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Intelligence Memorandum

*The Overall Impact of the US Bombing
and Mining Program on North Vietnam*

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TCS-2682/72
August 1972

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CONTENTS

	<u>Page</u>
Summary and Conclusions	i
I. Introduction	1
II. North Vietnam as a Target	3
III. Current Import Situation	5
Impact of the Mining Program on Imports	6
Impact of the Bombing Program on Imports	7
Supply Movements Within North Vietnam	8
Summing Up the Import Situation	11
IV. Impact on the Economy	13
Impact on Individual Economic Sectors	16
V. The Economic Outlook	21
VI. Impact on Military Capabilities	25
Military Resupply Requirements	26

Appendixes

Appendix A. Minimum Import Requirements	29
Appendix B. Petroleum Pipelines	33

Following Page

Maps

North Vietnam: Panhandle Area	28
North Vietnam: Northern Area	28
North Vietnam: Petroleum Pipeline Construction	33

TCS-2682/72

CENTRAL INTELLIGENCE AGENCY
11 August 1972

INTELLIGENCE MEMORANDUM

IMPACT OF THE US BOMBING
AND MINING PROGRAM ON NORTH VIETNAM

Summary and Conclusions

We have examined all available data regarding the present and potential effect of the US interdiction program in order to assess its probable overall impact on North Vietnam's economic, logistics, and manpower situation as of early August 1972, 1 October 1972, and 1 January 1973. This examination and analysis has produced the following general conclusions.

a. The data available support only the most tenuous estimate of the volume of overland imports now being received by North Vietnam. Our estimate -- based on extremely limited information -- is that such imports have totaled on the order of 3,000 metric tons per day during June and July 1972. This is less than one-half the daily rate of North Vietnam's combined sea and overland imports in 1971. It is, however, more than the daily level of imports (2,700 metric tons -- see Appendix A) which we estimate that Hanoi must receive to meet its minimum economic needs and to provide sufficient supplies for its military forces in the South to continue the war with periodic high levels of activity.

b. Given no significant increase in the impact of the US interdiction program, it seems likely that North Vietnam can sustain this level of resupply. Over the coming months, as North Vietnam continues to work out countermeasures to the US program (including the completion of multiple pipelines from China), it is likely that Hanoi will be able to increase its imports above the 3,000-ton-per-day level.

TCS-2682/72

c. Therefore, the evidence available suggests that over the next few months a lack of supplies alone -- with the possible exception of important items such as tanks and heavy artillery pieces -- will not materially diminish the capabilities of enemy main force combat units, at least in northern South Vietnam. Near the DMZ and in general in GVN MR 1, the enemy's ammunition and weapons requirements for this period, including requirements for occasional (not sustained) peaks of offensive activity, can probably be met out of current stocks, augmented by imports included in the 3,000-ton-per-day level cited above. Similarly, inside North Vietnam, current equipment and ammunition stocks, with some import augmentation, will probably be sufficient to sustain North Vietnam's air defense activities at about current levels over the period considered. (An exception may be surface-to-air missiles, whose rate of fire has perceptibly diminished since late May.)

d. In the areas of South Vietnam to the south of MR 1, we do not have sufficient information to judge whether the enemy's level of stocks is adequate -- this late in the rainy season and after the enemy's high rates of expenditure from April through June -- to carry out new rounds of heavy offensive action. In these areas from now at least until October, when the next dry season begins, the enemy will have to depend largely on stocks brought in during the last dry season.

e. The Communists' combat losses in the South (especially among their experienced cadres), the pounding they have taken on the ground and from the air and the degradation of morale, in at least some line units, will play a more important part than supply stock levels in determining the fighting effectiveness of Communist forces. This is true now and -- assuming no increase in the impact of the interdiction program -- it will also be true on 1 October 1972 and 1 January 1973.

f. Hanoi has had to divert large amounts of manpower to repair bomb damage and to keep its transportation network in operation. Despite the disruption of daily life and other difficulties this has caused, North Vietnam has sufficient able-bodied manpower to keep essential activities functioning both now and for the duration of the period dealt with in this memorandum.

TCS-2682/72

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TCS-2682/72

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TCS-2682/72

g. Petroleum and food are the only two resources we can specifically identify for which potentially critical shortages might emerge in the North Vietnamese economy between now and early 1973. Petroleum stocks at present are probably at their lowest point of the war. If the North Vietnamese failed to achieve a sustained flow of supplies (either through the new pipelines or by using tank cars and truck transports), severe shortages would probably develop at least by 1 October. On food, if the forthcoming autumn crop should fail -- that is, fall to the 1971 level or below -- and if Hanoi should be unable to import enough rice to counterbalance such a failure, serious food shortages could develop by 1 January 1973.

h. While the combination of reduced imports and continued bombing of North Vietnam's economy and transportation system is unlikely to cripple Hanoi's ability to provide the logistic support necessary to its military forces, the economy itself will face increasingly difficult problems in the months ahead. Most of North Vietnam's fledgling modern industry, rebuilt since the 1965-68 bombing campaign, has now been destroyed again. Consumers have had to tighten their belts and may have to do so again by early 1973. The damage to North Vietnam's transportation network has further disrupted economic activity. In the coming months, problems will almost certainly arise -- shortages of spare parts, certain types of industrial raw materials, etc. -- which we cannot now identify but which, cumulatively, may become increasingly troublesome to the regime. Such stresses will certainly have an adverse impact on the morale of the North Vietnamese people, but the general population is sufficiently patient and resilient -- and overall discipline reinforced by Party control sufficiently effective -- to minimize the likelihood of morale considerations exerting a major influence on Hanoi's political decisions during the next several months.

i. On balance, our view is that barring major agricultural failure or greater disruption to the logistic system than the United States has been able to impose in the past three months, the bombing and mining program probably will not, of itself, pose unmanageable difficulties to the North Vietnamese regime -- either now or through early 1973. It should be recognized, however, that this memorandum neither considers nor passes judgment on the question of whether a **combination** of pressures brought to bear by other factors in addition to

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the US interdiction program might create unmanageable difficulties for the regime in Hanoi and induce that regime to change its present policies.

TCS-2682/72

I. Introduction

1. To a greater degree than is the case with most other Communist countries, economic data on North Vietnam are sketchy, misleading, and dated. Military information, of course, is held in close secrecy by the regime and must be ferreted out by a variety of complex intelligence methods. Even the basic economic indices, however, are practically impossible to come by with any assured degree of accuracy. For example, the current population estimate of roughly 20 million people for North Vietnam was made, not by the North Vietnamese, but by the US Bureau of the Census, based on data from a North Vietnamese census now 12 years old. Similarly, the last major official statistics on the economy were published by the North Vietnamese nearly 10 years ago. Our estimates of North Vietnam's agricultural output are not made from any official statistical presentations; instead, they are derived from [REDACTED] some photography and communications intercepts, and from sometimes contradictory North Vietnamese propaganda statements.

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2. The estimates in this memorandum of overland imports into North Vietnam were developed largely from aerial photography taken on eight separate days during the period from 2 June to 7 July 1972.⁽¹⁾ From what are essentially "point-in-time" estimates of stock levels at the border storage points, we have derived a view of the dynamics of the daily supply flows -- a view obviously subject to a wide margin of error since we have usable photographic coverage for so few days. Pilot reports of truck traffic below the border, in northeastern North Vietnam, tend to confirm a relatively high level of import activity. Such sightings, however, have been infrequent -- only seven between 7 June and 20 July have been sufficiently detailed to be used in our analysis.

3. Our judgments on the future impact of the US interdiction program on North Vietnam are subject to an even greater range of imponderables: What level of imports will be underwritten by Hanoi's allies; will there be major changes in the scale or pattern of US bombing effort against North Vietnam; how will the weather, flooding, or other factors influence this autumn's harvest in North Vietnam? These are only a few of the questions that cannot be answered before the fact. The following discussion necessarily makes what are essentially arbitrary assumptions about all of these factors in order to arrive at meaningful conclusions. The passage of time and the continuing intensive collection effort will undoubtedly surface new information which, in turn, will allow us to sharpen many of our judgments below.

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II. North Vietnam as a Target

4. North Vietnam presents far from an ideal setting for a successful import denial and economic disruption program. First, except for its manpower and agricultural production, North Vietnam's own economy makes only a minimum contribution to the support of military operations. North Vietnamese industry has a very small capability to produce military equipment. All heavy military hardware, as well as most small arms, ammunition, and petroleum, must be imported from Communist countries.

5. Second, North Vietnam's economy is essentially agrarian. Its industries are generally simple and small-scale. This can be seen in the following tabulation, which shows the relative contributions of various sectors to national output. Such an economy has substantial resiliency and capacity to resist economic collapse and requires comparatively few sophisticated inputs from domestic industry or from abroad to sustain production levels.

<u>Economic Sector</u>	<u>Percent of National Output</u>
Agriculture	50
Industry	25
Central (modern)	10
Local and handicrafts	15
Construction	5
Commerce, transportation, and communications	20
Total	<u>100</u>

6. Third, the internal transportation system is, for a variety of reasons, relatively invulnerable to complete interdiction. When the US bombing first commenced in 1965, North Vietnam already had a road, rail, and waterway system which was entirely adequate for its military and economic requirements. During the following years, the system was continually repaired and its redundancy enhanced by new roads paralleling the old and by numerous fords, ferries, and bridges at points vulnerable to attack. The tonnages that must move over the North Vietnamese transport system are small compared with the overall capacity of the system, and any campaign directed at stopping the flow soon reaches a point where further effort expended produces only diminishing returns.

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7. Finally, any campaign directed ultimately at denying war materiel to the front lines is faced with the fact that there is in existence a multitude of widely dispersed -- and generally highly secure -- storage areas in North Vietnam and along the enemy's supply corridors in southern Laos and northeastern Cambodia. We have no way of estimating the sum total of such supplies, but there is substantial evidence that it is very large. During the course of the war, we have amassed a considerable body of information which reveals much about Communist stockpiling doctrine related to the war in Vietnam. In general, the doctrine is a conservative one. As a matter of policy, the North Vietnamese maintain large stockpiles of war materiel and do not prepare for offensive activity in a hand-to-mouth manner. Throughout the war, Communist forces appear to have adhered to a stockpiling concept that calls for large reserves of all basic equipment and supplies.

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III. Current Import Situation

8. In 1971, North Vietnam's seaborne imports, some 90% of total imports, jumped nearly 20% over the 1970 level to a record 2.2 million tons. Shipments from the USSR were at an all-time high, and those from the People's Republic of China (PRC) were the largest in three years, together accounting for 88% of total seaborne imports. Incoming cargo in the fourth quarter soared as Moscow and Peking poured in food and other supplies to assist in flood relief. Record volumes of fertilizer, petroleum, and general and miscellaneous cargoes were unloaded.

9. This pattern of imports continued until the activation of the mines on 12 May. North Vietnam's seaborne imports in the first quarter of 1972 -- 580,000 tons -- were slightly above the level for the first quarter of 1971 and represented the highest of any first quarter on record.⁽²⁾ Imports from the USSR were about the same as a year earlier, while those from the PRC were up about 25%. Shipments from non-Communist countries were the lowest ever, accounting for less than 1% of total imports.

10. Petroleum imports by sea soared to an all-time quarterly high of 152,800 tons in the January-March 1972 period, nearly all from the USSR. Although the volume of food imports was below the October-December level, it still was well above that of the first quarter of 1971. Fertilizer imports, however, dropped sharply as did metals and machinery.

11. The 1971 and early 1972 pattern of imports has generally been regarded as the scale against which to measure the effectiveness of the current US interdiction program. This, however, can be misleading. For example, the total of annual seaborne imports to North Vietnam during the past seven years has ranged from 850,000 tons (1965) to 2.2 million tons (1971), with the second highest level having been reached in 1968. Identified food imports have ranged from 80,000 tons (1966) to 800,000 tons (1968) while petroleum imports were only 170,000 tons in 1965, compared with about 390,000 tons in 1968 and 1971. This is not to argue that North Vietnam's economy could easily be rolled back to a position in which the level of imports in 1965 would be satisfactory, but it is clearly an oversimplification to regard the 1971 situation as the only standard by which to judge 1972.

2. Seaborne imports in April 1972 were slightly over 227,000 tons.

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Impact of the Mining Program on Imports

12. At the time of the mining on 12 May, 29 foreign ships were located in North Vietnamese ports. Of this total, 26 were at Haiphong, one was in Cam Pha, and two (both Chinese freighters) remained at the Hon Nieu anchorage in the Panhandle near Vinh. Despite press reports and North Vietnamese claims, no foreign ships have transited the minefields since they were activated. Continuing photography of the Haiphong area, while showing that some ships have moved to new locations, identifies all of the 26 ships within the confines of the port.

13. The 26 ships which remain at Haiphong carried about 151,000 tons of cargo and have been slowly unloaded since being confined to the port.⁽³⁾ As of 5 August, it is estimated that about 147,000 tons had been unloaded from these ships and either stockpiled or distributed to points throughout North Vietnam.

14. In addition to trapping ships in North Vietnamese ports, the mining caused the diversion of 23 foreign ships with more than 155,000 tons of cargo which were on the high seas en route to North Vietnam. Some of these ships were diverted to Chinese ports. As of 31 July 1972, 16 foreign ships, including two Soviet ships under North Vietnamese charter, had called at Chinese ports with about 59,000 tons of cargo for North Vietnam. By 10 August, 13 of these 16 ships -- with some 42,000 tons of cargo -- had been offloaded. By late July and early August, two Soviet tankers had been allowed to deliver petroleum to Shanghai, and -- since China does not normally import oil from the USSR -- this petroleum probably is intended for North Vietnam. These circumstances suggest that the Soviets and Chinese probably have concluded an offset arrangement, under which the Chinese provide oil to North Vietnam and in return receive oil for their own use which the Soviets previously would have shipped directly to North Vietnam.

Lightering

15. While no ocean going freighters have transited the minefields at Haiphong, some lightering is taking place off the southern coast of North Vietnam, in the general vicinity of Vinh and at Hon La Island. Since 8 May, eight Chinese ships have offloaded onto lighters about 20,000 tons of cargo (14,000 tons in the Vinh area and 6,000 tons at Hon La) most

3. Of the 151,000 tons of cargo, the major categories were 71,400 tons of miscellaneous and unidentified cargo and 50,600 tons of food. In addition, 16,400 tons were fertilizer and 12,300 tons were petroleum.

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of which was probably food. Although large numbers of lighters have been destroyed as they have moved toward the shore with cargo, as much as 75% (9,000 tons) of this tonnage may have been successfully landed.

Coastal Shipping

16. There is tenuous evidence that a coastal resupply link between China and North Vietnam has been established in the area north of Haiphong. On 24 and 25 July, US pilots reported sighting two small groups of coastal freighters or merchant ships just outside the Haiphong channel entrance. On 29 and 30 July, pilots observed approximately 50 to 75 junk-type watercraft in groups heading south toward the island of Bach Long Vi some 50 miles off the coast southeast of Haiphong. Some of the craft were reported to have canvas-covered aft decks, presumably concealing above-deck cargoes. Bach Long Vi Island, located midway between Hainan Island and the North Vietnamese mainland, could serve as a storage or stopover point for enemy boats traveling at night between these points.

Impact of the Bombing Program on Imports

17. Since May, North Vietnam has continued to move supplies overland from China. The aggregate tonnages delivered are substantial, although well below the combined seaborne-overland imports estimated for 1971. Until the first week of June, supplies continued to be shuttled over the battered northeast (Hanoi - Dong Dang) rail line, after which this rail line was blocked for a month, necessitating transshipment by truck into the Hanoi area. By early July the rail line was again open for limited shuttling operations. Throughout this period some supplies also have been shuttled along the less important rail line running northwest from Hanoi to Lao Cai on the Chinese border. Other supplies have moved into the country by roads and possibly by the new pipeline system from China (if any of the lines have been completed).

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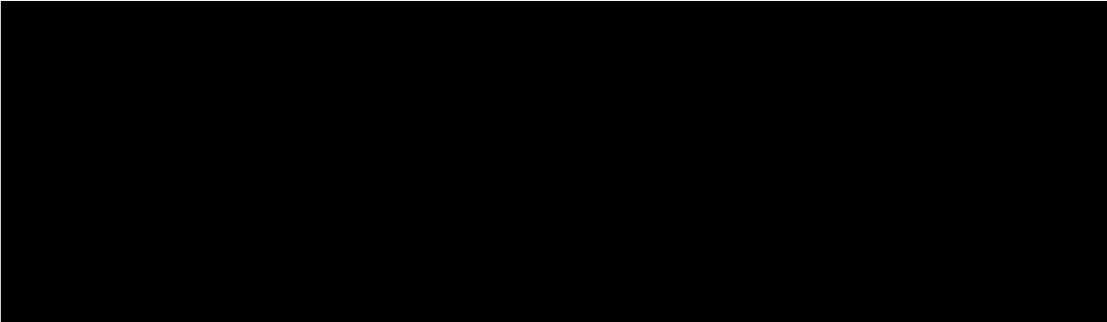
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Roads

19. Additional amounts of tonnage have moved across the border by road from various military storage areas in southern China or from rail transshipping points north of P'ing-hsiang and Ho-k'ou. Numerous storage facilities are located in southern China, where cargoes delivered by rail could be transshipped to trucks and driven over the road network into North Vietnam. A total of 15 to 20 road connections cross the China-North Vietnam border with a combined capacity of about 10,000 tons per day in the dry season and 3,000 tons per day in the wet season (June-September). Most of these roads are surfaced with gravel and are in fair to good condition. Several of the roads that cross the border parallel or connect with the two rail lines that enter North Vietnam. These roads could provide alternative routes for any cargoes backlogged on the rail lines.

20. It is impossible to quantify accurately the tonnage of supplies crossing the border by road, although it could amount to several hundred tons per day. COMINT has provided an example of a large order -- about 5,500 tons of food -- being planned for August shipment to or through two provinces in northern North Vietnam which have no rail lines. These shipments will therefore have to come by road. Intercepted messages have also indicated a possible movement within North Vietnam during early August of substantial amounts of supplies from a point near the northwest border to the Thai Nguyen area by truck.

Supply Movements Within North Vietnam

21. The movement of imports from the China border to the Hanoi transportation hub has been accomplished during the past three months by a combination of road, rail, and waterway use. There is no way to quantify accurately the actual tonnages so moved, but in the aggregate they are large.

22. Despite massive disruption of the northeast rail line from China after 10 May, some movement of supplies to the Hanoi area has continued to take place. Cumulative damage since May caused by the US bombing

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program has kept the line inoperative for intermittent periods, with the most serious damage inflicted in early June when 19 bridges, tunnels, and yards - some within 15 miles of China - were attacked and either destroyed or damaged, effectively disrupting rail service. This damage was not repaired until early July, and the capacity of the line was thus considerably reduced for at least one month. The disruptions along the northeast line lasted at least through 5 July. After this date, [REDACTED] a viable shuttling operation was restored so that goods could be moved from China to the Hanoi area with only two transshipping operations. In addition, [REDACTED] evidence of rail-to-road or rail-to-water transfer areas along this route and of supply buildups at these points indicates that rail shuttling was actually under way. Departures of the international train from Hanoi to Peking, as indicated in intercepted messages, also support the conclusion that the line was frequently usable, at least for shuttling.

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23. On the northwest rail line from China (via Lao Cai), through rail service to Hanoi has been effectively disrupted since 17 May, when the rail bridge at Viet Tri was destroyed. At least 25 other bridges between Viet Tri and the China border have been attacked and destroyed since then. As of late July, traffic could move from Lao Cai into North Vietnam for a distance of only about 30 miles. Selective repairs, as well as some efforts at camouflage on certain bridges, have been apparent on this line. To date, however, it appears that the North Vietnamese have used the line for light shuttling only and have concentrated their repair efforts on the more important northeast (Dong Dang - Hanoi) route. It is obvious from the much lower number of freight cars sighted at the border crossing point on the northwest line that the North Vietnamese have less reason to mount a major repair effort on this line.

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24. [REDACTED] after about mid-June (after the northeast rail line was interdicted) a sharp increase occurred in the use of three major road systems leading south from China in the vicinity of P'ing-hsiang - Dong Dang. Accompanying this surge in truck traffic has been the development of extensive roadside facilities to service the large fleet of vehicles and the supplies being moved over these roads -- Routes 1A, 1B, and 415/13B/184. Except for certain kinds of large machinery and special petroleum products, most rail-shipped items can be transshipped to trucks at the border quite easily for southward movement within North Vietnam. Heavy ordnance -- including SAM's -- can be unloaded at the border and either attached to trucks or prime movers, or loaded on special transporters and moved southward.

25. From P'ing-hsiang, some 2,700 to 2,800 trucks dispersed over the three main corridors would be required nightly to move the 2,200 tons

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estimated to be arriving daily at that juncture on the China-North Vietnam border. This is the equivalent of roughly nine trucks per mile per corridor. Such a volume falls well within the range of traffic reported by US pilots on a 90-mile segment of Route 1A in June. On 7 June, for example, the density was reported at a minimum of eight to ten vehicles per mile and, two nights later, 30-40 trucks per mile. Pilot reports in late June and early July did not quantify the volume, but their descriptions of "bumper-to-bumper" and "very heavy" truck traffic suggest that road traffic continued to be appreciable.

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26. [REDACTED] rail-to-road transshipment facilities south of the China border in the northeast were supporting a high level of activity. The North Vietnamese appear to be offloading supplies brought across China by rail at several points south of the P'ing-hsiang rail yard. [REDACTED]

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[REDACTED] At Lang Giai, the trucks have been loading from two large warehouse structures adjacent to the rail line. Since 26 June, new construction has doubled the capacity of both of these warehouses. Further south, at Lang Dang, cargo trucks transload directly from rail cars. [REDACTED]

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[REDACTED] as many as 20 cargo trucks lined up next to waiting rail cars, while others, apparently loaded, are south of the rail siding on Route 1A headed toward Hanoi.

27. North Vietnam's truck inventory is adequate to handle the level of resupply indicated above. The truck inventory prior to the bombing program is estimated to have contained 18,000 to 23,000 trucks, almost double the number in the inventory during the bombing program of the mid-1960s. In addition, since the start of the recent bombing program, rail imports of trucks have increased sharply, more than compensating for reported losses from bombing. Between 12 May and 26 June, more than 3,000 newly imported trucks were moved through the Dong Dang truck parks at the border, and another 900 units were on hand as of 26 June. Additional trucks probably have also been moved through P'ing-hsiang. The largest number of trucks -- as many as 185 -- ever seen at one time being transloaded from Soviet broad-gauge rail cars to Chinese standard-gauge cars was observed on 22 July at the Sino-Soviet border crossing point of Man-chou-li. On the following day, all but a few of the trucks had disappeared from the rail yard and the count of locomotives and freight cars had dropped considerably. Since China imports few trucks from the USSR, the trucks observed at Man-chou-li could have been part of a shipment to North Vietnam.

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Summing Up the Import Situation

28. A key to the relative success of North Vietnam's transportation effort thus far (and a key which contains implications for the future) is to be found in the enemy's effective application of countermeasures. As was the case in the 1965-68 period, the enemy's ability to construct alternate bypasses and road segments quickly around major trouble spots has greatly reduced the impact of the current bombing effort.⁽⁵⁾ After a short shakedown period during the first weeks of the bombing, the Communists began a concerted program of countermeasures. Construction crews have managed to keep most of the major lines of communication and choke points open much of the time, and heavy traffic has continued to move into and about the country. Thus, given no increase in the current level of air attacks against transportation targets north of Hanoi, it seems likely that, if anything, increased levels of resupply will be achieved in the months ahead.⁽⁶⁾

29. Another element in this judgment is the current construction of new oil pipelines from China. There are at present three pipelines under construction (see Appendix B for details) which, when completed, would have minimum throughput capacities totaling about 3,000 tons per day. While it seems highly unlikely that North Vietnam would ever use the system

5. During the 1965-68 bombing campaign, it was estimated that sustained interdiction of the land transport in the north -- principally directed at stopping through traffic on the major rail lines -- would require 3,000 aircraft sorties a month. Even granting the increased efficiency of the current bombing program, there has been a relatively small number of strikes against the railroad and railroad/highway bridges north of Hanoi -- only about 100 attacks were flown against these targets between 10 May and 28 July, compared with 200 against relatively less important bridges south of Hanoi.

6. Weather could upset this judgment. So far, this season's rains have been slightly less than normal with no severe storms yet hitting the area. But last year, the worst flooding in recent history caused heavy damage in the Red River Delta areas, isolating Hanoi for most of August. Transportation was brought to a standstill and not until well into September did normal road, water, and rail operations resume. Currently, high water and some flooding of low-lying areas is causing some transport problems in the Delta region. In particular, high water levels on the Red River already have disrupted the rail ferry into Hanoi, and the highway pontoon bridges there are now reportedly operable only intermittently. If heavier-than-average rainfall occurs in the coming weeks and the area is visited by several tropical storms -- two very good likelihoods -- then the North Vietnamese could in the near term face more difficulties with their transportation system than they have thus far this year.

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to capacity, its existence will greatly improve North Vietnam's import situation - assuming the North Vietnamese can keep it operating. Furthermore, once the system is fully completed, it will provide the capability to pump petroleum throughout much of the country and into northern South Vietnam and southern Laos.

30. Finally, it appears that the North Vietnamese themselves are optimistic about their import prospects. Thus far there are COMINT indications that Hanoi expects to import some 37,000 tons of petroleum and 102,000 tons of foodstuffs during August. These two orders alone, if completed, would represent some 4,500 tons per day -- well in excess of our minimum estimate of actual overland deliveries during June and July.

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IV. Impact on the Economy

31. The current interdiction program has inflicted heavy damage on physical facilities in North Vietnam and has severely disrupted normal economic patterns. We estimate that over \$100 million of economic and military facilities have been destroyed since May, and the effect of the program upon the modern industrial sector of North Vietnam has been devastating. Virtually every major industrial facility has been struck and either shut down or forced to operate at less than full capacity. The destruction of the electric power net and the reduced movement of raw materials throughout the country have had a further detrimental effect on economic activity. The indirect costs resulting from lost production will continue to mount as long as North Vietnam's productive facilities are idle.

32. The seriousness of the current disruption in North Vietnam's economy, however, must be viewed in perspective. The loss of the modern industrial sector is of relatively minor importance to the lives of the 90% of the North Vietnamese people who reside outside the larger cities. Few manufactured products -- foreign or domestic -- are purchased by ordinary consumers, and the people in general will not feel the lack of these products very sharply. The importance of the entire industrial sector, including both the modern and small handicraft facilities, is illustrated by the fact that in 1963 industrial consumer goods production -- those goods going to the North Vietnamese citizen -- amounted to less than 150,000 tons of all types of products. A total loss of all output of industrial consumer goods, which had not in 1972 advanced materially past the 1963 level, could therefore be completely replaced by a relatively small quantity of imports. Moreover, even if such imports were blocked, the peasant could, without too much difficulty, revert to the styles of living and production existing in North Vietnam a few years ago.

33. With regard to imports, the pattern which has emerged since May is surprisingly similar -- with a few notable exceptions -- to the normal one for the past several years. The following tabulation on overland imports has been pieced together from fragmentary COMINT data on shipments (not orders). While these amounts are only a very tiny part of the total overland imports, the sample does highlight certain trends.

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	<u>Metric Tons</u>	
	<u>Jan-Mar 1972</u>	<u>May-Jul 1972</u>
Total	<u>9,190</u>	<u>17,175</u>
Transportation and construction equipment	<u>7,425</u>	<u>13,460</u>
Motor vehicles	7,215	7,100
Iron and steel products	210	6,360
Industrial materials and machine tools	<u>790</u>	<u>1,140</u>
Explosives	610	630
Machine tools	--	100
Other	180	410
Food and other consumer goods	<u>970</u>	<u>1,150</u>
Petroleum	<u>0</u>	<u>1,250</u>
Other	<u>5</u>	<u>175</u>

34. The import data above would seem to confirm North Vietnam's increasing emphasis on building up its internal transportation system. Large numbers of trucks are being sent from both the USSR and China. In addition, large quantities of barge plate and sheet iron are being sent by rail from Hungary for use in construction and repair of transport equipment, for example, barges and pontoon bridges. The petroleum shipments are likewise consistent with the heavy emphasis on transportation. The amounts of petroleum indicated in the above tabulation are the minimum quantities which our incomplete coverage of intercepted messages shows were actually delivered. They represent only a tiny part of the petroleum requested from the USSR in June (55,000 tons) and July (29,000 tons). For August, Hanoi has requested 37,000 tons from China, a level slightly higher than the monthly average from the USSR during 1971.

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35. There are many signs that Hanoi's present import policy is not as restrictive as it would be if the government were concentrating on moving only goods which it considered absolutely essential. The North Vietnamese are currently importing numerous consumer items such as phonograph records, buttons, zippers, and fasteners. Not only have such goods been delivered since the mining of the ports, but negotiations are continuing for future deliveries of goods which are useful amenities but not vital necessities. Even though the quantities involved are relatively small compared to total observed overland imports, this is an indication that North Vietnam's supply situation for essential goods such as petroleum, weapons, and transportation equipment apparently allows the allocation of a portion of its limited transport capability to more frivolous items.

36. The situation with respect to food imports is also instructive. The North Vietnamese have just completed (in May) a successful harvest which should be sufficient to tide them over for several months. There are at present no significant signs of food shortages in North Vietnam -- the regime recently permitted its citizens to draw double food rations for August in anticipation of distribution problems in the event of flooding this month and next. Yet Hanoi has, since the mining, requested major deliveries of food from China, with an unusually large order for the month of August, as indicated in the following tabulation:

<u>Month</u>	<u>Metric Tons</u>
May	45,000
June	90,000
July	55,000
August	102,000

37. There is no hard evidence to indicate the extent to which China actually fulfills these requests for food, although intercepted messages indicate that substantial amounts are entering the country. These large orders do suggest, however, that the North Vietnamese believe they have the capability to transport significant tonnages southward from the Chinese border.

38. Several speculative judgments can be made about Hanoi's current food imports. Hanoi may believe that its stock levels are not adequate for future contingencies -- it has expressed considerable concern for the autumn harvest. Or, North Vietnam may be bargaining for food in amounts far

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beyond what it expects to receive. In any case, it seems clear that Hanoi is willing to burden the transportation system now with requirements which are almost certainly fairly long range in nature, suggesting that its current needs for critical strategic materials are being satisfactorily met. This, in turn, suggests that our 3,000-ton-per-day import estimate represents only a part of what Hanoi expects its logistic system to be able to handle in the future.

Impact on Individual Economic Sectors

Industry

39. Electric power facilities have borne the brunt of the air strikes against North Vietnam's industry. Losses of electric generating capacity by late June had reached some 200,000 kilowatts (kw), more than 75% of the estimated national total of 260,000 kw. The important Hanoi-Haiphong power network was reduced to less than 20% of its pre-bombing capacity. For the past month the cities of Hanoi and Haiphong have had to rely on one vintage powerplant in poor operating condition and a number of small diesel generating plants. Outlying areas of the power network are essentially without a central supply of electricity because of damaged generating plants and transmission facilities. The remaining power supply is sufficient only for selected high-priority consumers and emergency use. Some limited addition to the power supply can come from auxiliary diesels which are adequate to support small-scale production such as local industry. In the event of a repeat of last year's flood, pumping requirements could be expected to dominate all other power priorities and would severely strain the system. Normal agricultural and pumping requirements use about one-half the generating capability now remaining in the Hanoi-Haiphong network.

40. Relatively few air strikes have been directed against manufacturing facilities, but those struck thus far rank among the most important in the modern sector of industry. Manufacturing plants damaged and out of operation include the Haiphong Cement Plant, the country's only significant producer of cement; part of the Thai Nguyen Iron and Steel Combine; the Nam Dinh Textile Plant; Viet Tri Chemical Complex; Hanoi Motor Vehicle Repair and Reassembly Plant, the largest such facilities in North Vietnam; and the Hon Gai Coal Processing Plant, second largest of the two main coal grading plants.

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41. As was the case during 1965-68, the larger cities were quickly evacuated of old and young people and other non-essential personnel. Most handicraft enterprises went with them. Some easily movable industrial facilities also were dispersed, but the larger installations of necessity have had to remain in place. Construction of developmental projects was virtually halted by mid-June, and most foreign technicians, including at least 142 Soviets, were sent home. Dismantling of industrial installations to safeguard them against attack has been observed in only a few scattered instances, the most notable of these being the Cam Pha Coal Processing Plant, largest in the country, and undamaged portions of the Thai Nguyen Iron and Steel Combine.

42. Many of the still undamaged industrial facilities have shut down because of electric power shortages and transportation bottlenecks which have caused a depletion of raw material stocks. For example, fertilizer plants at Phu Tho and Van Dien have been operating only part time, probably because of power shortages or lack of apatite which must be transported from the Lao Cai area in the northwest. The large machine tool plant near Hanoi appears to be operating considerably below capacity, and the Hanoi rubber products plant and textile plant have often been idle in recent weeks.

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43. How much of North Vietnam's industry has been shut down is difficult to ascertain. [REDACTED] more than 75% of the modern sector is idle at a given point in time. As for local industry, probably only 50% is operating at any given time. The handicraft sector, however, is probably essentially intact and operating at a nearly normal level.

Petroleum

44. Overland petroleum imports brought into North Vietnam by truck may have averaged an estimated 300 tons per day during June and July, or a total of about 18,000 tons. Excluding the effect of the destruction of any supplies by bombing after 2 June,⁽⁷⁾ stocks on hand on 28 July are estimated to have been between 31,000 and 55,000 tons, or one to two months' supply. No imports of gasoline and diesel fuel have been actually detected since the mining program began. The continued high levels of vehicular and waterborne traffic, however, and the obvious destruction since 2 June of some petroleum reserves as evidenced by fires and secondary explosions at petroleum storage facilities and on the roads running south

7. Bomb damage in the period mid-April through 1 June was concentrated on the principal storage sites, where an estimated 27,000 tons of petroleum were destroyed. It is not possible to quantify the destruction of petroleum in the bombings at the dispersed sites since 1 June.

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from the China border indicate that the North Vietnamese have been receiving some supplies of diesel fuel and gasoline from abroad.

45. According to an intercepted message of 24 July, the Chinese plan to send about 37,000 tons of petroleum products to North Vietnam during the month of August. The products include 20,000 tons of gasoline, 10,000 tons of diesel fuel, 3,250 tons of kerosene, and some 3,700 tons of lubricants and greases. The projected amount is equivalent to more than one month's consumption at present rates and is far above the average monthly imports from China in 1971. The message did not disclose the origin of the petroleum or the method of transport to North Vietnam. It is likely that at least some of this petroleum will be of Soviet origin or, if of Chinese origin, will be offset by replacement deliveries from the USSR.

46. Unless the projected level of imports for August is actually achieved, and unless North Vietnam receives similar quantities in coming months, petroleum will continue to be a critical commodity for Hanoi. If only small quantities of petroleum can be imported in the next few months, shortages would be felt very soon, and severe rationing probably would have to be extended even to military consumers.

Agriculture

47. North Vietnam's agriculture has not yet suffered any significant effects from the US interdiction campaign. The nature of the country's agricultural activity is such that it is not really susceptible to disruption from bombing. (The only exception would be sustained attacks targeted against the primary dike system during the high water period, sufficient to cause major flooding.) Agricultural output may suffer slightly from loss of manpower temporarily used in other tasks, but the country has both enough manpower and enough stocks of necessary inputs -- such as fertilizer -- to make this autumn's harvest essentially independent of the interdiction program. The most serious threat facing North Vietnam's agriculture this year is the danger of heavy flooding, such as occurred in 1971.

Manpower

48. The US interdiction campaign has unquestionably caused a substantial disruption to North Vietnam's labor force. The evacuation of large numbers of workers from urban areas, the destruction of many

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factories, the postponement of capital projects, and the general slowdown of economic activity have probably released some 300,000-400,000 workers from their normal jobs. At the same time, damage to road, rail, and water routes has heightened the demand for labor in transport, communications, and construction sectors, while the dearth of seaborne food imports and the threat of adverse weather have put great pressure on the labor-intensive agricultural sector to produce a successful autumn food crop. Any recurrence of last year's disastrous flooding this August or September would necessitate a hasty diversion of labor for dike repairs, land reclamation, and crop replanting. Even the normal autumn rice harvest will put considerable demands on labor during October and November.

49. The direct effects of these disruptions to date, however, have been felt by a fairly small proportion of the labor force. Most affected are those engaged in modern industries as well as transport, communication, and construction workers. Approximately 70% of the 10-million-person labor pool is in agriculture and is largely immune to the economic consequences of the bombing.

50. The real manpower problem in North Vietnam is that of efficient allocation, rather than a general labor shortage. In a program similar to one introduced in the 1965-68 period -- when some 400,000 people throughout the country were engaged in full or part-time repair of the transportation system -- the regime has moved once again to insure that adequate manpower is available for "urgent and unexpected" transport, communications, and combat support tasks. (The extensive repairs to dikes damaged by the 1971 floods were carried out with the aid of similar temporary drafting of manpower.)

51. The recent manpower mobilization decree lays the groundwork for the systematic management of workers put out of work by the bombing and should enable the regime to maintain the flexibility to cope with both current and future problems as they arise. The decree seeks to insure that as many citizens as possible have productive employment and do not use the interdiction campaign as an excuse for slacking off. In fact, recent North Vietnamese press articles have emphasized the need to create new jobs to utilize available manpower.

52. The impact of the US interdiction campaign will not materially affect North Vietnam's military manpower pool. An estimated 1.4 million men (physically fit and between the ages of 15 and 39) remain available for military service, about 400,000 of whom are in the prime 17-25 age

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category. North Vietnam can induct more than 100,000 men a year almost indefinitely without lowering this aggregate manpower reserve.

53. Currently, the greater problem for Hanoi has been the high casualty rate which has claimed experienced officers and cadre. The experienced officers and noncommissioned officers that have been lost during the current campaign are not immediately replaceable, and the leadership that remains will be hard pressed to compensate for the general deterioration that has occurred.

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V. The Economic Outlook

54. Some insight into what North Vietnam will be faced with in the future is to be found in an examination of the 1965-68 bombing period, although mining of the principal harbors represents an important new ingredient. We know, in retrospect, that the impact of the 1965-68 bombing was heaviest on the modern sector of the industry, considerably less severe on local industry, and negligible on handicrafts. Agriculture felt the strain of military manpower demands, but this was largely offset by increased employment of women, and the agricultural sector clearly suffered far more from the vagaries of weather than from the direct or indirect effects of bombing.

55. The disruption to the internal transportation and distribution systems in the 1965-68 period rapidly curtailed the transport of bulk cargo, especially for modern industry. Stoppages in the distribution of apatite, of which almost 1 million tons are normally moved annually, frequently caused production delays at several fertilizer plants. Exports of apatite, which had totaled more than 300,000 tons annually, were virtually halted after 1965. Internal shipments of coal, typically some 2.5 million tons per year, were severely restricted because of reduced industrial demand from industry idled by bomb damage. Repair of damaged powerplants continued throughout the bombing campaign, but construction work on large developmental projects was terminated. Regional self-sufficiency was given heavy emphasis, and North Vietnam put into service about 1,000 local enterprises during these years to support agriculture and to sustain logistics movements. These local enterprises have remained an important and viable part of the economy.

56. Hanoi's reaction to the current bombing has been a publicly stated willingness to continue the military conflict even if this meant sacrificing North Vietnam's modern industry. The regime's fall-back position is to preserve agriculture and handicrafts, both of which it regards as relatively invulnerable to attack, and to preserve production operations of local industry insofar as possible. This shift in priorities is already occurring. COMINT documents the exodus of foreign economic technicians, and [REDACTED] the halt in developmental construction, as well as the lack of repairs to bomb-damaged economic facilities. The destruction of most modern industrial installations has already been accomplished, and further bombing of these facilities will not have much additional effect. The better part of four years was required to reconstruct the damage from the previous bombing campaign, and it is probable that Hanoi views any attempt to reconstruct under the current bombing program as an exercise in futility.

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57. If Hanoi holds to its avowed shift in priorities, import requirements to sustain industry and to support developmental investment will decrease significantly. Import requirements for industry could be reduced in essence to the maintenance needs of local industry -- at most, several thousand tons per year. Many manufactured consumer items could be dispensed with. Allowing modern industry and related construction to lie dormant would eliminate the need to import most of the 175,000 tons of machinery, equipment, and metal products required in 1971. On the other hand, imports of transportation equipment, rails, wire, and pipe would have to be continued or even increased in support of the logistics effort. These imports totaled about 45,000 tons in 1971. Maximum stringency on civilian consumption of petroleum products might reduce the total requirement by about 50,000 tons on an annual basis, cutting back petroleum for civilian needs to some 230,000 tons per year. Beyond these calculations, there is little basis for judging what degree of austerity the regime can accommodate itself to, or to what extent its possible success in countering the interdiction program might remove some of the constraints on imports.

58. The need for foodstuffs may emerge over the next six months as a primary import requirement which must be met by the North Vietnamese. Although the absolute need for food imports will not reach its peak until the end of the first quarter of 1973, Hanoi is obviously taking a cautious approach to the possibility of shortages emerging earlier. Current steps include the large orders for food already mentioned and a campaign urging increased diligence in the collection of agricultural production. In the absence of stock drawdowns -- and virtually nothing is known about current stock levels -- Hanoi could face an import requirement for nearly 500,000 tons of food in the weeks just before next year's spring harvest. If the 1972 autumn harvest is a poor one, this requirement could very well increase to 800,000 tons or more.

59. Several alternative solutions are available to reduce import requirements related to agriculture, but they are not without serious consequences. A reduction, as of now, in the normal monthly ration of 13.5 kilograms would extend food supplies, although the regime might not want to take such a step.⁽⁸⁾ Stocks for contingency purposes almost certainly exist, and the regime would have to allow drawdowns of these stocks in a dire emergency. Additional grain, perhaps 10% of the crop,

8. The monthly rice ration was gradually reduced over an eight-month period to only 9 kilograms during severe food shortages in 1960-61. Widespread malnutrition and fatigue -- and several food riots -- resulted.

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could also be diverted from use as animal food to human consumption, but at considerable cost to the animal population. Finally, secondary crop production, if at least average, could extend the grain ration somewhat. Popular tastes, however, would have to be compromised.

60. Sufficient fertilizers (of all types) were probably on hand to fertilize the traditional rice varieties grown for the autumn harvest, but, over the longer term, food production will suffer if fertilizer is not imported. North Vietnam is now planting almost two-thirds of its spring crop acreage with new, high-yielding rice strains. These new varieties are highly responsive to fertilization, and yields will suffer in its absence. The new varieties would still fare slightly better at extremely low fertilizer levels, however, than would traditional varieties.

61. The actual impact on total food production of a complete halt in fertilizer imports cannot be precisely assessed since fertilizer acts in concert with many other factors such as irrigation, weed control, seed varieties, length of growing season, type of fertilizer, and method of application. In recent years, North Vietnam has imported from about 150,000 to 330,000 tons of fertilizer annually, and supplemented this with probably no more than 150,000 tons of domestically produced inorganic fertilizer. This has not been sufficient to meet requirements for optimum yields.

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VI. Impact on Military Capabilities

62. Enemy logistic activity in southern North Vietnam over the past three months has provided a steady flow of supplies to enemy forces engaging ARVN in northern South Vietnam. Elsewhere in Indochina, because the 1972 wet season is now more than half over, Communist military stockpiles have been drawn down considerably, although available evidence indicates that there are still sizable reserves.

63. All intelligence sources have indicated that since the resumption of full-scale bombing the Communists have maintained a high level of logistical activity in southern North Vietnam. Beginning in early May and continuing through mid-July, intercepted communications from a logistics authority with headquarters at Vinh have disclosed heavy vehicular activity through the North Vietnamese Panhandle. Subordinate storage areas have reported the receipt and dispatch of large quantities of ordnance, much of which has been consigned to South Vietnam. Detected military cargo shipments (only a portion of the total) in the Vinh area included 609 tons for May, 2,048 tons in June, and 214 tons during the period 1-14 July.

64. Throughout June, [REDACTED] most of the routes in the North Vietnamese Panhandle were active, with some sustaining heavy vehicle activity. On 30 June, just north of Thanh Hoa, US pilots observed a convoy of about 50 trucks headed south. And in the same general area on 3 July pilots reported sighting a "solid mass" of trucks extending along Route 1A for several miles. Examples of more recent heavy activity include a pilot report of 17 July that bridges in the lower Panhandle were being rebuilt and receiving heavy vehicular use, and a pilot report on 21 July of 70 vehicles on Route 15. Pilots have also reported what they believe to be significant nighttime resupply activity being carried out by coastal watercraft.

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65. To maintain the continued southward flow of large amounts of ordnance, the North Vietnamese have deployed a substantial number of transportation battalions. Since mid-May, 16 transportation battalions have been detected moving supplies. Of these 16 battalions, 13 have been identified for the first time. To aid in the current transportation effort, the North Vietnamese have also reestablished a logistic element in the vicinity of Thanh Hoa,⁽⁹⁾ perhaps to serve as a link between the military logistical organization in Hanoi and the one at Vinh.

9. Last noted previously in August 1969.

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66. Possibly related to the rebirth of the Thanh Hoa logistical organization is a major new storage facility established in early June, apparently near Thanh Hoa, to "create a cargo base to the front." The new facility, according to intercepted traffic, is to be capable of accommodating 3,000 to 5,000 tons of supplies. Other new storage areas have also been established southeast of Vinh and at two [REDACTED] locations. All four have been engaged in transportation activities since the initiation of the bombing, particularly those near Thanh Hoa and Vinh which have been noted receiving and dispatching large quantities of ordnance for South Vietnam.

25X1D1a

67. Despite evidence that the Communists are continuing to move substantial quantities of supplies through southern North Vietnam, maintaining the supply flow is placing a strain on the system and some difficulties are being encountered. [REDACTED]

25X1D1a

25X1D1a

Military Resupply Requirements

68. North Vietnam's import requirements to continue the war at the level of the past four months amount to an average of about 510 tons daily of arms, ammunition, and petroleum. This tonnage would enable North Vietnam to prosecute the war in South Vietnam with periodic high levels of activity and to meet the essential supply requirements of its forces in Cambodia and Laos.

69. Among the most critical military imports is petroleum. Of the approximately 330 tons of petroleum required daily for military uses, the North Vietnamese inventory of military trucks and tanks probably would consume about 165 tons. Other consumers engaged in direct support of military operations, including particularly inland watercraft, would require the remainder.

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70. Ammunition requirements to support a continuation of the scale of fighting of recent months are estimated to be about 100 tons daily in all of Indochina. Of this amount, antiaircraft artillery, surface-to-air missiles, and other ammunition requirements for use inside North Vietnam total about 53 tons daily. (This estimate is based on rates of expenditure and analogies with experience elsewhere in Indochina.) Ammunition requirements in Laos, Cambodia, and South Vietnam should total about 47 tons daily (24 tons for South Vietnam, 18 tons for Laos, and 5 tons for Cambodia). These amounts allow for air defense expenditures as well as ammunition consumed in ground operations.

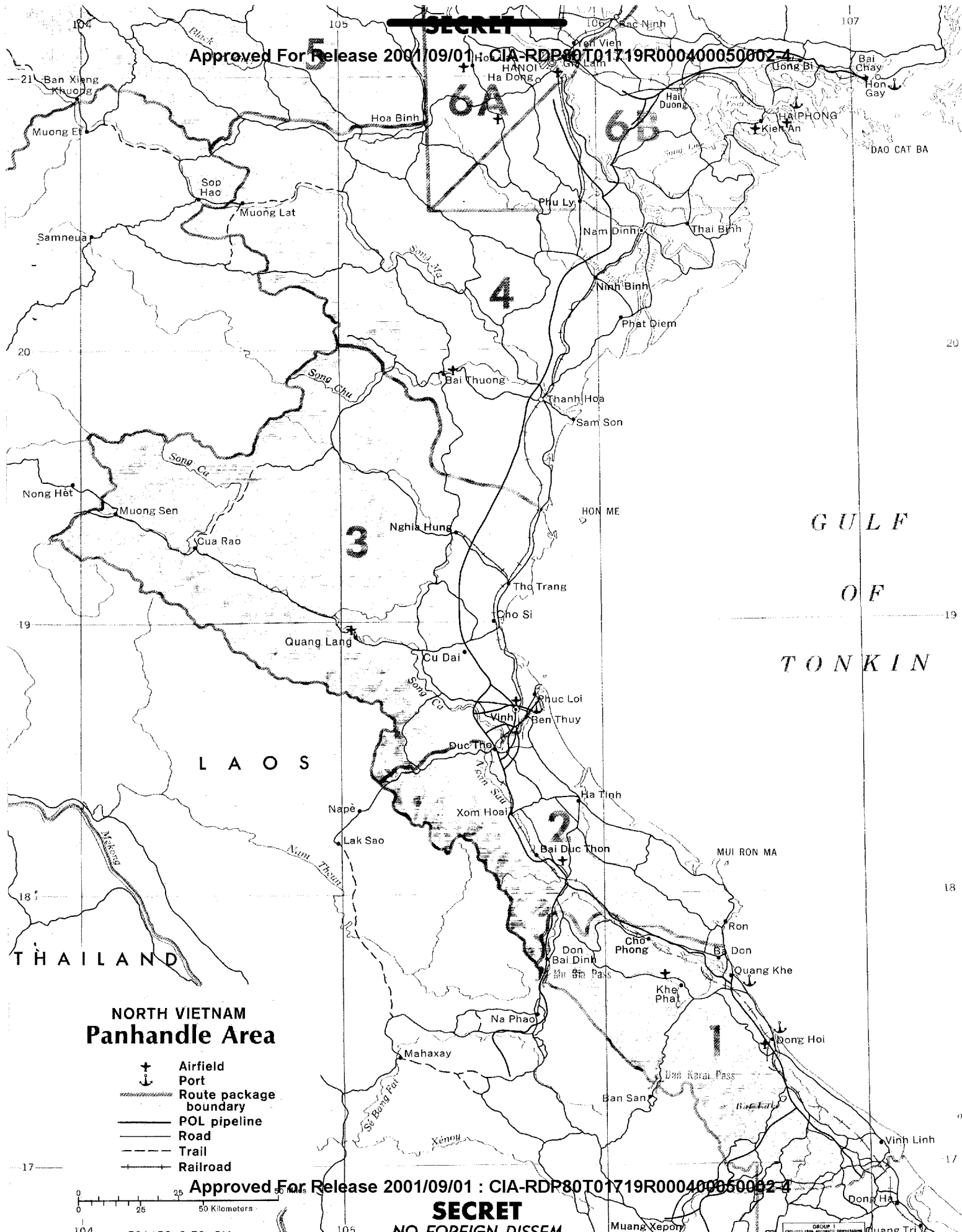
71. The remaining 80 tons of the 510-ton daily total would be weapons and equipment which the North Vietnamese need to operate in North Vietnam and on the battlefields of Indochina. Although this tonnage requirement varies in composition by region, it was derived using consumption factors which give a generally accurate aggregate figure for Indochina as a whole.

72. There is no direct evidence of the total amounts of North Vietnamese military imports, and we cannot realistically expect to obtain such evidence in the future. Given the low ratio of military cargoes to total import flows, however, the North Vietnamese should be able to continue to meet their military resupply requirements under almost any foreseeable circumstance during the next six months, provided the Soviet Union and China remain willing to furnish the goods.

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**NORTH VIETNAM
Panhandle Area**

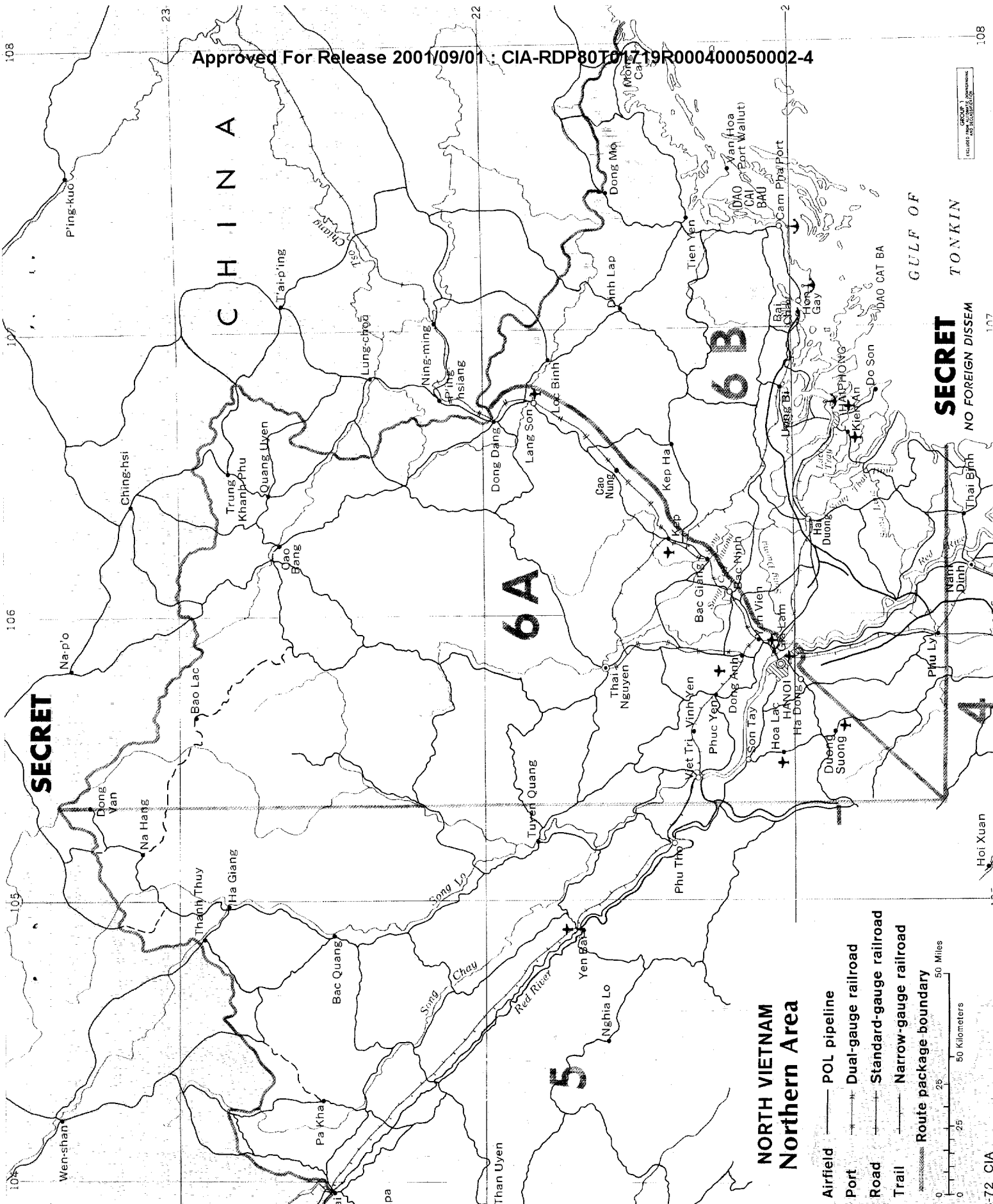
- Airfield
- Port
- Route package boundary
- POL pipeline
- Road
- Trail
- Railroad

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GROUP 1
EXCLUDED FROM AUTOMATIC
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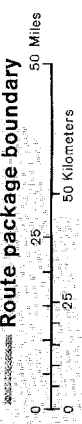


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**NORTH VIETNAM
Northern Area**

- + Airfield
- POL pipeline
- Dual-gauge railroad
- Standard-gauge railroad
- Narrow-gauge railroad
- Route package boundary



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APPENDIX A

Minimum Import Requirements

In earlier studies* we have discussed a concept "minimum import requirements" to illustrate what Hanoi might consider essential during the current situation. We defined the term "minimum imports" as that annual rate of imports which would provide Hanoi the supplies necessary to continue its main force war in Indochina with periodic high levels of activity and at the same time maintain domestic order in North Vietnam. We stated that North Vietnam's minimum import requirements on an annual basis would be 1 million tons, about 2,700 tons per day (see the table).

It must be recognized that the "minimum import" concept is a hypothetical illustration of an import level we believe Hanoi would require to service essential needs. Some readers of our earlier memoranda apparently thought that the "minimum import" concept related to the current level of actual imports or even the ceiling import capacity of the interdicted system.

It was not our intention that this table serve as a precise analytical tool. We pointed out that there were reasons why it was subject to fairly wide margins of error:

As the real world situation evolves, it is quite likely that certain categories of imports could be squeezed to even lower levels than our analysis assumes, in favor of more critical items in short supply. In other words, the imposition of truly extreme austerity measures by the regime could mean even lower import requirements. It is always risky to predict what a relatively underdeveloped country may or may not find to be essential under crisis conditions. Thus, a lower "minimum" might be acceptable to the regime if the immediate losses were seen as likely to be short-lived or if a judgment were made to sacrifice the country's economic needs in favor of immediate military goals to a greater degree than we now think is likely. Indeed, by drawing heavily on stockpiles, the regime might be able to forgo imports altogether for a short period of time. Conversely, Hanoi's leaders may be less sanguine than we about the resiliency of the North Vietnamese population and the extent to which the Party can impose further belt-tightening and burdens without running the risk of politically serious adverse reactions among the population.

* CIA Memorandum No. TCS-2679/72, 27 June 1972, and CIA Memorandum No. SC-07049/72, 6 July 1972.

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North Vietnam's Minimum Import Requirements
Mid-May 1972 to Mid-May 1973

	Thousand Tons ^{a/}
Petroleum	<u>350</u>
Military and military support	120
Civilian needs	230
Economic goods	<u>175</u>
Metals and metal products	70
Machinery and equipment	15
Transportation equipment	14
Other	77
Military goods	<u>65</u>
Ammunition, weapons, and military equipment for use in North Vietnam	38
Ammunition, weapons, and military equipment for use in Laos, Cam- bodia, and South Vietnam	27
Unidentified imports	<u>425</u> ^{b/}
Total	<u><u>1,000</u></u>

(Equivalent to about 2,700 tons per day)

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

b. Some food imports are included in the "unidentified" category -- possibly on the order of 150,000 tons.

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Three important developments have occurred since the "minimum import" concept was first presented: (1) North Vietnam is energetically constructing three pipelines to China, which when completed will provide the capability to move virtually all of North Vietnam's petroleum requirement into the country without burdening the road or rail transportation system; (2) the decision was made to essentially abandon the modern industrial sector -- a shift in priorities which ends a significant import requirement for machinery and raw materials; and (3) Hanoi has expressed clear concern for the autumn harvest and continues to negotiate for large imports of food, planning in part for potential shortfalls during the first quarter of 1973.

These three factors tend to cancel out one another in our calculations. If modern industry is shut down and the pipelines are used to meet North Vietnam's 350,000-ton annual petroleum import requirements, there will be greater road and rail capacity available for other transportation purposes -- although the trade-off is not one-for-one.

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APPENDIX B

Petroleum Pipelines

Prior to the mining, the vast bulk of North Vietnam's petroleum arrived by sea. Once the ports were mined, it became evident that the North Vietnamese would have to devise other means to import their vital petroleum supplies. The North Vietnamese reacted quickly. Photographic reconnaissance of 23 and 31 May 1972 showed that pipeline construction was under way from Hai Duong north for 30 miles to the Kep area. This construction had been carried out at the rate of 1.4 to 2.2 miles a day. A week later, on 2 and 7 June, pipeline construction was observed between the petroleum storage area at P'ing-hsiang (in China) and the North Vietnamese border (the storage area was also being expanded). By 14 June the southward pipeline construction had entered North Vietnam and moved to Dong Dang, about 3.5 miles south of the border. The construction rate was stepped up and by 22-24 June an additional 41 miles of pipeline between Dong Dang and Kep were under construction. The whole line from China to Hai Duong is now either completed or almost completed. At Hai Duong, the line ties into the North Vietnamese petroleum pipeline system that extends to the DMZ and into southern Laos.

The original pipeline had an estimated minimum throughput capacity of about 1,000 tons per day, but it seemed unlikely that it could be used for multiproduct service. Such service involves operation on a sustained basis at reasonably high pressure and velocity, substantial storage to accept the interface between products, and advanced operating techniques to avoid contamination -- all of which are probably beyond North Vietnam's capability. This situation presented a problem for the North Vietnamese since they have large volume requirements for at least two products -- gasoline and diesel fuel.

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In early June, [REDACTED] the North Vietnamese were constructing two pipelines. On a short segment of the pipeline system between Kep and Hai Duong, two pipes were observed in a single trench -- the first known instance of this type of construction in North Vietnam. In mid-July, a second pipeline was also observed under construction from north of Dong Dang south to within 5 miles of Hai Duong. It was west of and parallel to the earlier pipeline. By late July, yet another pipeline was being built in the segment from Dong Dang to Kep, making the third line on this route. Since the two products imported by North Vietnam in bulk -- diesel fuel and motor gasoline -- could be transported in two pipelines, the third pipeline may simply reflect a desire to have redundant distributive capacity.

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North Vietnam: Petroleum Pipeline Construction



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