

5. Petroleum Stocks: Causes and Effects of Lower Inventories

Stocks are needed to keep petroleum supplies moving smoothly from wellhead to end user. As an immediate source of supply, stocks provide a cushion against normal and unexpected demand and supply fluctuations. Crude oil, distillate, and total gasoline stocks dropped in 1995 and reached new lows in 1996, drawing attention to the long-term downward trend. This led to questions as to whether the lower stocks caused greater price volatility, whether the stock cushion was adequate (particularly in light of more efficient industry operations), whether the reformulated gasoline program in 1995 influenced stock levels, and whether the decline in stocks is short lived or lasting. The following chapter reviews the trends in EIA's comprehensive survey data on petroleum stocks in conjunction with other information on prices and industry activity to provide the background required to begin answering these questions. This chapter also identifies and assesses the short and long term factors that influence stock levels.

Introduction

Total U.S. gasoline stocks have been shrinking since the early 1990s. Near the beginning of 1995, stocks of crude oil, distillate, and gasoline started to decline so precipitously that, by May of that year, stocks fell below the 1991-1995 average level and have yet to recover (Figure 65).²⁶ In March 1996 crude oil, distillate, and total gasoline inventories were 593 million barrels, the lowest recorded in more than 15 years. When stocks are low, demand surges or supply shortfalls cause buyers to turn to spot markets for immediate supplies while waiting for production and/or imports. During such times, buyers tend to bid up prices to assure supply in a tight market. This occurred in spring 1996 when low crude oil, distillate, and total gasoline inventories forced refiners and marketers to rely more heavily on spot markets to meet unexpected heating oil and seasonally rising gasoline demands. This event contributed to the rise in the price of crude oil.²⁷

Table 6 shows the recent changes in petroleum stocks disaggregated by type (crude oil, distillate, and total gasoline), industry sector (mainly refineries, tank farms/bulk terminals, and pipelines), and Petroleum Administration for Defense District (PADD). Of the 64-million-barrel 1994 to 1996 decline in stocks, the greatest volumetric decrease occurred in crude oil (32 million barrels) while the greatest percentage decline occurred in distillate (15 percent). Much of the decline in crude oil, distillate, and total gasoline stocks occurred at bulk terminals/tank farms where more discretionary stocking takes place. The drop in stocks is most

evident in PADD I (East Coast), where consumption is concentrated, and PADD III (Gulf Coast), a major refining area.

Prior to 1995, it was refinery closures, caused in part by the decontrol of the oil industry, that had the most important impact on petroleum stocks. Between 1981 and 1986, 108 refineries closed and inventories declined as the storage capacity associated with these facilities was decommissioned. Since the beginning of 1995, price risk, where the commodity stored is expected to be *less* valuable in the future because prices are overvalued in the present, appears to be one of the most important factors behind the reduction in stocks. Poor profitability, driven by low gross refining margins, also contributed to the drop in inventories.

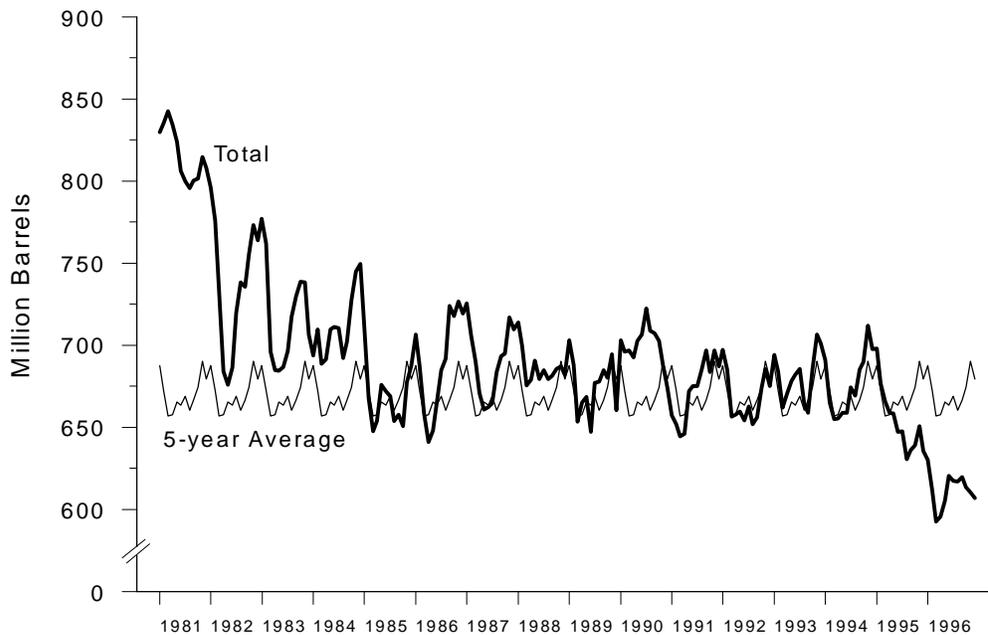
The forces that influence petroleum inventory levels can be divided into two categories. The first category consists of short term forces that influence refiners' (and to some extent, marketers') day-to-day decisions concerning inventory levels. These forces include current and expected prices, refining margins, the cost of storage, and the risk of stockouts, along with seasonal changes in product demand levels. The second category includes long term forces such as increased offshore stocks, enhanced inventory management through improved information technology, consolidation of petroleum storage facilities, the shift to short-haul crude oil sources, the introduction of clean products, and the change in secondary stocks.²⁸

²⁶Only crude oil, distillate, and total gasoline (finished gasoline plus blending components) stocks are addressed in this analysis. Excluded are stocks of all other petroleum products including jet fuel, residual fuel oil, and propane. Stocks held in the Federally owned Strategic Petroleum Reserve (SPR) are discussed separately (see box, p. 87).

²⁷U.S. Department of Energy, *An Analysis of Gasoline Markets Spring 1996*, DOE/PO-0046 (Washington, DC, June 1996), p. 4.

²⁸Primary stocks include crude oil or petroleum products held in storage at leases, refineries, natural gas processing plants, pipelines, tank farms, and bulk terminals that can store at least 50,000 barrels of petroleum products or that can receive petroleum products by tanker, barge, or pipeline. Secondary stocks include stocks at facilities having less than 50,000 barrels capacity or supplied strictly by tanker truck. Tertiary stocks are stocks held by end users.

Figure 65. Aggregate Crude Oil, Distillate, and Total Gasoline Stocks¹, January 1981-December 1996
(Million Barrels)



¹Includes crude oil, distillate, and total gasoline (finished gasoline plus blending components) only.

Source: Energy Information Administration (EIA), Forms EIA-810 "Monthly Refinery Report," EIA-811 "Monthly Bulk Terminal Report," EIA-812 "Monthly Product Pipeline Report," and EIA-813 "Monthly Crude Oil Report."

Table 6. Crude Oil, Distillate, and Total Gasoline Inventories by Industry Sector and PADD, 1994-1996
(Million Barrels)

	1994	1995	1996	Difference (1996-1994)
Petroleum Type - Total	676	654	612	-64
Crude Oil	336	322	304	-32
Distillate	126	126	107	-19
Total Gasoline ¹	214	206	201	-13
Crude Oil, Distillate and Total Gasoline Stocks by Industry Sector²				
Refineries	208	206	195	-13
Bulk Terminals	155	149	131	-24
Pipelines	77	78	77	0
Crude Oil Tank Farms and Pipelines	198	184	177	-21
Crude Oil Leases	18	17	17	-1
Alaska Crude Oil in Transit	20	21	15	-5
Crude Oil, Distillate and Total Gasoline Stocks by PADD				
East Coast (I)	128	124	106	-22
Midwest (II)	159	154	145	-14
Gulf Coast (III)	253	239	231	-22
Mountain (IV)	21	21	20	-1
Pacific (V)	115	115	110	-5

¹Finished gasoline plus blending components.

²In other published EIA data, bulk terminals that make finished gasoline by mixing blend stocks and/or oxygenates are included in the "Refinery" category. In the following entries, EIA data for distillate and gasoline were adjusted by removing the stocks these blenders report from the "Refinery" category and including the volumes in the "Bulk Terminals" category.

Source: Energy Information Administration (EIA), Forms EIA-810 "Monthly Refinery Report," EIA-811 "Monthly Bulk Terminal Report," EIA-812 "Monthly Product Pipeline Report," and EIA-813 "Monthly Crude Oil Report."

The Status of the U.S. Strategic Petroleum Reserve

The Strategic Petroleum Reserve (SPR) was created pursuant to the Energy Policy and Conservation Act of 1975 to mitigate the impact of disruptions in petroleum supplies and to carry out obligations of the United States under the Agreement on an International Energy Program. The reserves can be drawn down when the President determines that an energy supply emergency exists or could exist, and is of significant enough nature to adversely affect the economy.

The SPR facilities are designed to hold 680 million barrels of petroleum in three storage complexes in Texas and Louisiana. The SPR crude can be delivered to refineries in the Gulf Coast and Midwest through various connections to the U.S. petroleum pipeline network. The SPR crude can also be delivered by tanker or barge.

Persian Gulf War

On January 16, 1991, in conjunction with the beginning of Operation Desert Storm, President Bush ordered a drawdown and distribution of SPR petroleum as part of a coordinated plan agreed to by member countries of the International Energy Agency.²⁸ The Department of Energy issued a Notice of Sale for 33.75 million barrels.

In total, 17.2 million barrels of oil was sold from the SPR to a total of 13 purchasers between January 17 and March 31, 1991. This event marked the first emergency drawdown and sale of SPR oil. Even though the volumes sold were small, the use of the SPR at the onset of Operation Desert Storm provided an instantaneous counter force to expected market panic.²⁹

Current Sales and Stock Levels

In 1996, under Congressional direction, the U.S. Department of Energy sold 5.1 million barrels of petroleum from Weeks Island to 4 buyers between February 26 and March 21. The proceeds from the sale, totaling \$97 million, were used to relocate oil from the geologically unstable Weeks Island facility.

Again in May, pursuant to the Fiscal Year 1996 budget bill, the U.S. Department of Energy undertook an expedited release of up to 15 million barrels to raise an additional \$227 million. The expedited nature of the sale was in response to the increase in petroleum prices in Spring 1996. Between April 29 and mid-May, the announcement of this sale along with other factors lowered petroleum prices by \$1.60 per barrel.³⁰ The last contract under this sales effort was awarded in August. In total, the government sold 12.8 million barrels of petroleum from SPR at an average price of \$17.77 per barrel to 9 companies.

The Fiscal Year 1997 appropriations act directed the sale of SPR oil to raise \$220 million to fund the Reserve's facility requirements for that year. Sales pursuant to this act began in October and ended December 1996 with 10.2 million barrels sold for \$220.6 million.

Following these sales, the Reserve had an inventory of approximately 563 million barrels of oil, enough to cover 66 days of net U.S. oil imports. Commercial petroleum and product stocks add another 109 days. The total, 175 days, is well in excess of the 90 minimum required in the Agreement on an International Energy Program. The U.S. ability to cover its agreement is negatively affected by the expected growth in imports and the decline in commercial stocks, as well as sales from the SPR.

²⁸U.S. Department of Energy/Office of Fossil Energy, *Strategic Petroleum Reserve Quarterly Report*, DOE/FE-0220P-1 (Washington, DC, May 15, 1991), p. 7.

²⁹*Petroleum Intelligence Weekly*, "President Clinton and How Not to Use the SPR," Vol. 35 #19 (May 6, 1996), p. 7.

³⁰U.S. Department of Energy, *An Analysis of Gasoline Markets Spring 1996*, DOE/PO-0046 (Washington, DC, June 1996), p. 7.

Background

Inventories are necessary to ensure the uninterrupted operation of each step of the petroleum supply system from wells and seaports through refineries to wholesalers and retailers and, ultimately, the consumer. Refiners use inventories as a means to improve production scheduling, and suppliers use inventories to buffer against expected and unexpected supply or demand variations. Inventories can also serve as a hedge against price fluctuations. The focus of this analysis is on primary stocks, the target of EIA data collection efforts. Stocks in secondary and tertiary (end user) storage facilities are excluded from this analysis.

EIA collects data on crude oil stocks for four segments of the industry: refining, tank farms and pipelines, production lease sites, and Alaskan supplies in transit. Crude oil is first stored in tanks that accumulate oil from producing wells. The volumes held on the leased property awaiting transportation are included in EIA's "leases" category. Small pipelines or tank trucks collect the crude oil and deliver it to intermediate storage for pooling before transport via major pipelines. Large diameter pipelines carry the crude oil to hubs, focal points for a number of pipelines, where the crude oil is collected for batching and redistribution to other pipelines. The volume of crude oil progressing through the pipeline system is included in EIA's "pipeline fill" category.

Tankers deliver crude oil imports to marine terminals and refineries. The volumes associated with this activity are included in EIA's "tank farm" and "refinery" categories, along with domestic volumes. Storage is required at this juncture because tankers are off-loaded at a rate that differs from the rate of crude oil input to refineries.³¹ Also included in EIA's inventory statistics is Alaskan crude oil being shipped to the lower 48 states, Hawaii, and the U.S. Virgin Islands, referred to as "Alaska in Transit." Segregation of crude oil by quality necessitates substantial storage capacity throughout the supply system.³²

³¹"Very Large Crude Carriers" (VLCC's) and "Ultra Large Cargo Carriers" (ULCC's) carry up to 4 million barrels of crude oil and can be offloaded at rates that exceed 500 thousand barrels per day. The average refinery processes about 100 thousand barrels per day. Storage is required due to the differences in these rates.

³²National Petroleum Council, *Petroleum Storage and Transportation*, Volume IV (Washington, DC, April 1989), p. 21-28.

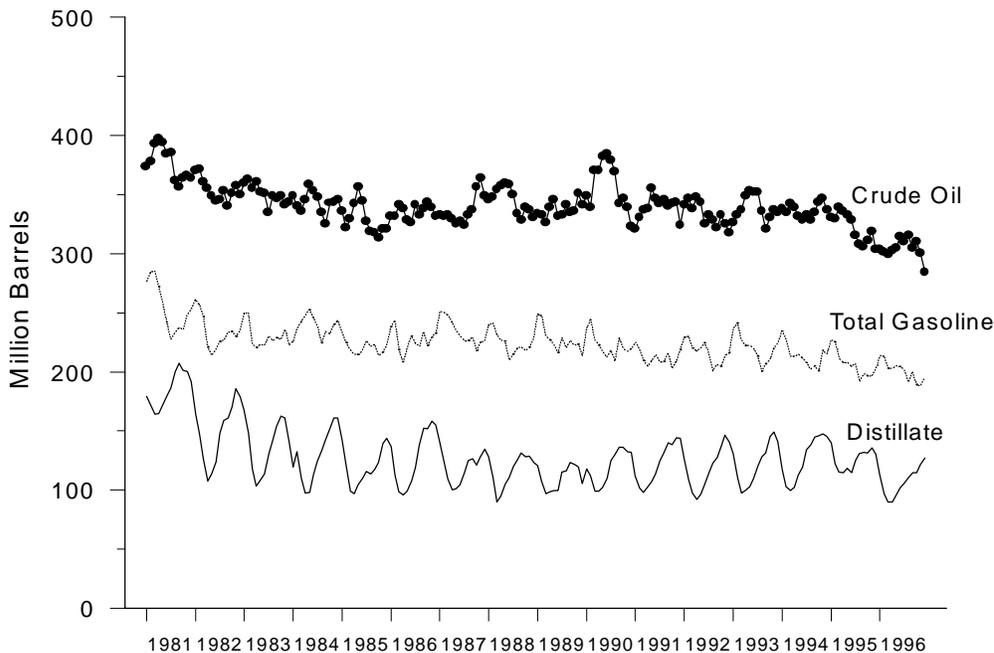
EIA collects data on distillate and gasoline stocks from three segments of the industry: refining, bulk terminals, and pipelines. Domestic supplies of distillate and gasoline are produced mainly in the Mid-Atlantic, upper Midwest, California and the Gulf Coast, with the Gulf Coast producers acting as the supplemental suppliers to the Northeast and Midwest. In 1996, Gulf Coast production accounted for around 60 percent of the distillate and gasoline consumed in PADD I and around 15 percent of the distillate and gasoline consumed in PADD II. Depending on price incentives, imports can also supplement these supplies.

Taken together, crude oil, gasoline, and distillate inventories are usually at an annual peak in November as the heating season gets underway. As indicated in Figure 66, distillate stocks show more seasonality than crude oil and gasoline. Much of the variation in distillate demand results from the demand for heating oil, which accounted for a little over one third of total distillate fuel oil demand in 1996. In particular, PADDs I and II increase their demand for heating oil considerably during the winter because central heating systems that use heating oil are concentrated in those regions. PADD I swings from about 30 percent of total U.S. distillate demand in the summer to as much as 50 percent of U.S. demand in the coldest months (usually January through March). Stocks are especially important to winter distillate supply. During the winter months, stocks represent 12 percent of demand. The remainder of distillate consumption is in the form of diesel fuel for transportation applications, which has a flatter usage pattern over the course of the year, but cycles that run counter to the heating oil consumption pattern. In total, distillate stocks usually peak in November in preparation for high winter demand.

By contrast, all gasoline is consumed in the transportation sector. This fact introduces a different set of seasonalities. Gasoline consumption peaks during the summer vacation period and drops off in the winter as weather conditions inhibit travel. Therefore, gasoline stocks are high in January and February, when demand is low and supplies are produced as a by-product of distillate production. Gasoline stocks are normally depleted at the primary level in August, near the end of the driving season.

Crude oil does not show as much seasonality as distillate and gasoline. Whatever seasonality is present is driven by combined gasoline and distillate demand. According to data for the 1991-1995 period, crude oil stocks peak in May to assure that enough feedstock is on hand during the busy

Figure 66. Crude Oil, Distillate, and Total Gasoline Stocks, January 1981-December 1996
(Million Barrels)



Source: Energy Information Administration (EIA), Forms EIA-810 "Monthly Refinery Report," EIA-811 "Monthly Bulk Terminal Report," EIA-812 "Monthly Product Pipeline Report," and EIA-813 "Monthly Crude Oil Report."

gasoline season. By December, crude oil stocks are depleted for physical and operational reasons.

Crude Oil

A closer look at crude oil stocks reveals a generally declining trend in the early 1980's (Figure 66). This decline coincided with the permanent closure of 108 refineries between 1981 and 1986. In the ensuing nine years, crude oil stocks remained fairly constant with two notable exceptions. Crude oil stocks rose in July 1987 and stayed high for a year because of the bargain prices brought on by OPEC overproduction and discount pricing. A contributing factor may have been the rising political tensions in the Persian Gulf that portended a possible supply disruption and higher prices.

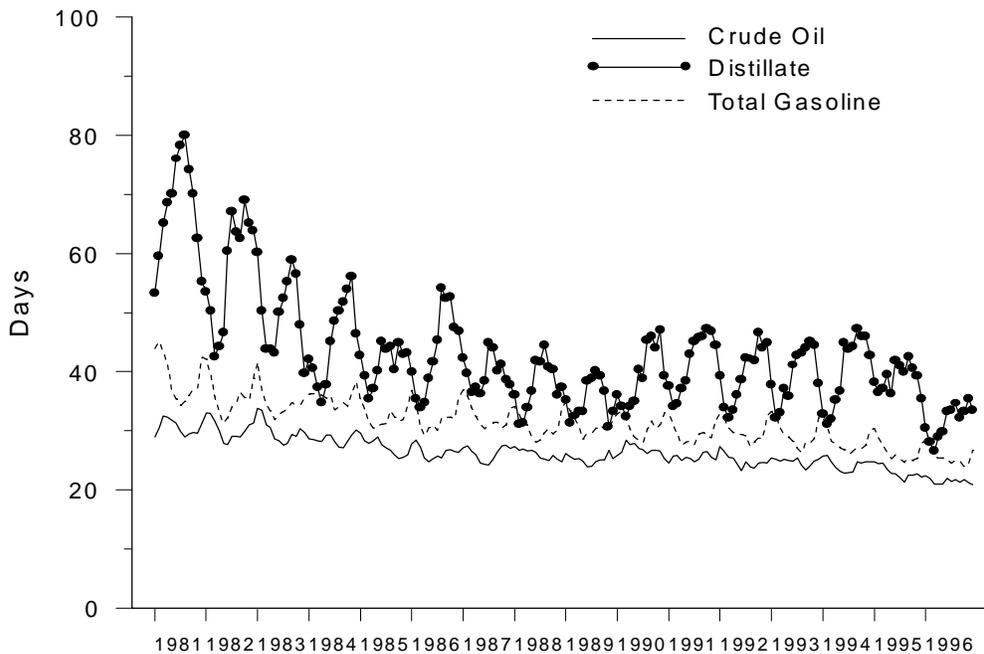
In March 1990, U.S. crude oil inventories jumped 31 million barrels to a level 13.6 percent higher than the previous year, due to the expectation of rising crude oil prices. Stocks stayed at or above the average 1991-1995 level after the August 2, 1990 Iraqi invasion of Kuwait until late fall 1990,

when it became apparent that other countries could make up the crude oil that would no longer be supplied by Kuwait and Iraq. During 1995 and 1996, crude oil stocks dropped precipitously mainly due to high winter 1995-96 demand and relatively high crude oil prices combined with an expectation for price decreases in the future and low refining margins. The following sections describe where the declines in inventory occurred.

Looking beyond seasonal ups and downs, days supply³³ of crude oil reveals a different pattern of near constant decline (Figure 67). Although crude oil input to refineries has increased by an average of almost 1 percent per year since 1981, days supply of crude oil in inventory has gradually decreased because stocks have failed to keep pace with the growth of inputs to refineries. In 1996, there were an average 22 days supply of crude oil resident at various segments of the industry compared to 24 at the end of 1994.

³³Days supply of crude oil is defined as end-of-month inventory divided by the following month's crude oil input to refineries. Not all of this volume is available as input to refineries.

Figure 67. Days Supply of Crude Oil, Distillate, and Total Gasoline (Days)



Source: Energy Information Administration (EIA), Forms EIA-810 "Monthly Refinery Report," EIA-811 "Monthly Bulk Terminal Report," EIA-812 "Monthly Product Pipeline Report," and EIA-813 "Monthly Crude Oil Report."

Crude Oil Stocks Declined at Tank Farms

Stocks in EIA's tank farms and pipelines category represent almost 60 percent of all crude oil held in inventory (Table 7). These stocks declined 14 million barrels during 1995 and a further 7 million barrels in 1996. A considerable portion of the reduction was recorded in PADDs III and V, where crude oil is produced domestically. The decline in this category is more appropriately associated with tank farms. Stocks at pipelines represent pipeline fill and, therefore, are operational (rather than discretionary) in nature. As such, pipeline fill stays fairly stable from year to year.

Almost a third of all crude oil stocks are maintained at refineries. These stocks were essentially unchanged during 1995, but then decreased 5 million barrels in 1996. The decline was spread fairly evenly across the PADD regions. This reduction translated into lower days supply of crude oil in inventory. Several big refiners pared back to 4 to 5 days of supply on hand.³⁴ The average for all refiners was 6 days at the end of 1996, down from 7 at the end of 1994. With the

lower stocks, refiners risked cuts in refining runs when supply disruptions occur. In January 1996, a reduction in refinery runs was forced on a number of Gulf Coast refiners when imports from Mexico and the North Sea were briefly disrupted at the end of the previous year.³⁵

The crude oil stored on leases awaiting transportation is recorded in EIA's "Leases" category. The drop in domestic production has resulted in less inventory being held at production leases. These stocks decreased from 18 million barrels in 1994 to 17 million barrels in 1995, and remained at 17 million barrels in 1996.

A drop-off in crude oil deliveries from Alaska to refiners in Hawaii, California, the Gulf Coast, and the U.S. Virgin Islands was evident in 1996, when a decline from 1994 of roughly 5 million barrels in stocks was recorded (Table 7).³⁶ Apart from the normal variation in this series, deliveries of Alaskan crude oil to the Far East started in July 1996 at a rate that averaged 73 thousand barrels per day through the end of the year, providing the basis for some of this decline.

³⁴*Petroleum Intelligence Weekly*, "Refiners Test Limits of Lean Inventory Strategy," Vol. 35 #03, (January 15, 1996), p. 1.

³⁵*Petroleum Intelligence Weekly*, "Refiners Test Limits of Lean Inventory Strategy," p. 1.

³⁶A company was added to the survey frame in 1994 resulting in a higher estimate for Alaskan crude in transit compared to 1993.

Table 7. Average Crude Oil Inventories by Industry Sector
(Million Barrels)

Sector	1994	1995	1996	Difference (1996-1994)
Refiners	100	100	95	-5
Tank Farms and Pipelines	198	184	177	-21
Leases	18	17	17	-1
Alaska in Transit	20	21	15	-5
Total	336	322	304	-32

Note: Totals may not equal sum of components due to independent rounding.

Source: Energy Information Administration (EIA), Forms EIA-810 "Monthly Refinery Report," and EIA-813 "Monthly Crude Oil Report."

Crude Oil Stocks Declined in Gulf Coast Area

Of the 32 million barrel decline in crude oil inventories from 1994 to 1996, 19 million barrels occurred in PADD III, the Gulf Coast area (Figure 68) where crude oil production and refining are concentrated. Some of the 7 million barrel drop in PADD II (Midwest) stocks may be related to a reduction in stocks in Cushing, Oklahoma, the spot market for sales of West Texas Intermediate crude oil.

Days supply of crude oil varies from PADD to PADD. The regional difference can be traced as far back as 1981. In 1996, PADD I, the East Coast, had 11 days of crude oil supply, while PADD V (West Coast) had 28 days supply. The average for all PADDs was 21 days. One explanation for this difference is the lack of oil production (and the associated stocks at leases, tank farms and pipelines) in any significant volumes in PADD I. Furthermore, PADD I receives all of its supplies by tanker or barge that, unlike pipeline supplies, are unaccounted for in EIA's data collection efforts while in transit.³⁷ Over 90 percent of the crude oil inventories in PADD I are stored directly at refineries, compared to less than a third in other PADDs.

Distillate

During the early- to mid-1980's, distillate stocks were on a generally declining path (Figure 66) due largely to petroleum industry downsizing. In the late 1980's, three consecutive winters with unusually cold weather³⁸ produced unexpected demand for distillate that was supplied largely through inventory withdrawals and resulted in historically low

inventory levels. The following two winters were warmer than normal, causing a decline in demand and, thus, requiring less from inventory. By 1993, prices for distillate were expected to rise with the introduction of low sulfur diesel in October 1993. The increase in price induced a stock build at a time when environmental regulations imposed by the Clean Air Act Amendments of 1990 reduced the fungibility of diesel fuel and heating oil inventories. While the loss in fungibility may have increased stocks for a while after the introduction of the low sulfur diesel fuel, other market forces have acted to lower distillate stocks from levels seen before the introduction of the new product.

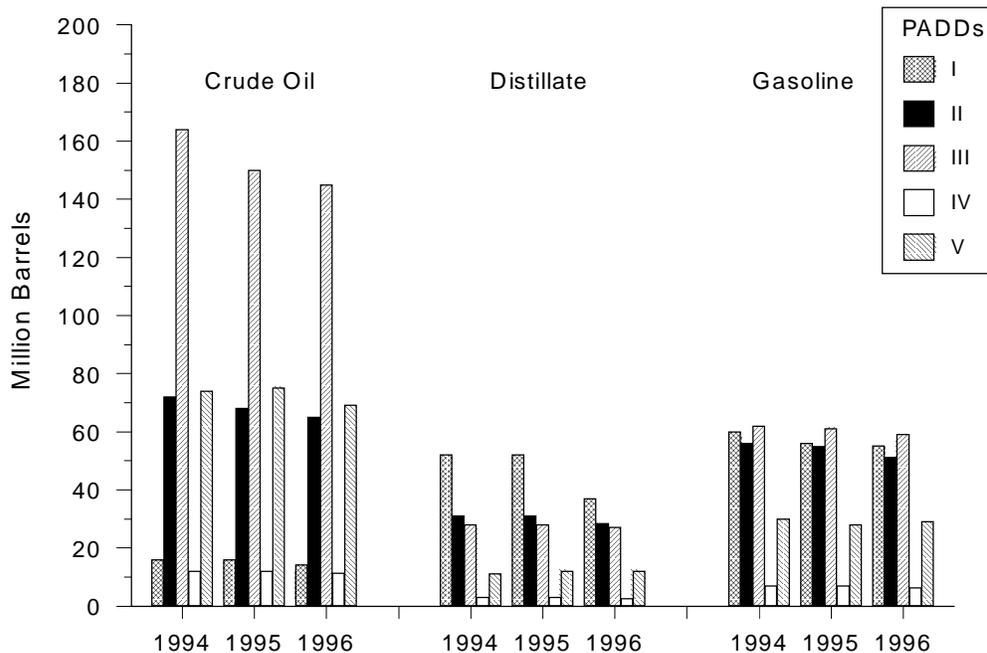
The decline in inventories that started in 1995 accelerated in 1996 when cold weather in January and February forced refiners to place a huge call on distillate inventories, leaving those inventories well below the 1991-1995 average. A late cold spell in April 1996 drove distillate demand to relatively high levels at a time when gasoline production should have been rising and distillate production declining. Strong diesel demand in the summer of 1996, attributable in part to robust economic growth, slowed the normal seasonal rebuilding of distillate stocks. Distillate production and imports were strong but not strong enough to rebuild stocks to the 1991-1995 average levels. The lack of normal storage replenishment in July, historically the biggest build month of the year, began to raise concerns. Through the end of the year replenishments were smaller than normal as prices for distillate in the future were expected to be less than current prices. Average distillate stock levels for 1996 finished 19 million barrels below the 1994 level.

In terms of days supply, inventories of distillate have decreased slowly since 1981, due to an ever increasing demand for this product (Figure 67). This decline accelerated in 1996. As Figure 67 illustrates, the days supply for distillate is higher than for either crude oil and gasoline, primarily due to the more seasonal nature of distillate consumption. Also, a large share of distillate consumption takes place away from the Gulf Coast refining center,

³⁷The one exception is supplies from Alaska, referred to as "Alaska In Transit", which are included as such in totals for PADD V.

³⁸The winters of 1987-1988 and 1988-1989 were colder than normal, and a severe cold shock occurred during December of the winter of 1989-1990.

Figure 68. Crude Oil, Distillate, and Total Gasoline Stocks by PADD Region, 1994-1996
(Million Barrels)



Source: Energy Information Administration (EIA), Forms EIA-810 "Monthly Refinery Report," EIA-811 "Monthly Bulk Terminal Report," EIA-812 "Monthly Product Pipeline Report," and EIA-813 "Monthly Crude Oil Report."

necessitating proportionately more stocks in reserve. In 1996, the industry had an average of 33 days supply of distillate on hand at various segments of the industry.

Distillate Stocks Declined at Bulk Terminals

Looking at the distillate primary inventory series³⁹, several things are clear (Table 8). Pipeline and refinery inventory levels changed very little compared to bulk terminal inventories. Due to the physical and operational requirements, pipeline fill rarely shows a significant change. Much of the stocking done at refineries is operational in nature, as well, with tanks collecting distillate production to create batches for shipping. As such, refineries have very

³⁹EIA collects primary inventory data from three groups of petroleum product inventory holders: refiners, pipelines, and bulk terminals. Included in the "Refinery" category are bulk terminals that make finished gasoline by mixing blend stocks and/or oxygenates. These facilities are required by EIA to report their inventories as "Refinery" inventories using the EIA-810 Form, "Monthly Refinery Report." Although blending operations do not affect the middle distillates, EIA data are adjusted in the following section so that the distillate stocks these blenders report are included in the "Bulk Terminal" category. The purpose of this is to more accurately reflect operations.

little discretionary storage capacity in comparison to bulk terminals which are sized to accommodate large seasonal swings in supply and demand. Furthermore, bulk terminal operations seem to be the target of cost-cutting efforts because of the direct variable costs associated with storage in this segment of the logistics system. Unlike storage space at refineries or in pipelines, which is viewed as a sunk cost and does not represent either a direct expense or opportunity cost to refiners (apart from the interest costs of carrying working capital), storage at bulk terminals has a variable cost of about 1 cent per gallon per month.⁴⁰

Although not indicated in Table 8, U.S. distillate inventories were low in 1989, much of which can be attributed to a reduction in bulk terminal holdings. After that, bulk terminal inventories increased, perhaps in response to the shortages that occurred at the end of 1989. The overall distillate inventory decrease in 1996 occurred primarily at bulk terminals.

⁴⁰EIA calculation based on discussions with energy industry sources. These costs are not completely variable in that each gallon not stored leads to a penny saved; some contract terms require a lease of multiple weeks or months regardless of whether the tankage is used. Furthermore, in order for the facility to remain economically viable, sometimes fixed tankage costs have to be prorated to a smaller stored volume.

Table 8. Average Distillate Inventories by Industry Sector
(Million Barrels)

Sector ¹	1994	1995	1996	Difference (1996-1994)
Refinery	34	32	31	-3
Bulk Terminal	67	68	51	-17
Pipeline	25	26	25	1
Total	126	126	107	-19

¹In other published EIA data, bulk terminals that make finished gasoline by mixing blend stocks and/or oxygenates are included in the "Refinery" category. In the following entries, EIA data were adjusted by removing the gasoline stocks these blenders report from the "Refinery" category and including the volumes in the "Bulk Terminals" category.

Note: Totals may not equal sum of components due to independent rounding.

Source: Energy Information Administration (EIA), Forms EIA-810 "Monthly Refinery Report," EIA-811 "Monthly Bulk Terminal Report," and EIA-812 "Monthly Product Pipeline Report."

Distillate Stocks Declined on the East Coast

Distillate inventories at bulk terminals did not decline uniformly throughout the U.S. Much of the change occurred in PADD I, the East Coast, where there is a concentration in bulk terminals (Figure 68). The seasonal swings in total U.S. distillate inventories are mainly due to the seasonal swings in PADD I. The annual U.S. inventory average had shown an increase from 123.2 million barrels in 1989 to 136.3 million barrels in 1990. The year-to-year change in PADD I, where these inventories increased by about 15 million barrels, alone accounted for more than the U.S. total build.

In 1994, distillate stocks in PADD I (and the nation as a whole) were high, and a modest draw down occurred over the winter of 1994-95. With little need to build stocks, refiners drew off the excess and entered the winter of 1995-96 slightly below average. A combination of extended cold weather in winter 1995-96, high diesel demand, high crude oil prices, and expectations that prices would be falling depleted stocks and discouraged rebuilding. The annual averages for U.S. distillate stocks declined from 126 million barrels in 1994 to 107 million barrels in 1996. Eighty percent of the change was recorded in PADD I.

Days supply of distillate for the PADDs I, II, and III, which are integrated by the pipeline system that connects the refineries in PADD III with the consumption areas in PADDs I, II, and III, averaged 33 days in 1996. In 1994, the eastern half of the country averaged 42 days supply and 41 days in 1995. The western half of the country had 27 days supply in 1996 compared to 29 days in 1994. This calculation is influenced by the close proximity of refining and consumption in California.

Motor Gasoline

Like crude oil and distillate, gasoline stocks were on a generally declining path in the early 1980's (Figure 66) because of petroleum industry downsizing. This downward trend continued in the 1990's, with significant declines observed during the early 1990's and again in 1995 and 1996. Almost one-half of the decline between 1990 and 1996 in total domestic gasoline stocks occurred in 1990 and 1991 when crude oil and petroleum product prices rose and gasoline demand fell. Between July 1990, just before Iraq invaded Kuwait, and September 1990, the world price of crude oil climbed from about \$16 per barrel to \$36 per barrel.⁴¹ The wholesale price of gasoline rose from 70 cents per gallon to almost \$1 per gallon over this same period. The high product prices in the second half of 1990 and the economic recession that lasted through most of 1991 caused gasoline demand to decline from an average 7.3 million barrels per day in 1989 to an average 7.2 million barrels per day in 1992. Total gasoline inventories during 1991 averaged about 16 million barrels less than inventories during 1990.

Between 1992 and 1993, inventories of total gasoline slowly recovered. This occurred despite a large drawdown of finished gasoline inventory during the third quarter of 1992 to prepare for the first winter season for oxygenated gasoline. Tanks of conventional unleaded gasoline were emptied to make room for oxygenated gasoline. The third quarter stock draw was quickly reversed in the fourth quarter of 1992 because of the extra oxygenates required during the winter months.

⁴¹Energy Information Administration, *The U.S. Petroleum Industry Past as Prologue 1970-1992*, DOE/EIA-0572 (Washington, DC, September 1993), p. 57.

Although stocks were lower than normal in early 1995, following the startup of the reformulated gasoline program, inventories did not recover in late 1995 and early 1996 as they normally do following the end of the summer driving season. By that time, the industry was anticipating price declines in the crude oil feedstock as indicated by backwardation in the futures market (i.e., the price of crude oil several months in the future is less than in the current month).⁴² This provided an incentive to hold-off making gasoline to stock. One cause for the anticipated lower crude oil prices was the possible sale of Iraqi crude oil. Gasoline stocks remained below average 1991-1995 levels throughout 1996.

Days supply of total gasoline has decreased (Figure 67) since 1981 because stock levels have failed to keep pace with a 1.1 percent per year growth in gasoline consumption. The decline in the days supply accelerated after 1995. In 1996, the United States had 26 days supply of total gasoline stocks, compared to 29 in 1994.

Inclusion of oxygenates increased the total days supply by 2 days at the end of 1996. Oxygenates — primarily methyl tertiary butyl ether (MTBE) and fuel ethanol — did not play a significant role in gasoline supply until late 1992, when the oxygenated gasoline program started. In January 1993, EIA stepped up efforts to collect data on oxygenates stocks to supplement the information on gasoline and gasoline blending components already collected. Inventories of oxygenates reported by EIA increased by about 8 million barrels between December 1992 and January 1993, primarily because of the extension of EIA oxygenate surveys to pipelines, bulk terminals, and oxygenate producers.⁴³ Nevertheless, even with the inclusion of oxygenates in the accounting of all gasoline stocks, these stocks still declined in 1995 and 1996.

⁴²Energy Information Administration, "Summer 1996 Gasoline Assessment," *Weekly Petroleum Status Report*, DOE/EIA-0209(96/14) (Washington, DC, April 10, 1996), p. xi.

⁴³Before January 1993, only refineries were required to report stocks of oxygenates. Refinery oxygenate stocks were reported by EIA in various publications under the category "Other Hydrocarbons/Alcohols." Beginning in January 1993, the sample frame for oxygenate inventories was expanded to include pipelines, bulk terminals, and oxygenate producers. The inventory of "Other Hydrocarbons/Hydrogen/Oxygenates" on January 31, 1993, was 14,016 thousand barrels. By comparison, the inventory of other hydrocarbons/alcohol at refineries on December 31, 1992, was 6,876 thousand barrels. Sources: Energy Information Administration, *Petroleum Supply Annual 1993, Volume 2*, DOE/EIA-0340(93)/2 (Washington DC, June 1994), pp. 26, 458 and *Petroleum Supply Annual 1992, Volume 1*, DOE/EIA-0340(92)/1 (Washington DC, May 1993), p. 69.

Gasoline Stocks Declined at Refineries and Bulk Terminals

In 1994, total gasoline stocks (finished gasoline plus gasoline blending components) averaged 214 million barrels. By 1996, the average dropped 6 percent to 201 million barrels. A comparison of annual average stock levels for the refining, pipeline, and bulk terminals segments of the industry indicates that a majority of the reduction in gasoline stocks has taken place at refineries and bulk terminals (Table 9).

Refinery inventories of total gasoline stocks represent about a third of total domestic gasoline stocks. Refineries also account for about 35 percent of total oxygenate inventories. Large drops in refinery inventories occurred in late 1995, causing the average for the year to decline from 74 million barrels in 1994 to 69 million barrels in 1996.

A reduction in gasoline stocks also occurred at the bulk terminal level, which accounts for about 40 percent of the total gasoline stocks. The reduction at bulk terminals represents an effort to lower direct variable costs associated with storage in this segment of the logistics system. In 1994, 88 million barrels of total gasoline stocks were stored in bulk terminals compared to 80 million barrels in 1996. As shown in Table 9, most of this reduction occurred in 1995.

Between 50 and 60 million barrels of gasoline are required to fill the domestic pipeline system so that refineries can supply remote bulk terminals on an ongoing basis. Pipeline fill shows little variance from month-to-month and year-to-year and represents about a quarter of total gasoline inventories. For the most part, gasoline inventories in pipelines consist of finished product since blending components stocks are held mainly at refineries.

Gasoline Stocks Declined in Eastern Half of Country

The overall downward trend in total gasoline stocks appeared predominantly in PADDs I, II, and III, which account for over 80 percent of bulk terminal gasoline supplies (Figure 68). Clearly, the decline in stocks at the bulk terminals impacted the totals recorded in these PADDs.

Days supply of total gasoline for the PADDs I, II, and III, averaged 32 days in 1996. In 1994, the eastern half of the country averaged 36 days supply and 34 days in 1995. The western half of the country had 26 days supply in 1996, unchanged from 1994.

Table 9. Average Gasoline Inventories by Industry Sector
(Million Barrels)

Sector ¹	1994	1995	1996	Difference (1996-1994)
Refinery	74	74	69	-5
Bulk Terminal	88	81	80	-7
Pipeline	52	52	51	-1
Total	214	206	201	-13

¹In other published EIA data, bulk terminals that make finished gasoline by mixing blend stocks and/or oxygenates are included in the "Refinery" category. In the following entries, EIA data were adjusted by removing the gasoline stocks these blenders report from the "Refinery" category and including the volumes in the "Bulk Terminals" category.

Note: Totals may not equal sum of components due to independent rounding.

Source: Energy Information Administration (EIA), Forms EIA-810 "Monthly Refinery Report," EIA-811 "Monthly Bulk Terminal Report," and EIA-812 "Monthly Product Pipeline Report."

Short-Term Influences on Petroleum Inventories

The short-term influences of expected crude oil and product prices, refining margins, the cost of inventories, and the risk of stockouts affect refinery managers' day-to-day decisions about inventory levels. Some of these influence marketers' inventory decisions as well. The impact of the 1995-96 short-term events on stock levels is discussed below.

Expected Price Drop Discouraged Stock Building

Figure 69 shows the difference between prices for crude oil on the New York Mercantile Exchange for delivery three months into the future minus prices for crude oil for delivery one month into the future. Stock levels are also provided. Since prices for delivery one month in the future are similar to current prices, the difference highlighted in the figure is equivalent to the expected change in the price of crude oil. Figure 69 shows that, from the end of 1995 and through 1996, the decline in stocks followed the decline in the expected price of crude oil.

In 1995, the expected price for crude oil never exceeded the current price and the market was "backward." By December 1995, the petroleum supply/demand balance had grown tight as crude oil exports from Mexico were reduced by damage from Hurricane Roxanne. However, petroleum traders expected the supply situation to ease, causing prices to decline. With the expectation for significantly lower petroleum prices in the future, it appeared more cost effective to forego purchases until prices came down. This strategy minimized the price risk associated with purchasing a commodity that is overvalued in the present, only to have

it become less valuable in the future. In February 1996, the U.N. opened discussion of Iraq's oil-for-food proposal. The ongoing talks and other market developments drove the market into further backwardation. Backwardation eased somewhat in the summer of 1996 when it became apparent that extra crude oil would not be supplied to the market, but persisted throughout 1996.⁴⁴

Low Margins and Poor Profitability Forced Industry to Trim Costs

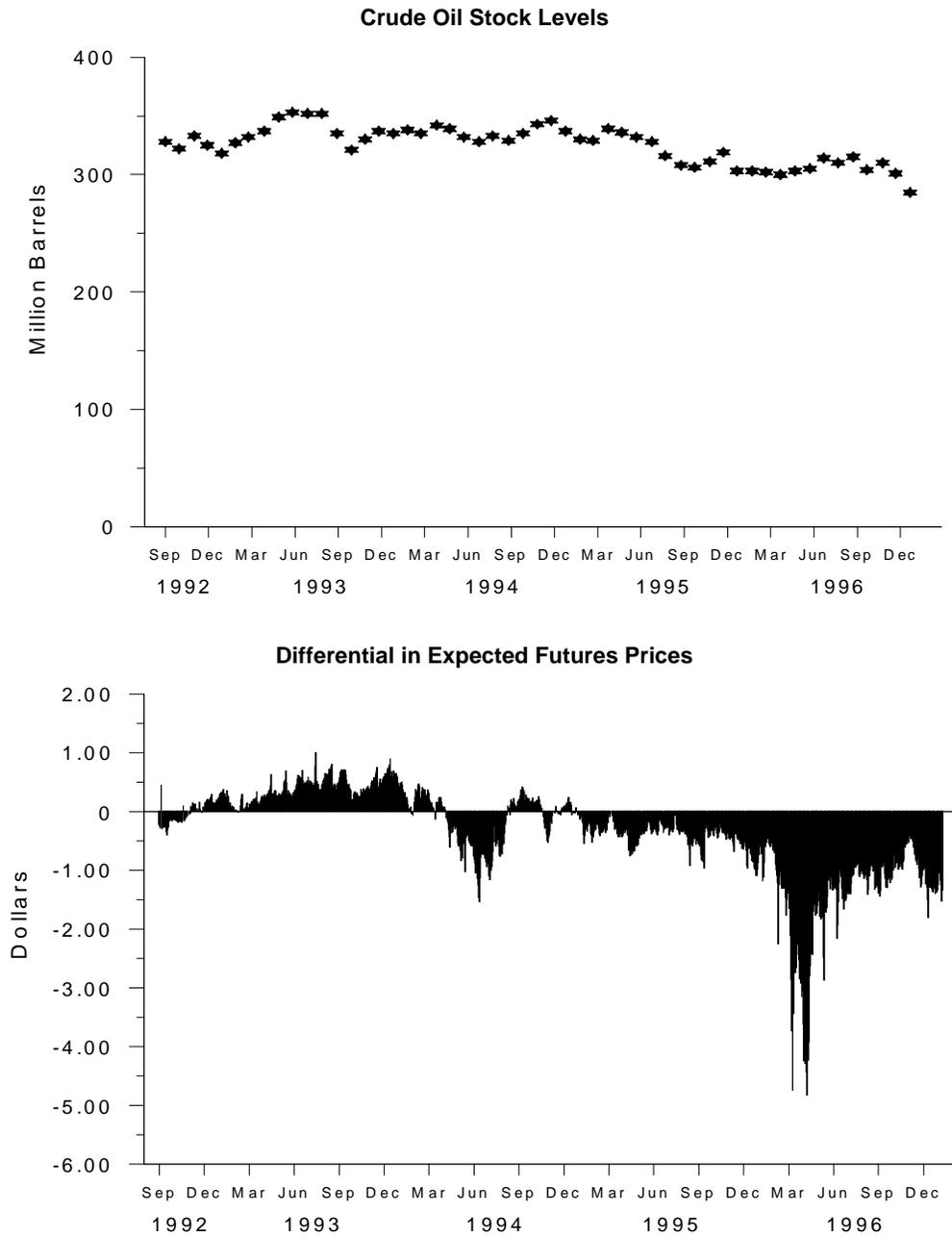
A barometer of the relative profitability of refining is the gross refining margin, i.e., the difference between the cost of the crude oil feedstocks and the price refiners receive for petroleum products produced. Gross refining margins are expected to cover not only refining costs but other costs as well, including logistics and marketing cost. While refiners may realize revenues from other activities, refining margins remain the most important source. Low margins forced refiners to trim costs in such areas as inventories.⁴⁵

In 1994, gross refining margins edged downwards as increases in product prices failed to match increases in crude

⁴⁴Chapter 6 provides a more detailed review of backwardation and the futures market.

⁴⁵Inventory cost reduction is frequently referred to as a "just-in-time" inventory program. However, this does not correspond to the conventional use of the term in economic theory. Just-in-time inventory programs involve the sharing of both the benefits (i.e., lower inventory carrying costs) and the risks (e.g., running out of stocks) between suppliers and a manufacturer. Inventory reduction programs in the petroleum industry are generally not characterized by risk sharing but represent the recognition by individual firms that the benefits of carrying lower inventories are greater than the incremental risk assumed or that the risks of stocking out for a given inventory level are now lower.

Figure 69. Crude Oil Stock Levels and Differential in Expected Future Prices
(Dollars and Million Barrels)



Source: Energy Information Administration (EIA), Forms EIA-810 "Monthly Refinery Report," EIA-813 "Monthly Crude Oil Report," and Reuters News Service, various dates.

oil prices.⁴⁶ The 1995 refining margins were at their lowest since 1987 and the industry turned to trimming inventories. Results for 1996 suggest refining margins were improved over 1995.⁴⁷

Cost of Maintaining Inventories Escalated In 1996

The cost of maintaining petroleum inventories is calculated by multiplying the current price of the material (crude oil, distillate, or gasoline) by the interest rate and adding the operating cost of tankage, about 30 cents per barrel for crude oil⁴⁸ and 42 cents per barrel for product.⁴⁹ The cost of inventories has increased since the beginning of 1994, mainly due to increases in prices for both crude oil and refined products. In spring 1996, these prices were driven up by marketers purchasing petroleum products to fill immediate needs. The price of crude oil (measured as the U.S. refiners average acquisition cost of imported and domestic crude) grew from \$17.75 per barrel in January 1996 to \$21.60 per barrel in April 1996. Over the same time period, distillate heating oil spot prices rose from 50.73 cents per gallon to 80.00 cents per gallon, and (reformulated) gasoline spot prices rose from 51.05 cents per gallon to 77.54 cents per gallon.⁵⁰

Multiplying these prices by interest rates and adding tankage (operating) costs gave a figure of 42 cents per barrel per month for maintaining crude oil inventories in January 1995. The increase in the acquisition cost of crude oil pushed the inventory cost to as much as 45 cents per barrel in April 1996. The cost of distillate and gasoline inventories were 57 cents and 60 cents per barrel, respectively, in January 1995. By April 1996, these costs went to 61 cents per barrel for distillate and 62 cents per barrel for gasoline. This upward trend in costs, while small in comparison to the influence of expected lower prices in the future, could only effect petroleum inventory levels negatively.

⁴⁶Energy Information Administration, *U.S. Energy Industry Financial Developments 1995 First Quarter*, DOE/EIA-0543(95/1Q) (Washington, DC, June 1995), p. 9.

⁴⁷A thorough discussion of the 1996 refining margin is contained in Chapter 7.

⁴⁸Energy Information Administration, *Petroleum Supply Monthly*, DOE/EIA-0109(96/03) (Washington, DC, March 1996), p. xix. Estimated cost of leasing commercial storage space.

⁴⁹Estimated cost of leasing commercial storage space, according to discussions with industry sources.

⁵⁰Reuters News Service, various dates.

Risk of Stockouts Was Reassessed

Refiners keep crude oil, distillate, and total gasoline stocks on hand to ensure a constant flow of product to consumers. The risks associated with supplies include embargoes and strikes as well as logistical problems in production, pipelines, and tanker/barge movements. Refiners and marketers informally assess risk of supply disruptions on an ongoing basis and prepare inventories accordingly. Demand surges, such as the one produced by the cold snap in January 1994, can also lead to stockouts if too little supply is in place.

The lower number of days supply on hand may suggest that petroleum supplies are believed to be more secure than previously thought and the risk of a disruption is lower. It may be that information systems and operational changes allow refiners to work with lower inventories without increasing risk of stockouts. The lower days supply may also be indicative of a belief that, thus far, decrements to inventories have not been large enough to increase the probability of product stockouts appreciably. Refiners' attitude toward risk is also a determinant of petroleum stock levels. Refiners may simply be willing to shoulder more risk than before, again leading to lower stocks. As previously documented, a policy of lower crude oil inventories has led to several reductions in runs at refineries.

Long-Term Influences on Petroleum Inventories

There are a variety of long-term influences affecting inventory levels, including increased offshore stocks, enhanced inventory management through improved information technology, consolidation of storage facilities, the shift to short-haul crude oil, the introduction of clean products, and the increase in secondary stocks. These trends are subtle and have almost no impact on the day-to-day inventory level decisions, but do affect inventory levels over time. Some of these forces represent reactions to the persistently poor financial performance in the refining industry.⁵¹

Offshore Stocks Also Declined

One explanation for some of the decline in petroleum stocks is the growth of stocks in facilities in the Caribbean. According to the *Weekly Petroleum Argus*, though, stocks at

⁵¹U.S. Department of Energy, *An Analysis of Gasoline Markets Spring 1996*, DOE/PO-0046 (Washington, DC, June 1996), p. 58-61.

independent storage terminals there went from 27.1 million barrels at the end of 1994 to 17.1 million barrels at the end of 1995 then 15.5 million barrels at the end of 1996.⁵² Therefore, the activity in the Caribbean cannot substantiate the decline in U.S. crude oil, distillate, and total gasoline stocks. It appears that the same forces causing stocks to decline in the United States have affected Caribbean stocks as well.

Improved Information Systems May Have Facilitated Decline in Stocks

Improved information technology has given managers better tools needed to optimize stock levels. Computer programs and tracking systems for monitoring sales, production and inventories have become more sophisticated in recent years. While the availability of more accurate and more timely data may permit maintenance of lower inventories,⁵³ the impact of these technological improvements is difficult to quantify because of the presence of other trends in EIA data.

Closure of Storage Facilities May Have Reduced Stocks

Information on specific tank farm and bulk terminal sites is scarce. In an effort to reduce reporting burden, EIA collects stock information on a PADD basis, not by individual terminal. Without site-specific data to monitor trends, it is difficult to determine to what extent the decline in stocks is attributable to the closure of terminals.

Several industry publications have indicated that major oil companies are divesting their oil terminals and that independent terminal operators are buying some of these properties. However, it is unknown how much storage is being decommissioned by the new owners.⁵⁴

Shift to Short-Haul Crude Oil Had Little Impact

With the decline in domestic production, crude oil imports have been increasing, particularly imports from the Western Hemisphere, referred to as “short-haul” crudes. In addition

to shorter transit times, short-haul crude oil allows refiners to reduce inventories because of the smaller cargo sizes. Less storage is required because the smaller vessels used are offloaded at slower rates that more closely approximate refinery input rates. The ability for quick resupply also factors into a reduction in stocks.

In order to have a negative impact on inventory levels, imports from long-haul sources would have had to decline from one period to the next. Imports from outside the Western Hemisphere decreased only 190 thousand barrels per day in 1995 and another 124 thousand barrels per day in 1996. The reduction in stock requirements attributable to this shift to short haul sources is small, particularly in comparison to what stocks should have been given the growth in demand and a decline in domestic sources of crude oil.

Product Quality Regulations Had Little Long-Term Influence

Beginning in 1992, the introduction of various air quality regulations has had broad ranging impacts on the petroleum industry, including storage management.⁵⁵ These regulations covered Reid vapor pressure of gasoline (June 1989 and January 1992), the oxygenated gasoline program in carbon monoxide nonattainment areas (November 1, 1992), low sulfur diesel fuel (October 1, 1993), and reformulated gasoline (January 1, 1995).

Previously, distillate grades (heating oil and diesel fuel) could be stored together because of their similar specifications. Inventory planners could build total distillate inventories on the basis of demand expectations for heating oil and diesel fuel. Any unexpected demand for either product could be pulled from the other’s inventories and production streams. With segregation, a cushion against unexpected demand had to be maintained for each product, which led to an increase in inventories.⁵⁶ The increase in distillate stocks after the start of the low sulfur diesel program in October 1993 (4 percent rise in 1994) may, in part, be attributable to the inefficiencies introduced by the legislation. It is more likely, though, that this increase was related to the expectation that distillate prices would rise, thus making inventories more valuable. Since then, average

⁵²*Weekly Petroleum Argus*, various issues.

⁵³*Fuel Technology and Management*, “Lower Gasoline Inventories Do Not Mean Higher Prices,” (March/April 1996), p. 9.

⁵⁴Energy Information Administration, *Storage and Transportation Changes Since 1989*, DOE/EIA-Draft Report (Washington, DC, June 1996), p. 5.

⁵⁵A more thorough discussion of the impacts of environmental regulations is contained in Energy Information Administration, “Recent Trends in Motor Gasoline Stock Levels” and “Recent Distillate Fuel Oil Inventory Trends, What EIA Data Show,” *Petroleum Marketing Monthly*, DOE/EIA-0380(96/06) (Washington, DC, June 1996), pp. xxi-xxiv.

⁵⁶Energy Information Administration, *Petroleum Marketing Monthly*, “Distillate Fuel Oil Assessment for Winter 1995 - 1996,” November 1995, Sidebar.

distillate stocks declined, meaning that other influences have outstripped the effects of environmental regulations. In some situations, suppliers have found it economical to substitute a clean fuel for a conventional fuel, rather than maintain additional stocks of the conventional fuel.

Fuel specification regulations have had an even smaller influence on gasoline stocks. EIA survey data for both refineries and bulk terminals indicate that the oxygenated and reformulated gasoline programs, required by the Clean Air Act Amendments of 1990, have changed the seasonality of stocking patterns from a third quarter build to a draw. The third quarter draw is necessary to draw down stocks for oxygenate blending in preparation for the start of the oxygenated season. Further research failed to identify any meaningful differences in stocking patterns between refineries that produce oxygenated and reformulated gasolines and refineries that produce only conventional gasolines, or between states that require the new clean gasoline and states that do not. The overall downward trend in inventories was apparently greater than any of the inefficiencies introduced by the Clean Air Act Amendments.

Refiners and bulk terminal operators made operational changes to meet the challenge of providing the additional gasoline types required by the Clean Air Act Amendments while still reducing stocks. For example, some oxygenate was moved from refineries to terminals, and in-line blending was added at bulk terminals, allowing operators to eliminate mid-grade storage in some cases. (Bulk terminal operators are able to make midgrade gasoline by blending premium and regular grades.) The willingness of companies to participate in exchange agreements and shared storage also may have allowed suppliers to accommodate new, clean products without increasing storage requirements.

Stocks Declined at Electric Utilities

An obvious cause of decline in distillate and gasoline stocks at the primary level may be an increase in stocks at the secondary and consumer levels. At the consumer level, EIA collects information on distillate stocks at electric utilities. Electric utilities accounted for less than 2 percent of distillate consumption in October 1996. The pattern of stocks since 1992, though, shows a definite decline in 1996, when consumption increased (Table 10). Higher prices served as a disincentive to replenishing stocks. Although utility stocks declined, this cannot be extended to other consuming sectors since utilities have some flexibility regarding the fuels they burn. Information on other secondary and tertiary stock levels is sketchy, at best.

Conclusion/Outlook

The 1995-96 decline in crude oil, distillate, and gasoline inventories occurred mostly at tank farms and bulk terminals, the point in the supply system most able to respond to changing supply economics. The declines in regional stocks, therefore, reflect the geographic distribution of these facilities, with the greatest reductions occurring in stocks of crude oil on the Gulf Coast and of products in the Northeast and Midwest.

The main determinant of inventory levels over this period was expected to be the increasingly stringent environmental regulations, requiring industry to stock a growing number of grades, thereby putting upward pressure on inventories. But this was overwhelmed by the downward pressure exerted by two other factors: the lower expected prices for crude, gasoline, and distillate; and the ongoing, poor financial performance of the downstream industry. Many other factors, such as the shift to shorter-haul crudes, offshore storage, and the cost of borrowing, had a much more minor impact on the industry's stock policy, but generally encouraged further reductions. The net result was new record lows for stocks of crude oil, distillate, and gasoline, which, in turn, contributed to higher price volatility.

Still, many questions concerning petroleum inventories remain unanswered. The most notable question is to what extent stock levels drive price volatility. The question of adequacy also persists, since the lower stock levels were untested during the mild 1996-97 winter. Lastly, the outlook for stocks brings into question the relative influences of expected prices and financial performance. Definitive answers to these questions must await quantitative analyses of the correlation between stock levels and prices, cost, and events such as the start of the clean fuels program. The downstream mergers recently announced (Texaco/Shell, Marathon/Ashland) give evidence that the industry expects low margins to continue, meaning that discretionary stocks will be minimized. From the standpoint of prices, changes in the supply situation are expected to stimulate stock building, since future prices are predicted to be equal to, or greater than, current prices.

With the flow of Iraqi crude oil and the end of the world's peak petroleum consumption season (winter), expected prices are already more in line with current prices for February 1997 (after adjusting for seasonal trends). The futures prices on the New York Mercantile Exchange provides evidence of this trend.⁵⁷ EIA forecasts that as the crude oil supply situation eases and current and expected prices remain comparable, crude oil inventories are expected

⁵⁷Reuters News Service, various dates.

Table 10. U.S. Electric Utility Distillate Consumption and Ending Stocks - October
(Million Barrels)

	1992	1993	1994	1995	1996
Stocks	15.4	14.8	15.6	15.6	14.5
Daily Consumption	0.792	0.897	0.811	0.932	1.477

Source: Energy Information Administration (EIA), Form EIA-759 "Monthly Power Plant Report."

to go from 12 percent to within 3 percent of the 1991-1995 average levels by the end of the of 1998 while gasoline will go from 9 percent to within 4 percent of the historic average. A continuing tightness in world distillate markets, however, may cause distillate inventories to remain low (about 10 percent below the 1991-1995 average at the end of 1998).⁵⁸

If the financial performance proves to be a more important factor than shown historically, then stocks may not recover to the extent forecast. Data for 1997 indicate the recovery in stocks may have already started; EIA's projections are predicated on normal weather. If the intervening heating seasons prove to be unusually cold or if logistical problems occur, particularly with distillate, inventories could be tested and prices may go higher.

⁵⁸Energy Information Administration, *Short-Term Energy Outlook*, DOE/EIA-0202(97/Q2) (Washington, DC, April 1997), p. 29.