



## **You may be interested.**

**PIRINC has prepared the enclosed report, *Using the SPR: Issues and Lessons from Recent History*. Material from this report was first presented at the *International Oil Stockpiling Symposium* sponsored by the U.S. Department of Energy, in Houston TX on December 1, 2004.**

**Escalating oil prices this year brought calls for using the SPR. Despite record prices, the SPR was not used — except for Hurricane Ivan. The SPR has been used in the past, even at much lower prices. This report discusses issues involved in judging when a release of SPR oil may be appropriate.**

**When due to “fundamentals,” high prices should be allowed to do their work of balancing supply and demand and incentivizing corrective behavior. But there are times when the market signals a strong need for crude now as opposed to later. This signal, significant market backwardation, occurred after the Iraqi invasion of Kuwait in 1990 and more recently when Venezuelan production was lost. There was also significant backwardation through much of 2000. Backwardation has been far less in recent months, even as prices rose to record levels, suggesting a weakening case for intervention. A further consideration is letting OPEC go first to the extent it can do so. In 2000, OPEC was clearly responding with more oil, as has also been the case since June 2003.**

**PIRINC was an early advocate of establishing the SPR and over the years has opposed its use for all but clear emergency situations. With ongoing declines in commercial stocks, and lower world spare producing capacity, a more active role for the SPR may be appropriate. However, it should be kept in mind that there are serious ongoing risks of even larger supply curtailments than we have seen to date. Large-scale SPR interventions should be reserved for large-scale disruptions.**

**If you have any questions or comments, please call Ron Gold.**

**December 2004**

---

**Petroleum Industry Research Foundation, Inc.**

3 Park Avenue • 26<sup>th</sup> Floor • New York, NY 10016-5989

Tel.: (212) 686-6470 • Fax: (212) 686-6558

## Using the SPR: Issues and Lessons from Recent History<sup>1</sup>

### Summary

As has happened before, escalating oil prices this year brought calls for using the SPR. Despite record prices, the SPR was not used — except for Hurricane Ivan. The SPR continued to be filled over most of the year. As of early December, the SPR was about 35 million barrels, or about 5%, above its level at the beginning of the year. There have been releases and fill suspensions in the past, even at much lower prices. High prices per se are not necessarily a reason for using the SPR. But on the other hand, with free markets policy-makers won't have the convenient signal of outright shortages to guide them. Prices will always move to keep physical markets in balance.

To assist in judging just when a release of SPR oil may be appropriate, this report considers in detail three episodes from recent history when oil prices surged to worrisome levels. The first was triggered by the Iraqi invasion of Kuwait in August, 1990, the second in mid-to-late 2000, and the third, beginning at the end of 2003, which, after a brief interruption, continued into November of this year. Both the first and the second periods saw significant draw-downs in SPR reserves while the third, the most prolonged and most acute price surge, saw none until the recent, relatively modest exchanges to cope and with the impact of hurricane Ivan. This presentation considers these episodes in detail and draws implications for future decisions regarding use of the SPR.

In general, when due to “fundamentals,” high prices should be allowed to do their work of balancing supply and demand and incentivizing corrective behavior. However, there are times when the market signals an exceptionally strong need for crude now as opposed to later. This signal, significant market backwardation, occurred in 1990 and again when Venezuelan production was lost. There was also significant backwardation through much of 2000. On the other hand, backwardation has been far less in recent months, even as prices rose to record levels, suggesting a weakening case for intervention. A further consideration is letting OPEC go first to the extent it can do so. In 2000, despite rising prices, OPEC was clearly responding with more oil, as has also been the case since June 2003.

PIRINC was one of the early advocates of establishing the SPR and over the years has opposed use of the SPR for all but clear emergency situations. However, with ongoing declines in commercial stocks, and lower world spare producing capacity, the SPR (along with other international strategic stocks) may have to play a more active role in limiting market instability. While there is a case for a somewhat more activist SPR, it should be kept in mind that there are serious ongoing risks of even larger supply curtailments than we have seen to date. Large-scale SPR interventions should be reserved for large-scale disruptions.

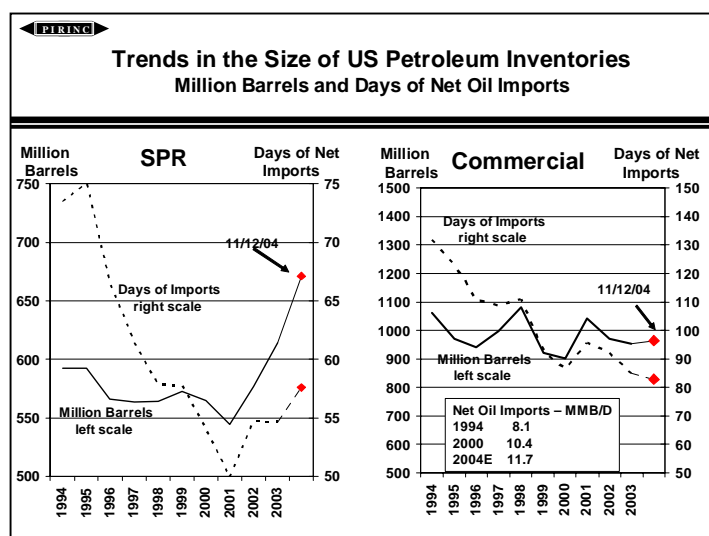
---

<sup>1</sup> Material from this report was first presented at the **International Oil Stockpiling Symposium** sponsored by the U.S. Department of Energy, in Houston TX on December 1, 2004.

## Trends in U.S. Petroleum Stocks

Before discussing the three price surge episodes, this section focuses on recent trends in the SPR and in commercial oil stocks. The left panel of chart below shows trends for the SPR for the past 10 years while the panel shows trends in total commercial crude and product stocks for the same period. Stocks are measured in million barrels (MMB) and in days supply of net imports.

In terms of barrels, the 1990s ended with the SPR lower than earlier in that decade. There were congressionally authorized drawdowns for deficit reduction purposes and to pay for improvements in SPR capabilities. In late 2000, there was an exceptionally large exchange of SPR oil (discussed in the next section of the report) that pushed the SPR below the 550 MMB level.<sup>2</sup> The Bush Administration has had a clear policy of filling the SPR to capacity and as of mid-November, the SPR stands at just over 670 MMB, a record level. Relative to net imports, the SPR is still far below its level 10 years ago. 58 vs. 74 days of coverage but up from its 2001 low-point.



For commercial inventories, shown on the right, the trend is gently down in terms of barrels and dramatically down in terms of days of import coverage. Days of import coverage are pulled down by the substantial growth in level of imports — up from about 8 MMB/D 10 years ago to nearly 12 this year and projected to rise further in the coming years.<sup>3</sup> A large proportion of commercial stocks are needed to maintain operations — including oil in tankers, barges, trucks and pipelines, crude for processing at refineries and product at terminals for movement to final consumers.

While the exact split between discretionary and minimum-operating levels of commercial stocks is uncertain it's clear that a growing share of the country's discretionary stocks is concentrated in the SPR. This is especially the case for crude oil where the SPR holds more than twice as much as the private sector (671 vs. 292 MMB as of 11/15).

<sup>2</sup> Drawdowns for deficit reduction were not contemplated in the 1975 legislation establishing the SPR. The 1975 Energy Policy and Conservation Act referred to a "severe energy supply interruption" of an emergency nature and/or a severe increase in the price of petroleum resulting from the emergency situation likely to have major adverse effects on the national economy.

<sup>3</sup> The Department of Energy's 2004 Energy Outlook Reference Case projects an increase in net imports to 13.2 MMB/D in 2010 and 15.5 MMB/D in 2015.

## Oil Price Run-Ups and OPEC Production

The next chart focuses on the three periods of price run-ups, defined as months when oil prices as measured by WTI moved above \$30/barrel. Price trends are shown on the left while OPEC production trends are shown on the right.

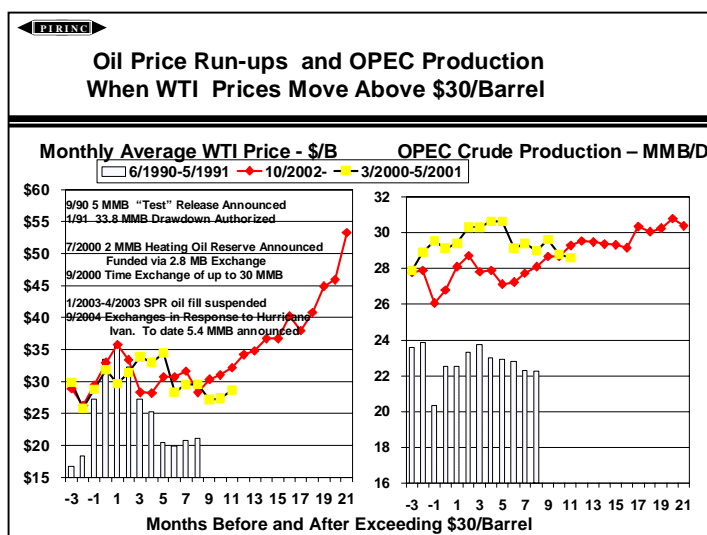
In the first episode, Between July 1990 and August, when Iraq invaded Kuwait, the price jumped from about \$18 to \$27/B and continued rising to a peak of about \$36 in October.

There was an immediate cut in OPEC production of about 4 MMB from July to August although within 4 months production was nearly back to pre-invasion levels.

There were two releases of SPR oil during the crisis. The first was a “test” release of 5 MMB announced in late September, and a second drawdown of nearly 34 MMB authorized in January 2001 as Desert Storm began. This second release was part of an IEA coordinated international use of strategic stocks. This instance of SPR use met with broad approval. But it should be noted that the most aggressive use of the SPR came well after the initial losses were made up by production elsewhere.

In the second episode, prices in the spring and summer of 2000 were already near the \$30 level and moved up to a high of \$34 in November before falling back to about the \$30 level. In this case OPEC production was moving up over the entire period of rising prices. In October 2000, when prices peaked, OPEC production was about 3 MMB/D above its level at the beginning of the year.

Two actions were taken regarding the SPR over this period. In July 2000, a 2 MMB Northeast Heating Oil Reserve was announced, to be funded by a 2.8 MMB exchange of SPR crude. In September, the Clinton Administration announced a 30 MMB time exchange of crude with repayment +bonus to take place in 2001.<sup>4</sup> The releases of oil that followed in over the next few months helped bring the price oil back down to just below the \$30/level but they were accompanied but cutbacks in OPEC production. Between their October peak and December, production fell by 1.5 MMB/D. The production cuts offset in part the price impact of the SPR release and meant that to a certain extent, OPEC saw the SPR release as reducing their own



<sup>4</sup> Returns were deferred due to market conditions in late 2001 and again toward the end of 2002 in response to the loss of Venezuelan supplies. In the end, the SPR received 34.5 million barrels in return for the initial release of 30.

responsibility to stabilize the market. Unlike 1990-91 there was strong debate over whether these uses of the SPR were appropriate.

Turning to the third episode, in December 2002 the curtailment of Venezuelan supplies provoked an immediate rise in prices — and an early supply response by the rest of OPEC. By February, total OPEC production was above its December level and prices fell back somewhat. The Iraq war had a limited effect on prices and on overall OPEC production. But beginning with the summer, prices began moving upward virtually every month to the unprecedented \$50 plus levels of October-November. At the same time, OPEC production moved upward as well. As of October, OPEC production is running about 1.7 MMB/D above year earlier levels and about 3.3 MMB/D above its June 2003 low point.

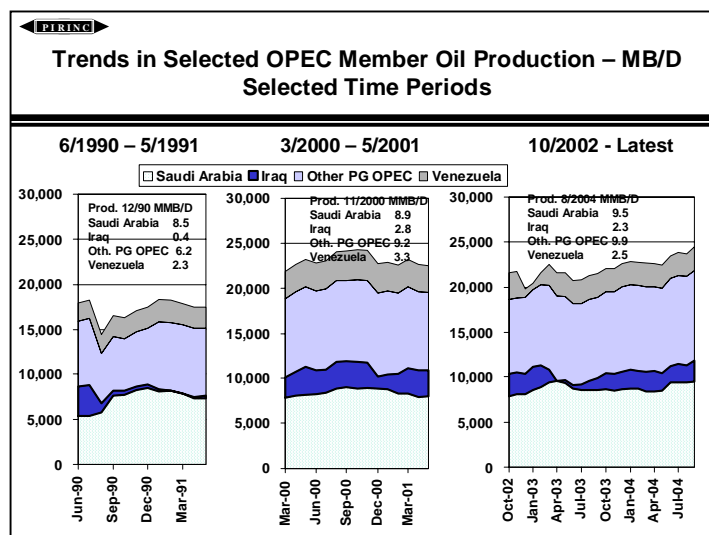
In this period there have been two minor SPR responses---a temporary suspension of the SPR fill in response to the Venezuelan supply loss and exchanges in response to production losses associated with Hurricane Ivan. Should the SPR have been used more aggressively? In this case prices reached far higher levels than in 1990 or 2000, but, at least since mid-2003, world oil supply has been rising nearly without interruption in response.

### Selected OPEC Member Oil Production

The next chart focuses on production in the Persian Gulf and Venezuela during the three time periods.

By end 1990, the other Persian Gulf producers had made up nearly all the losses in Kuwait and Iraq with the lion's share of the increase coming from Saudi Arabia. Outside the Persian Gulf, the most significant gains came from Venezuela. Venezuelan production rose by 300 MB/D over the period.

In the second period, total starting point production was about 5 MMB/D higher than 1990-91 and increased through the fall. The gains were more widespread than in 1990 although as before, the largest single increase came from Saudi Arabia — and also the most significant cutbacks after prices peaked.



In the third, the early rise in Saudi production was the main offset to the loss first of Venezuelan supply and then Iraq. Production then fell just after the Iraq war and resumed growth in the summer. As prices moved to unprecedented levels this summer, Saudi production expanded back to about 9.5 MMB/D. However, even this return to record production levels was not sufficient to bring prices down substantially — at least through November. In early December, prices did come off their extreme \$50-plus levels, but remain very high.

In the second and third periods, the expansion of Saudi production was far less than in 1990-91, 0.6 and 1.5 MMB/D respectively versus 3 in 1990. There is less spare capacity this time around. With OPEC production at all out levels not sufficient to end a months-long upward movement in prices, did this make a case for SPR intervention?

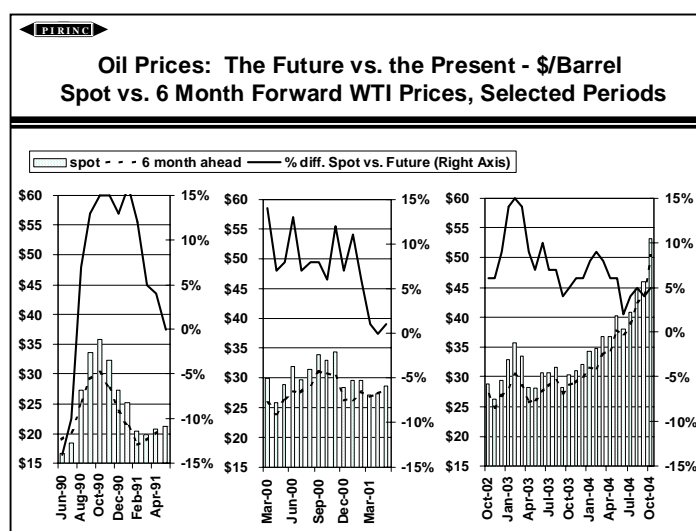
### Oil Prices: The Future Versus the Present

The legislation establishing the SPR refers to a "severe energy supply interruption" and to a "severe increase in the price of petroleum" as conditions, which could justify a release. The first clearly refers to an outright disruption in supply, which we have not had since early 2003. The second is more debatable. Prices have been very high but it's not clear they are causing "major adverse effects on the economy."

If high prices are due to "fundamental" as opposed to temporary conditions, then why not let prices do their work of balancing immediate and longer-term supply/demand. The next chart looks at market backwardation, that is to say, spot prices higher than future prices, as a means of distinguishing the temporary from the fundamental. Backwardation is an indicator of the value of supply right now as opposed to later. The chart shows spot and six-month forward prices for WTI over the three periods considered and also the percent differences between the spot and future prices.

Backwardation increased sharply at the onset of the 1990 crisis. The spring and summer of 2000 also saw significant backwardation.

In early 2003, with the loss of Venezuelan supplies, backwardation reached 1990 crisis levels. Thereafter, backwardation eased. Backwardation has been relatively modest since the spring of this year despite the climb in prices to record levels.



The backwardation patterns support use of the SPR in 1990-91 and, if anything, suggest it should have been used more aggressively and earlier. They also lend some support to the more controversial use in 2000. In the latest period, the backwardation pattern indicates a strong case for SPR use after the loss of Venezuelan supplies and a weakening case for use over the course of this year, despite the advance in prices to record levels.

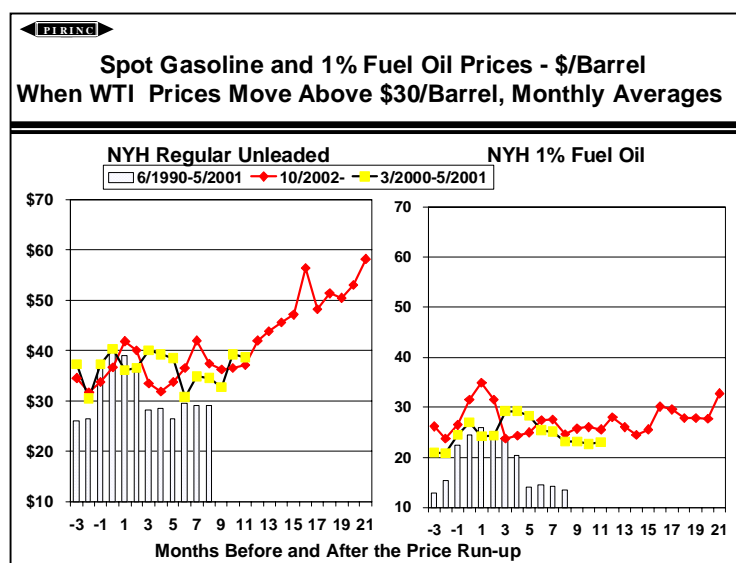
### Prices of Light Versus Heavy

Apart from record high crude prices, this latest period has another unique feature, namely the exceptionally sharp difference between light and heavy crudes — as reflected in light-heavy product differentials.

As shown in the next chart, prices of the main light product, gasoline, have moved far higher in the latest period than they ever did in 1990 and 2000. But this is not the case for heavy or residual fuel oil, where prices currently are close to their peak levels in the prior periods.

In effect, the international market has been extremely tight for light crude but not heavy. Another way to look at it is that the world is short of refining capability for deep conversion, or bottoms destruction. The SPR holds lighter, sweeter, crude than the world's marginal supply and a significant release could have eased the light/heavy differentials. But if these are the “fundamental” prevailing conditions, why contradict them? Let prices curb demand for the lighter products and incentivize new investments in refining capability.

Why use the SPR to make life easier for owners of Hummers and the largest SUV's?<sup>5</sup>



### Assessing Commercial Price Insurance Costs

While there are issues over use of the SPR when prices are moving to record levels, the need for the SPR as a backstop against severe price movements is clear.

<sup>5</sup> At a time of very high natural gas prices, the availability of fuel oil at less extreme prices helps contain increases in electricity prices as generators with dual fuel capability switch from gas to oil.

The ability of the private sector to insure itself against unanticipated sharp escalations in oil prices is limited and expensive compared to other commodities. For example, the next chart looks at the cost through buying call options of insuring against price increases more than 10% above the 3 and 6 month ahead futures prices as they stood on November 1st of this year.

The options prices for crude oil were respectively 2.6% and 6% of the three and six month-ahead futures prices. These are much higher percentages than for other commodities such as copper and corn and far above costs for hedging the Euro/\$ exchange rate. Only call options for natural gas were significantly more expensive (where ability to import plus volumes is limited and there is no equivalent SPR).

Price Insurance Costs: Selected Call Option Premiums For Strike Prices $\approx$ 10% above Futures Prices		
	Nov. 1 Traded Prices as % of Futures Contract Prices for:	
	Jan. 2005	March 2005
WTI Crude Oil	2.6% (\$50)*	6% (\$49)*
Heating Oil	3.5%	5.9%
Unleaded Gasoline	3.2%	5.1%
Copper	1.6%	3.8%
Corn	NA	1.4%
Euro/\$ Exchange Rate	0.1%	0.2%
Natural Gas	6.3%	9%

\*Figures in parenthesis are the associated futures contract prices.

### Edging Toward Guidelines

In a world where commercial inventories continue their downtrend and OPEC spare can be very limited, a more activist role for the SPR (and other international strategic stocks) may be reasonable. This means more willingness to engage in fill suspensions, exchanges, even “test” releases.

But high prices alone are not enough to justify a release. If they reflect “fundamentals,” let the market work and consumers pay up. Backwardation on the other hand signals a market need for crude now as opposed to later. Severe backwardation is the most timely market signal for considering SPR use.

Since the SPR is the nation’s backstop source of supply, and OPEC has a declared policy of promoting stable markets, OPEC should go first in dealing with disruptive price movements — if it can. But when they are already going all out there is little more they can do to counter new disruptions. The Saudi role continues to be critical in promoting stability but when nearly all of their production capacity is already in use, the SPR and other strategic stocks become the only place to turn for relief from new market stresses.

A more active role for the SPR does not mean a quick resort to large drawdowns. Large drawdowns should be reserved for big disruptions. This is a risk we will be living with this risk for an indefinite period and should it happen, there would be nowhere else to turn.