

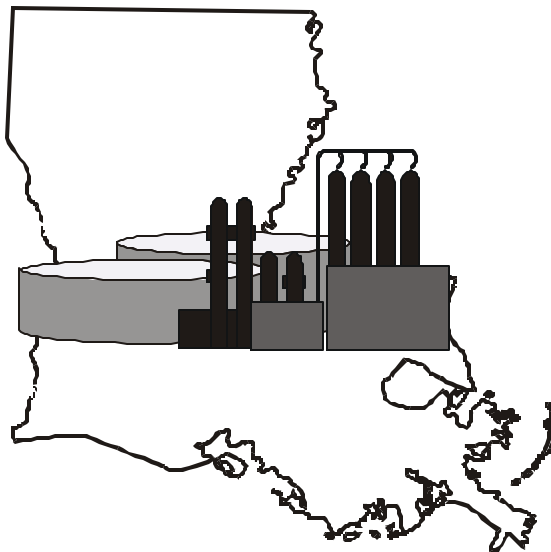
# LOUISIANA CRUDE OIL REFINERY SURVEY REPORT

Eleventh Edition

Louisiana Fiscal Year 1999 Survey

by Sam Stuckey, P.E.

Refining, Alternative Energy & Power Systems Program



LOUISIANA DEPARTMENT OF NATURAL RESOURCES

Jack C. Caldwell  
Secretary of Natural Resources



Technology Assessment Division

T. Michael French, P.E.  
Director

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

## FOREWORD

Since 1989 the Technology Assessment Division of the Louisiana Department of Natural Resources (DNR) has periodically conducted a survey 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 previous survey was accomplished in January 1999 for the State's fiscal year 1998 (FY98) and published April 16, 1999.

The information contained in this annual report is designed to complement the information presented in the refinery section of the Department of Energy/Energy Information Administration (DOE/EIA) Petroleum Supply Annual, now published biennially for the previous two calendar years. Generally, the period covered by DNR is the twelve months ending June 30, so this report is ordinarily about six months out of cycle with DOE/EIA data. DNR gratefully acknowledges permission to use the latest *Oil and Gas Journal* Worldwide Refining Survey results for Louisiana refineries to provide another independent dataset for comparison, especially for those years when the DOE/EIA information is more than a year old.

The operating refining capacities, operating rates, and product slate statistics presented in this report are prepared from data supplied by survey respondents. 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.

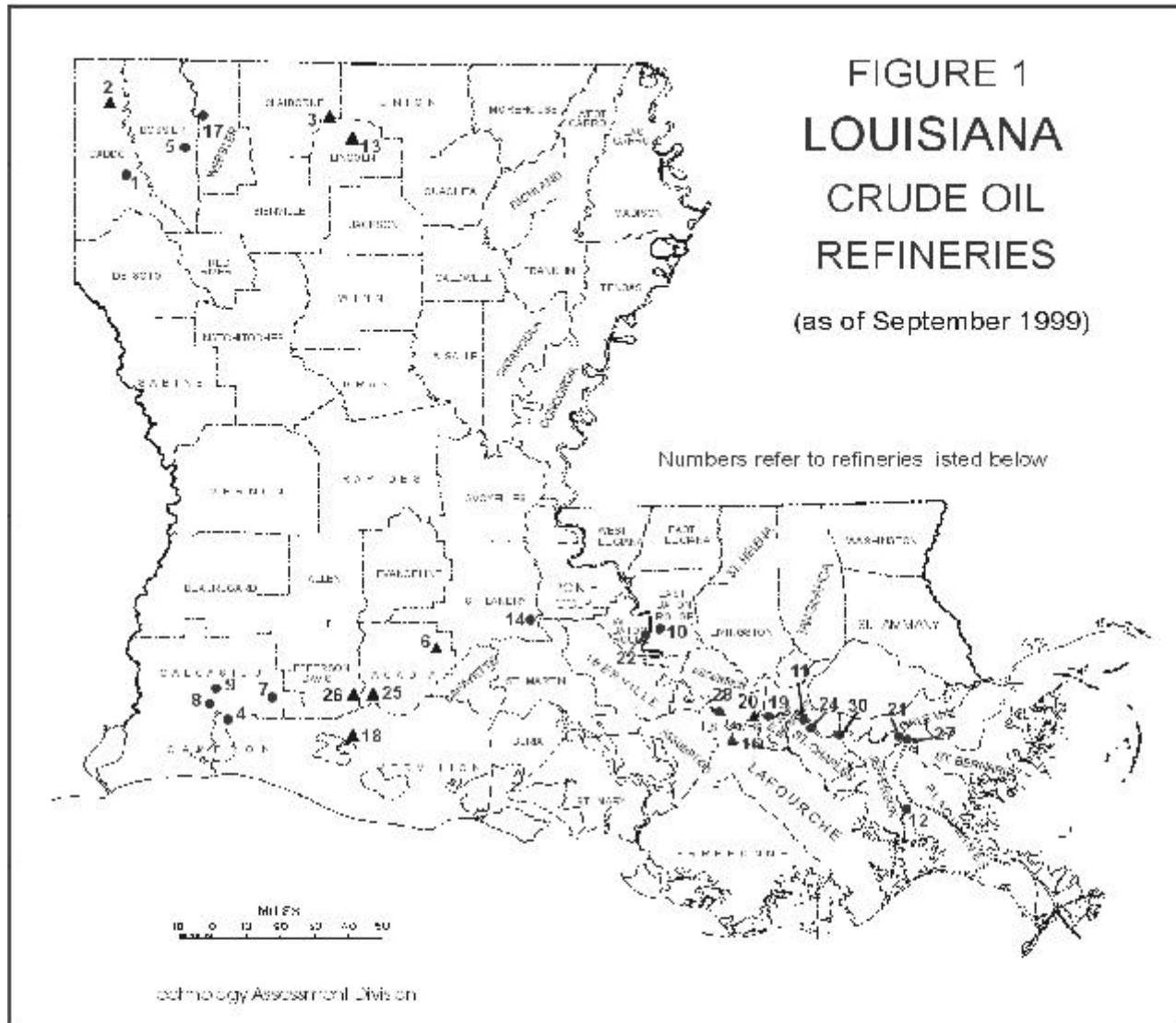
The principal terms and phrases used in this report are the same as used in DOE/EIA publications. It is important to note the slight difference in meaning between *operable* versus *operating* when used to specify capacity or utilization rate. Definitions of principal terms are located in the last section of this report.

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 LOUISIANA CRUDE OIL REFINERIES

(as of September 1999)



**OPERATING REFINERIES** ●

- 1 Pennzoil-Quaker State Corp./Shreveport
- 4 Calcasieu Refining Company/Lake Charles
- 5 Calumet Lubricants Co., L.P./Princeton
- 7 American International Refinery/Lake Charles
- 8 C TGO Petroleum Corp./Lake Charles
- 9 Conoco Inc./Lake Charles
- 10 Exxon Co. U.S.A./Baton Rouge
- 11 Orion Refining Corp./Norco
- 12 B.P. Amoco PLC/Belle Chasse
- 14 Valero Refining Company - Louisiana/Krotz Springs
- 17 Calumet Lubricants Co., L.P./Cotton Valley
- 19 Marathon Ashland Petroleum LLC/Caryville
- 21 Murphy Oil U.S.A., Inc./Meroux
- 22 Plaquemine Refining Co./Port Allen
- 24 Motiva Enterprises LLC/Norco
- 27 Chalmette Refining LLC/Chalmette
- 28 Motiva Enterprises LLC/Convent
- 30 Shell Chemical/St. Rose

**NON-OPERATING REFINERIES** ▲

- 2 Bayou State Oil Corp./Hosston
- 3 Lisbon Refinery J.V., LLC/Lisbon
- 6 Canal Refining Co./Church Point
- 13 El Paso Field Services/Dubauch
- 16 St. James Company LLC/St. James
- 18 Tina Resources, Inc./Talen's Landing
- 20 Petroleum Fuel & Terminal Co./Mt. Airy
- 25 Quantum Fuel & Refining/Eggn
- 26 Gold Line Refining, Ltd./Jennings

Missing numbers are facilities that have been dismantled or which no longer produce finished refinery products.

## DISCUSSION

### Overview

During this reporting period, Louisiana refineries completed projects and process reconfigurations to improve efficiency or alter the product mix to include more higher value products. Since July 1998, these projects have resulted in a total crude capacity increase of over 50,000 barrels per calendar day (BCD).

Of the eighteen refineries that operated during the fiscal year ending June 30, 1999, six produced reformulated gasoline (RFG) for sale in those markets where the U.S. Environmental Protection Agency (EPA) had mandated its use, none of which are in Louisiana. RFG accounted for 10.3% of all gasoline production by Louisiana refineries, about the same as last year. Total gasoline production increased 7.9% over the previous twelve month period.

For the twelve month period ending June 30, 1999, the average Louisiana refinery operating rate decreased to 92.6% from 93.9% in FY98. While there were some changes in the product mix of individual refineries, the overall mix remained about the same and the trend to less mid-grade gasoline production continued, with only one refinery producing that product. Crude capacity, operating rates, and product slate for each operating refinery are shown in Table 1. Tables 2 and 3 provide additional complementary information on downstream charge and production capacity, based on data published by the U.S. Department of Energy (DOE). Permission was obtained from the editor of *The Oil and Gas Journal* to add Table 4 to provide another current independent comparison with DNR survey results.

### Recent Changes

Orion Refining Corp. (until recently, known as TransAmerican Refining Corp.) restarted its vacuum and crude units in June 1998 and began processing heavy, sour feedstocks. Although the rated capacity is reported to be 200,000 BCD elsewhere, it is currently operating at 110,000 BCD until the fluid catalytic cracking unit and alkylation unit come online, now expected to occur in the first quarter of calendar year (CY) 2000.

### Operating Refineries

The total operating capacity of 2,694,838 barrels per calendar day reported as of June 30, 1999, is up 2.6% from our FY98 survey. The overall statewide average operating rate decreased to 92.6% from 93.9% in FY98. This compares with the national rate of 96.7% for calendar year 1998 and 93.5% for the 12-month period ending June 30, 1999. The graph of Figure 2 plots the overall operating rates of Louisiana refineries as compared to Texas Gulf Coast refineries and U.S. refineries beginning with the first DNR survey in September 1989. Figure 3 shows the trend of Louisiana and U.S. operating capacity from 1947-1999.

Louisiana refineries continued to obtain most of their crude supply from outside the state as oil production within the state continued to decline. Only 21% came from within Louisiana's borders. This trend is depicted in the graph of Figure 4, which shows Louisiana refinery operable capacity and oil production since 1900. Of the outside sources supplying crude to Louisiana refineries, foreign countries provide the

most at 57%, the Offshore Continental Shelf (OCS) is next at 16%, and other states at 5%. The relative percentages for Louisiana and OCS are slightly different from the previous edition of this report. The difference may be the result of using DNR's new SONRIS/2000 database for the first time for this report. Figure 5 shows the historical sources of crude oil for Louisiana refineries for the period 1981-1998. Generally, the smaller refineries use a greater percentage of Louisiana crude than the large refineries to satisfy their total requirements. Table 5 and Figure 6 show the percentage crude source for each Louisiana refinery for FY99.

The monthly Gulf Coast Refinery Margin has shown roller-coaster performance for the last half of FY99 after an essentially positive history for calendar year 1998. Figure 7 shows the yearly average cash margins for the period 1976-1998, and calendar year 1999 months for which data were available.

The following changes to refinery operating capacities were reported:

<b>Company/Refinery</b>	<b>Previous Operating Capacity (BCD)</b>	<b>Previous Idle Capacity (BCD)</b>	<b>New Operating Capacity (BCD)</b>	<b>New Idle Capacity (BCD)</b>	<b>Net Increase (Decrease ) (BCD)</b>
Calumet - Princeton	5,546	2,754	7,638	662	0
Chalmette	175,560	14,440	180,500	10,000	500
Citgo - Lake Charles	310,000	0	320,000	0	10,000
Conoco - Lake Charles	236,000	0	250,000	0	14,000
Exxon - Baton Rouge	450,000	0	470,000	0	20,000
Orion - Good Hope	110,000	90,000	110,000	0	*
Murphy Oil USA	101,000	2,000	101,000	0	(2,000)
Placid Refining Co.	48,000	0	49,000	0	1,000
Valero - Krotz Springs	70,000	0	78,000	0	8,000
<b>Net Change</b>					<b>51,500</b>

\* The previously reported 90,000 BCD idle capacity for the Orion refinery is associated with catalytic cracking and alkylation units which were expected to be online within the 90-day period specified by the definition. Construction on these units has been delayed; these units are now expected to be online during the first quarter of calendar year 2000, at which time the reported operating capacity will be increased accordingly.

Mailing addresses and contact names for the operating refineries are shown in Table 6. The physical



locations are shown in Figure 1 and described in Table 7, and Table 8 lists the name history for each facility since 1980.

### **Mobil - Exxon Merger**

The Mobil-Exxon merger, announced December 1, 1998, would result in a U.S. gasoline market share of 22%, compared to 16% for the BP - Amoco merger. As previously reported, approval of this merger will likely take more time than the BP - Amoco combine. News reports imply that the Federal Trade Commission may require the combined company to divest as many as 1,000 service stations in the Northeast and mid-Atlantic states. Impact on the Chalmette and Baton Rouge refineries remains uncertain at this time.

### **BP Amoco - Arco Merger**

According to *The Oil and Gas Journal*<sup>1</sup>, shareholders of both companies have approved the union of BP Amoco with Arco. European Union authorities reportedly are in favor of approval following concessions by both companies. Although both companies have found substantial savings to be made from the combine, BP Amoco expects a total staff reduction of 2,000 people. It is not clear whether these 2,000 are in addition to the 10,000 cut announced earlier this year. The Belle Chasse (Alliance) refinery has been put up for sale. It is known that potential buyers are interested in the facility, but a successful bidder has not been publicly announced.

### **Gasoline Additive: Methylcyclopentadienyl Manganese Tricarbonyl (MMT)**

The gasoline additive methylcyclopentadienyl manganese tricarbonyl (MMT), produced by Ethyl Corporation, was approved for sale in the U.S. in 1995. MMT improves the burning efficiency and octane of gasoline. Ethyl claims that the new additive will reduce millions of pounds of smog-related pollutants per year from the environment. The additive will reduce carbon monoxide and nitrogen oxide emissions. Among other advantages reported by Ethyl Corporation<sup>2</sup>, MMT reduces “. . . the amount of crude oil needed during the gasoline refining process. This process adjustment also lowers refinery emissions, including a reduction of up to 20% known greenhouse gases such as carbon dioxide . . . .”

However, the Environmental Protection Agency (EPA) considers MMT a possible health risk because it contains the metal, manganese. EPA has determined that further testing of long-term health effects, as well as the effects of the additive on emissions-control equipment, is required before MMT can be used in the U.S. without restriction. A three to four year test program was formally initiated by Ethyl Corporation to satisfy EPA requirements. During the test period MMT can be used by refiners, but U.S. refiners are using caution because of the controversy regarding the additive.

California has implemented a ban on the use of methyl tertiary butyl ether (MTBE) in reformulated gasoline.

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<sup>1</sup> *The Oil and Gas Journal*, October 25, 1999

<sup>2</sup> <http://www.ethyl.com/Products/MMT/mmtNest.html>

This may serve to encourage the consideration of MMT as a replacement constituent. Whether MMT could more easily replace MTBE than ethanol or other oxygenates such as ethyl tertiary butyl ether (ETBE), tertiary amyl methyl ether (TAME), or tertiary-butyl alcohol (TBA) remains to be determined. The debate concerning the need for oxygenates at all seems to be a never-ending discussion, but may influence whether MMT can be considered as an alternative additive.

Canadian refiners have resumed use of MMT, which has been used in Canadian gasoline since 1977. In the U.S., preliminary analysis indicates that MMT may lower tailpipe greenhouse gas emissions substantially and has no degrading effect on catalyst conversion efficiency. Even so, results of an informal telephone survey of 6 Louisiana refineries indicates that none of them are considering the use of MMT in the near future.

### **Non-Operating Refineries**

There was no change to the El Paso Field Services facility at Dubach, which consists of a crude oil refinery and a gas liquids fractionating plant. The refinery remains shut down, but the gas plant is operating although the liquids fractionating unit was shut down in January 1998.

The Canal Refining Co. facility at Church Point is still not operating for inclusion in this report. However, the refinery expects to restart in January 2000 after completing extensive maintenance and process projects that are expected to result in a capacity increase.

The Jennings refinery that was last operated by Gold Line remains shut down since February 1998. The owner of this facility desires to sell or lease the facility.

At Lisbon, the refinery remains shutdown since July 1997 and is available for lease or purchase.

St. James Co., LLC, continues to await decisions by the Louisiana Department of Environmental Quality concerning the status of cleanup efforts. Eight storage tanks with 350,000 barrels capacity are available for lease; docking facilities and pipeline access are controlled by Koch Petroleum Group, LP, on adjacent property.

The Quantum Fuel and Refining Co. facility at Egan, formerly known as U.S. Refining Co., did not produce during this period. According to the owner, sale of the facility is pending.

There was no response from Tina Resources, Inc., at Cameron to the current survey. The last information received over three years ago was that the refinery was shut in and for sale.

The identity and location of each of the non-operating refineries is shown on the map of Figure 1. Mailing addresses and contacts are listed in Table 9. Physical locations, last known crude capacity, date last operated, and present status are described in Table 10.

### **Near-Term Challenges**

Environmental concerns are causing refiners to be much more thoughtful in planning for future operations and product lines. One topic of particular concern is a mandate for much lower sulfur levels in gasoline (30 parts per million) and diesel fuel over the next four years or so. Since a large percentage of crude input is both heavy and sour, meeting the lower sulfur requirements will demand considerable financial commitment for almost all facilities. Present sulfur levels of around 300 ppm represent the nominal lowest amount of “purification” that can be obtained with most existing facilities. Therefore, installing and implementing new process equipment will be necessary and will cause some increase in price of the product due to the large capital expenditure necessary to achieve compliance with the proposed standard. Smaller refiners who will have an extra four years to comply will need an exceptionally clear crystal ball to correctly plan for a different product slate or costly capital investment.

Equally onerous to refiners is the recent ban on MTBE mandated by California, which is expected to spread to other states even though there is no significant hazard posed by the material to the environment. Appropriate substitute additives are not universally accepted by all state regulators and environmental activists, resulting in uncertainty for future planning.

Louisiana refiners may soon be required to produce reformulated gasoline for the five-parish Baton Rouge metropolitan statistical area if the ground-level ozone concentration cannot be controlled to EPA’s satisfaction. Then several refiners will have to plan for yet another blend of gasoline, and perhaps diesel fuel, as well, to maintain market share and profitability.

At press time, a “Pollution Prevention Performance” report<sup>3</sup> of 179 oil refineries in 34 states was featured in Baton Rouge and New Orleans newspapers. The Environmental Defense Fund (EDF) developed a ranking methodology to compare pollution prevention performance of 21 Louisiana refineries using 1997 data. Five performance indicators were evaluated for each facility: (1) release of toxic chemicals (mass of toxic pollutants released from facilities into the surrounding communities); (2) transfers of toxic chemicals (mass of toxic pollutants taken off-site for management or disposal); (3) the sum of benzene releases and transfers (as reported to Toxics Release Inventory by each facility); (4) Volatile Organic Compounds (VOCs) released to the air by a refinery; and (5) the quantity of sulfur released from a refinery (sulfur dioxide, SO<sub>2</sub>). EDF normalized the data by dividing the indicators by the production capacity of each refinery, which gave performance indicators in units of pounds per barrel per day. Of the 21 Louisiana refineries reviewed, 6 were excluded from the evaluation because of incomplete data. The remaining 15 were categorized by ranking from best (top 15%) to worst (bottom 20%). Three Louisiana refineries made the “best” category, one made the “worst” category, and the remainder fell in the “mid-grade” category.

Because of the rather complicated methodology used, news media glossed over the fact that the original 179 refineries in 34 states were culled to a total of 132 on the final list, and the state rankings included only those states with 4 or more refineries which resulted in a list of 12 states with a total of 97 refineries. Louisiana’s 15 refineries again made the “mid-grade” list, while Texas’ 23 refineries placed in the “worst” list and California’s 16 made the “best” list.

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<sup>3</sup> <http://www.edf.org/programs/PPA/cg/or/index.html>

The EDF rankings took no account of refinery complexity. Untimely for the refineries, the report caused feature stories in newspapers as EPA begins to increase scrutiny of fixed industrial sources of pollutants. A Texas refiner was recently fined several hundred thousand dollars for emitting certain pollutants “without proper authorization.” EPA’s tighter compliance posture coupled with unfavorable publicity such as described above will undoubtedly impact refineries, both large and small.

## **Conclusion**

Louisiana refineries operated at varying capacity rates during this period in response to increasing crude oil costs and increasing demand for certain products. The larger facilities have been able to absorb proportionally larger inputs of heavy crude while maintaining positive margins. For this reporting period, eight refineries (44%) of the eighteen that operated processed 84% of the total crude input, essentially the same as the previous reporting period. Louisiana refineries matched the U.S. national import rates for crude oil during this period, which implies that refineries in other states have increased foreign crude inputs over the last several months.

Louisiana refinery operators continue to face some difficult situations. Within the last few months, several states - Louisiana included - moved to provide varying degrees of relief for oil and gas well operators to counteract low prices. Federal agencies participated to a lesser extent, but these producer relief measures did not benefit refiners directly. The layoffs announced in response to low earnings and big company mergers will be a significant detriment to resumption of more normal refinery operations in the future as prices begin to recover. Present indications are that demand for petroleum and petrochemical products will continue to grow in the next few years, although the rate of increased demand is not clearly defined. If Louisiana refineries intend to meet this larger demand, it will be necessary to either expand capacity or import additional products to satisfy demand. Therefore, expansion planning must be both realistic and flexible to respond to increased environmental regulatory compliance while maintaining the ability to provide quality products in the marketplace with greater operating efficiency.

It is clear that continued capital improvements and additions which will enable operations with a wider variety of crude input or a more profitable product slate will be necessary. It is also clear that the costs of refining operations are bound to increase as environmental compliance activities continue to increase.



Exxon Baton Rouge looking Southwest. Plume is coming from wet gas scrubber.  
Photo courtesy Exxon Public Affairs.

**TABLE 1**  
**LOUISIANA OPERATING REFINERIES**  
**CRUDE CAPACITY (Barrels per Calendar Day, BCD) AND PERCENT PRODUCT SLATE**  
**Louisiana FY 1999 DNR Survey**

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

<b>REFINERY NAME</b>	<b>DNR FAC. CODE</b>	<b>OPERATING CAPACITY As of June 30, 1999 (BCD)</b>	<b>OPERATING RATE * (%)</b>	<b>IDLE CAP. (BCD)</b>	<b>OPERABLE RATE (%)</b>	<b>12-MONTH THROUGHPUT 1 July 98-30 June 99 (Barrels)</b>
American International Refinery Lake Charles NOTE A	<b>LKC</b>	35,000	2.8	0	2.8	352,357
B. P. Amoco PLC - Alliance	<b>STN</b>	254,500	90.3	5,500	88.3	83,840,553
Calcasieu Refining Co.	<b>CLC</b>	15,300	99.2	0	99.2	5,539,344
Calumet Lubricants - Cotton Valley	<b>CTT</b>	7,700	89.4	2,500	67.5	2,512,484
Calumet Lubricants - Princeton	<b>CLM</b>	7,638	87.8	662	80.8	2,447,335
Chalmette Refining, LLC	<b>TNN</b>	180,500	98.6	10,000	93.4	64,970,000
Citgo Petroleum Corp.	<b>CTS</b>	320,000	97.0	0	97.0	113,339,646
Conoco, Inc. - Lake Charles	<b>CNB</b>	250,000	93.2	0	93.2	85,068,473
Exxon Co. U.S.A.	<b>EXX</b>	470,000	92.3	0	92.3	158,300,500
Marathon Ashland Petroleum,	<b>MRT</b>	255,000	88.8	0	88.8	82,682,649
Motiva Enterprises, LLC -	<b>TXC</b>	225,000	103.0	0	103.0	84,548,300
Motiva Enterprises, LLC - Norco	<b>SHL</b>	235,000	96.4	0	96.4	82,728,171
Murphy Oil U.S.A., Inc.	<b>MRP</b>	101,000	90.0	0	90.0	33,172,463
Orion Refining Corp.	<b>GDH</b>	110,000	66.3	0	66.3	26,619,224
Pennzoil -Quaker State Corp.	<b>ATL</b>	46,200	92.6	0	92.6	15,613,605
Placid Refining Co.	<b>PLC</b>	49,000	98.9	0	98.9	17,682,810
Shell Chemical Co. - St. Rose	<b>INT</b>	55,000	79.7	0	79.7	16,000,000
Valero Refining Co. - La.	<b>HLL</b>	78,000	82.7	0	82.7	23,556,040
<b>WEIGHTED STATE AVERAGE (%)</b>			<b>92.6</b>		<b>91.9</b>	
<b>TOTAL LA. CAPACITY</b>		<b>2,694,838</b>		<b>18,662</b>		<b>898,973,954</b>

Footnotes are located on page 12.

**TABLE 1 (continued)**  
**LOUISIANA OPERATING REFINERIES**  
**CRUDE CAPACITY (Barrels per Calendar Day, BCD) AND PERCENT PRODUCT SLATE**  
**Louisiana FY 1999 DNR Survey**

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

DNR FAC. CODE	% OF TOTAL PRODUCT SLATE													
	GASOLINE				OTHER FUELS			MISCELLANEO US			OTHER PRODUCTS			
	REG	MID- GRADE	PREM	ALL RFG	DIESEL	JET/ KERO	FUEL OIL	LPGs	NAPTH	COKE/ RESID	PROD. 1	PROD. 2	PROD. 3	ALL OTHER
LKC					9.0	7.0		2.0	11.0		23.0	48.0		
STN	28.9		15.0		28.0	14.9 Jet		2.3		1.6/0.6	1.5 Carbon Blk	0.6 Normal	6.6 Petro-	
CLC					32.5	18.4	20.6	4.5	23.7					
CTT					0.3				57.0		24.0	18.7		
CLM					11.0						71.0	18.0		
TNN	43.1		11.5		6.5	12.3	12.8	5.0		0.35/3.8	4.2	0.45		
CTS	27.2		15.7	7.1	10.7	18.1	3.3	2.0		7.0/0	2.3	2.9		3.7
CNB	17.0		10.0	14.0	30.0	17.0	1.0	1.0	1.0	8.0/1.0				
EXX	22.0		8.0	7.0	16.0	12.0		2.0	1.0	4.0/3.0	16.0 Petrochem	2.0 Gas Oil	3.0 Lubes/	4.0 Sulfur, etc.
MRT	40.2		11.7	0.6		1.4	17.6	4.7	0.1	0/11.1	2.7	9.5	0.4	
TXC	32.0		3.8	5.1	18.6	11.7		2.1		1.5/14.5	0.8	2.7	0.5	6.7
SHL	37.1		19.7	4.9	16.7	15.0		1.3	0.7	1.8/ 2.8				
MRP	33.9		8.6		15.1	7.6	11.3	0.8		0/12.2	1.9 Propylene	0.3 Sulfur	0.4 Asphalte	
GDH					16.0	6.0			14.0	8.0/23.0 <b>NOTE</b>	37.0 HVGO	1.0 C3C4C		
ATL	35.9	1.7	2.5		21.7	14.0		2.3	0.3	0/3.1	16.6	1.6		0.3
PLC	37.6		5.7		26.2	10.9		0.5	0.4	0/6.1	6.0	2.9	0.1	3.6
INT					20.0 <b>NOTE</b>	9.0		2.0	21.0 <b>NOTE</b>	0/15.0	33.0 Olefin			
HLL	28.0		3.3		17.9	13.4		2.0	11.2		2.4	21.8		
Wtd %	28.2	0	10.4	4.4	16.4	12.4	3.6	2.2	1.7	3.1/5.2	<b>NOTE E</b>			

Footnotes are located on page 12.

Footnotes for Table 1:

Percentages may not sum precisely due to independent rounding.

\* Operating rates are calculated by dividing the 12-month total crude input by the operating capacity provided by survey respondents.

Note A. Not used in weighted average calculation.

Note B. Includes fuel produced and consumed in operations.

Note C. Some of this was re-run.

Note D. Can be olefin plant feed.

Note E. Weighted percentage of other products relative to total statewide crude throughput:

Sulfur	0.86%
Asphalt	0.93%
Asphaltene	0.01%
HVGO	1.10%
Gas Oil	0.99%
Olefin Plant Feed	0.59%
Aromatics	0.30%
Propylene/Propane	0.38%
C <sub>3</sub> C <sub>4</sub> C <sub>5</sub> C <sub>6</sub> Mix	0.03%
Normal Butane	0.06%
Dry Gas	0.25%
MTBE	0.05%
Fuel Gas	0.07%
Subgrade Gasoline	0.12%
Light Straight Run	0.12%
Lubes & Waxes	1.33%
Carbon Black Feedstocks	0.14%
Petrochemicals	0.98%
Petrochemical Feedstocks	-2.82%
All Other	1.10%
Total	12.23%





Calumet Refinery at Princeton. 1996 photo by Al Troy, La. Dept of Natural Resources

**TABLE 2**  
**U.S. DEPARTMENT OF ENERGY**  
**CAPACITY OF LOUISIANA OPERABLE PETROLEUM REFINERIES AS OF JANUARY 1, 1999**  
(Barrels per Stream Day, Except Where Noted)

REFINER/ LOCATION	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
American International Ref. Lake Charles	LKC									
BP Amoco PLC Belle Chasse (Alliance)	STN	255,000	0	255,000	0	93,000	25,800	0	0	0
Calcasieu Refining Co. Lake Charles	CLC	15,300	0	15,600	0	0	0	0	0	0
Calumet Lubricants Co. L.P. Cotton Valley	CTT	7,800	0	8,500	0	0	0	0	0	0
Calumet Lubricants Co.L.P. Princeton	CLM	8,300	0	8,655	0	6,257	0	0	0	0
Chalmette Refining LLC Chalmette	TNN	181,600	0	192,000	0	145,000	35,000	0	0	0
Citgo Petroleum Corp. Lake Charles	CTS	312,700	0	327,500	0	84,000	100,000	0	0	0
Conoco Inc. Westlake	CNB	229,900	0	242,000	0	115,500	66,000	0	0	12,000
Exxon Co. U.S.A. Baton Rouge	EXX	473,000	0	493,000	0	226,000	107,000	0	0	0
Marathon Ashland Petro LLC Garyville	MRT	232,000	0	243,000	0	125,000	0	0	0	0
Motiva Enterprises LLC Convent	TXC	225,000	0	240,000	0	113,000	0	0	13,500	0
Motiva Enterprises LLC Norco	SHL	232,000	0	235,000	0	80,000	27,000	0	0	0
Murphy Oil U.S.A. Inc. Meraux	MRP	95,000	0	100,000	0	50,000	0	0	0	0
Orion Refining Corp. Good Hope (Norco)	GDH	110,000	0	150,000	0	55,000	25,000	0	0	0
Pennzoil-Quaker State Corp. Shreveport	ATL	46,200	0	50,000	0	24,300	0	0	0	0
Placid Refining Co. Port Allen	PLC	48,500	0	49,500	0	20,000	0	0	0	0
Shell Chemical Co. St. Rose	INT	50,000	0	55,000	0	28,000	0	0	0	0
Valero Refining Co. - La. Krotz Springs	HLL	78,000	0	80,000	0	0	0	0	0	0
<b>LOUISIANA TOTALS</b>		<b>2,600,300</b>	<b>0</b>	<b>2,744,755</b>	<b>0</b>	<b>1,165,057</b>	<b>385,800</b>	<b>0</b>	<b>13,500</b>	<b>12,000</b>

\* Information not included in DOE Table 38.

**Source:** Energy Information Administration/Petroleum Supply Annual 1998 Volume 1, Table 38 [DOE/EIA-340(98/1), June 1999]

**TABLE 2 (Continued)**  
**U.S. DEPARTMENT OF ENERGY**  
**CAPACITY OF LOUISIANA OPERABLE PETROLEUM REFINERIES AS OF JANUARY 1, 1999**  
(Barrels per Stream Day, Except Where Noted)

REFINER/ LOCATION	DNR FAC. CODE	Downstream Charge Capacity (Continued)										
		Catalytic Cracking		Catalytic Hydro- Cracking	Catalytic Reforming		Catalytic Hydrotreating				Fuel Solvent Deasphlgt	
		Fresh	Recycled		Low Pressure	High Pressure	Heavy Gas Oil	Naphtha/ Ref. Feeds	Distillate	Other/ Residual		
American International Ref *	LKC											
Lake Charles												
BP Amoco PLC Belle Chasse (Alliance)	STN	105,000	2,000	0	0	44,100	0	48,000	58,400	0	0	
Calcasieu Refining Co. Lake Charles	CLC	0	0	0	0	0	0	0	0	0	0	
Calumet Lubricants Co. L.P. Cotton Valley	CTT	0	0	0	0	0	0	3,600	0	0	0	
Calumet Lubricants Co.L.P. Princeton	CLM	0	0	0	0	0	0	0	0	8,500	0	
Chalmette Refining LLC Chalmette	TNN	78,000	0	22,000	18,000	28,000	46,000	38,000	30,000	0	0	
Citgo Petroleum Corp. Lake Charles	CTS	130,000	0	38,000	86,000	18,000	68,000	116,000	33,000	25,500	0	
Conoco Inc. Westlake	CNB	51,000	0	28,000	48,000	0	0	52,700	128,500	13,000	0	
Exxon Co. U.S.A. Baton Rouge	EXX	219,000	0	25,000	71,000	0	0	154,000	90,000	47,700	0	
Marathon Ashland Petr LLC Garyville	MRT	110,000	0	0	45,000	0	93,000	46,000	52,000	0	36,000	
Motiva Enterprises LLC Convent	TXC	92,000	0	52,000	0	40,000	33,000	44,000	91,000	0	0	
Motiva Enterprises LLC Norco	SHL	110,000	0	34,800	40,000	20,500	0	38,000	44,300	0	0	
Murphy Oil U.S.A. Inc. Meraux	MRP	38,000	0	0	18,000	0	27,500	22,000	15,000	0	0	
Orion Refining Corp. Good Hope (Norco)	GDH	0	0	0	0	12,000	30,000	30,000	30,000	0	0	
Pennzoil-Quaker State Corp. Shreveport	ATL	3,500	7,000	0	10,000	0	8,900	10,000	10,000	1,200	0	
Placid Refining Co. Port Allen	PLC	19,000	2,000	0	10,000	0	0	12,000	0	0	0	
Shell Chemical Co. St. Rose	INT	0	0	0	0	0	0	0	0	0	0	
Valero Refining Co. - La. Krotz Springs	HLL	31,700	0	0	0	12,500	0	13,000	0	0	0	
<b>LOUISIANA TOTALS</b>		<b>987,200</b>	<b>11,000</b>	<b>199,800</b>	<b>346,000</b>	<b>175,100</b>	<b>306,400</b>	<b>627,300</b>	<b>582,200</b>	<b>95,900</b>	<b>36,000</b>	

\* Information not included in DOE Table 38.

**TABLE 3**  
**U.S. DEPARTMENT OF ENERGY and LOUISIANA DEPARTMENT OF NATURAL RESOURCES**  
**PRODUCTION CAPACITY OF LOUISIANA OPERABLE PETROLEUM REFINERIES**  
**AS OF JANUARY 1, 1999**  
(Barrels per Stream Day, Except Where Noted)

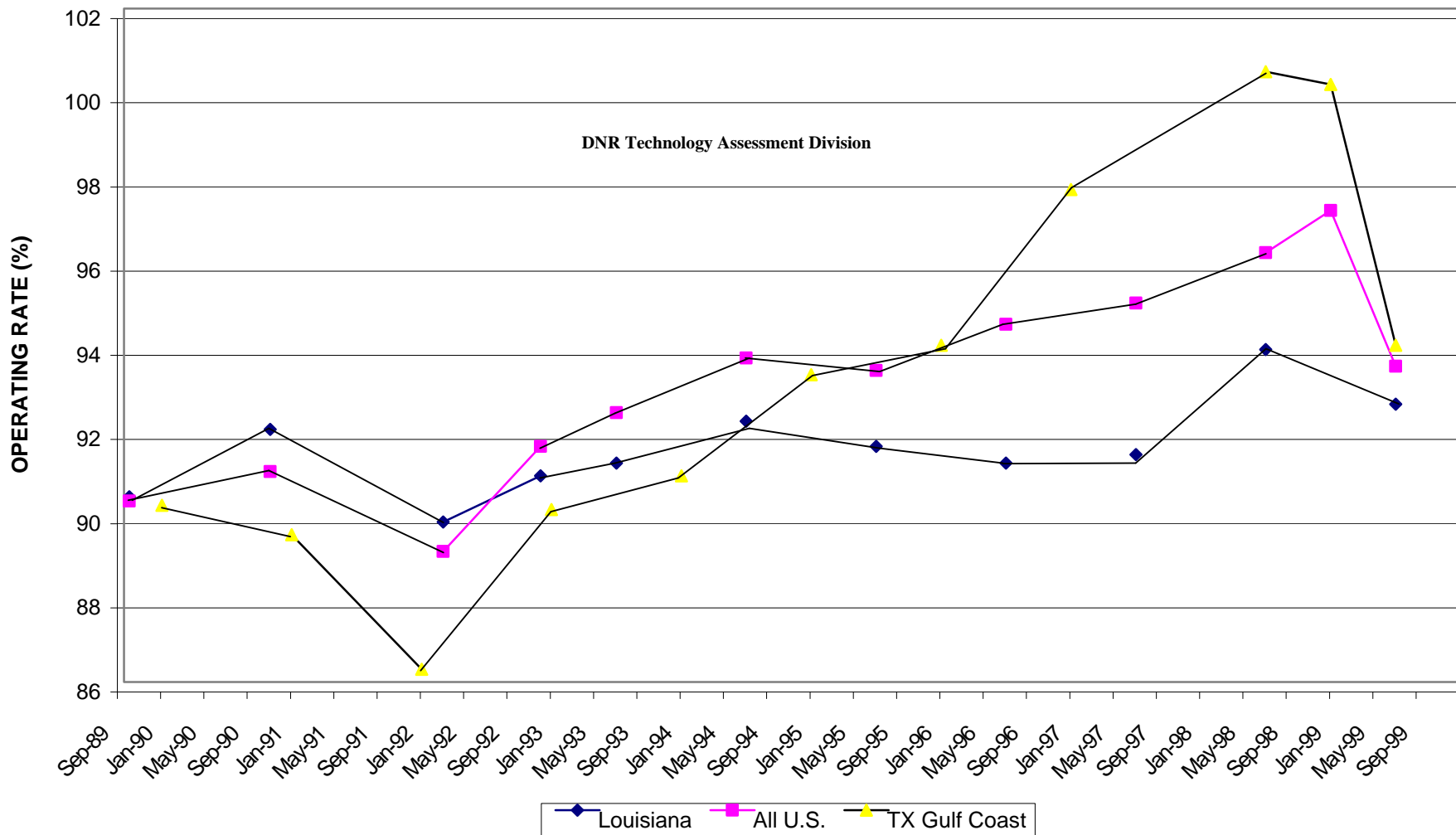
Refiner/Location	DNR Fac. Code	Production Capacity								
		Alkylates	Aromatics	Asphalt & Road Oil	Isomers		Lubricants	Marketabl e Petroleum Coke	Hydrogen (MMcfd)	Sulfur (short tons per day)
					Isobutane	Isopentane & Isohexane				
<i>American International Ref.</i> *	<i>LKC</i>									
<i>Lake Charles</i>										
BP Oil Corp. Belle Chasse (Alliance)	STN	38,000	12,300	0	0	0	0	5,289	40	125
<i>Calcasieu Refining Co. *</i> <i>Lake Charles</i>	<i>CLC</i>									
<i>Calumet Lubricants Co. L.P.</i> *	<i>CTT</i>									
<i>Cotton Valley</i>										
Calumet Lubricants Co. L.P. Princeton	CLM	0	0	1,700	0	0	5,950	0	5	3
Chalmette Refining LLC Chalmette	TNN	20,000	9,000	0	10,000	0	0	10,000	0	200
Citgo Petroleum Corp. Lake Charles	CTS	23,000	4,000	0	0	28,000	9,600	21,000	0	691
Conoco, Inc. Westlake	CNB	8,000	0	0	0	0	18,000	18,250	0	750
Exxon Co. U.S.A. Baton Rouge	EXX	35,900	0	0	0	0	16,000	30,195	19	672
Marathon Ashland Petro LLC Garyville	MRT	30,000	0	42,000	23,000	18,000	0	0	0	549
Motiva Enterprises LLC Convent	TXC	16,500	0	0	0	12,500	0	0	63	788
Motiva Enterprises LLC Norco	SHL	16,000	0	0	0	0	0	7,000	60	155
Murphy Oil U.S.A., Inc. Meraux	MRP	8,500	0	18,000	0	0	0	0	0	146
Orion Refining Corp. Good Hope	GDH	0	0	0	0	0	0	7,500	20	140
Pennzoil-Quaker State Corp. Shreveport	ATL	4,500	0	600	4,200	0	9,100	0	6	33
Placid Refining Co. Port Allen	PLC	4,000	0	0	0	0	0	0	0	8
<i>Shell Chemical Co. *</i> <i>St. Rose</i>	<i>INT</i>									
Valero Refining Co. - La. Krotz Springs	HLL	0	0	0	2,700	800	0	0	0	10
<b>LOUISIANA TOTALS</b>		<b>204,400</b>	<b>25,300</b>	<b>62,300</b>	<b>39,900</b>	<b>59,300</b>	<b>58,650</b>	<b>99,234</b>	<b>213</b>	<b>4,270</b>

MMcfd = Million cubic feet per day

\* Information not included in DOE Table 39

Source: Energy Information Administration/Petroleum Supply Annual 1998, Volume 1, Table 39 [DOE/EIA-0340(98)/1], June 1999, and La. DNR Survey, September 1999

**Figure 2**  
**OPERATING RATES (%)**  
**OF LOUISIANA, TEXAS GULF COAST, AND ALL U.S. REFINERIES**



**TABLE 4**  
**OIL AND GAS JOURNAL 1998 WORLDWIDE REFINING SURVEY**  
**Capacities of Louisiana Refineries as of January 1, 1999**

Reprinted with permission. Ref: *Oil & Gas Journal*, Vol. 96, No. 51, December 21, 1998; pp 49, 84, 85

DNR FAC. CODE	Company and Refinery Location	Charge Capacity, Barrels per Calendar Day								
		Crude	Vacuum Distillation	Coking	Thermal Operations	Catalytic Cracking	Catalytic Re- forming	Cat Hydro- cracking	Cat hydro- Refining	Cat Hydro- treating
LKC	American International Refining, Inc. - Lake Charles	27,600	10,000							
STN	BP Oil Co. - Belle Chasse *	255,000	89,300	<sup>2</sup> 22,500		<sup>1</sup> 92,700	<sup>1</sup> 37,800		<sup>4</sup> 27,900	<sup>2</sup> 43,200 <sup>4</sup> 23,400
CLC	Calcasieu Refining Co. - Lake Charles	15,300								
CTT	Calumet Lubricants Co. - Cotton Valley	8,000								<sup>3</sup> 3,600
CLM	- Princeton	8,000	7,150							
CNL	Canal Refining Co. - Church Point	10,000	3,000							<sup>1</sup> 3,000
	Cit-Con Oil Corp. - Lake Charles		38,000							
CTS	Citgo Petroleum Corp. - Lake Charles	304,000	76,950	<sup>2</sup> 84,600		<sup>1</sup> 117,000	<sup>1</sup> 46,800 <sup>3</sup> 45,000	<sup>1</sup> 36,000	<sup>4</sup> 35,100	<sup>1</sup> 73,800 <sup>2</sup> 5,400 <sup>4</sup> 12,600
CNB	Conoco, Inc. - Westlake	231,100	154,000	<sup>2</sup> 64,100	<sup>1</sup> 11,300	<sup>1</sup> 47,800	<sup>3</sup> 43,900	<sup>3</sup> 29,000		<sup>1</sup> 46,000 <sup>4</sup> 33,300 <sup>5</sup> 47,500 <sup>6</sup> 37,300 <sup>8</sup> 11,200
EXX	Exxon Co. - Baton Rouge	473,000	217,000	<sup>2</sup> 102,000		<sup>1</sup> 208,000	<sup>2</sup> 69,000	<sup>1</sup> 22,500		<sup>1</sup> 107,000 <sup>2</sup> 43,000 <sup>6</sup> 85,500 <sup>7</sup> 2,700 <sup>8</sup> 44,000
MRT	Marathon Ashland Petroleum LLC - Garyville <sup>z</sup>	232,000	124,000			<sup>1</sup> 102,000	<sup>3</sup> 43,000			<sup>1</sup> 43,700 <sup>4</sup> 48,000 <sup>5</sup> 83,500 <sup>8</sup> 18,000
TNN	Mobil Oil Corp. - Chalmette	184,100	120,000	<sup>2</sup> 33,800		<sup>1</sup> 66,000	<sup>1</sup> 27,000 <sup>3</sup> 16,500	<sup>1</sup> 19,600	<sup>3</sup> 43,700	<sup>2</sup> 36,500 <sup>6</sup> 26,500
TXC	Motiva Enterprises LLC - Convent <sup>ll</sup>	225,000	100,000		<sup>2</sup> 12,000	<sup>1</sup> 85,000	<sup>1</sup> 36,000	<sup>4</sup> 45,000		<sup>1</sup> 40,000 <sup>4</sup> 88,000 <sup>5</sup> 34,000
SHL	Motiva Enterprises LLC - Norco <sup>jj</sup>	225,000	78,000	<sup>2</sup> 25,500		<sup>1</sup> 107,000	<sup>1</sup> 19,600 <sup>2</sup> 39,000	<sup>1</sup> 36,000		<sup>1</sup> 40,000 <sup>4</sup> 51,000
MRP	Murphy Oil USA, Inc. * <sup>z</sup>	95,000	47,500			<sup>1</sup> 34,200	<sup>3</sup> 16,200			<sup>1</sup> 19,800 <sup>4</sup> 13,500 <sup>8</sup> 24,750
ATL	Pennzoil Products Co. - Shreveport	46,200	23,085			<sup>v2</sup> 10,080	<sup>1</sup> 8,000			<sup>1</sup> 10,000 <sup>7</sup> 3,060 <sup>8</sup> 8,500
PLC	Placid Refining Co. - Port Allen <sup>z</sup>	48,000	20,000			<sup>1</sup> 19,000	<sup>1</sup> 9,700			<sup>2</sup> 9,700 <sup>6</sup> 12,000
INT	Shell Chemical Co. - St. Rose	55,000	29,000							
GDH	TransAmerican Refining Corp. - Norco	200,000	220,000	<sup>2</sup> 75,000			<sup>1</sup> 12,000		<sup>3</sup> 30,000	<sup>1</sup> 30,000 <sup>6</sup> 30,000
HLL	Valero Energy Corp. - Krotz Springs	74,000	20,800			<sup>1</sup> 31,000	<sup>1</sup> 11,800			<sup>1</sup> 14,900
<b>Total</b>		<b>2,716,300</b>	<b>1,377,785</b>	<b>407,500</b>	<b>23,300</b>	<b>919,780</b>	<b>481,300</b>	<b>188,100</b>	<b>136,700</b>	<b>1,307,910</b>

(Table continued next page)

Footnotes for Table 4 appear on page 20.

**TABLE 4 (continued)**  
**OIL AND GAS JOURNAL 1998 WORLDWIDE REFINING SURVEY**  
**Capacities of Louisiana Refineries as of January 1, 1999**

DNR FAC. CODE	Production Capacity, Barrels per Calendar Day									
	Alkylation	Pol./Dim.	Aromatic s	Isomerizatio n	Lubes	Oxygenates	Hydrogen (MMcfd)	Coke (mt/d)	Sulfur (mt/d)	Asphalt
LKC										
STN	<sup>2</sup> 34,200		27,000				<sup>7</sup> 10.4	800		
CLC										
CTT							<sup>1a</sup> 2.5			
CLM					5,300		<sup>1a</sup> 4.5 <sup>4</sup> 4.5		3	1,500
CNL										
					9,500					
CTS	<sup>1</sup> 20,700		<sup>1a</sup> 4,500	<sup>3</sup> 25,200	9,500	<sup>1a</sup> 2,520 <sup>3</sup> 3,420		3,800	700	
CNB	<sup>1</sup> 10,300	<sup>1a</sup> 5,300			11,500	<sup>1</sup> 1,300	<sup>4</sup> 100.0	3,400	363	
EXX	<sup>1</sup> 35,000	<sup>1a</sup> 9,000			16,000	<sup>1a</sup> 7,000	<sup>4</sup> 11.0 <sup>6</sup> 7.0	4,940	610	
MRT	<sup>2</sup> 29,100			<sup>1a</sup> 21,400 <sup>3</sup> 17,400					490	39,900
TNN	<sup>2</sup> 11,600		<sup>1a</sup> 9,700	<sup>3</sup> 10,700				2,205	250	
TXC	<sup>1</sup> 13,050	<sup>2</sup> 3,600		<sup>3</sup> 11,250		<sup>1a</sup> 2,250 <sup>3</sup> 2,500	<sup>3</sup> 58.0		711	
SHL	<sup>1</sup> 16,000					<sup>1a</sup> 7,000	<sup>1a</sup> 65.0	1,000		
MRP	<sup>2</sup> 7,650								120	
ATL	<sup>1a</sup> 5,040			<sup>1a</sup> 4,032	7,650		<sup>1a</sup> 6.1		10	540
PLC	<sup>2</sup> 3,800								28	
INT										
GDH								4,110	290	
HLL		<sup>1a</sup> 4,200		<sup>3</sup> 4,300		<sup>1a</sup> 2,100				
<b>Total</b>	<b>186,440</b>	<b>22,100</b>	<b>41,200</b>	<b>94,282</b>	<b>59,450</b>	<b>28,090</b>	<b>269.0</b>	<b>20,255</b>	<b>3,575</b>	<b>41,940</b>

Footnotes for Table 4 appear on page 20.

**TABLE 4 Footnotes and Legend**

**LEGEND - Numbers identify processes in table**

- 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 regen.  
 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. Residual desulfurization  
 2. Heavy gas oil desulfurization  
 3. Catalytic cracker and cycle stock treatment  
 4. Mid distillate  
 5. Other
- Catalytic Hydrotreating**  
 1. Pretreating cat reformer feeds 2. Naptha desulfurizing  
 3. Naptha olefin or aromatics saturation  
     4. Straight-run distillate  
 5. Pretreating cat cracker feeds 6. Other distillates  
 7. Lube oil "polishing" 8. 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. C<sub>4</sub> feed  
 2. C<sub>5</sub> feed  
 3. C<sub>5</sub> and C<sub>6</sub> feed
- Oxygenates**  
 1. MTBE  
 2. ETBE  
 3. TAME  
 4. Other
- Hydrogen**  
**Production:**  
 1. Steam methane reforming  
 2. Steam naptha reforming  
 3. Partial oxidation  
 a. Third-party plant
- Recovery:**  
 4. Pressure swing adsorption  
 5. Cryogenic  
 6. Membrane  
 7. Other

**FOOTNOTES**

- \*\*\*  
 V RCC. (Resid Catalytic Cracking or Reduced Crude Conversion)  
 \*\*\*  
 Z ROSE. (Residuum Oil Supercritical Extraction)  
 \*\*\*  
 II Previously listed as Star Enterprise.  
 JJ Previously listed as Shell Norco Refining Co.  
 \*\*\*
- 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:
- Types and grades of inputs to be processed.
  - Types and grades of products to be manufactured.
  - Environmental constraints associated with refinery operations.
  - 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. Most U.S. capacity figures have historically been reported in b/sd, but all capacities are reported in b/cd here, as they will be in following years.
- Totals**  
 When an asterisk (\*) appears beside a refinery locaiton, this indicates that the figure has been converted from b/sd to b/cd by using the conversion factor 0.95 for crude oil and vacuum distillation units, and 0.90 for all downstream cracking and conversion units. Refining processes not covered are noted here.
- Process definitions**
- Hydrocracking includes processes where 50% of the feed or more is reduced in molecular size.
  - Hydrotreating includes processes where 10% of the feed or less is reduced in molecular size.
  - Hydrotreating includes processes where essentially no reduction in the molecular size of the feed occurs.
  - Hydrogen volumes presented here represent either generation or upgrading to 90+% purity.
- Catalytic reforming definitions**
- Semiregenerative reforming is characterized by shutdown of the reforming unit at specified intervals, or at the operator's convenience, for in situ catalyst regeneration.
  - 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.
  - 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.
  - Other includes nonregenerative reforming (catalyst is replaced by fresh catalyst) and moving-bed catalyst systems.

**MMcfd - Million cubic feet per day**  
**mt/d - Metric tons per day**



**Figure 3  
OPERATING CAPACITY  
OF LOUISIANA AND U.S. REFINERIES**

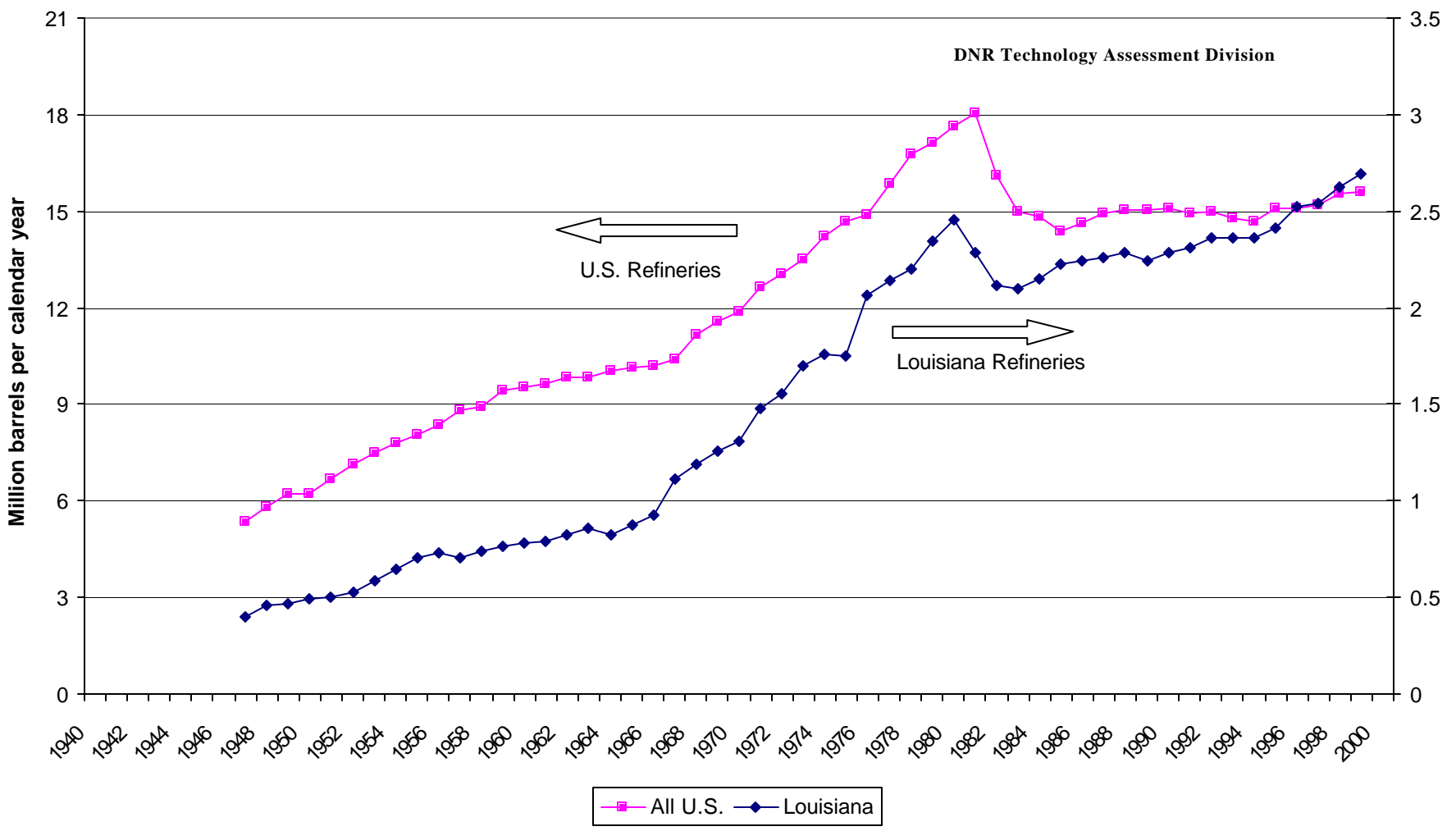
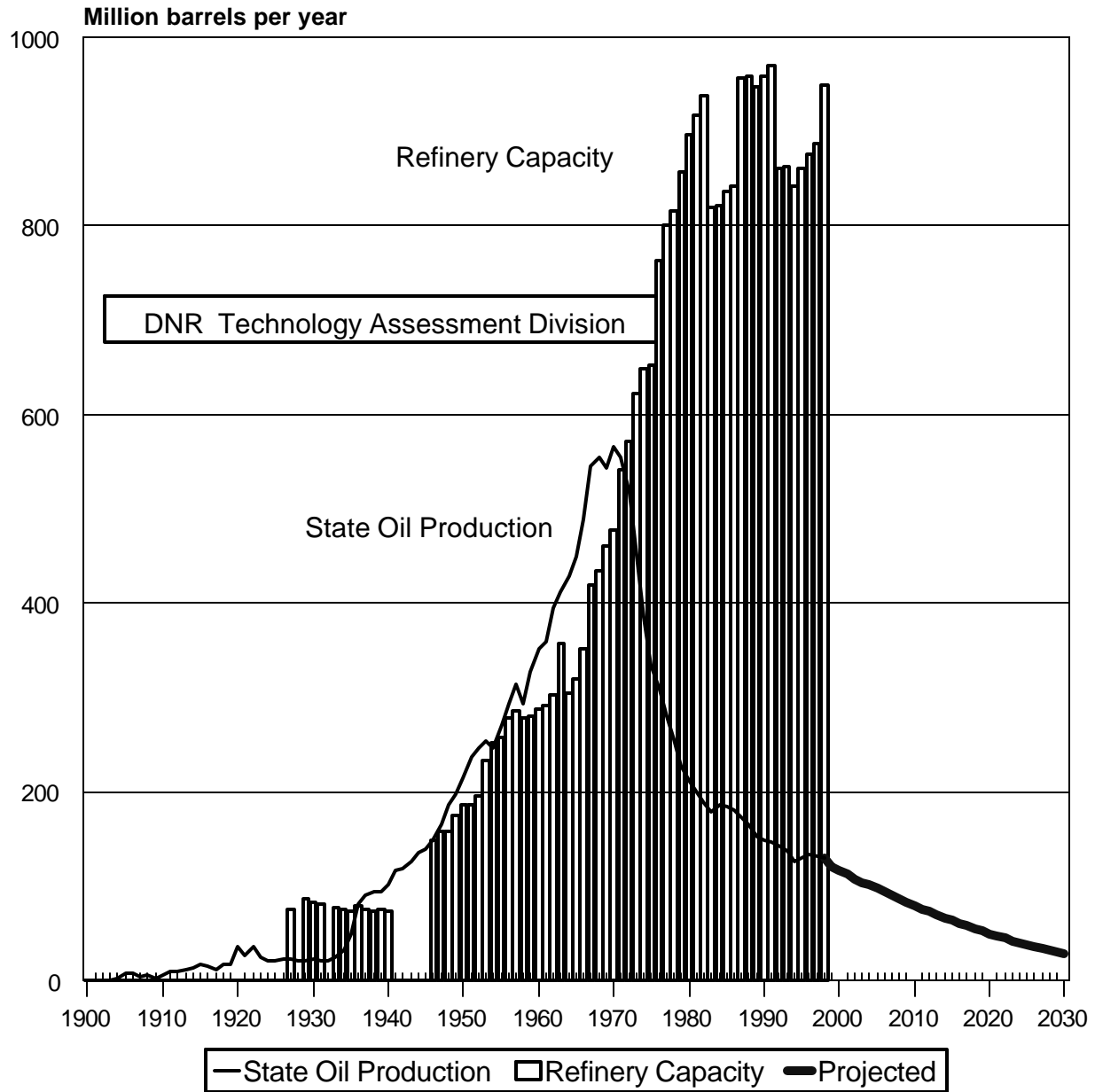


FIGURE 4

### LOUISIANA OIL PRODUCTION AND REFINERY OPERABLE CAPACITY



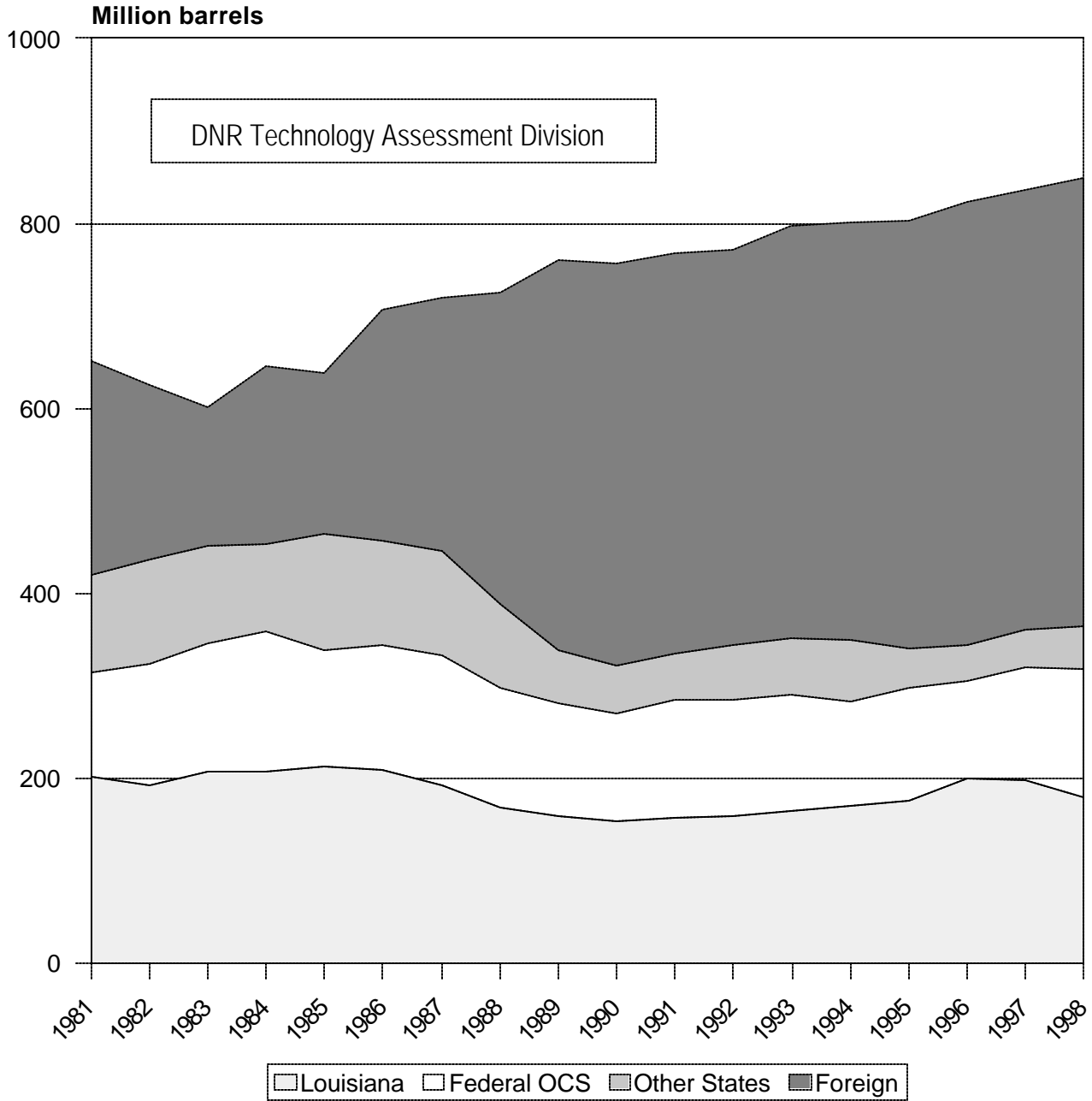
Source: Oil Production from DNR Database

Refinery Capacity - DNR Energy Database and DOE, EIA Petroleum Supply Annual, Volume I, Table 38

NOTE: 1979 Capacity is estimated

**FIGURE 5**

**HISTORICAL REFINERY INPUT BY SOURCE**



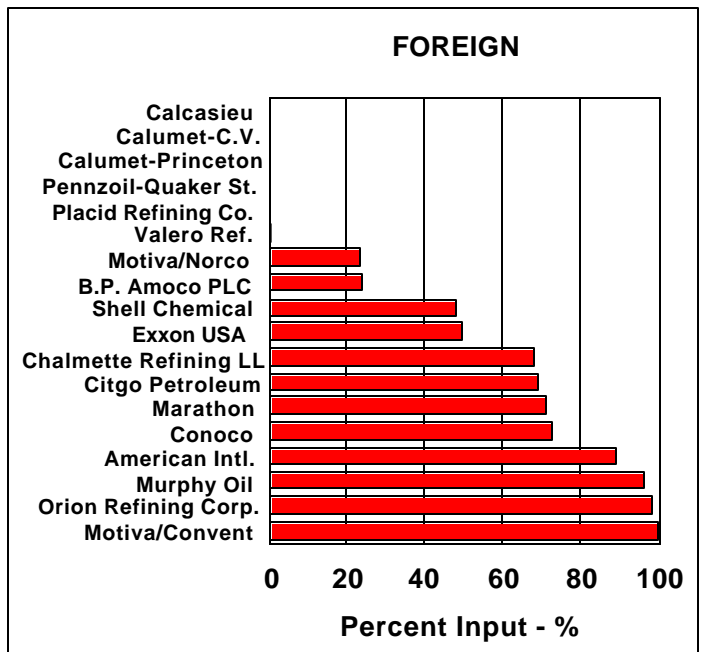
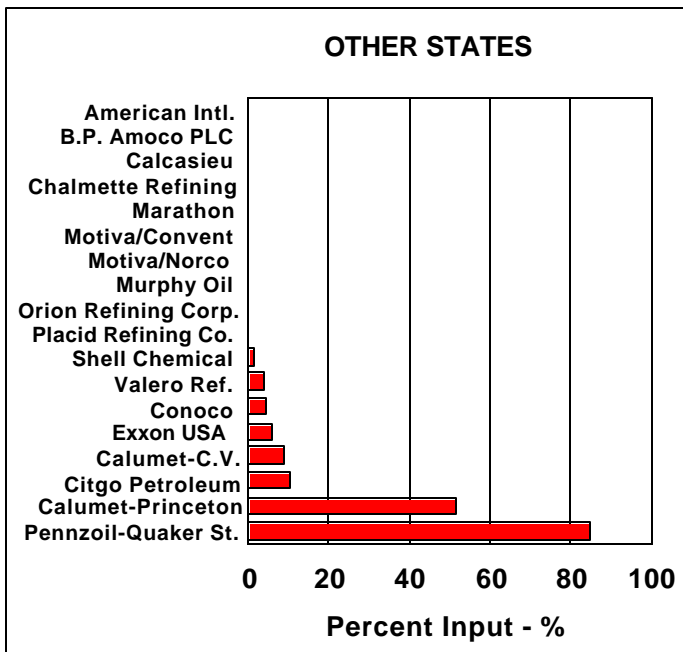
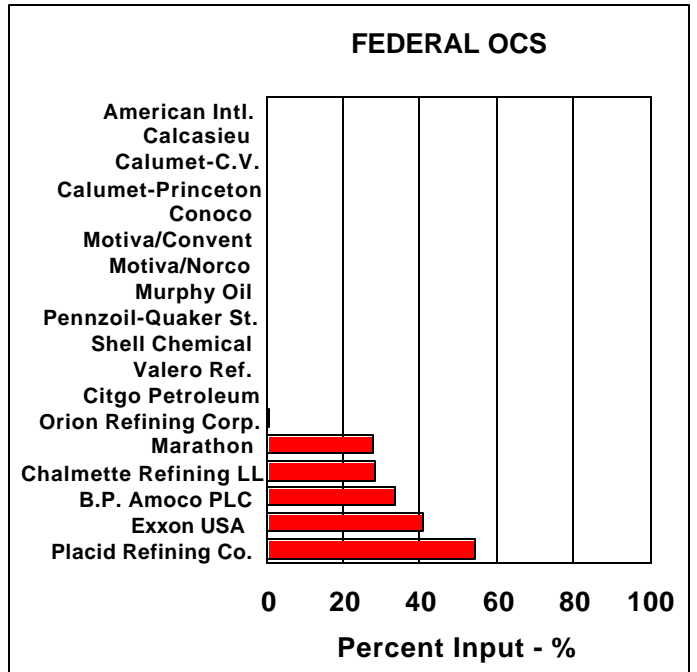
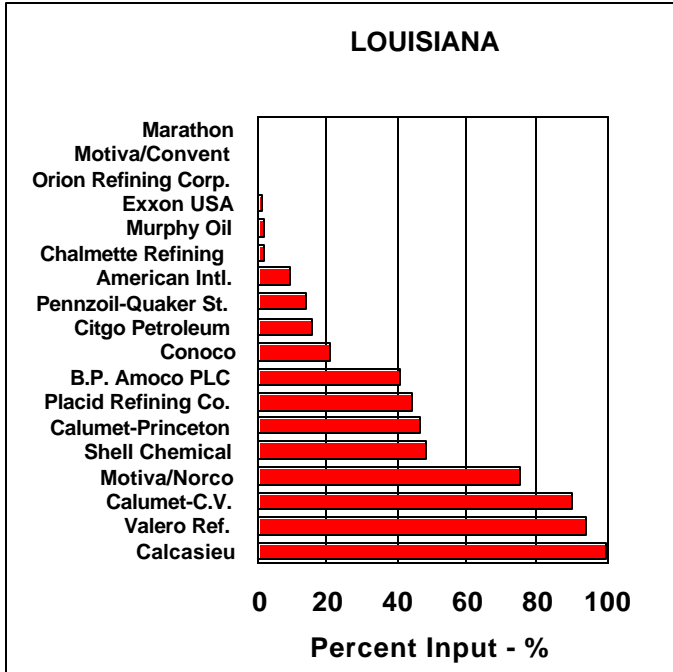
Source: La. DNR Database, from Refiner's Monthly Report Form R-3 (Calendar Year Basis)

**TABLE 5**  
**FY1999 Crude Oil Input Percentage by Source and Refinery**  
(data for Figure 6)

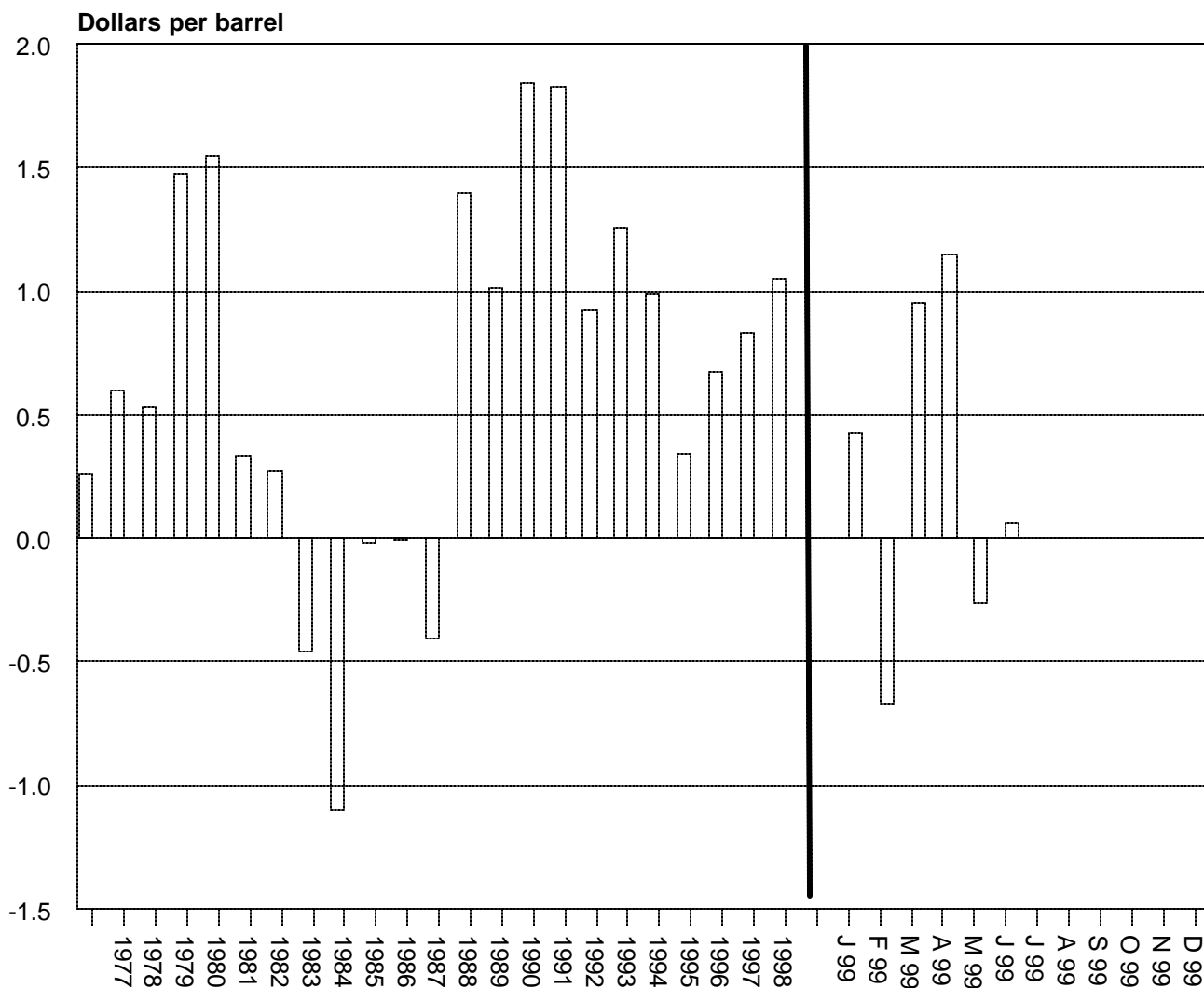
<b>REFINERY</b>	<b>LOUISIANA</b>	<b>FEDERAL OCS</b>	<b>OTHER STATES</b>	<b>FOREIGN</b>
American International	10	0	0	90
B.P. Amoco PLC	41.5	33.9	0	24.6
Calcasieu Refining Co.	100	0	0	0
Calumet-Cotton Valley	90.5	0	9.5	0
Calumet-Princeton	47.6	0	52.4	0
Chalmette Refining LLC	2.9	28.6	0	68.4
Citgo Petroleum Corp.	16.6	0.1	11.4	69.3
Conoco, Inc.	21.6	0	5.1	73.3
Exxon Co. USA	1.9	41.3	6.4	50.5
Marathon Ashland Petr.	0	28.5	0	71.5
Motiva - Convent	0	0	0	100
Motiva - Norco	76.1	0	0	23.9
Murphy Oil USA, Inc.	2.8	0	0	97.2
Orion Refining Corp.	1	0	0	99
Pennzoil-Quaker State	14.6	0	85.4	0
Placid Refining Co.	45	54.7	0.3	0
Shell Chemical Co.	48.9	0	2.5	48.7
Valero Refining Co.	94.8	0	4.4	0.8

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

**FIGURE 6  
FY1999 REFINERY CRUDE OIL INPUT PERCENTAGE  
SORTED BY SOURCE**



**Figure 7**  
**Gulf Coast Refinery Margins**  
**Regional Average Cash Operating Margin \***



\* Product revenues less cost of feedstocks and direct operating costs; e.g., allowance for all variable and fixed-cost items associated with plant operations (wages, salaries, related overhead, maintenance, insurance and ad valorem taxes, purchased fuel, power, cooling water, catalysts, and chemicals). Costs do not include income taxes, depreciation, or financial charges. See *Oil & Gas Journal*, Nov. 19, 1984, p. 110 and Dec. 5, 1986, p. 38.

Source: Wright Killen & Co, from *Oil & Gas Journal*

**TABLE 6  
LOUISIANA OPERATING REFINERIES  
MAILING ADDRESSES AND CONTACT LIST**

<b>NAME</b>	<b>MAILING ADDRESS</b>	<b>CONTACTS</b>	<b>TELEPHONE</b>
American International Refinery, Inc. Lake Charles Refinery	P. O. Drawer 16866 Lake Charles, LA 70616	Larry Nicholson, Plant Manager Bill Dean	(318) 439-4066
B. P. Amoco PLC Alliance Refinery	P.O. Box 395 Belle Chasse, LA 70037-0395	Felix Strater, Plant Manager Pat O'Neill, Chief Engineer	(504) 656-7711
Calcasieu Refining Company	4359 W. Tank Farm Road Lake Charles, LA 70605	Allen Lyons, Plant Manager Tom Prudhomme, Chief Engineer	(318) 478-2130
Calumet Lubricants Co. L.P. Cotton Valley Facility	P.O. Box 97 Cotton Valley, LA 71018	Jeff Lang, Plant Manager Rodney G. Butts, Sr. Process Engr.	(318) 832-4236
Calumet Lubricants Co. L.P. Princeton Refinery	10234 La. Hwy. 157 Princeton, LA 71067-9172	Jerry Arnold, Plant Manager	(318) 949-2421
Chalmette Refining, LLC	P.O. Box 1007 Chalmette, LA 70044	Toby Coy	(504) 281-1624
Citgo Petroleum Corp.	P.O. Box 1562 Lake Charles, LA 70602	Mark Smith, Plant Manager Joel Kieffer, Chief Engineer	(318) 497-6248
Conoco, Inc. Lake Charles Refinery	P.O. Box 37 Westlake, LA 70669	Robert J. Hassler, Plant Manager Ellen Gilmore, Chief Engineer	(318) 491-5070
Exxon Co. U.S.A.	P.O. Box 551 Baton Rouge, LA 70821	Gary W. Pruessing, Plant Manager Scott J. Sullivan, Process Manager	(504) 359-7711
Marathon Ashland Petroleum, LLC Garyville Refinery	P.O. Box AC Garyville, LA 70051-0842	Larry Echelberger, Plant Manager Tracy Case, Chief Engineer	(504) 535-2241
Motiva Enterprises, LLC Convent Refinery	P.O. Box 37 Convent, LA 70723	Arman S. Abay, Plant Manager Jim Kane, Chief Engineer	(504) 562-7681
Motiva Enterprises, LLC Norco Refinery	P.O. Box 10 Norco, LA 70079	Allen Kirkley, Plant Manager Jack Williams, Chief Engineer	(504) 465-7111
Murphy Oil U.S.A. Inc. Meraux Refinery	P.O. Box 100 Meraux, LA 70075	Jim Kowitz, Plant Manager Darrell Lake, Chief Engineer	(504) 278-5299 (504) 271-4141
Orion Refining Corp.	P. O. Box 537 Norco, LA. 70079-0537	Mark Keens, Plant Manager Frank Daley, Chief Engineer	(504) 764-8611
Pennzoil-Quaker State Corp. Shreveport Refinery	P.O. Box 3099 Shreveport, LA 71133	S. L. Rowland, Plant Manager E. F. Juno, Chief Engineer	(318) 636-2711 (318) 632-4111
Placid Refining Co.	1940 La. Hwy. 1 North Port Allen, LA 70767	Gary B. Fuller, Refinery Manager	(504) 387-0278
Shell Chemical Co. St. Rose Refinery	P.O. Box 10 Norco, LA 70079	David Brignac, Plant Manager Tom Brumfield, Chief Engineer	(504) 465-6248
Valero Refining Co. - Louisiana Krotz Springs Refinery	P.O. Box 453 Krotz Springs, LA 70750- 0453	John Edmunds, Plant Manager Greg Byers, Chief Engineer	(318) 566-2301

**TABLE 7  
LOUISIANA OPERATING REFINERY LOCATIONS**

NAME	PHYSICAL LOCATION
American International Refinery, Inc. / Lake Charles Refinery	Lake Charles, I-10 exit 36, north to La. 3059, left 3/4 mi.
B. P. Amoco PLC / Alliance Refinery	Belle Chasse, 12 mi. south on east side of La. 23.
Calcasieu Refining Company	Lake Charles, 3 mi. south at west end of Old Tank Farm Road on Ship Canal.
Calumet Lubricants Co. L.P. / Cotton Valley Facility	Cotton Valley, east side of La. 7 South at city limits.
Calumet Lubricants Co. L.P. / Princeton Refinery	Princeton, 5 mi. north of I-20 on east side of La. 157.
Chalmette Refining, LLC	Chalmette, 500 W. St. Bernard Hwy.
CITGO Petroleum Corp.	Lake Charles, I-10 exit 23, then 2 mi. south on La. 108.
Conoco, Inc. / Lake Charles Refinery	Westlake, I-10 Sampson Rd. exit; north to Old Spanish Trail.
Exxon Co. U.S.A.	Baton Rouge, 4045 Scenic Hwy.
Marathon Ashland Petroleum, LLC	Garyville, 2 mi. toward Reserve off U.S. 61.
Motiva Enterprises, LLC / Convent Refinery	Convent, on La. 44 at east bank foot of Sunshine bridge.
Motiva Enterprises, LLC / Norco Refinery	Norco, on River Road
Murphy Oil U.S.A. Inc. / Meraux Refinery	Meraux, 2500 St. Bernard Hwy.
Orion Refining Corp.	Norco, 257 Prospect Ave.
Pennzoil-Quaker State Corp. / Shreveport Refinery	Shreveport, 3333 Midway Ave., Across I-20 from State fairgrounds.
Placid Refining Co.	Port Allen, 1940 La. 1 North.
Shell Chemical Co. / St. Rose	St. Rose, 11842 River Road
Valero Refining Co. - La. / Krotz Springs Refinery	Krotz Springs, La. 105 South in town.



**TABLE 8**  
**Operating Refineries Name History (1980-1999)**

<b>Refinery Name</b>	<b>Date</b>	<b>DNR Code &amp; Location</b>	<b>Refinery Name</b>	<b>Date</b>	<b>DNR Code &amp; Location</b>	
Exxon Co. U.S.A.	1980-	EXX - Baton Rouge	Calcasieu Refining Co.	1985-	CLC - Lake Charles	
B.P. Amoco PLC	1999-	STN - Belle Chasse	CPI Oil & Refining, Inc.	1982-84		
B.P. Oil Corp.	1989-98		Calcasieu Refining Ltd.	1980-81		
Standard Oil Co.	1986-88		Citgo Petroleum Corp.	1984-		CTS - Lake Charles
Gulf Refining & Marketing Co.	1985-85		Cities Service Co.	1980-83		
Gulf Oil Corp.	1981-84		Conoco, Inc.	1982-		CNB - Lake Charles
Gulf Oil Co. U.S.	1979-80		Conoco	1980-81		
Chalmette Refining, LLC	1998 -	TNN - Chalmette	Continental Oil Co.	1979		
Mobil Oil Corp.	1989-98		American International Refinery, Inc.	1997-	LKC - Lake Charles	
Tenneco Oil Co.	1980-88		Gold Line Refining Ltd.	1992-97		
Motiva Enterprises, LLC	1998-	TXC - Convent	American Int'l Refining, Inc.	1989-91		
Star Enterprise	1989-98		Lake Charles Refining Co.	1980-88		
Texaco Refining & Marketing	1985-88		Aweco	1979-79		
Texaco, Inc.	1980-84		Murphy Oil U.S.A., Inc.	1984-	MRP - Meraux	
Calumet Lubricants Co., L.P.	1996-	CTT - Cotton Valley	Murphy Oil Corp.	1980-83		
Kerr-McGee Refining Corp.	1985-95		Motiva Enterprises, LLC	1998-	SHL - Norco	
Kerr-McGee Corp.	1983-84		Shell Oil Co.	1980-98		
Cotton Valley Solvents Co.	1980-82		Calumet Lubricants Co., L.P.	1991-	CLM - Princeton	
Marathon Ashland Petroleum, LLC	1998-	MRT - Garyville	Calumet Refining Co.	1980-90		
Marathon Oil Co.	1992-98		Placid Refining Co.	1980-	PLC - Port Allen	
Marathon Petroleum Co.	1985-91		Pennzoil-Quaker State Corp.	1999-	ATL - Shreveport	
Marathon Oil Co.	1980-84		Pennzoil Producing Co.	1992-98		
Orion Refining Corp.	1999-	GDH - Good Hope	Pennzoil Products Co.	1986-91		
TransAmerican Refining Co.	1992-98		Pennzoil Co.	1985-85		
TransAmerica Refining Co.	1988-91		Atlas Processing Co.	1980-84		
GHR Energy Corp.	1982-87		Shell Chemical Co.	1996-	INT - St. Rose	
Good Hope Refineries, Inc.	1981-81		St. Rose Refinery, Inc.	1994-95		
Good Hope Industries, Inc.	1980-80		Phibro Energy U.S.A., Inc.	1993-93		
Valero Refining Co. - La.	1997-	HLL - Krotz Springs	Phibro Refining, Inc.	1992-92		
Basis Petroleum, Inc.	1996-96		Hill Petroleum Co.	1987-91		
Phibro Energy U.S.A., Inc.	1993-95		International Processors	1981-86		
Phibro Refining Inc.	1992-92					
Hill Petroleum Co.	1980-91					

**TABLE 9  
LOUISIANA NON-OPERATING REFINERIES  
MAILING ADDRESSES & CONTACT LIST**

NAME	MAILING ADDRESS	CONTACTS	TELEPHONE
El Paso Field Services Dubach Location	400 Travis Street, Suite 1100 Shreveport, LA 71101	Martin Anthony, Marketing Director	(318) 222-2545
Bayou State Oil Corp.	Box 7886 Shreveport, LA 71137	Charles E. Brown, Sr., President	(318) 222-0737
Canal Refining Co.	P.O. Drawer 8 Church Point, LA 70525	Fred Marshall, Plant Mgr.	(337) 684-5421
Gold Line Refining, Ltd. Jennings Plant	Payton Smith 5034 Bonin Drive Sulfur, LA 70663	Payton Smith, Opns. Supt. Earl Thomas, Owner	(337) 823-2766
Lisbon Refinery J.V., LLC	8613 East Wilderness Way Shreveport, LA 71106	James Ballengee	(800) 722-4127
Petroleum Fuel & Terminal Co.	Box T Garyville, LA 70051	Claude Phelps, Plant Manager	(504) 535-6256
St. James Co., LLC	P.O. Box 318 St. James, LA 70086	Charles Waguespack, Owner	(225) 265-4067
Tina Resources, Inc.	207 Firestone Drive Marble Falls, TX 78654	Leslie Vance, President	(512) 463-2100
Quantum Fuel & Refining (was U.S. Refining, Inc.)	P.O. Box 136 Newton, TX 75966	James Hughes, Owner	(409) 397-4221
Refinery	101 Old Ferry Road Egan, LA 70531	Elmer Lord, Caretaker	(337) 824-6247

NOTE: Directions to the physical locations of each non-operating refinery are given in Table 10.

**TABLE 10  
LOUISIANA NON-OPERATING REFINERIES  
PHYSICAL LOCATIONS, LAST KNOWN CRUDE CAPACITY (barrels/calendar day), DATE LAST OPERATED, AND STATUS**

NAME	PHYSICAL LOCATION	LAST KNOWN OPERATING CAPACITY	DATE LAST OPERATED	PREVIOUS NAME(S)	STATUS
Bayou State Oil Corp.	Hosston, U.S. 71 North at junction with La. 2 West.	3,000	2/87	NONE	No plans to reopen. Some equipment sold, but process equipment remains operable.
Canal Refining Co.	Church Point, 2 mi. north on left side of La. 178	7,500	5/97	NONE	Expecting to restart January 2000 with increased capacity, processing La. crude.
El Paso Field Services Dubach Location	Dubach, 1/4 mi. west of U.S. 167 at south city limits.	10,000	6/93	Arcadia Refining & Marketing; Kerr-McGee Refining Co.; Dubach Gas Co., owned by Cornerstone Natural Gas Co., formerly known as Endeveco.	Facility consists of a crude oil refinery and gas liquids fractionating plant. El Paso continues to operate the gas plant but shut down the liquids fractionating unit in January 1998.
Gold Line Refining Co. Ltd. Jennings Refinery	3-1/2 mi. east of jct. U.S. 90E & La. 102 in Jennings. On Mermentau River 1 mile north of U.S. 90E at end of gravel road.	14,800	2/98	Celeron; Slapco; CAS Refining	Owner is attempting to sell or lease the facility.
Lisbon Refinery J.V., LLC	Lisbon, 3 mi. east on south side of La. 2.	12,500	1/96	Arcadia Refining; Dubach Gas Co.; Claiborne Gasoline	150,000 barrels storage useable. For sale or lease.
Petroleum Fuel & Terminal Co.	Mt. Airy, exit Gramercy on La.20 to La.44 (River Road) junction. Left 2 miles.	23,000	12/86	Clark Oil & Refining Mt. Airy Refinery	Terminal only in use. Actively pursuing the sale of all refinery process equipment so site can be used to expand terminal.
St. James Co., LLC	St. James, 7-1/2 miles south of Sunshine Bridge on La.18.	20,000	8/83	Texas NAPCO, Inc. LaJet	Eight storage tanks in good shape, approximately 350,000 barrels capacity. Koch Petroleum Group controls docks & pipeline access on adjacent property.
Tina Resources, Inc.	Cameron Parish. Talen's Landing on Intracoastal Waterway 9 miles south of jct. La. 14 & 26 in Lake Arthur via La. 14.	7,400	2/86	Mallard Resources, Inc.; Cameron Resources, Inc.	No response to last three surveys. Last status received was that the refinery was for sale.
Quantum Fuel & Refining Egan Refinery	Egan, 101 Old Ferry Road. Take I-10 exit 72; then 2 miles south on Old Ferry Rd.	10,000	9/87	U.S. Refining, Inc. La. Oil & Rerefining Crystal Refining, Inc.	Sale pending. Site includes 500,000 barrel storage capacity.

**TABLE 11**  
**Non-Operating Refineries Name History (1980 - 1999)**

Refinery Name	Dates	DNR Code & Location
Sooner Refining Co.	1980-82	SNR - Darrow
Conoco, Inc.	1982-89	CNA - Egan
Conoco, Inc.	1980-81	
Continental Oil Co.	1979	
Quantum Fuel & Refining U.S. Refining, Inc.	1998- 1994-98	LOR - Egan
Britt Processing & Refining Co.	1992-93	
Crystal Refining, Inc.	1989-91	
OGC Corp.	1988-88	
Louisiana Oil Refining Co. of Egan	1987-87	
El Paso Field Services Arcadia Refining	1997- 1995-96	
Endevco, Inc.	1989-94	
Kerr-McGee Refining Corp.	1985-88	
Kerr-McGee Corp.	1980-84	
Tina Resources, Inc.	1993-96	
Cameron Oil Refining Co., Inc.	1992-92	MLL - Gueydon
Cameron Resources	1990-91	
Mallard Resources, Inc.	1980-89	
Bayou State Oil Corp.	1980-	BYS - Hosston
Evangeline Refining Co.	1980-92	EVN - Jennings
Shepard Oil Co.	1980-82	SHP - Jennings
Laidlaw Environmental Systems GSX Recovery Systems T & S Refining Co.	1992-92 1983-91 1980-82	TSR - Jennings

Refinery Name	Dates	DNR Code & Location
Gold Line Refining Co., Ltd. CAS Refining	1994-98 1991-93	SLP - Mermanteau
Celeron Oil and Gas Co.	1983-90	
Slapco	1980-82	
South Louisiana Production Co.	1979	
Petroleum Fuel & Terminal Co. Clark Oil and Refining Corp Mt. Airy Refining	1992- 1983-91 1980-82	MTR - Mt. Airy
St. James Co., LLC Texas NAPCO, Inc La. Jet, Inc.	1998- 1983-98 1980-82	
McTan Refining Corp. McTan Corp. Bruin Refining Co.	1983-96 1982-82 1980-81	BRN - St. James
Sabine Resources Group Port Petroleum, Inc.	1990-92 1980-89	
Schulze Processing, Inc.	1980-82	SCH - Tallulah
Gulf Oil Co. U.S.A. Gulf Oil Corp.	1981-81 1980-80	GLF - Venice
Lisbon Refinery J.V., LLC Padre Refining Co. Arcadia Refining & Mktg. Co. Dubach Gas Co. Claiborne Gasoline Co.	1998- 1997-98 1995-96 1992-94 1980-91	
Canal Refining Co.	1980-	CNL - Church Pt.

## DEFINITIONS

Source: DOE/EIA Petroleum Supply Annual 1998, Volume 1, June 1999

**Barrels per calendar day** - The maximum number of barrels of input that can be processed during a 24-hour period after making allowances for the following limitations:

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 such as routine inspection, mechanical problems, maintenance, repairs, and turnaround; and

the reduction of capacity for unscheduled downtime such as mechanical problems, repairs, and slowdowns.

**Barrels per stream day** - The amount a unit can process running at full capacity under optimal crude oil and product slate conditions.

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

**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.

**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: The Louisiana survey uses the capacity at the end of the period (June 30).*

**Operating capacity** - The component of operable capacity that is in operation at the beginning of the period. *Note: The Louisiana survey uses the capacity at the end of the period (June 30).*

**Operable 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 operable refining capacity of the units.

**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.

Canal Refinery. Photo by Al Troy, La. Dept. of Natural Resources, December 1996.

