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STRATEGIC PETROLEUM RESERVE

HEARING

BEFORE THE

COMMITTEE ON ENERGY AND NATURAL RESOURCES UNITED STATES SENATE

ONE HUNDRED ELEVENTH CONGRESS

FIRST SESSION

TO

RECEIVE TESTIMONY ON S. 967, THE STRATEGIC PETROLEUM RESERVE MODERNIZATION ACT OF 2009, AND S. 283, A BILL TO AMEND THE ENERGY POLICY AND CONSERVATION ACT TO MODIFY THE CONDITIONS FOR THE RELEASE OF PRODUCTS FROM THE NORTHEAST HOME HEATING OIL RESERVE ACCOUNT

May 12, 2009

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STRATEGIC PETROLEUM RESERVE

TUESDAY, MAY 12, 2009

U.S. SENATE,
COMMITTEE ON ENERGY AND NATURAL RESOURCES,
Washington, DC.

The committee met, pursuant to notice, at 2:34 p.m. in room SD–366, Dirksen Senate Office Building, Hon. Jeff Bingaman, chairman, presiding.

OPENING STATEMENT OF HON. JEFF BINGAMAN, U.S. SENATOR FROM NEW MEXICO

The CHAIRMAN. Ok. Why don't we get started? Thank you all for being here. Today we want to have testimony on two bills that seek to improve our emergency petroleum reserve policy.

In the last few years we've experienced several oil market disruptions that resulted from hurricanes taking operations in the Gulf of Mexico region offline. Most recently in September 2008, Hurricanes Gustav and Ike caused a disruption that left many gas stations throughout the Southeast without sufficient gasoline and diesel for weeks following the storms. It strikes me that we can and should do better than that.

We expect to be facing a world with more hurricanes and more extreme weather situations in the future. We need to decide either to learn to live with temporary regional gasoline and diesel outages or we need to be prepared to deal with the aftermath of these storms in a better way than we have in the past and prevent these kinds of shortages. I believe we should take this latter approach. Preventing these kinds of hurricane-related shortages is an achievable goal.

We've learned in this country that when oil supplies are disrupted, economic hardships follow. This is not simply about inconvenience to those regions whose transport might be temporarily constrained. It's also about making sure that there is sufficient fuel for emergency services and about minimizing longer lasting economic damage that results from price spikes and disrupted commerce.

In the 1970s we created the Strategic Petroleum Reserve to prevent this kind of fallout from oil supply disruptions. At the time we were concerned about crude oil disruptions in exporting countries. We had a very robust domestic refining system. We were confident that our refining system could safeguard our markets from disruption as long as we could get enough crude to those refineries.

Therefore we made the decision which made sense at the time to keep only crude oil in the Strategic Petroleum Reserve. However

we are now increasingly reliant on imported gasoline and diesel as well as imported oil. We've also seen that our need for extra oil supplies from the Strategic Petroleum Reserve comes primarily from hurricanes and other weather-related events, not from geopolitical disruptions in other countries.

In the 34 years of history and its 34 years of history the Strategic Petroleum Reserve has been used as a result of only one geopolitical event, that is Desert Shield and Desert Storm in 1990 and 1991. The SPR has been used far more frequently to offset weather related glitches in the system. It makes sense that our reserve policy should evolve to meet this new need.

I note that we're considering today a bill in addition to the one I've been describing. We're also considering a bill sponsored by Senators Snowe and Dodd and Kerry which seeks to alter the drawdown criteria for the Northeast Home Heating Oil Reserve. I understand my colleague's concern that the home heating oil reserve has never been tapped since its creation in 2000. However it strikes me that experts often caution us again legislation that refers to specific price points.

So I look forward to hearing from the witnesses on these important bills. I defer to Senator Murkowski for her comments.

[The prepared statement of Senator Snowe follows:]

PREPARED STATEMENT OF HON. OLYMPIA J. SNOWE, U.S. SENATOR FROM MAINE

Thank you, Chairman Bingaman and Ranking Member Murkowski for holding this hearing today on the structure of the Strategic Petroleum Reserve and the Northeast Home Heating Oil Reserve. While there is no question that we must develop policies that achieve energy independence for United States, we must ensure that our energy defenses today are structured to allow maximum flexibility if our country experiences another energy crisis.

I strongly believe that last year's energy crisis demonstrated the need to improve the Northeast Home Heating Oil Reserve program and I developed legislation (S.283) with Senators Dodd and Kerry to address the problems. The essential issue is that the federal law governing the Northeast Home Heating Oil Reserve constrains the Administration within the confines of an arbitrary mathematical formula to trigger the release of the reserves. Compounding the problem is that the current formula for release fails to consider the ramifications of historically high heating oil prices on the health and safety of the people of the Northeast.

The legislation that I have formulated with Senators Dodd and Kerry would address this issue and allow the Administration to release heating oil if there is a significant supply disruption, or if the health and safety of Northeast residents are threatened. In addition, the legislation would mandate that, at a price threshold of $4 per gallon for heating oil, the reserve would be sold in a systematic process. I believe that this legislation will provide flexibility as well as certainty that heating oil currently sitting in New England will be used when it is most essential to the region's population.

Through Senator Dodd's leadership in 2000, Congress created the Northeast Home Heating Oil Reserve, which put in place a critical tool to reduce supply disruptions. At that point, heating oil prices were $1.49 per gallon, and while the situation has improved since the historic price spike last summer, it is clear that the Northeast remains dangerously reliant on a commodity that has shown extreme price volatility in recent years. The need for the Heating Oil Reserve was clearly illustrated this past summer when a catastrophe was emerging for our region with heating oil reaching the unprecedented level of $5 per gallon. Thankfully, the Northeast Home Heating Oil Reserve provided a basic level of assurance that heating oil could be provided if supplies were dramatically interrupted.

However, the trigger mechanism for the release of the funds is convoluted to the point that the program's functionality is in question and would not have allowed the reserve to be utilized if these prices had persisted. Indeed, under the law, the President does not have the ability to release heating oil from the reserve even if the health and safety of the population are at risk. Rather, the current threshold for release is when the differential between crude oil and heating oil is 60 percent high-

er than the five-year average. As a result, neither the overall price of heating oil nor the plight of our constituents has any effect on the release of the reserve. The formula trigger in statute is flawed to the point that the actual trigger has come close to being met not when crude oil prices are rising, but plummeting. This is clearly not the intent of the reserve and, without legislation, a meaningful federal tool that could be used to respond to an energy emergency is severely weakened.

I would like to thank the Chairman and Ranking Member again for holding this hearing and look forward to working with them to improve the legislation to address any concerns.

STATEMENT OF HON. LISA MURKOWSKI, U.S. SENATOR FROM ALASKA

Senator MURKOWSKI. Thank you, Mr. Chairman. I want to join you in welcoming the panel to the committee this afternoon.

I think we as a Nation have learned a number of hard lessons in the past few years with regard to energy supplies and price spikes. You mentioned the situation following Hurricanes Katrina and Rita and what happens when Gulf supplies get taken off line. We saw that again with Hurricane Gustav really reinforcing that.

Then last summer we spent a great deal of time debating whether to drawdown on the Strategic Petroleum Reserve or halt its filling in order to combat the record oil and gas prices at the time. But this proposal, we have before us today, goes beyond anything we have tried as the Federal Government. I have a few concerns about the idea of storing refined fuel in a centralized location. It seems to me that whatever problems can prevent normal fuel supplies from getting to market in an emergency are also going to exist as problems for our government supply of fuel getting to market in an emergency.

Strategic reserves of crude oil guard against supply disruptions from the foreign nations on which America chooses to rely upon for most of our oil. But refined reserves could be less about guarding against supply disruptions than perhaps guarding against outages of normal supply lines. Just as a general rule I have questions about how Congress can solve the issue better than the private sector.

The private sector is pretty typically incentivized to get the supplies online and into the stream of commerce with that said I'm very interested today in hearing the testimony from an excellent panel of witnesses. I'm happy to get a better sense as to why this proposal may or may not make sense.

I appreciate the opportunity to hear from the witnesses today and explore this a bit further. Thank you.

The CHAIRMAN. Thank you very much. Let me just introduce our five witnesses. Then we'll hear from each of them.

Mr. David Johnson is the Deputy Assistant Secretary for Petroleum Reserves in the Office of Fossil Energy in the Department of Energy. Thank you for being here.

Dr. Frank Rusco is the Director of Natural Resources and Environment with the Government Accountability Office. Thank you for being here.

Mr. John Shages is the former Deputy Assistant Secretary for Petroleum Reserves in the Office of Fossil Energy. Thank you for coming.

Mr. Kevin Book is Managing Director of ClearView Energy Partners here in Washington, DC.

Mr. Houssin is the Director of the Office of Oil Markets and Emergency Preparedness in the International Energy Agency in Paris. Thank you very much for coming.

If each of you could take 5 or 6 minutes and just make the main points that you think we need to understand that relates to this issue we would be very much appreciative. Then we'll probably have questions at that time.

Mr. Johnson.

STATEMENT OF DAVID F. JOHNSON, DEPUTY ASSISTANT SECRETARY FOR PETROLEUM RESERVES, DEPARTMENT OF ENERGY

Mr. JOHNSON. Thank you. Mr. Chairman and members of the committee, I'm pleased to be here today to discuss the issue of developing a refined product storage in the Strategic Petroleum Reserve. As you know the Reserve was established by Congress through the passage of the Energy Policy and Conservation Act in 1975 in response to the Arab oil embargoes.

The underpinning policy of the United States Petroleum Reserve has been to store crude oil. The Reserve has served to protect the Nation from crude oil disruptions over three decades. This decision was based primarily on the recognition that the United States has a robust, sophisticated and flexible refining industry.

In 2000 President Clinton directed the Department of Energy to establish a home heating oil reserve. Congress passed legislation to authorize the creation of the Northeast Home Heating Oil Reserve to address the heating oil supply vulnerabilities of that region. These two recent stockpiles in our open, flexible, competitive market have adequately addressed our vulnerabilities.

In the last 4-year period the United States Gulf Coast bore the impacts of two of the three most damaging hurricanes in American history. The SPR was utilized in response to these hurricanes both in 2005 and 2008. In both instances the Reserve provided loans of crude oil to the Gulf Coast refiners that were operating but unable to secure crude supplies.

Additionally the Strategic Petroleum Reserve executed a Presidentially ordered draw down of crude oil in 2005 as part of the coordinated IEA response to the disaster. In 2005 our IEA partners released their stocks of refined products which made available for sale additional fuel supplies to meet United States demands until domestic refining and distribution infrastructure were brought back online. Despite the efforts of the United States Strategic Petroleum Reserve and the IEA member countries, there were still some markets that could not be immediately supplied with refined products.

These markets were south of Virginia and north of Florida. They lacked the infrastructure to receive and distribute imports from the Atlantic coast to the inland population centers. As such this area is heavily dependent on gasoline supplies from the Gulf Coast refining centers through major product pipelines. This situation was realized again after Hurricanes Gustav and Ike damaged the Gulf Coast supply and the distribution infrastructure in 2008. This

time, however, the United States did not deem it necessary to request that the IEA initiate a coordinated release of its stocks.

The events of 2005 and 2008 have shown us that the Strategic Petroleum program may be limiting this ability to address some short term interruptions to our domestic refined product supply and distribution infrastructure. The question now to be answered is, do we have an increased probability of events such as hurricanes in the Gulf of Mexico that lead to short term disruptions of limited size that would warrant the additional costs of developing a refined product reserve. A major technical difference between storing refined products and storing crude oil is the relative stability of the commodity.

If stored properly, as crude is in the Strategic Petroleum Reserve caverns, it can be stored almost indefinitely without impact on quality or stability of the crude. However, refined products have a very limited storage life. These products degrade over time. The stocks require regular rotation and refreshment. The need to periodically rotate stocks adds to the cost of potential refined product reserve.

There are also many different regional and seasonal product specifications particularly for gasoline. Storing the right product and managing the rotation of stocks could be a challenge. However, many countries and private companies here and abroad have successfully built and maintained refined product storage. Therefore, there would be little to no technical uncertainty associated with the building of a refined product reserve.

I would like to conclude by saying that the administration has not, at this time, formulated a position on this proposed legislation and has not made a decision on the need to alter our crude oil reserve. The Strategic Petroleum Reserve currently with 720 million barrels of crude oil stands ready to provide crude oil to protect the U.S. in the event of a supply disruption. Additionally we look forward to working with Congress to make sure that the SPR continues to meet the Nation's need for energy security in the future.

This concludes my prepared testimony. I'll be happy to respond to questions that you have.

[The prepared statement of Mr. Johnson follows:]

PREPARED STATEMENT OF DAVID F. JOHNSON, DEPUTY ASSISTANT SECRETARY FOR PETROLEUM RESERVES, DEPARTMENT OF ENERGY

Mr. Chairman and members of the Committee, I am pleased to be here today to discuss the issue of developing refined products storage in the Strategic Petroleum Reserve. As you know, the SPR was established by Congress through passage of the Energy Policy and Conservation Act in 1975 in response to the Arab oil embargoes. The primary policy of the U.S. petroleum stockpiling program has been to store crude oil. The SPR has served to protect our Nation from crude oil supply interruptions for over three decades. This decision was based on the recognition that the United States has a robust, sophisticated and flexible refining industry. However, due to a temporary shipping disruption in Boston Harbor in 2000 prices for heating oil jumped dramatically for about a week in the midst of a very cold period. President Clinton directed the Department of Energy to establish a heating oil reserve and the Congress passed legislation authorizing the creation of the Northeast Home Heating Oil Reserve to address heating oil supply vulnerabilities in that region. These two stockpiles and our open, flexible, and competitive market have been adequate to effectively address our vulnerabilities.

DOMESTIC REFINING AND DISTRIBUTION INFRASTRUCTURE

The SPR currently consists of four storage facilities, two each in Louisiana and Texas, with a combined capacity to store 727 million barrels of crude oil in underground salt caverns. The current inventory of the SPR is just over 720 million barrels. The Gulf Coast region is the point of entry for over half of U.S. crude oil imports. Additionally, of the 17.6 million barrels per day of operable refining capacity in the U.S., nearly half or 8.4 million barrels per day is located in the U.S. Gulf Coast region. Locating the SPR storage facilities along the Gulf Coast allows direct access to all major commercial supply and distribution infrastructure within the region in the event of a supply disruption and allows access to the region's vast salt domes, which provide the lowest cost storage option for crude oil.

From the Gulf Coast, domestic crude oil production and foreign imports flow inland to refineries within the region and in the Midwest. Once refined, products such as gasoline, diesel, and jet fuel are shipped around the country by marine vessels and pipelines. A major disruption to the supply and distribution systems of the Gulf Coast region can potentially affect the entire country. However, the majority of the refined products produced in the Gulf Coast region are shipped to the East Coast, the Midwest, or consumed within the region.

Refined products travel to the Midwest primarily via pipeline systems. Within the Midwest region, there is approximately 3.6 million barrels per day of refining capacity; however, the region also receives over 900,000 barrels per day of refined product from the Gulf Coast region. In the event of a Gulf Coast disruption, the SPR can supply Midwest refineries with crude oil to meet that region's refinery demand, but the Midwest must rely upon product stocks stored in the region or seek additional imports to offset losses in the refined products received from the Gulf Coast. The average storage for gasoline in the Midwest since 1990 has been about 50 million barrels, and the average storage of distillate (diesel and heating oil) was about 29 million barrels. The SPR is currently unable to directly offset any additional loss in refined product supply to the region.

There is currently only 1.6 million barrels per day of refining capacity on the U.S. East Coast, none of which is north of New York City. As a result, the large population centers along the Eastern Seaboard must receive substantial fuels supplies, either imported or domestic, from outside the region. According to the Energy Information Administration, the U.S. East Coast consumes 40 percent to 45 percent, or over 3 million barrels per day, of the refined products produced in the U.S. Gulf Coast region. Between 500,000 and 600,000 barrels per day of Gulf Coast products are shipped to the East Coast on barges or other small vessels. However, a significant quantity of fuels supplied to the East Coast from the Gulf Coast arrives via pipeline. The Colonial Pipeline and the Plantation Pipeline systems have the ability to transport up to 2.4 million barrels per day and 600,000 barrels per day of petroleum products, respectively, to markets in both the South-Central and Eastern United States. These pipelines supply all or some of the refined products consumed in major population centers such as Nashville, TN; Atlanta, GA; Charlotte, NC; Washington, DC; Philadelphia, PA; and New York City. The East Coast receives an additional 1.5 million barrels per day of refined product imports. Aside from the relatively small quantity of heating oil stored in the Northeast Home Heating Oil Reserve, the region must rely upon product stocks stored in the region or seek additional imports to offset losses in refined products received from the Gulf Coast. The average storage for gasoline in the Northeast since November 1990 has been about 50 million barrels, and the average storage of distillate (diesel and heating oil) was about 48 million barrels. The SPR is currently unable to directly offset any additional loss in refined product supply to the region.

In the event of a major petroleum supply interruption, it has long been assumed that the SPR could supply crude oil to our domestic refiners which would produce the necessary refined products or that we will be able to increase imports of available alternative supplies or strategic refined products stocks that were released by our International Energy Agency (IEA) partners. While this is still true, our recent experiences with hurricanes hitting the Gulf Coast have demonstrated that there are some regions that may not have access to alternative fuel supplies, leading to localized disruptions. However, these disruptions were of short-term duration.

HURRICANE VULNERABILITIES AND DISTRIBUTION IMPACTS

In a four-year period, the United States Gulf Coast bore the impact of two of the three most damaging hurricanes in American history.

Over the three-week period following Hurricane Katrina in 2005, the wholesale price of gasoline on the Gulf Coast increased by over 38 percent, to $2.60 per gallon, before gradually retreating. The wholesale price of diesel fuel increased by 41 per-

cent to $2.70 per gallon over the same period. Within a month of Hurricane Katrina, product imports increased nearly 25 percent above the pre-hurricane level offsetting much of the decline in domestic production. This situation was mirrored in September 2008 when Hurricanes Gustav and Ike hit the Gulf Coast in close succession. Wholesale gasoline prices on the Gulf Coast increased by 22 percent to $3.66 per gallon in the first half of September 2008 when Hurricanes Gustav and Ike both struck the U.S. Higher gasoline prices lasted through October 2008. However, wholesale prices of diesel fuel actually fell over this period of time due to the rapidly decreasing prices of crude oil. By the end of September 2008, product imports increased by more than 30 percent above the pre-Hurricane Gustav level in response to the increase in fuel prices and helped address lower domestic production.

The SPR was utilized in response to the hurricanes of both 2005 and 2008. In both instances the Reserve provided loans of crude oil to Gulf Coast refiners that were operating but unable to secure crude supplies. Additionally, the SPR executed a Presidentially-ordered sale of crude oil in 2005 as part of a coordinated IEA response to the disaster. In 2005, our IEA partners released their stocks of refined products, which made available for sale additional fuel supplies to meet U.S. demand until domestic refining and distribution infrastructure was brought back online.

Despite the efforts of the U.S. SPR and IEA member countries, there were some markets that could not be immediately supplied with refined products. These markets, south of Virginia and north of Florida, lack the infrastructure to receive and distribute imports from the Atlantic coast to inland population centers. As such, this area is heavily dependent on gasoline supplies from the Gulf Coast refinery centers through major product pipelines. Disruptions to pipeline service were linked in many cases to electricity outages, rather than to damage to the pipelines themselves. This situation was realized again after Hurricanes Gustav and Ike damaged the Gulf Coast supply and distribution infrastructure in 2008. This time, however, the United States did not deem it necessary to request that the IEA initiate a coordinated emergency release of its stocks from our IEA partners.

It is also important to note that there are several areas in the United States that primarily receive their refined products through a single mode of transportation. For example, there are parts of the western United States that would be completely cut off from fuel supplies if an earthquake or other disaster affected refinery or pipeline operations.

SPR MISSION AND CAPABILITIES OF A REGIONAL PRODUCT RESERVE

The SPR was established in response to the Arab oil embargo of 1973 to protect the United States from interruption to our foreign crude oil imports. The decision to store only crude oil in the Reserve was based largely on the notion that our domestic refining industry was secure and had the ability to refine and distribute SPR crude oil to meet consumers' needs during an extended supply disruption. The Department of Energy still considers that a large SPR focused on crude oil storage to be the best way to protect the Nation from the negative impacts of a short-term international interruption to our crude oil imports. However, the events of 2005 and 2008 have shown us that this system may be limited in its ability to address some short-term interruptions to our domestic refined products supply and distribution infrastructure. The question now to be answered is: do we have an increased probability of events such as hurricanes in the Gulf of Mexico that lead to short-term disruptions of limited size that warrant the additional cost of developing a refined products reserve? The cost of storing refined products has also been a factor supporting the "all crude oil" SPR philosophy. The cost of storing refined products can be substantially higher than that of storing crude oil. As an example, it costs $4.80 per barrel per year to store heating oil in the Northeast Home Heating Oil Reserve, whereas the cost to store crude oil in the SPR is $0.21 per barrel per year. The costs incurred from a domestic product reserve must then be carefully weighed against the benefits of a new product reserve.

TECHNICAL ISSUES

A major technical difference between storing refined products and storing crude oil is the relative stability of the commodity. When stored properly, as it is in SPR salt caverns, crude oil can be stored almost indefinitely without any impact on the quality or stability of the crude. However, refined products have a limited storage life. The products degrade over time and stocks require regular rotation and replenishment. The need to continuously rotate stocks adds logistical constraints and costs to any potential refined products reserve. There are also many different regional and seasonal product specifications, particularly for gasoline. Storing the right prod-

ucts and managing the rotation of these stocks could be a challenge. However, many countries and private companies, both here and abroad, have successfully built and maintained refined products storage. Therefore, there would be little or no technical uncertainty associated with building a refined products reserve.

CONCLUSION

I would like to conclude by saying that the Administration has not at this time formulated a position on this proposed legislation and has not made a decision on the need to alter our SPR Policy. The Strategic Petroleum Reserve currently with 720 million barrels of crude oil stands ready to provide crude oil to protect the U.S. in the event of a supply disruption. Additionally, we look forward to working with Congress to make sure that the SPR continues to meet the Nation's need for energy security into the future. This concludes my prepared testimony, and I will be happy to respond to any questions you may have.

The CHAIRMAN. Thank you very much.

Dr. Rusco.

STATEMENT OF FRANK RUSCO, DIRECTOR, NATURAL RESOURCES AND ENVIRONMENT, GOVERNMENT ACCOUNTABILITY OFFICE

Mr. RUSCO. Thank you. Mr. Chairman and members of the committee, thank you for the opportunity to participate in this hearing on the potential for a strategic petroleum product reserve and the management of the Northeast Home Heating Oil Reserve.

In my summary statement I will discuss two primary factors that illustrate the potential value of a strategic petroleum product reserve. I will also discuss a key issue, specific to the United States, which if not addressed could complicate the holding of strategic petroleum product reserves. Last I will discuss one important lesson learned from evaluating the management of the current Strategic Petroleum Reserve that can be applied to reduce the costs of filling and maintaining a strategic product reserve or the Home Heating Oil Reserve should it be used or expanded going forward.

Two primary factors illustrate the potential benefits of a strategic petroleum product reserve.

First, as has long been the case with crude oil, gasoline and other petroleum products are increasingly globally traded commodities. The United States is now a large net importer of gasoline. While there are clear benefits associated with buying gasoline from Europe and other regions when prices make such purchases advantageous.

There are also potential costs. Specifically the global nature of gasoline and other petroleum products means that events anywhere in the world that disrupt supplies of these products can reduce United States supplies and increase prices. It also means that the supply chain from refiner to final consumer for gasoline may be both longer and more complicated than it used to be which may increase the amount of time it takes to resupply in the event of a domestic refining or pipeline disruption.

Another factor favoring a strategic product reserve is the nature of supply disruption such as Hurricanes Katrina and Rita which can be expected to result in losses of refining capacity or delivery infrastructure. In such cases a strategic crude oil reserve as we currently have is of far less help than it is in responding to a disruption that only affects crude oil supply. Having both crude oil and petroleum products would provide some diversification against

the varied types of supply risk that the country faces and enable a response to more types of disruption than the current reserve allows.

With regard to challenges associated with a strategic product reserve there are a number of issues such as the higher cost of storing petroleum products than for crude oil and the fact that crude oil can be stored almost indefinitely while gasoline will have to be turned over every 18 to 24 months to maintain its integrity as a motor fuel. However, a number of countries do hold petroleum product reserves. So we know it is technically feasible and that these countries have found it in their interest to do so.

I want to focus therefore on one issue specific to the United States which if left unaddressed potentially complicates the holding of petroleum product reserves. This issue is a proliferation of fuel types in the United States that has resulted from Federal and State efforts to improve air quality. For example there are over a dozen special, cleaner burning blends of gasoline that are required to be used in specific regions or localities and which have contributed to improved air quality in these areas.

To be maximally effective a petroleum product reserve might have to maintain stocks of all of these blends. Recently this proliferation of fuel types has continued as international, Federal, State and local initiatives to increase the use of biofuels appear to be headed toward a patchwork of different biofuel blends that vary by region or locality. This could further complicate the shipping and storage of appropriate blends of gasoline and biofuel blending agents for strategic purposes, especially as biofuel use is evolving and changing over time.

Many of the complications associated with having different fuel types could be reduced if supply emergencies large enough to illicit the use of strategic reserves were accompanied by waivers of requirements to use special fuel blends. Thereby allowing the limited number of fuel blends to be used anywhere and reducing the number of blends that would be kept in the reserve. Currently EPA has the authority to waive the requirement to use special blends and has done so in the past, most notably in the aftermath of Hurricanes Katrina and Rita. However this authority is not linked explicitly to decisions on when to use strategic reserves.

Last there is an opportunity to save a great deal of money when filling strategic reserves by paying attention to prices. Our past evaluations of the current Strategic Petroleum Reserve indicate that following the dollar cost averaging approach when filling can save money regardless of the level or trend of prices as long as there is price volatility. With a product reserve this too would apply. But there is also systematic, seasonal price variation that could further reduce the costs of filling the reserve initially or replenishing it when and if it is used. The same can be said for the Northeast Home Heating Oil Reserve in the event that it is put into use or expanded in the future.

While we have not studied this in enough detail to estimate the range of potential savings for product reserves a combination of dollar cost averaging and buying more during traditionally lower priced periods. For example, winter months for gasoline would likely save millions of dollars compared to a strategy of simply buying

products at a steady rate as has been done for much of the filling of the existing Strategic Petroleum Reserve.

This concludes my oral statement. I would be happy to answer any questions. Thank you.

[The prepared statement of Mr. Rusco follows:]

PREPARED STATEMENT OF FRANK RUSCO, DIRECTOR, NATURAL RESOURCES AND ENVIRONMENT, GOVERNMENT ACCOUNTABILITY OFFICE

STRATEGIC PETROLEUM RESERVE

ISSUES REGARDING THE INCLUSION OF REFINED PETROLEUM PRODUCTS AS PART OF THE STRATEGIC PETROLEUM RESERVE

Why GAO Did This Study

The possibility of storing refined petroleum products as part of the Strategic Petroleum Reserve (SPR) has been contemplated since the SPR was created in 1975. The SPR, which currently holds about 700 million barrels of crude oil, was created to help insulate the U.S. economy from oil supply disruptions. However, the SPR does not contain refined products such as gasoline, diesel fuel, or jet fuel. The Energy Policy Act of 2005 directed the Department of Energy (DOE) to increase the SPR's capacity from 727 million barrels to 1 billion barrels, which it plans to do by 2018.

With the possibility of including refined products as part of the expansion of the SPR, this testimony discusses (1) some of the arguments for and against including refined products in the SPR and (2) lessons learned from the management of the existing crude oil SPR that may be applicable to refined products.

To address these issues, GAO relied on its 2006 report on the SPR (GAO-06-872), 2007 report on the globalization of petroleum products (GAO-08-14), and two 2008 testimonies on the costeffectiveness of filling the SPR (GAO-08-512T and GAO-08-726T). GAO also reviewed prior DOE and International Energy Agency studies on refined product reserves.

What GAO Found

Since the SPR, the largest crude oil reserve in the world, was created in 1975 a number of arguments have been made for and against including refined petroleum products. Some of the arguments for including refined products in the SPR are: (1) the United States' increased reliance on imports and resulting exposure to supply disruptions or unexpected increases in demand elsewhere in the world, (2) possible reduced refinery capacity during weather related supply disruptions, (3) time needed for petroleum product imports to reach all regions of the United States in case of an emergency, and (4) port capacity bottlenecks in the United States, which limit the amount of petroleum products that can be imported quickly during emergencies. For example, the damage caused by Hurricane Katrina demonstrated that the concentration of refineries on the Gulf Coast and resulting damage to pipelines left the United States to rely on imports of refined product from Europe. Consequently, regions experienced a shortage of gasoline and prices rose. Conversely, some of the arguments against including refined products in the SPR are: (1) the surplus of refined products in Europe, (2) the high storage costs of refined products, (3) the use of a variety of different type of blends of refined products—"boutique" fuels—in the United States, and (4) policy alternatives that may diminish reliance on oil. For example, Europe has a surplus of gasoline products because of a shift to diesel engines, which experts say will continue for the foreseeable future. Europe's surplus of gasoline is available to the United States in emergencies and provided deliveries following Hurricanes Katrina and Rita in 2005.

The following three lessons learned from the management of the existing SPR may have some applicability in dealing with refined products.

- Select a cost-effective mix of products. In 2006, GAO recommended that DOE include at least 10 percent heavy crude oil in the SPR. If DOE bought 100 million barrels of heavy crude oil during its expansion of the SPR it could save over $1 billion in nominal terms, assuming a price differential of $12 between the price of light and heavy crude, the average differential from 2003 through 2007. Similarly, if directed to include refined products as part of the SPR, DOE will need to determine the most cost-effective mix of products.
- Consider using a dollar-cost-averaging acquisition approach. Also in 2006, GAO recommended that DOE consider acquiring a steady dollar value—rather than a steady volume—of oil over time when filling the SPR. This would allow DOE

to acquire more oil when prices are low and less when prices are high. GAO expects that a dollar-cost-averaging acquisition method would also provide benefits when acquiring refined products.

- Maximize cost-effective storage options. According to DOE, below ground salt formations offer the lowest cost approach for storing crude oil for long periods of time—$3.50 per barrel in capital cost versus $15 to $18 per barrel for above ground storage tanks. Similarly, DOE will need to explore the most cost-effective storage options for refined products.

Mr. Chairman and Members of the Committee:

We are pleased to be here today to participate in the Committee's hearing on the proposal to include refined petroleum products as part of the Strategic Petroleum Reserve (SPR). The Energy Policy and Conservation Act authorized the establishment of the SPR in 1975 to help protect the U.S. economy from damage caused by oil supply disruptions following the Arab oil embargo of 1973 to 1974.[1] The SPR, which consists of over 700 million barrels of crude oil stored in salt caverns in Texas and Louisiana, is owned by the federal government and operated by the Department of Energy (DOE). When processed, crude oil is refined to produce petroleum products such as gasoline, diesel, and jet fuel. As originally enacted, the Energy Policy and Conservation Act envisioned the possibility that the SPR would include a variety of petroleum products stored at locations across the country. Specifically, section 154(d) of the 1975 act stated that:

> The Strategic Petroleum Reserve Plan shall be designed to assure, to the maximum extent practicable, that the Reserve will minimize the impact of any interruption or reduction in imports of refined petroleum products and residual fuel oil in any region which the Administrator determines is, or is likely to become, dependent upon such imports for a substantial portion of the total energy requirements of such region. The Strategic Petroleum Reserve Plan shall be designed to assure, to the maximum extent practicable, that each noncontiguous area of the United States which does not have overland access to domestic crude oil production has its component of the Strategic Petroleum Reserve within its respective territory.[2]

However, a Federal Energy Administration (FEA) study in 1977[3] found that, at that time, it was less costly to maintain a centralized crude oil reserve rather than dispersed storage with multiple product reserves. The possibility of including refined petroleum products at part of the SPR has been studied periodically by DOE since the mid-1970s and each time the idea has been rejected.

Since 1974, the United States and 27 other nations have become members of the International Energy Agency (IEA) and have agreed to maintain reserves of oil or petroleum products equaling 90 days of net imports and to release these reserves and reduce demand during oil supply disruptions.[4] IEA member nations fulfill this obligation in various ways; some countries require that industry hold reserves, others have created government reserves, and some countries hold a combination of the two. Additionally, some IEA countries hold refined products in addition to crude oil reserves while the U.S. holds only crude oil. In May 2009, the SPR contained about 719 million barrels, equal to about 65 days of 2008 U.S. average net monthly oil imports. In addition to government reserves, private industry inventory of crude oil and petroleum products varies over time, but DOE estimates that private inventory contains an amount equivalent to an additional 59 days of U.S. oil imports. Thus, at the current level of oil demand, the SPR combined with private industry holdings contains enough oil and petroleum products to exceed the United States' 90-day reserve requirement.

The Energy Policy Act of 2005 directed DOE to increase the SPR inventory to 1 billion barrels.[5] DOE plans to accomplish this increase by 2018 and has chosen to increase the size of two current SPR sites and create one new site to accommodate the expansion in inventory. In August 2006 we made a number of recommendations

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[1] Pub. L. No. 94-163, Title I, Part B, 89 Stat. 881–90 (1975), codified as amended at 42 U.S.C. §§ 6231–6247(b).

[2] Repealed by Pub. L. No. 106-469, Title I, § 103(7)(C), 114 Stat. 2030 (2000).

[3] FEA, which was a predecessor agency to DOE, authored the 1977 study. FEA's functions were transferred to DOE effective October 1, 1977.

[4] The 28 member countries of the International Energy Agency are Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Japan, Republic of Korea, Luxembourg, The Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Spain, Sweden, Switzerland, Turkey, United Kingdom, and United States.

[5] Pub. L. No. 109–58, Title III, § 301(e)(1), 119 Stat. 684 (2005).

to the Secretary of Energy to improve the operation of the SPR and to improve decisions surrounding the SPR's use and expansion.[6] Specifically, we recommended, among other things, that the Secretary should study how to best implement experts' suggestions to fill the SPR more cost-effectively and to conduct a new review about the optimal oil mix in the SPR. Largely based on our August 2006 report, we testified twice in 2008 on options for DOE to improve the cost-effectiveness of filling the SPR to 1 billion barrels.[7]

With the expansion of the SPR, the issue of including refined petroleum products has resurfaced. As Congress debates whether to require DOE to include refined petroleum products, our testimony today will (1) summarize some of the arguments for and against including refined petroleum products and (2) highlight some of the lesson learned from the management of the existing SPR that may be applicable to refined petroleum products.

To address these issues, we reviewed our August 2006 report on the SPR, our December 2007 report on the globalization of petroleum products,[8] and our two 2008 testimonies on the cost-effectiveness of filling the SPR. We also reviewed the Energy Policy and Conservation Act, as amended; the regulations on the acquisition of petroleum for the SPR;[9] and prior DOE studies on the feasibility of including refined petroleum products as part of the SPR. In addition, we spoke with an IEA official and we reviewed IEA documents dealing with the issue of refined petroleum product reserves in the United States and other IEA member countries overseas. We conducted our work from April 2009 to May 2009 in accordance with all sections of GAO's Quality Assurance Framework that are relevant to our objectives. The framework requires that we plan and perform the engagement to obtain sufficient and appropriate evidence to meet our stated objectives and to discuss any limitations in our work. We believe that the information and data obtained, and the analysis conducted, provide a reasonable basis for any findings and conclusions.

BACKGROUND

The United States is the largest consumer of crude oil and petroleum products. In 2007, the U.S. share of world oil consumption was approximately 24 percent. While DOE projects that U.S. demand for oil will continue to grow, domestic production has generally been in decline for decades, leading to greater reliance on imported oil. U.S. imports of oil have increased from 32 percent of domestic demand in 1985 to 58 percent in 2007.

In managing the SPR, the Secretary of Energy is authorized by the Energy Policy and Conservation Act, as amended, to place in storage, transport, or exchange, (1) crude oil produced from federal lands; (2) crude oil which the United States is entitled to receive in kind as royalties from production on federal lands; and (3) petroleum products acquired by purchase, exchange, or otherwise.[10] The act also states that the Secretary shall, to the greatest extent practicable, acquire petroleum products for the SPR in a manner that minimizes the cost of the SPR and the nation's vulnerability to a severe energy supply interruption, among other things.[11] In addition, until being repealed in 2000, the act provided the Secretary discretionary authority to require importers and refiners of petroleum products to store and maintain readily available inventories, and it directed the Secretary to establish and maintain regional petroleum reserves under certain circumstances.[12]

Under conditions prescribed by Energy Policy and Conservation Act, as amended, the President has the discretion to authorize the Secretary of Energy to release the oil in the SPR to minimize significant supply disruptions.[13] In the event of an oil

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[6] GAO, Strategic Petroleum Reserve: Available Oil Can Provide Significant Benefits, but Many Factors Should Influence Future Decisions about Fill, Use, and Expansion, GAO–06–872 (Washington, D.C.: Aug. 24, 2006).

[7] GAO, Strategic Petroleum Reserve: Options to Improve the Cost-Effectiveness of Filling the Reserve, GAO-08-521T, (Washington, D.C.: Feb. 26, 2008); and GAO, Strategic Petroleum Reserve: Improving the Cost-Effectiveness of Filling the Reserve, GAO–08–726T (Washington, D.C.: Apr. 24, 2008).

[8] GAO, Energy Markets: Increasing Globalization of Petroleum Products Markets, Tightening Refining Demand and Supply Balance, and Other Trends Have Implications for U.S. Energy Supply, Prices, and Price Volatility, GAO–08–14 (Washington, D.C.: Dec. 20, 2007).

[9] 10 C.F.R. Part 626.

[10] 42 U.S.C. § 6240(a).

[11] 42 U.S.C. § 6240(b).

[12] Pub. L. No. 94–163, Title 1, Part B, §§ 156, 157, 89 Stat. 885–86 (1975), previously codified as amended at 42 U.S.C. § 6236 (Industrial Petroleum Reserve) and § 6237 (Regional Petroleum Reserve), respectively. Repealed by Pub. L. No. 106–469, Title I, §§ 103(9),(10), 114 Stat. 2030 (2000).

[13] Pub. L. No. 94–163, § 161, 89 Stat. 888–89 (1975), codified as amended at 42 U.S.C. § 6241.

supply disruption, the SPR can provide supply to the market—by selling stored crude oil or trading this oil in exchange for a larger amount of oil to be returned later. Presidents have twice ordered that oil be sold from the SPR in response to oil supply disruptions: that is, in response to the 1990-1991 Persian Gulf War and Hurricane Katrina in 2005. When oil is released from the SPR, it flows through commercial pipelines or on waterborne vessels to refineries, where it is converted into gasoline and other petroleum products, then transported to distribution centers for sale to the public. Additionally, the SPR has sold or exchanged oil on several other occasions, including providing small quantities of oil to refiners to help them through short-term localized oil shortages.

Oil markets have changed substantially in the 34 years since the establishment of the SPR. At the time of the Arab oil embargo, price controls in the United States prevented the prices of oil and petroleum products from increasing as much as they otherwise might have, contributing to a physical oil shortage that caused long lines at gasoline stations throughout the United States. Now that the oil market is global, the price of oil is determined in the world market primarily on the basis of supply and demand. In the absence of price controls, scarcity is generally expressed in the form of higher prices, as purchasers are free to bid as high as they want to secure oil supply. In a global market, an oil supply disruption anywhere in the world raises prices everywhere. Releasing oil reserves during a disruption provides a global benefit by reducing oil prices in the world market.

In response to various congressional directives, DOE has studied the issue of including refined petroleum products at various times since 1975. After the initial SPR plan was developed, the issue was reviewed again in whole, or in part, in 1977, 1982, 1989, and 1998.[14] Except for the 1998 report, DOE concluded that including refined petroleum products as part of the SPR was unnecessary and too expensive. The 1998 study dealt with establishing a home heating oil reserve and while it did not conclude that a reserve should or should not be established, it did find the construction of such a reserve would have net negative benefits. The 2000 amendments to the Energy Policy and Conservation Act authorized the Secretary to establish a Northeast Home Heating Oil Reserve, which was created and filled that same year. Although this reserve is considered separate from the SPR, it is authorized to contain 2 million barrels of heating oil and currently holds nearly that amount.[15] The Reserve is an emergency source of heating oil to address a severe energy supply interruption in the Northeast.[16] According to DOE, the intent was to create a reserve large enough to allow commercial companies to compensate for interruptions in supply of heating oil during severe winter weather, but not so large as to dissuade suppliers from responding to increasing prices as a sign that more supply is needed. To date, the Northeast Home Heating Oil Reserve has not been used to address an emergency winter shortage situation.

SOME OF THE ARGUMENTS FOR AND AGAINST INCLUDING REFINED PETROLEUM PRODUCTS IN THE SPR

Some of the arguments for including refined petroleum products in the SPR are: (1) the United States' increased reliance on foreign imports and resulting exposure to supply disruptions or unexpected increases in demand elsewhere in the world, (2) possible reduced refinery capacity during weather related supply disruptions, (3) time needed for petroleum product imports to reach all regions of the United States in case of an emergency, and (4) port capacity bottlenecks in the United States which limit the amount of petroleum products that can be imported quickly during emergencies. Some of the arguments against including refined petroleum products in the SPR are: (1) the surplus of gasoline in Europe, (2) the high storage costs of refined products, (3) the use of 'boutique' fuels in the United States, and (4) policy alternatives may diminish U.S. reliance on oil.

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[14] Federal Energy Administration, Strategic Petroleum Reserve Office, Strategic Petroleum Reserve Plan, Energy Publication No. 95-2 (Washington, D.C.: January 1977); DOE, Office of the Secretary, A Report to the Congress: Regional Petroleum Reserves, DOE/EP-0080 (Washington, D.C.: Dec. 31, 1982); DOE, Office of the Assistant Secretary for Fossil Energy, Report to the Congress on Expansion of the Strategic Petroleum Reserve to One Billion Barrels, DOE/FE-0126 (Washington, D.C.: Apr. 1989); DOE, Office of the Assistant Secretary for Fossil Energy, Report to Congress on the Feasibility of Establishing a Heating Oil Component of the Strategic Petroleum Reserve, DOE/FE-0376 (Washington, D.C.: June 1998).

[15] During June 2007, DOE sold 35,000 of its two million barrel reserve in order to cover the higher costs of new storage contracts. In August 2008, DOE repurchased 19,253 barrels of heating oil using $3 million of appropriated funds, taking the inventory to 1,984,253 barrels.

[16] Pub. L. No. 106–469, Title II, 114 Stat. 2034–37 (2000), codified as amended at 42 U.S.C. §§ 6250–6250e.

Some of the Arguments for Including Refined Petroleum Products in the SPR

First, in our December 2007 report,[17] we found that while the United States was largely self-sufficient in gasoline in 1970, in fiscal year 2007, we imported over 10 percent of our annual consumption of gasoline and smaller percentages of jet fuel and some other products.[18] We also found that along with an increased reliance on imports the United States is exposed to supply disruptions or unexpected increases in demand anywhere else in the world. Because the SPR contains only crude oil, if an unexpected supply disruption occurs in a supply center for the United States, the government's emergency strategy would rely on sufficient volumes of the SPR and a refinery sector able to turn out products at a pace necessary to meet consumer demands in a crisis. Any growth in demand in the United States would put increasing pressure on this policy, and for much of the past 25 years, demand for refined petroleum products in the United States and internationally has outpaced growth in refining capacity.

Second, in our August 2006 report,[19] we found that the ability of the SPR to reduce economic damage may be impaired if refineries are not able to operate at capacity or transport of oil to refineries is delayed. For example, petroleum product prices still increased dramatically following Hurricanes Katrina and Rita, in part because many refineries are located in the Gulf Coast region and power outages shut down pipelines that refineries depend upon to supply their crude oil and to transport their refined petroleum products to consumers. DOE reported that 21 refineries in affected states were either shut down or operating at reduced capacity in the aftermath of the hurricane. In total, nearly 30 percent of the refining capacity in the United States was shut down, disrupting supplies of gasoline and other products. Two pipelines that send petroleum products from the Gulf coast to the East Coast and the Midwest were also shut down as a result of Hurricane Katrina. For example, Colonial Pipeline, which transports petroleum products to the Southeast and much of the East Coast, was not fully operational for a week after Hurricane Katrina. Consequently, average retail gasoline prices increased 45 cents per gallon between August 29 and September 5, short-term gasoline shortages occurred in some places, and the media reported gasoline prices greater than $5 per gallon in Georgia. The hurricane came on the heels of a period of high crude oil prices and a tight balance worldwide between petroleum demand and supply, and illustrated the volatility of gasoline prices given the vulnerability of the gasoline infrastructure to natural or other disruptions.

Third, because some foreign suppliers are farther from the U.S. demand centers they serve than the relevant domestic supply center, the time it takes to get additional product to a demand center experiencing a supply shortfall may be longer than it would be if the United States had its own product reserves. For example, imports of gasoline to the West Coast may come from as far away as Asia or the Middle East, and the transport time and therefore cost is greater. To the extent that imported gasoline or other petroleum products come from far away, the lengthening of the supply chain has implications for the ability to respond rapidly to domestic supply shortfalls. Specifically, if supplies to relieve a domestic regional supply shortfall must come from farther away, the price increases associated with such shortfalls may be greater and/or last longer. In this sense, the West Coast and the middle of the country are more vulnerable to price increases or volatility than is the Northeast, which can receive shipments of gasoline from Europe, often on voyages of less than a week.

Fourth, the receipt of petroleum products may be delayed because port facilities are operating at or near capacity. For example, one-fourth of the ports in a U.S. Maritime Administration (MARAD) survey described their infrastructure impediments as "severe." Officials from the interagency U. S. Committee on the Maritime Transportation System, which includes MARAD, the National Oceanic and Atmospheric Administration, and the U.S. Army Corps of Engineers, told us that U.S. ports and waterways are constrained in capacity and utilization, and anticipate marine supply infrastructure will become more constrained in the future. Officials at the Ports of Los Angeles, Long Beach, Oakland, Houston, Savannah, and Charleston reported congestion and emphasized in a 2005 report that they are experiencing higher than projected growth levels. In fact, one European product transporter we spoke with said that the European response to Hurricanes Rita and Katrina were hindered because East Coast ports in the United States could not handle the num-

[17] GAO-08-14.

[18] Total gasoline includes both finished motor gasoline and motor gasoline blending components.

[19] GAO-06-872.

ber of oil tankers carrying petroleum products from Europe, with some tankers waiting for as long as 2 weeks at port.

Some of the Arguments Against Including Refined Petroleum Products in the SPR

First, a key impetus for global trade in petroleum products has been a structural surplus in production of gasoline and a deficit in production of diesel in Europe. This surplus of gasoline is largely the result of a systematic switch in European countries toward automobiles with diesel-powered engines, which are more fuel efficient than gasolinepowered engines. European regulators promoted diesel fuel use in Europe by taxing diesel at a lower rate, and European demand for diesel vehicles rose. The European refining and marketing sector responded to this change in demand by importing increasing amounts of diesel, and exporting a growing surplus of gasoline to the United States and elsewhere. The United States has purchased increasing amounts of gasoline, including gasoline blendstocks, from Europe in recent years. These imports have generally had a strong seasonal component, with higher levels of imports during the peak summer driving months and lower imports during the fall and winter. The major exception to this seasonality came in the months of October 2005 through January 2006, when imports surged in response to U.S. shortfalls resulting from Hurricanes Katrina and Rita in August and September 2005, respectively. Experts and company representatives told us they believe this structural imbalance within the European Union will continue for the foreseeable future, and perhaps widen, resulting in more exports of European gasoline and blending components to the United States.

Second, in its prior reports on the subject, DOE found that refined petroleum product reserves are more costly than crude oil to store and must be periodically used and replaced to avoid deterioration of the products. Although DOE officials said some refined products can be stored in salt caverns just as the SPR crude oil is currently stored, these caverns are predominantly found on the Gulf Coast. In order to store refined product in other parts of the United States, storage tanks may need to be built, which is costlier than centralized salt cavern storage. According to DOE, stockpiling oil in salt caverns costs about $3.50 per barrel in capital costs. Storing oil in aboveground tanks, by comparison, can cost $15 to $18 per barrel. One of the maintenance costs of refined petroleum products that is not associated with crude oil storage is turnover, or replacement costs, because refined products deteriorate more quickly. Turnover of the product is required to ensure quality. For example, DOE found that when gasoline is stored in above-ground tanks, the turnover time is 18 to 24 months. Conversely, DOE found that crude oil could be stored for prolonged periods without losing quality. The more frequent the turnover, the higher the throughput and administrative costs.

Third, while the language in the Energy Policy and Conservation Act addresses refined petroleum products as well as crude oil, DOE conducted a study in 1977 that found geographically dispersed, small reserves of a variety of petroleum products would be more costly than a centralized crude oil reserve. For example, many states have adopted the use of special gasoline blends—or 'boutique' fuels, which could pose a challenge in incorporating refined products in the SPR. Unless requirements to use these fuels were waived during emergencies, as they were in the aftermath of Hurricanes Katrina and Rita, boutique fuels could need to be strategically stored at multiple regional, state, or local locations due to reduced product fungibility. Conversely, crude oil provides flexibility in responding to fluctuations in refined product market needs as regional fuel specifications and environmental requirements change over time. Furthermore, the switching of seasonal blends to meet environmental requirements and product degradation would require inventory turnover as compared to crude oil storage, which does not require the same level of turnover.

Fourth, there are several policy choices that might diminish the growth in U.S. demand for oil. First, research and investment in alternative fuels might reduce the growth of U.S. oil demand. Vehicles that use alternative fuels, including ethanol, biodiesel, liquefied coal, and fuels made from natural gas, are now generally more expensive or less convenient to own than conventional vehicles, because of higher vehicle and fuel costs and a lack of refueling infrastructure. Alternative-fuel vehicles could become more viable in the marketplace if their costs and fuel delivery infrastructure become more comparable to vehicles fueled by petroleum products. Second, greater use of advanced fuel-efficient vehicles, such as hybrid electric and advanced diesel cars and trucks, could reduce U.S. oil demand. The Energy Policy Act of 2005, as amended, directs the Secretary of Energy to establish a program that includes grants to automobile manufacturers to encourage domestic production of these vehi-

cles.[20] Third, improving the Corporate Average Fuel Economy (CAFE) standards could curb demand for petroleum fuels. After these standards were established in 1975, the average fuel economy of new light-duty vehicles improved from 13.1 miles per gallon in 1975 to a peak of 22.1 miles per gallon in 1987.[21] More recently, the fuel economy of new vehicles in the United States has stagnated at approximately 21 miles per gallon. However, CAFE standards have recently been raised to require auto manufacturers to achieve a combined fuel economy average of 35 miles per gallon for both passenger and nonpassenger vehicles beginning in model year 2020.[22] Any future increases could further decrease the U.S. oil demand.

LESSONS LEARNED FROM THE MANAGEMENT OF THE EXISTING SPR THAT MAY BE RELEVANT TO REFINED PETROLEUM PRODUCTS

The following three lessons learned from the management of the existing crude oil SPR highlight some of the issues that may need to be considered in acquiring refined petroleum products.

- Select a cost-effective mix of products. To fill the SPR in a more cost-effective manner, we recommended in August 2006 that DOE include in the SPR at least 10 percent heavy crude oils,[23] which are generally cheaper to acquire than the lighter oils that comprise the SPR's volume.[24] Including heavier oil in the SPR could significantly reduce fill costs because heavier oil is generally less expensive than lighter grades. For example, if DOE included 10 percent heavy oil in the SPR as it expands to 1 billion barrels that would require DOE to add 100 million barrels of heavy oil, or about one-third of the total new fill. From 2003 through 2007, Maya—a common heavy crude oil—has traded for about $12 less per barrel on average than West Texas Intermediate—a common light crude oil. If this price difference were to persist over the duration of the new fill period, DOE would save about $1.2 billion in nominal terms by filling the SPR with 100 million barrels of heavy oil.[25] Similarly, refined petroleum products included as part of the SPR may comprise a number of different types of products (e.g., gasoline, diesel, and jet fuel) and possibly different blends of products (e.g., different grades and mixtures of gasoline); DOE will need to determine the most cost-effective mix of products in light of existing legal and regulatory requirements to use specific blends of fuels.
- Consider using a dollar-cost-averaging acquisition approach. Also in our August 2006 report, we recommended that DOE consider filling the SPR by acquiring a steady dollar value of oil over time, rather than a steady volume as has occurred in recent years. This "dollar-cost-averaging" approach would allow DOE to take advantage of fluctuations in oil prices and ensure that more oil would be acquired when prices are low and less when prices are high. In August 2006, we reported that if DOE had used this approach from October 2001 through August 2005, it could have saved approximately $590 million in fill costs. We also ran simulations to estimate potential future cost savings from using a dollar-cost-averaging approach over 5 years and found that DOE could save money regardless of the price of oil as long as there is price volatility, and that the savings would be generally greater if oil prices were more volatile. We would expect a dollar-cost-averaging acquisition method to also provide positive benefits when acquiring refined petroleum products.
- Maximize cost-effective storage options. According to DOE, salt formations offer the lowest cost, most environmentally secure way to store crude oil for long periods of time. Stockpiling oil in artificially created caverns, deep within rock-hard salt, has historically cost about $3.50 per barrel in capital costs. In comparison, storing oil in above-ground tanks can cost $15 to $18 per barrel. Simi-

[20] Pub. L. No. 109–58, Title VII, § 712, 119 Stat. 818 (2005), codified as amended at 42 U.S.C. 16062.

[21] According to the Environmental Protection Agency, these fuel economy numbers are based on "real world" estimates that the federal government provides to consumers and are about 15 percent lower than the values used for compliance with the CAFE program.

[22] Pub. L. No. 110-140, §102, 121 Stat. 1498 (2007).

[23] GAO-06-872.

[24] The weight of oil is measured by its gravity index. According to DOE's Energy Information Administration, light oil is greater than 38 degrees gravity; intermediate oils, such as those in the SPR, are 22 to 38 degrees gravity; and heavy oil is 22 degrees gravity or below. See DOE, Office of the Assistant Secretary for Fossil Energy, Strategic Petroleum Reserve: Annual Report for Calendar Year 2007 (DOE/FE-0525), for information on the composition of the SPR.

[25] This calculation is intended to illustrate the magnitude of potential savings, and is not meant to be a projection of actual savings. The actual price difference between light and heavy oil over the course of the new fill could be smaller or larger than over the past 5 years, which would either reduce or increase the savings.

larly, for those refined petroleum products that can be stored below ground, salt formations may offer a cost-effective storage option. However, possible storage options would need to be evaluated hand-in-hand with the need to (1) turn over the refined stocks periodically because their stability deteriorates over time, and (2) transport the refined petroleum products quickly to major population centers where the products will be used.

The CHAIRMAN. Thank you very much.

Mr. Shages, thank you for being here.

STATEMENT OF JOHN SHAGES, INDEPENDENT CONSULTANT

Mr. SHAGES. Thank you very much, Mr. Chairman, Senator Murkowski.

During my 22-year association with the Strategic Petroleum Reserve there were occasions when the government either would have or should have acted to prevent oil markets from becoming seriously imbalanced, but did not. Either because the response was outside of the physical capabilities of the reserve or the government paralyzed itself debating the complexities of a Presidential emergency finding. As some changes to the authorizing legislation in the reserves characteristics, we will certainly miss future opportunities.

I believe there are major issues that should be addressed by the Congress and the administration to modernize the reserve. S. 967 effectively addresses two of these issues.

First, the SPR inventory is all crude oil. In 1976 a case was made for refineries and the Nation's systems of pipelines were so robust the reserve could be all crude oil. The storage sites could be located on the Gulf of Mexico which would reduce both capital and operating costs.

While that reasoning was sound for many years, twice in the last 5 years we saw hurricanes shut down the whole petroleum industry for sustained periods. It is a mistake to assert the crude oil supply is our only vulnerability when a large segment of the Southeast United States can be cutoff from fuel.

There is no legitimate reason not to modernize the reserve by the inclusion of refined products other than cost avoidance. That issue can be addressed by proper management of the reserve. S. 967 addresses this issue by mandating refined products as part of the reserve. I endorse that mandate.

Second, the United States has literally wrapped itself in legislative red tape by requiring a finding of an emergency by the President to sell oil. It is no small matter to declare a national emergency. Appropriately the White House must be cautious about taking such a step for fear that the finding itself may make the situation worse.

Consequently over 33 years we've had only two such findings. One associated with the outbreak of war in 1991 and one due to Hurricane Katrina. Everyone realizes that this hurdle is problematic.

Both the Clinton and Bush administrations turned to oil loans to augment the drawdown authorities. While making loans is an appropriate way to respond to some supply disruptions the legal authority is frankly a loop hole. In addition loans are most appropriately used in situations involving a few refineries and when cur-

rent prices are higher than future prices. But not all emergencies coincide with those circumstances.

S. 967 solves this problem by authorizing the Secretary of Energy rather than the President to determine that a drawdown in sale from the reserve is needed. This is appropriate. The Secretary is supported by the best expertise available on timely usage of the reserve. The decisionmaking process will not be cluttered with all the departments of the executive branch. I highly endorse the change in drawdown authority that will be made by S. 967.

Third, S. 283 makes major changes to the authorization for using the Northeast Home Heating Oil Reserve. Unfortunately those changes would make the drawdown authority highly subjective. It also includes an absolute trigger price of $4 per gallon adjusted for inflation.

In the event the price stays above $4, liquidates the heating oil inventory without provision for replacement. A far preferable approach would be to change the drawdown authorization to mirror the change made by S. 967 for the Strategic Petroleum Reserve. If the Secretary rather than the President were allowed to determine the appropriate circumstances for a drawdown the reserves management could be more nimble and flexible.

Fourth, we will reach a critical milestone this year when the SPR reaches an inventory equal to its rated capacity. At that time the Secretary of Energy effectively loses two weapons in his policy arsenal.

First, because the authority to make loans from the Reserve is dependent upon acquiring oil the Secretary will be constrained by the lack of capacity to store newly acquired oil.

Second, the energy policy of the United States can effectively be undermined by OPEC and price volatility.

While we tend to think of oil price spikes as being devastating to our economy, price collapses wreak havoc on domestic suppliers, increase our imports and set the Nation up for the next price spike. There is no question that the collapse of oil prices at the end of 2008 is responsible for a 50-percent drop in domestic drilling activity and bankruptcy among ethanol producers.

The most effective way that the governments have for dealing with collapsing oil prices is to buy and store surplus oil. The Strategic Petroleum Reserve Office is capable of conducting a counter cyclical buying policy, the Reserve must be expanded to have that option. There is only one reason for not expanding the Reserve and that is the associated cost which leads me to my last recommendation to the committee.

The Strategic Petroleum Reserve Office has shown that it can make loans of oil from the Reserve and in consideration receive in kind premiums. The value of those premiums to date is hundreds of millions of dollars. There is potential for more except that there will be no in kind premiums if there is no place to store the oil.

A number of road blocks to expansion and making loans would be cleared away if, as part of the modernization, Congress authorized the SPR Office to take loan premiums in cash, put that money into the SPR petroleum account, and fund future expansion costs from the petroleum account.

Mr. Chairman, this concludes my prepared statement.

[The prepared statement of Mr. Shages follows:]

PREPARED STATEMENT OF JOHN D. SHAGES, INDEPENDENT CONSULTANT

I am pleased to be here today to discuss S. 967 the Strategic Petroleum Reserve Modernization Act of 2009, S. 283 Release of Products From Northeast Home Heating Oil Reserve, as well as other potential improvements in the Strategic Petroleum Reserve (Reserve) and petroleum stockpiling generally. By way of background I spent over thirty years in the Department of Energy and its predecessor organizations. I joined the Strategic Petroleum Reserve Office in 1985 and retired in 2007 as the Deputy Assistant Secretary for Petroleum Reserves. Since that time I have engaged in private consulting on strategic petroleum stockpiling. I am proud to have been associated with the Department and the Petroleum Reserves Office, and I believe that it is one program that has given a tremendous return to the American taxpayer in repayment for its support.

The Reserve is the Nation's first and only immediately deployable defense against a major oil supply interruption. Since its initial authorization in 1975 the Reserve has evolved both physically and managerially to be flexible and available for a wide array of problems. Nevertheless, there are five major improvements that can be made in the Reserve system as it now exists, three relate to physical properties, one to sales and loan authorities, and one to financing. S. 967 addresses two of these issues. In the interest of being concise I will dispense with general background and will only address these opportunities.

The Reserve today contains no refined products, has a capacity to hold oil which has not improved in almost twenty years, and consists of only two high quality streams of oil. All three of these characteristics require attention.

Include Refined Products in the Reserve: In the initial legislative authorization of the Reserve the Energy Policy and Conservation Act (Act)anticipated the Reserve would provide a defense against disruptions of oil imports, which was a direct response to the Arab OPEC oil embargo of 1973-74. The perception of vulnerability to international disruptions was fortified by the Iranian revolution of 1980-81, which caused fuel shortages, a devastating price spike, and sent the country into a major recession. The Act directly addressed the issue of supply assurance by requiring that the Reserve contain both regional and refined components. However, the Act allowed for the substitution of crude oil in centralized facilities if the Department of Energy found centralized facilities and crude oil could reasonably protect all regions of the country and reduce the Reserve's cost significantly. In fact, the initial Strategic Petroleum Reserve Plan sent to Congress in 1977 persuasively made the case that American refineries and a robust logistics system would amply protect the country as long as the refineries had sufficient access to crude oil. The Plan also emphasized that centralized storage would substantially reduce the cost of storage. Consequently, the Reserve inventory is now located at four sites along the Texas and Louisiana Gulf Coast and is composed of crude oil. This configuration of the Reserve was not seriously questioned until 2000. That year, the eastern half of the country suffered a late season freeze that disrupted heating oil and natural gas supplies. In the Northeast there was a danger of literally running out of heating oil.

In response to that near physical shortage of heating fuels, the Clinton administration determined to modify the Strategic Petroleum Reserve Plan to include a heating oil component in the Northeast. That change to the plan was made and the Strategic Petroleum Reserve Office exchanged enough crude oil to acquire two million barrels of heating oil and storage services. Later in 2000, Congress directly ratified this change by amending the Act to directly authorize the Northeast Home Heating Oil Reserve (Heating Oil Reserve) as a separate entity from the Strategic Petroleum Reserve.

Despite the addition of the Heating Oil Reserve, the Nations' stockpile of oil is still overwhelmingly oriented to protection against crude oil disruptions based upon the assumption of a robust refining industry and an extensive system of pipelines. The weather events of 2005 and 2008 seriously challenge the validity of this assumption. We have discovered that massive hurricanes can cause regional shortages by disrupting crude oil production in the Gulf of Mexico, refineries along the Gulf Coast, the pipelines that carry crude oil and refined products, and the power lines that are essential for both the refineries and pipelines to operate. In both 2005 and 2008 the inland parts of the Southeast—especially the city of Atlanta—suffered shortages of fuel because of absolute dependence on the Colonial and Plantation Pipelines. Even though those pipelines were operable soon after the storms, there were limited products for the pipelines to move because refineries remained closed due either to direct damage or because power could not be restored quickly to the refineries.

Today there is a widely held belief that the Gulf Coast will be visited by more devastating storms in the future. In addition the Southwest is also highly dependent upon a single pipeline system originating in Los Angeles. In the event of a major earthquake in the Los Angeles area, it is easy to construct a scenario in which supplies of oil products are disrupted into southern Nevada, Utah, New Mexico and Arizona.

Over the last 30 years debates about the value of the Strategic Petroleum to the United States have focused primarily on its ability to prevent the price of oil from spiking during a disruption and the associated economic havoc that frequently follows such spikes. Now we are faced with two recent examples of an entire region that could not be adequately supplied regardless of price. While the rest of the Nation was being relieved of very high fuel prices by September 2008, the interior Southeast was suffering disruptive fuel shortages that kept prices at devastatingly high levels for business and individual consumers.

In consideration of these developments, amending the composition of the Strategic Petroleum Reserve to contain a substantial refined product component would be prudent. Given that the anticipated disruptions will be discrete events and the effects limited in duration, the refined product component could be relatively small—in the range of 30 million barrels—and could consist of just gasoline and diesel fuel. The exact design and location of the facilities should be left to the Department of Energy with due consideration to minimizing the cost of new facilities and operations. One attractive option is to include caverns for refined products in the new Reserve site being planned in Mississippi. S. 967 provides positive, unambiguous direction to the Department of Energy to create a refined product component within the Strategic Petroleum Reserve. It also allows the Department flexibility to accomplish the mission in the lowest cost way without undue impacts on markets and allows for acquisitions during off peak periods. I fully endorse the spirit and language of S. 967 for this purpose.

Expand the Reserve: The Reserve is a very powerful tool for American economic and foreign policy. While most analysts appreciate the potential of the Reserve to moderate the effects of oil shortages and control surging oil prices, there has been very little attention focused on the value of having empty storage capacity simply because we have always had more storage capacity than inventory. That situation will change in the fourth quarter of this year when the inventory reaches the rated 727 million barrel capacity of the Reserve. There are a number of reasons that justify adding to the capacity of the Reserve and I will address four of the most important.

First, the goal of having more oil inventory is justified by the threat posed to our economy by disruptions and price spikes. The economic rationale for the Reserve has evolved and been refined over the past thirty years. At the heart of the argument is the observation that oil price spikes have preceded 10 of the 11 recessions which have occurred since the Second World War. Regardless of whether price spikes have been the sole causes of recessions or contributory, it would be implausible to argue that the gigantic price increase that occurred during 2007-2008 had nothing to do with the current state of our economy or that its role was inconsequential. A recent paper by Professor James Hamilton, the person credited with being the first to publish his observations on the frequency of recessions after oil shocks, eloquently defends the pertinence of this hypothesis relating the current severe recession to the oil shock. By his calculations absent the price shock during the year starting October 2007 the GDP of the United States would have grown 3.5 percent more than it actually did, equal to about $500 billion. Having a Reserve large enough that the President would feel comfortable using it to suppress a $100 per barrel price spike rather than allowing it to drive the economy into recession would easily be worth the cost of that expansion.

In 2006, the Administration conducted a study of the appropriate size of the Reserve, including all of the interested government agencies and outside expert consultants. Based on the probabilities of future disruptions, resulting price increases and the impacts of those price increases, the study found that an increase to one billion barrels was justified. The study also found that there were unquantifiable benefits of a larger Reserve such as its deterrent value and the freedom given to administrations to conduct foreign policy in a hostile world.

Second, the empty space available in the Reserve gives the government the ability to determine our own domestic energy policy without being undermined by the OPEC. After the major disruptions of 1973-74 and 1980-81, the United States embarked upon a major effort to control its own energy future, by producing more energy and being more efficient in its use. As a result oil demand dropped and imports were dramatically reduced, until 1986 when oil prices collapsed. At that point our domestic oil industry was devastated, virtually all alternative energy initiatives

were abandoned, consumption rose and imports filled the ever increasing gap between production and demand. In 1997-98 that scenario repeated itself setting us up for the situation that we faced in 2007-08, and which was only resolved by putting the United States and then the whole world into a recession. One certain way to assure an oil price spike is to allow oil prices to collapse first, and the oil market and OPEC left to their own devices may not keep that from happening again. The much preferable alternative is to have a substantial Strategic Petroleum Reserve capacity which would allow the Government to step into the market and acquire enough oil to support prices while supply and demand return to a long term balance. In addition to being good overall energy policy this strategy has the advantage of allowing the government to buy lots of oil at low prices, thereby reducing the cost of the Reserve and applying common sense business principles. The history of the Reserve is sadly replete with times of sitting on our hands out of complacency when prices are low and then trying to make up for lost time when the opportunity for a bargain is long past. With today's emphasis on creating work for engineers and contractors who are unemployed, now is an obviously good time to be building the storage facilities for a larger reserve.

Third, while the overview of the Strategic Petroleum Reserve makes it appear very robust, the system is skewed to the western Gulf of Mexico and does not adequately support Mississippi River refiners and the Capline distribution system which services that area. In the original plans for the Reserve, there were two sites supporting the refineries along the Mississippi River: Bayou Choctaw and Weeks Island. However, due to leakage Weeks Island was decommissioned a decade ago and the entire Mississippi River region is supported by only the Bayou Choctaw site. While Bayou Choctaw is very strategically placed, it is the smallest storage site of the four, with a capacity of only 73 million barrels. Furthermore, with only six oil caverns the maximum drawdown capability of the site is only 515,000 barrels per day, and can reach that rate only using sour oil. The maximum rate for sweet oil is only 300,000 barrels per day because with only two caverns of sweet, the inventory is depleted very quickly. Furthermore, one of the sweet caverns at Bayou Choctaw has a salt wall so close to the edge of the salt dome that it cannot be refilled after the oil is drawn down. Simply maintaining the current inadequate capacity of the site will require the eventual addition of a new cavern. The Capline system has been used time and again to respond to emergencies and requires an upgrade.

The ultimate resolution of this issue for the Capline complex is development of the new Strategic Petroleum Reserve site proposed for Richton, Mississippi. That new site will add capacity and drawdown capability to the Capline complex, and it will be far enough inland to have reduced hurricane vulnerability. It will also create an option for siting a refined product reserve component of the Reserve. However, at this time there is no budget available or requested for going beyond land acquisition.

Fourth, in the absence of an amendment to EPCA to expand the drawdown and sales authorities of the Secretary, the ability of the Secretary to make oil loans will be effectively curtailed or constrained once the inventory reaches the Reserves capacity of 727 million barrels later this year. This very helpful tool has been used many times, and the amount of oil delivered from the Reserve to stressed markets overshadows the total from the two emergency sales. In order to preserve the effectiveness of this authority, which is dependent upon acquiring oil, the Reserve would need to be expanded to accommodate the premiums that are received in consideration of the loans.

The Strategic Petroleum Reserve is fully authorized to one billion barrels by the Energy Policy and Conservation Act and no further legislation is required for these necessary improvements. However, as always, the Reserve will be in competition for resources to create the necessary facilities. As we have seen in the past, such competition can cause the Reserve to be static for many years between bursts of activity. For this reason, I recommend that authorization be given to the Reserve for self funding expansion, and I will address this proposal later in my testimony.

Add a Heavy Oil Component: All Strategic Petroleum Reserve inventory is classified as either sweet or sour oil. However, the reality is that even the sour oil is very high quality with an API gravity higher than 30 degrees and a sulfur content of about one percent. This formulation was ideal 30 years ago, but over time it is less reflective of the oils that U.S. refineries are using. Because the oils used as feedstock today have been continuously getting heavier with higher sulfur content, refiners have been improving the sophistication of their facilities to make the best use of the lower grade feedstock. As a result, some refineries today can produce more high value finished products in a day from lower grade oil than they could from the high quality oil in the Reserve. In recognition of this fact the General Accountability Office recommended the Department of Energy add a third crude stream of heavy

oil. The Department agreed with that recommendation and said that the issue would be addressed as part of the expansion to one billion barrels. That last decision would eliminate the cost and operational issues that would be generated if one site were converted to handle a third oil stream.

As with expansion, this initiative does not require any new legislative authorization, but it also will require capital expenditures, which will be difficult to fund by conventional appropriations. The Department has said that this issue could be addressed efficiently during expansion to one billion barrels. Resolution of this issue can, therefore, be accomplished by allowing self funding of expansion as will be discussed below.

Modernize Authorities to Sell and Exchange Oil From the Reserve: In addition to its focus on foreign oil disruptions, the Energy Policy and Conservation Act enacted in 1975 carefully constrained use of the Reserve to emergency circumstances, by requiring a presidential finding of a "severe energy supply interruption" of significant scope and duration and accompanying severe price increase, as a precondition for withdrawals and sales from the Reserve. This very tall hurdle assures that the Reserve will be used infrequently and that there will be debate within any administration about whether or not to make such a finding. One reason for this is no administration will be eager to lightly and frequently have the President sign a document declaring an emergency condition. Doing so can by itself can unnecessarily unnerve the public, effect international relations, and have unpredictable effects on financial markets.

Congress realized the highly restrictive nature of this language in the wake of the 1989 Exxon Valdez oil spill, when oil loadings in Alaska were halted. Oil prices on the West Coast immediately rose and there were calls for releasing oil from the Reserve, but the Administration argued that it did not have authority to release oil for a disruption that was clearly of a limited scope and duration. Congress subsequently amended the drawdown and sale section of the Act to clarify the authority of the President to act in a lesser domestic emergency, but, while the result was to expand the authority of the President, it is generally acknowledged that it is no easier to get a presidential finding than it was before the amendments. Today, after 34 years, there have been only two Presidential findings requiring a drawdown and sale from the Reserve.

This generally very restrictive policy constrained both the Clinton and Bush administrations from using the Reserve to address serious but relatively lesser disruptions. Consequently, beginning in 1996, in response to a pipeline malfunction in Texas, the Department began lending oil to companies in exchange for a promise to repay the oil plus a premium. While the practical benefits of this policy have been substantial and undeniable the legal foundation is convoluted. The authorization for these loans—technically referred to as "exchanges"—is the acquisition authorities contained in the Energy Policy and Conservation Act, which provide that the Secretary may "acquire oil by purchase, exchange or otherwise". Therefore, the legal rationale for all of the many loans that have been made in the last 13 years is not to avoid a shortage or price spike but to acquire the oil premiums that the Government receives in consideration of the loan. This situation is confusing at best, but may also unnecessarily constrain the government from acting in the Nation's best interest. For example, in the Spring of 2008 in reaction to very high oil prices, Congress passed legislation prohibiting oil acquisition for the Strategic Petroleum Reserve through the end of the calendar year. That seemingly straightforward act effectively eliminated the authority of the Secretary of Energy to conduct loans because the loan authority depends upon the authority to acquire oil. Later in 2008 when hurricanes disrupted the oil industry on the Gulf Coast, the Department was forced to go through legal gymnastics to justify two back-to-back "test oil exchanges" under the secretary's very limited authority to conduct test sales. A similar problem may occur as the capacity to add oil to the Reserve diminishes due to the fill program and natural cavern shrinkage.

One way to rationalize the legal authorities for loans and also remove the hobbling effect of the requirement for a presidential finding would be to expand the authorities of the Secretary to sell oil from the Reserve and to initiate loans. S. 967 addresses the sales authority issue by amending section 161 of EPCA to transfer responsibility for determining a drawdown is necessary from the President to the Secretary of Energy. It further modifies the language to give more weight to markets and deemphasize the necessity for physical disruptions when considering whether or not it is appropriate to sell oil from the Reserve. For the reasons stated above it is my opinion that this amendment is a major improvement to the current situation, and will allow the Reserve to be used whenever it is justifiable, without creating the tension associated with a Presidential finding of an emergency.

While S. 967 addresses the sale issues, it is silent regarding the authority of the Secretary to engage in exchanges/loans of oil. I believe that it would improve the flexibility of the Secretary to address minor emergencies if he were authorized to conduct exchanges/loans under the drawdown authorities of the Act rather than the acquisition authorities, without raising any issues comparable to those that are created by the proposal to transfer sales authority to the Secretary.

Allow Self-Funding Improvements to the Strategic Petroleum Reserve: Regardless of the degree to which congress desires to improve the Strategic Petroleum Reserve, whether increasing its size, adding capacity at Bayou Choctaw, adding refined products, or adding a third crude type, there will be capital costs and the probability of increased operational costs. At this time there are no funds in either the fiscal year 2009 SPR appropriation or the proposed 2010 budget for any of these initiatives, and it is improbable that money will be added by congress due to the size of the national budget deficit. The implication is that Strategic Petroleum Reserve policy may be driven not by good public policy but by budget constraints, and the Reserve may stay static at 727 million barrels, without any refined products, and only two crude streams indefinitely.

This constraint can be relieved and simultaneous solve a problem discussed above—the legal requirement to acquire oil in order to exchange (loan) oil. The proposal to resolve these problems is to allow the Strategic Petroleum Reserve to self fund expansions with the proceeds of occasional sales and exchanges.

The current inventory of the SPR is very robust and when even a small oil volume is sold it generates substantial revenues. For example, the Secretary of Energy has authority to conduct test sales of up to 5 million barrels. At current prices a test sale would produce more than $250 million in revenue. Revenues from all oil sales are treated in the same way; the revenues are deposited in the SPR Petroleum Account and require no further appropriation or budgeting to be used by the Department. However, at this time these funds may only be used for the acquisition, transportation, injection of petroleum into the Reserve, and the cost of sales. The funds in the SPR Petroleum Account may not be used for expansion or capital improvements.

Amending EPCA to allow expansion of the Reserve beyond its current capacity to be paid for from the SPR Petroleum Account would eliminate the budget bottleneck now facing the Congress and the Reserve. Of course funds would be needed in the SPR Petroleum Account to make the proposed amendment effective. That could be solved by a second simple amendment which would allow the Secretary to make exchanges of oil (loans) and take the premiums in cash, rather than in oil as is now required. The authority might also give him the authority to sell small amount of oil for operational or financial reasons—-say 5 million barrels in any fiscal year. This second amendment would have the desirable effect of funding expansion without requiring new appropriations as part of the budget and would also eliminate the problem discussed earlier regarding the ability of the Secretary to make loans once the Reserve reaches it rated capacity of 727 million barrels. From a management perspective it will also create an incentive for the SPR Office to work diligently during its negotiations for oil loans, thereby bringing business style discipline to the Government.

An objection might be raised that using oil funds for expansion would deplete the oil inventory, however, we would expect the SPR Office to periodically conduct exchanges and take premiums in kind to keep the inventory of the Reserve near the 727 million barrel capacity.

Northeast Home Heating Oil Reserve: The Heating Oil Reserve is very much different in size and purpose from the Strategic Petroleum Reserve. However, like the Reserve, the authorization for its use as defined in the Act militates against its use. S. 283 seeks to address this issue, but is flawed in numerous ways. Primarily S. 283 leaves the authority to determining that a drawdown is necessary with the President. We have discussed the difficulties this creates for the much bigger oil Reserve, and are near to insurmountable for a regional reserve with only two million barrels of oil. The changes in language offered in S. 283 would not have the desired effect.

S. 283 also directs mandatory releases linked to an inflation adjusted $4.00 per gallon price for heating oil. The receipts from these sales would be given to the Weatherization program. This is bad public policy because specific price thresholds written into legislation have a way of enduring past their relevant period. Furthermore, the price of heating oil probably will be driven by crude oil prices more than any other factor, and crude prices are notoriously fickle. If this legislation had been in effect for the last two years, all of the heating oil would be sold and the money transferred away, with the effect being that today there would be no heating oil in the Heating Oil Reserve. As written, S. 283 would be a notice that the Northeast

Home Heating Oil Reserve is to be abolished at an arbitrary and unknown time. As written I recommend that S. 283 not be adopted. However, in the spirit of S. 967, I would endorse applying the same amendments written for the Strategic Petroleum Reserve release authorities to the release authorities for the Northeast Home Heating Oil Reserve. All the reasons that make transferring the release authority from the President to the Secretary a good idea for crude oil also apply to heating oil in the Heating Oil Reserve.

In summary, the SPR is a well defined government program that has been well managed and today provides an unparalleled level of protection to the United States and our allies. Nevertheless, there are substantial opportunities to make the program stronger and more effective, some of which will require legislation. I endorse S. 967 and encourage the Committee to look favorably upon making other changes that will help to keep the Strategic Petroleum program dynamic and strong.

Mr. Chairman and members of the Committee, this completes my opening statement and I would be happy to answer any questions you may have.

The CHAIRMAN. Thank you very much.

Mr. Book.

STATEMENT OF KEVIN BOOK, MANAGING DIRECTOR, RESEARCH, CLEARVIEW ENERGY PARTNERS, LLC

Mr. BOOK. Thank you, Chairman Bingaman, Ranking Member Murkowski for the privilege of contributing to your discussion this afternoon. I want to applaud this committee's foresight in considering future energy challenges even as economic crisis temporarily obscures many of the troubling indicia of scarcity that so recently captured public attention. Business cycles after all tend to recover from one step back with two steps forward.

The Nation's Strategic Petroleum Reserve for oil is a valuable insurance policy. More than 700 million barrels can reach refineries within days of any disruption. In light of recent hurricanes it seems prudent to ask if a similar strategy exists for refined products.

Last week Energy Secretary Stephen Chu hinted that a products reserve might be no simple task. Indeed improving the status quo will require overcoming chemical, practical, logistical and economic challenges.

Chemistry first and it's been alluded to several times, crude oil is quite stable, but finished gasoline can go stale in a period of as little as 60 to 90 days as a result of evaporation, oxidation, separation of fuel alcohols and condensation of water vapors. Preservatives can extend its shelf life at added cost, but the continuous churning in inventory may be the cheapest way to keep gasoline fresh.

Next, practical questions. Consumers usually see through gasoline grades at the pump. But refiners and blenders transport and sell dozens of individual blends during the course of a year. Storing all these blends, as has been mentioned, would require active management of significant inventories. A single emergency speck of gasoline could solve the boutique fuels problem. But where would the refining capacity to stock the strategic reserve come from?

Refiner's spare capacity is mostly a consequence of hopefully fleeting economic weakness. If refiners run harder where will the products other than gasoline go? About three quarters of U.S. refiner's runs are light products. But gasoline comprises only about 55 to 60 percent of total volumes.

Should the Reserve contain other products and if so, in what proportion?

The alternatives might be subsidies for refiners that reconfigure for lighter runs or Federal purchases of refined products imports. But that said. More than 90 percent of refined products consumed in the U.S. today are produced here.

Third, logistics. Siting the product reserve away from the Gulf Coast might come at the impractically high price of new supporting infrastructure. Coastal refiners face hurricane disruptions. Refineries are on the coast because that's where the ships come in. The pipelines that carry products to their markets are on the coast because that's where the refineries are.

Unfortunately pipeline pumping equipment shares a common vulnerability with refineries themselves. Both types of infrastructure need electricity. Even if strategic reserves were available in the immediate aftermath of a serious disruption, pipelines might prove inoperable as with Hurricanes Katrina, Rita, Gustav and Ike.

Last, economics. Unlike other top oil producing nations, we have no national oil company. Approximately 169,000 gas stations operate profitably as a result of competition among a large number of individually invested, private owners. By buying an expensive commodity to sell a cheap one, without control over either price isn't an easy business.

Normalized profits are in the mid to high single digit percentages. Retailers and refiners earn their money at the margins, a fraction of a cent at a time. Upgrades and capacity increases carry billion dollar price tags. But government policies can change quickly. As recent experience reveals demand patterns can shift virtually overnight.

To balance the risk of negative refining margins. Refiners and retailers have relatively inelastic long term demand trends. As difficult and expensive as it may be to operate an existing refinery, it is still more difficult and expensive to build and operate a new one.

In this context unanticipated introduction of new supply into a tight market could undermine industry profitability and potentially drive smaller players out of business. In addition a Federal product safety net might lead cash strapped industry players to reduce working inventories below typical levels to free up capital negating the benefit of the reserve. There are other opportunities however.

At a vastly oversimplified level, refined products value chains break into four links: extraction, refining, transportation and storage and fourth, consumption. Each link is a policy opportunity for supply security. Increased domestic crude oil production is the most direct route to supply security. But other policy options includes biofuels, souring up refineries to use Canadian oils, environmentally responsible Fischer-Tropsch conversion of biomass and coal, electric vehicles and natural gas as a fuel for fleet vehicles.

Economically viable refinery expansions could provide a working reserve instead of a fuel storage facility sited in one or several physical locations. This does, however, involve considering existing deterrents to new capacity including permitting delays, air quality restrictions, environmental surcharges. Especially those that could be imposed for greenhouse gas emissions.

Blenders and refiners operate at economically efficient inventory levels and building parallel transportation and storage infrastruc-

ture makes little more sense than building a parallel refining industry for the same reason, prohibitive cost. But tax policies could encourage larger working inventories of finished products within existing transportation and storage infrastructure putting products at intermediate locations closer to end users.

Last, and perhaps most importantly, policies that discourage excessive demand encourage the production and the diffusion of energy efficiency technologies and transform energy use patterns by enabling better short, medium, and long term planning can buffer the impact of supply disruptions by reducing the economic reach of any shortfall.

Mr. Chairman, this concludes my prepared remarks. I will look forward to any questions at the appropriate time.

[The prepared statement of Mr. Book follows:]

PREPARED STATEMENT OF KEVIN BOOK, MANAGING DIRECTOR, RESEARCH, CLEARVIEW ENERGY PARTNERS, LLC

Thank you, Chairman Bingaman, Ranking Member Murkowski, and distinguished members of this Committee for the privilege of contributing to your discussion this afternoon. My name is Kevin Book and I am a managing director and energy analyst at ClearView Energy Partners, LLC, a research and consulting firm headquartered here in Washington, D.C. that serves institutional investors and energy sector clients.

A STRATEGY FOR THE FUTURE

The nation's Strategic Petroleum Reserve for oil (SPR) is one of the most valuable insurance policies an industrialized nation can have. More than 700 million barrels of oil contained within the SPR have the potential to reach many of the nation's refineries within days of any disruption of our highly import-dependent oil supply. In light of recent hurricane-related disruptions to the operation of these refineries, it seems prudent to ask whether there might be a mitigation strategy that could ensure similar continuity in refined products supply. Last week, Energy Secretary Steven Chu addressed this very matter. In public comments the Secretary offered at a press conference, he hinted that a products reserve might be no simple task, observing that

> For example, if a severe hurricane takes out a lot of the oil refining capacity in the United States, there might be a shortage, and I think that's the justification for [a products reserve]. The countervailing argument for that is that it's harder to store [refined products] underground.

I would like to examine several of the challenges to which Energy Secretary Chu alluded and highlight several other potential policy mechanisms that might increase transportation fuels supply security by impacting other links of the refined products value chain.

CHALLENGES

Let me begin by applauding this Committee's foresight in considering the energy challenges our nation may face in the future, even as economic crisis temporarily obscures many of the troubling indicia of scarcity that so recently captured public attention. Many financial investors generate value for their clients in a similar fashion by having the courage to buy when everyone else is selling, secure in the knowledge that business cycles tend to recover from one step back with two steps forward. Figure 1* presents a recent history of US annual demand for motor gasoline and projects two scenarios for the years ahead.

The blue diamonds in Figure 1 reveal last year's dramatic decline in gasoline demand. According to EIA data, sales fell from 137.46 billion gallons in 2007 to 132.22 billion gallons in 2008, probably more a result of consumers' adaptive responses to high prices than any structural change that might have occurred had drivers traded out of low-efficiency cars in favor of higher-fuel-economy vehicles. The red squares chart one possible course of gasoline demand in the unlikely event that a brisk recovery returns American drivers to their old ways. The green triangles present an

* Figures 1–3 have been retained in committee files.

alternative view of the future, informed by the history of the early 1980s, in which recovery might release pent-up new car demand and consumers' memories of recent price peaks might coincide with the arrival of a higher-efficiency vehicle fleet to dramatically destroy gasoline demand prior to its eventual recovery.

Whether the slope of future demand is shallow or steep, and irrespective of whether pent-up automobile purchases bring a "kink" in the demand curve, it seems a safe bet that broader economic recovery will depend on an uninterrupted supply of affordable transportation fuels. Even so, any policy improving the status quo will need to address chemical, practical, logistical and economic challenges.

Chemical challenges. Energy technologies may sometimes be best explained through familiar analogies, so let me offer an oversimplified comparison between crude oil and cereal grains. Most cereal grains, once dried and properly stored, are quite durable. The same is true of crude oil, whether it is stored in an underground salt cavern, in the hull of a tanker or in a commercial storage tank. When the miller grinds grain into flour, he removes many of its natural protective elements and transforms it into an intermediate good that is both more perishable and more useful than its granular precursor. The same is true, though it is a multi-stage process, when refiners manufacture specific fuels out of crude oil and ship them via pipeline, barge and truck to blending terminals. The most perishable link in the grain value chain is the bread the baker bakes, which tends to go stale fairly quickly once exposed to air and water. This, too, is true of finished gasoline, which can go stale over a period of as little as 60-90 days. Evaporation can strip gasoline of its octane-enhancing lighter "ends", oxidative degradation of refined petroleum can create gelatinous clumps that can gum up fuel lines and fuel alcohols can separate from fuel blends or attract water vapor from humid air. As a result, the procurement and storage processes associated with the current SPR may be unsuitable for a strategic refined products reserve. As with baked goods, preservatives added to gasoline could extend its "shelf life" at added cost but, for a variety of practical reasons, the continuous churning of inventory under existing distribution practices may be the cheapest way to keep gasoline fresh.

Practical challenges. The map in Figure 2, available on ExxonMobil's website, offers a perspective on the diversity of gasoline blends required around the nation during the course of a typical year. Even though a consumer buying gasoline at a service station might encounter only three grades of gasoline at the dispenser, many refiners and blenders transport and sell dozens of individual blends in order to conform to environmental regulations stipulating different specifications during winter and summer. Storing all of these blends would require active management of significant inventories, and no single blend might be available in sufficient quantities to meaningfully offset a supply disruption.

This "boutique fuels" problem could be surmounted by establishing a single, "emergency spec" of gasoline, probably at the lowest common environmental denominator to yield the benefits of scale, and on the expectation that an emergency drawdown of strategic reserves would provide sufficient grounds for local or national air quality waivers. Even then, only a continued economic slowdown would be likely to leave refiners with adequate spare capacity to stock this strategic reserve, and increased refining runs in the absence of increasing demand would raise a larger practical consideration: about three-quarters of U.S. refiners' runs are "light" products, but gasoline comprises only about 55-60% of total volumes. In turn, this raises the question of whether the reserve should contain products other than gasoline and, if so, in what proportion? Alternatives to a multi-product reserve might include federal financial incentives to encourage willing refiners to undertake costly reconfigurations that increase gasoline fractions, or the use of federal funds to import refined products from overseas, even though more than 90% of refined products consumed in the U.S. are produced here today.

Logistical challenges. Geographic diversification of a refined products reserve away from the Gulf Coast, although a sensible long-term idea, might come at an impractically high price: the cost of new related and supporting infrastructure. The concentration of refineries on the nation's coasts that exposes our refining infrastructure to hurricane-related disruptions reflects the ship-borne conveyance of crude oil from foreign ports. Likewise, the pipeline infrastructure that transports gasoline and distillate fuels from refineries to intermediate destinations follows a similar geography. The Colonial, Centennial, Explorer and Plantation refined products pipelines, among others, are likely to be the primary transport routes for refined products drawn from a strategic reserve sited in the Gulf Coast, as well. Unfortunately, this does not circumvent a common vulnerability that pipeline pumping equipment shares with refineries themselves: both types of infrastructure require electricity to operate, so pipelines might prove inoperable in the event of a serious

disruption, as in the immediate aftermath of hurricanes Katrina and Rita in 2005 and hurricanes Gustav and Ike in 2008, even if strategic reserves were available.

Economic challenges. In many ways, the U.S. refining sector is one of the purest forms of public-private partnership. Unlike the other two of the world's top three oil-producing nations, the U.S. has no national upstream oil company and no national downstream refining and marketing entity. Across the nation, approximately 169,000 gasoline stations and fueling depots operate profitably, locally and virtually continuously to support our way of life and our economy. This would be very difficult to replicate on a national, top-down basis, especially if one hoped to achieve the economical service delivery that results from tremendous competition among a large number individually-vested, private owners.

At the same time, buying an expensive commodity to sell a cheap one without any control over either price is not an easy business. As a legacy of decades of closely-regulated divestitures, retailers have little market power. The refiners who supply them must adhere to the above-mentioned framework of environmental standards. Retailers and refiners typically eke out normalized profits in the middle-to-high single-digit percentages and earn their money at the margins, a fraction of a cent at a time. Last but not least, refinery maintenance and expansion are time-consuming and expensive—complexity upgrades and capacity increases typically carry billion-dollar price tags and can require months to years of partial or total downtime—but government policies can change relatively quickly and, as recent experience reveals, demand patterns can shift virtually overnight. These factors add up to the ever-present risk of earning negative refining margins (refined products selling for lower per-barrel prices than the raw materials from which they are made).

Refiners' and retailers' primary consolations are: (a) relatively-inelastic, long-term refined products demand trends; and (b) the fact that, as difficult and expensive as it may be to operate an existing refinery, it is still more difficult and expensive to build and operate a new one. In this context, an autonomous supply of refined products could bring two unintended consequences. First, the unanticipated introduction of new supply into a tight market could undermine industry profitability and, potentially, drive smaller players out of business. Second, the assurance of a federal refined products safety net might lead cash-strapped industry players to consider reducing their working inventories below typical levels to free up capital, potentially negating the benefit of the reserve.

OPPORTUNITIES

Figure 3, below, offers an oversimplified model of the refined products sector as a value chain that has four links: (1) raw material extraction or acquisition; (2) energy conversion (refining); (3) transportation and storage; and (4) end-user consumption.

The downside of oversimplifying, of course, is that each of these little boxes represents far more than meets the eye. Crude oil extraction or acquisition is a topic as vast as the global economy. Energy conversion encapsulates 150 years of technologies for transforming crude oils into useful products. Transportation and storage refers to thousands of miles of pipeline and hundreds of thousands of dispensers, storage tanks and blending terminals of different sizes and descriptions. And the consumption "fleet" includes 240 million light-duty vehicles and 110 million households that can be influenced by policy actions and financial incentives.

The scale of the real world behind our four-stage model has an upside: each link of the value chain offers significant policy opportunities towards greater refined products supply security.

Raw material extraction/acquisition. Increased domestic crude oil production offers the most direct route to supply security (particularly as demand contraction may swiftly reverse when the global economy recovers), but other policy options include:

- Biofuels. The creation of the renewable fuels standard (RFS) by the Energy Policy Act of 2005 may well have prevented a catastrophic light products shortage when global crude oil demand peaked during the second quarter of last year.
- "Souring up". Another factor preventing a gasoline shock last summer may have been the ongoing modification of refineries to make use of heavy, sour, unconventional oils like those produced from oil sands in Alberta and Saskatchewan, a lower-cost source of expanded capacity.
- Further feedstock diversification efforts could include environmentally-responsible biomass and coal conversion into distillate fuels and gasoline through the Fischer-Tropsch process; electrification of passenger vehicles within urban areas for short distance travel and encouraging natural gas as a fuel for fleet vehicles.

Energy conversion (refining). Policies that stimulate the economic expansion of existing refinery capacity and increase (or maintain) the operating margins of existing facilities may offer a way to promote a "working reserve" instead of a fuel storage facility sited in one or several physical locations. Deterrents to new capacity include:

- Administrative and construction-related delays, which can rapidly erode project profitability for most types of energy infrastructure, and discourage projects on new sites;
- Air quality restrictions that limit the ability of existing refiners to profitably expand or upgrade their facilities; and
- New surcharges for carbon dioxide and other greenhouse gas emissions, which may further diminish economic incentives for expansion and new facility construction unless refiners receive emissions allowances in proportion to expected future costs.

Transportation and storage. The nation's blenders and refiners seek to operate at economically efficient inventory levels. On the other hand, building parallel transportation and storage infrastructure makes little more sense than building a parallel refining industry does, and for the same reason: its prohibitive cost. Tax policies may offer the potential to augment the productive capacity of existing infrastructure by encouraging larger working inventories of finished products at intermediate locations closer to end-users.

End-user consumption policies that discourage excessive demand, encourage the production and diffusion of greater energy efficiency technologies and transform energy use patterns by enabling better short-, medium-and long-term planning can also serve to buffer the impact of supply disruptions by reducing the economic reach of any shortfall. Inasmuch as this topic encompasses everything from public awareness strategies to industrial policy to urban planning, I will not attempt to treat it here, except to suggest that it might provide richer and more self-reinforcing mechanisms for improving supply security than a physical refined products reserve.

Mr. Chairman, this concludes my prepared testimony. I will look forward to any questions at the appropriate time.

The CHAIRMAN. Thank you very much.

Mr. Houssin, thank you for being here. Thank you for coming to testify.

STATEMENT OF DIDIER HOUSSIN, DIRECTOR FOR ENERGY MARKETS AND SECURITY, INTERNATIONAL ENERGY AGENCY, PARIS, FRANCE

Mr. HOUSSIN. Thank you, Mr. Chairman for inviting me to share with this committee the views of the International Energy Agency on emergency policy and strategic reserves.

As you know the IEA was created in 1974, 35 years ago, on the initiative of Secretary of State Henry Kissinger. The founding treaty obliged all member countries to create emergency petroleum reserve of 90 day based on the previous year net imports. To have demand restraint measures at hand. The treaty also created a solidarity mechanism which means that if one or several member countries are confronted with a sudden supply disruption, all member countries would take collective action by making oil available from their reserves and reducing the demand if the situation warranted it.

When Hurricanes Katrina and Rita devastated production facilities in the Gulf of Mexico as well as refineries onshore and the power sector all IEA countries acted in solidarity drawing on their strategic reserves and providing the U.S. with products that were in extremely short supply. There are different ways for IEA countries to fulfill this requirement to maintain reserves of at least 90 days of their net imports. Some countries oblige industry to hold reserves. Others have created government owned reserves and some have a mix of a combination of both.

Over time we've seen a positive trend with countries holding segregated public reserves. In 1984, 10 countries out of 21 members at that time had public reserves. Now we have 20 out of 28 members that have public reserves. The amount of public reserve in the total of IEA countries has moved from 23 percent to 37 percent.

We are often asked why if emergency reserve can also be used for domestic supply disruption. Why not use stocks to bring down price when they spike? We think that to use the reserve for price management is dangerous territory and would fail.

The market is currently aware that emergency stocks can and will be used during any severe supply disruption. This in itself helps to limit the price exuberance that can result in large spikes when there are physical disruptions. But a policy of releasing oils to counteract high prices would mainly add an additional source of speculation and wouldn't be efficient.

Let's focus now on the evolution of the United States SPR. The level now represents 61 days of net imports whereby it was 116 days in 1985. So even if the amount is increased in terms of net import it does considerably decreased.

Currently the SPR hold mainly crude oil. The damage of Hurricanes Katrina and Rita exposed some of the vulnerabilities of the SPR that were explained before. For this reason in its review of the United States Emergency Preparedness in 2007 the IEA advised the United States Government to consider holding product stocks as part of any expansion of the Strategic Reserve and to consider a wider distribution of the reserve throughout the country.

So why the IEA welcomes the expansion of the SPR we believe that the additional SPR borrows in the form of finished products and have in strategic locations to be defined by the DOE would bring great additional security for each dollar spent then purchases of additional crude oil. As an example for 30 million barrels of product stocks this would represent in the form of gasoline, this would equate around to a little over 3 days of consumption. Holding strategic reserves in terms of products is quite common in other IEA countries. For instance in Europe 55 percent of all public stocks are held in form of products.

Just in Germany half of the stockholding agency reserves are held in products. Korea as well has 15 percent of its reserves in the form of products. Of course all security has a price. Strategic product stocks are more costly.

For example, the yearly running costs for European countries start at about $3.00 per barrel stored looking at when we are looking at products. In most European countries the financing is done by special levy on the sale of petrol of less than one United States cent per liter. In the United States the running cost of the SPR are very low, about 20 United States cents per barrel stored which leaves some scope for the United States to expand the SPR with product stocks and still maintaining running costs well below that of other member countries.

So in conclusion we think that the idea of having some increase of the SPR stocks in the form of products would be along the line of the IEA recommendation considering—concerning the United States emergency policy. Thank you.

[The prepared statement of Mr. Houssin follows:]

PREPARED STATEMENT OF DIDIER HOUSSIN, DIRECTOR FOR ENERGY MARKETS AND SECURITY, INTERNATIONAL ENERGY AGENCY, PARIS, FRANCE

Mr Chairman, Ladies and Gentlemen

Thank you for inviting me to give you the views of the International Energy Agency on emergency policy and strategic reserves.

IEA policy for Energy Security considers both short and long term supply security. For the long term we focus on diversification of sources, adequacy of investment and energy savings. But even if we do all that for long term energy security, we can still be confronted with the potential for a sudden interruption in oil supplies. Geopolitical conflict, internal conflict in a producing country, hurricanes, earthquakes, strikes and myriad other incidents can all affect oil flows.

One of those incidents in the past, the Arab oil embargo against certain OECD countries in 1973, demonstrated OECD countries' vulnerability. This event triggered a long lasting recession. In response, the US Secretary of State, Henry Kissinger at the time, took the initiative to create a defence mechanism, and the International Energy Agency was established.

The founding treaty obliged all member countries to create emergency petroleum reserves of 90 days based on their previous year net imports and to have demand restraint measures at hand. The treaty also created a solidarity mechanism: if one, some or all of the member countries are confronted with a sudden supply disruption, all member countries would take collective action by making oil available from their reserves and reducing their demand if the situation warranted it.

This mechanism proved to be useful. Knowing that OECD countries were less vulnerable as a result, producing countries came to understand that threats to disrupt supplies, or even actual supply disruptions, became less effective. Relations between producing countries and consuming countries improved, resulting in a continuous dialogue on oil security issues. Geopolitical tensions are still there, but on the whole relations are more productive. When a supply disruption occurs, it is now standard practice that we immediately contact the OPEC Secretariat and key producing countries to assess the situation together and to determine whether they are willing and able to bring additional production on line.

That's not to say that the defence mechanism of the IEA is no longer needed. There are still substantive risks of supply disruptions and OPEC countries are not always in a position to provide additional relief. Indeed, the last time the strategic reserves were used was unrelated to geopolitics. When Hurricanes Katrina and Rita devastated production facilities in the Gulf of Mexico, refineries on shore and the power sector, all IEA countries acted in solidarity, drawing on their strategic reserves and providing the US with products that were in extremely short supply. The response was quick and effective, demonstrating the worth of IEA emergency preparedness and the quality of its Members' commitment to collective solidarity.

As I previously noted, the IEA treaty obliges all members to maintain reserves of at least 90 days of their net imports. There are different ways in which countries can fulfil this requirement. Some countries oblige industry to hold reserves; others have created government-owned reserves. And some countries have a combination of both. Over time, we see a positive trend towards countries holding segregated public reserves. In 1984, 10 countries out of the 21 members at that time had public reserves. This year, we expect that 20 out of 28 members will have public reserves. Another figure: at the start of 1985, 23% of total reserves were owned by public bodies. We are now close to 37%. This increase is strengthening our ability to react promptly and concretely.

Emergency stocks are still very relevant. I made reference to the last time the IEA called for a collective action—in the aftermath of the Hurricanes Katrina and Rita. While the last time the IEA released emergency stocks was in 2005, since then the IEA has been on alert several times, not only in the 2008 Hurricane season when Gustav and Ike hit the Gulf coast in rapid succession, but also because of incidents that have taken place in Iran, Iraq, Nigeria, in Russian pipelines to Europe and as a result of industrial actions.

These alerts have been in addition to regular crisis simulation exercises. The capabilities of IEA countries to react quickly to global supply disruptions are tested on a regular basis. The last exercise was held in June of last year, with the participation of all 28 IEA Member-countries and 14 non-member countries.

Notwithstanding the above discussion, emergency reserves are not only created to react to international supply disruptions. They have proven to be an effective response to domestic disruptions as well. Industrial actions in parts of Europe have led to strategic releases. And the US has made recourse to its reserves to offset logistical problems. In this decade alone, the US used the SPR on 10 separate occasions to give relief to refineries when their supplies were disrupted. In such cases

the oil is loaned from the SPR, not sold. When the disruption is over, oil companies that received oil return the oil with some additional quantity as a kind of interest payment.

We are often asked: if emergency stocks can be used for domestic supply disruptions, why not use stocks to bring prices down when they spike? We think that to use the reserves for price management is dangerous territory and would fail. The market is currently aware that emergency stocks can and will be used during any severe supply disruption. This in itself helps to limit the price exuberance that can result in large spikes when there are physical disruptions. But, a policy of releasing oil to counteract high prices would add an additional source for speculation. Had we released stocks during the 2004 price shock, there probably would have been a very short term dampening effect on prices, but the reverse could also have happened, for example, had the market worried that stock draw was reducing our strategic reserves and providing a negative incentive to invest in new supplies or improve efficiency, making the fundamental supply/demand situation even worse. As it turned out, we would also have been less prepared for the real supply disruption that occurred in 2005 and refilling of SPR's would have been at record prices.

Let's focus now on the US SPR from the IEA's point of view. Today it is rapidly approaching its current capacity of 727 million barrels, covering 61 days of net imports. In 1985, just before domestic production in the US began to steadily decline—the SPR represented 116 days. Even though the volume of SPR oil today is well above the amount back then, the number of days of net-imports it represents has declined considerably.

Although the US has no obligation on industry to hold stocks, there are of course commercial reserves in the US, which currently stand at about 75 days, so in total the US is more than compliant with IEA rules. But compliance results to some extent from voluntary commercial stock holding by industry, and most of those stocks are needed for day-to-day use. They are an important part of maintaining the supply and demand balance, their amounts are subject to fluctuations in market conditions, and are not volumes of additional oil that can be readily brought to market through emergency measures when markets are disrupted.

The issue this Committee is discussing today is the composition of the SPR. Currently the SPR holds mainly crude oil. It is all located near the Gulf Coast, the most hurricane-prone, vulnerable region of the United States. There is also a small heating oil reserve of 2 million barrel in the North East, for extremely cold winters. The damage of Hurricanes Katrina and Rita in 2005 exposed some vulnerabilities of the SPR. For one, if all oil is stored in the same region, this oil cannot be moved if the region is cut off. And secondly, having crude oil will provide security only if there is enough refining capacity to process the crude oil. In the aftermath of Hurricanes Katrina and Rita, product supply became critical because refining capacity and the power sector were severely damaged. One million incremental barrels per day of products had to be shipped from Europe and Asia to give appropriate relief to the US market. Therefore, in its review of US emergency preparedness in 2007, the IEA advised the US to consider holding product stocks as part of any expansion of the strategic reserves and to place a significant share of crude and product reserves away from the Gulf of Mexico to reduce their vulnerability to extreme weather events. Hurricanes Gustav and Ike this past summer reminded us of the relevance of this recommendation.

So while the IEA welcomes the expansions of the SPR, we believe that doing so by only adding more crude volumes to the SPR storage in the Gulf of Mexico would not effectively address the specific vulnerabilities underlined by recent hurricane seasons. Instead, we believe that additional SPR barrels in the form of finished product and held in strategic locations throughout the country, ready to be utilized when refineries or distribution networks are disrupted, would bring greater additional security for each dollar spent than purchases of additional crude oil.

The proposal currently under consideration is to hold 30 million barrels of product stocks. If held in the form of finished motor gasoline, the single largest product consumed in the US, this would equate to a little over 3 days of consumption. Holding strategic reserves of product stocks is not uncommon; many IEA Member countries hold them, and just recently we have seen media reports about China's intention to hold some 70 million barrels of product stocks, or about 9 days of consumption, by 2011.

European IEA member countries which are also members of the European Union have a requirement to hold a large portion of their stocks in products, based on EU regulations. These require all EU members to maintain, through a combination of public stocks or requirements on industry, 90 days of consumption of gasoline, middle distillates and fuel oil. While a portion of this requirement can be met with the holding of crude stocks, the result is a significant portion of emergency stocks are

held as refined products. Currently, some 55% of all public stocks held in Europe are in the form of product. For example, Germany's stockholding agency, EBV, holds over 180 million barrels of strategic reserves, nearly half of which is made up of diesel and gasoline, and spread out over the country's different regions. In France, the stockholding agency SAGESS holds over 103 million barrels of strategic reserves. Two thirds of this stock is diesel held in storage facilities throughout the country. SAGESS also holds 12% of its stock in the form of gasoline, with a good share of this being held in salt domes in the south of France.

Outside of Europe, Japan and Korea are the other IEA member countries which hold strategic reserves of product stocks. In addition to holding public stocks of some 320 million barrels of crude oil, Japan holds a little over 7 million barrels of public LPG stocks. This is on top of its obligation on industry to hold at least 70 days of oil stocks in proportion to their imports. Furthermore, following the lessons learned from the IEA's 2005 collective action and as part of Japan's new national energy strategy, the Japanese government has been preparing the introduction of a new system for holding public product stocks. Korea also holds a portion of its public stocks in refined products and requires its industry to hold minimum levels of product stocks. Of its some 81 million barrels of public stocks, nearly 12 million barrels are in the form of products, mostly middle distillates. These are held at storage sites located throughout the country.

How public product stocks are held varies across the different member countries. As said, France holds stocks of gasoline in underground salt domes, but for the most part product stocks are held in above ground tanks which are either owned by the public stockholding agency or rented from industry. Public product stocks are sometimes held in commercial tank farms, either in separate tanks, as is the case in Germany, or commingled to some extent with the oil of industry, as for example in the Czech Republic. New storage can be developed when existing capacity is insufficient; in Spain the agency CORES recently commissioned the building of storage capacity to increase its public stockholding cover, including middle distillates, from 30 to 40 days.

Of course, oil supply security has a price and strategic product stocks more so. For a typical European country with virtually no domestic production, the yearly running costs (without capital costs related to the buying of the oil itself) stand at about $ 3 per barrel stored. In most European countries the financing is done by a special levy on the sale of petrol of less than 1 US cent per litre. In other European countries, costs are paid by the government budget, equating to about $ 5 per inhabitant. In Japan, where space for storage is limited and thus expensive, strategic stockholding of crude oil is estimated to cost just over $ 2.5 per barrel.

In the US, the running costs for the SPR are about 20 US cents per barrel stored—considerably lower than in Europe or Asia. This can be explained primarily by the favourable underground storage possibilities, whereas elsewhere above ground tanks are dominant or even floating storage, such as in Japan, is necessary. The fact that the US SPR is almost entirely crude oil is another reason for the lower cost per barrel, as refined products are more costly to store. As the financing of the US SPR is through the government budget; there is no levy at the pump for this. The running costs are therefore some 50 US cents per inhabitant, about 10% of the running costs elsewhere.

The US system is thus very efficient, and the US taxpayer has received a great deal of security for the money spent on it. Such a savings, in comparison to other IEA member countries, leaves scope for the US to expand the SPR with product stocks, and still maintain running costs well below that of other member countries. For example, if the US were to hold 30 million barrels of product, and assuming the operational costs would be around the same as in Europe at $3 per barrel, the total cost of running the SPR (crude and product) would rise from 20 to 30 US cents per barrel, or about 75 cents per inhabitant.

I have also been asked to comment about how the decision is taken in various member countries concerning when to use strategic stocks. I know that for the US, this is taken at the highest level possible, that of the President. For the most part, in other IEA member countries, such a decision is taken at the level of the minster responsible for energy matters. In some cases, consultation with a council of ministers is required before a final decision is made.

In conclusion I would like to say that although the SPR system in the OECD countries dates back 35 years, it has evolved along with market realities and is even more effective today. The knowledge that we can supplement supply quickly when faced with a sudden supply disruption has a calming effect on oil markets.

Looking at the SPR of the US: the current level is an enormous volume. But we have to realize that the US alone consumes about 25% of all oil produced globally. In terms of days of net imports, the SPR alone is well below the 90 day minimum

that IEA member countries are committed to hold. Therefore, we wholeheartedly support the expanding of the volume of oil held in the SPR. However, the current SPR stocks are concentrated in the Gulf of Mexico and almost entirely in the form of crude oil, so the use of the SPR is vulnerable to events, such as hurricanes, which can take away the ability to refine the oil into a product useful for consumers. Therefore, we encourage the US to procure additional SPR barrels in the form of product stocks, held in storage more geographically spread across the country.

US taxpayers have benefited from the SPR; not only during the two collective actions of the IEA, but also on numerous occasions when the market confronted domestic disruptions. The US SPR ranks amongst the most efficient reserve agencies globally, providing a high degree of oil security to the US for only 50 cents a year per citizen. The SPR, by expanding from its current level through the addition of refined products, could significantly enhance security of supply and still maintain costs per barrel of public stocks at levels well below those of other member countries.

The SPR of the US has served as a model for many other countries within the IEA and beyond, notably in Asian countries like China, India and ASEAN states, which are currently developing or considering similar emergency reserves. In a time of heightened volatility in energy markets, the SPR should continue to uphold the same mission and ambitions as when it was first founded some 35 years ago.

Thank you for your attention.

The CHAIRMAN. Thank you. Thank all of you for your excellent testimony. Let me ask a couple of questions first here.

Let me just zero in on this issue that I believe Dr. Rusco, you talked about and others did too about this proliferation of fuel types that we have and the particular problems that creates for us. I guess that I'm not real clear as to what you think the solution to that is in this context. I mean obviously if we could lessen the number of fuel types that would be a solution.

But for purposes of making a product reserve work is there a simpler solution? Something that is more targeted to just fixing that problem?

Mr. RUSCO. I think that there are a number of possible solutions. The one that has been used during emergencies before is to provide a waiver. The Environmental Protection Agency can provide a waiver that allows areas that are required to use special blends to use any available fuel that's, you know, suitable. Obviously it has to be appropriate.

If those, such a waiver were possible during the release of Strategic Reserves than the Strategic Reserve could keep a less than full fuel slate. If, for example, there were supplies kept in the West Coast and maybe it makes sense there to have California, you know, car gas. But if you're in the Midwest and there are a bunch of different types of special blends of fuel there, if during an emergency you could have a waiver of the requirement to use those special blends then you could keep in the Midwest special—or just one particular blend that would be useful in any of those areas.

The CHAIRMAN. Ok. Let me ask about this suggestion that Mr. Shages has there about allowing the proceeds from SPR sales to be used to fund expansion or improvement of the reserve. That's what I understood you to be recommending.

Mr. SHAGES. Actually I was talking about the proceeds that came from exchanges or loans as opposed to sales.

The CHAIRMAN. Oh, ok. Let me ask Dr. Rusco. Have you looked at that proposal? Do you have a view on that or any of the rest of you have a view on that?

Mr. RUSCO. We have advocated in previous reports that DOE take a more active role in making such exchanges so that they can

defer delivery of oil during times when prices are high in exchange for additional barrels in the future, that to be negotiated by DOE and the companies that are delivering oil. We think that that is—can be a source of additional savings.

The CHAIRMAN. But on the issue of whether or not those savings should be put to use to expand and maintain the reserve itself rather than going back into something else. You don't have a view on that?

Mr. RUSCO. We have also advocated that using money rather than royalty in kind oil to fill the reserve would lead to greater efficiencies. To the extent that there were money put aside either through the sale of royalty in kind oil or authorized in some other way for the expansion of the reserve. Then the process that Mr. Shages talked about could be used and could save a great deal of money in filling it.

The CHAIRMAN. Ok. Mr. Houssin, let me ask you how frequent is, in Europe, in other industrial countries that do have product reserves, how frequently are they actually used? I mean is this something that they have reserves everybody feels good and then that's the end of it, sort of like our Northeast Home Heating Reserve or is there an actual need for these on a periodic basis?

Mr. HOUSSIN. Yes. Actually the reserves have been used as in the U.S. The extra has been used through swaps to meet some logistical problems that some refiners in some regions can have, very specific local issues. We saw several times in Europe that the product stocks have been used.

For instance when there were industrial actions in certain areas to meet with logistical problems. It can be done on a national basis only if the country complies with a 90 day obligation. So they don't need in that case. If this is above the 90 day obligation they don't need an IEA approval.

The other case of course is a collective action as was done in 2005 where every IEA member participated through the collective action and as well as in 1990.

The CHAIRMAN. Ok. Good.

Senator Murkowski.

Senator MURKOWSKI. Thank you, Mr. Chairman. Mr. Johnson, this first question is directed to you. This morning the RAND Corporation released a report stating that the absence of a publicly stated policy on when the SPR will be used has a potential to trigger panic hoarding if market participants fear a major supply disruption and thus bringing on the very conditions that the SPR is supposed to ameliorate when we set it up.

So I would ask you whether or not DOE will commit to providing certainty in the marketplace by developing a publicly stated policy as to when the SPR should be drawn down. I realize it is separate from what we're talking about here with a product reserve. But I figured the timeliness of this was worth the question.

Mr. JOHNSON. I'm here to testify on the technical aspects of the reserve. The administration really hasn't set a policy on this. So therefore I can't really answer that.

Senator MURKOWSKI [presiding]. That is my question to you. We don't have a policy, a stated policy, as to when the SPR, when there should be a drawdown. As I say, according to this report it

creates that same level of uncertainty that we're looking to ameliorate.

So if in fact you don't feel that you can answer that question today, I can appreciate where you're coming from. But I do think it is something that the administration does need to look at as we are reviewing this situation with our Strategic Petroleum Reserve.

Mr. JOHNSON. Ok.

Senator MURKOWSKI. I would like to ask and I'm not quite sure who will field this question. But as I understand as we've been talking about where a product reserve could be located. There's been some discussion about Mississippi because it ties in with existing access to resources within that region.

There has been conversation that by siting it in the Southeast you are not allowing the other parts of the country to have access to such a product reserve. So given the makeup of the existing pipeline distribution system and the fact that California and the West Coast and the Southwest are thousands of miles away, earthquakes could clearly disrupt aspects of our supply distribution system.

Would it be the intent to have multiple product reserves set up? Is that what we're contemplating here? We haven't really talked much about the cost.

Mr. Houssin, you mentioned the cost that you've experienced in Europe. But I'd like to get a better handle as to what we're actually talking about in terms of the cost to establish and maintain and operate a product reserve.

Mr. Shages, we have had little conversation on this. Mr. Book, I'd be curious to hear your thoughts as well.

Mr. SHAGES. Yes. I always think that you can't look at these things as absolutes. You always have to compare costs with value. All the things that you point out we were absolutely correct.

It's one reason why we've been focusing so much on the Richton dome site in Mississippi because it offers all of the advantages of salt on storage. It's also a plant site for expansion of the reserve overall. So the refined product portion of it could be an adjunct to the crude oil portion in which case a lot of the facilities in the management would be in common. So the marginal cost of adding refined products would be minimal.

If you start putting in free standing sites that are not associated with salt in which case there almost certainly going to be steel tanks, then it's going to become much more expensive. But again it will be relative because one of the large costs is the land in the area that you're going to and environmental considerations in that specific area. So again, I tend to focus on the Mississippi site to service the Southeast.

I am concerned also about the Southwest. Before I left the department we did some studies looking for sites for underground storage in the West. We didn't find any through the extent to which we did studies.

None the less land is inexpensive in the West. I think it would be worthwhile doing the engineering cost estimates to see how much it would cost to build steel tank storage in some sort of central point which was outside of the earthquake damage that could occur in the Los Angeles area which could knock out the refineries

and the pipelines, some place like Las Vegas and big demand center, but also sitting on the pipelines to distribute to Utah and New Mexico and various other places.

But what I believe the beauty of the legislation is drafted is it gives DOE time to look at these things to do a tradeoff between the costs as they define them and the potential benefits. So whether it's really worth it to go to other parts of the country, upper Midwest or wherever it happens to be. I think the details will give you the answer to whether it's worth it or not.

Senator MURKOWSKI. Mr. Book, any comment on cost?

Mr. BOOK. Yes. Thank you, Senator Murkowski. I think with the sort of the advance caveat that I'm using Monsieur Houssin's number in real time and back of the envelope right now.

There's two things to think about from the cost perspective.

The first is that the more decentralized your siting is, particularly if you have multiple products in storage, the more expensive it's going to be, obviously.

The second thing is that you have to think in terms of sort of, total acquisition costs. I'm just going to use rough proxies here. Last night's gallon average was $2.25, so 30 million barrels is 1.26 billion gallons or $2.83 billion to stock it.

Three dollars per barrel at 30 million barrels is $90 million a year. Your operating costs are comparable to essentially a refinery, a new refinery, your capital plus operating costs of the same size. In other words if you took the same requirement, you divide the 30 million by 365. You get 82,000 barrels per day.

Sort of think about the refinery producing more than just gasoline and transportation fuels. It expends up to about 105,000 barrel per day refinery. At prevailing cost of building a new one, it's about $2.9 billion, slightly more than buying the fuel.

So I think when you, as Mr. Shages talks about sort of the relative costs and benefits. This becomes sort of a fishing rod verses fish kind of question as well. Do you want to buy a lot of stuff or do you want to create the capacity to make the stuff?

Senator MURKOWSKI. I appreciate the responses. Mr. Chairman, I have other questions but I've got another committee that I need to attend. So I will submit them in writing.

The CHAIRMAN [presiding]. Senator Corker.

Senator CORKER. Thank you, Mr. Chairman and thanks for having the hearing. Thank all of you for your testimony. This may have been slightly addressed earlier, but I don't think it was fully.

You know we have this debate and we end up sort of using the petroleum reserve that we have right now almost in a populous way. You know, if prices get high then, you know, we put pressure on the President or we want to pass legislation here to send out all throughout the country to lower prices. Understand the way this, which it is not what its purpose is if my understanding is to keep us from being in a severe crisis in this country due to other kinds of disruption.

This language I guess is modified and actually moves it to the Department of Energy, off the President's desk which I guess politically makes it easier for somebody to release it. I don't know what the purpose of that is exactly.

But when we add, we're using the word, market to energy supply disruption, I'm just wondering if there's any fear on y'alls part that we're going to start releasing refined product when prices get high all of sudden and that's a reason for us, if you will, to be releasing product out on the marketplace based on the way this is now drafted.

You're shaking your head, Mr. Book, up and down. So I'm going to let—you may have just been trying to be nice.

Mr. BOOK. No, Senator Corker, I think actually there is risk to using the reserve frequently because it is an insurance policy. The more you do it in response to price, if you start that the market will look through it very quickly. I have clients that multi strategy hedge funds who trade crude oil. They're very sophisticated.

They're likely to move faster in the way they trade oil than the United States Federal Government is. Simply put you turn the United States Strategic Petroleum Reserve from the best energy policy ever into a fairly feeble upstream oil company competing with the most sophisticated nations on earth.

Senator CORKER. So is it my understanding that you would think taking the word market out of this would be an interesting thing to do?

Mr. BOOK. It's challenging to make the catalyst anything other than an emergency supply disruption, in my view, sir.

Senator CORKER. Ok. So it looks like maybe there may be some input from over here on that afterwards. So, you know, I guess I read something in one of the newspapers about this being a gift to southern Senators which I appreciate if that's the case. Typically I like to come to hearings and see what the bill is about before we jump on these things.

But when we had a disruption in the south this last time it was really more about electricity and just having the ability to get power to the pumping facilities that were actually sending the product into Tennessee and other places. At least that was my understanding as to a part of the problem. I've got another part of it that I'll address in a minute.

But is not the interruption of electricity supply one of the big issues as it relates to getting refined product to folks in various parts of the country after something like a hurricane?

Hello? Mr. Shages? You guys in the industry answer. I understand the oil industry didn't want to be here. So they sent you all instead.

[Laughter.]

Senator CORKER. Ok.

Mr. SHAGES. No, that is absolutely correct. One of the reasons we're focusing on the Mississippi site is because it has a few strategic advantages. It's already miles inland from the coast which removes it somewhat from the hurricane area. It also moves it further up along the colonial and plantation pipelines which are the pipelines that are serving the Southeast.

If there had been such a site in 2005 and 2008, that site would have been able to put the product into those pipelines and move it to the final consumers. So even though it's close to where the hurricanes did all the damage, it would provide the protection that

we're talking about in the event of this typical type of large hurricane.

Senator CORKER. Ok. One of the things that I think occurred also was there was this issue of panic buying that took place. In other words all the news outlets were advertising that there wasn't going to be any gasoline or diesel and so people went out and bought huge amounts of gasoline and diesel which added to the problem.

Then on top of that many of the retailers didn't want to buy at the high prices it was being sold to them at wholesale because they were afraid if they bought at that price and then tried to recoup what they paid for that the attorneys general would be after them from the standpoint of price gouging. Is that also an issue that comes into play?

Mr. SHAGES. Frankly it's so far down the level of what the Federal Government could possibly try to control that I don't think so.

Senator CORKER. Now I'm not talking about things that—actually I'm actually talking about those things that are sort of out of our control. I'm not saying that we should get involved in controlling that. But did that contribute to the shortages that took place during this last hurricane season?

Mr. SHAGES. It sounds plausible to me, but I don't have any actual information.

Senator CORKER. Mr. Book.

Mr. BOOK. My view is that the first factory you described, Senator is one of the biggest issues of all. It's like the hot summer day no one expects where everyone turns on the AC and the grid shutters and nearly goes down. Our system runs very lean and efficiently. It's the way we have such cheap motor fuels in this country.

When people panic and buy that has an effect of depleting supply faster than retailers expected. If they think that they can't recoup their replacement cost we're not talking—only 10 percent of the downstream is now owned by the integrated. It's a relatively small business, mom and pop kind of operation. They don't want to put themselves in a lot of capital risk.

Senator CORKER. So, so, then the big part of this issue is panic buying. Then a big part of the issue—part of the issue could be and I think this is true. In fact I know it's true in certain cases. The retailers don't want to pay at these pumped up prices that occur after this panic buying takes place because they don't want—they're afraid if they try to recoup what they paid for that the attorney generals will be on them for price gouging.

So let me go back to the genesis and that is this whole issue of storing refined product. What does that do to help solve those particular issues we just brought up?

Mr. BOOK. It's not necessarily a solution to panic buying because you could run through a lot of the supply available to you in a region before it could be replenished from a reserve. The flow down the colonial plantation pipelines is 2 weeks from the Gulf Coast all the way up to the Northeast. So even if you got a jump getting things into Tennessee as you would have wanted to have done. Panic buying could still have depleted your available reserves.

Senator CORKER. So, let me just one of my last questions. It's my understanding that before I got here it was discussed a little bit

about the fact that we have sort of boutique types of laws in various States as to the type of fuel mixes that people can sell in respective States. If we have a place where we store refined product if we actually use it then we're going to need some State waivers to actually be able to pump this refined product around in various places.

Would another solution that might also be highly beneficial be that during this period of time we have an automatic waiver process that kicks in so that when there is in fact refined product in other States that can be sold. I mean if this is a solution to the storage product would it not also be a solution to refined product existing in other places that could actually be used here. But yet for State laws that actually control these little boutique mixes.

Would that be something that would also be helpful during these fraught times when there's not enough supply?

Mr. SHAGES. If I may. I think there is a good analogy for the Strategic Petroleum Reserve if you were to have to drawdown the reserve at its maximum capacity the amount of pollutants going into the air would be tremendous. In the area that would happen is the Gulf Coast of Texas and Louisiana which are already non attainment areas as far as air quality.

Those two States know about this. So agreements were put in place in advance that upon a declaration of an emergency on a full scale drawdown on the reserve if the States of Texas and Louisiana would waiver those things to allow the drawdown to take place despite all the pollution that would occur which is appropriate. I think the same sorts of things which I believe is what you're suggesting, could be put in place in advance for all the States that might be affected.

Senator CORKER. When on a relative basis how would that help in solving the problem as compared to having a strategic reserve, if you will, of refined product on a relative basis?

Mr. SHAGES. I wasn't suggesting that that would be a substitute. I was suggesting that if you had refined product reserves in storage and they didn't meet the specification for the State at the time they might be drawn down that it would automatically be waived. So that whatever was in storage in the refined product reserve could be delivered to that State.

I wasn't suggesting that one was a substitute for the other.

Senator CORKER. Mr. Chairman, I thank you. It's my sense then that you generally support this type of legislation. Is that true or false?

Mr. SHAGES. I do support it. Yes, sir.

Senator CORKER. The concern then would be to do it in such a way that we don't use it as a mechanism to actually try to affect market prices.

Mr. SHAGES. I——

Senator CORKER. Only do so when there's actually a crisis that exists that's keeping product from being there. Is that?

Mr. SHAGES. For refined products I think that's absolutely true. I've testified that with regard to crude oil that when prices go extremely high, as they did last year, that that itself is devastating to our economy. It should be considered to use the Strategic Petroleum Reserve just for prices in that case.

The CHAIRMAN. Senator Shaheen.

Senator SHAHEEN. Yes. Thank you, Mr. Chairman. Thank you all for being here. I'm sorry that I have missed your comments. But as someone who has been Governor of New Hampshire at a time of supply disruption I can speak very personally to the importance of the Northeast Home Heating Oil Reserve and its potential to address concerns in New England.

In New Hampshire we are probably one of the most heavily dependent States on oil because over 60 percent of people use it to heat their homes. Then of course when you add in the transportation sector it has a huge impact on the State. So let me apologize for having missed some of the questioning because you may have already addressed this issue.

I think Senator Corker, you were talking about this in what little I heard from your remarks. But one of the concerns that we've heard from some of the business entities in New Hampshire is about the potential to drawdown from the reserve based on a political decision when prices spike as opposed to when there really seems to be need because of disruption in the oil supply. So can you speak to how you can determine the difference between the two and so that you can both reassure business that there's going to be real disruption but you can also reassure me as somebody who is trying to talk to consumers in New Hampshire who is concerned that when prices spike that it does create an emergency situation for many people in the State.

Are the two desires contradictory or can you find some balance between those two and reassure both entities? I don't know who would like to address that.

[Laughter.]

Mr. SHAGES. Would you like me?

Senator SHAHEEN. Yes, go ahead.

Mr. SHAGES. Alright. I tend to think that you can make that distinction. But it's sort of the fine points that people in the industry.

If you go back to the situation that created the Northeast Home Heating Oil Reserve in 2000, it was quite clear that because of the freeze up of all of the harbors and——

Senator SHAHEEN. Yes, I remember that very clearly.

Mr. SHAGES. We all remember that very well. When you have a situation like that it's quite clear that you have a supply shortage where even if there is heating oil it can't get to where it's supposed to be. It's late in the season so the inventories are already down.

You can rack up all these things and say, it is a supply shortage. On the other side of it you can take situation like we've had the last 2 years where the price of crude oil was going through the roof. Naturally the price of heating oil has to follow since it's the predominant thing.

So the typical consumer is not a specialist and doesn't know. They only know if the price is going to $4. So I think you do have to trust.

I believe in this case it's Mr. Johnson and the other people in the Department of Energy that you—and wherever the authority is to drawdown that you want brought down just for price purposes, that you'll only drawdown in the event that there's a shortage that

is going to cause a price increase. I think you have to trust their expertise on that.

Senator SHAHEEN. Conversely are there benefits from tying the drawdown to a mandatory price spike?

Mr. SHAGES. No.

Senator SHAHEEN. So everybody would agree with that that there's no—that it wouldn't help to alleviate the price spike. For example this last year when we saw prices go above $4 a gallon there was agreement between Congress and the Bush administration that actually we should drawdown the petroleum reserves to try and alleviate the price impacts. Would you all disagree with that logic?

Mr. BOOK. Senator, if I could.

Senator SHAHEEN. Sure.

Mr. BOOK. Any price becomes arbitrary over time. The lessons of the 1980s and the credits that were based on a 29 barrel price were hard lessons for this government losing money over the next 3 decades. Four dollars won't seem like $4 in 10 years. So that's the first problem.

The second one really has more to do with the idea that if there's a clear understanding that something gets used at a certain time. It has no surprise value to the market. The market sees that, knows that that is the move.

It's programmatic. Then any price manipulation power the government, good price manipulation power, the government might want to use, goes away because it's already priced into everyone's expectations looking ahead.

Senator SHAHEEN. Thank you. Yes.

Mr. HOUSSIN. If I might just and one word from an IEA point of view clearly our position is trying. I think it's a position of all IEA government that the strategic reserves whether they are crude or product doesn't matter but the strategic reserves shouldn't be used for market manipulation. But just if there's a disruption or if we're very close or if we have a severe threat of a disruption, so a physical event that would justify a drawdown, a collective drawdown, possibly at IEA level.

Then the question of having a strategic reserve in the form of crude product is up to each member country of the IEA to decide. So the U.S. mainly in crude oil and for instance in Europe, European countries have mainly products in their reserve. But it doesn't mean that the discussion about should we use strategic stocks to alleviate price spikes like last year.

The fact these products are crude doesn't interfere in the discussions. This is not a discussion I would go along with previous speakers who have said that it should be done. Basically we had that same kind of discussion in Europe.

Although the majority of reserve is made out of production, the decision was made not to drawdown stocks also in Europe.

Senator SHAHEEN. Thank you. Yes.

Mr. SHAGES. If I may just to clarify and draw a distinction. On the Strategic Petroleum Reserve side, I think there is a place for using the Strategic Petroleum Reserve to respond just to price increases and not necessarily to a disruption. I think it was a travesty last year when the price of oil went to $147 and OPEC coun-

tries when American officials went to them, hat in hand, and said the market is well supplied.

There's no question in my mind if they had any pumping capacity they should have brought it online. But they didn't. I think it would be naïve to think that the recession that we're in now is just caused by the housing problem or the mortgage problem.

The fact that oil went to $147.00 played a huge role in that. Just to put it in a little perspective, a price increase from $47 to $147 given the level of imports we have means $1.2 billion a day goes out of the United States to some foreign location. That money could be used to pay mortgages.

So it had a huge impact. The fact that we, for whatever reason, felt constraint to sit on our hands is, you know, is unfortunate.

Senator SHAHEEN. So you disagree with Mr. Book.

Mr. SHAGES. There's a distinction between the product reserve and——

Senator SHAHEEN. Right, right.

Mr. SHAGES [continuing]. The Strategic Petroleum Reserve which is crude oil.

Senator SHAHEEN. Right, I get it.

Mr. SHAGES. I mean in size they are not going to be comparable no matter how big you make the refined product reserve. I think you should minimize the number of times that you go into the market because you don't—we're primarily going to be based on a free market system and there are millions of players in that. You don't want to interfere if you don't have to.

But again I would figure it would be naïve to say that the world crude oil market is a free market given OPEC and given countries like Russia that have huge reserves and are clearly controlling the price and then other players. The Chinese are not exporters they are importers, but they are clearly using sophisticated technique for building their Strategic Petroleum Reserves in doing what Mr. Rusco has been calling for. Sitting on their hands when prices are high and then going into the markets very heavily when prices are low.

So you have these very big, non-commercial players moving prices around like crazy. For us to say we'll only intervene in the markets when there's a disruption. I think disruptions can happen at any time without anybody announcing them.

Senator SHAHEEN. Thank you.

The CHAIRMAN. Let me just clarify. As I understand as a follow on to your statement there, Mr. Shages. It's your view that limiting the any drawdown or sale of petroleum products to interruptions in supply is appropriate.

Mr. SHAGES. I think that is appropriate.

The CHAIRMAN. That's what we're trying to do here in this language. I think Senator Corker pointed out some ambiguity there which we need to correct perhaps. But I think our thought, at least my thought on this is that if we make provision for a product reserve it would, we would specify that the drawdown of this product reserve by the Secretary would be limited to circumstances where there is a supply disruption which may also result in a price change. But there would have to be a supply disruption that accompanied that.

On the other issue that we've talked about a lot is this boutique fuel thing. Let me just clarify for Senator Corker and Senator Shaheen that part of our thinking in not specifying that in this legislation is that our committee doesn't have jurisdiction over that. I think that's clearly the Environment Committee. Therefore we did not include provision in here that specified exactly how EPA would handle that circumstance.

But Mr. Shages, you pointed out that under current law the waivers that EPA grants relative to the Strategic Petroleum Reserve are a result of agreements entered into between the States.

Mr. SHAGES. These are actually agreements between the Department of Energy and States of Texas and Louisiana, not the Environmental Protection Agency.

The CHAIRMAN. Oh, I see. Ok. So you think similar agreements would be appropriate here?

Mr. SHAGES. I do. I'm not familiar with the particular requirements of the States of North and South Carolina and Georgia.

The CHAIRMAN. But are there any statutory authorization for those agreements or the Department of Energy takes it so that they have that authority for these agreements with the States?

Mr. JOHNSON. The EPA delegates this down to the States. Because we will be loading ships at the terminals, there's always vapor that comes off and it goes over the allowed limits.

So the States give us a waiver in an emergency so that we can load ships to reach the parts of the country that need to be helped. So we have agreements between us and the State energy offer.

The CHAIRMAN. Us, being the Department of Energy?

Mr. JOHNSON. Yes, correct.

The CHAIRMAN. You think you could have similar agreements between the Department of Energy and the States——

Mr. JOHNSON. No.

The CHAIRMAN [continuing]. Involved with product reserve or no?

Mr. JOHNSON. No, not DOE. In 2005 the EPA took the lead on that. The Department of Energy actually did due diligence with them to make sure there was need in the States.

But they did blanket waivers. They granted waivers to 30 States for Katrina and Rita for gasoline and diesel and other fuels to increase the imports to those areas.

Then in 2008 the EPA didn't give a blanket waiver, but they gave a waiver to all the Gulf Coast States as well as, I think, Virginia and Florida. But they got waivers by asking for them and essentially they needed to bring in fuel that didn't meet their specs. So EPA——

The CHAIRMAN. So I guess what I'm trying to determine is, do you feel comfortable with the way the law now allows this to happen or provides for this contingency or do you think we need to be specifying in law somewhere that someone has additional authority beyond what they have under current law?

Mr. JOHNSON. I think at the national level the EPA waiver is a proper way to go, to look at the whole situation and grant waivers to the States that need it. If we get a product reserve would there be an advantage to setting up some national waiver like the Jones Act waiver for ships. I think that would be applicable. Yes.

The CHAIRMAN. Ok. Alright. Senator Corker.

Senator CORKER. The very nature of a refined product as I understand it, the life cycle is far different than it is for just crude, unrefined product. How often is it for this product to remain useful that it would have to be actually back out of the reserve and into the marketplace for us to know that what was there was actually useful?

Mr. Book.

Mr. BOOK. Reasonable estimates would be somewhere between 12 and 18 months. You'd have to circulate to be sure. That the differences by product type and the composition of the product.

The way it works elsewhere where they do have product reserves is typically they rotate through a reservoir so that volumes pass through the storage tank on their way through to somewhere else. That limits by necessity, the size of the reservoir. The easiest way to do that is for companies to hold larger working inventories.

The reason why we don't necessarily want to mandate that is that is literally taking money out of their pockets unless you find a way to make them whole. I suspect there's probably a nausea response to giving money to oil companies to hold bigger inventories.

[Laughter.]

Senator CORKER. That is what happens in Europe, is that not correct? Many of the companies there, themselves, are required. I'm not advocating that, are required to hold certain amounts of reserves there for this very issue. Is that correct?

Mr. HOUSSIN. If I may. Part of the obligation is on the industry. But part is also on the public agencies that are—it's similar as the SPR but the difference is that these agencies in Europe have their own stocks just for strategic reasons.

But they behave very close to the markets because on so far that specific reason that the products have to turn over frequently. So they sell and buy. But their objective is to maintain the level of strategic reserves which is mandated by law.

Senator CORKER. By the——

Mr. HOUSSIN. In the way they act they are probably closer to the markets, even if the products are just maintained for strategic reasons when they are maintained by the public agencies.

Senator CORKER. Mr. Chairman, I, first of all, I very much appreciate the thoroughness with which you're going through this energy bill. I very much appreciate the fact that you're focusing on something that is more regional in nature recently and trying to find a solution for that. I would say that it seems to me one of the biggest issues since it doesn't sound like the currency, we can solve the currency of the product by letting it flow through the reserve.

Are you saying we can or we can't?

Mr. BOOK. Not cheaply. I mean we'd either have to have a lot of reserves that cost a lot of money in a lot of places or else not have very big ones.

Senator CORKER. Or release it into the market every 12 to 18 months. In an essence be fiddling with the very issue you were talking about earlier. Is that correct?

Mr. BOOK. Yes. I defer to how you would do that to the folks who've run the SPR and run it now. But the mechanics of doing it would not be easy to get the kind of volumes you're talking about here.

Mr. JOHNSON. I mean, the Northeast Home Heating Oil Reserve that we have today, the two million barrels, is in commercial storage terminals. Is being turned over continuously, with the inventories that are there.

So we have no refreshment requirements. It's automatically taken care of. Yes, on a small scale that's true.

I do want to add that, you know, Germany and France also store products in salt caverns underground. In talking with them they look to rotate about every 2 years.

The Danish also have some underground storage. They claim they can even go longer. I think there needs to be some study on the life of a product stored underground.

Essentially it is longer than in storage tanks. So we think a product reserve could be actually kept longer than 12 to 18 months.

Mr. BOOK. Their products are mostly distillate fuels though and not refined.

Mr. JOHNSON. It's both.

Mr. BOOK. Not reformulated gasolines though.

Mr. JOHNSON. It's gasoline and distillate.

Senator CORKER. Mr. Chairman, a number of interesting issues. Thank you. I think that, you know, the philosophical issue, it sounds like at least for those that are present today that the issue of insuring that this is not something that's used in the event of a price disruption, but only a supply disruption.

I think we've seen for instance, just to use a most recent example of tarp. Once it can be used, it can be used for lots of things. Alot of people think that's good. A lot of people didn't intend for it to be that way.

But it seems to me that that's the kind of thing we might want to think about. Again, I thank you very much for trying to address this issue.

The CHAIRMAN. Alright. Thank you very much. Senator Shaheen.

Senator SHAHEEN. I don't really have any more questions except to pick up on what you just said, Senator Corker. Because as I heard what folks said and as I look at the language in the bill, it does allow for using the reserve for price disruptions when those are deemed to be an emergency.

Did I misunderstand? I thought there was some disagreement on the panel about whether that was an appropriate use of the reserve or not.

Mr. BOOK. Senator, I think, if I may, properly. Mr. Shages is suggesting that it's appropriate to do it with crude oil, but not with refined products. I'm suggesting that it's not appropriate to do it on the basis of price with either crude or refined products.

The CHAIRMAN. Just to clarify.

Senator SHAHEEN. There is some disagreement among you all.

The CHAIRMAN. I think just to clarify. We, to the extent that we wind up legislating the establishment of a product reserve we would try to clarify that it was intended that it only be drawn down where there is a severe energy market supply disruption, not a change in price. That's consistent with both Mr. Shages and Mr. Book's position with regard to product supplies as I'm understanding it.

Senator SHAHEEN. But that doesn't resolve the difference in what they're saying, does it?

The CHAIRMAN. No. They still have a difference of opinion that with regard to whether or not the crude oil could be used.

Senator SHAHEEN. Right.

The CHAIRMAN. Crude oil and the Strategic Petroleum Reserve today could be used for to deal with price spikes. I believe they have a difference of opinion on that. That's dealt with in current law to the extent it is.

I don't think we're ready to change in that.

Senator SHAHEEN. Ok. Thank you.

The CHAIRMAN. Any other questions? If not, thank you all. I think it's been a useful hearing. We appreciate very much the testimony.

That will conclude our hearing.

[Whereupon, at 3:57 p.m. the hearing was adjourned.]

APPENDIX

RESPONSES TO ADDITIONAL QUESTIONS

RESPONSES OF KEVIN BOOK TO QUESTIONS FROM SENATOR MURKOWSKI

Question 1. This morning, the RAND Corporation released a report stating that the absence of a publicly-stated policy on when the Strategic Petroleum Reserve will be used has the potential to trigger panic hoarding if market participants fear a major supply disruption, bringing on the very conditions that the Strategic Petroleum Reserve was supposed to ameliorate.

Should DOE commit to providing certainty in the marketplace by writing and holding a publicly stated policy on when the Strategic Reserve will be drawn down?

Answer. Senator Murkowski, one of the greatest advantages of the current configuration of the Strategic Petroleum Reserve (SPR) may be, ironically enough, the tremendous range of tactical opportunities it offers in the event of a supply disruption. The current SPR sends very few market signals of any kind other than the affirming presence of a potent insurance policy.

Programming draw-downs at defined prices or calendar intervals, or in conjunction with a publicly-announced set of protocols may have the untoward effect of riling energy end-users, but it is much more likely, in my view, to have the untoward effect of riling the intermediate commercial users (and traders) of crude oil and refined products.

Why is this bad? Because introducing SPR oil to a marketplace that anticipates the trade not only undermines the value of the price pressure that introducing supply might exert, but it also leaves the U.S. Department of Energy vulnerable to traders who may be well-positioned to structure transactions that exploit the limited scale and latency associated with flowing volumes from an intermittent source. The only certainty likely to obtain from planned draws may be a high degree of certainty that the U.S. government will lose money in the process.

Question 2. During a supply disruption, the presence of a products reserve could create uncertainty about whether, when, and how much would be drawn down. High gasoline prices send a signal to the market participants and encourage product imports. Could the uncertainties surrounding a product reserve actually result in greater market volatility and discourage necessary imports of petroleum products? How do we need to address these unintended market consequences if we proceed forward with a regional product reserve?

Answer. The presence of a fully-stocked products reserve might well discourage imports of refined products well before any supply disruption.

In fact, the presence of a fully-stocked products reserve might well discourage production and storage of refined products within commercial inventories here at home.

Today, although a majority of global crude deliveries are contracted in advance, tremendous volumes of oil and refined products freely traverse the open seas in search of the highest bidder.

Scarcity premiums are a beacon for imports and for domestic production alike; the looming prospect of a government sale that undermines products margins could easily divert speculative cargoes to other ports of call where scarcity premiums are more certain.

Likewise, commercial players in the U.S. have every incentive to minimize working capital to maintain their highest possible operating margins. Few refiners, blenders or retailers will want to tie up cash in gasoline inventories above and beyond reasonable operating minimums if there's no upside, because there will always be a reasonable risk of a government sale.

The result could be greater volatility and lower commercial inventories in the event that U.S. and international commercial players, in an effort to maximize their own profits, might be "free riding" on government inventories.

The nation's SPR in its current form does not undermine refiners' incentives to produce or invest precisely because it does not compete with the refining sector. On

the contrary, the crude-only SPR supports domestic refiners by providing a critical input for production in the event that outside events disrupt ordinary supply chains.

Question 3. Can you provide an estimated range of cost for the establishment and continued operation of a 30 million barrel refined product reserve as proposed?

Answer. These are just ballpark estimates, but, taking the assumption of a near-term oil price of $65/bbl, Figure 1, below, presents a theoretical cost of filling the reserve of approximately $2.7B. The discounted costs of maintaining it for 30 years, using a slight reduction to the projections offered during testimony by the IEA ($2.50/bbl instead of $3.00/bbl) to accommodate tax structures and overhead, would discount back to a present value of about $1.7 billion (Figure 2).

Construction costs would vary depending on the architecture of the reserve and could range anywhere from $50 million to $500 million for a distributed reserve.

Since it's impossible to make a good estimate of construction cost without a sense of the reserve's architecture, a back-of-the-envelope estimate would be about $4.4 billion, excluding construction.

Figure 1—Fuel Costs

reserve size	30 million barrels 1.26 billion gallons
expected crude price	$65.00 per barrel
normalized refining margin	$0.05 per barrel
transportation costs	$4.00 per barrel
implied gasoline price	$1.72 per gallon, net of taxes
federal gasoline tax	$0.184 per gallon
average state gasoline tax	$0.25 per gallon
all-in implied cost	$2.15 per gallon
initial fueling cost	$2.71 billion

Figure 2—Ongoing Maintenance

SPRO	700 million barrels
annual operating costs	$130.00 million per year
variable cost, net of fuel	$0.19 per annual barrel
IEA product reserve cost	$2.50 per annual barrel
products:crude multiplier	13.5
proposed refined products reserve size	30.0 million barrels
estimated annual cost	$75.00 million per year
operating life	30.0 years
inflation escalator	3%
discount rate	5%
nominal operating costs	$3.68 billion over operating life
present value of operating costs	$1.69 billion over operating life

By way of contrast, our refineries are configured for about 75% light products. Therefore, 75% of a new refinery would be able to produce the capacity required to deliver 30 million barrels in a given year, or about $82,000 bbl. At current refinery

construction costs of $30,000/bbl/d (a high estimate), an equivalent new refinery would cost about $3.2 billion.

A new refinery owned by anybody—public or private—at a time of gasoline demand contraction does not seem a particularly good policy option, either, but I offer this analysis as an example of the efficiency with which the oil industry might deliver a similar result through new investment.

Question 4. In terms of incentive to deliver, are there advantages to a government run supply of fuel as opposed to a privately held fuel supply?

Answer. It is unlikely that a U.S. Government gasoline sector would possess any natural advantages relative to its 150-year-old private petroleum sector, and certainly not within the early years of operation.

With the exception of several extremely well-run national oil companies in the Middle East, most government-run fuels businesses operate less efficiently than U.S. companies.

Nations with nationalized petroleum sectors typically must pay premiums to acquire foreign technology expertise to manage their producing assets.

And that's upstream, where producers can still earn significant profits with natural resources in their care acquire market-derived scarcity premiums; the downstream presents a far more challenging commercial environment.

Refining and marketing is a low-margin, high-volume business that penalizes inefficiency.

Last but not least, the U.S. government would probably face challenging commercial conflicts of interest with some of its necessary upstream trade partners that could interfere with profitable business decisions. For example: would the U.S. be perceived to be "dumping" if it did not establish taxes that closed the gap between pump prices here and abroad; and, if foreign governments imposed these taxes, how would the nation avoid further eroding its balance-of-trade deficit already much worsened by petroleum import dependency?

In short, replacing 150 years of learning and hundreds of billions of dollars of global infrastructure could be done, but it would probably come at a cost that would need to be paid back through fuels taxes, eroding the very advantage the nation enjoys in products prices relative to other OECD economies that derives from the efficiency of its own, private suppliers.

Question 5. With respect to gasoline the sheer number of boutique fuels required by state and federal laws makes it practically impossible to store all the different types of fuels. For example, Colonial Pipeline, a major pipeline supplying products to the Southeast and Eastern U.S. has 60 different grades of gasoline and 26 different distillate fuels that will be shipped in 2009.

What types of fuels will the Department of Energy require to be stored, and is there, in your opinion, a need to provide a fuel waiver on the boutique fuel requirements to ensure that the market disruption gets resolved in a timely manner?

Answer. In my view, it would stand to reason that any disruption that merits deployment of strategic reserves is likely to also require deployment of any available resources as soon as possible. In this vein, it would make sense to establish a single "emergency spec" of gasoline predicated on an automatic waiver of Clean Air Act rules in the event it must be used.

Question 6. Given the make-up of our product pipeline distribution system, a product reserve located in the Gulf States will not be able to provide any relief to consumers west of the Rocky Mountains. Would it be the intent of the Department of Energy to establish a number of product reserves?

Answer. I do not know the intent of the Department of Energy, but if price were no object, it would make sense to site reserves as close to possible to destination markets that might run short of refined products supplies. Multiple reserves would cost substantially more than a single reserve, particularly given the requirement to actively manage inventories, but they would solve some of the transportation problems that would persist in the event of electrical failures that affect pipelines.

Question 7. For many members of Congress, the most logical need for this regional product reserve would occur in the wake of a natural disaster similar to the hurricanes in 2005 and 2008. However, in looking back on those hurricanes the most critical problem with product supply was not a supply shortage, but the prolonged loss of electric power and associated impediments to the product distribution system.

How do we address the electric power problems and ensure that the product reserve is used to provide short-term relief after a natural disaster and not be used solely as a political tool to lower gasoline prices when the price is high?

Answer. Electric power problems that impact refineries and pipelines will impact everything else, too. There are few easy refinery-specific remedies, short of paying refiners to install cogeneration capacity that turns their facilities into largely grid-

independent, multi-purpose industrial facilities, and to purchase generators to support that cogeneration capacity.

Otherwise, I would suggest that the best course of action remains the current trajectory towards a more robust, interoperable and resilient electrical grid that takes advantage of available generating capacity and incorporates renewable (intermittent) sources in a productive way by pairing them with conventional generation and/or storage technologies.

Question 8. As members of the International Energy Agency (IEA), the United States is required to hold the equivalent of 90 days of oil imports. Since the IEA's International Energy Program was created in 1974, oil reserves have only been released into the market twice and refined products have only been released once.µ

Since the US is part of this program, given the limited use of the IEA's response mechanism, what is the benefit to the tax payer to create a costly Refined Product Reserve?

Answer. Risks require expensive countermeasures, either through assurance (parallel infrastructure) or insurance (usually financial mechanisms). When the cost of assuring or insuring exceeds the cost of a disruption, mitigation makes little sense.

Assessing the costs of a disruption falls outside my modest capabilities as an energy specialist, but it makes sense to ask the question: "Do we really need this?" given the many competing uses of taxpayer dollars. Inasmuch you and your esteemed colleagues are faced with the unenviable task of prioritizing our outlays to maximize social welfare, let me offer this perspective.

The fact that existing reserves have met their chartered purpose suggests that the insurance was, in fact, worthwhile. On the other hand, the frequency of payouts is such that it might be irrational to layer on more insurance at this juncture.

RESPONSES OF DIDIER HOUSSIN TO QUESTIONS FROM SENATOR MURKOWSKI

Question 1. This morning, the RAND Corporation released a report stating that the absence of a publicly-stated policy on when the Strategic Petroleum Reserve will be used has the potential to trigger panic hoarding if market participants fear a major supply disruption, bringing on the very conditions that the Strategic Petroleum Reserve was supposed to ameliorate.

Should DOE commit to providing certainty in the marketplace by writing and holding a publicly stated policy on when the Strategic Reserve will be drawn down?

Answer. Yes, we believe that a clearly stated policy and transparent process for using the Strategic Reserves would be in every stakeholder's interest. This should clearly indicate that the reserves are only to be used in a supply disruption. As for when a release is triggered, we believe that an assessment of each individual situation is better than a mathematical trigger that forces action when drawdown might not be warranted—and perhaps invites speculation by market players. A volumetric trigger which may seem appropriate now, might not be appropriate in the future as the availability of alternative supply, seasonal demand fluctuations and industry stock levels all contribute to determining what level of a supply disruption necessitates the use of the strategic reserves.

We also believe a price based trigger is undesirable. In the absence of a physical disruption, high prices might come about due to fundamentals, such as demand growth outpacing production capacity. Yet a price based trigger could force the reduction of emergency stocks which would not alter market fundamentals. Any impact on prices would be temporary at best, and the strategic reserves would be drained and no longer available to respond to a physical disruption.

It is the ability to act effectively in a crisis which avoids panic and fear. Consumers should be reassured that the reserves are there in the case of a disruption; the emergency stocks offer a safety net for when the normal supply chain breaks down, helping industry to adapt to the disruption and continue to supply the local gas station. Thus there is no need for consumers to run to the local filling station on hearing news reports of the next hurricane hitting Gulf coast refiners ; the government is there if industry needs help to fill the gap. It should also be clear that the reserves are there for a supply disruption and not to manage prices at the pump.

Industry should also be assured that the reserves are there to help them to maintain product supply to their customers in the unforeseen crisis event. At the same time, it should be clear that the strategic product reserves are not there so that they can save costs by holding less product stocks; the reserves are there for the unforeseen event such as natural disasters or accidents which block the normal supply flow, not to meet seasonal demand spikes. They are a temporary solution until in-

dustry can get the disrupted supply flow back on-line. At the same time, the reserves should not be a disincentive for necessary investment by industry.

I would add that this is not unlike the case for holding crude oil in the SPR, which provides the safety net for the oil industry and serves the purpose of mitigating disruptions whether from a global disruption stemming from geopolitical tensions or a localized disruption caused by an accident or natural disaster. The policy of using the SPR for physical disruption provides this safety net, reassuring market participants without resulting in refiners holding less adequate levels of stocks or dissuading the oil industry to make necessary investments.

Question 2. During a supply disruption, the presence of a products reserve could create uncertainty about whether, when, and how much would be drawn down. High gasoline prices send a signal to the market participants and encourage product imports. Could the uncertainties surrounding a product reserve actually result in greater market volatility and discourage necessary imports of petroleum products? How do we need to address these unintended market consequences if we proceed forward with a regional product reserve?

Answer. A clear and publicly stated policy of releasing emergency reserves only in the case of a physical disruption, when markets are no longer able to assure supplies, would significantly help to remove uncertainty surrounding their use. Oil markets should be the first recourse in a disruption, where the oil industry looks to find alternative supply routes and sources, including of course imports of refined products. It is only when the industry cannot supply the market due to exceptional circumstances that the reserves should come in to fill the gap. The mere existence of the strategic product reserves, ready to be brought to the market in a disruption, can help reduce volatility by reducing speculation on shortages.

Question 3. Can you provide an estimated range of cost for the establishment and continued operation of a 30 million barrel refined product reserve as proposed?

Answer. The cost of establishing the storage capacity would of course depend on issues such as whether above ground tanks or salt caverns are used, if storage capacity is newly built or if already existing capacity is bought or rented. Such decisions will depend on the given conditions of whichever region or regions are chosen for the reserves, and thus difficult to estimate in advance.

The acquiring of the volumes will depend on markets at the time of filling. In today's market, 30 million barrels of gasoline would cost some $ 2.1 billion; the same amount of diesel would be about $1.8 billion. If the reserves mirrored somewhat the consumption patterns in the US (for example, 50% gasoline, 40% diesel and 10% jet/kerosene), the cost of acquiring the products at today's prices would be around $ 2.08 billion [prices based on today, US Gulf gasoline $77/bbl, diesel $61.50/bbl and jet/kerosene $62.50/bbl].

As stated in my testimony before the Senate Committee, European countries have running costs of about $3 per barrel. If the running costs in the US were the same, this would suggest an annual cost of $90 million to maintain the strategic product reserves. More likely, the annual operating costs would be lower because of economies of scale in the US compared to Europe.

Question 4. In terms of incentive to deliver, are there advantages to a government run supply of fuel as opposed to a privately held fuel supply?

Answer. The true advantage of the strategic reserves is the nature of their use as oil is held outside of the normal supply system which can be brought to markets in a disruption. Either a government or privately run entity for fulfilling this role would be valid. Indeed, an industry based SPR could also be a solution. This is the case in some IEA member countries, such as Germany, where there is an obligation on refiners and oil importers to be members of the stockholding agency which manages the country's emergency reserves.

Question 5. With respect to gasoline the sheer number of boutique fuels required by state and federal laws makes it practically impossible to store all the different types of fuels. For example, Colonial Pipeline, a major pipeline supplying products to the Southeast and Eastern U.S. has 60 different grades of gasoline and 26 different distillate fuels that will be shipped in 2009.

What types of fuels will the Department of Energy require to be stored, and is there, in your opinion, a need to provide a fuel waiver on the boutique fuel requirements to ensure that the market disruption gets resolved in a timely manner?

Answer. The boutique fuel specifications are a challenge to the supplying of fuels to the US market. These add to the costs of normal operations of companies, which ultimately gets passed on to the consumer, and can limit the ability to respond to a fuel shortage in one area with fuels available in another.

The choice of what product specifications to hold in the reserves should be linked to the choice of a strategic location. The reserves should match the specifications of the area in which they are considered most likely to be released. However, that

is not to say that the reserves would only be for this area, and waivers on fuel requirements should be a part of the emergency response policy in place to effectively use the reserves in a crisis.

In a disruption, the market should be given as much flexibility as possible to properly allocate the additional supply that the strategic reserves are making available. Just as during the 2005 response, when the US EPA waved regulation to allow "winter blend" gasoline use throughout the country, fuel specification waivers should be used if necessary to facilitate the release of strategic product stocks.

Question 6. Given the make-up of our product pipeline distribution system, a product reserve located in the Gulf States will not be able to provide any relief to consumers west of the Rocky Mountains. Would it be the intent of the Department of Energy to establish a number of product reserves?

Answer. We believe the reserves should be located in various strategic locations to be defined by the DOE according to assessed regional vulnerabilities and not necessarily concentrated in one location. However, if the product markets over several regions are fluid, aided by the above mentioned specification waivers, a product release in one area of the country would be beneficial to other areas further away.

Question 7. For many members of Congress, the most logical need for this regional product reserve would occur in the wake of a natural disaster similar to the hurricanes in 2005 and 2008. However, in looking back on those hurricanes the most critical problem with product supply was not a supply shortage, but the prolonged loss of electric power and associated impediments to the product distribution system.

How do we address the electric power problems and ensure that the product reserve is used to provide short-term relief after a natural disaster and not be used solely as a political tool to lower gasoline prices when the price is high?

Answer. A clear policy for using the reserves only for responding to a physical supply disruption should be put in place to avoid the reserves being used as a political tool for lower gasoline prices. The supply of electricity necessary to deliver the product reserves should be assured through measures such as having back-up generators on site to pump the products out of storage. However the issue of power supply is different in the case of refineries, where it is much more difficult to start back up a refinery after an emergency shutdown. In the case of products, as these do not need further processing, deliveries to consumers can be made through a variety of routes, include road, rail and barge, which are less prone to impediments related to power outages.

Question 8. As members of the International Energy Agency (IEA), the United States is required to hold the equivalent of 90 days of oil imports. Since the IEA's International Energy Program was created in 1974, oil reserves have only been released into the market twice and refined products have only been released once.

Since the US is part of this program, given the limited use of the IEA's response mechanism, what is the benefit to the tax payer to create a costly Refined Product Reserve?

Answer. While the IEA has only taken coordinated action on two occasions in its 35 year history to deal with global supply disruptions, strategic reserves have also been used by individual member countries in order to deal with domestic supply issues. For example, the US SPR has drawn on its stocks 10 times in the last decade in order to deal with localized disruptions of crude supplies to refiners.

Of course, oil supply security, like any insurance system, has a price and strategic product stocks more so. While the IEA 90 day stockholding requirement does not specify what form of oil should be held, the advantage of holding refined products is in the case of a disruption to the refining industry. The reliance on strategic reserves of crude oil is contingent on refiners' abilities to ramp up utilization rates or restart shut-in refineries. In the hurricane seasons of 2005 and 2008 a significant amount of the refinery capacity in the US Gulf coast was taken off-line for an extended period of time. The release of strategic product reserves can bring relief to consumers in a much shorter time under such circumstances. The SPR, by expanding from its current level through the addition of refined products, could significantly enhance security of supply.

RESPONSES OF JOHN D. SHAGES TO QUESTIONS FROM SENATOR MURKOWSKI

Question 1. This morning, the RAND Corporation released a report stating that the absence of a publicly-stated policy on when the Strategic Petroleum Reserve will be used has the potential to trigger panic hoarding if market participants fear a major supply disruption, bringing on the very conditions that the Strategic Petroleum Reserve was supposed to ameliorate.

Should DOE commit to providing certainty in the marketplace by writing and holding a publicly stated policy on when the Strategic Reserve will be drawn down?

Answer. It would be a very good idea for the public and market participants to understand the policy of each administration toward its use of the Strategic Petroleum Reserve, and a public policy statement would reduce ambiguity. An appropriate statement would be precise on philosophy but would not supply certainty for market participants, because certainty implies a commitment to market intervention or nonintervention which may not be appropriate in all circumstances. In addition, a trigger would effectively cap futures prices, limit inventory building and discourage high cost production. For example, the Bush administration's SPR policy was unequivocal; the SPR would only be used in the event of a disruption that caused an observable shortage that could not be addressed by the market. It was very specific that the SPR would never be used to affect changes in market price. While this policy was clear, it did not provide latitude for the Administration to address the 2007-08 surge in oil prices that was a leading cause of the world wide recession because that surge was not marked by a definable disruption. Similarly, any equally rigid policy, such as a $100 trigger price for drawdown might discourage investment in methane hydrates, oil shale, coal to liquids, cellulosic ethanol, solar photovoltaics and a broad array of unconventional fuels.

I highly recommend that an administration's policy statement on the SPR include a promise that in the event of a severe price change that threatens economic stability, the administration would act either in conjunction with the International Energy Agency or on its own to stabilize prices. However, I also strongly recommend that no specific price or price differential be included in that policy statement, and the decision to use the SPR be made only after consideration of the facts at the time.

Question 2. During a supply disruption, the presence of a products reserve could create uncertainty about whether, when, and how much would be drawn down. High gasoline prices send a signal to the market participants and encourage product imports. Could the uncertainties surrounding a product reserve actually result in greater market volatility and discourage necessary imports of petroleum products? How do we need to address these unintended market consequences if we proceed forward with a regional product reserve?

Answer. The same arguments were made against a two million barrel heating oil reserve when it was created in 1999. The ten year history of the Department of Energy's management of the Northeast Home Heating Oil Reserve should assure refiners, importers and suppliers that the intent of modest refined product reserves is for relief in the event of a disruption to supply that cannot be satisfied by the provision of more supplies as prices rise. The evidence is clear that in the past ten years the Heating Oil Reserve has never been used to supplement supply despite regular demands that it be released every time the price of heating oil rose to an uncomfortably high level.

As a result of this management philosophy there is no evidence suppliers have let the existence of the Northeast Home Heating Oil Reserve be a consideration as they have built their winter inventories, and there have not been any shortages in the last decade. I would expect the same industry response to any other refined product reserves, and as a result I would not expect any change in the level of price volatility in either the prompt or futures markets for these products. Furthermore, most other countries belonging to the International Energy Agency hold some portion of their stockpiles as refined products, and there is no evidence that their commercial inventories are inadequate or that they suffer from greater price volatility than the United States. A clear statement of intent to stay with this proven philosophy on minimum intervention should be all that is necessary to prevent market participants from changing their behavior once the new refined product reserves actually exist.

Finally, it is important to note that in the case of the Southeast United States, all product supply moves though the Colonial and Plantation pipelines. In 2005 and 2008, the willingness of importers to respond to price signals was not an issue. The price signals were there for imports to increase, but the infrastructure to move the products from the coastal areas inland did not exist or was impaired by the hurricanes. These instances were classic cases of high prices being unable to illicit supply to meet demand; consequently the only option was for prices to rise high enough to destroy demand to allow markets to balance.

Question 3. Can you provide an estimated range of cost for the establishment and continued operation of a 30 million barrel refined product reserve as proposed?

Answer. There are so many variables that will determine the answer to this question that the range would nearly meaningless until the Department of Energy determines a plan for implementation. For example, the Northeast Home Heating Oil Re-

serve is located in private storage terminals and managed by those terminals. The cost of that storage fluctuates depending upon the level of private inventories and the market price of storage. Today that storage is costing about $4.80 per barrel per year, but that reflects the fact that inventories are very high and storage space is at a premium. In other years the cost has been approximately half that amount. If the plan proposed by DOE is to use private facilities, the range of costs would be comparable to those of the Heating Oil Reserve.

If instead the Department proposes to include the refined product storage facilities as part of the Richton Dome expansion, the marginal capital cost above the cost of crude oil storage would probably add 5 percent or more to the cost of that site, which given the uncertainty associated with the site's cost could range from +$100 million to +$200 million. However, after the initial capital costs the marginal operating and maintenance costs would be pennies per year.

There is also the possibility that the government could decide to build steel tank storage, which would be less costly over time than leasing but much more expensive than underground storage. It would also require a capital cost substantially greater than the other two options.

A consideration that makes point-in-time cost estimates unreliable is that the capital cost of oil field facilities is very volatile. At this time, the cost of engineering services, construction services and steel pipes is very low due the slow economy. If the plan to develop new facilities is delayed until the price of oil rises and domestic oil field activity is again booming as it was in 2007-08, the cost of construction could double from today's cost estimates. An immediate implementation of any construction plan would save the government capital costs and would help with the currently desired economic stimulus versus a delayed start.

Question 4. In terms of incentive to deliver, are there advantages to a government run supply of fuel as opposed to a privately held fuel supply?

Answer. Yes, the incentives for the government to sell oil are different from and complement the incentives that motivate the private sector. As with most energy programs in a free market economy, the government has a role to play when private markets fail, or the consequences of balancing supply and demand by price changes are unacceptable for reasons such as economic stability. Petroleum is a special case in that efficient free markets are the general rule on a day-to-day basis but with fairly frequent instances of cartel interventions, wars, and Acts of God disrupting supply. While the private sector builds inventories and systems redundancies to take advantage of statistically predictable disruptions, the financial incentives are just not there to guard against disruptions caused by random events such as the hurricanes that disrupted supplies in 2005 and 2008. Therefore, while it is generally preferable to allow profit incentive to drive private enterprise to supply markets, there is a role for government stockpiling. The government's incentive to use its stocks would obviously be to protect the welfare of people. In addition, but less obvious, the government wants to protect the free market system which would be highly criticized if it cannot supply essential products such as heating oil and transportation fuels, and which would become vulnerable to oppressive and inefficient regulation in the event it should fail to supply essential fuels at reasonable prices. Preservation of the market approach for supplying and balancing demand is well worth the modest cost of insuring against unlikely but potentially devastating disruptions.

Question 5. With respect to gasoline the sheer number of boutique fuels required by state and federal laws makes it practically impossible to store all the different types of fuels. For example, Colonial Pipeline, a major pipeline supplying products to the Southeast and Eastern U.S. has 60 different grades of gasoline and 26 different distillate fuels that will be shipped in 2009.

What types of fuels will the Department of Energy require to be stored, and is there, in your opinion, a need to provide a fuel waiver on the boutique fuel requirements to ensure that the market disruption gets resolved in a timely manner?

Answer. In all likelihood the Department will store no more than two types of gasoline plus diesel fuel. In that case if a state needs a release of gasoline from the Strategic Petroleum Reserve inventory, and that fuel does not meet the state specification, the state will have to grant a waiver (as delegated by the U.S. Environmental Protection Agency). Just as with the crude oil, such waivers may be agreed to by the effected states in advance of the actual emergency. While fuel specification is an issue, it is dealt with by industry every day and there is no reason to think that the Department will not be able to overcome this hurdle.

Question 6. Given the make-up of our product pipeline distribution system, a product reserve located in the Gulf States will not be able to provide any relief to consumers west of the Rocky Mountains. Would it be the intent of the Department of Energy to establish a number of product reserves?

Answer. I cannot answer for the Department, however, I would encourage the Department to consider a product reserve in the Southwest to protect that region of the country from an Act of God that might affect the ability of the Los Angeles, California area refineries to service the Morgan Kinder pipeline, which is the sole source of products to a large portion of the Southwest.

Question 7. For many members of Congress, the most logical need for this regional product reserve would occur in the wake of a natural disaster similar to the hurricanes in 2005 and 2008. However, in looking back on those hurricanes the most critical problem with product supply was not a supply shortage, but the prolonged loss of electric power and associated impediments to the product distribution system.

How do we address the electric power problems and ensure that the product reserve is used to provide short-term relief after a natural disaster and not be used solely as a political tool to lower gasoline prices when the price is high?

Answer. It is critical that the location(s) of the product reserve be beyond the immediate areas impacted by Gulf of Mexico hurricanes. It may also be wise to supply the storage site(s) with their own auxiliary power systems so that the reserve can be delivered to buyers regardless of the status of the general power system. One reason that the Richton Dome site in Mississippi is repeatedly mentioned as a possible site is that it is 80 miles inland from the Gulf of Mexico, which is sufficient to avoid major hurricane damage, and it would be connected into the Colonial Pipeline at a point where power has been available soon after recovery from hurricanes begins. After the 2008 hurricanes, the Colonial Pipeline was operable well before the Gulf Coast refineries were able to come on line and begin providing it with refined products, so that a refined product reserve inventory would have filled the gap.

Question 8. As members of the International Energy Agency (IEA), the United States is required to hold the equivalent of 90 days of oil imports. Since the IEA's International Energy Program was created in 1974, oil reserves have only been released into the market twice and refined products have only been released once.µ

Since the US is part of this program, given the limited use of the IEA's response mechanism, what is the benefit to the tax payer to create a costly Refined Product Reserve?

Answer. The Strategic Petroleum Reserve is and has always been an insurance policy against disruptions. As with standard health insurance, the hope is that nothing will ever happen that causes you to collect on the policy. Furthermore, as with health insurance, we do not expect the events to occur that will cause us to collect on the policy, and if they do not, the health insurance might be viewed as a bad investment—-all premium payments with no return. The true question of whether or not to have health insurance is "Can you afford to get sick without it?" Similarly, the United States cannot afford petroleum supply shortages and the accompanying prolonged price surge without disrupting our whole economy and our way of life. This was dramatically shown in the spring, summer and fall of 2008 when fuel prices helped to break our economy's back. For the people of the southeast U.S., the fuel shortages that disrupted life and drained the regional economy of cash during the fall of 2008, the pain was palpable. The clear benefit of releasing reserves of refined products in September 2008 would have been to allow the Southeast to be on the same economic footing as the rest of the country. Judicious use of the crude oil in the Strategic Petroleum Reserve in 2007-08 might have reduced the severity and duration of the current economic recession at the national level, saving millions of jobs, and hundreds of billions of dollars of gross domestic product. It could have been a case of insurance paying for itself handsomely, and if a refined product reserve had existed its benefits would have easily covered its costs.

RESPONSES OF FRANK RUSCO TO QUESTIONS FROM SENATOR MURKOWSKI

Question 1. This morning, the RAND Corporation released a report stating that the absence of a publicly-stated policy on when the Strategic Petroleum Reserve will be used has the potential to trigger panic hoarding if market participants fear a major supply disruption, bringing on the very conditions that the Strategic Petroleum Reserve was supposed to ameliorate. Should DOE commit to providing certainty in the marketplace by writing and holding a publicly stated policy on when the Strategic Reserve will be drawn down?

Answer. In developing our August 2006 report on the Strategic Petroleum Reserve (SPR) we contracted with the National Academy of Sciences to convene a group of 13 experts to collect opinions on the impacts of past SPR fill and use and on recommendations for the future, as well as on the benefit of the SPR on reducing eco-

nomic losses in the event of oil supply disruptions.[1] With regard to using the SPR, experts generally supported providing broad discretion about when to use the SPR, although they questioned some past presidential decisions about SPR use. The Energy Policy and Conservation Act, as amended, allows broad presidential discretion and provides only general guidance for the SPR's use, making its use a matter of judgment by the President.[2] While the President's discretion over the release of oil introduces some uncertainty into the market, it also has certain advantages. Members of our group of experts told us that uncertainty around SPR use can be valuable. For example, the President can use the SPR as a bargaining tool in diplomatic negotiations during energy crises, enabling him to encourage behavior by oil-producing nations that could be beneficial to the United States.

Experts also described several key factors to consider when making future decisions about using the SPR, including using the SPR without delay when it is needed to minimize economic damage. Expert group members encouraged early use of the SPR as a first line of defense against oil supply disruptions, noting that recent changes in the oil industry—including diminished spare crude oil production capacity, refining capacity, and product inventories—have removed sources of supply security that have covered short-term supply losses in the past. Additionally, some experts believe that much of the harm to the U.S. economy occurs in the early phases of a disruption, before the economy has a chance to adjust to higher prices.

We have found that it is important for markets to have some information about potential government intervention, but to temper how much information to provide. The concern about providing a detailed description of when the SPR would be used is twofold: first, such information could provide the ability of market participants to "game the system" with respect to availability and pricing and second, it could restrict the government from either acting or refraining from releasing from the SPR in response to the facts and circumstances at a certain time. Because of this, it may be better to provide only broad guidance on the potential usage and provide the administration flexibility to determine when to release.

Question 2. During a supply disruption, the presence of a products reserve could create uncertainty about whether, when, and how much would be drawn down. High gasoline prices send a signal to the market participants and encourage product imports. Could the uncertainties surrounding a product reserve actually result in greater market volatility and discourage necessary imports of petroleum products? How do we need to address these unintended market consequences if we proceed forward with a regional product reserve?

Answer. There are a number of potential risks and benefits that could result from including refined products in the SPR. We have not done work to specifically examine whether creating a refined product reserve would affect volatility. However, it is clear that a product reserve will add complexity to the market and market participants will have to take this complexity into consideration as they make key decisions about pricing as well as imports and other supply factors. How the reserve is used will have a great impact on whether such a reserve would result in greater volatility, much of which will remain unknown for some time after the reserve is established.

Question 3. Can you provide an estimated range of cost for the establishment and continued operation of a 30 million barrel refined product reserve as proposed?

Answer. I am unable to provide an estimate of the cost to establish and operate the proposed refined product reserve at this time. We have not done any work in this area and many of the key factors that will determine the cost have not been resolved. S. 967, which was introduced by Senator Bingaman on May 4, 2009, would direct the Secretary of Energy to develop a plan to include refined petroleum products in the SPR. As envisioned in the proposed legislation, the plan would address the issues that need to be resolved such as, what types of the refined products to store and how and where to store them. Furthermore, the proposed legislation directs the Secretary of Energy to include in the plan "the estimated costs of establishment, maintenance, and operation of the refined petroleum product component of the Reserve."

Question 4. In terms of incentive to deliver, are there advantages to a government run supply of fuel as opposed to a privately held fuel supply?

Answer. We have not examined the implications of overt and extensive government intervention into the supply of fuel and as such do not have an informed opin-

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[1] GAO, *Strategic Petroleum Reserve: Available Oil Can Provide Significant Benefits, but Many Factors Should Influence Future Decisions about Fill, Use, and Expansion*, GAO-06-872 (Washington, D.C.: Aug. 24, 2006).

[2] Pub. L. No. 94-163, § 161, 89 Stat. 888-89 (1975), *codified as amended at* 42 U.S.C. § 6241.

ion as to the comparative advantages of this approach versus a market-driven supply.

Question 5. With respect to gasoline the sheer number of boutique fuels required by state and federal laws makes it practically impossible to store all the different types of fuels. For example, Colonial Pipeline, a major pipeline supplying products to the Southeast and Eastern U.S. has 60 different grades of gasoline and 26 different distillate fuels that will be shipped in 2009. What types of fuels will the Department of Energy require to be stored, and is there, in your opinion, a need to provide a fuel waiver on the boutique fuel requirements to ensure that the market disruption gets resolved in a timely manner?

Answer. We agree that the proliferation of boutique fuels poses a challenge in incorporating refined products in the SPR. I highlighted this issue in my testimony as one of the arguments against including refined products in the SPR.[3] Under the provisions of S. 967, the plan that the Secretary of Energy would be required to develop would address what specific types of fuels would be stored as part of a refined product reserve. Unless the requirements to use special gasoline blends—or 'boutique' fuels—were waived during emergencies, as they were in the aftermath of Hurricanes Katrina and Rita, boutique fuels could need to be strategically stored at multiple regional, state, or local locations due to reduced product fungibility.

Question 6. Given the make-up of our product pipeline distribution system, a product reserve located in the Gulf States will not be able to provide any relief to consumers west of the Rocky Mountains. Would it be the intent of the Department of Energy to establish a number of product reserves?

Answer. Under the provisions of S. 967, the plan that the Secretary of Energy would be required to develop would address "storage facility options for the storage of refined petroleum products, including the anticipated location of existing or new facilities." At this time I do not know if the Department of Energy would store the refined products in one location or in a number of locations spread out across the country if the requirement to establish a refined product reserve is enacted.

Question 7. For many members of Congress, the most logical need for this regional product reserve would occur in the wake of a natural disaster similar to the hurricanes in 2005 and 2008. However, in looking back on those hurricanes the most critical problem with product supply was not a supply shortage, but the prolonged loss of electric power and associated impediments to the product distribution system. How do we address the electric power problems and ensure that the product reserve is used to provide short-term relief after a natural disaster and not be used solely as a political tool to lower gasoline prices when the price is high?

Answer. With respect to the challenges of electric power outages, the hurricanes had a number of impacts on the distribution of refined products, including inundation of refineries, damage to pipelines and related equipment, as well as the loss of electric power. In the U.S. electric power outages are rare, in general, and widespread outages are exceedingly rare. To the extent that facilities such as transshipment locations and pipelines require the ability to operate during a time when the electric power supplies are disrupted, it is possible to maintain back-up power supplies via diesel generators or others. A number of the witnesses at the hearing were emphatic that if refined products are included as part of the SPR, they should not be used simply to lower gasoline prices when prices are high. However, GAO has no position on this question at this time.

Question 8. As members of the International Energy Agency (IEA), the United States is required to hold the equivalent of 90 days of oil imports. Since the IEA's International Energy Program was created in 1974, oil reserves have only been released into the market twice and refined products have only been released once. Since the U.S. is part of this program, given the limited use of the IEA's response mechanism, what is the benefit to the tax payer to create a costly Refined Product Reserve?

Answer. GAO has not formed a position as to the overall costs and benefits of a strategic reserve, whether held as crude oil or as a combination of crude oil and petroleum products. In my testimony, we identified both potential benefits and costs associated with holding petroleum products as part of the SPR.[4] However, the SPR, the reserves held by IEA member countries, and the possible U.S. refined product reserve can be thought of as similar to insurance policies. It is possible that the value of an insurance policy is great enough, in terms of the peace of mind it provides, that it is worth holding even if it is never used. Generally, the amount people are willing to pay for insurance depends on their feelings about risk. As such, it

[3] GAO, *Strategic Petroleum Reserve: Issues Regarding the Inclusion of Refined Petroleum Products as Part of the Strategic Petroleum Reserve*, GAO-09-695T (Washington, D.C.: May 12, 2009).

[4] GAO–09–695T.

would be very difficult to assess the national costs and benefits of the SPR in general, or a petroleum product reserve specifically, because the benefits depend on the public's collective feelings about the risk of facing a potential crude oil or petroleum product supply disruption.

RESPONSES OF DAVID F. JOHNSON TO QUESTIONS FROM SENATOR MURKOWSKI

Question 1. This morning, the RAND Corporation released a report stating that the absence of a publicly-stated policy on when the Strategic Petroleum Reserve will be used has the potential to trigger panic hoarding if market participants fear a major supply disruption, bringing on the very conditions that the Strategic Petroleum Reserve was supposed to ameliorate.

Should DOE commit to providing certainty in the marketplace by writing and holding a publicly stated policy on when the Strategic Reserve will be drawn down?

Answer. The SPR has a well defined release policy which is stated in the Energy Policy and Conservation Act (EPCA), the authorizing legislation for the Strategic Petroleum Reserve (SPR). Section 161 of EPCA requires that, before crude oil from the SPR can be drawn down and sold, the President must find that "drawdown and sale are required by a severe energy supply interruption or by obligations of the United States under the international energy program."

EPCA defines "severe energy supply interruption" as a national energy supply shortage which the President determines: "(A) is, or is likely to be, of significant scope and duration, and of an emergency nature; (B) may cause major adverse impact on national safety or the national economy; and (C) results, or is likely to result, from (i) an interruption in the supply of imported petroleum products, (ii) an interruption in the supply of domestic petroleum products, or (iii) sabotage or an act of God." EPCA further states that a severe energy supply interruption is "deemed to exist" if the President finds that an emergency situation exists and various other factors are met.

It is impossible to define in advance precisely what set of factors or circumstances might lead to a Presidential finding that a severe energy supply interruption exists. However, in adhering to the release conditions that require an actual or imminent severe supply interruption as defined in EPCA, the DOE avoids interfering with petroleum markets when a severe energy supply interruption does not exist.

Question 3. Can you provide an estimated range of cost for the establishment and continued operation of a 30 million barrel refined product reserve as proposed?

Answer. We have not yet fully evaluated the projected costs for the establishment or the continued operation of a 30 million barrel refined product reserve. The costs of such a project could vary significantly based on the choice of storage location(s) and medium; the distribution system for inventories; types and varieties of product stored; the methodology for managing the reserve; and the timeframe for development.

Question 4. In terms of incentive to deliver, are there advantages to a government run supply of fuel as opposed to a privately held fuel supply?

Answer. In the event of a severe supply interruption, Government ownership of a refined product reserve would ensure that the Government directly controls when petroleum products would be released into the market. A release decision would be based on the objective to minimize or prevent product shortages. Government owned inventories would be maintained to protect against potential disruptions.

Question 5. With respect to gasoline the sheer number of boutique fuels required by state and federal laws makes it practically impossible to store all the different types of fuels. For example, Colonial Pipeline, a major pipeline supplying products to the Southeast and Eastern U.S. has 60 different grades of gasoline and 26 different distillate fuels that will be shipped in 2009.

What types of fuels will the Department of Energy require to be stored, and is there, in your opinion, a need to provide a fuel waiver on the boutique fuel requirements to ensure that the market disruption gets resolved in a timely manner?

Answer. We have not yet fully evaluated which products might be appropriate for storage in the proposed 30 million barrel refined product reserve.

The Environmental Protection Agency issues waivers of State or Federal fuel requirements, as appropriate, after consultation with, and concurrence by, DOE. Whether or not a waiver should be granted from boutique fuel requirements would be determined on a case-by-case basis in light of specific circumstances existing at the time the request for a waiver is made.

Question 6. Given the make-up of our product pipeline distribution system, a product reserve located in the Gulf States will not be able to provide any relief to

consumers west of the Rocky Mountains. Would it be the intent of the Department of Energy to establish a number of product reserves?

Answer. The Department hasn't fully evaluated how the reserve would be designed or products would be stored under the provisions of the bill.

Question 7. For many members of Congress, the most logical need for this regional product reserve would occur in the wake of a natural disaster similar to the hurricanes in 2005 and 2008. However, in looking back on those hurricanes the most critical problem with product supply was not a supply shortage, but the prolonged loss of electric power and associated impediments to the product distribution system.

How do we address the electric power problems and ensure that the product reserve is used to provide short-term relief after a natural disaster and not be used solely as a political tool to lower gasoline prices when the price is high?

Answer. Loss of electrical power at refineries, terminals, and pipeline pumping stations significantly contributed to refined product shortages in the southeastern United States following Hurricanes Katrina and Rita in 2005. In addition, some facilities experienced more damage from wind and water in 2005. Following these storms, some major product pipelines invested in generators to power critical pumping stations. In 2008, refined product shortages that followed Hurricanes Gustav and Ike were more the result of lost refinery output when refineries shut down as a precaution prior to the storms.

The Colonial and Plantation pipelines were both operational several days following Hurricane Gustav, but operated at reduced flows due to refineries not being able to provide products into the lines. Given their complexity, it takes much longer to inspect and restart a refinery once it has been shut down. As a result, there is a gap between when refined products pipelines can resume operations and when refiners can supply products to the pipelines.

The Administration has not yet assessed the need to add a refined products component to the Strategic Petroleum Reserve (SPR). However, the Energy Policy and Conservation Act (EPCA) establishes the release criteria for the existing SPR. EPCA requires the President issue a finding of a severe energy supply interruption before oil can be released from the SPR. This requirement helps minimize the likelihood that the SPR will be used for political purposes or solely in response to high prices.

Question 8. As members of the International Energy Agency (IEA), the United States is required to hold the equivalent of 90 days of oil imports. Since the IEA's International Energy Program was created in 1974, oil reserves have only been released into the market twice and refined products have only been released once.

Since the US is part of this program, given the limited use of the IEA's response mechanism, what is the benefit to the tax payer to create a costly Refined Product Reserve?

Answer. The International Energy Agency (IEA) has conducted two coordinated emergency releases since it was established in 1974. Both crude oil and refined products were released in 1991 (Persian Gulf War) and 2005 (Hurricanes Katrina and Rita). Additionally, IEA member countries have adopted the practice of conducting exchanges and loans to address short-term or localized disruption events. In this capacity, additional refined products have been released to the market.

Neither the costs nor benefits of establishing a regional refined products reserve have been analyzed. Further study of this issue is needed.

[Response to the following question was not received at the time the hearing went to press:]

QUESTION FOR DAVID F. JOHNSON FROM SENATOR MURKOWSKI

Question 2. During a supply disruption, the presence of a products reserve could create uncertainty about whether, when, and how much would be drawn down. High gasoline prices send a signal to the market participants and encourage product imports. Could the uncertainties surrounding a product reserve actually result in greater market volatility and discourage necessary imports of petroleum products? How do we need to address these unintended market consequences if we proceed forward with a regional product reserve?

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