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AN APPRAISAL OF THE BOMBING OF NORTH VIETNAM

(THROUGH 12 SEPTEMBER 1966)
SEPTEMBER 1966

Prepared Jointly by
The Central Intelligence Agency
and
The Defense Intelligence Agency



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AN APPRAISAL OF THE BOMBING OF NORTH
VIETNAM THROUGH 12 SEPTEMBER 1966

SUMMARY

1. (S/NFD) Air strikes against North Vietnam in August and early September continued at a high level with particular emphasis on dispersed POL storage sites, lines of communication (LOCs) and transportation equipment. The campaign against North Vietnamese POL has continued to be a slow and grinding effort to reduce the remaining bulk and dispersed storage capacity, and this effort has succeeded in making it more difficult and costly for the North Vietnamese to import and distribute POL. Continued discovery of additional dispersed POL storage sites indicates that the dispersal program is still in progress and will probably make it possible for North Vietnam to defer any serious reconstruction of the major bulk facilities. There is no evidence yet of any shortage of POL in North Vietnam and stocks on hand, with recent imports, have been adequate to sustain necessary operations.

2. (S/NFD) Air strikes against all modes of transportation in North Vietnam increased during the past month, but there is no evidence of serious transport problems in the movement of supplies to or within North Vietnam. The regime's recent claim that most transportation routes remain open appears to be valid. The status of the five major rail lines in North Vietnam has improved somewhat over last month. Only two rail lines are known to be interdicted for through service, although rail and truck shuttle service continues between and around interdicted points. Destruction and damage of transport equipment, especially

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locomotives, trucks, and barges, continued at a high level during the past month. A heavy program of road interdiction also continued in August and early September, particularly in the North Vietnamese Panhandle. Nevertheless, a high level of truck traffic continues to be observed, with the bulk of vehicle sightings located south of Thanh Hoa.

3. (S/NFD) There is no evidence yet that the air strikes have significantly weakened popular morale. The raids, however, have caused mounting disruption in the routine of the civil populace, and observers in Hanoi have reported continuing shortages in certain food commodities.



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4. (S/NFD) Air strikes continue to depress economic growth and have been responsible for the abandonment of some plans for economic development, but essential economic activities continue. The increasing amounts of physical damage sustained by North Vietnam are in large measure compensated by aid received from the Communist countries. In recent weeks, a North Vietnamese mission signed new agreements for additional unspecified grants of economic and technical assistance from Communist countries, and probably has or will receive additional commitments. The measurable damage to the economy caused by the air strikes now stands at some 125 million dollars, an increase of almost 20 million dollars over those losses recorded a month ago.

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Effects on Military Targets

1. (S/NFD) Air strikes against North Vietnam in August and early September continued at a high level with particular emphasis on dispersed POL storage sites, lines of communication (LOCs) and transportation equipment. Rainy weather over the northern portion of the country limited air strikes in that area during the latter part of August and the first part of September. The campaign against North Vietnamese POL has continued to be a slow and grinding effort to reduce the remaining bulk and dispersed storage capacity. This effort has been effective in making it more difficult and costly for the North Vietnamese to import and distribute POL. Strikes were made during August against nine major and over 200 dispersed POL storage sites. As of 12 September 1966, about 78 per cent of the JCS targeted POL storage capacity had been destroyed. Continued discovery of additional dispersed POL storage sites indicates that this dispersal program is still in progress and will probably make it possible for North Vietnam to defer any serious reconstruction of the major bulk facilities.

2. (S/NFD) The capacity of the Haiphong POL facility has been reduced to barely 10 per cent of its original level, and the facility is unusable as an off-loading terminal for oceangoing tankers. Soviet tankers, nevertheless, continue to arrive in North Vietnamese waters. The tanker BUGURUSLAN arrived in late August. The receiving points for the BUGURUSLAN's cargo of almost 11,000 M.T.s of diesel oil and

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motor gasoline, which is being discharged into barges, are unknown. The tanker MOSKOVSKIY FESTIVAL is scheduled to arrive in the Haiphong area about 18 September with almost 11,000 M.T.s of gasoline and diesel fuel. In addition, general cargo ships carrying POL and other cargo continue to be received at or are en route to North Vietnam. Rail imports of POL into NVN from China are estimated to be continuing, probably at an increased rate. Imports of POL by other means, such as coastal barge and craft, and to a very limited extent by air, have probably occurred.

3. (S) No evidence of any shortage of POL in North Vietnam has been noted, and it must be assumed that stocks on hand and recent imports have been adequate to sustain necessary operations. How long this condition will continue is not clear, but high priority activities such as military transport, SAM support, and aircraft operations will be sustained at the expense, if necessary, of other POL consuming functions.

4. (S/NFD) Air strikes against all modes of transportation in North Vietnam increased during the past month, but there is no evidence of serious transport problems in the movement of supplies to or within North Vietnam. The North Vietnamese, with Chinese engineering help and the diversion of a large labor force to the task, have provided sufficient transport capacity to meet the essential needs of the economy and to continue logistic support for the military effort in the South. The regime's recent claim that transportation

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routes for the most part remain open in spite of fierce bombing and strafing appears valid. In addition, rail construction continues, almost 200 kilometers of road have been built or reconstructed and inland waterways are being improved. The regime also claims that mechanized transport has increased, and that the number of repair shops and plants for building transport equipment is being doubled.

5. (S/NFD) Rail transportation continues to be the most important form of transport in terms of ton-kilometers, although the use of water and truck transportation appears to be increasing. The status of the five major rail lines has improved somewhat over last month. Only two rail lines (Hanoi-Lao Cai and Hanoi-Vinh) are known to be interdicted for through service, but rail and truck shuttle service continues between and around unusable bridges. The remaining three lines (from Hanoi to Dong Dang, to Haiphong, and to Thai Nguyen) probably are operable for through service. The important Hanoi-Dong Dang line appeared to be interdicted at the Dap Cau railroad/highway bridge during August. Ample time had elapsed for the repair of the original bridge or for completion of construction of the railroad bypass bridge in the area, but August photography showed the original bridge unserviceable and a section missing from the bypass bridge. The North Vietnamese, therefore, may have floated a bridge section into place at night and removed it during the day, thus providing limited through service on this critical line. An initial readout of 11 September photography, however, indicates that

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the original Dap Cau bridge has now been repaired. Destruction and damage of transport equipment, especially locomotives, trucks, and barges, continued at a high level during the past month. Imports of trucks and barges continue, however, and recent information reveals that the North Vietnamese plan to increase imports of rail-road equipment from Communist China. The North Vietnamese freight car inventory may have already been significantly supplemented if the use of Chinese standard-gauge rolling stock has become possible on part of the Hanoi-Dong Dang line. Sufficient time has elapsed for this rail line to have been converted to dual-gauge from the Chinese border to the Kep area, although it is not yet possible to confirm this.

6. (S) A heavy program of road interdiction -- concentrated in the North Vietnamese Panhandle -- continued in August and early September. Photo analysis of some of the more effectively cratered road segments indicates that longer delays in restoration are being experienced. In some instances the North Vietnamese have completely abandoned cratered segments in favor of alternate routings. Bridge strikes were well above the high level attained in the previous period. A sharp increase has been noted in the installation of cable supported bridging over destroyed spans. The employment of ferry facilities continues, however, to be the principal alternate means of restoring service at the larger interdicted stream crossings.

7. (S) A relatively high level of truck traffic continues to be observed. Nearly 2,250 vehicle sightings were recorded during

August with the bulk of these located in the region south of Thanh Hoa either in truck parks or moving in small groups along the highways. This current total is greater than the previous high reported in July. Although vehicles are still detected along segments of Route 1A, the main north-south coastal route, emphasis on selected interdiction points has forced the use of inland detours and a shift of more of the traffic load onto a less capable interior network. Cumulative vehicle loss totals are shown in Tab A.

8. (S) The number of watercraft struck during August set a new record. Significant activity continued on inland water routes westward from Haiphong and southward from Hanoi. Strike activity against inland water routes was well dispersed over all waterways with the heaviest effort concentrated on the intracoastal waterway between Vinh and Thanh Hoa. Active utilization of southern inland routes and contiguous coastal waters continued, however, particularly in the Dong Hoi vicinity and southward.

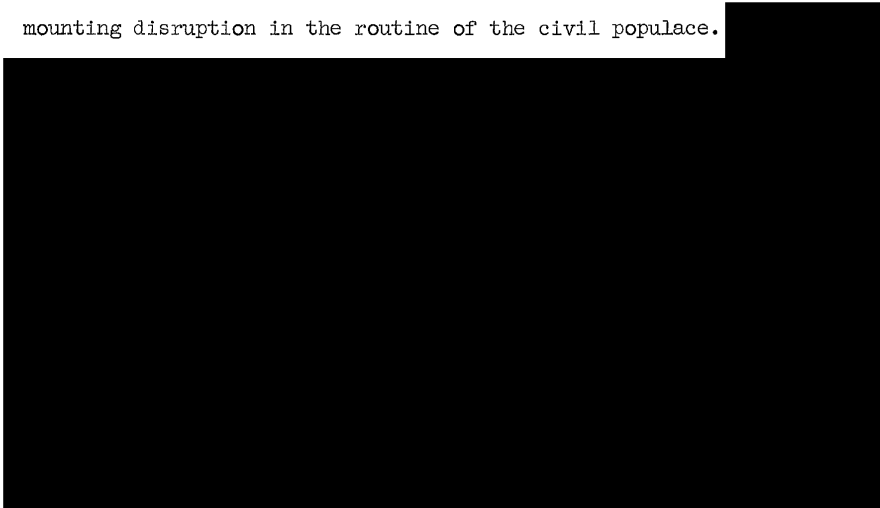
9. (S) Despite the increased intensity of US air strikes during this period, Hanoi retains the capability to continue support of activities in South Vietnam and Laos even at increased combat levels and force structures. Moreover, the armed forces of North Vietnam continue to expand and the infiltration of men and material into South Vietnam and Laos continues at a high rate. Nevertheless, it is estimated that the North Vietnamese capability for overt aggression has been limited by US air actions.

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Leadership and Public Reactions

10. (S/NFD) Despite the intensification of the US bombings of North Vietnam to record levels in the past month, there continues to be no evidence that the morale of the DRV populace has been affected to the extent that it could influence the Hanoi leadership's determination to continue the prosecution of the war. The anniversary of North Vietnam's national day on 2 September provided the forum for the Hanoi leadership to reassert its belief in an ultimate Communist victory in Vietnam. Delivering the major address at a rally marking the occasion, Premier Pham Van Dong called upon the Vietnamese people to practice "to the highest degree" economy in production, fighting, consumption, manpower, and material "so as to have abundant reserves for protracted fighting."

11. (S/NFD) The bombing raids have, none the less, caused mounting disruption in the routine of the civil populace.



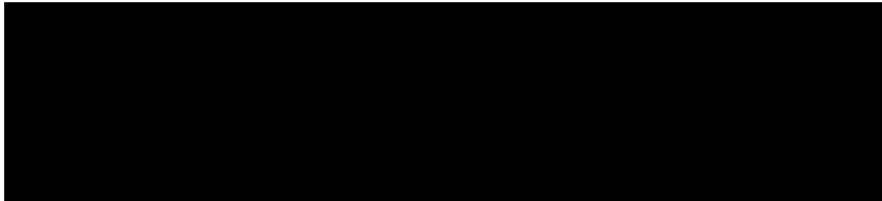
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Effects on the Economy

13. (S/NFD) Air strikes continue to depress economic growth and have been responsible for the abandonment of some plans for economic development, but essential economic activities continue. The increasing amounts of physical damage sustained by North Vietnam are in large measure compensated by aid received from the Communist countries. This aid, which totaled roughly \$1.5 billion in 1955-1965 and at least \$350 million in 1965 alone, probably has been significantly augmented in 1966. In addition, a North Vietnamese mission recently signed new agreements for additional unspecified grants of economic and technical assistance from Communist China and North Korea, and probably will receive or has already received further commitments from the USSR and East European countries. The composition of the forthcoming economic aid may reflect Hanoi's need for material for the restoration of economic facilities destroyed or damaged in air attacks as opposed to earlier economic assistance which was directed mainly to new development. The delegation sent by Hanoi to seek foreign aid was the second such mission in 1966 and the third in slightly more than a year. The first two missions obtained loans and grants from the USSR, all the Communist countries of Eastern

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Europe, except Albania and Yugoslavia, and from China and North Korea.

14. (S/NFD) There is as yet no evidence that the loss of petroleum or petroleum facilities has had a measurable effect on the economy. The need for North Vietnam to institute a new method for storage and distribution of petroleum, however, has not only increased the costs of the supply of petroleum but also has placed an additional burden on the already severely taxed management and manpower resources of North Vietnam. About 34,000 tons of petroleum products have been discharged in China for the North Vietnamese since the concentrated bombing of petroleum facilities began in June. An indeterminate quantity of this petroleum -- probably less than half -- has been delivered to North Vietnam by rail and possibly by coastal watercraft.

15. (S/NFD) The measurable damage to the economy caused by the air strikes now stands at some 125 million dollars, an increase of almost 20 million dollars over these losses recorded a month ago and almost double those at the end of 1965. Damage to transportation equipment, the Uong Bi Thermal Power Plant, and naval craft accounted for some 75 per cent of the measurable damage inflicted in the current reporting period which saw the heaviest damage of any month since the air strikes began. Total reported damage to transportation equipment in 1966 is now estimated at 19.2 million dollars or more than the cumulative losses for 1965 and 1966 in any other category.

16. (S/NFD) Direct losses caused by air strikes against economic and military facilities and equipment measured in terms of

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estimated reconstruction or replacement cost are now estimated at some 109 million dollars as shown in the tabulation below:

<u>Economic Facilities and Equipment</u>		<u>Military Facilities and Equipment</u>	
<u>Targets</u>	<u>Million Dollars</u>	<u>Targets</u>	<u>Million Dollars</u>
Railroad/Highway Bridges <u>1/</u>		Barracks	16.4
Reconstruction	15.4	Ammunition Storage	4.5
Temporary Repairs	3.1 <u>2/</u>	Supply Depots	3.2
Transportation Equipment	25.1 <u>3/</u>	Radar and Communications	1.1
Railroad Yards and Ports	1.0	Naval Bases	0.8
Electric Power Plants	11.5	SAM Sites	2.0
Petroleum Storage Facilities	2.3 <u>4/</u>	Aircraft	10.7
Manufacturing Facilities	2.1	Airfields	0.4
Telecommunications Facilities	0.2	Naval Craft	8.2
		Miscellaneous Targets of Armed Reconnaissance	1.0
Total	<u>60.7</u>	Total	<u>48.3</u>

- 1/ The estimate in this category is incomplete because of inadequate post-strike photography.
- 2/ Includes 2.1 million dollars expended to date on temporary repairs and 1.0 million dollars required to provide temporary repairs for structures damaged but not yet restored to operable condition.
- 3/ Excludes destruction and damage to trucks in Laos. The estimated value of damage and destruction to transportation equipment in North Vietnam is based on pilot reports and may be somewhat overstated.
- 4/ Excludes destruction and damage to support facilities and contents of petroleum tanks.

Measurable indirect losses amount to about 16.2 million dollars made up of losses of foreign exchange earnings of 12.7 million dollars,

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and losses in the 1965 fall rice crop of 3.5 million dollars. In addition to these measurable losses, there are many other losses and costs to the economy and the military establishment which cannot be assigned values. These would include the loss of production and lower productivity of labor resulting from the dispersal of industry, time lost from work as a consequence of civil defense measures, and loss of production caused by shortages of electric power.

17. (S/NFD) All sectors of the economy have shared in the difficulties produced by the bombing. In August the regime admitted that "the US imperialists have created difficulties for the economy in general and light industry in particular." Air strikes have undoubtedly contributed to shortfalls in the spring rice crop and to problems encountered in the planting of the fall rice crop. Although the regime claims that industrial production in the first seven months of 1966 met state plans, and that production in heavy industry increased since the beginning of the bombing, the failure to announce data on either plans or output suggests that growth was, in fact, limited. Lagging production in light and local industry is evident in a recent government statement regarding the importance of this segment of industry which placed emphasis on accomplishments in 1964 rather than 1965 or 1966.

18. (S/NFD) The recent attention devoted to the increased employment of women, particularly in the agricultural cooperatives and the militia, indicates that the manpower problem in North Vietnam

is becoming more troublesome. Tens of thousands of women allegedly have learned agricultural skills since 1965, thus helping to alleviate a problem which is in large part the result of the diversion of labor to repair and reconstruction activities and dispersal problems associated with the bombing. Hanoi continues to devote an extremely large portion of its manpower and materiel resources to the construction and maintenance of lines of communication and there continue to be reports of shortages of both men and materiel. These shortages are considered to be primarily caused by poor management practices and by problems of distribution. To further supplement the labor supply the regime is trying -- apparently with limited success -- to make greater use of unskilled workers from the peasant and urban population. Other measures embarked upon to relieve the tight labor situation include increased training and the increased use of agricultural implements. The latter step, in turn, is hindered by the shortage of skilled workers needed for the production of labor-saving implements.

19. (S/NFD) The damage -- valued at about 4.4 million dollars -- inflicted in August by two restrikes against the Uong Bi Thermal Power Plant will prohibit operation of the plant for at least one year. Complete restoration of the generating facility will require a minimum of two years. Uong Bi supplied some 20-25 per cent of the electricity consumed in both Hanoi and Haiphong. Both cities will now be forced to rely primarily on power supplied by older

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plants which are subject to intermittent breakdowns.

20. (S/NFD) Seaborne trade continues to be hindered as a result of the air strikes. Petroleum products arriving by sea totaled about 12,000 M.T.s in August compared with an average of over 20,000 M.T.s a month in the first half of 1966. The greater part of the petroleum arriving in August represents the contents of one Soviet tanker. Seaborne exports from North Vietnam in August totaled 63,000 tons compared with an average monthly volume of 106,000 tons in the first half of this year. Coal shipments were considerably below normal volumes as a result of earlier bomb damage to facilities at Cam Pha and there were no shipments of apatite, largely because of rail interdictions between the mines and the port. Seaborne imports of miscellaneous general cargoes, however, continued at a high level, and this volume of general cargo deliveries together with frequent interruptions of port operations by air raid alerts, resulted in many Soviet ships waiting three weeks to complete unloading. The normal unloading time had previously been about one week. A record low number of foreign ships -- 22 -- called at North Vietnamese ports in August, compared with an average of 44 calls a month in 1965 and 33 in the first seven months of 1966. Part of this reduction in shipping can be attributed to the effects of the bombing on North Vietnam's export capability.

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Fixed Targets	Total Targets		Targets Struck		No. Attacks	Strike Sorties <u>b/</u>	% of National Capacity	
	No. <u>c/</u>	Targeted No(*) % <u>d/</u>	No(*)	% <u>d/</u>			Destroyed	Inactive <u>g/</u>
Barracks	443 man	62 39.63	45	33	216	2344	21.79	5.56
Ammo Depots	112.6 MT	18 96.7	13	75.7	52	1155	73.4	37.51
POL Storage *	131.9 MT	13 NA	11	NA	52	478	NA	NA
Supply Depots	10550sqft	26 38.6	17	19.0	50	599	12.22	2.0
Power Plants	187 KW	19 94.1	8	46.6	26	240	33.	
Maritime Ports	7.8 ST/Dy	10 95	5	28	17	219	13.0	2.63
RR Yards	33.7 ST/Dy	4 78	2	19	18	139	9.3	
Explosive Plant	1 MT	1 100	1	100	3	28	71.	
Airfields	23		4		12	359		
Naval Bases	15		3		16	213		
Bridges	883		46		195 <u>e/</u>	2407		
Commo Install	45		2		2	15		
Radar Sites	50		15		65 <u>e/</u>	413		
SAM Sites	130		47		62	338		
Locks & Dams	91		2		2	10		
Ferries	34		11		7 <u>e/</u>	44		
Total Sorties: 9,207						<u>Results f/</u>		
Armed Recce Sorties						Destroyed		
64,345						Damaged		
						Vessels 2,909		
						4,760		
						Vehicles 2,065		
						1,870		
						RR Stock 1,184		
						1,503		

* POL Storage Excludes Dispersed Storage.

a/ Assessments are based on best information received, will be refined as more accurate information becomes available.b/ Strike plus flak suppression sorties. Some applied to multiple targets; in this summary assigned to principal target.c/ National capacity in 1,000's where measurement shown.d/ Percentages of national capacity where appropriate.e/ Also numerous attacks during armed recce and other missions.f/ Also numerous installations, AA sites, bridges, etc, attacked and road and rail cuts made.g/ Per cent inactive due to dismantling or abandonment of facilities as a result of air strikes.

(*) These columns are not additive, since the number of installations, both targeted and struck in some cases, apply to more than one category of targets. (i.e., barracks, supply and ammo depots).

NOTE: For comparative purposes.

US worldwide ammo storage capacity is 6,936,000 metric tons (CONUS 5,719,000 MT).

US worldwide military POL storage capacity is 15,452,000 MT; national US commercial capacity is 151,325,000 MT; approximate average \$ value of 1 MT of POL products is \$28.

US worldwide military supply depot covered storage space is 137,100,000 sq. ft. (CONUS 121,300,000 sq. ft.).

Total kilowatt capacity of power plants serving metropolitan areas: New York - 7.6 million; Chicago - 6 million; Washington (DC and Md/suburbs only) - 2.4 million.

TAB A

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AID	1 Cy
NASA	1 Cy
NSA	5 Cys
STATE	12 Cys
AEC	1 Cy
FBI	1 Cy
NIC	1 Cy
ACDA	1 Cy
CHAIRMAN, JCS	1 Cy
DIRECTOR, JOINT STAFF	1 Cy
J-1	1 Cy
J-3	2 Cys
J-4	1 Cy
J-5	1 Cy
J-6	1 Cy
SACSA	1 Cy
NMCC	3 Cys
ARMY:	
CHIEF OF STAFF	2 Cys
DCSOPS	1 Cy
ACSFOR	1 Cy
ACSI	1 Cy
ACSI-CI	1 Cy
ACSI-Eastern	1 Cy
STAG	1 Cy
NAVY:	
CHIEF OF NAVAL OPERATIONS	2 Cys
DNI	1 Cy
OP-921E	1 Cy
OP-922Y1	1 Cy
OP-922Y2	1 Cy
OP-92B1	1 Cy
AIR FORCE:	
CHIEF OF STAFF	2 Cys
ACS,I/USAF	1 Cy
AFNINDI	3 Cys
AFNIEBB	1 Cy
AFISI (Spec Investigation)	1 Cy
AUL (Air Univ Library)	1 Cy

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MARINE CORPS:

COMMANDANT	1 Cy
G-2	1 Cy
CINCPAC	2 Cys
CINCPACAF	1 Cy
CINCUSARPAC	1 Cy
CINCPACFLT	1 Cy
COMUSMACV	2 Cys
7AF	1 Cy
CINCLANT	1 Cy
CINGSTRIKE	1 Cy
CINGSAC	1 Cy
SAC 544	1 Cy
CINCTAC	1 Cy
AFSTRIKE	1 Cy
CONTIC	1 Cy
CINCALCOM	1 Cy
CINCEUR	1 Cy
CINCUSAREUR	1 Cy
CINCUSAFE	1 Cy
CINCNAVEUR	1 Cy
CINCCONAD	1 Cy
CIA	125 Cys
DIA:	
DIADR	1 Cy
DIADD	1 Cy
DIAAP	1 Cy
SC-1	1 Cy
XX	1 Cy
AP-2	1 Cy
AP-2A3	2 Cys
AP-2F	4 Cys
AP-1	1 Cy
AP-1C3	1 Cy
AP-1H2	1 Cy
CO-2C	1 Cy
JT	1 Cy
CI	1 Cy
AP-1R2	1 Cy
AP-1R3	1 Cy
AP-1T	2 Cys
JS	1 Cy

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