Jesse N. Marquez

Public Comments

White House - Office of Management & Budget (OMB) Meeting

October 24, 2019

The Office of Management & Budget
725 17th Street, NW
Washington, DC 205503
202-395-3080

Reference:

Reconsideration of Amendments
EPA's Proposal to Roll Back the Chemical Disaster Rule

ENVIRONMENTAL PROTECTION AGENCY
40 CFR Part 68
[EPA–HQ–OEM–2015–0725; FRL–9954–46–OLEM]
RIN 2050–AG82

Accidental Release Prevention Requirements:
Risk Management Programs Under the Clean Air Act

AGENCY: Environmental Protection Agency (EPA).

ACTION: Final rule.

Docket ID No. EPA–HQ–OEM–2015–0725

Office of Management & Budget:

My name is Jesse N. Marquez, I am 67 years old and I live in Wilmington, California 90744, a City of Los Angeles Environmental Justice Harbor Community most of my life. I am also the founder and executive director of the Wilmington community-based environmental justice organization the Coalition For A Safe Environment created in April 2001.

I wish to state for the record that I oppose the proposed EPA changes and roll-backs to the Risk Management Program Regulations because they do not protect me, my family and my community's legal rights to a safe, heathy and sustainable environment.

The U.S. EPA has provided no significant validated or substantiated technical, scientific, economic or legal basis for its proposed changes and roll-backs.

EPA and the Oil & Gas Industry cannot say they cannot afford to enact the new regulations

EPA and the Oil & Gas Industry cannot say they cannot afford to enact the new regulations because the Oil & Gas Industry have made enormous net profits in recent years.

The Oil & Gas Journal reported on April2, 2019, “A group of 58 US-based oil and gas producers and refiners reported full-year 2018 net earnings of $54.75 billion on revenues of $1,012 billion compared with full-year net earnings of $44.38 billion on revenues of $835.21 billion in 2017.”

In information obtained from the U.S. Energy Information Administration as reported by Inspectioneering on May 13, 2019. “U.S. Oil Companies' 2018 Profits Highest Since 2013.”

EPA and the Oil & Gas Industry cannot say they will lose world market share

EPA and the Oil & Gas Industry cannot say they will lose world market share because the U.S. Energy Information Administration reported on May 21, 2018, “The United States remained the world's top producer of petroleum and natural gas hydrocarbons in 2017, reaching a record high. The United States has been the world's top producer of natural gas since 2009, when U.S. natural gas production surpassed that of Russia, and the world's top producer of petroleum hydrocarbons since 2013, when U.S. production exceeded Saudi Arabia’s. Since 2008, U.S. petroleum and natural gas production has increased by nearly 60%.”

EPA and the Oil & Gas Industry cannot say that petroleum incidents are decreasing significantly

Every year major oil refinery fires, explosions and incidents continue to occur throughout the United States.

Rand Corporation study contradicts EPA’s proposed changes and roll-backs and justifications

In 2016, the Rand Corporation published a report titled, “Cost-Benefit Analysis of Proposed California Oil and Gas Refinery Regulations,” commissioned by California Department of Industrial Relations and California Environmental Protection Agency. I now reference our Abstract of relevant information.

ABSTRACT

Objective The objective of this study was to assess the costs and benefits of the proposed California PSM and California Accidental Release Prevention regulations that are designed to improve the safety of oil and gas refineries operating in the state of California.

These costs and benefits fall into four categories:

1. Costs to industry (to implement the regulation)
2. Costs to society (a pass-through of certain industry costs)
3. Benefits to industry (costs avoided)
4. Benefits to society (costs avoided and other improvements and fewer worker deaths).

FINDINGS

1. We calculate costs in 12 major areas that the regulations cover: safety training, damage mechanism reviews, root-cause analysis, hierarchy-of-hazard-control analysis, process safety culture assessment, program management, performance indicators, human factors, safeguard protection analysis (SPA), layer-of-protection analysis (LOPA),

process hazard analysis, and other (or undifferentiated) costs. We base these estimates on detailed answers that refiners provided for a set of structured interview questions designed as part of the study to elicit the expected marginal costs of the proposed regulations for various aspects of PSM.

Summing costs from all refiners produced a best estimate of $58 million per year for refiners to maintain compliance with the proposed regulations.

2. We have estimated the price impact of the proposed regulations under the assumptions that additional regulatory costs will be passed on to consumers through increased gasoline prices and that demand for gasoline is perfectly inelastic. In recent years, gasoline consumption in California has averaged about 14.5 billion gallons per year.

   Spreading the $58 million estimated cost of the regulations across this volume of sales indicates an increase in price of about $0.004 per gallon. Aggregating this to calculate the impact on the average adult Californian gives an estimated cost per person of about $2 per year, with a low estimate of $0.68 and a high estimate of $6.20 per person per year.

3. Safety improvements could result from implementing the proposed regulation. These safety improvements could reduce the number of major refinery incidents (MRIs) at California refineries.

   We found no evidence, however, that the proposed regulations would reduce the long-term operating costs of California refineries.

   a. Safety improvements could result from implementing the proposed regulation. These safety improvements could reduce the number of costly MRIs (CMRIs). In the study, we estimated the costs of a costly major incident for a California refinery (an incident that has a macroeconomic impact of greater than $1.5 billion on the California economy). At least three refinery incidents of this magnitude have occurred in California since 1999. Our analysis reveals that the average cost of such an incident to the refiner that suffers the incident is at least $220 million.

      Therefore, a benefit to industry of the proposed regulation is that the costs of major incidents could be reduced in the future.

   b. Our analysis of gasoline prices in California versus the rest of the United States in response to the 2015 incident at Exxon Mobil Corporation's Torrance Refinery indicated a cost to California drivers of nearly $2.4 billion, which took the form of a prolonged $0.40 increase in gasoline prices.

      In quantitative terms, the largest potential benefit of the proposed regulations is the avoided cost of fuel supply disruption related to a future MRI.

      Macroeconomic analysis indicates that the lost supply associated with this one incident reduced the size of the California economy by $6.9 billion.

A reduction in the number of refinery incidents would enable Californians to avoid other costs that would be incurred by residents who live near the refinery afflicted by the incident.

These include costs for:

- Emergency Services
- Health Care
- Reductions in Property Values
- Reductions in Local Tax Revenue to Local Governments.

My Personal Experience as an Oil Refinery Explosion Survivor and Environmental Justice Organization Community-Science Researcher

On March 28, 1969 the Fletcher Oil & Refining Company in the City of Carson exploded in front of my house in the Los Angeles city community of Wilmington. I was 17 years old at the time. All 8 members of my family were burned with 1st degree to 3rd degree burns. My Grandmother was burned the worse with permanent 3rd degree burns and scars on her neck, shoulder and arm. She was in the front yard gardening at the time of the explosions.

Three fuel storage tanks exploded in 5-7 minutes. There were no refinery safety personnel, no fire department firemen and no city public safety there when the explosions occurred. There was no automatic fire suppression system at this oil refinery. We could not escape in our car after the first explosion because of the crashed cars in the streets in front of our home, flames of fire extending from the refinery across the street to the front of our home and a second explosion taking place. We then held hands and began to run to the corner of the street to escape, when the third tank exploded it was larger than the other two. A huge and wide ball of flame and smoke was coming at our house. My parents yelled at me to help my younger brothers and sister over the backyard block wall to escape, while my father helped my grandmother and 7 month pregnant mother over the wall.

I then jumped over the fence and was beginning to run when I heard a woman's voice yell at me "boy, boy please turn around." I stopped and turned around and I could see a blond woman whose face was burned and she was holding a baby in her arms and the babies face and blanket were also burned. She yelled at me and said please save my baby and she threw her baby over the wall for me to catch like a football and she said run as fast as you can and save my baby. There are no hospitals in Wilmington and so I ran until I found a medical clinic and left the baby there.

The cause of the explosion and disaster was caused by a gas leak from a storage tank. It was also reported that two back-up safety systems failed to work. The entire oil refinery would have exploded and burned burn had it not been for an injured refinery worker who made it to the control center to shut down the refinery operations.

This accident could have been prevented if there has been a $ 2,000 off-the shelf Gas Leak Detector installed on the tank or nearby as a precautionary measure. It also could have been prevented if there were more frequent tank inspections and if the two refinery workers had grounded their vehicles which when started caused an electrical spark which ignited the fugitive leaking combustible gas. There would have been less injuries to the public if the oil refinery had as a SOP-Standard Operating Procedure Safety Explosion Practice Drills.

On February 18, 2015 ExxonMobil Oil Refinery in Torrance just a few miles from Wilmington exploded. The Electro-Static Precipitator (ESP) exploded sending a shower of toxic ash throughout the Torrance residential community and public schools.

Two months later two California Senate Committees held a public hearing at the Torrance City Hall. They asked the ExxonMobil Plant Manager what caused the explosion and he said he did not know because there was nothing in the ESP that could explode. They asked the Fire Department and a dozen other people why the explosion occurred and not one could provide an answer.

They then opened public comment and I got in line to speak. When it was my turn to speak I told them that I knew within one hour after the explosion why the ESP exploded. The Chair of the committee hearing asked if I worked for the refinery and I said no, he asked if I was a Petroleum Engineer and I said no. He then asked me how did I know? I said I used Common Sense and went on-line to an internet search engine and I looked up ESP explosions. I found out that the only way an explosion can occur is if there was an external combustible gas that enters the ESP which was then ignited by the electro-static charges. So in other words a gas leak.

I also spoke with some refinery workers and they stated that they held smelled a gas odor in the air and reported it to management and they did nothing.

The Chemical Industry and Petroleum Industry all claim that they are over regulated. But sadly they have not followed “lessons learned” from past history as to how to prevent explosions at refineries. Their refusal to conduct a Root Cause Analysis, Additional Safety Audits, Comprehensive Risk Assessments, Equipment & Process Audits and incorporate New Feasible Safer Technologies has resulted in yearly fires and explosions at Chemical and Petroleum Facilities throughout the US.

A $ 2,000 off-the-shelf Industrial VOC-Volatile Organic Compounds Gas Detector for detecting leaks could have prevented the explosions in Wilmington and Torrance. Mandating in Title V Permits that VOC Gas Detectors be installed in all potential explosive sources is another safe and cost-effective measure.

Mandating in Title V Permits that Vapor Recovery Systems be installed on fuel storage tanks instead of Gas Pressure Release Valves is another inexpensive, cost-effective off-the-shelf safety technology.

The Torrance ExxonMobil explosion also revealed another terrible potential disaster in the making. The Chemical Safety Board also categorized this explosion as a Near Miss because a 15,000 lb. piece of metal came within inches of hitting a storage tank containing Hydrofluoric Acid. If the tank had been ruptured the escaping gas would kill everyone in minutes within 2 miles.

The Valero Oil Refinery in Wilmington also uses Hydrofluoric Acid and if that tank had been ruptured the gas would also kill everyone in minutes within 2 miles. Since the city of Long Beach borders this oil refinery Long Beach residents would also be casualties. The Valero Oil Refinery also borders the Port of Long Beach and the Port of Los Angeles.

A new August 2019 released earthquake fault study in Wilmington has disclosed, “The Wilmington Blind-Thrust Fault: An Active Concealed Earthquake Source beneath Los Angeles, California.” “The size of the fault suggests that it is capable of generating moderate-magnitude earthquakes (Mw 6.3–6.4), whereas potential linkages with other nearby faults (e.g., Huntington Beach,

Torrance, and Compton) pose the threat of larger multi-segment events (Mw > 7). These earthquakes would directly impact the overlying Ports of Los Angeles and Long Beach, as well as the broader Los Angeles metropolitan area.

But I now what to bring to your attention to the subject of Risk Factors. Traditionally EPA and Industry only consider risks at facilities but we the public and impacted EJ Communities where these facilities exist want to inform you of Significant External Risks that you fail to include.

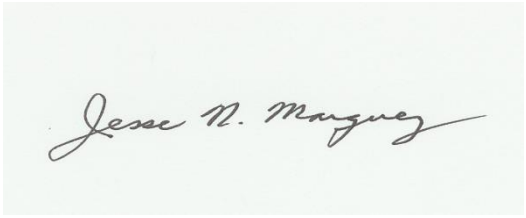
I have prepared two separate documents for you, one is a map and the other a list which identifies 12 external facilities and industry operations less than 1,000' from Valero Oil Refinery which can also catch on fire and explode which could impact Valero and cause the release of Hydrofluoric Acid.

We the Public, Workers and First Responders have a right to know what toxic, hazardous and explosive chemicals are stored, used and manufactured at a Chemical and Petroleum Facility. There is no acceptable trade secret when it comes to the lives of residents in bordering communities. 50,000-100,000 residents could die within 10 minutes of a Hydrofluoric Acid release.

Hospitals and Clinics need to know immediately what chemicals have been released in the atmosphere that the public and children have been exposed to. There are numerous circumstances when patients are being treated for a typical asthma attack when in fact they have been exposed to other toxic chemicals. These require a blood or urine test, further examinations, treatment and long-term health monitoring.

On Monday June 11, 2018 while participating in a Toxic Tour of the ExxonMobil/PBF Oil Refinery community with California South Coast Air Quality District Board Members in Torrance, Teachers at a Middle School were asked about their knowledge about Hydrofluoric Acid and any special training that they have received from the school district. Everyone stated that the school district provided no information on HF and no training on what to do in the event of an accidental release of HF. A Teacher also commented that even if they had to Shelter-In-Place they have no ladder to reach the high windows in order to shut them and seal them.

Respectfully Submitted,



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OIL&GAS JOURNAL

Apr 2nd, 2019

https://www.ogj.com/refining-processing/refining/article/17222671/us-producers-2018-results-improved-on-higher-prices-volumes

US producers' 2018 results improved on higher prices, volumes

A group of 58 US-based oil and gas producers and refiners reported full-year 2018 net earnings of $54.75 billion on revenues of $1,012 billion compared with full-year net earnings of $44.38 billion on revenues of $835.21 billion in 2017.

US OIL AND GAS FIRMS' FOURTH QUARTER 2018 REVENUES, EARNINGS

	Revenues		Net income		Revenues		Net income	
	4th quarter				Full year			
	2018	2017	2018	2017	2018	2017	2018	2017
	Million $ (US)							
Anadarko Petroleum Corp.	3,269.0	3,042.0	102.0	976.0	13,382.0	11,908.0	615.0	(456.0)
Antero Resources Corp.	1,021.7	1,045.6	486.9	(121.5)	1,744.5	3,655.6	(848.8)	615.1
Apache Corp.	1,703.0	1,640.0	(381.0)	456.0	7,348.0	5,887.0	40.0	1,304.0
Black Stone Minerals LP	246.0	95.4	158.9	16.8	609.6	429.7	274.5	152.1
Bonanza Creek Energy Inc.	66.2	50.2	106.1	(5.8)	276.7	192.1	168.2	(2.4)
Brazos Valley Longhorn LLC	243.7	180.2	229.0	14.1	947.4	427.2	87.3	31.1
Cabot Oil & Gas Corp.	716.3	400.5	275.0	(44.4)	2,188.1	1,764.2	557.0	100.4
California Resources Corp.	1,078.0	455.0	346.0	(138.0)	3,064.0	2,006.0	328.0	(266.0)
Callon Petroleum Co.	161.9	118.2	1,154.4	21.0	587.6	366.5	293.1	113.1
Carrizo Oil & Gas Inc.	273.3	246.8	260.3	(17.0)	1,065.9	745.9	376.1	78.5
Centennial Resources Development Co.	222.5	166.1	31.0	30.5	891.0	430.0	199.9	75.6
Chesapeake Energy Corp.	3,069.0	2,519.0	486.0	309.0	10,231.0	9,496.0	775.0	813.0
Chevron Corp.	42,352.0	37,616.0	3,730.0	3,111.0	166,339.0	141,722.0	14,824.0	9,195.0
Cimarex Energy Co.	624.1	550.9	316.2	174.7	2,339.0	1,918.2	791.9	494.3
CNX Resources Corp.	431.7	460.3	101.9	276.6	1,730.4	1,455.1	796.5	380.7
Comstock Resources Inc.	153.5	73.2	50.3	(42.3)	390.3	255.3	(28.6)	(111.4)
Concho Resources Inc.	1,067.0	780.0	1,513.0	267.0	4,151.0	2,586.0	2,286.0	956.0
ConocoPhillips	9,666.0	8,119.0	1,868.0	1,579.0	38,727.0	32,584.0	6,257.0	(825.0)
Continental Resources Inc.	1,149.3	1,047.2	197.7	841.9	4,709.6	3,120.8	988.3	789.4
Denbury Resources Inc.	338.4	326.6	174.5	126.8	1,473.6	1,129.8	322.7	163.2
Devon Energy Corp.	3,708.0	2,380.0	1,149.0	183.0	10,734.0	8,878.0	3,064.0	898.0
Diamondback Energy Inc.	631.8	399.2	306.7	114.6	2,176.3	1,205.1	845.7	482.3
Dorchester Minerals LP	22.3	19.5	17.3	14.2	73.3	57.3	53.9	38.4
EOG Resources Inc.	4,574.5	3,340.4	892.8	2,430.5	17,275.4	11,208.3	3,419.0	2,582.6
EQT Corp.	1,245.1	1,033.5	(636.7)	1,280.1	4,557.9	3,091.0	(2,244.6)	1,508.5
Extraction Oil & Gas Inc.	288.2	214.0	99.9	(30.6)	1,060.7	604.3	114.6	(44.4)
ExxonMobil Corp.	68,253.0	65,312.0	6,000.0	8,380.0	290,212.0	244,363.0	2,084.0	19,710.0
Gulfport Energy Corp.	416.0	397.8	134.0	156.5	1,355.0	1,320.3	430.6	435.2
Hess Corp.	1,650.0	1,663.0	(4.0)	(2,677.0)	6,466.0	5,391.0	(328.0)	(4,120.0)
HollyFrontier Corp.	4,344.2	3,992.7	141.9	521.1	17,714.7	14,251.3	1,098.0	805.4
Jagged Peak Energy Inc.	138.5	104.4	186.3	12.8	581.6	267.3	165.5	(76.5)
Jones Energy Inc.	53.9	54.5	(1,191.1)	(5.3)	236.4	188.6	(1,298.8)	(109.4)
Laredo Petroleum Inc.	215.3	240.3	149.6	408.6	1,105.8	822.2	324.6	549.0
Marathon Oil Corp.	1,380.0	1,336.0	390.0	(28.0)	6,582.0	4,765.0	1,096.0	(5,723.0)
Marathon Petroleum Corp.	32,333.0	21,055.0	951.0	2,016.0	97,102.0	75,369.0	2,780.0	3,432.0
Matador Resources Co.	193.4	165.1	136.7	38.3	899.6	544.3	274.2	125.9
Murphy Oil Corp.	664.7	580.5	103.4	(286.8)	2,570.6	2,225.1	411.1	(311.8)
Noble Energy Inc.	1,197.0	1,201.0	(824.0)	494.0	4,986.0	4,256.0	(66.0)	(1,118.0)
Oasis Petroleum Inc.	599.8	434.9	222.0	124.6	2,321.9	1,293.7	(35.3)	123.8
Occidental Petroleum Corp.	4,762.0	3,492.0	706.0	497.0	18,934.0	13,274.0	4,131.0	1,311.0
Parsley Energy Inc.	454.9	311.5	53.8	49.9	1,826.4	967.0	369.1	106.8
PDC Energy Inc.	794.8	189.5	178.9	77.6	1,548.7	921.6	2.0	(127.5)
Penn Virginia Corp.	124.9	54.3	200.7	(10.8)	440.8	160.1	224.8	32.7
Phillips 66	29,098.0	29,746.0	2,240.0	3,198.0	114,217.0	104,622.0	5,595.0	5,106.0
Pioneer Natural Resources Co.	2,677.0	1,526.0	324.0	665.0	9,415.0	5,455.0	978.0	833.0
QEP Resources Inc.	410.5	429.0	(629.3)	150.3	1,932.6	1,622.9	(1,011.6)	269.3
Range Resources Corp.	1,072.6	679.0	(1,764.4)	221.2	3,282.6	2,611.0	(1,746.5)	333.1
Ring Energy Inc.	9.8	23.3	(0.5)	(4.5)	120.1	66.7	9.0	1.8
Sanchez Energy Corp.	259.9	246.0	90.0	(79.4)	1,056.9	740.3	(3.5)	(35.1)
Sandridge Energy Inc.	85.1	93.2	54.2	(18.8)	349.4	357.3	(9.1)	47.1
SilverBow Resources Inc.	88.2	58.7	56.8	25.1	257.3	195.9	74.6	72.0
SM Energy Inc.	394.2	340.5	309.7	(26.3)	2,067.1	1,129.4	508.4	(160.8)
Southwestern Energy Co.	1,175.0	809.0	307.0	267.0	3,862.0	3,203.0	535.0	815.0
Unit Corp.	214.8	204.8	(77.8)	89.2	843.3	736.9	(45.3)	117.8
Valero Energy Corp.	28,730.0	26,392.0	952.0	2,371.0	117,033.0	93,980.0	3,122.0	4,065.0
W&T Offshore Inc.	143.4	129.1	138.8	23.4	580.7	487.1	248.8	79.7
Whiting Petroleum Corp.	473.2	474.4	204.0	(798.3)	2,081.4	1,481.4	342.5	(1,237.6)
WPX Energy Inc.	1,022.0	155.0	354.0	(42.0)	2,025.0	1,016.0	143.0	(31.0)
Totals	**261,751.6**	**228,209.3**	**23,128.9**	**27,632.6**	**1,012,080.2**	**835,207.8**	**54,758.8**	**44,387.0**

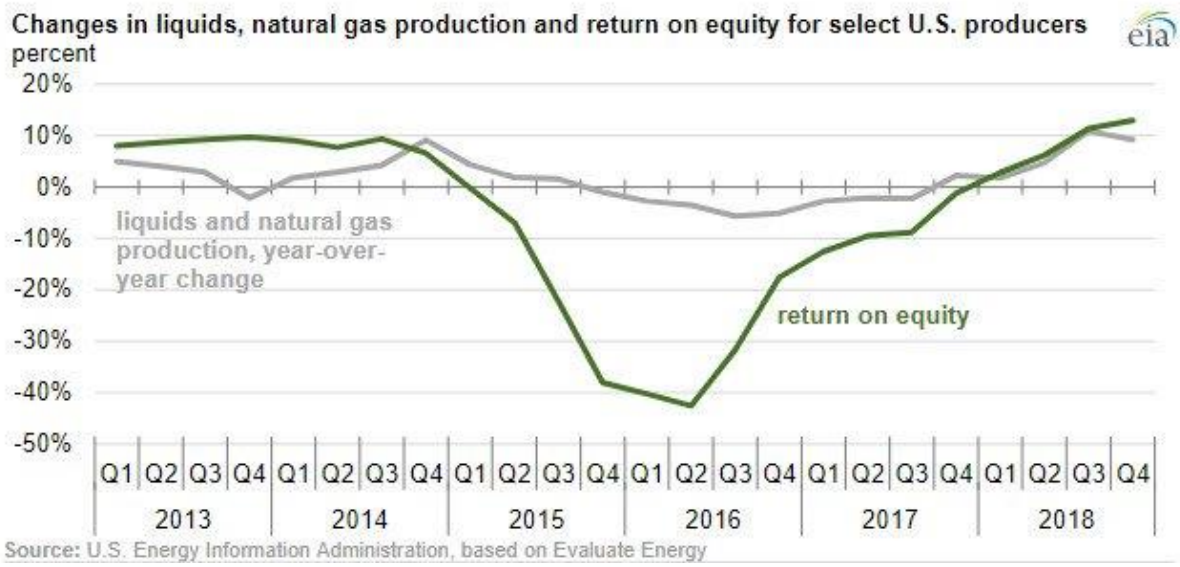
Inspectioneering

U.S. Oil Companies' 2018 Profits Highest Since 2013

U.S. Energy Information Administration, May 13, 2019

https://inspectioneering.com/news/2019-05-13/8453/us-oil-companies-2018-profits-highest-since-2013

Net income for 43 U.S. oil producers totaled $28 billion in 2018, a five-year high. Based on net income, 2018 was the most profitable year for these U.S. oil producers since 2013, despite crude oil prices that were lower in 2018 than in 2013 on an annual average basis.



Lower production costs per barrel of oil equivalent (BOE) and increased production levels contributed to a higher return on equity for these companies for the fourth quarter of 2018 than in any quarter from 2013 through 2018.

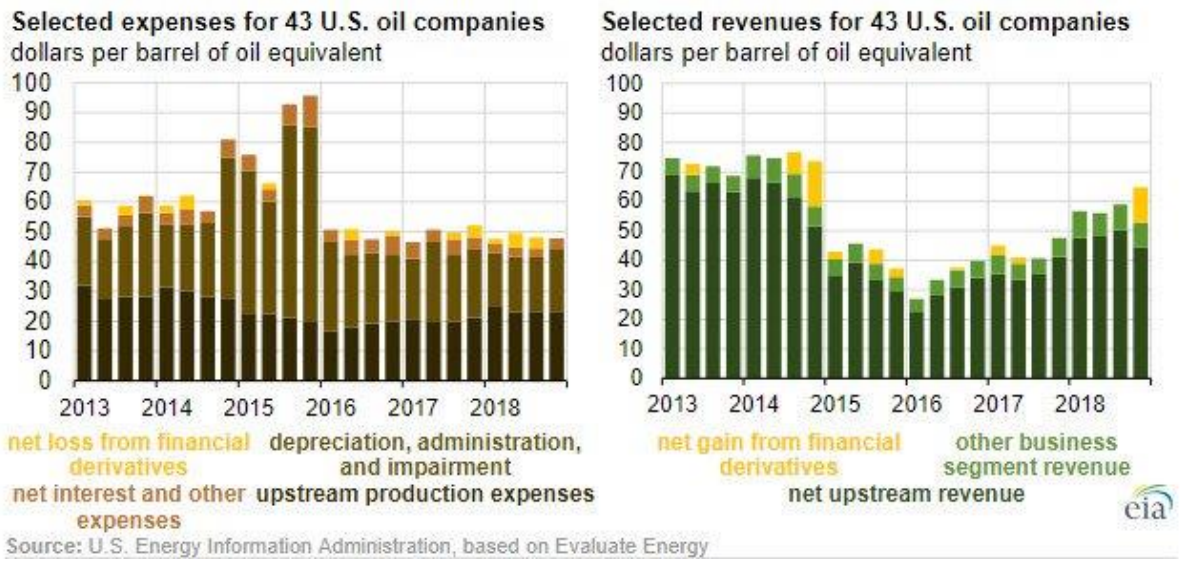
The companies included in the analysis are listed on U.S. stock exchanges, and as public companies, they must submit financial reports to the U.S. Securities and Exchange Commission. EIA calculates that these companies accounted for about one-third of total U.S. crude oil and natural gas liquids production in the fourth quarter of 2018. However, these companies were not selected as a statistically representative sample but instead because their results are publically available. Their results do not necessarily represent the U.S. oil production industry as a whole.

Most of these companies operate in Lower 48 U.S. onshore basins, with some in the Federal Offshore Gulf of Mexico and Alaska, and some in several other regions across the globe. Because of various corporate mergers and acquisitions in 2018, the number of U.S. producers that EIA examined in this analysis fell from 46 companies in 2017 to 43 companies in 2018.

The aggregated income statements for these 43 companies reveal a trend of relatively low increases in expenses directly related to upstream production in 2018. Although these upstream production expenses per barrel typically correlate with crude oil prices, the magnitude of these increases in 2018 was small compared with the increase in prices.

The annual average West Texas Intermediate (WTI) crude oil price increased 28% from 2017 to average $65 per barrel (b) in 2018, but expenses directly related to upstream production activities increased 16% between 2017 and 2018 to $24/BOE. When including depreciation, impairments, and other costs not directly related to upstream production, expenses for these 43 companies averaged $48/BOE in 2018, the lowest amount from 2013 to 2018.

In contrast to production expenses, between 2017 and 2018, upstream revenue for these 43 companies increased 31% to average $48/BOE in 2018, mainly because of the increases in average energy prices and production. As crude oil prices fell in late 2018, their upstream revenue declined 11% between the third and fourth quarters of 2018.



However, this group of companies reported financially hedging nearly one-third of their fourth-quarter 2018 production at prices in the mid-$50/b range, offsetting revenue declines when WTI prices fell lower than $50/b by the end of the year. Consequently, even with their decline in upstream revenue in the last quarter of 2018, total revenue increased for these 43 companies because of the gains from financial derivatives.

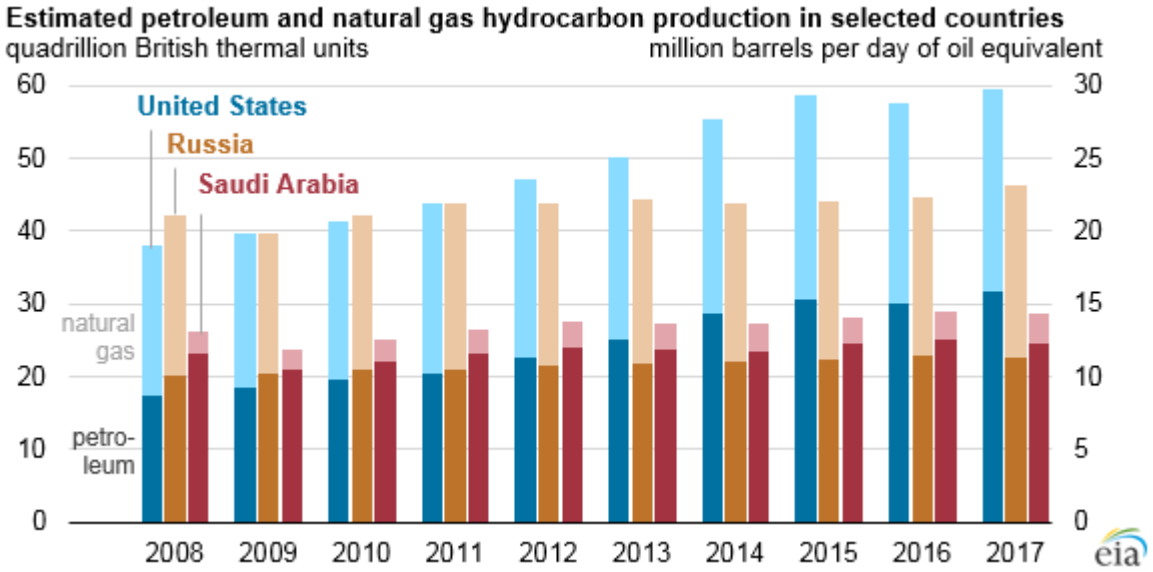
Contributions to revenue from derivative hedges—which increase in value when prices decline—for these 43 companies reached the largest total for any quarter since the fourth quarter of 2014. Financial hedging can act like an insurance policy, reducing risk by stabilizing revenue for producers. When oil prices fall lower than the prices at which producers established a hedge, the producer effectively receives higher revenues than selling at market prices. When oil prices rise higher than the hedged price, hedging results in a loss that is treated as an operating expense.

Independent Statistics & Analysis
U.S. Energy Information Administration

May 21, 2018

https://www.eia.gov/todayinenergy/detail.php?id=36292

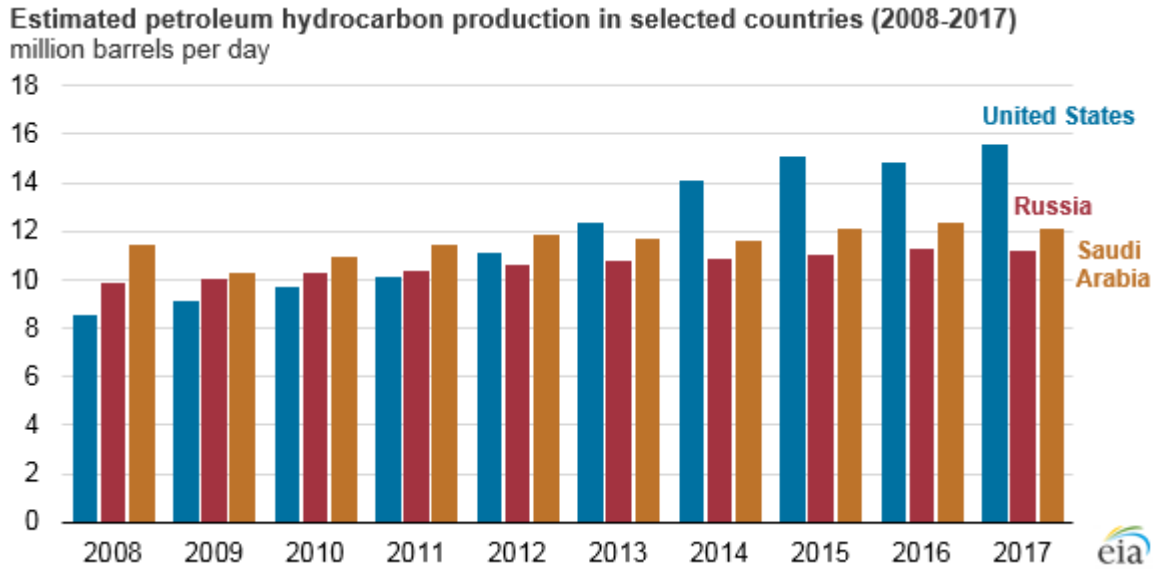
United States remains the world's top producer of petroleum and natural gas hydrocarbons



Source: U.S. Energy Information Administration

The United States remained the world's top producer of petroleum and natural gas hydrocarbons in 2017, reaching a record high. The United States has been the world's top producer of natural gas since 2009, when U.S. natural gas production surpassed that of Russia, and the world's top producer of petroleum hydrocarbons since 2013, when U.S. production exceeded Saudi Arabia's. Since 2008, U.S. petroleum and natural gas production has increased by nearly 60%.

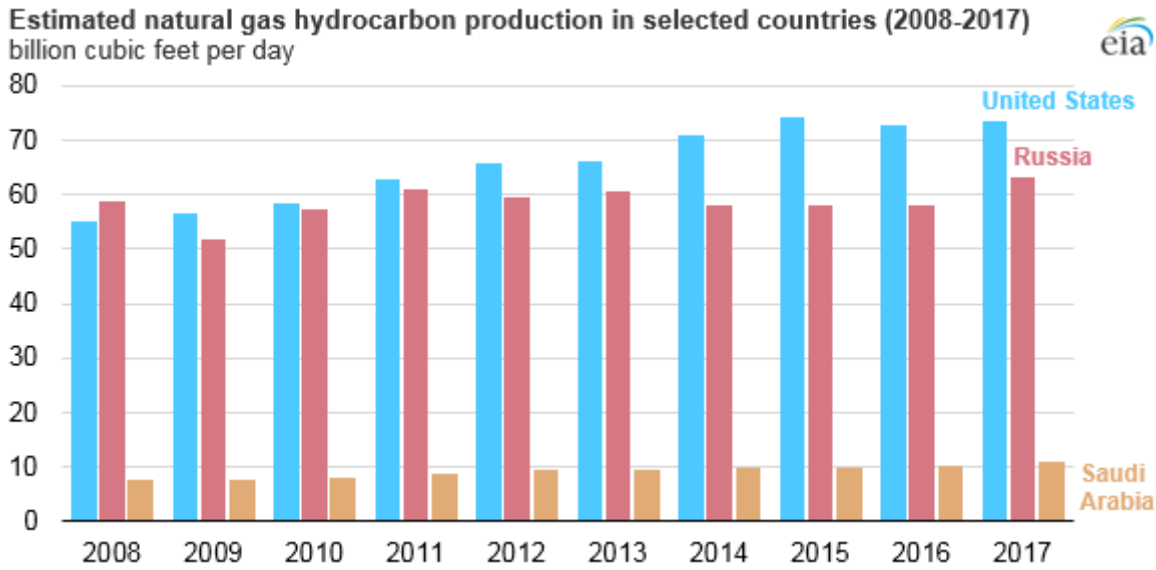
For the United States and Russia, total petroleum and natural gas hydrocarbon production, measured in energy content, is almost evenly split between petroleum and natural gas, while Saudi Arabia's production heavily favors petroleum. Total petroleum production is made up of several different types of liquid fuels, including crude oil and lease condensate, tight oil, extra-heavy oil, and bitumen. In addition, various processes produce natural gas plant liquids (NGPL), biofuels, and other liquid fuels, some as a result of refinery processing gain.



Source: U.S. Energy Information Administration

U.S. petroleum production increased by 745,000 barrels per day (b/d) in 2017, driven by a 21% increase in oil prices to approximately $65 per barrel. In the United States, crude oil and lease condensate accounted for 60% of total petroleum hydrocarbon production in 2017, and natural gas plant liquids accounted for 24%. Saudi Arabia and Russia have much smaller volumes of natural gas plant liquids, as well as refinery gain and biofuels production, which combined account for most of the remaining share of U.S. petroleum production.

U.S. dry natural gas production grew slowly in early 2017 because of unfavorable economic conditions at that time. Production increased during the last nine months of the year, ultimately leading to a 5.7 billion cubic feet per day (Bcf/d) difference between the first quarter and fourth quarter of 2017. From 2016 to 2017, domestic dry natural gas production increased by 1%, and U.S. liquefied natural gas exports quadrupled. Consumer natural gas demand was mixed, as a result of warmer winter weather compared with 2016 and higher natural gas prices contributing to a 7% decline in natural gas consumption for power generation.



Source: U.S. Energy Information Administration

Russian and Saudi natural gas production expanded significantly in 2017, at 8% and 6% year-on-year growth, respectively. In contrast, Russian and Saudi total liquids production fell in 2017 compared with 2016. Saudi Arabia and Russia lowered oil production as part of an agreement by the Organization of the Petroleum Exporting Countries (OPEC) and some non-OPEC producers (including Russia) to reduce total crude oil production in an effort to lower global oil inventories.

Saudi Arabia's petroleum production is critical to the Saudi economy, but it is specifically important as a source of domestic energy because the country burned nearly 0.5 million b/d of crude oil for electricity generation in 2017. The continued development of the Wasit, Hasbah, and Arabiyah natural gas fields is expected to reduce the country's long-term reliance on power generation from crude oil.

In EIA's May Short-Term Energy Outlook (STEO), U.S. petroleum and other liquid fuels production is expected to increase, reaching 17.6 million b/d in 2018 and 19.1 million b/d in 2019, up from 15.6 million b/d in 2017.

The May STEO forecasts Russian liquid fuels production to average 11.2 million b/d in 2018 and in 2019, the same as the 2017 production level. The STEO provides a production forecast for members of OPEC as a whole rather than for individual countries. Total liquids production for OPEC, which was 39.3 million b/d in 2017, is forecast to be 39.2 million b/d in 2018 and 39.5 million b/d in 2019. This forecast takes into account recent agreements among OPEC member countries, as well as pledges by some non-OPEC producers, such as Russia, to reduce output. However, noncompliance is expected to increase toward the end of 2018.

Principal contributors: Linda Doman, Ari Kahan

Cost–Benefit Analysis of Proposed California Oil and Gas Refinery Regulations

Daniel Gonzales, Timothy R. Gulden, Aaron Strong, William Hoyle

2016

https://www.rand.org/content/dam/rand/pubs/research_reports/RR1400/RR1421/RAND_RR1421.pdf

ABSTRACT

Objective The objective of this study was to assess the costs and benefits of the proposed California PSM and California Accidental Release Prevention regulations that are designed to improve the safety of oil and gas refineries operating in the state of California.

These costs and benefits fall into four categories:

5. Costs to industry (to implement the regulation)
6. Costs to society (a pass-through of certain industry costs)
7. Benefits to industry (costs avoided)
8. Benefits to society (costs avoided and other improvements and fewer worker deaths).

FINDINGS

4. We calculate costs in 12 major areas that the regulations cover: safety training, damage mechanism reviews, root-cause analysis, hierarchy-of-hazard-control analysis, process safety culture assessment, program management, performance indicators, human factors, safeguard protection analysis (SPA), layer-of-protection analysis (LOPA), process hazard analysis, and other (or undifferentiated) costs. We base these estimates on detailed answers that refiners provided for a set of structured interview questions designed as part of the study to elicit the expected marginal costs of the proposed regulations for various aspects of PSM.

   Summing costs from all refiners produced a best estimate of $58 million per year for refiners to maintain compliance with the proposed regulations.

5. We have estimated the price impact of the proposed regulations under the assumptions that additional regulatory costs will be passed on to consumers through increased gasoline prices and that demand for gasoline is perfectly inelastic. In recent years, gasoline consumption in California has averaged about 14.5 billion gallons per year.

   Spreading the $58 million estimated cost of the regulations across this volume of sales indicates an increase in price of about $0.004 per gallon. Aggregating this

to calculate the impact on the average adult Californian gives an estimated cost per person of about $2 per year, with a low estimate of $0.68 and a high estimate of $6.20 per person per year.

6. Safety improvements could result from implementing the proposed regulation. These safety improvements could reduce the number of major refinery incidents (MRIs) at California refineries.

   We found no evidence, however, that the proposed regulations would reduce the long-term operating costs of California refineries.

   a. Safety improvements could result from implementing the proposed regulation. These safety improvements could reduce the number of costly MRIs (CMRIs). In the study, we estimated the costs of a costly major incident for a California refinery (an incident that has a macroeconomic impact of greater than $1.5 billion on the California economy). At least three refinery incidents of this magnitude have occurred in California since 1999. Our analysis reveals that the average cost of such an incident to the refiner that suffers the incident is at least $220 million.

      Therefore, a benefit to industry of the proposed regulation is that the costs of major incidents could be reduced in the future.

   b. Our analysis of gasoline prices in California versus the rest of the United States in response to the 2015 incident at Exxon Mobil Corporation's Torrance Refinery indicated a cost to California drivers of nearly $2.4 billion, which took the form of a prolonged $0.40 increase in gasoline prices.

      In quantitative terms, the largest potential benefit of the proposed regulations is the avoided cost of fuel supply disruption related to a future MRI.

      Macroeconomic analysis indicates that the lost supply associated with this one incident reduced the size of the California economy by $6.9 billion.

      A reduction in the number of refinery incidents would enable Californians to avoid other costs that would be incurred by residents who live near the refinery afflicted by the incident.

      These include costs for:

      • Emergency Services
      • Health Care
      • Reductions in Property Values
      • Reductions in Local Tax Revenue to Local Governments.

Valero Oil Refinery

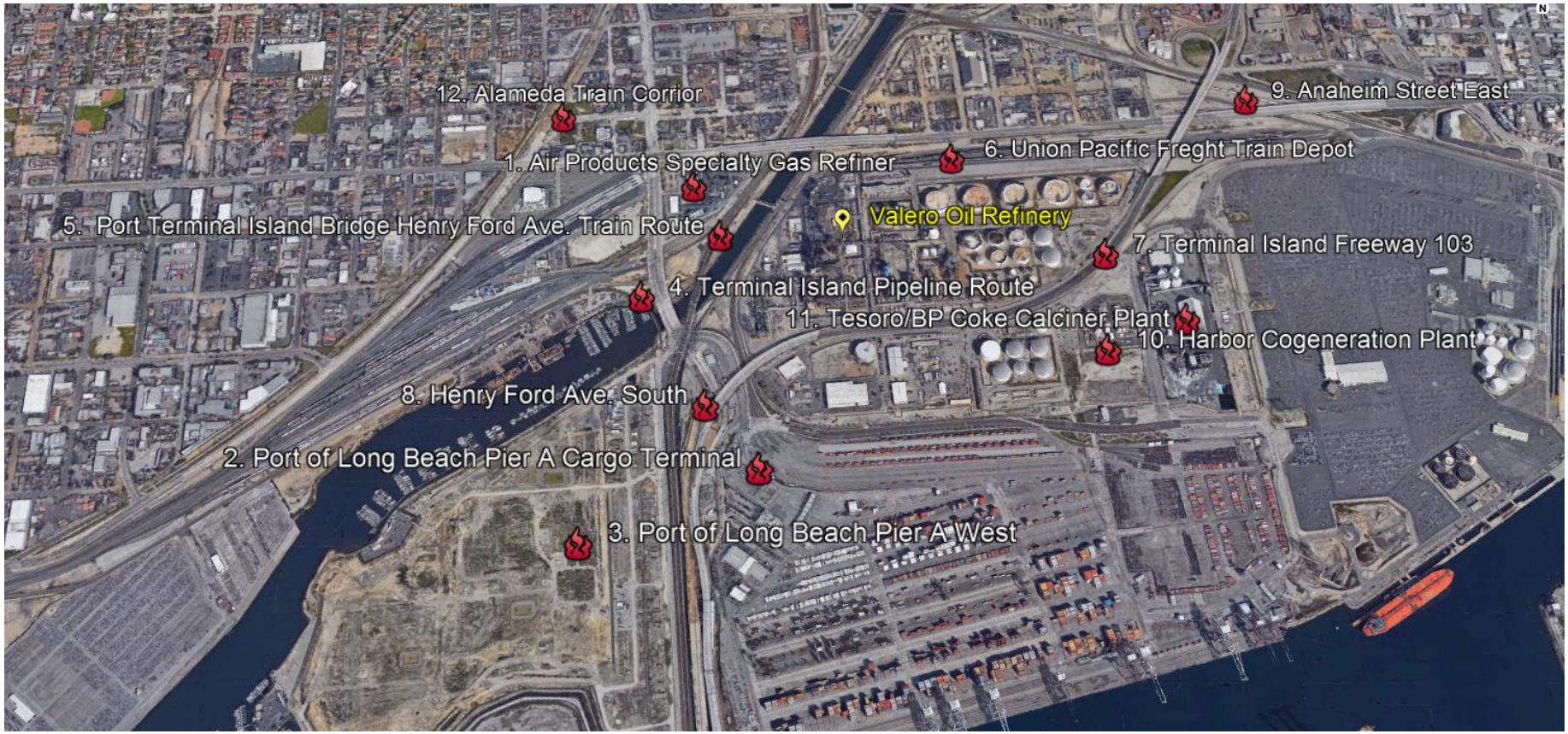
Wilmington - California

110,000 lbs. Hydrofluoric Acid Stored

External Facility Adjacent Industry Explosion Risk Factors

Less than 1,000'

1. **Air Products - Specialty Gas Refiner Fire/Explosion**
2. **Port of Long Beach Pier A Cargo Terminal Fire/Explosion**
3. **Port of Long Beach Pier A West Oil Drilling Field Fire/Explosion**
4. **Port Terminal Island Petroleum Terminal Fuel/Gas Pipeline Fire/Explosion**
5. **Port Terminal Island Bridge Henry Ford Ave. Train Derailment Fire/Explosion**
6. **Union Pacific Freight Depot Train Derailment Fire/Explosion**
7. **Port Terminal Island Bridge Terminal Island Freeway 103 Truck Accident Fire/Explosion**
8. **Port Terminal Island Henry Ford Ave. South to Alameda Street Corridor Truck Accident Fire/Explosion**
9. **Wilmington Anaheim Street East Truck Accident Fire/Explosion**
10. **Harbor Cogeneration Plant Fire/Explosion**
11. **Tesoro/BP Coke Calciner Plant Fire/Explosion**
12. **Alameda Train Corridor Train Derailment Fire/Explosion**


12. Alameda Train Corrior
9. Anaheim Street East
1. Air Products Specialty Gas Refiner
6. Union Pacific Freght Train Depot
Valero Oil Refinery
5. Port Terminal Island Bridge Henry Ford Ave. Train Route
7. Terminal Island Freeway 103
4. Terminal Island Pipeline Route
11. Tesoro/BP Coke Calciner Plant
10. Harbor Cogeneration Plant
8. Henry Ford Ave. South
2. Port of Long Beach Pier A Cargo Terminal
3. Port of Long Beach Pier A West