IV. CASE STUDY: THE COSTS OF FILLING THE SPR IN SPRING 2002

"In the long run commodity prices are governed but by one law – the economic law of demand and supply. The business of the trader in commodities is simply to get facts about the demand and the supply, present and prospective."
--Edwin Lefèvre, Reminiscences of a Stock Operator, 1923

A. Introduction

In February 2002, DOE reversed its policy of routinely granting requests to defer oil shipments to the SPR when crude oil prices were high and market supplies were tight.[119] DOE made this policy change after receiving a request by an oil company in February to defer shipments due to be delivered to the SPR later in the spring. Senior DOE officials instructed the SPR Office to deny the oil company's request.

During DOE's consideration of this deferral request, SPR career officials warned senior DOE officials, including the Deputy Secretary of Energy, that filling the SPR when oil prices were high or oil supplies were tight could drive oil prices higher, reduce U.S. commercial inventories, and hurt U.S. consumers and taxpayers, and advocated returning to the prior market-based policy.[120] Despite these warnings, DOE decided to keep the no-deferral policy in place for most of 2002. DOE made this decision without conducting any cost-benefit analysis of the new policy, without analyzing the relative costs of the new policy compared to the prior policy, and without preparing a detailed analysis of the new policy's potential impact on overall U.S. oil supplies.[121] DOE has yet to track the actual costs associated with the new policy.

This Section provides a case study illustrating how the new SPR policy became a major factor contributing to higher crude oil prices in the United States in the spring of 2002, which led to increases in the price of various petroleum products, such as heating oil, diesel fuel, and jet fuel. It focuses on the period from mid-November 2001, when DOE began to add substantial amounts of oil to the SPR, through mid-May 2002, six months later. In particular, the case study traces how the large demands placed on the Brent market in late 2001 and early 2002 due to purchases of Brent cargoes for shipment to China and the SPR increased Brent prices in early 2002. DOE's change in policy to not allow any deferrals of SPR shipments was a major factor contributing to the tightness of the Brent market in the spring of 2002, and boosting the price of Brent and crude oils priced in relation to Brent.

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[119] See Section II of this Report.

[120] See Section V of this Report.

[121] The Subcommittee asked DOE to produce all documents containing any cost-benefit analysis related to the new policy, and was informed by DOE that none exist. In fact, DOE was unable to produce a single document explaining or justifying the policy decision to stop granting requests to defer oil shipments to the SPR.

The case study details how higher Brent prices translated into higher costs for imported crude oil, lower U.S. crude oil inventory levels, and a sudden, sharp increase in the futures and spot prices for WTI crude oil in April and May. The case study then shows how this price spike drove up the price of heating oil, jet fuel, and diesel fuel, and briefly explains how increases in the prices of these petroleum products hurt U.S. consumers and businesses. The case study also shows how the elevated crude oil prices decreased U.S. refining margins and increased economic pressures on U.S. refiners in the second quarter of 2002. The case study finds that, in just one month alone, the new SPR fill policy imposed additional crude oil costs on U.S. consumers and businesses of between $500 million and $1 billion. These one-month costs were the most directly visible and quantifiable of the additional costs created by the SPR program during these months.

DOE's actions to fill the SPR were not the only factor pushing up crude oil prices in the spring of 2002. Factors such as Saddam Hussein's one-month suspension of Iraqi oil exports in April 2002, an 8-day oil strike in Venezuela, OPEC production cuts in the first quarter of 2001, and speculation and concern over impending war with Iraq also affected oil prices. Nonetheless, the evidence shows DOE's new policy to deposit oil into the SPR regardless of the price of oil was an additional major factor driving up U.S. oil prices and hurting U.S. consumers in the spring of 2002.

B. Analysis

1. Large Amounts of Brent Crude Oil Were Put into the SPR in Late 2001 and Early 2002

From November 2001, when DOE began its recent program to fill the SPR to 700 million barrels, through the second quarter of 2002, most of the oil deposited into the SPR was Brent crude oil. As can be seen in Figure IV-1, Brent crude oil accounted for about 25 of the 29 million barrels, or nearly 90 percent, of the sweet crude deposited into the SPR during this period.[122] Although each company had the option of delivering a variety of light sweet crude oils to the SPR, each one deposited mostly Brent.

Crude oil traders interviewed by the Subcommittee stated that Brent was the most economical choice to place in the SPR for various reasons. These traders explained, first, that Brent is the most widely traded of the sweet crude oils that may be placed into the SPR, thus making it easiest to obtain. Secondly, some said that the variety of Brent instruments that are traded – 21-day contracts, futures contracts, CFDs, and DFL swaps – makes it possible to hedge against changes in the price of Brent cargoes more precisely than other types of crude oil. They stated that the use of other grades of crude oil presented basis risks (risks in the divergence between the price of the grade of crude oil and the price of dated Brent) that did not exist when Brent itself was used. Third, many of the companies depositing crude oil into the SPR during this period were major players in the Brent market, and their traders stated that acquiring physical Brent cargoes was, and is, a core part of their business. Fourth, according to some traders, it was physically easier to load large cargo ships at the Sullom Voe terminal than at other

[122] See also Figure II-3.

North Sea terminals. All of the traders interviewed by the Subcommittee staff denied their purchases of Brent were intended to increase oil prices by creating a shortage of Brent.

As can be seen in Figure IV-1, however, beginning in July 2002, much less Brent, relative to other sweet crudes, was placed into the SPR. It is not clear which additional factors made Brent so much more attractive for satisfying SPR obligations in the first half of 2002 than in the second half. Section V.C of this Report discusses whether oil companies and traders may have acquired large amounts of Brent crude oil in order to take advantage of the vulnerability of the Brent market to squeezes that existed through the first half of 2002.

Figure IV-1
Sweet Crude Oil Delivered to the Strategic Petroleum Reserve
November 2001 - September 2002

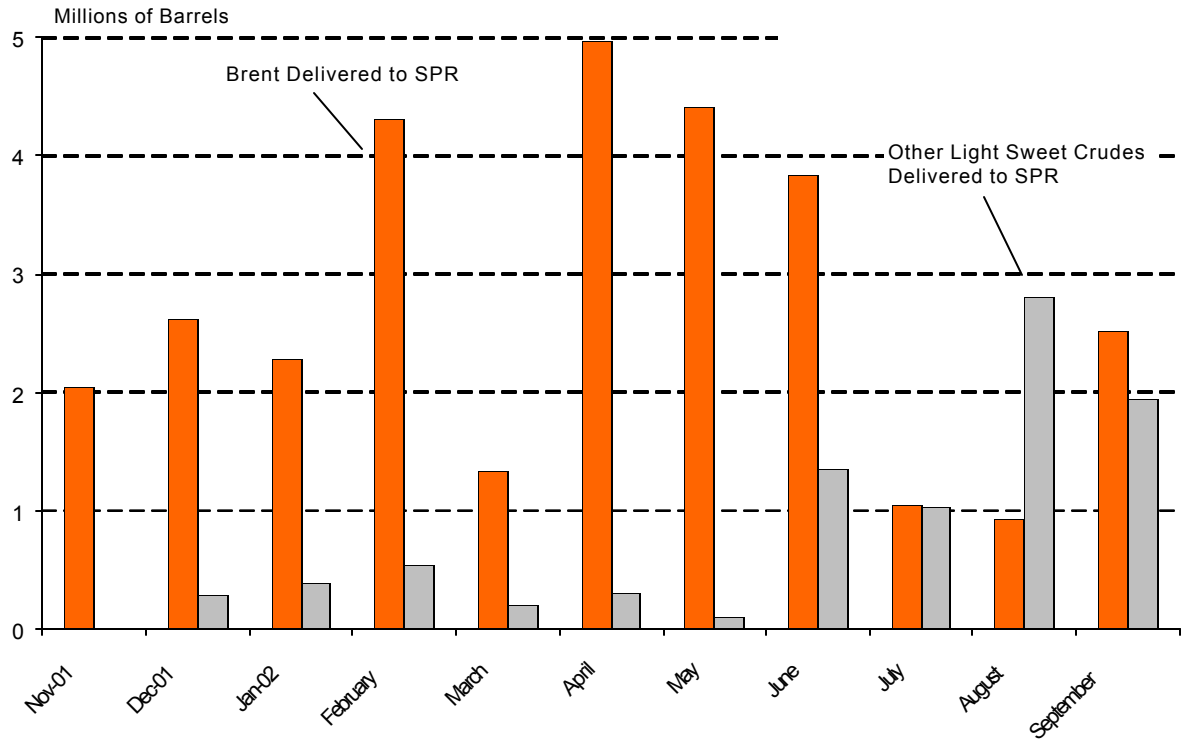


Fig. IV-1. Brent accounted for nearly 90% of the crude oil deposited into the SPR from late 2001 through the first half of 2002. Source of data: DOE.

In addition to the demand for Brent created by the SPR program, in early 2002, two oil companies purchased large amounts of Brent for shipment to China. The companies, Sempra Energy Trading and Sinochem, acquired all of the Brent cargoes loaded in February 2002, and sent 20 of these cargoes to China. According to Sempra officials interviewed by the Subcommittee staff, a narrowing of the price differential between Brent and Dubai crude oils in late 2001 had made Brent relatively inexpensive compared to the sour Middle Eastern grades, which led Chinese refiners to purchase these large amounts of Brent. These shipments of Brent to China tightened market supplies just as DOE was announcing new contracts to fill the SPR. In the spring of 2002, with the Brent market unsettled by the large shipments to China, the market was further disturbed by reports that large amounts of Brent were being sent to the SPR.

Figures IV-2 and IV-3 show the shippers and destinations for the Brent cargoes loaded from January through May 2002. Koch's Brent loadings in January, Shell's loadings in March and April, and BP's loadings in May went primarily to the SPR. Viewed together, Figures IV-1 through IV-3 demonstrate that an unusually large portion of the Brent crude oil produced from November 2001 through June 2002, was deposited in the Strategic Petroleum Reserve.

Figure IV-2
Brent Production: Shippers
January - May, 2002

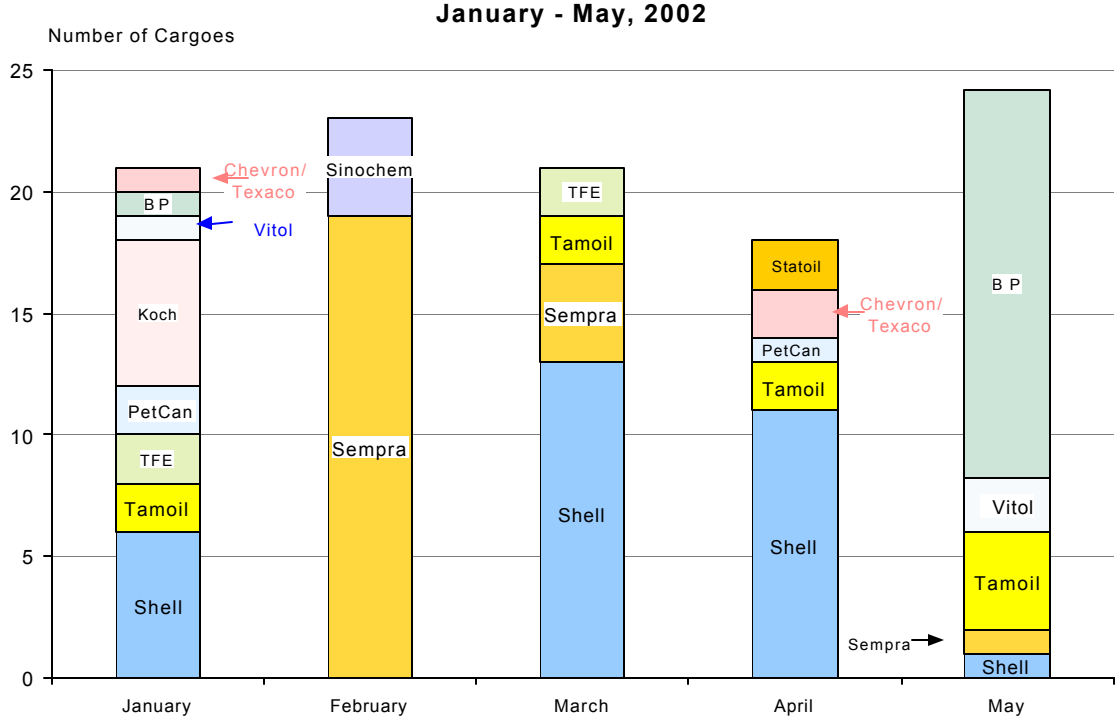
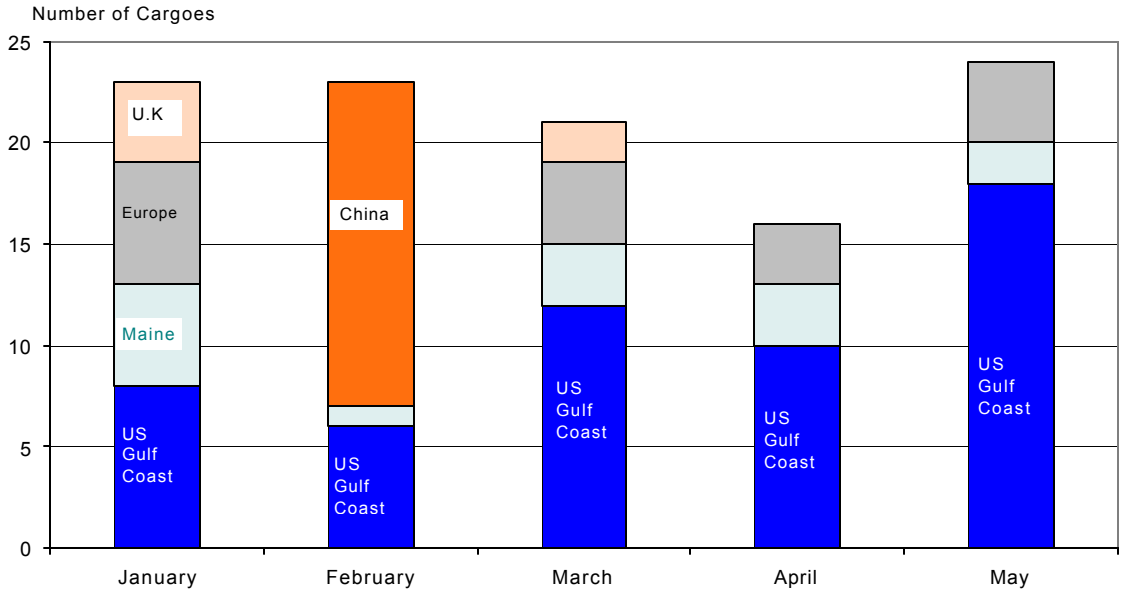


Figure IV-3
Brent Production: Destinations
January - May, 2002



Figs. IV-2 and IV-3. In early 2002, large amounts of Brent crude oil went to China and the U.S. Strategic Petroleum Reserve, which is located in the U.S. Gulf Coast. Source of data: Industry estimates.

2. The Use of Brent To Fill the SPR Increased the Price Of Brent Relative to WTI

Brent and WTI are two benchmark oils that generally rise and fall together, reflecting changes in global supply and demand.[123] Brent normally costs about $1.50 per barrel less than WTI.[124] But from November 2001 through May 2002, the price of Brent rose significantly relative to the price of WTI.

Figure IV-4 shows the price of Brent rose significantly relative to WTI at about the same time as Brent cargoes began to be sent to the SPR. From 1992 through September 2001, the average difference in price between WTI and Brent was $1.49; from November 2001 through May 2002, the average price difference was 75 cents. In other words, from November 2001 through May 2002, the price of Brent rose 75 cents relative to the price of WTI, cutting in half the normal differential between the two benchmarks.

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[123] See Figure III-9.

[124] See Section III.

Figure IV-4
Difference in Spot Price between Brent and WTI
October 2001 - August 2002

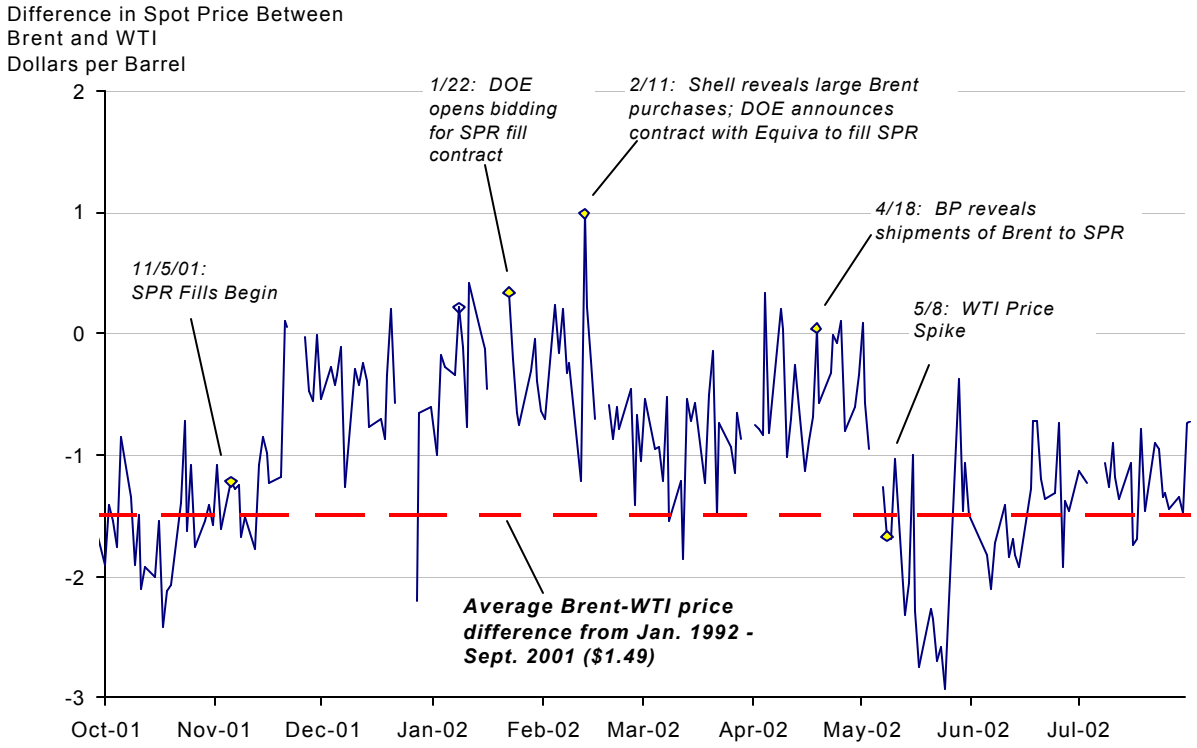

Figure IV-4. Beginning in November 2001, shipments of Brent to the SPR increased the price of Brent relative to WTI. Source of price data: EIA.

Figure IV-4 also shows that on a number of dates in this period the price of Brent actually rose above the price of WTI. Several of these mini-spikes in the price of Brent appear to have been caused by announcements related to the SPR program: DOE's January 22, 2002 announcement opening the bidding for the RIK contract; DOE's February 11, 2002 announcement of the award the RIK contract for light sweet crude oil; and BP's announcement on April 18, 2002, that it was sending shipments of Brent to the SPR.

Figure IV-5
Difference in Spot Price between Brent and WTI
January 1992 - August 2002

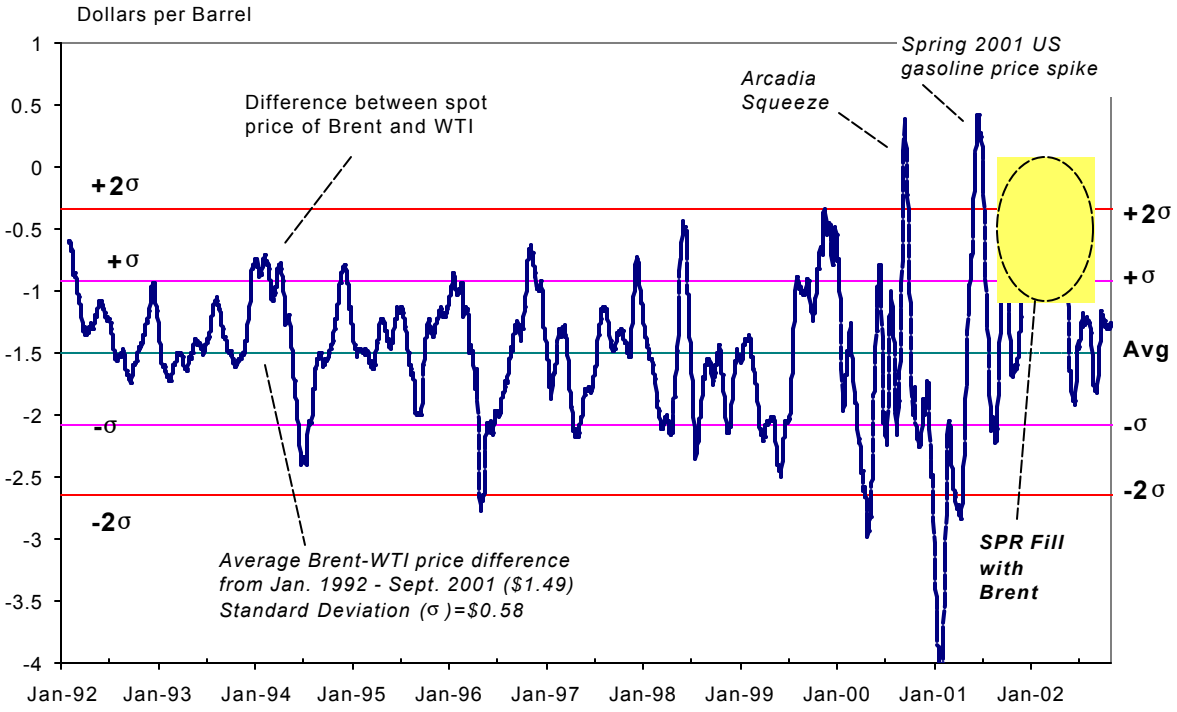

Fig. IV-5. From November 2001 through May 2002, Brent was more expensive relative to WTI for longer than any other period over the previous ten years. Prices reflect 20-day moving averages. Source of price data: EIA.

Figure IV-5 places the relative Brent price increase in a historical context. As can be seen from Figure IV-5, for the seven months from November 2001 through May 2002, the price of Brent was higher in relation to WTI for a longer period than at any other time during the previous ten years. For most of this seven-month period, the price of Brent had risen between 60 cents and $1.20 in relation to WTI, which is between one and two standard deviations above the previous norm. For two-and-a-half weeks in late January and early February 2002, the price of Brent rose to within 33 cents of WTI, which is a variation of more than two standard deviations from the norm. These are statistically significant price changes, and it is no mere coincidence that they took place at the same time as the demands placed on the Brent market from the SPR and China.

Additional price data provides evidence that, in fact, the large demands on the Brent market from China squeezed the Brent market in January, and the large demand for Brent for the SPR squeezed the Brent market from mid-March through early May. As Section III explains, in a squeeze the supply of the physical commodity is in scarce supply as compared to the outstanding contracts to deliver, so that the "shorts" must either bid up the price of the commodity to obtain it for delivery or pay a high premium to the "longs" for their expiring futures contracts to cancel their obligation to deliver the commodity.[125] The fact that the Brent market was squeezed can be seen by examining the Brent-WTI relationship during this period, the price of near-term and longer-term Brent futures, and the price of Brent OTC DFL swaps. Viewed together, this evidence demonstrates the acquisition of large amounts of demands on the dwindling supply of Brent in early 2002, due to shipments of Brent to China and the SPR, squeezed the Brent market, first in January, and then again from mid-March to early May, in the same manner as the Arcadia shipments of Brent to India had done in 2000.

One classic sign of a market squeeze is a sharp and sudden increase in the price of one commodity in relation to the price of similar commodities. Figures IV-4 and IV-5 demonstrate that the price of Brent increased significantly relative to the price of WTI shortly after Brent began to be used for SPR deposits, and this relative increase continued into May 2002.

A second classic sign of a squeeze is a sudden increase in the near-term price of a commodity as compared to the price of the commodity farther in the future (backwardation), while the markets for other, similar commodities do not exhibit the same price behavior.[126] Figure IV-6 shows the difference between the first and second month contracts for IPE Brent and NYMEX WTI futures from July 2000 through August 2002. This chart shows the two instances in early 2002 in which the near-term prices for Brent increased sharply, particularly in relation to the prices for second month contracts (backwardation), while the WTI market did not exhibit a similar pattern. The first instance was due to the large number of Brent cargoes purchased for shipment to China, and the second instance was due to BP's acquisition of a large number of Brent cargoes for shipment to the SPR.[127] This contrast in the behavior of the Brent and WTI futures markets is evidence that squeezes in the Brent market occurred in January and around April 2002.

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[125] See also Appendix 1.

[126] See Section III.C.

[127] Although Shell also bought large amounts of Brent in early 2002, the Brent futures market did not show signs of a squeeze from these purchases, perhaps as a result of Shell's announcement on February 11, 2002, that it had "potential demand for all the Brents [cargoes] in March." *See* The Oil Daily, *Another Feared Brent Squeeze Sends Shock Across Energy*, February 13, 2002. Although Shell's announcement helped spike the Brent spot price to a $1.00 premium over WTI on February 11, see Figure IV-4, the announcement also may have discouraged traders from selling futures contracts for delivering Brent, thereby avoiding a squeeze. *See also* Section IV.C.

Figure IV-6: Brent and WTI
Difference Between 1st & 2nd Month Futures Contracts
October 2001 - June 2002

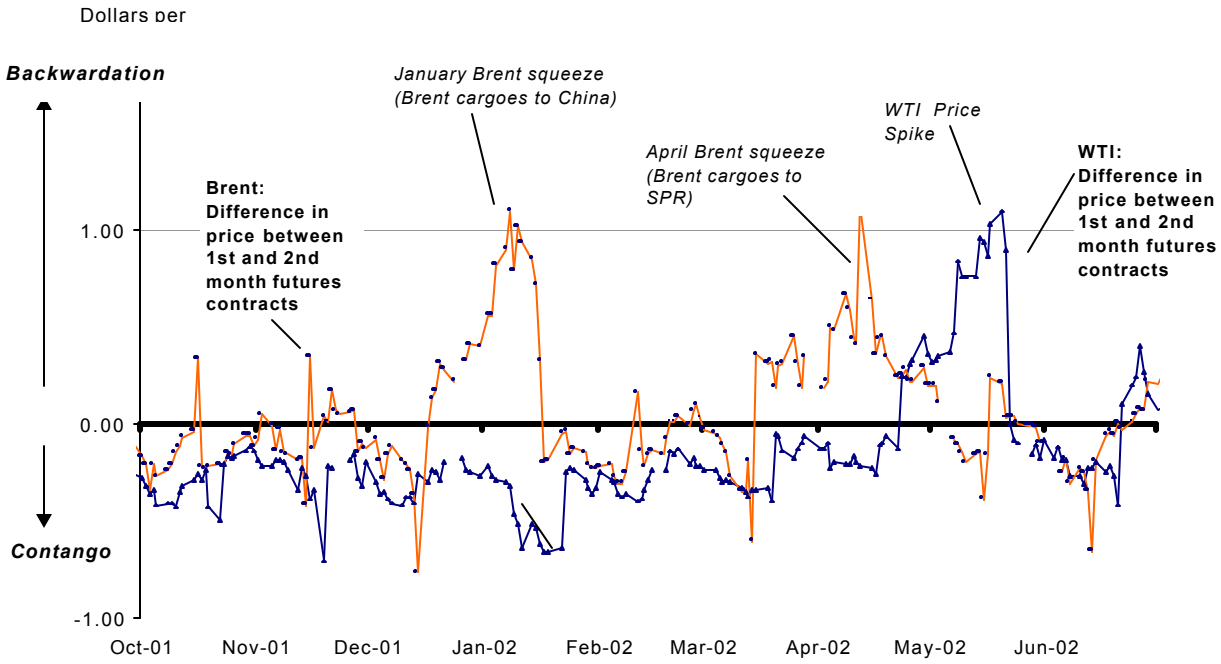

Figure IV-6. In January and April 2002, the Brent market shifted from contango to backwardation, while the WTI market remained in contango, a classic signal of a squeeze in the Brent market. Source of price data: EIA, IPE.

The increase in the price of various Brent derivatives in the OTC markets is additional evidence the Brent market was squeezed in January and mid-March to early May.[128] Figure IV-7 shows, for example, the difference between the price of the first month IPE Brent futures contract and the price of dated Brent. This price difference is equivalent to the price of a DFL swap, which is a Brent derivative traded on the OTC market. Figure IV-7 shows that in January and around April, the price of a Brent futures contract rose to nearly $1.50 more than the price of a dated Brent cargo, indicating the "shorts" holding futures contracts requiring delivery of Brent were being forced to pay a premium to the "longs" to cancel their obligation for delivery. The monthly pricing patterns for DFL swaps from October 2001 through May 2002, as seen in Figure IV-7, are similar to the pattern for DFL swaps during the Arcadia squeeze in August 2000, as

[128] See Section III.B for an explanation of these Brent derivatives.

shown in Figure III-11. An increase in the price of a DFL swap, by itself, does not indicate a squeeze; however, a squeeze will result in an increase in the price of a DFL swap.[129]

Figure IV-7
October 2001 - June 2002

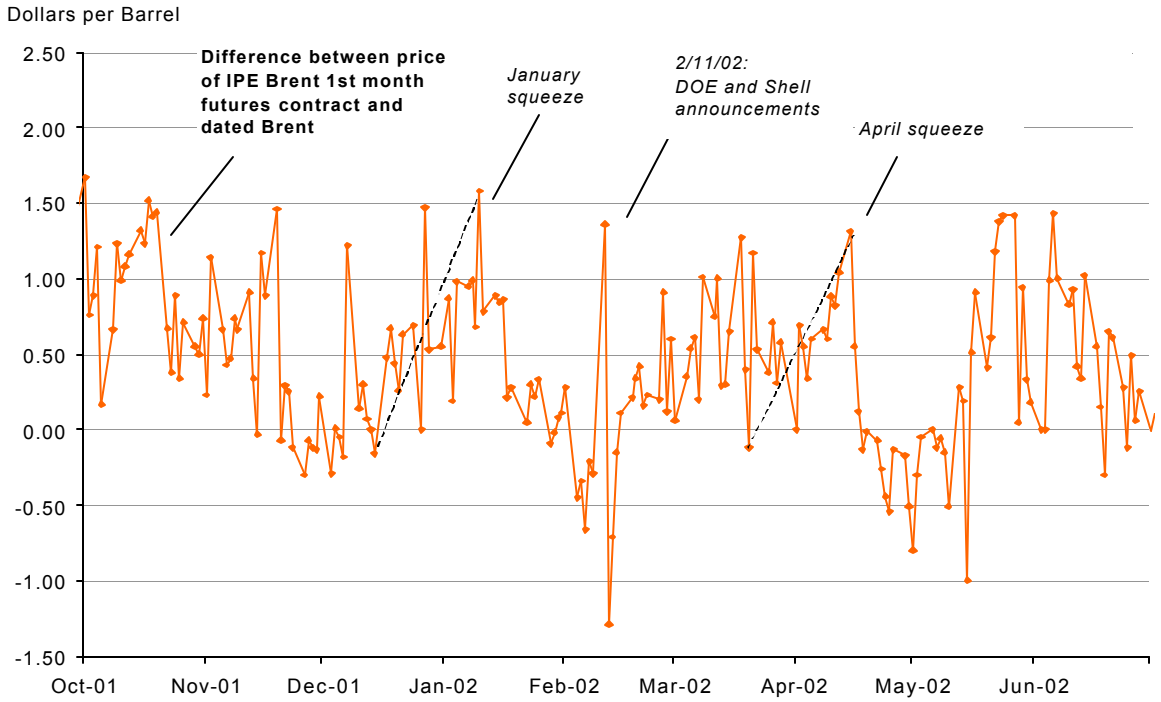

Figure IV-7. On several occasions, from late 2001 through mid-2002, the price of the first month IPE Brent contract rose significantly relative to the price of dated Brent. This data is consistent with a market squeeze. Source of price data: EIA, IPE.

The price spikes in the futures and OTC contracts for Brent in January and around April 2002 cannot be explained by global oil supply and demand. The global economy was in a slump. The crude oil markets had yet to recover from the drop in demand following the September 11, 2001 terrorist attack on the United States. Indeed, the WTI futures market reflected these fundamentals – that current demand for crude oil was lower than anticipated future demand, and near-term prices were lower than prices further in the future (contango). The Brent market, however, was just the opposite (in backwardation), with higher near-term prices

[129] See Horsnell and Mabro, *supra*, at 130-132, for a discussion of the effect of a Brent squeeze on these derivatives.

reflecting the immediate demands on Brent supplies to provide shipments to China and the SPR, rather than overall global supply and demand.

In sum, the large number of shipments of Brent sent to the SPR and China, from November 2001 through May 2002, significantly increased the price of Brent relative to WTI, caused the near-term price for Brent to rise relative to the price of more distant Brent futures contracts (backwardation) for extended periods, and caused significant price increases in the OTC market. From mid-March through early May 2002, the demands placed on the Brent market by the SPR program squeezed the Brent market.[130]

3. Higher Brent Prices Increased the Price of Crude Oil Imported into the U.S.

Increases in the price of Brent relative to WTI led to relative increases in the price of a variety of crude oils priced off Brent. Most of the crude oils priced off Brent are sold in term contracts that set the price of the oil at a fixed differential to the price of dated Brent. Generally, these differentials are fixed for the term of the contract, and are not renegotiated during the term of the contract. Squeezes and other disruptions in the Brent market that increase the price of dated Brent, therefore, generally increase the cost of crude oil priced off Brent under term contracts. Since term contracts are individually negotiated and not traded on any exchange, however, information on the terms of these contracts is unavailable, and the total impact of Brent price increases cannot be measured.[131]

Crude oil spot market data, however, provides evidence of how higher Brent prices increased the price of crude oils priced in relation to Brent. Although comprehensive and reliable spot price data is not available, the spot price of Nigerian Bonny Light, a major crude oil imported into the United States, is commonly reported by trade publications.

Bonny Light is produced in Nigeria and is usually priced at a discount to Brent. The price of Bonny Light is generally reflective of the price of other Nigerian crudes. The United States imports large amounts of crude oil from Nigeria, which is the fifth largest exporter of crude oil to the United States, sending, on average in 2001, about 850,000 barrels daily to refiners in the United States.[132] An increase in the cost of Nigerian imports, therefore, has significant effects for refiners and consumers in the United States.

Data on spot market transactions shows the price of this Nigerian crude oil closely tracked the price of Brent during the period examined, from October 2001 through June 2002. Figure IV-8 shows how the price of Nigerian Bonny Light moved in tandem with the price of Brent during this period.

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[130] In interviews with the Subcommittee staff, officials from the London IPE and the U.K. FSA agreed with the characterization that the Brent market was squeezed in January and April 2002.

[131] On April 24, 2002, the Petroleum Intelligence Weekly, in the article *Beyond Hoarding*, wrote, "Buyers of less transparent or term contract barrels have been less able to protect themselves from the spiking benchmark."

[132] See Figure III-3.

Figure IV-8
Price of Dated Brent and Nigerian Bonny Light
October 2001 - June 2002

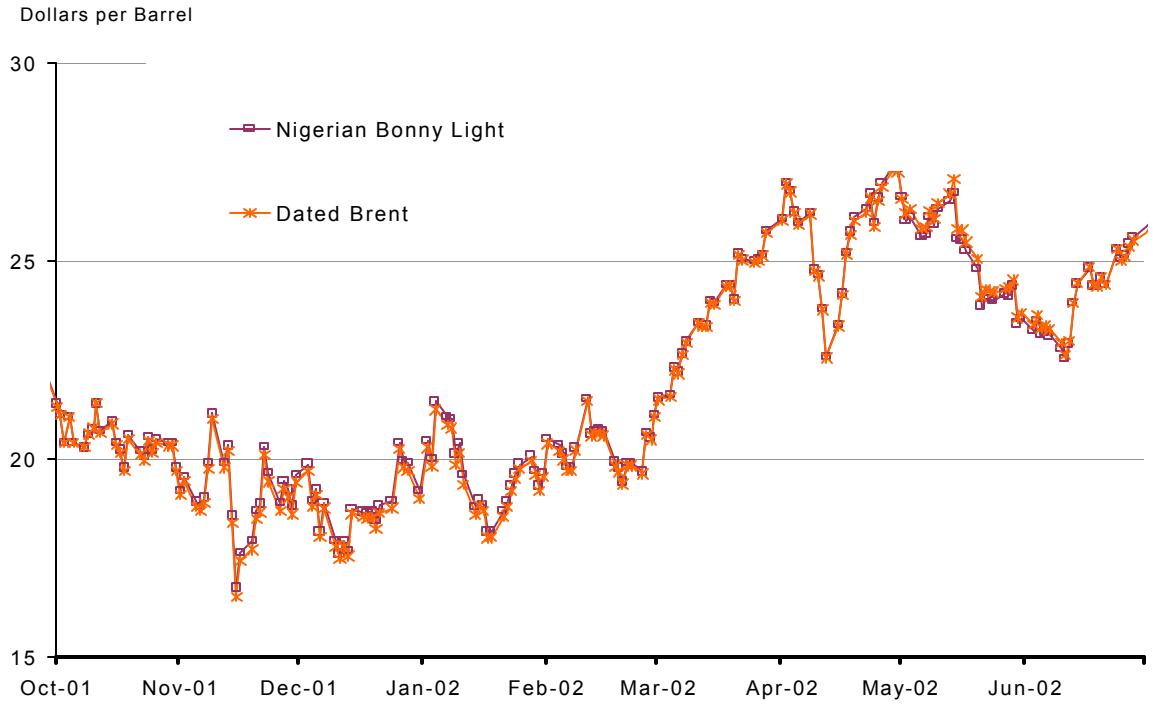

Figure IV-8. Nigerian crude oils are priced at a differential to dated Brent. The price of Nigerian Bonny Light and other Nigerian crude oils follow the price of dated Brent. Source of price data: Platts.

Figure IV-9 shows the difference between the price of dated Brent and the price of Nigerian Bonny Light over the same time period. The data shows that the differential between the price of Nigerian Bonny Light and the price of dated Brent varied by only a few cents per barrel from late 2001 through May 2002. This data demonstrates that as the price of dated Brent rose during this time period, the price of Bonny Light rose as well.[133] Hence, as the price of Brent rose relative to WTI, the price of Nigerian crude oils rose as well.

[133] Due to demand from Asia, Nigeria had little incentive to discount its crude oil for prospective purchasers in North America. The narrowing of the Brent/Dubai differential due to OPEC productions cuts in 2001 led Asian refiners to increase their purchases of Atlantic Basin sweet crudes, including Nigerian crudes. In light of the increased Asian demand for west African crudes, most west African exporters, such as Nigeria, did not provide discounts to refiners in the United States. According to one press report, "Most West African crudes have managed to defend differentials to international benchmark dated Brent reasonably successfully in a tricky market." Energy Intelligence Briefing, *Spring West African Barrels Pointed at US, Not Asia*, April 23, 2002.

Figure IV-9
Difference in Price
Dated Brent and Nigerian Bonny Light
October 2001 - June 2002

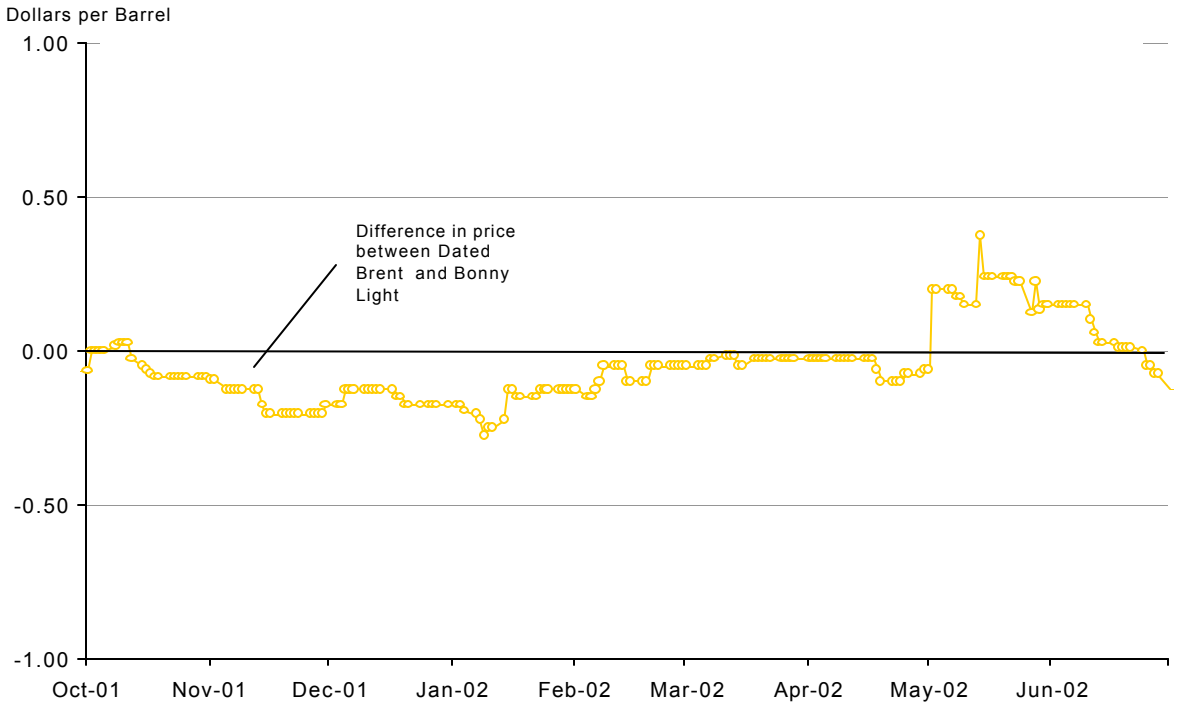

Figure IV-9. In early 2002, the spot market differential between dated Brent and Nigerian crude oil was nearly constant. As Brent prices rose relative to WTI, so did the price of Nigerian crude oil. Source of price data: Platts.

In sum, the use of so much Brent to fill the SPR was a major factor increasing not only the price of Brent relative to WTI, but also the price of other sweet crude oils priced off Brent. Since both Brent and other crude oils priced off Brent, like Bonny Light, are regularly exported in large amounts to the United States, these increases significantly raised the costs of importing crude oil in the latter months of 2001 and the first part of 2002.

4. Higher Costs for Imported Crude Oils Led to Fewer Imports

The most immediate effect on the U.S. crude oil market of the Brent price increases just described was to increase the relative price of crude oil imports. From November 2001 to May 2002, the price of Brent rose to within 50 cents of WTI on 48 different days, and on 17 days was more expensive than WTI. As a rule of thumb, it is uneconomical to import Brent or other Atlantic basin sweet crudes when Brent is priced within about $1.50 of WTI. Although other factors mattered too, such as transatlantic shipping rates, grade differentials, and the price of other U.S. Gulf Coast crudes, like Louisiana Light Sweet (LLS), the unprecedented magnitude of the increases in the price of Brent relative to WTI beginning in late 2001 made Brent imports significantly more expensive when compared to domestic grades or to oil already purchased and stored in U.S. commercial inventories.

A number of contemporaneous reports in oil industry trade publications explain how relatively higher prices for Brent affected U.S. crude oil imports. For example, several of these trade press reports state that on a number of occasions during this period the increases in the price of Brent relative to WTI "closed the arbitrage." On January 14, 2002, *Weekly Petroleum Argus* reported that Sempra's acquisition of a large number of Brent cargoes from BP "pushed dated Brent to a premium over WTI, shutting off the arbitrage that allows crude cargoes to sail from Europe and west Africa to the US."[134]

On February 4, *Petroleum Argus* reported that the January Brent squeeze, caused by Sempra's shipments of Brent cargoes to China, had distorted Brent-related trade and cut off shipments of Brent and other North Sea crudes to the United States. "Trade on Brent-related crudes, particularly other North Sea grades, became unhealthily opaque as buyers and sellers struggled to avoid the price spike. Brent's inflated strength forced some European refiners to cut runs. And dated Brent moved to an abnormally wide premium over WTI – from its customary discount – choking off the flow of cargoes to the US."[135]

Following Shell's announcement that it had enough orders to purchase all of the Brent cargoes in March, most of which were deposited into the SPR, the transatlantic trade again was disrupted. "North Sea trade came to a standstill as the market waited for Shell's intentions to become clear, pressuring unsold late February loading cargoes. . . . The prospect of another Brent trading play reduced the US appetite for Brent-linked North Sea and west African crudes."[136]

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[134] The transaction involved a swap of 60 cargoes, a volume of oil greater than the entire amount of Brent produced in February. Weekly Petroleum Argus, *Brent Blip Squeezes Transatlantic Traffic*, January 14, 2002.

[135] Petroleum Argus Global Markets, *Ending Brent's Eternal Games*, February 4, 2002.

[136] Petroleum Argus Global Markets, *Prices Jump on Squeeze Talks*, February 18, 2002.

In mid-March, *The Oil Daily* reported the increase in the price of Brent relative to WTI had caused a decline in U.S. imports, putting upward pressure on domestic crude oil prices. "The narrow arbitrage between WTI and North Sea Brent, of about 25 [cents] on Friday, has been working against competition from foreign barrels, contributing to keeping values for most US grades steady last week."[137]

In early April, the *Financial Times Business Recorder* reported that a brief drop in the price of dated Brent had opened up the trans-Atlantic trade:

> Crude oil traders are scrambling to exploit a brief opening in the trans-Atlantic arbitrage for European crude, taking advantage of a fall in benchmark Dated Brent despite steamy futures prices. As much as 10 million barrels of sweet North Sea grades have recently been booked to sail west in April, fleeing the severely depressed European market, but the opportunity could be short-lived if wet Brent climbs again as many traders expect."[138]

Crude oil traders quoted in this article attributed the higher dated Brent prices choking the transatlantic trade to the filling of the SPR: "'The levels are all distorted because you don't have fundamentals, you have the SPR commitments that are affecting Dated,' said one trader with a US refiner."[139]

In late April, *Petroleum Argus* reported the April Brent squeeze was distorting the transatlantic trade.[140] "A squeeze on Atlantic basin benchmark Brent caused the grade's third price distortion this year, and pushed prices $2/bl higher last week. This left US benchmark WTI at a 35 cents/bl discount to Brent in May and confused transatlantic arbitrage economics. Sellers of Brent-linked North Sea grades were forced to slash their offers relative to dated Brent to keep cargoes moving to the US."[141]

Still another trade publication wrote about the decline in transatlantic Brent trade in late April due to higher prices. "The victim of a trading squeeze, liquidity in the physical Brent market had all but dried up and price transparency had effectively been limited to the often manipulated contract-for-difference market. . . . A delay in the release of the May loading program and the lack of transparency as well as the steeply backwardated dated Brent pricing profile acted as a brake on trade."[142]

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[137] The Oil Daily, *US Sweet Grades Firm, Sours Lose Ground While WTI-Brent Arbitrage Remains Closed*, March 18, 2002.

[138] Business Recorder, *Never Mind Futures, Europe and US Crude Arb Opening*, April 5, 2002. From mid- to late-March, the Brent-WTI differential averaged about 90 cents.

[139] *Id.*

[140] See Figures IV-6, 7.

[141] Petroleum Argus Global Markets, *Brent Squeeze Wreaks Havoc*, April 22, 2002. The article also noted, "Advance warning of the Brent squeeze had been provided by the short-term swaps market for dated Brent and Brent contracts for differences (CFDs). They indicated a late April and early May price spike."

[142] Nefte Compass, *Crude Oil: Brent Squeeze Hypes Benchmark*, April 23, 2002.

U.S. import data over this period shows a striking decline in imports of North Sea and west African crude oils priced off Brent. Figure IV-10 shows that this decline in imports began in December 2001 and continued through April 2002. This time period corresponds with the period during which the price of dated Brent rose, on average, 75 cents relative to WTI, and in which the transatlantic trade was totally disrupted several times due to the squeezes in the Brent market.

Figure IV-10 also shows that Nigerian crude oil imports dropped the most of the Atlantic Basin crude oils imported into the United States during this period. From October 2001 through February 2002, imports of crude oil from Nigeria declined by 33 percent. In April 2002, imports from Nigeria were 45 percent lower than in April 2000, and 56 percent lower than in April 2001. This data is consistent with the data in Figures IV-8 and -9 showing the spot price of Nigerian Bonny Light moving in tandem with the price of dated Brent, thereby become relatively expensive compared to WTI. During this period the amount of crude oil from the United Kingdom also dropped significantly compared to previous U.K. import levels. Not including Brent crude oil sent to the SPR in April 2002, imports of crude oil from the U.K. were 20 percent lower than in April 2001, and 65 percent lower than in April 2000.

Figure IV-10
U.S. Imports of Atlantic Basin Sweet Crudes Priced Off Brent
January 2000 - August 2002

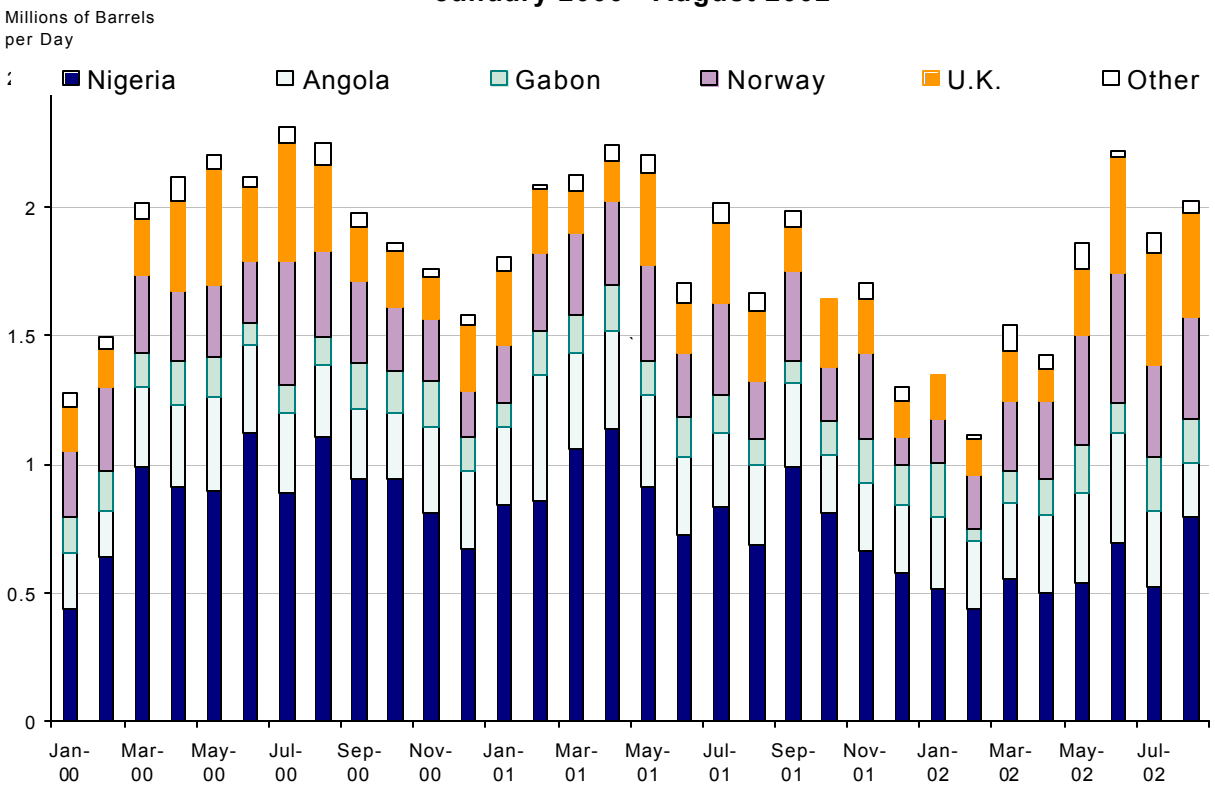


Fig. IV-10. From December 2001 through April 2002, imports of Atlantic Basin sweet crudes priced off Brent were at their lowest in two years. Imports in February 2002 were nearly 1 million barrels per day lower than during February 2001 (48% decrease), and about 400,000 barrels per day lower than in February 2000 (26% decrease). In April, Atlantic Basin imports were 35% lower than in April 2001, and 33% lower than in April 2000. Source of import data: EIA.

Crude oil imports into the U.S. declined more in the first half of 2002 than in any of the comparable time frames over the past several years. Figure IV-11 shows that from January through March 2002, average daily imports declined, whereas over a similar three-month period in the years 1999 through 2001 average daily imports were increasing. Additionally, average daily U.S. imports in April 2002 were substantially lower than in April 2001 and April 2000.

The overall level of U.S. imports in early 2002 also was affected by a general economic slowdown following the September 11 tragedy, so the reduction in imports seen in Figure IV-11 was also caused by a decline in demand. Higher import prices were nonetheless another major factor contributing to this reduction.

Figure IV-11
Total U.S. Crude Oil Imports
Daily Average, by Month, First Half of Each Year
1999 - 2002

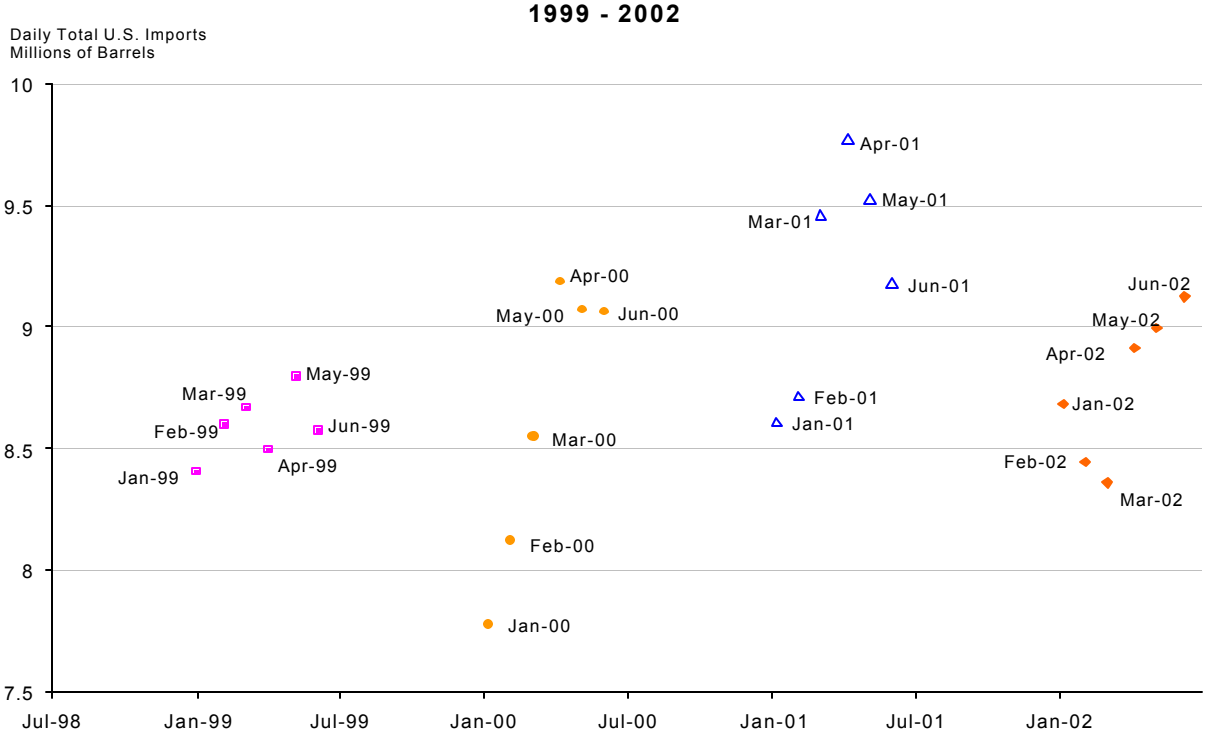


Fig. IV-11. Total U.S. imports in the first half of 2002 were lower than in previous years. Source: EIA.

Additional evidence that the level of overall imports was reduced largely as a result of the reduction in imports priced off Brent is provided in Figure IV-12, which shows the level of U.S. imports priced off WTI. From January 2002 through April 2002, at the same time the level of imports priced off Brent declined by 500,000 to 1 million barrels per day,[143] no parallel decline took place in the amount of imports priced off WTI.

Figure IV-12
U.S. Imports of Crude Oils Priced Off WTI
January 2000 - August 2002

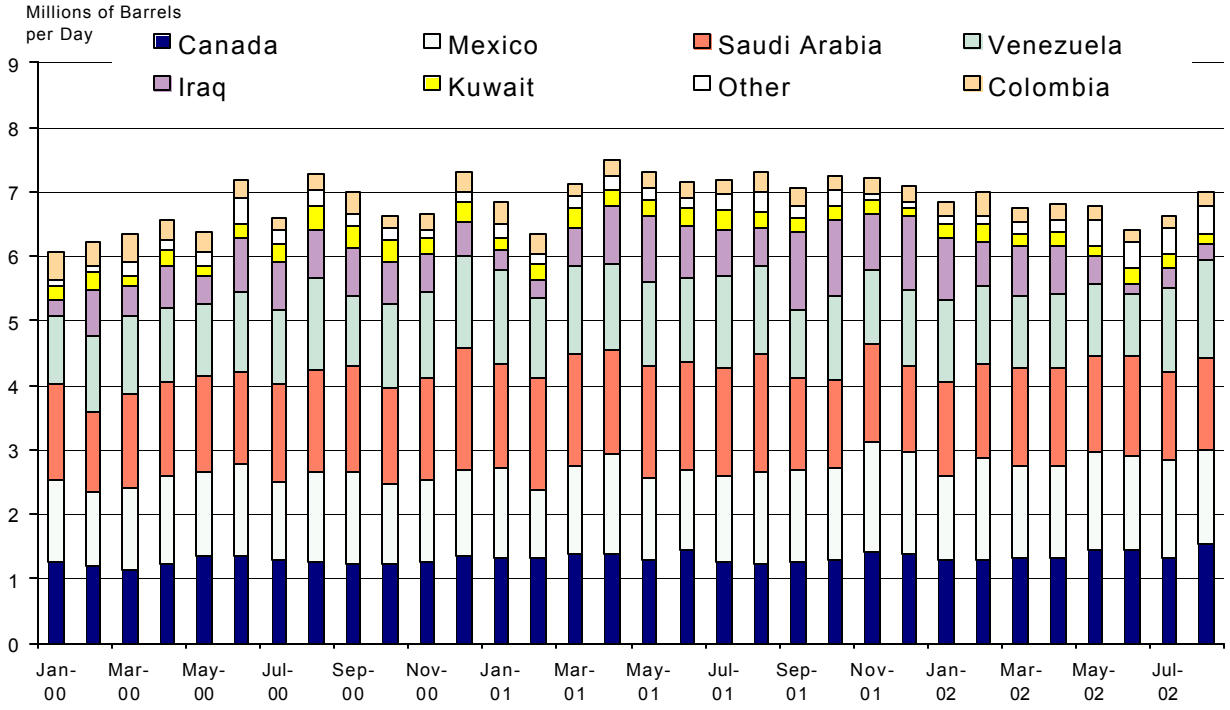


Fig. IV-12. Imports of Western Hemisphere and Middle Eastern crude oils priced off WTI remained nearly constant in the first half of 2002. Source of import data: EIA.

[143] See Figure IV-10.

The regional breakdown of U.S. crude oil imports provides further evidence that reduced imports of Brent-priced sweet crudes were responsible for the most of the decrease in U.S. crude oil imports during the first five months of 2002. Figures IV-13, IV-14, and IV-15 provide a month-by-month comparison of daily import levels into the East Coast (PADD 1), the Midwest (PADD 2), and the Gulf Coast (PADD 3). Of these three regions, refiners on the U.S. East Coast were the most sensitive to the price of Brent, as a number of East Coast refineries rely heavily on sweet crudes from the United Kingdom, Norway, and west Africa. Refiners in the Midwest (PADD 2) use both light, sweet crudes and heavy, sour crudes, and some Midwestern refiners are able to vary the types of crudes run through the refinery as the economics of the crude oil and refined product markets vary. Figures IV-13, 14, and 15 show that in the first several months of 2002 the East Coast, which is the refining region most sensitive to the price of Brent, experienced the most significant drop in imports, and that Midwestern refiners, who also rely heavily on light, sweet crudes, also cut back on imports significantly.

Figure IV-13
East Coast (PADD 1) Crude Oil Imports
Daily Average, by Month, First Half of Each Year
1996-2002

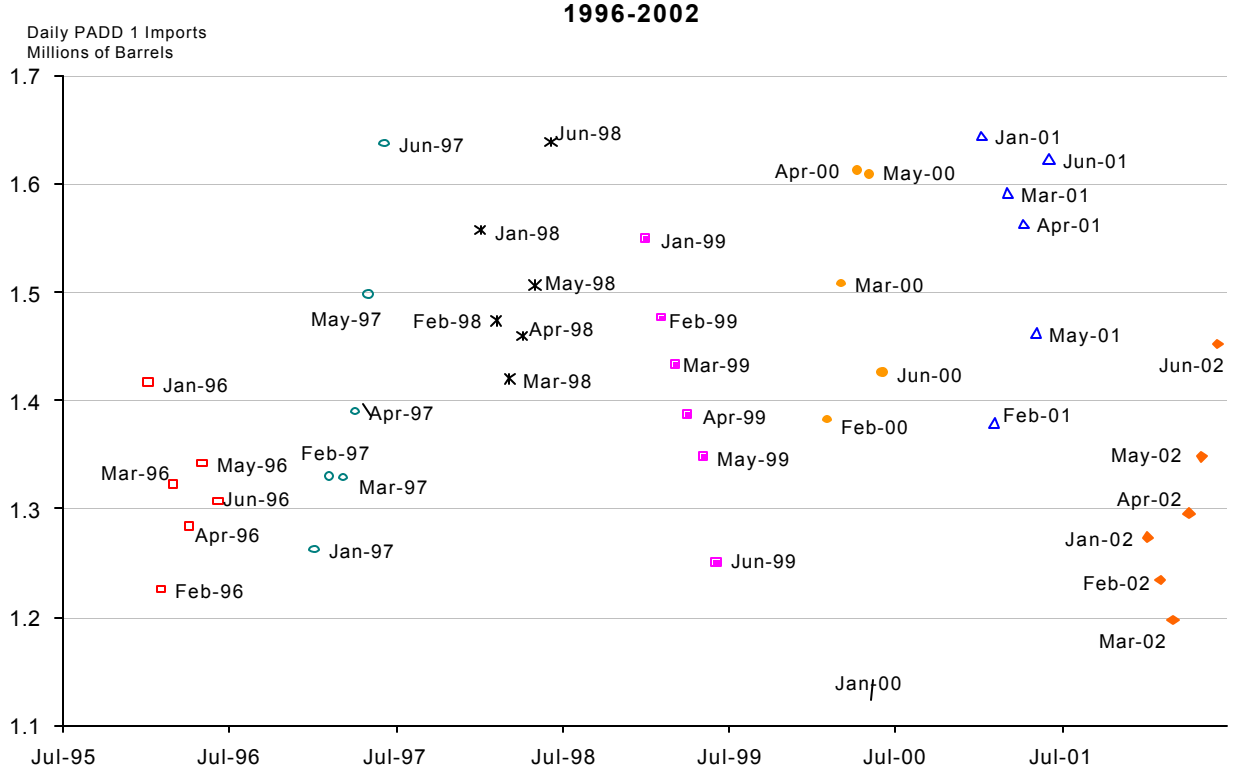


Fig. IV-13, -14, and -15. In the first six months of 2002, East Coast (PADD 1) and Midwest (PADD 2) imports declined substantially.
Source of import data: EIA.

Figure IV-14
Midwest (PADD 2) Imports
Daily Average, by Month, First Half of Each Year
1996-2002

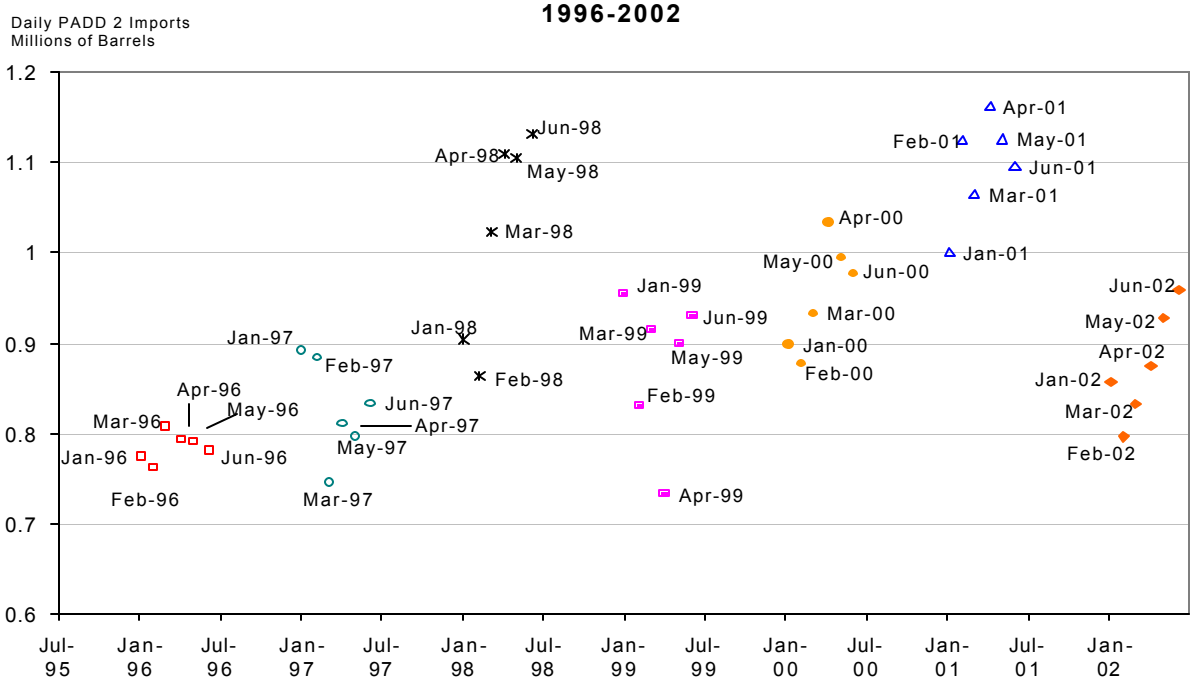
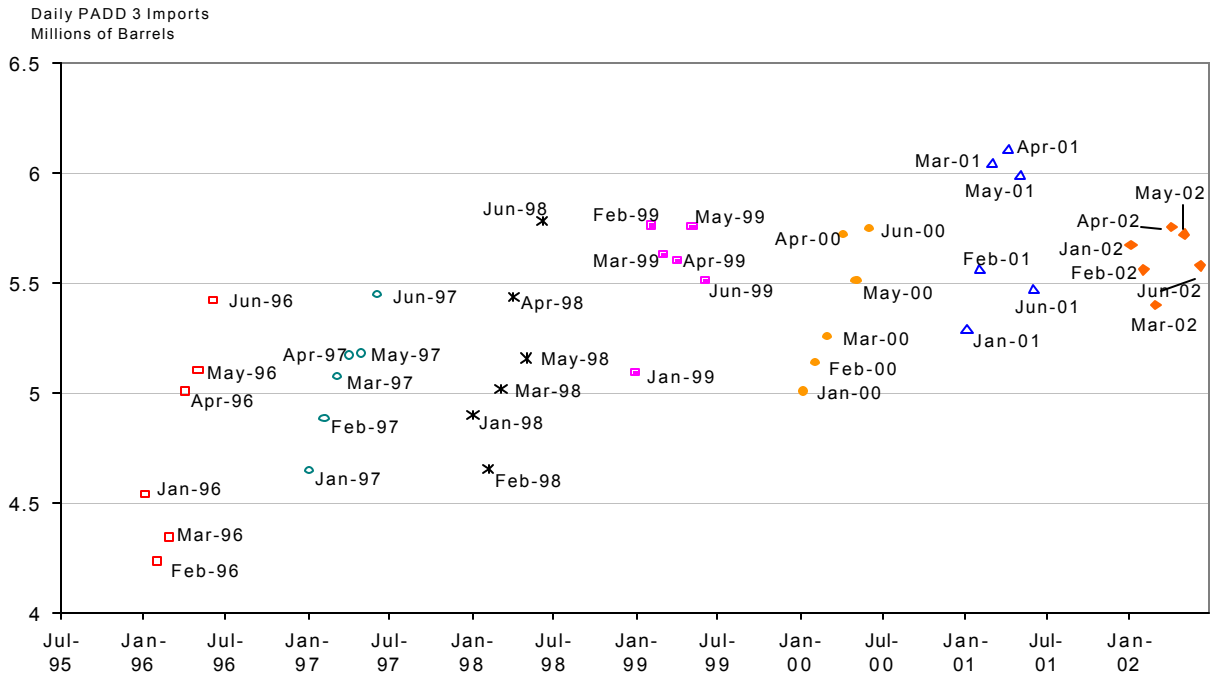


Figure IV-15
Gulf Coast (PADD 3) Imports
Daily Average, by Month, First Half of Each Year
1996-2002



Although a number of other factors also affected the price and supply of crude oil during the first part of 2002, these factors did not affect U.S. import levels nearly as much as the relative increase in the price of Brent during the first five months of 2002. For example, although in early April Saddam Hussein announced a suspension of Iraqi oil exports for 30 days, imports from Iraq did not decline below average levels until May 2002. As late as April 2002, the U.S. was importing over 750,000 barrels per day from Iraq, nearly at the 2001 daily average of 795,000 barrels per day.

Despite growing political unrest and an eight-day strike by oil workers in Venezuela, imports from Venezuela ranged from 1.1 to 1.25 million barrels per day from January through May 2002, which is roughly equivalent to the Venezuelan imports over the same period in 2000, and only slightly less than the 1.29 million barrels per imported daily, on average, in 2001. The strike spiked the market for several days, but the strike was short-lived and there were no longer-term effects upon U.S. supplies from the temporary suspension of exports.[144]

Some observers attributed the reduction in U.S. imports in early 2002 to OPEC production cuts announced in January 2002. For example, in its weekly report released on April 24, the DOE's Energy Information Administration (EIA) linked the reduction in imports to lower OPEC production quotas:

> U.S. crude oil imports over the last four weeks have averaged just 8.8 million barrels per day, or nearly 850,000 barrels per day less than over the same period last year. With OPEC 10 (excluding Iraq) crude oil production in the first quarter of 2002 averaging 22.6 million barrels per day, this is the lowest quarterly average since the second quarter of 1992! With less crude oil being produced by these countries after a series of cuts in production quotas, they are exporting less, and so it is no surprise to see the world's largest importing country experiencing declining imports.[145]

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[144] See, e.g., Bloomberg News, *Oil Prices Fall as End Seen for Venezuelan Strike*, National Post April 23, 2002. Additionally, OPEC representatives signaled to the market that OPEC would work to stabilize oil prices if the disruption in Venezuela continued. "If the drama in Venezuela continues we could have a problem and we might have to put more oil on the market," one OPEC official stated. U.S. Secretary of Treasury O'Neill "said it appeared that Saudi Arabia and other oil producers were 'doing whatever production it takes' to stay within a price band.'" Matthew Jones and Andy Webb-Vidal, *OPEC Moves to Limit Impact of Venezuela, Iraq*, Financial Post, April 11, 2002. *See also* Nadim Kawach, *UAE Saudi Arabia Assure Oil Supply*, Gulf News, March 21, 2002.

Contemporaneous trade press reports also state that the Venezuelan strike had no effect upon U.S. crude oil producers operating in Venezuela. Petroleum Finance Week, *As Chavez Returns, Venezuela's Oil Industry Tries to Get Back to Normal*, April 22, 2002.

[145] EIA, *This Week in Petroleum*, April 24, 2002. In its report for the previous week, EIA had also stated, "most of the reason for the crude oil import deficit rests with OPEC's decision to cut their quotas by another 1.5 million barrels per day (effective on January 1), which has clearly reduced imports into the United States." EIA, *This Week in Petroleum*, April 17, 2002.

EIA monthly data indicates, however, that the OPEC production cuts were not nearly as significant a factor as initially reported. Of the 850,000 barrel-per-day reduction noted in the EIA's April 24 report, reduced imports of Atlantic Basin sweet crudes priced off Brent accounted for nearly all this amount – 815,000 barrels. Reductions from Nigeria alone accounted for nearly 630,000 barrels, or about 70 percent, of this reduction. See Figure IV-10.

Of the Atlantic Basin countries exporting crude oil, only Nigeria is a member of OPEC. The reason for the large reduction in Nigerian exports appears not to be the OPEC quotas, but the relatively high price of Nigerian crude oil priced off dated Brent. Even with Nigeria's initial adherence to the OPEC quotas, there was a surplus of Nigerian crude because of its inflated price. In early March, one publication reported, "At this time of the month, most of Nigeria's crude oil cargoes designated to load in the Apr. 1-10 time frame should have found permanent homes. They haven't. . . . To be fair, Nigerian barrels are not alone in having difficulties finding buyers. The physical market is well and truly in the dumps."[146] Similarly, in early May it was reported:

> The climate for selling Nigerian oil has taken a severe turn for the worse in recent weeks, judging by the May loading schedule for Nigeria's eight main crude systems. The schedule indicates at least six May cargoes still unsold, while appetite for early June remains lackluster. Some tankers will soon be steaming toward the US Gulf Coast – port of last resort – in hopes that conditions will have improved before they arrive. But current prospects for placing cargoes at the right price look slim, as crude supplies appear well in excess of demand in the US.[147]

EIA's initial analysis also did not reflect the extent to which global demand was sharply lower in early 2002 than in early 2001. "Even in a period when the Iraqi embargo and Venezuelan disruption took barrels off the market unexpectedly, demand fell even faster – by 1.4% and 1.5% on the year in March and April, respectively."[148] In March, global production exceeded global demand by 400,000 barrels per day, and in April by 700,000 barrels per day.[149] By contrast, in April 2001, global production had exceeded demand by only 100,000 barrels per day. With relatively more crude oil available on the global market in 2002 than 2001, it does not appear that the OPEC cuts relative to 2001 production levels were responsible for the reduced levels of imports into the U.S. during this period.[150]

In short, political events affecting the global crude oil markets in early 2002 did not create shortages of crude oil relative to demand during that period. Rather, in light of the reduced global demand for crude oil, there were ample supplies of crude oil available for U.S. refiners.

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[146] Energy Intelligence Briefing, *Nigeria Ensures OPEC Compliance in March and April*, March 7, 2002.

[147] Energy Intelligence Briefing, *Nigerian Crudes Fail to Impress US Buyers – So Far*, May 7, 2002.

[148] The Oil Daily, *Supply-Demand Fundamentals Far From Bullish*, May 23, 2002.

[149] Petroleum Intelligence Weekly, *Oil Prices Fly in Face of Fundamentals*, May 22, 2002.

[150] As discussed in Appendix 3, the OPEC reductions did affect the price differential between heavy and light crude oils.

Moreover, the global political factors just described affected the global supply and demand for crude oil, not just the North American market. Thus, although these factors contributed, to some extent, to the overall increase in the price of crude oil in the first five months of 2002, and the overall amount of oil supplied, none of these factors explains the dynamics of the crude oil trade between the U.S. and the rest of the world during this period. This trade is driven by the price differentials between the WTI and Brent benchmarks, rather than absolute price levels or absolute supply numbers. Global political events do not explain the divergences between the Brent and WTI markets beginning in late 2001, when the price of Brent rose significantly relative to WTI. The most significant factor leading to the reduced U.S. crude oil imports in early 2002, other than the overall decline in demand, was the reduction in light sweet crude oil imports priced off Brent due to higher relative Brent prices resulting from the use of Brent to fill the SPR.

5. High-Priced Imports Led U.S. Refiners to Use Crude Oil in Existing Inventories

The relatively high cost of Brent-based imports had two major effects. First, U.S. refiners able to substitute less expensive WTI-based crudes did so, thereby increasing the imports of WTI-based crudes. Secondly, U.S. refiners increasingly relied upon crude oil already in their inventories to meet demand and build stocks of gasoline in anticipation of the upcoming seasonal surge in gasoline usage.

In late March, the EIA noted that crude oil imports were decreasing at the same time U.S. refinery runs were increasing in anticipation of the late spring and early summer driving season. "With crude oil imports last week at the lowest level in more than a year (partly due to significant fog-related closures in the Houston Ship Channel) and refinery runs increasing, last week saw a drop in crude oil stocks (4.5 million barrels) not seen since the week ending October 12, 2001. If crude oil imports continue to remain low, while inputs into refineries increase, crude oil stocks would continue to fall."[151]

Even after the fog lifted from the Houston Ship Channel, U.S. crude oil imports continued to drop while use of crude oil in U.S. inventories increased. Total U.S. inventories declined from about 325 million barrels on April 5 to about 319 million barrels on April 12, and again declined from late April until mid-May. From April 5 to April 12 Gulf Coast (PADD 3) inventories also fell, from about 165 million barrels to about 161 million barrels, and Midwest (PADD 2) inventories slipped from just over 70 million barrels to about 69 million barrels.

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[151] EIA, *This Week in Petroleum*, March 27, 2002.

6. Decreasing U.S. Inventories Spiked the Price of WTI

In early April, EIA warned of increasing crude oil prices due to reduced imports and increasing refinery runs:

> The level of crude oil imports to supply increasingly higher refinery output of petroleum products, particularly gasoline, has become a major concern over the past several weeks. In order to stave off a repeat of last year's steep run up in motor gasoline prices, crude oil supplies will need to be maintained at a rate that keeps up with anticipated strong demand for gasoline and other petroleum products as the U.S. economy recovers from its recent downturn. . . . If the discrepancy between crude imports and refinery runs continues to widen as the summer driving season nears, both crude and product stocks are expected to drop sharply, pressuring up further gasoline and other petroleum product prices.[152]

Two weeks later, EIA's weekly report warned: "So, at a time when imports are usually increasing to supply increased refinery production as the gasoline season begins, this year, crude oil imports are declining. And while crude oil inventories started this period in much better position than in the previous two years, at this rate, it won't be long until crude oil inventories become tight once again, thus putting more pressure on crude oil prices."

Indeed, in mid-April the crude oil import data released by EIA and the American Petroleum Institute (API) affected the market in just the manner forecast. On April 16, 2002, API released its weekly industry data report showing a drop in U.S. crude oil inventories for the previous week. Immediately after the release of this inventory data, the price of the next-month WTI futures contract on the NYMEX rose about 20 cents per barrel. Over the next several days the next-month WTI futures contract continued to rise. A week later, on April 23, the WTI contract for delivery of crude oil in June ("the June contract") became the next-month contract. At the same time, API and EIA data continued to show a decline in Midwest (PADD 2) inventories. Traditionally, Midwest (PADD 2) aggregate crude oil inventories have strongly influenced the price of the NYMEX WTI contract, because they influence the supply and demand balance for crude oil at the WTI delivery location at Cushing, Oklahoma. Generally, the WTI market interprets a decline in PADD 2 inventories as a sign of a shortage of available crude oil for delivery at Cushing, and hence will increase the price of WTI oil for delivery at Cushing.

The WTI market reacted in just this manner in late April. Just at the time the June WTI contract became the next-month contract, the price of this contract jumped above the price of the next month contract (shifting the market from contango to backwardation), indicating the market believed there was a near-term shortage in supply. The increase in the near-term WTI futures price (shifting the market from contango to backwardation) took place at the same time as the April squeeze in the Brent market was dissipating, lowering the price of the near-term Brent futures contract (shifting the Brent market from backwardation to contango). See Figure IV-6.

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[152] EIA, *This Week in Petroleum*, April 3, 2002.

Many traders viewed the sudden upward shift in the WTI market in light of the Brent market's move in the opposite direction as evidence of a squeeze in the WTI market. For example, on May 8, 2002, *Reuters* reported:

> The premium for U.S. crude oil prices over other international grades exploded higher on Wednesday as dwindling supplies in the pivotal Midwest region made the market more vulnerable to supply squeezes, traders said. Oil traders said that a market play by oil major BP was a driving force behind the sudden U.S. price run-up – just the latest in a series of trading maneouvers that has distorted prices on both U.S. and European markets this year.[153]

In reality, however, there were ample supplies of crude oil available to Midwestern refiners, indicating the sudden price increase in the WTI market was not caused by a squeeze. In interviews with the Subcommittee staff, traders and officials with a number of companies supplying and purchasing crude oil stated there were no shortages of crude oil at this time. According to these traders and officials, ample supplies of crude oil in the Gulf Coast were available for Gulf Coast and Midwest refiners, and the crude oil pipelines from the Gulf Coast to the Midwest were not filled to capacity.

These traders and officials stated that Midwestern inventories declined not because of any physical shortages of crude oil, but rather because the imports that were reaching the Gulf Coast ports were too expensive for Midwestern refiners. According to traders interviewed by the Subcommittee, because crude oil priced off Brent arriving at the Gulf Coast already was expensive compared to WTI, it was uneconomic for Midwestern refiners to pay the additional costs to transport the crude oil by pipeline from the Gulf Coast to their refineries in the Midwest. These traders state they had plenty of crude oil in the Gulf Coast, and would have sent it to the Midwest if it were economical to do so.

Instead of buying the relatively expensive imports, Midwestern refiners used crude oil from their existing inventories. The result was that Midwestern inventories declined. Figure IV-16 shows the decline in Midwestern (PADD 2) inventories during this period. Figure IV-17 shows that during this same period Gulf Coast supplies were increasing, indicating the decline in Midwestern inventories was not due to any shortage of crude oil, but rather because it was not economical to ship the relatively high-priced imports arriving on the Gulf Coast up to the Midwest.

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[153] Reuters, *U.S. Crude Rockets as BP Completes Brent Play*, May 8, 2002. Another publication stated: "Market whispers last week focused on evidence of yet another wet-barrel crude squeeze, knocking the futures markets out of whack as they used physical trades as a guide. . . . The smoking gun: The forward price curve for Brent is in contango, or upward sloping, while the forward curve for West Texas Intermediate showed a 90 cents backwardation." Petroleum Intelligence Weekly, *Marketview: Smoke and Mirrors*, May 15, 2002.

Figure IV-16
Midwest (PADD 2) Crude Oil Inventories
February - May 2002

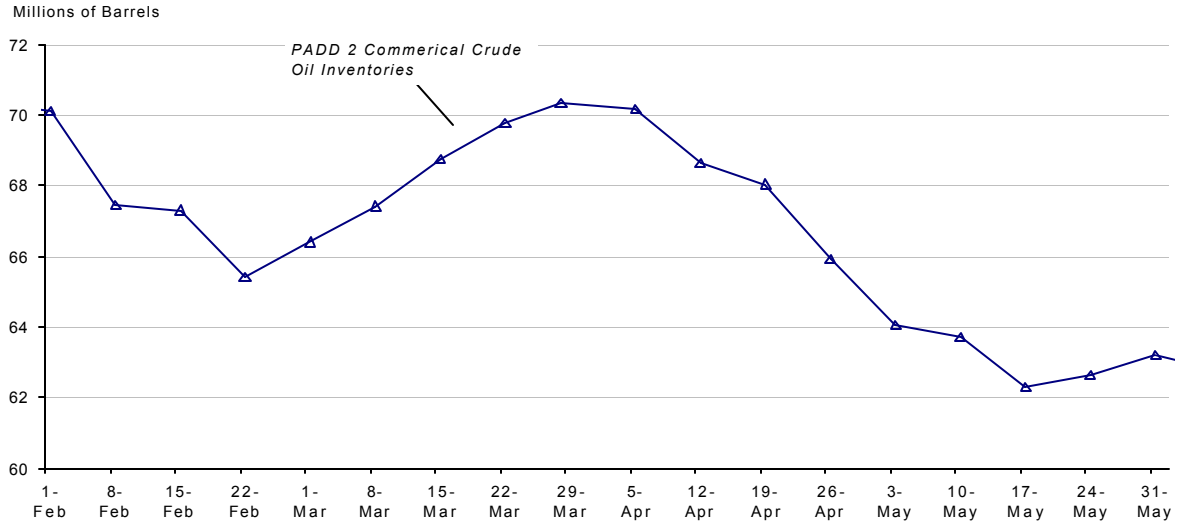
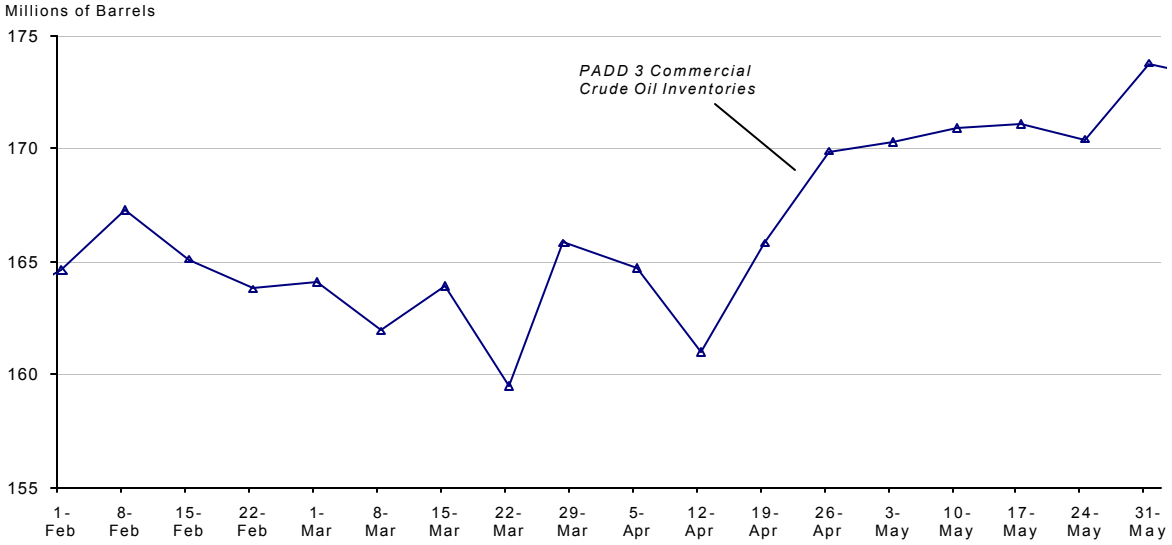


Figure IV-17
Gulf Coast (PADD 3) Crude Oil Inventories
February - May 2002



Figures IV-16 and 17. As a result of the relatively high price of imports, Midwestern refiners drew down existing inventories and crude oil piled up unsold on the Gulf Coast. Source of import data: EIA.

"Refiners do not corroborate the widespread interpretation that the US Midwest is short of crude, and neither do the data," the *Oil Market Intelligence* wrote on May 21.[154] The article blamed the relatively high near-term prices in the WTI market on the reluctance of Midwestern refiners to purchase crude oil: "They are not keen on buying the incremental barrel because of the steep premium of prompt delivery to the second month, and are inclined to run down stocks and hold out for lower prices."[155]

Another article in the same publication observed it was "no surprise" the "sharp and sudden backwardation" in the WTI market followed "two weeks of sizable crude draws in the US. In particular, crude stocks in Padd 2 – the Midwest region – deflated by nearly 5 million barrels between mid-April and mid-May."[156] The article concluded crude oil traders had perceived the inventory drops in the Midwest (PADD 2) as an indication of a crude oil shortage:

> Traders bought the apparent Midwest tightness hook, line, and sinker, bidding up the front-month price of WTI by as much as $3 in the second and third week of May. Crude inventories in Padd 2, some suggest, are something of a barometer for the shape of the forward price curve. Indeed, the relationship between the first- and second-month New York Mercantile Exchange contracts for light, sweet crude map very closely the magnitude by which Padd 2 crude stocks rise or fall above 65 million-67 million [barrels].[157]

But in fact, the article observes, there was no tightness in the supply of crude oil for the Midwest:

> But is the US market really short of crude? At second glance, the situation in the Midwest looks to be not so much a story of refiners without crude, as it is a story of crude without refiners. Refiners deny that there is any outright lack of availability, the prices just aren't right. . . . Meanwhile, since the run-up in the front-month [WTI] crude price, it makes more sense to rely on term-contracts and crude in storage for throughputs, than it does to buy up prompt wet barrels.
>
> As evidence, they point to slowed crude supplies from Canada, and crude pipelines in the Midwest from the US Gulf, which have ample spare capacity. In fact, crude stocks have piled up in the US Gulf even faster than they drained from mid-continent tanks over the last month.[158]

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[154] Oil Market Intelligence, *Crude Oil Market Tightness: Squeezed or Perceived?*, May 21, 2002.

[155] *Id.*

[156] Oil Market Intelligence, *Feature: Perception vs. Reality*, May 21, 2002.

[157] *Id.*

[158] *Id.*

The widely held but inaccurate perception of the actual supply and demand balance in the U.S. during the Midwest (PADD 2) inventory draw-down was re-enforced as refiners, in response to the sudden increase in near-term prices, drew even more heavily from their inventories of stored oil rather than make new purchases. This further drawdown in stocks further increased the near-term prices in the backwardated WTI market, creating a vicious cycle of inventory draws and near-term price increases that continued until the June WTI NYMEX contract reached expiry. As *Oil Market Intelligence* wrote: "[E]nough market players have interpreted the stock draws as a shortage in the Midwest that they have successfully bid up prices. The result: a reinforcing cycle of backwardation."[159]

Figure IV-18 shows the difference between the first and second month WTI futures contracts for the period from February through June 2002. This Figure shows the price of the near-month WTI futures contract jumped immediately after the release of the API and EIA inventory data. This spike in the near-term futures price for WTI lasted about one month, increasing the WTI June futures price nearly 20 percent, from $24.75 to $29.36 per barrel.

From a variety of contemporaneous reports, as well as from the price data, it appears that the spike in the WTI June contract price, which lasted from late April through late May, was caused by traders bidding up the price of the contract in light of the declining Midwestern oil inventories. In the Gulf Coast, however, there was an excess of supply over demand, as inventories rose. Given this excess of supply relative to demand, Gulf Coast prices should have fallen and excess oil should have been shipped to the Midwest. But the near-month price for WTI continued to increase, discouraging refiners from buying oil, and causing WTI prices on the NYMEX to increase even more. Because the WTI contract delivery point is in the Midwest, it was the declining Midwestern inventories, rather than the plentiful Gulf Coast inventories, which drove up the price of WTI nationwide.

This example illustrates how the supply and demand balance in the Midwest can present an isolated, disproportionate, and inaccurate reflection of national supply and demand, and yet still be the most significant factor affecting the NYMEX WTI price. If, indeed, as Dr. Mabro states, the "most important function [of prices] is to signal at every moment the state of the supply/demand balance," over this time period the NYMEX WTI contract failed in its most important function.

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[159] *Id.*

Figure IV-18
Difference Between WTI 1st and 2nd Month Futures Contracts
February - June 2002

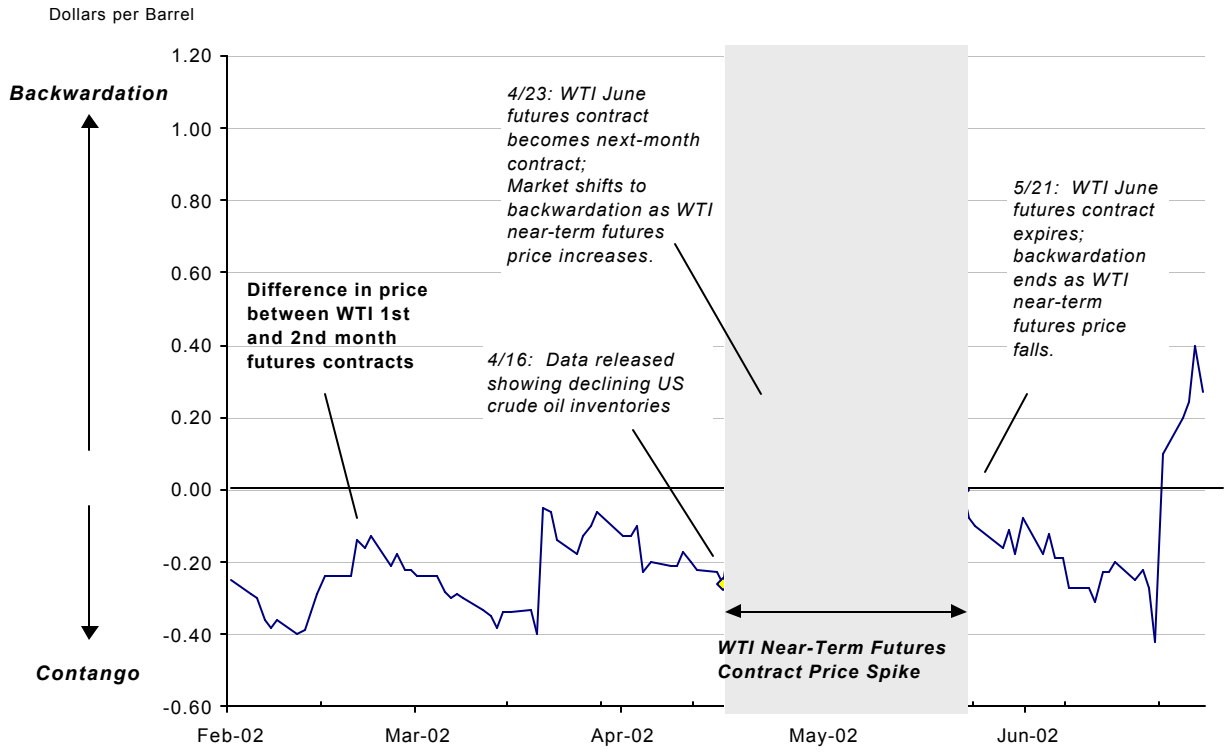

Fig. IV-18. Declining U.S. inventories led to increases in WTI near-term futures prices (shifting the WTI market from contango to backwardation). Source of price data: EIA.

Figure IV-19 shows the sharp rise in the price of the near-month WTI futures contract that began on April 16, when API and EIA data showing a decline in total U.S. and Midwestern inventories, and continued through late May, as Midwestern inventories continued to decline from mid-April through late May (see Figure IV-16).

Figure IV-19
WTI First Month Futures Contract
February - June 2002

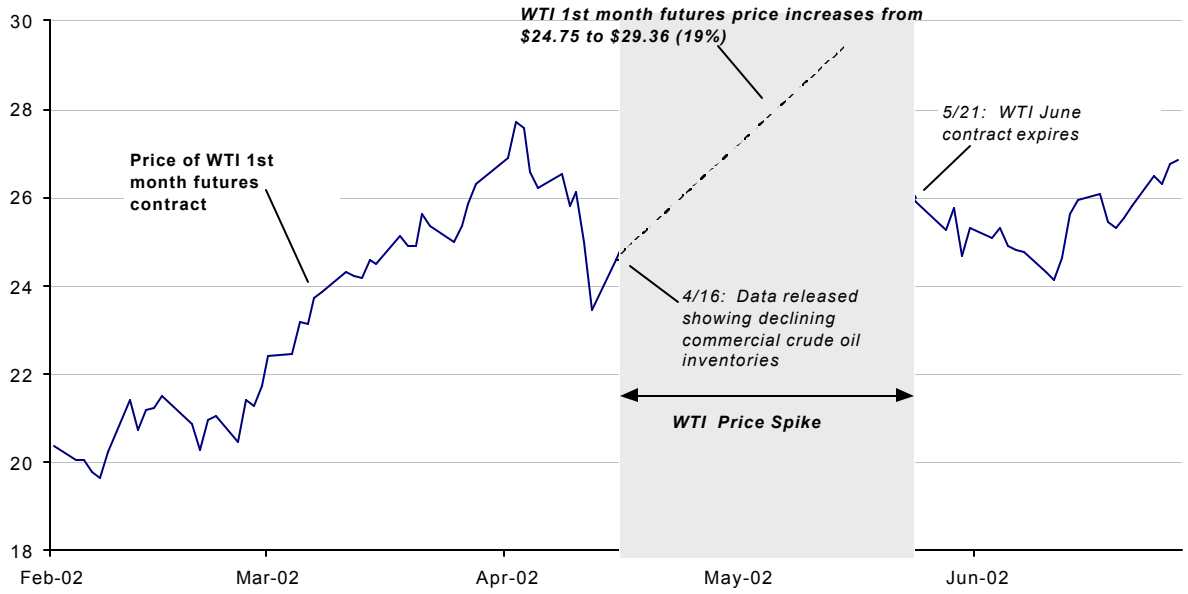

Fig. IV-19. The price of the WTI 1st month futures contract increased by nearly $5 per barrel after the release of data showing declining US commercial and Midwestern inventories. Source of price data: EIA

Figure IV-19 shows that the price of the next-month WTI futures contract rose from $24.75 per barrel on April 16 to a peak of $29.36 on May 14, an increase of approximately $4.60, or 20 percent. Within days of expiry of the June contract, the WTI near-month futures contract price dropped back down to around $25, the WTI near-month futures price before the price spike. The sudden rise in the WTI next-month price as soon as the June contract began trading and the sudden fall in the next-month price after the June contract expired indicates the June contract price was artificially inflated and did not reflect the fundamentals of global supply and demand.[160]

[160] The price of the WTI nearest-month contract fell about $1 per barrel per day just before expiry – from $28.33 on May 20 to $27.33 on May 21 to $26.37 on May 22 – and then down to $25.27 on May 28, following the Memorial Day holiday.

Figure IV-20 shows that the WTI spot price exactly tracked the nearest-month WTI futures price during this period. As seen in this figure, the price spike in the WTI futures market in April and May spiked the prices in the crude oil spot market as well.

Figure IV-20
WTI Spot Price and Near-Month Futures Contract Price
February - June 2002

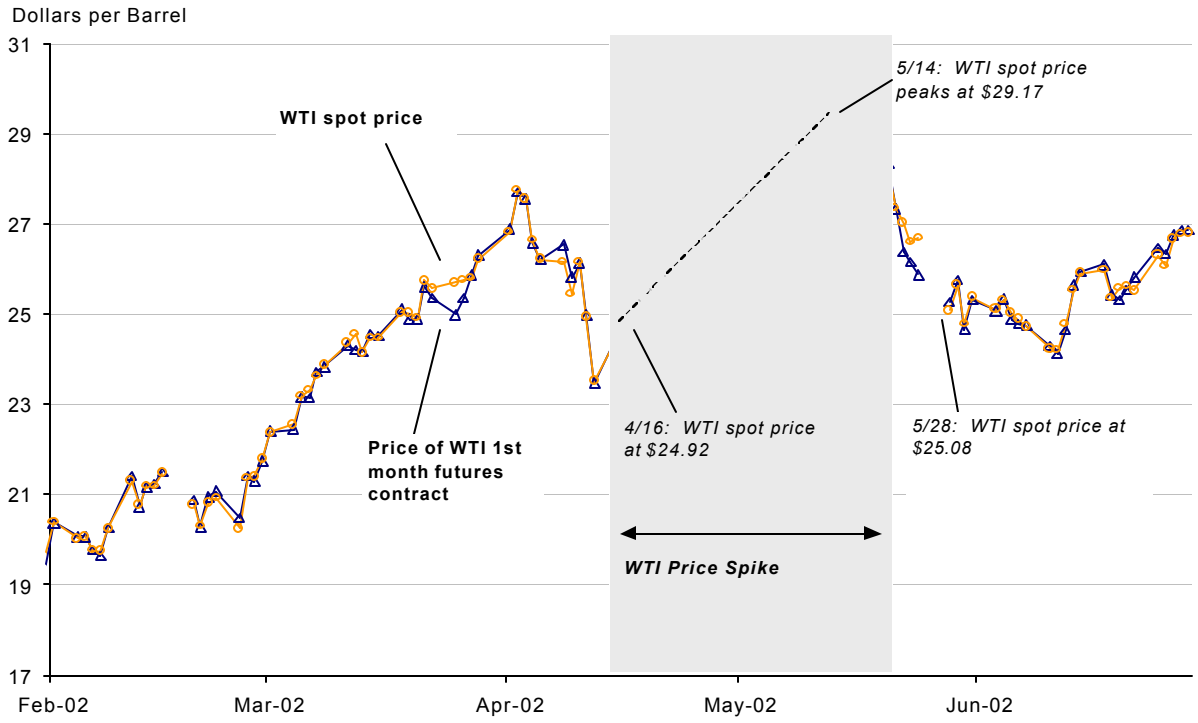

Fig. IV-20. WTI spot prices closely track WTI 1st month futures contract prices. As the 1st month futures contract price spiked in April-May, WTI spot prices spiked too. Source of price data: EIA.

An upper-bound estimate of the additional crude oil costs imposed by the April-May WTI spike, can be obtained by calculating how much the WTI spot price rose during the spike compared to the WTI spot price before and after the spike. The spot price of WTI before and after this spike was about $25 per barrel. The average price of WTI during the spike, from April 16 to May 21, was $27.16. Hence, the spot price of WTI was, on average, $2.16 higher during the April-May spike than before or after. Under this methodology, in just the one-month period from April 16 to May 21, U.S. consumers and businesses paid over $1 billion in additional costs for crude oil as a result of the SPR fill.[161]

A more conservative, lower-bound estimate, of the added costs imposed on U.S. consumers is obtained by comparing the first and second month WTI contract prices to determine how much the first month contract rose above the baseline price during the one-month price spike. Generally, the price of the second month contract is viewed as a more accurate reflection of global supply and demand, since it is not subject to the type of distortions that can affect the price of a first month contract near expiry. Thus, under this methodology, the second-month contract price is considered the "baseline" WTI price. From April 23 to May 21, the price of the first month contract exceeded the price of the second month contract by, on average, 60 cents per barrel. Prior to and after these dates the second month contract was higher than the first month contract by about 20 cents. Hence, the first month contract rose, on average, 80 cents relative to the second month or "baseline" price during this period. Under this methodology, in the one-month period from April 23 to May 21, U.S. consumers and businesses paid over $450 million in additional costs for crude oil as a result of the SPR fill.[162]

It is reasonable to conclude, therefore, that the WTI price spike in April and May 2002 increased crude oil costs by between $500 million and $1 billion. Most of these higher costs were passed on to consumers and businesses in the form of higher costs for heating oil, diesel fuel, and jet fuel.[163]

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[161] The U.S. consumes approximately 18 million barrels of crude oil each day. $2.16/barrel/day x 30 days x 18million barrels/day = $1.17 billion. A similar upper-bound estimate of over $1 billion in additional costs is reached if one takes the $2 drop in the price of the near-month WTI futures contract that occurred at the expiry of the June WTI contract as the added cost attributable to the backwardation the previous month.

These estimates do not include the additional costs passed on through OTC instruments linked to the price of WTI. Nor do they include the additional costs to U.S. consumers and businesses from the increase in the cost of imports priced off Brent from November through May. This Report does not quantify these costs because of the unavailability of specific crude oil price and volume data for the affected imports.

[162] $0.80 /barrel/day x 30 days x 18 million barrels/day = $432 million. Again, this calculation does not take into account additional costs arising from inflated costs for OTC instruments or costs arising from the Brent price increases.

[163] Spot prices are, in effect, wholesale prices. As a general matter, increases in petroleum product spot prices are eventually passed on in the form of higher retail prices for consumers. See, e.g., Michael Burdette and John Zyren, EIA, *Diesel Fuel Price Pass-through*, at EIA website at http://www.eia.doe.gov/pub/oil_gas/petroleum/feature_articles/2002/diesel.html. Because of the decentralized nature of retail sales for petroleum products, which are sold through tens if not hundreds of thousands of retail outlets across the nation, retail sales data is much more difficult to obtain than data for the futures or spot markets. A host of additional factors affect product markets, apart from the crude oil markets, making an analysis of the specific short-term retail effects of increases in crude or wholesale prices beyond the scope of this Report.

7. WTI Price Spike Led to Price Spikes for Home Heating Oil, Jet Fuel, and Diesel Fuel

Figures IV-21, 22, and 23 show how the increases in the WTI spot price immediately increased the price of home heating oil, jet fuel, and diesel fuel. From April 16 through May 14, the near-20 percent increase in the WTI spot price spiked the spot price for heating oil by 13 percent, jet fuel by 10 percent, and diesel fuel by 8 percent.

Figure IV-21
Higher WTI Prices Increase the Spot Price of Heating Oil

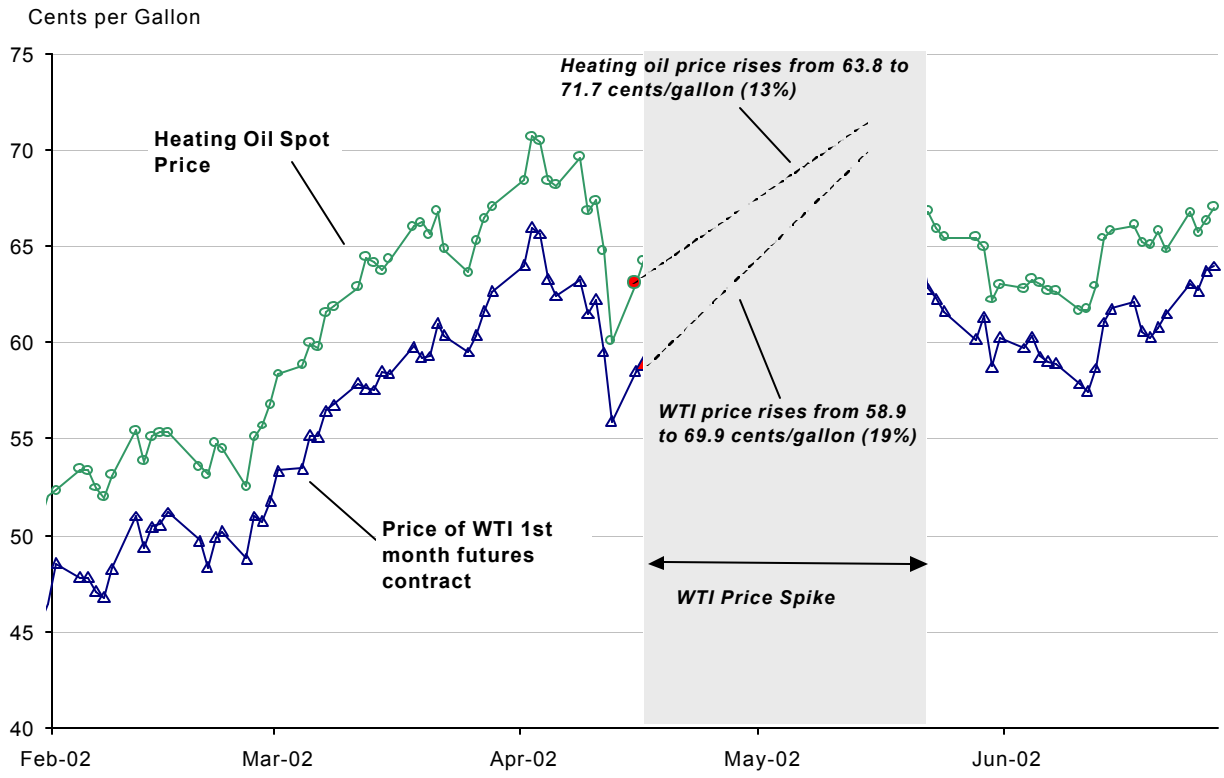

Fig. IV-21. In May 2002, higher prices for WTI crude oil increased the spot price of home heating oil by 13 percent. Source of price data: EIA.

Figure IV-22
Higher WTI Prices Increase the Spot Price of Jet Fuel

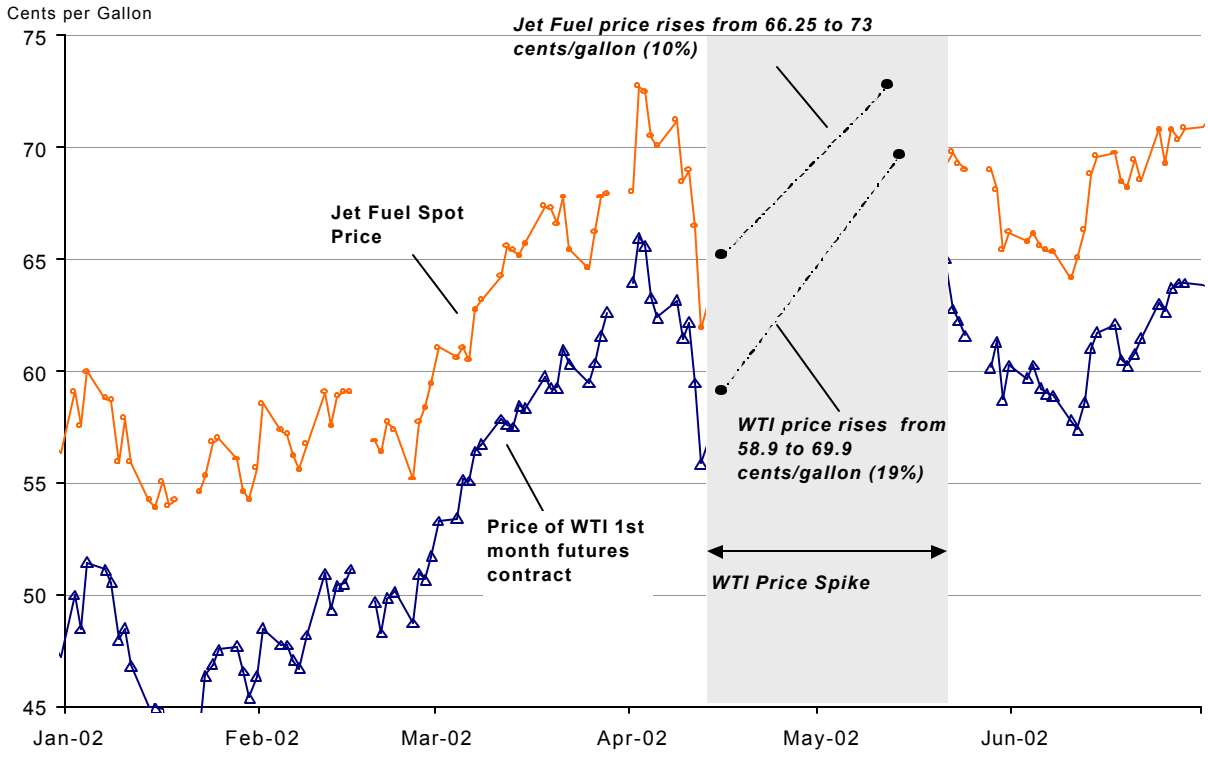

Fig. IV-22. In May 2002, higher prices for WTI crude oil increased the spot price of jet fuel by 10 percent. Source of price data: EIA.

Figure IV-23
Higher WTI Prices Increase the Spot Price of Diesel Fuel

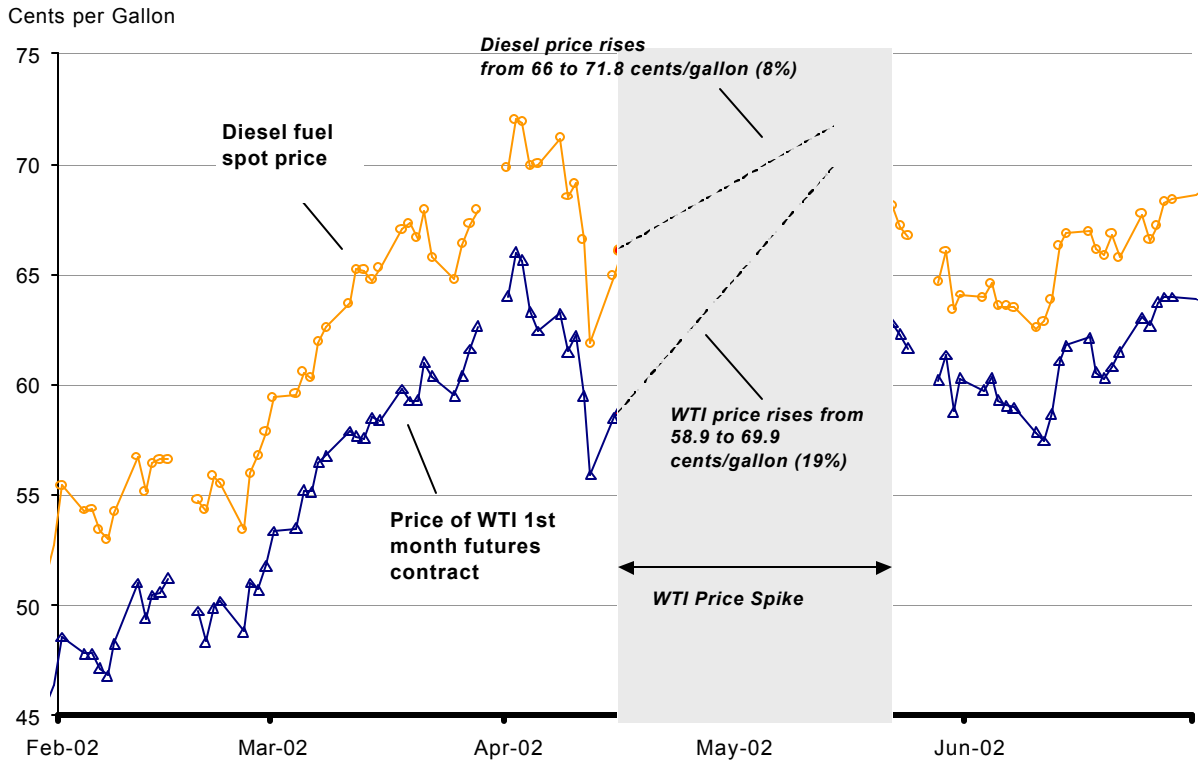

Fig. IV-23. In May 2002, higher prices for WTI crude oil increased the spot price of diesel fuel by 8 percent. Source of price data: EIA.

8. Higher Heating Oil, Jet Fuel, and Diesel Fuel Prices Hurt U.S. Consumers and Businesses

Increases in the prices of these basic commodities affect nearly every American and every sector of the economy. Home heating fuel increases, for example, affect millions of families and businesses in the Northeast and Midwest. According to the Department of Energy, 70 percent of homes in the Northeast rely on home heating oil.[164] In Michigan, for example, the percentage is 3.5 percent, in Minnesota, it is 8 percent, and in Maine, 4 out 5 people, or 80 percent heat their homes with oil.[165]

The hardships caused by expensive heating fuel have long been recognized by Congress and the Administration which administer several programs to address them. For example, the Low Income Home Energy Assistance (LIHEAP) program assists more than 4.6 million low-income households each year. Recently, LIHEAP has provided about $1.5 billion each year to assist U.S. households with energy costs related to extreme heat and cold. At a 2002 event announcing the release of $200 million in LIHEAP funding for American families facing rising heating bills, U.S. Secretary of Health and Human Services Tommy Thompson noted, "Higher fuel prices pose a real hardship for many Americans. This emergency aid will give states the opportunity to help more of their citizens stay warm this winter."[166]

Congress also recently established the Northeast Heating Oil Reserve (NHOR) to stabilize home heating oil prices. This reserve was established to reduce the disruptive effects associated with home heating fuel shortages and sudden price hikes, such as occurred in December 1996 and early 2000. NHOR currently holds about 2 million barrels, all of which were acquired by exchanging crude oil from the SPR for heating oil delivered to NHOR storage facilities in New Jersey, Connecticut, and Rhode Island.

Programs like LIHEAP and NHOR mean that the 13 percent jump in heating fuel futures caused by the 2002 crude oil price spikes imposed not only higher costs on U.S. consumers and businesses in the Northeast and Midwest, but also on taxpayers across the country, since these government programs are funded with taxpayer dollars.

Jet fuel is another key petroleum product that was affected by the 2002 crude oil price increases. Jet fuel is the second largest airline cost after labor, and, each month, U.S. airlines consume approximately 1.6 billion gallons of jet fuel.[167] In 2002, the airlines were estimated to have consumed about 18 billion gallons altogether.[168]

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[164] http://www.eia.doe.gov/emeu/plugs/plheat.html.

[165] See, for example, Michigan Public Service Commission website, at http://cis.state.mi.us/mpsc/reports/energy/02-03winter/distill.htm; "More Minnesotans heating with natural gas," Minnesota Public Radio, December 4, 2002; "Agency predicts surge in oil prices; A study finds Mainers could pay 45 percent more this winter, depending on the chill - and the winds of war," Portland Press Herald, October 15, 2002.

[166] http://www.ncat.org/liheap/news/Jan03/emergen.htm

[167] "Higher energy prices so far an irritant, but not a detriment, to U.S. economy," Associated Press, December 20, 2002.

[168] Information supplied by Air Transport Association.

Jet fuel price increases have a major impact on the airlines' finances and ability to keep operating. David Swierenga, chief economist at the Air Transport Association, informed the Subcommittee staff that "every penny increase per gallon translates into $180 million in added costs annually ... which the beleaguered industry can ill afford."[169] Another economist has estimated that when the price of crude oil increases by 1 percent, the price of jet fuel increases by 0.74 percent.[170] One low-cost operator, Southwest Airlines, indicated that, "Jet fuel accounts for 15 percent of our cost structure. When we see energy prices move, it has a very dramatic effect on us."[171] Another airliner, Northwest Airlines, has calculated that each penny increase in jet fuel costs it an additional $20 million annually.[172]

Media reports noted that, in 2000, high jet-fuel bills wreaked havoc on the airline industry, forcing bankruptcy filings of some start-up carriers, lowering earnings at major airlines, and widening losses at others.[173] In 2002, jet fuel prices increased 10 percent, from about 56 centers per gallon in January to about 78 cents in December. This added expense came on top of higher airline safety costs, higher debt levels, and reduced travel demand after the 9-11 tragedy in 2001. This added expense contributed to the airlines' ongoing financial woes, which have persisted even after the industry received a $5 billion cash infusion authorized by Congress in 2001. Altogether in 2002, the major U.S. airlines suffered losses estimated between $5 and $7 billion; increased jet fuel costs over the same period contributed to these losses.

Diesel fuel, a third key petroleum product, is also sensitive to crude oil price increases. Due to their reliability, efficiency, and safety, diesel engines play a key role in the U.S. economy, powering engines used in agriculture, construction, mining, transportation, and the military.[174] The Diesel Technology Forum has determined that locomotives, ships, trucks, and other forms of transportation utilizing diesel fuels move 94 percent of the nation's goods and materials, or more than 18 million tons of freight each day. Farm equipment, which is essential to not only the 2 million operating farms in this country but also millions of consumers that buy U.S. food, generally relies on diesel fuel. Diesel fuel also powers most buses, including intercity, transit, and school buses, and a number of post office vehicles. Overall, the Diesel Technology Forum calculates that the gross output of the diesel industry in 1997, the last year for which figures are available, totaled more than $85 billion.

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[169] *Id.* See also testimony of Susan Donofrio, Deutsche Bank Securities, before the Senate Committee on Commerce, Science, and Transportation, October 2, 2002.

[170] Subcommittee interview with Gene Huang, FedEx economist, February 5, 2003.

[171] "Crude awakening," San Francisco Chronicle, April 10, 2002.

[172] "Rising fuel prices hit NWA," Star Tribune, July 6, 2001.

[173] See, for example, " Southwest's Fuel Hedging Yields Lower Prices, Savings," Wall Street Journal, January 16, 2001.

[174] See "Diesel Technology and the American Economy," a report prepared for the Diesel Technology Forum, October 2000.

The American Trucking Association estimates that for every dollar increase in crude oil prices, retail diesel fuel prices increase 2.8 cents.[175] An economist at FedEx, Gene Huang, estimates that when the price of crude oil increases by 1 percent, diesel prices increase by 43 percent.[176] Figure IV-23 demonstrates how closely diesel prices tracked crude oil prices in the first part of 2002.

Higher diesel prices hike costs in each of the sectors that rely on diesel fuel, often with attendant, negative ripple effects across the U.S. economy. One example is the trucking industry. Nearly all large trucks that transport freight in the United States run on diesel fuel, with the trucking industry consuming roughly 32 billion gallons each year.[177] According to the American Trucking Association, the trucking industry employs almost 10 million people, including over 3 million drivers, and accounts for nearly 5 percent of U.S. gross domestic product. Bob Costello, chief economist at the American Trucking Association, estimates that for every 10 cent increase in the price of diesel an average 1,000 motor carriers with five trucks or more in their fleet go bankrupt. According to a transportation analyst with A.G. Edwards, Donald Broughton, the large numbers of trucking company failures in 2000 and 2001 generally coincided with the rise in diesel prices.

In addition to trucking business failures, trucking disruptions can impose an immediate, widespread drag on the U.S. economy by delaying shipment of goods and materials. "There is more dependence on just-in-time deliveries," Mark Whitenton of the National Association of Manufacturers said. "Even a couple of days disruption could cause factories to close."[178] In 2000, for example, a price spike in diesel fuel stalled truckers in parts of New England. "Diesel fuel cost between $2.50 and $2.60 a gallon, and trucks would not even go into Maine because there was not enough freight to pick up on the return trip to offset the cost," said Todd Spencer of the Owner-Operator Independent Drivers Association.[179] After Iraq invaded Kuwait in 1990, and crude oil prices nearly doubled to $41 per barrel, one long-haul trucker, Lee Klass, stopped driving.[180] "The price of diesel fuel jumped 40 cents a gallon," Klass recounted. Rather than pay the price at the pump, he parked his truck. "It reaches a point that unless rates are doubled it doesn't make sense to haul any freight."

Home heating oil, jet fuel, and diesel fuel prices spiked in the spring of 2002 as a result of the increase in the price of crude oil. Since that time, the prices of these petroleum products have continued to climb along with crude oil prices. They have been joined by increases in gasoline prices. Since these an other costs took place after the period examined in this case study, they are discussed in the next section of this Report. Their attendant negative effects on the U.S. economy have continued to hurt U.S. consumers and businesses.

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[175] Subcommittee interview with Diego Saltes, economist at the American Trucking Association, February 3, 2003.

[176] Subcommittee interview with Gene Huang, FedEx economist, February 5, 2003.

[177] Information provided to Subcommittee staff.

[178] "Fuel price escalation already spills into cost of other goods," Chicago Tribune, January 26, 2003.

[179] *Id.*

[180] *Id.*

In light of the economic harm to U.S. consumers and business from higher prices for home heating fuel, jet fuel, and diesel fuel, as well as other costs associated with high-priced crude oil, it is critical that DOE recognize these costs and take steps to minimize the costs associated with depositing oil into the SPR.

9. High Crude Oil Prices Increased Refinery Costs

Higher crude oil prices in early 2002 also increased refinery costs. A refiner's income is determined by how much it can sell its product for on the wholesale market, and its expenses are determined by how much it has to pay for crude oil and how much it costs to operate the refinery. If it can sell its products for more than it costs to purchase the crude oil plus its expenses, then it will make a profit; if not, it will lose money. The difference between the price a refiner can obtain for a refined product, such as gasoline, and the price of crude oil is called the "refining margin," and to a large extent determines the profitability of the refinery.

In spring 2002, U.S. refiners saw their crude oil costs increase significantly, but were unable to raise gasoline prices due to the high level of gasoline supplies resulting from a flood of gasoline exports from Europe. Because the plentiful supplies of excess European gasoline capped potential increases in the retail price of gasoline, more direct consumer harm from the crude oil price increases was avoided. Instead, U.S. refiners had to absorb these additional costs.

Because U.S. refiners could not pass along the increased costs of crude oil to the gasoline market, refining margins fell significantly in April and May. The overall margin for a refinery (termed the "crack spread") is determined by taking into account the refining margins for several of the key products of a typical refinery. Figure IV-24 shows the negative effect the April-May WTI price spike had on the "3-2-1 crack spread." The 3-2-1 crack spread is calculated by assuming that three barrels of crude oil are refined into two barrels of gasoline and one barrel of heating oil. As Figure IV-24 demonstrates, refining margins, as measured by the 3-2-1 crack spread, fell from $6.38 per barrel on April 16, when the EIA and API inventory data was released, to $3.98 per barrel on May 21, when the WTI June contract reached expiry.

The near-40 percent fall in the crack spread resulting from the WTI price spike dropped this measure of refinery profitability to one of the lowest levels in the past several years.

Figure IV-24
Higher WTI Prices Decrease Refining Margins
("Crack Spread")

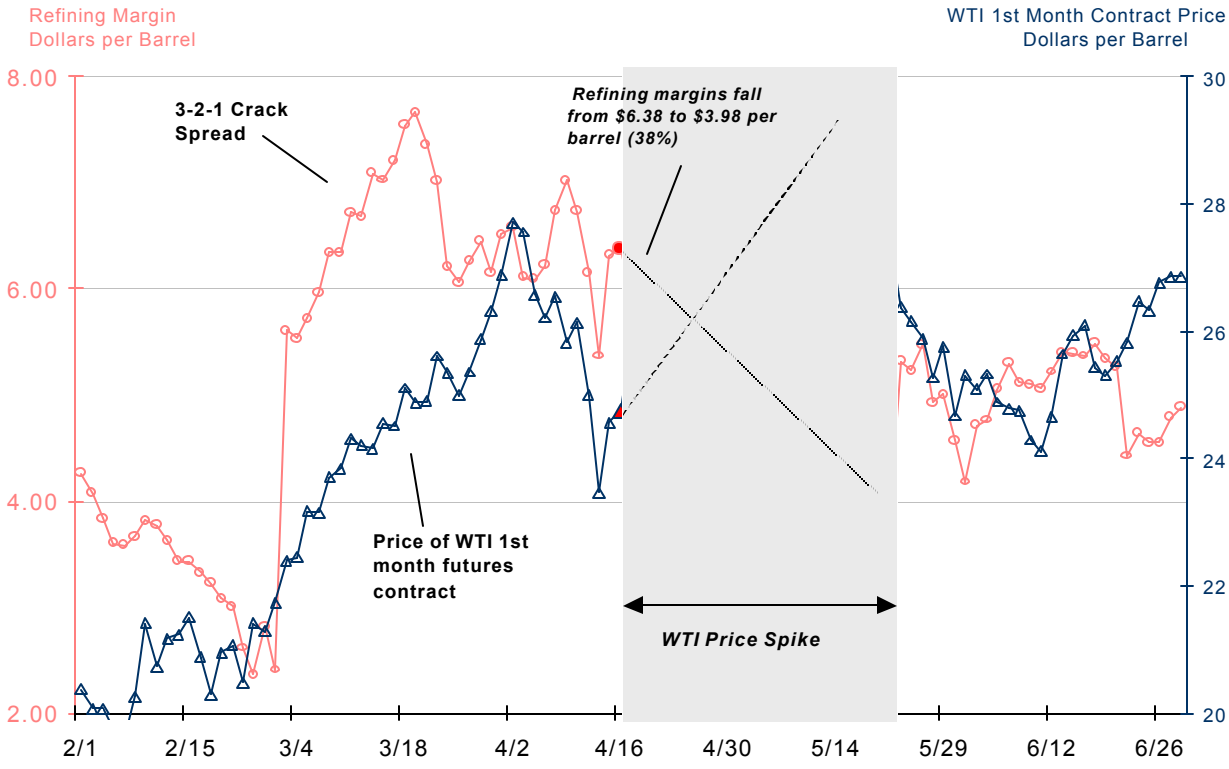

Fig. IV-24. From late April through late May 2002, overall refining margins fell as the WTI price spiked. Source of price data: EIA.

These lower refining margins were one of the major reasons for the dismal financial performance of oil companies in the second quarter of 2002.[181] Table IV-1 presents the reported earnings of major oil companies for the second quarter of 2002, a very poor quarter for refiners, as compared to the second quarter of 2001, a very good quarter for refiners.

[181] The narrowing of the heavy-light and sweet-sour differentials led to major losses for U.S. refiners that rely on heavy and sour crudes. Although OPEC production cuts are often attributed to be the reason for the narrowing of this differential in the first half of 2002, the decrease in Atlantic basin sweet crude imports due to high Brent prices led U.S. refiners to use relatively more heavy sour crudes. This shift in the relative percentages of heavy and light imports also contributed to the narrowing of the heavy-light differential in the second quarter of 2002.

Table IV-1

Oil Company Second Quarter Earnings

Company	Earnings Per Share	Change from 2Q 2001
Exxon/Mobil	$0.39	-39.0%
Royal Dutch/Shell	n.a.	-37.7%
BP	$0.59	-51.2%
Chevron Texaco	$1.16	-42.5%
Phillips*	$0.95	-38.7%
Conoco	$0.22	-76.7%
Marathon	$0.62	-67.5%
Valero*	$0.10	-95.9%
Sunoco	$0.35	-86.8%
Occidental	$1.25	-1.5%
Amerada Hess	$1.91	–52.1%
Ashland	$0.93	-67%
Tesoro*	($0.28)	-160.7%
Unocal	$0.55	-41.2%
Murphy	$0.30	-85.3%

*Indicates 2001 figures do not include subsequent acquisitions that increased the company size substantially.

Source: Petroleum Finance Week (August 19, 2002)

Different refiners were affected differently, based upon the slate of crude oils normally purchased for the different refineries. East Coast refiners relying on the transatlantic trade in sweet crudes priced off Brent were hit hardest:

> Average U.S. gross refining margins dropped more than $1 barrel to $2.50 a barrel during the week ended May 11, marking the fourth consecutive weekly decline due to high crude oil prices and relatively moderate prices for gasoline and distillates, according to Salomon Smith Barney's weekly margin report. . . . The weakest margins are on the East Coast for Brent-based production at $1.40 a barrel, while the highest are in the Midwest at $4.40 a barrel."[182]

The high costs of Brent were cited as reasons for production cuts at the Valero and Phillips refineries in New Jersey.[183]

The negative effects of the SPR program on refinery performance is of concern because low refining margins threatening the financial viability of many U.S. refiners. Low and volatile refining margins have been one of the main factors underlying the large degree of consolidation in refinery ownership that has occurred in recent years. In a number of areas of the country the refining industry has become highly concentrated, exacerbating the volatility of gasoline prices, harming consumers and the national economy.[184] To the extent that governmental action imposes additional costs upon this industrial sector with no attendant benefits, further investment in this sector is discouraged, energy security is diminished, and consumers are harmed.

Perhaps most significantly, in recent years refiners have been reducing inventories as a way to reduce costs. Governmental actions and policies that increase the costs for refining crude oil, without any commensurate benefits, will lead refiners to reduce inventories even further.[185] This will lead to more price volatility and higher consumer prices.

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[182] Reuters, *US Refining Margins in Red in Most Regions – Report*, May 14, 2002.

[183] *Id.* In mid-May, Valero announced it would cut back on refinery production by 23 percent – or by 360,000 barrels per day -- as a result of "high product inventory levels and uneconomical operating conditions." The Oil Daily, *Refiners Put Brakes On As Car Season Nears*, May 17, 2002; Oil Market Intelligence, *Americas: Where's the Upside?,* May 21, 2002. "The very low margin between the selling price of gasoline and the purchase price of crude oil is the reason for the run cuts," Valero officials stated Dow Jones, *Valero Cuts Runs at Non-West Coast Refineries by 20%*, May 16, 2002.

[184] The Subcommitttee's Report, *Gasoline Prices: How Are They Really Set?* addressed these issues.

[185] For example, independent refiner Valero, which was one of the companies most affected by the increase in crude oil prices and the narrowing of the heavy/light differential in early 2002, and facing a downgrade by Moody's credit-rating agency, recently announced that it had cut its stocks from a high of 69 million barrels in 2002 to 54 million barrels. Philip K. Verleger, Jr., *Notes at the Margin*, February 3, 2003.

C. Oil Company Decisions to Send So Much Brent to the SPR

Although DOE provided SPR contractors with the option to place a variety of sweet crude oils into the SPR, from the fourth quarter of 2001 through the second quarter of 2002, nearly 90 percent of the sweet crude oil deposited into the SPR was Brent crude oil. The placement of so much Brent crude oil into the SPR, as well as the shipment of so much Brent to China, halved the normal Brent-WTI differential for most of this period and squeezed the Brent market twice, once in January, and once around April. The Arcadia squeeze of 2000 had demonstrated the price increases that would follow of a squeeze in the Brent market, so traders acquiring large amounts of Brent in 2002 would have known that acquiring large amounts of Brent could significantly increase prices.

One of the issues examined by this investigation is whether traders may have acquired large amounts of Brent in early 2002 to create these foreseeable impacts and profit from them, or whether the decision to acquire large amounts of Brent was motivated solely by other commercial interests.[186] Because of the complexity of the analysis required, and the unavailability of information about OTC trading activity, the Subcommittee Minority staff was unable to reach a conclusion on this matter.

The following discussion presents the explanations provided by oil companies interviewed by the Minority Staff as to why they acquired large amounts of Brent in late 2001 and early 2002. Because of the voluminous and complex records underlying these transactions, the Staff did not examine company documents.

In essence, traders with companies that purchased large amounts of Brent in early 2002 told the Subcommittee staff that their purchases of futures contracts for Brent were undertaken solely for hedging purposes, were limited to the amount of contracts necessary to accomplish this purpose, and were not undertaken for the speculative purpose of profiting from rises in the price of Brent. Similarly, these officials stated that their use of the 15-day Brent OTC market was for the purposes of hedging and acquiring Brent cargoes.

Sempra Energy Trading Company officials told the Subcommittee staff that in November 2001, Chinese refiners placed large orders for Atlantic Basin sweet crude oil because the Brent-Dubai differential had narrowed, making it more economic to purchase Brent and other Brent-based grades than sour Middle Eastern grades. Sempra officials stated they used the futures market to hedge the purchase price of the cargoes it was acquiring, and did not make trades to exacerbate the squeeze.

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[186] Even if trading activity is undertaken pursuant to a legitimate commercial purpose, however, a trader's activity still may amount to abuse under U.K. law or manipulation under U.S. law if the trader exacerbates a "natural" squeeze that has arisen. The CFTC has warned that traders who continue to purchase "long" contracts during a squeeze may be found to have violated the prohibition against manipulation. See Appendix 1.

Shell officials told the Subcommittee staff that in late January and early February it received a large number of inquiries and orders for light sweet crude oil. Shell believed these orders were placed by oil companies seeking light sweet crude oil to meet the DOE's SPR fill requirements, and from other traders who had postponed their purchases of North Sea crudes until the market had returned to contango following the backwardation arising from the purchase of Brent for buyers in Asia. Shell stated that its public statement on February 11 that it had potential orders for all of the Brent crude loading in March evidences its intent to avoid an exacerbation of the market congestion, which, Shell admitted, was partially done for purposes of self-interest, as it was acquiring cargoes. Shell claimed that its announcement, despite causing a one-day price spike in the market, helped prevent the type of squeezes that occurred in January and April 2002.

BP stated that its schedule for delivering crude oil into the SPR was set by the Department of Energy pursuant to the requirements of the exchange program under which BP had previously acquired crude oil from the SPR, and thus it was necessary to acquire large amounts of Brent crude for loading in April and May 2002. BP pointed to the fact that in early April it requested the DOE to permit a deferral of its obligations in light of the high price of Brent that prevailed at the time as evidence that it sought to relieve rather than exacerbate the market congestion resulting from the large demands placed on the Brent market from the SPR program.

All of the traders interviewed by the Subcommittee staff stated that Brent was the light sweet crude that was easiest and most economical to obtain. Some traders stated Brent was preferable even at a small premium in price to other acceptable sweet crudes because the price of Brent could be hedged more precisely and because of the ease of obtaining large amounts of Brent, both directly from the loading terminal at Sullom Voe and through trades with other companies.

Officials from the London IPE stated in interviews with the Subcommittee staff that their review of IPE trading activity in early 2002, which included a review of trading positions and discussions with all of the parties involved in significant trades of Brent, did not detect any violations of exchange rules by any traders within its jurisdiction. Officials with the U.K. FSA attributed the unusual movements in the price of Brent to the dwindling supply of Brent, and did not conclude there was any market abuse under U.K. law. But IPE officials also noted that their review of the Brent market encompassed only trading activity within the IPE's market, and did not extend to other markets, such as trading on the OTC markets.

The Subcommittee's review did not include a review of OTC activity, since data on OTC trading activity is not available. Without information about the OTC positions held by traders, such as the amount and types of contracts purchased or sold, the price paid, and the dates of the transactions, it is impossible to arrive at any conclusion regarding whether or not the OTC markets were used to exploit the squeezes in the physical and commodity markets, or whether positions were taken in the OTC markets that would constitute manipulation or abuse if undertaken on the futures markets.