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WASHINGTON D.C. 20548

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FEBRUARY 24, 1981

**RESTRICTED** -- Not to be released outside the General Accounting Office except on the basis of specific approval of the Office of Congressional Relations.

The Honorable James McClure  
Chairman, Committee on Energy  
and Natural Resources  
United States Senate

RELEASED



The Honorable John Dingell  
Chairman, Committee on Energy  
and Commerce  
House of Representatives

Subject: [Status of Strategic Petroleum Reserve  
Activities--February 1981] (EMD-81-49)

This is the fourth in a series of status reports requested by certain members of the Senate Committee on Energy and Natural Resources and the House Committee on Energy and Commerce on the administration's activities to implement title VIII of the Energy Security Act. (See enc. II for the July 23, 1980, letter requesting these reviews.) Title VIII requires the President to resume filling the Strategic Petroleum Reserve (SPR) at an average rate of at least 100,000 barrels per day for fiscal year 1981 and succeeding years. Our most recent report on the status of SPR activities (EMD-81-37, Dec. 22, 1980) stated that, as of December 11, 1980, the administration had completed its fiscal year 1981 efforts to purchase 100,000 barrels per day of oil for the SPR.

This report is based on interviews with officials in DOE, the Defense Fuel Supply Center, and the Office of Management and Budget. We also reviewed publications, studies, and DOE and Defense Fuel Supply Center program documents related to the SPR and the entitlement program. Our analysis of the implications of alternative fill rates is based on assumptions described throughout this report. We did not evaluate the reasonableness of DOE's SPR expansion schedule or the availability of oil to meet oil fill requirements.

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This fourth report discusses actions taken by the Government, between December 11, 1980, and February 2, 1981, to fill the SPR. It notes that for the first time since the passage of the Energy Security Act, the Government has acted to increase the fill rate above the minimum of 100,000 barrels per day. We also note that the administration cannot exceed a fill rate of 214,000 barrels per day during fiscal year 1981 without additional funds. Subsequent years also require funds.

Assuming accelerated fill rates beginning June 1981, DOE will not have enough capacity under its existing expansion plans to maintain a fill rate of 300,000 barrels per day beyond July 1982. Any early effort to fill the reserve at the rate of 300,000 barrels per day will require complementary efforts to insure alternative storage. Of course, the actual rate and timing of oil fill will ultimately determine the adequacy of SPR storage capacity.

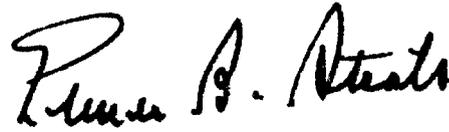
The report contains several recommendations to address our concerns. Specifically, we recommend that the Secretary of Energy:

- Set specific goals for SPR fill during 1981 and succeeding fiscal years consistent with congressional intent.
- Insure that adequate storage capacity is available on a timely basis to meet the needs of an accelerated SPR fill effort.
- Report to the Congress on (1) the costs, advantages, and disadvantages of an accelerated construction program and other storage options, and (2) the feasibility and appropriateness of SPR financing mechanisms which may be used to reduce financing through appropriated funds.

In order to meet the requested reporting time frames, we did not obtain official agency comments. We are also sending this letter to the ranking minority members of the Senate Committee on Energy and Natural Resources and the House Committee on Energy and Commerce. As requested by your office, we plan no further distribution of this report

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until 30 days from its date of issuance. At that time we will send copies to the Department of Energy and other interested parties and make copies available to others upon request.

A handwritten signature in black ink, appearing to read "Robert A. Stearns". The signature is written in a cursive style with a large initial 'R'.

Comptroller General  
of the United States

Enclosures - 2

STATUS OF STRATEGIC  
PETROLEUM RESERVE ACTIVITIES

BACKGROUND

The Energy Policy and Conservation Act of 1975 (P.L. 94-163) authorized creation of a Strategic Petroleum Reserve (SPR) to store up to 1 billion barrels of crude oil. The Department of Energy (DOE) is implementing a three-phase construction plan to achieve a 750-million-barrel oil storage capacity. The first construction phase involving storage capacity of 249 million barrels is nearing completion. DOE has started the second construction phase and expects to complete it by 1987. The second phase is expected to add about 290 million barrels of capacity to bring the total storage capacity to about 539 million barrels.

In the past, DOE has experienced serious difficulties in acquiring oil to fill SPR facilities. The worldwide shortage of oil which occurred in early 1979 resulted in a suspension of new purchases of SPR oil. The last oil delivered to the SPR during 1979 arrived in August of that year. Oil deliveries to the SPR resumed on September 23, 1980, when the first oil acquired through a competitive exchange of Elk Hills Naval Petroleum Reserve oil arrived.

The competitive exchange of Elk Hills Naval Petroleum Reserve oil is the approach DOE has been pursuing to meet the minimum supply requirement set forth in title VIII of the Energy Security Act (P.L. 96-294). Title VIII requires the President to fill the SPR at an average rate of at least 100,000 barrels per day. The Conference Committee's report on S. 932, which became the Energy Security Act, specifies that this rate is intended to be a minimum and not the appropriate rate of oil injection. Title VIII also requires

DOE to use its entitlements program 1/ to lower the purchase price for SPR oil.

DOE's fiscal year 1981 appropriation (P.L. 96-514) reinforces congressional intent that the administration exceed the title VIII's minimum supply requirement. It provides that the President should seek to fill the SPR at an average annual rate of at least 300,000 barrels per day or at a rate which will fully utilize appropriated funds. This provision, together with title VIII, underscores congressional support for filling the SPR at a rate above 100,000 barrels per day.

Our first three letters in this series of status reports discussed the Government's activities in response to title VIII of the Energy Security Act. Our December status report (EMD-81-37; Dec. 22, 1980) stated that the Defense Fuel Supply Center (DFSC)--DOE's purchasing agent for the SPR--had completed its fiscal year 1981 efforts to exchange 100,000 barrels per day of Elk Hills Naval Petroleum Reserve oil, plus cash premiums, for an identical amount of oil to be delivered to the SPR. In that report, we noted that the Government had taken no action to acquire oil above this minimum 100,000-barrel-per-day requirement.

We also reported that as of December 1, 1980, DOE had received about 11 million barrels of oil as a result of the competitive exchange. This brought the total amount of oil received by the SPR to about 102 million barrels. Information on the type of oil to be delivered to the SPR as a result of the competitive exchange, proposed delivery schedules, and prices to be paid for the oil is also presented in our December report.

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1/An entitlement is the right to refine a barrel of price-controlled domestic oil. However, on January 28, 1981, the President ordered the immediate decontrol of domestic oil prices. Thus, January 1981 was the last month the Government earned entitlements for the SPR, and the last month of the entitlement program's operation. Previously, refiners bought and sold entitlements, the value of which was calculated monthly by DOE generally as the difference between the average price of controlled and uncontrolled oil.

SPR FILL ACTIVITIES

To date, the new administration has not made known its policies and plans for filling the SPR during 1981 or succeeding fiscal years.

Actions to acquire additional oil for delivery in 1981

DOE has recently taken steps to exceed the 100,000-barrel-per-day minimum supply requirement during fiscal year 1981. As stated earlier, contracts under the competitive exchange of Elk Hills Naval Petroleum Reserve oil will result in the delivery of an average 100,000 barrels per day to the SPR during fiscal year 1981. On January 27, 1981, the Deputy Assistant Secretary for the SPR signed an oil acquisition order which provides DFSC funds to purchase 8.6 million barrels of oil for the SPR through an open continuous solicitation. Additional funds could be provided to DFSC depending on the offers received. With this additional oil, DOE will exceed 100,000 barrels per day delivery to the SPR during fiscal year 1981.

On January 30, 1981, DFSC issued its open continuous solicitation for additional oil. The solicitation invites companies to submit offers to sell oil to the SPR on a weekly basis. According to DFSC officials, the closing date for receiving offers will be Tuesday of each week. Offers received by the closing date will be evaluated during the week and awards will be made each Friday. The first cutoff date for receiving offers was February 10, 1981. DFSC planned to award the first contracts on February 13, 1981. DFSC will use a range of market prices paid for similar types of oils to evaluate the reasonableness of the prices offered for oil each week and to make final awards. 1/

The January 30, 1981, solicitation is for crude oils meeting the full range of SPR specifications, including Alaskan North Slope oil and blends of oil meeting the SPR specifications. It also specifies that the Government will consider offers for minimum quantities of 240,000 barrels

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1/On February 13, 1981, DFSC awarded contracts for 1.4 million barrels of oil under the open continuous solicitation. DFSC will continue to receive offers under this solicitation in the succeeding weeks.

by ship and 50,000 barrels by pipeline. Depending on the availability of oil and offers received, deliveries resulting from the solicitation could begin during early spring.

#### Mandatory program

DOE's activities to reach the minimum fill rate requirement set forth in title VIII of the Energy Security Act have been through voluntary exchanges of crude oil. On January 5, 1981, DOE's Economic Regulatory Administration (ERA) finalized regulations which would require refiners to provide oil to the SPR if the voluntary exchanges do not reach the 100,000-barrels-per-day minimum requirement. The regulations were to be effective February 13, 1981.

According to ERA officials, the mandatory approach also could be used to exceed the 100,000-barrel-per-day requirement. The regulations are to be available for use on a stand-by basis in case DOE decided not to rely on voluntary sale of oil to fill the SPR.

The regulations require 15 major U.S. refiners, located throughout the United States, and other domestic refiners with refining capabilities in excess of 175,000 barrels per day of crude oil to sell oil to the SPR. According to the regulations, DOE would notify the refiners of the amount and type of oil to be sold. DOE and refiners would negotiate the selling price for oil to be delivered.

The President took two actions at the end of January 1981 which concern the mandatory regulations. On January 28, 1981, the President issued Executive Order 12287 which removed remaining price and allocation controls on crude oil and refined petroleum products. The mandatory regulations are part of the allocation controls. However, at this time it is not clear what effect the removal of allocation controls will have on these regulations.

Also, on January 29, 1981, the President issued an order postponing the effective date of all Federal regulations that were scheduled to become effective during the following 60-day period. Under the President's order, the affected regulations, which includes the SPR regulations, are being reviewed by an administration task force.

NEED TO EXAMINE  
STORAGE CAPACITY

Assuming accelerated fill rates beginning June 1981, DOE will not have enough capacity under its existing expansion plans to maintain a fill rate of 300,000 barrels per day beyond July 1982. Any early effort to fill the reserve at the rate of 300,000 barrels per day will require complementary efforts to insure alternative storage capacity or accelerate the completion of planned storage. Of course, the actual rate and timing of oil fill will ultimately determine the adequacy of SPR storage capacity.

Capacity available under  
three fill rates

We estimated the Phase I storage capacity available at fill rates of 100,000, 215,000, and 300,000 barrels per day. The key results of this analysis are as follows:

- DOE has sufficient Phase I storage capacity to maintain an average fill rate of 100,000 barrels per day during fiscal years 1981 through 1983.
- The maximum fill rate DOE can maintain with existing capacity is 215,000 barrels per day beginning in June 1981 1/ through December 1982.
- DOE cannot maintain beyond July 1982 a fill rate of 300,000 barrels per day beginning in June 1981.

Table 1 on page 6 shows the remaining storage capacity available under the three fill rates and at four intervals from June 1981 through October 1982. The rate of decline allows for 32 million barrels of existing capacity which is not now available for use but is expected to come on line in July 1981.

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1/As reported in our December 1980 status report, in the past it has taken DOE and DFSC about 87 days to prepare solicitations to purchase more than 10 million barrels, evaluate offers, and award delivery contracts. Assuming the same time requirements, if preparation for a new solicitation begins in February 1981, contracts could be issued by May 1981. Deliveries could start as early as June 1981.

Table 1

Fiscal Year 1981 And 1982 SPR Fill Rates

	<u>Additional oil purchases needed through FY 82</u>	<u>SPR Phase I capacity remaining after deliveries (note a)</u>			
		<u>June 1981</u>	<u>October 1981</u>	<u>April 1982</u>	<u>October 1982</u>
----- (in millions of barrels) -----					
Maintain minimum 100,000 b/d	36.5	90.6	121.2	102.3	84.0
Begin 215,000 b/d in June 1981	104.7	84.1	94.9	55.1	15.8 (note b)
Begin 300,000 b/d in June 1981	146.1	81.6	84.6	29.3	(note c)

a/Our estimates of storage capacity remaining at SPR facilities after deliveries at each of the rates discussed above is for illustration purposes only. We projected oil deliveries to the SPR through December 1982 by multiplying the number of days in each month times the daily average fill rate in each case. DOE's schedule for delivering oil will differ from our estimates depending on the type of oil being received and the different receiving rates of the terminals and storage facilities in the SPR systems. Based on the status of current storage capacity, we estimate DOE will have 217 million barrels of capacity available to receive oil through June 30, 1981. An additional 32 million barrels of constructed, but uncertified capacity, is expected to become available by July 1981. (See discussion of the status of current capacity on page 8.)

b/If this rate continues through fiscal year 1983, existing Phase I capacity will be filled in December 1982.

c/Filled in July 1982.

Status of existing capacity

The five SPR sites and the terminals which receive the oil are:

- Bayou Choctaw, Louisiana, and Weeks Island, Louisiana, which are connected via pipeline to the DOE-owned St. James terminal in Louisiana.
- West Hackberry, Louisiana, and Sulphur Mines, Louisiana, connected via pipeline to the Sun Oil Company (Sunoco) terminal in Nederland, Texas.
- Bryan Mound, Texas, which is connected to the Seaway, Inc., terminal in Texas.

Although DOE has constructed about 249 million barrels of storage capacity at the five sites, about 32 million barrels of this capacity is not ready to receive oil. This 32 million barrel storage capacity consists of storage at two facilities--the 24 million barrel Sulphur Mines facility and an 8 million barrel storage cavern at West Hackberry.

As of January 31, 1981, the Sulphur Mines facility contained only about 7,000 barrels of oil transported via truck during initial preparation of the site. Prior to scheduling deliveries from the Sunoco terminal to the Sulphur Mines caverns, DOE tentatively plans to test the pumps, valves, pipes, other operating equipment, and computerized control equipment by transferring about 60,000 barrels of oil from West Hackberry to the facility. Sulphur Mines' withdrawal capability will also be tested by reversing the process and transferring oil back to West Hackberry. DOE plans to successfully complete the start-up tests and have these caverns available for storage by July 1981.

At West Hackberry, one storage cavern is not available for oil storage because of problems resulting from a September 1978 fire. <sup>1/</sup> After the fire, DOE decided to test the integrity of the 8 million barrel cavern by injecting salt-saturated water into the cavern under pressure and measuring for pressure losses. Initial tests during late 1980 identified several potential sources of pressure leaks,

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<sup>1/</sup>We discussed the fire in our report "Information On Department Of Energy's Management Of The Strategic Petroleum Reserve," (EMD-79-49, Mar. 22, 1979).

primarily near the concrete which seals wells used to fill and withdraw oil during normal operations. These problems must be resolved before the cavern can be recertified for oil storage. DOE officials told us that they are performing additional tests to pinpoint the reasons for losing pressure in the cavern and hope to have the problems solved by July 1981. However, it is too early to tell whether DOE's efforts to correct the problems will be successful.

If DOE's efforts to recertify the 8 million barrel West Hackberry cavern fail and/or problems arise in the testing of the 24 million barrels of capacity at Sulphur Mines so that start-up of either or both of these facilities is delayed, DOE will not be able to maintain the 215,000-barrel-per-day rate through December 1982 indicated on the table.

Using 217 million barrels of SPR storage capacity which will be available for deliveries until July 1981, we estimated the storage capacity available for new deliveries by subtracting volumes we estimate DOE will have received by that date. As of June 30, 1981, we estimate DOE will have received about 127 million barrels, leaving about 90 million barrels in storage capacity available for future deliveries. The 127 million barrels received by June 30, 1981, consists of about 112 million barrels in storage as of January 31, 1981, and an estimated 15 million barrels to be delivered by June 30, 1981, under existing contracts.

PLANS FOR ADDITIONAL  
PHASE II CAPACITY

DOE's plans for expanding SPR storage capacity call for adding about 290 million barrels of Phase II capacity by December 1987. Its goal is to add a total of 29 new storage caverns, each with a 10 million barrel capacity in underground salt formations. Twelve new caverns will be created at Bryan Mound, 16 at West Hackberry, and 1 at Bayou Choctaw. If DOE adheres to its schedule, the first of these new caverns will be completed in January 1983.

Creating new SPR storage capacity involves a three stage activity of drilling, testing, and a process called leaching. A well is drilled through sands and rock into the salt formation. The well is lined with steel casing which is set in cement to set off fresh water beds and other formations. When the casing is tested for pressure leaks, and found to have none, the well is certified. The cavern is then created by leaching--injecting water, which dissolves salt, into the formation and removing the salt-saturated

water, or brine. DOE currently plans to fill the caverns with oil as capacity becomes available during leaching.

According to DOE's plans for Bryan Mound expansion, after about 500 days of leaching, DOE will begin injecting an average of about 8,000 barrels per day of oil into a cavern. After another 300 days, DOE will increase this oil injection rate to about 15,000 barrels per day. Between August 1981 when the first of its new caverns is expected to receive an average of about 8,000 barrels per day during leaching and December 1982 when Bryan Mound's caverns are expected to receive an average of about 15,000 barrels per day, DOE plans to use an average of about 38,000 barrels per day of oil.

During January 1981, DOE was leaching 6 of the 12 Bryan Mound Phase II caverns. (Three of these caverns were started in March 1980, and the other three were started in July 1980.) The leaching process takes about 3 years; accordingly, the Bryan Mound caverns are expected to be completed between April and August 1983. DOE expects to complete the remaining caverns by August 1986.

At West Hackberry, although wells for 14 of the 16 new caverns have been drilled, certification tests on these wells are not scheduled until April 1981. If the wells pass the certification tests, leaching can begin the next month.

DOE plans to complete the first 8 of these 16 caverns during December 1983 and complete the remaining 8 caverns by March 1987. However, until wells are certified and leaching completed, it is too early to tell whether DOE will meet this schedule.

Our analysis showed that, even with the schedule for completing new caverns, DOE would not have sufficient storage capacity after July 1982 if the fill rate is increased to 300,000 barrels per day beginning June 1981. DOE agreed with our conclusion. Based on a November 1980 schedule for Phase II expansion, DOE officials project, however, that they will have sufficient new storage capacity to maintain a 215,000 barrel per day fill rate, starting in June 1981, through the third quarter of fiscal year 1984. Because of time constraints we were not able to verify the reasonableness of these estimates nor of the assumptions upon which they are based.

As of January 1981, the well for the new cavern at Bayou Choctaw had not been drilled. DOE originally scheduled drilling to begin in December 1980 and leaching to be

completed by February 1983. However, according to a DOE official, the drilling contract has not been awarded because offers received were at a price higher than DOE was willing to accept.

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In summary, if DOE were to maintain a fill rate beyond 1982 of 300,000 barrels per day, it will need to make a decision soon on how to store the oil. DOE's Deputy Assistant Secretary for the SPR told us that DOE is aware of its inability to maintain a 300,000-barrel-per-day fill rate beyond July 1982, and has examined options for increasing SPR storage capacity. According to the official, as part of its fiscal year 1983 to 1988 Program Planning and Budgeting System, DOE examined such options as accelerating the current Phase II construction schedule, acquisition of additional SPR sites, and the purchase or lease of tankers for temporary SPR storage. However, DOE has not reached a final decision on these alternatives.

#### OIL ACQUISITION FINANCING

As stated in earlier reports, DOE has obligated \$2.1 billion during fiscal year 1980 to acquire the first 100,000 barrels per day to be delivered during fiscal year 1981. Fiscal year 1981 appropriations of \$1.4 billion could be used to purchase about 35 million barrels of oil or about 96,000 barrels per day during fiscal year 1981, assuming a price of about \$40 per barrel. The proceeds from the sale of entitlements as of February 2, 1981--\$262 million--could be used to purchase an additional 6.6 million barrels or about 18,000 barrels per day for 1 year. This would bring the total oil fill rate during fiscal year 1981 which could be sustained by existing funds to 214,000 barrels per day.

If DOE is to increase the fiscal year 1981 oil fill rate above 214,000 barrels per day additional financing options must be considered and a decision made by the administration on the most appropriate mechanism. Such a decision is also applicable to fiscal year 1982 and beyond funding of the SPR. Other financing options are: (1) issuing oil bonds to be bought and sold in the public market, (2) imposing an in-kind tariff on imported oil--importers would be required to supply the Government an amount of oil in proportion to the quantity imported, (3) requesting a user tax to be levied on the users of petroleum products, and (4) requiring and/or providing incentives for industry to maintain petroleum reserve stocks.

CONCLUSIONS

Assuming accelerated fill rates beginning June 1981, DOE will not have enough capacity under its existing expansion plans to maintain a fill rate of 300,000 barrels per day beyond July 1982.

In addition, the administration cannot exceed a fill rate of about 214,000 barrels per day during fiscal year 1981 without additional funds. Subsequent years also require funds.

RECOMMENDATION

We recommend that the Secretary of Energy

- Set specific goals for SPR fill during 1981 and succeeding fiscal years consistent with Congressional intent.
- Insure that adequate storage capacity is available on a timely basis to meet the needs of an accelerated SPR fill effort.
- Report to the Congress on (1) the costs, advantages, and disadvantages of an accelerated construction program and other storage options, and (2) the feasibility and appropriateness of SPR financing mechanisms which may be used to reduce financing through appropriated funds.

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## United States Senate

COMMITTEE ON  
 ENERGY AND NATURAL RESOURCES  
 WASHINGTON, D.C. 20510

July 23, 1980.

Honorable Elmer B. Staats  
 Comptroller General of the United States  
 GENERAL ACCOUNTING OFFICE  
 441 G Street, N.W.  
 Washington, D. C. 20548

Dear Mr. Staats:

On June 30, 1980 the President signed the Energy Security Act (Public Law 96-294). Title VIII of this Act is intended to provide for a resumption of purchases by the United States government of crude oil for the Strategic Petroleum Reserve authorized in 1975 by the Energy Policy and Conservation Act. Purchases of oil for this purpose have been suspended for well over a year, despite the fact that the present level of the SPR is clearly inadequate insurance against any contemplated interruption in petroleum imports.

The Congress attaches a high priority to the timely implementation of the provisions of title VIII. Both the language of the Act and the accompanying joint statement of managers are very emphatic on this matter. Accordingly, we are asking that you assist Congress in monitoring implementation of this title by the Executive Branch.

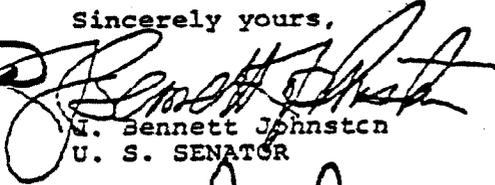
In particular we request that the General Accounting Office report by letter on a monthly basis to the Senate Committee on Energy and Natural Resources and the House Committee on Interstate and Foreign Commerce describing the activities taken by the Executive Branch under the provisions of title VIII of the Energy Security Act. This report should include GAO's evaluation of these activities in relation to the clear intent of Congress, expressed in the Act, to resume as soon as possible the filling of the SPR. These monthly reports should continue through October, 1981. We are further requesting that GAO provide Congress by January 1, 1982 with a comprehensive report on activities of the Executive Branch under title VIII for the period July, 1980 through October, 1981.

Please let us know if the Senate Committee on Energy and Natural Resources or the House Committee on Interstate and Foreign Commerce can be of assistance in carrying out this request.

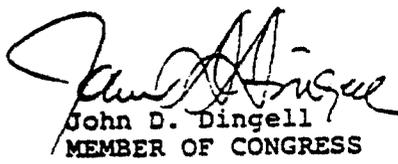
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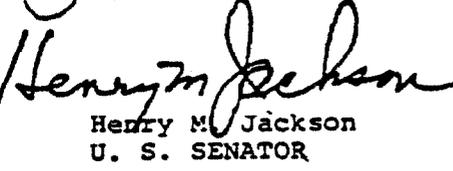
Warren O. Staggers  
MEMBER OF CONGRESS



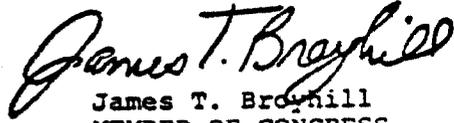
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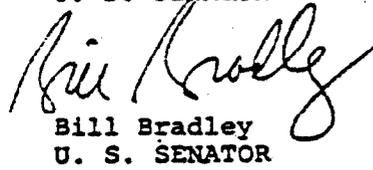
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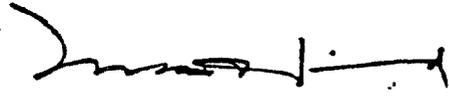
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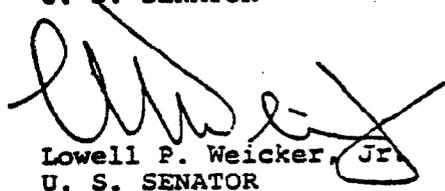
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