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STATEMENT OF
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ENERGY AND MINERALS DIVISION
BEFORE THE
SUBCOMMITTEE ON ENERGY AND MINERAL RESOURCES
OF THE
SENATE COMMITTEE ON ENERGY AND NATURAL RESOURCES
ON
THE STRATEGIC PETROLEUM RESERVE

Mr. Chairman and Members of the Subcommittee:

We welcome the opportunity to discuss GAC's work on the Strategic Petroleum Reserve (SPR) program. We have had a continuing interest in the SPR for quite some time and have issued numerous reports which addressed the progress and problems associated with its development. My testimony will focus on issues concerning

- the size of the SPR,
- capacity constraints, and
- oil quality.

These issues are covered in more detail in our December 1981 report 1/ on the SPR.

To place the specific SPR issues in perspective, I would like to briefly discuss GAC's recent work regarding energy emergency preparedness at the Federal level. In September 1981, we issued a

1/"Strategic Petroleum Reserve: Substantial Progress Made, But Capacity and Oil Quality Concerns Remain" (EMD-82-19, Dec. 31, 1981).

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comprehensive evaluation 1/ of DOE energy emergency preparedness efforts and just recently, at the request of the Chairman of the House Subcommittee on Fossil and Synthetic Fuels, issued a follow-up report 2/ taking into consideration the fiscal year 1983 budget proposals for energy emergency preparedness. Our work can be summarized in one sentence. Except for the recent buildup of the SPR, undertaken largely as a result of congressional interest, the United States is no better prepared to deal with a major oil disruption now than it was during the 1973 oil embargo, and almost all other energy emergency preparedness efforts are in various states of disarray.

Our work has convinced us that the Nation needs a balanced energy emergency program, one which judiciously blends reliance on private oil markets with Government programs. Such a program would greatly limit the serious economic damage which oil import disruptions can cause. The SPR is the keystone for this type of program and is vital to the Nation's efforts to protect itself against such a disruption.

As of March 8, 1982, the SPR contained about 243 million barrels of oil. This amount currently could be withdrawn at about 1.7 million barrels per day for about 3-1/2 months, at which point the drawdown rate would decrease until the SPR is exhausted about 3 months later. Even though the SPR can currently provide some relief

1/"The United States Remains Unprepared for Oil Import Disruptions" (EMD-81-117, Sept. 29, 1981).

2/"The Effects of the Fiscal Year 1983 Budget, Energy Reorganization, and Program Changes on U.S. Energy Emergency Preparedness" (EMD-82-45, Mar. 9, 1982).

from an oil supply disruption, specific plans have not yet been developed for its use during an emergency. We believe a specific SPR use plan should be developed to avoid ad hoc decisionmaking during a crisis. This use plan should be integrated with energy emergency preparedness plans.

SPR SIZE

The question of SPR size has significant budget and national security implications and directly relates to decisions which need to be made regarding SPR storage capacity over the next several years. I will comment in detail on the capacity issue in a moment.

In 1979, when DOE was calling for a 1-billion-barrel SPR by 1985, we reported 1/ that no study had shown that 1 billion barrels is the optimum-sized reserve. Further, DOE gave a low probability to the possibility of a future supply disruption which would require a 1-billion-barrel reserve. In addition, we pointed out that the reserve does not have to be sized to meet supply shortfalls on a barrel-for-barrel basis. It can be supplemented by such measures as:

- using existing industry stocks;
- fuel switching;
- restraining demand or managing supplies through conservation or allocation;
- creating an industrial petroleum reserve; or
- using political, military, or economic leverage to affect the size and duration of the shortfall.

1/"Factors Influencing the Size of the U.S. Strategic Petroleum Reserve" (ID-79-8, June 15, 1979).

As our work on overall energy emergency preparedness indicates, however, it remains to be seen whether plans will be developed and put in place in some or all of these areas.

The question of the appropriate size of the SPR is directly related to assumptions about possible energy emergencies and the adequacy of other emergency preparedness measures. If the SPR is the Nation's only significant insurance against an oil import disruption, the argument for a larger reserve is strengthened. But, if other well-developed emergency plans exist, the argument for the currently planned 750-million-barrel or an even smaller reserve is strengthened. As required by the Omnibus Budget Reconciliation Act of 1981, DOE is studying options for changing the current 750-million-barrel reserve and now promises the results of its study by May 1, 1982.

Given the significant budgetary and national security implications, the administration and the Congress must ultimately make the judgments concerning how much insurance the SPR should provide against an oil supply disruption and how fast progress should be made toward achieving that end.

CAPACITY CONSTRAINTS

That brings me to a key issue raised in our December 1981 SPR report--capacity constraints facing the SPR.

During fiscal year 1981, the administration far surpassed the required minimum 100,000-barrels-per-day fill rate of the Energy Security Act of 1980 and almost met the higher 300,000-barrels-per-day goal of the Omnibus Budget Reconciliation Act of 1981 by adding to the SPR at an average rate of about 292,000 barrels per day.

This is by far the highest fill rate achieved for any fiscal year since oil fill began. The previous high fill rate was 165,000 barrels per day during calendar year 1978. By the end of fiscal year 1981, the SPR contained about 199 million barrels of oil, more than twice the 93 million barrels that were in the SPR at the beginning of the year.

So far during fiscal year 1982, the SPR fill rate has averaged about 277,000 barrels per day. As of March 8, 1982, the reserve contained about 243 million barrels of oil, or about 32 percent of the planned 750-million-barrel capacity.

While DOE's progress in filling the SPR over the past 17 months has been commendable, DOE is now approaching the limits of its available storage capacity. Currently, DOE's fill rate is tied to the rate at which underground storage capacity can be created. Because of the long lead time required to add such capacity, funding and program decisions made now can dictate the volume of oil that can be added and the completion date for the SPR.

The effects of capacity constraints have already become obvious. In January 1982, DOE decided to delay purchasing additional oil for the SPR until the third quarter of fiscal year 1982 because of storage capacity limitations. Ironically--and unfortunately--this delay in oil purchases comes at a time when there is a surplus of oil on the world market at relatively favorable prices. As you know, major oil producing countries in recent weeks have cut their prices and the spot market price for Arabian light crude has dropped to about \$29 per barrel.

The delay further underscores the matters discussed in our report concerning the availability of storage capacity and the need

for DOE to consider further the costs and benefits of alternatives to its current capacity expansion plans, including leasing existing storage capacity on a temporary basis, or substituting above ground storage tanks for part of its planned underground capacity.

Options to accelerate the availability of capacity

DOE has not fully examined options for accelerating the availability of storage capacity. In July 1981, DOE considered options which increase the permanent size of the reserve and assumed that the schedule for completing a 750-million-barrel reserve would be maintained. DOE's study did not consider other options such as leasing temporary storage space, substituting above ground steel tanks for part of its planned underground capacity, or completing a smaller sized reserve.

As pointed out in our December 1981 report, DOE may be able to lease existing storage capacity to increase the SPR's oil fill capability while long-term storage capacity is being developed. Existing capacity may be available in the form of above ground steel tanks, oil tankers, or underground caverns.

Recently we developed estimates 1/ of the costs associated with leasing existing above ground steel tanks or oil tankers to achieve the 300,000-barrels-per-day fill rate goal.

Details of these estimates are attached to my statement. In summary, based on price ranges provided by DOE and industry groups, we estimate that, if a fill rate of 300,000 barrels per day is to

1/"Leasing Storage Capacity for the Strategic Petroleum Reserve" (EMD-82-62, Mar. 12, 1982).

be maintained until the first 500 million barrels are stored, DCE would need to lease varying amounts of storage space over a period of about 4 years. Temporary storage needs would range from about 42 million barrels in fiscal year 1982 to 83 million barrels in fiscal year 1984. The total cost could range from about \$471 million to \$523 million for steel tanks and from about \$785 million to \$954 million for oil tankers.

If the 300,000-barrels-per-day rate is to be maintained until 750 million barrels are stored, total leasing costs would be significantly higher and would be incurred from fiscal years 1982 through 1989. DOE would need to lease storage space ranging from 42 million barrels in fiscal year 1982 to a peak of about 209 million barrels in fiscal year 1986. Total costs involve about \$1.8 billion to \$2.0 billion for steel tanks and about \$2.9 billion to \$3.6 billion for oil tankers.

Under either case, in fiscal year 1983, if the Congress wishes to maintain this fill rate, about 75 million barrels of temporary capacity would be involved at a cost of \$135 million to \$150 million for steel tanks and \$225 million to \$274 million for oil tankers.

Although DOE has discussed leasing storage space with several companies, until recently it did not pursue the leasing option because it intended to fill the SPR at the rate allowed by its expansion plans. We understand that DOE recently initiated actions to obtain a better understanding of the amount of storage capacity that may be available for leasing. On February 10, 1982, DOE issued a Request for Proposals that asked interested companies with available storage capacity to indicate whether they would be willing to lease capacity to DOE for a 6- to 12-month period.

We believe that DOE should more fully assess the costs and benefits of alternatives to its current expansion plans which would allow it to achieve a fill rate consistent with congressional goals. We recommended in our December 1981 report that the Secretary of Energy evaluate options for achieving an average annual fill rate of 300,000 barrels per day, assuming the planned or other SPR sizes. Also we recommended that DOE assess the costs and benefits of alternatives to its current plans. Because of the budgetary implications, the evaluation should be available for congressional deliberations on the fiscal year 1983 budget and should assess the costs and benefits of alternatives to constructing new underground storage facilities.

We further suggested that the Congress explore with DOE the capacity expansion plans and options to achieve an average fill rate of 300,000 barrels per day until the SPR is filled and reaffirm or provide new guidance on its desired fill rate.

DEFERRAL OF FISCAL YEAR 1982
SPR FUNDS FOR THE BIG HILL
STORAGE SITE

On February 5, 1982, the administration announced the deferral of \$53 million of fiscal year 1982 funds associated with the development of the new 140-million-barrel Big Hill, Texas, storage site. This deferral would, in effect, modify DOE's Phase III expansion plans by stretching the completion date for the 750-million-barrel SPR by 1 year to the end of fiscal year 1990. Because of the long lead times involved in developing a new underground storage site, this proposal will not affect the planned SPR capacity and resulting fill rates until fiscal year 1987. Then additions to capacity would drop by 13 million barrels. In fiscal year 1988, the deferral would

allow DOE to add only 25 million barrels of new capacity and result in a fill rate of only 68,000 barrels per day during the year, or about 32,000 barrels per day less than the minimum 100,000-barrels-per-day rate required by the Energy Security Act.

OIL QUALITY CONCERNS

Let me briefly turn to our concerns regarding the quality of the oil being purchased by DOE. Since oil acquisition for the SPR resumed in October 1980, DOE has purchased a large quantity of heavier crude oil. Because of the refinery yields of various grades of crude oil, the quality of the SPR oil is an important determinant of the amount of specific petroleum products available to the Nation during an oil supply disruption.

DOE's original crude oil quality specifications and oil acquisition strategy were based on a 1976 assessment of refinery product needs and capabilities. DOE modified its acquisition strategy during fiscal year 1981 to accept Alaskan North Slope and Mexican crudes that are heavier than oil previously purchased without conducting a similar assessment. Although DOE awarded a \$258,000 contract in May 1981 to perform such an analysis, the study will not be completed until August 1982. In the interim, DOE has continued to purchase lower quality oil without the needed analysis. In January, DOE purchased about 1.6 million barrels of Alaskan North Slope oil.

By February 28, 1982, about 51 million barrels--about 21 percent--of the 241 million barrels of oil that the SPR had received were heavier crudes. Depending on the ultimate size of the reserve and the amount of heavier crude oil it contains, this percentage could change. Consequently, the likely impact of the heavier crudes

on the mix of oil products which might be available is not known at this time.

In our December 1981 report, we recommended that DOE document the rationale for future reductions in the quality specifications for SPR oil and make a determination whether the SPR oil quality specifications should be revised. The results of the SPR size study and the ongoing study of oil quality should be useful in making that determination.

In its March 9, 1982, comments on this aspect of the report, DOE stated that we exaggerated the risks of storing heavy, high-sulfur crude oil. While DOE stated that its plans call for less than 10 percent of the total crude stored to be the heavy, high-sulfur type, as I just noted, already about 21 percent of the reserve is the heavier crudes. Depending on decisions on the ultimate size of the reserve and continued purchases, DOE may not be able to adhere to its planned ratio of heavier crudes. Because the oil quality is an important determinant of the products which could be available, we continue to believe further attention is warranted in this area.

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In summary, Mr. Chairman:

- The SPR is vital to the Nation's efforts to increase the oil available for emergency use and to protect itself against oil supply disruptions.
- Although much progress has been made during the last 17 months to fill the reserve, DOE is now approaching the limits of its available underground storage capacity and

will find it increasingly difficult to achieve a fill rate consistent with existing congressional goals.

--Because of the long lead time required to construct underground storage, the Congress needs to address the size of the SPR and storage alternatives now in the context of desired program objectives and funding levels. The SPR size cannot be considered in isolation; rather judgments on size must be related to the availability and adequacy of other emergency preparedness efforts.

--Storage alternatives which would accelerate SPR oil fill have significant budgetary implications because they spread the oil and facilities' costs over fewer years and necessitate higher funding levels in those years. This, of course, must be traded off against the national security benefits which could result from early completion of the SPR.

--DOE's practice of purchasing some heavier crudes for the SPR should be monitored closely and, if necessary, modified to ensure that the oil in the SPR will yield the specific products needed by the Nation during an oil supply disruption.

This concludes my statement, Mr. Chairman. I would be happy to respond to questions.

Table 1

Leasing Costs to Achieve the 300,000-Barrels-Per-Day
Fill Rate Goal Until 750 Million Barrels are in the SPR
(By Fiscal Year)

	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>	<u>1989</u>	<u>1990</u>	<u>Total</u>
<u>Oil Storage Requirements</u>											
	----- (millions of barrels) -----										
Permanent Storage (FY 1983 Budget)	199	267	343	417	456	538	598	623	670	750	
Leased Temporary Storage (note a)	--	41.5	75	110.5	181	208.5	152	127	80	--	
Total SPR Storage	199	308.5	418	527.5	637	746.5	750	750	750	750	
<u>Cost of Leased Temporary Storage (note b)</u>											
<u>Above Ground Steel Tanks</u>											
	----- (millions of constant 1982 \$) -----										
Assuming \$1.80/barrel/year (note c)		75	135	199	326	375	274	229	144	--	1,757
Assuming \$2.00/barrel/year (note d)		83	150	221	362	417	304	254	160	--	1,951
<u>Oil Tankers (note e)</u>											
Assuming \$3.00/barrel/year (note f)		125	225	332	543	626	456	381	240	--	2,928
Assuming \$3.65/barrel/year (note g)		151	274	403	661	761	555	464	292	--	3,561

a/The total temporary storage needed to fill the SPR at a rate of 300,000 barrels per day is 975.5 million barrels. It is assumed that temporary storage is needed for each full year; however, the actual capacity requirements would vary depending on deliveries.

b/Does not include transportation costs.

c/DOE officials stated in December 1981 that they believe DOE could lease between 10 million and 30 million barrels of capacity at a monthly cost of about 15 cents per barrel.

d/In testimony before the Subcommittee on Fossil and Synthetic Fuels on March 2, 1982, a representative of the Independent Fuel Terminal Operators Association cited a figure of \$2 per barrel per year as a rate at which members of the association would be willing to lease space.

e/According to H. P. Drewry's monthly report on "Shipping Statistics and Economics", worldwide there are 164 oil tankers of at least 100,000 deadweight tons (DWT) that are inactive--primarily either laid up or being used for oil storage. One DWT is equivalent to 7.3 barrels of storage capacity for Arabian Light oil. According to the Drewry monthly reports and the Journal of Commerce, leasing rates for large tankers have generally ranged from \$11,000 to \$13,000 per day.

f/Representatives of the Petroleum Industry Research Foundation and the Transportation Institute cited \$3 per barrel per year for leasing oil tanker storage capacity in testimony before the Subcommittee on Fossil and Synthetic Fuels on March 2, 1982. This is equivalent to tankers with an average size of 200,000 DWT (1.46 million barrels) leased for \$12,000 per day, or about 0.8 cents per barrel per day.

g/GAO calculation based on an assumption of an average size of 150,000 DWT (1,095 million barrels) leased for \$11,000 per day, or 1.0 cent per barrel per day.

Table 2
Leasing Costs to Achieve the 300,000-Barrels-Per-Day
Fill Rate Goal Until the First 500 Million Barrels are in the SPR
(By Fiscal Year)

	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	Total
Oil Storage Requirements											
	----- (millions of barrels) -----										
Permanent Storage (FY 1983 Budget)	199	267	343	417	456	538	598	623	670	750	
Leased Temporary Storage (note a)	--	41.5	75	83	62	--	--	--	--	--	
Total SPR Storage	199	308.5	418	500	h/518	538	598	623	670	750	
Cost of Leased Temporary Storage (note b)											
	----- (millions of constant 1982 \$) -----										
Above Ground Steel Tanks											
Assuming \$1.80/barrel/year (note c)		75	135	149	112						471
Assuming \$2.00/barrel/year (note d)		83	150	166	124						523
Oil Tankers (note e)											
Assuming \$3.00/barrel/year (note f)		125	225	249	186						785
Assuming \$3.65/barrel/year (note g)		151	274	303	226						954

a/The total temporary storage needed to fill the SPR at a rate of 300,000 barrels per day is 261.5 million barrels. It is assumed that temporary storage is needed for each full year; however, the actual capacity requirements would vary depending on deliveries.

b/Does not include transportation costs.

c/DOE officials stated in December 1981 that they believe DOE could lease between 10 million and 30 million barrels of capacity at a monthly cost of about 15 cents per barrel.

d/In testimony before the Subcommittee on Fossil and Synthetic Fuels on March 2, 1982, a representative of the Independent Fuel Terminal Operators Association cited a figure of \$2 per barrel per year as a rate at which members of the association would be willing to lease space.

e/According to H. P. Drewry's monthly report on "Shipping Statistics and Economics", worldwide there are 164 oil tankers of at least 100,000 deadweight tons (DWT) that are inactive--primarily either laid up or being used for oil storage. One DWT is equivalent to 7.3 barrels of storage capacity for Arabian Light oil. According to the Drewry monthly reports and the Journal of Commerce, leasing rates for large tankers have generally ranged from \$11,000 to \$13,000 per day.

f/Representatives of the Petroleum Industry Research Foundation and the Transportation Institute cited \$3 per barrel per year for leasing oil tanker storage capacity in testimony before the Subcommittee on Fossil and Synthetic Fuels on March 2, 1982. This is equivalent to tankers with an average size of 200,000 DWT (1.46 million barrels) leased for \$12,000 per day, or about 0.8 cents per barrel per day.

g/GAO calculation based on an assumption of an average size of 150,000 DWT (1.095 million barrels) leased for \$11,000 per day, or 1.0 cent per barrel per day.

h/The additions to storage reflect deliveries of 50,000 barrels per day under the 5-year contract with PEMEX, Mexico's State oil company. These deliveries would require additional storage capacity over the previous fiscal year.