.52
125	1/29/2017	21	5	38.12	Yes	32.79	-5.33
126	1/29/2017	21	6	37.30	Yes	32.79	-4.51
127	1/29/2017	21	7	38.20	Yes	32.79	-5.41
128	1/29/2017	21	8	37.49	Yes	32.79	-4.70
129	1/29/2017	21	9	36.93	Yes	32.79	-4.14
130	1/29/2017	21	10	35.86	Yes	32.79	-3.07
131	1/29/2017	21	11	35.95	Yes	32.79	-3.16
132	1/29/2017	21	12	34.23	Yes	32.79	-1.44
133	1/29/2017	22	1	37.50	Yes	32.79	-4.71
134	1/29/2017	22	2	37.66	Yes	32.79	-4.87
135	1/29/2017	22	3	35.82	Yes	32.79	-3.03
136	1/29/2017	22	4	37.19	Yes	32.79	-4.40
137	1/29/2017	22	5	37.19	Yes	32.79	-4.40
138	1/29/2017	22	6	36.49	Yes	32.79	-3.70
139	1/29/2017	22	7	34.65	Yes	32.79	-1.86
140	1/29/2017	22	8	34.27	Yes	32.79	-1.48
141	1/29/2017	22	9	32.72	Yes	32.79	0.07
142	1/29/2017	22	10	32.25	Yes	32.79	0.54
143	1/29/2017	22	11	33.18	Yes	32.79	-0.39
144	1/29/2017	22	12	32.25	Yes	32.79	0.54
145	1/30/2017	15	1	22.62	No	44.23	21.61
146	1/30/2017	15	2	21.12	No	44.23	23.11
147	1/30/2017	15	3	22.69	No	44.23	21.54
148	1/30/2017	15	4	20.81	No	44.23	23.42

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Number	Trade Date	Trade Hour	Interval	Market LMP	Eligible Flag	Calculated LMP	Change in LMP
149	1/30/2017	15	5	23.67	No	44.23	20.56
150	1/30/2017	15	6	24.37	No	44.23	19.86
151	1/30/2017	15	7	24.92	No	44.23	19.31
152	1/30/2017	15	8	24.92	No	44.23	19.31
153	1/30/2017	15	11	25.94	No	44.23	18.29
154	1/30/2017	15	12	24.97	No	44.23	19.26
155	1/30/2017	16	1	23.78	No	44.23	20.45
156	1/30/2017	16	2	21.19	No	44.23	23.04
157	1/30/2017	18	1	29.40	No	32.79	3.39
158	1/30/2017	18	2	27.21	No	32.79	5.58
159	1/30/2017	18	3	26.78	No	32.79	6.01
160	1/30/2017	18	4	27.47	No	32.79	5.32
161	1/30/2017	18	5	28.60	No	32.79	4.19
162	1/30/2017	18	6	29.68	No	32.79	3.11
163	1/30/2017	18	7	30.47	No	32.79	2.32
164	1/30/2017	18	8	31.76	No	32.79	1.03
165	1/30/2017	18	9	34.55	No	32.79	-1.76
166	1/30/2017	18	10	36.38	No	32.79	-3.59
167	1/30/2017	18	11	38.30	No	32.79	-5.51
168	1/30/2017	18	12	40.74	No	32.79	-7.95
169	1/30/2017	19	1	51.14	Yes	32.79	-18.35
170	1/30/2017	19	2	56.16	Yes	32.79	-23.37
171	1/30/2017	19	3	48.35	Yes	32.79	-15.56
172	1/30/2017	19	4	49.13	Yes	32.79	-16.34
173	1/30/2017	19	5	56.65	Yes	32.79	-23.86
174	1/30/2017	19	6	68.68	Yes	32.79	-35.89
175	1/30/2017	19	7	931.00	Yes	32.79	-898.21
176	1/30/2017	19	8	67.54	Yes	32.79	-34.75
177	1/30/2017	19	9	57.51	Yes	32.79	-24.72
178	1/30/2017	19	10	43.29	Yes	32.79	-10.50
179	1/30/2017	19	11	40.74	Yes	32.79	-7.95
180	1/30/2017	19	12	37.46	Yes	32.79	-4.67
181	1/30/2017	24	1	31.52	Yes	32.79	1.27
182	1/30/2017	24	2	31.85	Yes	32.79	0.94
183	1/30/2017	24	3	30.38	Yes	32.79	2.41
184	1/30/2017	24	4	29.81	Yes	32.79	2.98
185	1/30/2017	24	5	29.03	Yes	32.79	3.76
186	1/30/2017	24	6	28.01	Yes	32.79	4.78

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Number	Trade Date	Trade Hour	Interval	Market LMP	Eligible Flag	Calculated LMP	Change in LMP
187	1/30/2017	24	7	28.49	Yes	32.79	4.30
188	1/30/2017	24	8	28.10	Yes	32.79	4.69
189	1/30/2017	24	9	26.29	Yes	32.79	6.50
190	1/30/2017	24	10	26.40	Yes	32.79	6.39
191	1/30/2017	24	11	27.13	Yes	32.79	5.66
192	1/30/2017	24	12	27.87	Yes	32.79	4.92
193	1/31/2017	1	1	25.47	Yes	31.90	6.43
194	1/31/2017	1	2	25.95	Yes	31.90	5.95
195	1/31/2017	1	3	25.56	Yes	31.90	6.34
196	1/31/2017	1	4	25.60	Yes	31.90	6.30
197	1/31/2017	1	5	25.52	Yes	31.90	6.38
198	1/31/2017	1	6	25.70	Yes	31.90	6.20
199	1/31/2017	1	7	25.53	Yes	31.90	6.37
200	1/31/2017	1	8	24.78	Yes	31.90	7.12
201	1/31/2017	1	9	24.78	Yes	31.90	7.12
202	1/31/2017	1	10	24.74	Yes	31.90	7.16
203	1/31/2017	1	11	24.78	Yes	31.90	7.12
204	1/31/2017	1	12	24.68	Yes	31.90	7.22
205	1/31/2017	7	1	27.19	Yes	31.90	4.71
206	1/31/2017	7	2	28.26	Yes	31.90	3.64
207	1/31/2017	7	3	26.74	Yes	31.90	5.16
208	1/31/2017	7	4	26.66	Yes	31.90	5.24
209	1/31/2017	7	5	31.35	Yes	31.90	0.55
210	1/31/2017	7	6	33.18	Yes	31.90	-1.28
211	1/31/2017	7	7	35.51	Yes	31.90	-3.61
212	1/31/2017	7	8	37.44	Yes	31.90	-5.54
213	1/31/2017	7	9	37.66	Yes	31.90	-5.76
214	1/31/2017	7	10	37.18	Yes	31.90	-5.28
215	1/31/2017	7	11	37.33	Yes	31.90	-5.43
216	1/31/2017	7	12	37.66	Yes	31.90	-5.76
217	1/31/2017	9	1	22.83	Yes	31.90	9.07
218	1/31/2017	9	2	22.79	Yes	31.90	9.11
219	1/31/2017	9	3	24.99	Yes	31.90	6.91
220	1/31/2017	9	4	24.67	Yes	31.90	7.23
221	1/31/2017	9	5	24.26	Yes	31.90	7.64
222	1/31/2017	9	6	16.84	Yes	31.90	15.06
223	1/31/2017	9	7	-8.01	Yes	31.90	39.91
224	1/31/2017	9	8	-11.97	Yes	31.90	43.87

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Number	Trade Date	Trade Hour	Interval	Market LMP	Eligible Flag	Calculated LMP	Change in LMP
225	1/31/2017	9	9	-15.59	Yes	31.90	47.49
226	1/31/2017	9	10	-15.54	Yes	31.90	47.44
227	1/31/2017	9	11	-30.24	Yes	31.90	62.14
228	1/31/2017	9	12	-19.03	Yes	31.90	50.93
229	1/31/2017	16	1	-12.13	Yes	31.90	44.03
230	1/31/2017	16	2	-12.13	Yes	31.90	44.03
231	1/31/2017	16	3	9.55	Yes	31.90	22.35
232	1/31/2017	16	4	16.21	Yes	31.90	15.69
233	1/31/2017	16	5	22.84	Yes	31.90	9.06
234	1/31/2017	16	6	22.73	Yes	31.90	9.17
235	1/31/2017	16	7	23.77	Yes	31.90	8.13
236	1/31/2017	16	8	24.49	Yes	31.90	7.41
237	1/31/2017	16	9	24.62	Yes	31.90	7.28
238	1/31/2017	16	10	24.64	Yes	31.90	7.26
239	1/31/2017	16	11	24.64	Yes	31.90	7.26
240	1/31/2017	16	12	23.91	Yes	31.90	7.99
241	1/31/2017	17	1	17.92	Yes	31.90	13.98
242	1/31/2017	17	2	9.98	Yes	31.90	21.92
243	1/31/2017	17	3	15.83	Yes	31.90	16.07
244	1/31/2017	17	4	19.47	Yes	31.90	12.43
245	1/31/2017	17	5	24.20	Yes	31.90	7.70
246	1/31/2017	17	6	26.42	Yes	31.90	5.48
247	1/31/2017	17	7	27.47	Yes	31.90	4.43
248	1/31/2017	17	8	29.67	Yes	31.90	2.23
249	1/31/2017	17	9	35.25	Yes	31.90	-3.35
250	1/31/2017	17	10	31.90	Yes	31.90	0.00
251	1/31/2017	17	11	32.09	Yes	31.90	-0.19
252	1/31/2017	17	12	32.30	Yes	31.90	-0.40

Appendix C: Exceptional Dispatch Bid Mitigation Analysis

In January 2017, the ISO applied the exceptional dispatch bid mitigation to the exceptional dispatches. Table 10 shows the costs by instruction type in January. With exceptional dispatch bid mitigation, the costs for these types of exceptional dispatches were \$ 195. Without the exceptional dispatch bid mitigation, the costs for these types of exceptional dispatches would be \$ 290. The cost saving from the exceptional dispatch bid mitigation was \$ 95.

Table 10: Bid Mitigation Analysis for January 2017

Type	Number of Resources	Costs without Bid Mitigation	Costs with Bid Mitigation	Cost Saving
NONTMOD	2	\$290	\$195	\$95
Total	2	\$290	\$195	\$95