

Guide to CAISO OASIS Pricing Data

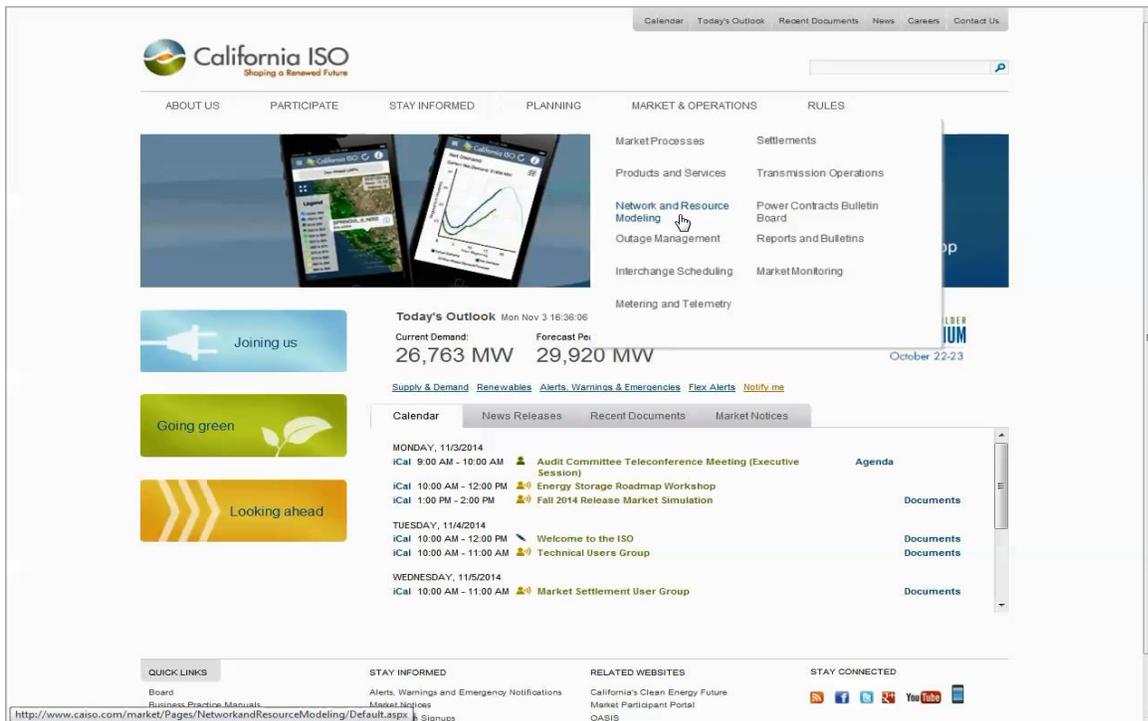
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Guide Tools

The California ISO publishes real-time market prices, along with other information, on its Open Access Same-Time Information System (OASIS) web site. Following are instructions to access the CAISO's OASIS site to obtain 5-minute (RTD) and 15-minute (FMM) real-time locational marginal prices (LMPs) for Generator Resources, intertie points (or Intertie Resources) and load aggregation point (LAP) prices in connection with the Energy Imbalance Market (EIM).

Before navigating to the CAISO's OASIS web site, the user must understand how pricing information is mapped and presented on CAISO's OASIS so that the user can perform effective price searches. The CAISO's [Network and Resource Modeling](#) web page contains pricing node mapping documents. Specifically for the EIM, on October 24, 2014 the CAISO posted a pricing node (PNode) [mapping document](#) which depicts its full network model expansion to the PacifiCorp balancing authority areas (BAAs) – PACE and PACW under the CAISO's DB71 Full Network Model. This document is available on the CAISO's website. With the release of each new, updated Full Network Model (e.g., consecutively numbered DB71, DB72, etc.), the CAISO will update and post a new mapping document; the most recent mapping document should be used to identify the PNodes currently included in the newest version of the Full Network Model. To access the Network and Resource Modeling web page, open the CAISO's home page at www.aiso.com, hover over Market & Operations on the menu ribbon at the top of the page, and click on Network and Resource Modeling.



The screenshot displays the California ISO website interface. At the top, the logo reads "California ISO" with the tagline "Shaping a Renewed Future". A navigation menu includes "ABOUT US", "PARTICIPATE", "STAY INFORMED", "PLANNING", "MARKET & OPERATIONS", and "RULES". The "MARKET & OPERATIONS" menu is expanded, showing sub-items: "Market Processes", "Settlements", "Products and Services", "Transmission Operations", "Network and Resource Modeling" (highlighted with a mouse cursor), "Power Contracts Bulletin Board", "Outage Management", "Reports and Bulletins", "Interchange Scheduling", "Market Monitoring", and "Metering and Telemetry".

Below the navigation, there are three call-to-action buttons: "Joining us" (with a plug icon), "Going green" (with a leaf icon), and "Looking ahead" (with a chevron icon). The "Today's Outlook" section shows "Current Demand: 26,763 MW" and "Forecast P: 29,920 MW" for "October 22-23".

The "Calendar" section is active, showing a list of events:

Day	Date	Event	Documents
MONDAY	11/3/2014	9:00 AM - 10:00 AM: Audit Committee Teleconference Meeting (Executive Session)	Agenda
		10:00 AM - 12:00 PM: Energy Storage Roadmap Workshop	
		1:00 PM - 2:00 PM: Fall 2014 Release Market Simulation	
TUESDAY	11/4/2014	10:00 AM - 12:00 PM: Welcome to the ISO	Documents
		10:00 AM - 11:00 AM: Technical Users Group	Documents
WEDNESDAY	11/5/2014	10:00 AM - 11:00 AM: Market Settlement User Group	Documents

At the bottom, there are sections for "QUICK LINKS", "STAY INFORMED", "RELATED WEBSITES", and "STAY CONNECTED". The URL in the address bar is <http://www.aiso.com/market/Pages/NetworkandResourceModeling/Default.aspx>.

Once on the Network Resource and Modeling web page, click on the most recently posted Excel document containing the Full Network Model Pricing Node Mapping and open the document. The screenshot below shows an arrow pointing at the document posted 10/24/14. As noted above, new mapping documents are posted when the CAISO releases consecutive versions of its Full Network Model and the mapping document posted with the current version of the Full Network Model should be used.

The screenshot shows the California ISO website with the 'Network and Resource Modeling' page. The navigation menu on the left is expanded, and a blue arrow points to the document 'Full Network Model Pricing Node Mapping (based on DB71 with Full Network Model Expansion)' dated 10/24/2014. The page title is 'Accurate network modeling supports efficient market operations'.

The spreadsheet contains several tabs across the bottom:



The Definition tab defines the content under each tab: 1) Generator Resources; 2) Aggregated Resources; 3) Intertie Resources; and 4) Load Aggregated PNodes (or LAPs). Each of the spreadsheets contains a list of the points /resources in PacifiCorp's BAAs in each of the four categories and provides identifying information to use when searching for specific prices on the CAISO's OASIS (navigation instructions follow).



Sample from GEN_RES tab for Generator Resources:

	A	B	C	D	E	F	G	H
1	RES_TYPE	BAA	RES_ID	RES_NAME	PNODE (APNODE) ID	FNM_VERSION	RELEASE_DATE	COMMENTS
2	GEN	PACE	BONANZA_7_UNIT	Bonanza	BONANZA_NODET	DB71 with FNM Expansion	1-Oct-2014	Phnode (Price Node)
3	GEN	PACE	CARBON_7_UNIT 1	Carbon 1	CARBON_NODE1	DB71 with FNM Expansion	1-Oct-2014	Phnode (Price Node)
4	GEN	PACE	CARBON_7_UNIT 2	Carbon 2	CARBON_NODE2	DB71 with FNM Expansion	1-Oct-2014	Phnode (Price Node)
5	GEN	PACE	CHOLLA_7_UNIT	Cholla 4	CHOLLA_NODET	DB71 with FNM Expansion	1-Oct-2014	Phnode (Price Node)
6	TG	PACE	COLSTR_5_PACE	Colstrip 3 & 4 - East	PTRSNF_2_N1	DB71 with FNM Expansion	1-Oct-2014	Phnode (Price Node)
7	GEN	PACE	CURRCRK_7_UNITS	Currant Creek	CURRCRK_7_UNITS-APND	DB71 with FNM Expansion	1-Oct-2014	APnode (Aggregated Phnode)
8	GEN	PACE	CUTLER_7_UNIT 1	Cutler Hydro Unit 1	CUTLER_NODE1	DB71 with FNM Expansion	1-Oct-2014	Phnode (Price Node)
9	GEN	PACE	CUTLER_7_UNIT 2	Cutler Hydro Unit 2	CUTLER_NODE2	DB71 with FNM Expansion	1-Oct-2014	Phnode (Price Node)

Access to CAISO's OASIS Web Site

To access the CAISO's OASIS web site, open the CAISO's home page at www.caiso.com, scroll to the bottom of the home page and click on OASIS. Link to CAISO OASIS home page: <http://oasis.caiso.com/mrioasis/logon.do>.

The screenshot shows the California ISO OASIS web site. At the top, there is a navigation menu with links for 'Calendar', 'Today's Outlook', 'Recent Documents', 'News', 'Careers', and 'Contact Us'. The main header includes the California ISO logo and a search bar. Below the header, there are navigation tabs: 'ABOUT US', 'PARTICIPATE', 'STAY INFORMED', 'PLANNING', 'MARKET & OPERATIONS', and 'RULES'. A large banner image shows a control room with multiple monitors and the text: 'Working hard around the clock to keep the lights on for consumers across the West'. The 'Today's Outlook' section for Monday, Nov 3, 16:17:08 2014, displays 'Current Demand: 26,454 MW' and 'Forecast Peak: 29,986 MW'. Below this are links for 'Supply & Demand', 'Renewables', 'Alerts, Warnings & Emergencies', 'Flex Alerts', and 'Notify me'. The 'Calendar' section shows events for Wednesday, 11/5/2014 (Market Settlement User Group), Thursday, 11/6/2014 (Load Granularity Refinements Pricing Study Design, Fall 2014 Release Market Simulation), and Monday, 11/10/2014 (Outage Management System Training (Generation), Fall 2014 Release Market Simulation, Outage Management System Training (Transmission)). At the bottom, there are sections for 'QUICK LINKS', 'STAY INFORMED', 'RELATED WEBSITES', and 'STAY CONNECTED'. A blue arrow points to the 'OASIS' link in the 'RELATED WEBSITES' section.

Access to Prices – Overview

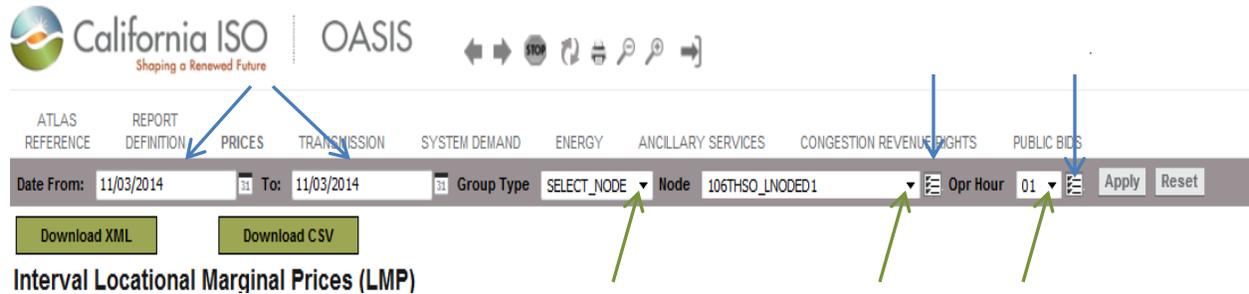
Locational Marginal Prices, including LAP and Interchange prices, are available on the CAISO's OASIS web site in five-minute (RTD) and fifteen-minute (FMM) intervals. PacifiCorp's LAP prices are posted under the PNodes identified as ELAP_PACE-APND and ELAP_PACW-APND. In addition, Interchange LMPs are posted under PNodes with names preceded by "DGAP_" followed by the acronym for the BAA to which the energy flows. For example, Intertie transactions from the PACW BAA to the PGE BAA are under the PNode named "DGAP_PGE-APND. All EIM PNode names for generation, Interties, and LAPs are listed in the CAISO's pricing node mapping spreadsheet posted to the CAISO web site on the [Network Model and Pricing Node Mapping](#) page.

To Access Five-Minute Interval Prices (RTD)

On the OASIS web site, hover over the Prices tab in the menu ribbon at the top of the page, scroll to and click on Interval Locational Marginal Prices.

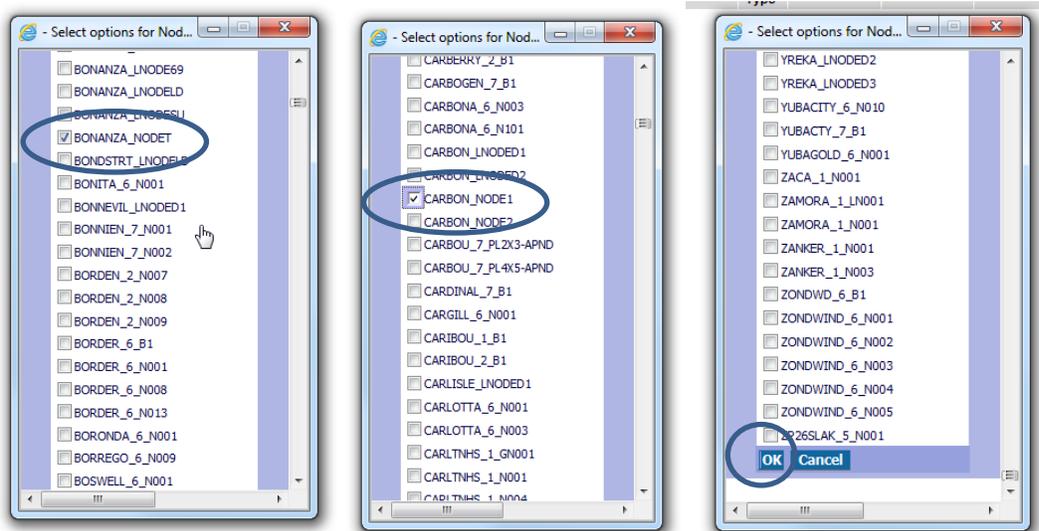
The screenshot displays the California ISO OASIS website. The top navigation bar includes the California ISO logo and the text "OASIS". Below this is a menu ribbon with tabs for ATLAS REFERENCE, REPORT DEFINITION, PRICES, TRANSMISSION, SYSTEM DEMAND, ENERGY, ANCILLARY SERVICES, CONGESTION REVENUE RIGHTS, and PUBLIC BIDS. The "PRICES" tab is active, and a dropdown menu is open, listing various pricing options. The "Interval Locational Marginal Prices" option is highlighted. To the right of the menu is a map of California with three regions highlighted: NP15 (North Pacific), ZP26 (Central Pacific), and SP15 (South Pacific). Below the map, a status bar shows real-time pricing information: "For RT Interval: 18:10 LMP for SP15=\$52.21826 | NP15=\$51.48502 | ZP26=\$51.28457 | SMEC=\$52.75105". At the bottom, there are quick links for OASIS Home, System Operating Messages, LMP Price Contour Maps, Trading Hub Real-Time Prices, Historical ACE, SYSTEM HELP, WWW.CAISO.COM, Support, and System Technical Information. A footer note states: "The contents of these pages are subject to change without notice. Decisions based on information contained within the California ISO web site are the visitor's sole responsibility. Copyright © 2005-2012 California ISO. All rights reserved. Privacy Legal Software Version 6.6.0".

On the resulting page: 1) choose a date range by providing a date in each the Date From: and To: boxes located just under the menu ribbon at the top of the page; 2) click on the  icon next to the box provided beside the Node drop down menu and put check marks beside the Nodes to display; 3) do the same with the  next to the Opr Hour drop down menu and choose the Operating Hours to display (all shown below with blue arrows pointing down). All APNodes can be displayed by selecting ALL_APNodes in the Group Type drop down menu and individual APNodes or Operating Hours can be selected from the drop down menus (shown below with green arrows pointing up).



Example: Search RTD prices at two Nodes

A search for BONANZA_NODET and CARBON_NODE1 for Operating Hour 1 of a selected date or date range would be conducted by clicking on the Interval Locational Marginal Prices under “Pricing”, selecting the date range, selecting the  next to the Node drop down, placing check marks next to the two Node names and clicking OK at the bottom of the list window as illustrated below. Then click the “Apply” button on the upper right side of the main OASIS window (the Opr Hour defaults to 01).



Results:

California ISO | OASIS

ATLAS REFERENCE REPORT DEFINITION PRICES TRANSMISSION SYSTEM DEMAND ENERGY ANCILLARY SERVICES CONGESTION REVENUE RIGHTS PUBLIC BIDS

Date From: 11/02/2014 To: 11/02/2014 Group Type: SELECT_NODE Node: [Set] Opr Hour: 01

Download XML Download CSV

Interval Locational Marginal Prices (LMP)

Market	Opr Date/Hour	Node	LMP Type	INTERVAL01	INTERVAL02	INTERVAL03	INTERVAL04	INTERVAL05	INTERVAL06	INTERVAL07	INTERVAL08	INTERVAL09	INTERVAL10	IN
RTM	11/02/2014 - Hour Ending 1	BONANZA_NODE1	LMP	-142.06874	-37.72524	-48.05512	25.76994	22.39548	22.45293	22.35391	22.14541	22.34611	22.15866	
RTM	11/02/2014 - Hour Ending 1	BONANZA_NODE1	Congestion	-4.10975	44.08685	-76.44892	-7.06830	-13.60611	-16.47306	-4.93410	-7.04016	-5.01290	-6.00933	
RTM	11/02/2014 - Hour Ending 1	BONANZA_NODE1	Energy	-150.89025	-89.48054	31.05523	35.87310	39.32880	42.19575	30.28635	32.39242	30.36516	31.25956	
RTM	11/02/2014 - Hour Ending 1	BONANZA_NODE1	Loss	12.93129	7.66848	-2.66143	-3.03486	-3.32722	-3.56976	-2.99835	-3.20685	-3.00615	-3.09157	
RTM	11/02/2014 - Hour Ending 1	BONANZA_NODE1	Greenhouse Gas	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	
RTM	11/02/2014 - Hour Ending 1	CARBON_NODE1	LMP	-141.88764	-37.61783	-48.09239	25.76996	22.32862	22.08120	22.95358	22.78678	22.94734	22.83074	
RTM	11/02/2014 - Hour Ending 1	CARBON_NODE1	Congestion	-4.10975	44.08685	-76.44892	-7.06830	-13.60611	-16.47306	-4.93410	-7.04016	-5.01290	-6.00933	
RTM	11/02/2014 - Hour Ending 1	CARBON_NODE1	Energy	-150.89025	-89.48054	31.05523	35.87310	39.32880	42.19575	30.28635	32.39242	30.36516	31.25956	
RTM	11/02/2014 - Hour Ending 1	CARBON_NODE1	Loss	13.11236	7.77586	-2.69870	-3.09585	-3.39408	-3.64149	-2.99868	-2.56548	-2.40492	-2.41949	
RTM	11/02/2014 - Hour Ending 1	CARBON_NODE1	Greenhouse Gas	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	

Report Generated: 11/03/2014 17:47:57

To Access Fifteen-Minute Interval Prices (FMM)

Choose FMM Locational Marginal Prices from the Prices pull down menu as described above for five-minute interval prices. Then choose the parameters of the query (date range, Nodes, Operating Hours) as set forth above, and click Apply.

To Access Data Specific to PacifiCorp’s PACE and PACW BAAs

Real-Time prices in five-minute (RTD) and fifteen-minute (FMM) intervals for PacifiCorp’s EIM Load Aggregation Points (ELAP or LAP, as referred to in PacifiCorp’s Open Access Transmission Tariff) are available on the CAISO’s OASIS (ELAP_PACE-APND and ELAP_PACW-APND). However, ELAP RTD and FMM prices are not the prices used to settle hourly load imbalance under PacifiCorp’s Open Access Transmission Tariff. In order to determine LAP hourly real-time prices used for settlement purposes, customers will need to obtain certain additional data from the CAISO’s OASIS and perform an estimate calculation to approximate the calculation set forth in the CAISO’s Tariff Section 11.5.2.2 Hourly Real-Time Demand Settlement. Customers will need to obtain the PACE and PACW ELAP five-minute interval and 15-minute interval prices and forecasted load to perform this estimate calculation. For more detailed information, please contact Christine Kirsten (916-207-4693).

To Advance or Go Back on the Results Page

A search of multiple APNodes may produce many pages of data. To advance to the next data set or to go back to a previous display, use the and buttons as applicable, or insert a specific number in the box. Results are listed in alphabetical order by Node name (third column). To view additional intervals, use the bottom scroll bar to scroll to the right.



ATLAS REFERENCE	REPORT DEFINITION	PRICES	TRANSMISSION	SYSTEM DEMAND	ENERGY	ANCILLARY SERVICES	CONGESTION REVENUE RIGHTS	PUBLIC BIDS					
Date From:	11/02/2014	To:	11/02/2014	Group Type	ALL_APNODES	Node	Opr Hour	01					
Download XML Download CSV													
Interval Locational Marginal Prices (LMP)													
Market	Opr Date/Time	Node	LMP Type	INTERVAL01	INTERVAL02	INTERVAL03	INTERVAL04	INTERVAL05	INTERVAL06	INTERVAL07	INTERVAL08	INTERVAL09	INTERVAL10
RTM	11/02/2014 - Hour Ending 1	BLM_2_UNITS-APND	LMP	-147.81712	-87.65812	30.42274	35.06118	38.43866	41.24072	29.51809	31.57073	29.59489	30.44264
RTM	11/02/2014 - Hour Ending 1	BLM_2_UNITS-APND	Congestion	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
RTM	11/02/2014 - Hour Ending 1	BLM_2_UNITS-APND	Energy	-150.89025	-89.48054	31.05523	35.87310	39.32880	42.19575	30.28635	32.39242	30.36516	31.25956
RTM	11/02/2014 - Hour Ending 1	BLM_2_UNITS-APND	Loss	3.07313	1.82242	-0.63249	-0.81193	-0.89014	-0.95503	-0.76826	-0.82169	-0.77026	-0.81692
RTM	11/02/2014 - Hour Ending 1	BLM_2_UNITS-APND	Greenhouse Gas	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
RTM	11/02/2014 - Hour Ending 1	BRODIE_2_WIND-APND	LMP	-145.66146	-86.37977	29.97907	34.56817	37.89816	40.66082	29.13993	31.16627	29.21575	30.04504
RTM	11/02/2014 - Hour Ending 1	BRODIE_2_WIND-APND	Congestion	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
RTM	11/02/2014 - Hour Ending 1	BRODIE_2_WIND-APND	Energy	-150.89025	-89.48054	31.05523	35.87310	39.32880	42.19575	30.28635	32.39242	30.36516	31.25956
RTM	11/02/2014 - Hour Ending 1	BRODIE_2_WIND-APND	Loss	5.22879	3.10076	-1.07615	-1.30494	-1.43064	-1.53493	-1.14643	-1.22615	-1.14941	-1.21453
RTM	11/02/2014 - Hour Ending 1	BRODIE_2_WIND-APND	Greenhouse Gas	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000

CAISO Price Corrections

Real-time prices published on the CAISO's OASIS are subject to validation and possible price correction – the normal process begins immediately after prices are available on OASIS and ends at 23:59 five business days following the Trading Day. Pursuant to Section 29.35 of the CAISO's tariff, "...for a period not to exceed 90 days after an EIM Entity Implementation Date, the time allowed for the CAISO's correction of Real-Time Market prices shall be 10 Business Days." The time between the beginning and end of the process is called the Price Correction Time Horizon. Real-time prices published on the CAISO's OASIS are subject to validation and possible price correction until the Price Correction Time Horizon has ended or the CAISO publishes notice that the price validation process has ended.

The CAISO posts price correction messages on its OASIS web site. To access the price correction messages, hover over "ATLAS REFERENCE" on the menu ribbon at the top of the page, scroll to and click on "Price Correction Messages." Choose a date range and click the "Apply" button.

Message Time	Market	Message Text
10/29/2014 14:38:45	RTPD	Trade Date: 10/23/2014, Market: FMM, Hours: 23 & 24, Intervals: 3, Constraint: WESTLYLBNS_ITC, Commodity: Energy, Correction Method: Selective recalculation, Reason: Invalid congestion due to a tariff inconsistency, open tie condition.
10/29/2014 08:32:21	RTD	Trade Date: 10/22/2014 Market: RTD and FMM Hour(s): 10-11, 13-16 Interval(s): various Constraint: 22448_MESAHGTS_69.0_22496_MISSION_69.0_BR_1_1 Commodity: Energy Correction Method: Selective recalculation Reason: Invalid congestion due to a software defect.

Report Generated: 11/11/2014 16:16:26