

LOUISIANA CRUDE OIL REFINERY SURVEY REPORT

Twentieth Edition
2014 Survey

Department of Natural Resources
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Foreword

Since 1989, the Technology Assessment Division of the Louisiana Department of Natural Resources (DNR) has periodically conducted surveys of Louisiana crude oil refineries. The results of the survey are compiled into a report focusing on developments that have occurred since the previous survey. These include an overview of the general direction of the industry and updated information on the current status of refinery ownership, mailing addresses, operating status, and key personnel. Tabulated statistical data, charts, and graphs relating to oil production, refinery crude oil sources, refinery margins, capacities, operating rates, and product slate are also presented. Information on both operating and non-operating refineries that are still intact is included.

The operating refining capacities, operating rates, and product slate statistics presented in this report are prepared from data supplied by survey respondents and the Refiner's Monthly Report (R3 report). The information on the non-operating refineries is obtained from their owners, trustees, or management personnel and is current within a few weeks of publication. The data used to construct the charts and graphs on oil production, refinery margins, and crude oil sources is obtained from DNR's database.

The time period covered by DNR's current report is January 1, 2014 – December 31, 2014, and is designed to complement the petroleum statistics published by the Energy Information Administration (EIA). DNR gratefully acknowledges permission to use the December 1, 2014 *Oil and Gas Journal* Worldwide Refining Survey results to provide another independent dataset for comparison.

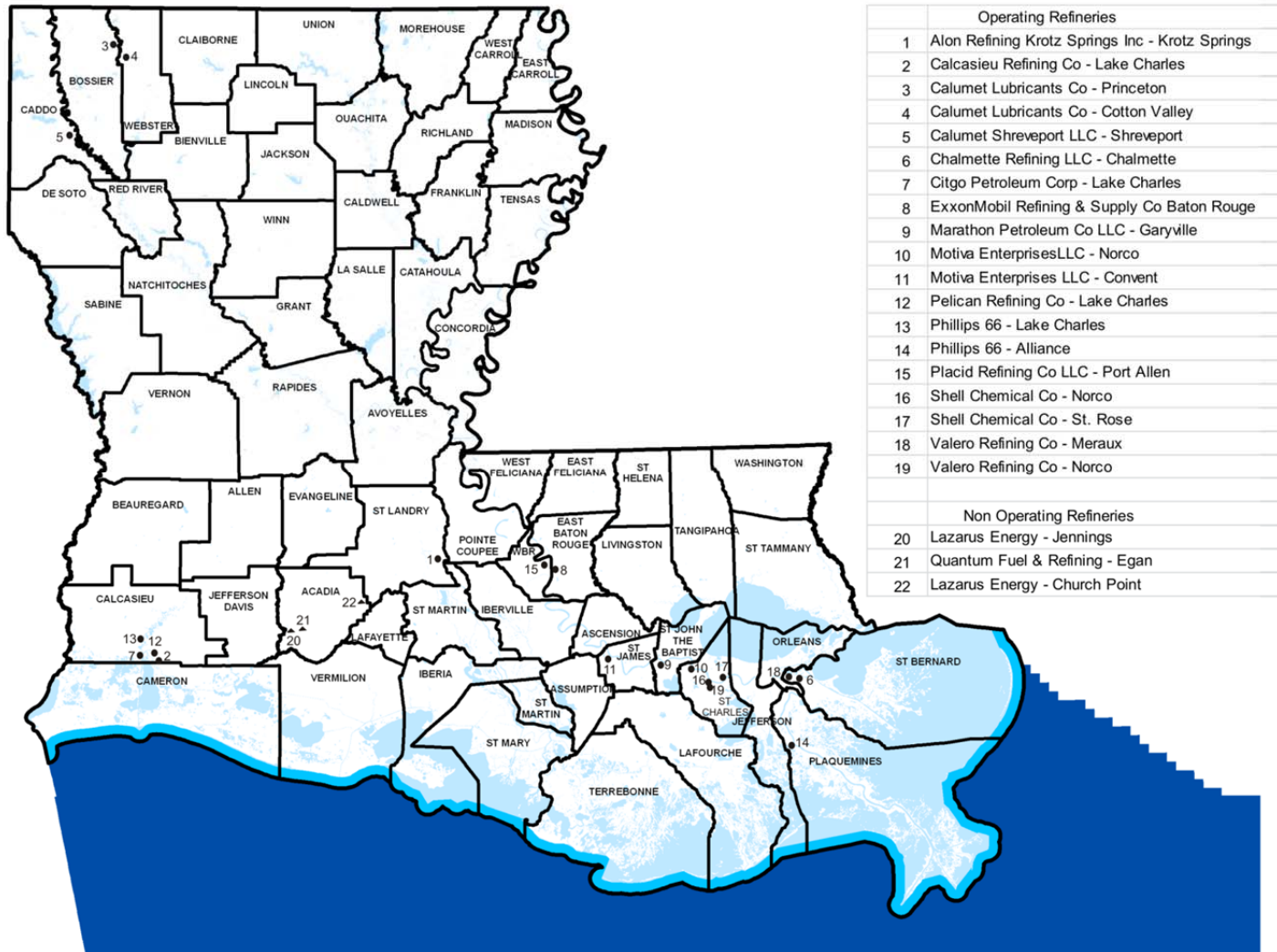
Louisiana motor fuels production from 2000 to 2014 is shown on Figure 7 (pg. 27), U.S. EIA Louisiana refineries data is shown in Table 14 (pg. 28) and Table 15 (pg. 31), and *Oil & Gas Journal*, Louisiana refineries data is shown in Table 16 (pg. 32).

The principal terms and phrases used in this report are the same as those used in EIA publications. The definitions of these terms can be found on the glossary of this report. The slight difference in meaning between *operable* and *operating*, when used to specify capacity or utilization rate, has caused some confusion. "Operable" refers to the maximum amount of crude oil capacity that a refinery can utilize to process crude oil in its atmospheric stills; "operating" refers to the amount of crude oil capacity actually utilized. See glossary for detailed definitions.

The Department of Natural Resources uses the information in this report to enhance the economic development efforts of the State by:

- Developing information on State and Federal energy policies that affect the oil and gas production and refining industries located in the State;
- Helping crude suppliers locate refining sources and refined petroleum product buyers locate sources of supply;
- Assisting new industries desiring to site facilities near refineries; and,
- Providing information to parties evaluating refineries for possible purchase.

Figure 1: Map and Highlights of Louisiana Refineries



Overview

Louisiana is a primary energy producing state with 622 million barrels in crude and lease condensate reserves (2013), ranking it 10th among the states (3nd if the Louisiana portion of the federal outer continental shelf (OCS) is included). Louisiana ranks 7th among the states in crude oil and lease condensate production, with an estimated 73.4 million barrels produced in 2014. The Central Gulf of Mexico OCS territory is the most extensively developed and matured OCS territory in the United States, and over 90% of this area is located adjacent to the Louisiana coastal boundary. The Central Gulf of Mexico OCS territory has produced approximately 90% of the 20 billion barrels of crude oil and condensate produced in the U.S. OCS areas through the end of 2014.

The discovery of these large quantities of crude oil led to the development of the refining and petrochemical industry in Louisiana. Louisiana's refining capacity grew with oil production until about 1970 when Louisiana's oil production peaked and began to decline. Refinery capacity continued to grow by processing more foreign oil and oil from other states as well. Approximately two thirds of refinery input is foreign crude.

All refineries and refining companies are not created equal. There are small refineries and large ones. Some are quite complex, while others are relatively simple. A number are part of major, integrated oil companies, and some are independent.

Table 1
Top 10 U.S. Refineries* by Operable Capacity
(As of January 1, 2015)

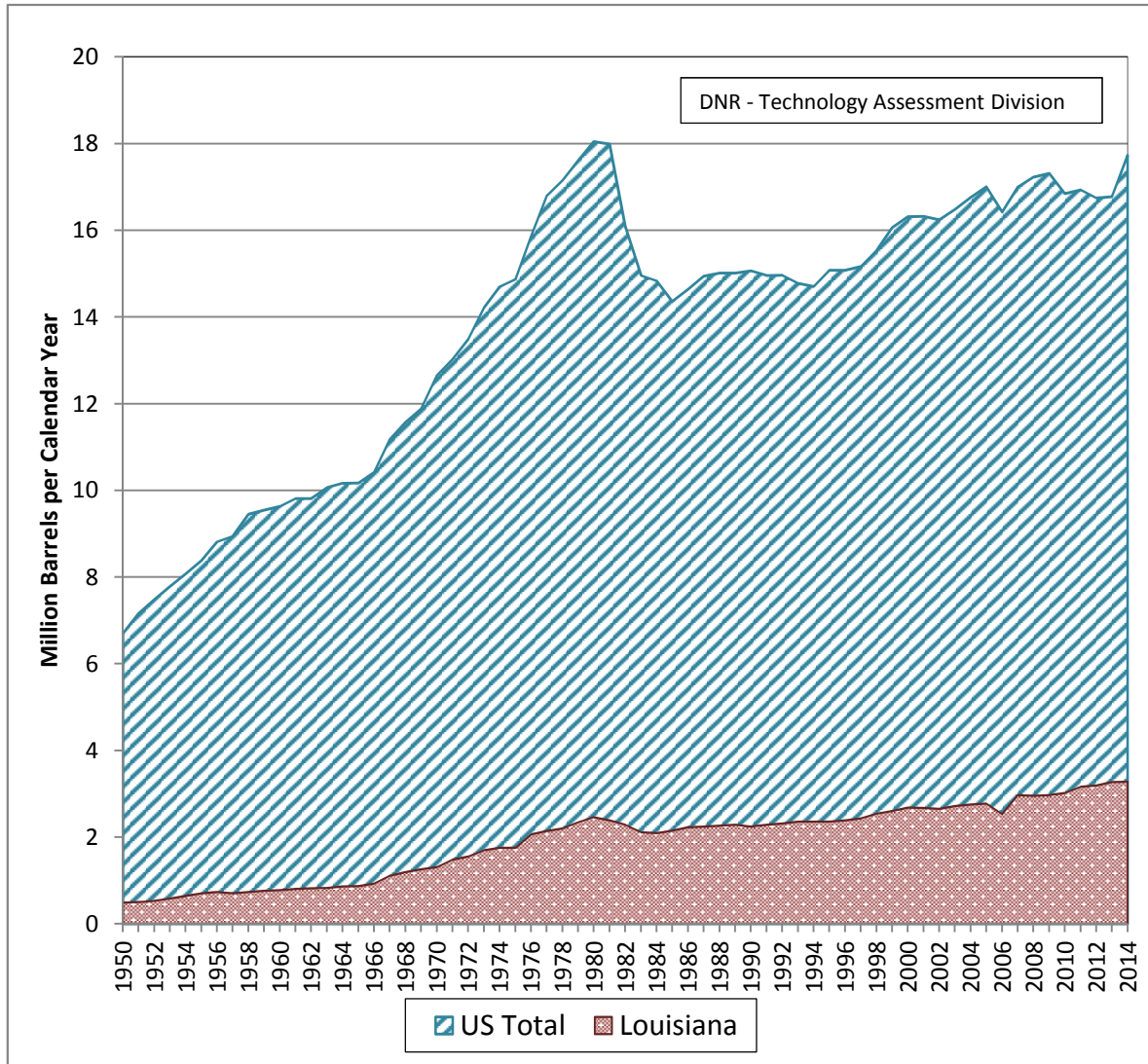
Rank	Corporation	Company	State	Site	Capacity (bcd)
1	Motiva Enterprises LLC	Motiva Enterprises LLC	Texas	Port Arthur	603,000
2	ExxonMobil Corp.	ExxonMobil Refining & Supply Co.	Texas	Baytown	560,500
3	Marathon Petroleum Corp.	Marathon Petroleum Co. LLC	Louisiana	Garyville	522,000
4	ExxonMobil Corp.	ExxonMobil Refining & Supply Co.	Louisiana	Baton Rouge	502,500
5	Marathon Petroleum Corp.	Marathon Petroleum Corp.	Texas	Galveston Bay	451,000
6	PDV America Inc.	Citgo Petroleum Corp.	Louisiana	Lake Charles	427,800
7	BP PLC	BP Products North America Inc.	Indiana	Whiting	413,500
8	ExxonMobil Corp.	ExxonMobil Refining & Supply Co.	Texas	Beaumont	344,600
9	WRB Refining LP	WRB Refining LP	Illinois	Wood River	336,000
10	Carlyle Group	Philadelphia Energy Solutions	Pennsylvania	Philadelphia	335,000

*Only refineries with Atmospheric Crude Oil Distillation Capacity

Source: Energy Information Administration, "Refinery Capacity Report 2015"

Figure 2

Operating Capacity of Louisiana and U.S. Refineries



Source: 1950 - 1975: U.S. Bureau of Mines, "Petroleum Refineries in the United States and Puerto Rico" Annual
 1976 - 1981: EIA, "Petroleum Refineries in the United States and U.S. Territories" Annual
 1982 - 2004: EIA, "Petroleum Supply Annual, Vol. 1"
 2005 - 2014: EIA, "Refinery Capacity Report"
 1995: Louisiana data from DNR survey, as of June 30, 1995
 1997: Louisiana data from DNR survey, as of June 30, 1997

In addition to refining, integrated oil companies are engaged in all other aspects of the petroleum industry which range from the exploration of crude oil to the marketing of finished petroleum products. Independent refiners, on the other hand, purchase most of their crude oil on the open market rather than producing it. Refiners such as Placid Refining Co. and Calcasieu Refining Co. are examples of independent refiners.

Major oil companies dominate the refining industry, the top 10 U.S. refiners, all of them major integrated oil companies, account for about 75% of the total domestic refinery charge capacity. Most of these have operations in Louisiana, either as wholly owned facilities such as the Baton Rouge ExxonMobil refinery, or as part owners or joint ventures such as Motiva Refineries in Norco and Convent. A list of the top 10 U.S. refineries by operable capacity is shown on Table 1 (pg. 3).

Many refineries are primarily fuels refineries, some are lube stock refineries, and others are petrochemical refineries. Phillip 66's refinery in West Lake is a good example of a petrochemical refinery, where some of its products are raw feed for a chemical plant or refinery (Excel Paralubes).

Besides the level of vertical integration of a refiner and the product mix of a refinery, industry analysts also look at capacity and complexity. A "complexity factor" is assigned to each process unit of a refinery based on its relative construction cost. The atmospheric crude distillation unit is assigned a value of one. For example, the cost of a fluidized catalytic cracker is six times greater than an atmospheric crude distillation unit of the same capacity, so its unit complexity factor is six.

Greater complexity does not necessarily go hand-in-hand with larger capacity. Some of the smaller facilities in Louisiana are the most complex. For example, the smaller lube and wax producing refineries of North Louisiana are quite complex when compared to some very large refineries in the state.

EIA statistics show total U.S. petroleum consumption in 2014 increased 0.7% to 19.11 million barrels per day (bpd). Finished motor gasoline increased 0.9% to 8,921 thousand bpd, jet fuel increased 2.5% to 1,470 thousand bpd, and overall distillate fuel oil increased 5.5% to 4,037 thousand bpd in 2014.

As reported in the *Oil & Gas Journal's* 2014 Worldwide Refinery Report, yearly worldwide refining capacity fell for the second time since reaching its record high in 2013. In

Table 2
Top 10 World Refiners by Crude Capacity
(As of January 1, 2015)

World Rank	Company	Crude Capacity ¹ (bcd)
1	ExxonMobil	5,465,500
2	Royal Dutch Shell	4,184,600
3	Sinopec	3,971,000
4	BP	2,858,964
5	Saudi Aramco	2,835,500
6	Valero Energy	2,769,500
7	Petroleos de Venezuela SA	2,678,000
8	China National Petroleum	2,675,000
9	Phillips 66	2,523,200
10	Chevron	2,463,600

Source: *Oil & Gas Journal*, Dec. 1, 2014

¹ Includes partial interest in refineries not wholly owned by the company.

2014 it decreased by nearly 70,000 bcd, from 88 million bcd in 2013. *Oil & Gas Journal* reported the downturn can be attributed to refinery shutdowns, some capacity reductions, and the availability of more accurate data. Table 2 (pg. 5) shows the ranking of the 10 largest refiners in the world according to crude capacity, and it includes partial interest in refineries not wholly owned by the company. There were no newcomers to the list; Phillips 66, moves up from 10th to the 9th spot, and Chevron moves from 9th to 10th place.



Catalytic cracking technology invented at Exxon Baton Rouge in 1942 helped win WWII. It remains industry standard.
Photo courtesy Exxon Public Affair

DNR's Louisiana Refinery Survey

According to DNR's survey, the Louisiana refinery operating rate was 86.2% for this survey period with little idle capacity. Figure 3 (pg. 9) compares Louisiana Gulf Coast, Texas Gulf Coast, and total U.S. refinery operating rates since 1990. The operating capacity for Louisiana refineries in 2014 was 3,286,120 barrels per calendar day (bcd), 18,400 bcd, or 0.56% lower than previous DNR's survey. Table 3 (pg. 8) shows the details of operating capacity and throughput changes between DNR's two most recent surveys. Figure 4 (pg. 12) shows the historical Louisiana and U.S. operating capacity since 1950. Table 5 (pg.13) shows the refinery products slate reported to DNR in the R3 report. Motor gasoline accounted for 39.3% of Louisiana refinery production. The percentages are weighted by the refineries' crude capacity, to reflect the contribution made by each refinery. From the 16 surveyed refineries that have atmospheric distillation capacity, only 13 of them produced motor gasoline.

Most of Louisiana's refinery products are exported to other states. According to the most recent data published by the Energy Information Administration (EIA), Louisiana itself consumes about 327 million barrels of petroleum products. This represents only 24% of the 1,367 million barrels of petroleum products its refineries produce.

Louisiana refineries continue to obtain most of their crude supply from outside the state as oil production within the state continues to decline. Only about 7.1% comes from Louisiana State. The outside sources supplying crude to Louisiana refineries are, the federal OCS provided the most at 45.6%, foreign countries is next at 32.6%, and other states at 14.7%. Figure 5 (pg. 16) shows the historical sources of crude oil for Louisiana refineries for the period 1993-2014. Generally, the smaller refineries use a greater percentage of Louisiana crude than the large refineries to satisfy their total requirements. Figure 6 (pg. 17) shows the percentage crude source for each Louisiana refinery for 2014.

Operating Refinery Recent Changes

Marathon at Garyville facility completed a \$3.9 billion expansion of the refinery in 2009 that nearly doubled its production capacity to 522,000 bpd, making it the third largest refinery in the US. Marathon also proposed a follow up upgrade project called ROUX (residual oil upgrade expansion) to convert residual oil from the refining process into low-sulfur diesel. The proposed ROUX upgrades would have added another 1.2 billion gallons of diesel production per day. In the first quarter of 2015, Marathon Petroleum Corp. announced that is pulling the plug on the plan for more than \$2 billion in upgrades at its Garyville refinery. The project is the latest casualty of low oil prices, which have hovered below \$50 per barrel.

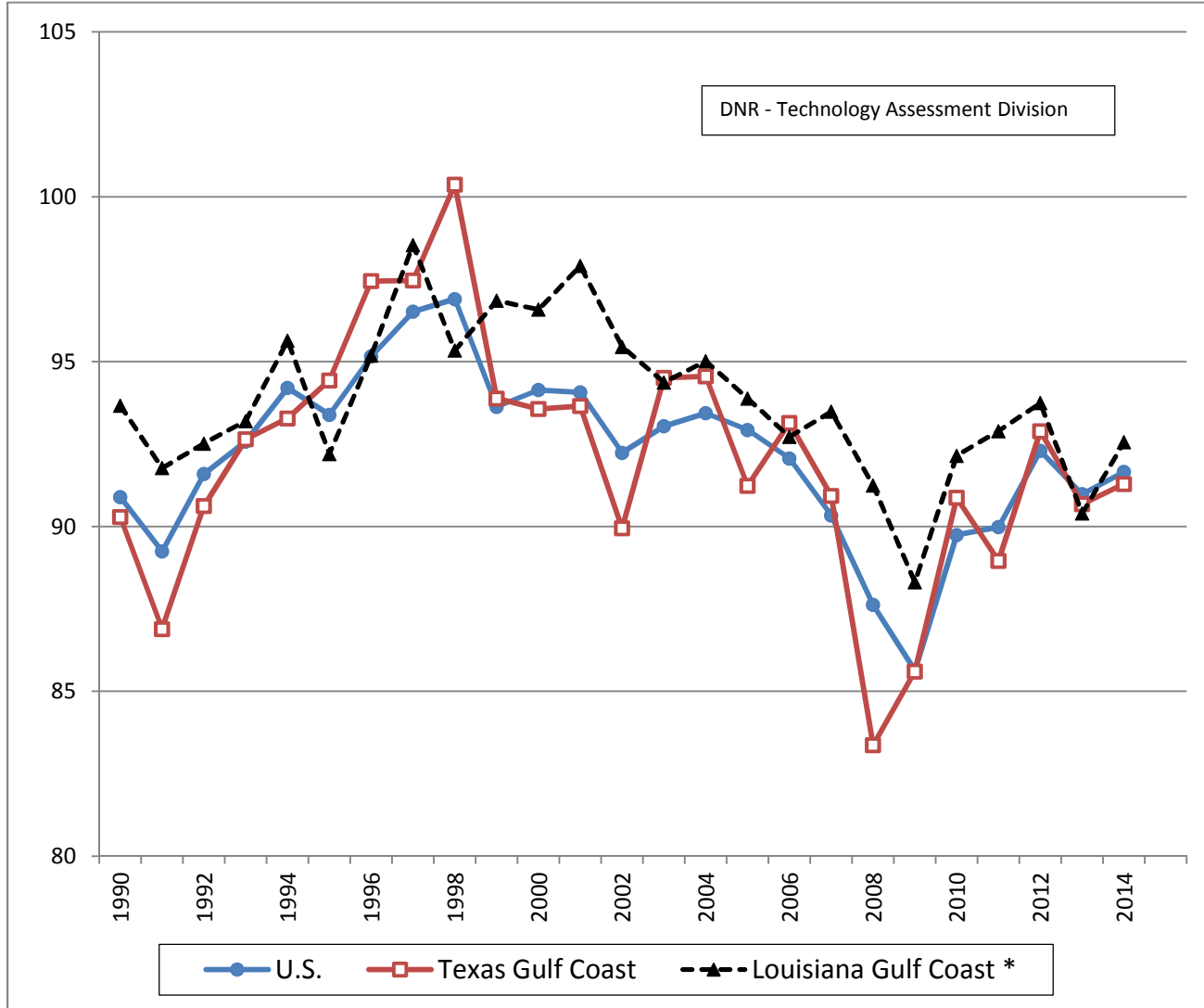
The Norco Manufacturing Complex since 1995 has been split into two units Norco Refining Co., and Shell Chemical Co. The Norco Refining Co. became Motiva Enterprise LLC 250,000 bpd refinery that refines "medium sweet" crude oil.

Table 3
Louisiana Operating Refineries ¹
Capacity and Throughput Changes from DNR Survey

Refinery Name	Operating capacity as of 12/31/2013 (bcd)	Capacity Change From 2013 to 2014 (bcd)	Throughput 1/1/2013 - 12/31/2013 (Barrels)	Throughput Change From 2013 to 2014 (Barrels)	Capacity Change (%)	Throughput Change (%)
Alon Refining Krotz Springs Inc Krotz Springs	80,000	0	21,819,402	1,863,891	0.00	8.54
Calcasieu Refining Co	80,000	0	26,119,989	381,042	0.00	1.46
Calumet Lubricants Co LP Cotton Valley	13,020	0	2,356,515	45,121	0.00	1.91
Calumet Lubricants Co LP Princeton	8,300	0	2,049,965	372,532	0.00	18.17
Calumet Shreveport LLC Shreveport	65,000	0	13,230,593	-944,088	0.00	-7.14
Chalmette Refining LLC Chalmette	197,000	-4,500	50,248,212	3,970,196	-2.28	7.90
Citgo Petroleum Corp Lake Charles	427,800	0	138,820,092	2,334,784	0.00	1.68
ExxonMobil Refining & Supply Co Baton Rouge	502,500	0	169,081,277	10,387,760	0.00	6.14
Marathon Petroleum Co LLC Garyville	522,000	0	179,588,724	10,120,351	0.00	5.64
Motiva Enterprises LLC Convent	235,000	0	70,943,162	6,969,022	0.00	9.82
Motiva Enterprises LLC Norco	233,500	4,500	73,891,592	-7,955,270	1.93	-10.77
Phillips 66 Belle Chasse	252,000	-5,000	80,442,976	-6,125,486	-1.98	-7.61
Phillips 66 West Lake	239,400	20,600	81,161,759	7,631,785	8.60	9.40
Placid Refining Co Port Allen	59,000	16,000	21,345,121	-1,624,820	27.12	-7.61
Valero Refining Co Meraux	140,000	-15,000	36,739,355	117,842	-10.71	0.32
Valero Refining Co Norco	250,000	-35,000	36,657,465	1,514,665	-14.00	4.13
Totals	3,304,520	-18,400	1,004,496,199	29,059,327	-0.56	2.89

¹ Louisiana operating refineries with no atmospheric distillation capacity were not surveyed by DNR and not included in this table. These facilities are listed in Table 10.

Figure 3
Operating Rates (%)
U.S., Texas Gulf Coast, Louisiana Gulf Coast Refineries



* Louisiana Gulf Coast includes the parishes of Vernon, Rapides, Avoyelles, Pointe Coupee, West Feliciana, East Feliciana, Saint Helena, Tangipahoa, Washington, and all parishes south thereof, Mississippi counties of Pearl River, Stone, George, Hancock, Harrison, and Jackson, and Alabama counties of Mobile and Baldwin.

Source: EIA, "Petroleum Supply Annual, Volume 1"

Table 4
Louisiana Operating Refineries Crude Capacity ¹
Data as of December 31, 2014 DNR Survey

Data in this table may differ from data reported elsewhere for a different time period.

Refinery Name	DNR FAC Code	Operating capacity as of 12/31/2014 (bcd)	Operating rate (%)	Idle capacity (bcd)	Operable rate (%)	Throughput 1/1/2014 - 12/31/2014 (Barrels)
Alon Refining Krotz Springs Inc Krotz Springs	HLL	80,000	81.1	0	81.1	23,683,293
Calcasieu Refining Co Lake Charles	CLC	80,000	90.8	0	90.8	26,501,031
Calumet Lubricants Co LP Cotton Valley	CTT	13,020	50.5	0	50.5	2,401,636
Calumet Lubricants Co LP Princeton	CLM	8,300	80.0	0	80.0	2,422,497
Calumet Shreveport LLC Shreveport	ATL	65,000	51.8	0	51.8	12,286,505
Chalmette Refining LLC Chalmette	TNN	192,500	77.2	0	77.2	54,218,408
Citgo Petroleum Corp Lake Charles	CTS	427,800	90.4	0	90.4	141,154,876
ExxonMobil Refining & Supply Co Baton Rouge	EXX	502,500	97.8	0	97.8	179,469,037
Marathon Petroleum Co LLC Garyville	MRT	522,000	99.6	0	99.6	189,709,075
Motiva Enterprises LLC Convent	TXC	235,000	90.8	0	90.8	77,912,184
Motiva Enterprises LLC Norco	SHL	238,000	75.9	0	75.9	65,936,322
Phillips 66 Belle Chasse	STN	247,000	82.4	0	82.4	74,317,490
Phillips 66 West Lake	CNB	260,000	93.6	0	93.6	88,793,544
Placid Refining Co Port Allen	PLC	75,000	72.0	0	72.0	19,720,301
Valero Refining Co Meraux	MRP	125,000	80.8	0	80.8	36,857,197
Valero Refining Co Norco	GDH	215,000	48.6	0	48.6	38,172,130
Weighted State Average			86.2		86.2	
Total La. Operating Capacity		3,286,120		0		1,033,555,526

¹ Louisiana operating refineries with no atmospheric distillation capacity were not surveyed by DNR and not included in this table. These facilities are listed in table 10.

Motiva Norco Refinery produces gasoline (premium and regular grades, unleaded), jet aviation fuel, Ultra Low Sulfur diesel, liquefied petroleum gases (i.e. propane, propylene, isobutene), and anode grade coke. In 2003 it was acquired by Valero. Since acquisition, Valero has invested nearly \$4.5 billion, making the plant one of the company's more complex refineries. These investments enabled the plant to process additional heavy feedstocks, increase throughput capacity to 275,000 bpd, upgrade its product yields, reduce emissions and improve on-stream reliability. The Norco facility also adds value to the company's operations by providing intermediate feedstocks to other refineries and chemical plants located along the Gulf Coast, and it has access to the Colonial and Plantation pipelines for distribution of refined products to numerous markets in the southern and eastern US. The Shell Chemical plant is further described in the Louisiana Operating Refineries not Surveyed by DNR.

The identity and location of each of the surveyed operating refineries is shown on the map in Figure 1 (pg. 2). Name histories are listed in Table 7 (pg. 19), mailing addresses and contacts are listed in Table 8 (pg. 20), and physical locations are listed in Table 9 (pg. 22).

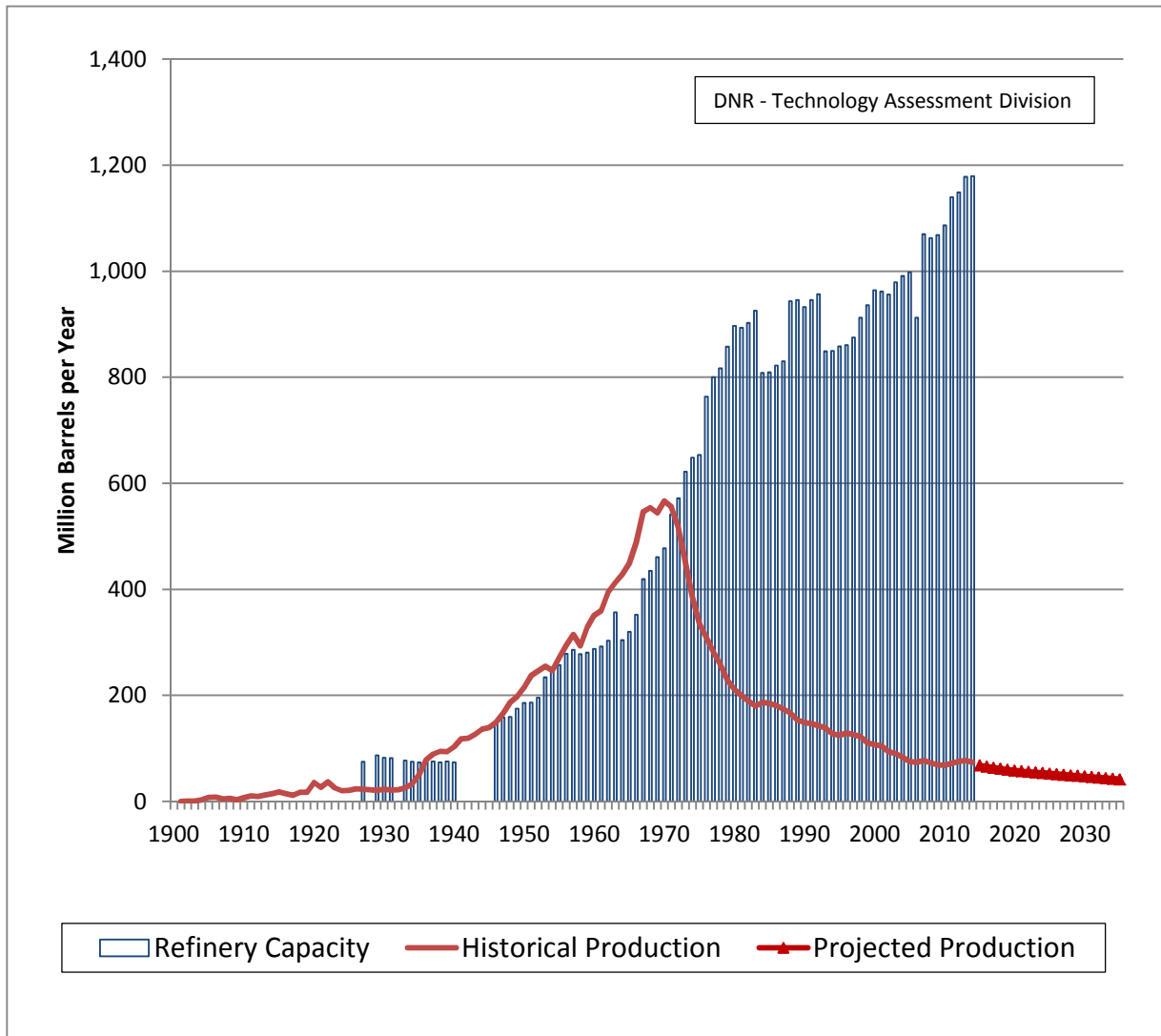
The identity and location of each of the not surveyed operating refineries is shown on the map in Figure 1 (pg. 2). Name, contact information, location and products are listed in Table 10 (pg. 23).

Non-Operating Refinery Recent Changes

During this survey period there is one change to non-operating refinery status. The Shell Oil Products US refinery at St Rose which has been idle since October 2011 was moved from Surveyed Operating Refinery list to the Non-Operating Refinery list. The identity and location of each of the non-operating refineries is shown on the map in Figure 1 (pg. 2). Name histories are listed in Table 11 (pg. 24), and mailing addresses and contacts are listed in Table 12 (pg. 26). Physical locations, last known crude capacity, date last operated and present status are described in Table 13 (pg. 26).

Figure 4

Louisiana Oil Production (Excluding OCS) and Refinery Operable Capacity



Source: Oil historical and projected production data from DNR Technology Assessment Division; and refinery capacity data from DNR database and EIA, "Petroleum Supply Annual, Vol. 1" and EIA, Refinery Capacity Data Report

**Table 5
Louisiana Operating Refineries
Product Slate Percentages
2014 DNR's R3 Report**

DNR FAC Code	Product Code ⁴															
	1 1 0	1 4 0	2 1 0	2 2 0	2 3 0	2 9 0	3 2 0	3 4 0	3 5 0	3 9 0	4 1 0	4 9 0	5 1 0	5 2 0	5 9 0	6 1 0
HLL	0.0	13.3	0.0	47.6	0.0	4.4	20.8	14.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
CLC	0.0	0.0	0.0	0.0	0.0	24.0	18.8	28.0	0.0	0.0	0.0	0.0	0.0	0.0	28.5	0.7
CTT	0.0	0.0	0.0	0.0	0.0	79.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.6	0.0
CLM	0.0	41.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	9.8	38.8	0.0	10.1	0.0	0.0	0.0
ATL	0.0	33.1	0.0	7.4	18.6	0.0	0.0	14.5	0.0	4.7	19.7	0.0	0.4	0.0	0.0	1.6
TNN	0.0	4.9	0.0	37.3	0.0	10.6	0.0	26.6	0.0	6.7	0.0	0.5	0.0	3.6	6.4	3.4
CTS	0.0	0.1	0.0	41.4	17.6	5.5	0.0	0.0	0.0	15.1	0.0	6.8	0.5	6.3	1.9	4.8
EXX	0.0	2.1	0.1	35.2	9.7	21.4	0.0	18.3	0.3	0.1	2.3	1.6	0.0	3.4	3.4	2.1
MRT	0.0	2.9	0.0	46.4	0.0	1.8	0.0	37.1	0.0	0.0	0.0	0.8	1.9	4.2	0.5	4.5
TXC	0.0	3.4	0.0	44.8	11.8	0.0	0.0	28.0	0.1	11.8	0.0	0.0	0.0	0.0	0.0	0.0
SHL	0.0	0.0	0.0	59.0	10.6	0.0	0.0	26.0	0.0	0.0	0.0	0.0	0.0	1.4	3.0	0.0
STN	0.0	22.3	0.0	39.1	12.6	0.0	0.0	21.0	0.0	0.0	0.0	0.0	0.0	1.5	0.0	3.6
CNB	0.0	3.8	0.0	25.8	12.6	4.3	0.1	25.0	0.0	2.3	1.4	13.7	0.0	5.5	5.1	0.4
PLC	0.0	0.6	0.0	55.0	8.5	0.0	0.0	18.6	0.0	0.0	0.0	8.7	1.0	0.5	5.3	1.7
MRP	0.0	0.0	0.0	33.4	0.0	5.3	9.6	20.2	0.0	0.2	0.0	26.9	0.0	1.5	0.3	2.7
GDH	0.0	0.0	0.0	33.7	0.0	11.6	0.0	45.3	0.0	0.1	0.0	0.0	0.0	7.4	0.1	1.8
Wtd %	0.0	3.6	0.0	39.3	7.4	8.0	1.1	23.9	0.1	3.0	0.7	3.5	0.5	3.6	2.7	2.5

⁴ See products code definition on page 14

Source: DNR Database - Refiner's Monthly Report, R-3 Report

Refinery's Product Codes (Used in Table 5)

Product Code 110

This includes (a) crude oil from the well, these hydrocarbons existed in liquid phase in underground reservoirs and remain liquid in atmospheric conditions; (b) condensate, natural gas liquids recovered from gas well gas; and (c) raw make a conglomerate of liquid hydrocarbons which has been through a recovery process only.

Product Code 140

Other unfinished oils that were not be included in product code 110, but require further processing to become marketable.

Product Code 210

Aviation gasoline a special grades of gasoline for use in aviation reciprocating engines .Include all refinery products within the gasoline range that are to be marketed straight or in blends as aviation gasoline.

Product Code 220

This includes (a) motor gasoline a mixtures of relatively volatile hydrocarbons which have been blended to form a fuel suitable for use in spark ignition engines such as leaded motor gasoline, unleaded motor gasoline, and all refinery products to be marketed as motor gasoline without further processing such as gasohol; and (b) casinghead gasoline which are recovered from the "wet gas" which accompanies crude oil from the well or from "wet" natural gas which contains an appreciable amount of heavier hydrocarbons of which LP gases and gasoline are composed.

Product Code 230

Jet fuel this includes (a) Naphtha type jet fuel, a fuel in the heavy naphtha boiling range, used for turbojet and turboprop aircraft engines, primarily by the military; (b) Kerosene type jet fuel a quality kerosene used primarily as fuel for commercial turbojet and turboprop aircraft engines.

Product Code 290

Other light distillates are all light distillate products which do not qualify as aviation gasoline, motor gasoline or naphtha type jet fuel.

Product Code 320

Kerosene a petroleum distillate which is cleans burning and suitable as an illuminant when burned in wick lamps. Include grades of kerosene called range oil having properties similar to No. 1 fuel oil.

Product Code 340

Diesel fuel is distillate oils and diesel oils with a distillation range from 10 percent point at 400 degrees Fahrenheit to 90 percent point at 640 degrees Fahrenheit. Include No. 1 and No. 2 heating oil, No. 1-D and No. 2-D diesel fuel, marine and military diesel fuels

Product Code 350

Number 4 Fuel Oil is fuel oil blend for commercial burner installations not equipped with pre-heating facilities.

Product Code 390

Include all middle distillate products which do not qualify as kerosene, kerosene type jet fuel, casinghead gasoline, diesel fuel or number 4 fuel oil.

Product Code 410

Include all grades of lubricating oils from spindle oil to cylinder oil and those used in greases, and all marketable waxes should also be included whether crude scaled or refined.

Product Code 490

Include all heavy distillate products which are not lubricants or waxes.

Product Code 510

Asphalt is a mix of finished asphalt products such as cements, fluxes, the asphalt content of emulsions (exclusive of water) and petroleum distillates blended with asphalt to make cutback asphalts.

Product Code 520

Petroleum coke is a solid residue, the final product of the condensation process in cracking, consisting mainly of highly polycyclic aromatic hydro-carbons very poor in hydrogen. Include both marketable and catalyst.

Product Code 590

Include all refinery residue products which do not qualify as asphalt or petroleum coke.

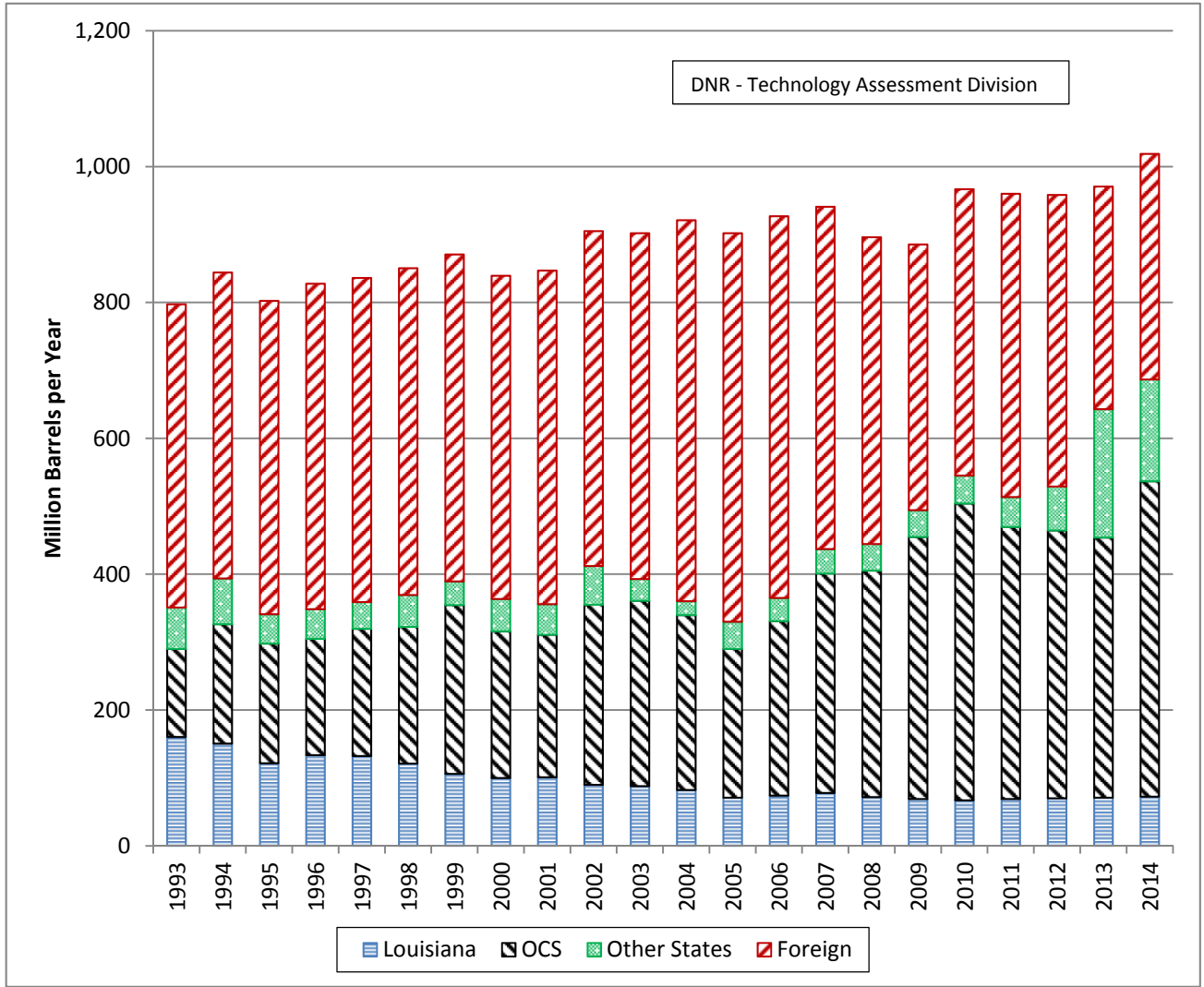
Product Code 610

Any form or mixture of gas produced in refineries by distillation, cracking, reforming and other processes. Include still gas used for petrochemical feedstock and other uses sometimes called still gas.

In some cases the % of Total Product Slate in Table 5 did not add up to 100. We did not change any of the numbers reported, but normalized the figures to derive the weighted totals for each product.

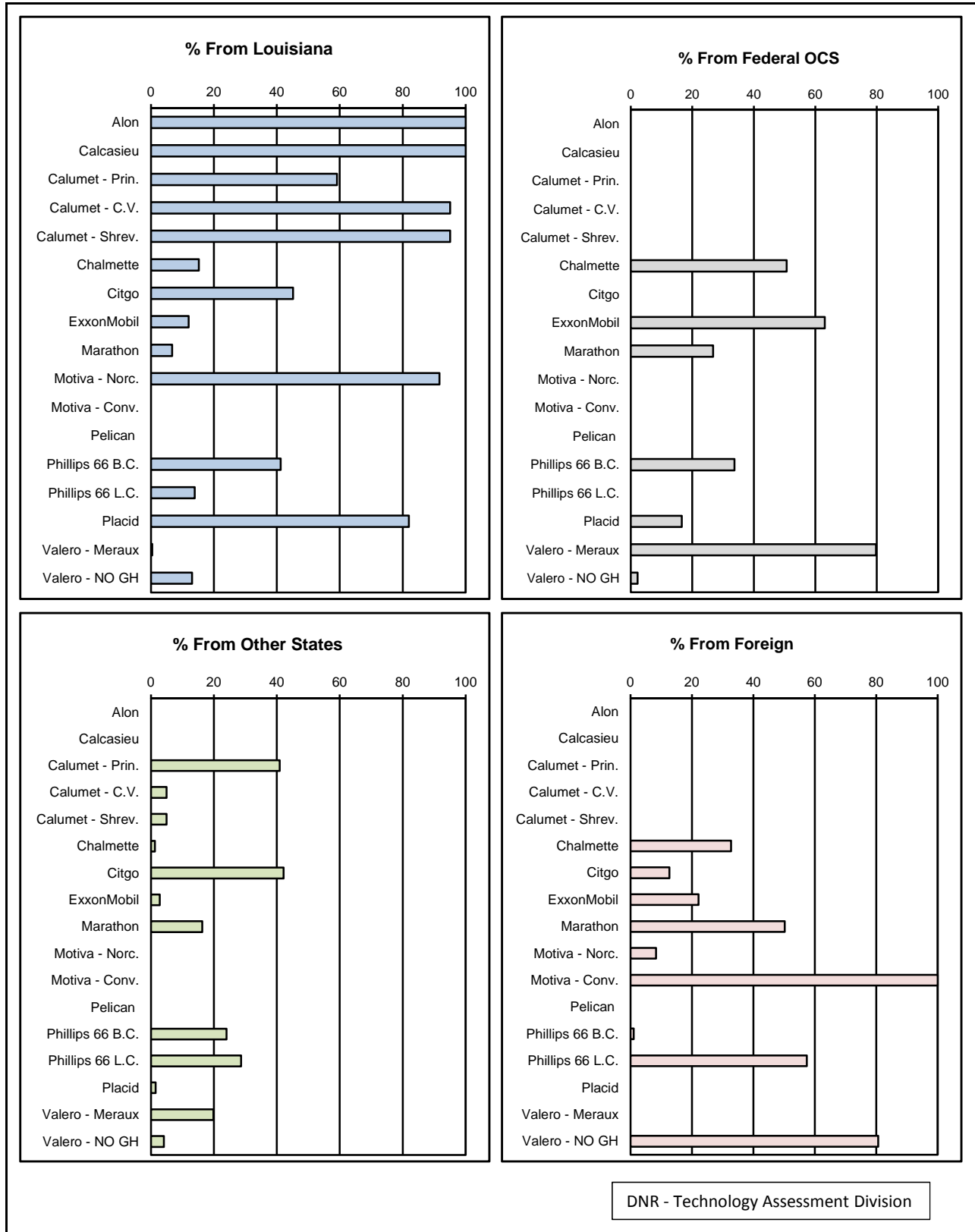
Figure 5

Historical Crude Oil Sources for Louisiana Refineries



Source: DNR Database, from Refiner's Monthly Report, Form R-3

Figure 6
Crude Oil Input Percentages by Source and Refinery
2014 DNR's R3 Report



DNR - Technology Assessment Division

Source: DNR Database, from Refiner's Monthly Report, Form R-3

Table 6 (Data for Figure 6)
Crude Oil Input Percentages by Source and Refinery
2014 DNR's R3 Report

Refinery	DNR FAC Code	Louisiana	Federal OCS	Other States	Foreign
Alon Refining Krotz Springs Inc Krotz Springs	HLL	100.0	0.0	0.0	0.0
Calcasieu Refining Co Lake Charles	CLC	100.0	0.0	0.0	0.0
Calumet Lubricants Co Princeton	CTT	59.1	0.0	40.9	0.0
Calumet Lubricants Co Cotton Valley	CLM	95.0	0.0	5.0	0.0
Calumet Shreveport LLC Shreveport	ATL	95.0	0.0	5.0	0.0
Chalmette Refining LLC Chalmette	TNN	15.3	50.7	1.2	32.8
Citgo Petroleum Corp Lake Charles	CTS	45.2	0.0	42.2	12.7
Excel Paralubes Westlake	EXL	0.0	0.0	0.0	0.0
ExxonMobil Refining & Supply Co Baton Rouge	EXX	12.0	63.1	2.8	22.1
Marathon Petroleum Co LLC Garyville	MRT	6.7	26.8	16.3	50.2
Motiva Enterprises LLC Norco	SHL	91.7	0.0	0.0	8.3
Motiva Enterprises LLC Convent	TXC	0.0	0.0	0.0	100.0
Pelican Refining Co Lake Charles	PLN	0.0	0.0	0.0	0.0
Phillis 66 Belle Chase	STN	41.2	33.7	24.0	1.1
Phillis 66 West Lake	CNB	13.9	0.0	28.7	57.4
Placid Refining Co LLC Port Allen	PLC	81.9	16.6	1.5	0.0
Valero Refining Co Meraux	MRP	0.4	79.7	19.8	0.0
Valero Refining Co Good Hope	GDH	13.0	2.2	4.1	80.7

Source: DNR Database - Refiner's Monthly Report, R-3 Report

**Table 7
Louisiana Operating Refinery Name History (1980-2014)**

Refinery Name	Date	FAC/Conservation Code & Location
ExxonMobil Refinery and Supply Co Exxon Co USA	1999- 1980-99	EXX / 9140 Baton Rouge
Phillips 66 ConocoPhillips Philips Petroleum Co B.P. Amoco PLC B.P. Oil Corp Standard Oil Co Gulf Refining & Marketing Co Gulf Oil Corp Gulf Oil Co US	2003-12 2000-02 1999-00 1989-98 1986-88 1985-85 1981-84 1979-80	STN / 9148 Belle Chasse
Chalmette Refining LLC Mobil Oil Corp Tenneco Oil Co	1998 - 1989-98 1980-88	TNN / 9174 Chalmette
Motiva Enterprises LLC Star Enterprises Texaco Refining & Marketing Texaco Inc	1998- 1989-98 1985-88 1980-84	TXC / 9180 Convent
Calumet Lubricants Co LP Kerr-McGee Refining Corp Kerr-McGee Corp Cotton Valley Solvents Co	1996- 1985-95 1983-84 1980-82	CTT / 9156 Cotton Valley
Marathon Petroleum Co LLC Marathon Ashland Petroleum LLC Marathon Oil Co Marathon Petroleum Co Marathon Oil Co	2005- 1998-04 1992-98 1985-91 1980-84	MRT / 9159 Garyville
Valero Refining Co Orion Refining Corp TransAmerican Refining Co TransAmerica Refining Co GHR Energy Corp Good Hope Refineries Inc Good Hope Industries Inc	2004- 1999-03 1992-98 1988-91 1982-87 1981-81 1980-80	GDH / 9144 Norco

Refinery Name	Date	FAC/Conservation Code & Location
Alon Refining Krotz Springs Inc Valero Refining Co Basis Petroleum Inc Phibro Energy USA Inc Phibro Refining Inc Hill Petroleum Co	2008- 1997-07 1996-96 1993-95 1992-92 1980-91	HLL / 9151 Krotz Springs
Calcasieu Refining Co CPI Oil & Refining Inc Calcasieu Refining Ltd Phillips 66	1985- 1982-84 1980-81	CLC / 9118 Lake Charles
Citgo Petroleum Corp Cities Service Co	1984- 1980-83	CTS / 9126 Lake Charles
ConocoPhillips Conoco Inc Conoco Continental Oil Co	2003-12 1982-02 1980-81 1979	CNB / 9129 Lake Charles
Valero Refining Meraux Murphy Oil USA Inc Murphy Oil Corp	2011- 1984-11 1980-83	MRP / 9161 Meraux
Motiva Enterprises LLC Shell Oil Co	1998- 1980-98	SHL / 9163 Norco
Calumet Lubricants Co LP Calumet Refining Co	1991- 1980-90	CLM / 9117 Princeton
Placid Refining Co	1980-	PLC / 9165 Port Allen
Calumet Shreveport LLC Calumet Lubricants Co LP Pennzoil-Quaker State Corp Pennzoil Producing Co Pennzoil Products Co Pennzoil Co Atlas Processing Co	2005- 2000-04 1999-00 1992-98 1986-91 1985-85 1980-84	ATL / 9104 Shreveport

Source: DNR Database - Refiner's Monthly Report, R-3 Report and TAD Refinery Survey

Table 8
Louisiana Operating Refinery Mailing Address and Contact Information

Company Name	Mailing Address	Contacts *	Telephone
Alon Refining Krotz Springs Inc	PO Box 453 Krotz Springs, LA 70750 0453	Kevin Roy Gregg Byers Stephen Chachere	(337) 566 0114
Calcasieu Refining Co	4359 W. Tank Farm Rd. Lake Charles, LA 70605	Don Johnson Russ Willmon Tim Jordan	(337) 480 6637
Calumet Lubricants Co LP	PO Box 97 Cotton Valley, LA 71018	Wayne Rhymes Charles Cost Rodney Butts	(318) 832 4236
Calumet Lubricants Co LP	10234 La Hwy. 157 Princeton, LA 71067-9172	Levi LaMothe Jerry Arnold Grady Lee	(318) 949 2421
Calumet Shreveport LLC	PO Box 3099 Shreveport, LA 71133	Stan Snead Tom Germany James Kelly	(318) 632 4063
Chalmette Refining LLC	500 W Saint Bernard Hwy Chalmette, LA 70043	Ajesh D'Souza Janet Matsushita	(504) 281 6266
Citgo Petroleum Corp	PO Box 1562 Lake Charles, LA 70602	Phil Woods Eduardo Assef Don Fruge	(337) 708 6357
ExxonMobil Refining and Supply Co	PO Box 551 Baton Rouge, LA 70821	Barbara Beckman Steve Blume Dave Brownwell	(225) 977 8888
Marathon Petroleum Co LLC	PO Box AC Garyville, LA 70051-0842	Scott Poche Aulton Anderson Eric Sjunnesen	(985) 535 2241
Motiva Enterprises LLC	PO Box 37 Convent, LA 70723	Oliver Boyd David Brignac Brian Evans	(225) 562 6747
Motiva Enterprises LLC	PO Box 10 Norco, LA 70079	Jenny Weber Donald Weaver Robert Perrotta	(504) 465 7873
* Contacts are listed in order as: Contact Person, Plant Manager, Plant Engineer			

Source: DNR Database - Refiner's Monthly Report, R-3 Report and TAD Refinery Survey

Table 8 (Continued)
Louisiana Operating Refinery Mailing Address and Contact Information

Company Name	Mailing Address	Contacts *	Telephone
Phillips 66	15551 Hwy 23 Bell Chasse, LA 70037	Bill Baker Greg Lucchesi	(504) 656 3647
Phillips 66	PO Box 37 Westlake, LA 70669	Grant Jones Willie Tempton Jr	(337) 491 4913
Placid Refining Co	1940 La Hwy 1 North Port Allen, LA 70767	Joey Hagmann Joey Hagmann	(225) 387 0278
Valero Refining Co	PO Box 537 Norco, LA 70079	Tracie Lack Ralph Phillip Gary Devenish	(985) 764 5839
Valero Refining Co	1615 E. Judge Perez Chalmette, LA 70043	Tim Andrews Lauren Bird Chuck Morgan	(504) 278 5245
* Contacts are listed in order as: Contact Person, Plant Manager, Plant Engineer			

Source: DNR Database - Refiner's Monthly Report, R-3 Report and TAD Refinery Survey

Table 9
Louisiana Operating Refinery Locations

Company Name	Physical Location
Alon Refining Krotz Springs Inc	356 S. Levee Rd. Krotz Springs, LA 70750
Calcasieu Refining Co	4359 W. Tank Farm Rd. Lake Charles, LA 70605
Calumet Lubricants Co LP	1756 Old Hwy. 7 Cotton Valley, LA 71018
Calumet Lubricants Co LP	10234 Hwy. 157 Princeton, LA 71067
Calumet Shreveport LLC	3333 Midway St. Shreveport, LA 71109
Chalmette Refining LLC	500 W. St. Bernard Hwy. Chalmette, LA 70044
Citgo Petroleum Corp	4401 Hwy. 108 Sulphur, LA 70665
ExxonMobil Refining and Supply Co	4045 Scenic Hwy. Baton Rouge, LA 70805
Marathon Petroleum Co LLC	4663 West Airline Hwy. Garyville, LA 70051
Motiva Enterprises LLC	La. 44 & 70 Convent, LA 70723
Motiva Enterprises LLC	15536 River Rd. Norco, LA 70079
Phillips 66	15551 Hwy. 23 South Belle Chase, LA 70037
Phillips 66	2200 Old Spanish Trail Rd. Westlake, LA 70669
Placid Refining Co	1940 La. 1 North. Port Allen, LA 70767
Valero Energy Corp	14902 River Rd. Norco, LA 70079
Valero Refining Co	2500 E. St. Bernard Meraux 70075

Source: DNR Database - Refiner's Monthly Report, R-3 Report and TAD Refinery Survey

Louisiana Refineries Not Surveyed by DNR

Table 10

Company Name	Contact Information	Capacity (bcd)	Process	Product	FAC/Conservation Code & Location
Excel Paralubes ¹	2800 Old Spanish Trail Westlake, LA 70669 (337) 497-4900	42,000 ²	Catalytic hydrocracking	Lubes	EXC / ##### Westlake
Pelican Refining Co ¹	4646 Old Town Rd Lake Charles, LA 70615 (337) 433-6773	12,000 ²	Vacuum distillation	Asphalt	PEL / 9102 Lake Charles
Shell Chemical Co ¹ Norco	15536 River Road Norco, LA 70615 (504) 465-7342	Part of the Norco Manufacturing Complex	Part of the Norco Manufacturing Complex	Ethylene, propylene and butadiene	SCN / 9102 Norco

¹ The facilities in this table do not have any atmospheric distillation capacity. They typically process heavy crude fractions and / or waste streams.

² Source: Energy Information Administration, "Refinery Capacity Report 2015"

Excel Paralubes

It started as a lube hydrocracker facility a 50-50 joint venture between Conoco and Pennzoil (in 2003-04 Pennzoil sold its share to Flint Hills Resources) in 1994 located in Westlake, Louisiana. Later the lube plant was upgraded to be a refinery with the addition of 40,000 bpd atmospheric distillation capacity, 60,000 barrels per day (bpd) vacuum distillation capacity and 34,000 bpd catalytic reforming capacity. The lubes plant's main units are a 32,000 bpd hydrocracker and a 20,000 bpd Isodewaxing unit. The lubes plant also includes two sulfur-recovery units. Excel Paralubes sits adjacent to a 260,000 bpd refinery owned by Phillips 66. This refinery provides Vacuum Gas Oil (VGO) to Excel Paralubes vacuum distillation tower, where 15,000 bpd of lighter distillates are removed and returned to the Phillips 66 refinery. Recent survey by EIA says its catalytic hydrocracking has 42,000 bpd capacity.

Pelican Refinery

The Lake Charles refinery is located on 4343 Old Town Road. The 87-acre Lake Charles refinery is best accessed by barge via the Calcasieu River. Formally known as American International Refinery, Inc. which sold the Lake Charles refinery and all associated real and personal property to Pelican Refining Company L.L.C. for \$9 million in cash, on December 9, 2004. In 2006 the Pelican Refining Company LLC commences production and equipped with an atmospheric distillation unit, a vacuum distillation unit, a Pre-Flash Drum and an asphalt terminal. It was run mainly as an asphalt plant and sold some of its byproducts to other refiners for further processing. By 2011, the Lake Charles refinery's production was down to zero. Recent survey by EIA says its vacuum distillation unit has 12,000 bpd capacity.

**Table 11
Louisiana Non-Operating Refinery Name History (1980-2014)**

Refinery Name	Dates	FAC/Conservation Code & Location	Refinery Name	Dates	FAC/Conservation Code & Location
Lazarus Energy Holdings LLC Canal Refining Co	2006- 1980-06	CNL / 9120 Church Pt.	Shepard Oil Co	1980-82	SHP/ 9172 Jennings
Sooner Refining Co	1980-82	SNR / 9178 Darrow	Laidlaw Environmental Systems GSX Recovery Systems	1992-92 1983-91	TSR / 9150 Jennings
Dubach Gas El Paso Field Services Arcadia Refining Endevco Inc Kerr-McGee Refining Corp Kerr-McGee Corp	2000- 1997-99 1995-96 1989-94 1985-88 1980-84	KRR / 430Z Dubach	Pelican Refinery American Int'l Refining Inc Gold Line Refining Ltd American Int'l Refining Inc Lake Charles Refining Co Aweco	2004- 1997-04 1992-97 1989-91 1980-88 1979-79	LKC / 9102 Lake Charles
Conoco Inc Conoco Continental Oil Co	1982-89 1980-81 1979	CAN / 9171 Egan	Lisbon Refinery J.V LLC Padre Refining Co Arcadia Refining & Mktg. Co Dubach Gas Co Claiborne Gasoline Co	1998-07 1997-98 1995-96 1992-94 1980-91	CLB / 9125 Lisbon
Quantum Fuel & Refining U.S. Refining Inc Britt Processing & Refining Co Crystal Refining Inc OGC Corp Louisiana Oil Refining Co of Egan	1998- 1994-98 1992-93 1989-91 1988-88 1987-87	LOR / 9164 Egan	Lazarus Energy Holdings LLC Gold Line Refining Co Ltd CAS Refining Celeron Oil and Gas Co Slapco South Louisiana Production Co	2006- 1994-98 1991-93 1983-90 1980-82 1979	SLP / 9173 Mermenteau
Tina Resources Inc Cameron Oil Refining Co Inc Cameron Resources Mallard Resources Inc	1993-96 1992-92 1990-91 1980-89	MLL / 9158 Gueydon	Petroleum Fuel & Terminal Co Clark Oil and Refining Corp Mt. Airy Refining	1992-03 1983-91 1980-82	MTR / 9160 Mt. Airy
Bayou State Oil Corp	1980-06	BYS / 9114 Hosston	St. James Co LLC Texas NAPCO Inc La Jet Inc	1998-03 1983-98 1980-82	TXS / 9157 St. James
Evangeline Refining Co	1980-92	EVN / 9135 Jennings			

Source: DNR Database - Refiner's Monthly Report, R-3 Report and TAD Refinery Survey

Table 11 (Continued)
Louisiana Non-Operating Refinery Name History (1980-2014)

Refinery Name	Dates	FAC/Conservation Code & Location	Refinery Name	Dates	FAC/Conservation Code & Location
McTan Refining Corp McTan Corp Bruin Refining Co	1983-96 1982-82 1980-81	BRN / 9162 St. James	Sabine Resources Group Port Petroleum Inc	1990-92 1980-89	PRT / 9166 Stonewall
Shell Oil Products US Shell Chemical Co St. Rose Refinery Inc Phibro Energy USA Inc Phibro Refining Inc Hill Petroleum Co International Processors	2012- 1996-11 1994-95 1993-93 1992-92 1987-91 1981-86	INT / 9155 St. Rose Idle	Schulze Processing Inc Gulf Oil Co USA Gulf Oil Corp	1981-82 1981-81 1980-80	SCH / 9169 Tallulah GLF / 9149 Venice

Source: DNR Database - Refiner's Monthly Report, R-3 Report and TAD Refinery Survey

Shell Chemical Co - Norco Refinery

The Shell Chemical Co owns the plant which produces ethylene, propylene and butadiene using a variety of feedstocks including crude oil. Technically this is a chemical plant but is considered as refinery by Louisiana Office of Conservation, but EIA and O&G Journal consider it as part of the Norco Manufacturing Complex (Valero refinery).

Shell Chemical Co - St Rose Refinery

Shell Chemical Co and IMTT (International-Matex Tank Terminals) owns and operates this petroleum refinery located in St. Rose, St. Charles Parish Louisiana. The refinery was acquired by Shell on August 11, 1995 from St. Rose Refining, Inc. Process units at the St. Rose 55,000 barrel/day refinery includes a crude distillation column, vacuum flasher, steam boiler, storage tanks, a wastewater treatment plant, and various support facilities. The facility was in the process of converting to an asphalt production facility. Today the refinery is idle and has not process any crude since October 2010. By 2012 IMITT completed construction of the tank farm and associated infrastructure at the site. The tank farm has 212 tanks with a total capacity of 163 million barrels, and truck and railcar loading/unloading facilities with spill containment and many fitted with vapor emissions controls and monitoring instrumentation; in excess of 100 tank car spots able to handle vegetable oil, chemical and petroleum heated and non-heated products.

Table 12
Louisiana Non-Operating Refinery Mailing Address and Contact Information

Company Name	Mailing Address	Contacts	Telephone
Lazarus Energy Holdings LLC	4400 Post Oak Pkwy Houston, TX 77027	Mr. Jason Huering	(713) 850 0500
Lazarus Energy Holdings LLC	4400 Post Oak Pkwy Houston, TX 77027	Mr. Jason Huering	(713) 850 0500
Quantum Fuel & Refining	PO Box 136 Newton, TX 75966	Mr. Mike McQueen	(713) 977 6108

Source: DNR Database - Refiner's Monthly Report, R-3 Report and TAD Refinery Survey

Table 13
Louisiana Non-Operating Refinery Location and Status Information

Name	Physical Location	Last Known Operating Capacity	Date Last Operated	Status
American International Refinery Inc	La. 3059 Lake Charles	35,000	2003	Sold to Pelican Refining in 2005 (asphalt plant, no crude capacity).
Bayou State Oil Corp	US 71 N. @ La. 2 West Hosston	3,000	Feb. 1987	Dismantled.
Lazarus Energy Co	1901 E. Ebey Church Point	30,000	2003	Planning to start up.
Lazarus Energy Co	U.S. 90 E. Jennings	14,800	Feb. 1998	Planning to start up.
Lisbon Refinery J.V. LLC	La. 2 Lisbon	12,500	Jan. 1996	Dismantled.
Ergon St. James Co LLC	La.18 St. James	20,000	Aug. 1983	Dismantled.
Tina Resources Inc	La. 14 Lake Arthur	7,400	Feb. 1986	Dismantled.
Quantum Fuel & Refining	101 Old Ferry Rd. Egan	10,000	Sep. 1987	Planning to start up.
Shell Chemical Co	11842 River Rd. St. Rose	45,000	May-09	Idle

Source: DNR Database - Refiner's Monthly Report, R-3 Report and TAD Refinery Survey

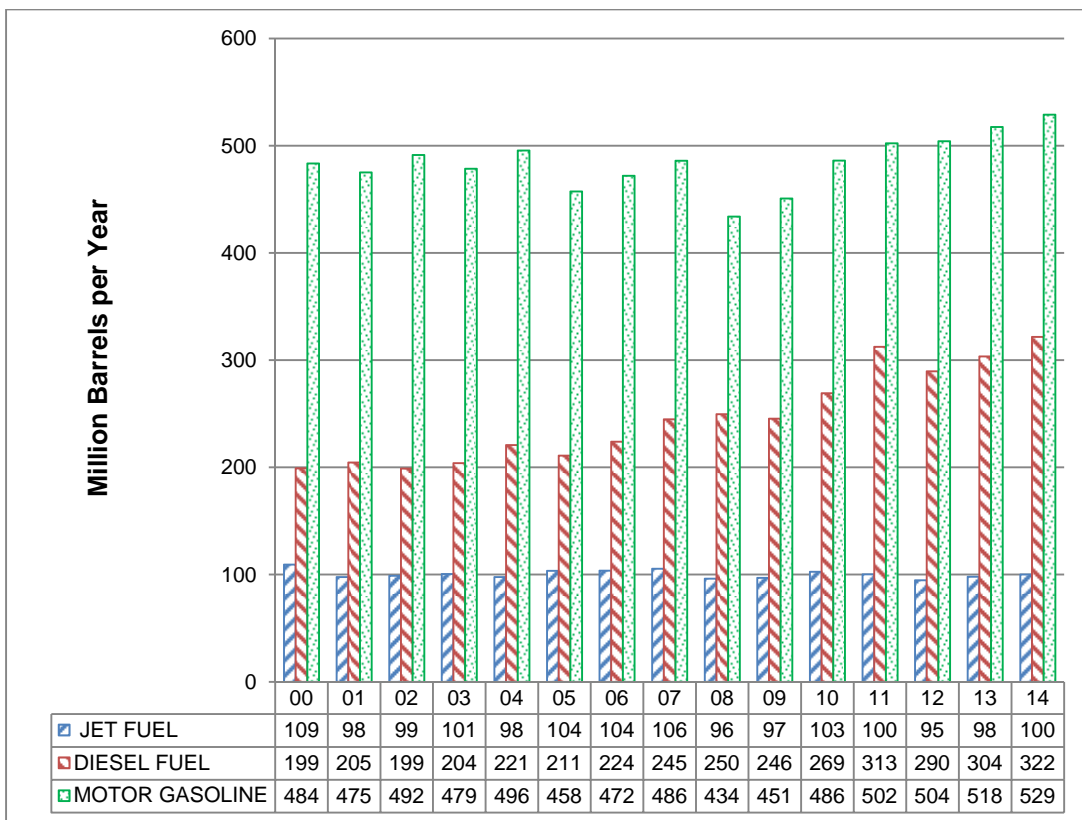
Louisiana Refineries Motor Fuels Production

Motor fuels are the sum of diesel, jet fuel and motor gasoline. They are major components of the total output slate from the refineries as shown on Table 5 (pg. 13). Motor gasoline is 39.3%, jet fuel is 7.4% and diesel fuel is 23.9% of the total Louisiana refineries product slate output.

- Motor gasoline: 2014 production increased 2.2% over 2013 and 8.8% over 2010 production. The Louisiana refineries gasoline production averages by type are 82% regular gasoline, 13% premium gasoline and 5% of RPG gasoline.
- Jet fuel: 2014 production increased 2.1% over 2013 but decrease 2.5% from 2010.
- Diesel fuel: 2014 production increased 5.9% over 2013 and 19.5% over 2010.

Figure 7

Louisiana Refineries Motor Fuels Production 2000 - 2014



Source: DNR Database, from Refiner's Monthly Report (R-3 Report)

Figure 7 showed Louisiana an average production increase 3.2% per year in motor gasoline and 5.8% in diesel fuel over the past five years. While the jet fuel showed an almost stable production level for the same time period.

**Table 14 U.S. Energy Information Administration
Capacity of Louisiana Operable Petroleum Refineries as of January 1, 2015**

(Barrels per Stream Day, Except Where Noted)

Refinery Name	DNR FAC Code	Atmospheric Crude Oil Distillation Capacity				Downstream Charge Capacity				
		Barrels per Calendar Day		Barrels per Stream Day		Vacuum Distillation	Thermal Cracking			
		Operating	Idle	Operating	Idle		Delayed Coking	Fluid Coking	Vis- Breaking	Other Gas/Oil
Alon Refining Krotz Springs Inc Krots Springs	HLL	80,000	0	83,000	0	36,200	0	0	0	0
Calcasieu Refining Co Lake Charles	CLC	80,000	0	85,000	0	30,000	0	0	0	0
Calumet Lubricants Co LP Cotton Valley	CTT	13,020	0	14,000	0	0	0	0	0	0
Calumet Lubricants Co LP Princeton	CLM	8,300	0	8,655	0	7,000	0	0	0	0
Calumet Shreveport LLC Shreveport	ATL	57,000	0	60,000	0	28,000	0	0	0	0
Chalmette Refining LLC Chalmette	TNN	192,500	0	195,000	0	116,700	30,000	0	0	0
Citgo Petroleum Corp Lake Charles	CTS	427,800	0	440,000	0	230,000	110,000	0	0	0
Excel Paralubes Westlake	EXL	0	0	0	0	0	0	0	0	0
ExxonMobil Refining & Supply Co Baton Rouge	EXX	502,500	0	523,200	0	246,100	123,500	0	0	0
Marathon Petroleum Co LLC Garyville	MRT	522,000	0	561,000	0	291,000	93,500	0	0	0
Motiva Enterprises LLC Convent	TXC	235,000	0	255,000	0	119,400	0	0	0	0
Motiva Enterprises LLC Norco	SHL	238,000	0	250,000	0	95,000	28,500	0	0	0
Pelican Refining Company LLC Lake Charles	PLN	0	0	0	0	12,000	0	0	0	0
Phillips 66 Belle Chasse	STN	247,000	0	260,000	0	103,000	26,000	0	0	0
Phillips 66 West Lake	CNB	260,000	0	273,000	0	132,000	60,000	0	0	10,600
Placid Refining Co Port Allen	PLC	75,000	0	82,000	0	27,000	0	0	0	0
Shell Chemical Co St. Rose	INT	0	45,000	0	46,000	25,000	0	0	0	0
Valero Refining Co Meraux	MRP	125,000	0	128,000	0	60,000	0	0	0	0
Valero Refining Co Norco	GDH	215,000	0	220,000	0	160,000	84,000	0	0	0
Totals		3,278,120	45,000	3,437,855	46,000	1,718,400	555,500	0	0	10,600

Source: Energy Information Administration, "Refinery Capacity Report 2015", Table 3

**Table 14 (Continued) U.S. Energy Information Administration
Capacity of Louisiana Operable Petroleum Refineries as of January 1, 2015**

(Barrels per Stream Day, Except Where Noted)

Refinery Name	DNR FAC Code	Downstream Charge Capacity (Continued)							
		Catalytic Cracking		Catalytic Hydrocracking			Catalytic Reforming		Fuels Solvent Deasphaltin g
		Fresh	Recycled	Distillate	Gas Oil	Residual	Low Pressure	High Pressure	
Alon Refining Krotz Springs Inc Krots Springs	HLL	34,000	0	0	0	0	0	13,000	0
Calcasieu Refining Co Lake Charles	CLC	0	0	0	0	0	0	0	0
Calumet Lubricants Co LP Cotton Valley	CTT	0	0	0	0	0	0	0	0
Calumet Lubricants Co LP Princeton	CLM	0	0	0	0	0	0	0	0
Calumet Shreveport LLC Shreveport	ATL	0	0	0	0	0	12,000	0	0
Chalmette Refining LLC Chalmette	TNN	75,600	0	0	0	0	23,000	0	0
Citgo Petroleum Corp Lake Charles	CTS	148,000	3,000	0	47,300	0	58,000	52,000	0
Excel Paralubes Westlake	EXL	0	0	0	42,000	0	0	0	0
ExxonMobil Refining & Supply Co Baton Rouge	EXX	244,500	0	27,000	0	0	76,000	0	0
Marathon Petroleum Co LLC Garyville	MRT	138,000	0	0	117,000	0	128,000	0	37,500
Motiva Enterprises LLC Convent	TXC	92,000	0	0	0	52,000	0	40,000	0
Motiva Enterprises LLC Norco	SHL	118,800	0	0	44,000	0	40,000	0	0
Pelican Refining Company LLC Lake Charles	PLN	0	0	0	0	0	0	0	0
Phillips 66 Belle Chasse	STN	105,000	2,000	0	0	0	0	48,490	0
Phillips 66 West Lake	CNB	50,000	0	0	0	0	44,000	0	0
Placid Refining Co Port Allen	PLC	25,000	500	0	0	0	11,000	0	11,000
Shell Chemical Co St. Rose	INT	0	0	0	0	0	0	0	0
Valero Refining Co Meraux	MRP	0	0	0	47,000	0	32,000	0	22,000
Valero Refining Co Norco	GDH	100,000	0	28,000	70,000	0	27,500	0	0
Totals		1,130,900	5,500	55,000	367,300	52,000	451,500	153,490	70,500

Source: Energy Information Administration, "Refinery Capacity Report 2015", Table 3

Table 14 (Continued) U.S. Energy Information Administration
Capacity of Louisiana Operable Petroleum Refineries as of January 1, 2015
(Barrels per Stream Day, Except Where Noted)

Refinery Name	DNR FAC Code	Downstream Charge Capacity (Continued)							
		Desulfurization (incl. Catalytic Hydrotreating)							
		Naptha/Reform er Feed	Gasoline	Kerosene/Je t Fuel	Diesel Fuel	Other Distillate	Residual	Heavy Gas Oil	Other
Alon Refining Krotz Springs Inc Krots Springs	HLL	14,000	18,000	0	0	0	0	0	0
Calcasieu Refining Co Lake Charles	CLC	0	0	0	0	0	0	0	0
Calumet Lubricants Co LP Cotton Valley	CTT	6,200	0	0	0	0	0	0	0
Calumet Lubricants Co LP Princeton	CLM	0	0	0	0	0	0	0	0
Calumet Shreveport LLC Shreveport	ATL	16,000	0	0	14,000	0	0	21,100	1,200
Chalmette Refining LLC Chalmette	TNN	22,000	44,000	0	30,000	0	0	64,800	0
Citgo Petroleum Corp Lake Charles	CTS	127,000	85,400	64,800	100,000	0	0	0	0
Excel Paralubes Westlake	EXL	0	0	0	0	0	0	0	0
ExxonMobil Refining & Supply Co Baton Rouge	EXX	76,000	238,000	0	189,500	0	0	0	23,000
Marathon Petroleum Co LLC Garyville	MRT	106,500	110,000	80,000	149,000	0	0	106,000	0
Motiva Enterprises LLC Convent	TXC	98,000	0	39,800	70,000	0	0	40,000	0
Motiva Enterprises LLC Norco	SHL	38,500	77,000	0	70,000	0	0	0	0
Pelican Refining Company LLC Lake Charles	PLN	0	0	0	0	0	0	0	0
Phillips 66 Belle Chasse	STN	50,540	65,000	0	74,800	0	0	0	0
Phillips 66 West Lake	CNB	50,000	38,500	24,000	55,000	0	12,500	49,000	0
Placid Refining Co Port Allen	PLC	11,000	20,000	0	25,000	0	0	0	0
Shell Chemical Co St. Rose	INT	0	0	0	0	0	0	0	0
Valero Refining Co Meraux	MRP	40,000	0	16,400	45,000	0	0	0	0
Valero Refining Co Norco	GDH	44,000	60,000	12,000	50,000	44,000	0	24,000	0
Totals		699,740	755,900	237,000	872,300	44,000	12,500	304,900	24,200

Source: Energy Information Administration, "Refinery Capacity Report 2015", Table 3

Table 15 U.S. Energy Information Administration
Production Capacity of Louisiana Operable Petroleum Refineries as of January 1, 2015
(Barrels per Stream Day, Except Where Noted)

Refinery Name	DNR FAC CODE	Production Capacity								
		Alkylate	Aromatics	Asphalt and Road Oil	Isomers		Lubricants	Marketable Petroleum Coke	Hydrogen (MMcf/d)	Sulfur (short tons per day)
					Isobutane	Isopentane and Isohexane				
Alon Refining Krotz Springs Inc Krots Springs	HLL	0	0	0	0	6,220	0	0	0	0
Calcasieu Refining Co Lake Charles	CLC	0	0	0	3,500	0	0	0	0	0
Calumet Lubricants Co LP Cotton Valley	CTT	0	0	0	0	500	0	0	2	0
Calumet Lubricants Co LP Princeton	CLM	0	0	2,000	0	0	7,000	0	4	3
Calumet Shreveport LLC Shreveport	ATL	0	0	6,500	0	0	12,500	0	12	40
Chalmette Refining LLC Chalmette	TNN	16,800	5,800	0	0	8,200	0	9,000	0	935
Citgo Petroleum Corp Lake Charles	CTS	24,000	17,200	0	0	28,000	0	30,000	0	717
Excel Westlake	EXL	0	0	0	0	0	30,000	0	0	185
ExxonMobil Refining & Supply Co Baton Rouge	EXX	41,000	0	0	0	0	16,500	31,525	0	800
Marathon Petroleum Co LLC Garyville	MRT	33,000	0	33,000	23,000	26,500	0	33,000	0	1,476
Motiva Enterprises LLC Convent	TXC	16,500	0	0	0	12,500	0	0	0	728
Motiva Enterprises LLC Norco	SHL	16,800	0	0	0	0	0	7,316	0	180
Pelican Refining Company LLC Lake Charles	PLN	0	0	6,000	0	0	0	0	0	0
Phillips 66 Belle Chasse	STN	35,000	15,500	0	0	0	0	6,716	0	125
Phillips 66 West Lake	CNB	6,000	0	0	0	0	0	22,500	0	440
Placid Refining Co Port Allen	PLC	7,500	0	0	0	0	0	0	0	55
Shell Chemical Co St. Rose	INT	0	0	13,000	0	0	0	0	0	0
Valero Refining Co Meraux	MRP	0	0	0	0	0	0	0	0	180
Valero Refining Co Norco	GDH	21,000	3,000	0	0	0	0	26,000	100	880
Totals		217,600	41,500	60,500	26,500	81,920	66,000	166,057	118	6,744

Source: Energy Information Administration, "Refinery Capacity Report 2015", Table 4

**Table 16 Oil & Gas Journal 2014 Worldwide Refining Survey
Capacities of Louisiana Refineries as of January 1, 2015**

Reprinted with permission. *Oil and Gas Journal*, December 1, 2014

Refinery Name	DNR FAC Code	Charge Capacity, Barrels per Calendar Day							
		Crude	Vacuum Distillation	Coking	Thermal Operations	Catalytic Cracking	Catalytic Reforming	Cat Hydro- cracking	Cat Hydro- treating
Alon Refining Krotz Springs Inc. Krotz Springs	HLL	74,000	36,000			¹ 33,000	¹ 12,000		¹ 14,000
									² 4,500
Calcasieu Refining Co. Lake Charles	CLC	75,000							
Calumet Lubricants Co. Cotton Valley	CTT	13,500							¹³ 5,000
Calumet Lubricants Co. Princeton	CLM	10,000	8,500					⁴ 8,000	
Calumet Lubricants Co. Shreveport	ATL	60,000	15,000				¹ 10,000	^{C4} 8,500	¹ 12,000
									⁵ 7,000
									¹³ 5,000
Chalmette Refining LLC Chalmette	TNN	189,000	162,000	² 28,500		¹ 72,000	³ 21,500		¹ 21,500
									⁷ 30,500
									⁸ 63,000
									¹² 43,000
Citgo Petroleum Corp. Lake Charles	CTS	440,000	79,800	² 88,200		¹ 126,000	¹ 42,300	^{C1} 37,800	¹ 103,500
							³ 52,200		² 6,300
									⁴ 26,100
									⁵ 32,400
Excel Paralubus (Citgo Oil Corp) Westlake	EXL		36,100						
ExxonMobil Refining Supply Co. Baton Rouge	EXX	502,500	236,500	² 117,500		¹ 232,500	² 73,500	^{C1} 24,500	¹ 73,500
									² 105,000
									⁷ 183,000
									¹¹ 23,500
									¹² 101,000
									¹³ 47,500
Marathon Ashland Petroleum LLC Garyville	MRT	522,000	276,500	² 88,800		¹ 131,100	³ 121,600	¹ 111,200	¹ 101,200
									⁴ 76,000
									⁵ 141,600
									⁸ 100,700
									¹² 104,500

See page 36 for notes and legend

**Table 16 (Continued) Oil & Gas Journal 2014 Worldwide Refining Survey
Capacities of Louisiana Refineries as of January 1, 2015**

Reprinted with permission. *Oil and Gas Journal*, December 1, 2014

DNR FAC Code	Production Capacity, Barrels per Calendar Day									
	Alkylation	Pol./Dim.	Aromatics	somerization	Lubes	Oxygenates	Hydrogen (MMcfd)	Coke (t/d)	Sulfur (t/d)	Asphalt
HLL		¹ 2,100		³ 4,500						
CLC										
CTT							^{a1} 2.5			
							⁴ 2.5			
CLM					7,500		^{a1} 4.5		3	
							⁴ 4.5			
ATL					8,000		^{a1} 6.1		15	
							⁴ 6.1			
TNN	² 15000							1,540	870	
CTS	¹ 20,700		¹ 13,500	³ 28,800	9,900	13,150	^{a1} 47.7	3,870	567	
							⁶ 10.8			
EXL					8,550					
EXX	¹ 40,000	¹ 9,500			16,000		⁴ 12.5	5,430	690	
MRT	² 31,400			¹ 21,900			² 114.0	5,672	1,274	31,400
				³ 25,200						

See page 36 for notes and legend

**Table 16 (Continued) Oil & Gas Journal 2008 Worldwide Refining Survey
Capacities of Louisiana Refineries as of January 1, 2015**

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Refinery Name	DNR FAC Code	Charge Capacity, Barrels per Calendar Day							
		Crude	Vacuum Distillation	Coking	Thermal Operations	Catalytic Cracking	Catalytic Reforming	Cat Hydro- cracking	Cat Hydro- treating
Motiva Enterprises LLC Convent	TXC	230,000	104,000		² 12,520	¹ 82,000	¹ 36,000	² 45,000	¹ 40,000
									⁴ 26,000
									⁵ 64,000
									⁸ 38,000
Motiva Enterprises LLC Norco	SHL	235,000	78,000	² 25,000		¹ 107,000	¹ 20,000	^{C1} 39,000	¹ 38,000
							⁴ 38,000		⁵ 36,000
									¹² 49,500
Phillips 66 Belle Chasse	STN	247,000	97,900	¹ 23,400		¹ 94,500	¹ 43,100		¹ 45,400
									⁷ 67,300
									¹² 58,500
Phillips 66 Westlake	CNB	244,000	106,200	² 61,000		¹ 46,100	³ 43,200	³ 35,100	¹ 51,900
								³ 27,900	⁴ 25,100
									⁵ 35,000
									⁶ 4,000
									⁷ 24,000
									⁸ 45,700
Placid Refining Co. LLC Port Allen	PLC	82,000	27,000			¹ 22,500	¹ 11,000		¹ 11,000
									⁵ 25,000
									¹² 20,000
Shell Chemical Co. St. Rose	INT	55,000	28,000						
Valero Energy Corp. Meraux	MRP	135,000	50,000			¹ 37,000			² 35,000
									⁷ 52,000
									⁹ 12,000
Valero Energy Corp. Norco	GDH	280,000	200,000	² 70,400		¹ 100,000	³ 25,000	60,000	² 36,000
									⁵ 48,000
									⁸ 35,100
								¹² 12,000	
Totals		3,394,000	1,541,500	502,800	12,520	1,086,200	549,400	397,000	2,579,350

See page 36 for notes and legend

**Table 16 (Continued) Oil & Gas Journal 2014 Worldwide Refining Survey
Capacities of Louisiana Refineries as of January 1, 2015**

Reprinted with permission. *Oil and Gas Journal*, December 1, 2014

DNR FAC Code	Production Capacity, Barrels per Calendar Day									
	Alkylation	Pol./Dim.	Aromatics	somerization	Lubes	Oxygenates	Hydrogen (MMcfd)	Coke (t/d)	Sulfur (t/d)	Asphalt
TXC	¹ 14,000	² 4,000		³ 12,000			¹ 58.0		640	
SHL	¹ 14,000	¹ 7780				18,000	¹ 50.0	1,020	140	
STN	² 34,200		¹ 30,000				⁷ 10.4	1,100	80	
			² 8,100							
CNB	¹ 7,700	¹ 1,900					^{a1} 15.0	3,600	337	
							⁴ 112.0			
PLC	² 7,500								50	
INT										
MRP	² 8,500								1,800	
GDH	¹ 19,000							4,500	450	
Totals	212,000	25,280	51,800	92,400	49,950	11,150	457	26,732	6,916	31,400

See page 36 for notes and legend

Legend & Notes for Table 16

Source: *Oil & Gas Journal's* 2014 Worldwide Refinery Report

LEGEND

Coking

1. Fluid coking
2. Delayed coking
3. Other

Thermal Processes

1. Thermal cracking
2. Visbreaking

Catalytic Cracking

1. Fluid
2. Other

Catalytic Reforming

1. Semiregenerative
2. Cyclic
3. Continuous regenerative
4. Other

Catalytic Hydrocracking

1. Distillate upgrading
2. Residual upgrading
3. Lube oil manufacturing
4. Other
- c. Conventional (high-pressure) hydrocracking:
(>100 barg or 1,450 psig)
- m. Mild to moderate hydrocracking:
(<100 barg or 1,450 psig)

Catalytic Hydrotreating

1. Pretreating cat reformer feeds
2. Naphtha desulfurization
3. Naphtha aromatics saturation
4. Kerosine/jet fuel desulfurization
5. Diesel desulfurization
6. Distillate aromatics saturation
7. Other distillates
8. Pretreatment of cat cracker feeds
9. Other heavy gas oil hydrotreating
10. Resid hydrotreating
11. Lube oil polishing
12. Post hydrotreating of FCC naphtha
13. Other

Alkylation

1. Sulfuric acid
2. Hydrofluoric acid

Polymerization/Dimerization

1. Polymerization
2. Dimerization

Aromatics

1. BTX
2. Hydrodealkylation
3. Cyclohexane
4. Cumene

Isomerization

1. C₄ feed
2. C₅ feed
3. C₅ and C₆ feed

Oxygenates

1. MTBE
2. ETBE
3. TAME
4. Other

Hydrogen

Production:

1. Steam methane reforming
2. Steam naphtha reforming
3. Partial oxidation
 - a. Third-party plant

Recovery:

4. Pressure swing adsorption
5. Cryogenic
6. Membrane
7. Other

NOTES

Capacity definitions:

Capacity expressed in barrels per calendar day (b/cd) is the maximum number of barrels of input that can be processed during a 24-hr period, after making allowances for the following:

- (a) Types and grades of inputs to be processed.
- (b) Types and grades of products to be manufactured.
- (c) Environmental constraints associated with refinery operations.
- (d) Scheduled downtime such as mechanical problems, repairs, and slowdowns.

Capacity expressed in barrels per stream day (b/sd) is the amount a unit can process when running at full capacity under optimal feedstock and product slate conditions. An asterisk (*) beside a refinery location indicates that the number has been converted from b/sd to b/cd using the conversion factor 0.95 for crude and vacuum distillation units and 0.9 for all downstream cracking and conversion units.

Hydrogen:

Hydrogen volumes presented here represent either generation or upgrading to 90+% purity.

Catalytic reforming:

1. Semiregenerative reforming is characterized by shutdown of the reforming unit at specified intervals, or at the operator's convenience, for in situ catalyst regeneration.
2. Cyclic regeneration reforming is characterized by continuous or continual regeneration of catalyst in situ in any one of several reactors that can be isolated from and returned to the reforming operation. This is accomplished without changing feed rate or octane.
3. Continuous regeneration reforming is characterized by the continuous regeneration of part of the catalyst in a special regenerator, followed by continuous addition of this regenerated catalyst to the reactor.
4. Other includes nonregenerative reforming (catalyst is replaced by fresh catalyst) and moving-bed catalyst systems.

Glossary

Asphalt - A dark-brown to black cement-like material containing bitumen as the predominant constituents, obtained by petroleum processing. The definition includes crude asphalt as well as the following finished products: cements, fluxes, the asphalt content of emulsions (exclusive of water), and petroleum distillates blended with asphalt to make cutback asphalts. The conversion factor for asphalt is 5.5 barrels of 42 U.S. gallons per short ton.

ASTM – It is the acronym for the American Society for Testing and Materials.

Barrels per calendar day – It is the amount of input that a distillation facility can process under usual operating conditions. The amount is expressed in terms of capacity during a 24-hour period and reduces the maximum processing capability of all units at the facility under continuous operation (see Barrels per Stream Day) to account for the following limitations that may delay, interrupt, or slow down production:

- The capability of downstream facilities to absorb the output of crude oil processing facilities of a given refinery. No reduction is made when a planned distribution of intermediate streams, through other than downstream facilities, is part of a refinery's normal operation;
- The types and grades of inputs to be processed;
- The types and grades of products expected to be manufactured;
- The environmental constraints associated with refinery operations;
- The reduction of capacity for scheduled downtime due to such conditions as routine inspection, maintenance, repairs, and turnaround; and
- The reduction of capacity for unscheduled downtime due to such conditions as mechanical problems, repairs, and slowdowns

Barrels per stream day – It is maximum number of barrels of input that a distillation facility can process within a 24-hour period when running at full capacity under optimal crude oil and product slate conditions with no allowance for downtime.

Butane - A normally gaseous straight chain or branch chain hydrocarbon, (C_4H_{10}), it is extracted from natural gas or refined gas streams. It includes isobutene and normal butane and is covered by ASTM Specification D1835 and Gas Processors Association Specifications for commercial butane

- **Isobutene** - A normally gaseous branch chain hydrocarbon, (C_4H_{10}), it is a colorless paraffinic gas that boils at a temperature 10.9 degrees F. It is extracted from natural gas or refinery gas streams.

- **Normal Butane** - A normally gaseous straight chain hydrocarbon, (C₄H₁₀), it is a colorless paraffinic gas that boils at a temperature of 31.1 degrees F. It is extracted from natural gas or refinery gas streams.

Catalytic Cracking – It is the refining process of breaking down the larger, heavier, and more complex hydrocarbon molecules into simpler and lighter molecules. Catalytic cracking is accomplished by the use of a catalytic agent and is an effective process for increasing the yield of gasoline from crude oil

Catalytic Hydrocracking – It is refining process for converting middle boiling or residual material to high-octane gasoline, reformer charge stock, jet fuel and/or high grade fuel oil. Hydrocracking is an efficient, relatively low temperature process using hydrogen and a catalyst.

Catalytic Hydrotreating – It is process for treating petroleum fractions (e.g. distillate fuel oil and residual oil) and unfinished oils (e.g. naphtha, reformer feeds and heavy gas oils) in the presence of catalysts and substantial quantities of hydrogen to upgrade their quality.

Charge capacity - The input (feed) capacity of the refinery processing facilities.

Ethane - A normally gaseous straight-chain hydrocarbon,(C₂H₆). It is a colorless paraffinic gas that boils at a temperature of -127.48 degrees F. It is extracted from natural gas and refinery gas streams.

Ethylene – It is a small hydrocarbon gas, (C₂H₄), recovered from refinery processes or petrochemical processes

Idle capacity - The component of *operable* capacity that is not in operation and not under active repair, but capable of being placed in operation within 30 days; and capacity not in operation, but under active repair that can be completed within 90 days.

Lubricating Oils - A substance used to reduce friction between bearing surfaces. Petroleum lubricants may be produced either from distillates or residues. Other substances may be added to impart or improve certain required properties "Lubricants" includes all grades of lubricating oils from spindle oil to cylinder oil and those used in greases.

Operable capacity - The amount of capacity that, at the beginning of the period, is in operation; not in operation and not under active repair, but capable of being placed in operation within 30 days; or not in operation, but under active repair that can be completed within 90 days. Operable capacity is the sum of the operating and idle capacity and is measured in barrels per calendar day or barrels per stream day. *Note: This survey uses the capacity at the **end** of the period.*

Operating capacity - The component of operable capacity that is in operation at the beginning of the period. *Note: This survey uses the capacity at the **end** of the period.*

Operating utilization rate - Represents the utilization of the atmospheric crude oil distillation units. The rate is calculated by dividing the gross input to these units by the operating refining capacity of the units.

Operating rate % - Throughput divided by 365 divided by operating capacity expressed as a percentage.

Operable rate % - Throughput divided by 365 divided by operable capacity expressed as a percentage.

Petroleum Products - Petroleum products are obtained from the processing of crude oil (including lease condensate), natural gas and other hydrocarbon compounds. Petroleum products include unfinished oils, liquefied petroleum gases, pentanes plus, aviation gasoline, motor gasoline, naphtha-type jet fuel, kerosene-type jet fuel, kerosene, distillate fuel oil, residual fuel oil, naphtha less than 400 F. end-point, other oils over 400 F. end-point, special naphtha, lubricants, waxes, petroleum coke, asphalt, road oil, still gas, and miscellaneous products

Petroleum Refinery - An installation that manufactures finished petroleum products from crude oil, unfinished oils, natural gas liquids, other hydrocarbons, and alcohol-

Thermal Cracking - It is a refining process in which heat and pressure are used to break down, rearrange or combine hydrocarbon molecules. Thermal cracking is used to increase the yield of gasoline obtainable from crude oil.

Throughput - Is the actual barrels of crude oil processed by the atmospheric stills for the survey time period.

Vacuum Distillation – Distillation under reduced pressure (less the atmospheric) which lowers the boiling temperature of the liquid-being distilled. This technique with its relatively low temperatures prevents cracking or decomposition of the charge stock

Wax - A solid or semi-solid material derived from petroleum distillates or residues by such treatments as chilling, precipitating with a solvent, or de-oiling. It is light-colored, more-or-less translucent crystalline mass, slightly greasy to the touch, consisting of a mixture of solid hydrocarbons in which the paraffin series predominates. Includes all marketable wax whether crude scale or fully refined. The three wax grades included are:

- **Microcrystalline Wax** - Wax extracted from certain petroleum residues having a finer and less apparent crystalline structure than paraffin wax.
- **Crystalline-Fully Refined Wax** - A light-colored paraffin wax.
- **Crystalline-Other Wax** - A paraffin wax.