PETROLEUM TRANSPORTATION

A REPORT OF

THE NATIONAL PETROLEUM COUNCIL

1958

NATIONAL PETROLEUM COUNCIL

REPORT OF

THE COMMITTEE ON PETROLEUM TRANSPORTATION

FEBRUARY 21, 1958

B. I. GRAVES, CHAIRMAN

J. R. PARTEN, VICE CHAIRMAN

JOHN D. FREITAG, SECRETARY

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NATIONAL PETROLEUM COUNCIL

REPORT OF COMMITTEE ON PETROLEUM TRANSPORTATION

This report is submitted on behalf of the Transportation Committee of the National Petroleum Council which was requested by Mr. H. A. Stewart, Director of the Office of Oil and Gas, of the Department of the Interior, to make a study of petroleum transportation facilities.

The development of the data was assigned to five Sub-Committees.

Sub-Committees	Chairmen
Pipe Lines	C.S. Mitchell, Cities Service Co.
Tank Cars	B. C. Graves, Union Tank Car Co.
Tank Trucks	S. F. Niness, Leaman Transportation Company
Barge and Lake Tankers	A. C. Ingersoll, Jr., Federal Barge Lines
L. P. G.	G. R. Benz, Phillips Petroleum Company

The scope of the study was outlined as follows:

1. To ascertain the facts as they exist with respect to petroleum pipelines (crude and product), barges, tank cars and tank trucks, giving consideration to additional capacity under construction or definitely planned.

Each subcommittee was requested in handling their assignment to follow carefully the directions of the Council's agenda outline. In this report no comment is made as to the adequacy of the available transportation facilities in the event of a national emergency.

For the first time a separate report was made to cover transportation facilities of LPG as per Mr. Stewart's request.

This report does not include data on tankers at the request of Mr. Stewart as a complete report on tankers was prepared a short time ago.

Reports of the Subcommittees are attached. Following is a summary of the important points of the several reports.

Pipelines

Crude Oil Pipe Lines The principal pipeline movements of crude oil within the United States are from producing areas in PAD Districts II and III to refineries in the Mid-Continent and Gulf Coast areas, and to marine terminals on the Gulf Coast. From producing areas in District III, there exists some 4,140,000 barrels daily capacity into Gulf Coast refineries and terminals, and 1,221,000 barrels daily capacity to Mid-Continent refineries. Crude production from District II, supplemented by receipts from Districts III and IV and Canada, supplies major refining centers in the Great Lakes, Wood River, and Kansas-Oklahoma areas. Capacity to Great Lakes refineries is 1,373,000 barrels daily, to Wood River refineries 737,000 barrels daily.

Major crude oil pipelines now under construction are the Texas-New Mexico Line from The Four Corners Area to the Permian Basin, and the Four Corners Line to Los Angeles. Just completed and placed in operation as of October 1957, is the Tecumseh line, linking pipeline terminal points near Chicago with the Toledo, Ohio area.

Products Pipe Lines The greatest network of product pipelines in the United States is found in District II. The major movements within the district are from refineries in Oklahoma-Kansas Area to consuming points in North Central States and Lower Great Lakes Area with daily capacities of 458,000 barrels and 271,000 barrels respectively. Pipelines out of District II have a total capacity of 118,000 barrels daily to District I and III, and the International Boundary, while those entering have a total capacity of 478,000 barrels daily from District I, III and IV.

Primary movement in District III is to various destinations in Southern portion of District I, having a capacity of 250,000 barrels daily. In District I, there also exists substantial pipe line movements from New York-New Jersey and Philadelphia-Delaware area refineries, to points in Pennsylvania and New York.

Principal product pipelines proposed or under construction are the conversion of the Texas Eastern Little Big Inch Pipeline from the Gulf Coast to Moundsville, West Virginia and into the Great Lakes Area, the Laurel System from Philadelphia to Pittsburgh and Cleveland, and the Wabash System from Wood River and Robinson, Illinois to Chicago.

The Subcommittee on Pipe Lines under the Chairmanship of Mr. C. S. Mitchell of Cities Service Company has prepared in addition to the small detailed flow maps of crude and product pipelines included in their report 4 large maps which will be given to the Office of Oil and Gas, Department of the Interior which should be of great value to them.

Tank Cars

The Tank Car study shows that as of January 1, 1957, when the last complete census of the Association of American Railroads was taken there were in operation some 163,059 private and railroad owned tank cars of various types and capacities for all purposes, which represented a total carrying capacity of 1,525,700,000 gallons, or approximately 9,350 gallons per car. Of this total, 96,074 cars were identified as being in petroleum service, including 19,240 liquefied petroleum gas cars, 39,432 in chemical service and 27,553 in miscellaneous service.

Between January 1 and May 31, data available to the Tank Car Subcommittee indicates an additional 3,027 cars constructed and 1,000 retired from service, giving a total of 165,086 cars in operation on May 31. Although it is not practical to accurately segregate the available tank cars as to type of service in which these cars are employed, data is available to the extent that of the above total cars in operation on May 31, approximately 112,968 cars or 68% are classified as general purpose cars, capable of being used in one or more services. The balance are of special construction and are not readily available for diversified use.

Tank Trucks

As of July 1, 1957, there were in operation by private and for-hire carriers, some 41,837 over-the-road general purpose tank trucks, trailers and trains in petroleum service having a total capacity of 242,719,383 gallons for an average capacity per unit of 5,802 gallons.

This compares with a census taken in 1955 by a previous tank truck Committee of the NPC showing a total of 31,012 units in operation having a capacity of 174,275,550 gallons for an average of 5,620 gallons per unit.

PAD District I and II have by far the greatest number of units with the number in each amounting to approximately 36% of the total. PAD District IV has the fewest units with less than 5% of the total. While the total number of units have increased some 35%, total capacity has increased almost 40%. This is due to the increase in average capacity per unit, as a result of the construction of larger units both as replacements and as additions to the fleet.

Barge and Lake Tankers

Report of the Barge Subcommittee shows that as of January 1, 1957, there were in operation in this country and Alaska some 2,138 non-propelled and self-propelled barges and small lake tankers (31,300 barrel capacity or less) capable of transporting 21,932,520 barrels of petroleum products. This is exclusive of those vessels certified for carrying LPG.

Of these 2,138 units, 1588 or 74 percent were reported to be operating on the Mississippi River System (including the Gulf Intracoastal Canal); 19% or 398 units were reported in operation on the East Coast waterways; 6% were reported in use on the West Coast waterways and Alaska; while the remaining 1% were operating on the Great Lakes.

LPG

LPG Association data covering LPG operations during 1956 showed that of a total of 6,636,000,000 gallons of LPG shipped during the year, almost 90% was handled by tank trucks and tank cars, while pipelines accounted for about 7% and barges a little more than 1%. The balance was unaccounted for.

Based on latest data available to them, the LPG Subcommittee reported the following facilities presently in operation and capable of handling LPG:

Tank Trucks	- 3,327	units	providing	capacity	of	10,148,000 gal.
Tank Cars	-34,082	"	"	"	"	384,427,000 gal.
Barges & Lake-Tankers (31,300 barrel capacity or less)	17	"	"	"	"	7,333,200 gal.

Pipeline capacity for LPG movement is concentrated essentially in PAD districts II and III. In District III the primary movements are from producing centers in East Texas, West Texas and Gulf Coast areas to refineries on the Gulf Coast. In District II, the main movement is from Mid-Continent producing centers to consuming points in Mid-Continent, St. Louis, and lower Great Lakes areas.

The Transportation Committee's work was assisted greatly by the willing counsel and help of Mr. H. A. Stewart and his associates, particularly C. D. Fentress and E. G. Ellerbrake and also by the fine help and cooperation of J. V. Brown of the National Petroleum Council and his associates.

Respectfully submitted,
Committee on Petroleum Transportation

B. I. Graves

SECTION 2

ORGANIZATION OF THE
NATIONAL PETROLEUM COUNCIL
COMMITTEE ON PETROLEUM TRANSPORTATION

UNITED STATES
DEPARTMENT OF THE INTERIOR
OFFICE OF OIL AND GAS
WASHINGTON 25, D. C.

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March 1, 1957

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

Dear Mr. Hallanan:

In December 1951, the Petroleum Administration for Defense published its comprehensive report, "Transportation of Oil" which grew out of the November 28, 1950 transportation study of the National Petroleum Council. This report has been of great value.

One of the elements of this report covered domestic petroleum transportation facilities. It is now desirable that the Government have again a comprehensive study of domestic petroleum transportation facilities, including petroleum pipelines, both crude and products, barges, tank cars and tank trucks. This information should include present capacity and the additional capacity now under construction or definitely planned. It should include transportation capabilities from major producing areas to principal refining areas and from those refining areas to markets. Special facilities for the transportation of liquefied petroleum gases should be separately studied.

It is, therefore, requested that the National Petroleum Council make a comprehensive study of domestic petroleum transportation facilities as outlined above with such report, recommendations and comments as are deemed appropriate.

Sincerely yours,

/S/ H. A. Stewart

Director

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outlining the scope of the report that should be prepared by the Committee of the National Petroleum Council appointed to ascertain the facts on domestic petroleum transportation facilities.

A committee of the Council should be appointed to ascertain the facts and report to the Council on domestic petroleum transportation facilities, including petroleum pipelines, both crude and products, barges, tank cars, and tank trucks, as set forth in Mr. Stewart's letter of March 1, 1957 marked Exhibit B and attached hereto and giving consideration also to furnishing information on additional capacity presently under construction or definitely planned, transportation capabilities from major producing areas to principal refining areas and from those refining areas to markets and the separate study of special facilities for the transportation of liquid petroleum gases. The Committee should not suggest plans or programs, but should confine its report to findings of fact.

COPY

April 4, 1957

Mr. B. I. Graves
B. I. Graves Associates
Petroleum Consultants
315 Montgomery Street
San Francisco 4, California

Dear Mr. Graves:

I am pleased to appoint you Chairman of the National Petroleum Council's Committee on Petroleum Transportation.

The Agenda Committee, in its report of March 6, 1957, unanimously adopted by the Council on March 7, recommended that a committee of the Council should be appointed to ascertain the facts and report to the Council on domestic petroleum transportation facilities, including petroleum pipelines, both crude and products, barges, tank cars, and tank trucks. The report also stated that the Committee should not suggest plans or programs but should confine its report to findings of fact and submit results of this study with such recommendations as it deems appropriate at the earliest possible date, in compliance with the request of the Director of the Office of Oil and Gas, Department of the Interior, dated March 1, 1957.

There is enclosed for your information a copy of the Agenda Committee report, including Mr. Stewart's letter of request, together with a copy of the membership list of the Committee. Each member of the Committee has been informed of his appointment as per the attached sample letter.

You will no doubt want to name necessary subcommittees and a secretary, who, in addition to such other duties as you may assign to him, should supply the Secretary of the Council with attendance records and brief minutes of all meetings. If you prefer that subcommittee members be appointed by me, I shall promptly carry out your wishes upon receipt of your lists for such members.

I greatly appreciate your undertaking this important assignment.

Best personal regards,

Sincerely,

/S/ Walter S. Hallanan

Walter S. Hallanan

SECTION 3

REPORT OF THE
SUBCOMMITTEE ON PETROLEUM PIPELINE TRANSPORTATION
of the
NATIONAL PETROLEUM COUNCIL
COMMITTEE ON PETROLEUM TRANSPORTATION

C. S. MITCHELL, CHAIRMAN

September 30, 1957

Mr. B. I. Graves, Chairman
Committee on Petroleum Transportation
National Petroleum Council
Washington 6, D. C.

Dear Mr. Graves:

Pursuant to the request in your letter of June 24, 1957, there is submitted herewith the report of the Pipeline Subcommittee of the Committee on Petroleum Transportation. This report contains data on the capacity of crude oil and products pipelines in the United States as of September 30, 1957.

The work of preparing the basic information for the Subcommittee report was assigned to various PAD District chairmen. The Chairmen appointed were:

District I	Mr. R. D. McGranahan	Gulf Oil Corp. Pittsburgh, Pennsylvania
District II	Mr. E. W. Unruh	Sinclair Pipe Line Co. Independence, Kansas
District III	Mr. J. W. Emison	The Texas Pipe Line Co. Houston, Texas
District IV	Mr. R. F. Moore	Platte Pipe Line Co. Kansas City, Missouri
District V	Mr. G. A. Davidson	Standard Oil Co. of Cal. San Francisco, California

Included in each of the District reports is an analysis of the capabilities of existing and planned pipeline facilities to meet transportation requirements for crude oil and products. Much of the statistical information was obtained from the files of the Committee for Oil Pipe Line Companies. The Subcommittee wishes to express its apprecia-

tion to Mr. John E. Boice, Secretary of the Committee for Oil Pipe Line Companies for his valued assistance.

Because of continuing changes in the capacity of pipeline transportation facilities through expansion of existing lines, new construction, and conversions, the Pipeline Subcommittee respectfully urges that the information be revised periodically to reflect current conditions. It is suggested, therefore, that this report be subject to review every three years.

Major crude oil pipeline projects now being constructed are the Texas-New Mexico and Four Corners Pipelines which extend from the Four Corners area south-eastward to the Permian Basin and westward to Los Angeles area refineries. Scheduled for October 1957 completion is the Tecumseh line linking pipeline terminal points near Chicago with the Toledo, Ohio area.

The principal product pipelines proposed or under construction are the conversion of the Texas Eastern Little Big Inch Pipeline from the Gulf Coast north-eastward to the Great Lakes Area and into Moundsville, West Virginia, the Laurel System extending westward from Philadelphia refineries to Pittsburgh and Cleveland, and the Wabash System linking the Wood River area and Robinson, Illinois with Chicago.

Copies of the individual PAD district reports and maps of pipeline capacities summarizing information as detailed in the district reports are attached. The summary discussion of pipeline facilities within each of these districts follows:

DISTRICT I

District I comprises the seventeen states of Maine, Vermont, New Hampshire, Massachusetts, Connecticut, Rhode Island, New York, New Jersey, Delaware, Pennsylvania, West Virginia, Maryland, Virginia, North Carolina, South Carolina, Georgia and Florida, and the District of Columbia.

CRUDE OIL PIPELINES

Crude oil pipeline movements in District I involve transshipments of crude received by pipeline from District II, by tanker at the Portland, Maine marine terminal, and from local producing area gathering systems.

Crude oil is delivered to the Northern Pipe Line at the Pennsylvania-Ohio state line by the Buckeye system having a capacity of 62,000 barrels daily from District II. In addition to the capacity existing from this source to fulfill requirements of western Pennsylvania-New York and West Virginia area refineries, crude oil received from either inter-district shipments or from local production is delivered by the Eureka, National Transit, New York Transit, Ashland, and Northern pipe line systems.

The Portland Pipeline is the United States section of a system which extends from a marine terminal at Portland, Maine to Montreal, Canada. This system has a capacity of 241,000 barrels daily which is to be increased to 257,000 barrels daily by November 1, 1957.

PRODUCTS PIPELINES

Products destined for pipeline movement in District I are delivered into the district via marine terminals at Port St. Joe, Florida; Staten Island, New York, Providence, Rhode Island; Fall River and Everett, Massachusetts; Portland and Sears Port, Maine, and via pipe line by the Plantation system near Bremen, Georgia. The Plantation and Southeastern systems deliver into District II near Chattanooga, Tennessee.

The primary movements of petroleum products by pipeline in District I are via the Plantation system and a number of systems north and west from the Philadelphia-New York area refineries and marine terminals.

Plantation, which originates at Baton Rouge and extends to Greensboro, North Carolina, has a delivery capacity into District I of 250,000 barrels daily. Deliveries are made to terminal points in Tennessee, Georgia, and South and North Carolina. Products pipeline systems westward from the New York-Philadelphia area to Pittsburgh have a capacity of 149,000 barrels daily and northward to the Syracuse-Rochester-Buffalo area of 153,000 barrels daily.

The Laurel Pipe Line Company has under construction a products line from Philadelphia to Cleveland via Pittsburgh. The system capacity, completion of which is scheduled for late 1958 or early 1959, will be 160,000 barrels daily to Pittsburgh and 52,000 into District II. In addition the conversion of the Texas Eastern Little Big Inch to products will provide another 185,000 barrels daily receiving capacity for the District.

DISTRICT II

District II comprises the states of North Dakota, South Dakota, Nebraska, Kansas, Oklahoma, Minnesota, Iowa, Missouri, Wisconsin, Michigan, Illinois, Indiana, Ohio, Kentucky, and Tennessee.

CRUDE OIL PIPELINES

Crude oil demands within District II are supplied by inter-district pipeline movements from Districts III and IV, by pipeline from Canadian sources, and from producing fields in the district.

Pipelines bringing crude from other districts and from Canada into this District have a total capacity of 1,847,000 barrels daily and pipelines delivering crude out of District II into Districts I, III and to Canada have a capacity of 340,000 barrels daily.

Crude oil production in Kansas and Oklahoma is more than sufficient to meet local refining needs. Surplus production from this area, augmented by shipments from Districts III and IV, is transported to refining centers at Wood River and in the Great Lakes Area.

The Wood River Area is supplied by pipelines having a capacity of 737,000 barrels daily. The Great Lakes Area refineries receive crude from pipelines having an aggregate capacity of 1,373,000 barrels daily. This crude oil originates from producing areas within District II, from Districts III and IV and to a small extent from Canadian pipeline imports.

DISTRICT II (Cont'd)

PRODUCTS PIPELINES

The principal products pipeline movements in District II are from refining centers to points of consumption within the District. The major products movements within the district is from the Oklahoma-Kansas area northward throughout the North Central States. Capacity of products lines to this area is 458,000 barrels daily. The second largest movement originates in the Oklahoma-Kansas area delivering products eastward to the Mississippi River and thence to the Lower Great Lakes Area with a pipeline capacity of 271,000 barrels daily. Completion of the proposed Wabash system will provide an additional 40,000 barrels daily capacity from Wood River and Robinson, Illinois to Chicago. Substantial relatively short-haul products movements from Great Lakes Area refineries supply products to local consuming areas.

Product pipelines from District II to District I have a total capacity of 30,000 barrels daily which will be increased to 215,000 barrels daily upon conversion of the 'Little Big Inch' system, to District III a total capacity of 65,000 barrels daily, and to the International Boundary 23,000 barrels daily. Products are received from other districts through pipe lines with the following capacities: 133,000 barrels daily from District I, 335,000 barrels daily from District III and 10,000 barrels daily from District IV.

DISTRICT III

District III comprises the States of New Mexico, Texas, Arkansas, Louisiana, Alabama and Mississippi.

CRUDE OIL PIPELINES

The principal movements of crude oil in District III are from producing areas in these States to Gulf Coast refineries and marine terminals, and to District II destinations. As of September 30, 1957, there existed a total crude oil pipeline capacity of 4,140,000 barrels daily into Gulf Coast refineries and terminals, 246,000 barrels daily to inland refining centers and 1,221,000 barrels daily capacity into District II.

The major sources of crude oil reserves within District III are the Permian Basin (West Texas and Southeast New Mexico), South and Southwest Texas, and South Louisiana.

The 1952-1953 completion of the West Texas Gulf and Rancho pipeline systems substantially augmented the capacity of pipelines moving crude oil from the Permian Basin. The total capacity of pipeline systems out of the Permian Basin as of the end of September, 1957 was 2,037,000 barrels daily. Of this quantity 1,163,000 barrels daily capacity existed from the Basin to Gulf Coast refineries and marine terminals.

Of the 4,140,000 barrels daily capacity into Gulf Coast refineries and terminals, 2,103,000 barrels originates from areas outside of the Gulf Coast. Crude oil movements northward from the Gulf Coast are possible through only one line having 46,000 barrels daily capacity.

PRODUCTS PIPELINES

The principal movements of petroleum products by pipeline in District III are from the Gulf Coast northward to various destinations within District III, into District II, and eastward throughout the Southeastern States. There are movements, however, into Districts I, IV, and V from District III.

At the end of September 1957, product pipelines capacities from the Gulf Coast northward amounted to 374,000 barrels a day to inland District III destinations or for trans-shipments to other Districts, and 323,000 barrels daily for shipment eastward to various destinations in the Southeastern States via the Plantation system.

The District III daily pipeline capacities for the movement of refined products originating from the Gulf Coast and inland refineries to the other Districts were as follows: to District I - 250,000 barrels, to District II - 335,000 barrels, to District IV - 15,000 barrels, and to District V - 14,000 barrels. Pipelines delivering petroleum products into District III have a total capacity of 65,000 barrels daily.

The 335,000 barrel product capacity from District III to District II includes the proposed 185,000 barrel per day capacity of the Texas Eastern "Little Big Inch" gas line. This line operated as a gas carrier by Texas Eastern Transmission Corp. since 1947, will be switched to products service from the Houston-Beaumont, Texas Area

to the Lower Great Lakes Area, a distance of 1168 miles. Texas Eastern is constructing a 14" line from a "Little Inch" terminal at Seymour, Indiana, to serve the Chicago, Illinois area.

DISTRICT IV

District IV comprises the States of Colorado, Utah, Wyoming, Montano and Idaho. Crude oil movements by pipeline furnish crude oil to local refineries and inter-district shipments into District II. Products are transported by pipeline to points within the District, into Districts II and V and from District III.

CRUDE OIL PIPELINES

The crude oil pipelines moving crude oil out of District IV into District II are the Platte, Service and Arapahoe systems which have an aggregate capacity of 392,000 barrels daily. The other pipelines within District IV are operated as feeder systems to these three trunk lines or to supply local refinery requirements.

The primary crude oil sources in District IV are the Big Horn, Powder River, Denver-Julesburg Basins, the Rangely area fields and the Eastern Montana region of the Williston Basin.

A portion of the crude oil from the Big Horn Basin (Northwest Wyoming) is transported northward to Laurel and Billings refineries by the Interstate system which has a capacity of 52,000

barrels daily. Other Big Horn crude is transported to Casper area refineries and eastward to District II.

Rangely Area (Uinta Basin) crude oils are moved to Salt Lake refineries and northward to local refineries and for movement by trunk carrier to District II.

Powder River Basin (Northeast and East Central Wyoming) crude oil is transported to refineries at Casper and Denver and to trunk systems for further movement to District II.

Crude oil produced in Denver-Julesburg Basin fields in Northeastern Colorado is transported by a feeder line into District II where it connects with Platte Pipe Line for movement eastward.

Crude oil produced in the Western part of the Williston Basin is delivered by Butte Pipe Line to trunk carriers for movement into District II.

Two crude oil pipelines from the rapidly developing Paradox Basin in southeastern Utah are under construction. Texas-New Mexico Pipe Line will complete in the Spring of 1958 a line from the area to connect with existing facilities in southeastern New Mexico. Also planned for early 1958 completion is the Four Corners Pipe Line from the Paradox Basin to the Los Angeles Area.

PRODUCTS PIPELINES

Seven refined products systems operate in District IV. Three of the lines operate within and four extend beyond the District.

DISTRICT IV (Cont'd)

The principal refining centers in District IV are Billings and Laurel, Montana; Cheyenne, Sinclair and Casper, Wyoming; and Salt Lake City, Utah. Pipeline capacities from these refining centers are 142,000 barrels daily with 49,000 barrels of refined products capacity available for shipment outside the District. Pipelines making inter-district shipments into District V from District IV have a capacity of 39,000 barrels daily and 10,000 barrels daily capacity into District II.

District IV receives products from only one other district, namely District III. The Phillips-Shamrock pipeline into Denver, Colorado from Texas Panhandle refineries has a capacity of 15,000 barrels per day.

DISTRICT V

District V is composed of States of Arizona, California, Nevada, Oregon and Washington.

CRUDE OIL PIPELINES

The demand for crude oil within District V is met principally by local production and supplemented by imports from foreign sources. There are no inter-district pipeline movements, although the Transmountain Pipe Line Company delivers Canadian production to refineries in the Puget Sound Area. With completion of the

Four Corners Pipeline early in 1958, crude will be moved into the Los Angeles Area from Districts III and IV.

Imported crude reaches District V through the Transmountain line and by tanker into each of the principal refinery centers, namely Los Angeles, San Francisco and Seattle.

The major producing fields in District V are in the San Joaquin Valley, Coastal, and Los Angeles Basin areas in California. This crude is moved by pipeline direct and by trans-shipment in tankers from marine terminals to each of the refining centers.

The source of the greatest crude supply is the San Joaquin Valley Area. The four crude oil systems extending northward from this area to San Francisco have a combined capacity of 326,000 barrels daily. The two pipeline systems extending southward to the Los Angeles Area have a combined capacity of 161,000 barrels daily and the three pipeline systems extending westward to tide-water terminals have a total capacity of 126,000 barrels daily.

Pipeline movements of crude oil produced in the Coastal fields are principally to marine terminals and to refineries in the Los Angeles area. Capacity to marine terminals is 192,000 barrels daily, and to Los Angeles refineries is 136,000 barrels daily.

Crude oil production from numerous Los Angeles Basin fields is moved to refineries by local pipeline systems having an aggregate capacity of 642,000 barrels daily.

PRODUCTS PIPELINES

The three refining centers in District V are located adjacent to tidewater and major market areas which has reduced the need for a vast netowork of products pipelines. Recently, however, there has been an upsurge in products pipeline activity with the construction of systems designed to serve inland District V points.

Three products pipelines transport products into District V: the Southern Pacific pipe line having a capacity of 14,000 barrels daily to Phoenix; the Salt Lake pipe line with 25,000 barrels daily capacity to Pasco and the Yellowstone System having a capacity of 14,000 barrels daily to Spokane.

The two extensive products lines within District V are the Southern Pacific line from Los Angeles to Phoenix, with a capacity of 37,000 barrels daily, and the Southern Pacific Line extending eastward from San Francisco having a capacity of 15,000 barrels daily to Reno and 11,300 barrels daily to Fallon, Nevada.

In addition there are numerous lines in the Los Angeles and San Francisco areas that deliver products from refineries to local distribution points and marine terminals. The combined capacity of these lines is 675,000 barrels daily in the Los Angeles area and 50,000 barrels daily in the San Francisco area.

Respectfully submitted,

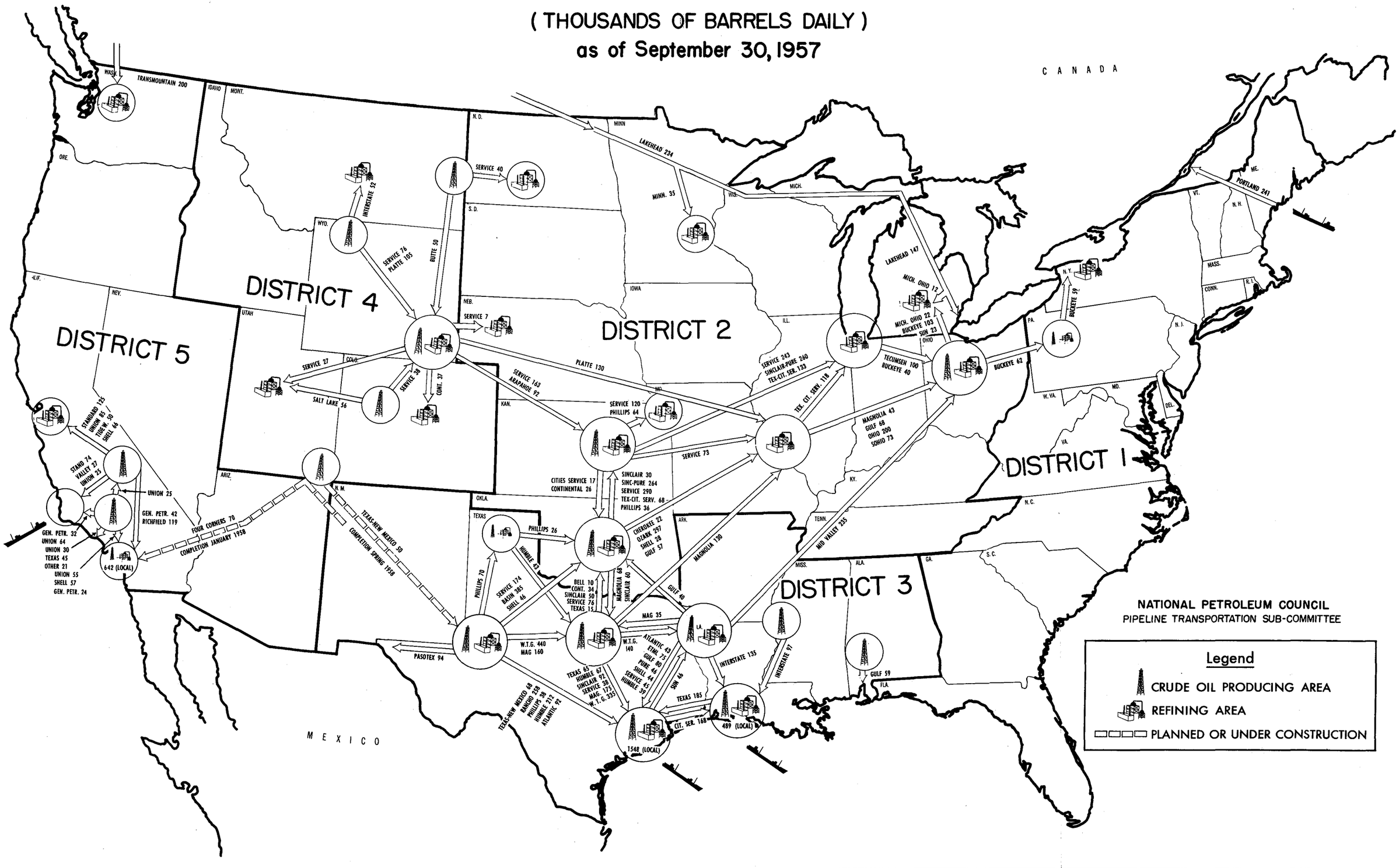
/S/ C. S. Mitchell, Chairman

C.S. Mitchell, Chairman
Subcommittee on Petroleum Pipeline Transportation

CRUDE OIL PIPELINE CAPACITIES

(THOUSANDS OF BARRELS DAILY)

as of September 30, 1957



NATIONAL PETROLEUM COUNCIL

PIPELINE TRANSPORTATION SUB-COMMITTEE

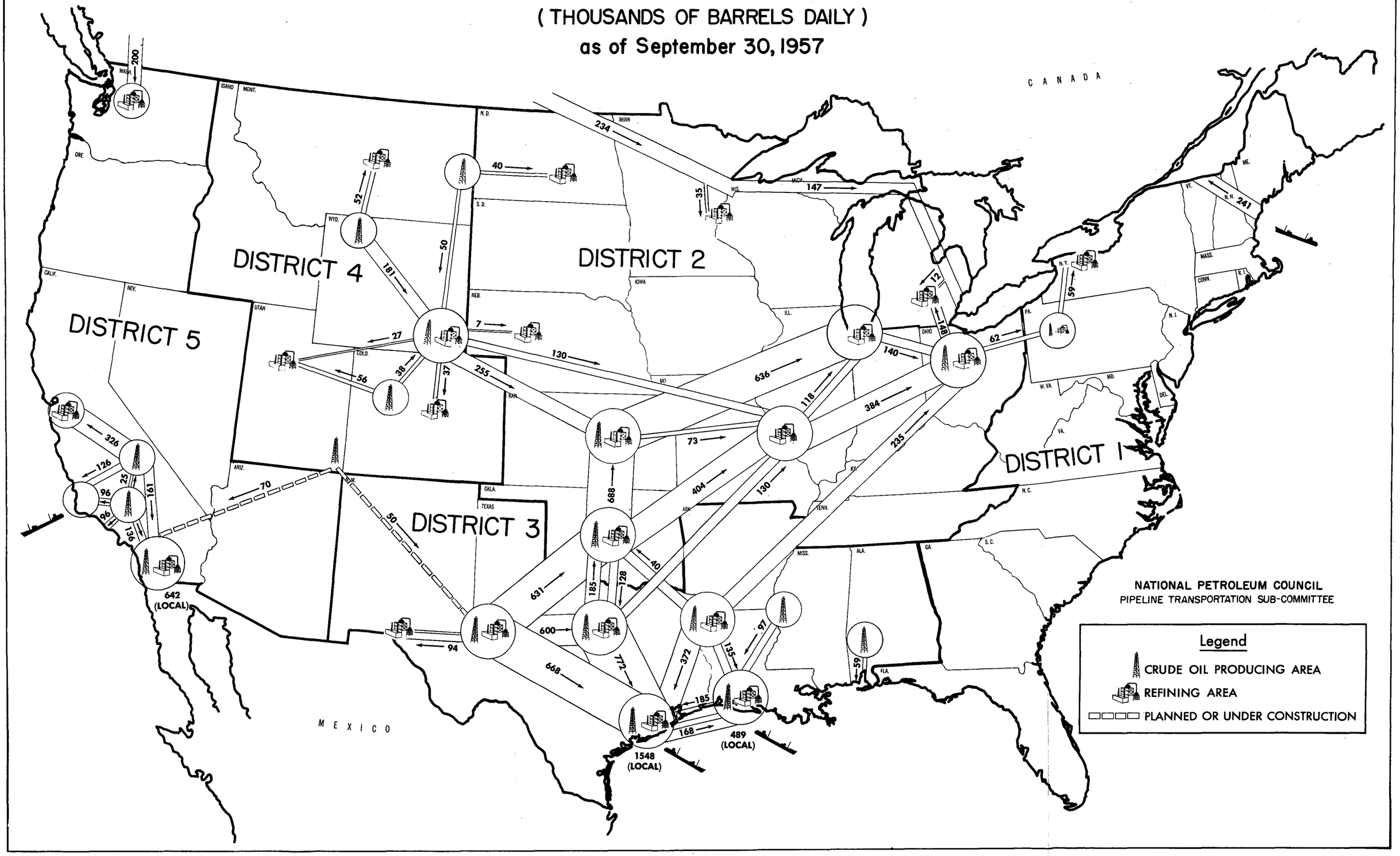
Legend

- CRUDE OIL PRODUCING AREA
- REFINING AREA
- PLANNED OR UNDER CONSTRUCTION

CRUDE OIL PIPELINE CAPACITIES

(THOUSANDS OF BARRELS DAILY)

as of September 30, 1957



NATIONAL PETROLEUM COUNCIL

PIPELINE TRANSPORTATION SUB-COMMITTEE

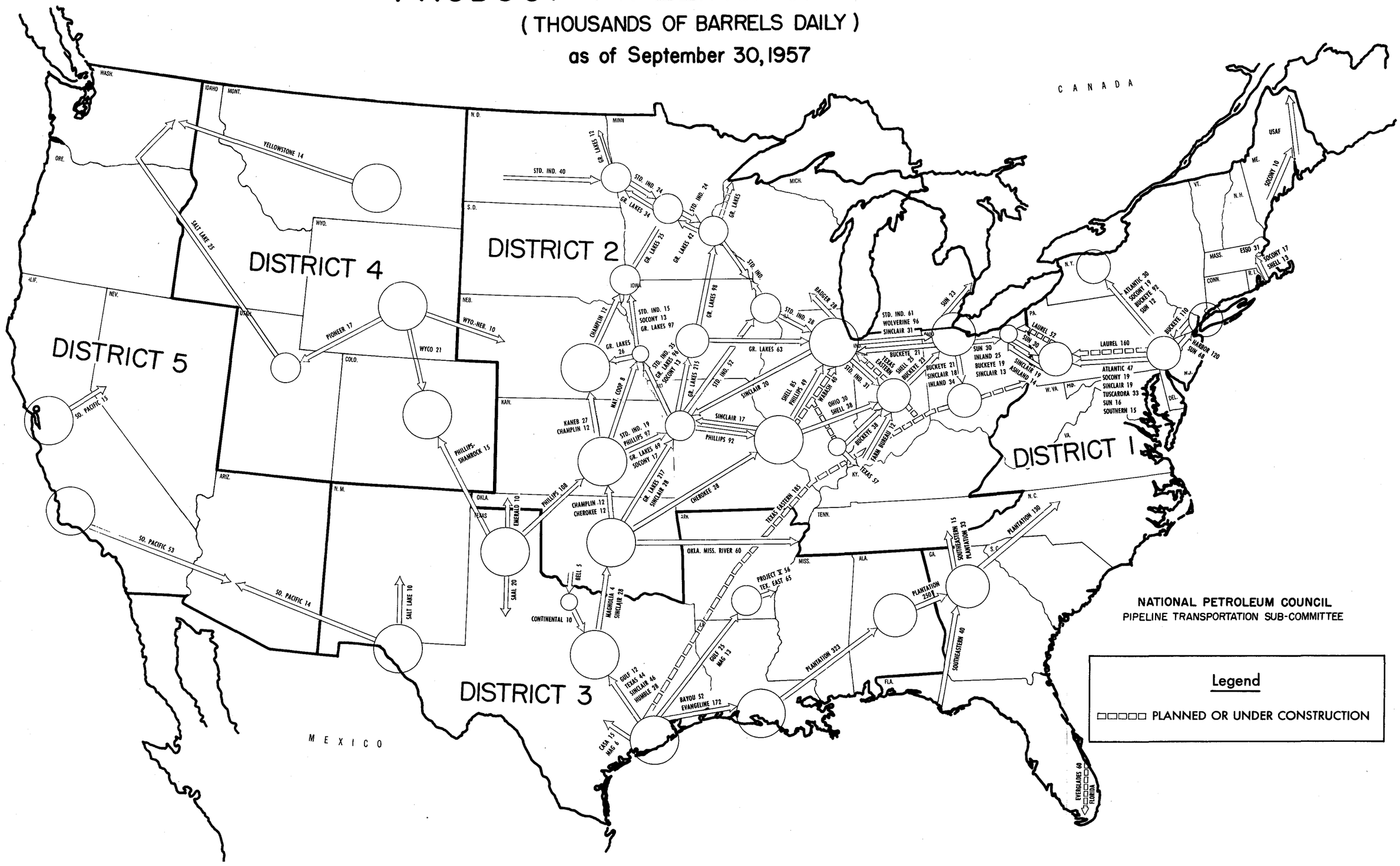
Legend

- CRUDE OIL PRODUCING AREA
- REFINING AREA
- PLANNED OR UNDER CONSTRUCTION

PRODUCT PIPELINE CAPACITIES

(THOUSANDS OF BARRELS DAILY)

as of September 30, 1957



NATIONAL PETROLEUM COUNCIL
PIPELINE TRANSPORTATION SUB-COMMITTEE

Legend

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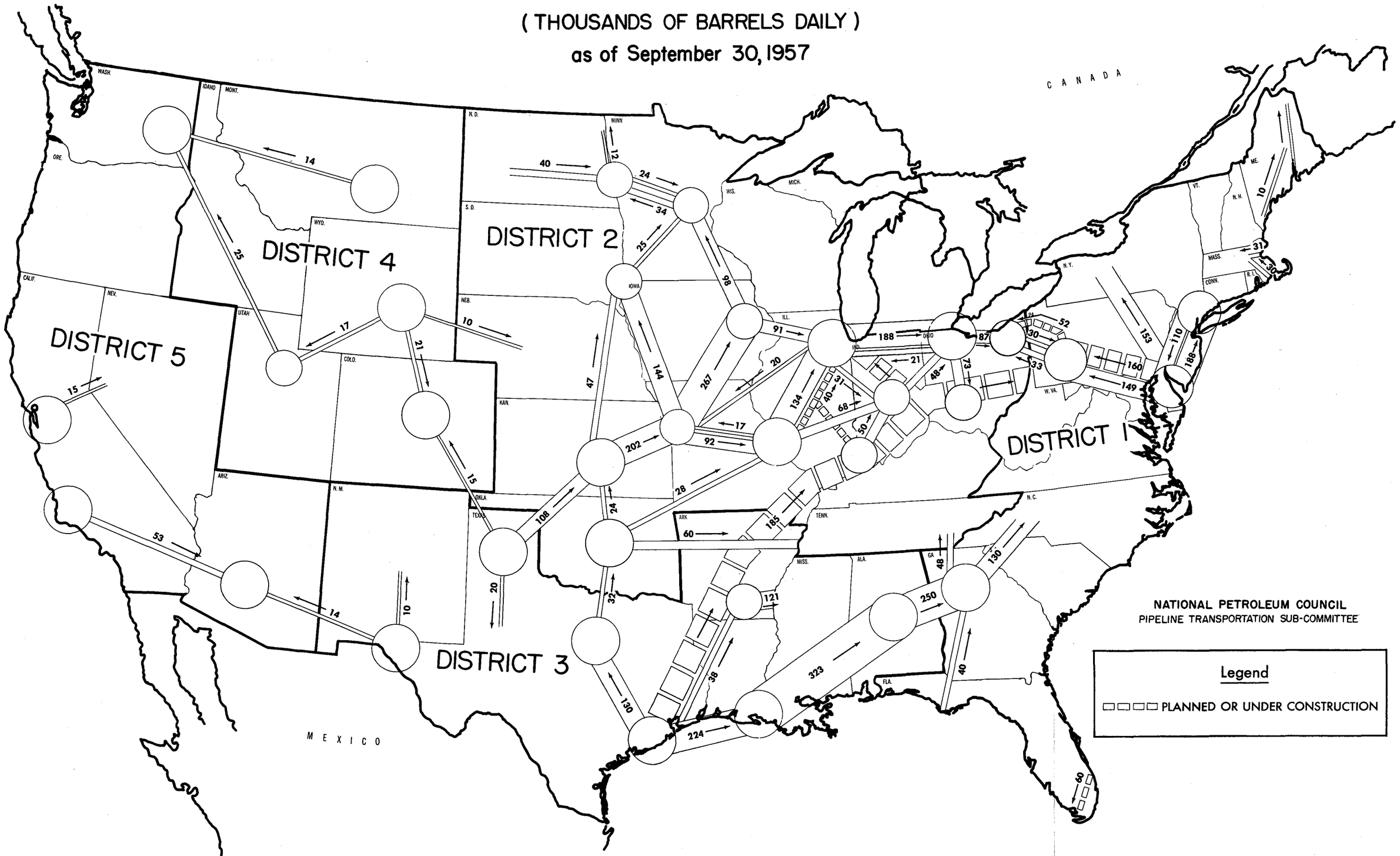
PRODUCT PIPELINE CAPACITIES

(THOUSANDS OF BARRELS DAILY)

as of September 30, 1957



SECTION 4

REPORT OF
SUBCOMMITTEE ON TANK CAR TRANSPORTATION
OF
NATIONAL PETROLEUM COUNCIL
COMMITTEE ON PETROLEUM TRANSPORTATION

B. C. GRAVES, CHAIRMAN

Report of Subcommittee on Tank Car Transportation
National Petroleum Council

The Association of American Railroads compiles annually a census of tank cars owned by United States corporations and shows, as of January 1, 1957, the existence of tank cars as listed on the attached statements.

It will be noted that on the statements the tank cars are divided into types (an explanation of the types is attached hereto) and capacities, and a further effort was made to separate cars as between those assigned to petroleum service, chemical service, and other than petroleum or chemical service. Many of these cars, particularly TM and TMI cars, are interchangeable between petroleum, chemical and other services. Consequently, the number of cars assigned to the various industries are in constant change. Other types of cars such as TP and TPI, although constructed for a special purpose, could in an emergency be used for gasoline and other light petroleum products, which would, of course, require facilities at loading and unloading points for overhead loading and unloading of such products.

According to the records of the American Railway Car Institute from January 1 to May 31, 1957, there were 1,362 TM and TMI cars, and 1,665 TP and TPI cars, constructed by carbuilders, which should be added to the totals shown on the attached statements. As of May 31, 1957, there were 3,115 TP and TPI cars, 3457 TM and TMI cars, and 174 miscellaneous cars on order. Information is not readily available as to whether such cars will be assigned to petroleum, chemical or

other services. At the same time, cars have been withdrawn from service for dismantling since January 1st, and it is believed that the cars withdrawn were mainly TM, TMI and TA cars. The exact number retired is unknown, but it is estimated to be about 1000.

Because of the increased transportation of petroleum products by means other than rail, the tank cars so displaced have been diverted to other than petroleum service or have been exported to Canada or Mexico, where they are either permanently assigned or are being used for temporary service.

It is estimated that apart from TP and TPI cars, which have increased from 8,790 to 19,602, the number of other types used in petroleum service has declined from 90,000, the figure submitted in 1950 to the National Petroleum Council, to 74,580.

It will also be noted that for the same causes there has been an appreciable decline in tank cars owned by the United States railroads during the same period, from 9,000 to 7,096 cars.

Most of the cars recently built or on order are 8000 gallons capacity and upwards, while the majority of those being retired average less in capacity. As a result, the annual average increase in capacity per car in the fleet from 1950 to date is 450 gallons, and it is expected that this trend will continue. The total capacity of the petroleum fleet has therefore increased, although declining in the number of tank cars.

Respectfully submitted,

B. C. Graves, Chairman
Subcommittee on Tank Car
Transportation

CLASS A, TANK CARS - UNITED STATES PRIVATELY OWNED - JANUARY 1, 1957

A. A. R. DESIGNATION	Non-Coiled 6000	8000	10000	12000	16000	Coiled 6000	8000	10000	12000	16000	TOTAL
Petroleum Service											
TA	36	1									37
TL	88	244	105	5		30	306	15			793
TLI	27	229	175			41	164	310			946
TM	4958	13772	11555	1180		2189	8230	10972	376	6	53238
TMI	46	3709	481			167	1215	8441	183	4	14246
TP			1	3							4
TPA			362								362
TPI-ICC-105A100			128	514				13	11		666
-ICC-105A300			1202	16213				1	6		17422
-ICC-105A400			131	890				4	120		1145
-ICC-105A500				3							3
TRI			96					1			97
Total	5155	17955	14236	18808		2427	9915	19757	696	10	88959
Chemical Service											
TA	688	3248	488	80		1	11	1			4517
TAI	2	1				22	122	1			148
TGI	1	1									2
TL	262	1241	278	98		34	403	28			2344
TLI	27	382	436	75		28	372	1555			2875
TM	169	1568	911	344		651	3066	2712	92	5	9518
TMI	62	623	313			92	2148	2042	100		5380
TMU	345		2								347
TP	1	275		10							286
TPA		20	312								332
TPI-ICC-105A100	16		187	247				20	6		476
-ICC-105A300	2028	97	233	4961		20	8	2	318		7667
-ICC-105A400			215	1692							1907
-ICC-105A500	544	37	7	335		94		5			1022
TR	122	122	131			41	251	308			975
TRI	10	134	1100			5	196	46			1491
Total	4277	7749	4613	7842		988	6577	6720	516	5	39287
Other than Petroleum or Chemical Service											
TA	19		20								39
TL	31	758	189	1		50	707	18		1	1755
TLI	608	1339	523			26	293	203			2992
TM	892	2726	1200	172		1009	8834	3142	163	1	18139
TMI	33	276	417			236	433	1347	43	9	2794
TMU	19		88								107
TPI-ICC-105A300	2			531							533
TR						5	27				32
TRI							7	3			10
Total	1604	5099	2437	704		1326	10301	4713	206	11	26401
Grand Total	11036	30803	21286	27354		4741	26793	31190	1418	26	154647

This statement includes cars owned by companies from whom no reports were received.

CLASS A, TANK CARS - UNITED STATES RAILROAD OWNED - JANUARY 1, 1957

A. A. R. DESIGNATION	Non-Coiled 6000	8000	10000	12000	16000	Coiled 6000	8000	10000	12000	16000	TOTAL
Petroleum Service											
TA	4	7	8								19
TM	8	438	937	1593	904	1	187	247	2400	381	7096
Total	12	445	945	1593	904	1	187	247	2400	381	7115
Chemical Service											
TA	15	37	50								102
TM		11	10	21				1			43
Total	15	48	60	21				1			145
Other than Petroleum or Chemical Service											
TM	2	31	46	654			137	49	229	4	1152
Total	2	31	46	654			137	49	229	4	1152
Grand Total	29	524	1051	2268	904	1	324	297	2629	385	8412

This statement includes cars owned by companies from whom no reports were received.

In the designations shown, when an "I" is added, such as "TPI", the container or tank is insulated.

TA - This designation covers tank cars for shipment of various acids, such as sulphuric, oleum, nicotine, nitrobenzol, etc.

Tank car equipped with container of ICC Specification 103A, 103A-W, 103E-W, 103A-N-W, 103C and 103C-W. Also ARA II, ARA III, ICC 103 or 103-W if containers and appurtenances were originally designed or subsequently reconstructed to comply with the requirements for ICC 103A cars.

TG - This designation covers tank cars that are glass lined and used for wine, milk, etc.

Tank car having one or more glass-lined containers of ICC Specification 103A-W.

TL - These are tank cars that are lined or coated with various materials other than glass to prevent corrosion or contamination of contents. They handle such products as acetic acid, latex, plasticizers, phenol, etc.

Tank car equipped with container lined with any material other than glass, such as ICC Specification 103B, 103B-W, ICC 103B100-W, 105A300-W (rubber lined). Also ARA III (rubber lined).

TM - These are considered to be "general purpose" tank cars. They are used for everything from alcohols to zinc sulphate solutions, including most petroleum products, except liquefied petroleum gases.

Tank car equipped with container of ARA or AAR Specification I, II, III, III Experimental Welded Seams, IV, 203,203-W, 203-X, or ICC Specification 103, 103-W, 103D-W, 104, 104-W, or Specification Emergency USG-A, USG-B or USG-C.

TPA - These are aluminum cars used for pressure products, such as ammonium nitrate solutions.

Tank car equipped with aluminum container of ICC Specification 104A-AL-W, 105A100AL-W, 105A300AL-W or 109A100AL-W.

TP - These are the tank cars used for liquefied petroleum gas, anhydrous ammonia, chlorine, etc.

Tank car equipped with container of ARA Specification IV-A, V or AAR-205A300-W or ICC Specification 104A, 104A-W, 105, 105A100, 105A100-W, 105A300, 105A300-W, 105A400, 105A400-W, 105A500, 105A500-W, 105A600, 105A600-W or 109A300-W.

TR - Special type of tank car, made of aluminum, for fatty acids, nitrogen solutions, acetic acid, etc.

Tank car equipped with container of AAR Specification 201A35, 201A35Special 201A35-W, 201A35-X, 201A70-W, or ICC Specification 103AL, 103AL-W, 103A-AL-W and 103C-AL.

TMU - Special type of tank cars of high pressure used for trimethylamine, sulphur dioxide, sodium chloride, etc.

Tank car equipped with containers of ARA Specification VI, B.E. Specification 27, ICC Specification 27, 51, 106A500, 106A500-X, 106A-800, 106A800-X, 106A800-NCI, 107A****series or 110A500-W.

SECTION 5

REPORT OF
SUBCOMMITTEE ON TANK TRUCK TRANSPORTATION
OF
NATIONAL PETROLEUM COUNCIL
COMMITTEE ON PETROLEUM TRANSPORTATION

S. F. NINESS, CHAIRMAN

December 3, 1957

Mr. B. I. Graves, Chairman
Transportation Committee
National Petroleum Council
Washington 6, D. C.

Dear Mr. Graves:

Pursuant to the request in your letter of June 24, 1957, there is submitted herewith the report of the Subcommittee on Tank Truck Transportation of the Committee on Petroleum Transportation of the National Petroleum Council. This report contains data on over-the-road (excluding local delivery) tank motor vehicles as of July 1 1957.

It includes both straight trucks ("unit tank trucks") and articulated vehicles (semi-trailers and trains), operated by both private and for-hire carriers. Figures are reported separately for general purpose equipment, Liquefied Petroleum Gas equipment, and special equipment for chemicals and other commodities.

Because of the necessary time limitations we did not attempt to make a complete new survey of tank truck equipment. Instead, we took the figures reported in the 1955 census made by the National Petroleum Council and brought them up-to-date on the basis of the number of new tank vehicles manufactured as reported by the Department of Commerce since 1955, further modifying these figures by eliminating an estimated percentage of vehicles as being scrapped, exported or converted to non-highway use. The figure used for this latter purpose was based on information obtained from tank trailer

manufacturers regarding trade-ins, and from the experience of both private and for-hire tank vehicle owners on obsolescence.

This resulted in new figures for total number of vehicles. The increase was distributed to each PAD District in proportion to each District's relative gasoline consumption, and divided between for-hire and private carriers on the same basis as the 1955 census. Capacities were obtained from these figures, taking into consideration state motor vehicle size and weight limit changes since 1955.

GENERAL PURPOSE EQUIPMENT

Using the methods described, our studies indicate a total fleet of over-the-road general purpose tank motor vehicles in petroleum service as of July 1, 1957, of 41,837 units operated by private and for-hire carriers combined. Of these, 37,068 are semi-trailers or trains, and 4,769 are unit tank trucks. They have a total capacity of 242,719,383 gallons for an average capacity of 5,802 gallons per unit. (See Appendix A.)

Breaking the semi-trailer and train equipment down as between private and for-hire carriers, we find that private carriers are operating 15,763 pieces of this type, and for-hire carriers are operating 21,305 pieces. Average capacity of this equipment (which does not include unit tank trucks) is 5,957 gallons for private carriers, and 6,269 for for-hire carriers, for a total capacity of 94,005,382 gallons and 133,576,901 gallons, respectively. The combined capacity for all carriers of 227,582,283 represents a 41.2 percent increase over 1955. (See Appendix B.)

LIQUEFIED PETROLEUM GAS EQUIPMENT

Our survey found a total of 3,327 tank motor vehicles in Liquefied Petroleum Gas service, 2,276 of which are operated by private carriers, and 1,051 by for-hire carriers. This represents a capacity of 6,302,675 water gallons for private carriers and 4,873,555 for for-hire carriers, for a total of 11,176,230 or an average capacity of 3,359 water gallons per unit. (See Appendix C.)

CHEMICAL EQUIPMENT

The total number of tank motor vehicles designed for hauling chemicals has more than doubled since the 1955 census. This figure increased from 1,987 in 1955 to 4,025 in 1957. Private carriers operate 636 of these and for-hire carriers 3,389.

Statistics were not available on which to develop capacities for this type of equipment. (See Appendix D.)

The Chairman wishes to express his appreciation to all the members of the subcommittee for their help, and especially to C. Austin Sutherland, National Tank Truck Carriers, Inc., Frank Perry, Atlantic Refining Co.; Frank L. Grimm, O'Boyle Tank Lines; and L. E. Reed, Socony-Mobil Oil Co., Inc.

Respectfully submitted,

S. F. Niness

S. F. Niness, Chairman
Subcommittee on Tank Truck
Transportation

TOTAL CENSUS OF TANK TRUCKS IN U.S. - PRIVATE & FOR-HIRE
ALL TANK & TRAILER EQUIPMENT - HAULING PETROLEUM PRODUCTS
(Does Not Include LPG, Chemical or Other Type Equipment)
As of July 1, 1957

Type of Equipment by PAD District	Number of Units	Total Capacity (Gallons)	Average Capacity Per Unit
PAD District No. 1			
(a) Unit Tank Trucks	1,511	4,835,200	3,200
(b) Tank Semi-Trailers & Trains	13,344	77,766,376	5,828
Total Private & For-Hire Equipment - District No. 1	14,855	82,601,576	5,560
PAD District No. 2			
(a) Unit Tank Trucks	2,103	6,519,300	3,100
(b) Tank Semi-Trailers & Trains	13,100	81,366,594	6,211
Total Private & For-Hire Equipment - District No. 2	15,203	87,885,894	5,781
PAD District No. 3			
(a) Unit Tank Trucks	351	1,123,200	3,200
(b) Tank Semi-Trailers & Trains	4,865	28,871,797	5,935
Total Private & For-Hire Equipment - District No. 3	5,216	29,994,997	5,751
PAD District No. 4			
(a) Unit Tank Trucks	62	210,800	3,400
(b) Tank Semi-Trailers & Trains	1,446	9,286,116	6,422
Total Private & Fore-Hire Equipment - District No. 4	1,508	9,496,916	6,298
PAD District No. 5			
(a) Unit Tank Trucks	742	2,448,600	3,300
(b) Tank Semi-Trailers & Trains	4,313	30,291,400	7,023
Total Private & For-Hire Equipment - District No. 5	5,055	32,740,000	6,477
Total United States			
(a) Unit Tank Trucks	4,769	15,137,100	3,174
(b) Tank Semi-Trailers & Trains	37,068	227,582,283	6,140
Total Private & For-Hire Equipment - United States	41,837	242,719,383	5,802

GENERAL PURPOSE TANK TRAILER AND SEMI-TRAILER EQUIPMENT IN U. S. PRIVATE AND FOR-HIRE CARRIERS
As of July 1, 1957

Region	Number of Units 1955	Number of Units 1957	Total Capacity (Gal.) 1955	Total Capacity (Gal.) 1957	% Increase + or -	Average Capacity per Unit 1955	Average Capacity per Unit 1957
PAD District No. 1							
Private Carriers	4,758	6,392	25,217,400	36,249,032	43.7	5,300	5,671
For-Hire Carriers	5,156	6,952	28,873,600	41,517,344	43.8	5,600	5,973
Total-Dist. 1	9,914	12,344	54,091,000	77,766,376	43.7	5,456	5,828
PAD District No. 2							
Private Carriers	3,968	5,541	23,808,000	33,246,000	39.6	6,000	6,000
For-Hire Carriers	5,422	7,559	34,518,900	48,120,594	39.3	6,366	6,366
Total-Dist. 2	9,390	13,100	58,326,900	81,366,594	39.5	6,212	6,211
PAD District No. 3							
Private Carriers	1,227	1,732	7,116,600	10,045,600	40.9	5,800	5,800
For-Hire Carriers	2,223	3,133	13,359,000	18,826,197	41.6	6,009	6,009
Total-Dist. 3	3,450	4,865	20,475,600	28,871,797	41.1	5,935	5,935
PAD District No. 4							
Private Carriers	231	295	1,443,750	1,843,750	27.8	6,250	6,250
For-Hire Carriers	900	1,151	5,819,800	7,422,366	27.9	6,466	6,466
Total Dist. 4	1,131	1,446	7,263,550	9,286,116	27.9	6,422	6,422
PAD District No. 5							
Private Carriers	1,251	1,803	8,757,000	12,621,000	44.1	7,000	7,000
For-Hire Carriers	1,736	2,510	12,220,800	17,670,400	44.6	7,040	7,040
Total-Dist. 5	2,987	4,313	20,977,800	30,291,400	41.4	7,023	7,023
Total United States							
Private Carriers	11,435	15,763	66,342,750	94,005,382	41.7	5,802	5,957
For-Hire Carriers	15,437	21,305	94,792,100	133,576,901	40.9	6,140	6,269
Total	26,872	37,068	161,134,850	227,582,283	41.2	5,996	6,140

SPECIAL TANK TRUCK EQUIPMENT
TOTAL EQUIPMENT - PRIVATE AND FOR-HIRE
HAULING - LIQUEFIED PETROLEUM GAS
As of July 1, 1957

	Number Of Units		Total Capacity (Gallons)		Average Capacity Per Unit	
	1955	1957	1955	1957	1955	1957
PAD DISTRICT NO. 1						
Private Carriers	258	309	541,175	648,282	2,098	2,098
For-Hire Carriers	160	193	692,200	834,917	4,326	4,326
Total Dist. 1	418	502	1,233,375	1,483,200	2,951	2,951
PAD DISTRICT NO. 2						
Private Carriers	621	689	1,277,625	1,417,273	2,057	2,057
For-Hire Carriers	201	224	837,800	933,632	4,168	4,168
Total Dist. 2	822	913	2,115,425	2,350,905	2,574	2,574
PAD DISTRICT NO. 3						
Private Carriers	880	910	2,348,825	2,428,790	2,669	2,669
For-Hire Carriers	158	163	751,500	775,228	4,756	4,756
Total Dist. 3	1,038	1,073	3,100,325	3,204,018	2,987	2,987
PAD DISTRICT NO. 4						
Private Carriers	106	111	233,300	244,200	2,200	2,200
For-Hire Carriers	54	57	249,000	262,827	4,611	4,611
Total Dist. 4	160	168	482,300	507,027	3,014	3,014
PAD DISTRICT NO. 5						
Private Carriers	235	257	669,750	732,450	2,850	2,850
For-Hire Carriers	404	414	1,825,055	1,870,038	4,517	4,517
Total Dist. 5	639	671	2,494,805	2,602,488	3,904	3,904
TOTAL UNITED STATES						
Private Carriers	2,100	2,276	5,070,675	5,470,995	2,415	2,415
For-Hire Carriers	977	1,051	4,355,555	4,676,643	4,458	4,458
TOTAL U. S.	3,077	3,327	9,426,230	10,147,638	3,063	3,063

SPECIAL TANK TRUCK EQUIPMENT

TOTAL TANK & TRAILER EQUIPMENT

PRIVATE AND FOR HIRE

HAULING - CHEMICALS

(As of July 1, 1957)

	PRIVATE CARRIER (No. of Units		FOR - HIRE CARRIER (No. of Units)		TOTAL EQUIPMENT (No. of Units	
	1955 - 1957		1955 - 1957		1955 - 1957	
TOTAL	316	636	1,671	3,389	1,987	4,025

SECTION 6

REPORT OF
COMMITTEE ON
BARGE AND LAKE TANKER TRANSPORTATION
OF
NATIONAL PETROLEUM COUNCIL
COMMITTEE ON PETROLEUM TRANSPORTATION

A. C. INGERSOLL, JR. - CHAIRMAN

January 28, 1958

Mr. B. I. Graves
Chairman, Transportation Committee
National Petroleum Council
c/o B. I. Graves Associates
315 Montgomery Street
San Francisco 4, California

Dear Mr. Graves:

The following report covering the transportation facilities for petroleum and its products over the inland waterways and on the Great Lakes has been compiled in accordance with your request.

All data contained herein has been correlated and compiled from official documents and records of the United States Coast Guard, the Corps of Engineers, U. S. Army, and the American Bureau of Shipping, together with actual area survey application and the able assistance extended by individual members of the Subcommittee in order to make a thorough and true industry report.

The importance of having available the source data necessary to compile accurate reports pertaining to equipment used in vital commerce is illustrated by the present need of the National Petroleum Council for this report.

During the last few years efforts have been made to have the yearly Corps of Engineers' Transportation Series codified in a more comprehensive manner. Comparatively simple changes would do the job. However, the suggestions have encountered some resistance. In 1954, the Hoover Commission Task Force on Paperwork Management questioned the need for the detail requested by the Corps of Engineers in order to compile the present report.

Consideration should, therefore, be given to a recommendation by the National Petroleum Council that the necessary adjustments be made to the Corps of Engineers' Transportation Series in order to facilitate future equipment compilations.

For the purpose of this report the country has been divided into four areas of operation as in the 1950 study, as follows:

1. The Mississippi River System (including the Gulf Intercoastal Canal)

All tank barges operating on the Mississippi River System, as of January 1, 1957, have been tabulated in Table I, according to the year built. This shows that there were 1,196 tank barges with a total capacity of 15,178,608 barrels; 336 tank barges of 5,000 barrels capacity or less with a total capacity of 777,050 barrels (Table I-A); and 56 tank barges with special features or in special services with a total capacity of 383,194 barrels (Table I-B) or an overall total of 1,588 tank barges with a total combined capacity of 16,338,852 barrels (42's) in operation. Barges of less than 5,000 barrels capacity have been shown separately as it is believed that most such vessels are tenders or service units and not usually in petroleum transportation service. (Note: These figures are subject to some slight reduction due to retirements.)

2. The East Coast Waterways (including the New York State Barge Canal

All non-propelled and self-propelled petroleum barge equipment presently trading in the east coast area and on the New York State Barge Canal, has been tabulated in Table II, according to the year built. This shows that there were in operation 398 units having a total capacity of 4,366,078 barrels (42's). Eliminated from the east coast list and therefore, excluded from its total were 173 units, shown in the Coast Guard List of Inspected Tank Vessels, with a total capacity of 278,768 barrels for the reason that these vessels are not engaged in petroleum transportation services but rather are used as cleaning vessels, slop barges, etc. (See note in I above.)

3. The Great Lakes

Table III represents the tabulation of the American Flag Tanker Fleet operating on the Great Lakes, broken down by year built. It excludes the present equipment which seasonally operates on the New York State Barge Canal or in short-run coastwise trade, but which is capable of and sometimes does operate on the Great Lakes. This shows available 25 units having a total capacity of 825,198 barrels. Non-self-propelled vessels engaged in auxiliary services other than for the exclusive transportation of petroleum have been excluded from the total number of vessels operating on the Great Lakes.

4. The Inland Waterways of the West Coast

Table IV gives the latest available data as to barge and self-propelled equipment operating on the west coast waterways, broken down by the year built. This equipment is concentrated principally in the San Francisco Bay area and on the Columbia River with a minor proportion of the equipment operating in either the Puget Sound or Los Angeles Bay area. This shows there are 92 units of over 5,000 barrels capacity with a combined total capacity of 1,150,361 barrels and 1 vessel for which no year of construction can be determined with a capacity of 5,312 barrels (Table IV). There are also 33 units of 5,000 barrels capacity or less with a total combined capacity of 91,559 barrels and 1 vessel of 381 barrels capacity for which no year of construction can be determined or an overall total of 127 tank barges with a total combined capacity of 1,247,613 barrels (42's) operating in this area. The supplementary table for vessels which operate in Alaska shows there are 2 units with a total combined capacity of 14,300 barrels and 18 units of 5,000 barrels capacity or less, with a total combined capacity of 26,003 barrels (Table IV-A) or an overall total of 20 units with a total combined capacity of 40,303 barrels (42's). Generally speaking, barges under 5,000 barrels are mostly tenders or service units and not usually in petroleum transportation service as such.

The summary of these four tables shows that as of January 1, 1957, there were in petroleum service in this country a total of 1,712 units with a combined total capacity of 21,525,557 barrels (42's). The supplementary tables show 2 units in Alaska with a combined total capacity of 14,300 barrels (42's); 56 special features and/or services barges with a total combined capacity of 383,194 barrels (42's) and 336 units with a total combined capacity of 777,050 barrels (42's) on the Western Rivers; 34 units on the West Coast with a combined total capacity of 91,940 barrels (42's) and 18 units in Alaska with a combined total capacity of 26,003 barrels (42's) both of which are of 5,000 barrels or less capacity each.

Based on the most complete data available compiled from official Coast Guard records and individual Subcommittee members' survey research, the following tabulation shows the barge building status as of November 22, 1957:

	No. of Vessels	Barrels (42's) Total Capacity
Mississippi River System (including Gulf Intracoastal Canal)		
Mississippi River System (including Gulf Intracoastal Canal)	97	939,777
Inland Waterways of the East Coast	15	186,940
Inland Waterways of the West Coast	4	176,941

Supplementing Tables I, II, III, and IV is the following breakdown by areas of all equipment contained therein together with additional information and data not shown:

Inland Waterways and Great Lakes Petroleum Tank Vessels under 31,300 Barrels (42's) Capacity - as of January 1, 1957

	Propelled		Non Propelled		Total	
	Units	Bbls.(42's) Capacity	Units	Bbls.(42's) Capacity	Units	Bbls.(42's) Capacity
Area Active 1/1/57						
East Coast (A)	90	934,005	307	3,399,073	397	4,333,078
Western Rivers	-	-	1,196	15,178,608	1,196	15,178,608
a) Barges 5,000 Bbls.cap. or less	-	-	336	777,050	336	777,050
b) Special feature and/or services units	-	-	56	383,194	56	383,194
Great Lakes (A)	11	175,885	-	-	11	175,885
West Coast (A) (B)	3	21,987	83	924,782	86	946,769
a) Barges 5,000 Bbls. capacity or less	-	-	34	91,940	34	91,940
1. Alaska	-	-	2	14,300	2	14,300
a) Barges 5,000 Bbls. capacity or less	1	499	17	25,504	18	26,003
Sub-Total	105	1,132,376	2,031	20,794,451	2,136	21,926,827

Inland Waterways and Great Lakes Petroleum Tank Vessels Under 31,300 Barrels (42's) Capacity - as of January 1, 1957 (Cont'd.)

	Propelled		Non Propelled		Total	
	Units	Bbls (42's) Capacity	Units	Bbls.(42's) Capacity	Units	Bbls.(42's) Capacity
(Carried Fwd.) Sub-Total	105	1,132,376	2,031	20,794,451	2,136	21,926,827

(A) In addition there is one (1) self-propelled vessel operating on the East Coast (over 31,300 barrels) with a capacity of 33,000 barrels; fourteen (14) self-propelled vessels operating on the Great Lakes (over 31,300 barrels) with a combined total capacity of 649,313 barrels (42's); and five (5) non-self propelled vessels operating on the West Coast (over 31,300 barrels) with a combined total capacity of 203,211 barrels (42's). Vessels over 31,300 barrels on the Western Rivers impossible to segregate if in operation.

East Coast	1	33,000
Great Lakes	14	649,313
West Coast	5	203,211

(B) Impossible to breakdown due to no year of construction listed	West Coast	2	5,693
Total indicated U. S. Inland Waterways petroleum fleet as of January 1, 1957		2,158	22,818,044

Not included in this report there are in addition to the above listed equipment one (1) self-propelled vessel of 13,095 barrels (42's) capacity and ten (10) non-self-propelled vessels with a combined capacity of 80,179 barrels (42's) certified for the carriage of L.P.G., all of which operate on the Western Rivers. There is also one barge of 17,173 barrels capacity available for the transportation of pressure cargoes presently engaged in the transportation of LAA operating on the west coast.

This report details present barge capacity as of November 22, 1957 in the same manner as in the previous report of November 28, 1950 which we understand served the purpose of the National Petroleum Council. Because of the many factors affecting transportation capability this Subcommittee does not feel that the data as submitted

would permit those receiving it to prepare an accurate estimate of transportation capabilities. We believe there is a method by which transportation capabilities could be determined based on actual transportation services rendered during past periods, but a substantial amount of work would be involved securing data and we doubt the advisability of entering upon such a project. However, if those receiving this report consider additional information desirable and necessary, our Subcommittee would be happy to discuss it further and to lend any assistance required in setting up procedures to accumulate such data for future use.

Sincerely yours,

/S/ A. C. Ingersoll, Jr.

A. C. Ingersoll, Jr.
Chairman, Subcommittee on Barge
and Lake Tanker Transportation of the
Committee on Petroleum Transportation

Attachments

Table I
I-A
I-B - Mississippi River System (including the Gulf Intracoastal Canal)
Table II - East Coast Area (including N. Y. State Barge Canal)
Table III- Great Lakes - U. S. Flag Tank Vessels
Table IV - West Coast (barges over 5,000 barrels capacity)
- West Coast (barges 5,000 barrels capacity or less)
Table IV-A-Alaska

PETROLEUM TANK VESSEL EQUIPMENT- 1/1/57 - TABLE I
MISSISSIPPI RIVER SYSTEM
(INCLUDING GULF INTRACOASTAL CANAL)
EXCLUDING BARGES WITH CAPACITIES OF 5000 BBLS. OR LESS AND SPECIALTY BARGES

YEAR BUILT	NO OF UNITS	BBLS. (42's) CAPACITY
1956	45	676,837
1955	56	859,176
1954	14	197,214
1953	18	342,769
1952	68	1,227,060
1951	91	1,712,752
1950	32	532,232
1949	67	1,140,266
1948	111	1,562,344
1947	64	834,240
1946	33	410,692
1945	64	675,102
1944	27	289,798
1943	63	614,494
1942	56	562,820
1941	116	1,127,082
1940	75	746,441
1939	38	356,165
1938	12	108,495
1937	57	466,447
1936	33	252,903
1935	16	124,711
1934	5	24,104
1933	6	49,754
1932	5	35,500
1931	6	47,426
1930	1	10,547
1929	-0-	-0-
1928	4	54,096
1927	1	12,500
1926	5	64,546
Sub-Totals	1,189	15,118,513
Prior to 1926	7	60,095
Grand Total	1,196	15,178,608

BARGES WITH CAPACITIES OF 5000 BBLS. OR LESS
MID-CONTINENT AREA
PER U. S. COAST GUARD LIST - 1957

TABLE I-A

YEAR BUILT	NO. BARGES	BARRELS
1956	12	25478
1955	11	28555
1954	19	63410
1953	5	15215
1952	9	24841
1951	20	102328
1950	9	21201
1949	13	27208
1948	7	17962
1947	9	14034
1946	5	11837
1945	10	31025
1944	-0-	-0-
1943	4	11924
1942	6	18501
1941	5	18000
1940	16	20316
1939	20	38238
1938	8	16684
1937	10	24403
1936	13	24734
1935	13	34875
1934	13	18284
1933	10	1220
1932	3	8846
1931	15	27887
1930	7	5197
1929	7	11100
1928	16	32441
1927	4	5638
1926	3	10136
Sub-Totals	302	711518
Prior to 1926	34	65532
Grand Total	336	777050

BARGES WITH SPECIAL FEATURES OR IN SPECIAL SERVICES
AS INDICATED IN TRANSPORTATION SERIES 4 - 1957
(MISS. RIVER & GULF I.C. CANAL)

TABLE I-B

YEAR BUILT	NO. BARGES	BARRELS
1956	7	52070
1955	5	37905
1954	4	33060
1952	2	14820
1951	3	30381
1950	1	8550
1948	16	99180
1947	3	10260
1946	2	10089
1945	2	16860
1944	1	6840
1943	1	10055
1942	1	8550
1941	5	29070
1939	1	4389
1937	1	6555
Sub-Totals	55	378634
Prior to 1926	1	4560
Grand Total	56	383194

PETROLEUM TANK VESSEL EQUIPMENT - 1/1/57 - TABLE II
EAST COAST AREA
(INCLUDING THE N. Y. STATE BARGE CANAL)

YEAR BUILT	NO. BARGES	BARRELS
1956	16	200531
1955	14	174331
1954	5	54587
1953	7	94687
1952	5	55749
1951	15	268824
1950	13	184515
1949	28	333989
1948	23	284417
1947	13	224173
1946	11	182792
1945	19	188836
1944	12	129317
1943	10	100157
1942	10	76275
1941	11	112695
1940	13	139942
1939	6	41005
1938	9	92720
1937	32	316281
1936	14	179299
1935	5	62726
1934	14	158885
1933	7	73905
1932	3	14553
1931	6	43327
1930	9	53350
1929	6	36921
1928	3	22600
1927	5	39844
1926	5	42264
Sub-Totals	349	3983497
Prior to 1926	49	382581
Grand Total	398	4366078

GREAT LAKES - U. S. FLAG TANK VESSELS - 1/1/57 - TABLE III

YEAR BUILT	NO. BARGES	BARRELS
1954	2	40500
1953	1	26000
1952	1	13000
1947	1	30000
1945	1	35000
1943	2	56000
1942	2	87954
1940	2	85000
1938	2	48218
1937	1	66682
1934	1	42126
1931	1	7505
1930	2	61223
1928	1	50542
1926	1	1162
Sub-Totals	21	650912
Prior to 1926	4	174286
Grand Total	25	825198

PETROLEUM TANK VESSEL EQUIPMENT - 1/1/57 - TABLE IV
WEST COAST
EXCLUDING BARGES WITH CAPACITIES OF 5000 BBLS. OR LESS

YEAR BUILT	NO OF UNITS	BBLS. (42's) CAPACITY
1956	1	39359
1955	4	115500
1954	5	121296
1953	3	67796
1952	3	60671
1951	3	57333
1950	1	26458
1949	5	74744
1948	3	26548
1947	2	26000
1946	4	41300
1945	1	11620
1944	14	114588
1943	7	78584
1942	5	48717
1941	4	34153
1940	5	33385
1939	1	6190
1938	1	8300
1937	-0-	-0-
1936	-0-	-0-
1935	-0-	-0-
1934	1	5550
1933	-0-	-0-
1932	-0-	-0-
1931	-0-	-0-
1930	2	15977
1929	1	7152
1928	-0-	-0-
1927	1	7023
1926	5	33497
Sub-Totals	82	1061741
Prior to 1926	10	88620
No Year Listed	1	5312
Grand Total	93	1155673

BARGES WITH CAPACITIES OF 5000 BBLS. OR LESS
WEST COAST

YEAR BUILT	NO. OF UNITS	BBLS. (42's) CAPACITY
1955	1	189
1948	1	3511
1945	2	3609
1944	2	1955
1943	2	7810
1941	2	2055
1940	3	7068
1939	2	9309
1938	3	11608
1937	1	3000
1935	1	2561
1929	1	3143
1927	3	7529
Sub-Totals	24	63407
Prior to 1926	9	28152
No Year Listed	1	381
Grand Total	34	91940

PETROLEUM TANK VESSEL EQUIPMENT - 1/1/57 - TABLE IV-A
ALASKA
EXCLUDING BARGES WITH CAPACITIES OF 5000 BBLS OR LESS

YEAR BUILT	NO OF UNITS	BBLS (42's) CAPACITY
1937	1	7150
1935	1	7150
Sub-Total	2	14300
Prior to 1926	-	-
Grand Total	2	14300

BARGES WITH CAPACITIES OF 5000 BBLS. OR LESS
ALASKA

YEAR BUILT	NO. OF UNITS	BBLS. (42's) CAPACITY
1956	3	8860
1954	1	499
1952	1	490
1951	5	6276
1950	2	1780
1948	2	1780
1946	2	1856
1945	1	2143
1941	1	2319
Sub-Total	18	26003
Prior to 1926	-	-
Grand Total	18	26003

SECTION 7

REPORT OF
SUBCOMMITTEE ON L.P.G. TRANSPORTATION
OF
NATIONAL PETROLEUM COUNCIL
COMMITTEE ON PETROLEUM TRANSPORTATION

GEORGE R. BENZ, CHAIRMAN

C
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NATIONAL PETROLEUM COUNCIL

December 30, 1957

Report of LPG Transportation Subcommittee

Mr. B. I. Graves, Chairman
Committee on Petroleum Transportation
National Petroleum Council
c/o B. I. Graves Associates
315 Montgomery Street
San Francisco, California

Dear Mr. Graves:

The LPG Transportation Subcommittee of the National Petroleum Council Committee on Petroleum Transportation is pleased to submit its report on LPG transportation in the United States as of January 1, 1958.

Four modes of transportation of LPG are covered in this report.

A. Pipelines.
B. Tank Cars.
C. Tank Trucks.
D. Barges and Tankers.

Each of these four modes of transportation is covered in a separate section later in this report.

For the purpose of clarity in interpreting this report the following basic premises were established and are applied:

A. LPG as used in this report means and includes any material which is composed predominantly of any of the following hydrocarbons, or mixtures of them: propane, propylene, butanes (n-butane or isobutane) and butylenes.

B. Report is confined to findings of fact and does not project into future plans or programs. Report covers existing facilities, facilities under construction and facilities definitely planned.

Total volume of LPG transported by the various modes of transportation has shown an increase each year for each mode of transportation - See Table I for the 5-year period trends in LPG transportation.

TABLE I
LPG TRANSPORTATION

Mode of Transportation	Shipments Total Volume in Millions of Gallons 1952	1953	1954	1955	1956
Railroad Tank Car	2080	2276	2490	2573	2767
Tank Truck	1476	1751	2043	2421	2955
Pipeline	96	151	223	268	490
Tanker and Barge	-	42	55	77	84
	Shipments Percent of Total				
Railroad Tank Car	~~26.4~~ 46.4	46.1	48.6	42.9	41.8
Tank Truck	33.0	35.5	39.9	40.3	44.5
Pipeline	2.2(1)	3.1	4.3	5.2	7.4
Tanker and Barge	0.3	0.9	1.1	1.1	1.3
Unaacounted for	18.1	14.4	6.1	15.7	5.0
Total	100.0	100.0	100.0	100.0	100.0
Total Shipments, Millions of Gallons	4477	4932	5125	6000	6636
Total Production, Millions of Gallons	-	-	6431	7369	8482

(1) Only five months.

In the five year period shown, from "Market Facts" published by the Liquefied Petroleum Gas Association (2), the total shipments have increased from 4,477,000,000 gallons to 6,636,000,000 gallons per year. It is interesting to note that the greatest volume of product moved is now done by tank truck. The trends show that pipeline LPG shipment has had the greatest percentage increase in the last year for which figures are available, and while the LPG railroad tank car volume is increasing, its percentage increase is not keeping abreast of the gains made by the other modes of transportation. In 1956, 86 percent of the total volume of LPG transported was made by tank trucks and railroad tank cars.

It has been a pleasure working with the LPG Transportation Subcommittee and their willing assistance is gratefully acknowledged.

Respectfully submitted,

/S/ George R. Benz, Chairman

LPG Transportation Subcommittee

GRB;s

(2) "Market Facts" quotes production, sales and transportation data from the Bureau of Mines.

PIPELINE TRANSPORTATION OF LPG

The bulk of LPG pipeline distribution is made in products pipelines that have been built or converted to handle product with the specific gravity of LPG.

Information on pipeline transportation is depicted in Table II in tabular form and on Figure I as a map showing the relationship of the pipelines to the five former PAD Districts. Shown in both the table and figure are the carrier, origin and terminus of the line, line size, method of shipment, and maximum LPG capacity in barrels per day.

Four methods of LPG pipeline transportation are covered:

1. Pipelines batching LPG through products pipelines.
2. Pipelines handling LPG mixed with natural gas liquids.
3. Pipelines handling propane-ethane mixtures.
4. Pipelines batching LPG through crude oil pipelines.

LPG pipelines under construction or that are proposed are also included in the table and map and are identified as lines proposed or under construction.

Three additional methods of moving LPG by pipeline are not covered:

1. LPG mixed with crude oil and transported in crude oil lines. (LPG in this case is later recovered in a refining center and the refining center is considered the source of the LPG).

2. LPG which is not extracted from natural gas at the gathering point but which is separated somewhere along the natural gas pipeline. (The fractionating plant in this case is considered the manufacturing source of the LPG).

3. LPG that is blended in motor fuels or natural gasolines and the finished product moved through a pipeline. (This type movement is excluded because the LPG has lost its identity and is not available for LPG use at the terminus of the shipment).

In order for this report to have the most utility for those interested in the petroleum industry's capabilities of transporting LPG by pipeline, the pipelines' maximum LPG capacity in barrels per day is reported. To meet these LPG maximums on a protracted basis would mean, in many cases, the sacrifice of transportation of other products. Consequently, product transportation priorities would have to be established. In addition, these LPG pipeline transportation capabilities will have to be correlated with LPG production capacity, LPG aboveground and underground storage, and demand.

The assistance of the Pipeline Transportation Subcommittee is gratefully acknowledged. The information furnished by it has been supplemented by additional information available to the members of the LPG Transportation Subcommittee.

LPG PIPELINE TRANSPORTATION
January 1, 1958
PIPELINES BATCHING LPG THROUGH PRODUCTS PIPELINES

TABLE II

Company	From	To	Line Size	Method of Shipment	Maximum LPG Capacity BBl/Day
Phillips Pipeline Co.	Borger, Texas	E. Chicago, Ind.	8"	LPG slugs	40,000
Phillips-Shamrock	Borger, Texas	Denver, Colorado	6"	LPG slugs	15,000
Shell Oil Company	Wood River, Ill.	E. Chicago, Ind.	14"	LPG slugs	40,000
Cities Service Oil Co.	Blackwell, Okla.	Hutchinson, Kans.	4"	LPG slugs	7,000
Texaco-Cities Service Pipeline Co.	E. Chicago, Ind.	Lowell, Mich.	6"	Propane	13,000
Goliad Corp.	Sheridan, Tex.	Texas City, Tex.	5" to Chocolate Bayou 8" to Texas City	LPG slugs	8,500
Goliad Corp.	Three Rivers, Tex.	Corpus Christi, Tex.	6"	LPG slugs	8,700
Magnolia Pipeline Co.	Hull, Texas	Texas City, Tex.	8"	Butane	24,000
Magnolia Pipeline Co.	Beaumont, Tex.	Orange, Texas	6"	Butane	12,000
Shell Pipeline Co.	Hope (3" and 4") Provident City Sheridan (6")	Houston, Tex.	3", 4" and 6"	LPG slugs	8,500
Interstate Oil Pipeline Co.	Baton Rouge, La. (Flows both ways)	Sorrento, La.	4"	Propane	Undetermined
Interstate Oil Pipeline Co.	Baton Rouge, La. (Flows both ways)	Sorrento, La.	4"	Butane and Isobutane	Undetermined
Phillips Pipeline (1) Ohio Oil Co. Buckeye Pipeline	Borger, Texas	Lima, Ohio	8",10"	Butane slugs	24,000

(1) Phillips Pipeline from Borger to St. Louis, then Ohio Oil Co. to Indianapolis, and then Buckeye Pipeline to Lima, Ohio.

PIPELINES HANDLING LPG MIXED WITH NATURAL GAS LIQUIDS

Company	From	To	Line Size	Method of Shipment	Maximum LPG Capacity Bbl/Day
Magnolia Pipe-line Co.	Andrews, Texas Kilgore, Texas	Beaumont, Texas	8", 10" 5- 1/2"	Natural Gas Liquids	25,000 4,700
Phillips Pipe-line Co.	Benedum, Texas	Sweeny, Texas	10"	Natural Gas Liquids	40,000
Okan	Ulysses and Kis-mit, W. Kans.	Cushing - Tulsa Oklahoma	6"	Natural Gas Liquids	20,000 (LPG and Natural)
Gulf Refining Company	Monument, N.M. Eunice, N.M. Andres Co., Tex.	Houston, Texas (Mont Belview)	10"	Natural Gas Liquids	30,000
Humble Pipe-line	New London (1)	Baytown, Texas	8"	Natural Gas Liquids	19,700
Humble Pipe-line	Anahuac	Baytown, Texas	3"	Natural Gas Liquids	2,600
Humble Pipe-line	Clear Lake	Baytown, Texas	3"	Natural Gas Liquids	4,500
Tennessee Products	Aqua Dulce, Texas	Houston, Texas	6"	Natural Gas Liquids	10,000
Texas Pipe-line Co.	Erath, La.	Avery Island, La.	6"	Natural Gas Liquids	12,000

(1) 4" line from Conroe, Tomball and Midland ties in at Santa Suma.

PIPELINES HANDLING PROPANE ETHANE MIXTURES

Company	From	To	Line Size	Method of Shipment	Maximum LPG Capacity Bbl/Day
Dow Chemical Co.	Katy, Texas (4")	Freeport, Tex.	4"	Propane-ethane mix	10,000 (approx.)
Dow Chemical Co.	Katy, Texas (6") (1)	Freeport, Tex.	6"	Propane-ethane mix	20,000 (approx.)
Dow Chemical Co.	Pledger, Tex. (4") (2) N. Markham, Tex. (4") Old Ocean, Tex. (8")	Freeport, Tex.	4",8"	Propane-ethane mix	
Dow Chemical Co.	Freeport, Texas (Flows both ways)	Texas City, Tex.	4"	varies - LPG slugs and LPG ethane mix	varies

PIPELINES BATCHING LPG THROUGH CRUDE OIL PIPELINES

Company	From	To	Line Size	Method of Shipment	Maximum LPG Capacity Bbl/Day
Shell Pipeline Co.	Elk City, Okla.	Cushing, Okla.	10"	LPG slugs through crude line (3)	27,000
Texas Pipeline Co.	Erath, La.	Port Arthur, Tex.	22"	LPG slugs through crude line	50,000

(1) 4" ties into 6" coming from North.
(2) 4" and 8" ties into 8" line at Old Ocean
(3) At Cushing, Oklah., LPG is blended with crude and pipelined to Wood River, Illinois in crude oil line.

PIPELINES UNDER CONSTRUCTION OR PROPOSED

Company	From	To	Line Size	Method of Shipment	Maximum LPG Capacity Bbl/Day
Magnolia Pipeline Co.	Cameron Meadows, La.	Beaumont, Tex.	6"	Natural Gas liquids	6,000+
Interstate Oil Pipeline Co.	Baton Rouge, La.	Sorrento, La.	8"	Propylene	Under Construction
Interstate Oil Pipeline Co.	Esso, Baton Rouge, La.	Dow Plant Plaquemine, La.	4"	Propane-ethane mix	Under Construction
Texas Eastern Transmission	Baytown, Tex.	Moundsville, W. Va.(1)	16"-20"	LPG slugs in products line	(Proposed)

(1) There is a 12" branch line from Seymour, Indiana to Chicago, Illinois.

NATIONAL PETROLEUM COUNCIL
L. P. G. PIPE LINES

JAN. 1, 1958

PREPARED BY:
L. P. G. TRANSPORTATION SUB-COMMITTEE

WASH. ORE. CALIF. NEV. UTAH ARIZ. N.M. COLO. WYO. MONT. IDA. N.D. S.D. NEBR. KANS. OKLA. TEX. MINN. IA. MO. ARK. LA. WISC. ILL. MICH. IND. OHIO KY. TENN. MISS. ALA. GA. FLA. S.C. N.C. VA. W. VA. PA. N.Y. MD. DEL. N.J. CONN. R.I. MASS. VT. N.H. ME.

LAKE SUPERIOR · LAKE MICHIGAN · LAKE HURON · LAKE ERIE · LAKE ONTARIO

1 2 3 4 5

DENVER
PHILLIPS & SHAMROCK OIL & GAS 8" 15,000

HUTCHINSON
CITIES SERVICE 4" - 7,000
PHILLIPS 40,000
ULYSSES
KISMIT
WICHITA
BLACKWELL
OKAN 6" 20,000
TULSA
BORGER
SHELL 10" 27,000
ELK CITY
CUSHING

LOWELL
TEXACO & CIT. SER. 6" 13,000
EAST CHICAGO
SHELL 14" 40,000
PHILLIPS
OHIO 24,000
LIMA
BUCKEYE 8"
10"
INDIANAPOLIS
SEYMORE
MOUNDSVILLE
CORP 20"
WOOD RIVER
ST. LOUIS
8"
P.P.L. CO. TO LIMA OHIO VIA OHIO & BUCKEYE
TRANSMISSION

MONUMENT
EUNICE
ANDREWS
NEW LONDON
KILGORE
HUMBLE 8" 17,100
MAG. 4" & 5" 4,700
BENEDUM
MAGNOLIA 8" & 10" 25,000
GULF 10" 30,000
PHILLIPS 10" 40,000
TEXAS EASTERN 20"
BATON ROUGE
SEE INSERT
ERATH
T.P. 22"
TEX. PIPE, 6", 12,000
AVERY ISLAND
HOUSTON
SEE INSERT
CAMERON MEADOWS
MAG., 6", 6,000+, NAT'L. GAS LIQ.
SHELL 6"
SHERIDAN
3" & 4"
GOLIAD
HOPE
PROV. CITY 6"
AQUA DULCE
T.P.
THREE RIVERS
GOLIAD 6" 8,700
CORPUS CHRISTI

HULL
MAG. 8" & 10"
GULF 10"
HUM. 8" 24,000
MONT BELVIEU
HUM. 3" 2,600
ANAHUAC
MAG. 4" & 5"
T.E.T.
BEAUMONT
MAG. 12,000 6"
ORANGE
MAG. 22" 6"
T.P. LI CO. 30,000
PORT ARTHUR
TEX. LA. 20"
KATY
SHELL 6" 8,500 10,000
TENN. PROD.
BAY TOWN
HOUSTON
HUM. 3" 4,500
CLEAR LAKE
MAG.
GOLIAD 5" & 8" 8,500
TEXAS CITY
DOW 4"
PLEDGER
MOD.
OLD OCEAN & SWEENY
PHILLIPS 10"
DOW 6" & 8"
MARKHAM
DOW 8" 20,000
FREEPORT
VARIES

HOUSTON AREA

BATON ROUGE
4" PROPANE
4" BUTANE & ISOBUTANE
3" PROPYLENE
4" PROPANE-ETHANE MIX
PLAQUEMINE
SORRENTO
BATON ROUGE AREA

LEGEND

- PROPOSED
- L P G SLUGS THRU PRODUCTS LINES
- L P G SLUGS THRU CRUDE LINES
- L P G - NATURAL GAS LIQUIDS MIX
- L P G - ETHANE MIX
- LIMA — GEOGRAPHICAL LOCATIONS
- MAG. 10" / 5,000 — OWNERSHIP, LINE SIZE / CAPACITY IN BARRELS PER DAY
- DIRECTION OF FLOW.
- P. A. D. DISTRICT OUTLINE

ONLY MAJOR GEOGRAPHICAL LOCATIONS ARE SHOWN.

PIPE LINES ARE APPROX.

LPG TANK CAR TRANSPORTATION
TABLE III

NUMBER OF TANK CARS PRIVATELY OWNED IN THE UNITED STATES WHICH ARE CAPABLE OF TRANSPORTING LPG
January 1, 1957

Petroleum Service

Tank Car Specification	6,000 Gal. Water Cap.	8,000 Gal. Water Cap.	10,000 Gal. Water Cap.	11,000 Gal. Water Cap.	12,000 Gal. Water Cap.	13,700 Gal. Water Cap.	TOTAL
ICC 105 A 100W			141		525		666
ICC 105 A 300W			1,203		16,219		17,422
ICC 105 A 400W			135		1,010		1,145
ICC 105 A 500W					3		3
Sub-total			1,479		17,757		19,236

Chemical Service(1)

Tank Car Specification	6,000 Gal. Water Cap.	8,000 Gal. Water Cap.	10,000 Gal. Water Cap.	11,000 Gal. Water Cap.	12,000 Gal. Water Cap.	13,7000 Gal. Water Cap.	TOTAL
ICC 105 A 100W	16		207		253		476
ICC 105 A 300W	2,048	105	235		5,279		7,667
ICC 105 A 400W			215		1,692		1,907
ICC 105 A 500W	638	37	12		335		1,022
Sub-total	2,702	142	669		7,559		11,072

Other Than Petroleum or Chemical Service(1)

Tank Car Specification	6,000 Gal. Water Cap.	8,000 Gal. Water Cap.	10,000 Gal. Water Cap.	11,000 Gal. Water Cap.	12,000 Gal. Water Cap.	13,700 Gal. Water Cap.	TOTAL
ICC 105 A 300W	2				531		533
TOTAL (Jan. 1, 1957)	2,704	142	2,148		25,847		30,841

Telephone contact with tank car builders yielded following information on tank cars built during 1957:

ICC 105 A 300W (LPG)	(1)		250	1,424			1,674
ICC 105 A 300W (Chemical)	(1) 21		537	26			584
ICC 105 A 500W (Chemical)	(1) 13						13
ICC 112 A 400W (LPG)				700		270	970
Total for 1957	34		787	2,150		270	3,241
GRAND TOTAL (Jan. 1, 1958)	2,738	142	2,935	2,150	25,847	270	34,082

(1) Capable of transporting LPG provided certain changes are made to valves and fittings.

TANK CAR TRANSPORTATION OF LPG

Interstate Commerce Commission Regulations govern the shipment of LPG in tank cars and also prescribe tank car construction specifications. In addition, the ICC regulations govern the commodity that may be placed in certain specification tank cars.

The Number of LPG tank cars in this report include tank cars authorized for LPG only; LPG or anhydrous ammonia; and LPG or anhydrous ammonia or other chemicals such as anhydrous dimethylamine; anhydrous trimethylamine; butadiene, inhibited; propylene oxide, ethylene oxide; vinyl chloride, inhibited; methyl chloride; or ethyl chloride. Petroleum products other than LPG are not generally shipped in high pressure tank cars. Many specification cars capable of handling LPG are in chemical service such as chlorine, tetraethyl lead, sulphur dioxide, hydrofluoric acid, carbon dioxide, sodium, etc.

Demand for LPG is seasonal with the very large requirements occurring in the fall and winter. Similar to the approach made in the LPG pipeline section of this report, the industry's ability to move LPG by tank car is reported based on the number of specification tank cars authorized to, or capable of, handling LPG with the full realization that to utilize the full transportation capability of those cars for LPG the tank car movement of anhydrous ammonia and other chemicals would be impaired and consequently the priority need of LPG and other products would have to be taken into consideration.

LPG is authorized for tank car shipment in ICC 112A400W and the ICC 105A series of specifications depending on its vapor pressure. For example:

1. Butane, isobutane and butylene are authorized for ICC 105A100 tank cars. At the discretion of the shipper, higher pressure tank cars of the ICC 105A or ICC 112A series may be used.

2. Propane is authorized for ICC 105A300 and ICC 112A400W tank cars. Again, higher pressure cars may be used and some ICC 105A400 tank cars are in use.

3. Propylene is authorized for ICC 105A400 cars.

The number of tank cars of the ICC 105 series and the ICC 112A400W in existence are shown in Table III. The ICC 105 series data are from the Association of American Railroads' report on all U. S. privately owned tank cars as of January 1, 1957. This information was furnished by the Tank Car Transportation Subcommittee and is acknowledged with thanks.

In a telephone survey with the tank car builders it was determined that during 1957 the tank car builders constructed 2,644 new LPG tank cars and 597 chemical tank cars capable of transporting LPG if valves and fittings were changed.

These figures show that as of January 1, 1958 there were in existence 21,880 LPG tank cars and 12,202 chemical tank cars capable of transporting LPG if changes were made in valves and fittings.

LPG TANK TRUCK TRANSPORTATION

The information on LPG Tank Truck Transportation was supplied by the Tank Truck Subcommittee and was obtained by it from the 1955 census made by the National Petroleum Council and brought up to date on the basis of new tank vehicles manufactured as reported by the Department of Commerce since 1955. The figures were adjusted by estimating the number of vehicles that may have been scrapped or exported during this period.

The LPG tank truck information includes both straight trucks (unit tank trucks) and articulated vehicles (semi-trailers and trains) operated by both private and for-hire carriers. The following data are presented on over-the-road tank motor vehicles as of July 1, 1957, but does not include local delivery LPG tank trucks:

> 3,327 tank truck motor vehicles are in LPG service of which 2,276 are operated by private carriers and 1,051 by for-hire carriers. This represents a capacity of 6,302,675 water gallons for private carriers and 4,873,555 water gallons for for-hire carriers, for a total of 11,176,230 water gallons capacity or an average capacity of 3,359 water gallons per unit.
>
> This information is detailed in Table IV.

The average capacity in water gallons may be converted to LPG volume by using the following formula:

$$\frac{\text{Water capacity of container x filling density}}{\text{Specific gravity of LPG x volume correction factor}} = \text{Max. volume of LPG}$$

Assuming propane with a specific gravity of 0.51 then

$$\frac{3359 \times 0.45}{0.51 \times 1.031} = 2870$$ Max LPG capacity that can be transported in a 3,359 water gallon capacity tank truck.

If, from Table I, one takes that 2,955,000,000 gallons of LPG were transported in 1956, then it can be seen that the average 3,356 water gallon capacity tank trucks made a little over one million trips.

TABLE IV

SPECIAL TANK TRUCK EQUIPMENT
TOTAL EQUIPMENT - PRIVATE AND FOR-HIRE
HAULING - LIQUEFIED PETROLEUM GAS
As of July 1, 1957

	NUMBER OF UNITS		TOTAL CAPACITY		AVERAGE CAPACITY PER UNIT	
	1955	1957	1955	1957	1955	1957
PAD DISTRICT NO. 1						
Private Carriers	258	309	541,175	648,282	2,098	2,098
For-Hire Carriers	160	193	692,200	834,918	4,326	4,326
Total Dist. 1	418	502	1,233,375	1,483,200	2,951	2,951
PAD DISTRICT NO. 2						
Private Carriers	621	689	1,277,625	1,417,273	2,057	2,057
For-Hire Carriers	201	224	837,800	933,632	4,168	4,168
Total Dist. 2	822	913	2,115,425	2,350,905	2,574	2,574
PAD DISTRICT NO. 3						
Private Carriers	880	910	2,348,825	2,428,790	2,669	2,669
For-Hire Carriers	158	163	751,500	775,228	4,756	4,756
Total Dist. 3	1,038	1,073	3,100,325	3,204,018	2,987	2,987
PAD DISTRICT NO. 4						
Private Carriers	106	111	233,300	244,200	2,200	2,200
For-Hire Carriers	54	57	249,000	262,827	4,611	4,611
Total Dist. 4	160	168	482,300	507,027	3,014	3,014
PAD DISTRICT NO. 5						
Private Carriers	235	257	669,750	732,450	2,850	2,850
For-Hire Carriers	404	414	1,825,055	1,870,038	4,517	4,517
Total Dist. 5	639	671	2,494,805	2,602,488	3,904	3,904
TOTAL UNITED STATES						
Private Carriers	2,100	2,276	5,070,675	5,470,995	2,415	2,415
For-Hire Carriers	977	1,051	4,355,555	4,676,643	4,458	4,458
TOTAL U. S.	3,077	3,327	9,426,230	10,147,638	3,063	3,063

BARGE AND TANKER TRANSPORTATION OF LPG

Barge and tanker transportation of LPG accounts for approximately one percent of the total annual movement of LPG.

The information in Table V was developed from the best information available to the subcommittee.

It can be seen from Table I, in the four years 1953 to 1956 that the volume of LPG shipped by tanker and barge has doubled from 42 million gallons to 84 million gallons. Further increases are expected when the barges and tankers shown in Table V as under construction are completed.

TABLE V

LPG TANKERS AND BARGES
January 1, 1958

SHIPS AND TANKERS

Name of Ship or Tanker	Owner or Operator	Net Capacity (Bbls)
Natalie O. Warren	Warren Petroleum Corporation	34,300
Marion P. Billups	Marine Transport	12,800
	Total	47,100
Esso (under construction) Easo		50,100
Unnamed (under construction)	Marine Transport	20,000
	Total Tankers	117,100

BARGES

Name of LPG Barge	Owner or Operator	Net Capacity (Bbls)
Mid-South Big N	Mid-South Chemical Corporation	8,500
Simpson No. 1	Simpson Oil Company	7,800
Simpson No. 2	Simpson Oil Company	7,800
Simpson No. 3	Simpson Oil Company	7,800
Simpson No. 4	Simpson Oil Company	7,800
City of Mobile	Warren Petroleum Corporation	7,800
City of Lake Charles	Warren Petroleum Corporation	7,800
City of Corpus Christi	Warren Petroleum Corporation	8,500
City of St. Marks	Warren Petroleum Corporation	8,500
City of Tampa	Warren Petroleum Corporation	12,000
Port Everglades	Warren Petroleum Corporation	12,000
City of Pensacola	Warren Petroleum Corporation	12,000
Puerto La Cruz	Warren Petroleum Corporation	21,000
Panama City (Butane)	Warren Petroleum Corporation	8,500
	Total	137,800
Simpson No. 5 (under construction)	Simpson Oil Company	7,800
Simpson No. 6 (under construction)	Simpson Oil Company	7,800
	Total Barges	153,400

FOREIGN SHIPS OR TANKERS

Name of Foreign Ships or Tankers	Owner or Operator	Net Capacity (Bbls)
Marion P. Billups	Tropical Gas - Miami	12,800
Megara	Shell Co. of Gibraltar	16,000
Agipas Primera	"AGIP" Roma - Rome	4,200
Agispas Sequnda	"AGIP" Roma - Rome	4,200
Heroya No. 1	Norsk-Hydro	17,750
Heroya No. 2	Norsk-Hydro	17,750
Heroya No. 3	Norsk-Hydro	17,750
Kosangas	Kosangas	3,400
Rasmus Tholstrup No. 1	Kosangas	3,400
Rasmus Tholstrup No. 2	Kosangas	3,400
Rasmus Tholstrup No. 3	Kosangas	3,400
Rasmus Tholstrup No. 4	Kosangas	3,400
Gas Bras Norte	Oivind Lorentzen, Inc.	42,500
Gas Bras Sul	Oivind Lorentzen, Inc.	16,000
Proposed (refrigerated)	Oivind Lorentzen, Inc.	60,000
Ultragas Sao Paulo	LPG Suppliers, Inc.	40,000
Petrobras No. 1	Petroleo Brasilero, S. A.	13,000
Petrobras No. 2	Petroleo Brasilero, S. A.	13,000
Rebecca	Compania Shell de Ven Ltd.	1,493
Esso - Viru	International Petroleum	5,250
	Total Foreign	298,193

AMMONIA BARGES (1)

Name of Ammonia Barges (capable of hauling LPG)	Owner or Operator	Net Capacity (Bbls)
Ammonia Mariner	Tidewater-Shaver Barge Lines	15,500
Mid-West Big N	Mid-South Chemical Corporation	8,500
	Total	24,000
Unnamed (under construction)	Commercial Transports	10,000
	Total Ammonia Barges	34,000

(1) Capable of hauling LPG

SECTION 8

MEMBERSHIP
OF
NATIONAL PETROLEUM COUNCIL'S
COMMITTEE ON PETROLEUM TRANSPORTATION
AND ITS
SUBCOMMITTEES

NATIONAL PETROLEUM COUNCIL

COMMITTEE ON PETROLEUM TRANSPORTATION

1957

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B. I. Graves Associates
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315 Montgomery Street
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VICE CHAIRMAN: J. R. Parten, President
Woodley Petroleum Company
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SECRETARY: John D. Freitag
Cities Service Petroleum, Inc.
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New York 5, New York

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President and General Manager
Sabine Transportation Co. Inc.
P. O. Drawer 1500
Port Arthur, Texas

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American Trading & Production Corporation
American Building
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Executive & Finance Committees
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1409 Winchester Avenue
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Fall River, Massachusetts

Fayette B. Dow
c/o National Petroleum Association
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Gordon Duke
Southeastern Oil & Affiliates
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Clint Elliott, President
National Oil Jobbers Council
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W. Alton Jones, Chairman of the Board
Cities Service Company
60 Wall Tower
New York 5, New York

7/30/57

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SUBCOMMITTEE ON PETROLEUM PIPE LINE TRANSPORTATION

OF THE

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E. G. Wilmoth, Vice President
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Enid, Oklahoma

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Lion Oil Bldg.
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Bradford, Pennsylvania

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OF THE

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818 Olive Street
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Washington, D. C.

SECRETARY: David M. Brown, Jr.
American Waterways Operators, Inc.
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Munger T. Ball
Sabine Transportation Company, Inc.
P. O. Drawer 1500
Port Arthur, Texas

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Seaboard Shipping Corporation
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Shipowners & Merchants Towboat Co. Ltd.
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Foss Launch & Tug Company
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J. H. Fox
Ashland Oil & Refining Company
Ashland, Kentucky

H. A. Gilbert
Oil Transfer Corporation
17 Battery Place
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L. M. Jonassen
Cleveland Tankers, Inc.
1700 Standard Building
Cleveland 1, Ohio

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The Pure Oil Company
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606 Southern States Life Bldg.
3400 Montrose Blvd.
Houston 6, Texas

G. W. Poorman, Vice President
Esso Standard Oil Company
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New York 19, New York

Clayton Smith
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Wilmington, North Carolina
Representing Gulf Atlantic Towing Corp.
P. O. Box 4908
Jacksonville 1, Florida

Chad Taylor, President
Mississippi Valley Barge Line Co.
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SUBCOMMITTEE ON LPG TRANSPORTATION

OF THE

NATIONAL PETROLEUM COUNCIL'S

COMMITTEE ON PETROLEUM TRANSPORTATION

1957

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Phillips Building
Bartlesville, Oklahoma

VICE CHAIRMAN: Chas. E. Webber
Sun Oil Company
1608 Walnut Street
Philadelphia, Pa.

SECRETARY: Frank J. Heller
Phillips Petroleum Company
Adams Building
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A. D. Carleton
Standard Oil Company of California
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San Francisco, California

Fred Creel
Warren Petroleum Company
San Pedro, California

P. H. Hunter
Interstate Oil Pipeline Co.
P. O. Box 1107
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H. A. W. Kidd
Magnolia Petroleum Co.
Magnolia Bldg.
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A. R. Olson, Vice President
Suburban Propane Gas Corp.
Whippany, New Jersey

A. T. Schere
Sinclair Oil & Gas Company
Sinclair Oil Building
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Tulsa, Oklahoma

SECTION 9

MEMBERSHIP
OF THE
NATIONAL PETROLEUM COUNCIL

(As of January 1, 1958)

NATIONAL PETROLEUM COUNCIL

OFFICERS

C H A I R M A N

Walter S. Hallanan, President
Plymouth Oil Company
1946 - 1957

V I C E C H A I R M A N

R. G. Follis, Chairman of the Board
Standard Oil Company of California
1949 - 1957

S E C R E T A R Y - T R E A S U R E R

James V. Brown, Secretary-Treasurer
National Petroleum Council
1947 - 1957

COUNCIL MEMBERSHIP
1958

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Malco Refineries, Inc.
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Roswell, New Mexico

BALDRIDGE, Earl, President
Champlin Oil and Refining Company
5301 Camp Bowie
Box 9365
Fort Worth, Texas

BALL, Munger T., President and General Manager
Sabine Transportation Co., Inc.
P. O. Drawer 1500
Port Arthur, Texas

BARRETT, A. F., President
Rocky Mountain Oil and Gas Association
c/o Mobil Producing Company
Billings, Montana

BENEDUM, Paul G., President
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BERGFORS, Fred E., Sr.
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BLAUSTEIN, Jacob, President
American Trading & Production Corporation
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BRAZELL, Reid President and General Manager
Leonard Refineries, Inc.
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BRIDWELL, J. S.
Bridwell Oil Company
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BROWN, Bruce K., President
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DAVIS, Morgan J., President
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DUKE, Gordon
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