Short-Term U.S. Petroleum Outlook

A Reappraisal

National Petroleum Council
February 26, 1974

National Petroleum Council

(Established by the Secretary of the Interior)

February 26, 1974

My dear Mr. Secretary:

On November 15, 1973, the National Petroleum Council's Committee on Emergency Preparedness submitted to you, in response to your request, an initial appraisal of the impact of Arab oil embargo upon the U.S. energy supply/demand posture. There have been a number of significant developments in the three months that have elapsed since that time. The Committee has reviewed its initial assessment, taking into account these factors and projecting the outlook, given a continuation of the embargo, through the second quarter of this year. I am pleased to transmit to you herewith this reappraisal in the hope that this information will be of assistance to government, industry and the general public during this difficult period.

Because of the focus of national attention on the energy crisis, the need for information with respect to its depth and magnitude, and the frequent misunderstandings that have arisen due to the complexities inherent in this situation, I would like to submit for your consideration, by way of preface, the following observations:

A. Energy Use Curtailment

It is imperative for policy makers to distinguish between actions which effectively reduce end-use demand for energy and those measures which shift available energy supplies from one end-use or geographical area to another. Voluntary reductions in energy use include lowering room temperatures, conserving electricity, car pooling, Sunday closing, etc. The public has responded reasonably well to appeals for voluntary restraint of fuel consumption, and this action has made a notable contribution to reducing the magnitude and thus the impact of the shortfall in energy supplies. Mandatory restraints on consumption include lower speed limits, and allocation or rationing of fuels.

While the present product allocation systems have some effect on reduction of fuel consumption, they also alter normal channels of distribution. Results to date have not been entirely satisfactory and allocation procedures have contributed to regional inequalities of energy supplies. Future energy policy administration should focus primary attention on actions which effectively reduce the end-use demand for fuel products and minimize needless interference with established energy distribution systems.

The role of product prices as a means of rationally restraining and allocating market demand must also be fully appreciated in energy policy determination. Though the ability of consumers to make large immediate adjustments in energy use in response to higher prices is very limited, longer term options are much greater. Thus, a new level of equilibrium prices for energy is essential as a stimulus for necessary actions by consumers as well as suppliers to restore a workable balance of supplies with requirements for energy in the long run.

It should also be emphasized that effective energy conservation measures depend upon public understanding that energy supplies will be limited for a long period of time and that all forms of energy will be much costlier in the future than they have in the past. Though it seems conceivable that energy could be in surplus supply sometime in the future and available at lower than present costs, this is a very remote possibility. Public awareness of this outlook is the key to willingness to purchase smaller cars, better insulated homes, more efficient appliances and equipment, etc. Accordingly, public cooperation is necessary in order for conservation efforts to be truly effective and is likely to be obtained only after the public is made aware that the energy problem is a long-term problem.

B. Energy Supplies

Though there are obvious limits to our ability to increase energy production in the immediate future, it is imperative that every effort be made to increase domestic supplies rapidly within our technical capability. This objective requires increased energy exploration and development activities, research, and the maintenance of economic incentives which permit production from high cost areas and eliminates uncertainties resulting from changes in regulations affecting energy industries.

The impact of an atmosphere of uncertainty as to policy and economics upon the willingness to make adequate investments to increase energy supplies is often not fully appreciated. Present laws providing for mandatory allocation of crude oil and refined products, for example, make it extremely difficult to justify investments in refinery construction or modernization, expansion of storage facilities and related activities. Prior to the current crisis, a large number of refinery projects were announced, but actual construction is proceeding at a slower pace than anticipated. Current uncertainties regarding control over proprietary crude oil sources and the market disposition of additional refined products manufactured appear to be partially responsible for this slowdown. It is probable that many firms will defer construction until they are assured of access to raw materials and a clarification of the market disposition of their products.

Rather than reducing market uncertainties, government policies appear to be gravitating toward greater disruption of normal commercial operations. Efforts to equalize the cost of heating oil at the wholesale level, for example, would eliminate incentive to invest in facilities to reduce refining costs.

Present crude oil and product allocation programs, in fact, not only tend to hamper investment in refining facilities, but also tend to result in less efficient utilization of existing refining capacity. If national refinery yields were mandated, further deterioration in refinery operating efficiency would certainly occur.

Not just refinery construction, but the full range of investments in energy related activities is affected by uncertainties as to future allowable market prices and the disposition of raw material and finished fuel products. A great many projects for recovering additional oil from existing fields (e.g., secondary or tertiary oil recovery projects, in-fill wells, workovers, stripper wells, etc.) have now become economic with the recent higher crude prices. The economics of LPG recovery in the field and in refineries is also highly dependent upon market price assumptions. However, market uncertainties tend to result in deferrals of such projects because optimum facilities design is contingent upon specific price and cost conditions. Thus, an important prerequisite to the attainment of a satisfactory rate of capital investment in the petroleum industry is the adoption of constant and consistent energy policies which permit sound long-term facilities planning.

C. Inventory Policies

Though the enclosed report discusses the addition to energy supplies that might result from an accelerated drawdown of primary petroleum inventories, it is not at all certain that it would be in the national interest to follow this course of action. These inventories at present levels provide us with a modest cushion against unforeseeable but potential additional reductions in energy supplies or greater than expected requirements. A renewal of hostilities in the Middle East or other political events which could threaten our supplies from that part of the world is an ever present possibility. Moreover, there is no assurance that we will continue to receive current import volumes from traditional Western Hemisphere suppliers. Weather is another ever-present potential threat to the adequacy of energy supplies. We certainly should not count on the warmer-than-normal winter temperatures in both the U.S. and Europe again next year that we are enjoying during this heating season. Finally, there is no guarantee that voluntary fuel conservation efforts will be as effective during the summer as during the winter. The public may be more reluctant to give up air conditioning than heating or to forego normal summer time use of automobiles. In short, rational U.S. energy policies might well dictate the maintenance of more than a bare minimum working level of inventories.

D. Achieving Relative Self-Sufficiency in Energy

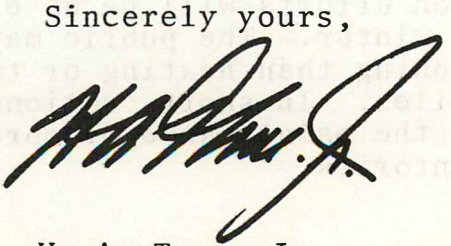
The overriding national energy policy objective must be a full commitment to restoring a high degree of energy self-sufficiency. Attainable long-range energy supply goals and end-use curtailment targets must be clearly specified, and action must be initiated immediately to meet objectives. Our short-term supply problems are, of course, serious and politically sensitive. But we should not adopt short-term energy policies that are inconsistent with the necessity of attaining longer-term national self-sufficiency at acceptable costs.

Though the magnitude of the task of meeting our expanding future energy requirements is awesome, the U.S. energy industries are capable of satisfactorily providing our fuel needs if given sufficient latitude to respond to the challenge. As a nation we have a sufficient resource base, the technical skills, and the ability to finance the level of effort required. However, exploration for conventional hydrocarbons, construction of synthetic fuel plants, the building of additional refining and mining capacity, as well as other developmental projects of the energy industries, will not proceed at a sufficient rate unless energy prices cover prospective costs, and operations are not unduly restricted by rigidly applied allocation procedures or other rules that distort normal operating procedures. In order to achieve relative self-sufficiency in energy it is imperative that we move as quickly as possible to free-market determination of resource allocation and investment decisions. It is impossible to provide our energy requirements over the longer term under a short-term system of artificially imposed restrictions.

In conclusion, may I reiterate some of the observations contained in the Council's 1972 report on the U.S. Energy Outlook.

Positive policies and programs for increasing domestic energy supplies in the near and long-term future are being delayed. These include action items relating to increased exploration and drilling activities; access to previously leased lands subsequently withdrawn from production; leasing of new potential petroleum provinces in the public domain; the need for faster refinery and nuclear power plant sitings; relaxation of natural gas price regulations; workable environmental standards to permit greater utilization of coal, and establishment of adequate economic incentives for all fuels in a stable price and taxation climate. These remain matters of utmost urgency in order to develop our national energy resources.

Sincerely yours,



Honorable Rogers C. B. Morton
Secretary of the Interior
Washington, D.C.

H. A. True, Jr.
Chairman

SHORT-TERM U.S. PETROLEUM OUTLOOK
A REAPPRAISAL

National Petroleum Council
February 26, 1974

A Reappraisal of
Emergency Preparedness for
Interruption of Petroleum Imports
Into the United States:
A Supplemental Interim Report
Published November 15, 1973

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INTRODUCTION AND SUMMARY

The National Petroleum Council's Committee on Emergency Preparedness, on November 15, 1973, submitted to the Secretary of the Interior a report giving its initial appraisal of the impact of the Arab oil embargo on the U.S. energy supply/demand posture. (See Appendix A for Study Request Letters and Appendix B for Committee Rosters.) A number of significant events have occurred since the beginning of the petroleum embargo in October 1973 and the Committee submits herewith its reappraisal of the situation as applicable to the first half of 1974.

Because the initial appraisal was completed before the impact of the embargo was felt, the premise was made that the embargo would be immediately and totally effective. The shortfall was then projected against a normal fourth-quarter demand to provide an indication of the corrective steps needed. The November 15 report estimated that by year-end 1973, the net effect upon U.S. petroleum supply would be a shortage of 3 million barrels per day or 17 percent of the average 1973 domestic demand for petroleum products. The net effect, although not fully impacting upon U.S. supply until later than anticipated, is still serious and is estimated to average 2.7 million barrels per day during the first quarter of 1974, and 2.3 million barrels per day during the second quarter of 1974, assuming continuation of the embargo.

The magnitude of this petroleum denial, as indicated in the previous report, will impact upon national income, employment and the Nation's standard of living, as has in fact, become evident.

To alleviate the effects of the shortage on the economy and to distribute the available supplies equitably, the Committee recommended on November 15 that emergency actions be taken by the Federal Government, including mandatory measures to reduce energy consumption, to increase domestic production and to distribute equitably the shortfall. The Committee reaffirms these conclusions.

The impact of the embargo has been minimized by public cooperation, government action and a warmer-than-normal winter. Through its allocation programs, the government has instituted systems for rationing supplies to wholesalers, retailers, industrial and commercial consumers under a priority system. Motor gasoline rationing has not yet been instituted, although the Federal Energy Office (FEO) has developed a standby rationing system which can be initiated promptly.

For as long as the Arab oil embargo continues, and for a considerable period of time after its cessation, the domestic petroleum supply situation cannot be *normalized*. Any significant increase in U.S. oil and gas production or refining capacity requires at least 3 to 5 years lead time. This was emphasized in the NPC's study, *U.S. Energy Outlook*, published in December 1972. In addition, it is uncertain at this time whether once the embargo

is lifted, Arab exports will reach pre-embargo projections of growth. Consequently, in view of this fact, less fuel supplies than those desired may be available, with resulting supply dislocations and personal and business inconveniences. Industry, government and the consumer, in the meantime, should extend every effort possible to ameliorate the situation.

THE EMBARGO

The United States has become increasingly dependent on imported petroleum. During the first 9 months of 1973, the United States imported an average of 6.2 million barrels per day. At that rate, 1973 would have seen an increase of over 30 percent in imports compared to 1972. This increase, while extremely high, is much smaller than the 9-month, 80-percent increase in imports from Arab countries. These countries have become the world's incremental source of petroleum and have become the major petroleum exporters of the world.

After the resumption of hostilities in the Middle East on October 6, 1973, Arab oil producing states initiated production cutbacks and embargoes. Initially, production cutbacks of 25 percent were announced with the provision for an additional 5-percent cut each month. Moreover, certain countries (e.g., United States, Netherlands, Caribbean countries) were totally cut off from receipt of oil from certain Arab producing countries. The effect upon worldwide petroleum supply and movements was immediate. Since the imposition of the initial production cutbacks and embargoes, however, the Arab countries have decreased the cutbacks and production now averages 10 to 15 percent below September 1973 levels. But Persian Gulf oil prices have quadrupled during this time.

On the basis that the announced embargo would be instituted fully and immediately, the initial assessment by the Committee anticipated that a reduction of imports into the United States would be felt during the last 2 weeks of November 1973 and would be about 2.0 million barrels per day below normal or required levels. The Committee further anticipated that as domestic demand increased during the winter season, the effect of the embargo would be a shortfall of 3.0 million barrels per day of imported petroleum in the first quarter of 1974.

After 3 months of actual embargo conditions, the Committee now estimates that an average shortfall of 2.7 million barrels per day will be felt in the first quarter of 1974 and 2.3 million barrels per day in the second quarter.

U.S. SUPPLIES

The supply of petroleum available for consumption in the United States is equal to the sum of the production from U.S. wells, imported supplies and changes in inventories. With the

exception of inventory reduction, little can be done to alter the Nation's near-term supply situation. Domestic wells are producing at their established maximum efficient rates (MER's).

The Arab nations have become the incremental supply source for most of the importing countries of the world largely because of the inability of non-Arab countries to increase oil production significantly. Even with the increased incentive of higher world market prices, these countries, as well as the United States, will require at least several years' lead time to explore for and develop new oil reserves. Therefore, the United States cannot anticipate any significant near-term increases in imports from countries not participating in the embargo or from its domestic wells.

The only short-term variables in the product supply side of the equation available to U.S. policy makers are refinery yields (to the extent they exchange one product for another) and inventories. These variables do not actually increase supply, they merely provide a cushion which can be used to alleviate any seasonal or regional problems which may arise.

The Nation's petroleum inventories are a much misunderstood segment of the supply distribution system. Each petroleum company maintains certain amounts of crude or products in inventory in order to obtain the most efficient overall operation of its system. The absolute number of barrels of crude or products held per barrel of producing, refining or marketing capacity can and does vary regionally and seasonally as well as between operators in any particular part of the country. Another misunderstood factor about inventories is that a substantial percentage is not really available for consumption. This *unavailable* oil is required to fill pipelines, to maintain continuous processing at refineries or is in transit.

Industry does, however, have the physical ability to operate at lower than optimum inventory levels, but at some cost to the efficiency of their operations and at the risk of spot shortages. On a composite basis, total U.S. inventories can be drawn down to some minimum level without creating spot shortages or severe dislocations of supplies at any particular point in time. The term "minimum historical level" (MHL), as used with respect to inventories in this report, reflects the lowest levels reported in recent years, although actual spot shortages and dislocations of products occurred at these levels for distillates and motor gasoline. Therefore, as a contribution to near-term supply, excessive inventory drawdown must be considered as a dangerous expedient: to totally remove this cushion would impair the industry's ability to respond to various logistical, refinery or weather problems which arise on occasion.

The second adjustment variable is the yield of various products at a refinery. Within relatively narrow limits, a refiner may adjust his output of a specific product viz-a-viz another product. He does not change the total number of barrels of output, only the type of product produced and thus help to distribute the shortages among product lines.

Some 250 refineries in the United States produce a varied mix of products on yields calculated to meet current and seasonal requirements. No single directive for refinery yields can take into account all the varying regional, physical and seasonal demands affecting each refiner. Moreover, it must be recognized that rigid rules may interfere with the most efficient utilization of existing refinery facilities, either by mismatching crude oil types with processing equipment or by diverting raw materials from refineries with relatively greater capacity to optimize yields of needed products to refineries not having such capabilities. Additionally, regulations must be implemented in such a manner as to allow adequate lead time for adjustment of processing schedules.

U.S. PETROLEUM CONSUMPTION

Actual consumption of petroleum in the United States cannot exceed available supply after adjustment for change in inventories. The anticipated demand for petroleum--i.e., the amount consumers would like to have--has been projected to exceed supply available during the embargo. The important distinction is that the Nation cannot consume more than is available. Anticipated demand is used as the base in this report from which to measure the shortfall caused by the embargo. However, as economic conditions change through time, the anticipated demand base becomes less realistic.

Prior to the embargo, it had been projected that the U.S. demand for petroleum products in the first quarter of 1974 would reach 19.8 million barrels per day. It now appears that as a direct result of the embargo, 2.7 million barrels per day will not be available, and thus total domestic consumption will be 17.4 million barrels per day, or 13.4 percent lower than anticipated demand, assuming the same inventory drawdown. This roughly equates to the actual consumption level of 1972. (Anticipated or normal demand has been adjusted upward by 295 thousand barrels per day to reflect increased military demand.)

The FEO has suggested numerous voluntary conservation measures and has implemented a mandatory allocation program to ensure adequate supplies to priority users. The allocation plan is intended to have the secondary effect of limiting supply available to other users and thus making conservation unavoidable. This mandatory conservation, coupled with abnormal inventory changes, could potentially eliminate the net shortfall in the first quarter and reduce it to 0.4 million barrels per day in the second quarter. Although this might appear to solve the problem, actual experience does not indicate that all the FEO programs are fully successful, and additional steps may have to be taken. For example, the motor gasoline reduction reported for January by the FEO was only about two-thirds of the reduction targeted earlier by that office. As of mid-February, the gasoline program was having its desired *average* effect, but for the first quarter to meet the average target, the last 6 weeks will have to compensate for the January deficiencies.

Other effects, such as reduced demand due to a lower level of overall economic activity and higher product prices, may at least partially compensate for such variances from future goals or targets.

Based on the findings of this study, as discussed in detail in later sections of this report, the Nation has no alternative in the short-term other than to rely on voluntary and mandatory programs to reduce consumption. Even immediate restoration of Arab exports would have no effects on the first quarter and only modest effects on the second-quarter situation because of the time required to transport, process and distribute additional imported supplies.

FINDINGS AND CONCLUSIONS

The National Petroleum Council's Committee on Emergency Preparedness submits the following findings:

FINDINGS

Fourth Quarter 1973 Review

Prior to the October 1973 oil embargo, petroleum supplies in the United States were already extremely tight due to rapidly increasing demand, tight world-wide crude supplies, a shortage of domestic refining capacity and the fact that U.S. oil and gas production had peaked. Critical spot shortages of both heating oil and gasoline occurred during the 1972-1973 seasons, and the level of petroleum imports increased rapidly. The onset of the embargo made it clear that the loss of anticipated supplies would require immediate and substantial action to bring domestic supply and demand into balance.

Accordingly, the mid-November 1973 report called for emergency action to reduce petroleum consumption and equitably distribute the anticipated severe shortages. Since the release of that report, a number of factors have combined to delay the full impact of the embargo from the fourth-quarter 1973 to the first and second quarters of 1974. These factors include the following:

- Rapid and effective actions taken by the Federal Government, industry, and the public reduced consumption during the fourth quarter. Public and industry response to the President's calls for energy conservation in early November was favorable. The Federal Government moved quickly to form the Federal Energy Office which urged voluntary conservation steps and implemented mandatory programs.

- Imports continued to arrive in the United States at considerably higher levels than expected. Rather than declining abruptly in mid-November as originally projected, crude and product imports gradually declined to near the anticipated post-embargo levels by year-end. This provided additional time for the Nation to adjust to the shortfall and to implement emergency measures.

- Fourth-quarter weather was considerably warmer than normal (by 13 percent), thus reducing the anticipated demand for distillate and residual fuel oils. This permitted the Nation to avoid potentially critical heating fuel shortages and to improve its inventory situation in anticipation of possibly colder weather during the latter half of the heating season.

These favorable factors reduced fourth-quarter consumption by an estimated 725 thousand barrels per day or 4 percent, and permitted the Nation to avoid critical petroleum shortages. They allowed some building of inventories and have allowed the Nation to enter 1974 in a better than previously anticipated condition. For these reasons, the principal impact of the embargo was delayed until the first and second quarters of 1974.

Sensitivity Factors

Any assessment of supply and demand balances for future periods is affected by many variables and is subject to a degree of uncertainty. This is particularly true in the current embargo situation. The assessment in this report is centered around a likely case which is necessarily based on many assumptions which are discussed in the body of the report. As conditions change, actual results will, of course, differ from this analysis. Nevertheless, this report presents a reasonable prediction of the situation considering currently available information.

First-Quarter 1974 Situation

*Adjusted normal demand** for petroleum during the first quarter of 1974 is expected to exceed available supplies by 2.7 million barrels per day or 13.4 percent (see Table 1). The shortfall is based on projections of normal demand and also assumes import levels of 5.2 million barrels per day during the first quarter under embargo conditions.

It appears that the gross shortfall of 2.7 million barrels per day can be balanced by means of substantial demand reductions and much larger than normal withdrawals from inventories. At any given location, this may require inventory drawdowns in excess of those dictated by prudent inventory management and may result in spot shortages.

In addition to a heavy drawdown of inventories, demand reductions on the order of 11.5 percent (based on adjusted normal demand) would have to occur. These are attainable according to targets set by the FEO; however, experience through January indicates that reductions in motor gasoline consumption were only about two-thirds as large as needed. Thus, significantly greater reductions in motor gasoline may be required to prevent depletion of gasoline inventories below minimum operable levels.

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* Total demand for the first and second quarter that had been projected before the October embargo is called *normal demand* in this report. It is the demand which would have existed without constraints imposed by the embargo, higher prices and other factors and is a benchmark against which to measure demand reductions and shortfalls. It is called unconstrained demand by some, anticipated demand by others. This report uses the term *adjusted normal demand* when that military demand, formerly met by overseas supplies prior to the embargo, is added to normal demand.

TABLE 1

FIRST AND SECOND QUARTERS 1974
(Millions of Barrels per Day)

	First Quarter	Second Quarter
Demand		
Normal Demand*	19.8	17.5
Added Military Demand	.3	.3
Total Adjusted Normal Demand	**20.1**	**17.8**
Supply		
Domestic*		
Production	10.8	10.8
Processing Gain and Other	.5	.4
Normal Inventory Drawdown (Buildup)	.9	(.8)
Subtotal	**12.2**	**10.4**
Imports with Embargo†	5.2	5.1
Total	**17.4**	**15.5**
Shortfall	**2.7**	**2.3**

* Based on the Independent Petroleum Association of America Report, October 1973.

† Imports based on NPC survey estimate.

Overall, the first-quarter situation appears extremely tight but balanced, with the possible exception of motor gasoline. The extent to which the situation remains operable depends on a number of variables such as the continuation of warmer than normal weather, the continuation of a high level of voluntary conservation, and the effectiveness of actions mandated by federal agencies.

Second-Quarter 1974 Situation

During the second-quarter 1974, the adjusted normal demand is expected to exceed available supplies by 2.3 million barrels per day or 12.8 percent of demand. This is based on imports of 5.1 million barrels per day during the period.

While the gross shortfall is smaller during the second quarter, the supply/demand situation would be even tighter than at present due to the projected drawdown of inventories to minimum historical levels during the first quarter. Thus, balancing the 2.3 million barrels per day shortfall requires demand reductions in excess of those currently projected for fuels by the FEO (by over 400 thousand barrels per day) plus continued operations at minimum inventory levels. The specific distribution of the 400 thousand barrels per day among fuel categories is dependent on government policy as

well as the impact of weather, economic activity and price on overall demand. Conservation efforts should be continued in all product areas with adjustments of specific product reductions as the effects of the cutbacks become better defined.

The overall second-quarter situation appears more difficult than the first quarter because of previously depleted inventories. The degree to which voluntary conservation measures are maintained by industry and the public, and the effectiveness of federally mandated measures to equitably distribute available supplies will determine to a large degree whether the problems are critical or somewhat less serious. Substantial inconveniences are already being experienced by consumers in some areas and these could become more severe during the second quarter.

CONCLUSIONS

- U.S. petroleum supplies in the first and second quarters of 1974 will be extremely tight. The projected gross shortfall of 13 to 14 percent will be offset if a high degree of conservation of all energy forms is exercised, (particularly in the areas of motor gasoline and other discretionary uses), and if mandatory federal programs to reduce consumption and distribute the available supplies become more effective. However, this will at the same time require the depletion of the Nation's petroleum fuel stocks to minimum historical levels.

- The petroleum supply and demand outlooks projected in this report are subject to a number of highly variable factors. For example, demand will be strongly influenced by the weather, rising energy prices, the effectiveness of federally mandated measures, and of course, the duration and magnitude of the embargo. Under this dynamic and uncertain environment, dedication to any overly rigid course of action is likely to lead to a mis-allocation of resources.

- Within the limits of the uncertainties discussed above, a substantial problem appears to be developing in balancing fuel demand and supply in a way satisfactory to the consumer. The findings of this report indicate additional reductions in fuel usage, including motor gasoline, are required. Motorists in some areas are already experiencing substantial inconveniences in obtaining supplies, and several states have instituted measures such as "odd-even day" purchase systems. If the federal allocation programs cannot both reduce consumption and satisfy consumers, then additional mandatory actions will be required. These should include additional use of odd-even day purchase plans, requirements that retail purchasers cannot refill their tanks unless half-empty, and staggering selling hours among retail outlets. If these measures to improve distribu-

tion and minimize inconvenience are not successful and public compliance does not increase substantially, the Nation will have no alternative but to institute some system of mandatory rationing.

- If energy conservation measures and fuel allocation programs are successful in alleviating the impact of the denial, economic activity and employment will not suffer significant additional degredation. However, if oil imports are not substantially increased well before year-end, it is not thought possible that even extremely effective conservation and allocation measures can allow real Gross National Product (GNP) to increase significantly above the current level, or that unemployment rates in the neighborhood of 6 percent can be avoided.

- Actions taken to date by the federal and state governments to minimize the detrimental effects occasioned by the current energy crisis are to be commended. Many of these have resulted in significant fuel-use savings. However, delays and uncertainties regarding allocation priorities, rationing, refinery yields and prices will tend to compound the severity of the current situation and retard progress toward long term solutions. Even if the embargo is lifted in the near future, anything approaching "normality" in the energy supply system cannot be achieved for some time. Accordingly, the Committee re-emphasizes the following conclusions which represent a restatement or further elaboration of conclusions previously reached in the November 15, 1973 report:

  --The Federal Government, industry and the communications media have failed to convince the public of the facts which are so necessary for cooperation in achieving needed consumer energy conservation at all levels. Allegations by some consumers and politicians of contrivance, hoax or manipulation in connection with the oil shortage, in the face of an actual cut-off of Arab oil supplies into the United States, astronomically increased prices for foreign oil that is available, is indicative of broad general public misunderstanding and distrust.

  --The level of government-industry cooperation needed due to the extremely complex and vast systems of the energy industries, has not been realized. The expertise available from private industry which could be utilized in an advisory and operational capacity has not been drawn upon for legal and political reasons.

  --National economic health, employment, personal income and the Nation's defense system, dependent upon normal industrial operations, are now being affected by the energy shortfall. Every effort must be made to continue operations of the industrial and key service

sectors of the U.S. economy as close to normal as possible.

--In order to strive for relative self-sufficiency in energy in a realistic time frame, it is imperative that national policy move as quickly as possible to free market determination of resource allocation and investment decisions. Any emergency measures enacted during the current denial should be undertaken with the clear provision for their removal at the termination of the denial and its after-effects. The American system should continue to operate on a competitive, free-enterprise basis. Increased government intervention for emergency purposes should be taken only as absolutely necessary and should not be continued upon the cessation of the emergency.

Chapter One

REVIEW OF FOURTH QUARTER 1973

SUMMARY OF NOVEMBER 15, 1973 REPORT

The November 15, 1973 Supplemental Interim Report of the National Petroleum Council's Committee on Emergency Preparedness estimated that the initial impact of the Arab oil embargo on the United States would be in the order of 2 million barrels daily during the last 6 weeks of 1973. For the first quarter of 1974, the import denial was projected to average 3 million barrels per day as the embargo became more restrictive and demand for petroleum products increased seasonally.

Given such supply restrictions and making an initial assumption that no offsetting demand curtailments would be implemented, year-end inventories of gasoline and distillates were calculated to be significantly lower than they would have been under pre-denial expectations. Stocks of residual fuel oil would have been drawn down to minimum operable levels during December 1973. It was pointed out that a continuation of the embargo without demand constraints would have resulted in all major product inventories falling to or below desired minimum levels during the 1974 first quarter, thus inducing massive shortages and dislocations in petroleum product supplies. This was considered an unacceptable solution to the import denial. As a preferable alternative, the National Petroleum Council recommended initiating demand curtailments immediately in order to reduce the expected shortfall and spread it over an extended time period.

FOURTH QUARTER 1973 PROJECTION COMPARED WITH ACTUAL EXPERIENCE

A supply/demand balance for the fourth quarter of 1973 provides the basic data for comparing the actual situation with the pre-denial projection. The actual situation tabulations have been estimated from the Weekly Statistical Bulletins of the American Petroleum Institute (API), pending publication of U.S. Bureau of Mines figures. The pre-denial figures are those of the Independent Petroleum Association of America (IPAA) published in October 1973, prior to the announcement of the Arab embargo.

A number of factors have contributed to the actual situation being less severe during the 1973 fourth quarter than the conditions anticipated in the November 15, 1973 NPC Emergency Preparedness Report. These include:

- Prompt voluntary and mandated reductions in U.S. energy consumption
- Warmer than normal weather

- Slower than expected decline in oil imports.

The combined effect of these factors was to reduce demand by a greater quantity than the denial of imports during the final quarter of 1973. As a direct result, total petroleum inventories at year-end 1973 were higher than had been anticipated in the November report.

Closing stocks of aviation fuels and total middle distillates were above mid-November projections and also were above the same peri-

TABLE 2

SUPPLY/DEMAND BALANCE—FOURTH-QUARTER 1973
(Thousand Barrels per Day)

	Pre-Denial Estimate (IPAA)	Actual* (API)	Difference	
			Amount	Percent
Demand (Domestic)				
Motor Gasolines	6,704	6,433	(271)	(4.0)
Aviation Fuels	1,155	1,049	(106)	(9.2)
Middle Distillates	3,822	3,522	(300)	(7.8)
Residual Fuels	3,049	2,864	(185)	(6.1)
All Others	3,685	3,805	120	3.3
Totals	**18,415**	**17,673**	**(742)**	**(4.0)**
Total Exports†	228	245	17	7.5
Total Demand	**18,643**	**17,918**	**(725)**	**(3.9)**
Stock Change	(443)	(183)	260	58.7
Required Supply	**18,200**	**17,735**	**(465)**	**(2.6)**
Domestic Production				
Crude & Condensate	9,195	9,155	(40)	(0.4)
NGL	1,740	1,740	—	—
Subtotal	**10,935**	**10,895**	**(40)**	**(0.4)**
Imports				
Crude Oil	3,561	3,342	(219)	(6.1)
Residual Fuels	2,094	1,842	(252)	(12.0)
Other Imports	1,097	1,106	9	(0.8)
Subtotal	**6,752**	**6,290**	**(462)**	**(6.8)**
Processing Gain and Other	513	550	37	7.2
Total Supply	**18,200**	**17,735**	**(465)**	**(2.6)**
Closing Inventory (Millions of Barrels)	971.2	998.8	27.6	2.8

* Fourth-quarter balance is estimated from preliminary API results pending publication of U.S. Bureau of Mines figures.

† See detailed discussion in Appendix D.

‡ Processing gain and other is primarily volumetric increase in output due to processing.

TABLE 3

U.S. INVENTORIES OF CRUDE OIL AND PRODUCTS AT YEAR-END
(Millions of 42-Gallon Barrels)

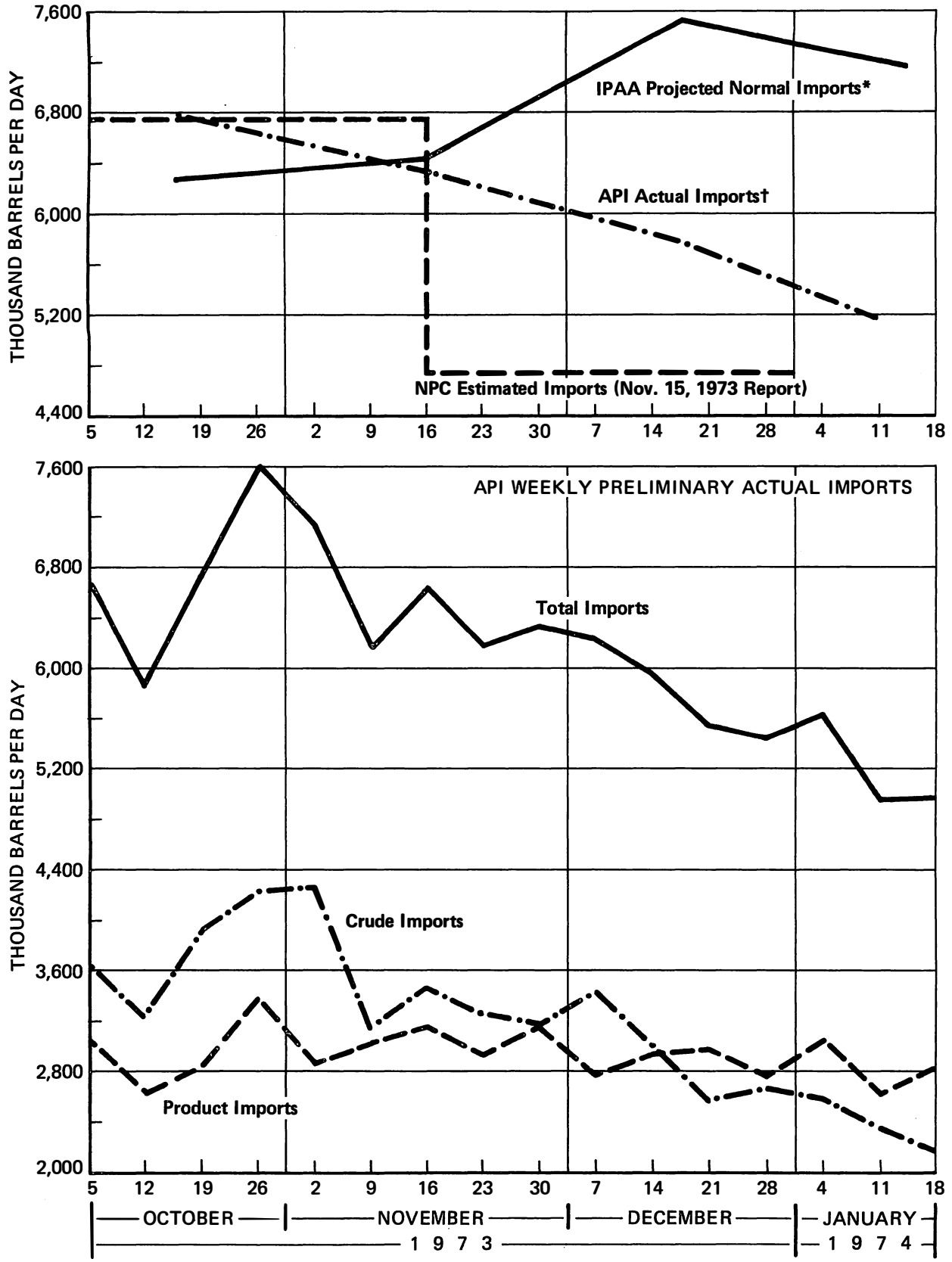
Item	December 31, 1973			December 31, 1972
	Pre-denial Estimate (IPAA)*	Actual (API)†	Difference	Actual‡
Crude Oil	244.6	240.6	- 4.0	246.4
Products:				
Motor Gasoline	219.5	208.3	- 11.2	212.9
Aviation Fuels:				
Aviation Gasoline		3.7		4.3
Naphtha Jet Fuel		5.7		6.1
Kerosine Jet Fuel		22.9		19.3
Total	**28.3**	**32.3**	**+ 4.0**	**29.7**
Middle Distillates:				
Kerosine		23.1		19.1
Distillate Fuel Oil		200.7		154.3
Total	**190.7**	**223.8**	**+33.1**	**173.4**
Residual Fuel Oil	53.6	52.9	- 0.7	55.2
Other Oils	234.5	240.9	+ 6.4	241.4
Total Refined	**726.6**	**758.2**	**+31.6**	**712.6**
Total Inventories	**971.2**	**998.8**	**+27.6**	**959.0**

Sources: * Pre-denial 1973 Estimate—Report of the Supply/Demand Committee, IPAA (October 23, 1973).
† Estimated 1973 Actual—Press release (January 13, 1974).
‡ Actual 1972—U.S. Bureau of Mines, Annual Petroleum Statement (December 1973).

od of a year earlier. December 31, 1973 inventories of crude oil, motor gasoline and residual fuel oil were below anticipation and also below the end of 1972. Details are shown in Table 2 which gives supply/demand balances, in Figure 1 which illustrates total U.S. imports and in Table 3 which gives year-end inventories.

REDUCTION IN CONSUMPTION

The Nation heeded the warning signs of impending shortage and reduced consumption significantly by a combination of voluntary and mandatory measures. In the fourth quarter of 1973, estimated domestic consumption was less than unconstrained demand by an estimated 725 thousand barrels per day, or 3.9 percent. It appears that the most significant contribution to the lower demand was the positive consumer effort to reduce consumption by such responses as lower thermostat settings, less driving and lower highway speeds. The various actions by the government were an important contribution to this effort (see Appendix C).



*Quarterly IPAA normal demand (October 1973) converted to monthly based on Bureau of Mines historical data for 1971, 1972 and 1973.

†Monthly profiles averaged from published API weekly data shown in lower figure.

Figure 1. U.S. Petroleum Imports.

Another significant factor in demand reduction was warmer than normal weather. According to *Platts Oilgram*, weather in the total United States during the last 4 months of 1973 (as measured in degree days) was 13.1 percent warmer than normal. It is estimated that warmer weather contributed about a third of the reduction in demand during the fourth quarter by virtue of lower distillate and residual fuel oil consumption. An important indirect effect on petroleum demand could have been the lower electricity and natural gas consumption due to warmer weather and voluntary cooperation by industry and the private sector in reducing electricity consumption.

Finally, higher refined product prices and a *below normal* rate of real GNP growth in the fourth quarter (1.9 percent on an annualized basis) may have dampened petroleum consumption below earlier estimates.

CRUDE IMPORTS

Crude imports in the fourth quarter were less than had been anticipated in the pre-denial IPAA balances by an average of 219 thousand barrels per day, or 6 percent. Although crude oil imports did in fact decline as anticipated in the November 15, 1973 report, the major impact was delayed from mid-November to mid-December, as Figure 1 graphically illustrates. For the 5 weeks ending January 18, 1974, crude imports were less than expected in the pre-denial case by an average of 1,167 thousand barrels per day, or 32 percent. Thus, the 1,200 thousand barrels per day shortfall discussed in the National Petroleum Council's November 15, 1973 report was approached at year-end.

PRODUCT IMPORTS

Product imports in the fourth quarter were less than had been anticipated in the pre-denial IPAA case by an average of 243 thousand barrels per day, or 7.6 percent. Much of this shortfall was in the importation of residual fuel oil which, during this period, was less than the pre-denial expectation. Although product imports did not decline in absolute numbers during the quarter (see Figure 1), the shortfall did increase significantly, as the pre-denial case anticipated that the level of imports would rise toward the end of the quarter to meet seasonal requirements. As in the case of crude imports, the major impact was delayed from mid-November to the latter part of December. For the 5 weeks ending January 18, 1974, product imports were less than expected in the pre-denial case by an average of 632 thousand barrels per day, or 18 percent. Thus, the 800 thousand barrels per day shortfall discussed in the National Petroleum Council's November 15 report was approached at year-end.

TOTAL IMPORTS

For the entire fourth quarter 1973, total imports of crude oil and products averaged 6.3 million barrels daily or about one-

half million barrels daily less than expected before denial. However, the weekly trend of total imports has been decidedly downward since the middle of November. For the 5 weeks ending January 18, 1974, total imports were less than expected in the pre-denial case by an average of 1.7 million barrels per day, or 25 percent, approaching the 2.0 million barrels per day shortfall discussed in the November 15, 1973 report. As may be observed on Figure 1, total imports for the 2 weeks ending January 18, 1974, were below 5 million barrels daily. Available data through mid-February indicate that total imports have averaged slightly over 5 million barrels per day.

Chapter Two

OUTLOOK FOR FIRST AND SECOND QUARTER OF 1974

INTRODUCTION

When the NPC reported to the Secretary of the Interior on November 15, 1973, its assessment of the impact of the Arab embargo on exports of petroleum to the United States, there was little or no basis on which to judge the effectiveness of the embargo or the willingness of the American people to adjust to reduced consumption.

As pointed out in Chapter One, significant effects of the embargo upon domestic supply were not observed until 60 days after it was initiated (instead of the 30 to 35 days normal tanker sailing time from the Persian Gulf to the United States assumed in the November 15 report). Nevertheless, public cooperation and voluntary reduction in energy usage began almost immediately. While this cutback has aided the situation markedly, it has obscured an accurate assessment of the emergency.

It is not known how long the embargo will last, and the ultimate magnitude of the shortfall cannot be closely determined. In an effort to quantify the effect, a survey of import estimates has been compiled for this report. The November 15 report, analyzed the impact of an import denial of 3.0 million barrels per day, and this study reappraises those impacts based on the most current assessment of the situation.

It now appears that due to the Arab embargo, petroleum supply for the United States will be short by approximately 2.7 million barrels per day during the first quarter of 1974 and approximately 2.3 million barrels per day during the second quarter of 1974. This most recent assessment reflects a slight improvement over that contained in the November 15 report, but still portends a very serious situation.

It should be pointed out that in calculating the demand/supply shortfall or the magnitude involved in the embargo, many assumptions are required. The most important of these is the magnitude of demand. This report uses a figure for *normal* demand which was estimated by the IPAA prior to the embargo. To meet the demand level, the IPAA projected that total imports of 7.5 million barrels per day would be required. The Committee's estimate of imports under embargo conditions during the first quarter of 1974 is approximately 5.2 million barrels per day. This level, coupled with adjustments for processing gain and increased military requirements, results in a 2.7 million barrel per day shortfall compared to adjusted normal demand. To the extent that domestic supplies can be increased through oil and gas production not anticipated, that conversion of oil to coal is accomplished above the level estimated, that weather and price have an effect not taken into account,

and that actual imports differ from the Committee's estimate, the magnitude of the calculated shortfall will change. For example, the weather during the first half of the first quarter has continued the warmer-than-normal pattern of the fourth quarter of 1973. It appears that unless the last six weeks of the quarter are extremely cold, the Nation will experience a warmer-than-normal first quarter. To the extent that this proves to be the case, demand for heating oils will be lower than that used in this report.

The data presented in this chapter reflect a middle ground regarding the many variables involved in calculating supply and demand balances. Chapter Three discusses the effect of the sensitivity of the various assumptions involved.

NORMAL SUPPLY AND DEMAND CONDITIONS

Petroleum Supply--Domestic Sources

Projected U.S. petroleum supply from domestic sources for the first half of 1974 is shown in Table 4. Domestic crude and natural gas liquids production is shown to remain relatively constant at 10.8 million barrels per day during the two quarters. Normal seasonal inventory changes for this time of year were assumed in order to fulfill product demands.

Foreign Sources

In an effort to ascertain an estimated level of imports of crude oil and products into the United States during the first

TABLE 4

PROJECTED U.S. DOMESTIC PETROLEUM SUPPLY
FIRST AND SECOND QUARTERS 1974
(Thousand Barrels per Day)

	First Quarter	Second Quarter
Domestic Production		
Crude	9,128	9,062
NGL	1,725	1,725
Subtotal	**10,853**	**10,787**
Processing Gain and other	520	519
Inventory Drawdown (Buildup)	939	(763)
Total Domestic Supply	**12,312**	**10,543**

Source: IPAA Projection (October 1973).

TABLE 5

ESTIMATED 1974 IMPORTS UNDER EMBARGO CONDITIONS
(Thousand Barrels per Day)

	First Quarter	Second Quarter
Crude	2,450	2,510
Unfinished	105	105
NGL	130	130
Subtotal	**2,685**	**2,745**
Motor Gasoline	105	115
Aviation Fuels	140	145
Middle Distillate	290	260
Residual Fuel	1,690	1,570
LPG	135	130
Other	105	90
Subtotal	**2,465**	**2,310**
Total Imports	**5,150**	**5,055**
Range of Individual Estimates Surveyed		
Low	4,680	4,670
High	5,722	5,772

Source: NPC Survey of Estimates, January 1974.

half of 1974, the Committee requested that a survey of estimates be made by the staff of the National Petroleum Council. The results are tabulated in Table 5. These data represent simple arithmetic averaging of the estimates received and, as shown in the bottom line of the table, reflect a range of approximately plus or minus 10 percent. The range of estimates is small when considered against the total world oil movement balance that must be made to prepare an estimate of U.S. imports. The effects of this range upon the first and second quarter 1974 supply and demand balances is discussed in Chapter Three.

The average figures used in this report represent a composite *best estimate* case. Because of the constantly changing situation in the Arab countries with regard to production cutbacks plus changing worldwide petroleum logistics, any estimate is subject to considerable uncertainty.

Petroleum Demand

The estimate of demand is from a report published by the IPAA in October of 1973. These projections are the best current

assessment of what demand would have been under normal conditions. The total for all products is 19.8 million barrels per day in the first quarter and 17.5 million barrels per day in the second quarter. They represent a benchmark against which the effects of the embargo can be measured.

Supply/Demand Balances

Normal Pre-Embargo Conditions

The pre-denial supply/demand balance for the total United States for the first and second quarters 1974 are shown in Table 6. The figures are taken from the IPAA October 1973 report and assume normal demand--i.e., no voluntary or mandatory consumption restraints and normal supply quantities. Imports were expected to be 7.5 million barrels per day and 7.0 million barrels per day during the first and second quarter, respectively. Inventory drawdown was expected to be 939 thousand barrels per day in the first quarter, and an inventory buildup of 763 thousand barrels per day was expected in the second quarter.

TABLE 6

NORMAL 1974 SUPPLY/DEMAND BALANCE
(Thousand Barrels per Day)

	First Quarter	Second Quarter
Demand		
Domestic	19,575	17,324
Export	213	221
Total Normal Demand	**19,788**	**17,545**
Domestic Supply		
Crude	9,128	9,062
NGL	1,725	1,725
Processing Gain and Other	520	519
Inventory Drawdown (Buildup)	939	(763)
Subtotal	**12,312**	**10,543**
Imports		
Crude	3,713	3,892
NGL	135	132
Unfinished Oils	140	160
Products	3,488	2,818
Subtotal	**7,476**	**7,002**
Total Supply	**19,788**	**17,545**

Source: IPAA Report (October 1973).

TABLE 7

EMBARGOED 1974 SUPPLY/DEMAND BALANCE*
(Thousand Barrels per Day)

	First Quarter	Second Quarter
Demand		
Domestic	19,575	17,324
Export	213	221
Added Offshore Military Demand	295	295
Total Adjusted Normal Demand	**20,083**	**17,840**
Domestic Supply		
Crude	9,128	9,062
NGL	1,725	1,725
Processing Gain and Other	473	476
Normal Inventory Drawdown (Buildup)	939	(763)
Subtotal	**12,265**	**10,500**
Average Import Estimate		
Crude	2,450	2,510
NGL	130	130
Unfinished Oils	105	105
Products	2,465	2,310
Subtotal	**5,150**	**5,055**
Total Supply	**17,415**	**15,555**
Shortfall	(2,668)	(2,285)

* Includes added military demand which had been supplied from offshore pre-embargo.

Gross Supply/Demand Shortfall Under Import Embargo

The *gross* shortfalls (difference between adjusted normal demand and embargoed supply) are shown for the first and second quarters in Table 7. This total U.S. supply/demand shortfall is calculated for the first two quarters of 1974 based on the following assumptions:

- Import levels reflect a continuing Arab embargo.
- Demand will be normal.
- Inventories will be drawn down in the usual historical amounts per IPAA projection for the time of year.
- No added domestic crude production is assumed over that used in the normal supply and demand balance.

- Added military demand of 295 thousand barrels per day occasioned by loss of foreign supply is included in demand.

Under these assumptions, a gross shortfall of 2.7 million barrels per day is seen for the first quarter and 2.3 million barrels per day for the second quarter.

OPTIONS AVAILABLE TO OVERCOME INDICATED SHORTFALL

Increase in Supply of Petroleum from Domestic Sources

The NPC estimated (Interim Report, July 1973, and Supplemental Report, November 15, 1973) the incremental volume of oil and gas production potentially available from existing domestic fields above maximum efficient rates and from Naval Production Reserves (NPR's). To date, none has been realized and, in the absence of Congressional action (for NPR's) and state action (for other fields), no added domestic supply is considered to become available to overcome the shortfall during the first or second quarters.

Reduction in Petroleum Demand

In the November report, the NPC suggested several means to reduce the Nation's demand for petroleum. These means are of two general types: conversion of equipment to use energy sources other than petroleum and reduction in the use of petroleum.

Conversion to Other Energy Sources

Capabilities were demonstrated in the November report for conversions of oil to other energy sources. While the Committee was not overly optimistic that these conversions would be realized, the potential was shown to be 250 thousand barrels per day to coal and 150 thousand barrels per day to gas, with a small additional amount attributable to the potential for increased utilization of nuclear fuels. Currently, about 75 thousand barrels per day of this potential has been converted, and the Committee believes 100 to 125 thousand barrels per day (almost all oil to coal in electric utilities) to be realistic limit of conversions during the first half of 1974. This is not to say, however, that the potential no longer exists. Based upon the experience of conversions to date, the maximum expected level of 250 thousand barrels per day of coal conversion will not be reached until the fourth quarter of 1974. There is little likelihood that actual conversions can be expanded beyond the 250 thousand barrels per day level. Potential convertibility has not been realized because electric utilities along the East Coast have experienced problems in switching to coal due to:

- Inability to acquire coal supplies, both low-sulfur and high-sulfur
- Transportation bottlenecks

- Restraints imposed by air pollution agencies and fuel quality regulations

- Technical problems related to convertible equipment, such as physical deterioration of coal-burning and coal-handling facilities.

Curtailments

Since its creation on December 4, 1973, the FEO has been charged with the design and implementation of conservation actions. The NPC in its November report projected voluntary savings of 1.6 million barrels per day for the first quarter. FEO projects a savings against normal demand of about 2.1 million barrels per day in the first quarter through a combination of voluntary and mandatory programs. Table 8 sets out the two projections as well as the FEO second-quarter projection. For purposes of this update, the FEO projections have been used, with slight modification as indicated on the table. The categories of greatest differences are "Gasoline" and "Other Products."

The higher FEO gasoline figure reflects their greater emphasis on mandatory allocations than is assumed for the NPC projection. The NPC projected 614 thousand barrels per day (9.2 percent) reduction possible through voluntary measures versus the FEO appraisal of 900 thousand barrels per day (13.6 percent) reduction.*

The NPC did not estimate a reduction in consumption of LPG and Other Products, assuming requirements for industry are met first to minimize the impact on the economy.

These savings are, however, based on normal demand levels which, in fact, under the current environment of warmer-than-normal weather and increased prices, may not have been attained even if supplies were available. Although most consumers have a limited ability to adjust their fuel consumption patterns abruptly in response to higher costs, some near-term reduction in consumption due to price effects may occur. Another consideration which will tend to decrease fuel consumption in the next several months is the expected low rate of increase in real GNP. In fact, if industrial production decreases, as many forecasters expect, potential petroleum demand would further decline below the normal levels projected in the IPAA balances.

Combined Demand Reductions

The anticipated total petroleum demand reductions from conservation and curtailment actions from the NPC November report and the

* The FEO reported that gasoline consumption reduction for January was 8.6 percent, or less than 600 thousand barrels per day. Data available by mid-February indicate that desired reductions are now occuring, but that in order for the first quarter to average 900 thousand barrels per day, reductions in the last half of the quarter will have to be more severe than those now being attained.

FEO (modified) programs are detailed on Table 8. For the first quarter the two projections totals are reasonably close--2.0 million barrels per day for the NPC projections versus 2.3 million barrels per day for the FEO. However, the FEO's lower conversion amount (200,000 barrels per day) now appears closer to what is being achieved, but it is supplemented by the higher than NPC conservation reductions which the FEO achieves through mandatory supply allocations.

The FEO curtailment projections are compared with expected normal demand in the first and second quarters of 1974, and also with actual demand in 1973, on Table 9.

ADJUSTED SUPPLY/DEMAND BALANCES (AFTER DEMAND REDUCTIONS)

The impact of the constrained demand on the supply/demand balance for the first two quarters of 1974 is shown on Table 10 and is based on the following assumptions:

- Import levels relfect a continuing Arab embargo.

TABLE 8

1974 DEMAND REDUCTIONS
(Thousand Barrels per Day)

	First Quarter		Second Quarter
	NPC*	FEO (Modified)†	FEO (Modified)†
Conservation Measures			
Gasoline	614	900	900
Jet Fuels	257	165	165
Distillate Fuel Oil	344	500	50
Residual Fuel Oil	365	175	–
Other Products	–	366	366
Subtotal	**1,580**	**2,106**	**1,481**
Conversion Measures			
Oil to Coal	250	100	100
Oil to Gas	150	–	–
Utilities Wheeling and Base Loading	–	100	100
Subtotal	**400**	**200**	**200**
Total Curtailment	**1,980**	**2,306**	**1,681**

* NPC, *Supplemental Interim Report,* (November 15, 1973).

† Federal Energy Office Report 74-1 dated January 2, 1974, modified to reflect reduction of 35 thousand barrels per day for jet fuels reflecting the impact of special allocations on the reduction; and 30 thousand barrels per day for "other" in both quarters (to reflect lower crude runs and therefore lower "other" product production than earlier considered).

TABLE 9

ESTIMATED U.S. DOMESTIC DEMAND FIRST HALF 1974
(Thousand Barrels per Day)

Product	First Quarter				Second Quarter			
	1974 Adjusted Normal	1974 Reduction*	1974 Constrained	1973 Actual†	1974 Adjusted Normal	1974 Reduction	1974 Constrained	1973 Actual†
Motor Gasoline	6,633	900	5,733	6,355	7,163	900	6,263	6,840
Aviation Fuels	1,325	165	1,160	1,114	1,305	165	1,140	1,098
Middle Distillate	4,694	500	4,194	4,220	2,927	50	2,877	2,711
Residual	3,694	375	3,319	3,241	2,906	200	2,706	2,560
LPG and LRG	1,876	196	1,680	1,784	1,315	196	1,119	1,263
Other Products	1,861	170	1,691	1,773	2,224	170	2,054	2,105
Total	**20,083**	**2,306**	**17,777**	**18,487**	**17,840**	**1,681**	**16,159**	**16,591**

* FEO measures with NPC adjustments (see Table 8).

† Source: Bureau of Mines.

- Demand will be constrained by the announced actions of the of the FEO. (Additional demand reductions--as required to balance in the second quarter--are assumed to be taken in motor gasoline.)

- Inventories will be drawn down to minimum historical levels, as required.

- No added domestic crude production is assumed over that used in the normal supply/demand balance.

- Added military demand of 295 thousand barrels per day occasioned by loss of foreign supply is included in demand.

Added Reductions

The major point to be made by Table 10 is that the first quarter can be essentially balanced, but demand in the second quarter must be curtailed by a substantially greater amount (over 400 thousand barrels per day) than now planned.

Inventories

In preparing the projected supply/demand balance, it was assumed that all available inventory of particular products would be consumed consistent with expected imports and limitations of refinery yield flexibility. In other words, demand for all products should equal the sum of new production, imports and available inventory.

Available inventory is defined as that amount which exceeds the minimum historical level (MHL) for a given date--the level needed to maintain operations without dislocations or spot shortages. The minimum historical levels have been taken as the lowest observed inventories as published by the Bureau of Mines at a particular date in recent history. MHL is not simply determined for several reasons: (1) on an industry basis, all companies are not necessarily in the same physical operating situation at the same time; (2) no surveys are available to verify the adequacy of the MHL's used; the low figure could well have been an exceptional level (due to weather, for example) that was soon changed and does not represent a sustainable level; and (3) demand has grown which should normally require increasing inventory levels. This factor has been ignored. It is known, however, that at the lowest MHL's used for gasoline and middle distillates spot shortages actually occurred. Accordingly, the MHL's suggested are considered to be on the low side and should not be intentionally reached. The pertinent figures are set out in Table 11. MHL's have been established for December 31, March 31 and June 30. The levels vary among the months because of seasonal buildup. The lowest levels for each fuel are as published in the November 15 report, except that the *middle distillate* category has been increased by 15 million barrels to reflect the inclusion of kerosine to the category.

TABLE 10

ADJUSTED 1974 SUPPLY/DEMAND BALANCE
(Thousand Barrels per Day)

	First Quarter	Second Quarter
Demand (Constrained)		
Domestic (Constrained)	17,269	15,643
Export	213	221
Added Offshore Military Demand	295	295
Total	**17,777**	**16,159**
Domestic Supply		
Crude	9,128	9,062
NGL	1,725	1,725
Processing Gain and Other	473	476
Inventory Drawdown (Buildup)	1,301	(572)
Subtotal	**12,627**	**10,691**
Average Import Estimate		
Crude	2,450	2,510
NGL	130	130
Unfinished Oils	105	105
Product	2,465	2,310
Subtotal	**5,150**	**5,055**
Total Supply	**17,777**	**15,746**
Additional Demand Reduction	0	413

As of December 31, 1973, residual fuel oil levels were at MHL; gasoline was 4.3 million barrels above MHL; and middle distillates were about 50 million barrels over minimum. Gasoline stocks reflect the results of demand conservation measures and larger than expected imports; the amount over MHL, however, represents less than one day's consumption, or only 0.7 percent of first-quarter demand. With no added gasoline demand reductions above the 900 thousand barrels per day assumed by FEO, gasoline inventories as of June 30 would by 37.1 million barrels *under* MHL, assuming the total supply shortage in the second quarter is taken in gasoline. It will require further demand reduction of 413 thousand barrels per day to keep inventories above MHL. The middle distillates level as of December 31 reflects maximization of refinery runs to distillates, warmer weather and larger than expected imports. Although the 50 million barrels over MHL represents about 11 days consumption and is about 12 percent of first quarter demand, it is required to compensate in the second quarter for the expected inability of the refinery system to rebuild inventories for the 1974-1975 heating season. The projected June 30 level is at MHL.

TABLE 11

PETROLEUM INVENTORIES IN THE U.S.
(Millions of Barrels)

	Month Ending		
	December 1973	March 1974	June 1974
Motor Gasoline			
6 Year Low—Minimum Historical Level	204	208	195
Actual/Projected (Constrained Demand)	208.3	208	†
Middle Distillates*			
6 Year Low—Minimum Historical Level	173	115	147
Actual/Projected (Constrained Demand)	223.8	126	147
Residual Fuel Oil			
6 Year Low—Minimum Historical Level	53	40	46
Actual/Projected (Constrained Demand)	52.9	40	46

* Includes Distillate Fuel Oil and Kerosine.

† If the additional 413 thousand barrels per day of demand reduction is taken in gasoline (1,313 thousand barrels per day total gasoline reduction) closing inventory is projected at 195 million barrels. If no product demand reductions are made and gasoline inventory is used to meet supply as necessary, then closing gasoline inventory is projected at 158 million barrels—a level that is believed to be not operable.

Source: Bureau of Mines except API for figures at December 31, 1973.

Refinery Operations

Until crude oil imports return to estimated pre-embargo levels, U.S. refining capacity will not be fully utilized. This condition will prevail because of the inability to obtain any significant volumes of additional crude oil in the short term from domestic production, inventories or non-embargoed foreign sources.

Refinery yields for particular product categories are a function not only of the characteristics and technical limitations of existing refinery facilities but also of a number of other criteria: satisfying current demand and providing for future seasonal inventory needs, conforming to a complex mix of product specifications and complying with government directives while operating as efficiently and as economically as possible. Therefore, for making a supply balance, it is desirable to hold projected refinery yields within or near the limits of recent historical capability.

GROSS SHORTFALL AND BALANCING STEPS--MAJOR PRODUCT CATEGORY BASIS

Table 12 summarizes the first and second quarter 1974 gross shortfall by major product category and the steps that could be

TABLE 12

GROSS PRODUCT SHORTFALLS AND BALANCING STEPS
(Thousand Barrels per Day)

Products	Gross Shortfalls			Balancing Steps			
	First Quarter 1974						
	Adjusted Normal Demand*	Supply†	Gross Shortfall	Additional Inventory Drawdown (Buildup)‡	Refinery Yield Increase-(Decrease)	Demand Reductions	Net Shortfall
Motor Gasoline	6,635	6,056	577	54	(377)	900	0
Aviation Fuels	1,325	989	336	58	113	165	0
Middle Distillates	4,694	4,019	675	360	(185)	500	0
Residual Fuel	3,694	2,842	852	28	449	375	0
LPG & LRG	1,876	1,791	85	(111)	–	196	0
Other Products§	1,861	1,718	143	(27)	–	170	0
Total	**20,083**	**17,415**	**2,668**	**362**	**0**	**2,306**	**0**
	Second Quarter 1974						
Motor Gasoline	7,163	6,476	687	39	(665)	900	413
Aviation Fuels	1,305	975	330	3	162	165	0
Middle Distillates	2,927	2,525	402	150	202	50	0
Residual Fuel	2,906	2,387	519	18	301	200	0
LPG & LRG	1,315	1,262	53	(143)	–	196	0
Other Products §	2,224	1,930	294	124	–	170	0
Total	**17,840**	**15,555**	**2,285**	**191**	**0**	**1,681**	**413‖**

* Based on IPAA October 1973 projection plus additional offshore military demand.

† IPAA October 1973 projection with NPC estimates of imports.

‡ Includes adjustment for inventory opening and closing.

§ Includes crude, condensate and losses.

‖ Indicates need for added demand reduction (reduction shown here as gasoline).

taken to re-balance the system.* The steps include abnormal inventory changes, refinery yield changes and demand reductions. Demand reductions are the essential balancing step after maximizing the other alternatives. The additional demand reduction of 413 thousand barrels per day is shown in motor gasoline as one method of achieving a balance. This method was used only to display the problem. There may very well be less disruptive reductions that could be made in other products.

Abnormal Inventory Changes

In the first quarter, major product inventories are drawn down by 362 thousand barrels per day more than normal drawdown projected by the IPAA, including adjustments of starting inventory differences. This drawdown is made possible by the higher-than-expected December 31, 1973 inventory. In the second quarter, gasoline, aviation fuel and other products are drawn down more than normal. Middle distillates and residual fuel oil inventories are built to MHL on June 30 in preparation for the 1974-1975 winter season.

Refinery Yield Changes

To aid in balancing the system by major products, reasonable refinery yield changes (within historical limits) are assumed. In the first quarter, gasoline and middle distillates are reduced to make additional jet fuel and residual fuel oil. In the second quarter, gasoline yield is reduced to make additional jet fuel, middle distillates and residual fuel. Some of these changes may be accomplished outside of the refineries by substituting middle distillates for residual fuel oil, for example.

Demand Reductions

The demand reductions are the modified FEO estimates as of the end of January. However, demand in the second quarter must be reduced in excess of the FEO reductions in order to balance the system. As discussed previously, the demand reductions are shown in motor gasoline for illustrative purposes.

* Includes military demand and normal inventory effects.

Chapter Three

SENSITIVITY FACTORS FOR 1974

It is extremely difficult in any discussion of supply/demand balances for future periods to make single, fixed estimates due to the vast number of variables involved in such calculations. The computation of these balances necessarily is based on many underlying assumptions. The following is a discussion of these sensitivity factors which could alter the base assumptions, and thus the supply/demand balances, for the first and second quarters of 1974.

DEMAND SENSITIVITIES

Demand for crude oil and petroleum products is sensitive to many factors. The following is an examination of some of the more pertinent variables that may influence demand during 1974.

Weather will be a major consideration, particularly during the first quarter of 1974, in the requirement for heating fuels. During the fourth quarter of 1973, temperatures were considerably above normal, thus reducing heating fuel demand during the period. Normal temperature averages for the entire heating season would indicate below-normal temperatures for the remainder of the season, resulting in an increased demand for distillates and residual fuel oil of about 300 thousand barrels per day versus the *normal* assumed in current estimates. Below-normal end-of-season temperatures would also result in an increased demand for fuel products by electric utilities to generate electricity for heating purposes. Conversely, warmer-than-normal weather in the first quarter (as has been the experience through mid-February) would decrease demand from the *normal* level.

Voluntary curtailments will be a variable influence on demand during the first and second quarters of 1974. Public acceptance of energy conservation measures has been a major consideration in the demand reductions that have occurred since the embargo was instituted. If voluntary curtailments increase during this period, greater demand reductions will be experienced. Similarly, if public acceptance of conservation measures wanes due to false security occasioned by distorted reports of inventory levels or other misrepresentations of the magnitude of the energy problem, the indicated demand reductions will not be achieved.

Mandatory government-imposed actions will directly influence demand. It is estimated that allocation programs and other actions will result in reduced consumption of 2.3 million barrels per day. Only limited experience is available on which to base the validity of these estimates. As pointed out earlier, it is very important that these reductions be achieved.

Conversion measures such as the substitution of gas, coal and nuclear for oil as an energy source could result in an estimated reduction of 100 to 125 thousand barrels per day for the first half of 1974. As the potential for conversion exceeds 400 thousand barrels per day, it is possible that the substitution will be greater than estimated, resulting in a reduction in oil demand. Yet again, the conversion may not exceed the present level of about 75 thousand barrels per day, and thus oil demand would be greater than estimated in Table 12. Additionally, if demand for natural gas and electricity could be reduced and if these savings could be translated into reduced oil demand, the shortfall would be reduced.

Gross National Product. Another consideration which will tend to decrease fuel consumption below assumed levels in the next several months is the expected low rate of increase in real GNP. It is impossible, however, to distinguish or quantify the fluctuations in demand that result from this factor.

Other factors also have a role in influencing demand levels for this period. The demand picture could be distorted by the withholding or delaying of consumption for fear of lack of supply, such as the decision by a consumer to forego a driving trip. Vacations, or other trips, however, may simply be deferred rather than cancelled, depending on the consumer's future assessment of fuel supply conditions.

The levels of secondary and tertiary inventories may also affect demand. The buildup and drawdown of these inventories will distort the demand picture for whatever periods in which they occur. Data are not available to allow meaningful quantification of such effects.

SUPPLY SENSITIVITIES

Petroleum supplies during the first half of 1974 will be subject to the sensitivities of imports, additional oil and gas production and inventory management strategies. The following is an examination of some of the more important factors.

Domestic Production. Production of domestic crude and natural gas liquids is expected to remain relatively constant at 10.8 million barrels per day during the first two quarters of 1974. During this period, the potential of additional crude oil and gas production could be realized. The crude oil could be produced from the Naval Petroleum Reserves and a limited number of large, high-quality fields by temporarily operating these fields at rates in excess of their MER's. Temporary emergency production can have little impact during the first quarter but might contribute an average of 330 thousand barrels per day during the second quarter if the necessary actions are taken immediately.

It is estimated that perhaps as much as 1 billion cubic feet per day of additional gas could be produced under emergency incen-

tives provided by the Federal Power Commission. The combined contribution of additional oil and gas production to offsetting the net shortfall could average 530 thousand barrels per day during the second quarter, boosting supplies well above levels assumed in this report.

Imports. Estimated imports during the first two quarters of 1974 will be subject to variations depending on the effectiveness of the embargo and the absolute levels of production cutbacks. Import estimates range between approximately plus or minus 10 percent in the first and second quarter 1974 supply and demand balances.

Because of the volatility of the situation in the Middle East, no single estimate is implausible; thus, the average figures used in this report do not necessarily reflect a *most likely* situation. In addition, the ratio of the crude oil to products will also affect the sensitivity of import supplies.

It should also be noted that future import levels may be influenced by U.S. Government policies in two areas: (1) the maximum price of imported crude oil that may be permitted to pass through into refined product prices, and (2) possible future determination of the total amount of money that the United States may be willing to spend on petroleum imports.

Imports will also be dependent on the duration of the embargo. This consideration is based upon international politics and government policies; and import levels will vary accordingly. The end of the embargo, assuming it is accompanied by an increase in Arab oil production, will not be transmitted into an immediate increase in supply levels in the United States for two main reasons. First, oil shipped from the Persian Gulf will require over 30 days to reach the United States, and the time required to move ships to the Persian Gulf, load and discharge vessels may almost double this time. Second, product imports to the United States derived from embargoed crude require additional time for refining and associated intermediate discharge, processing, loading and shipment on the way to the United States. All stocks reaching the United States must be handled one or more times before reaching the consumer. Consequently, the embargo's effect will last substantially beyond its lifting date.

Undoubtedly, the increase in reported imports will build gradually, in a manner similar to the fall of imports, rather than an abrupt surge upward. Replenishment of offshore inventories will contribute to such a dampening of import increase. Thus, the timing of the end of the embargo will be an important factor in any computation of supply levels.

Chapter Four

IMPACT OF OIL IMPORT INTERRUPTIONS ON THE NATIONAL ECONOMY

The November NPC appraisal of the potential impact of energy shortages on GNP and employment considered a possible denial of up to 3 million barrels per day. This is still representative of the order of magnitude of possible petroleum shortages for the time period considered in this report. Nevertheless, it should be noted that the estimate of economic dislocation presented earlier assumed generally less effective conservation measures and allocation policies than have been adopted and no increase in the real price of fuels. In fact, moderately effective conservation and allocation actions have been taken. Furthermore, petroleum product prices have risen--in large part due to quadrupling of crude oil prices by producing countries, but also domestically as required to call forth economically marginal production and to stimulate additional exploration. These product price rises have contributed to the observed reduction in energy demand from earlier forecasts. Therefore, the economic dislocation effects of fuel shortages are now expected to be somewhat less severe.

In addition to direct reductions in economic activity resulting from lower fuel deliveries--for example, curtailed service and associated employment reductions by airlines--there have been important secondary economic consequences of the interruption of oil imports. Certainly the reduction in automobile and recreation vehicle manufacture reflects gasoline price and availability considerations, and homebuilding and other categories of construction have been affected by current fuel supply problems and uncertain future conditions. Layoffs in one industry ultimately depress sales and employment in other industries in a cumulative manner as the effects spread throughout the general economy.

Assuming that current conservation and fuel allocation policies continue to be moderately effective, and petroleum supplies equivalent to projected volumes are available, it is considered unlikely that sharply lower rates of economic activity in the United States or much higher unemployment rates will result from energy shortages. Nevertheless, if oil imports are not substantially increased well before year-end, it is thought not possible that real GNP can be increased significantly above the current level, or that unemployment rates in the neighborhood of 6 percent can be avoided.

An important potential constraint on petroleum imports and ultimately upon real GNP is the impact of sharply higher costs of petroleum imports upon the U.S. balance of payments. It is not clear at this time how the U.S. economy will be able to meet the much greater costs of petroleum imports without sustaining a very serious external deficit, and the longer range costs of achieving balance of payments equilibrium may constitute a continuing economic burden. The dollar outlays for even the restricted level

of imports this year will reach $18 to $20 billion. Petroleum consumption ultimately could be constrained by our financial capacity to make payment for extremely costly oil and gas imports.

The primary focus of this report is upon anticipated conditions during the first half of 1974. However, the expected longer-term necessity of making major adjustments in established petroleum supply and consumption patterns in response to dramatically increased real prices will result in generally lower potential rates of increases in real GNP in this country. The real cost of providing required energy supplies will be substantially greater in the future, meaning that more labor and capital will be required to provide the same amount of energy. Moreover, relatively less energy will be available to support the production of other goods and services. This condition will be reflected in lower measured productivity and slower rates of real economic growth.

Appendices

United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

DEC 5 - 1972

Dear Mr. True:

The United States is in a period of rapidly increasing dependence on imported petroleum. Associated with this dependency is the high risk involved to the Nation's economic well-being and security in the event these needed, imported energy supplies are interrupted for any reason. With such an alarming trend it becomes mandatory that the Nation's emergency preparedness program to insure supply of petroleum be improved without delay.

Over the past years, the Council has provided the Department of Interior with many outstanding studies which have contributed directly to preparedness for a national emergency. The Council's recent comprehensive energy outlook study indicates national policy options which will minimize dependence on imported petroleum over the long term. However, the study does not examine and evaluate alternatives, possible emergency actions and the results of such actions in the event of a temporary denial or marked reduction in the volume of imported petroleum available to the Nation during the next few years ahead.

The Council is therefore requested to make a comprehensive study and analysis of possible emergency supplements to or alternatives for imported oil, natural gas liquids and products in the event of interruptions to current levels of imports of these energy supplies. Where possible, the results of emergency measures or actions that could be taken before or during an emergency under present conditions should be quantified. For the purpose of this study only, assume that current levels of petroleum imports to the United States are reduced by denial of (a) 1.5 million barrels per day for a 60-day period, and (b) 2.0 million barrels per day for a 90-day period.

Of particular interest are supplements to normal domestic supply such as: the capability for emergency increases in production, processing, transportation and related storage; the ability to provide and maintain an emergency storage capability and inventories; interfuel substitution

or convertibility of primary fuels in the major fuel consuming sectors; side effects of abnormal emergency operations; gains in supply from varying levels of curtailments, rationing and conservation measures; gains from temporary relaxation of environmental restrictions; as well as the constraints, if any, imposed by deficient support capability if an extraordinary demand occurs for manpower, materials, associated capital requirements and operating expenses due to emergency measures.

Such studies should be completed as soon as practicable, with at least a preliminary report presented to me by July 1973.

Sincerely yours,

Hollis M. Dole

Assistant Secretary of the Interior

Mr. H. A. True, Jr.
Chairman
National Petroleum Council
1625 K Street, N. W.
Washington, D. C. 20006

United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

In Reply Refer to:
MOG

JAN 22 1973

Dear Mr. True:

In our letter to you of December 5, 1972, we asked that the National Petroleum Council make a comprehensive study and analysis of possible emergency supplements to or alternatives for imported oil, natural gas liquids and products in the event of interruptions to current levels of imports of these energy supplies. We are pleased that the Council has agreed to undertake this study.

Our request letter set out several assumptions regarding petroleum supply levels which we now believe require clarification. Rather than assuming a reduction in petroleum imports to the United States of (a) 1.5 million barrels per day for a 60-day period, and (b) 2.0 million barrels per day for a 90-day period, it would be more useful to assume a denial of (a) 1.5 million barrels per day for 90 days, and (b) 3.0 million barrels per day for a period of 6 months. It is anticipated that the Committee will consider the current and predicted mix between crude and product imports in determining the impact of the assumed denials.

We wish to reaffirm that a preliminary report should be submitted by July 1973.

Sincerely yours,

Secretary of the Interior

Mr. H. A. True, Jr.
Chairman
National Petroleum Council
1625 K Street, N.W.
Washington, D. C. 20006

United States Department of the Interior

OFFICE OF THE SECRETARY
WASHINGTON, D.C. 20240

In Reply Refer To:
EOG

OCT 26 1973

Dear Mr. True:

One of the scenarios in the National Petroleum Council's Emergency Preparedness Study considers a major interruption in foreign oil supplies to the United States as of January 1, 1974.

Though this phase of your Study is nearing completion, recent events have added new urgency to this scenario. Therefore, I ask that you quickly draw together the work which you have accomplished regarding a January 1, 1974 supply interruption and submit it to the Department of the Interior at the earliest possible date.

Sincerely yours,

Stephen A. Wakefield

Assistant Secretary of the Interior

Mr. H. A. True, Jr.
Chairman, National Petroleum Council
1625 K Street, N.W., Suite 601
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AUTHORITIES AND ACTIONS TO COPE WITH THE CURRENT SITUATION *

ADMINISTRATIVE AND LEGAL AUTHORITIES

Economic Stabilization Act Amendments of 1973

The Economic Stabilization Act P.L. 92-210 was amended April 30, 1973, and provides in part in Section 203(a):

> ...that in order to maintain and promote competition in the petroleum industry and assure sufficient supplies of petroleum products to meet the essential needs of various sections of the Nation, it is necessary to provide for the rational and equitable distribution of those products.

A new Section 203(a)(3) provides that the President is authorized to issue orders and regulations and:

> ...make appropriate for the establishment of priorities of use and for systematic allocation of supplies of petroleum products, including crude oil in order to meet the essential needs of various sections of the Nation and to prevent anti-competitive effects resulting from the shortages of such products.

Emergency Petroleum Allocation Act of 1973

The Emergency Petroleum Allocation Act of 1973, P.L. 93-159, directed the President to exercise specific temporary authority to deal with shortages of crude oil, residual fuel oil and refined petroleum products or dislocation in the national distribution system. Authority under this Act is to be exercised for the purpose of minimizing the adverse impacts of such shortages or dislocations on the American people and the domestic economy. The Act which became law November 27, 1973, requires the President to promulgate a regulation for mandatory allocation of crude oil, residual fuel oil and each refined product in specified amounts and at prices specified by the regulation.

Federal Energy Office

On December 4, 1973, under the authority of the Economic Stabilization Act of 1970 (P.L. 91-379, 84 Stat. 799), as amended, the Emergency Petroleum Allocation Act of 1973 (P.L. 93-159), enacted November 27, 1973), the Defense Production Act of 1950 (50 USC App. 2166-a), as amended, and Section 301 of Title 3, U.S. Code, the President established (by Executive Order 11748) in the Executive Office of the President a Federal Energy Office. All

* Actions detailed in this appendix are current as of mid-February 1974. Because of the rapidly moving nature of energy policy, subsequent actions may alter some of the statements contained in this revie

the authority vested in the President by the Emergency Petroleum Allocation Act of 1970, as amended, was delegated to the Administrator, FEO. The authority vested in the President by the Defense Production Act of 1950, as amended, as it relates to the production, conservation, use, control, distribution and allocation of energy was also delegated to the Administrator, FEO.

Executive Order 11748 directed the Chairman of the Cost of Living Council to delegate from time to time such authority under the Economic Stabilization Act as may be necessary to carry out the purposes of that Act with respect to energy matters. Pursuant to that directive, on December 26, 1973, authority was delegated to the Administrator, FEO to make determinations and take actions required or permitted by the Economic Stabilization Act of 1970, as amended, with respect to petroleum products and crude oil and the leasing of real property used in the retailing of gasoline. This delegation of authority with respect to applications for exceptions and determinations and actions regarding Phase II, Phase III and Phase IV compliance and enforcement cases is effective only for cases received on or after December 21, 1973. The delegation does not include authority for stabilization of wages or salaries or authority with respect to the petrochemical industry.

The Federal Energy Office issued on January 14, 1974, effective January 15, 1974, Title 10, Chapter 11, Petroleum Allocation and Price Regulations intended to implement the Emergency Petroleum Allocation Act of 1973 P.L. 93-159 and Executive Order 11748. These comprehensive regulations revoke the previously issued FEO regulations 10 CFR Parts 200, 201, and 202 and supersede the voluntary programs established by the Energy Policy Office. The principal provisions are:

Part 205, Administrative Procedures, states that the criteria for granting a petition for an adjustment or assignment will be sure that the allocation shall provide:

1. Protection of public health, safety and welfare, and the national defense,

2. maintenance of all public services,

3. maintenance of agricultural operations and services directly related thereto,

4. preservation of economically sound and competitive petroleum industry,

5. the allocation of suitable types, grades and quality of crude oil to refineries in the United States to permit such refineries to operate at full capacity,

6. equitable distribution of crude oil, residual fuel oil, and refined petroleum products at equitable prices among all regions and areas of the United States and sectors of the petroleum industry,

7. allocation of residual fuel oil and refined petroleum in such amounts and in such manner as may be necessary for the maintenance of exploration for, and production of, fuels, and for required transportation related thereto,

8. economic efficiency; and,

9. minimization of economic distortion, inflexibility, and unnecessary interference in market mechanisms.

The criteria abstracted above were published in paragraph 205.24 as direct quotes from P.L. 93-159, Section 4(b)(1).

Part 210, General Allocation and Price Rules, exempts from these regulations the first sale of domestic crude petroleum and petroleum condensates including natural gas liquids produced from stripper wells, that is, wells that average during the month no more than 10 barrels per day of petroleum liquids in total production. This exemption was provided by P.L. 93-159, Section 4(e)(2)A. Rules are established for meetings with oil company representatives as was required by P.L. 93-159. Suppliers will deal with purchasers according to normal business practices. Quantities of an allocated product required by an allocation order to be sold must be sold at the price for that product on the date the order was issued or other date specified by the order.

Part 211, Mandatory Petroleum Allocation Regulations, establishes allocation levels, supplier/purchaser relationship, method of allocation and procedures and reporting requirements for each class of petroleum liquid.

These allocation regulations apply to crude oil (except the first sale of stripper well oil), residual fuel oil and refined petroleum products produced or imported into the United States. They do not apply to refinery products such as paraffin wax, coke, asphalt, road oil (not crude oil) and refinery gases or to natural gas.

State set-asides are provided for middle distillates, residual fuel oil, motor gasoline and propane.

Each supplier's allocable supply for each allocated product is the sum of production, imports, purchases and inventory adjustments less any required state set-asides.

Suppliers are required to allocate their total allocable supply among their wholesale purchasers in proportion to the purchasers base period volumes, or adjusted base period volumes. The base period is specified for each product. Each supplier's allocation fraction for a product is his estimated allocable supply divided by his base-period volume. This supplier allocation fraction must be adjusted monthly and cannot be applied above 1.0

without FEO approval. Each supplier was required to report to each of his wholesale purchasers by February 1, 1974, the volume of each allocable product sold to that wholesale purchaser in each month of the base period year. The regulations provided for adjustments in the allocation program to account for substantial changes and requirements of wholesale purchasers.

Subpart C - Crude Oil and Refinery Yield Control establishes rules for distribution of crude oil supplies between refineries based upon a quarterly determination of refinery allocable supply/capacity ratio. The allocable crude oil supply available for redistribution does not include amounts in excess of 1973 levels or crude oil produced from stripper wells and exempted from the program by P.L. 93-159, Section 4(e)(2)A. There is no state set-aside for crude oil allocation. The refinery yield control program is designed to require refiners to maximize production of aviation fuels, distillates, residual fuels and petrochemical feedstocks by reducing the total production of gasoline. Refiners will be allowed to produce their historical 1972 quarterly gasoline yield fraction multiplied by a fraction which may be ordered by the FEO as circumstances warrant.

Subpart D - Propane allocates by classes of priority uses with an initial 3 percent state set-aside for hardship cases. The base period is the period from October 31, 1972, through April 30, 1973.

Subpart E - Butane allocates by classes of priority uses and provides no state set-aside. Use for peak shaving by a gas utility is limited. The base period is the corresponding quarter of 1972.

Subpart F - Motor Gasoline allocates 100 percent of current requirements for the following uses:

- Agricultural production
- Emergency services
- Energy production
- Sanitation services
- Telecommunication services
- Passenger transportation services.

Also, 100 percent of base period is allocated for all other business activities. The base period is the corresponding month of 1972. The initial state set-aside for hardship cases is 3 percent.

Subpart G - Middle Distillates allocates by class of priority uses. One hundred (100) percent of current requirements is allocated for the same uses listed above for gasoline, plus the manufacturing of ethical drugs and related research and for space heating with specified requirements for lower ambient indoor temperatures. Allocation for electric utilities is 100 percent of base period volumes or as otherwise ordered by the FEO taking into account factors such as convertibility of coal. One hundred ten (110) percent of base-period use is allocated for industrial use (except space heating) and for cargo freight and mail handling. The base period is the corresponding month of 1972. There is an initial state set-aside of 4 percent.

Subpart H - Aviation Fuels allocates specified percentages of base period-volumes by classes of priority uses. Only emergency services, safety and mercy missions, agricultural production, energy production and aircraft manufacturing are allocated 100 percent of current requirements. Aircraft manufacturing is limited to 130 percent of base-period use. The base period is the corresponding month of 1972. There is no state set-aside and there will be no hardship allocation for general or public aviation.

Subpart I - Residual Fuel Oil allocates 100 percent of current requirements to specific non-utility priority uses with specified ambient indoor temperature reduction. Priority uses are the same as for motor gasoline plus the manufacture of ethical drugs and related research and for non-military marine shipping except for recreational cruise ships. The FEO will issue special monthly allocations for each utility. Industrial users are allocated 100 percent of base-period use. The base period is the corresponding month of 1973. The initial state set-aside is 1.5 percent.

Subpart J - Petrochemical Feedstocks allocation program will attempt to assist petrochemical producers in obtaining feedstocks if they have been unable to contract for 100 percent of current needs. Preference will be given to petrochemical producers whose feedstock supplies are less than their 1972 use. Current supplier/purchaser contracts will take precedence over new contracts under this program. There is no state set-aside.

Subpart K - Other Products which include refined lubricating oils, naphtha and any other refined products not covered by Subparts D through J, provide for 100 percent allocation of current requirements. The base period is the corresponding quarter of 1972. There is no state set-aside of these products.

Subpart L - General Reporting and Record Keeping Requirements calls for monthly reports of refiners and importers of beginning, ending and fluctuations in crude and product inventories; receipts, deliveries and other details related to implementation of the allocation program. This was revised on February 11, 1974, to require weekly reporting by refineries, bulk terminal operators, importers and crude oil to product pipelines operators. The first report is due March 4, 1974.

Part 212, Mandatory Petroleum Price Regulations establishes rules for crude oil and product price increases.

Subpart C exempts from regulations the price charged for the first sales of petroleum liquids from any stripper well.

Subpart D allows a price increase for any crude oil of $1.35 per barrel above the posted price as of 6:00 a.m., May 15, 1973. New oil (production from a property in excess of that produced in the same month of 1972) is exempt from price regulation, as is stripper well oil.

Subpart E sets out procedures for refiners to calculate their allowed increases in product prices. A price in excess of the base price (May 15, 1973) of an item in a product line may be changed only to recover on a dollar-for-dollar basis those net increases in allowable costs that have been incurred and will continue with respect to the product line since the period for determining base cost.

As the first follow-up order implementing regulation 10 CRF, Part 211, the FEO issued on January 18, 1974, the National Supply/Capacity Ratio and Refiners Buy-Sell List, effective February 1, through April 30, 1974. The national (FEO) ratio of allocable supply to refining capacity for all domestic refiners was calculated for the period to be 0.7631. On January 30, 1974, the FEO ratio was corrected to 0.7665.

The Federal Energy Office published on January 16, 1974, a Gasoline Rationing Contingency Plan as a notice of inquiry. Comments were requested by January 30, 1974. The announced goals of the plan are to:

- Provide an equitable system of supply
- Preserve economic stability
- Maximize individual freedom of choice
- Establish a workable administrative framework.

The rationing program would apply only to the retail purchase of gasoline. Coupons would be issued to each person in the United States at least 18 years of age who holds a valid driver's license. All coupons would have the same gallonage value, but the number issued per driver would vary with area population density. Trading or sale of coupons would be encouraged. A 5-percent state set-aside is proposed to provide state officials a means of relieving hardship cases. Each coupon would be signed by the user when gasoline is purchased. The gasoline retailer would be required to turn in the redeemed coupons to a collection point where he would be given a receipt to forward to his supplier to authorize delivery of his re-supply. The states would have some part in the ration program, but the bulk of the responsibility would be

retained by the FEO. This would include distributing of coupons, collecting the cancelled coupons, auditing, monitoring and enforcing the provisions of the program.

Voluntary Agreements

The Defense Production Act of 1950 contained specific titles authorizing priorities and allocations, requisitioning and condemnation, expansion of productive capacity and supply, stabilization of wages and prices, settlement of labor disputes and control of real estate credit. The section on general provisions authorized the President to consult with representatives of industry and other groups to encourage such persons to develop voluntary agreements and programs to further the objectives of the Act. Such agreements and programs were required to be approved by the President and the Department of Justice. The Act exempted certain actions taken pursuant to an authorized voluntary agreement or program from the antitrust laws or the Federal Trade Commission Act of the United States

The first Voluntary Agreements Relating to Foreign Petroleum Supply was approved in 1951 with 19 oil companies participating. That Voluntary Agreement established the procedure under which participating companies could take cooperative action to prevent, eliminate or alleviate shortages of petroleum supplies from friendly foreign nations which threaten the defense interests or programs of the United States. The procedure prescribed in the Voluntary Agreement included an emergency plan of action and established the Foreign Petroleum Supply Committee to assist in carrying out the objectives of the Agreement.

The voluntary Agreement has been amended several times, the most recent being in 1967. The emergency provisions have been used in three serious petroleum crises (1951, 1956 and 1967) when interruption of oil supplies has occurred in one or more of the principal oil-exporting nations.

The Foreign Petroleum Supply Committee was called into closed session by the Secretary of the Interior on October 30, 1973, to address the present situation. The Emergency Petroleum Supply Committee was also activated by the Secretary on November 8, 1973.

The Department of Justice has pointed out that the Voluntary Agreement Relating to Foreign Petroleum Supply is very explicitly limited in scope both by its terms and historical practices to emergencies in which deprivation of petroleum supply occurs in friendly foreign nations. For the President to utilize the Voluntary Agreement provisions of the Defense Production Act to consult with representatives of industry on domestic oil supply problems, an entirely new and separate Voluntary Agreement would have to be developed and approved.

The Emergency Petroleum and Gas Administration

The President promulgated a National Plan for Emergency Preparedness in 1964 under authority of the Defense Production Act of 1950, the National Security Act of 1947, the Federal Civil Defense Act of 1950 and the Strategic and Critical Materials Stockpiling Act. The plan recognized that a future emergency might range in seriousness from international tension to limited conventional warfare or even to a nuclear attack.

Chapter 10 of the National Plan for Emergency Preparedness, entitled "Fuel and Energy," deals with oil and gas, solid fuels and electric power. In oil and gas, the most important planning effort has gone into the establishment, staffing and training of the Emergency Petroleum and Gas Administration (EPGA). The EPGA is a standby organization designed to meet the need for an agency which is ready and authorized to coordinate and direct the operation of the petroleum industry in mobilizing the oil and gas resources of the United States in the event of a national emergency.

By Executive Order 10480 and Defense Mobilization Order 8400.1, the Secretary of the Interior has the authority to impose priorities and allocations over petroleum and gas upon the declaration of a national emergency. This authority has been predelegated to EPGA.

The EPGA, on activation, would be an independent government agency headed by a National Administrator who would be the Secretary of the Interior. Other key positions would be filled primarily by personnel drawn from the petroleum and gas industry who are immediately available and trained because they are members of the Petroleum and Gas Unit of the National Defense Executive Reserve with specific responsibilities in the EPGA.

The EPGA cannot be activated by the Secretary of the Interior unless there has been a declaration by the Congress or the President of the National Defense Emergency. If the United States is attacked, activation would be automatic.

Naval Petroleum Reserves

Naval Petroleum Reserve 1 (Elk Hills Field), located about 20 miles west of Bakersfield, California, is the largest petroleum reserve in the United States from the standpoint of short-term additional production potential. Naval Petroleum Reserves are controlled and operated by the U.S. Navy's Office of Naval Petroleum Reserves and under existing laws can only be produced when "...the Secretary, with approval of the President, finds it is needed for national defense and the production is authorized by a joint resolution of Congress." The production of the reserves for national defense has been permitted once before when NPR-1 was authorized to produce 65,000 barrels per day during World War II.

The law here is clear. Authority to produce NPR-1 during the present emergency will require a resolution of Congress, approved by the President.

State Authority for Oil and Gas Production

With the exception of production from federal public lands and the Outer Continental Shelf, all oil and gas production in the United States is under the authority of the respective states. Therefore, any additional production from fields not under federally controlled lands must be in compliance with state laws.

Some additional short-term productive capacity may be made available from five major fields in Texas and a number of other scattered smaller fields. All are now producing at their maximum efficent rate (MER) as has been determined by state regulatory agencies, based upon technical data on individual fields. These MER's are for long-term continuous production without reservoir damage. State statutes forbid the production of any oil or gas field in an inefficient manner or in a way that would reduce ultimate recovery. Therefore, state regulatory agencies, such as the Texas Railroad Commission, cannot legally allow production rates above MER.

Since current field MER's are for sustained rates, the state regulatory agencies could make a technical determination of possible short-term higher MER's on a field-by-field basis where there is spare productive capacity. Establishing higher allowables on a temporary basis should be possible under the state laws.

To obtain this potential additional production for the duration of the present supply emergency will require the cooperation of the state regulatory agencies in establishing temporary higher MER's. Since oil production allowables are not mandatory producing rates, producers in the fields involved would have to be willing to make whatever facility additions as are necessary to produce at the higher but temporary rates.

EXECUTIVE ACTIONS

Table 13 summarizes federal action in response to the President's November 7 and November 25, 1973, recommendations for countering the domestic energy crisis. The President has also recommended the following measures:

- Prevention of oil conversion by industries which currently use coal. Power plants using oil which are able to convert to coal will be encouraged to do so

- Reduction of fuel allocations to commercial and other jet fuel users, leading to schedule changes and a cutback in the number of flights

TABLE 13

ENERGY CONSERVATION MEASURES—JANUARY 3, 1974
(Compiled by the Federal Energy Office)

Measures	Actions to Date	New and Proposed Actions
Outdoor and Ornamental Lighting	President requested curtailment of outdoor advertising and ornamental lighting, including gas yardlights. Federal program includes banning of such lighting with the exception of several national monuments in Washington, D.C.	1. Public education program to drastically reduce use of yardlights, decorative lighting. 2. Request state regulatory authorities to advise utilities to hasten programs to assist customers in lighting reduction programs. 3. Joint FEO and DOC letter to 43,000 major business persons.
Temperature Levels in Buildings and Facilities, including Homes	Sixty-five to 68 degree heating levels in buildings and facilities, cooling levels of 80-82 degrees; petroleum allocation program facilitates objectives; advertising and publicity program since October.	Federal contractors will be required to meet Federal program objectives in in the near future.
Gasoline Sales Limits	Voluntary reductions in purchases (10 gallons a week); limits on refinery gasoline production; coupon printing in the event a rationing system becomes necessary; obtained cooperation of U.S. Chamber and AAA on member gasoline curtailment programs.	Independent gasoline distributors and retailers have agreed to FEO's request to help institute the 10 gallon limit; major oil companies have been ordered to do the same, they agreed to enforce the 10 gallon limit in the company-owned stations and urge their brand name outlets to support the program.
Vehicle Speed Limits	President signed bill to establish maximum 55 mph speed limit. Federal limit is 50 mph.	
Gas Station Closings	Voluntary nationwide ban on retail sales of gasoline from 9:00 p.m. Saturday to midnight Sunday.	

TABLE 13 (Cont'd.)

Measures	Actions to Date	New and Proposed Actions
Indoor Lighting Standards (50-foot candles at work stations, 30-foot candles in work areas, 10-foot candles in corridors,	Total Federal compliance, some voluntary in business and industry.	1. Compliance will be sought in all new and renegotiated Federal contracts. 2. Develop model municipal code and send all mayors. 3. Joint letter from DOC and FEO to 43,000 business firms.
Highway Lighting (Discontinuance or severe reduction in such lighting other than exit and entrance ramps, exit signs, hazardous locations such as busy intersections)	Announcement made of intention to institute	Detailed proposal placed in the Federal Register on reductions in highway lighting; interested parties are given seven days to comment. Work with governors to achieve voluntary compliance.
Limits on Student Driving	Requested students to use public transportation, school buses, carpools in place of private cars.	Letters from FEO and HEW to college and high school officials requesting that they discourage use of cars by students and faculties unless such use is vital to get to and from school and after-school employment.
Electric Space Heaters	Banned in Federal offices	New public education program on their proper use; capacities and efficiencies for specific purposes.
Commercial and Industrial Buildings	Voluntary program to reduce heating and requirements; petroleum allocation program facilitates compliance.	Joint letter from FEO and DOC to 43,000 major business firms.
Federal Programs	Interim report and energy conservation strategy; first quarter (FY'74) results indicate 20 percent energy savings; ornamental lighting ban (exteriors, grounds, monuments) interior lighting standards 50/30/10 or equivalents in Federal facilities; ban on space heaters in offices. Federal program to emphasize reduced driving, less travel, carpooling, automobile purchases to emphasize fuel economy, trade-ins of heavy sedans and limousines, parking space priority system.	

- Relaxation of environmental regulations on a temporary, case-by-case basis

- Imposition of special energy conservation measures, i.e., reduction of commercial operating hours

- Increased production of the Naval Petroleum Reserves

- Use of the proceeds from the sale or exchange of the Navy-owned oil to fund further development and production of NPR-1 and for exploration and proving the Naval Petroleum Reserves in Alaska (NPR-4)

- Reinforcement on the state and local levels of the President's recommendations.

The following actions are currently being taken by the Administration, primarily under the authority of the Economic Stabilization Act of 1970 and the Defense Production Act of 1950:

- The President directed the Secretary of Transportation to give priority to grant applications for the purchase of buses for mass transit under the authority of the Federal Aid Highway Act of 1973 and the Urban Mass Transportation Act.

- The Internal Revenue Service has been directed to monitor the allocation and rationing program.

- The Secretary of the Interior has activated the Emergency Petroleum Supply Committee.

- The establishment of a National Industrial Energy Conservation Council has been directed by the Secretary of Commerce.

- The Federal Energy Office has established advisory committees on business, industry, environment, agriculture and consumer interests.

Governors and Mayors are being asked to determine the supply/demand situation in their areas, develop programs to reduce energy consumption and coordinate with Federal agencies that are allocating fuel. Steps requested of the Governors and Mayors to reduce gasoline demand include:

- A greater use of mass transit and car pools

- Fifty (50) miles-per-hour speed limits on highways. P.L. 93-239, approved January 2, 1974, establishes a national highway speed limit of 55 miles-per-hour.

- Special bus lanes

- Higher parking taxes
- Blocking off certain sectors to cars with only one passenger
- Preferential parking for car pools
- Staggering of working hours in state and local government
- A contingency plan has been developed which includes a program for the rationing of gasoline and was published for comments on January 16, 1974.

The Atomic Energy Commission was requested to speed the licensing and construction of nuclear plants in order to reduce lead times for construction from 10 to 6 years.

Administration legislative proposals to counter the energy crisis signed into public law by the end of the first session of the 93rd Congress:

- P.L. 93-159, Emergency Petroleum Allocation of 1973
- P.L. 93-182, Emergency Daylight Saving Time Energy Conservation Act of 1973
- P.L. 93-193, to amend Section 28 of the Mineral Leasing Act of 1920, to authorize a trans-Alaska oil pipeline, and for other purposes.

Administration legislative proposals awaiting Congressional action include:

- Emergency Energy Act
- Federal Energy Administration
- Energy Research and Development Administration
- Natural Gas Supply Act
- Mined Area Protection Act
- Deepwater Port Facilities
- Elk Hills Naval Petroleum Reserves.

U.S. PETROLEUM EXPORTS

United States exports of petroleum and by-products of petroleum refining have declined in recent years as a proportion of domestic petroleum use. These exports were at the 12-year low of 1.4 percent of U.S. consumption in 1973; they have usually been in the range of 1.6 to 1.9 percent over the last 12 years. The peak year was 1967 at 2.4 percent. These statistics do not by themselves adequately describe the situation. It is necessary to examine the range of products shipped and the destination countries to gain a full appreciation of this sector of U.S. exports.

There are two product groups whose domestic supply has been sufficient and which have been traditional exports: petroleum coke and lubricating oils. For the latest U.S. Bureau of Mines and U.S. Customs data available (first half 1973) petroleum coke was 41.6 percent and lubricating oils were 16.6 percent; a total of 58.2 percent of the petroleum goods exported.

Forty-six percent of first half 1973 petroleum exports from the United States were to countries that sent us more petroleum than they received from us.

Of the 54 percent of petroleum exports going to countries shipping us no petroleum products or less than we shipped them, just over half (52 percent) were exports of coke and lubricating oils. The conclusion is that three-quarters of the petroleum products exported in the first half of 1973 were within the two product categories not stressing U.S. supply or were to countries supplying us more than we supplied them. Only 0.35 percent of U.S. demand for petroleum represents exports that might have been retained for domestic use were it not for the dependency of these countries upon commercial ties with the United States.

The largest categories of stocks exported are petroleum coke and lubricating oils. Exports of petroleum coke have been increasing, which reflects the increased use of coking in U.S. refining and the relative economics of importing countries receiving petroleum coke versus coal for metallurgical uses. Refinery coking operations in the United States were built to allow refiners to convert residual oil into distillate fuel oil.

The United States has been an historic exporter of lubricating oil and greases to the world. Exports of these products have been declining because of the increase in foreign lubricating oil manufacturing capacity. Lube oil exports contribute to a favorable U.S. trade balance because of their high value.