McCULLOUGH RESEARCH

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"Response to McCullough Research Report 'May and October 2012 Gasoline Price Spikes on the West Coast' ": A Rebuttal by McCullough Research

On February 6, 2013, Western States Petroleum Association (WSPA) issued a critique prepared by Stillwater Associates of our November 2012 report concerning the causes of the West Coast's two gasoline price spikes in May and October 2012.[1] Overall, WSPA's critique does not offer an explanation for the price spikes, nor does it perform any analyses that would justify its opinions. Because WSPA's response is poorly organized, we first rebut its conclusion and then the four "errors" cited in its executive summary.

Western States Petroleum Association	Rebuttal
Conclusion: The gasoline price spikes of 2012 are entirely explainable using publically available data, are consistent with competitive market behavior, and are inconsistent with the McCullough paper's contention that refiners may have agreed to allocate production targets in order to maintain higher prices.	The rebuttal contains no substantive explanation of the price spikes and identifies no errors. The unnamed author's own website describes the October price spike as unprecedented and asks the reader for help in finding an explanation (see attachment A).
1. Inaccurate description of the market, including incorrectly blaming the May and October spikes on refinery outages that occurred in February and August.	This may be a typographic error. Tupper Hull of WSPA has taken the position that the February fire in Washington State was a cause of the May price spike. Our report casts doubt on this argument.
2. Use of the wrong measures for inventory and price analysis, which lead to the incorrect conclusion that price spikes are not correlated with gasoline production shortfalls.	The alternative variables WSPA recommends also do not provide a statistically significant explanation. The recommendation to use wholesale prices instead of retail prices makes little sense for an analysis of changes in retail prices, especially for an industry characterized by a degree of vertical integration. Including intermediate products in the calculation of finished product inventories is also questionable since consumers are unable to purchase or use intermediate products.
3. Regression analysis that is not explanatory and uses the wrong variables.	WSPA takes issue with the statement that PADD 5 prices are not explained by PADD 5 production and inventory levels, but provides no evidence to the contrary.
4. Incorrectly linking emissions data, gasoline production, and news service reporting of maintenance shutdowns, concluding that refiners are exercising market power.	A careful reading of the report indicates that WSPA is in agreement with the points made in our report, including the conclusion that press coverage was inaccurate in explaining the May peak as a function of maintenance outages.

[1] "Response to McCullough Research Report 'May and October 2012 Gasoline Price Spikes on the West Coast'", Western States Petroleum Association (Stillwater Associates), February 6, 2013.

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WSPA's Conclusion

> *"The gasoline price spikes of 2012 are entirely explainable using publically available data, are consistent with competitive market behavior, and are inconsistent with the McCullough paper's contention that refiners may have agreed to allocate production targets in order to maintain higher prices."*

WSPA actually does not address fundamental causes or provide an explanation for the 2012 price spikes, other than to state that retail prices are lagged and increase faster than they decline.[2] There are no explanatory statistics or new data. Stillwater Associates' own website states:

> "Our analysis of California gasoline production and inventories does not reveal clear insight into the drivers of the spike. Production was about the same as the prior weeks and the prior year. Inventories were low on October 1st, at the bottom of the 5 year average, but not dramatically low.
>
> The cause of this spike is likely the confluence of a number of problems and mistakes by market participants, but the magnitude of this price spike that was unprecedented. Stillwater would like to understand the problems as we think there may be energy policy changes made because of the spike. If you have any insight into this issue, please let us know."[3]

Our review of the May and October 2012 price spikes noted that increasing levels of gasoline inventory make it difficult to ascribe the spikes to a shortage. Citing the absence of market oversight and detailed data, we recommended an investigation and the introduction of market oversight consistent with the existing oversight of other energy sources.

[2] Ibid., page 7.
[3] http://www.stillwaterassociates.com/index.php?option=com_content&view=article&id=193:what-caused-the-october-gasoline-price-spike-in-alifornia&catid=40:white-papers&Itemid=155

WSPA's Executive Summary Point 1

1. *Inaccurate description of the market, including incorrectly blaming the May and October spikes on refinery outages that occurred in February and August.*

This is an unusual claim, since WSPA cites the February outage as a cause of the May price spike. Our report criticized this explanation. In short, WSPA has rebutted its own position.

WSPA's response states:

> "The McCullough paper misses the mark on the causes of the May and October price spikes. The paper claims 'The May spike was blamed on the February 18 fire at the Cherry Point refinery and the October spike was blamed on the August 6 fire at the Richmond refinery.'[11]"[4]

The end of the quotation taken from our November report directs the reader to footnote 11, which is missing. WSPA is most likely referencing pages 4 and 5 of our report, which states the exact opposite:

> "The May spike was blamed on the February 18 fire at the Cherry Point refinery and the October spike was blamed on the August 6 fire at the Richmond refinery. The lengthy delay between cause and effect makes these explanations suspect. It is not the refinery outage itself that increases price, but rather the impact of the outage on supply. Moreover, if a decline in production levels causes price increases – a hypothesis at odds with the statistical data – prices should have risen soon after the outages and not two or three months later."

On page 13, WSPA quotes and cites our November report correctly, but concludes:

> "This is the heart of the matter. Because correct price and inventory tools were not used, in the analysis, 'the impact of the outage on sup-

[4] "Response to McCullough Research Report 'May and October 2012 Gasoline Price Spikes on the West Coast'", WSPA (Stillwater Associates), February 6, 2013, page 10.

> ply' could not be determined. All of the subsequent analysis in the McCullough report is wrong because of this fundamental mistake."[5]

WSPA appears to say that if we had used the correct price and inventory data, we would have discovered that the Cherry Point fire in February 2012 was the cause of the price spike in May 2012. As WSPA should know, using intermediate product inventories and California spot prices for an analysis of a Washington State supply interruption (Cherry Point is the largest oil refinery in Washington) is difficult since the data are not available for this state.

WSPA does refute the notion that the Cherry Point and Richmond refinery outages caused the high prices in May and October 2012:

> "While it is true that these two refineries had fires that caused their crude oil processing units to shut down, by ignoring key facts, the McCullough paper fails to explain that these incidents had only a peripheral impact on the events in May and October."[6]

Strangely enough, the position WSPA ascribes to our report was articulated by Tupper Hull, Vice President, Strategic Communications, in a television interview last year:

> "The situation that we had here, it was not only associated with the refinery in the Puget Sound area. The spring is when refineries throughout the West Coast do this very important maintenance . . . normally that maintenance schedule is handled in a way that we as consumers see very little impact. This year, with that taking place and this unfortuante accident, I think at least according to the published reports we've seen, that appears to be what caused this short period of time when the system on the West Coast was a bit short of fuel."[7]

In October 2012, Stillwater Associates itself pointed to a series of refinery outages in 2012 that resulted in low gasoline inventories in California:

> "Gasoline inventories in California have been low due to a series of refinery outages throughout the year. In March BP's Cherry Point refin-

[5] "Response to McCullough Research Report 'May and October 2012 Gasoline Price Spikes on the West Coast'", WSPA (Stillwater Associates), February 6, 2013, page 13.
[6] Ibid., page 10.
[7] "High Gas Prices in the Northwest". *Straight Talk*. KGW-TV. Portland, Oregon, June 23, 2012.

> ery had a fire....In August the crude unit at Chevron's Richmond refinery went up in flames and is expected to be off-line for the rest of the year."[8]

We stand by our conclusion on page 8 of our November 2012 report:

> "The production and inventory data from the CEC suggests an alternative explanation for the May and October price spikes. As mentioned, the California gasoline market is highly concentrated with a limited number of refineries, no ready access to gasoline supplies outside the West Coast, and very little market data. This is an environment where market power, defined as the ability of a few producers to set prices outside of market forces, is likely to exist."[9]

WSPA's Executive Summary Point 2

2. *Use of the wrong measures for inventory and price analysis, which lead to the incorrect conclusion that price spikes are not correlated with gasoline production shortfalls.*

WSPA argues that an analysis of price spikes should use a wholesale price and consider intermediate inputs to gasoline in addition to the stocks of gasoline. WSPA references an old (2003) Energy Information Administration study produced in response to a request by then Congressman Doug Ose.[10] A primary focus of the study was the price impact of the shift from MBTE to ethanol. The EIA's statistical analysis of retail price lags used data from June 2000 through October 2003.[11]

WSPA's argument that analysis should consider wholesale and not retail prices in an investigation of retail price spikes appears contradictory on its face. If we were investigating market power or market manipulation among wheat farmers, we would certainly focus on the wholesale price of wheat, since farmers seldom own bakeries and bakeries seldom own supermarkets.

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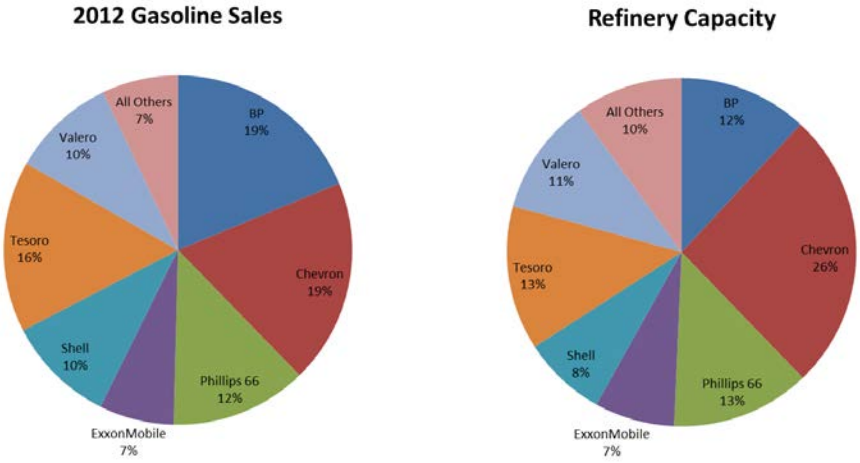
[8] http://www.stillwaterassociates.com/index.php?option=com_content&view=article&id=193:what-caused-the-october-gasoline-price-spike-in-california&catid=40:white-papers&Itemid=155
[9] "May and October 2012 Gasoline Price Spikes on the West Coast", McCullough Research, November 15, 2012, page 8.
[10] U.S. Energy Information Administration, 2003 Gasoline Price Study Final Report, November 2003.
[11] Ibid., page 82.

The situation is entirely different for gasoline. The same seven firms that own 90% of the refining capacity also comprise 92% of retail gasoline sales in California.[12,13,14] This level of vertical integration means that the wholesale spot price represents only a fraction of the gasoline sold in California. Transfers between vertically integrated refineries and their captive retailers would not be reflected in this price.



The 2003 EIA study specifically addressed a production shift – replacing MBTE with ethanol – and thus focused accordingly at the production level. Our November 2012 report focused on retail price spikes and market structure, so the price actually paid by the consumer is the appropriate variable.

WSPA's argument that an analysis of price spikes should include the stocks of gasoline is more interesting. Intermediate products are often found in industry, e.g., bauxite in aluminum, taconite in steel, pulp in papermaking, and chlorine in a variety of chemical products. In each case, vertical integration is common, but secondary markets in the intermediate products also occur. Since we are not aware of West Coast independent price data for blending components like alkylate, it would appear that these intermediate products are not routinely bought and sold on the West Coast.[15]

Is WSPA recommending that inventory data be redefined to include intermediate products? This suggests that it would improve the correlation between prices, pro-

[12] http://energyalmanac.ca.gov/petroleum/refineries.html
[13] The data are taken from sales and production information through October 2012.
[14] http://www.boe.ca.gov/sptaxprog/spftrpts.htm
[15] When we asked OPIS for a price series for alkylate, we were told that the data are only available for the Gulf Coast.

duction, and inventory. As noted in our report, the correlation between production and retail prices is not statistically significant. After the Cochrane-Orcutt correction for autocorrelation, only the world oil price is significant. The results are no better using a combined inventory of finished and intermediate gasoline components. A simple regression using California data indicates that the combined inventory is significant at the 99% level:

Source	SS	df	MS	Number of obs =	663
				F(3, 659) =	2292.41
Model	325.643529	3	108.547843	Prob > F =	0.0000
Residual	31.204236	659	.047350889	R-squared =	0.9126
				Adj R-squared =	0.9122
Total	356.847765	662	.539044962	Root MSE =	.2176

gasprice	Coef.	Std. Err.	t	P>|t|	[99% Conf.	Interval]
brent	.0232954	.0002848	81.81	0.000	.0225598	.0240311
totalgasol~n	.0001049	.0000169	6.20	0.000	.0000611	.0001486
totalstocks	-.0000357	7.45e-06	-4.78	0.000	-.0000549	-.0000164
_cons	1.113395	.1566836	7.11	0.000	.7086329	1.518158

The residuals are autocorrelated with a Durbin-Watson statistic of .2151192. The standard Cochrane-Orcutt adjustment yields:

Cochrane-Orcutt AR(1) regression -- iterated estimates

Source	SS	df	MS	Number of obs =	662
				F(3, 658) =	17.11
Model	.214226019	3	.071408673	Prob > F =	0.0000
Residual	2.74578697	658	.004172929	R-squared =	0.0724
				Adj R-squared =	0.0681
Total	2.96001299	661	.004478083	Root MSE =	.0646

gasprice	Coef.	Std. Err.	t	P>|t|	[99% Conf.	Interval]
brent	.0052236	.000748	6.98	0.000	.0032913	.0071559
totalgasol~n	3.35e-07	5.68e-06	0.06	0.953	-.0000143	.000015
totalstocks	-7.27e-06	4.31e-06	-1.69	0.092	-.0000184	3.86e-06
_cons	3.12735	.4508878	6.94	0.000	1.962562	4.292139
rho	.99431					

Durbin-Watson statistic (original) 0.215119
Durbin-Watson statistic (transformed) 0.657901

Again, we find that the explanatory variables for inventory and production are not significant. The data remain autocorrelated after the Cochrane-Orcutt adjustment.

This would make a finding that the coefficient of total gasoline production is more significant than zero completely inappropriate.

WSPA's response also asserts:

> "The lagged response is often complex. In some situations spot or wholesale price increases trigger a sharp run-up in street pricing, which only gradually returns to 'normal' differentials relative to rack or spot. This asymmetric response, often characterized as 'rockets and feathers' results from the highly opportunistic market monitoring and independent price-setting exercised by numerous dealers and wholesale operators in the retail sales segment."[16]

WSPA does not comment on the contradiction between the sharp (and very temporary) spot price increase in October 2012 and the statistical results in Appendix D of the 2003 EIA study.[17]

The point of our November 2012 report was to obtain the data to determine which explanation was correct; simply assuming the answer is an ineffective replacement for a careful investigation. Moreover, explaining perceptions of shortage when gasoline inventories are increasing appears doubtful. Inventory increases during periods when prices are rising sharply are more easily explained by market power or market manipulation than the assumption of lags and asymmetric responses.

WSPA's Executive Summary Point 3

3. *Regression analysis that is not explanatory and uses the wrong variables.*

WSPA has an interesting view of statistical tools. Our report noted that "Current production levels for both West Coast and California have no statistically significant

[16] "Response to McCullough Research Report 'May and October 2012 Gasoline Price Spikes on the West Coast'", WSPA (Stillwater Associates), February 6, 2013, page 7.
[17] U.S. Energy Information Administration, 2003 Gasoline Price Study Final Report, November 2003, page 80. The lag structure implied in the 2000–2003 data would appear to be very different than the immediate price response in October 2012.

impact on the price of gasoline."[18] Our point was that simple supply and demand theories of the price spikes have not fit the data well.

Oligopolistic markets, i.e. markets with few players, tend to be difficult to explain by simple supply and demand analysis. WSPA asserts:

> "By May, stocks were low and the delay at Cherry Point sent prices up. Similarly, stocks were low during the ExxonMobil utility power interruption, which resulted in the final spike of the year."[19]

There is little statistical evidence that this is so. As we noted in our report, the only variable which stays significant after the Cochrane-Orcutt regression is the world oil price. Even so, serial correlation in the residuals is still present.

Our simple model underestimates the price spike impact on West Coast consumers by including explanatory variables at their simple regression values. Our estimate of the impact of the price spike on consumers would be higher if we restricted the explanation to only the world oil price.

WSPA does not offer a competing model or include any statistical evidence for its claims. As mentioned, WSPA's conclusion is that "The gasoline price spikes of 2012 are entirely explainable using publically available data, are consistent with competitive market behavior...".[20] Ironically, a spokesperson for Stillwater Associates offered a markedly different position during the October 2012 price spike:

> "'Where's the hurricane?' Dave Hackett asks.
>
> The price that traders paid for California gasoline – the 'spot price' – jumped $1.16 in two weeks. Yet the longtime watcher of California gasoline production doesn't have a real good guess about what's driven California gas prices to record highs in a shockingly quick time frame."[21]

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[18] "May and October 2012 Gasoline Price Spikes on the West Coast", McCullough Research, November 15, 2012, page 1.
[19] "Response to McCullough Research Report 'May and October 2012 Gasoline Price Spikes on the West Coast'", WSPA (Stillwater Associates), page 12.
[20] Ibid, page 24.
[21] Lansner, Jonathon. "How Did Gas Prices Go Into Panic Mode?." *Orange County Register,* October 8, 2012.

Stillwater Associates has stated that the Cherry Point and Richmond refinery outages in 2012 are the most reasonable explanation for the October 2012 price spikes.[22] It has also stated that the "magnitude of the price spike...was unprecedented."[23]

Its published comments and review of the October price spike on its website are entirely consistent with our analysis – the price spikes cannot be explained by a simple application of supply and demand.

WSPA's Executive Summary Point 4

4. *Incorrectly linking emissions data, gasoline production, and news service reporting of maintenance shutdowns, concluding that refiners are exercising market power*

This section of WSPA's critique is difficult to follow. WSPA agrees that press reports can give a misleading picture of the market, but apparently considers it inappropriate to check them against public environmental reports – including Continuous Emission Monitoring (CEM) data.

Unlike many other energy sources, oil and gasoline facilities have little public data.[24] This lack of transparency undoubtedly drives the widely held belief that large oil companies exercise their market power to push prices above what would occur in a normal competitive market situation. It is a common practice in the public utility sector for companies to submit plant level data to state public utility commissions and the EIA.[25] No governmental entity currently exists which fulfills the same purpose for the oil and gasoline market. Given the high degree of vertical integration and market concentration in California, we recommend that refinery data should be public. In the absence of such data, secondary sources, such as reports to environmental authorities, are useful substitutes.

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[22] "Response to McCullough Research Report 'May and October 2012 Gasoline Price Spikes on the West Coast'", WSPA (Stillwater Associates), page 12.
[23] See Attachment A to this rebuttal.
[24] Power plants, for example, have detailed data available at both the Federal Energy Regulatory Commission (FERC) and the EIA. Hourly production data for larger units are available at the Environmental Protection Agency.
[25] For example, see http://www.eia.gov/electricity/data/detail-data.html. Following the 2000–2001 market manipulation in California, FERC requires wholesale transaction data as well; see http://www.ferc.gov/docs-filing/eqr.asp

WSPA notes that California's air quality authorities do not accumulate throughput, production, or inventory data.[26] While the amount of data available from these sources is limited, it provides a way to check whether press reports are accurate.

We are glad that the WSPA agrees that media coverage of the refinery outages was misleading. One of our concerns is that incorrect press reports of this nature can be used to exercise market power. Our November 2012 report discussed several inconsistencies in Reuters and *The Wall Street Journal* press reports between devices reported to be shut down and the nitrogen oxide (NOx) CEM data submitted to environmental authorities.[27]

Access to the public startup and shutdown reports at the Bay Area Air Quality Management District (BAAQMD) was delayed as some refineries objected to the release of public reports. We have since received official shutdown and startup notifications and have found that discrepancies between device emissions and dates for shutdowns and startups remained. Below, we discuss three notable irregularities at Chevron Richmond, Shell Martinez, and Exxon Mobil Torrance. The significance of these irregularities is that the press coverage has been the source of explanations for both the May and October outages. In both cases, the underlying environmental data brings the press coverage – and the subsequent explanations – into question.

The Chevron Richmond May 2012 Equipment Shutdown

In May 2012, several press reports suggested that Chevron Richmond shut down the FCCU and Hydrotreater.[28,29] Our November 2012 report found that these press reports were inconsistent with the CEM emissions data submitted to BAAQMD.[30] When we obtained the official shutdown filings after the release of our November report, we discovered that the actual devices shut down were the Light Neutral Hydrocracker, Light Neutral Hydrofinisher, #5 Rheniformer, and the #5 Naphtha Hy-

[26] "Response to McCullough Research Report 'May and October 2012 Gasoline Price Spikes on the West Coast'", WSPA (Stillwater Associates), page 18.
[27] "May and October 2012 Gasoline Price Spikes on the West Coast", McCullough Research, November 2012, page 10.
[28] "Refinery Status: Delta Airlines Trainer Refinery to Begin Turnaround on July 4", Dow Jones Business News, June 25, 2012.
[29] "Refinery Status: FCCU, Hydrotreater Work Underway At Chevron Richmond", Dow Jones Newswire, May 15, 2012.
[30] "May and October 2012 Gasoline Price Spikes on the West Coast", McCullough Research, November 15, 2012, page 12.

drotreater.[31] We also discovered the following abnormalities.

First, Chevron's original shutdown notification was not provided to us with our public records request. Chevron contested release of these public documents which entailed a substantial delay before they were released. The report describing the May equipment shutdowns has not been provided to us. Instead, we received four revisions to the original shutdown submission. We have been told by BAAQMD staff that the original notification for this shutdown cannot be found.[32] Chevron's repeated revisions over just a few days are unique in the materials we have reviewed.

Second, the four revisions to the original notification changed the startup dates for the Light Neutral Hydrocracker and the #5 Naphtha Hydrotreater. The first revision said the Light Neutral Hydrocracker would start up on or about June 7, and subsequent revisions changed the date from May 26 to May 30, and then back to May 26. The startup date for the #5 Naphtha Hydrotreater was changed from an unknown original startup date to May 22.[33] None of the revisions referenced the equipment reported in the press.

Third, it is unusual for refineries to keep confidential the names of employees who submit reports. All of the names on Chevron's official shutdown reports were meant to be redacted, but our careful review indicates the vast majority were submitted by Tim Burchfield, an Environmental Specialist for Chevron. It appears as though the May 2012 shutdown reports were submitted by a different Chevron employee based on systematic differences in the report. The identity of the second person filing the revised reports was also redacted.

Fourth, actual CEM emissions values were replaced during the shutdown with "substituted values". Devices included in the filing that could be cross-checked with emissions data include the #5 Rheniformer and the #5 Naphtha Hydrotreater. In both cases, actual values were replaced with substituted values during the periods of reported shutdowns. It is unclear why Chevron substituted CEM values during this shutdown, and Chevron's Title V Permit does not include a discussion of the use of substituted values in CEM reporting requirements. In contrast, when the #5 Rheni-

[31] Shutdown and startup reports are faxed from the refinery to the BAAQMD to comply with its Title V permit, Section I, Condition J.3.
[32] Email from Rochelle Reed, Public Records, BAAQMD, January 10, 2013.
[33] The repeated revisions are highly unusual. Chevron Richmond sent faxes on the same equipment on May 19, May 23, and two on May 26. BAAQMD was unable to find any notification from May 12 as stated in Reuters, May 13, 2012.

former was shut down in November of 2009, CEM emissions values were zero; thus, we do not know what the emission levels were during the May shutdown.

Fifth, the Naphtha Hydrotreater was reported to be shut down from May 13 to May 20, yet the CEM data indicate that the unit actually started back up on May 17 – a three-day period where CEM data contradict the refinery's shutdown reports. It is important to note that a revised startup report was submitted by Chevron to BAAQMD on May 26, which still maintains that the Naphtha Hydrotreater was online as of May 20. It is not clear to us why this was not revised after the three-day discrepancy occurred.

The Shell Martinez May 2012 Equipment Shutdown

WSPA's response criticizes our investigation into the Shell Martinez May shutdown. Again, our November report indicated inconsistencies in the press reports with Shell's CEM emissions data submitted to BAAQMD. These official shutdown filings were also obtained by us after the release of our November report.[34] Devices in the filing that could be cross-checked with emissions data include the Delayed Coking Unit, Sulfur Recovery Unit #1, the Heavy Cracked Gasoline Hydrotreater (HGHT), and the #1 and #3 COB.

In our November 2012 report we argue that CEM data for the Shell Martinez refinery indicated that it was still offline when it had reported a startup. Shell's official notifications indicated these devices were shut down on or about Saturday, April 21. According to the emissions data, the HGHT shut down on April 25. Shell's official notification said these devices restarted on or about May 3, yet actual CEM data indicate that the HGHT was shut down until May 8 and normal operations were not resumed until May 16. The press coverage is also inaccurate. A Dow Jones report indicated that the HGHT was shut down on May 27, and the *San Jose Mercury* reported a startup date of May 16.

[34] "May and October 2012 Gasoline Price Spikes on the West Coast", McCullough Research, November 15, 2012, page 12.

The ExxonMobil Torrance October 2012 Power Outage Shutdown

Many industry commentators have pointed to a power outage at the ExxonMobil Torrance refinery on October 1, 2012 as the cause of the October price spike. To be absolutely clear, this is not our opinion, although the reporting of the outage raises questions.

On October 1, ExxonMobil reported a power outage to the Southern California Air Quality Management District (SCAQMD).[35] WSPA's only evidence for the dates of this shutdown is taken from press releases. Figure 9 in WSPA's response indicates that the ExxonMobil refinery outage lasted at least a week.[36] SCAQMD has not released a list of official shutdowns, but a telephone call by us to Sam Atwood, Media Office Manager for SCAQMD, confirmed that the refinery had shut down on October 1 and resumed operation by October 2.[37] Reuters quoted ExxonMobil stating that the refinery shut down on October 1 due to a power outage, but resumed the following day.[38]

Several points must be made about this shutdown and its relation to the October price spike. Initially, Stillwater Associates stated "This final hiccup in the supply system [at the ExxonMobil refinery] drove concerns about inadequate supplies and sent wholesale prices soaring."[39] This claim is inconsistent with inventory data from the California Energy Commission, which show an increase, not a sharp decrease, in inventories during October 2012.

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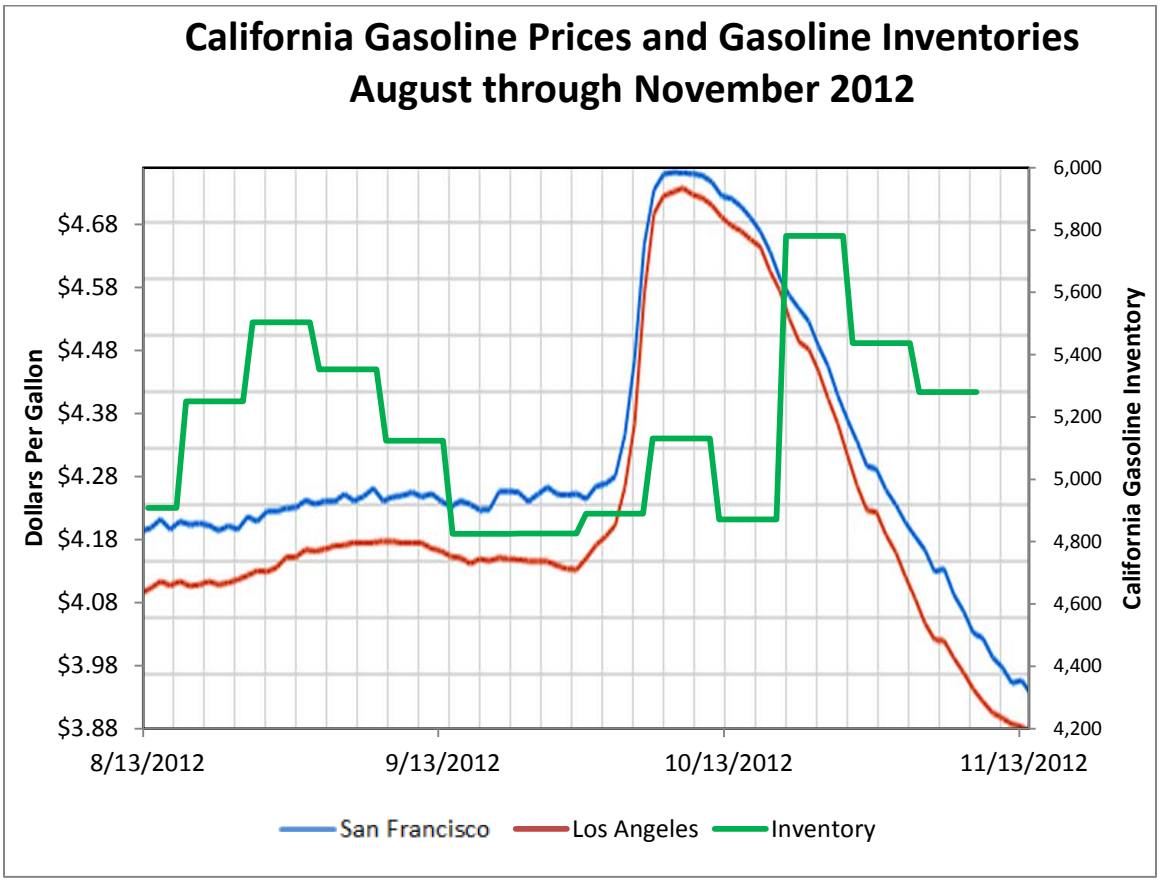
[35] Hernandez, Miriam. "ExxonMobil Torrance refinery investigated for effect on spiking California gas prices." *KABC-TV*: October 12, 2012.
[36] Figure 9 has a block of time comprising about a fourth of a month of time, representing the duration of the ExxonMobil shutdown. Interestingly, this chart also shows the outage beginning in late September, rather than October 1.
[37] Long, S. (2013, February 20). Telephone interview with Sam Atwood, SCAQMD.
[38] "Exxon says normalizing ops at Torrance, California, refinery." *Reuters*: October 2, 2012.
[39] http://www.stillwaterassociates.com/index.php?option=com_content &view=article&id=193:what-caused-the-october-gasoline-price-spike-in-california&catid=40:white-papers&Itemid=155



Furthermore, after the Torrance refinery shutdown announcement, in a Reuters article ExxonMobil indicated that "the power outage was expected to have a minimal impact on production at the refinery which is expected to meet all of its contractual obligations."[40] The data confirm that the impact on production resulting from this one day outage was minimal, which leads us to three possible conclusions:

1. Reuters was incorrect, in which case it is unclear why ExxonMobil would not have corrected such a significant error.
2. ExxonMobil was incorrect, which calls into question why it would have issued such a misleading statement.
3. Both Reuters and ExxonMobil were correct, and the refinery outage had little impact on the October 2012 price spikes.

[40] "Exxon says normalizing ops at Torrance, California, refinery." *Reuters*. October 2, 2012.

If 1 were true, we would expect that ExxonMobil would correct this false statement about its refinery productions. Not doing so would be misleading the public into believing that there is no cause for alarm. If 2 were correct, why would ExxonMobil issue such a patently false statement? If 3 were correct, then ExxonMobil's shutdown is not an explanation for the October spike. Therefore, it is unclear why WSPA is so convinced that ExxonMobil's outage resulted in the October spike.

It is also unclear why the electrical outage on October 1 would have caused a severe production outage in the Torrance refinery. ExxonMobil claimed the shutdown was a result of "a Southern California Edison (SCE) power supply interruption caused by its La Fresa substation, the main power feed for the refinery."[41] However, a Southern California Edison spokesperson stated that "the only electricity incident that morning was a 'flickering light-type condition'…like a hiccup – lasting less than a second according to residential customers in the area. He says there was no outage at the substation."[42] It is unclear how an electrical flicker that did not result in a substation outage shut the refinery down for a day. More importantly, why has this "flicker" been widely accepted as the reason why California gasoline prices shot through the roof in October 2012?

McCullough Research's Conclusions

WSPA's response provides no explanation, additional data, or statistical analyses for the price spikes in May and October 2012. Its proposed variable changes are neither substantive nor explanatory.

WSPA blames the May 2012 price spike on refinery outages, a fire at BP's Cherry Point refinery in Washington State, low inventory, extended refinery turnarounds, and the yearly transition from winter to summer gasoline blends. In our June 2012 report, we also noted the unusually high number of refinery maintenance announcements during May.[43]

Based on our experience with Enron, we suggest that erroneous information in the media can be a form of market manipulation. It was certainly a part of electricity

[41] Hernandez, Miriam. "ExxonMobil Torrance refinery investigated for effect on spiking California gas prices." *KABC-TV*: October 12, 2012.
[42] Ibid.
[43] "Analysis of West Coast Gasoline Prices", McCullough Research, June 5, 2012, page 2.

market manipulations in 1999, 2000, and 2001.[44] Since little information is available on refinery operations, an erroneous press release may have significant impacts on market prices.[45] As discussed above, there is evidence that this was a factor in both May and October 2012.

WSPA's response fails to prove – and explain – how normal market factors caused the West Coast gasoline price spikes in May and October 2012. Nor does WSPA identify any errors in our earlier analysis.

[44] The infamous "Silver Peak" exploit in 1999 involved selling massive amounts of fictitious electricity to the California PX in order to manipulate the perceptions in the market. Similar exploits took place in the following years.

[45] WSPA appears doubtful that such manipulations can actually occur: "The case involved an electricity provider trading in the electricity market not to the petroleum market." The actual trader comments at the time were:

> And then that way we going to put out that we are short NOx, we're short capacity factor—or we're worried about the capacity factor of units, and trying to get people to say look we can't – these levels don't make sense to do. Reliant Trader Tapes, June 20, 2000, 06:30

The significance of the Reliant trader tapes is that a major actor in the market was releasing erroneous information in order to affect market prices.

Attachment A

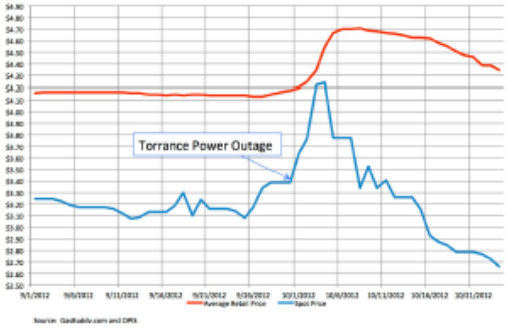
What Caused the October Gasoline Price Spike in California?

California is an island. Well, a gasoline island. Stringent air quality standards mandate the specially formulated blend of gasoline sold only in California. The state is further cut off by the lack of significant pipeline infrastructure connecting it to the rest of the country. Given that almost all of the gasoline sold in California is refined on the West Coast, it is particularly vulnerable to supply disruptions.

Gasoline inventories in California have been low due to a series of refinery outages throughout the year. In March BP's Cherry Point refinery had a fire. Other smaller market disruptions occurred throughout the spring leading to a PADD 5 inventory level on May 18th of 24.1 million barrels, the lowest inventory level in more than ten years. In August the crude unit at Chevron's Richmond refinery went up in flames and is expected to be off-line for the rest of the year. In September, several refineries were hit with unplanned maintenance, in addition to several plants that had process units down for planned work. But the event that kicked the supply-squeeze into full gear was the unexpected loss of power at ExxonMobil's Torrance refinery on October 1st. This final hiccup in the supply system drove concerns about inadequate supplies and sent wholesale prices soaring.

What's interesting is the unusual magnitude of the price increase. Spot prices started to rise the week before the Torrance outage, going from $3.08 per gallon on September 25th to $3.29 on September 28th. The day of the power outage at the Torrance refinery, the spot price for CARBOB was $3.39. By that Thursday, October 4th, the price had gone up another 61 cents to $4.24. On October 7th Governor Jerry Brown directed the California Air Resources Board to allow refiners to increase supply by blending winter-grade gasoline and spot prices began to drop. On October 10th the spot price for CARBOB was $3.34 and the price has continued to fall, to $2.66 on October 24th. Unfortunately retail prices remain high at $4.35 in Los Angeles on October 24th.

Los Angeles Spot & Retail Gasoline Prices
Ending 10/24/2012



Apart from consumers, unbranded service stations were the hardest hit by the price spike. It has been reported that refiners declined to sell to unbranded customers. On Monday, October 1st signs were posted at Tesoro's Southern California terminals saying "unbranded open rack gas out till further notice." Unbranded services stations, including Costco, were sent scrambling to find supply.

Our analysis of California gasoline production and inventories does not reveal clear insight into the drivers of the spike. Production was about the same as the prior weeks and the prior year. Inventories were low on October 1st, at the bottom of the 5 year average, but not dramatically low.

The cause of this spike is likely the confluence of a number of problems and mistakes by market participants, but the magnitude of this price spike that was unprecedented. Stillwater would like to understand the problems as we think there may be energy policy changes made because of the spike. If you have any insight into this issue, please let us know.