REPORT OF THE

COMMITTEE ON BUNKER "C" FUEL OIL

OF THE

NATIONAL PETROLEUM COUNCIL

December 9, 1952

(Pages 10 & 10A Revised January 9, 1953 in view of recommendations contained in Report of Agenda Committee dated December 30, 1952 regarding request of Deputy Petroleum Administrator dated December 22, 1952 relating to extending period to be covered.)

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NATIONAL PETROLEUM COUNCIL
COMMITTEE ON BUNKER C FUEL OIL
1952

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COPY

December 9, 1952

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Gentlemen:

By letter dated April 21st addressed to Mr. Walter S. Hallanan, Chairman of the National Petroleum Council, Mr. Bruce K. Brown, Deputy Administrator, requested "that the National Petroleum Council study the Bunker C fuel oil supply situation, including the prospects for supplies from United States refineries and by importation, and submit its findings." Mr. Brown's letter further suggested that to the extent found feasible the report might encompass the topics and answer the following questions:

1. Summarize the trends of domestic manufacturing importation, and individual types of usage of Bunker C fuel oil commencing with 1946 and continuing through 1952. (Basic figures are already available to PAD in summary form but it is thought that a Council Committee could amplify the available data, particularly as to usage.)

2. Assuming that the yield of Bunker C fuel oil per barrel of crude run has diminished since 1946, advise as to the reasons for diminution, including technological changes, and the net effect that has resulted in per barrel yields of petroleum products.

3. Is the trend referred to in (2) above a continuing one and, if so, what is the probable bedrock minimum yield of Bunker C fuel oil to be anticipated from United States refineries.

4. Should the quantities of Bunker C fuel oil required in the United States exceed the quantities available from United States refinery operations and by importation, what impediments, if any exist that would prevent an increase in yield of Bunker C fuel oil per barrel of crude oil run?

The Agenda Committee of the National Petroleum Council, in reporting the Deputy Administrator's request, approved the request contained in Mr. Brown's letter of April 21st with the exception of Items 3 and 4 on the ground that "studies involving future

supply and demand relationships and studies involving future price relations in connection therewith, have always been regarded as beyond the scope of Council activity."

Pursuant to Mr. Bruce K. Brown's request of April 21st and authorization of the Council at its April meeting, the Committee on Bunker C Fuel is pleased to submit its report herewith.

Respectfully submitted,

/S/ B. B. Jennings

B. B. Jennings, Chairman
Committee on Bunker "C" Fuel Oil.

REPORT OF THE NATIONAL PETROLEUM COUNCIL COMMITTEE ON BUNKER "C" FUEL OIL

Introduction

The Committee was charged with summarizing the trends of domestic manufacturing, importation, and individual types of usage of Bunker "C" fuel oil, commencing with 1946 and continuing through April 30, 1952. Accordingly, the Committee limited the scope of its study to a review of historical data considered pertinent to an understanding of this product's supply and demand in the United States and various major areas thereof.

The report discusses the Committee findings on trends of production, imports, and end-use of residual fuel oil, together with certain data on the economics of supply and demand factors involved. The subject is covered both on a nationwide basis and by significant regional subdivisions.

Supply Situation

In 1951, the United States' total supply of residual fuel oil amounted to 1,627,000 barrels per day, 270,000 barrels daily or almost 20% above 1946. Practically all of the increase occurred east of the Rocky Mountains. The Midwest (PAW Districts II and IV) increased supplies by over 70,000 barrels daily, or 28.5%, while the East and Gulf Coast areas experienced a combined gain of almost 200,000 barrels daily, or 26.7%. Imports of the product accounted for the increment in supplies in these latter areas, as small changes in refinery production and net receipts/shipments tended to neutralize. The production on the Pacific Coast has remained fairly stable throughout the period, with some decline

recorded in 1950. The latter probably was caused by large above-ground stocks accumulated in prior years. In meeting the demands for light products, California appeared to over-produce residual fuel despite progress towards lower yields on refinery crude runs. Very high heavy fuel inventories in 1949 culminated in their reduction by shipment of considerable volumes to the East Coast over 1949 and 1950. Outbreak of hostilities in Korea followed a year later by the shut down in Iran created satisfactory outlet for California residual supplies during 1951.

Regional participation in the country's total refinery production of residual fuel oil changed only slightly during the period. Refineries located in Districts I and III combined, and in California, each decreased about 1% in their proportion of total supply, while those in Districts II and IV combined gained over 2%. The approximate relative standings in 1951 were: Districts I and III, 48%; Districts II and IV, 23.5%; District V, 28.5%. See Table 1, attached.

Economics of Yield From Crude

The relative stability exhibited in the volumes of production at refineries in this country (+ 5.5% in 5 years) resulted from the combination of materially reduced percentage yields on greatly increased volumes of crude oil run to stills. The latter was impelled by the large gains experienced in demands for gasoline, middle distillates, and specialties, while the yield pattern reflected the economics of refining crude oil into finished products. There was only a moderate decline in yields

in 1951 (California actually increased) due to a number of circumstances, including the increased requirements brought about by the Korean war.

Historically, the price for residual fuel oil has been appreciably lower than for most of the other products refined from crude oil. Indeed, for a great many years it has been lower than the price of the raw material itself. Thus, residual fuel oil has the status of a by-product of the petroleum refining industry. Table II, attached, shows historical relationships of residual fuel oil prices versus those of crude oil and all other refined products.

Price relationships among products, resulting from the changing pattern of supply and demand, primarily caused by the upsurge of middle distillate demands in the postwar period, have caused refiners to utilize technological advances to redesign equipment. This resulted in higher yields of the lighter fractions at the direct expense of residual fuel yields. In the period covered by this report, the overall United States residual fuel oil yield has declined from 25.4% to 19.7%. District V refiners have made the largest reduction in percentage yields, (5.9 yield points), most of this drop in yield having taken place in 1947, while Districts II and IV have made the smallest (4.4%). Districts 1 and III reduced yields 5.2 yield points. If 1947 were used as a starting year for the comparisons, then District V would show the smallest reduction in yield points. See Table III attached.

An additional contributing factor (although a minor one) to the decline in yields of residual fuel oil is the upward trend in average gravity of the crude oil stream avilable to refiners. Table IV, attached, shows that the average gravity of crude oil produced in the United States increased from 34.0° to 34.7° between 1946 and 1951. California and the balance of the country each increased the gravity of production by half a degree. Imported crudes in 1951 averaged 29.6° or 2.8° above the 1946 average. Weighting the domestic production and imports, it is indicated that the average gravity of the crude oil stream to refineries increased 0.6°, between 1946 and 1951, to an average of 34.3°.

Effect of Refining Processes on Yields

The refining processes developed during recent years have been aimed quality-wise toward the up-grading of products and quantity-wise toward the reduction of residual fuel oil yields.

The reasons for working toward the reduction of fuel oil yields is an obvious one as indicated in the foregoing sections of this report. In 1946 residual fuel oil sold at 96.4% of the price of crude oil at the wellhead and in 1951 at 72.5% of crude oil at the wellhead. The refining processes primarily responsible for the reduction of residual fuel oil yield are catalytic cracking and coking.

It should be pointed out that although there has been a constant and successful effort (5.7% reduction percentage yield on residual fuel oil 1951 vs. 1946) to reduce residual fuel oil yields, refiners can, by various operational changes, but without

any or with only very minor equipment changes, increase residual fuel oil yields to almost any level desired. Of course, increases in residual fuel oil yields will be at the expense of other products.

U. S. Demand Trends Summarized

Domestic

United States domestic demand for residual fuel oil in the postwar period has been highly erratic. Although demand in 1951 was almost 17.5% above that in 1946, annual changes in the five-year period range from -3.7% to +11.6%. This is readily understandable as this product has a high sensitivity to changes in industrial production, whether caused by economic conditions or strikes. The influence of strikes, although sometimes obscured by other factors, particularly in reviewing national and annual figures, has been significant. The monthly and regional data accompanying this report will reveal the effects of such important work stoppages as the coal strikes of April 1946, March 1948 and September 1949; the steel strikes of January 1946 and October 1949; and the shipping strikes during the fall of 1946 and 1948. In addition, demand has been influenced by such diverse factors as a competition from Diesel fuel oil, coal, and natural gas, price relationships, variation in temperatures and precipitation, military requirements, and the availability of coal, both here and abroad. The yearly record of U. S. domestic demand is as follows:

Year	Volume (M B/D	Changes from Previous Year MB/D	%
1946	1,315		
1947	1,420	+ 105	+ 8.0
1948	1,368	- 52	- 3.7
1949	1,359	- 9	- 0.7
1950	1,517	+ 158	+11.6
1951	1,544	+ 27	+ 1.8
1st 4 mos. 1952	1,668	- 65	- 3.8

Analyzing domestic demands by principal categories of end-use (Table V), it will be seen that, despite the erratic pattern existing from year to year, only two general types of use - railroad and oil company fuel - showed a loss in 1951 vs. 1946. The downward trend for railroads has been persistent and reflects extensive dieselization of equipment. The volumes used as oil company fuel have fluctuated rather widely and, while influenced somewhat from year-to-year by changes in runs to stills, displacement by gas also has been influential in contributing to the pattern and has kept consumption from rising along with refinery throughput.

An interesting shift in the relative importance of broad types of consumers (from a volume standpoint) occurred between 1946 and 1951. In the first postwar year, railroads were the largest consumers of residual fuel oil, followed closely by the group embracing "smelting, mining and manufacturing." In relatively close third place was shipping. These three categories then accounted for almost 60% of all domestic consumption. By 1951, smelters, etc. had moved into first place with a commanding lead over ships' bunkers, the next largest use, while heating purposes had climbed from sixth into third position. These three in 1951

accounted for 59% of the total. Railroads in that year dropped to sixth position. Public utilities in 1946 were in fifth place, but by 1950 they had moved up to second place, and in 1951, dropped back to fourth place.

Export

Exports of residual fuel oil rose over 200% between 1946 and 1951. With the exception of a minor drop in 1949, the annual growth rate varied between 17% and 30% per year through 1950. In 1951, however, exports soared as a direct result of the Iranian situation. The volume of 80,000 barrels daily was up 80% from the 1950 level, and through the first four months of 1952 this average volume was maintained.

Total demand (including exports) in the five year period increased about 284,000 barrels daily, or over 21%. See Table V attached.

Trends in Demand by Districts

The following table shows that Districts I and III, combined, have remained dominant and even increased their participation in the country's total domestic demand during the period reviewed. District V maintained second place, but has slipped fast and it is the only area to show an absolute loss 1951 vs. 1946. Districts II and IV, combined, have risen appreciably, although they still account for the lowest volume of consumption.

Area	1946 Demand M B/D	1946 Percentage Partici- pation	1951 Demand (M B/D)	1951 Percentage Partici- pation	Percentage Change 1951 vs. 1946
Districts 1 & III	722.0	54.9	916.0	59.3	+ 26.9
Districts II & IV	244.1	18.6	308.4	20.0	+ 26.3
District V	349.0	26.5	320.0	20.7	- 8.3
Total U. S.	1,315.1	100.0	1,544.4	100.0	+ 17.4

Districts I & III

The area embracing Districts I and III is the largest consumer of residual fuel oil. It has accounted for 55% to 62% of the country's domestic demand in each year since the war and, in the five-year period reviewed, has experienced a percentage gain slightly greater than the other areas east of the Pacific states.

Historically, its principal mainstay has been bunker fuel supplied to vessels engaged in coastwise and foreign trade. The three most important users of residual fuel oil in Districts I and III in 1951 were, in order, smelters-mining-manufacturing, vessels, and heating. Volumes consumed by the first two categories were 250,200 b/d and 219,800 b/d respectively, while heating accounted for 136,200 barrels daily. The three groups represented 66% of the region's domestic demand. In 1946 the order was vessels, smelters, etc., and utilities -- and those three equalled 60% of that year's total.

In general, demands in this area have shown wider fluctuations from year to year than in other sections of the country. Variations in water-borne trade, strikes in the shipping and coal industries, changes in the general level of business, greater utilization of gas, and the weather, have been pertinent factors affecting

demands, since the types of consumption which would be most influenced by such events are the dominant ones in the area. Another important factor contributing to fluctuation in demand has been conversions from coal or back to coal, which occurred when the relationship between the price of coal and residual fuel oil varied. When oil was in tight supply the price generally rose until consumers able to do so switched to coal. Easier supplies depressed the oil price until sufficient conversions back to heavy fuel balanced demand and supply. Because of more extensive dual facilities in equipment, public utilities as a whole seem to be in the most favorable position to take quick advantage of these price variations. Utility plants in District I were better able to accomplish these switches in fuel than were plants in other districts, because the average price of oil and coal was not far apart and the shift in the price advantage was frequent enough to justify the expense involved in duplicate storing and burning facilities.

The postwar record of demand in Districts I and III is as follows:

Year	Volume (M B/D)	Change From Previous Year	
		M B/D	%
1946	722		
1947	794	+ 72	+10.0
1948	774	- 20	- 2.5
1949	804	+ 30	+ 3.9
1950	940	+136	+16.9
1951	916	- 24	- 2.6

See Table VI, attached, for details of demand by uses.

Districts II & IV

Primarily because of the use of smelting-mines-manufacturing demand for the product in this area has exhibited the most consistent upward trend in the country, having shown only one small decline for the period through 1951. Use by smelters-mines-manufacturing has been in first place throughout 1946-51. It has shown a strong and fairly consistent trend, and has increased by more than twice the amount of the loss in railroads. Even in the business dip of 1949, the smelters, etc. category showed an increase, although a very modest one, in the use of residual fuel. Use for heating purposes rose over 60% in 1951 vs. 1946. Utilities, shipping and military uses have been negligible in these districts.

Though the tables in this report are not extended beyond the close of 1951, it appears from more recent data that during 1952 the long time upward trend in consumption of residuals in Districts 2 and 4 has been reversed. Consumption during the first three months of the year was off considerably. May, June and July were particularly seriously affected by the refinery and steel strikes and although August, September and October showed an improvement in consumption over the corresponding period of 1951, the figures for November indicated a return to the lower consumption evident in the first quarter. It would appear that railroad use has declined in 1952 about 40% or 18,000 b/d below the 1951 rate.

During the current year refiners in Districts 2 and 4 reduced their yield considerably, apparently about 13.5% as compared to 15% for 1951. Though there was a small increase in crude runs, this sharp drop in yield curtailed residual production in those districts

by about 23,000 b/d which very nearly offset the drop in market demand of about 24,000 b/d. Although residual stocks have not changed appreciably during 1952 to date, the abnormally large stocks which were accumulated during the last half of 1951 have continued on hand during most of 1952. The effect of these stocks has been reflected in the posted price for residual which as of December 1, 1952 was 85¢ a barrel below the price in effect in mid 1951.

Severe local problems are faced by many interior refiners who are far removed from a flexible heavy fuel demand. A small drop in tributary railroad or industrial consumption necessitates shipping residual considerable distances at high freight rates before the refiner can reach a substantial market with any degree of demand flexibility. This causes rather sharp fluctuations in refinery prices which tend to be more severe than in areas where more flexible outlets exist. Dieselization of railroads reflecting declines in heavy fuel sales has been most severe on the interior refiner.

Annual changes in domestic demand in Districts II and IV are shown below:

Year	Volume (M B/D	Change from Previous Year M B/D	Change from Previous Year %
1946	244.1		
1947	266.3	+22.2	+ 9.1
1948	281.7	+15.4	+ 5.8
1949	268.0	-13.7	- 4.9
1950	277.3	+ 9.3	+ 3.5
1951	308.4	+31.1	+11.2

See Table VII, attached, for details of demand by use in District II and IV.

District V

This area is the only one in the country to show a loss in 1951 vs. 1946. This is entirely accounted for by the drop in railroad consumption, which in 1951 was only 44% of the first postwar year. In 1946, railroads were the largest users of the product, representing about 2-1/3 times as much volume as the next largest user - the military. Smelters, etc. were in third place, and only a shade lower than the military. In 1951, a much more evenly balanced demand existed among users. Vessels were in the number one position, but represented only 21% more than the second group - utilities. Military purchases were third in volume.

During this period importation of natural gas from the Texas - New Mexico area was expanded substantially. While the increasing receipts did not cut back fuel oil consumption, it doubtless prevented its increasing as rapidly as it otherwise might have.

Demand in 1951 was unduly stimulated by the Korean developments, which accounted for increased ships' bunkers, military takings, and higher demands by industry in general. In addition, it was a year of poor water run-off, which was reflected in greater use of oil by utilities. Over the years, fluctuations in public utility use have been fairly large and result mostly from the abundance or lack of rainfall. The four categories just mentioned increased their use of residual fuel oil by 40,000 barrels per day over 1950, whereas other consumers collectively used 20,000 barrels daily less than in 1950. In fact, were it not for the Korean developments in the latter part of 1950, it is likely that the Pacific Coast region would have

shown a substantial loss in the period 1946-51, reflecting railroad dieselization and greatly increased use of natural gas from the southwest.

West Coast residual fuel oil demand appears to be more sensitive than other areas to the influences of natural gas and hydro power competition, as well as military takings and dieselization of railroads.

The 1946-51 record of domestic demand in District V follows:

Year	Volume (M B/D)	Change from Previous Year M B/D	Change from Previous Year %
1946	349		
1947	360	+ 11	+ 3.2
1948	312	- 48	-13.3
1949	287	- 25	- 8.0
1950	300	+ 13	+ 4.5
1951	320	+ 20	+ 6.7

This area, together with Districts I and III, experienced a very sharp rise in exports in 1951 primarily because of the Iranian situation.

See Table VIII, attached, for details of demand by uses.

Position In The Energy Market

Residual fuel oil, despite its position as second largest petroleum product in sales volume, has been supplying only about 10% of the total energy requirements of U. S. consumers in the postwar period. Furthermore, the oil industry itself probably is its own best customer, through requirements of its tankers and refineries.

Table IX indicates the percentage of the energy market which residual held by various categories. Only in supplying ships' bunkers has it enjoyed a dominant position in a particular

market, having shared to the extent of about 85% of this business. Its next most important position, based on 1951 data, was in the steel industry, but residual supplied only 11.6% of that market's energy requirements. As a railroad fuel, an outlet for substantial volumes of heavy fuel in the past, residual's participation in total railroad fuel requirements has consistently declined to only 9.5% in 1951, from 15.5% in 1946. The impact of this loss has been heaviest in the interior where few other outlets for residual fuel oil exist. The Korean War caused a temporary reversal in 1950 of this down trend. In the utility field, it averaged only 7.5% of the energy requirements, having declined from 10.4% in 1950. Fluctuations have been fairly wide, reflecting conversions to or from coal. In the overall industrial markets, exclusive of the steel and cement industries, residual's share has varied in the postwar period at between 7.5% and 8.4%

Price Relationship of Competitive Fuels

Generally speaking, residual sales are made under great competitive obstacles. Its chief competitors are coal and natural gas, but pressures from such divergent energy sources as Diesel oil and hydroelectric facilities, especially in District V, also exist. Through the years, however, residual has had its most vigorous competition from coal, especially in the Eastern Seaboard area where greater flexibility exists in the alternate use of the two fuels. Thus, it is logical that heavy fuel prices in the East have been in close relationship to coal prices. This is indicated in Table X, which compares Eastern Seaboard

prices for No. 6 fuel and run-of-mine bituminous coal. Of course, these are not the real commercial equivalents, as oil has, in addition, some advantages because of greater thermal efficiency, ease of handling, etc.

An inspection of the data will show that residual prices per BTU averaged 86% of coal in the 1935-39 period. The relationship fluctuated widely in several years, but the data appear to reflect periodic corrections in quotations to maintain competitive position with coal. For example, in 1932 No. 6 fuel sold at only 67% of the coal price. By 1934 it had risen to 102%, only to fall to 84% in the following year. In 1937 it returned to 99%, but fell to 81% the next year. In the postwar period, residual prices reached 131% of coal parity in 1948, (a year of tight supply for all products) only to fall to 80% in 1949.

These price ratios appear to have been at least partially instrumental in causing variations in demands or in taking up variations in supply. The years of highest price ratios have generally curtailed demand trends, either in the same year or in the following one. Downward corrections in price relationship to coal have generally stimulated demand gains, either in the same year or in the year following. A further inspection of demands in Districts I and III shows that the 1948 ratio of 131%, a 25-year peak, coincided with a demand loss of 2.5%, while the 80% ratio existing in 1949 saw an increase of about 4% in the area's demand. Undoubtedly, factors other than price, such as the business recession of 1949 and the inability of industry to secure coal freely in late 1949 and early 1950, also

contributed to the fluctuations in demand. It seems evident, however, that with coal and residual competing for the energy markets, a price relationship does exist. Furthermore, when No. 6 fuel price ratios were far above the 1935-39 average, some depressing effect on demand has taken place. Price relationships seem to affect the supply to only a limited extent.

In the past few years, natural gas supplies have made significant strides in the direction of enlarging their share of the energy market. However, no long term comparison is believed to be significant. The major reason is that natural gas has not been freely available in the large industrial regions of the northeast and north central states for more than a short period of time. Indeed, as recently as the past winter or two, natural gas has had to be cut off from industry uses as far west as Illinois. In the southwest, natural gas has been much cheaper than residual and has found ready markets even in refineries themselves. No direct effect on fuel oil supplies or prices seems evident, however, because of the ability of the Gulf Coast refiner to move his residual by tanker to other coastal markets. Up to now, California residual has found markets in the northwest, in the east, and in foreign markets of the Pacific during the period of greatest expansion of the West Texas - California natural gas transmission line. A current shortage in crude oil supplies in California must delay evaluation of long-term natural gas effects, since the California refiner is now undertaking a fuel oil reduction program to increase supplies of gasoline and light fuels at a minimum incremental requirement for crude oil.

The conclusion which must be drawn from the data available is that while natural gas has increased its markets substantially in the postwar period, its direct effect on the ability of the industry to sell fuel oil is not as clear as in the relationship of fuel price to coal price in the east, and the necessity for the California refiner to re-process residual into lighter products for the west. The recent sharp drop in sales to the gas utilities shows the effect of natural gas taking over this market. In this connection, it might be expedient to recall that Table I indicates that District V is the only major area where residual supplies were substantially the same in 1951 as in 1946.

Seasonality of Demand and Supply

As the concluding presentation of data, Table XI, attached, shows monthly details of demand and supply trends from January, 1946 to April 1952, while the attached chart shows average monthly variations from an annual average of the 1948-51 period.

The pronounced seasonality of residual demands is well reflected in the chart. Over the four-year period, it will be noted that demands in December were nearly 250,000 b/d over the annual average, while demands in July were approximately 200,000 b/d below the yearly average. Between February and July, a seasonal average decline of 385,000 b/d has taken place. After July, demands have risen by an average of 438,000 b/d into December. In individual years of the period, a record rise of 548,000 b/d took place between July, 1949 and March, 1950, while a near-record decline of 473,000 b/d occurred between February and July of 1951. January, 1952 was 494,000 b/d over July, 1951, but

by April 1952 demand was 284,000 b/d under January, a sharper drop than previously experienced through April. This suggests that the seasonality of residual demands has increased slightly in the past two years.

One of the contributing factors in the growing seasonality seems to be the greater availability of gas during the summer season. During the winter months large quantities of natural gas are used for heating purposes. As the heating season wanes this gas becomes increasingly available for sale to commercial and industrial users, replacing some fuel oil as well as coal. Another factor would be the growing use of heavy fuel as a heating oil, with demand concentrated in the winter.

Supplies varied seasonally along with demands, but the variation of refinery production and imports was considerably less than the demand variations. As a result, inventory expansion absorbed excess summer supplies while winter demands were satisfied by withdrawals from storage. However, additional tankage capacity to provide even greater flexibility in seasonal storage could be utilized towards further smoothing the seasonal variations in supply and demand. Residual yields on crude are seasonally reduced in the summer period because of the required expansion of asphalt production, which is at its seasonal demand peak when residual is lowest. Conversely, residual production rises in the winter through reduction of asphalt production. There appears to be no clear evidence of a significant seasonal fluctuation in crude runs, except for changes in April and December. Lower runs to stills in April have contributed to

reduced residual production while higher runs in December have added about 60,000 b/d of residual output over the average annual rate experienced in the 1948-51 period.

Committee on Bunker "C" Fuel Oil

B. Brewster Jennings
Chairman

December 9, 1952

TABLE I

U. S. SUPPLIES OF RESIDUAL FUEL BY PAW DISTRICTS
(Thousands of B/D)

	1 & 3	2 & 4	Total I-IV	V	U. S.
1946					
Refy. Prodn.	597	258	855	364*	1,219*
Transfers	8	2	10	6*	16*
Foreign Imports	122	-	122	-	122
Net Receipts/(Shipments)	11	(11)	-	-	-
Net Supply	738	249	987	370	1,357
1947					
Refy. Prodn.	635	276	911	358*	1,269*
Transfers	8	5	13	8*	21*
Foreign Imports	149	-	149	-	149
Net Receipts/(Shipments)	7	(7)	-	-	-
Net Supply	799	274	1,073	366	1,439
1948					
Refy. Prodn.	662	282	944	367	1,311
Transfers	8	4	12	6	18
Foreign Imports	144	2	146	-	146
Net Receipts/(Shipments)	-	-	-	-	-
Net Supply	814	288	1,102	373	1,475
1949					
Refy. Prodn.	556	258	814	350	1,164
Transfers	6	1	7	6	13
Foreign Imports	205	1	206	-	206
Net Receipts/(Shipments)	20	(2)	18	(18)	-
Net Supply	787	258	1,045	338	1,383
1950					
Refy. Prodn.	569	271	840	325	1,165
Transfers	6	4	10	5	15
Foreign Imports	329	-	329	-	329
Net Receipts/(Shipments)	37	6	43	(43)	-
Net Supply	941	281	1,222	287	1,509
1951					
Refy. Prodn.	616	302	918	368	1,286
Transfers	7	4	11	5	16
Foreign Imports	325	-	325	-	325
Net Receipts/(Shipments)	(13)	14	1	(1)	-
Net Supply	935	320	1,255	372	1,627
1952 (Jan.-April)					
Refy. Prodn.	625	309	934	362	1,296
Transfers	7	6	13	6	19
Foreign Imports	397	-	397	-	397
Net Receipts/(Shipments)	6	(5)	1	(1)	-
Net Supply	1,035	310	1,345	367	1,712

*NOTE: Adjusted to compare with subsequent years by treating transfers of crude in California on a basis similar to that adopted in 1948 by the Bureau of Mines - principally as a refinery crude run yielding 80% residual fuel.

MK

TABLE II

RELATIVE PRICE OF RESIDUAL FUEL AT REFINERIES
TOTAL UNITED STATES

	Crude Oil Prices At Wells $/Bb.	Refinery Value Of All Products Ex. Resid. F.O. $/Bbl.	Residual Fuel Realizations		
			$/Bbl.	As % of Crude Oil	As % of Refinery Value of All Products Ex. Residual Fuel
1946	1.40	2.59	1.35	96.4	52.2
1947	1.93	3.42	1.80	93.3	52.6
1948	2.60	4.25	2.40	92.3	56.5
1949	2.54	4.05	1.47	57.9	36.3
1950	2.53	4.13	1.66	65.6	40.2
1951	2.55	4.37	1.85	72.5	42.4
1st 4 Mos. 1952	2.55	4.40	1.85	72.5	42.1

TABLE III

% YIELD OF RESIDUAL FUEL OIL
(Bureau of Mines Basis)

	Districts I & III	Districts II & IV	Districts I - IV	District V	U. S.
1946	22.6	19.4	21.6	*44.0	*25.4
1947	22.6	19.1	21.4	*40.6	*24.7
1948	21.1	18.0	20.1	41.6	23.5
1949	19.2	16.5	18.3	39.1	21.7
1950	18.3	15.3	17.2	37.1	20.3
1951	17.4	15.0	16.5	38.1	19.7
Change 1946-51	-5.2	-4.4	-5.1	-5.9	-5.7

* Adjusted to compare with subsequent years by treating transfers of crude in California on a basis similar to that adopted in 1948 by the Bureau of Mines - principally as a refinery crude run yielding 80% residual fuel.

MK

TABLE IV

U. S. CRUDE OIL SUPPLY (INCLUDING IMPORTS)
ESTIMATED DISTRIBUTION BY GRAVITY RANGES
(Thousands of Barrels Daily)

	15° & Below	16.0° to 20.9°	21.0° to 24.9°	25.0° to 29.9°	30° & Above	Total	Average Gravity
East of California							
1946	1	22	155	418	3,294	3,890	35.8
1947	1	34	163	457	3,519	4,174	35.8
1948	1	46	185	535	3,824	4,591	35.7
1949	1	27	139	449	3,519	4,135	36.1
1950	1	48	160	476	3,825	4,510	36.3
1951	1	66	169	574	4,369	5,179	36.3
California							
1946	85	144	196	168	268	861	25.7
1947	85	153	200	185	290	913	25.8
1948	85	156	212	176	301	930	25.8
1949	75	137	217	164	319	912	26.3
1950	68	122	219	160	329	898	26.6
1951	85	155	220	168	343	971	26.2
United States							
1946	86	166	351	586	3,562	4,751	34.0
1947	86	187	363	642	3,809	5,087	34.0
1948	86	202	397	711	4,125	5,521	34.0
1949	76	164	356	613	3,838	5,047	34.3
1950	69	170	379	636	4,154	5,408	34.7
1951	86	221	389	742	4,712	6,150	34.7
Crude Imports							
1946	25	48	25	20	118	236	26.8
1947	32	55	23	20	137	267	26.7
1948	32	59	14	22	226	353	28.8
1949	33	56	18	22	292	421	29.3
1950	36	59	23	20	349	487	29.3
1951	37	56	25	18	355	491	29.6
Crude Supply							
1946	111	214	376	606	3,680	4,987	33.7
1947	118	242	386	662	3,946	5,354	33.6
1948	118	261	411	733	4,351	5,874	33.7
1949	109	220	374	635	4,130	5,468	33.9
1950	105	229	402	656	4,503	5,895	34.3
1951	123	277	414	760	5,067	6,641	34.3

TABLE V

CONSUMPTION OF RESIDUAL FUEL OILS
TOTAL UNITED STATES

TABLE V

(Thous. Bbls. Daily)	1946	1947	1948	1949	1950	1951
Use						
Railroads	274.8	267.0	244.8	173.9	166.8	150.8
Vessels	241.6	279.2	261.6	244.8	254.7	293.2
For'n Trade - Bonded Oil	(60.0)	(69.0)	(71.0)	(67.0)	(62.0)	(93.0)
" " -Domestic Oil	(91.0)	(107.0)	(79.0)	(70.0)	(77.4)	(81.8)
" " -Total	(151.0)	(176.0)	(150.0)	(137.0)	(139.4)	(174.8)
Domestic Trade	(90.6)	(103.2)	(111.6)	(107.8)	(115.3)	(118.4)
Total Gas and Electric	139.5	167.1	155.2	219.4	255.0	193.2
Gas	(50.9)	(57.3)	(62.7)	(56.5)	(60.4)	(34.6)
Electric	(88.6)	(109.8)	(92.5)	(162.9)	(194.6)	(158.6)
Smelting, Mining & Manufg.	271.3	315.3	321.8	336.0	405.8	430.9
Steel Industry	(116.0)	(141.0)	(143.0)	(120.0)	(150.0)	(165.0)
Cement Industry	(11.0)	(13.0)	(13.0)	(13.0)	(14.0)	(17.0)
Heating	136.3	154.6	160.2	165.5	199.2	208.6
Military	102.1	66.0	67.4	62.3	77.6	104.2
Oil Company (Incl. Crude)	159.0	171.8	154.8	141.6	145.9	148.1
Miscellaneous	13.8	18.7	18.1	12.5	13.4	14.5
Adjustments to Agree with Total	-23.3	-19.4	-16.2	3.0	-1.1	0.9
All Domestic Uses*	1,315.1	1,420.3	1,367.7	1,359.0	1,517.3	1,544.4
Exports	25.2	29.4	35.5	34.6	44.4	80.0
Total Uses*	1,340.3	1,449.7	1,403.2	1,393.6	1,561.7	1,624.4

* As per Bureau of Mines Annual Summaries or Monthly Reports

n. b. Data in parentheses are memo items and are included in sub-totals.

TABLE VI

CONSUMPTION OF RESIDUAL FUEL OILS
DISTRICTS 1 AND 3

TABLE VI

(Thous. Bbls. Daily)

Use	1946	1947	1948	1949	1950	1951
Railroads	92.4	89.5	85.9	62.1	59.4	55.7
Vessels	194.1	217.2	211.9	193.6	190.8	219.8
For'n Trade - Bonded Oil	(60.0)	(69.0)	(71.0)	(67.0)	(62.0)	(93.0)
" " - Domestic Oil	(61.0)	(72.0)	(50.0)	(40.0)	(39.2)	(30.0)
" " - Total	(121.0)	(141.0)	(121.0)	(107.0)	(101.2)	(123.0)
Domestic Trade	(73.1)	(76.2)	(90.9)	(86.6)	(89.6)	(96.8)
Total Gas & Electric	94.6	104.7	103.4	159.6	205.6	131.2
Gas	(44.9)	(50.2)	(52.7)	(46.8)	(49.6)	(24.5)
Electric	(49.7)	(54.5)	(50.7)	(112.8)	(156.0)	(106.7)
Smelting, Mining & Manufg.	145.7	169.4	169.2	182.2	232.1	250.2
Heating	76.5	95.0	105.1	112.7	133.1	136.2
Military	47.9	34.4	30.4	30.4	36.6	50.9
Oil Company (Incl. Crude)	82.1	95.7	88.8	62.2	70.2	74.6
Miscellaneous	7.2	9.6	8.7	5.1	4.3	5.9
Adjustments to Agree with Total	-18.5	-21.5	-29.4	- 3.9	7.9	- 8.5
All Domestic Uses *	722.0	794.0	774.0	804.0	940.0	916.0
Exports	6.0	7.0	9.0	8.0	7.0	15.0
Total Uses *	728.0	801.0	783.0	812.0	947.0	931.0

* Calculated from Bureau of Mines Annual Summaries or Monthly Reports
n. b. Data in parentheses are memo items and are included in sub-totals.

TABLE VII

CONSUMPTION OF RESIDUAL FUEL OILS
DISTRICTS 2 AND 4

TABLE VII

(Thous. Bbls. Daily)

Use	1946	1947	1948	1949	1950	1951
Railroads	70.2	71.0	69.0	52.2	44.5	45.3
Vessels	1.5	2.2	2.5	3.0	4.7	4.1
For'n Trade - Bonded Oil	(-)	(-)	(-)	(-)	(-)	(-)
" " - Domestic Oil	(-)	(-)	(-)	(-)	(0.1)	(0.2)
" " - Total	(-)	(-)	(-)	(-)	(0.1)	(0.2)
Domestic Trade	(1.5)	(2.2)	(2.5)	(3.0)	(4.6)	(3.9)
Total Gas & Electric	8.6	8.1	6.4	8.3	7.9	5.0
Gas	(0.1)	(0.2)	(0.2)	(-)	(-)	(-)
Electric	(8.5)	(7.9)	(6.2)	(8.3)	(7.9)	(5.0)
Smelting, Mining & Manufg.	77.9	94.0	103.0	106.6	128.1	132.3
Heating	30.9	34.1	31.8	34.1	44.5	50.6
Military	5.2	1.1	0.7	0.4	1.5	1.7
Oil Company (Incl. Crude)	51.0	53.9	52.9	54.9	55.0	58.2
Miscellaneous	1.8	3.7	4.0	1.8	1.7	2.4
Adjustments to Agree with Total	3.0	-1.8	11.4	6.7	-10.6	8.8
All Domestic Uses*	244.1	266.3	281.7	268.0	277.3	308.4
Exports	0.2	1.4	0.5	0.6	2.4	3.0
Total Uses*	244.3	267.7	282.2	268.6	279.7	311.4

* Calculated from Bureau of Mines Annual Summaries or Monthly Reports

n.b. Data in parentheses are memo items and are included in sub-totals.

TABLE VIII

CONSUMPTION OF RESIDUAL FUEL OILS
DISTRICT 5

TABLE VIII

(Thous. Bbls. Daily)

Use	1946	1947	1948	1949	1950	1951
Railroads	112.2	106.5	89.9	59.6	62.9	49.8
Vessels	46.0	59.8	47.2	48.2	59.2	69.3
For'n Trade - Bonded Oil	(-)	(-)	(-)	(-)	(-)	(-)
" " - Domestic Oil	(30.0)	(35.0)	(29.0)	(30.0)	(38.1)	(51.6)
" " - Total	(30.0)	(35.0)	(29.0)	(30.0)	(38.1)	(51.6)
Domestic Trade	(16.0)	(24.8)	(18.2)	(18.2)	(21.1)	(17.7)
Total Gas & Electric	36.3	54.3	45.4	51.5	41.5	57.0
Gas	(5.9)	(6.9)	(9.8)	(9.7)	(10.8)	(10.1)
Electric	(30.4)	(47.4)	(35.6)	(41.8)	(30.7)	(46.9)
Smelting, Mining & Manufg.	47.7	51.9	49.6	47.2	45.6	48.4
Heating	28.9	25.5	23.3	18.7	21.6	21.8
Military	49.0	30.5	36.3	31.5	39.5	51.6
Oil Company (Incl. Crude)	25.9	22.2	13.1	24.5	20.7	15.3
Miscellaneous	4.8	5.4	5.4	5.6	7.4	6.2
Adjustments to Agree with Total	-1.8	3.9	1.8	0.2	1.6	0.6
All Domestic Uses*	349.0	360.0	312.0	287.0	300.0	320.0
Exports	19.0	21.0	26.0	26.0	35.0	62.0
Total Uses*	368.0	381.0	338.0	313.0	335.0	382.0

* Calculated from Bureau of Mines Annual Summaries or Monthly Reports.

n.b. Data in parentheses are memo items and are included in sub-totals.

TABLE IX

TABLE IX

UNITED STATES

Energy Supplied by Residual Fuel Oil, Expressed as Per Cent of Total

Year	Steel Industry			Cement Industry			Other Industrial Uses			Ships Bunkers		
	Resid.	Coal	All Other	Resid.	Coal	All Other	Resid.	Coal	All Other	Resid	Coal	All Other
1946	11.2	81.7	7.1	9.5	68.8	21.7	7.9	35.2	56.9	83.8	5.5	10.7
1947	10.9	82.7	6.4	9.7	69.1	21.2	7.5	35.2	57.3	83.3	5.8	10.9
1948	10.6	82.5	5.9	9.0	68.4	22.6	7.7	31.5	60.8	83.9	4.0	12.1
1949	10.4	81.9	7.7	9.0	64.7	26.3	8.1	27.1	64.8	84.9	3.6	11.5
1950	11.4	80.4	8.2	9.7	61.2	29.1	8.4	25.1	66.5	86.2	2.7	11.1
1951	11.6	80.6	7.8	10.9	61.0	28.1	7.8	27.3	64.9	85.8	3.0	11.2

Year	Gas & Electric Utility Plants			Space Heating			Railroads			Total All Uses of Energy		
	Resid.	Coal	All Other	Resid.	Coal	All Other	Resid.	Coal	All Other*	Resid.	Coal	All Other#
1946	7.6	46.9	45.5	4.9	43.0	52.1	15.5	73.2	11.3	10.1	46.9	42.4
1947	7.8	50.0	42.2	5.3	40.2	54.5	14.7	70.7	14.6	9.9	46.3	43.6
1948	6.7	50.5	42.8	5.3	35.6	59.1	13.9	64.6	21.5	9.1	43.6	46.5
1949	9.7	44.0	46.3	5.7	36.8	57.5	11.6	54.6	33.8	10.3	39.1	50.6
1950	10.4	44.1	45.5	6.3	32.5	61.2	10.6	47.0	42.4	10.0	36.9	53.1
1951	7.5	47.5	45.0	6.3	27.4	66.3	9.5	40.2	50.3	9.6	34.8	55.6

Conversion factors - Coal 26,200,000 BTU/ton
Resid. 6,287,400 BTU/bbl.
Gas 1,000 BTU/C.F.

*Adjusted to reflect greater efficiency of diesel fuel oil.

#The energy participation in the "All Other" category varies considerably according to type of use. It embraces all petroleum products (other than residual fuel oil), natural gas, and hydro-power. An example of the participation in 1951 for total "All Other" uses follows: Petroleum (other than residual), 30.6%; Dry Natural Gas, 20.8%; Hydro-Power, 4.2%; Total "All Other", 55.6%

U. S. RESIDUAL FUEL OIL SUPPLY, DEMAND AND INVENTORIES BY MONTHS JANUARY 1946 TO APRIL 1952

(Thousand Bbls. Daily Except Ending Inventories in Thousand Bbls.)
(Yield from Crude on Bureau of Mines Basis)

	January	February	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.	Average Year
1946													
Domestic Demand	1,457	1,417	1,378	1,271	1,277	1,319	1,197	1,236	1,128	1,194	1,383	1,529	1,315
Export Demand	23	25	26	29	17	19	30	21	35	26	17	34	25
Total Demand	1,480	1,442	1,404	1,300	1,294	1,338	1,227	1,257	1,163	1,220	1,400	1,563	1,340
Refinery Production*	1,248	1,269	1,248	1,278	1,258	1,263	1,206	1,195	1,189	1,135	1,149	1,193	1,219
Transfers*	16	19	16	15	17	18	18	16	15	18	18	17	16
Total Domestic Supply*	1,264	1,288	1,264	1,293	1,275	1,281	1,224	1,211	1,204	1,153	1,167	1,210	1,235
Total Imports	127	128	98	70	130	131	119	125	142	107	127	162	122
Total Supply*	1,391	1,416	1,362	1,363	1,405	1,412	1,343	1,336	1,346	1,260	1,294	1,372	1,357
Inventory Change*	- 89	- 26	- 42	+63	+111	+ 74	+116	+79	+183	+ 40	-106	-191	+ 17
Ending Inventories)													41,700
Yield From Crude %)					Not Calculated								25.4
1947													
Domestic Demand	1,558	1,547	1,479	1,405	1,292	1,273	1,304	1,286	1,356	1,419	1,451	1,683	1,421
Export Demand	29	36	25	37	29	35	27	30	34	29	18	20	29
Total Demand	1,587	1,583	1,504	1,442	1,321	1,308	1,331	1,316	1,390	1,448	1,469	1,703	1,450
Refinery Production*	1,208	1,265	1,265	1,195	1,249	1,290	1,297	1,298	1,282	1,293	1,274	1,319	1,269
Transfers*	18	20	20	21	20	20	22	21	21	20	19	22	21
Total Domestic Supply*	1,226	1,285	1,285	1,216	1,269	1,310	1,319	1,319	1,303	1,313	1,293	1,341	1,290
Total Imports	174	179	174	182	155	100	130	103	117	125	166	180	149
Total Supply*	1,400	1,464	1,459	1,398	1,424	1,410	1,449	1,422	1,420	1,438	1,459	1,521	1,439
Inventory Change*	-187	-119	- 45	-44	+103	+102	+118	+106	+30	- 10	- 10	-182	- 11
Ending Inventories)													37,700
Yield From Crude %)					Not Calculated								24.7

* Adjusted to new basis so that comparison is possible with subsequent years.

U. S. RESIDUAL FUEL OIL SUPPLY, DEMAND AND INVENTORIES BY MONTHS JANUARY 1946 TO APRIL 1952

(Thousand Bbls. Daily Except Ending Inventories in Thousand Bbls.)
(Yield from Crude on Bureau of Mines Basis)

	January	February	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.	Average Year
1948													
Domestic Demand	1,570	1,568	1,540	1,426	1,281	1,300	1,234	1,239	1,167	1,252	1,304	1,533	1,368
Export Demand	20	27	27	45	33	39	41	47	41	43	30	34	35
Total Demand	1,590	1,595	1,567	1,471	1,314	1,339	1,275	1,286	1,208	1,295	1,334	1,567	1,403
Refinery Production	1,345	1,369	1,337	1,342	1,359	1,306	1,297	1,302	1,158	1,264	1,292	1,368	1,311
Transfers	20	15	17	17	15	16	15	20	29	20	18	16	18
Total Domestic Supply	1,365	1,384	1,354	1,359	1,374	1,322	1,312	1,322	1,187	1,284	1,310	1,384	1,329
Total Imports	164	188	168	156	120	119	133	144	144	100	137	173	146
Total Supply	1,529	1,572	1,522	1,515	1,494	1,441	1,445	1,466	1,331	1,384	1,447	1,557	1,475
Inventory Change	- 61	- 23	- 45	+ 44	+180	+102	+ 170	+180	+123	+ 89	+113	- 10	+ 72
Ending Inventories	35,731	35,073	33,663	34,998	40,594	43,684	48,919	54,480	58,153	60,927	64,336	64,021	64,021
Yield From Crude	24.4	24.7	24.7	24.4	24.1	23.2	23.1	22.9	21.6	22.6	22.7	23.4	23.5
1949													
Domestic Demand	1,551	1,532	1,437	1,273	1,154	1,160	1,148	1,227	1,323	1,327	1,527	1,660	1,359
Export Demand	34	35	39	29	42	35	38	26	25	38	35	39	35
Total Demand	1,585	1,567	1,476	1,302	1,196	1,195	1,186	1,253	1,348	1,365	1,562	1,699	1,394
Refinery Production	1,355	1,282	1,264	1,153	1,147	1,039	1,034	1,070	1,108	1,141	1,180	1,203	1,164
Transfers	19	17	13	13	15	12	12	15	9	11	10	10	13
Total Domestic Supply	1,374	1,299	1,277	1,166	1,162	1,051	1,046	1,085	1,117	1,152	1,190	1,213	1,177
Total Imports	166	153	159	185	160	180	187	193	240	264	253	328	206
Total Supply	1,540	1,452	1,436	1,351	1,322	1,231	1,233	1,278	1,357	1,416	1,443	1,541	1,383
Inventory Change	-45	-115	-40	+49	+126	+36	+47	+25	+ 9	+51	-119	-158	-11
Ending Inventories	62,585	59,398	58,190	59,668	63,576	64,628	66,084	66,843	67,117	68,673	65,112	60,193	60,193
Yield From Crude	23.8	23.6	23.7	22.3	21.9	20.4	20.0	20.3	20.4	20.9	21.8	21.7	21.7

U. S. RESIDUAL FUEL OIL SUPPLY, DEMAND AND INVENTORIES BY MONTHS JANUARY 1946 TO APRIL 1952

(Thousand Bbls. Daily Except Ending Inventories in Thousand Bbls.)
(Yield from Crude on Bureau of Mines Basis)

	January	February	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.	Average Year
1950													
Domestic Demand	1,659	1,692	1,682	1,434	1,353	1,302	1,317	1,448	1,423	1,490	1,599	1,813	1,517
Export Demand	38	35	52	40	41	61	42	53	40	29	47	56	45
Total Demand	1,697	1,727	1,734	1,474	1,394	1,363	1,359	1,501	1,463	1,519	1,646	1,869	1,562
Refinery Production	1,209	1,172	1,154	1,048	1,063	1,069	1,140	1,148	1,178	1,250	1,240	1,306	1,165
Transfers	17	13	11	13	14	14	13	17	14	17	15	15	15
Total Domestic Supply	1,226	1,185	1,165	1,061	1,077	1,083	1,153	1,165	1,192	1,267	1,255	1,321	1,180
Total Imports	329	257	376	351	302	301	272	298	303	350	393	409	329
Total Supply	1,555	1,442	1,541	1,412	1,379	1,384	1,425	1,463	1,495	1,617	1,648	1,730	1,509
Inventory Change	-142	-285	-193	- 62	-15	+ 21	+ 66	- 38	+ 32	+ 98	+ 2	-139	- 53
Ending Inventories	55,808	47,828	41,860	39,979	39,482	40,124	42,165	40,979	41,966	45,004	45,048	40,750	40,750
Yield From Crude	21.9	21.7	21.8	20.1	19.4	18.9	19.5	19.1	19.4	20.3	20.3	20.7	20.3
1951													
Domestic Demand	1,814	1,826	1,729	1,561	1,423	1,405	1,271	1,305	1,318	1,452	1,699	1,754	1,544
Export Demand	31	36	47	48	94	97	118	111	115	98	80	74	80
Total Demand	1,845	1,862	1,776	1,609	1,517	1,502	1,389	1,416	1,433	1,550	1,779	1,828	1,624
Refinery Production	1,368	1,382	1,348	1,230	1,265	1,277	1,275	1,226	1,228	1,224	1,304	1,313	1,286
Transfers	16	16	15	13	15	13	16	20	20	18	18	18	16
Total Domestic Supply	1,384	1,398	1,363	1,243	1,280	1,290	1,291	1,246	1,248	1,242	1,322	1,331	1,302
Total Imports	447	432	353	346	315	287	215	237	218	315	356	388	325
Total Supply	1,831	1,830	1,716	1,589	1,595	1,577	1,506	1,483	1,466	1,557	1,678	1,719	1,627
Inventory Change	- 14	- 32	- 60	- 20	+ 78	+ 75	+117	+ 67	+ 33	+ 7	-101	-109	+ 3
Ending Inventories	40,317	39,409	37,516	36,910	39,317	41,566	45,163	47,243	48,212	48,415	45,378	41,979	41,979
Yield From Crude	20.8	21.1	20.8	20.0	19.6	19.5	19.5	18.7	18.8	18.9	19.6	19.4	19.7

U. S. RESIDUAL FUEL OIL SUPPLY, DEMAND AND INVENTORIES BY MONTHS JANUARY 1946 TO APRIL 1952

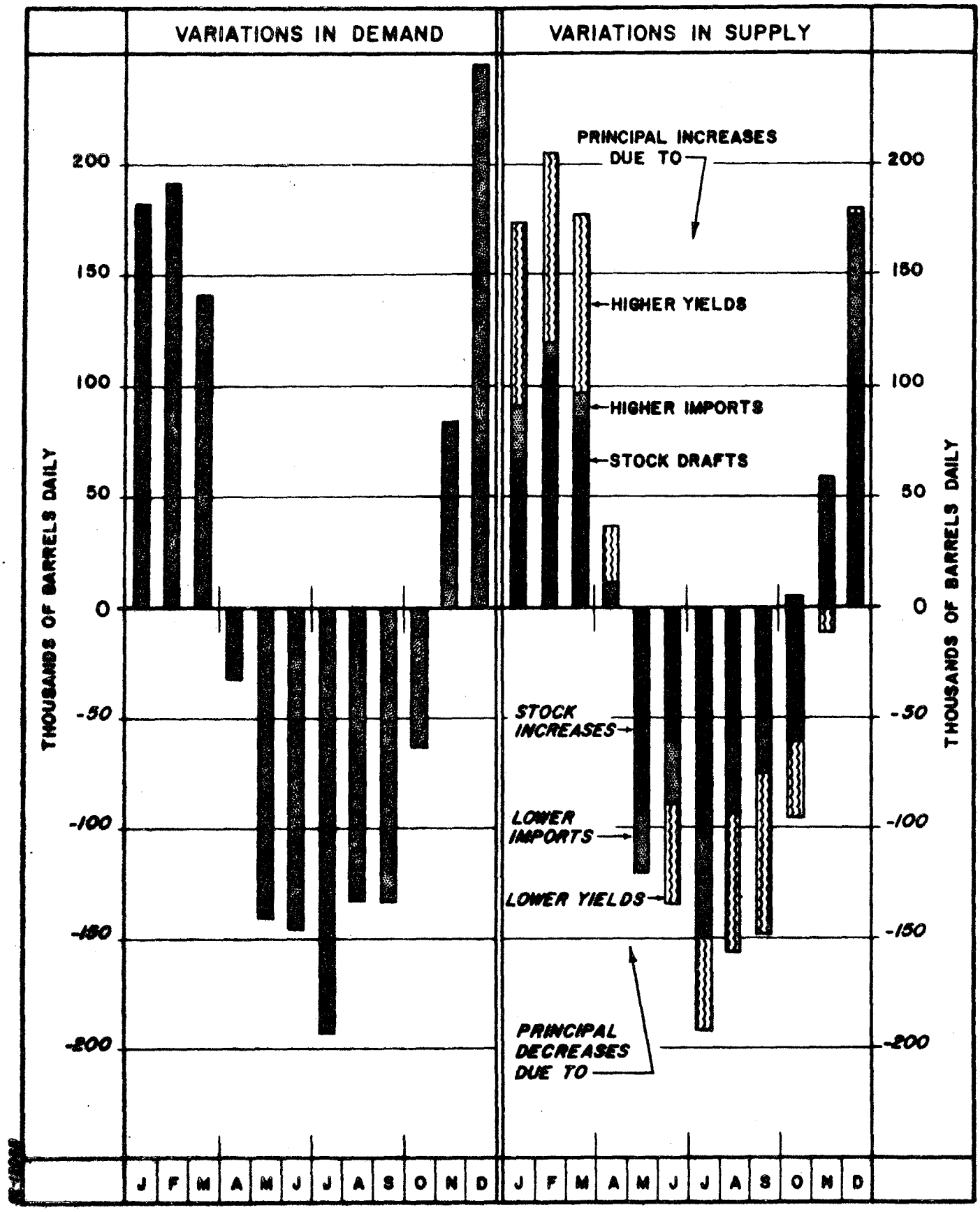
(Thousand Bbls. Daily Except Ending Inventories in Thousand Bbls.)
(Yield from Crude on Bureau of Mines Basis)

	Jan	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Average Year
1952													
Domestic Demand	1,814	1,717	1,636	1,504									
Export Demand	69	77	78	95									
Total Demand	1,883	1,794	1,714	1,599									
Refinery Production	1,338	1,322	1,274	1,253									
Transfers	20	20	18	17									
Total Domestic Supply	1,358	1,342	1,292	1,270									
Total Imports	417	409	411	349									
Total Supply	1,775	1,751	1,703	1,619									
Inventory Change	-108	- 43	- 11	+ 20									
Ending Inventories	42,853	39,523	38,295	37,971									
Yield From Crude %	19.8	19.6	19.3	19.5									
Average 1948-1951													
Domestic Demand	1,649	1,655	1,597	1,424	1,303	1,292	1,243	1,305	1,308	1,380	1,532	1,690	1,447
Export Demand	31	33	41	40	53	58	60	59	55	52	48	51	49
Total Domestic Supply	1,337	1,317	1,290	1,207	1,223	1,187	1,201	1,205	1,186	1,236	1,269	1,312	1,247
Imports	277	258	264	260	224	222	202	218	226	257	285	325	252
Ending Inventories	48,610	45,427	42,807	42,889	45,742	47,500	50,582	52,386	53,862	55,754	54,969	51,735	51,735
Yield from Crude	22.6	22.7	22.6	21.7	21.2	20.5	20.5	20.2	20.0	20.6	21.0	21.2	21.2

Source: U. S. Bureau of Mines
8/22/52

U. S. RESIDUAL FUEL OIL SUPPLY AND DEMAND

SEASONAL VARIATIONS FROM 1948-51 AVERAGE ANNUAL RATES



NOTE: IN APRIL THERE IS A MARKED REDUCTION IN SUPPLY CAUSED BY DECREASED REFINERY RUNS. IN DECEMBER THERE IS A MARKED INCREASE IN SUPPLY CAUSED BY INCREASED REFINERY RUNS.

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UNITED STATES
DEPARTMENT OF THE INTERIOR

Petroleum Administration for Defense
Washington 25, D. C.

April 21, 1952

Mr. Walter S. Hallanan, Chairman
National Petroleum Council
1625 K Street, N. W.
Washington, D. C.

Dear Mr. Hallanan:

In recent years the production of Bunker C fuel oil ("resid") by United States refineries has decreased when measured as a percentage of crude oil run and the supply of Bunker C fuel needed for domestic use and offshore bunkering of ships has been augmented by importation. Some demands for Bunker C fuel oil have diminished for technological reasons, as for example, a diminishing use for fueling oil-fired steam locomotives. Other usages, notably as fuel for fixed power installations, appear to fluctuate, dependent upon the relative cost of competitive fuels. Still other uses, particularly for the bunkering of ships (including naval vessels fueled with Navy Special fuel oil - a "blend" containing Bunker C) seem to fluctuate in part with the international situation.

In recent months Bunker C fuel oil has been in relatively short supply in coastal areas of the United States due partly to the cessation of refining operations in Iran and partly to the "breaking out" of reserve ships for international trade. At the same time, relative surpluses have existed in some interior areas.

According to the best data currently available to PAD, the supply situation surrounding Bunker C fuel oil is likely to remain a vexing one in the coastal areas during the winter of 1952 and probably thereafter. Any threatened shortage is of interest not only to PAD but also to the Defense Department, the Defense Electric Power Administration, the shipping authorities and the coastal industries requiring Bunker C fuel oil.

For the reasons suggested, the Petroleum Administration for Defense requests that the National Petroleum Council study the Bunker C fuel oil supply situation, including the prospects for supplies from United States refineries and by importation, and submit its findings. For obvious reasons the situation in PAD Districts One and Three, Two and Four, and Five should be considered separately where appropriate.

To the extent found feasible, it is suggested that the report might well encompass the topics and answer the questions mentioned hereinafter, together with such other topics and questions as may develop during the course of the study and be deemed worthy of report:

1. Summarize the trends of domestic manufacturing, importation, and individual types of usage of Bunker C fuel oil commencing with 1946 and continuing through 1952. (Basic figures are already available to PAD in summary form but it is thought that a Council Committee could amplify the available data, particularly as to usage.)

2. Assuming that the yield of Bunker C fuel oil per barrel of crude run has diminished since 1946, advise as to the reasons for diminution, including technological changes, and the net effect that has resulted in per-barrel yields of petroleum products.

3. Is the trend referred to in (2) above a continuing one and, if so, what is the probable bedrock minimum yield of Bunker C fuel oil to be anticipated from United States refineries.

4. Should the quantities of Bunker C fuel oil required in the United States exceed the quantities available from United States refinery operations and by importation, what impediments, if any, exist that would prevent an increase in yield of Bunker C fuel oil per barrel of crude oil run?

Inasmuch as the matter of adequate supply of residual fuel oil, both Bunker C and Navy Special, has a material effect on national security and national defense, I request that a committee be appointed to make the study requested herein with such comments and recommendations as may be appropriate.

Sincerely yours,

/s/ Bruce K. Brown

Bruce K. Brown
Deputy Administrator