

**SECRET**



**Nº**

**70**

50X1

**ECONOMIC INTELLIGENCE REPORT**

**PETROLEUM PIPELINES IN THE USSR  
AS OF 1 JANUARY 1957**



CIA/RR 128  
2 June 1958

**CENTRAL INTELLIGENCE AGENCY  
OFFICE OF RESEARCH AND REPORTS**

**SECRET**

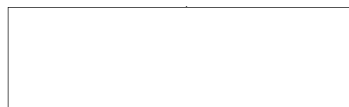


50X1

**W A R N I N G**

This material contains information affecting the National Defense of the United States within the meaning of the espionage laws, Title 18, USC, Secs. 793 and 794, the transmission or revelation of which in any manner to an unauthorized person is prohibited by law.

S-E-C-R-E-T



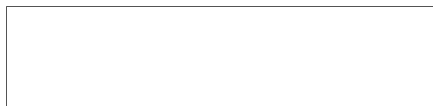
50X1

ECONOMIC INTELLIGENCE REPORT

PETROLEUM PIPELINES IN THE USSR  
AS OF 1 JANUARY 1957

CIA/RR 128  
(ORR Project 25.872)

CENTRAL INTELLIGENCE AGENCY  
Office of Research and Reports



50X1

S-E-C-R-E-T

S-E-C-R-E-T

FOREWORD

This report discusses the construction, existence, physical characteristics, use, and industrial potentials of oil and gas pipelines in the USSR and makes generalized comparisons between the USSR and the US in the resultant developments, facilities, and potentials. For the USSR, there are presented a chronological summary of the construction of oil and gas pipelines and also a chronological record of the traffic in the oil pipelines as related to other freight traffic.

Because of the confused status and the inordinate number of sources of information on Soviet pipelines, only the basic conclusions and estimates are presented in this report, with no reference to either the supporting evidence or the complicated methodologies necessary to resolve the evidence. The full methodology, completely documented, is available in CIA files.

- iii -

S-E-C-R-E-T

S-E-C-R-E-T

CONTENTS

	<u>Page</u>
Summary . . . . .	1
I. Introduction . . . . .	5
II. Administration of Oil and Gas Pipelines . . . . .	9
III. Oil Pipelines . . . . .	11
A. Operating and Under Construction, 1 January 1957 . . . . .	11
B. Planned . . . . .	13
C. Traffic . . . . .	17
IV. Gas Pipelines . . . . .	21
A. Operating and Under Construction, 1 January 1957 . . . . .	21
B. Planned . . . . .	25
C. Capacity, Distribution, and Sources . . . . .	29
V. Conclusions . . . . .	35
A. Capabilities and Technological Considerations . . . . .	35
B. Vulnerabilities . . . . .	37
C. Intentions . . . . .	38

Appendixes

Appendix A. Statistical Data . . . . .	39
Appendix B. Methodology . . . . .	91
1. General . . . . .	91
2. Soviet Oil and Gas Pipelines . . . . .	91
a. Basis of Estimated Physical Data for Oil Pipelines . . . . .	91
b. Basis of Estimated Physical Data for Gas Pipelines . . . . .	92
c. Assumed Continuity Status of Oil and Gas Pipelines . . . . .	92

- v -

S-E-C-R-E-T

S-E-C-R-E-T

	<u>Page</u>
3. Petroleum Traffic in the USSR . . . . .	93
4. Auxiliary Service Installations and Potential Throughput Capacities . . . . .	93
5. Data on Oil Pipeline Traffic . . . . .	94
6. Recent General Reports on Soviet Oil and Gas Pipelines . . . . .	95
7. Weight-to-Volume Conversion Factors for Petroleum Stocks . . . . .	95



50X1

Tables

1. Trunk Oil Pipelines in the USSR, Operating or Under Construction, 1 January 1957 . . . . .	41
2. Chronology for Construction of Trunk Oil Pipelines in the USSR, Before 1957 . . . . .	43
3. Comparison of Total Lengths of Oil Pipelines in the USSR, 1 January 1957, and in the US, 1 January 1956 . . . . .	47
4. Comparison of Diameter Distribution of Trunk Oil Pipelines in the USSR, 1 January 1957, and in the US, 1 January 1956 . . . . .	49
5. Planned Trunk Oil Pipelines in the USSR, 1956-60 and 1961-65 . . . . .	51
6. Estimated Annual Traffic in Nongas Petroleum Stock in the USSR, 1940-55 and 1960 Plan . . . . .	53
7. Total Freight Traffic in the USSR, by Type of Carrier, Selected Years, 1913-56, and 1960 Plan . . . . .	55
8. Transportation Balances in Nongas Petroleum Stock in the USSR and the US, by Type of Carrier, 1950, 1955, and 1960 Plan in the USSR and 1949 and 1955 in the US . . . . .	57

S-E-C-R-E-T

	<u>Page</u>
9. Transportation Balances in Total Freight in the USSR, by Type of Carrier, 1940, 1950, 1955-56, and 1960 Plan . . . . .	59
10. Comparison of Railroad Transport of Nongas Petroleum Stock in the USSR and the US, 1950, 1954-55, and 1960 Plan in the USSR and 1950-53 in the US . . . . .	63
11. Output of Nongas Petroleum Stock and Traffic in Oil Pipelines in the USSR and the US, 1940, 1950, 1952, 1955, and 1960 Plan in the USSR and 1940, 1949-50, 1952, and 1955 in the US . . . . .	65
12. Comparison of Prewar and Postwar Net Delivery of Crude Oil to Refineries in the USSR, 1939 and 1954, and in the US, 1936 and 1954 . . . . .	65
13. Principal Transmission Gas Pipelines in the USSR Completed for Operation Before 1 January 1957 . . . . .	67
14. Installed Lengths of Gas Pipelines Estimated for the USSR, 1 January 1946 and 1 January 1957, and Reported for the US, 1 January 1946 and 1 January 1956 . . . . .	71
15. Planned Transmission Gas Pipelines in the USSR, 1956-60 . . . . .	73
16. Chronology for Construction of Transmission Gas Pipelines in the USSR, Before 1957 . . . . .	83
17. Estimated Throughput Capacities of Transmission Gas Pipelines in the USSR, 1 January 1957 . . . . .	85
18. Potential Service Factors of Transmission Gas Pipelines in the USSR and the US, 1950, 1955-56, and 1960 Plan in the USSR and 1954 in the US . . . . .	87
19. Specific Conversion Factors for Petroleum Products . . . . .	89

S-E-C-R-E-T

Illustrations

	<u>Following Page</u>
Figure 1. USSR: Oil Pipelines, 1 January 1957 (Map) . . . . .	Inside Back Cover
Figure 2. Total Length of Operating Trunk Oil and Gas Pipelines in the USSR and the US, 1945-56 and 1960 Plan in the USSR (Chart) . . . . .	48
Figure 3. Transport of Nongas Petroleum, by Type of Carrier, in the USSR, 1940-55 and 1960 Plan (Chart) . . . . .	54
Figure 4. Percentage of Transport of Nongas Petroleum, by Type of Carrier, in the USSR, 1940-55 and 1960 Plan (Chart) . .	54
Figure 5. Transport of Nongas Petroleum, by Type of Carrier, in the US, 1940-55 (Chart) . . . . .	58
Figure 6. USSR: Gas Pipelines, 1 January 1957 (Map) . . . . .	Inside Back Cover



CIA/RR 128  
(ORR Project 25.872)

S-E-C-R-E-T

PETROLEUM PIPELINES IN THE USSR  
AS OF 1 JANUARY 1957\*

Summary

Soviet trunk oil pipelines form an interconnecting network between most of the important crude oil regions and refining centers of the USSR, nearly all of which are located in the European USSR. Important trunk pipelines for oil products also connect with the refineries. Of particular interest is the recent oil pipeline connection between the Ural-Volga area and the "new lands" area of southwestern Siberia.

Soviet exploitation of fuel gas resources has taken place largely in the last few years. The transmission gas pipelines, nearly all of which are also located in the European USSR, serve to connect the principal sources of production of fuel gas with the principal centers of consumption.

In 1956, centralized authority over the construction of pipelines in the USSR was in the All-Union Ministry of Construction of Petroleum Industry Enterprises, functioning through the Main Administration for Construction of Petroleum Pipelines. Some specific construction of pipelines and their utilization for transport appear to be under the control of various agencies correlated within the union-republic organization for the petroleum industry. The effect of the official program for general decentralization of authority of this type, as announced early in 1957, is yet to be established.

As of 1 January 1957 the total length of installed trunk oil and gas pipelines in the USSR was estimated to be about 19,500 kilometers (km), of which 12,482 km were for the transport of petroleum oils and 7,037 km were for the transport of fuel gas, including about 740 km for the transport of manufactured fuel gas.\*\* Of the total length of trunk oil pipelines, 73.3 percent was for crude oil and 26.7 percent was for oil

---

\* The estimates and conclusions contained in this report represent the best judgment of ORR as of 1 January 1958. It should be noted, however, that during the last 6 months of 1957 the original Sixth Five Year Plan (1956-60) was in the process of revision (see II, p. 9, below; III, B, pp. 13-16, below; IV, B, p. 26, below; and Appendix B, 1, a, p. 92, below).

\*\* Throughout this report, unless otherwise indicated, the total length of pipelines given for any year refers to the total length at the end of the year.

S-E-C-R-E-T

S-E-C-R-E-T

products. Of the total length of transmission gas pipelines, 89.5 percent was for natural gas and 10.5 percent was for manufactured gas.\*

On 1 January 1956 the corresponding total lengths in the US consisted of 185,098 km of trunk oil pipelines and 233,662 km of transmission gas pipelines. Of this total length of trunk oil pipelines in the US, 68.3 percent was for crude oil and 31.7 percent was for oil products. Of the total length of transmission gas pipelines in the US, 97.6 percent was for natural gas and 2.4 percent was for manufactured and mixed gas.

The amount of oil pipeline transport in the USSR in 1955 is estimated to have been 13.7 billion metric ton-kilometers,\*\* constituting 9.7 percent of the total transport of all nongas petroleum stock by all types of carriers. In the US in 1955 the amount of oil pipeline transport is estimated to have been 256 billion ton-kilometers, constituting 44.6 percent of the total transport of all nongas petroleum stock by all types of carriers. Although data are not available for ton-kilometers of gas pipeline transport in either the USSR or the US, the net production of natural gas for pipeline transfer is estimated or reported to have been 9 billion cubic meters in the USSR in 1955 and 203.4 billion cubic meters in the US in 1954, measured at the industry standard conditions of temperature and pressure. There was a corresponding estimated net production of 1.4 billion cubic meters of manufactured fuel gas for transmission gas pipeline transport in the USSR in 1955.

Apparently the USSR proposed during the original Sixth Five Year Plan (1956-60) to complete for new service about 13,000 km of trunk oil pipelines and about 12,250 km of identified transmission gas pipelines.\*\*\* Other new trunk oil and gas pipeline projects are identified for completion after 1960. The proposed trunk oil pipelines appear to be about equally divided in length between crude oil pipelines and oil product pipelines. Almost all of the proposed transmission gas pipelines are for natural gas. Completions for new service in 1956 included 1,075 km of the proposed trunk oil pipelines and 1,875 km of the proposed transmission

\* For definitions of terms, see I, p. 5, below.

\*\* Tonnages are given in metric tons throughout this report.

\*\*\* In the directives of the plan, 14,500 km were proposed for the trunk oil pipelines, and 9,000 km were proposed for the transmission gas pipelines, without identification of all pipelines involved in such totals. The Soviet press has published revised plans for the pipeline constructions.

S-E-C-R-E-T

gas pipelines. If the proposed lengths are constructed, the installed trunk oil pipelines will be about 2.1 times as long in 1960 as in 1955, and the transmission gas pipelines about 3.3 times as long.

The majority of the proposed trunk oil pipelines originate in the Ural-Volga regions and extend westward to industrialized areas in the central European USSR and eastward into southwestern Siberia. The USSR has also announced a long-range plan for construction of a trans-Siberian trunk oil pipeline system, with the trunk oil pipelines to be extended to the Pacific Ocean under the original Seventh Five Year Plan (1961-65). The proposed transmission gas pipelines, some of which are not to be completed until after 1960, will serve primarily to exploit the newly discovered natural gas reserves at Shebelinka, Stavropol', Stepnoye, and Berezovo, and also the recently expanded gas reserves at Dashava. The proposed transmission gas pipelines will further provide for major exploitation of the natural gas reserves located in general regions of oilfields.

One goal of the original Sixth Five Year Plan was a large increase in the volume and efficiency of the use of oil pipelines. It is proposed that in 1960 the ton-kilometers of oil pipeline traffic will increase sixfold above the 1955 value and will in 1960 attain a value of 83 billion ton-kilometers, representing 25 percent of the total transport of nongas petroleum stock by all carriers.

Evidence shows that the USSR now has the capability for the mass construction of oil and gas pipelines. Mechanized equipment of advanced design is available, and other technological improvements are apparent. In applied construction practice, and especially in the utilization of pipelines, Soviet efficiency appears to be considerably below Western standards, but improvement in efficiency appears to be in progress. The projects of the original Sixth Five Year Plan for the construction of pipelines probably are within Soviet capabilities, but there is evidence that maximum use of capabilities probably will be required to meet the goals involved.

The installed oil pipelines are presently inadequate for Soviet needs, and this inadequacy places an extra burden on the already overloaded railroad facilities. Because of the deadhead hauls necessary for the return of empty railroad tank cars, the burden placed on railroads has a double effect. The USSR is especially vulnerable in regard to the major trunk oil pipelines which now exist, and loss of the use of any major oil pipeline might cause serious disruptions in industrial

S-E-C-R-E-T

production. To the extent that the Soviet economy becomes dependent on transmission gas pipelines as a source of fuel, a similar vulnerability extends to the gas pipelines.

---

- 4 -

S-E-C-R-E-T

S-E-C-R-E-T

I. Introduction.

This report discusses pipelines during past periods in the USSR and those in existence during the closing period of Imperial Russia. The data may be assumed to apply to the national areas enclosed within the nominally prevailing boundaries during each period in question.

Definite terminology is applied as follows in this report with respect to petroleum production and traffic:

The term petroleum is used in this report in its most general sense, to mean either natural petroleum or synthetic petroleum, whether in the gas, liquid, or solid phase. As applied in this report, the term stock is used in a generalized sense to mean any petroleum material, and the term oil is used in a specialized sense to mean any liquid petroleum. The term natural petroleum means a petroleum either derived as such from a natural deposit or derived subsequently from such a naturally derived stock. The term crude petroleum means any petroleum stock that normally serves as a source of new petroleum stock by subsequent processing. The term crude oil means a liquid type of crude petroleum and in this report refers only to natural crude oil, a stock constituted by natural liquid crude petroleum in a physical state essentially as derived from a natural deposit. Oil stocks discussed in this report are in general predominantly of the natural type. The term petroleum product means any petroleum stock normally already suitable for end consumption, specifically a nonwaste stock not normally used as a source of new petroleum stocks by processing. The term oil products is used to refer to liquid petroleum products. The term refinery is used specifically to mean a petroleum refinery handling a charge of natural liquid crude petroleum, usually natural crude oil.

The term natural gas is applied in this report in its conventional meaning, to denote natural gaseous crude petroleum in a physical state essentially as derived from a natural deposit. The term gas is applied more generally, to denote either a gas of the petroleum type or a manufactured fuel gas not of the petroleum type. As considered in this report, gases of the petroleum type include not only natural gas but also the manufactured (processed) gases which consist of refinery gas, generally a form of natural petroleum in a converted state, and of shale gas, specifically a form of synthetic petroleum derived from oil shale. Furthermore, as considered in this report, manufactured fuel gases not of the petroleum type generally consist of varieties such as producer gas and coke oven gas, specifically derived by gasification of coal material.

S-E-C-R-E-T

Definite terminology is further applied as follows in this report with respect to type and use of pipelines:

The term petroleum pipeline as used in this report refers either to an oil pipeline which is in service for oil of the petroleum type or to a gas pipeline which is in service for gas of the petroleum type. The term oil pipeline is used specifically, referring only to a crude oil pipeline for crude oil or to a product oil pipeline for oil products. The term gas pipeline is applied more generally, to denote a pipeline handling the natural gas or any manufactured gas that may be under consideration.

The term trunk pipeline is used in this report in a generalized, relative sense with reference to the function of the pipeline, meaning a centralized or principal pipeline in a pipeline system connecting two terminal points or areas. The principal coverage of this report relates to trunk pipelines as thus defined. Especially with reference to instances where the pipeline installations are extensive, the pipeline system may have one or more branch pipeline systems serviced by trunk pipeline branches, and the separate pipeline system typically consists of one or more trunk pipelines serviced by branch pipelines. As distinguished from the trunk pipelines, the branch pipelines are relatively shorter in route length; tend to be relatively smaller in line pipe diameter; tend to be featured by intermittent operation compared with the more or less continuous operation in the trunk pipelines; and consist of collection pipelines, or gathering pipelines, which feed the fluids to the trunk pipelines, together with distribution pipelines which deliver the transported fluids away from the trunk pipelines.

It is emphasized that the term trunk pipeline is relative in meaning. Sometimes, and especially so where the routes serve as connections in over-all transportation systems or are relatively short in other instances, trunk pipelines may constitute pipeline systems having no branch pipelines. Nevertheless, a trunk pipeline usually has branch pipelines and is typically of major extent in route length. Furthermore, a trunk pipeline typically serves for a relatively high quantity rate of transfer of fluids, necessitating a relatively large line pipe diameter. By way of exception, especially where the pipeline system has no branch pipelines, a trunk pipeline may be relatively short in route length. A trunk pipeline also may exist in useful service for a relatively low rate of fluid transfer, featuring a relatively small line pipe diameter. Trunk pipelines of small diameter are usually of short route length and usually have few, if any, branch pipelines.

- 6 -

S-E-C-R-E-T

S-E-C-R-E-T

Trunk pipelines of short route length typically have few, if any, branch pipelines, whereas the branch pipelines and the relatively large line pipe diameters are typically featured if the trunk pipelines are of major route length. Trunk petroleum pipelines, trunk oil pipelines, and trunk gas pipelines are derived terms, even though the trunk gas pipelines are usually, but not necessarily, designated as transmission gas pipelines.

In this report the work done in transportation is quantified in terms of metric ton-kilometers, and such quantities are specifically designated by the synonymous terms traffic and transport and sometimes are still more specifically designated as quantity (or amount or volume) of the traffic (or the transport). The mass of the material transferred in transportation is quantified in terms of metric tons, and such quantities are specifically designated by the term transfer and are sometimes still more specifically designated as quantity (or amount) of the transfer. The distance through which the material is transported is given in kilometers and is specifically designated by the variation terms distance of transfer, or transfer distance, and not by the term transfer alone. The term transportation is not used in the sense of traffic, transport, or transfer as defined above. According to context, however, the terms traffic, transport, or transfer may denote the general process or operation of transportation. The term transportation balance refers to a correlation of the traffic, transfer, and distance of transfer values as defined above, by type of carrier, period of time, and usually category of material transported.

S-E-C-R-E-T

II. Administration of Oil and Gas Pipelines.

In 1940 [ ] stated that through 1936 the control of the construction of petroleum pipelines in the USSR had been centralized in Nefteprovodstroy (Gosudarstvennyy Trest po Proyektirovaniyu i Sooruzheniyu Magistral'nykh Truboprovodov Neftyanoy Promyshlennosti -- State Trust for the Planning and Construction of Main Pipelines of the Petroleum Industry). Between 1936 and 1940, [ ] [ ] the control of the construction of pipelines was decentralized and jointly vested in several organizations.

50X1

50X1  
50X1

Following World War II the installation of oil and gas pipelines in the USSR appears to have become a major enterprise, developed to meet the urgent requirements of the Soviet petroleum industry. By 1955, authority was centralized in Minneftestroy (Ministerstvo Stroitel'stva Predpriyatiy Neftyanoy Promyshlennosti -- the [All-Union] Ministry of Construction of Petroleum Industry Enterprises). This ministry had as a subordinate Glavneftteprovodstroy (Glavnoye Upravleniye po Stroitel'stvu Nefteprovodov -- the Main Administration for Construction of Petroleum Pipelines). Specific control of physical construction of the pipelines and of their subsequent use appears to have been delegated concurrently to agencies of various names in different areas, apparently involving correlation among certain main administrations, trusts, and associations in the union-republic organization for the petroleum industry.

Early in 1957 the USSR officially announced a program for decentralization of ministerial authority of the types just enumerated. The effect of this program in relation to oil and gas pipelines is not yet completely established.

- 9 -

S-E-C-R-E-T



S-E-C-R-E-T

III. Oil Pipelines.

A. Operating and Under Construction, 1 January 1957.

At the close of 1956, Soviet trunk oil pipelines, with probable diameters ranging from 8 to 28 inches and possibly more, formed a significant network of interconnecting lines between most of the important crude oil regions and refining centers of the USSR. The network connected the Caspian Sea with the Black Sea across the Caucasus, the Caucasus area with the Donets Basin area of the Ukraine, the Caucasus area with the Ural-Volga area, and the Ural-Volga area with the "new lands" area of southwestern Siberia. In addition, several important trunk oil pipelines existed, connecting the refineries with main distribution centers.

The operating length of all trunk oil pipelines in the USSR was increased from about 5,530 km in 1945 to 12,482 km in 1956, about 2.25 times. The total length was increased about 1.8 times during the course of the Fifth Five Year Plan (1951-55). Operating lengths of major trunk oil pipelines, each of which is at least 100 km long, are estimated to have been about 5,200 km in 1950, about 10,000 km in 1955, and about 10,900 km in 1956. The existing trunk oil pipelines consist of crude oil pipelines and product oil pipelines. Three of the crude oil pipelines are indicated for transport of oil products also.

Available data provide no firm basis for estimating the length of gathering crude oil pipelines in the USSR, but it is probable that the total of 12,482 km of trunk oil pipelines constituted at least 60 percent of the total length of Soviet oil pipelines in 1956.\* This probability is established by analogy with the US.

By 1954 the availability of trunk crude oil pipelines in the USSR had increased greatly compared with that before World War II. In spite of the rapid progress during the postwar period, the need for more oil pipelines is emphasized [redacted] As late as 1956, [redacted] the inadequacy of oil pipelines

50X1  
50X1

\* In July 1954 a TASS radio broadcast from Moscow set forth a claim that there were "several tens of thousands of kilometers" of oil pipelines in the USSR. Although this claim may not be untruthful, it appears to be an overstatement, for there is no evidence that "several" referred to more than three, if so many.

- 11 -

S-E-C-R-E-T

S-E-C-R-E-T

in the USSR and commented on the future use of oil pipelines to relieve the excessive freight loading on railroads.

In 1955 and 1956, [redacted] noted the recent practice of installing oil and gas pipelines of relatively large diameter, and [redacted] the current use of 28-inch line pipe for high-pressure transmission gas pipelines. [redacted] showing oil pipelines indicates that in the USSR individual trunk oil pipelines are much longer, on the average, than they are in the US. Moreover, the average diameters in the longer Soviet trunk oil pipelines are greater than those in the US trunk oil pipelines.

50X1

50X1

50X1

Probable trunk oil pipelines operating or under construction in the USSR as of 1 January 1957 are shown in Table 1.\* The chronology of trunk oil pipeline construction in the USSR in 1945-57 is shown in Table 2.\*\* A comparison of total lengths of oil pipelines installed in the USSR and the US is shown in Table 3,\*\*\* and a comparison of diameter distribution of trunk oil pipelines in the USSR and the US is shown in Table 4.\*\*\*\*

Table 1 shows pipelines [redacted] and also shows a number of pipelines the existence of which is possible but doubtful. The oil pipelines and oil pipeline lengths considered in this report are only those confirmed [redacted]

50X1

[redacted] The traces of all of the oil pipelines, including those the existence of which is possible but doubtful, are shown on the map, Figure 1.†

50X1

50X1

On the map, Figure 1, different types of trace lines serve to distinguish the traces of pipelines existing on 1 January 1957, the traces of pipelines under construction, the traces of other pipelines proposed in the original Sixth Five Year Plan, and the

\* Appendix A, p. 41, below.

\*\* Appendix A, p. 43, below.

\*\*\* Appendix A, p. 47, below.

\*\*\*\* Appendix A, p. 49, below.

† Inside back cover. [redacted]

50X1

50X1

S-E-C-R-E-T

S-E-C-R-E-T

traces of pipelines proposed for the original Seventh Five Year Plan. Different colors on the map distinguish the pipelines confirmed [redacted] the pipelines confirmed [redacted] [redacted] the pipelines the existence of which is possible but doubtful. Some of the pipeline routes, however, are schematic on the map and may only approximate the route lengths as given in Tables 1 and 3.

50X1  
50X1

Shaded areas on the map indicate generalized regions of natural crude oil production, and two sizes of symbols are used to denote relative magnitude of production in the more important oil-fields correlated with the pipelines. Symbols on the map represent the major oil refineries and oil refinery constructions which are correlated with the oil pipelines. Two sizes of symbols denote relative magnitude of charge capacity in the refinery complexes, and two types of symbols denote major refinery construction projects of the original Sixth Five Year Plan, making a distinction between major expansions of existing facilities and major construction of new facilities.\*

Figure 2\*\* provides a graphic comparison of the chronology of construction, referring to lengths of trunk oil pipelines completed for operation in the USSR and the US.

B. Planned.

In published Soviet directives and in later Soviet press releases on the original Sixth Five Year Plan, the total length of projected trunk oil pipelines is variously cited, ranging from "at least" 10,500 km to "more than" 15,000 km. Table 5\*\*\* summarizes [redacted] available in early 1957 dealing with the oil pipelines planned and constructed after 1955. It shows data on 32 projects for trunk oil pipelines having total length of about 14,850 km, identifiable with the original Sixth Five Year Plan.

50X1

The trunk oil pipelines of the original Sixth Five Year Plan will serve as additional connections between the Ural and Emba areas and between those areas and the Siberian "new lands," and they will extend far eastward to connect with the central southern area of

\* The shaded areas and symbols are intended to be schematic, and exact geographic locations or boundaries are not to be inferred from them.

\*\* Appendix A, following p. 48, below.

\*\*\* Appendix A, p. 51, below.

S-E-C-R-E-T

Siberia at Lake Baykal. In the European USSR the new trunk oil pipelines will connect the Ural-Volga area with the Kama area and with Moscow and also with specified large industrialized centers north and south of Moscow.

Official Soviet long-range proposals for the original Seventh Five Year Plan covered planned construction and completion of trunk oil pipelines extending eastward from Lake Baykal in Siberia. As proposed, the eastward extensions would complete a trans-Siberian trunk oil pipeline system (see Planned Oil Pipelines [redacted] in Table 5\*). The system would follow the general route of the Trans-Siberian Railroad and would reach across the 7,000 km in the southern expanse of Siberia, connecting the Ural Mountains with the Siberian coastal areas of the Pacific Ocean.

50X1

The pipelines listed in Table 5 are shown on the map, Figure 1, and the map shows general distinction in these traces as to the construction status in 1956.

In addition to the planned oil pipelines shown in Table 5, other trunk oil pipelines of major length appear to be officially planned for installation at some future date, but data describe the additional plans only in general terms. [redacted] there will be two systems of trunk oil pipelines to transport crude oil from the Tatar and Bashkir oilfields in order to supply new refineries to be constructed in Gor'kiy, Yaroslavl', Ryazan', and Moscow. Planned Oil Pipelines [redacted] in Table 2, with a total length of 1,277 km, constitute one of the planned systems, omitting service to Moscow. The second planned system might very well follow the routes of Planned Oil Pipelines [redacted] and include a fourth segment along the route of Planned Oil Pipeline [redacted] which appears to have been planned to transport oil products, rather than crude oil, from Ryazan' to Moscow. The inclusion of Planned Oil Pipeline [redacted] would give a total length of about 1,550 km in the second system of trunk oil pipelines.

50X1  
50X1

50X1

50X1  
50X1

50X1

50X1

S-E-C-R-E-T

[redacted] crude oil from the Tatar and Bashkir oilfields will be supplied by trunk oil pipeline for refining, not only in the proposed new refineries in Gor'kiy, Yaroslavl', Ryazan', and Moscow but also in 3 other new refineries planned for construction -- 1 in the Ukraine and 2 in Belorussia. Odessa is specifically cited as one terminal of such a trunk oil pipeline for the supply of crude oil. The sites of the latter 3 new refineries are not specified in available Soviet data, but the refinery in the Ukraine possibly will be at either Kremenchug or Odessa, whereas Minsk, Vitebsk, or Polotsk would be logical sites for the refineries in Belorussia.

50X1

As shown in Table 5, Bryansk, Polotsk, Kremenchug, and Odessa are terminals on Planned Oil Pipelines [redacted] and these pipelines probably are planned for transport of oil products. These products are to be transported to Bryansk from Kuybyshev via Planned Oil Pipeline [redacted] a trunk oil pipeline specified [redacted] as one proposed for oil products.

50X1

550X1

If 2 trunk oil pipeline carriers are to transport crude oil from the Tatar and Bashkir oilfields with a terminal at Ryazan', it may very well be that 3 trunk oil pipelines are planned to carry part of the crude oil on from Ryazan' -- 1 line from Ryazan' to Moscow; 1 line, about 1,200 km in length, southward from Ryazan' and across the Ukraine to Odessa; and 1 line, about 800 km in length, westward from Ryazan' to the 2 new refineries in Belorussia. Thus the additional trunk pipelines for crude oil would have a total length of 3,550 km.

The USSR reportedly intends to construct trunk oil pipelines connecting the Baltic Sea areas with the Ural-Volga oilfields to transport oil stocks. The planned trunk oil pipelines into Belorussia would constitute a major segment of such a connection.

[redacted] stated in early 1957 that 25,284 km of trunk oil pipelines and transmission gas pipelines were scheduled for construction in the USSR in 1956-60 and that in that total there would be about 12,000 km of transmission gas pipelines. In this report, 12,266 km is estimated to be the length of transmission gas pipelines to be completed for new operation in the USSR in 1956-60.\* The corresponding length for trunk oil pipelines to be completed for new operation then would be 13,018 km, representing an

50X1

\* See IV, B, p. 25, below.

S-E-C-R-E-T

S-E-C-R-E-T

average rate of about 2,600 km per year.\* It is improbable, therefore, that the additional length of 3,550 km of trunk oil pipelines cited above is officially planned for construction in 1956-60, and it is possible that some of the total length as shown for 1956-60 in Table 4 is not officially scheduled for completion in the stated period, particularly some of the lengths of Planned Oil Pipelines [redacted]

50X1

It is estimated that 11,407 km of trunk oil pipelines were operating in the USSR in 1955. If 13,018 km of new trunk oil pipelines are completed for operation during the period of the original Sixth Five Year Plan, the total length scheduled for 1960 will be 24,425 km, an increase to about 2.14 times the length in 1955 during the period of the plan.

It is estimated that 1,075 km of trunk oil pipelines were completed for operation in the USSR in 1956. [redacted]

50X1

at least 600 km in seven trunk oil pipelines, [redacted] were completed for new service in 1956 and that the total length of trunk oil pipelines completed for new service during 1956 exceeded 1,000 km. In addition, a considerable length of trunk oil pipeline appears to have been installed in place in 1956 but not put into service, in particular Planned Oil Pipelines [redacted]

50X1

50X1

[redacted] These 1956 results, however, do not compare too well with the required average rate of 2,600 km per year mentioned above, and maximum use of increasing capabilities apparently will be required for the USSR to fulfill the goal of the original Sixth Five Year Plan for the construction of trunk oil pipelines. [redacted]

50X1  
50X1

in 1956 the USSR may have utilized to the limit all of the current capabilities of the country for supplying line pipe for pipelines.

50X1

As shown in Table 5, 22 trunk pipelines for crude oil with a total length of 7,541 km and 10 trunk pipelines for oil products with a total length of 7,309 km are to be completed under the original Sixth Five Year Plan. Although available Soviet data are very meager in regard to the construction of gathering crude oil pipelines in the USSR, it is estimated that for the original Sixth Five Year Plan to be realistic, the plan probably would involve a total length of about 6,000 km to be constructed in gathering crude oil pipelines, most of which would be located in the Ural-Volga oilfields. This length of 6,000 km represents about 80 percent of the length of 7,541 km in

\* For comparison, construction of new trunk oil pipelines in the US was at an average rate of about 9,370 km per year during 1950-52 and about 9,960 km per year during 1953-55.

S-E-C-R-E-T

trunk pipelines for crude oil and would represent an average construction rate of 1,500 km per year during the 5-year period.\*

[redacted] 28-inch line pipe for several of the 50X1  
long transmission gas pipelines and some of the long trunk oil pipelines planned for construction under the original Sixth Five Year Plan in the USSR. [redacted] of the total length of 50X1  
these new trunk pipelines for oil and gas, 10 percent will be 32 inches in diameter, 50 percent will be 28 inches in diameter, and 27 percent more will be between 20 and 28 inches in diameter. In early 1957, [redacted] the actual manufacture and use 50X1  
of 32-inch line pipe was still experimental.\*\*

C. Traffic.

According to the present estimates, the volume of transport in Soviet oil pipelines increased from about 2.7 billion ton-kilometers in 1946 to about 13.7 billion ton-kilometers in 1955.\*\*\* The volume thus

\* In the US in 1955 the total length of gathering crude oil pipelines constituted about 93.6 percent of the total length of trunk pipelines for crude oil. The construction of new gathering crude oil pipelines in the US was at an average rate of about 7,726 km per year during 1950-52 and of about 6,540 km per year during 1953-55.

\*\* In the US there has also been a pronounced trend toward larger diameters in trunk oil pipelines, especially in trunk lines for crude oil. During 1950-52, for example, 40 percent of the installed length of new trunk oil pipelines in the US replaced trunk oil pipelines concurrently dismantled, and almost 48 percent of the new installed length was 12 inches in diameter or larger, whereas more than 93 percent of the dismantled length was less than 12 inches in diameter. In the US during 1953-55, about one-third of the installed length of new trunk oil pipelines similarly replaced trunk oil pipelines concurrently dismantled, and more than 51 percent of the new installed length was 12 inches in diameter or larger, whereas almost 80 percent of the dismantled length was less than 12 inches in diameter.

\*\*\* [redacted] this oil pipeline traffic represented 50X1  
1.2 percent of the total freight traffic by all carriers in 1955 in the USSR. [redacted] in 1955, 1.4 percent of the 50X1  
total freight traffic in the European USSR and 0.9 percent of the total freight traffic in the Asiatic USSR were carried by oil pipeline. It is presently estimated that of the 13.7 billion ton-kilometers of oil pipeline transport, 9.6 billion ton-kilometers were accounted for by the European USSR and 4.1 billion ton-kilometers by the Asiatic USSR.

S-E-C-R-E-T

increased 5.1 times during 1946-55. It is estimated, however, that during the same period the indigenous output of nongas petroleum stock increased from 40.2 million tons per year to 133.7 million tons per year, about 3.3 times, and that the volume of total traffic in nongas petroleum increased from 45.1 billion ton-kilometers per year to 141.2 billion ton-kilometers per year, about 3.1 times. Hence the share of pipeline transport in the total traffic in nongas petroleum stock increased from 6.0 percent in 1946 to 9.7 percent in 1955. The corresponding percentage is estimated to have been 6.2 percent in 1950.

In the postwar period in the USSR, there have been large increases in the traffic in other types of freight as well as in nongas petroleum, but at a somewhat less rapid rate of increase. Estimates show that the total traffic in nongas petroleum represented 11.0 percent of the total freight traffic in 1950 and that this percentage increased to 12.1 percent in 1955. Estimates also show that the relative share of the oil pipeline traffic in the total freight traffic has been likewise increasing, the increase being from 0.7 percent in 1950 to 1.2 percent in 1955 and to 1.6 percent in 1956. In spite of the emphasis in the Soviet press on the need for reduction in the share of nongas petroleum in the total freight by railroad, estimates show that this share actually increased from 8.6 percent in 1950 to 10.5 percent in 1955.

In the original Sixth Five Year Plan, 83 billion ton-kilometers is the goal for 1960 in oil pipeline traffic, about 6 times as much as in 1950, and it appears that this traffic in 1960 will represent 25 percent of the total traffic in nongas petroleum by all carriers and 4.6 percent of the total freight traffic in the USSR. Estimates further show that in 1960 the total traffic in nongas petroleum will represent 18.4 percent of the total freight traffic and that nongas petroleum still will account for a share of 10.6 percent in the railroad freight.

[redacted] oil pipeline traffic essentially resolves as a matter of statistics. Estimated statistical data are accordingly presented for the USSR as follows: traffic in nongas petroleum by oil pipeline and by other types of carriers, 1940-55, and that planned for 1960, in Table 6\*; total freight traffic by oil pipeline and by other types of carriers in selected years, 1913-56, and that planned for 1960, in Table 7\*\*; transportation balances in traffic in nongas

50X1

\* Appendix A, p. 53, below.

\*\* Appendix A, p. 55, below.



S-E-C-R-E-T

petroleum by oil pipeline and by other types of carriers, 1950, 1955, and that planned for 1960, in Table 8\*; transportation balances in total freight traffic by oil pipeline and by other types of carriers, 1940, 1950, 1955, 1956, and that planned for 1960, in Table 9\*\*; break-down of railroad freight traffic showing the relative share of nongas petroleum in the traffic, 1950, 1954, 1955, and that planned for 1960, in Table 10.\*\*\*

Similarly as in the instances of estimated data on lengths and diameters of Soviet trunk oil pipelines, the estimated data on traffic in oil pipelines in the USSR have greater significance when they are compared with corresponding data for countries in which the potentials are better understood. Corresponding data for the US are included for such comparison in Tables 8 and 10, even though corresponding data are not always available for exactly the same years in the US and the USSR and even though there are no planned goals for 1960 in the US.

Table 8 illustrates the different traffic patterns for nongas petroleum in the USSR and the US. It is indicated that the average distance of transfer in this over-all traffic is much longer in the USSR than in the US but that the reverse has been true in regard to the average distances of transfer in oil pipeline traffic. As planned for 1960 in the USSR, the average distance of transfer in oil pipeline traffic is to be much increased but not quite enough to equal the corresponding distance as of 1955 in the US. Compared with the 9.7 percent in 1955 and the 25 percent planned for 1960 in the USSR, the share of the oil pipelines in the over-all traffic was equal to about 45 percent as of 1955 in the US.

As shown in Table 10 for the relative share of nongas petroleum in total freight traffic by railroads, the percentages as of 1950-55 and as planned for 1960 in the USSR are about three times the corresponding percentages as of 1950-53 in the US.

Comparative data are shown in Table 11\*\*\*\* for correlation of potential transfer distances by oil pipeline traffic in the USSR and the US. The use index is developed as defined in Table 11, giving the ratio of oil pipeline traffic to indigenous output of nongas petroleum.

- 
- \* Appendix A, p. 57, below.
  - \*\* Appendix A, p. 59, below.
  - \*\*\* Appendix A, p. 63, below.
  - \*\*\*\* Appendix A, p. 65, below.

S-E-C-R-E-T

Other than for the relatively small quantities of solid petroleum products normally included in the output, this output constitutes the principal oil stock potentially available for separate transfer in oil pipelines. Except where other factors are controlling, the resulting indexes stand in ratios approximating the ratios between average distances of transfer in oil pipeline traffic.

Comparative data are shown in Table 12\* for prewar and post-war net delivery of crude oil to refineries in the USSR and the US. Table 12 quantifies the large increase in availability of trunk crude oil pipelines by 1954 in the USSR, as previously mentioned.\*\* As of 1956 in the USSR, [redacted] essentially all of the net delivery of crude oil to refineries was by oil pipeline. It is noted that the percentage data in Table 12 have been misinterpreted [redacted] [redacted] being given sometimes as applicable to the total mass of transfer (or tons originated) in the total traffic in crude oil, sometimes as applicable to the total mass of transfer (or tons originated) in the total traffic in nongas petroleum, and even sometimes as applicable to the ton-kilometers of traffic in non-gas petroleum.

50X1

50X1  
50X1

\* Appendix A, p. 65, below.  
\*\* III, A, p. 11, above.

S-E-C-R-E-T

#### IV. Gas Pipelines.

##### A. Operating and Under Construction, 1 January 1957.

The operating length of all transmission gas pipelines in the USSR is estimated to have increased from about 700 km in 1945 to about 7,000 km in 1956, or about 10 times during 1946-55 and about 2.2 times during the course of the Fifth Five Year Plan. The operating lengths of the major transmission gas pipelines in the USSR, each of which is at least 100 km long, are estimated to have been about 1,720 km in 1950, about 3,750 km in 1955, and about 5,050 km in 1956.

The operating transmission gas pipelines, shown in Table 13,\* were about 7,037 km long on 1 January 1957. This total length consists of 6,296 km for natural gas and 741 km for manufactured gas.

Available data provide no firm basis for estimating the total lengths of the collection and distribution pipelines installed for fuel gas service in the USSR. The 7,037 km of transmission gas pipelines, however, probably constituted at least 50 percent of the total length of Soviet fuel gas pipelines in 1956. Available data generally indicate that pipelines for the collection and distribution of gas are relatively shorter in the USSR than in the US and that transmission gas pipelines are relatively longer. A comparison of the total lengths of fuel gas pipelines in the USSR with those of the US is shown in Table 14.\*\*

[redacted] the gathering gas pipelines in the USSR are more restricted to the larger producer wells, which are more centrally located in the gas fields, than are those in the US and also that the distribution gas mains typically lead to more centralized units of consumption in large apartment houses, industrial enterprises, and public and government establishments. Exploitation of resources of fuel gas is relatively new in the USSR, and further exploitation is given high priority in the original Sixth Five Year Plan. It probably will be many years, however, before the USSR can attain a status comparable to the US in the collection of natural gas from a wide scattering of small producer wells as well as from large producer wells and in the distribution of fuel gas over extended areas for small unit consumptions.

50X1

\* Appendix A, p. 67, below.

\*\* Appendix A, p. 71, below.

S-E-C-R-E-T

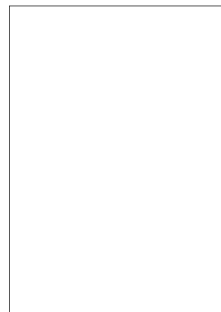
S-E-C-R-E-T

Practically all of the exploitation of fuel gas in the USSR has been in the postwar period, beginning with 1946. In 1945 the Saratov and Dashava areas contained the major natural gas fields then explored. Before 1946 there was only local exploitation of the Saratov gas fields, supplying gas chiefly to the city of Saratov [redacted] [redacted] Before 1948 the only exploitation of the Dashava fields was also local, supplying gas chiefly to the cities of L'vov and Stryy [redacted].

50X1  
50X1  
50X1

The other known major exploitations of fuel gas in the USSR in 1945 were of natural gas produced in the general vicinity of oil-fields. Transmission gas pipelines connecting the sources with eight cities of considerable size are as follows:

<u>Oilfield</u>	<u>Cities</u>
Buguruslan	Buguruslan, Kuybyshev
Yablonovo	Kuybyshev
Malgobek	Malgobek, Groznyy
Izberbash	Makhachkala
Baku/Apsheron	Baku
Andizhan	Andizhan



50X1

By 1945, in some of these cities that were furnished with natural gas, and likewise in certain other large cities of the USSR, there probably existed limited supplies of manufactured gas derived from coal in local gas plants.\* Moscow and Leningrad, for example, probably had such supplies.

In 1956, fuel gas in appreciable, but by no means abundant, quantities was supplied by transmission gas pipelines to more than 50 cities of considerable size compared with service to about 10 cities in 1945. An incomplete list of these cities included the following, given in decreasing order of probable population:

\* For the purposes of this report, local gas plants are considered to have direct connection with the distribution gas mains of the local areas and, for that reason, to have no connections with transmission gas pipelines.

S-E-C-R-E-T

<u>City</u>		<u>City</u>	
Moscow		Podol'sk	
Leningrad		Bryansk	
Kiev		Zhitomir	
Baku		Kolomna	
Khar'kov		Novorossiysk	
Kuybyshev		Stalinogorsk	
Dneprepetrovsk		Makhachkala	
Kazan'		Vinnitsa	
Rostov		Serpukhov	
Molotov		Kaluga	
Stalingrad		Bezhitsa	
Saratov		Berdichev	
Voronezh		Stanislav	
L'vov		Chernigov	
Tula		Yelets	
Krasnodar		Drøgobych	
Ufa		Yefremov	
Tallinn		Ternopol'	
Voroshilovgrad		Borislav	
Groznyy		Morshansk	
Chernikovsk		Buguruslan	
Taganrog		Nebit-Dag	
Dneprodzerzhinsk		Stryy	
Ordzhonikidze		Leninsk	
Ryazan'		Ostrogozhsk	
Poltava		Malgobek	
Stavropol'		Khmel'nitskiy	
Andizhan		Mirgorod	

50X1

As shown in Table 13, 58 transmission gas pipelines\* are identified as facilities completed for operation by 1 January 1957. Forty-seven of these lines are shown in service for large cities, and connecting lines, minor branch lines, and other types of minor lines in local areas account for the remaining 11 [redacted]

50X1

\* Fifty-eight pipelines are denoted by gas pipeline index numbers in Table 13, but 71 separate pipelines are involved (see Table 13, [redacted] and footnote p).

50X1  
50X1

- 23 -

S-E-C-R-E-T

S-E-C-R-E-T

[redacted] Although the  
58 pipelines are considered to be trunk or transmission gas pipe-  
lines, a number of the lines are relatively short in length.\*

50X1

The principal natural gas pipelines listed in Table 13 serve  
for exploitation not only of the major gas reserves in the older Dashava  
and Saratov areas but also of the recently discovered major gas reserves  
in the Stavropol' and Shebelinka areas (Gas Pipeline [redacted] from Shebe-  
linka is the lead portion of Planned Gas Pipeline [redacted] which will have  
a total length of about 500 km when completed). The other natural gas  
pipelines of various lengths listed in Table 13 are auxiliary to the  
principal natural gas pipelines or are in service for exploitation of  
other gas reserves, including some reserves that are very large, sev-  
eral reserves that are new, and many reserves that are located in the  
general areas of oilfields.

50X1

50X1

Of these other natural gas reserves connected with the trans-  
mission gas pipelines, the following are important enough to warrant  
specific mention: the Borislav area in the western Ukraine; the Ugersko  
stepout from Dashava; the Mirgorod area in the central Ukraine; the  
Buguruslan, Minibayevo, Tuymazy, and Molotov areas in the Ural-Volga  
oilfield region; the Archeda field in the Stalingrad area; new fields  
in the general area of Krasnodar; various fields, old and new, in the  
Groznyy area; the Izberbash field in the Makhachkala area; the large  
new Karadag field together with older fields in the Baku area; minor  
fields in the Turkmen and Fergana area; and long-neglected minor gas  
reserves in the Okha area of Sakhalin.

Manufactured fuel gas has been exploited to some extent by  
means of transmission gas pipelines constructed in the USSR after World  
War II. As shown in Table 13, the principal pipelines of this type con-  
nect Leningrad and Tallinn with the shale gas plants in Estonia and con-  
nect Moscow with the large new coal gasification plant at Shchekino near  
Tula.

Although the present report does not cover the data on the  
plants producing manufactured fuel gas, it is noted that [redacted]  
[redacted] the existence in 1956 of about 250 plants producing manu-  
factured fuel gas in the USSR, presumably including the shale gas

50X1

50X1

\* Except for the traces of minor pipelines corresponding to two of  
the index numbers [redacted] the traces of these  
pipelines are shown on the map, Figure 6 (inside back cover). For a  
description of Figure 6, see B, pp. 28-29, below.

50X1

S-E-C-R-E-T

plants, the coke oven gas plants that process coal materials, and the local gas plants that gasify coal materials directly. The coke oven gas facilities appear to be connected with direct local gas distribution as well as with transmission gas pipelines.

B. Planned.

The directives of the original Sixth Five Year Plan of the USSR stated that 9,000 km of transmission gas pipelines were to be constructed in 1956-60. [redacted] increased commitments for this planned length and early in 1957 stated that the construction would be about 12,000 km.

50X1

Based on Soviet data as of early 1957, the following lengths are estimated for planned transmission gas pipelines: 12,266 km confirmed as completions for new operation in 1956-60, including 11,661 km for natural gas and 605 km for manufactured gas; 1,875 km completed for new operation in 1956, with construction work under way on 1,864 km more in 1956; 2,315 km identified as scheduled to be completed for operation in 1957; 1,654 km identified as scheduled to be completed for operation in 1958; and a total of 6,721 km identified as scheduled to be under active construction in 1957. Apparently, however, only 1,615 km of the line pipe were installed in place in 1956. Construction work is scheduled for 1956-60 on 1,700 km of transmission gas pipelines which are not scheduled to be completed for operation until after 1960, and [redacted] the possibility of constructing 2,027 km of transmission gas pipelines which are not known to be confirmed as official plans.

50X1

50X1

Table 15\* summarizes the data available early in 1957 which deal with 81 transmission gas pipelines planned or constructed subsequent to 1955 in the USSR, chiefly in conjunction with the original Sixth Five Year Plan. Traces of the pipelines listed in Table 15, with the exception of two minor ones, are shown on the map, Figure 6,\*\* and the map shows general distinction in these traces as to the construction status in 1956. Table 13 includes 15 of the pipelines listed in Table 15, 14 of them being shown in Table 13 as completed in 1956\*\*\* and the

\* Appendix A, p. 73, below.

\*\* Inside back cover. [redacted]

50X1

50X1

\*\*\* In 1 of these 14 lines, [redacted] all but the minor lead portion was completed for operation before 1956.

50X1

S-E-C-R-E-T

remaining 1 [ ] being shown as under construction in 1957 with the lead portion completed for operation in 1956. The chronology of transmission gas pipeline construction in the USSR is shown in Table 16.\*

50X1

Tables 13 and 15 are based on the Soviet data available early in 1957. Other new reliable data were appearing later in 1957, however, and when these are more completely analyzed, Tables 13 and 15 may be revised, particularly the data for construction in 1950-56 and the plans for 1956-60 and later.\*\*

As shown in Table 15, the 81 transmission gas pipelines generally will serve for additional exploitation of most of the major fuel gas resources already exploited in 1955-56. In particular, pipelines to be completed for operation in 1957-60 will transport more gas from the major natural gas reserves in the Stavropol' and Shebelinka areas and apparently will round out the exploitation of the Dashava-Ugersko natural gas reserves. Other new pipelines will serve the following significant areas and reserves of natural gas; the newly developed Kosov, Zakarpatskaya, and Mikhaylovka areas in the Ukraine; the Mirgorod area in the Ukraine; in the Ural-Volga oilfield region, the newly developed Mukhanovo reserves in the Kuybyshev area, the reserves of the Al'met'yevsk area, and the newly developed and reportedly large reserves of the Shkapovo area; the newly developed and reportedly large Stepnoye reserves near Saratov; several newly developed reserves in the general areas of Stalingrad, Krasnodar, and Groznyy; in the Baku area, especially the Karadag reserves and the newly developed Siazan' reserves, respectively located to the south and north of Apsheron'skiy Poluostrov (Apsheron Peninsula); the newly developed Kizyl-Kum reserves in Turkmen and the newly developed Khodzhiabad reserves in the Fergana Valley; and the reserves of the Okha area on Sakhalin.

One principal pipeline [ ] also will lead to initial exploitation of recently discovered natural gas reserves at Berezovo in the Arctic tundras of western Siberia. In addition, there may be major exploitation of the recently explored natural gas reserves located near Ukhta in the Arctic (see Table 15, [ ] and footnote w).

50X1

50X1  
50X1

\* Appendix A, p. 83, below.

\*\* [ ] 16,000 km of transmission gas pipelines were scheduled for construction in the USSR during the original Sixth Five Year Plan. [ ] 1,800 km of transmission gas pipelines were scheduled for construction in the Ukraine during the original Sixth Five Year Plan, but [ ] a large increase in that planned total.

50X1

50X1

50X1

50X1

50X1

S-E-C-R-E-T



S-E-C-R-E-T

The planned pipelines provide for some additional transport and distribution of manufactured gas. One of the major lines is a second transmission gas pipeline connecting Leningrad with the Kokhtla-Yarve shale gas plants, and there will be new transmission gas pipelines for coke oven gas in the Donbas and Pridnepr areas of the Ukraine (see Table 15, footnote aa).

[redacted] during the period of the original Sixth Five Year Plan new supplies of fuel gas will be provided for 132 cities in the USSR, including 56 cities in the RSFSR and 54 cities in the Ukraine. [redacted] there was formerly no supply of fuel gas for 93 of these cities, including 35 cities in the Ukraine and 58 elsewhere. Available data indicate that in 1957-60 transmission gas pipeline service will be provided for the first time to at least 28 major cities each with a probable population of 100,000 or more. A list of these cities is as follows, given in decreasing order of probable population:

50X1

50X1

<u>City</u>		<u>City</u>	
Gor'kiy		Kursk	
Stalino		Kadiyevka	
Odessa		Dzerzhinsk	
Riga		Chernovtsy	
Minsk		Kherson	
Zaporozh'ye		Vitebsk	
Krivoy Rog		Orel	
Makeyevka		Kramatorsk	
Magnitogorsk		Kirovabad	
Zhdanov		Armavir	
Gorlovka		Nikopol'	
Nikolayev		Konstantinovka	
Vil'nyus		Yenakiyevo	
Shakhty		Novocherkassk	

50X1

Except that the service may not be provided until after 1960, at least three other metropolitan cities fall in the same group: Sverdlovsk, Tbilisi, and Yerevan, [redacted]

50X1  
50X1

S-E-C-R-E-T

It is estimated that 5,162 km of transmission gas pipelines were operating in 1955 in the USSR. If 12,266 km of transmission gas pipelines are completed for operation during the period covered by the original Sixth Five Year Plan, the total length of transmission gas pipelines scheduled for 1960 will be 17,428 km, an increase to about 3.4 times the length in 1955 during the period of the plan. The installation of 12,266 km of gas pipelines under the plan corresponds to an average rate of about 2,450 km per year.\*

The present estimate of 1,615 km of transmission gas pipelines installed in place in 1956 is to be compared with [redacted] citations which range from 1,400 km to 1,700 km for the length "installed" in 1956. The estimated length of 1,875 km for the completion of such lines for new service in 1956 is less than the required average of 2,450 km per year. It appears that in 1956 the USSR utilized to the limit all of the capabilities of the country for supply of line pipe to transmission gas pipelines (see Table 15, footnote z). As in the case of trunk oil pipelines, maximum use of increasing capabilities apparently will be required for the USSR to fulfill the goal of the original Sixth Five Year Plan for construction of transmission gas pipelines. Early in 1957, [redacted] from 2,390 to 3,000 km of the transmission gas pipelines were to be "installed" in 1957 in the USSR. [redacted] about 850 km of this "installation" in 1957 will be in the Ukraine, including about 300 km of branch lines from Planned Gas Pipeline [redacted] and that the "installation" would be in addition to the 150 km of natural gas field collection lines already being constructed. Table 15 identifies 2,315 km of the lines as scheduled to be completed for new operation in 1957.

50X1

50X1

50X1

50X1

[redacted] 8,000 km of distribution gas pipelines are planned for construction in 1956-60, including 3,900 km in the RSFSR and 2,500 km in the Ukraine. The total length of 8,000 km represents an average installation rate of 1,600 km per year.\*\*

50X1

Different colors on the map, Figure 6,\*\*\* serve to distinguish the traces and gas pipeline index numbers of the completed

\* The net addition to transmission gas pipelines in service in the US was at an average rate of about 10,140 km per year during 1946-55.

\*\* The net addition to distribution gas pipelines in service in the US was at an average rate of about 16,800 km per year during 1946-55.

\*\*\* Inside back cover.

S-E-C-R-E-T

pipelines as differentiated from the traces and planned gas pipeline index numbers of the pipelines that were projected for future completion. Different types of trace lines on the map distinguish the traces of the pipelines for natural gas, the traces of the pipelines for manufactured gas, the traces of the projected natural gas pipelines which probably will be completed after 1960, and the traces of the projected natural gas pipelines which appear to be doubtful or canceled as official plans.\* Some of the pipeline routes, however, are schematic on the map and may only approximate the route lengths as given in Tables 13 and 15.

Symbols are applied on the map to show the locations of the most important natural gas fields and the sites of the most important fuel gas manufacturing plants. The transmission gas pipelines connected to these sources of fuel gas are also shown. Two sizes of symbols of each type denote relative magnitude of output of fuel gas.

C. Capacity, Distribution, and Sources.

Available data are too fragmentary for a realistic estimate of the actual volume of transport in the Soviet gas pipelines. Published figures in Soviet and non-Soviet sources for throughput capacity\*\* ratings in some of the more important of the lines, although often inconsistent among themselves, have been used to estimate the capacity ratings shown in Table 17.\*\*\* The capacity ratings are subject to a considerable range of error but nevertheless are indicative and fairly consistent with related data. Table 17 covers only the major transmission gas pipelines in service in 1956.

In Table 18,\*\*\*\* potential service factors are developed, showing the relations between the fuel gas produced and the total length

---

\* All other projected pipelines shown on the map presumably are planned for completion during 1957-60. The unpublished appendixes contain data on a number of totally improbable transmission gas pipelines for the USSR, allegedly installed or planned in the past, including a few that are allegedly planned for construction under the original Sixth Five Year Plan

\*\* Throughput capacity is a time-rate, being a function of the diameter of the pipeline and the velocity of flow as well as of other factors.

\*\*\* Appendix A, p. 85, below.

\*\*\*\* Appendix A, p. 87, below.

S-E-C-R-E-T

of transmission gas pipelines in operation. Table 18 shows a comparison between the USSR and the US in this respect. The data in Table 18 indicate that the planned expansion in fuel gas output in the USSR is at a higher relative rate than is the planned increase in length of transmission gas pipelines.

Moscow and Leningrad were the major centers of consumption of fuel gas in 1956 in the USSR. [redacted]

50X1  
50X1

early in 1956 fuel gas was supplied to Moscow at the following rates, mostly by means of transmission gas pipelines:

Type and Source	Amount (Million Standard Cubic Meters Per Year)
Coke oven gas from a large plant in the suburbs	475
Gas from local coal gasification plants	155
[redacted]	260
[redacted]	830
[redacted]	520
Total	<u>2,240</u>

50X1

50X1

50X1

[redacted] in 1956 Leningrad had a local coal gasification plant with an output of 65 million standard cubic meters of gas per year.

In 1955, there were possibly 2,000 km of distribution gas mains in Moscow and 800 km in Leningrad. Of the 2,000 km in Moscow, 350 km were constructed during 1952 and 200 km during 1955. Recent construction of distribution gas mains in Moscow has included extensions to the suburban areas: for example, a 15-km main was completed early in 1956 to serve the Kuntsevo area. During 1956-60, 700 km are scheduled to be added to the Moscow mains. Of the length of the gas mains in Leningrad, 654 km existed in 1954 but only about 80 km in 1945. During 1956, 100 km were scheduled to be added to the Leningrad mains,

S-E-C-R-E-T

and 400 km were scheduled to be added during 1957-60. In all of the RSFSR, 470 km of distribution gas mains were scheduled to be constructed during 1956, and 3,430 km more were scheduled to be constructed during 1957-60. In Kuybyshev, 210 km of distribution gas mains were constructed during 1949-52, and 90 km of gas mains were constructed during 1955 in Kuybyshev, Saratov, Ryazan', and Krasnodar together. During 1956, 46 km of gas mains were scheduled to be constructed in Khar'kov. During 1956-60, plans call for the construction of 60 km of gas mains in Vil'nyus and for an increase in the length of gas mains in Stalino to 200 km. In 1955, 8 km of distribution gas mains existed in Dneprodzerzhinsk.

50X1  
50X1

50X1  
50X1

50X1  
50X1

50X1  
50X1

According to Soviet data on the original Sixth Five Year Plan, about 1.25 million additional apartments are to be gasified in the USSR. This figure includes 610,000 apartments in the RSFSR, 100,000 of which were to be gasified in 1956. Under the plan, 200,000 additional apartments are to be gasified in Moscow, so that a total of 700,000 apartments will be gasified in that city by 1960. In Leningrad, 75,000 additional apartments are to be gasified, including

\* This enumeration of the mechanical units in Moscow probably is independent of the enumeration of apartments or housing units.

S-E-C-R-E-T

8,000 in 1956, and 28,500 additional apartments are to be gasified in Kuybyshev. [redacted] in 1956 there were about 120,000 gasified apartments in Baku and about 8,000 in Stalingrad.

50X1

[redacted] in 1956-60 about 250 "giant" industrial plants in the USSR will be converted to fuel gas as a source of energy.

50X1

[redacted] progress is being made in eliminating the large waste of natural gas in the producing fields of the USSR represented by burning in flares and by other loss to the atmosphere.\*

50X1

[redacted] even though the transmission gas pipelines in the USSR transport stripped associated gas as well as crude dry natural gas, only about 40 percent of the gross associated natural gas was actually recovered as of 1955 in the oilfields.\*\* [redacted]

50X1

[redacted] in the future there will be more efficient recovery of the increasing gross production of associated gas in the oilfields.

50X1

50X1

[redacted] 40 new natural gas deposits and 89 new natural crude oil deposits were discovered during 1951-55 in the USSR. The most prolific of the gas deposits appear to have been of the dry gas type and to be located in the Stavropol' and Shebelinka areas.

50X1

\* [redacted] 1 billion standard cubic meters of natural gas was thus wasted in 1946 at the producing wells in the Baku area.

50X1

\*\* Associated natural gas is associated with natural crude oil in the natural reservoir traps. Stripped associated gas is the dry natural gas derived from this associated gas after removal of natural gas liquids as condensates in the recovery plants. Crude dry natural gas occurs mostly by itself in the natural reservoir traps and in normal instances is composed predominantly of volatile hydrocarbons, chiefly methane, without a content of the hydrocarbon vapors that will condense and form natural gas liquids where these natural gas liquids consist of liquefied petroleum gas, natural gasoline, and occasionally cycle products of the kerosine type. Although crude dry natural gas is to be found only in gas wells, it is noted that gas wells often yield in place of the dry gas a wet natural gas which contains condensible vapors of natural gas liquids and which is similar to associated gas in that respect. In the US in 1954 the dry natural gas for pipeline transmission to market consisted of about a third of crude dry natural gas, about a third of dry gas stripped out of wet gas from gas wells, and about a third of dry gas stripped out of associated gas from oil wells. The evidence is very confusing, however, in regard to Soviet exploitation of wet gas from gas wells. In this report the term dry natural gas means crude dry natural gas unless otherwise stated.

S-E-C-R-E-T

Dry natural gas constitutes the reserves in the major gas field areas: the Dashava area with the newly developed Ugersko step-out, the newly developed Shelbelinka area, the Saratov area and the newly developed Stepnoye area correlated with it, and the Stavropol' area on the northern Causasus steppes. It is probable that dry gas also constitutes other newly developed reserves in areas of lesser potential such as the following: in the Ukraine, the Kosov, Mirgorod, and possibly other areas; on the northern Caucasus steppes, the Il'skiy area containing the Akhtyrskaya and Anastasiyevka deposits, the Aleksandrovka area, and possibly other areas; the Kizyl-Kum area in Turkmen; and the potential Berezovo area in the Siberian Arctic. Some of the older exploited gas reserves in the general regions of oilfields -- for example, the Buguruslan reserves and the Izerbash reserves -- probably likewise contain dry gas.

Other natural gas reserves, some of which are of major significance and most of which are located in or near major oilfield regions, may contain either associated gas or dry gas. [redacted]

50X1  
50X1

[redacted] gas comprises some of these other reserves, as follows: in the Ural-Volga oilfield region, the newly developed and large reserves of Minibayevo and Shkapovo and certain older and lesser reserves such as those at Tuymazy and Yablo-novo; most of the reserves in the Baku area, including the newly developed and large reserves at Karadag; and the Fergana Valley reserves at Khodzhiabad. Although the present report does not cover data on the plants which process fuel gases and petroleum, there is Soviet confirmation\* that increasing emphasis is being placed on the recovery of natural gas liquids and stripped associated gas (see Table 14, footnote e).

\* [redacted] a new natural gas liquids recovery plant at Nizhnyaya Maktama began to operate early in 1957 and delivered stripped associated gas through local transmission gas pipelines to Bugul'ma and Al'met'yevsk and also, possibly through Gas Pipelines [redacted] to Kazan', Ufa, and Chernikovsk.

50X1

A second part of this new recovery plant was reported to be scheduled for completion in 1957. From Al'met'yevsk it is possible that stripped associated gas is to be furnished to Stavropol'krasnyy [redacted]

50X1  
50X1

[redacted] From Kazan', [redacted] stripped associated gas will be furnished to Cheboksary and Gor'kiy through Planned Gas Pipeline [redacted] and to Yoshkar Ola through Planned Gas Pipeline [redacted]

50X1  
50X1

S-E-C-R-E-T

In addition to the facilities for coke oven gas of the Donbas and the Pridnepr areas which are serviced by transmission gas pipelines (see Table 15, footnote aa), and the local coal gasification plants in Moscow and Leningrad, other important coal gasification plants existed in 1956 as a source of fuel gas in local areas of the USSR. Some of these plants are here mentioned for reference as follows: coke oven gas facilities at Kaliningrad, reportedly restored in 1951-55; coke oven gas facilities at Magnitogorsk and also in the "new lands" area at Kemerovo; a restored coal gasification plant at Vyborg in the Leningrad Oblast; and the underground coal gasification projects of the Podzemgas Research Institute at Tula, at Lisichansk, and also in the "new lands" area at Kiselyevsk near Kemerovo.

The original Sixth Five Year Plan further called for the construction of a number of significant coal gasification plants which also would supply fuel gas to local areas. Examples of these proposed plants are as follows: coke oven gas facilities at Chelyabinsk and in the "new lands" area at Stalinsk near Kemerovo and at Nizhniy-Tagil near Sverdlovsk and a coal gasification plant in the "new lands" area at Pavlodar. In addition, manufactured fuel gas derived from coal reportedly is to be furnished in 1956-60 to Serpukhov and Podol'sk, possibly through Gas Pipeline [ ] and to Sverdlovsk, possibly from Nizhniy-Tagil.

50X1

The USSR has actively experimented not only with the techniques of underground coal gasification -- a new process that is still in the development stage in the West -- but also with a process for the recovery of methane gas for fuel gas use by exhausting the methane gas from coal mines, where this gas is generated as the dangerous and explosive "fire damp," or "marsh gas," by spontaneous decomposition of coal. [ ] the methane recovery process was applied early in 1957 to coal mines at Shakhtarsk and Chistyakovo, [ ] plans for producing only about 350 million standard cubic meters per year by the methane recovery process by 1960.

50X1

50X1



S-E-C-R-E-T

V. Conclusions.

A. Capabilities and Technological Considerations.\*

The practices and equipment now applied by the USSR for construction of oil and gas pipelines are described [redacted] and Soviet technology seems generally comparable to that of the US. The USSR has acquired this technology within a period of a few years, mostly by following the patterns already fully developed in the West. Only in a few instances is there evidence of significant originality or invention in what has been done in the USSR. It is probable that the USSR still lacks the finesse which has been attained in the West by years of experience in construction operations and in the manufacture of equipment and material.

50X1

[redacted] recent Soviet progress in mechanization of construction work. The mechanization is reported to have resulted in high-speed installation of pipelines. The digging of trenches, the laying of metal pipe, and most of the other heavy labor processes are said to be fully mechanized. Self-propelled excavators have replaced manual trench digging, and a factory at Leningrad is said to have produced a new type of machine\*\* for the laying of long-distance pipelines. It is claimed that the machine has one-third more power than older types. This machine is an integrated, mechanized unit which serves to clean, insulate, and place the line pipe in the trenches. It is said that bulldozers are used to fill the trenches.

50X1

[redacted] progress in the use of new automatic and semiautomatic devices for pipe welding, claiming not only that electric arc welding has replaced the use of welding torches where electric welding is applicable but also that progressive electric welding\*\*\* machines have come into use for joining pipe ends without the need for separate electrodes or flux. Although it is true that such progressive electric welding is applicable to only certain services and that even the oxyacetylene torch process is still desirable in some instances, it is also true, [redacted] that the older manual operations are especially handicapped in use for overhead

50X1

50X1

[redacted] 50X1

\*\* Mechanized column.

\*\*\* Contact or resistance welding with ring transformer.

S-E-C-R-E-T

S-E-C-R-E-T

welding. [redacted] state that magnetographic methods for testing welds have come into use.\*

50X1

50X1  
50X1

50X1

50X1

[redacted] in the efficient use of mechanization there is need for improvement, and Soviet officials set up as a goal a world record achieved in the West, wherein 1,000 km of pipeline were installed in 2 months over a previously prepared right-of-way. [redacted] urge the use of longer pipe sections to increase the speed of installation and to reduce the time and cost in welding. Six-meter pipe lengths appear to have been standard in the USSR, and 12-meter and even up to 36-meter lengths are reportedly now coming into use. Pleas for reduced cost of construction without loss in utility are generally present in the Soviet sources which are critical of the progress made. [redacted] propose the use of modern radio communication to replace the more expensive telegraph and telephone lines at present required along the routes of the Soviet pipelines.

50X1

50X1

The USSR does not appear to have attained a very high level of efficiency in the utilization of the installed oil and gas pipelines. Soviet sources note that more efficient design is required for equipment and housing at pumping and compressor stations and that closer spacing of the stations within optimum limits would serve to increase the capacity of the lines.\*\* [redacted] propose more use of automatic control devices for more efficient operation of the pipelines. Available evidence shows that Soviet pipelines are at present deficient in modern devices for automatic control of the flows.

50X1

\* Techniques using radioactive cobalt isotopes are also mentioned.  
\*\* In December 1955 an official Soviet source mentioned 50-atmosphere gauge for design pressure in gas pipelines.

S-E-C-R-E-T

[redacted] because of the absence of automatic controls on the Saratov-Moscow gas pipeline, the first long transmission gas pipeline to be installed in the USSR, 100 employees are required at each of the 6 compressor stations and a total of 1,000 employees is required for operation of the transmission pipeline, which is 12 inches in diameter and 843 km long. [redacted]

50X1

[redacted] urge that the automatic controls be applied not only to increase efficiency of the pipelines but also to reduce maintenance and other operation costs of the oil and gas pipelines.

50X1  
50X1

In discussing progress to be made during the original Sixth Five Year Plan, [redacted] the future use of automatic controls on oil pipelines to the extent that a dispatcher could sit at a control panel in Ufa and from there control the flow of oil in the pipelines (presumably several oil pipelines with an aggregate length of several thousand kilometers). The goals of the original Sixth Five Year Plan for construction of oil and gas pipelines appear to be within Soviet capabilities, although these goals probably will require maximum use of the capabilities.

50X1

Referring to what is shown by comparison with corresponding facilities and installations in the US, the relatively greater length of the Soviet trunk oil pipelines is made necessary by the greater distance of major crude oilfields from major areas of processing and of major areas of processing from major areas of consumption of the oil products. The relatively greater average diameter is explained by the fact that the economic advantage of petroleum pipeline service, especially in a long pipeline, generally increases with an increase in line pipe diameter up to an optimum diameter established by physical limitations and by the quantity of petroleum stock to be transported. [redacted]

50X1  
50X1

[redacted] the economy resulting from use of pipe of large diameter when pipelines are long. As direct results of Soviet plans and current practices in the location of new oil-processing facilities -- the selection of major areas of consumption of the oil products rather than areas centralized relative to the crude oilfields -- future product oil pipelines in the USSR probably will be decreased in average length and line pipe diameter. The future trunk lines for crude oil, however, probably will be longer than the present lines.

B. Vulnerabilities.

The USSR may be especially vulnerable in dependence on services of 30 or more major trunk oil pipelines of large diameter. Permanent

- 37 -

S-E-C-R-E-T

S-E-C-R-E-T

loss of the service of a particular trunk oil pipeline might cause serious difficulty in the Soviet petroleum industry, especially because of the heavy freight traffic in petroleum already imposed on Soviet railroads. [redacted] an average trunk oil pipeline 200 km long could transport in 24 hours the same amount of oil as could be moved by 1,400 railroad tank cars. [redacted] in 1954 the average daily load of the Soviet oil pipelines was the equivalent loading of 6,600 railroad tank cars and that 33,000 railroad tank cars would be required in continuous service to replace the oil pipelines.

50X1

50X1  
50X1

Mass utilization of fuel gas is in the early stage of development in the USSR. Twelve large-size transmission gas pipelines, each at least 100 km long, existed in the USSR by the close of 1956, and construction was in progress on one or more other lines of equal or greater length and diameter. There is an apparent vulnerability in these long and large-size transmission gas pipelines to the extent that the Soviet economy is dependent on the use of gas for fuel or other purposes, a dependence which will increase.

C. Intentions.

The present analysis of pipelines in the USSR reveals no reliable indications of the military intentions of the government. It is apparent that the USSR intends to correct as rapidly as possible the present acute deficiency in the extent of existing oil pipelines and the present low level of efficiency in the utilization of such lines. Although the original Sixth Five Year Plan appeared to involve a two-fold increase both in the production of crude oil and in the total installed length of trunk oil pipelines, the plan still proposed to increase sixfold the annual traffic in oil pipelines, so that the share of the oil pipelines in total petroleum transport would increase 2.5 times.

It is also apparent that the USSR intends to expand on a large scale the exploitation and utilization of extensive resources of natural gas formerly undeveloped and to build the necessary transmission gas pipelines. This planned expansion appears to be consistent with Soviet capabilities.

- 38 -

S-E-C-R-E-T

S-E-C-R-E-T

APPENDIX A

STATISTICAL DATA

This appendix contains the tables referred to in the text and also the charts which illustrate some of the data on which the tables and the text are based.

The total length of operating trunk oil and gas pipelines in the USSR and the US in 1945-56 and those scheduled to be built under the original Sixth Five Year Plan of the USSR is shown in Figure 2.\* The data used in Figure 2 were extracted from Tables 1, 2, 3, 5, 13, 14, 15, and 16.

The transport of nongas petroleum, by type of carrier, in the USSR in 1940-55 and as originally planned for 1960 is shown in Figure 3,\*\* and the percentage of the transport of nongas petroleum attributed to each type of carrier in the USSR in 1940-55 and as originally planned for 1960 is shown in Figure 4.\*\* The data for both Figure 3 and Figure 4 were drawn from Table 6. To facilitate the comparison of the transport of petroleum in the USSR with that of the US, the transport of nongas petroleum, by type of carrier, in the US in 1940-55 is shown in Figure 5.\*\*\* Figure 5, which may be compared with Figure 3, is based primarily upon the data in Table 8.

---

\* Following p. 48.

\*\* Following p. 54.

\*\*\* Following p. 58.

S-E-C-R-E-T

S-E-C-R-E-T

Table 1 TRUNK OIL PIPELINES IN THE USSR OPERATING OR UNDER CONSTRUCTION 1 JANUARY 1957

Table with columns: Origin, Intermediate Points and Terminals, Length (Kilometers) - Confirmed, Not Confirmed/Possible but Doubtful, Total, Probable Date of Installation, Probable Type of Service. Includes a summary table at the bottom with rows for Major length, construction; Total, all completed; and Minor length, construction.

1. Unless otherwise specified, the data in this table are derived from tables in the unclassified appendices which give details and complete documentation. 2. Double numerals identify separate pipelines shown on the map, Figure 1 (inside back cover). 3. Fifty kilometers (50) or more. 4. Less than 50 km. 5. Some of the installation dates given are those for the years of probable completion of construction, which indicate the probable periods of construction, and some indicate the period sometime within which construction probably was completed.

6. There is other Soviet evidence that a similar line may have been completed much earlier, specifically in 1951 as the first underwater petroleum pipeline constructed by the USSR in its power line. 7. Identified in Soviet sources as Tyumen'-Omsk. 8. Repeatedly completed in 1956 for service from Omsk to Tyumen', completed length of about 180 km. 9. Soviet sources stated that only 200 km of the line from Omsk was scheduled for completion in the fourth quarter of 1957. However, 500 km of the line from Omsk reportedly was welded in 1956, and construction work reportedly had reached Barabulsk in September 1956.

10. Identified in the USSR. 11. Repeatedly completed for service prior to 1956 from Ufa to Chelyabinsk, estimated completed length of 890 km-Ufa-Belovoisk, 718 km, completed in 1951, and Belovoisk-Chelyabinsk, 168 km, completed in 1955. Repeatedly completed in 1956 for service from Chelyabinsk to Chuvpisk, completed length of 39 km, the 161 km of line for the next winter, Chuvpisk-Kurgan, was also reportedly completed in 1956. A Soviet source stated that the portion from Chuvpisk to Pelypovsk, 252 km long, was scheduled for completion in the fourth quarter of 1957. See Table 5, footnote 8, p. 41, below.

50X1 50X1

50X1 50X1

50X1 50X1 50X1

S-E-C-R-E-T

Table 2  
Chronology for Construction of Trunk Oil Pipelines in the USSR  
Before 1957

Date of Installation of Pipeline in Place and Completed for Initial Operation											Extensions Continued in 1957		Lengths by Inches of Diameter (Kilometers)							
Before 1946		1946-50		1951-55		Before 1956		1956		Before 1957		Extension (Kilo-meters)	Total (Kilo-meters)	4 or Less	6	8	10	12	More Than 12	
Length (Kilo-meters)	Units	Length (Kilo-meters)	Units	Length (Kilo-meters)	Units	Length (Kilo-meters)	Units	Length (Kilo-meters)	Units	Length (Kilo-meters)	Units									
883	1					883	1			883	1									
64	1					64	1			64	1									
162	1					162	1			162	1									
155	1					155	1			155	1									
89	1					89	1			89	1									
644	1					644	1			644	1									
108	1					108	1			108	1									
709	1			200	1	200	1			200	1									200
211	1					211	1			211	1									211
61	1					61	1			61	1			61						
118	1					118	1			118	1									118
		167	1			167	1			167	1									167
		100	1			100	1			100	1									
		80	1			80	1			80	1									
73	1					73	1			73	1									73
166	1					166	1	125	1	125	1	452	577							125
166	1					166	1			166	1									166
		227	1			227	1			227	1									227
				227	1	227	1			227	1									227
63	1			1,332	1	1,332	1			1,332	1									1,332
60	1					60	1			60	1									
160	1					160	1			160	1			60		63				
				600	1	600	1			600	1									600
								94	1	94	1									94
								110	1	110	1									110
								110	1	110	1									110
				200	1	200	1			200	1									
								100	1	100	1									100
								74	1	74	1									74
				140	1	140	1			140	1									140
				260	1	260	1			260	1									260
				359	1	359	1			359	1									359
<b>1,592</b>	<b>17</b>	<b>574</b>	<b>4</b>	<b>3,318</b>	<b>8</b>	<b>7,784</b>	<b>22</b>	<b>613</b>	<b>6</b>	<b>8,397</b>	<b>38</b>	<b>452</b>	<b>577</b>	<b>0</b>	<b>121</b>	<b>1,326</b>	<b>213</b>	<b>1,212</b>	<b>2,046</b>	
455	1					455	1			455	1									455
665	1					665	1			665	1									665
		120	1			120	1	180	1	180	1	620	800							120
		88	1	1,130	1	1,130	1			1,130	1	1,070	1,200							88
				380	1	380	1	95	1	95	1	655	1,130			88				380

50X1

S-E-C-R-E-T

S-E-C-R-E-T

Table 2

Chronology for Construction of Trunk Oil Pipelines in the USSR  
Before 1957  
(Continued)

Date of Installation of Pipeline in Place and Completed for Initial Operation										Extensions Continued in 1957		Lengths by Inches of Diameter (Kilometers)								
Before 1946		1946-50		1951-55		Before 1956		1956		Before 1957		4 or Less	6	8	10	12	More Than 12			
Length (Kilo-meters)	Units	Length (Kilo-meters)	Units	Length (Kilo-meters)	Units	Length (Kilo-meters)	Units	Length (Kilo-meters)	Units	Extension (Kilo-meters)	Total (Kilo-meters)									
1,120	2	208	2	1,510	2	2,838	6	405	1	3,243	8	2,345	3,130	0	0	88	555	455	2,035	
<u>5,012</u>	<u>19</u>	<u>782</u>	<u>6</u>	<u>4,828</u>	<u>10</u>	<u>10,622</u>	<u>35</u>	<u>1,018</u>	<u>2</u>	<u>11,640</u>	<u>42</u>	<u>2,797</u>	<u>3,707</u>	<u>0</u>	<u>0</u>	<u>124</u>	<u>1,404</u>	<u>1,580</u>	<u>4,374</u>	<u>4,061</u>
4,602	13	614	4	4,828	10	10,044	27	850	7	10,894	32	2,797	3,707	0	0	1,253	1,427	4,227	3,987	
13	1					13	1			13	1			13						
42	1					42	1			42	1								42	
25	1					25	1			25	1							25	6	
6	1					6	1			6	1									
24	1					24	1			24	1									
8	1					8	1			8	1									
6	1					6	1			6	1		8							
16	1					16	1			16	1		6							
23	1					23	1			23	1								16	
19	1					19	1			19	1									
40	1					40	1			40	1								40	
18	1	15	1			15	1			15	1									
7	1					7	1			7	1									
20	1					20	1			20	1									
				46	1	46	1			46	1									
		14	1			14	1			14	1									
35	1					35	1			35	1									
10	1					10	1			10	1								14	
		14	1			14	1			14	1									
		11	1			11	1			11	1		14							
26	1					26	1			26	1									
4	1					4	1			4	1		26							
28	1					28	1			28	1									
		35	1			35	1			35	1									
		35	1			35	1			35	1								35	
25	1					25	1			25	1								35	
				24	1	24	1			24	1									
				7	1	7	1			7	1								7	
35	1					35	1			35	1									
				31	1	31	1			31	1									
				22	1	22	1			22	1								22	
				15	1	15	1			15	1								16	
								6	1	6	1								6	
								35	1	35	1								35	
								16	1	16	1								16	
<u>130</u>	<u>21</u>	<u>124</u>	<u>6</u>	<u>145</u>	<u>6</u>	<u>629</u>	<u>33</u>	<u>27</u>	<u>1</u>	<u>756</u>	<u>26</u>	<u>24</u>	<u>72</u>	<u>309</u>	<u>76</u>	<u>126</u>	<u>112</u>			

S-E-C-R-E-T



S-E-C-R-E-T

Table 2  
Chronology for Construction of Trunk Oil Pipelines in the USSR  
Before 1957  
(Continued)

	Date of Installation of Pipeline in Place and Completed for Initial Operation										Extensions Continued in 1957		Lengths by Inches of Diameter (Kilometers)							
	Before 1946		1946-50		1951-55		Before 1956		1956		Before 1957		Extension (Kilo-meters)	Total (Kilo-meters)	4 or Less	6	8	10	12	More Than 12
	Length (Kilo-meters)	Units	Length (Kilo-meters)	Units	Length (Kilo-meters)	Units	Length (Kilo-meters)	Units	Length (Kilo-meters)	Units	Length (Kilo-meters)	Units								
	32	1					32	1			32	1								
	18	1					18	1			18	1	18							
	18	1					18	1			18	1		18						
	18	1					18	1			18	1					18			
Total product oil	86	4					86	4			86	4	18	18	32	18		0	0	
Total oil	516	25	124	6	145	6	785	37	57	3	842	40	42	97	341	94	156	112		
Total pipelines																				
Crude oil	4,322	38	698	10	3,463	14	8,483	62	670	9	9,153	70	24	200	1,705	991	4,075	2,158		
Product oil	1,206	6	208	2	1,510	2	2,924	10	405	2	3,329	12	18	18	120	683	455	2,035		
Total oil	5,528	44	906	12	4,973	16	11,407	72	1,075	12	12,482	82	42	218	1,825	1,674	4,530	4,193		
Extensions to 1956 completions, construction continued in 1957 a/											2,797	4								
Others under construction in 1956, construction continued in 1957 b/											5,123	6								
Total confirmed c/											20,402	88								
Doubtful d/											5,112	11								
Total listed											25,514	99								

c. See Table 1, p. 41, above.

S-E-C-R-E-T

S-E-C-R-E-T

Table 3

Comparison of Total Lengths of Oil Pipelines  
in the USSR, 1 January 1957,  
and in the US, 1 January 1956

	Kilometers	
<u>Oil Pipelines</u>	<u>USSR a/ 1 January 1957</u>	<u>US b/ 1 January 1956 c/</u>
Trunk lines for crude oil	9,153	126,485
Gathering lines for crude oil	N.A.	118,329
Total lines for crude oil	<u>N.A.</u>	<u>244,814</u>
Trunk lines for oil products	3,329	58,613
Total trunk lines	<u>12,482</u>	<u>185,098</u>
Total oil lines	<u>N.A.</u>	<u>303,427</u>

a. Estimates developed in this report.

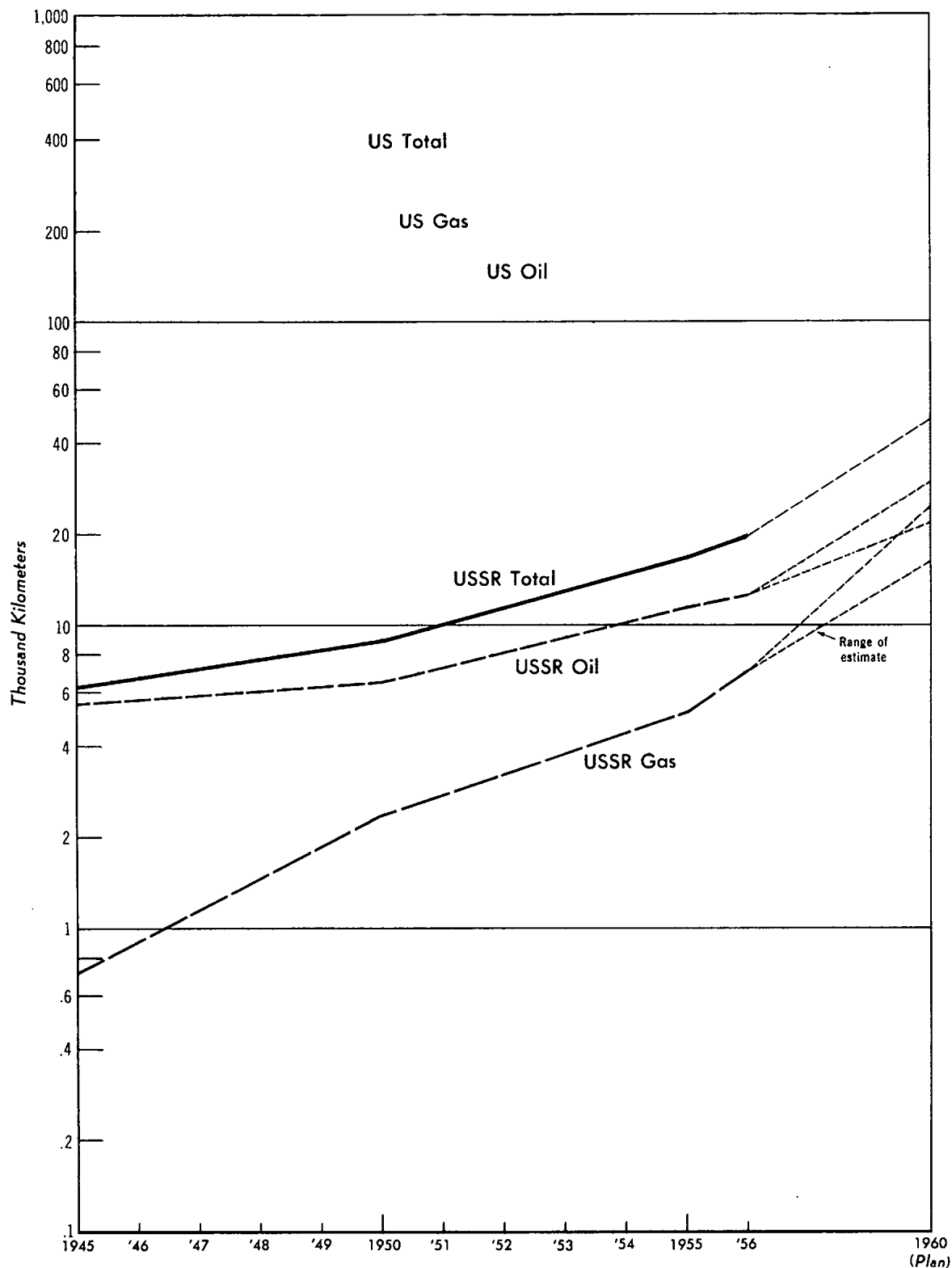
b. Reported statistics.

c. Later similar statistics collated on a national basis are not yet available.

Figure 2

50X1

### TOTAL LENGTH OF OPERATING TRUNK OIL AND GAS PIPELINES\* IN THE USSR AND THE US 1945-56 and 1960 Plan in the USSR



25741 12-57

\*Trunk pipelines for petroleum oils;  
transmission pipelines for fuel gases.

50X1

S-E-C-R-E-T

Table 4

Comparison of Diameter Distribution of Trunk Oil Pipelines  
in the USSR, 1 January 1957, and in the US, 1 January 1956

Type of Pipeline and Diameter  (Inches)	USSR a/ 1 January 1957		US b/ 1 January 1956	
	Length (Kilometers)	Percent of Total	Length (Kilometers)	Percent of Total
Pipelines for crude oil				
4 or less	24	0.3	7,255	5.7
6	200	2.2	15,687	14.8
8	1,705	18.6	41,236	32.6
10	991	10.8	21,651	17.1
12	4,075	44.5	14,886	11.8
More than 12	2,158	23.6	22,770	18.0
Total	<u>2,153</u>	<u>100.0</u>	<u>126,485</u>	<u>100.0</u>
Pipelines for oil products				
4 or less	18	0.5	3,219	5.5
6	18	0.5	14,230	24.3
8	120	3.6	22,840	39.0
10	683	20.5	7,028	12.0
12	455	13.7	7,920	13.2
More than 12	2,035	61.2	3,376	5.7
Total	<u>3,329</u>	<u>100.0</u>	<u>58,613</u>	<u>100.0</u>
Total trunk oil pipelines				
4 or less	42	0.3	10,474	5.7
6	218	1.8	32,917	17.8
8	1,825	14.6	64,076	34.6
10	1,674	13.4	28,679	15.5
12	4,530	36.3	22,806	12.3
More than 12	4,193	33.6	26,146	14.1
Total all diameters	<u>12,482</u>	<u>100.0</u>	<u>185,098</u>	<u>100.0</u>

a. The data are derived from Table 1 (p. 41, above). If the diameter of a pipeline is shown as an odd number in Table 1, the line is grouped in this table with lines having the next higher even number for a diameter. If Table 1 shows two values for the diameter of a line, the line is grouped in this table with lines having the larger value for a diameter.

b. Later statistics for the US, collated on a national basis, are not yet available.

S-E-C-R-E-T

S-E-C-R-E-T

Table 5

Planned Trunk Oil Pipelines in the USSR a/ 1956-60 and 1961-65

Origin	Intermediate Points and Terminals	Length by (Kilometers)			Total of the Original Sixth Five Year Plan (1956-60)	Total of the Original Seventh Five Year Plan (1961-65)	Probable Diameter d/ (Inches)	Probable Type of Service
		Completed in 1956	Under Construction in 1956	Still in Planning Stage as of Early 1957				
Specified in Directives as Projects of the Original Sixth Five Year Plan								
Al'met'yevsk	Chistopol', Kasan', Gor'kiy		577		577	12	Crude oil g/	
Omak	Bataisk', Novosibirsk		800		800	20	Oil products g/	
Kuybyshev	Syrnan', Penza, Kuybysk		1,200		1,200	20	Oil products g/	
Ufa	Chelyabinsk, Chumlyak, Kurgan, Omak		1,130		1,130	14 to 20	Crude oil g/	
Al'met'yevsk	Molotov		446		446	14 to 20	Crude oil g/	
Omak	Bataisk', Novosibirsk, Irkutsk		2,450		2,450	12	Crude oil g/	
Novosibirsk	Irkutsk		1,650		1,650	20	Oil products	
Tupayev	Ufa, Chelyabinsk, Omak		1,450		1,450	28	Crude oil g/	
Gor'kiy	Yaroslavl'		350	1,350	1,700	20	Oil products	
Gor'kiy	Ryazan'		350	350	700	20	Crude oil g/	
Ryazan'	Moscow		250	250	500	20	Crude oil	
Ishimbay	Omak		310	310	620	20	Oil products g/	
Identified in Later Soviet Sources as Projects of the Original Sixth Five Year Plan								
Subkhakulovo (Nymazy-Bavly area)	Shakapovo		94		94	15 to 20	Crude oil	
Al'met'yevsk	Azadkovo, Subkhakulovo (Nymazy-Bavly area)		110		110	15 to 20	Crude oil	
Krotovka	Novolubyshevsk (Kuybyshev area)		110		110	20	Crude oil	
Zaitmoge	Stalingrad		300		300	12	Crude oil g/	
Ostrov Artina	Moskovskiy Polostrov (Apscheron Peninsula)		6		6	12	Crude oil g/	
Karakoye	Moskovskiy		74		74	12	Crude oil g/	
Saratov (Stepovoy) Oilfields	Trofimovskiy (Baltovaya)		35		35	15	Crude oil	
Suleyero	Al'met'yevsk		16		16	12	Crude oil g/	
Kaltayev	Trofimovskiy-Ufa		30		30	12	Crude oil g/	
Seryyev Yody	Krotovka		87		87	12	Crude oil g/	
Omak	Pavlodar		400		400	12 to 16	Crude oil g/	
Bryansk	Polotsk		500		500	20	Oil products	
Bryansk	Kremenchug		530		530	20	Oil products	
Kremenchug	Moscow		409		409	20	Oil products	
Saratov	Voroshilov		530		530	20	Oil products	
Tikhovetsk	Shagun		230		230	20	Crude oil	
Mftyanyevskiy Kanti	Ostrov Zhilov, Apscheron Peninsula		80		80	16	Crude oil g/ m/	
Mukhamovoy (Krotovka area)	Kuybyshev area		90		90	20	Crude oil	
Al'met'yevsk area	Kuybyshev area		260		260	20	Crude oil g/	
Dolina	Drogobych		76		76	20	Crude oil g/	
Identified in Soviet Sources as Projects of the Original Seventh Five Year Plan								
Irkutsk	Auzskaya Oblast' g/				2,500		Crude oil	
Amurskaya Oblast'	Khabarovskiy Krai g/				700		Crude oil	
Total		745	4,330	4,500	2,272	14,850	1,200	

c. The sequence of Oil Pipeline numbers is applied in Table 1 (p. 41, above) and on the map, Figure 1 (inside back cover), and has been developed for geographical grouping. The sequence of Planned Oil Pipelines is here applied for coordination in Table 5. Table 1 has been developed for trunk oil pipelines completed or under construction as of 1 January 1957 and includes the 18 lines in Table 3 that are designated by Table 5 lists 38 Oil Pipelines as projects of the original Sixth Five Year Plan, none of these.

d. In accordance with the text of this report (p. 17, above), 16 inches is considered to be the probable minimum diameter in the Soviet trunk oil pipelines that comprise projects planned or actually constructed since 1955. In the longer lines in this category the diameters are probably 20 inches or more. The diameters of such lines, however, are not generally specified in the available Soviet sources, and the individual diameters have not been estimated except for the 18 lines that were completed or under construction in 1956 and for Planned Oil Pipelines Nos. 8 and 29, both of which have diameters specified in Soviet sources. As shown in Table 1 (p. 41, above), with completion dates prior to 1956, Oil Pipelines (Nymazy-Omak) (Nymazy-Omak) were completed directly with the planned lines, and there is Soviet source specification of 20 inches as the diameter of Oil Pipeline in the USSR.

e. This pipeline apparently was completed in 1956 for service from Al'met'yevsk to Chistopol', and its completed length is estimated to be 125 km. The total length installed in place in 1956 is reported to be 200 km.

f. This pipeline reportedly was completed in 1956 for service from Omak to Bataisk' and its completed length is reported to be about 130 km.

g. This pipeline reportedly was completed in 1956 for service from Omak to Bataisk' and its completed length is reported to be about 130 km.

h. This pipeline (Ufa-Omak) reportedly was completed for service before 1956 from Ufa to Chelyabinsk, and its completed length is estimated to be 300 km divided as follows: Ufa-Berdyuzhsk, 218 km, completed in 1956, and Berdyuzhsk-Chelyabinsk, 182 km, completed in 1955. It was also reported that 95 km were completed in 1956 for service from Chelyabinsk to Chumlyak, and the 184 km of trench for the next portion, Chumlyak-Kurgan, also reportedly were completed in 1956. A Soviet source states that the portion from Chelyabinsk to Petropavlovsk, 293 km, was scheduled for completion in the fourth quarter of 1957. See Table 1, footnote o, p. 41, above.

i. The reported length of the section of this pipeline installed in 1956 is 290 km. Construction advanced 230 km northward from Al'met'yevsk to tie in with construction advancing 60 km southward from Molotov. The entire pipeline reportedly was scheduled for completion in 1957.

j. This trunk line will transport crude oil for charge to two new refineries to be constructed during the original Sixth Five Year Plan, at Bogotol in Krasnozarskiy Krai and at Angarsk near Irkutsk.

k. Soviet sources state that construction is scheduled to start in 1957 on Planned Oil Pipelines Nos. 8, 29, and 38 and in 1958 on Planned Oil Pipeline . They also state that Planned Oil Pipeline and presumably Planned Oil Pipeline will be completed in 1958. Planned Oil Pipeline is designated as Nymazy-Omak.

l. The delivery of crude oil to Stalingrad may be for transshipment via river barges on the Volga. It is possible, however, that the crude oil may be for refining in Stalingrad. The status of possible refining facilities in Stalingrad is still uncertain. Reportedly as of early 1957, a crude oil refinery was under construction in Stalingrad and was to be operating in part in the third quarter of 1957. Refinery construction in that city has been indicated in the past, and unconfirmed secondary reports have identified existing refineries in the city.

m. These pipelines are underwater pipelines connecting with off-shore crude oil production in the Caspian Sea.

n. Thirty-five km of this pipeline reportedly were completed in 1956.

o. The line was scheduled for completion in the second quarter of 1957.

p. On the basis of Soviet reports it appears that this oil pipeline is projected as a branch from Oil Pipeline (Omak-Irkutsk) from a point between Omak and Bataisk'.

q. Second trunk crude oil pipeline to connect the two areas, the first such line being Oil Pipeline.

r. On the basis of Soviet reports this terminal probably will be at a new natural crude oil refinery to be constructed in the Blagoveshchensk-Berzhitskiy area of Amurskaya Oblast'.

s. This terminal probably will be at the existing natural crude oil refinery in Khabarovsk.

S-E-C-R-E-T

S-E-C-R-E-T

Table 6

Estimated Annual Traffic in Nongas Petroleum Stock in the USSR  
1940-55 and 1960 Plan

Year	Oil Pipelines		Internal Waterway		Maritime		Railroad		Total	
	Amount (Billion Ton-Kilometers)	Percent	Amount (Billion Ton-Kilometers)	Percent	Amount (Billion Ton-Kilometers)	Percent	Amount (Billion Ton-Kilometers)	Percent	Amount (Billion Ton-Kilometers)	Percent
1940	3.8	5.7	12.1	18.3	13.7	20.8	36.4	55.2	66.0	100.0
1941	3.9	5.8	12.0	17.7	14.0	20.7	37.8	55.8	67.7	100.0
1942	2.7	5.8	8.0	17.1	9.4	20.2	26.5	56.9	46.6	100.0
1943	2.1	6.0	5.9	16.7	7.0	19.9	20.2	57.4	35.2	100.0
1944	2.2	5.9	6.0	16.1	7.4	19.8	21.7	58.2	37.3	100.0
1945	2.4	5.9	6.3	15.6	7.9	19.5	23.9	59.0	40.5	100.0
1946	2.7	6.0	6.8	15.1	10.5	23.3	25.1	55.6	45.1	100.0
1947	3.3	6.1	7.9	14.6	14.7	27.1	28.3	52.2	54.2	100.0
1948	3.7	6.1	8.6	14.2	13.7	22.5	34.7	57.2	60.7	100.0
1949	4.3	6.2	9.5	13.7	12.3	17.8	43.2	62.3	69.3	100.0
1950	4.9	6.2	10.4	13.2	11.4	14.5	52.0	66.1	78.7	100.0
1951	5.5	6.4	11.2	13.0	17.3	20.0	52.4	60.6	86.4	100.0
1952	6.3	6.6	12.0	12.6	15.2	16.0	61.6	64.8	95.1	100.0
1953	7.1	6.8	12.8	12.3	12.3	11.8	71.9	69.1	104.1	100.0
1954	10.1	8.0	15.8	12.6	15.2	12.1	84.5	67.3	125.6	100.0
1955	13.7 <sup>a/</sup>	9.7	13.2	9.3	12.7	9.0	101.6	72.0	141.2	100.0
1960	83.0	25.0	51.3 <sup>b/</sup>	15.5 <sup>b/</sup>	51.3 <sup>b/</sup>	15.5 <sup>b/</sup>	146.4	44.1	332.0	100.0

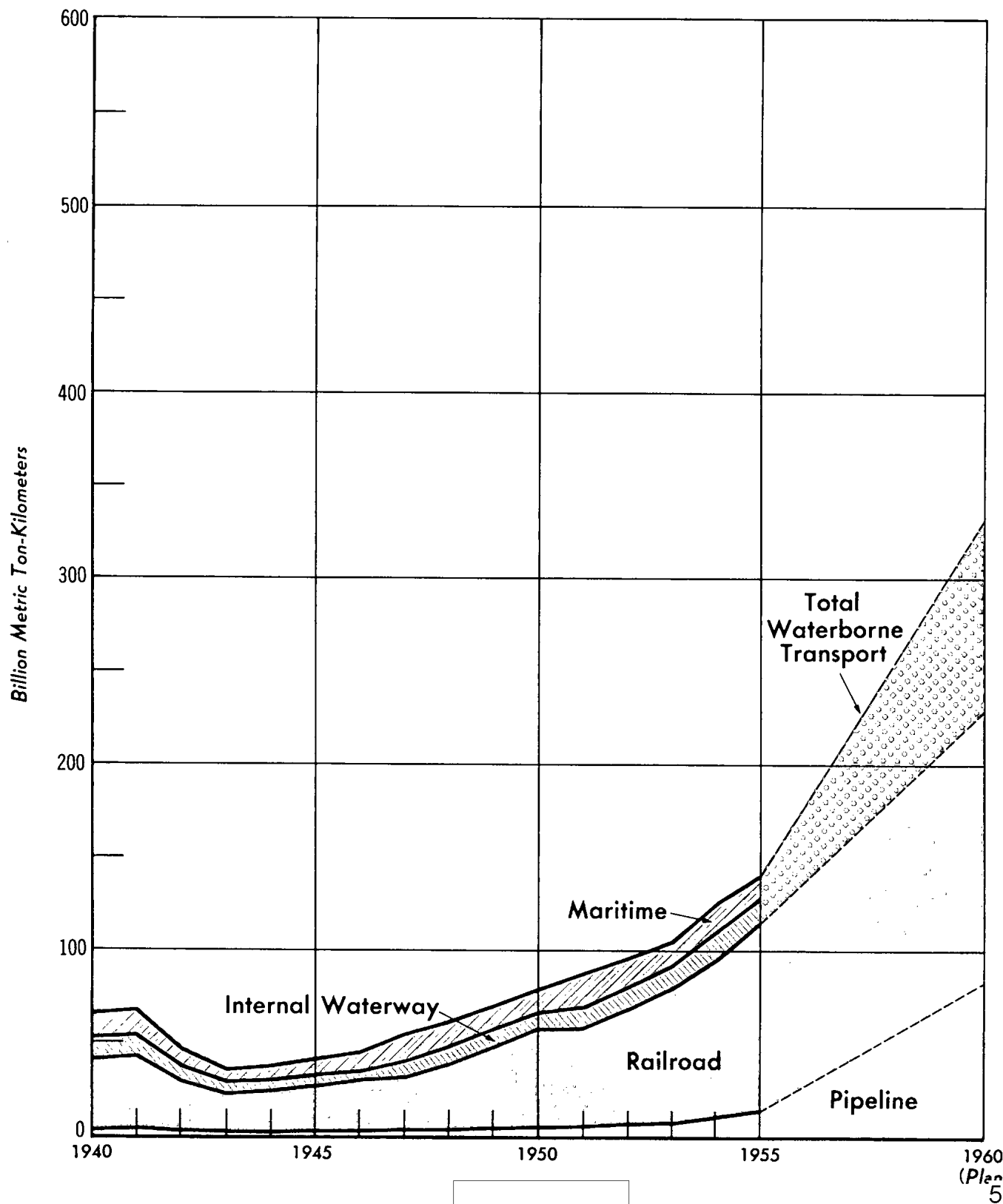
a. [redacted] the volume figure for oil pipeline traffic in 1955 as 14.7 billion ton-kilometers, but the figure of 13.7 billion ton-kilometers, [redacted] is considered to be more realistic, since it correlates with other [redacted] evidence. [redacted] the volume figure for oil pipeline traffic in 1956 was 20.5 billion ton-kilometers, and the planned volume figure for 1957 was 27.8 billion ton-kilometers.

b. The traffic planned for internal waterway and maritime carriers combined is known to be 102.6 billion ton-kilometers. The amounts shown here are simple averages and do not imply that the traffic necessarily will be shared equally by the two types of carriers.

50X1  
50X1

S-E-C-R-E-T

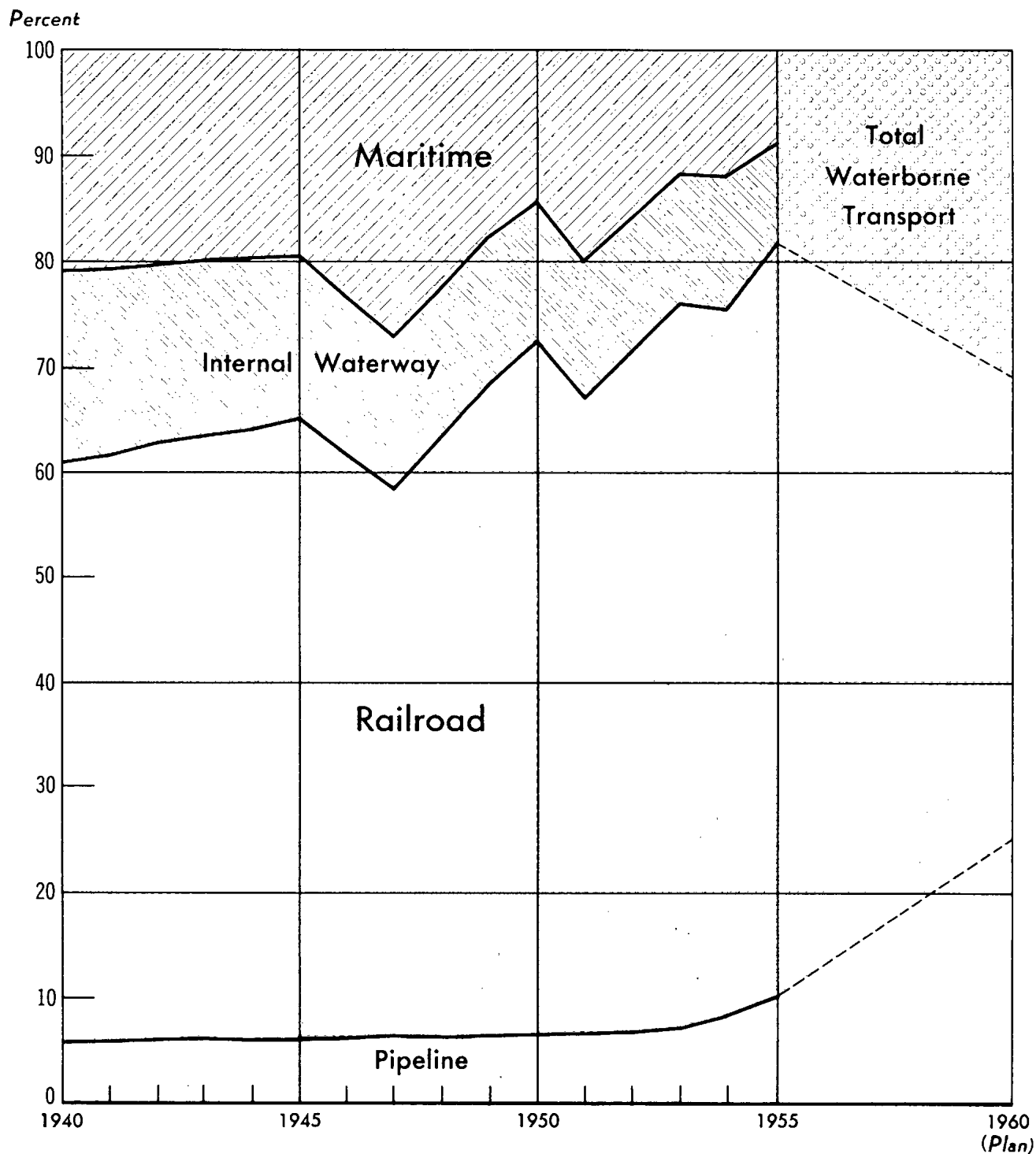
# TRANSPORT OF NONGAS PETROLEUM, BY TYPE OF CARRIER, IN THE USSR 1940-55 and 1960 Plan



25740 12-57

1960 (Plan) 50X1

# PERCENTAGE OF TRANSPORT OF NONGAS PETROLEUM, BY TYPE OF CARRIER, IN THE USSR 1940-55 and 1960 Plan





## S-E-C-R-E-T

Table 7

Total Freight Traffic in the USSR, by Type of Carrier a/  
Selected Years, 1913-56, and 1960 Plan

Year	Type of Carrier													
	Internal Waterway		Maritime		Total Waterway		Railroad		Highway		Oil Pipeline		Total	
	Amount (Billion Ton- Kilometers)	Percent of Total	Amount (Billion Ton- Kilometers)	Percent of Total	Amount (Billion Ton- Kilometers)	Percent of Total	Amount (Billion Ton- Kilometers)	Percent of Total	Amount (Billion Ton- Kilometers)	Percent of Total	Amount (Billion Ton- Kilometers)	Percent of Total	Amount (Billion Ton- Kilometers)	Percent of Total
1913 b/	28.59	24.9	19.78	17.3	48.37	42.2	65.7	57.4	0.1	0.1	0.31	0.3	114.5	100.0
1928	15.9	13.3	9.3	7.8	25.2	21.1	93.4	78.2	0.2	0.2	0.64	0.5	119.4	100.0
1940	35.89	7.4	23.79	4.9	59.68	12.3	415.0	85.1	8.9	1.8	3.76	0.8	487.4	100.0
1950	45.93	6.4	39.72	5.6	89.65	12.0	602.3	84.5 e/	20.1	2.8 e/	4.85	0.7	713.0	100.0
1954	62.4	6.1	56.6	5.5	119.0	11.6	856.8	83.7	37.52	3.7	10.07	1.0	1,023.4	100.0
1955 d/	67.44	5.8	68.94	5.9	136.38	11.7	970.92	83.4 e/	42.5	3.7 e/	13.7	1.2	1,163.5 e/	100.0
1956	70.2	5.4	82.4	6.3	152.6	11.7	1,079.1	83.0	47.5	3.7	20.5	1.6	1,299.7	100.0
1960 d/	121	6.7	143	7.9	264	14.6	1,375	76.1	85	4.7	83	4.6	1,807	100.0

a. [ ] rounded figures are given for some but not all of the absolute values shown in Table 7. Conforming within limits of conventional rounding to the various absolute values, to the ratios of absolute values, and to the percentages of totals, all as given in [ ] a manner to cause all such values, ratios, and percentages to show minimum discrepancy with respect to one another, certain absolute values are introduced into the table, and certain of the rounded absolute values [ ] are expanded to more significant figures. The totals of ton-kilometers are always rounded as shown in the table. Negligibly different rounded figures are shown for most of the data.

b. Within the borders of the USSR prevailing prior to 17 September 1939. [ ] For these data also gives the following values in billion ton-kilometers for total freight traffic in 1913, reckoned within the borders of the USSR prevailing as of 1956: internal waterway, 28.9; maritime, 20.3; and railroad, 76.4.

c. [ ] slightly different values for these percentages as follows: railroads, 84.6 for 1950 and 83.7 for 1955; highway, 2.7 for 1950 and 3.4 for 1955.

d. [ ] rounded figures as shown below for total freight traffic in the USSR; these figures cover 1955 operations and the planned percentage breakdown for 1960. Some of the figures differ somewhat from those shown in Table 7, and the same series of slightly differing percentages for 1960 are also [ ] mentioned in footnote c, above:

Type of Carrier	Traffic		
	Quantity in 1955 (Billion Ton-Kilometers)	Percent	
		1955	1960
Waterborne transport			
Internal waterway	67.4	5.7	6.7
Maritime	68.9	6.0	7.9
Total waterborne transport	136.3	11.7	14.6
Railroad	970.9	83.4	76.4
Highway	42.5	3.7	4.4
Oil pipeline	13.9	1.2	4.6
Total	1,163.6	100.0	100.0

S-E-C-R-E-T

Table 7

Total Freight Traffic in the USSR, by Type of Carrier  
Selected Years, 1913-56, and 1960 Plan  
(Continued)

the above figures also gives values for each type of carrier, where each such value is the ratio of the volume planned for 1960 to the volume developed in 1955: for internal waterway traffic, 1.8; for maritime traffic, 2.1; for railroad traffic, 1.42; for highway traffic, 2.02; for oil pipeline traffic, 6; and for all traffic, 1.55. Except for highway traffic the same ratios for 1960 over 1955 are given in Table 7 and are correlated in the volume values derived for the 1960 Plan as shown in Table 7. The highway traffic ratio of 2.02 is replaced by a rounded factor of 2 in Table 7; the ratio of 2.02 is numerically incompatible with the percentages and other ratios correlated with the 2.02 in the other Soviet source. Within limits of conventional rounding, the figure given in the 1960 total volume of freight is 1.55 ± 0.0049 times the 1955 total. Using also the upper and lower limits of the figures given for the percent of total freight that is or will be transported by highway carrier in the 2 years (1955 = 3.7 percent and 1960 = 4.4 percent), the ratio of the volume in 1960 to that of the volume in 1955 will have to fall between 1.79 and 1.90. The figure 2.02 does not fall within this range. found to be internally inconsistent, and the 1955 and 1960 data of Table 7 are assumed to be the more nearly realistic.

e. In the European USSR, 706.8 billion ton-kilometers; in the Asiatic USSR, 456.7 billion ton-kilometers.

50X1  
50X1  
50X1  
50X1

S-E-C-R-E-T

S-E-C-R-E-T

Table 8

Transportation Balances in Nongas Petroleum Stock in the USSR and the US  
by Type of Carrier  
1950, 1955, and 1960 Plan in the USSR  
and 1949 and 1955 in the US

Country, Year, and Carrier	Mass of Transfer <sup>a</sup> /*		Average Distance of Transfer (Kilometers)	Traffic	
	Amount (Million Metric Tons)	Percent of Total		Volume (Billion Ton- Kilometers)	Percent of Total
USSR					
1950					
Oil pipeline	15.3	18.3	318	4.9	6.2
Internal waterway	12.3	14.7	846	10.4	13.2
Maritime	12.8	15.3	891	11.4	14.5
Railroad	43.2	51.7	1,205	52.0	66.1
Total or average	<u>83.6</u>	<u>100.0</u>	941	<u>78.7</u>	<u>100.0</u>
1955					
Oil pipeline	50.7	32.0	270	13.7	9.7
Internal waterway	13.9	8.8	950	13.2	9.3
Maritime	16.1	10.2	789	12.7	9.0
Railroad	77.6	49.0	1,309	101.6	72.0
Total or average	<u>158.3</u>	<u>100.0</u>	892	<u>141.2</u>	<u>100.0</u>
1960					
Waterborne transport					
Internal waterway	17.0	5.6	N.A.	N.A.	N.A.
Maritime	24.2	8.0	N.A.	N.A.	N.A.
Total waterborne transport	<u>41.2</u>	<u>13.6</u>	2,490	<u>102.6</u>	<u>30.9</u>
Oil pipeline	127.7	42.0	650	83.0	25.0
Railroad	135.1	44.4	1,084	146.4	44.1
Total or average	<u>304.0</u>	<u>100.0</u>	1,092	<u>332.0</u>	<u>100.0</u>

\* Footnotes for Table 8 follow on p. 58.

S-E-C-R-E-T

Table 8

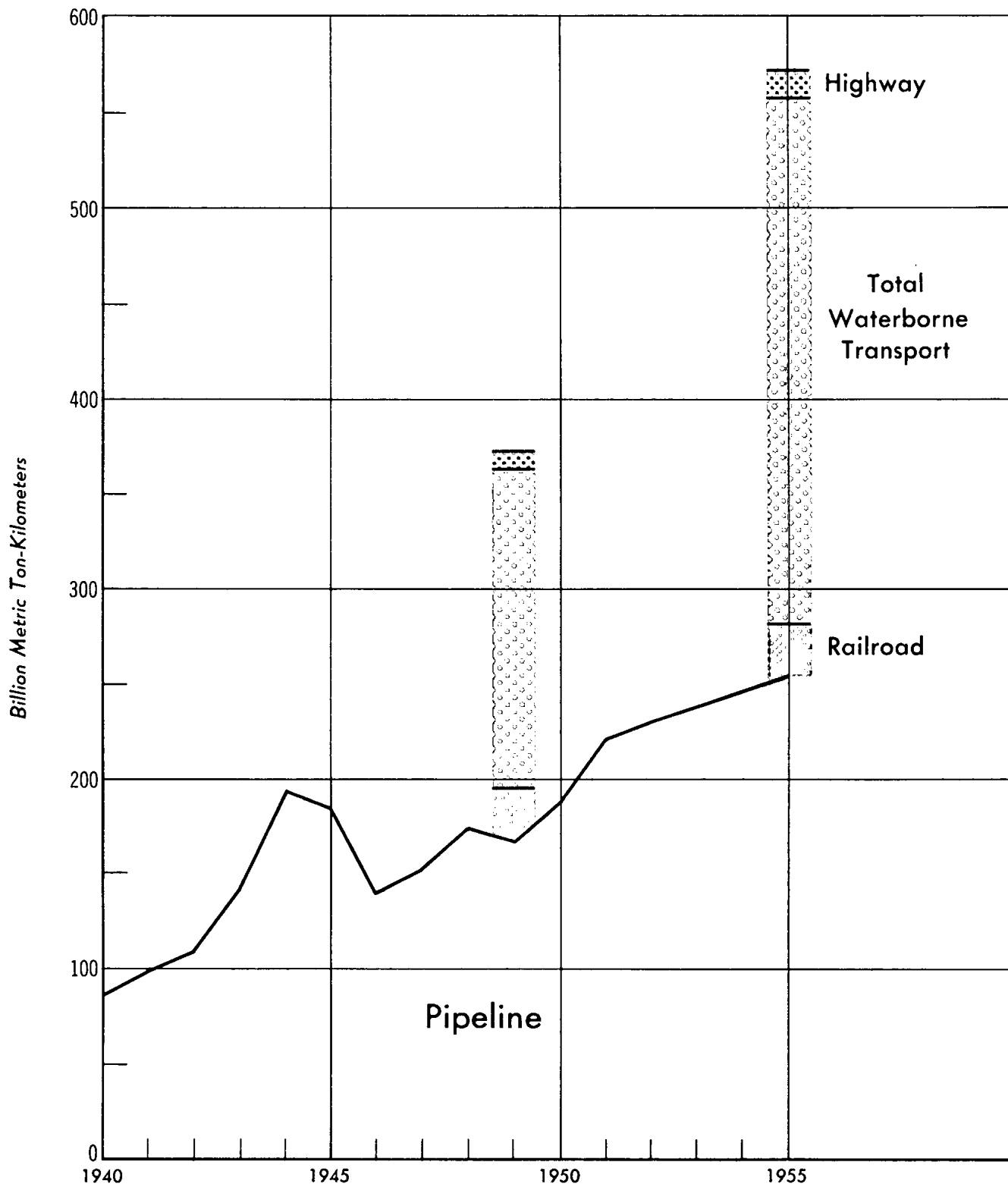
Transportation Balances in Nongas Petroleum Stock in the USSR and the US  
by Type of Carrier  
1950, 1955, and 1960 Plan in the USSR  
and 1949 and 1955 in the US  
(Continued)

Country, Year, and Carrier	Mass of Transfer <sup>a/</sup>		Average Distance of Transfer (Kilometers)	Traffic	
	Amount (Million Metric Tons)	Percent of Total		Volume (Billion Ton- Kilometers)	Percent of Total
US					
1949					
Oil pipeline	236.8	36.4	709	167.8	45.0
Waterway	256.0	39.3	654	167.5	44.9
Railroad	43.7	6.7	651	28.5	7.6
Highway <sup>b/</sup>	114.5	17.6	80	9.2	2.5
Total or average	<u>651.0</u>	<u>100.0</u>	573	<u>373.0</u>	<u>100.0</u>
1955					
Oil pipeline	340.9	37.3	751	256.0	44.6
Waterway	356.0	39.0	776	276.4	48.2
Railroad	38.0	4.2	701	26.7	4.7
Highway	178.1	19.5	80	14.2	2.5
Total or average	<u>913.0</u>	<u>100.0</u>	628	<u>573.3</u>	<u>100.0</u>

a. [ ] represent the total tonnage originated in the USSR (for further explanation of the meaning of the mass of transfer, see Table 9, footnote a, p. 60, below). US figures represent the tonnage of net delivery in the US. The data for the US are developed by analysis of published statistics. Referring to the ton-kilometer values shown for the US traffic, the values for oil pipeline and railroad may be derived more or less directly, whereas the values for waterway and highway require independent estimates of certain statistical details that are not published. The data as shown in Table 8, however, are believed to represent correctly orders of magnitude for the US and the USSR alike.

b. The principal highway carriers are motor tank-trucks. [ ] the highway transportation of nongas petroleum stock in the USSR has been insignificant, at least before the original Sixth Five Year Plan.

# TRANSPORT OF NONGAS PETROLEUM, BY TYPE OF CARRIER, IN THE US 1940-55



S-E-C-R-E-T

Table 9

Transportation Balances in Total Freight in the USSR  
by Type of Carrier  
1940, 1950, 1955-56, and 1960 Plan

Year and Carrier	Mass of Transfer <sup>a/</sup> *		Average Distance of Transfer <sup>a/</sup> (Kilometers)	Traffic	
	Amount (Million Metric Tons)	Percent of Total		Volume (Billion Ton-Kilometers)	Percent of Total
1940					
Waterborne transport					
Internal waterway	72.9	4.7	492	35.89	6.4
Maritime	31.2	2.0	763	23.79	5.6
Total water- borne transport	<u>104.1</u>	<u>6.7</u>	<u>573</u>	<u>59.68</u>	<u>12.0</u>
Oil pipeline	7.9	0.5	476	3.76	0.7
Railroad	892.6	57.9	700	415.0	84.5
Highway	858.6	54.9	10.4	8.9	2.8
Total or average	<u>1,563.2</u>	<u>100.0</u>	<u>312</u>	<u>487.4</u>	<u>100.0</u>
1950					
Waterborne transport					
Internal waterway	86.3	3.0	532	45.93	6.4
Maritime	33.7	1.2	1,178	39.72	5.6
Total water- borne transport	<u>120.0</u>	<u>4.2</u>	<u>714</u>	<u>85.65</u>	<u>12.0</u>
Oil pipeline	15.3	0.5	318	4.85	0.7
Railroad	834.2	29.5	722	602.3	84.5
Highway	1,861.1	65.8	10.8	20.1	2.8
Total or average	<u>2,830.6</u>	<u>100.0</u>	<u>252</u>	<u>712.2</u>	<u>100.0</u>
1955					
Waterborne transport					
Internal waterway	131.0	2.5	515	67.44	5.8
Maritime	53.5	1.0	1,288	68.94	5.9
Total water- borne transport	<u>184.5</u>	<u>3.5</u>	<u>739</u>	<u>136.38</u>	<u>11.7</u>
Oil pipeline	50.7	0.9	270	13.7	1.2
Railroad	1,267.5	23.8	766	970.92	83.4
Highway	3,828.8	71.8	11.1	42.5	3.7
Total or average	<u>5,331.5</u>	<u>100.0</u>	<u>218</u>	<u>1,163.5</u>	<u>100.0</u>

\* Footnote for Table 9 follows on p. 60.

- 59 -

S-E-C-R-E-T

S-E-C-R-E-T

Table 9  
 Transportation Balances in Total Freight in the USSR  
 by Type of Carrier  
 1940, 1950, 1955-56, and 1960 Plan  
 (Continued)

Year and Carrier	Mass of Transfer <sup>a/</sup>		Average Distance of Transfer <sup>a/</sup> (Kilometers)	Traffic	
	Amount (Million Metric Tons)	Percent of Total		Volume (Billion Ton-Kilometers)	Percent of Total
1956					
Waterborne transport					
Internal waterway	146.6	2.5	479	70.2	5.4
Maritime	57.7	1.0	1,428	82.4	6.3
Total water- borne transport	<u>204.3</u>	<u>3.5</u>	747	<u>152.6</u>	<u>11.7</u>
Oil pipeline	65.3	1.1	314	20.5	1.6
Railroad	1,371.0	23.6	787	1,079.1	83.0
Highway	4,166.7	71.8	11.4	47.5	3.7
Total or average	<u>5,807.3</u>	<u>100.0</u>	224	<u>1,809.7</u>	<u>100.0</u>
1960					
Waterborne transport					
Internal waterway	198.7	2.2	609	121	6.7
Maritime	79.4	0.9	1,800	143	7.9
Total water- borne transport	<u>278.1</u>	<u>3.1</u>	949	<u>264</u>	<u>14.6</u>
Oil pipeline	127.7	1.4	650	83	4.6
Railroad	1,833.3	20.7	750	1,375	76.1
Highway	6,640.6	74.8	12.8	85	4.7
Total or average	<u>8,879.7</u>	<u>100.0</u>	203	<u>1,807</u>	<u>100.0</u>

a. The mass of transfer appears to be tons originated. The originated tonnage usually involves duplicate accounting of the actual material carried when there is transshipment by different types of carriers and sometimes by different systems comprising the same type of carrier. The duplicate accounting may be of considerable significance in the national total for different types of carriers and also may develop a significant factor in the total for a given type of carrier, especially for the highway type. The average distance of transfer is then a ratio that is an apparent average only. The originated tonnage is the actual transferred tonnage (total tonnage of net delivery) multiplied by a duplicate accounting factor that is greater than unity. The actual average length of haul of the actual transferred tonnage is the correlated apparent average distance of transfer multiplied by the same factor. The actual average length of haul is the ratio of the total ton-kilometers to the total mass of transfer when the latter is corrected to represent total tonnage of

50X1

S-E-C-R-E-T

S-E-C-R-E-T

Table 9

Transportation Balances in Total Freight in the USSR  
by Type of Carrier  
1940, 1950, 1955-56, and 1960 Plan  
(Continued)

net delivery. In the transportation of nongas petroleum stock, however, the duplicate accounting factors probably have only nominal effect in the Soviet data for a given type of carrier, although the effect may be significant in the national total for different types of carriers.

Negligibly different rounded figures are shown for some of the mass transfer data. Differences of some significance but still very small are present in the following data:

Transport Facility	Mass of Transfer (Million Metric Tons)	
	1950	1955
Waterborne transport		
Internal waterway	91.5	139.1
Maritime	33.7	53.7
Total waterborne transport	<u>125.2</u>	<u>192.8</u>
Oil pipeline	15.3	51.7
Railroad	834.3	1,267.0
Highway	1,859.2	3,730.0
Total	<u>2,834.0</u>	<u>5,241.5</u>

50X1

S-E-C-R-E-T



Table 10

Comparison of Railroad Transport of Nongas Petroleum Stock in the USSR and the US  
1950, 1954-55, and 1960 Plan in the USSR and 1950-53 in the US

Country	Year	Traffic					
		Volume (Billion Ton-Kilometers)			Percent of Total		
		Nongas Petroleum Stock	Other Material	Total	Nongas Petroleum Stock	Other Material	Total
USSR	1950	52.0	550.3	602.3	8.6	91.4	100.0
	1954	84.5	772.3	856.8	9.9	90.1	100.0
	1955	101.6	869.3	970.9	10.5	89.5	100.0
	1960	146.4	1,228.6	1,375.0	10.6	89.4	100.0
US <u>a/</u>	1950	30.0	831.9	861.9	3.5	96.5	100.0
	1951	31.7	921.7	953.4	3.3	96.7	100.0
	1952	30.5	878.0	908.5	3.4	96.6	100.0
	1953	29.5	904.8	934.3	3.2	96.8	100.0

a. For intercity service, thus excluding the relatively small intracity nonpassenger traffic on railroads, the data for railroads in the US, referring to total nonpassenger traffic (freight, express, and mail), are as follows:

Year	Traffic (Billion Ton-Kilometers)
1950	871.51
1951	956.79
1952	910.29

S-E-C-R-E-T

Table 11

Output of Nongas Petroleum Stock and Traffic in Oil Pipelines  
 in the USSR and the US  
 1940, 1950, 1952, 1955, and 1960 Plan in the USSR and  
 1940, 1949-50, 1952, and 1955 in the US

Country and Year	Indigenous Output of Nongas Petroleum Stock (Million Metric Tons)			Traffic	
	Crude Oil	Nongas Products <sup>a/</sup>	Total	Volume (Billion Ton-Kilometers)	Use Index <sup>b/</sup>
USSR					
1940	31.1	26.7	57.8	3.8	66
1950	37.9	33.4	71.3	4.9	69
1952	47.3	41.9	89.2	6.3	71
1955	70.8	62.9	133.7	13.7	102
1960	135.0	119.6	254.6	83.0	326
US					
1940	182.4	162.1	344.5	86.5	251
1949	248.3	247.3	495.6	167.8	339
1950	266.0	266.3	532.3	188.6	354
1952	308.7	330.3	639.0	230.0	360
1955	334.9	370.8	705.7	256.0	363

a. Gross output at processing units, derived from crude oil, from natural gas liquids, and from synthetic oil processing. The crude petroleum charged to this processing is developed into the gross output of the nongas products, plus gas and waste. Of the gross output of nongas products, a portion is consumed in petroleum processing and in other phases of the petroleum industry.  
 b. The index, given in terms of kilometers and representing a theoretical length, is derived by dividing volume of traffic by total output of stock.

Table 12

Comparison of Prewar and Postwar Net Delivery of Crude Oil to Refineries  
 in the USSR, 1939 and 1954, and in the US, 1936 and 1954

Carrier	Percent of Total Tonnage			
	USSR		US	
	1939	1954	1936	1954
Oil pipeline	11.4	75.0	71.3	74.6
Waterway	45.9	25.0	26.6	23.9
Railroad and truck	42.7		2.1	1.5
Total	100.0	100.0	100.0	100.0

S-E-C-R-E-T

Table 13

Principal Transmission Gas Pipelines in the USSR  
Completed for Operation Before 1 January 1957 a/\*

Origin	Intermediate Points and Terminals	Length <sup>a</sup> / (kilometers)				Diameter <sup>b</sup> / (inches)	Date of Installation <sup>c</sup> / 1955	
		Major Pipe- lines	Lesser Pipe- lines	Minor Pipe- lines	Total Pipe- lines			
Dashava	Ternopol', Derichev, Kiev, Bryansk/Bezhitza, Kaluga, Moscow	1,320			1,320	20	1946-51 <u>d</u> / 1955	
	Zhitomir			42	42		1955 <u>e</u> / 1955	
	Vinnitsa			40	40		1955 <u>f</u> / 1955	
	Pereyslav-Khmel'nitskiy		75		75		1955 <u>g</u> / 1956	
	Chernigov			18	18		1955 <u>h</u> / 1956	
Ugerenko	Dashava - Stantalev		52		52		1955-56 <u>i</u> / 1955	
Ugerenko (Dashava area)	L'vov		70		70		1951-55 <u>j</u> / 1955	
Dashava	L'vov		70		70		1930 <u>k</u> / 1930	
Dashava	L'vov		70		70		1930-40 <u>l</u> / 1940	
Dashava	Staryy			10	10		1940 <u>m</u> / 1940	
Borislav	Drogobych				25	25	1947-50	
Redchankov (Gogolevo)	Mirgorod		60		60		1956	
Radchenkov (Gogolevo)	Poltava		90		90		1956	
Shebelinka	Khar'kov		74		74	28	1956 <u>n</u> / 1956	
Saratov	Tambov, Ryazan', Moscow	843			843	12	1944-46 <u>o</u> / 1955	
Ryazan'	Prickakkiy		97	15	15		1956	
Tambov	Norshansk			97	97		1951-55 <u>p</u> / 1955	
	Kolonna			5	5		1955 <u>q</u> / 1955	
Yelshanka	Saratov				17	17	16 to 18	1942
Yelshanka	Saratov				17	17	16 to 18	1942-43 <u>r</u> / 1944
Ust'-Kurdyum	Saratov-Kryazevka				30	30	1944 <u>s</u> / 1944	
	Novostepanovka, Pokhristnevo, Kuybyshev	166			166	10 to 14	1943	
	Novostepanovka, Pokhristnevo, Kuybyshev	166			166	10 to 14	1946-51 <u>t</u> / 1955	

\* Footnotes for Table 13 follow on p. 69.

S-E-C-R-E-T

Table 13  
Principal Transmission Gas Pipelines in the USSR  
Completed for Operation Before 1 January 1957 a/  
(Continued)

Gas Pipeline Number b/ (Map Key Number)	Planned Gas Pipeline Number	Origin	Intermediate Points and Terminals	Length s/ (kilometers)				Diameter d/ (Inches)	Date of Installation s/
				Major Pipe- lines	Lesser Pipe- lines	Minor Pipe- lines	Total Pipe- lines		
		Sultangulovo Suprunles Yablunovo Zhitgulevsk	Novostepanovka, Pokhvistnevo Aksuovo Kuybyshev Zol'noye (Zhoinoya)			19 10 32 25	19 10 32 25	6 to 12	1947 1948 1945 g/ 1952 l/
		Minbayevo Minbayevo	Kazan' Tuban-Kul'			260 100	260 100	12 10	1954 1954
		Oktyabr'skiy	Tuban-Kul', Ufa/Chernikovsk			164	164	12	1948-51 g/
		Archeda	Frolovo, Stalingrad			127	127	12	1953
			Stavropol', Rostov, Voroshilovgrad, Voronezh, Tula, Moscow			1,300	1,300	28	1955-56 g/
		Rostov	Taganrog			78	78		1956 g/
		Akhtyrskaya (Il'skiy area) Amaatseliyevka (Il'skiy area)	Krasnodar Novorossiysk			80 80	80 80		1953 1955
		Pravoberezhnoye Malgobek Malgobek Isberbash	Groznyy Groznyy Groznyy Makhachkala				26 72 80 65	10 10 10	1946 1945 1951-55 1940 g/
			Baku/Apsheron area (14 pipelines) Kereba, Baku			75	150 75	10 to 16	Before 1946 g/ 1951-55 g/
			Belyy Gorod (Shaumyanovskiy District, Baku)			50	50		1956
		Nebit-Dag oilfield Tuzhnyy Alamyshik oilfield Andizhan oilfield Andizhan oilfield Palvutensk oilfield Changrtaash oilfield	Vyahka, Nebit-Dag Grunch Mazar Andizhan Andizhan Lentinsk Koshkor-Ata				30 7 14 10 2 7	30 7 14 10 2 7	1951 1940-46 1945 1948 1947 1956
		Yarino (Kama River)	Molotov			27	27		1956

S-E-C-R-E-T

Table 13

Principal Transmission Gas Pipelines in the USSR  
Completed for Operation Before 1 January 1957 a/  
(Continued)

	Origin	Intermediate Points and Terminals	Length of (kilometers)				Diameter of (inches)	Date of installation
			Major Pipe-lines	Lesser Pipe-lines	Minor Pipe-lines	Total Pipe-lines		
For transmission in Ocha area, Sakhalin								
	Erri Ocha Rayon oilfield	Ozeruy Populated area, Ocha Rayon			27 4	27 4	1956	
Total natural gas			4,446	1,238	612	6,296		
Manufactured gas pipelines								
Shale gas pipelines								
Producer gas pipelines	Kokhtla-Yarve	Leningrad (Pipeline No. 1)	203		203	20	1948	
	Kokhtla-Yarve	Tallinn	200		200	20	1953	
	Silavay	Junction with Gas Pipeline No. 52		53	53	20	1951-55	
Coke oven gas pipelines	Shchekino	Tula, Moscow	200		200	20	1951-55 g/	
Refinery gas pipeline	Bagley	Dneprodzherzhinsk			10	10	1955	
	Bagley	Dnepropetrovsk			40	40	1956	
Total manufactured gas	Baku (Novobakinskiy refinery)	Sungalt (synthetic alcohol and rubber plant)	603	53	86	741	1951-55 b/	
Total fuel gas			5,049	1,291	697	7,037		

a. Details and complete documentation are shown in the monthly local newspapers.  
 b. As shown in Table 15 (p. 73, below), which  
 were also included in Table 13 as pipelines that had lengths completed in 1956. The Gas Pipeline and Planned Gas Pipeline number sequences, distinguished by color, are used to identify traces of the gas pipelines shown on the map, Figure 6 (inside back cover).  
 c. Lengths are based either on [redacted] or on map measurements and probable deviation factors. In this table a major pipeline has a length of at least 50 km but less than 100 km, and a minor pipeline has a length of less than 50 km.  
 d. The diameter is given only where there is reasonably firm basis for the figure [redacted].  
 e. In some instances the time periods shown are the probable periods of active construction and effective completion. In other instances the actual dates of construction and completion are not known, and the time periods shown are those during which there probably was construction and completion.  
 f. [redacted] the lead sector of Gas Pipeline [redacted] (Dashaeva-Kiev), 510 km, was completed for operation in 1946-48, and the remaining sector (Kiev-Moscow), 810 km, was completed for operation in 1948-51. It is probable, however, that the installation of the pipeline in place in that remaining sector was effectively completed in 1950.  
 g. [redacted] in 1955 at Berdichev, servicing also the branch line, Gas Pipeline [redacted].  
 h. It appears that the Dashaeva-Stanislav sector, 47 km, was completed for operation in 1955 and that the lead sector (Ugersko-Dashaeva), 5 km, connecting with the stepout development at Ugersko, was installed in 1956.  
 i. Gas Pipelines [redacted] constitute pipelines reportedly constructed in the Soviet Carpathian area which was in Poland at the time of construction. Gas Pipelines [redacted] probably existed as operating lines in 1957, [redacted] comprising 2 parallels connecting Dashaeva with L'vov. [redacted] was a third line constructed (1951-55) between the Dashaeva area and [redacted].  
 j. [redacted] was completed for operation northward to Khar'kov, 74 km, in the first half of 1956 and that the construction of Planned Gas Pipeline [redacted]. The 843 km of length include 28 km of field collection lines in the Saratov oilfields and apparently also the length of a branch constructed from Fezhany Unet to the Kologrivovka compressor station on the main trunk line. [redacted] Tambov is not on the trace of Gas Pipeline [redacted] but that Voronezh-Tambov-Morshansk, 300 km, is a branch from Gas Pipeline [redacted] projected for construction in original Sixth Five Year Plan.  
 k. Construction of this pipeline [redacted] the geographical location is not completely identified. The probable location is shown on the map, Figure 6 (inside back cover).  
 l. This line reportedly was completed for operation in 1951, but the effective completion of the installation of the line pipe in place probably occurred in 1950.  
 m. [redacted] the length of [redacted] (Planned Gas Pipeline [redacted]) vary from 1,865 km to 1,600 km. This variation appears to depend on what lengths are included for 15 planned branch lines (see Table 15, p. 73, below) and also for 17 intermediate connecting lines. The 17 intermediate connecting lines presumably are each quite short and serve to tie in with the distribution mains in the 17 populated places which are [redacted] located on the trace of the central trunk line between Izobil'noye and Moscow (these 17 places are cited in Table 15, p. 73,

S-E-C-R-E-T

S-E-C-R-E-T

Table 13

Principal Transmission Gas Pipelines in the USSR  
Completed for Operation Before 1 January 1957  
(Continued)

below. Of the 17 populated places, Stavropol', Rostov, Voroshilovgrad, and Voronezh are the principal cities. The 1,307 km length as shown in this table and in Table 15 (p. 73, below) is considered to be that of the central trunk line, 1,265 km, plus those of the 17 relatively short connecting lines. The lead sector of this line to Rostov, 560 km, was effectively installed in place in 1955, that the installation for operation in the lead sector to Rostov was completed in the early part of 1956; and that the installation for operation in the entire central trunk line to Moscow was effectively completed by the end of 1956. The relatively short connecting lines to Stavropol', Rostov, and the city of Podolsk are completed in 1956, and the similar connecting lines to the large cities of Voroshilovgrad and Voronezh were scheduled for completion in 1957, presumably early in the year. The 12 other connecting lines to the populated places (smaller cities, towns, and villages) presumably either were completed in 1956 or were scheduled for completion early in 1957.

In Table 15 (p. 73, below), 15 branches of Gas Pipelines are listed as reported, representing an aggregate length of 667 km. The Rostov-Maganar branch, Gas Pipeline (Planned Gas Pipeline), 78 km, completed for operation in 1956. 17 such places on the central trunk line trace and 15 similar places to be served by the branch lines.

Gas Pipeline has been heralded with much fanfare in the Soviet press and radio broadcasts and is declared to be the largest gas pipeline installed in Europe. There has been much publicity about the completion of this significant pipeline a year ahead of schedule.

This line is the first significant fuel gas pipeline installed in an area that was within the USSR at the time of the installation. natural gas was still being produced in appreciable quantities in the Ierzbash field as of early 1957. Unconfirmed reports allege that a longer transmission gas pipeline, Khachmas-Derbent-Izerbush-Makhachkala, 200 km long, also exists for natural gas and that its terminal sector is parallel.

the following transmission gas pipelines were then in service on the Apsheron Peninsula: Eight pipelines leading to the Shamyanovskiy district of Baku, with origins in these outlying areas on the Peninsula:

Peninsula Area	Diameter (inches)
Azizbekov	10
Azizbekov	12
Kaganovich	14
Kaganovich	16
Lenin	10
Lenin	12
Ordzhonikidze	14
Stalin	14

Two pipelines interconnecting the following areas on the peninsula also were reported: one from Ordzhonikidze to Kaganovich, with a diameter of 16 inches, and one from Ordzhonikidze to Lenin, with a diameter of 14 inches. In addition, Chervy Sorod in the Shamyanovskiy district was connected by a similar 10-inch pipeline with the Kirov Rayon on the peninsula and was to be connected by three more pipelines of that type with designated peninsula areas, specifically by a 10-inch pipeline with the Bibi Dybat area, and by a 14-inch line and a 16-inch line with the Azizbekov area.

All such transmission gas pipelines on the Apsheron Peninsula would be very short, later details are not available on gas pipelines in oilfield areas and other areas on the Apsheron Peninsula except in correlation with the original Sixth Five Year Plan.

Gas Pipeline appears to have been constructed in 1951-55, to be of large diameter, and to be the carrier supplying natural gas to the Karadag cement plant. The Davanny gas deposits appear to have been exploited earlier than were the Karadag gas deposits. a master distribution gas main circumventing Baku was constructed, presumably in 1950-55. Gas Pipelines and Planned Gas Pipelines and 46 (see Table 15, p. 73, below) will comprise three pipelines connecting the reportedly prolific Karadag natural gas deposits with the Baku area. Gas Pipeline as a second transmission gas pipeline connecting Karadag with Baku.

Pipeline for transport of producer gas from the large gas plant recently completed at Shchekino, apparently using as raw material the brown coal or lignite of the Moscow Basin. supply via pipeline of refinery gas for charge stock (process gas) in the synthetic alcohol and rubber plant.

S-E-C-R-E-T

50X1  
50X1  
50X1  
50X1  
50X1  
50X1

50X1  
50X1  
50X1  
50X1

S-E-C-R-E-T

Table 14

Installed Lengths of Gas Pipelines Estimated for the USSR, 1 January 1946 and 1 January 1957,  
and Reported for the US, 1 January 1946 and 1 January 1956

Type of Gas Pipeline	USSR <sup>a/</sup>		US							
	Transmission Gas Pipelines		Transmission Gas Pipelines		Gathering Gas Pipelines <sup>b/</sup>		Distribution Gas Pipelines <sup>c/</sup>		Total Gas Pipelines	
	1 January 1946	1 January 1957	1 January 1946	1 January 1956	1 January 1946	1 January 1956	1 January 1946	1 January 1956	1 January 1946	1 January 1956
Natural gas	713	6,296	124,367	228,061	43,451	74,384	183,170	420,829	350,988	723,274
Manufactured gas <sup>d/</sup>	0	741	5,488	676	0	0	110,382	18,572	115,870	19,248
Mixed gas <sup>d/</sup>	0	0 <sup>e/</sup>	2,382	4,812	0	0	27,647	45,786	30,029	50,598
Liquefied petroleum gas	0	0 <sup>e/</sup>	32	113	0	0	3,203	7,242	3,235	7,355
Total fuel gas	<u>713</u>	<u>7,037</u>	<u>132,269</u>	<u>233,662</u>	<u>43,451</u>	<u>74,384</u>	<u>324,402</u>	<u>492,429</u>	<u>500,122</u>	<u>800,475</u>
Percent of total gas pipelines			26.4	29.2	8.7	9.3	64.9	61.5	100.0	100.0

a. Pipelines completed for service as shown in Table 13 (p. 67, above). Specific estimates of the lengths of fuel gas pipelines installed in the total USSR are available only for the transmission type.

b. Field gathering and other collection gas pipelines; in general, the gathering gas pipelines in natural gas fields.

c. Distribution gas mains excluding service lines to consumer meters; in general, the distribution gas pipelines in cities and other consumption areas.

d. Mixed gas is a mixture of natural and manufactured gases. In the US, natural gas has largely replaced manufactured gas as a fuel gas except insofar as manufactured gas is locally produced and consumed in the industrial plants. Of the total length of transmission gas pipelines installed in the US, the lengths of those for manufactured and mixed gases represented the following percentages:

Type of Gas	1946	1956
Manufactured gas	4.1	0.3
Mixed gas	1.8	2.1
Total	<u>5.9</u>	<u>2.4</u>

In the USSR the transmission of manufactured gas is relatively more significant in the gas industry. Of the estimated total length of transmission gas pipelines installed for service in the USSR on 1 January 1957, the length for manufactured gas represented 10.5 percent. However, of the total length of transmission gas pipelines shown in Table 15 (p. 73, below), as the ones apparently planned and confirmed for completion for operation during the original Sixth Five Year Plan (1956-60), the length for manufactured gas represents only 4.9 percent.

e. [ ] do not indicate that transmission gas pipelines have been installed or are planned for mixed gas or liquefied petroleum gas in the USSR. It is quite probable, however, that mixed gas has been, and will be, carried by the distribution mains in the consumption areas which have supplies of manufactured gas as well as of natural gas. As of 1956, [ ] rapid development in the distribution of liquefied petroleum gas in the form of "bottled gas" for fuel gas use, especially in the Ukraine and in Moldavian cities such as Kishinev.

[ ] plans to distribute liquefied petroleum gas for fuel gas use, at least on an interim basis until transmission gas pipelines are constructed, in the distribution gas mains of certain cities such as Leningrad. Official Soviet plans further call for the supply of "liquefied gas" (probably liquefied petroleum gas but possibly liquefied natural gas) to distribution gas mains in other cities such as Molotov, Ulyanovsk, Irkutsk, Noyansk, Ivanovo, and Tallinn.

- 71 -

S-E-C-R-E-T

S-E-C-R-E-T

Table 15

Planned Transmission Gas Pipelines in the USSR a/\*  
1956-60

Origin	Intermediate Points and Terminals	Length <sup>b/</sup>														
		Identified in the Original Sixth Five Year Plan (1956-60)						Identified in Other Sources								
		Completed for Operation in 1956	Completion for Operation Scheduled for 1957	Completion for Operation Scheduled for 1958	Other	Completion for Operation Scheduled for 1957	Completion for Operation Scheduled for 1958	Other	Still in Planning Stage early in 1957	Confirmed as Proposal but Apparently Canceled	Identified but Not Confirmed as Definite Plan	Completion for Operation Actual or Probable in Plan Period	Confirmed Only to Be Started in Plan Period	Construction Actual or Probable	Canceled or Doubtful	Line Pipe Diameter <sup>c/</sup> (Inches)
	Kovel, Kobrin, Baranovichi, Minsk, Opochka, Ostrov, Pskov, Luga, Leningrad								1,420					1,420		28
	Lida, Vil'nyus								200					200		20
	Riga								280					280		16
	Khar'kov, Belgorod, Kursk, Orel, Bryansk	74	426								500			500		28
	Gor'kiy Stavropol', Yegorlykayaya, Akasyakaya, Batayak, Rostov, Voroshilovgrad, Novorossiysk, Ostrogodsk, Saituki, Voronezh, Yelets, Yefremov, Stalingorsk, Shebekino, Dula, Serpukhov, Podolsk, Moscow	1,300			400						400			400		28
	Nevinnomyassk, Mineral'nyye Vody, Nalchok, Grozny								400			400		400		28
	Ordzhonikidze (Dzardzhtseu), Tbilisi, Yerevan								500				500	500		28
	Krasnovodsk								200					200		20
	Sverdlovsk (Siberia)								1,200					1,200		20
	Chernigov	18										18		18		18

\* Footnotes for Table 15 follow on p. 79.

S-E-C-R-E-T



S-E-C-R-E-T

Table 15

Planned Transmission Gas Pipelines in the USSR a/  
1956-60  
(Continued)

Origin	Intermediate Points and Terminals	Length b/										Kilometers		
		Identified in the Original Sixth Five Year Plan (1956-60)					Identified in Other Sources							
		Completed for Operation in 1956	Completion for Operation Scheduled for 1957	Completion for Operation Scheduled for 1958	Other	Other Under Construction in 1957	Still in Planning Stage Early in 1957	Confirmed as Proposal but Apparently Cancelled	Identified but Not Confirmed as Definite Plan	Completion for Operation Actual or Probable in Plan Period	Confirmed Only to Be Started in Plan Period		Construction Actual or Probable	Cancelled or Doubtful
	Belaya Tserkov'			50							50	50		
	Chernovtsy							150		150	150	150		
Ryazan'	Prickskiy	15									15	15		
								75			75	75		
	Starobel'ek							25			25	25		
	Lieichanak							65			65	65		
	Rubeznoye							15			15	15		
	Stalino							130		130	130	130		
	Krasnodon					25				25	25	25		
	Kamensk-Shakhtinskiy					40				40	40	40		
	Roven'ki					10				10	10	10		
	Sverdlovsk					15				15	15	15		
	Krasnyy Sulin					13				13	13	13		
	Shakhty					5				5	5	5		

S-E-C-R-E-T

S-E-C-R-E-T

Table 15  
Planned Transmission Gas Pipelines in the USSR a/  
1956-60  
(Continued)

		Kilometers														
		Length b/														
		Identified in the Original Sixth Five Year Plan (1956-60)			Identified in Other Sources											
		Under Construction in 1956		Other Under Construction in 1957	Under Construction in 1956		Other Under Construction in 1957									
Origin	Intermediate Points and Terminals	Completed for Operation in 1956	Completion for Operation Scheduled for 1957	Completion for Operation Scheduled for 1958	Other	Completion for Operation Scheduled for 1957	Completion for Operation Scheduled for 1958	Other	Still in Planning Stage Early in 1957	Confirmed as Proposal but Apparently Canceled	Identified but Not Confirmed as Definite Plan	Completion for Operation Actual or Probable in Plan Period	Confirmed Only to Be Started in Plan Period	Construction Actual or Probable	Canceled or Doubtful	Line Pipe Diameter c/ (Inches)
Rostov	Taganrog	78										78		78		
Taganrog	Zhdanov					120						120		120		
Taganrog	Amrosyevka							67				67		67		
Bataysk	Azov		25									25		25		
Aksaykaya	Novocherkassk					34						34		34		
Ugerako	Dashava	5										5		5		
Kosov	Kuty, Chernovtsk					65						65		65		
Chernovitsy (Gogolevo)	Kamomete Podol'skiy							65				65		65		
Zakarskaya gas field	Musachevo, Uzhgorod								70		70	70		70		
Radchenkov (Gogolevo)	Mirgorod	60										60		60		
Radchenkov (Gogolevo)	Poltava	90										90		90		
Mirgorod area									270			270		270		
Mirgorod area									220			220		220		
Mikhaylovka									175			175		175		
Shebelinka	Dnepropetrovsk					192		458				192		192		28
Dnepropetrovsk	Odesa											458		458		28
Bryansk	Vitebsk								360			360		360		
Vitebsk	Minsk, Villynyu, Riga								680			680		680		
Vitebsk	Pskov, Leningrad											600		600	600	

S-E-C-R-E-T

S-E-C-R-E-T

Table 15  
 Planned Transmission Gas Pipelines in the USSR a/  
 1956-60  
 (Continued)

		Kilometers														
		Length b/						Identified in Other Sources								
		Identified in the Original Sixth Five Year Plan (1956-60)			Other Under Construction in 1957											
		Under Construction in 1956		Other Under Construction in 1957	Under Construction in 1956		Other Under Construction in 1957		Identified in Other Sources							
Origin	Intermediate Points and Terminals	Completed for Operation in 1956	Completion for Operation Scheduled for 1957	Completion for Operation Scheduled for 1958	Other	Completion for Operation Scheduled for 1957	Completion for Operation Scheduled for 1958	Other	Still in Planning Stage Early in 1957	Confirmed as Proposal but Apparently Cancelled	Identified but Not Confirmed as Definite Plan	Completion for Operation Actual or Probable in Plan Period	Confirmed Only to Be Started in Plan Period	Construction Actual or Probable	Cancelled or Doubtful	Line Pipe Diameter c/ (Inches)
Stepnoye	Ruzel's-Saratov					100						100		100		26
Stepnoye	Vol'sk					75						75		75		26
Mukhamovo	Kuybyshev				88							88		88		28
Al'mat'yevsk	Stavropol'kraznyy							260			260	260		260		
Shkapovo	Belebey, Tuban-Kul'				130							130		130		
Shkapovo	Inhimbey/Salavat, Sterlitamak area				160							160		160		
Ishimbey	Magnitogorsk				225							225		225		
Snezhinsk	Stalingrad					127						127		127		21
Korobki	Stalingrad					100						100		100		21
Korobki	Kamyshin					63						63		63		17
Linevo	Zhirnoye					27						27		27		14
Archada	Abramov					36						36		36		13
Archada											127				127	

S-E-C-R-E-T

S-E-C-R-E-T

Table 15  
 Planned Transmission Gas Pipelines in the USSR a/  
 1956-60  
 (Continued)

Origin	Intermediate Points and Terminals	Length b/														
		Identified in the Original Sixth Five Year Plan (1956-60)					Identified in Other Sources									
		Under Construction in 1956		Other Under Construction in 1957			Under Construction in 1956		Other Under Construction in 1957							
		Completed for Operation in 1956	Completion for Operation Scheduled for 1957	Completion for Operation Scheduled for 1958	Other	Completion for Operation Scheduled for 1957	Completion for Operation Scheduled for 1958	Other	Still in Planning Stage Early in 1957	Confirmed as Proposal but Apparently Cancelled	Identified but Not Confirmed as Definite Plan	Completion for Operation Actual or Probable in Plan Period	Confirmed Only to be Started in Plan Period	Construction Actual or Probable	Cancelled or Doubtful	Line Pipe Diameter c/ (Inches)
	Voroshilovgrad, Serpukhov, Moscow Leningrad Tikhoretsk			550	750				750	280		1,300	1,300	750	280	28
	Novorossiysk	80										80	80			
	Arasvir-Tikhoretsk Novodmitriyevskaya			21	70	119						140	70	140	70	17
	Groznyy				53							53	53			
	Belyy Gorod (Shaumyanovskiy District, Baku) Baku/Shchluvel'yany	50				50						50	50	50	50	
	Sungait Kirovabad Baku (Pipeline No. 4 to Baku)		45						350	150		45	350	150	150	
	Ali Dayramli Sungait Ostrov Arzema				9				85	50		85	50	85	50	

S-E-C-R-E-T

Table 15  
 Planned Transmission Gas Pipelines in the USSR a/  
 1956-60  
 (Continued)

		Kilometers														
		Length b/						Identified in Other Sources								
		Identified in the Original Sixth Five Year Plan (1956-60)			Other Under Construction in 1957											
		Under Construction in 1956		Other	Under Construction in 1956		Other	Still in Planning Stage Early in 1957	Confirmed as Proposal but Apparently Cancelled	Identified but Not Confirmed as Definite Plan	Completion for Operation Possible in Plan Period	Confirmed Only to Be Started in Plan Period	Construction Actual or Probable	Cancelled or Doubtful	Line Pipe Diameter <sup>c/</sup> (Inches)	
Origin	Intermediate Points and Terminals	Completed for Operation in 1956	Completion for Operation Scheduled for 1957	Completion for Operation Scheduled for 1958	Other	Completion for Operation Scheduled for 1957	Completion for Operation Scheduled for 1958	Other	Still in Planning Stage Early in 1957	Confirmed as Proposal but Apparently Cancelled	Identified but Not Confirmed as Definite Plan	Completion for Operation Possible in Plan Period	Confirmed Only to Be Started in Plan Period	Construction Actual or Probable	Cancelled or Doubtful	Line Pipe Diameter <sup>c/</sup> (Inches)
Kizyl-Kum Khodzhisbad Kokand Changyrtaab oilfield Khilya oilfield Severnyy Sokh Severnyy Sokh	Kum Dag, Nebit-Dag		85			85		30				30	30			
	Niyazbatyr-Fergana-Kokand											170	170		170	10
	Tashkent	7						28				28	7	28		
	Kochkor-Ata											30	30			
	Khilya								30			10	10			
Yarino (Kama River) Dava/Itza	Molotov	27										27		27		900
	Molotov, Izhavsk											900				
Sverdlovsk	Chelyabinsk											230			230	
Erri Okha Rayon oilfield Okha Rayon oilfield	Ozernyy	27										27		27		
	Populated area, Okha Rayon	4					20					20		20		
	Populated area, Okha Rayon	1,832	130	426	1,103	1,860	1,208	1,409	5,370	1,900	5,372	11,661	1,700	13,361	3,227	
		14	2	1	7	24	3	8	22	3	16	75	2	77	8	
Koikhtla-Yarve				205								205		205		21

S-E-C-R-E-T

Table 15

Planned Transmission Gas Pipelines in the USSR a/  
1956-60  
(Continued)

		Kilometers																				
		Identified in the Original Sixth Five Year Plan (1956-60)						Identified in Other Sources														
		Under Construction in 1956			Other Under Construction in 1957			Still in Planning Stage Early in 1957		Confirmed as Proposal but Apparently Cancelled		Identified but Not Confirmed as Definite Plan		Completed for Operation Actual or Probable in Five Year Plan		Confirmed Only to Be Started in Five Year Plan		Construction Actual or Probable		Cancelled or Doubtful		Line Pipe Diameter c/ (Inches)
Origin	Intermediate Points and Terminals	Completed for Operation in 1956	Completion for Operation Scheduled for 1957	Completion for Operation Scheduled for 1958	Other	Completion for Operation Scheduled for 1957	Completion for Operation Scheduled for 1958	Other	Still in Planning Stage Early in 1957	Confirmed as Proposal but Apparently Cancelled	Identified but Not Confirmed as Definite Plan	Completed for Operation Actual or Probable in Five Year Plan	Confirmed Only to Be Started in Five Year Plan	Construction Actual or Probable	Cancelled or Doubtful	Line Pipe Diameter c/ (Inches)						
Bagley	Dnepropetrovsk	40				120						40				40						
Krivoy Rog	Bagley											120				120						
Stalino, Makeyevka	Yenakiyevsk, Debal'tovo, Voroshilovsk, Konstantinovka, Artemovsk-Kramatorsk				240							240				240						
		40	205			120		240				605				605						
		1	1			1		1				4				4						
		1,875	335	426	1,103	1,060	1,228	1,642	4,370	1,000	5,378	12,266	1,700	13,966	3,927							
		15	3	1	7	25	3	9	22	3	16	79	2	81	8							

a. Except as otherwise indicated, these lines are planned for completion in 1956-60.  
 b. Lengths are based on citations where available or are otherwise based on map measurements and probable deviation factors.  
 c. Diameters are given only where there is a direct citation, or a reasonably firm indirect substantiation.  
 d. Although Planned Gas Pipeline [redacted] and its principal branches (Planned Gas Pipelines) [redacted] were officially proposed and shown on maps in 1956 in the Soviet press, [redacted] the proposal had been definitely canceled, whereas earlier [redacted] 1959 and sometimes earlier years as planned completion dates. Soviet sources in 1957 indicate that the recent expansions in potential reserves in the Dniepr gas fields, at Ugerato and elsewhere, were sufficient only for the requirements of existing gas pipelines plus the expanding needs for the gas in the western Ukraine. [redacted] Planned Gas Pipelines [redacted] were scheduled to be replaced by [redacted] furnish Shebelinka gas to Minsk, Vil'nyus, Riga, and Leningrad, and by Planned Gas Pipeline [redacted] gas to Leningrad. Still later Soviet sources, however, discussed the possibility that the lead sector of [redacted] to Minsk, length 640 km, together with [redacted] combined length 480 km, would be constructed after all, canceling the construction of Planned Gas Pipelines [redacted] combined length 1,640 km. This possibility would reduce by 380 km the total construction shown to be actual or probable in Table 15. [redacted] 1959 as the scheduled completion date of any transmission gas pipeline thus involved, whichever it may be, carrying natural gas from any source to Minsk, Vil'nyus, Riga, and Leningrad.  
 e. See Table 13, footnote 1, p. 69, above.  
 f. See Table 13, footnote n, p. 69, above.  
 g. Directives and later discussion [redacted] of the original Sixth Five Year Plan merely state that construction of Planned Gas Pipeline [redacted] is to be started during the course of the plan. The trace of Planned Gas Pipeline [redacted] is designated as Groznyy-Ordzhonikidze-Tbilisi in some Soviet sources, whereas other Soviet sources indicate that Mineral'nyye Vody - Ordzhonikidze - Groznyy is to be the terminal trace of Planned Gas Pipeline [redacted] with Planned Gas Pipeline No. 6 branching off from Planned Gas Pipeline [redacted] at Ordzhonikidze so as to lead to Tbilisi. It is presently assumed that the terminal trace of Planned Gas Pipeline [redacted] will be Mineral'nyye Vody - Malgobek - Groznyy and that Planned Gas Pipeline [redacted] will branch off from Planned Gas Pipeline [redacted] between Mineral'nyye Vody and Malgobek, passing through Ordzhonikidze to Tbilisi. [redacted] plans for the distribution of natural gas from the Stavropol' area to towns in Stavropol' Krai; [redacted] Planned Gas Pipeline [redacted] is planned to supply gas to Nevinnomyssk and Yessentuki in the Krai, and also to Mineral'nyye Vody, Pyatigorsk, Sheksnovodsk, and Kislovodsk, the principal health resorts of the northern Caucasus in the Krai.

S-E-C-R-E-T

Table 15  
Planned Transmission Gas Pipelines in the USSR  
1956-60  
(Continued)

construction work was being started on Planned Gas Pipeline [redacted] and that Planned Gas Pipeline [redacted] would be extended to Yerevan, giving a total length of 500 km for Stavropol'-Tbilisi-Yerevan.

b. Although the location of the Kizil-Kum reserves is not directly identified, there is indirect evidence for locating this Kizil-Kum area as a stepout from the Hebit-Dag oilfields. [redacted] construction of Planned Gas Pipeline [redacted] will begin in 1957. The trace of Planned Gas Pipeline [redacted] as shown on the map, Figure 6 (inside back cover), is schematic only. [redacted] preparatory work on the first section of Planned Gas Pipeline [redacted] was scheduled for completion in the latter half of 1956. Planned Gas Pipelines [redacted] and 53 are sometimes identified as separate pipelines, and Planned Gas Pipeline [redacted] is sometimes identified as a branch from Planned Gas Pipeline [redacted]. The length of Planned Gas Pipeline [redacted] was originally cited as 200 km, as shown in Table 15, but this length has been recently cited as 260 km.

i. Directives of the original Sixth Five Year Plan specified that development work was to be started on the newly discovered natural gas reserves at Bereztovo and that construction work was to be started on Planned Gas Pipeline [redacted]. Construction work was to be started on Planned Gas Pipeline [redacted] in 1956; construction and completion in 1956 has been inferred [redacted] but the actual status is not confirmed.

k. [redacted] included Kurak as a city to be supplied with gas via Planned Gas Pipeline [redacted] a branch such as Voronezh-Kurak, 225 km, might thus be inferred as planned, but that is doubtful inasmuch as there is no direct confirmation.

l. See Table 13, footnote g, p. 69, above.

m. [redacted] early in 1957 gave information as follows on Planned Gas Pipelines [redacted] with respect to providing fuel gas as a substitute for solid fuels. The particular reference was to the Pridnepr industrial area, including the large cities of Dnepropetrovsk and Dneprodzerzhinsk to which Planned Gas Pipelines [redacted] were scheduled to supply natural gas in 1957; the large city of Zaporozh'ye to which the same two lines were scheduled to supply natural gas in the first half of 1958; and the smaller cities of Zolotova, Pivlograd, Simeleukovo, and Novo-Moskovsk to which the two lines were scheduled to supply natural gas in 1957. The lead pipeline, Planned Gas Pipeline [redacted] Shebelino-Dnepropetrovsk, 192 km, was scheduled for completion by 1 July 1957, and the next sector of Planned Gas Pipelines Nos. 20 and 21 including service to Dneprodzerzhinsk was to be completed in 1957. Thus nearly 200 km of the central trunk line in Planned Gas Pipelines [redacted] and 21 were scheduled for completion in about 5 months during the first half of 1957. In 1958 the remaining sector of Planned Gas Pipelines [redacted] to Odessa was to be completed, much of the excavation and other preliminary work on this remaining portion presumably being scheduled for completion in the latter part of 1957. In addition to the seven cities of the Pridnepr as above listed, Mikopul', Krivoy Bog, Nikolayev, and Kherson as well as Odessa were designated as principal cities to receive natural gas via Planned Gas Pipelines [redacted]. It appears that Planned Gas Pipelines [redacted] will have a number of branches leading from a central trunk line in order to deliver natural gas to the various cities as designated in the Soviet sources. Currently available information provides no details with respect to the proposed routes of the central line and its branches, and the trace of Planned Gas Pipelines [redacted] as shown on the map, Figure 6 (inside back cover), is schematic only.

n. This pipeline construction comprises one phase of the exploitation of the Stepyovye natural gas deposits. The directives and later Soviet source discussions of the original Sixth Five Year Plan specified that the Stepyovye deposits were to be exploited during the plan period. Available data are not specific, but it is probable that Planned Gas Pipelines [redacted] will comprise two separate pipelines as shown above. A Soviet source lists for construction in 1957 a 14-inch transmission gas pipeline, 145 km long, from Saratov to Vol'sk; however, other data indicate that this is a confused reference to Planned Gas Pipelines [redacted].

o. [redacted] a pipeline of large diameter.

p. [redacted] this second central trunk pipeline from the Stavropol' area to Moscow is to be completed from the point of origin to Voroshilovgrad in 1957; length citations [redacted] for such a completion vary from 500 km to 550 km. [redacted] the entire line will be completed in 1956, and [redacted] the entire line will be completed in 1957. [redacted] has been completed, apparently early in 1957.

q. The lead portion of Planned Gas Pipeline [redacted] from Aleksandrova to Armasvir, [redacted] scheduled for completion in 1957.

r. See Table 13, footnote r, p. 70, above. Planned Gas Pipeline [redacted] is [redacted] a pipeline that will connect Karadag with Shuvlyany for supply of natural gas to the power plants Krasnaya Zvezda and Severnaya Osa and also for supply of natural gas to residential consumption on the Apsheron Peninsula. [redacted] the thermal electric power plant, and other industrial installations in [redacted]. Planned Gas Pipeline [redacted] is proposed for delivery of natural gas for use as fuel in the pipe rolling mill, [redacted].

s. [redacted].

t. Although the location of Gora Kyurov-Dag is not definitely established, it is here inferred [redacted] that the place is Kirovdag, located southwestward from the general area of the Duvanany and Karadag gas deposits.

u. Underwater pipeline proposed to transport associated gas from off-shore production in the Caspian Sea.

v. [redacted] a 40-km portion of Planned Gas Pipeline [redacted] was installed in 1956. Presumably comprising the portion, Khotshayehad-Niyasbatyr, [redacted] scheduled for installation in 1956. [redacted] the entire length of Planned Gas Pipeline [redacted] was scheduled for completion in the first quarter of 1957, thereby supplying the natural gas not only to Fergana, but also to the towns of Andizhan, Leninok, and Margelan.

w. [redacted] large new reserves of natural gas were being exploited in the Ukhta area and that construction of a transmission gas pipeline was contemplated, connecting the Ukhta and Karadag gas deposits. [redacted] has been alleged [redacted] with such construction said to have been started during World War II. Because of lack of known confirmation of Soviet origin, this prior construction is considered to be improbable. The trace of Planned Gas Pipeline [redacted] as shown appears, however, to be logical for the pipeline [redacted] a plan for the future.

x. [redacted] natural gas service was installed in 1956 for domestic use in the following three workers' settlements in Okha Rayon: Novostroyka, Rudnik, and Vtoraya Ploshchad. [redacted] state that systems for natural gas field collection were installed in 1956 in Vtoraya Ploshchad and in Sakonnyaya Rayon on Sakhalin and that Planned Gas Pipeline [redacted] will be completed for operation in January 1958.

y. Specific locations of terminals are not identified; pipeline not shown on the map, Figure 6 (inside back cover).

z. [redacted] 146 km of this project were completed by the end of 1956 but that work on the remaining 59 km to Leningrad was temporarily halted because of the lack of line pipe. In 1956, priority was given to the completion [redacted] Planned Gas Pipeline [redacted] is parallel to Gas Pipeline [redacted] in the same service for transport of shale gas. Early in 1957, Gas Pipeline [redacted] was reported to be badly corroded and in need of general repairs after nearly 10 years of service. It is reported that Planned Gas Pipeline [redacted] will supply shale gas for fuel to the following places in Leningrad Oblast in addition to Leningrad: Kolpino, Petrovskaya, Pushkin, Gostrovskaya, and Shelenskoaya. Hence a number of branch lines from Planned Gas Pipeline [redacted] are indicated, but because of a lack of detailed information, the trace of Planned Gas Pipeline [redacted] as shown on the map, Figure 6 (inside back cover), is schematic.

S-E-C-R-E-T

Table 15

Planned Transmission Gas Pipelines in the USSR  
1956-60  
(Continued)

\_\_\_\_\_ in 1939 stated that a network of gas pipelines was then under construction in the Donbas for transmission of coke oven gas for industrial use. The reported network consisted of 4 systems, including 2 systems leading from Ordzhonikidze (Yenakiyev), 1 system connecting places in the vicinity of Stalino, and 1 system leading from Sergo (Kadiyevka), as follows: (1) Ordzhonikidze-Makeyevka-Konstantinovka, (2) Ordzhonikidze-Makeyevka-Stalino, (3) Mambetovo-Stalino-Rutchenkovo-Smolynka-Putilovka, and (4) Sergo-Voroshilovsk-Voroshilovgrad. Later data, however, with direct bearing on such constructions are not available.

\_\_\_\_\_ in 1954 stated that there were distribution gas mains in service for coke oven gas in Stalino, Yenakiyev, Makeyevka, and Dnepropetrovsk and that apartments were then being piped for use of coke oven gas in Gorlovka, Dneprodzerzhinsk, and Krivoy Rog.

\_\_\_\_\_ in 1955 reported that reconstruction work was then in progress on distribution gas lines for coke oven gas in Stalino. \_\_\_\_\_ the original Sixth Five Year Plan called for the construction of 200 km of distribution gas mains to supply coke oven gas to 45,000 apartments in Stalino and further called for supply of coke oven gas in Gorlovka, Konstantinovka, Yenakiyev, Artemovsk, and Kramatorsk.

\_\_\_\_\_ in 1955 stated that coke oven gas was then distributed for use in Stalino, Makeyevka, Dneprodzerzhinsk, Khar'kov, and Zhdanov and that the original Sixth Five Year Plan called for construction of 400 km of transmission gas pipelines to supply coke oven gas to 12 other cities including Gorlovka, Konstantinovka, Artemovsk, Kramatorsk, Dnepropetrovsk, Voroshilovsk, and Drushkivka. It is probable that the remaining 5 of these other 12 cities consisted of Yenakiyev, Krivoy Rog, Dzerzhinsk, Kadiyevka, and Debal'tsevo. \_\_\_\_\_ construction work was concurrently in progress on distribution gas mains for coke oven gas in Stalino, Gorlovka, Konstantinovka, Yenakiyev, Artemovsk, Kramatorsk, Makeyevka, Zhdanov, and Dzerzhinsk.

\_\_\_\_\_ in Table 15 the 400 km of transmission gas pipeline as planned (1955-60) for coke oven gas in the Donbas and Pridnipro areas are shown in a combination of 3 lines. \_\_\_\_\_ will connect the coke oven facilities of \_\_\_\_\_ generally identified in \_\_\_\_\_ data on the original Sixth Five Year Plan.

\_\_\_\_\_ will connect the coke oven facilities of \_\_\_\_\_ Krivoy Rog with the fuel gas services in Dneprodzerzhinsk and Dnepropetrovsk, via the Bagley coke oven facilities. Planned Gas Pipeline No. 69 will interconnect the coke oven facilities and fuel gas services as situated in the local areas of Stalino-Makeyevka, Yenakiyev-Gorlovka, Debal'tsevo, Kadiyevka-Voroshilovsk, Trubkivka-Dzerzhinsk-Konstantinovka, Artemovsk, and Kramatorsk, including within these local areas the more localized vicinities of Mambetovo-Stalino-Rutchenkovo-Smolynka-Putilovka and Artemovsk-Sergo.

\_\_\_\_\_ gas-producing coke oven (or coke chemical) facilities exist not only in Krivoy Rog and at Bagley but also in Dneprodzerzhinsk, Stalino, Makeyevka, Yenakiyev, and Voroshilovsk, with new facilities of that type to be constructed during the original Sixth Five Year Plan at Konstantinovka. It appears that fuel gas service in Khar'kov and Zhdanov, and possibly also in Voroshilovgrad, will be individually supplied by local coke oven facilities.

\_\_\_\_\_ reportedly was completed in 1956, and \_\_\_\_\_ reportedly was planned for completion in 1957. Active construction work reportedly was in progress in 1955-57 on the general fuel gas supply system represented by \_\_\_\_\_ and the central trunk line of \_\_\_\_\_ apparently was under construction in 1957. The route of \_\_\_\_\_ as shown schematically on the map, Figure 6 (inside back cover).

50X1  
50X1  
50X1  
50X1  
50X1  
50X1  
50X1  
50X1  
50X1

S-E-C-R-E-T



S-E-C-R-E-T

Table 16

Chronology for Construction of Transmission Gas Pipelines in the USSR Before 1957

Length (Kilo-meters)	Date of Installation of Line Pipe in Place #/												Date Completed for Initial Operation											
	1946-50		1951-55		Before 1956		1956		Before 1957		Before 1946		1946-50		1951-55		Before 1956		1956		Before 1957			
	Length (Kilo-meters)	Units	Length (Kilo-meters)	Units	Length (Kilo-meters)	Units	Length (Kilo-meters)	Units	Length (Kilo-meters)	Units	Length (Kilo-meters)	Units	Length (Kilo-meters)	Units	Length (Kilo-meters)	Units	Length (Kilo-meters)	Units	Length (Kilo-meters)	Units	Length (Kilo-meters)	Units		
843	1	1,320	1			1,320	1	1,320	1			210	1	810	1	1,320	1			1,320	1			
166	1			166	1	166	1	166	1	166	1	166	1	166	1	166	1	166	1	166	1			
		166	1			166	1					166	1	166	1	166	1	166	1	166	1			
				260	1	260	1	260	1	260	1	260	1	260	1	260	1	260	1	260	1			
		164	1	100	1	100	1	100	1	100	1	100	1	100	1	100	1	100	1	100	1			
				127	1	127	1	127	1	127	1	127	1	127	1	127	1	127	1	127	1			
				260	1	260	1	1,040	1	1,300	1			164	1	164	1	164	1	164	1			
1,092	2	1,650	1	747	1	1,406	2	1,040	1	4,446	2	166	1	1,351	2	1,697	6	1,146	8	1,300	1			
				203	1	203	1			203	1			203	1	203	1	203	1	203	1			
				200	1	200	1			200	1			200	1	200	1	200	1	200	1			
				200	1	200	1			200	1			200	1	200	1	200	1	200	1			
				400	2	603	1			603	1			400	2	603	1			603	1			
1,009	2	1,851	4	1,147	6	1,009	12	1,040	1	5,049	12	166	1	1,356	1	2,027	8	1,752	11	1,300	1			
				75	1	75	1			75	1			75	1	75	1			75	1			
				47	1	47	1	5	1	52	1			47	1	47	1	5	1	52	1			
				70	1	70	1			70	1			70	1	70	1			70	1			
				70	1	70	1			70	1	70	1	70	1	70	1			70	1			
				70	1	70	1			70	1	70	1	70	1	70	1			70	1			
								60	1	60	1							60	1	60	1			
								90	1	90	1							90	1	90	1			
								74	1	74	1							74	1	74	1			
				97	1	97	1			97	1			97	1	97	1			97	1			
				80	1	80	1			80	1			80	1	80	1			80	1			
								80	1	80	1							80	1	80	1			
								72	1	72	1			72	1	72	1			72	1			
								80	1	80	1			80	1	80	1			80	1			
								65	1	65	1			65	1	65	1			65	1			
								75	1	75	1			75	1	75	1			75	1			
								50	1	50	1							50	1	50	1			
277	1			224	7	801	11	437	7	1,228	17	277	1	224	7	801	11	437	7	1,228	17			
								53	1	53	1			53	1	53	1			53	1			
277	1			277	8	824	12	437	7	1,221	18	277	1	277	8	824	12	437	7	1,221	18			

a. The data as given do not account for line pipe installed in place before 1 January 1957 and not completed for operation by 31 December 1956.

S-E-C-R-E-T

Table 16  
Chronology for Construction of Transmission Gas Pipelines in the USSR  
Before 1957  
(Continued)

Date of Installation of Line Pipe in Place												Date Completed for Initial Operation											
Before 1946		1946-50		1951-55		Before 1956		1956		Before 1957		Before 1946		1946-50		1951-55		Before 1956		1956		Before 1957	
Length (Kilo-meters)	Units	Length (Kilo-meters)	Units	Length (Kilo-meters)	Units	Length (Kilo-meters)	Units	Length (Kilo-meters)	Units	Length (Kilo-meters)	Units	Length (Kilo-meters)	Units	Length (Kilo-meters)	Units	Length (Kilo-meters)	Units	Length (Kilo-meters)	Units	Length (Kilo-meters)	Units	Length (Kilo-meters)	Units
				42	1	42	1			42	1					42	1	42	1			42	1
				40	1	40	1			40	1					40	1	40	1			40	1
10	1					10	1			10	1	10	1			10	1	10	1			10	1
		25	1			25	1			25	1			25	1	25	1	25	1			25	1
				5	1	5	1			5	1					5	1	5	1			5	1
17	1					17	1			17	1	17	1			17	1	17	1			17	1
17	1					17	1			17	1	17	1			17	1	17	1			17	1
30	1					30	1			30	1	30	1			30	1	30	1			30	1
		19	1			19	1			19	1			19	1	19	1	19	1			19	1
		10	1			10	1			10	1			10	1	10	1	10	1			10	1
32	1			25	1	25	1			25	1	32	1			25	1	32	1			25	1
		26	1			26	1			26	1			26	1	26	1	26	1			26	1
150	14			30	1	150	14			150	14	150	14			150	14	150	14			150	14
7	1					7	1			7	1			7	1	7	1	7	1			7	1
14	1					14	1			14	1	14	1			14	1	14	1			14	1
		10	1			10	1			10	1			10	1	10	1	10	1			10	1
		5	1			5	1			5	1			5	1	5	1	5	1			5	1
								7	1	7	1									7	1	7	1
								27	1	27	1									27	1	27	1
								27	1	27	1									27	1	27	1
								4	1	4	1									4	1	4	1
277	21	22	6	142	2	214	22	26	6	612	22	270	20	102	7	142	2	214	22	26	6	612	22
				10	1	10	1			10	1					10	1	10	1			10	1
				35	1	35	1			40	1					35	1	35	1			40	1
				45	2	45	2	40	1	85	1					45	2	45	2	40	1	85	1
277	21	22	6	187	7	222	24	132	7	627	24	270	20	102	7	187	7	222	24	132	7	627	24
1,563	27	1,795	9	1,413	16	1,721	22	1,575	14	6,296	64	713	25	1,455	9	2,293	28	1,461	51	1,835	14	6,296	64
		203	1	498	5	701	6	40	1	741	7			203	1	498	5	701	6	40	1	741	7
1,563	27	1,918	10	1,911	21	1,422	28	1,615	15	7,037	71	713	25	1,658	10	2,791	23	1,162	27	1,875	15	7,037	71

50X1

S-E-C-R-E-T

Table 17

Estimated Throughput Capacities of Transmission Gas Pipelines in the USSR a/  
1 January 1957

<u>Pipeline Terminals</u>	<u>Length (Kilometers)</u>	<u>Throughput Capacity (Million Standard Cubic Meters Per Year)</u>
Dashava, Moscow	1,320	900
Saratov, Moscow	843	600
Buguruslan, Kuybyshev	166	250
Buguruslan, Kuybyshev	166	250
Minibayevo, Kazan'	260	350
Minibayevo, Tuban-Kul'	100	150
Oktyabr'skiy, Ufa/Chernikovsk	164	150
Archeda, Stalingrad	127	150
Izobil'noye, Stavropol', Moscow	1,300	5,000
Kokhtla-Yarve, Leningrad	203	350
Kokhtla-Yarve, Tallinn	200	200
Shchekino, Tula, Moscow	200	260
Total	<u>5,049</u>	<u>8,610</u>

a. [redacted] All pipelines shown are at least 100 km long. The capacities as shown are probably maxima and possibly higher than is realized.

S-E-C-R-E-T

S-E-C-R-E-T

Table 18

Potential Service Factors of Transmission Gas Pipelines  
 in the USSR and the US a/  
 1950, 1955-56, and 1960 Plan in the USSR  
 and 1954 in the US

Country and Type of Gas	Year	Operating Transmission Gas Pipelines b/ (Kilometers)	Gas Production c/ (Billion Standard Cubic Meters)	Potential Service Factor d/
USSR				
Natural gas	1950	2,168	5.8	374
	1955	4,461	9.0	496
	1956	6,296	12.06	522
	1960	16,122	56.5 e/	285
Manufactured gas f/	1950	203	.04	508
	1955	701	1.4	501
	1956	741	1.66	446
	1960	1,306	3.5	373
US				
Natural gas	1954	215,646	203.4	1,060

a. Estimated data for the USSR; reported data for the US.

b. At the end of the year shown.

c. Net field delivery to transmission.

[redacted] figures are indicated (but not positively stated) to be the quantifications of net field delivery to transmission. The following material balance for the US shows the significance of such quantifications, even though the available intelligence is inadequate for a similar balance for the USSR:

50X1  
 50X1

Production and Disposition of Dry Natural Gas in the US, 1954	Billion Standard Cubic Meters
Stripped gas	192.3
From oil well associated gas	95.3
From gas well wet gas	97.0
Crude dry gas from gas wells	110.0
Gross production	302.3
From oil wells	95.3
From gas wells	207.0
Oil well repressure use	43.0
Net production	259.3
Field storage in ground	2.9
Gross field delivery	256.4
Field consumption	53.0
Field waste	11.8
Field use	41.2
Net field delivery to transmission	203.4
Transmission waste	6.1
Marketed use	197.3
Field use	41.2
Total use	238.5
Total waste	17.9
Gross field delivery	256.4

d. Kilometers of pipeline per billion cubic meters of gas.

e. [redacted], which show considerable upward revision of the original

planned figure.

f. [redacted] about 250 manufactured-gas plants existed in 1956 in the USSR, producing 15 billion standard cubic meters of low-calorific fuel gas per year. Presumably included in this enumeration and output are the local coal gasification plants and their production of gas for local use, as well as the plants and correlated production of manufactured gas which are serviced by transmission gas pipelines. Production of manufactured gas, [redacted] presumably refers only to the plants and correlated production of manufactured gas serviced by transmission gas pipelines.

50X1  
 50X1

50X1

S-E-C-R-E-T

Table 19  
 Specific Conversion Factors for Petroleum Products a/

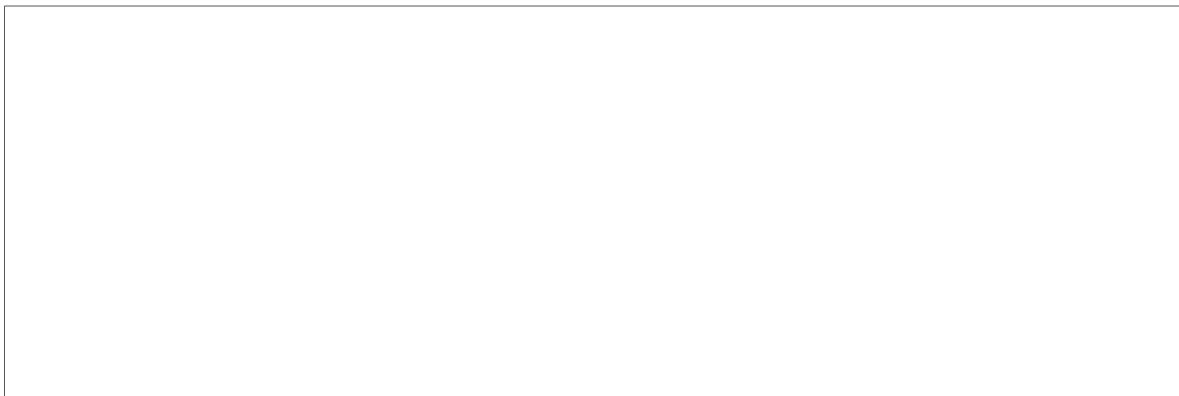
Products	Degrees API <u>b/</u>	Pounds per US Gallon	Barrels per Metric Ton <u>c/</u>
Aviation gasoline	68.0	5.904	8.891
Other gasoline	61.0	6.119	8.578
Kerosine	42.0	6.790	7.731
Specialty distillates (naphtha, gas oil, solvents, and the like)	41.7	6.803	7.716
Diesel fuel and distillate fuel oil	36.0	7.034	7.462
Benzene	29.4	7.323	7.168
Lubricating oil	27.0	7.434	7.061
Residual fuel oil and light specialty liquid residuals	13.0	8.115	6.437
Heavy specialty residuals (tar, road oil, and the like)	4.6	8.658	6.063
Liquefied petroleum gas	133.3	4.450	11.799
Natural gasoline	79.0	5.596	9.379
Cycle product type of natural gas liquids	49.1	6.523	8.047

- a. These conversion factors are applied only where the stock is specifically identified. The factors are used primarily in the unpublished appendixes. Standard values of the oil industry are assumed for temperature and pressure. Average dry refinery still gas is considered to weigh 0.07 pound per standard cubic foot.
- b. Degrees of gravity on the American Petroleum Institute (API) scale. Data as shown are for liquid products only.
- c. The standard oil barrel of 42 US gallons (35 Imperial gallons) is used.

S-E-C-R-E-T

APPENDIX B

METHODOLOGY



50X1

2. Soviet Oil and Gas Pipelines.

a. Basis of Estimated Physical Data for Oil Pipelines.

In general, the oil pipelines discussed in this report are the most important ones in the USSR [redacted]. In some instances, however, the available evidence is not conclusive. Estimates have been made for some minor trunk oil pipelines and certain trunk oil pipeline branches in addition to the major trunk oil pipelines. It was necessary in several instances to develop additional estimates for the line pipe diameters and dates of installation of some pipelines. The additional estimates are based on evidence of Soviet practices in a given area or in general or during a specific time period, and the estimates are subject to a rather wide range of probable error. The estimates of the lengths of pipelines are [redacted] selected by correlation with map measurements and probable route deviations where necessary, and are believed to be the most realistic available.

5(50X1  
50X1

50X1  
50X1

Table 1\* shows 10 pipelines under construction and 8 pipelines completed in 1956, all of which are projects of the original Sixth Five Year Plan, and also shows 76 pipelines completed before 1956.

\* Appendix A, p. 41, above.

S-E-C-R-E-T

S-E-C-R-E-T

Table 1 summarizes the information available at the time of the final compilation of this report, but new data were becoming available [redacted] [redacted] later in 1957 which may identify a number of trunk oil pipeline constructions and construction activities not listed in the table and may necessitate revision of some data given in the table, particularly that of 1950-56. All pipelines in Table 1 serve as main central lines between terminal points, and to facilitate comparison with US statistics on trunk pipelines, all pipelines in the table are considered as trunk lines. Because of a general lack of adequate intelligence data at present, no specific coverage of gathering crude oil pipelines in Soviet oilfields is included in this report.

50X1  
50X1

b. Basis of Estimated Physical Data for Gas Pipelines.

[redacted]

50X1

[redacted] Progress in the Soviet fuel gas industry has been limited except in the last few years, and Soviet publications, even as late as 1956, point to the acute inadequacy of the distribution gas pipelines in the cities.

50X1

c. Assumed Continuity Status of Oil and Gas Pipelines.

If an oil or gas pipeline is indicated to have been installed between given terminal points in the USSR, and if there is no evidence to the contrary, it is here assumed that the pipeline has been continued in active service. Various maintenance operations, such as repair, rehabilitation, or even replacement, depending on the age and use of the line, obviously would be required for service to continue. With few exceptions, [redacted]

50X1  
50X1

[redacted] service is considered to have been continuous for all of the reported and estimated total pipeline lengths as given for the USSR.\*

\* In the US at present, most of the new pipeline construction is either for replacement of old lines or along new routes to serve for production or processing. The USSR is still in the stage of building oil pipelines largely for service to older areas of production and processing. [redacted]

50X1  
50X1

[redacted] during 1950-52 in the US almost 45 percent of the total length of new oil pipeline construction (more than 51,000 km) served to make up for oil [redacted] [footnote continued on p. 93]

- 92 -

S-E-C-R-E-T

S-E-C-R-E-T

3. Petroleum Traffic in the USSR.

The quantity or volume of Soviet petroleum traffic is estimated in this report in terms of metric ton-kilometers, metric tons originated, and average length of stock transport in kilometers. Unless otherwise noted, metric ton-kilometers and metric tons originated are considered and quantified on an annual basis. The average length of stock transport in kilometers is the ratio of metric ton-kilometers to metric tons originated.

Soviet literature on oil pipeline traffic is mostly concerned with the transport of nongas petroleum stock\* by railroad, internal waterway shipping, and maritime shipping and usually excludes reference to truck or other highway freight traffic. Such nongas petroleum stock generally consists of crude oil and petroleum products, presumably including natural gas liquids. Most of this stock in the USSR originated as natural petroleum, but minor quantities of synthetic petroleum derivatives may be included.

4. Auxiliary Service Installations and Potential Throughput Capacities.

The principal auxiliary service installations consist of tank farms and pumping stations for oil pipelines and of gas holders and

---

pipelines that were concurrently dismantled either along the same route or along different routes. During the subsequent 3-year period, 1953-55, almost 42 percent of more than 50,000 km of total new oil pipeline construction similarly served to make up for concurrently dismantled lines.

\* The nongas-stock is predominantly liquid petroleum in the physical state handled, chiefly the following: crude oils and natural gas liquids; distillate or liquid fuels for internal combustion engines, mostly as gasolines, otto-cycle tractor fuels, diesel-cycle engine fuels, and jet fuels; other kerosines; lubricating oils; specialty oils and other specialty naphthas with solvents included; and residual and other types of fuel oils primarily used for direct heating. In minor proportions the stock may consist of semiliquid materials (tars, asphalts, paste greases, and the like) and some solid materials (petroleum coke, waxes, and the like). Petroleum pipeline traffic, of course, is essentially restricted to the transport of fluid stocks.

- 93 -

S-E-C-R-E-T



S-E-C-R-E-T

compressor stations for gas pipelines. Potential throughput capacities refer to time rates of volume or mass transfer of oil or gas by pipelines. The available information for all such features is applicable to only a small portion of the total lengths of the pipelines in the USSR.

[redacted] no attempt has been made in this report to develop an over-all correlation for the auxiliary service installations. A brief review is included in the unpublished appendixes, however, to cover the source information on facilities of those types.

50X1

[redacted] a reasonable basis for estimates of the actual amount of transportation accomplished by use of oil pipelines in the USSR, but data are not available on the actual use of gas pipelines. Estimates of the actual amount of transportation by oil pipelines are substituted in this report for estimates of potential capacities applicable, inasmuch as the estimates of actual use should be of more intelligence value than estimates of potential capacities. In the unpublished appendixes, however, there is a summary of the fragmentary data available for potential capacity ratings of the Soviet oil pipelines. For the trunk or transmission gas pipelines estimated to be existing in the USSR, available data on even the potential throughput capacity ratings are fragmentary.

50X1

5. Data on Oil Pipeline Traffic.

The estimates in this report for oil pipeline traffic in the USSR are based primarily on the data and ratios published in the Soviet press in 1955-57. These data generally relate only to specified key years, and the time sequences as here estimated required a somewhat elaborate system of interpolations and extrapolations together with use of numerous sources of earlier origin. Although all comparative data for the US shown in this report are essentially based on open-source statistics, a mathematical analysis of some complexity was required to develop data suitable for comparison with oil pipeline traffic in the USSR. Details and full documentation for the oil pipeline traffic data in the USSR and the US are included in the unpublished appendixes.\*

50X1

S-E-C-R-E-T

6. Recent General Reports on Soviet Oil and Gas Pipelines.

In 1956 and early 1957 a number of Free World press reports [redacted] were published, generally covering the trunk pipelines installed and currently planned for oil and gas in the USSR. These reports vary from brief summaries to comprehensive discussions and generally have pipeline maps attached and sometimes deal only with the Soviet gas industry. [redacted]

50X1  
50X1

50X1  
50X1

7. Weight-to-Volume Conversion Factors for Petroleum Stocks.

In this report an assumption is made that when no temperature and pressure conditions are specified, the standard values of the industry are implied for such conditions where volumes are reported for liquid petroleum. On the basis of general information, referring to the standard oil barrel of 42 US gallons, the liquid densities of typical natural crude oils are assumed to be as follows: 7.3 barrels weigh 1 metric ton in the USSR, and 7.418 barrels weigh 1 metric ton in the US. Distillates generally predominate among petroleum product oils transported by pipeline, and the average conversion factor for such product oils in the US is 8.488 barrels per metric ton. On waterway carriers, such as river barges and ocean tankers, loads of petroleum products normally consist of all of the liquid types together with the solid types, and for such liquid products the average density is taken as that of the typical natural crude oil.

Specific conversion factors for petroleum products are shown in Table 19.\* In addition to the liquid products shown in the table, average dry refinery still gas is considered to weigh 0.07 pound per standard cubic foot.

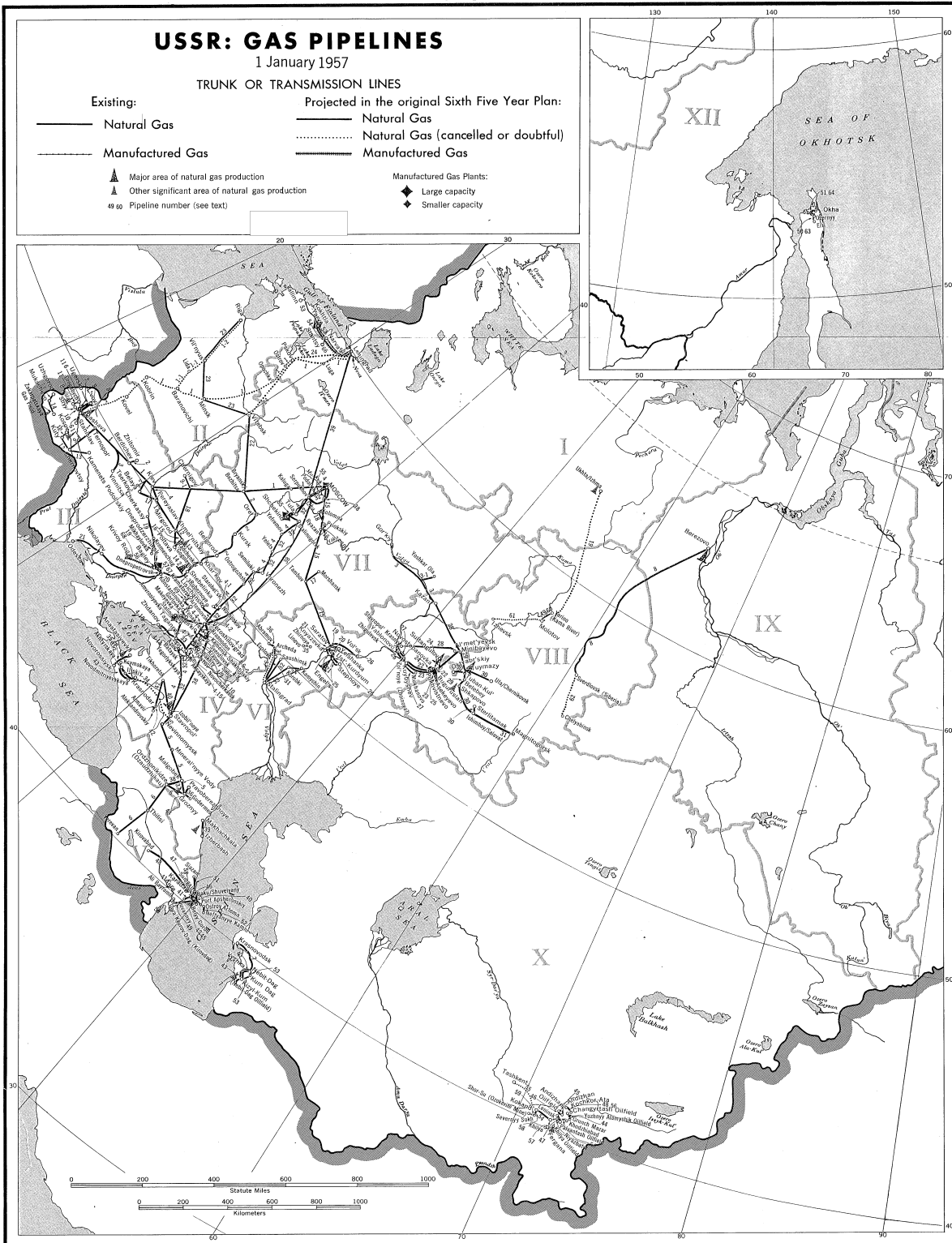
\* Appendix A, p. 89, above.

S-E-C-R-E-T

**Page Denied**

**SECRET**

Figure 6



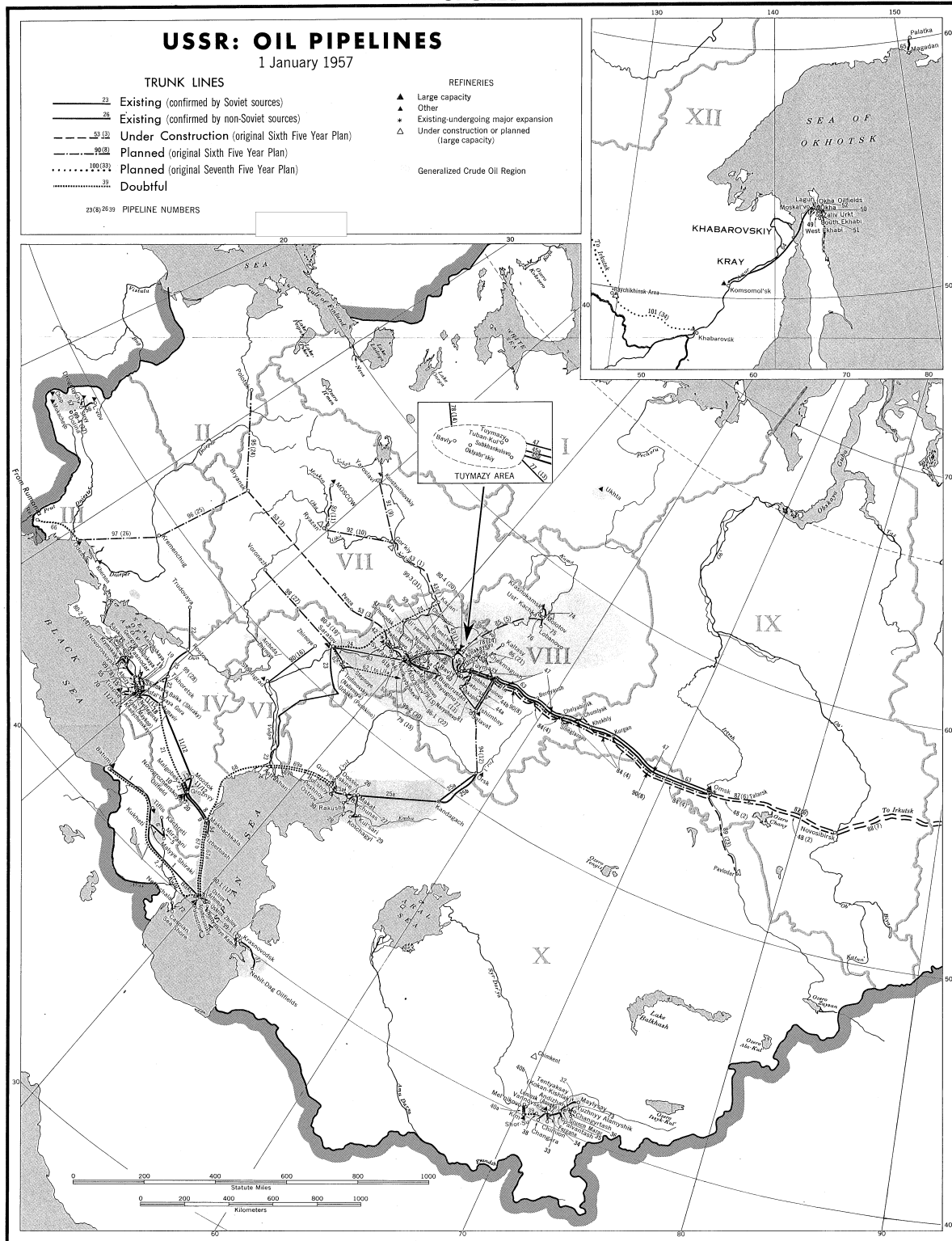
50X1

**SECRET**

50X1

**SECRET**

Figure 1



25610 12-57

**SECRET**

50X1

50X1

**SECRET**



50X1

**SECRET**



50X1