BY THE COMPTROLLER GENERAL

Report To The Congress

OF THE UNITED STATES

Iranian Oil Cutoff: Reduced Petroleum Supplies And Inadequate U.S. Government Response

The Iranian oil cutoff had varied effects on U.S. oil companies, and the Department of Energy was ill-prepared to keep informed of the situation and to deal with its effects.

--The U.S. supply of crude oil during the first 4 months of 1979 was reduced by 600,000 to 700,000 barrels a day compared to the average daily supply in 1978. This contributed to companies not increasing their production of gasoline and other petroleum products.

--GAO found no evidence that the oil companies created the U.S. crude oil shortage; however, situations developed as a result of, or at about the same time as, the Iranian shortfall which could have been used by the companies to their advantage.

--The Department needs to be better prepared for dealing with energy shortages. As a result, the Secretary of Energy should develop:

  --A comprehensive plan for dealing with shortages.

  --A system for better identifying demand and consumption of petroleum products.

  --A reliable system for gathering and publishing accurate, complete, and timely energy data.

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COMPTROLLER GENERAL OF THE UNITED STATES
WASHINGTON, D.C. 20548

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MASTER

To the President of the Senate and the
Speaker of the House of Representatives

This report discusses the effect of the Iranian oil cutoff on the Nation's supply of petroleum products and evaluates the Department of Energy's attempts to respond to the situation. The Department's actions to develop information on and deal with the current oil supply shortfall in the United States have been ad hoc, fragmented, and not guided by any overall plan to determine the extent of the shortage and the reasons behind it. We believe that the Department should be better prepared to deal with such energy disruptions, and have recommended measures for action by the Secretary of Energy.

We undertook this review at the request of the Chairman, Senate Committee on Energy and Natural Resources. Several other Members of Congress have also expressed interest in this effort, and because of this the Chairman agreed that the report should be addressed to the Congress as a whole.

Copies of the report are being sent to the Director, Office of Management and Budget, and the Secretary of Energy.

Comptroller General
of the United States

COMPTROLLER GENERAL'S
REPORT TO THE CONGRESS

IRANIAN OIL CUTOFF: REDUCED PETROLEUM SUPPLIES AND INADEQUATE U.S. GOVERNMENT RESPONSE

D I G E S T

In late December 1978, after several weeks of sporadic interruptions, oil exports by Iran were stopped. They were not resumed until March. Prior to the interruptions, Iran was producing between 5 and 6 million barrels of crude oil a day. U.S. daily imports from Iran had been about 770,000 barrels which meant about 9 percent of total U.S. imports and 4 percent of its consumption. Since March, Iran has not returned to its former production levels. and is averaging between 3 and 4 million barrels daily.

Acting at the request of the Chairman, Senate Energy and Natural Resources Committee, GAO reviewed how the Iranian situation affected U.S. oil companies and what the Department of Energy did to monitor the situation and deal with its effects. Subsequently, GAO received similar requests from six other Senators and Representatives. To respond to these requests GAO reviewed information at the Department of Energy and other sources and obtained data directly from 19 oil companies. GAO visited six of these companies for detailed follow-up work. Because of widespread interest in this issue, the Chairman requested that GAO not take the time to obtain agency or oil industry comments.

The 19 major U.S. oil companies from which GAO obtained information account for about 75 percent of U.S. refining capacity, oil imports, and gasoline sales. Data was gathered by means of questionnaires on the specific effects of the Iranian oil shortfall, including monthly inventory levels, gasoline production and sales figures, and refinery operating levels. GAO followed up at six companies with numerous interviews about

the companies' domestic and international operations. GAO verified the information obtained by examining the six companies' records, documents, and correspondence.

Based on data obtained from the 19 oil companies and other available information, GAO concludes that the Iranian shutdown tightened world crude oil supplies and had varying degrees of impact on the companies. Generally the companies which had significant amounts of imports from Iran were more heavily affected. GAO estimates that the Iranian situation, in conjunction with other events, caused a net reduction in daily U.S. petroleum supplies of from 600,000 to 700,000 barrels a day during the first 4 months of 1979. (The gross reduction in U.S. petroleum supplies was about 1.1 million barrels a day; about 500,000 of this was compensated for by increased supplies from other countries and by reduced crude oil sales to third parties.) In addition, an unusual decrease in U.S. production occurred from October through January which further decreased supplies by 200,000 barrels a day below what would normally be expected. The overall shortage contributed to companies not increasing their production of gasoline and other petroleum products. GAO found no evidence that the 19 companies' stocks of crude oil, gasoline, and distillates (home heating oils and diesel fuel) exceeded normal operating levels.

Although GAO found no evidence that these U.S. companies had created the oil shortage in the U.S., several situations developed as a result of, or concurrent with, the reduction of Iranian petroleum exports which further tightened U.S. crude oil supplies. The multinational oil companies' crude oil allocation procedures, the unusual reduction in U.S. crude oil production (mentioned above), and decisions of the larger companies not to purchase crude oil on the spot market helped tighten U.S. crude oil supply. GAO believes the large multinational

companies are less affected by supply shortages than smaller companies since the larger companies have considerably more resources available to withstand the effects of such shortages.

Department of Energy actions and pronouncements about the Iranian situation were fragmented and, at times, contradictory. The Department did not provide the Congress and the public with credible, convincing explanations of the status of gasoline, diesel fuel, and home heating oil supplies. Notwithstanding the Nation's experience during the 1973-74 Arab oil embargo, the Department accomplished little in planning for and dealing with subsequent energy shortages, especially the current one.

WHAT EFFECT DID THE SHORTFALL HAVE ON U.S. OIL COMPANIES?

Based on GAO's questionnaires to the 19 oil companies and its follow-up interviews and examinations, GAO reached a series of conclusions.

Those companies which imported little or no Iranian oil generally were minimally affected by the reduction in Iranian crude.

In addition to the loss of Iranian crude, the U.S. lost an additional 200,000 barrels a day as a result of the six multinational oil companies' methods used to allocate crude oil supplies. The companies decreased each affiliates' crude supplies by the same percentage, regardless of the affiliates' original planned source of crude oil. Thus, the amount of an affiliate's reduction was different from its reliance on Iranian crude. For example, one of the companies determined that their second quarter 1979 crude oil supplies would be 16-percent short of requirements. They applied this 16-percent reduction to each affiliate's estimated crude oil requirements. Their U.S. affiliate's crude oil supplies were decreased by 101,000 barrels a day as a result of the Iranian shortfall, even though it had formerly relied on Iranian crude for only 31,000 barrels a day. (See p. 22.)

From January 1 through March 31, 1979, the companies drew down their crude oil stocks by a total of 31.9 million barrels. GAO compared each of the companies' latest available crude oil inventory levels for the first 5 months of 1979 with its inventory as of September 30, 1978 (according to the Department of Energy, historically this has been the annual inventory low point). Based on this analysis, GAO estimates that if the companies had drawn down inventories further to the September 30, 1978 level, they could have produced only an additional 3.6 million barrels of gasoline--one-half of one day's U.S. gasoline production.

GAO's analysis of crude oil stocks was on an ownership basis whereas the Department of Energy's data is on a custody basis. Therefore, the Department's data only includes stocks in the U.S. It does not include oil in transit from foreign countries and, as such, only accounts for a portion of the total crude oil stocks owned by the companies. This explains why GAO's analysis could show a first quarter 1979 crude oil stock drawdown of 31.9 million barrels, while the Department's data showed that crude oil stocks increased by 6 million barrels between the end of January and the end of March.

In addition, GAO found that distillate stocks decreased from 180 million barrels at the beginning of 1979 to 96 million barrels at the end of March, 25 million less than a year earlier. Gasoline stocks were 199 million barrels on March 31, 1979, 13 million less than a year earlier and 10 million less than at the beginning of the year.

Eleven of the 19 companies estimated that if the international supply of crude oil

remains tight, they will allocate gasoline sales for the remainder of 1979. Three companies believed they will be able to supply at least 100 percent of the 1978 levels. For distillates, eight companies believed that they will allocate sales for the remainder of the year. Six estimated they will supply 100 percent or more of the 1978 levels. Five did not make estimates because of future supply uncertainties.

WHY WERE THERE DISPROPORTIONATE U.S. GASOLINE CUTBACKS?

In addition to the multinational oil companies' crude oil allocation procedures, there were other reasons why companies reduced gasoline allocations beyond the amount of their Iranian imports.

--Department of Energy regulations require that the gasoline allocation percentage be computed from the amount of gasoline remaining after a refiner has supplied the federally mandated State set-aside and priority user programs.

--Some companies normally exchange their Iranian crude for other types before importation to the U.S. Thereby they lost crude supplies greater than the total of their imports from Iran. Based on the data obtained from the 19 companies, GAO estimates that 7 companies' crude supplies were reduced by about a total of 100,000 barrels a day as a result of not having Iranian crude available for exchange.

--The loss of Iranian crude increased the problem of finding lighter, low-sulfur crude to supply U.S. refineries.

--The Department of Energy's gasoline pricing regulations may have helped cause gasoline allocations, even by

refiners with unreduced crude oil supplies. Lower prices may have helped cause temporary excess demand for some companies' gasoline, forcing them to allocate their sales.

DECREASE IN DOMESTIC PRODUCTION

In addition to the reduced supplies from Iran and other foreign sources, U.S. domestic crude oil production fell significantly, from 8.83 million barrels daily in October to 8.46 million barrels daily in January, a decline of about 370,000 barrels daily. Although production normally falls during this period because winter weather hampers oil field operations, this year's decline appears unusually large. In comparison, production during the same period in the previous year fell by only 226,000 barrels a day, almost 150,000 barrels a day less than this year's decline.

Most explanations attribute the decline to inclement weather or operational probblems at production sites. Although GAO agrees that these were factors, it believes that by no means do they fully explain the large nationwide drop in production. Although GAO did not perform a detailed analysis of the drop in production, it did review weather data for the past 2 winters in the four major oil-producing States in the lower 48. GAO found that the average temperature in three of the States, which account for about 64 percent of the lower-48 production, was the same or higher this past winter as compared to the 1977-78 winter.

INTERNATIONAL EFFECTS OF IRANIAN SHORTFALL

There has been a difference of opinion as to whether there was a world shortage of crude oil. Those who believe there has been little or no shortage generally base their view on the fact that Free

World oil production was higher during the first 3 months of 1979 than during the same period in 1978. They do not consider, however, the high levels of crude oil stocks available in the first quarter of 1978, which reduced the need for crude oil production. At the beginning of 1978 crude oil stocks were 4 billion barrels, 400 million barrels more than a year earlier. By the end of March 1978 they had been drawn down to 3.5 billion barrels and, as a result, Free World oil production dropped by 4.5 million barrels a day between December 1977 and March 1978. The March 1978 production level of 44.8 million barrels a day was 3.6 million less than the March 1977 level. Therefore, GAO believes it is inappropriate to conclude, merely on the fact that 1979 production outpaced the first 3 months of 1978, that there has been no world oil shortage. Other factors, such as levels of crude oil and product inventories, must also be considered.

Most experts believe that as a result of the Iranian situation, available worldwide crude oil supplies were about 1.0 to 1.5 million barrels a day below normal demand during the fourth quarter of 1978 and about 2.0 to 2.5 million barrels a day below during the first quarter of 1979. This shortfall was exacerbated by government-mandated reductions in production by several other oil-producing countries.

For example, Saudi Arabia, which had allowed production to increase to over 10 million barrels a day in the last 2 months of 1978, limited first quarter 1979 production to 9.5 million barrels a day, and second quarter production to 8.5 million barrels a day. The Saudis have since allowed production to go back up to 9.5 million barrels a day effective July 1.

The International Energy Agency, representing 20 major oil-consuming countries,

concluded that the Iranian situation had a significant adverse effect on world crude oil availability. Member countries have agreed to reduce their oil consumption by 2 million barrels a day. But the Agency expects oil supplies to remain tight for the rest of 1979 and into 1980.

The prices of oil supplies available for purchase on the spot market reached record high levels. The member governments of OPEC have taken advantage of the tight supply situation to increase their oil prices 54 percent--from a weighted average of $12.98 a barrel in December 1978 to about $20 a barrel in July 1979.

DEPARTMENT OF ENERGY EFFORTS TO MONITOR AND DEAL WITH THE IRANIAN OIL SHORTFALL

In spite of repeated past suggestions that it improve its planning to deal with energy emergencies, the Department's energy information was not current, relied heavily on trade association statistics, some of which were estimates which differed significantly from the subsequent actual data published by the Department, and did not include data on actual petroleum demand and all petroleum stocks. Petroleum demand is defined by the Department as output from refineries minus changes in stock levels and therefore is not true consumer demand. The Department collects virtually no information on petroleum product stocks held by wholesalers and distributors. Refiners sell about 45 percent of their gasoline to these firms.

The Department's lack of adequate energy planning and data has led to inconsistent and conflicting administration statements and policies on the U.S. oil shortfall. For example, in March the Department urged refiners to use restraint in purchasing crude oil on the spot market. In May the Department reversed its position and indicated that some companies might need to make such purchases.

RECOMMENDATIONS TO THE SECRETARY OF ENERGY

The current situation is similar to the one discussed in an October 1978 GAO report on the Department's energy contingency planning, in which GAO recommended that a specific plan of action be created to respond to energy emergencies and that the development of an energy emergency management information system be given top priority within the Energy Information Administration. Although the Department has taken some actions to develop an energy emergency management information system, it has done little to create a specific plan of action for responding to energy emergencies.

In light of those previous recommendations and the results of its current review, GAO recommends that the Secretary of Energy develop:

--A comprehensive plan for dealing with energy shortages such as the Iranian situation. This plan should include, as much as possible, the specific actions or options available for monitoring and responding to the shortage, so that ad hoc reactions are kept to a minimum.

--A system for better identifying demand and consumption of petroleum products on a national and regional basis, in order to be able to determine the extent of supply shortages.

--A reliable system for gathering, verifying, and publishing accurate and complete energy data in a timely manner. This system should include information not only on refinery stocks and operations, but also on the stocks at the middleman level--wholesalers, jobbers, and distributors.

Contents

ABBREVIATIONS

API	American Petroleum Institute
DOE	Department of Energy
EIA	Energy Information Administration
GAO	General Accounting Office
IEA	International Energy Agency
MB/D	thousand barrels a day
MMB/D	million barrels a day
OPEC	Organization of Petroleum Exporting Countries

CHAPTER 1

INTRODUCTION

If the United States needed to be reminded of its dependence on insecure foreign sources of petroleum, 1/ the lines at gasoline stations around the country this summer have done so. Indeed, the events following the cutoff in oil exports from Iran seem to be a replay of the events that followed the 1973-74 Arab oil embargo. But, we are even more dependent on imported oil today than we were in 1973. U.S. petroleum imports have risen from 6.3 million barrels a day (MMB/D) in 1973 to over 8 MMB/D in 1978, an increase of about 28 percent. Imports now account for 43 percent of our domestic petroleum consumption, compared to 36 percent in 1973. As long as the United States continues to rely on foreign sources for a large share of its petroleum needs, it faces the threat of a disasterous supply disruption.

Before the events in Iran, the United States was the second largest market, behind Japan, for Iranian oil. In 1978, U.S. imports of Iranian crude oil and products were about 770 thousand barrels a day (MB/D). This represented about 9 percent of U.S. imports and about 4 percent of U.S. oil consumption. Prior to the disruptions, Iran was the world's fourth largest producer and the second largest exporter of crude oil. It had been producing between 5 and 6 MMB/D of oil, about 10 percent of Free World oil production.

Disruptions in the flow of Iranian oil began with strikes in the Abadan refinery and neighboring oil fields on October 20, 1978. As the strikes became more widespread, production continued to decline until December 26, 1978, when all oil exports were terminated. Oil production during January and February 1979 was not even sufficient to meet Iran's internal needs. As a result, the United States authorized exports of 1.2 million barrels of heating and cooking oil to Iran for humanitarian reasons.

Production began to increase and exports resumed in early March. For most of the month, production averaged about 2.2 MMB/D with exports of about 2 MMB/D. During June Iran was producing about 4 MMB/D and exporting about 3.3 MMB/D.

1/For purposes of this report, petroleum includes both crude oil and petroleum products.

In response to a request from the Chairman, Senate Energy and Natural Resources Committee, in March 1979 we did a quick analysis of the potential effects of the Iranian oil shortfall on the United States. 1/ In our report we noted that there was an apparent discrepancy between the size of the refined product cutbacks one would expect from the Iranian shortfall and the larger gasoline allocation reductions announced at that time by a number of major U.S. oil companies. Although we did not draw any conclusions about the apparent discrepancy, we gave several possible explanations. Companies may have been redistributing crude to other nations, stockpiling for future price increases, selling on the spot market for higher profits, or responding to Department of Energy (DOE) price and allocation regulations. We said that the apparent discrepancy should be looked into.

On March 8, 1979, the Committee Chairman requested that we undertake such a study. (See app. I.) Pursuant to agreements with the Chairman's office, we broadened the scope of our inquiry to (1) determine how the oil companies have been affected by the Iranian situation, (2) identify factors which have contributed to the gasoline and distillate supply problems, (3) determine what actions the companies have undertaken to offset the loss of Iranian supplies, and (4) assess what DOE has done to monitor the situation and deal with its effects.

Subsequently we received similar requests from Senators Max Baucus, Howard M. Metzenbaum, William Proxmire, and William V. Roth, Jr., and Representatives Jim Lloyd and Anthony T. Moffett. (See apps. II, III, IV, and V.) Because of the high level of interest in the results of our analysis, the Chairman's office agreed that we should issue the report to the Congress as a whole.

The Committee Chairman also asked that we report to him on measures the United States could take to reduce demand and increase domestic energy production. Our response to this request was provided to him in our letter report of August 27, 1979.

1/"Analysis of the Energy and Economic Effects of the Iranian Oil Shortfall," EMD-79-38, Mar. 5, 1979.

SCOPE OF REVIEW

As part of our analysis we obtained information from 19 of the largest U.S. oil companies (see app. VI) by means of questionnaires which requested specific company data on the effect of the Iranian oil shortfall. Such data included monthly inventory levels, gasoline production and sales figures, and refinery operating levels. Collectively, these companies account for about 75 percent of U.S. oil imports, refining capacity, and gasoline production and sales. From these 19 companies, we selected 6--Texaco, Mobil, Shell, Cities Service, Gulf, and Amoco (Standard of Indiana)--for more detailed work. During visits to these companies, we held numerous discussions with officials about their companies' domestic and international operations. We verified information they gave us by examining official company records, documents, and correspondence.

All of the six companies produce or acquire crude oil from foreign countries, but some are primarily domestic refiners and marketers. Others refine and sell crude oil and products globally. The six companies vary in size. They also differ in their dependence on Iranian crude oil in recent years; some acquired and imported large quantities of Iranian crude oil, but others produced or imported little or none.

We also performed work at DOE on how well the Department has monitored and responded to the effects of the Iranian oil shortfall on U.S. supplies of petroleum products. To further our understanding of the situation, we obtained the views and reviewed the reports of other petroleum experts in and out of government.

Our analysis of the overall international and U.S. petroleum markets is presented in chapter 2. Chapter 3 describes the effects of the Iranian oil shortfall on our sample of 19 companies and their responses to it. Chapter 4 presents our observations on DOE's response to the U.S. oil shortfall arising from the events in Iran. Our conclusions and recommendations are in chapter 5.

AGENCY AND INDUSTRY COMMENTS

Because of the widespread interest in the subject of this report, the Chairman requested that we not take the time to obtain DOE or oil industry comments.

CHAPTER 2

EFFECTS OF THE IRANIAN OIL SHUTDOWN ON THE INTERNATIONAL AND U.S. PETROLEUM MARKETS

Since the interruption of Iranian oil exports, there has been considerable debate over the amount of the shortfall in world and United States crude oil supplies. Some observers, in fact, contend there has been little or no oil shortage. We arrived at the following conclusions.

--There was a tightening of world as well as U.S. crude oil supplies during at least the first 4 months of 1979.

--U.S. refiners tended to use available crude oil supplies for the production of gasoline, distillates, and the other petroleum products, but their crude oil supplies and inventories were not sufficient to completely satisfy their customer's requirements.

--The U.S. shortfall was exacerbated by an unusually large decline in domestic crude oil production between October 1978 and January 1979.

WAS THERE A CRUDE OIL SHORTAGE?--DIFFERING VIEWS

Those observers who believe there has been little or no oil shortage generally base their view on the fact that Organization of Petroleum Exporting Countries (OPEC) and Free World oil production was higher during the first 3 months of 1979 than during the same period in 1978. They do not consider, however, the high levels of crude oil stocks available during the first quarter of 1978 and thus the reduced crude oil production requirements. On the other hand, those who believe a considerable crude oil shortfall has occurred assume that market demand would have been high enough for Iran to have continued to export about 5 MMB/D. They estimate that the shortfall was about 1.0 MMB/D to 1.5 MMB/D in the fourth quarter of 1978, and about 2.0 MMB/D to 2.5 MMB/D during the first quarter of 1979. DOE's estimate falls within these estimates.

There has been a similar controversy over domestic petroleum supplies. Some observers allege that the U.S. gasoline shortage has been caused by the major oil companies withholding crude oil and/or refined products from the market to raise prices and increase profits. Contrary to this view,

DOE, in its April 1979 report, "Response Plan: Reducing U.S. Impact on the World Oil Market," estimated that the U.S. shortfall in petroleum imports was about 700 MB/D during the first quarter of 1979. DOE concluded that imports should have averaged about 9.3 MMB/D in order to have avoided the excessive drawdown of U.S. petroleum stocks. 1/ It said that "actual" imports of 8.6 MMB/D were therefore 700 MB/D less than desirable.

We have no confidence in DOE's estimate of the shortfall because much of the data used in its preparation was preliminary and was subsequently revised significantly. For example, petroleum imports (excluding imports for the Strategic Petroleum Reserve) averaged only 8.4 MMB/D during the first quarter of 1979. Additionally, petroleum stock figures for December 1978 and March 1979 used in the estimate were overstated by 17.9 million barrels and 20.7 million barrels, respectively. Our findings concerning DOE's lack of timely and accurate data needed to assess the effects of the shortfall are presented in chapter 4.

The conflicting views on whether there was a world crude oil shortage arise in part from the lack of accurate, complete, consistent, and timely data. The shortcomings can be found in information concerning world oil production, exports, imports, stocks, demand, and consumption. Such information is not easy to acquire in the short term. For example, a shortfall does not simply begin on a certain date, end on a certain date, and remain at a constant level throughout the period. An oil supply-demand balance is difficult to calculate with any precision, depending on evolving events and circumstances. We have nevertheless attempted to acquire complete and current information on how the changing Iranian situation has affected U.S. oil companies and how they have responded to it.

As stated above, we believe that there has been a worldwide tightening of crude oil supplies as a result of the events in Iran. The analysis upon which our conclusions are based and the reasons we disagree with those who contend that there

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1/Petroleum stocks, as defined by DOE, include those stocks held at refineries, in pipelines, and in lease tanks, and do not include those held in the Strategic Petroleum Reserve.

has been no shortfall in available supplies are presented in the following sections and in Chapter 3.

INTERNATIONAL PETROLEUM MARKET

The reduction in available world crude oil supplies, caused primarily by termination of Iranian oil exports, was exacerbated by the oil production and supply trends which preceded it, and by the subsequent reduction in exports from other oil-exporting countries that followed. The shortfall pushed international crude oil and product prices to record high levels.

Shortfall exacerbated by supply trends preceding the Iranian cutoff

Comparison of world oil production levels for 1977, 1978, and 1979 shows that the apparent rise in production between the first quarters of 1978 and 1979 is misleading. During the last 9 months of 1977, oil companies built up Free World oil stocks to record high levels in anticipation of year-end OPEC price increases. Oil stocks rose from 3.4 billion barrels to 4 billion barrels, an increase of 600 million barrels, or 18 percent. At the close of the year, oil stocks were 400 million barrels more than the 3.6-billion barrel level the year before. The expected OPEC price increase did not occur, however, and companies drew down inventories rapidly during the first quarter of 1978. Stocks fell by 500 million barrels to 3.5 billion barrels on March 31, 1978. Because companies were drawing down inventories, Free World oil production in the first quarter of 1978 was abnormally low. Between December 1977 and March 1978, production dropped by 4.5 MMB/D--from 49.3 MMB/D to 44.8 MMB/D. Compared to March 1977, production in March 1978 was down by 3.6 MMB/D. Therefore, we believe it is inappropriate to conclude, merely because of the fact that 1979 production has outpaced the first 3 months of 1978, that there has been no world oil shortage. Other factors, such as the levels of crude oil and product inventories, must also be considered.

Oil companies usually increase their production in OPEC countries in the latter part of the year because of seasonal factors such as winter weather which can delay tanker loadings and unloadings, and in anticipation of year-end OPEC price increases. However, production fell from 31.5 MMB/D in October to about 30.3 MMB/D in December 1978, a decrease of 1.2 MMB/D. Although production during this period remained the same or increased in most OPEC countries other than Iran, it was not enough to offset the interruption in Iranian production.

Production cutbacks by OPEC countries

The shortage was also exacerbated by Government-mandated production cuts by countries other than Iran. Saudi Arabia, which had allowed Aramco 1/ to increase its production to over 10 MMB/D in November and December 1978, ordered Aramco to limit its first quarter 1979 production to a monthly average of 9.5 MMB/D. It subsequently ordered that figure reduced to 8.5 MMB/D beginning in April, although it has permitted an increase to 9.5 MMB/D effective July 1, 1979. In addition, the Saudi's, who normally sell most of their 60-percent share of Aramco's oil production back to the four U.S. companies, reportedly reduced the amount of oil sold to the companies by about 400 MB/D, or 5 percent of Aramco production. Most of this oil is now being sold by the Saudi Arabian national oil company to other governments. This forced the U.S. Aramco companies to further reduce the volumes of oil they have been supplying to their affiliates and third-party customers.

Libya, Indonesia, and Algeria also announced reductions in allowable crude oil exports. Some observers believed that these countries were diverting crude to the spot market to take advantage of the high prices.

Rising crude oil prices

Crude oil prices posted by producer governments as well as those quoted in the spot market are further indication of a shortfall in supplies. In economic terms, supply will always equal demand, but at a price. If available supplies are less than what is demanded, prices will go up until buyers are driven out of the market and supply and demand are again in balance. This economic phenomenon appears to have operated recently in the current crude market, as suggested by the upward spiral of prices. In spite of the high prices, countries have been able to sell all the crude oil they produce.

1/The major oil-producing company in Saudi Arabia. The Saudi Arabian Government owns 60 percent of Aramco's assets and its oil production. Exxon, Texaco, Mobil, and Standard of California share the remaining 40-percent interest in the company.

The following table compares the December 1978 and May 1979 prices of several major OPEC crudes. These are official prices charged for the crude under term contracts. 1/

Crude	Price		Price increase	Percent increase
	Dec. 1978	May 1979		
Arab Light - 34	$12.71	$14.55	$1.84	14
Iran Light - 34	12.81	17.17	4.36	34
Kuwait - 31	12.03	15.80	3.77	31
Iraq Basrah - 35	12.66	16.40	3.74	30
Nigeria Bonny	13.97	18.52	4.55	33
Algeria Saharan	14.10	18.55	4.45	32
Libya Zueitina	13.90	18.30	4.40	32

On June 28, 1979, OPEC announced new price increases effective July 1. Changes include an increase of the Arab Light marker crude oil from $14.55 to $18.00 a barrel, provisions for additional charges by some members, and a maximum allowable ceiling price of $23.50 a barrel. Based on DOE preliminary estimates of the OPEC price increases, the average weighted OPEC price is expected to be about $20 a barrel. This represents a 54-percent increase over the December 1978 weighted average OPEC price of $12.98.

Crude oil price increases in the spot market have been even more dramatic. Prices quoted for crude oil earlier in the year were around $25 a barrel. More recent price quotes are in the range of $30 a barrel or more. Spot market prices for most refined products were also at record high levels.

Under more normal circumstances, it would seem that the high spot prices would attract greater volumes of crude oil. Petroleum Intelligence Weekly, however, has reported different results. It reported that as late as the third quarter of 1978, an estimated 2 to 3 MMB/D moved on the spot market, but that this volume fell to 1 MMB/D as the Iranian crisis hit in late 1978 and early 1979. Volume fell to about 500 MB/D later in the first quarter, and estimates in May indicated that at most 100 to 200 MB/D were being traded daily. Petroleum Intelligence Weekly reported that these volumes had been

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1/Contracts for delivery of crude oil or product over a specified period of time.

reduced as a result of the tight international market. Since there are no organizations which collect and compile data on spot transactions for crude oil, we could not make an analysis to determine the parties selling or buying oil and the volumes being traded.

International Energy Agency analysis and response

The international oil shortfall was monitored by the International Energy Agency (IEA) whose membership includes 20 major oil-consuming countries. It reported that as a result of the turmoil in Iran the international oil market abruptly developed into a situation of overall supply stringency. Oil stock drawdown in the IEA countries during the first quarter 1979 was reportedly 1.3 MMB/D larger than normal--3.3 MMB/D compared to an expected 2 MMB/D. IEA member countries viewed the situation with concern and agreed to reduce their demand for oil on the world market by about 2 MMB/D, or about 5 percent of member countries' consumption, by the end of 1979. Nevertheless, IEA concluded that the supply situation would remain tight through 1979 and into 1980 even if the demand reduction goal was met.

U.S. PETROLEUM MARKET

As a result of the international crude oil shortfall, inventories of crude oil, gasoline, and distillates 1/ have fallen below historical levels. A contributing factor has been an apparent unusual decline in domestic crude oil production during the cutoff.

U.S. petroleum supply trends before the Iranian cutoff

As described previously, events preceding the cutoff exacerbated its effect. Oil companies built stocks to record high levels in 1977. In the United States, stocks of crude oil, gasoline, and distillates on December 31, 1977, were at 848 million barrels, compared to 703 million barrels at the end of 1976, an increase of 21 percent. As a result, companies reduced crude oil imports during the first 5 months of 1978.

1/Home heating oils and diesel fuel.

From the end of December 1977 through the end of May 1978, crude oil, gasoline, and distillate stocks declined by 140 million barrels (from 848 to 708 million barrels) compared to an average decline of 4.2 million barrels during the 2 previous years. In addition to the unusually large inventory drawdown, crude oil and product imports fell from 8.4 MMB/D in December 1977 to 7.2 MMB/D in May 1978, their lowest level since 1976. As noted earlier, since imports were abnormally low early in 1978, we do not believe it is appropriate to compare imports in 1979 with imports in 1978, as some studies have done. Such studies generally concluded there has been no real oil shortage in the United States because imports have been higher in the first quarter of 1979 than in the first quarter of 1978--8.4 MMB/D compared to 8.1 MMB/D.

The decrease in crude oil stocks was particularly significant. They fell from about 340 million barrels at December 31, 1977, to 329 million barrels at May 31, 1978, a decrease of 11 million barrels compared to an average increase of 28 million barrels during the same periods the 2 preceding years. They continued to decline from the end of May through the end of September from 329 million barrels to 321 million barrels, consistent with normal seasonal trends. However, from September 30, 1978, through December 31, 1978, crude oil stocks fell by an additional 11 million barrels instead of increasing as in previous years (an average of 6 million barrels in the three previous years). At the end of 1978, crude oil stocks were 310 million barrels, about 30 million barrels less than at the end of 1977, but higher than at the end of 1975 and 1976. This continued drawdown appears to have been due to high domestic consumption--up 5 percent from the third quarter--and the tight supply situation in the international petroleum market. According to DOE, the crude oil inventories at the end of 1978 were below the projected normal stock range. 1/

Reduced U.S. crude oil and petroleum stocks after the cutoff

The effect of the oil shortfall is reflected in the reduced levels of U.S. petroleum stocks. With the exception of crude oil in 1977, days of supply in inventory for crude oil, gasoline, and distillates are less this year than in any of the 4 previous years. The following table compares the average days of supply available for the period January through April 1979 with the same period during the 4 previous years.

1/As defined by DOE, this projected range is based upon trends and seasonal patterns inherent in Bureau of Mines and DOE monthly data from 1972-78.

Average Number of Days of Supply Available,
First 4 Months of Year

	1975	1976	1977	1978	1979
Crude oil (note a)	23.0	22.3	21.0	24.3	21.2
Gasoline (note b)	38.5	35.7	37.3	37.6	34.0
Distillates (note c)	48.3	41.9	35.0	39.7	32.3

a/Computed by dividing crude oil stocks by refinery runs.
b/Computed by dividing gasoline stocks by gasoline demand.
c/Computed by dividing distillate stocks by distillate demand.

Although the companies' supplies of crude oil were reduced as a result of the loss of Iranian production, they maintained crude oil runs 1/ and the production of gasoline and distillates at historical levels. The following table compares average crude oil runs and gasoline and distillate production during January through April for the years 1975-1979.

Average Crude Oil Runs,
Gasoline and Distillate Production,
First 4 Months of Year

	1975	1976	1977	1978	Average 1975-78	1979
	(MB/D)					
Crude oil runs	12,000	12,700	14,300	14,000	13,300	14,400
Gasoline production	6,200	6,500	6,900	6,700	6,600	6,900
Distillate production	2,600	2,800	3,300	3,000	2,900	3,000

1/The amount of crude oil processed in refineries for the production of gasoline, distillates, and other petroleum products.

The table shows that crude oil runs and production of products during the first 4 months of 1979 have generally exceeded levels during the same period the previous 4 years. Nevertheless, the companies have not been able to make available the quantities of some products, especially gasoline, to meet their customers' demands. As a result, companies have had to allocate gasoline supplies to their retail outlets.

Domestic crude oil production down significantly

Still another factor in reduced U.S. oil supplies has been an apparently unusual drop in domestic production between October and January. Most explanations attribute the decline to inclement weather or operational problems at production sites. Although production normally declines somewhat during this period because winter weather hampers oil field operations, the decline this year appears larger than normal. The following table shows the monthly and total reduction in domestic oil production during the period October 1978 through January 1979.

U.S. Domestic Crude Oil Production

Month	Production	Decline from previous month	Cumulative reduction
	(MB/D)	(MB/D)	(thousand barrels)
Oct. 1978	8,830	-	-
Nov. 1978	8,729	101	3,030
Dec. 1978	8,652	77	5,417
Jan. 1979	8,457	195	11,462

Source: DOE.

Production fell from 8.83 MMB/D in October to 8.46 MMB/D in January 1979, a reduction of 373 MB/D, or 4.2 percent. The average monthly reduction was 124 MB/D. The total loss in oil production during the period was about 11.5 million barrels. As the table shows, the largest monthly decline occurred during January when production fell by almost 200 MB/D. The decline in production this winter appears to have been larger than normal, and higher than it has been in any of the previous four winters, as shown below.

Period	Production (MB/D)	Decrease (MB/D)	Percent decrease
Oct. 1974	8,611		
Jan. 1975	8,455	156	1.8
Oct. 1975	8,324		
Jan. 1976	8,232	92	1.1
Oct. 1976	8,063		
Jan. 1977	7,854	209	2.6
Oct. 1977	8,573		
Jan. 1978	8,347	226	2.6
Oct. 1978	8,830		
Jan. 1979	8,457	373	4.2

Source: DOE.

The decline this winter was almost 150 MB/D greater than the next largest decline, which occurred between October 1977 and January 1978, and about 200 MB/D greater than the average 171 MB/D for the previous four winters.

Another indication of an unusual production drop results from comparing American Petroleum Institute (API) estimates of domestic production with DOE figures. API does not collect actual production data for the month being estimated; instead it estimates production based on historical data and trends. Its methodology, therefore, includes the effect of weather on production during winter months. Because API's estimates include the effects of weather, the large variance shown would seem to be due to unusual circumstances. The following table shows that API's estimates have been significantly higher than DOE's.

Comparison of API Estimates and DOE's Actual Data on Domestic Crude Oil Production

Month	API estimates	DOE actual	Difference
		(MB/D)	
Oct. 1978	8,807	8,830	-23
Nov. 1978	8,803	8,729	74
Dec. 1978	8,841	8,652	189
Jan. 1979	8,699	8,457	242
Average	8,788	8,667	121

As a follow-up to our analysis of the nationwide production figures, we discussed the drop in production in the Gulf of Mexico with the United States Geological Survey and officials from two companies which accounted for almost half of the production drop. Production in the Gulf dropped from 663 MB/D in December to 611 MB/D in February, a 52-MB/D reduction. In the previous year production only decreased by 19 MB/D between December and February. The United States Geological Survey officials said that this past winter's decline was significant and that although they do not monitor production on a field-by-field or operator-by-operator basis, they believed the companies were not intentionally holding down production and that the major cause of the decrease was probably the weather. Based on our discussions with the officials of the two companies, however, we do not believe that weather was the principal cause. Officials of one company told us that the principal reason for their production decrease in the Gulf was the installation of facilities on a production platform. Officials of the other company said that a fire on a production platform was the principal reason for their drop in production. Although these officials' explanations appear plausible, we have no basis for commenting on them since, due to time constraints, we did not document or verify them.

Although we did not do a detailed analysis of the drop in production in the remainder of the United States, we did review the weather data published by the National Oceanic and Atmospheric Administration for the past two winters for the four major oil-producing States, which account for about 77 percent of the lower-48-States oil production. We found that this past winter's average temperatures in three of the States, which account for about 64 percent of the lower-48-States production, were the same or higher than the previous

winter. This past winter's average temperature in the other State, which accounts for 13 percent of production in the lower 48 States, was 4 to 8 degrees Fahrenheit below the previous winter's. Therefore, we believe that the nation-wide drop in production during this past winter, which was almost 150 MB/D greater than the previous winter's, could not be due just to inclement weather.

CHAPTER 3

EFFECTS OF THE SHUTDOWN ON OIL COMPANIES

The Iranian oil shutdown has had varying degrees of impact on the 19 U.S.-based oil companies whose data we reviewed. The extremes ranged from one company that had about 47 percent of its petroleum supplies interrupted, to others which were only marginally affected. Generally the companies which had significant amounts of imports from Iran were more heavily affected. Overall we estimate that the domestic operations of the 19 companies incurred a reduction of about 600 MB/D of crude oil. We found that the crude oil, gasoline, and distillate stocks of the 19 companies were not in excess of normal operating levels, and there was no indication of inventory build-up or hoarding. In fact, most of the companies' stocks on March 31, 1979, were below what they were at the beginning of the year.

Even though our analysis of the data we obtained from the 19 companies showed there had been an impact on the United States from the Iranian oil shortfall, numbers do not tell the entire story. Companies are in business to make a profit and are alert to situations which they can use to their advantage to increase their profits. Such actions can be taken legally. We believe that as a result of, or at about the same time as, the Iranian oil shortfall, situations developed which the oil companies could have used to further tighten supplies and to increase prices and profits. The manner in which the companies allocated crude oil among their U.S. and foreign affiliates, their decisions not to purchase oil on the spot market, and the reduction in domestic production were contributing factors in the tight U.S. petroleum market.

The 600-MB/D reduction for the 19 companies resulted not only from the Iranian situation, but also reduced crude oil supplies from other countries and the multinational oil companies' methods of allocating crude oil among their affiliates. Each of these companies determined what percent of their affiliates' total requirements for crude oil they would be able to supply. Each affiliate then generally received that percent of its total requirements, regardless of its planned source of crude oil. As a result the U.S. affiliates of these companies received 200 MB/D less crude oil than if they had only lost their Iranian oil supplies. If that crude oil had been available to U.S. refiners an additional 90 MB/D of gasoline could have been produced during the first 5 months of 1979.

The larger companies' decision not to purchase crude oil on the spot market also could have tightened U.S. crude oil supplies. The smaller companies generally purchased on the spot market to compensate for reduced crude oil supplies. In March DOE urged the companies to use restraint in purchasing the high-priced oil being sold on the spot market. In chapter 4 we discuss how DOE reversed this position in May.

COMPANIES INCLUDED IN OUR ANALYSIS

We selected 19 of the largest oil companies for our analysis. The six we selected for detailed review and verification are identified in appendix VI. The table below shows their aggregate size and the percentage of the U.S. market the 19 companies represent.

	Aggregate size 1978 (MB/D)	Percent of market
Petroleum imports	6,471	76
U.S. refining capacity	13,153	75
U.S. gasoline sales	6,279	85

POSSIBLE REASONS WHY GASOLINE CUTBACKS EXCEED AMOUNT OF CRUDE OIL IMPORTS FROM IRAN

In our report dated March 5, 1979, entitled, "Analysis of the Energy and Economic Effects of the Iranian Oil Shortfall" (EMD-79-38), we questioned why some oil companies had announced gasoline allocation fractions much different than their imports of Iranian oil. For example, a company may have announced that it was only going to sell 85 percent of its base period gasoline supply even though only 3 percent of its oil supplies came from Iran. The report listed the following possible reasons for such variances:

--Diversion of oil to the spot market where prices are much higher.

--Stockpiling for future price increases.

--Redistribution of oil to other nations more dependent on Iranian oil.

--DOE's allocation and pricing regulations.

In a letter to us dated March 23, 1979, the API offered additional reasons which might account for such variances:

--Oil from other countries often comes to individual companies in the United States as a result of exchanges involving Iranian oil. Consequently, direct imports from Iran are not a useful indication of dependence on Iranian oil.

--The set-aside programs of individual States cause company-announced allocation figures to overstate the resulting reduction in the products made available to final consumers.

--Government requests for a buildup of stocks for the peak demands of summer reduce current product availability--for the logical purpose of increasing future product availability.

--Iranian crude loss has a disproportionate effect on gasoline production.

We analyzed the above reasons based on the data obtained from the 19 companies and other available information on the gasoline allocation process. We found that the gasoline allocation fraction is a very unreliable indicator of a refiner's dependence on Iranian crude oil. Furthermore, the fraction is not even a good indicator of the total amount of gasoline being produced and sold. At most, it reflects the percent of gasoline supplies the refiners have available for non-priority customers 1/ during a given month compared with these customers' purchases in the base period, specified in DOE's regulations.

DOE's allocation and pricing regulations

Contrary to popular belief, the allocation fraction is not based on the total amount of gasoline a refiner expects to have available. From his total available gasoline supplies, the refiner must deduct 3 percent (5 percent from June 1 through September 30, 1979) for the State set-aside program. These State set-asides are available to each State to alleviate temporary shortages by providing gasoline to users who cannot obtain fuel from their traditional suppliers. Prior to August 1, 1979, the refiner also had

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1/For purposes of this report non-priority customers are defined as all customers except priority customers and entities receiving gasoline as part of a State set-aside program. These priority customers and the State set-aside program are discussed in the next paragraphs.

to deduct amounts for (1) priority users who were entitled to receive 100 percent of their current requirements and (2) priority users who were entitled to receive 100 percent of their current requirements, as reduced by the application of an allocation fraction. After these deductions, the refiner's remaining supply is available for distribution to his non-priority customers based upon their base period purchases.

Department of Defense needs and agricultural producers made up the first category of priority users, and the second category of priority users included those listed below.

--Emergency services.

--Energy production.

--Sanitation services.

--Telecommunications.

--Passenger transportation.

--Cargo, freight, and mail hauling by truck.

--Aviation ground support vehicles and equipment.

Effective August 1, 1979, DOE amended the priority users program by merging these priority users into one category whose members are now restricted to 100 percent of their base period purchases. This change will reduce the possibility of these priority users stockpiling gasoline since under the old regulations they were able to purchase up to 100 percent of their current requirements, which could have been purposely inflated.

Although the State set-aside and priority use programs are generally not a factor when supplies are ample, their use increases significantly when supply is tightened. According to DOE there are some indications that the priority status was abused by some priority users who received more fuel than their current needs warranted.

Effective May 1, 1979, base period means the month corresponding to the current month of the period November 1977 through October 1978. Thus, if a refiner supplied 1 million gallons of gasoline to his non-priority customers in July 1978, but in July 1979 expects to be able to supply

only 800,000 gallons, his allocation fraction is 80 percent (800,000 ÷ 1,000,000 = 80 percent). The one exception to this procedure is where a wholesaler or retailer during October 1978 through February 1979 purchased an average of 10 percent or more gasoline beyond that purchased during the applicable base period month. If so, he is permitted to use this increased amount as the basis for his allocation.

The following hypothetical example illustrates the effects of the State set-aside and the priority user programs. In July 1978 a refiner sold 1 million gallons, of which 950,000 went to non-priority customers. In July 1979 he also had 1 million gallons for sale; however, after deducting 5 percent for the State set-aside (50,000 gallons) and 10 percent for priority users (100,000 gallons), he had only 850,000 gallons for sale to his non-priority customers. Therefore, his allocation fraction was 89 percent (850,000 ÷ 950,000) even though he was actually producing and selling the same amount of gasoline as in the previous year. Therefore, although this refiner's sources of supply could be totally independent of Iran, he could have a 89-percent allocation fraction.

DOE's pricing regulations can also affect a refiner's gasoline allocation percentage. Under these regulations a refiner may not charge any purchaser a price for gasoline in excess of the maximum allowable price. The maximum allowable price is made up of the May 15, 1973 base price plus increased product and non-product costs incurred from that date to the current month. If a refiner elects not to charge his maximum allowable price, he can bank these unrecovered costs and, with some limitations, pass them through as part of future price increases. These regulations caused one major oil company to allocate its gasoline sales in December 1978. This company had used all of its banked costs as of September 1978 and therefore could not increase its price to dampen demand for its gasoline which in October and November 1978 was about 12 percent higher than the previous year and 9 percent above the industry average. This increased demand was the result of its price for gasoline being substantially under the marketplace price. Since the company could not use price to dampen demand, it allocated its sales of gasoline from December 1978 through February 1979.

As is evidenced by the preceding discussion, the State set-aside program, priority users, and DOE's pricing regulations are reaons why gasoline allocation fractions are not directly related to the amount of a company's crude oil imports. Our review did not, however, include an analysis of DOE's allocation and pricing regulations and procedures to

determine whether they are effective and equitable. We plan, however, to do an analysis of the allocation procedures as part of a separate assignment which we have recently begun.

Diversion of oil to the spot market

Our analysis showed that of the 16 companies for which we had obtained information on crude oil sales, 14 had 1979 crude oil sales at or below their 1978 average. (Due to our oversight we did not obtain detailed crude oil sales information from three companies.) Their crude oil sales had decreased by 1.1 MMB/D, or about 12 percent below the 1978 average. These reduced sales were the result of the companies' reduced crude oil supplies. Even though we did not determine which, if any, of the 1979 sales were made on the spot market, the overall reduction in sales could have occurred because the companies were looking to preserve their supplies of crude oil.

As for the two companies whose 1979 crude oil sales increased, we discussed this with company officials. One official said that his company, in addition to its domestic refining operations, buys crude oil for resale to other companies. The company has been successful in acquiring some additional crude oil and therefore has had more to sell. The company's ratio of crude oil sales to crude oil acquisitions during the first 5 months of this year was consistent with the fourth quarter 1978 ratio. Also, most of the company's increase in sales had taken place in the United States.

The official of the other company said that his company's average 1979 crude oil sales, although higher than the 1978 average, were less than the average for the last half of 1979. He explained that his company's domestic production of Alaskan North Slope crude oil increased significantly beginning in July 1978 and, as a result, the company was able to increase its crude oil sales. This explanation agrees with our knowledge of the situation.

Redistribution of oil to other countries

Of the 19 companies included in our analysis, the 6 large multinational companies allocated crude supplies to their domestic and foreign affiliates as a result of the Iranian shortfall. We visited four of these companies as part of our verification process. The other 13 companies included in our analysis were not directly affected since they did not have to allocate their crude supplies between domestic and foreign affiliates.

Two of the six companies allocated on the basis of crude supplies from the Persian Gulf and the other four allocated on the basis of their total crude oil supplies as compared to their affiliates' and customers' requirements. Under each method, however, each affiliate's crude supplies, either Persian Gulf or total, were decreased by the same percentage, regardless of the affiliates' original planned source of crude oil. As a result, the amount of an affiliate's reduction could be different from its reliance on Iranian crude. For example, one of the companies determined that its second quarter 1979 crude oil supplies would be 16 percent short of requirements. It applied this 16-percent reduction to each affiliate's estimated crude oil requirements. Its U.S. affiliate's crude oil supplies were decreased by 101 MB/D as a result of the Iranian shortfall, even though it had formerly relied on Iranian crude for only 31 MB/D. The overall effect of the six companies' allocation methods was that their domestic operations' foreign crude oil supplies were reduced by about 480 MB/D although they were only dependent on Iranian crude oil for about 280 MB/D. Therefore, their supplies of foreign crude oil were reduced an additional 200 MB/D below what they would have been had they only lost their Iranian oil supplies. We estimate that, if the 200 MB/D of crude oil had been available to the companies' domestic refiners, an additional 90 MB/D of gasoline could have been produced during the first 5 months of 1979.

Exchanges of crude oil

Exchanges of crude oil prior to importation are a valid reason why Iranian crude oil imports do not reflect a company's total reliance on Iranian crude. For example, although a company may not import Iranian oil into the United States, it may use Iranian oil to acquire other crude oil which it does import. In our sample of 19 companies, 7 identified exchanges as a reason for their supplies of crude oil being reduced by more than the amount of their crude oil imports from Iran.

For example, one of the companies in our sample had been acquiring 25 MB/D of Iranian oil, 12 MB/D of which it exchanged for crude oil more suitable to its refining system. Because of the loss of this Iranian crude, however, the company could no longer make the exchange and thus its refineries were deprived of this source of supply. Based on the data we obtained from these seven companies, we estimate that their crude oil supplies were reduced by a total of about 100 MB/D as a result of not having Iranian crude oil available for exchanges.

Supply of petroleum products

Two of the cited possible reasons for variance between allocation fractions and Iranian imports are similar--stockpiling for future price increases and government requests for stock buildup. Our analysis showed that the oil companies had not built up inventories of gasoline or distillates for either of these reasons. Rather, the inventory levels for these products were lower than normal. Gasoline stocks of the 19 companies at March 31, 1979, were 199 million barrels, 10 million less than the start of the year and 13 million barrels less than a year earlier. As of the same date, distillate stocks of these companies were at 96 million barrels, 84 million barrels less than at the beginning of the year and 25 million barrels less than a year earlier.

In addition to these two reasons for variances, there is another related reason--the disproportionate effect on gasoline production of the loss of Iranian crude oil. We found in our analysis that the Iranian shortfall served to highlight a problem which had already been emerging. The U.S. refineries have had an increasing need for lighter crudes, while the OPEC countries, particularly Saudi Arabia, have begun to require that more of the less desirable, heavier, higher sulfur crude oil be produced. As a result, the world market, and in particular the United States, has found it increasingly difficult to obtain desired amounts of the lighter, low-sulfur crude oils. This situation was exacerbated by the loss of Iranian crude oil, which, although not of the best quality, is generally lighter and sweeter than the crude oils available to replace it. Since the U.S. refining system is generally geared to processing the lighter, sweeter crude oils, a shift to heavier, higher sulfur crude oils results in less gasoline production per barrel of crude oil. 1/ Therefore, even if a refiner were importing the same amount of crude oil, the quality of

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1/In our report "The United States Refining Policy in a Changing World Oil Environment," EMD-79-59, June 2, 1979, we discuss the fact that U.S. refiners will increasingly be forced to process sour crudes in the future and that, as a result, there is a need for U.S. refineries to convert to desulfurization processes. Our observation, therefore, was that, to the extent that capital investment in new refinery capacity is encouraged by U.S. policy, efforts should encourage the development of additional conversion capacity to refine heavy sour crudes as light sweet crudes become less available.

it might be such that he can only produce 98 percent of the gasoline he produced from the same amount of higher quality crude oil.

EFFECT OF THE SHORTFALL ON GASOLINE AND DISTILLATE SUPPLIES

The loss of Iranian oil does not fully explain the gas lines which were evident this summer. Even before this loss of Iranian crude there were indications that our domestic supply of gasoline, particularly unleaded, was beginning to tighten. There were spot shortages of unleaded gasoline in late 1978, and the summer driving season lasted longer than normal, into October and November; usually it tapers off after Labor Day. Nevertheless, reduced oil availability because of the Iranian situation has been the catalyst which focused attention on our domestic supplies and production of gasoline.

Less crude oil available to oil companies

In our March 5, 1979, report on the energy and economic effects of the Iranian oil shortfall, we said that a 500 MB/D reduction in U.S. supplies appeared plausible. Our current analysis of the 19 oil companies generally supports our earlier estimate. The following table compares the results of our earlier analysis and our current review.

Results of Our Analysis of
Iranian Shortfall

	March 5, 1979 report (note a)	Current review (note b)
	(MB/D)	
Reduced petroleum imports from Iran	800	630
Oil companies' crude oil allocation methods	100	200
Reduced supplies from other countries	0	190
Reduced domestic production	0	80
Gross U.S. reduction	900	1,100
Compensating actions (note c)	-400	-500
Net U.S. reduction	500	600

a/Estimates for entire United States.

b/Estimates for 19 oil companies based on comparison of their average crude oil supplies during the first 4 months of 1979 with their average crude oil supplies during 1978.

c/This item represents the difference between the gross and net crude oil supply reductions. In our current reivew we estimated the gross and net reductions based on the data we obtained from the 19 companies and then calculated the amount of the compensating actions. These actions include obtaining increased supplies from other countries, such as Saudi Arabia and Nigeria, and reducing crude oil sales to third parties.

As depicted in the table, our earlier estimates, which were based on our experience and data available at that time, are generally consistent with the results of our current review. The reason for the two significant differences--companies' allocation methods and reduced supplies from other countries--is that time constraints in our earlier analysis prevented us from obtaining oil company data which is necessary to accurately estimate these two items.

Our current estimate of a 600-MB/D net reduction is based on our sample of 19 companies which imported 700 MB/D, or about 90 percent of the 1978 petroleum imports from Iran. Therefore, we estimate that the total U.S. petroleum supply could have been reduced by as much as 700 MB/D.

As depicted in the table and as discussed on page 22, the oil companies' crude oil allocation procedures reduced U.S. supplies by 200 MB/D. Another factor which reduced U.S. crude oil supplies was that countries other than Iran reduced the amount of crude oil available to U.S. companies. The crude oil supplies of four of the companies in our sample were reduced by 190 MB/D as a result of these countries' actions.

Although the overall impact on the 19 companies amounted to reduced crude oil supplies of about 600 MB/D, the degree of impact varied by company. With one exception, the four companies which did not import any Iranian crude and the five companies which imported 10 MB/D or less were minimally affected by the Iranian shutdown. The exception was a company which reduced its refinery runs by 46 MB/D in the first quarter 1979. The reason for this reduction was that its total foreign crude supply was reduced by 40 MB/D more than its dependence on Iranian crude oil. This company was one of the six whose crude allocation procedures we discuss on page 22.

The degree of impact also generally varied by size of the 19 companies. We used refinery capacity and gasoline sales to measure size. Seven of the 19 companies incurred crude oil supply reductions of about 568 MB/D, 95 percent of the overall reduction of 600 MB/D. Six of these companies were in the top half of the 19 companies and accounted for 73 percent of the reduction. Another company, which was in the bottom half of the 19 companies, had relied on Iran for 47 percent of its petroleum supplies. To compensate for these lost supplies it purchased crude oil on the spot market. Its spot market purchases averaged 136 MB/D from November 1978 through February 1979. Of the six companies which purchased crude oil on the spot market to compensate for the loss of other sources of supply, five were in the bottom half of the 19 companies and four of these did not have to reduce refinery runs. In chapter 4 we discuss how DOE reversed its position on whether the oil companies should purchase crude oil on the spot market.

Some studies have concluded that the gasoline shortages are the result of oil companies arbitrarily reducing refinery utilization from about 90 percent in the latter part of 1978 to about 85 percent during 1979. Such studies do not give sufficient consideration to the enormous reduction in crude oil stocks the higher rate of utilization would have caused. In our opinion, refinery utilization rates have gone down because of the oil companies' crude oil supply problems brought about by the Iranian shortfall. If refiners

had continued to operate at the 90-percent level, crude oil stocks would have declined from about 310 million barrels at the end of December 1978 to 217 million barrels at the end of April 1979. At that time, crude oil stocks would have been 99 million barrels below DOE's estimated minimum acceptable level of 316 million barrels.

Lower crude oil inventories

The total crude oil owned by the 19 companies was 391.2 million barrels on March 31, 1979. This included crude oil in transit from foreign countries, in pipelines from ports of entry, and in holding tanks at the refineries. DOE's inventory data on crude oil is on a custody rather than an ownership basis and only includes that which has been landed (imported); therefore, its inventory data on these 19 companies would be significantly lower. In our analysis we used the ownership basis since this method reflects the total amount of crude oil controlled by each of the companies.

The companies' March 31, 1979, crude oil stocks were 11.7 million barrels lower than a year earlier and represented a drawdown of 31.9 million barrels since the beginning of the year. The principal cause of this drawdown was the worldwide tightening of the availability of crude oil. Even though this drawdown was significant, these stocks of 391.2 million barrels at March 31, 1979, were not abnormally low. These stocks were not high enough, however, to permit refinery runs at fourth quarter 1978 levels. For example, we compared each of the companies' latest available crude oil inventory levels for the first 5 months of 1979 with the inventory levels as of September 30, 1978, which for the 19 companies was generally their inventory low point for 1978. Also, according to DOE data, this date has historically been the inventory low point before the fourth quarter stock buildup. This comparison indicated that only about 3.6 million barrels of additional gasoline could have been produced had inventory levels been reduced to those at September 30, 1978. This amount represents only about 50 percent of 1 day's U.S. production.

DOE's data showed that crude oil stocks dropped below the minimum acceptable level 1/ at the end of January (303

1/As defined by DOE, the levels to which stocks fall without disruption of customer deliveries or the creation of spot shortages. The levels are based upon the frequency with which stocks have fallen below normal patterns as determined from Bureau of Mines and DOE actual monthly data from 1972 to 1978 and upon recent analysis of inventory requirements for efficient operation.

million barrels) and that although they increased to 309 million barrels at the end of March, this was still 4 million barrels below minimum. The data we gathered from the 19 companies showed almost a 32 million barrel reduction during the first quarter. Although this appears to contradict DOE's data, it should be noted that DOE's data only includes stocks in the United States. It does not include oil in transit from foreign countries and, as such, only accounts for a portion of the total crude oil stocks owned by the companies. During the first quarter of 1979, the crude oil stocks in the United States increased slightly while the stocks in transit from foreign countries decreased significantly. The volume of the reduction of stocks in transit was large enough not only to offset the slight increase in the stocks in the United States but also to cause a significant overall reduction to the total crude oil stocks owned by the companies.

Gasoline and distillates

Based on our analysis of the data we obtained from the 19 companies and our visits to six of these companies, it appears that the companies' stocks of gasoline and distillates were not in excess of the amounts normally held in inventory. Gasoline stocks at March 31, 1979, were at 199 million barrels, 13 million barrels less than a year earlier and 10 million barrels less than at the start of the year. According to DOE's statistics on stocks at the primary level, 1/ gasoline stocks decreased from 237.9 million barrels at the beginning of 1979 to 231.7 million barrels at the end of June.

Distillate stocks of the 19 companies decreased from 180 million barrels at the beginning of 1979 to 96 million barrels at the end of March, which was 25 million barrels less than a year earlier. DOE statistics show total distillate stocks at the primary level of 142 million barrels at the end of June. DOE has been quite concerned about the level of distillate stocks and has urged refiners to build their stocks over the summer months in order to be prepared for the winter heating season. However, based on public statements by DOE officials, we believe that DOE has not adequately analyzed the impact of increased distillate production on gasoline production, and vice-versa. We discuss this subject more fully in the next chapter.

1/Includes those held at refineries, in pipelines, and at major bulk terminals. Does not include stocks held at the wholesale or retail level.

As shown in the table below, the companies have increased their purchases and sales of gasoline and distillates in the first quarter of 1979 compared to the first quarter of 1978. Distillate production has declined, but gasoline production has increased.

Gasoline and Distillates
Production, Purchases, and Sales

	1st quarter 1978	1st quarter 1979	Change
		(MB/D)	
Gasoline:			
Production	5,744	5,807	+63
Purchases	125	434	+309
Sales	5,726	6,218	+492
Distillates:			
Production	2,727	2,591	-136
Purchases	100	235	+135
Sales	3,638	3,760	+122

Outlook for remainder of 1979

In addition to the concern about the current amount of supplies, the public is interested in what the remainder of 1979 will be like for gasoline and distillate supplies. Eleven of the 19 companies estimate that if the international supply of crude oil remains tight, they will allocate sales of gasoline for the remainder of 1979. Three companies estimated that they would not have to allocate and five companies did not estimate due to uncertainties such as crude oil supply and weather conditions. For distillates, eight of the companies estimated that they will allocate sales for the remainder of the year, six estimated that they would not have to allocate, and five did not estimate due to uncertainties.

We have recently begun two assignments which pertain to gasoline and home heating oil supplies. One is a review of DOE's nationwide gasoline and home heating oil allocation system to determine how effective it is in dealing with supply shortages. The other is a review of the gasoline and home heating oil situation in the Washington, D.C., metropolitan area. We plan to complete these reviews later this year.

CHAPTER 4

DEPARTMENT OF ENERGY ACTIONS TO MONITOR AND DEAL WITH THE CURRENT OIL SUPPLY SITUATION

Energy emergencies are no longer a novelty in the United States. Major examples of such emergencies are the fuel oil and propane shortages in 1972, the 1973-74 Arab oil embargo, the coal strike in 1974, the natural gas shortage during the winter of 1976-77, and the coal strike again in 1977-78. As long as the United States continues to rely on foreign sources for a significant share of its crude oil needs, the Government must be prepared to deal with an oil supply disruption. The Congress recognized this in the Department of Energy Organization Act (42 U.S.C. 7101). One of the act's purposes was to develop plans and programs for dealing with domestic energy production and import shortages. DOE has made little progress toward effectively carrying out this purpose.

DOE's actions to develop information on and deal with the current oil supply shortfall have been ad hoc, fragmented, and not guided by an overall plan to determine the extent of the shortage and the reasons behind it. As a result, Department officials have made contradictory statements and policy positions seem to have been based on inadequate factual and analytical support. DOE has not been able to provide the Congress and the public a credible and convincing explanation for the reduced supplies of gasoline. In the absence of such an explanation, cynicism and suspicion have become widespread, and public confidence in the Government's ability to deal with the situation has been severely eroded.

DOE'S PLANNING FOR ENERGY EMERGENCIES

As in other recent energy emergency situations, DOE was ill-prepared to deal with the shortages arising from the Iranian oil cutoff. Our findings during the current energy shortfall are consistent with the conclusions of two of our previous reports as well as a report issued by the DOE Inspector General. The results of these reports are both illuminating and troublesome. They show the stark reality of our Nation's continued vulnerability to energy disruptions and its failure to deal with them.

A September 1978 report 1/ by the DOE Inspector General concluded that, among other things:

--Energy emergency planning in the Department was inadequate, with deficiencies in preparation for national defense contingencies being cause for special concern.

--Emergency data needs have not been defined, sources have not been fully identified, and detailed processing responsibilities have not been assigned. Likewise, even though the concept of an Emergency Management Information System was outlined in the President's National Energy Plan in April 1977, little progress has been made toward its development and implementation.

As part of its review, the Inspector General's office examined DOE's actual operations during the coal strike of 1977-78. It found that although certain aspects of the operations were handled smoothly, it was basically an ad hoc system, lacking the cohesion and consistency which advance planning would have provided.

The findings of our own review 2/ of DOE actions during the coal strike were similar to those of the Inspector General. We made a series of recommendations to improve the effectiveness of DOE's contingency planning. Among other things, we recommended:

--DOE make sure that a specific plan of action is provided to respond to energy emergencies.

--The development of an energy emergency management information system be given top priority within the Energy Information Administration (EIA).

1/"Emergency Energy Preparedness," Sept. 15, 1978, Department of Energy.

2/"Improved Energy Contingency Planning is Needed to Manage Future Energy Shortages More Effectively," EMD-78-106, Oct. 10, 1978.

--DOE's energy emergency forecasting capability be refined to candidly report current energy impacts and to present a balanced assessment of projected conditions.

Although DOE has taken some actions to develop an energy emergency management information system, it has done little to implement the other two recommendations.

In a February 13, 1979, letter to the chairmen of the energy-related committees and subcommittees, we expressed our concern that DOE still had not developed the emergency energy conservation and gasoline rationing plans which the Energy Policy and Conservation Act (42 U.S.C. 6261) required to be submitted to the Congress by June 1976. DOE finally submitted these plans in March 1979. The stand-by gasoline rationing plan was not approved and only one part of the conservation plan was passed. Subsequently, in July the Congress began consideration of a modified bill authorizing a standby gasoline rationing plan, but had not taken final action prior to its August recess.

DOE has used a consultant and a special inquiry to the oil companies to obtain needed information in an attempt to better respond to the Iranian situation. In our opinion, these efforts have been only reactions to the shortfall, and should not be used as substitutes for a well-prepared, comprehensive plan for dealing with energy shortages. We believe such efforts are indicative of DOE's lack of a systematic approach to identifying the types and sources of information which it needs during U.S. energy emergencies.

INADEQUATE EMERGENCY ENERGY DATA

EIA was established within DOE to collect, analyze, and disseminate energy data and information upon which policy decisions were to be based. The Congress intended EIA to be a credible and unbiased source of energy data. EIA has not been effective in providing timely, accurate, and complete energy data and analyses during the Iranian situation.

EIA collects an extensive amount of energy data from the oil companies. However, the data is collected on a monthly basis and several weeks may elapse between the reporting month and when the data is received, compiled, published, and distributed. Significant changes in items such as petroleum imports, refinery operating levels, and petroleum stock levels can occur during a month and DOE

did not know precisely what the changes were until several weeks into the next month. As a result DOE did not have the most current and precise data available on the impact of the Iranian situation on U.S. petroleum supplies. Furthermore, because EIA had no standby system for collecting the data on a more frequent basis, DOE relied on weekly statistics published by API, a trade association of the major U.S. oil companies.

DOE has recently implemented a system for collecting data from the companies on a weekly basis. An EIA official said that the system has not yet been sufficiently tested and "debugged" to permit the use of the data and that EIA would continue to use the API data until it has insured the validity of its new system.

API collects its weekly data from those companies which choose to report to it and makes projections for the industry. These reporting companies account for about 90 percent of petroleum stocks. EIA's data, however, represents complete coverage of the companies. We noted that there could be considerable differences between the API and the EIA data when the latter becomes available. For example, DOE, based on API statistics, reported that crude oil stocks at the end of March 1979 were 320.7 million barrels. Subsequently, based on EIA data, this figure was revised downward to 308.7 million barrels. As another example, DOE, again based on API statistics, reported that domestic oil production in January and February was about 8,699 MB/D and 8,591 MB/D, respectively. Later, based on EIA data, these figures were revised to 8,346 and 8,286 MB/D, and then to about 8,457 and 8,498 MB/D, respectively.

These large differences are significant because production and stock data are used to calculate the U.S. petroleum status. Inaccuracies and inconsistencies distort this status and may lead to the adoption of inappropriate policy positions. As discussed on page 5, DOE's estimate of the U.S. petroleum shortfall is unreliable because of the inaccurate data used in its preparation.

EIA does not have sufficient information on two items--petroleum demand and petroleum stocks held at secondary levels 1/--that are important to assessing the extent and

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1/Stocks held by wholesalers, distributors, and retailers.

causes of the current shortages. Demand as reported by DOE for gasoline, diesel fuel, home heating oil and other petroleum products is not true consumer demand. Product demand is defined by DOE as output from refineries plus or minus changes in stock levels. This means that during a gasoline shortage, demand for gasoline may appear to decrease, not because consumers are demanding less but because refiners are producing less. Thus, the anomolous situation can develop in which there are long gasoline lines, yet DOE reports a drop in gasoline demand.

We believe that a system for better identifying demand on a national and regional basis is necessary in order for DOE to determine the real extent of supply shortages and to take appropriate measures to deal with them. Data on a regional basis is needed since the impact of a supply shortage will not necessarily be the same for all regions of the country. For example, in our report dated March 5, 1979, entitled, "Analysis of the Energy and Economic Effects of the Iranian Oil Shortfall" (EMD-79-38), we discussed how the East Coast might lose a substantially greater percent of refined products than the other regions of the country. DOE should, therefore, know what the demand for products in each region is so that it can assess the impact of the supply reduction.

DOE collects extensive data on the supply of oil from the time it is produced or imported until it is refined and products are turned out of the refinery. Refiners sell about 45 percent of their gasoline to middlemen--wholesalers, jobbers, distributors--who in turn sell it to retailers or consumers. DOE collects virtually no information on product stocks held by middlemen, yet there is considerable potential for hoarding of supplies at this level. Such action can significantly and immediately reduce supplies available to consumers.

INCONSISTENT DOE STATEMENTS AND POLICIES

DOE statements and policies regarding the oil shortage have been inconsistent and contradictory and have eroded public confidence in DOE's ability to manage energy matters. We believe that these problems stem from the lack of emergency preparedness, and from the inadequate energy data and information described in the preceding sections. The following are two examples of the inconsistent statements and policies.

Oil company purchases of spot market crude oil

According to DOE officials, IEA and the administration, in support of the objective of reducing pressures for permanent world oil price increases, urged U.S. refiners in March to use restraint in purchasing the high-priced oil that was being sold on the spot market. A DOE official was aware, however, that at least two other IEA member countries were vigorously pursuing spot market oil purchases.

In view of the world oil market conditions in May, however, DOE reversed its position and indicated that some companies might need to make spot market purchases to increase refinery runs to more desirable levels. DOE officials told us that these were official DOE positions, but could not provide us with analysis to support them.

Distillate production versus gasoline production

On May 17, the Deputy Secretary testified before the Subcommittee on Energy, House Small Business Committee, that DOE was concerned about the low level of distillate stocks. Stocks were at 120 million barrels and needed to be in the range of 230-240 million barrels by October 1. He said that rebuilding distillate stocks might require some reductions in gasoline output below otherwise desirable levels, but that human needs must be met even if inconvenience to motorists resulted.

Four days later on May 21, the Deputy Secretary testified before the Senate Committee on Energy and Natural Resources. He said that in view of the failure of U.S. consumers to restrain their demand for gasoline, refiners should help ease the immediate shortage by increasing the rate of use of available crude oil and gasoline stocks to provide time for the States to implement measures to restrain demand and help reduce long lines at gasoline stations.

In our opinion, there is a basic contradiction between having adequate stocks of crude oil and distillates available during the winter and drawing down crude oil stocks to produce more gasoline during the summer, especially since there is no guarantee that State demand restraint programs will be successful or that adequate supplies of crude oil will be available for the remainder of the year.

CHAPTER 5

CONCLUSIONS, OBSERVATIONS, AND RECOMMENDATIONS

There has been considerable debate about the amount of the world and U.S. crude oil shortfall caused by the Iranian shutdown. Based on the data we obtained from 19 U.S. oil companies and other available information, we concluded that the Iranian shutdown caused a tightening of world crude oil supplies and reduced U.S. petroleum supplies of from 600 to 700 MB/D during the first 4 months of 1979. An unusual decrease in domestic production contributed to this reduction in January.

Events pointing to a tightening of world crude oil supplies were:

--The reduction of OPEC crude oil production from 31.5 MMB/D in October 1978 to 30.3 MMB/D in December 1978.

--A larger than normal world-wide crude oil stock drawdown during the first quarter 1979, 3.3 MMB/D compared to an expected 2 MMB/D.

--OPEC crude oil prices which rose from a weighted average of $12.98 a barrel in December 1978 to $20 a barrel in July 1979.

The shortage of crude oil in the U.S. market during the first 4 months of 1979 was caused by both reduced foreign and domestic supplies of crude oil. We found no evidence that the 19 oil companies' stocks of crude oil, gasoline, and distillates were in excess of normal operating levels. These companies' reduced crude oil supplies contributed to them not increasing the amount they could process into gasoline, distillates, and other petroleum products.

Even though our analysis of the data we obtained from the 19 companies showed there had been an impact on the United States from the Iranian oil shortfall, numbers do not tell the entire story. Companies are in business to make a profit and are alert to situations which they can use to their advantage to increase their profits. Such actions can be taken legally. We believe that as a result of, or at about the same time as, the Iranian oil shortfall the following situations developed which the oil companies could have used to further tighten supplies and to increase prices and profits. The manner in which the companies allocated

crude oil among their U.S. and foreign affiliates, their decisions not to purchase oil on the spot market (in March DOE urged them not to, but then reversed its position in May), and the reduction in domestic production were contributing factors in the tight U.S. petroleum market. Although we realize that the companies could have passed through to customers the high cost of the spot market crude oil, we believe they could not have increased their profits as much as they could have as a result of the further tightening of supplies. Tight supplies give the companies the opportunity to increase their prices and profits through the use of their banked costs. These costs, accumulated during periods when market conditions would not permit full recovery of allowable costs, can be much more easily factored into price when supply tightens and demand remains constant or increases. We believe that purchases of high-priced spot market crude oil do not afford the companies the same opportunity to increase profits.

Each of the three situations discussed above resulted in a tightening of U.S. crude oil supplies. The oil companies' crude oil allocation procedures resulted in the U.S. receiving 200 MB/D less crude oil than if it had only lost its Iranian oil supplies. Decreased domestic production accounted for a 200 MB/D reduction below normal trends from October 1978 to January 1979. The larger companies decision to not purchase crude oil on the spot market also could have tightened U.S. crude oil supplies. The smaller companies generally purchased on the spot market to compensate for reduced crude oil supplies.

Although we did not review any of the companies' pricing procedures, we believe the tightening of supply resulting from the above three situations provided more of an opportunity to increase prices and profits than just the Iranian oil shortfall and the resulting increased prices of foreign crude oil.

The larger companies are generally less affected by a tightening of supply since they have sufficient resources to bear the impact and do not have to be as concerned about maintaining market shares as the smaller companies. The smaller companies, however, are not as well-equipped to deal with such a situation and have to concentrate on maintaining market shares. Therefore, they take whatever actions necessary to compensate for reduced supplies. The differences in the larger and the smaller companies' approaches to the Iranian situation are reflected in the data we collected on the 19 oil companies. For example:

--Seven of the companies accounted for 95 percent of the U.S. crude oil reduction; six of these were in the top half of the 19 companies and accounted for 73 percent of the reduction.

--Five of the six companies which purchased crude oil on the spot market to compensate for reduced supplies were in the bottom half of the companies.

Although energy emergencies are no longer a novelty and DOE has the responsibility for planning for and dealing with energy shortages, DOE has made little progress in effectively carrying out this responsibility. Its actions and pronouncements about the Iranian situation were fragmented and, at times, contradictory. As a result, DOE has not provided the Congress and the public with credible, convincing explanations for the reduced supplies of gasoline and diesel fuel and the status of home heating oil supplies.

DOE's ability to respond to energy shortages is hampered by the lack of timely, accurate, and complete energy data. Most of DOE's current energy data is labeled "estimate," is based on API data, and is subject to revision 2 or 3 months after the fact. In addition, DOE has virtually no information on petroleum products held by middlemen (wholesalers) and retailers, and does not know what consumer demand for petroleum products is. As a result, DOE management does not have the data necessary to thoroughly analyze a situation such as the effects of the Iranian oil shortfall and to decide on feasible, consistent policy options.

RECOMMENDATIONS TO THE SECRETARY OF ENERGY

The current situation is similar to those discussed in our October 10, 1978, report on DOE's energy contingency planning to manage energy shortages. In that report we made several recommendations to improve the effectiveness of DOE's contingency planning. Although DOE has taken some actions to implement some of these recommendations, much remains to be done. The Department has done little to create a specific plan of action for responding to energy emergencies. Based on those recommendations and the results

of our current review, we recommend that the Secretary of Energy develop:

--A comprehensive plan for dealing with energy shortages such as the Iranian situation. This plan should include, as much as possible, the specific actions, or options to be considered, to monitor and respond to the shortage so that ad hoc reactions are kept to a minimum.

--A system for better identifying demand and consumption of petroleum products on a national and regional basis in order to be able to determine the extent of supply shortages.

--A reliable system for gathering, verifying, and publishing accurate and complete energy data in a timely manner. This system should include information not only on refinery stocks and operations, but also on the stocks at the middleman level--wholesalers, jobbers, and distributors.

United States Senate

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

March 8, 1979

Honorable Elmer B. Staats
Comptroller General of the United States
General Accounting Office
441 G Street
Washington, D. C. 20548

Dear Mr. Staats:

Thank you for your March 5 letter containing GAO's initial analysis of the energy and economic effects of the Iranian oil situation which I requested last month. It is an excellent piece of work.

It would be extremely valuable to this Committee, and to the Congress generally, if GAO would continue to examine the international oil price and supply situation. I believe it is particularly important for you to analyze, in greater depth, the apparent discrepancy between the size of refined product cutbacks which one would expect from the Iranian shortfall and the considerably larger gasoline allocation reductions being announced by a number of major oil companies in the United States. As your report indicates, this could be caused by a number of factors such as redistribution of crude to other nations, stockpiling for future price increases, selling on the spot market for higher profits or market distortions caused by DOE price and allocation controls.

A determination of the facts is essential to implementation of any conservation measures. Nothing makes real conservation harder to achieve than cynicism from suspicions of price gouging. I assume that any in depth analysis will

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require exercise of GAO's special investigatory power under Title V of the Energy Policy and Conservation Act.

I would also appreciate more detailed analyses of those actions which the Federal government could take to carry out an effective program of demand restraint and increased domestic energy supply.

Your expeditious response would be greatly appreciated.

Sincerely yours,

Henry M. Jackson
Chairman

HMJ/mhf

APPENDIX II

United States Senate

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

7 May 1979

Mr. Elmer B. Staats
General Accounting Office
Comptroller General of the United States
441 G Street NW
Washington, D.C. 20548

Dear Mr. Staats,

The effects of the Iranian crude shutoff on crude and product availability in the United States have been unclear. Department of Energy officials originally claimed that the U.S. would experience upwards of a 500 million barrel per day shortfall. By late March those estimates had been revised. Instead of a shortage, there actually was an oil production increase for the first two months of 1979.

Yet, despite revisions that indicate that more oil than usual is available to us, in the last three weeks we have all seen the beginnings of gasoline shortages. Nationwide, gasoline stations are closing on Sundays. In California, the severity of the shortage has led Governor Brown to institute an allocation plan based on odd-even numbered license plates.

Our concern is that the shortage the nation is now experiencing is not the result of a genuine shortfall in crude or refining capacity. It is our suspicion that once again the American people are being manipulated by oil companies, that the shortage is contrived, not real, and that the purpose is to justify the higher prices that have spiraled relentlessly upward since January.

Accordingly, we are writing to request that GAO investigate the circumstances affecting the availability of gasoline and the justification of the price increases that have occurred. Specifically, we request information on the effects on gasoline production of the Iranian situation, stock levels of distillates, gasoline, crude

APPENDIX II

and consumer demand for each, figures on refinery capacity, the number of refineries shutdown, a comparison between the number shutdown and the usual amount of refinery shutdowns, and the reasons they are not operating.

As you know both Houses of Congress are seriously considering the efforts of some of us to continue controls on crude oil prices beyond 1 June 1979. It is hoped that the issue may be brought to a vote in the Senate before we recess for Memorial Day. Given the connection between gasoline shortage and the need to increase production, your findings on whether the current shortage is real or contrived takes on considerable importance. We therefore request that this study be done as expeditiously as possible so that the Congress may benefit from your work in its decision on decontrol.

Sincerely,

Howard M. Metzenbaum
United States Senator

Anthony T. Moffett
Member of Congress

APPENDIX III

WILLIAM V. ROTH, JR.
DELAWARE

3215 DIRKSEN SENATE OFFICE BUILDING
TELEPHONE: 202-224-2441

United States Senate

WASHINGTON, D.C. 20510

COMMITTEES:
FINANCE
GOVERNMENTAL AFFAIRS
JOINT ECONOMIC COMMITTEE

May 9, 1979

Hon. Elmer B. Staats
Comptroller General
General Accounting Office
441 G Street, N.W.
Washington, D.C. 20548

Dear Mr. Staats:

The American public seriously questions whether there really is a current gasoline shortage - or whether "artificial" forces are at work behind the scenes. There is a serious and immediate need for the facts to be made public by a 'neutral' body. A shortage of confidence in our national energy policy is as serious as a shortage of oil supply.

Continuing shortages of gasoline across the country have heightened the concern of all Americans over the amount of gasoline which will be available.

I share this concern. It is important the American people support and have confidence in a national energy policy. They need a clear, objective understanding of the facts, whatever they may be.

I am therefore requesting the General Accounting Office to analyze and review the availability and allocation of gasoline and distillate fuel oil.

Because of the urgency of the situation, your analysis should be available within 30 days of the date of this letter. The possible implementation of the Administration's rationing plan make your data all the more timely.

In particular, I would ask you review the data and underlying assumptions contained in the April, 1979 U.S. Departmtne of Energy "Response Plan: Reducing U.S. Impact on the World Oil Market" on which current policies for gasoline and distillate fuel oil allocation are based.

There are several questions I would like answered about the current gasoline shortages.

1. Does the world oil production situation, now that Iran has resumed oil exports, factually support the continued U.S. commitment to reduce petroleum consumption by 700,000 to 1 million barrels per day by the end of 1979?
2. If the U.S. oil shortage brought about by the reduced Iran oil production is 3%, what are the causes for actions by oil companies and DOE to reduce gasoline supplies across the country an average of 20%?
3. Does the reduction in U.S. oil imports factually support the reduction by oil companies in refinery output, which dropped from 91% last December to 88% in January, 1979, 84.5% in February, 1979, and 83.5% in March, 1979?
4. What are the causes of the current reductions in gasoline production by oil refiners and in gasoline stocks? How do the current levels of gasoline production and gasoline inventories compare to historic normal levels? To projected levels of monthly demand through December, 1979?
5. What are the current regional disparities in gasoline allocations across the country? What are they caused by? Based on currently available data, where are gasoline shortages expected to be most acute between May 1, 1979 and November 1, 1979?
6. How do current levels of distillate fuel oil stocks and production compare to historic normal levels? To projected levels of monthly demand through December, 1979?

APPENDIX III

7. DOE has requested oil refiners establish individual distillate stock level targets for October 1, 1979, to reach a total distillate primary stock level of 240 million barrels. Are these targets consistent with historic normal and safe levels and projected demand for distillate fuel oil stocks and production? How will these targets affect the availablility of gasoline across the country for the rest of this year? How much will gasoline production and available supplies have to be reduced in order to achieve these targets?

Thank you for your expedited consideration of this serious request.

Sincerely

William Proxmire

William V. Roth, Jr.

WVR:ms

APPENDIX IV

COMMITTEE ON SCIENCE AND TECHNOLOGY
U.S. HOUSE OF REPRESENTATIVES
SUITE 2321 RAYBURN HOUSE OFFICE BUILDING
WASHINGTON, D.C. 20515

June 6, 1979

Honorable Elmer B. Staats
Comptroller General of the
United States
General Accounting Office
Washington, D.C. 20548

Dear Mr. Staats:

As a California Congressman I am deeply concerned about the recent energy shortages in my home state and across the country. My constituents, the general public, most of all my colleagues and I, myself, question whether or not we are getting the true facts concerning the energy shortage.

I am aware that your office is analyzing the impact of the Iranian oil shortfall on the United States' supply of petroleum products. I wish to lend my support to this effort and accordingly ask that you add my name to the list of Congressmen who have requested this analysis.

In addition to my interest in the overall energy shortage, I am specifically interested in obtaining answers to the following questions:

1. Does the present situation where the oil companies have vertical control of the oil industry increase the possibility of abuses within the petroleum distribution and reserve systems? If so, does this cause distortion in the price of gas and oil? Can and should this system be adjusted?

2. Is the Department of Energy's system of verification of statistics sufficient? Is a better verification system needed?

3. Is the Department of Energy's allocations system sufficient to handle the many variables in each region of the nation? Does it answer the specific problems of the areas involved? For example, in Southern California there is no mass transit system and it does not appear that there could be one in the near future. Does the allocation system take this into consideration? Are changes needed?

APPENDIX IV

4. Is there a policy favoring small refineries at the Department of Energy? Does this policy help certain areas of the country, and hurt others such as California?

5. Are the oil companies slowing the growth of refining capabilities? Is the residual oil clogging up the system? Are refineries operating below their capacity levels? If so, why? Is there anything the Department of Energy should or could be doing to improve this particular situation? Is corrective legislation needed?

6. Are the laws of the State of California or any other West Coast State seriously restricting refining capabilities?

7. California reports a decrease in the number of service stations. Is the gas that would have gone to these stations staying in the state or is it being transported elsewhere?

I understand that your report on the effects of the Iranian oil shortfall will be issued in mid-July. After its issuance, I propose that our staffs meet to discuss how the findings of your report satisfy my specific concerns and what further analysis, if any, would be required.

Sincerely,

JIM LLOYD, Chairman
Subcommittee on Investigations
and Oversight

JL:Ssh

July 23, 1979

Honorable Elmer B. Staats
Comptroller General
General Accounting Office
Washington, D.C. 20548

Dear Mr. Staats:

In a March 5 report the General Accounting Office concluded that Iranian oil supply disruptions can account for only about a three percent shortfall in supplies for the United States. Department of Energy figures show that foreign oil imports are up every month this year over last year, and that consumption (or U.S. demand for oil) is down, with the exception of January, every month this year over the same month last year.

At the same time, domestic oil production crossed from above to below last year's levels during the month of March -- about the time when President Carter announced his plan to phase in oil price decontrol, starting in June.

I have been receiving conflicting information from the Department of Energy about the causes of present oil shortages, and accordingly would appreciate GAO's reviewing the present oil shortage and attempting to answer the following questions:

1. Did U.S. oil companies draw down on crude and refined product stocks in 1978?

   a. If so, was this done to firm up the oil market, thereby increasing prices and profits?

   b. To what extent, if any, was such draw down in stocks responsible for this summer's shortages of diesel, gasoline and other products?

   c. What power does the Department of Energy have to ensure that oil companies keep adequate crude and refined stocks on hand to meet seasonal and other tight supply/demand situations?

   d. Did the Department of Energy foresee supply problems and do all that was possible to ensure adequate stocks for this year's needs?

2. Have oil companies increased stocks of crude and refined product this spring?

   a. If so, are these increases above normal levels?

   b. What impact on oil company profits, if any, will there be from withholding crude and refined product from the market as prices are increasing? Is there evidence that oil stocks were increased this spring in order to increase profits by selling the oil after prices have risen?

   c. To what extent, if any, is such increase in stock this spring responsible for this summer's shortages?

   d. As in question one, please describe DOE's authority and effectiveness in utilizing its authority to ensure that oil companies do not "hoard" oil waiting for higher prices.

3. Is the decrease in domestic oil product from above last year's levels in January and February to below last year's levels by April explainable by normal production trends?

   a. To what extent, if any, would domestic producers gain by holding oil in the ground as decontrol is phased in?

   b. Is there any evidence that President Carter's April 5 decontrol announcement, or "leaks" preceding it, influenced domestic producers to decrease production?

   c. What authority does DOE have to monitor and control domestic production levels? How effective has DOE been in using this authority?

Thank you for your assistance. I would appreciate your keeping the origin of this request and the report itself confidential through the standard 30 days following completion and delivery of the report to me.

Sincerely,

Max Baucus, Chairman
Subcommittee on Limitations of
Contracted and Delegated
Authority

LISTING OF 19 OIL COMPANIES INCLUDED IN OUR ANALYSIS OF THE EFFECTS OF THE IRANIAN OIL SHORTFALL

Amerada Hess Corporation

Ashland Oil, Inc.

Atlantic Richfield Company

Champlin Petroleum Company

Cities Service Company 1/

Coastal States Gas Corporation

Continental Oil Company

Exxon Corporation

Gulf Oil Corporation 1/

Marathon Oil Company

Mobil Oil Corporation 1/

Phillips Petroleum Company

Shell Oil Company 1/

Standard Oil Company of California

Standard Oil Company (Indiana) 1/

Standard Oil Company (Ohio)

Sun Petroleum Products Company

Texaco, Inc. 1/

Union Oil Company of California

1/These are the companies we visited in order to verify the accuracy of the information they provided to us.

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