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DIRECTORATE OF
INTELLIGENCE

Intelligence Memorandum

Petroleum In North Vietnam At The Outset Of 1970: A Review Of Developments During 1969

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February 1970

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CENTRAL INTELLIGENCE AGENCY
Directorate of Intelligence
February 1970

INTELLIGENCE MEMORANDUM

Petroleum In North Vietnam At The Outset Of 1970: A Review Of Developments During 1969

Introduction

The capability to import, store, distribute, and consume petroleum is critical to the North Vietnamese support of its military forces and its civil economy. This memorandum examines activities that affected that capability during 1969 and describes the petroleum economy at the outset of 1970.*

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Note: This memorandum was produced solely by CIA. It was prepared by the Office of Economic Research and was coordinated with the Office of Current Intelligence and the Director's Special Assistant for Vietnamese Affairs.

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Petroleum Supply and Demand

1. North Vietnam imported almost 390,000 tons* of petroleum products in 1969, only slightly less than the record level of 400,000 tons in 1968. As in earlier years, motor gasoline and diesel fuel oil, in approximately equal shares, accounted for about 85% of the imports; kerosine, aircraft fuels, lubricants, and specialty products made up the remainder. The total value of these imports was about $16 million. Monthly imports are shown in Table 1 and are compared with earlier periods in the chart.

2. Monthly imports in 1969 followed the cyclical pattern that has been evident since 1966. During the summer months, petroleum deliveries are generally lower than the average for the rest of the year. This probably reflects seasonal changes in demand in North Vietnam and the reduced availability in the Far East of Soviet oil supplies and shipping during the navigation season on the Northern Sea Route.

3. North Vietnamese consumption of petroleum in 1969 probably was about 384,000 tons, an average of 32,000 tons per month.** The estimated monthly

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* *Unless otherwise indicated, all tonnages are in metric tons.*

** *It is not possible to quantify consumption by types of equipment or consuming sector, because of inadequate data on numbers and use. Estimates of consumption are derived basically from analyses of estimates of imports, storage capacity, and stocks-on-hand and are probably accurate within plus or minus 10%. Average monthly imports during the 24-month period ending in December 1969 were about 33,000 tons; observed imports, which represent about 95% of total estimated imports, are highly accurate. Estimates of storage capacity,* [redacted] *are considered to be reasonably accurate, could accommodate, over time, the interim stock levels calculated from estimated imports and consumption. If consumption was substantially lower than estimated, the usable storage would have been inadequate.* [footnote continued on p. 3]

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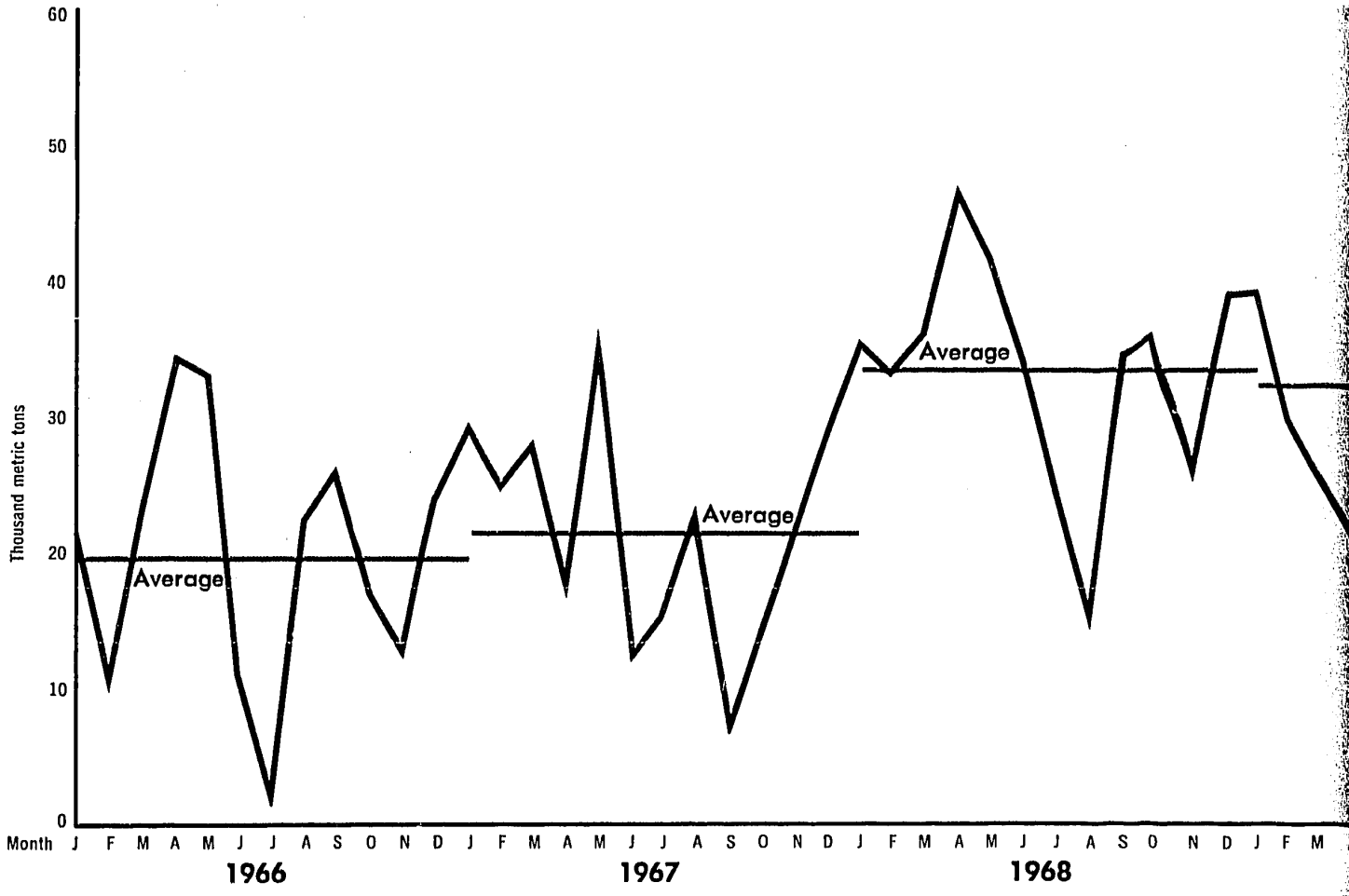
North Vietnam: Imports of Petroleum by Month, 1966-69



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North Vietnam: Imports of Petroleum by Month, 1966-69

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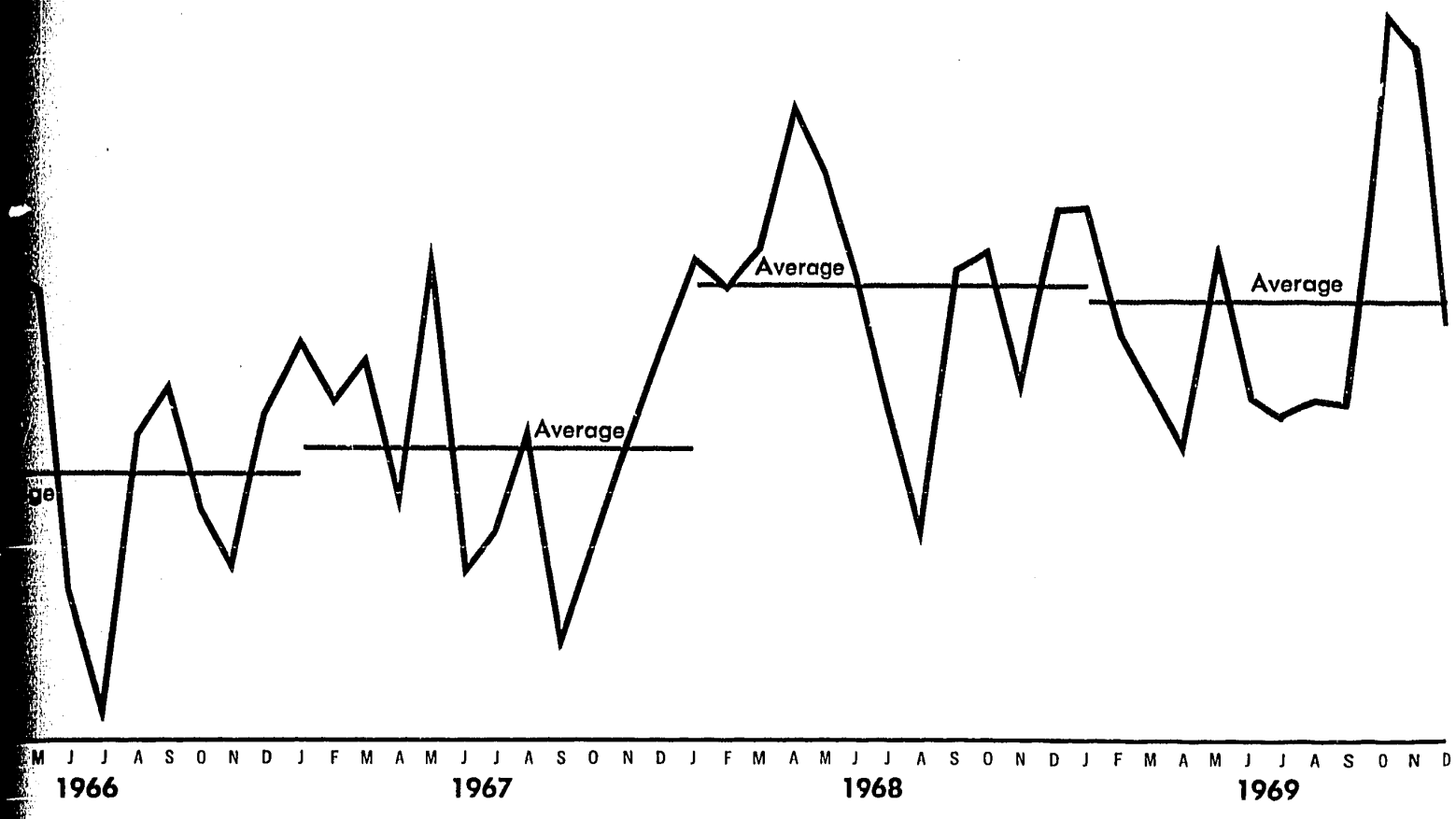

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Table 1

North Vietnam: Estimated Monthly Imports of Petroleum, by Type of Carrier 1969

Thousand Metric Tons

Month	Tanker	Cargo Vessel	Rail	Total a/
January	36.4	1.8	1.2	39.3
February	25.8	2.5	1.2	29.6
March	23.2	1.4	1.2	25.8
April	16.3	3.3	1.2	20.8
May	30.0	5.1	1.2	36.3
June	21.0	2.7	1.2	25.0
July	20.5	1.6	1.2	23.3
August	20.8	3.2	1.2	25.2
September	21.8	1.6	1.2	24.6
October	49.7	2.8	1.2	53.6
November	43.9	5.7	1.2	50.9
December	29.0	2.8	1.2	33.0
Total a/	*338.4*	*34.6*	*14.4*	*387.4*

a. Because of rounding, components may not add to the totals shown.

average in 1968 was 30,000 tons. This moderate increase in estimated consumption is consistent with the substantial imports and use of petroleum-consuming equipment and the probable increased level of activity resulting from the bombing halt.

If consumption was substantially higher, there would have been excess storage capacity and there would be no reason for North Vietnam to continue its expansion of the storage system. Moreover, if consumption was substantially higher than estimated, countrywide stocks-on-hand would have declined to levels dangerously low for a wartime economy dependent on outside sources of supply.

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4. Supplies of petroleum on hand in North Vietnam are estimated to have been about 105,000 tons on 31 December 1969, about the same as a year earlier. At the consumption rate estimated for 1969, year-end stocks would represent 100 days of supply. Petroleum supply and demand balances for recent years are shown in Table 2.

Table 2

North Vietnam: Petroleum Supply and Demand

Thousand Metric Tons

	1966	1967	1968	1969
Stocks on hand, 1 January	46	52	65	102
Imports	237	256	400	387
Total supply	283	308	465	489
Less total demand	231	243	363	384
Consumption	190	240	360	384
Losses	41	3	3	Negl.
Stocks on hand, 31 December	52	65	102	105

Petroleum Imports -- Origin and Transport

5. The USSR supplied 90% of the total petroleum delivered to North Vietnam in 1969 compared with less than 80% in 1968. The decline in deliveries from Communist China from almost 18% in 1968 to about 6% in 1969 probably reflects the end of the transfer of petroleum delivered in earlier years to China for the North Vietnamese account from Romania and the USSR. The East European countries continued to provide only about 5% of North Vietnam's oil imports.

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6. More than 95% of the imports were delivered by ship. Table 3 shows the origin of these seaborne imports of petroleum in 1969. The overwhelming share of the petroleum imports originated in the Soviet Far East and were delivered in small 4,000-DWT tankers, a procedure in effect since October 1966. In the last quarter of 1969, however, several larger tankers were employed, including one of 20,000 DWT, the largest ever to visit North Vietnam. Although tankers must discharge their cargo into lighters while at anchor, the rebuilding of bulk storage tanks and related pumping facilities at Haiphong and expansion of the lightering fleet in 1969 make it possible for North Vietnam to discharge these large tankers without undue delay.

Table 3

North Vietnam: Seaborne Imports of Petroleum, by Origin and Type of Ship
1969

Origin	Thousand Metric Tons			Percent of Total
	Tanker	Cargo	Total	
USSR	318.9	16.0	334.9	89.8
Black Sea	19.8	11.9	31.7	8.5
Far East	299.1	4.1	303.2	81.3
Communist China	8.5	12.6	21.1	5.7
Romania	11.0	2.7	13.7	3.7
Hungary	0	2.3	2.3	0.6
Bulgaria	0	0.9	0.9	0.2
Poland	0	0.1	0.1	Negl.
Total	*338.4*	*34.6*	*373.0*	*100.0*
	Percent			
	91	9	100	

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Petroleum Storage

Principal Storage Terminals

7. Immediately following the bombing halt in November 1968, the North Vietnamese began reconstruction of some of the tanks at the principal storage terminals that had been damaged severely in the intensified bombings in mid-1966. Using steel salvaged from the damaged tanks, large welded-steel tanks were constructed on the existing foundations.

8. At the Haiphong terminal, seven tanks with a total capacity of about 6,800 tons had been restored by the end of 1969, and two tanks with a total capacity of about 1,000 tons were under construction. At the Hanoi terminal, where tankage had been completely destroyed, ten tanks with a total capacity of about 7,100 tons were constructed; and at Nguyen Khe, three tanks with a total capacity of about 2,800 tons were rebuilt. Capacity was also increased at these terminals by a negligible amount through the installation of small horizontal tanks.

9. Storage capacity at the principal terminals was more than doubled during 1969 largely through this reconstruction program. At the beginning of 1970, total storage at these terminals was almost 38,000 tons, about 40% of the total capacity (about 101,000 tons) existing on 1 January 1966. Table 4 shows the estimated storage capacities at the principal terminals at the outset of recent years.

10. The North Vietnamese had already demonstrated a capability to accept, store, and distribute petroleum supplies sufficient for their needs on a routine basis. However, restoration of tankage at the principal terminals, particularly at Haiphong, together with the coastal shuttle of petroleum from the port of Haiphong to the pipeline terminus at Vinh, has enhanced and expanded that capability. As a result, North Vietnam was able to handle a record quantity of imports -- more than 100,000 tons -- in the period October-November 1969.

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Dispersed Storage Sites -- Tanks

11. This storage system -- consisting of small horizontal tanks buried in shallow excavations and covered with earth -- was modified and expanded again during 1969. It is difficult to be precise about the net change in the number of sites or total capacity of this system during 1969. An indeterminate number of sites were abandoned and tanks were relocated from one site to another during 1969. Moreover, some sites that may have existed during 1968 were not identified until 1969.

12. There probably were at least 200 sites with an estimated total capacity of between 70,000 and 80,000 tons at the outset of 1970, compared with at least 150 sites with an estimated total capacity of between 50,000 and 60,000 tons a year earlier. This apparent increase is attributable to the expansion of the system in association with the pipeline south from Vinh and to the expansion of the storage and distribution outlets elsewhere in the south following the suspension of bombing. The dramatic shift southward in the geographical distribution of these storage sites is shown in the following comparison of the probable dispersion of these sites on 1 January 1970 and 1969.

	As of 1 January 1970		As of 1 January 1969	
Location	Capacity (Thousand Metric Tons)	Percent of Total	Capacity (Thousand Metric Tons)	Percent of Total
Above 21°	23	31	28	51
Between 20° and 20° 59'	16	21	12	22
Between 19° and 19° 59'	6	8	5	9
Between 18° and 18° 59'	16	21	8	14
Between 17° and 17° 59'	14	19	2	4
Total	*75 a/*	*100*	*55 a/*	*100*

a. Totals represent the midpoint of the estimated range of capacity.

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Dispersed Storage Sites -- Drums

13. Containers (of various small sizes but expressed in terms of 55-gallon drum equivalents) continue to be used extensively in North Vietnam for the storage and distribution of petroleum. There probably was the equivalent of about 500,000 drums, representing storage capacity of about 85,000 tons, at the outset of 1970.* This increase of about 100,000 drums from a year earlier resulted from the higher level of petroleum imports on dry cargo vessels during 1969.

Other Storage

14. No change was observed in the bulk petroleum storage facilities at military and industrial installations -- about 5,000 tons. There also is an indeterminate but presumably sizable "floating" storage capacity represented by barges, rail tank cars, and tank trucks in North Vietnam.

Summary of Storage Capacity

15. The estimated total storage capacity on 1 January 1970 probably exceeds the total that was available in North Vietnam prior to the bombings.** The following tabulation summarizes the changes in storage capacity in recent years.

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* *The drum-equivalent inventory is based on the tonnage of petroleum shipped to North Vietnam in containers on dry cargo vessels since the beginning of 1966, reduced by 10% to reflect estimated losses from attack and normal use.*

** *At the start of 1966 the principal storage terminals had an estimated capacity of about 101,000 tons, and only limited storage capacity was provided by drums and dispersed tanks.*

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	Capacity in Thousand Metric Tons			
	As of 1 January			
	1967	1968	1969	1970
Principal storage terminals	18	16	17	38
Dispersed storage sites (tanks)	30 to 40	40 to 50	50 to 60	70 to 80
Dispersed storage sites (drums)	28	50	65	85
Military and industrial sites (tanks)	5	5	5	5
Total	*81 to 91*	*111 to 121*	*137 to 147*	*198 to 208*

16. It is not practicable for all of this storage to be used at 100% of capacity. On the basis of military and civil experience, the practical limit on the use of tank capacity is 75% on the average; on drum capacity about 50%. The storage capacity in North Vietnam used in such a manner would, on the average, accommodate between 127,000 and 135,000 tons of petroleum, corresponding to at least 120 days of supply at the average consumption rate estimated for 1969. "Floating" storage, not included in this summary, would accommodate additional supply.

Other Developments

Pipeline System

17. North Vietnam's petroleum pipeline system, first observed in July 1968, continued to be extended and improved during 1969.* There now are about 150 miles

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of pipeline serving a variety of storage and distribution points in North Vietnam between Vinh and the border of Laos at the Mu Gia Pass. From the Mu Gia Pass a 30-mile extension of the system into Laos has been identified (see the map).

18. A 10-mile segment of pipeline, the operational status of which is unknown, has been identified recently in Laos, west of the Demilitarized Zone (DMZ). No extensions of this segment have been located, but this short section almost certainly has, or will have, its origin in North Vietnam. The apparent alignment of the new segment and the distance -- about 60 miles -- and formidable terrain between the new segment and the presently identified southern terminus of the Mu Gia extension, suggest that the two probably are not connected. It is more likely, although there is no firm evidence, that the new segment represents part of a separate system with its origin in the vicinity of Dong Hoi or Quang Khe on the southern coast of North Vietnam, and passes across the area immediately north of the DMZ into Laos. Such a system would provide North Vietnam with an independent and reasonably secure petroleum supply route supplied by coastal shipping from Vinh and/or Haiphong for servicing the petroleum consumers in the Panhandle regions of North Vietnam and Laos.

Exploration for Oil

19. No new oil exploration activities in North Vietnam were identified in 1969. The drilling rig identified in November 1968 in the vicinity of Thai Binh in the Red River delta had been removed as of 9 September 1969. Three drilling rigs reportedly arrived from Romania early in 1969, but their location and activity have not yet been determined.

Imports of Pipe

20. North Vietnam imported about 6,000 tons of steel pipe, not otherwise identified, from Japan in October 1969. Although this pipe may be used to expand the North Vietnamese pipeline system, the characteristics are substantially different from any pipe observed in the system. Data on identified pipe follow:

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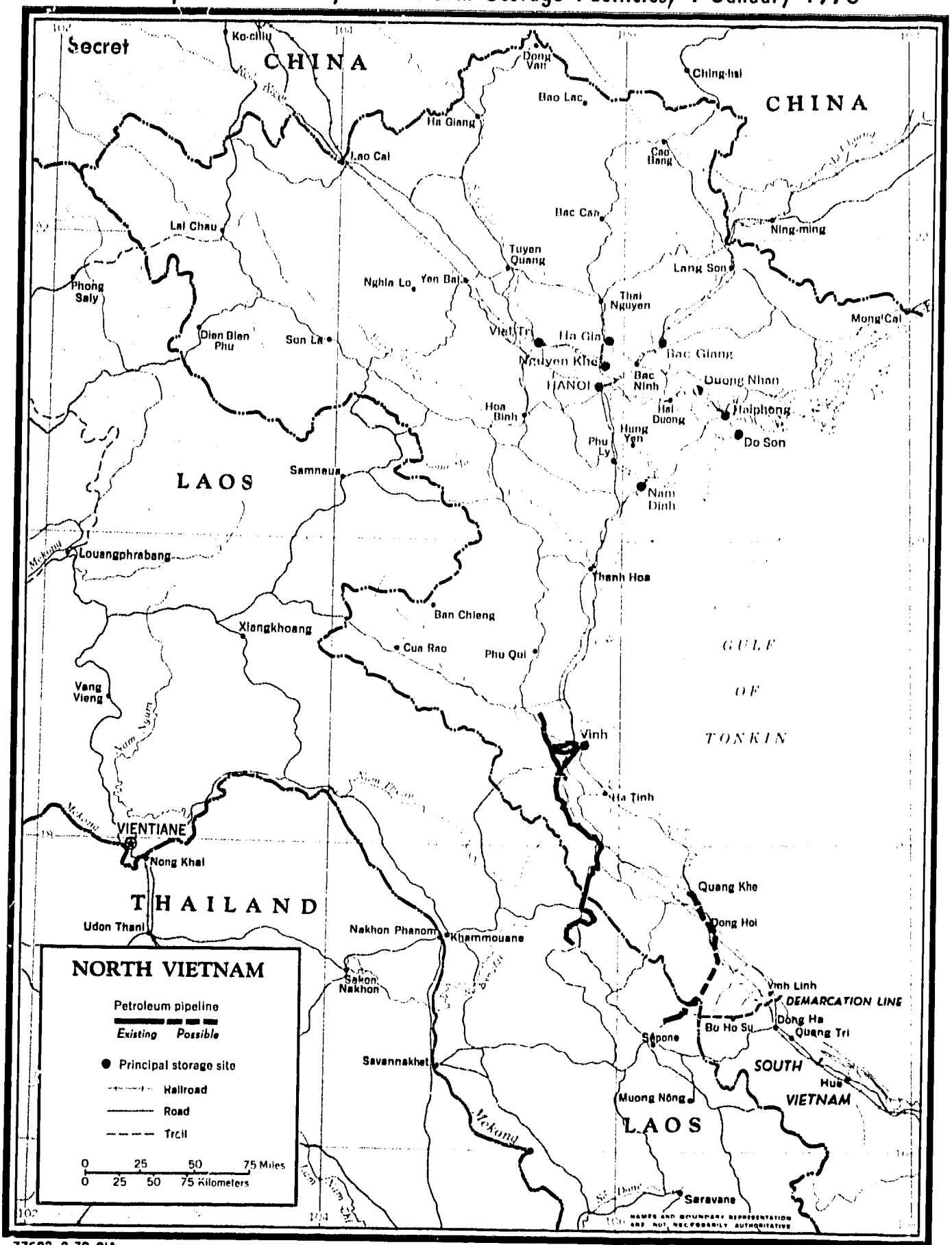
Location of Pipelines and Major Petroleum Storage Facilities, 1 January 1970



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	Tons	Inside Diameter (Inches)	Length of Section (feet)	Weight per Foot (Pounds)
Line pipe identified in North Vietnam	--	4	20	2.3 to 9*
Japanese pipe				
Type A	736	10.7	23 to 39	32
Type B	5,243	6.26	32 to 39	13.7**

21. If, as seems likely, the imported pipe is for oil-related activities, the small amount of type A would be suitable for use as a tanker discharge line or for internal distribution at the Haiphong terminal. Type B would provide for about 160 miles of pipeline with a daily throughput capacity of about 2,200 tons or double that of the present 4-inch system in North Vietnam. Additional pipeline of such length and capacity would far exceed foreseeable needs.

22. The Japanese pipe may be intended for use in oilfield activities. No imports of pipe for use with the Soviet and Romanian drilling rigs have been observed.

Conclusions

23. In 1969, North Vietnamese petroleum supplies continued to be adequate for military and civil needs, and the capacity to handle and store petroleum increased.

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* *Most of the line pipe in the North Vietnamese system is estimated to weigh between 2.3 and 4.6 pounds per foot.*

** *This pipe may consist of two grades of different unit weights, the arithmetical average of which is 13.7 pounds per foot.*

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24. Using steel salvaged from storage tanks that were damaged during the bombings, North Vietnam reconstructed oil storage capacity at three of the eight principal terminals. As a result, the total storage capacity at the outset of 1970, including dispersed tanks and drums, probably exceeds the total capacity existing in North Vietnam prior to the bombings. Moreover, the storage capacity available at the Haiphong terminal, the principal oil import point in North Vietnam, now permits the delivery of oil imports in large tankers, without excessive delays, on a routine basis. This was demonstrated by the import of 100,000 tons of petroleum in October-November 1969, about 25% of the total for the year and a record level for a 60-day period.

25. The fully operational pipeline now provides an economical and efficient all-weather petroleum supply route from Vinh to various storage and consuming points within the Panhandle of North Vietnam and into Laos. A newly observed segment of pipeline, the ultimate limits of which are not yet identified, may be an extension of the existing operational pipeline system through the Mu Gia Pass or, as seems more likely, it may be part of a separate, more secure supply route from the coastal areas of Dong Hoi/Quang Khe.

26. There was no evidence of petroleum shortages in North Vietnam during 1969, and the USSR continued to provide timely shipments in adequate quantities. Imports and consumption of petroleum in 1969 were essentially unchanged from a year earlier, and stocks-on-hand at the outset of 1970 were sufficient for 100 days of supply.

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