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1962
REPORT
OF THE
NET EVALUATION SUBCOMMITTEE
NATIONAL SECURITY COUNCIL

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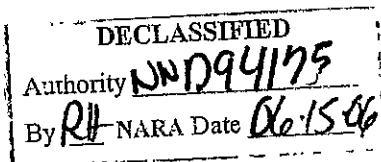
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- V Report of the Air Force Intelligence Center
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VOLUME I
THE REPORT

I. INTRODUCTION

1. The President directed the Net Evaluation Subcommittee (NESEC) to analyze the results of a nuclear exchange between the US and USSR based on the following assumption:

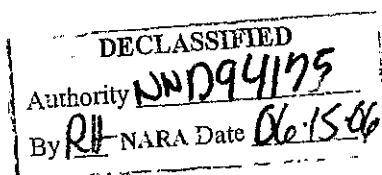
"A nuclear attack in mid-1965 by the USSR against the United States, following the outbreak of limited war in Southeast Asia, with the US forces in a high state of alert but with the Soviets seeking to achieve optimum surprise."

2. To this end, a scenario was developed which set forth a hypothetical sequence of military actions and reactions which led to a nuclear exchange involving the Soviet and US homelands. In particular, it established the disposition and alert status of US forces.

a. In the spring of 1965 the Communist government of North Vietnam, with the support of Communist Bloc leaders, decided to commit overtly their military forces on 1 May to seize complete control of South Vietnam and Laos. Communist China and the USSR, in view of possible US reactions, brought their forces to a heightened state of alert.

b. Within a matter of three days (4 May) after the overt nature of the Communist attack became apparent, initial units of US forces began to arrive in the Southeast Asian area. On 11 May, it became apparent to the US that the invasion could not be contained by action directed solely against the attacking forces, and therefore the US began an aerial campaign against military targets in North Vietnam. The use of nuclear weapons was not authorized at this time.

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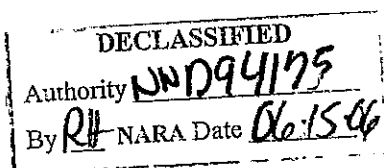
c. At this point, the Chinese Communists, responding to North Vietnamese appeals for air support, began to commit their fighters against US aircraft over North Vietnam. During the following two weeks the area of aerial conflict continued to enlarge and by the end of the period Chinese Communist aircraft were attacking military targets throughout South Vietnam. They had also launched several attacks against the US carrier task force operating off the Vietnamese coast.

d. The President, advised that the Chinese Communist air campaign could only be contained by strikes against bases in South China, decided on 26 May that US forces should attack to destroy the Chinese Communist air capability in the area south of the Kunming-Kweilin-Swato line, and authorized use of nuclear weapons against these targets. Because of possible Sino-Soviet reaction against US and Allied bases, all US forces were to be brought to a high state of alert.

e. The US forces launched their nuclear strikes against Chinese Communist airfields on 27 May. The advanced alert status of US forces, especially strategic systems, coincident with this attack caused the Soviet leaders to miscalculate US intentions. They concluded that the US was preparing for an all-out attack against the Soviet Union and Communist China. As a result, within 24 hours of the US strikes against Chinese Communist air bases, the Soviet leaders decided that they must launch a pre-emptive attack against the US as soon as possible. The date of their attack was established as 1 June 1965.

f. During the period of preparation, the Chinese Communist and US forces continued the air battle over South China and adjacent areas. The Soviet leaders hoped that the continuing conflict would cause the US to maldeploy, or even

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to commit part of its strategic force prematurely to the battle in Communist China. They initiated diplomatic action, ostensibly, directed to ending the fighting in Communist China as a means to camouflage their intentions.

3. In order to explore alternative results, the nuclear exchange between the Soviet Union and the US which resulted from the above series of events, was analyzed under two conditions of initiation. The hypothesized First General War was initiated by the Soviet Union as a result of their miscalculation of US intentions. The Second General War was initiated by a US pre-emptive strike, launched after the US had acquired conclusive intelligence of an impending Soviet attack.

4. In the First General War, the concept of controlled response was played, insofar as both sides attacked counter-force targets in the initial phase, and attacked urban-industrial targets only in a subsequent phase after attempts at negotiations were assumed to have failed. In the Second General War, the US pre-emptive attack was against counter-force targets, but the Soviets retaliated immediately with an attack against both military and urban-industrial targets. This nuclear exchange was completed by a US attack against Soviet urban-industrial targets.

5. Since the intelligence community in the Intelligence Assumptions for Planning ^{1/} gave an upper and lower figure for the Soviet ICBM force in 1965, both were used in each of the two wars analyzed. In addition, the possible effects of certain other potential variables, i.e., warning, command and control, operational factors, and the possibility of use

^{1/} Intelligence Assumptions for Planning, Soviet ICBM Sites, 1961-1967, 9 Nov 1961 (Top Secret, Limited Distribution).

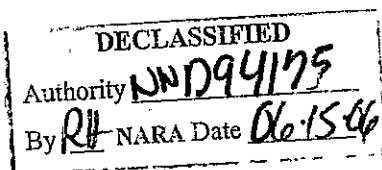
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of other Soviet approaches, including clandestine operations and use of Biological Warfare (BW) and Chemical Warfare (CW) agents, were considered relative to the outcome of the war.

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II. THE FIRST GENERAL WAR - SOVIET INITIATION

A. SOVIET WAR PLANS AND DEPLOYMENT OF FORCES

6. The Committee assumed that the Soviet military had developed plans for the commitment of their strategic forces in a nuclear exchange with the United States. Included were plans for a retaliatory attack and a "first strike." The latter was assumed to call for a missile counterforce strike and, if necessary, subsequent missile and bomber attacks against urban-industrial and other military targets. It was planned that an attempt would be made to open negotiations with the US as soon as possible after Soviet missiles were down.

7. The objective of the counterforce strike was to so degrade the US strategic forces that the US would seek an immediate armistice. Practically, the best the Soviet leaders could hope for would be to reduce substantially the weight of the US retaliatory attack, and to gain US acquiescence to a cessation of hostilities. The duration of any negotiations for a cease-fire might be limited to the time which Soviet bombers (whose take-off time coincided with the first salvo missile launch) could remain airborne, under positive control, and still reach their targets should negotiations fail--this could be but a matter of a few hours.

8. If the negotiations were inconclusive, the Soviet leaders could then unilaterally withhold their forces, launch further attacks against military targets, or commit their remaining strategic forces primarily against urban-industrial targets. The prime considerations would probably be the scope and nature of the US retaliatory strikes and the Soviet

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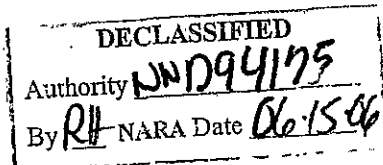
estimate of their own surviving strategic capabilities. Should they choose the third alternative, the primary objective would be the destruction of the US industrial base. The planned effect of the total attack would be to damage the US so heavily that its recovery to a major military power status would take longer than that of the Soviet Union. For the purposes of this study, the Committee assumed that the negotiations failed and the Soviets did fully commit their second phase force against its planned targets.

9. In developing the Soviet plans, it was assumed the Soviet leaders had precise knowledge concerning the capabilities of the Ballistic Missile Early Warning System (BMEWS) and other early warning systems. They were aware of the quick reaction capabilities of SAC missiles and alert bombers. They had a general understanding of the numbers

off the US Atlantic and Pacific coasts. They had precise knowledge of the location of missile sites, bomber bases, air defense installations, and hardened national control centers.

10. The most critical problem to be dealt with in their counterforce attack plans was that posed by the US missile force. Because of the large number of aiming points presented by US missile launchers relative to the number of Soviet missiles, they could program only one missile against each Atlas and Titan launcher complex and one high megaton yield weapon against each Minuteman squadron area. They knew that the CEPs of their missiles ruled out a high probability that they would be able to destroy missiles in silos hardened to withstand [redacted] psi overpressure. They accepted the fact that they had little or no capability to prevent the

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launch of on station [redacted] missiles. Moreover, since their anti-ballistic missile defense system was limited to the protection of a few urban areas, the Soviet capability to destroy missiles once launched against the USSR was limited.

11. Nevertheless, given the Soviet estimate that the US President would not order the launch of US missiles prior to the detonation of enemy warheads, all US ICBMs would be at risk if Soviet missiles could achieve a near simultaneous impact. A significant number of the ICBMs would be destroyed or caused to malfunction either during the launch phase or in the period of lift-off. [redacted]

Finally,

[redacted] blast damage and disruption of local control systems could reduce somewhat the number of hardened missiles that could be launched.

12. While the Soviet planners estimated that SAC alert bombers would be ordered to take off on BMEWS warning, they could not accurately estimate the proportion of the force on alert. Therefore, a portion of their initial missile salvo was scheduled against SAC bases to destroy non-alert bombers, and, in the event of delayed launch due to indecision or malfunction, the portion of the alert force which had not cleared the area of the base. In any event, because of their large air defense force, they did consider SAC bombers somewhat less of a threat than US ICBMs.

13. All ICBMs on launchers (first salvo missiles) were programmed in the counterforce attack against CONUS targets. (See Table 1 following for programming of weapons.) Highest priority was accorded to US missile sites, second priority to SAC bomber bases on which were located GAM-87 (Sky Bolt) squadrons, and third priority to other SAC bases, especially those on which were located important US air defense installations and facilities.

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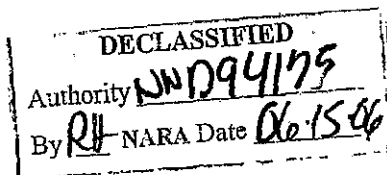
TABLE 1

SOVIET TARGETING--SOVIET PRE-EMPT
WITH "LOW" ICBM FORCE ^{1/}

<u>Counterforce Attack</u>	<u>No. DGZs</u>	<u>SLBM</u>	<u>ICBM</u>		<u>ASM</u>	<u>Bomb</u>
			<u>1st Salvo</u>	<u>2nd Salvo</u>		
<u>ICBM Launch Complexes</u>	199	1	198			
<u>SAC Bases</u>	46	17	29			
<u>VLF Stations</u>	3	3				
<u>Urban-Industrial/Military</u>						
<u>SAC Bases</u>	51					102
<u>Air Defense (not collocated with SAC bases)</u>	64				128	
<u>TAC Bases</u>	6				12	
<u>Naval Air Stations</u>	13				20	16
<u>Naval Bases</u>	5					10
<u>National Hardened Command and Control</u>	3					12
<u>Nuclear Storage Sites</u>	14					56
<u>Military Depots</u>	18					54
<u>Major Troop Concentrations</u>	13					26
<u>Urban-Industrial Canadian:</u>	94			219		188
<u>Air Defense</u>	10				20	
<u>Total</u>		21	227	219	180	464

^{1/} In the "high" ICBM force the Soviet would have available 406 first salvo and 374 second salvo missiles.

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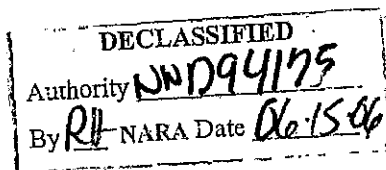
14. In addition, Soviet planners programmed 21 submarine launched ballistic missiles (SLBM) carried by five nuclear-powered missile launching submarines against counterforce targets. Beginning in 1964, this number of submarines was deployed to remain on station, two within two to three days' sailing time of launch points off the US Pacific coast and three in a like deployment off the US Atlantic coast. The SLBM targets included SAC bases, VLF stations (very low frequency stations which are the primary system for communicating with Polaris submarines on station), and the operational missile complex at Vandenberg AFB. The requirement to achieve simultaneous impact of missiles in the United States ruled out the employment of SLBMs in a surprise attack mode. SLBMs were accordingly programmed to impact at the same time as the ICBMs.

15. As part of their counterforce attack, the Soviet planners scheduled 192 medium range ballistic missiles (MRBM) and 34 SLBMs against SAC reflex bases, British bomber and Thor missile bases, nuclear capable fighter-bomber bases in Europe and the Far East, Jupiter sites in forward-based Polaris tenders, and BMEWS sites. These missiles were to impact simultaneously with those on the US. Although the Soviet leaders hoped to keep the European nations out of the war, they felt compelled to attack US and other nuclear capable forces in Europe, as well as in the Far East. It was anticipated that this could be done with limited damage and casualties to the civilian population. Should this prove to be the case, the Soviet leaders believed there was a good chance that most European nations would seek to remain neutral.

16. In their plans for the second phase, they had scheduled second salvo ICBMs against urban-industrial

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complexes; air-to-surface missiles against air defense bases and installations in the US and in a few cases, in Canada. (It was assumed that second salvo missiles were those available for reload of launchers.) Heavy and medium bombers were scheduled against SAC bases and urban-industrial areas to raise the assurance of destruction, and against a series of other military targets, including air bases, naval bases, materiel depots, and troop concentrations.

17. The Soviet plan called for the redeployment of Long Range Air Army (LRAA) bomber forces as part of the preparation for the attack. BISON and BLINDER aircraft would be deployed forward to staging bases to place them in a more favorable attack position. BEAR and BADGER bombers and tankers would be dispersed to other support-capable fields to reduce their vulnerability to a possible US pre-emptive attack. All LRAA bombers and tankers were programmed to be airborne prior to the first missile detonation in the US and to proceed toward the North American continent under positive control.

18. The Soviet planned employment of forces left uncommitted 63 SLEMs loaded in seven nuclear-powered and 12 conventional-powered missile launching submarines, and 1058 MRBMs. The submarines and surviving bombers could be used for further strikes against the US. The uncommitted MRBMs would be available for subsequent use against US and Allied nuclear bases overseas to raise the assurance of destroying any restrike capability, and, if a ground battle had begun in Europe, to destroy bases and important Allied lines of communications.

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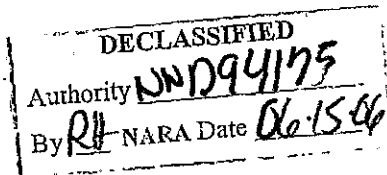
TABLE 2

SOVIET STRATEGIC FORCES - 1965 ^{1/}

<u>Total</u>	<u>Number</u>	
	<u>Wpns/Bombs</u>	<u>Lchr/Carrier</u>
ICBMs: Low Force (High Force)	446(780)	
ICBM Launchers: Low Force (High Force)		227(406)
Submarine Launched Ballistic Missiles (SLBM)	118	
Missile Launching Submarines		35
Bombs	465	
Air-to-Surface Missiles (ASM) (excluding anti-shipping)	180	
Bombers		485 ^{2/}
Medium Range Ballistic Missiles (MRBM) ^{3/}	1250	
MRBM Launchers		450

- ^{1/} See Part II, Section A, for discussion of the sources from which these forces were derived and more detailed presentation of their assumed deployment.
- ^{2/} Estimated total LRAA force was 905 bomber/tankers of which we assumed 485 were assigned to targets in the US, and 420 were configured as tankers.
- ^{3/} Included are 300-700 nm missiles; 750-1100 nm missiles; and 200-2000 nm missiles.

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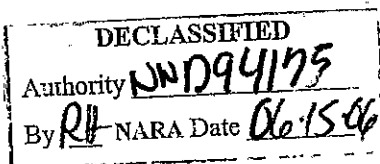
B. US WAR PLANS AND DEPLOYMENT OF FORCES

19. On the US side, the Committee assumed that the Strategic Plan for 1965 included a retaliatory option which called for an initial counterforce attack against those weapon systems which posed a threat to continental US, and to Allied and US bases overseas. Subsequent strikes were scheduled against other military targets and urban-industrial complexes, and were to be executed unless the Soviets agreed to a cease-fire under conditions favorable to the US.

20. The option called for the launch of US missiles scheduled in the counterforce attack as rapidly as possible after receipt of the order to execute. The unified and specified commanders were authorized to launch their alert aircraft under positive control on receipt of warning. As a contingency, applicable if US aircraft forces were in a high state of alert at the time of attack, the option left uncommitted a portion of the SAC bomber force and many of the theater aircraft.

21. The option assumed that nuclear capable forces of nations allied with the US would participate in the retaliatory attacks. In addition, British V-bombers and Thor missiles, NATO Jupiter missiles, and certain fighter-bomber units were programmed. However, recognizing the possibility that these forces might not be available, the option scheduled these weapon systems as additional weapons against targets also covered by US forces.

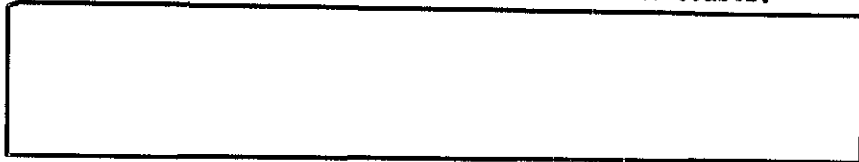
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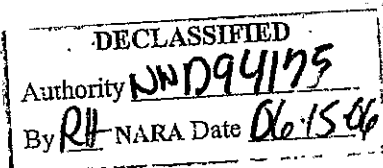
22. Critical to the successful implementation of this retaliatory attack option was the receipt of sufficient warning to enable alert aircraft to clear their bases. The option assumed that the Ballistic Missile Warning System (BMEWS) would provide at least 15 minutes' warning of an ICBM attack at the operational level. It was also assumed that the radar coverage provided by the Defense Early Warning line (DEW), mid-Canada line, the contiguous NORAD system, and theater systems gave assurance that there would be adequate warning should the Soviets attempt to initiate an attack against the US with bombers. With warning provided by any of these systems, it was assumed that presidential authority would survive to order the launch of US forces and that this decision would be communicated to the operational level, even though the decision was made after the enemy missiles had begun to detonate in the US.

23. This retaliatory option recognized the continuing inability of the US to detect a missile attack launched from submarines. Although six urban areas were defended by modified Nike-Hercules batteries,^{2/} their prime function was destruction of incoming missiles rather than warning since the time from detection to impact would be only about one minute. Likewise, there was not high assurance that submarines would be detected as they approached potential launching areas of the US Pacific and Atlantic coasts.



^{2/} Around Boston, New York City, Washington, Norfolk, Hartford and Seattle.

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24. A last resort warning and unequivocal indication of attack would be provided by the Bomb Alarm System and the Nuclear Detection System (NUDETS). These would be capable of detecting nuclear detonations at key military and urban-industrial locations in the US and the BMEWS sites and of reporting automatically to national command centers. It was also anticipated that NUDETS would give the President and his military advisors evidence as to the general nature of the Soviet attack--that is whether it was restricted to military targets or included urban-industrial areas as well.

25. The specific programming of weapons in this retaliatory option is given in Table 3, which follows, and is divided between an initial counterforce phase and subsequent attacks against urban-industrial and other military targets.

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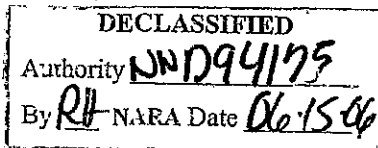
TABLE 3

TARGETING
 US RETALIATION - SOVIET LOW FORCE

TARGET SYSTEM	US Weapons				Allied Wps	
	ICBM	Polaris	SAC GAM	Theater Bombs	GAM	MRBMs
<u>Counterforce Attack</u>						
156 Sov ICBM	468					
123 Sov MRBM	246				18	105
30 Sov Staging	60	30				
43 LRAA Bases	43	43				
113 Sov ADC/Aflds			24		226	89
92 Eur Sat Aflds					231	
50 China [redacted]					114	
1 Sov VLF Station		2				
<u>Urban-Industrial Attack</u>						
278 Sov U-I Complexes 1/	67	178		1154		
151 Sov ADC/Aflds			302			
68 Sov [redacted]				272		
69 China U-I Complexes 1/	12	16		284		
50 China Aflds			100			
Total (Phase I & II)	896	269	426 ^{2/}	1710	571	107 105
Reserve (Uncommitted)	141	163	94	689		

- 1/ Includes industrial and military critical category targeting.
- 2/ Two hundred twenty-one additional US and UK GAMs were utilized as bomber penetration aids with no damage assessment performed.

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26. Soviet ICBM and MRBM sites were targeted with the objective of destroying missile reload capability, missiles out-of-commission or delayed in their launch, and missiles held in reserve.^{3/} LRAA staging bases, home bases, and potential dispersal bases were to be attacked to destroy support facilities and all aircraft remaining on the bases. Also included in the counterforce attack were strikes against Soviet air defense installations and Soviet offensive fighter bases primarily to reduce the threat to the European theater. If subsequent attacks were necessary, weapons were programmed against urban-industrial complexes, [redacted] and other military targets. The large size of the reserve or uncommitted force was directly related to the advanced state of alert of all forces at the outbreak of hostilities. However, regardless of the state of alert this option required that at a minimum a reserve of 100 hardened ICBMs and Polaris missiles be maintained.

27. In the situation depicted for this study, US and NATO air, missile, and naval forces were assumed to be on a heightened alert. The specific proportion of the various elements of the forces on a quick reaction status was as follows:

- a. SAC Bombers and Missiles. Ninety percent of the 890 SAC bombers, including 12 bombers flying airborne alert missions, and all 1037 ICBMs.
- b. Polaris Force. Twenty-seven of the 31 fleet ballistic missile submarines were deployed forward as

^{3/} It was assumed that the location of 70 percent of the 227 Soviet ICBM sites and 90 percent of the 137 MRBM sites were known with sufficient precision to be targeted.

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follows:

and three en route to station, one in the Pacific and two in the Atlantic.

c. US Theater Nuclear Capable Forces. Ninety-six of the 126 MACE missiles and 50 percent of the 1007 nuclear capable fighter bombers in the European theater--the total included regular and Air National Guard units assumed to have been deployed to the theater in the month preceding the attack. It was assumed that a large number of the 732 nuclear capable fighter bombers in the Pacific theater were engaged in the air battle over China and that only a small proportion were committed to cover SIOP theater targets not already destroyed.

d. US Carrier Strike Aircraft. Eighty percent of 384 strike aircraft on eight attack carriers deployed as follows: two in the Mediterranean, one in the North Atlantic en route to northern European waters, and five in the western Pacific. It was assumed that the bulk of the carrier strike aircraft in the Pacific were committed in the air war over China and that relatively few were committed to cover remaining SIOP theater targets.

e. Non-US Nuclear Capable Forces in Europe. All 60 Thor missiles and 91 bombers in the UK V-force--the latter carried 128 GAM-87s in addition to bombs. All 45 NATO Jupiter missiles. One third of the 1104 non-US NATO nuclear armed tactical aircraft--the latter were committed to preplanned theater targets which would have been engaged, should a battle for Europe develop during subsequent strategic exchange--this part of the war was not analyzed in this study.

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28. In this study, only the alert weapon systems were considered available for strategic targeting purposes-- these are displayed in the following table. In Europe, the surviving units of the highly vulnerable non-alert forces were available to SACEUR to perform on-call missions.

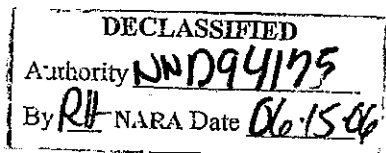
TABLE 4

US AND WEST EUROPEAN ALERT NUCLEAR DELIVERY FORCES - 1965

<u>Total</u>	<u>Number</u>	<u>No. Weapons</u>	<u>Yield (MT)</u>
ICBM			
Polaris Missiles			
US GAM 77 and 87			
SAC Bombers			
US Fighter/Bombers			
Europe			
Pacific			
MACE Missile			
Carrier Strike Aircraft			
Non-US NATO Fighter Bomber			
NATO Jupiter Missile			
UK V-Bombers			
Thor Missiles			
UK GAMs			

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C. THE OUTCOME OF THE NUCLEAR EXCHANGE
THE FIRST GENERAL WAR
SOVIET "LOW" ICBM FORCE

29. In the first machine operational analysis, US and Soviet forces were gamed using operational factors and tactics described in the preceding section. The counterforce exchange was considered separately to determine the comparative force levels which might have been expected to exist if the war had ended at this point without further attacks either way. Also important was a determination of the damage and casualties which such an attack might inflict on the civilian sector. The total attack was then analyzed to determine the total effect which might have been expected from a nuclear exchange of the projected magnitude. It should be noted that the results discussed below are based on aggregate factor analysis and not derived from an interacting two-sided war game.

The Counterforce Exchange--Soviet Attack "Low" ICBM Force

30. In the hypothetical war, the Soviet launched a pre-emptive counterforce missile attack with detonations in the US and overseas to occur simultaneously at 2300 EST, 31 May 1965. BMEWS gave warning of this attack 22 minutes before the first warhead reached the US. Orders were immediately issued in SAC and other commands to launch alert aircraft and to initiate preparatory missile countdown. As the Soviet warheads began to detonate, the President, advised that the Soviet attack was apparently directed against military targets, ordered the execution of the counterforce retaliatory option. US missiles and theater forces were launched on their strikes, and SAC bombers, airborne under positive control, awaited orders to execute attacks against urban-industrial and other military targets, if directed.

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31. The strategic base system in the US was hit by 183 warheads, yielding 2365 megatons, within a 15-minute period. All weapons down against hardened missile launch complexes were ground burst--120 warheads yielding 2001 megatons; the balance were air burst.

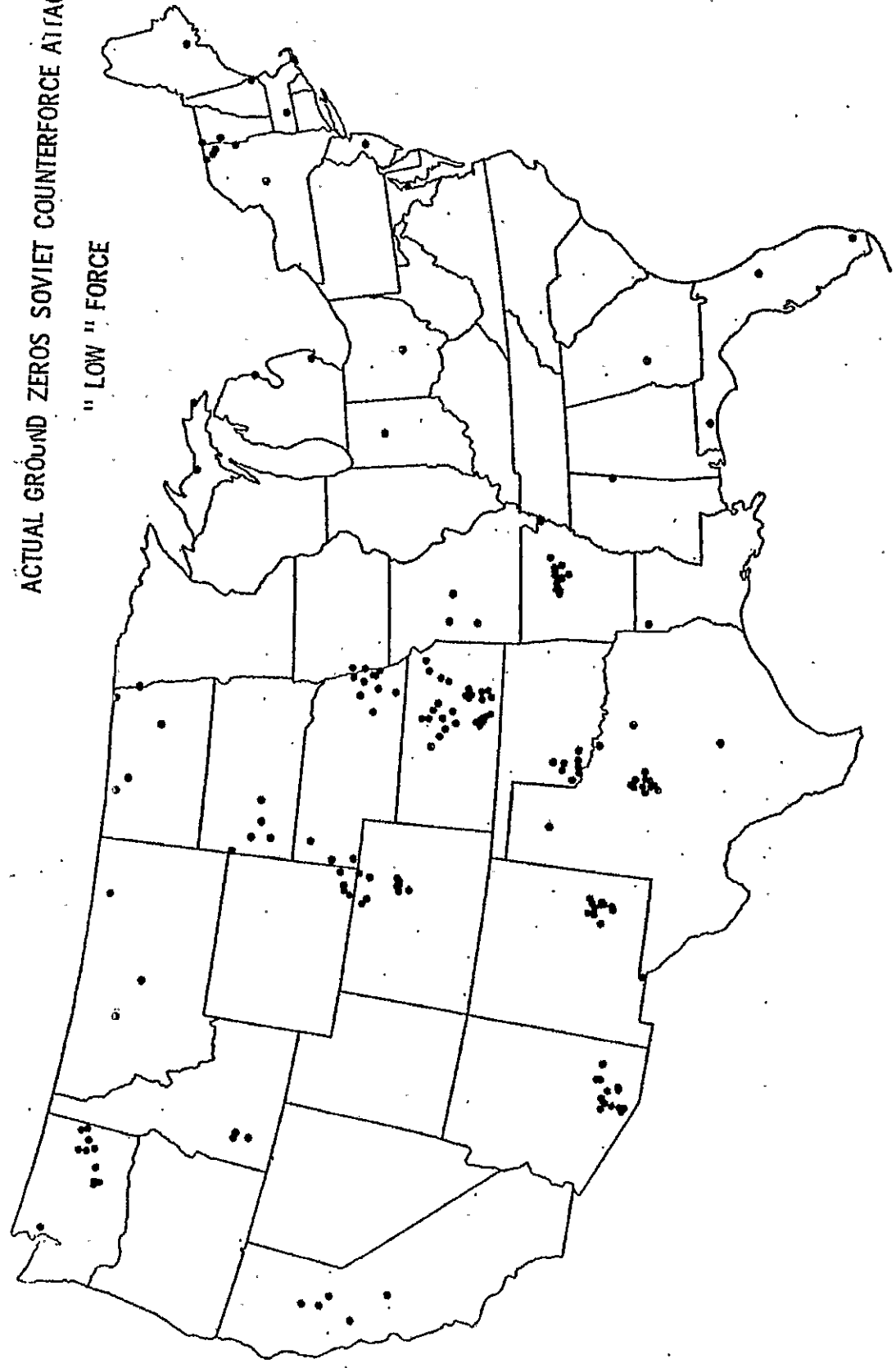
32. Effect on US and Allied Military. The Soviet missile attack destroyed only 53 Atlas and Titan missiles, or six percent of the total US land based missile force. In part, this was because the Soviet failed to attain a simultaneous impact in the US because of launching difficulties. Their missiles impacted over a 15-minute period--82 detonated in the first five minutes, 72 in the second, and 29 in the last five minutes--with many of these arriving after US missiles had been launched. A more important cause, independent of the time factor, was the ineffectiveness of the yield/CEP combination of most Soviet missiles relative to the hardness of underground silos. With respect to Minuteman, although seven of the total of 80 launch control centers were severely damaged as a result of one 100-megaton weapon being targeted against one control center in each squadron area, the dispersion of control centers, combined with flexibility of the launch control systems, prevented the Soviet attack from halting the launch of any Minuteman. Furthermore, because of the dispersed deployment of silos, the detonation on a launch control center had no effect on adjacent missiles. Therefore, none of the Minuteman missiles, either those scheduled in the counterforce attack or withheld for subsequent missions, were affected.

33. The Soviet attack against SAC bomber bases was substantially more productive, since 40 of 51 suffered severe damage. However, only 161 SAC aircraft, 82 bombers and 79 tankers, or less than ten percent of the total force were destroyed. Similarly only 12 of the 58 strategic force nuclear

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ACTUAL GROUND ZEROS SOVIET COUNTERFORCE ATTACK

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weapon storage sites were severely damaged. Though the four SAC command posts, Offutt AFB and the alternates at Barksdale AFB, March AFB, and Westover AFB, were destroyed, SAC command continued by means of the airborne command post. Because of collocation, the Soviet attack against SAC installations also degraded US air defenses. Severely damaged or destroyed were about one third of the air defense interceptors, three BOMARC squadrons, three SAGE centers, one Missile Master, and many of the Nike Hercules batteries protecting the targeted SAC bases. Damage to other elements of the military establishment was relatively minor.

34. As could be expected from the focus of the attack, the Air Force, with 190 thousand immediate fatalities suffered the heaviest toll. Immediate casualties in the other services were relatively small. Total military fatalities, including those from nation-wide fallout rose to 233 thousand at the conclusion of the counterforce attack.

35. One hundred and fifty-one Soviet MRBMs and 20 SLEMs detonated in the vicinity of US and Allied bases overseas. Although 50 percent of the tactical forces on these bases were assumed to be on quick reaction alert (QRA) and were launched on warning, US regular and Air National Guard tactical forces lost 698 of 1790 fighter bombers and 30 of 126 MACE missiles, and Allied nuclear capable forces lost 677 of 1197 fighter bombers. The three BMEWS sites were rendered inoperative. In addition, four Reflex B-47s and many transport, air defense, and tactical reconnaissance aircraft were damaged or destroyed. Although Polaris tenders were targeted they had deployed elsewhere prior to impact of missiles.

36. Effect on the Civilian Sector. Essential to the concept of a counterforce strategy is the assumption that military targets, especially those presented by strategic

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weapon systems, can be attacked with nuclear weapons without causing significant damage to non-military installations or major casualties among the civilian population. In terms of physical damage to non-military installations, the Soviet attack appeared to have met the requirement. As a rough indication of the extent of damage, only about two percent of large manufacturing plants were affected.^{4/} The isolation of most US missile launch complexes and many SAC bases acted to offset the potential destructive effects of the large yield weapons used by the Soviet force.

37. Similarly, civilian casualties of 4.6 million would appear to be within acceptable limits. Of this total, 2.4 million would be fatalities, of which 1.6 million were caused by blast and .8 million by fallout. The latter was caused primarily by the ground bursting of large megaton weapons against hardened missile sites. In Western Europe, the Soviet attack caused 2.7 million civilian casualties.

The Counterforce Exchange--US Retaliation.

38. Immediately following detonation of the first Soviet missile warheads in the US, the President ordered the execution of the retaliatory counterforce option. In this attack the US expended 817 ICBMs, 75 Polaris missiles, 24 GAM-87s, and 571 theater force weapons. In addition, 60 UK Thors and 107 UK GAM-87s, and 45 NATO Jupiters were used. The megatonnage delivered was as follows:

^{4/} Plants employing 100 or more personnel

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TABLE 5
WEIGHT OF ATTACK

<u>Country</u>	<u>No. Down Weapons</u>	<u>Total MT</u>
Soviet Union China and European Satellites		

All weapons were air burst to minimize population casualties from fallout and to maximize damage to target areas.

39. Although the entire ballistic missile phase of the US counterforce attack was completed in 50 minutes, the theater aircraft and cruise missiles did not complete their strikes until approximately the end of the second hour. This continuation of the nuclear attacks on both the European Satellites and military targets in western USSR was unavoidable because of the time required for fighter bombers or carrier strike aircraft and MACE missiles to reach their targets--a MACE missile flight time from Western Germany to a target 400 miles inside the western Soviet border would be roughly two hours; for a fighter bomber from the UK, the time to targets on the Baltic coast in the vicinity of Tallin would be roughly two and one half hours. This relatively slow delivery capability of existing theater weapon systems is a serious drawback to their contemplated use in a counterforce exchange; this time problem would rule out their use in long range missions if it is believed that there must be a complete lull in the nuclear attack during any negotiations for a cease-fire at the end of a counterforce strike. This would also apply if there must be instantaneous cessation of detonations at the moment an agreement is reached.

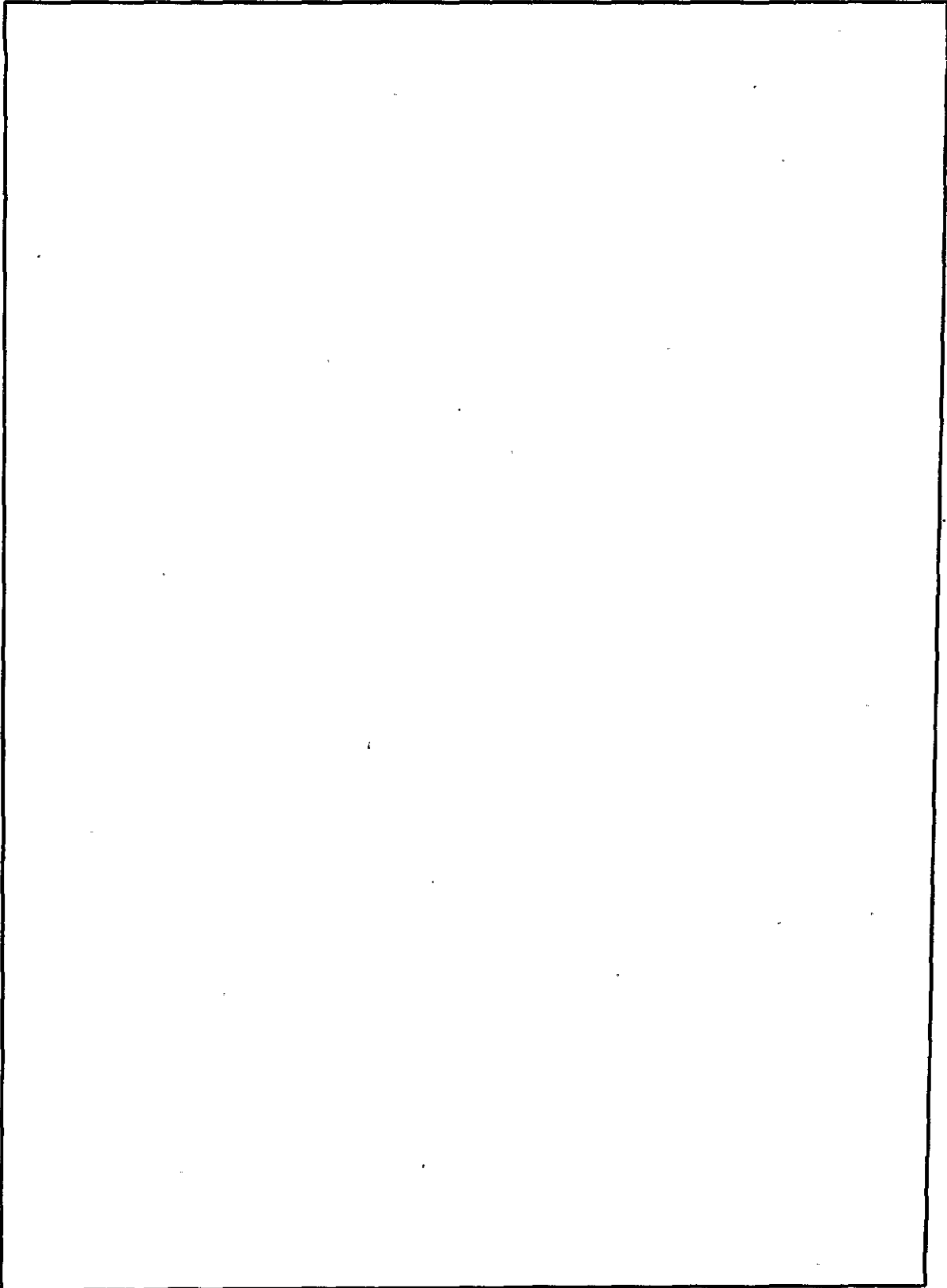
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40. Effect on the Sino-Soviet Bloc Military. The counterforce retaliatory attack caused 410 thousand casualties among Bloc military forces. It destroyed 169 ICBMs, or 37 percent of the pre-attack total, leaving 73 ICBMs for subsequent attacks. Of the latter figure, 66 were considered to be at launch sites the location of which were not known with sufficient precision for targeting. Missile attacks against MRBM launch sites destroyed 436 missiles.

41. Although the Soviet bomber/tanker force was scheduled to be airborne at the time of the attack and many fighters were launched to survive, still the US attack killed 239 medium and heavy bomber/tankers (18 percent of the total force) ^{5/} and 1269 tactical aircraft (27 percent of the total). These aircraft were a large percentage of those assumed to be on the ground at the time of the attack. More importantly in a retaliatory situation, the Soviet airbase system was severely damaged, as summarized below:

TABLE C.
DAMAGE TO SOVIET AIR BASES

Type	Total Number Bases	Number Damaged	Percent Damaged
LRAA home bases	43	37	86
Primary staging bases	30	28	93
Other bomber capable bases	279	19	6
Offensive Fighter and Light Bomber	88	73	83

42. Relatively minor damage accrued to other Soviet military forces and installations, except for those associated with air defense. Again, as in the US, air defense suffered heavily as a result of collocation with LRAA units.

^{5/} Including medium bombers assigned to naval and tactical air units.

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The destruction of about 50 percent of the air defense control centers, predominantly in western USSR, would be of particular significance in reducing the attrition of US bombers in subsequent attacks.

43. The attacks against the active air bases in the European Satellites and Communist China were highly effective. Seventy-seven of the 109 air bases from which European Satellite and Soviet aircraft were operating were hit, causing the destruction of about 60 percent of the total Satellite air order of battle. In Communist China, the attack by strategic and theater forces in the area north of the Yangtze added destruction to that which had already been inflicted by US forces during the air battle incident to the fighting in Southeast Asia. Ninety-nine bomber capable bases and 85 fighter bases were hit, resulting in destruction of almost 400 additional combat aircraft.

44. Effect on the Sino-Soviet Civilian Sector.

The US and Allied counterforce attacks caused 6.4 million civilian casualties in the Bloc, but little damage to urban-industrial areas. This was partly attributable to the relatively low yield of many US missiles and, especially, of theater weapons, and to a greater degree, to the relative isolation of Soviet missile sites and many air fields. Even in the Soviet Union, which bore the brunt of the attack, only two critical industrial categories, synthetic rubber and airframe production, registered as much as five percent damage, while most registered little or none.

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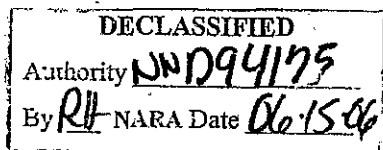
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The Counterforce Exchange with Soviet "Low" ICBM Force--
US-USSR Military Position at Completion.

45. At the completion of strikes scheduled in the counterforce exchange both the US and the USSR retained substantial surviving forces. However, even though the US and Allied units expended almost four times the number of weapons as did the Soviet military (1795 compared to 466), US strategic forces retained a numerical superiority. The airborne SAC bomber force amounted to about 800 compared to 400 LRAA bombers; the land based missile force was approximately 220 as compared to 73; and the SLBM comparison was 357 to 63. On the other hand, in Europe the Soviet fighter-bomber and MREB forces were probably larger than those still available to the US and its Allies.

46. Moreover, if the cease-fire had been reached and the First General War had ended at this point, the US probably would have had less difficulty in reconstituting its strategic bomber forces after they had been called back. For example, 11 SAC bases remained untouched, while only four of the LRAA home bases escaped. Additionally, because of the collocation of major airframe factories and maintenance depots with certain of the destroyed LRAA home bases, the Soviet problem was probably much greater than that of SAC. In both the USSR and the US, neither reloads of nuclear weapons nor fuel would limit the capability of the reconstituted forces, although problems of transportation would have to be overcome in certain cases. It should be noted that the capability of the LRAA both to bring its bomber force home and to launch subsequent strikes, in the event the cease-fire proved to be only temporary, would be substantially degraded. All

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but four of its major staging bases had been destroyed, and because of range limitations, most missions flown against the US except those by the BEAR would have to be one way, even with aerial refueling. Thus, in any negotiations to arrange a cease-fire, the US would have been in a substantially stronger position.

47. The conclusion as to the efficacy of a Soviet counterforce attack as a means of initiating a nuclear exchange in a situation as assumed in this study, rests on the objective of the Soviet effort. If the Soviet leaders had believed that a US attack was imminent and that such an attack would be restricted to military targets, the objective of their pre-emptive counterforce attack could have been only to "spoil," to some degree, the expected effectiveness of the US strikes. They could have hoped that there would have been sufficient political pressures in the US and from other countries in the world to cause the US to agree to a cease-fire at this point. Under these conditions, they might have been willing to accept a cease-fire, even though in terms of strategic forces they would have been in an inferior position. There would not, in fact, be any change in the relative comparative strategic force strengths that existed before the outbreak of war. But more importantly, the Soviet industrial base and conventional forces would be largely undamaged.

48. On the other hand, if the Soviet planners had as their objective the destruction of the US land based strategic forces, then a counterforce attack as discussed above would have been almost a complete waste of effort. Of the hundreds of weapons in this category, the Soviet attack succeeded in destroying before launch only 53 missiles and 82 bombers. Thus, in purely military terms, it would

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seem that the Soviets would have had little to gain by initiating a war with a counterforce attack--in terms of the comparison of total forces, this conclusion could be broadened to say that, except possibly for the reasons given in paragraph 47 above, the Soviets would have had nothing to gain by initiating a nuclear exchange under any circumstance.

The Total Soviet Attack with "Low" ICBM Force--Effect on the US.

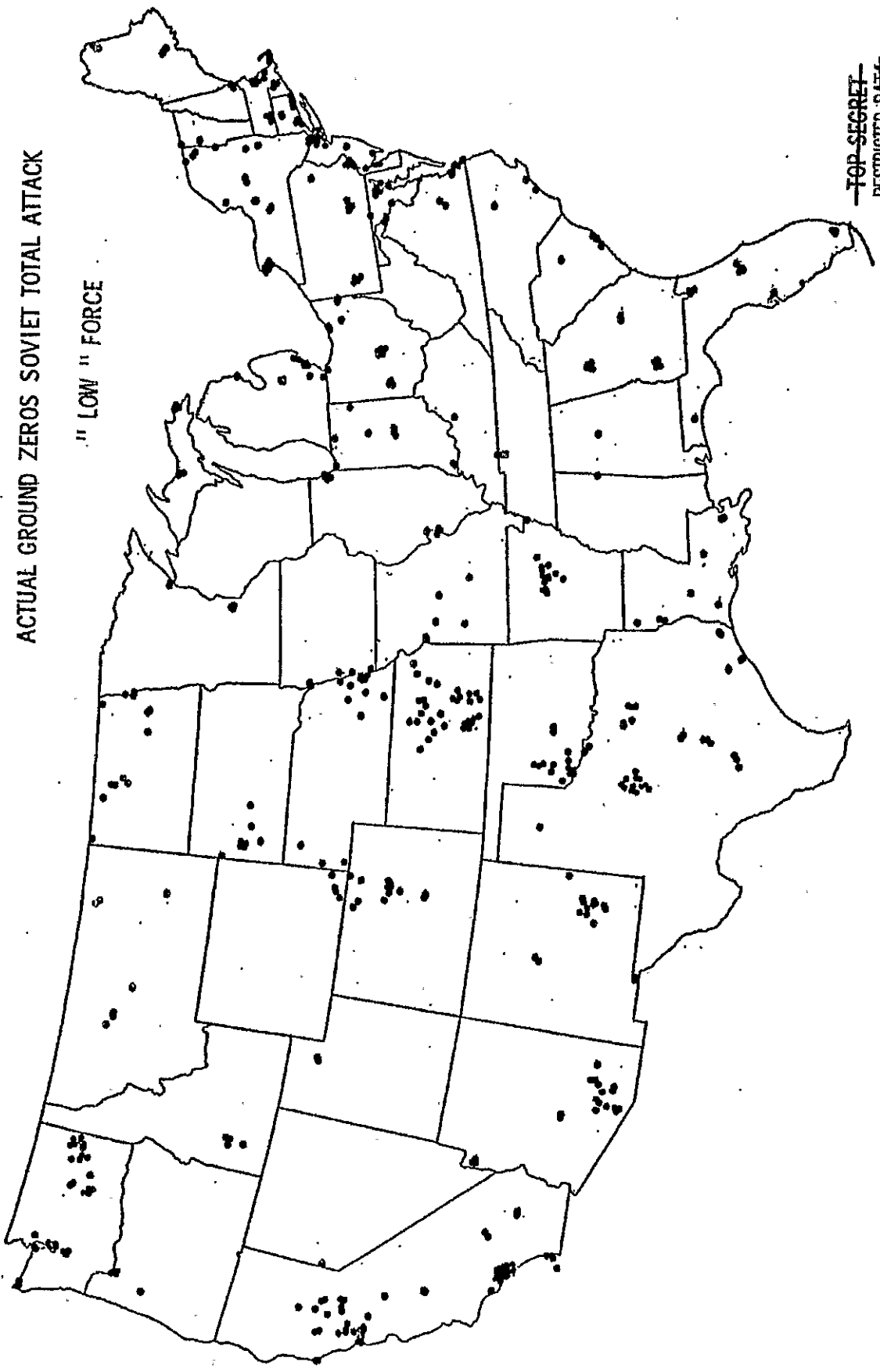
49. The Attack. Following the completion of the initial missile counterforce exchange, theater forces continued intermittent attacks against Soviet and Satellite offensive airfields and air defense installations. The Soviet responded with continuing, though sporadic, fighter-bomber and MRBM strikes. Against this background, offers and counter-offers for a cease-fire were regarded with suspicion by both sides. The failure of negotiations became all too apparent in the fourth hour of the war when North American air defenses were penetrated by Soviet bombers; subsequently, in the sixth hour, second salvo ICBMs began to detonate on US cities.

50. The second phase of the Soviet attack followed the pre-established plan and resulted in the detonation of 61 ICBMs, 82 ASMs and 203 bombs against US urban-industrial and military targets. The total weight of the Soviet two-phased attack was:

	<u>Weapons</u>	<u>Megatons</u>
Counterforce	183	2365
Urban-industrial/military	346	2078
Total	529	4443

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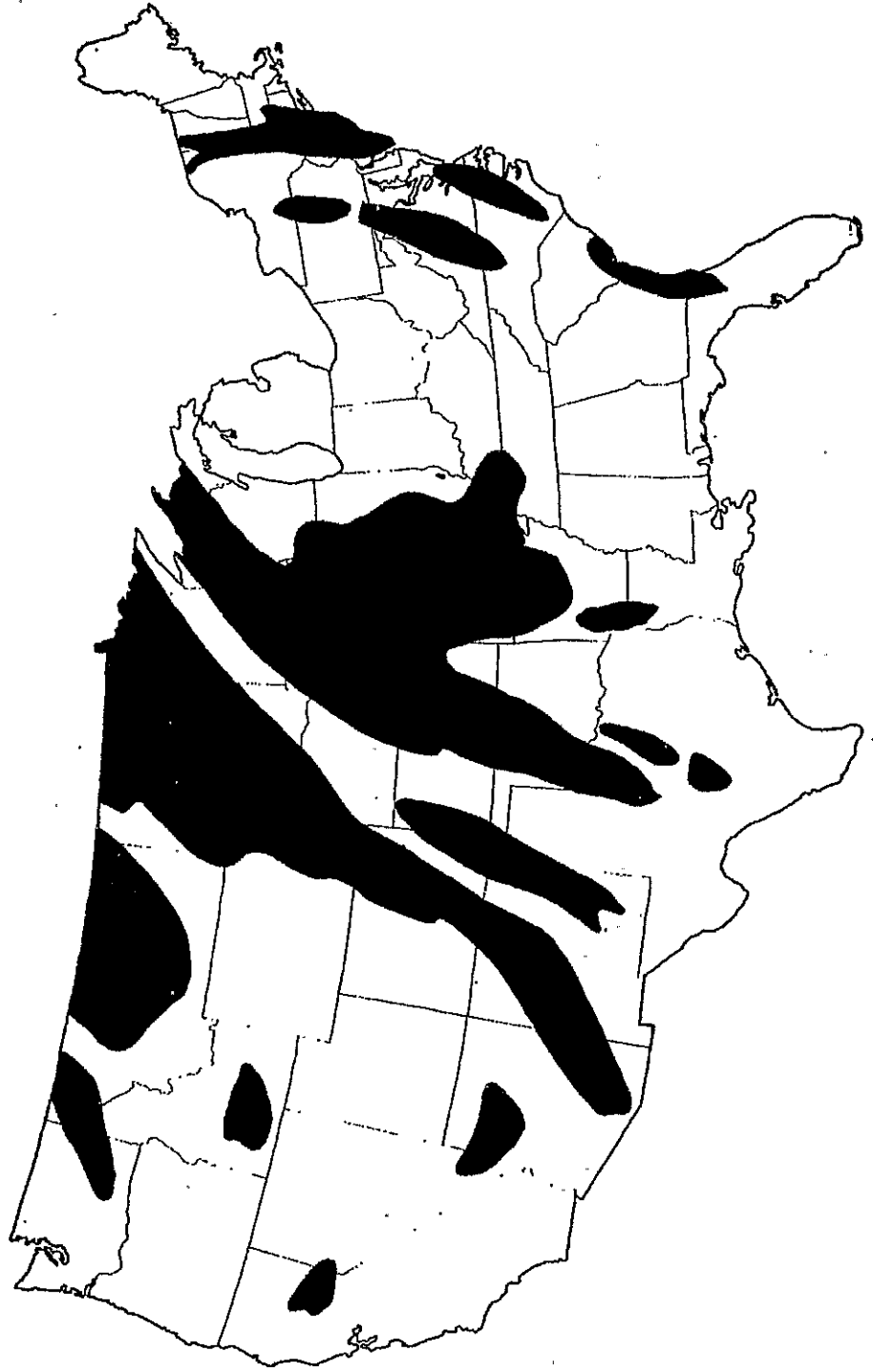
ACTUAL GROUND ZEROS SOVIET TOTAL ATTACK

" LOW " FORCE

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**DISTRIBUTION OF FALLOUT
SOVIET TOTAL ATTACK "LOW" FORCE**



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Of the 529 weapons down, 65 percent were directed against military targets and 35 percent against urban-industrial complexes. One hundred fifty-nine weapons, delivering 51 percent of the total yield, were ground burst almost entirely in the first phase strikes against hardened missile sites.

51. Effect on US Military Forces. Approximately 508 thousand military personnel died from blast and fallout produced by the total Soviet attack, and selected categories of US military installations in CONUS suffered damage as follows:

TABLE 7

DAMAGE TO US MILITARY INSTALLATIONS

<u>Category</u>	<u>Number Installations</u>	<u>Number Damaged</u>	<u>Percent Damage</u>
Hardened Nat'l Cmd/Cntrl	3	3	100
SAC Hdqts, Major	4	4	100
Army Hdqts, Major	10	4	40
Navy and Marine Hdqts, Major	19	16	84
ICBM LCC	260	66	26
SAC bomber bases	51	49	96
Other Active AF Bases	68	14	20
Navy and Marine Air Sta.	29	9	32
SAGE Centers	22	16	73
AC&W Sites	130	35	27
Bomarc Sites	8	6	75
Missile Master	10	8	80
Nike-Hercules Btrys	130	76	58
Hawk Batteries	36	4	11
Army, Major Troop Centers	26	14	54
Naval Sta., Shipyards, and Bases, Major	15	12	80
Marine Corps Bases	4	2	50
Air Logistics Depots	10	7	70
Army Depots, Major	14	2	14
Navy and Marine Supply Depots, Major	18	13	72
Nuclear Wpn Storage Sites	146	30	21

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52. Major US naval ships in CONUS ports suffered damage or destruction as follows:

TABLE 8
DAMAGE TO US NAVAL SHIPS

<u>Type</u>	<u>Total Number</u>	<u>Number Damaged</u>	<u>Percent of Total Damaged</u>
Submarines	137	10	7
Cruisers	14	7	50
Destroyers	223	43	19
Other Vessels	472	55	12

53. Losses to military aircraft in CONUS from Soviet nuclear strikes, but not including combat attrition, were as follows:

TABLE 9
DAMAGE TO MILITARY AIRCRAFT DEPLOYED IN CONUS

<u>Type</u>	<u>Total Number</u>	<u>Number Damaged</u>	<u>Percent of Total Damaged</u>
Naval Aircraft (combat types)	873	351	40
Marine Corps Aircraft (combat types)	420	60	14
Strategic Air Command	1650	195	12
Tactical Air Command	211	123	58
Air Defense Command	718	461	64
Military Air Transport Service	234	144	61
Air National Guard	1084	278	26
Air Reserve Forces	436	171	39

54. Despite the above damage the US would retain a substantial strategic capability. The land-based reserve missile force of 141 could be augmented by mating spare, resupply, or repaired out-of-commission missiles with launching complexes that had been cleared and rehabilitated. The SAC bomber force would consist of the 231 bombers not committed and another 256 which were assumed to return from their strikes. The surviving tanker capability would be

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adequate to support these bombers. The SAC post-attack command and control system, PACCS, could perform its function. However, because of heavy losses of trained SAC airmen and of logistic installations the maintenance of the force at a combat readiness posture would be difficult. Thus in the initial period after the close of the total Soviet attack only a modest force of 100 to 200 bombers could be available for subsequent strikes.

55. The nuclear weapons delivery systems of the Navy would also retain considerable capability. In addition to the Polaris submarines carrying 163 reserve missiles not committed in the total attack, the submarines which had expended their missiles could obtain about 50 replacement weapons from the three tenders and two cargo support ships which were assumed to have survived. Furthermore, assuming that a number of the 12 attack carriers at sea had survived, their weapons requirements could be met from accompanying ammunition ships. Their strike force would consist of aircraft which had returned from missions, or had not been committed, and, in time, replacements from the aircraft which had survived in the US. However, the severe destruction to naval shore installations in the US would mean that the above capability would begin to diminish as shore support was required.

56. US air defense capability was severely degraded. Interceptor aircraft, surface-to-air elements, and control systems were heavily damaged. While a major proportion of the Aircraft Control and Warning (AC&W) radar stations survived and could provide warning of subsequent attacks for some period following the attack, the air defense system would be relatively ineffective.

57. Army combat forces in the US were relatively untouched because at each major installation the troops had

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dispersed into prepared field shelters. The loss of headquarters personnel and facilities would cause disruption in the command structure and communications systems; however, with the use of mobile troop communications equipment and a reconstituted command structure, the Army would be available, in many areas of the nation, to assist in maintaining order and providing assistance to the civil authorities.

58. Effect on the Civilian Sector--Casualties. The total Soviet attack caused the death of 47 million civilians and injured another 17 million, most of whom could survive; total casualties of 64 million amounted to about 33 percent of the projected 1965 total population of 194 million. The casualties were centered in the largest urban-industrial areas--50 percent of the casualties occurred in 13 of the US largest city complexes.

59. Only 12 percent (7.9 million) of the total casualties were attributable solely to fallout. This was due to the air bursting of weapons directed against cities, and to the assumption that by 1965 there would be a substantial improvement in protection against fallout and in the training of most of the population as to proper behavior in a nuclear attack. ^{6/} Only in the Midwest were casualties from fallout heavy--in Civil Defense Region Six encompassing this area, 39 percent of the casualties were from this cause. This was a result of the ground bursting of large yield Soviet weapons against hardened missile sites. Winds prevailing on the day of the attack carried fallout north and east and affected the North Atlantic region less than might have been expected.

^{6/} If there had been no improvement in 1965 over the 1962 shelter and behavior pattern, the casualties from fallout would have been about 25 million, or about three times as great.

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60. Effect on the Civilian Sector--Industry. The Soviet attack against urban-industrial areas resulted in the destruction ^{7/} of a substantial portion of major industrial capacity in the US. ^{8/} Production of basic materials was affected in varying degrees, ranging from a ten percent loss of capacity in the primary metals and minerals industry to 50 percent in chemicals. Of greater significance was the damage to fabrication plants. For example, some 62 percent of metal products fabrication and 47 percent of machine tool production capacity was lost. In total, large manufacturing plant capacity of all types was reduced by 57 percent.

TABLE 10

DAMAGE TO US INDUSTRIAL CAPACITY

<u>Large Manufacturing Plants</u>	<u>Percent Available w/1 15 days</u>	<u>Percent Destroyed or Indef. Unavailable</u>
Chemicals and Allied Products	50	50
Petroleum and Coal Products	41	59
Rubber Products	36	64
Leather Products	66	34
Primary Metal Industries	40	60
Fabricated Metal Products	38	62
Machinery, except Electrical	46	54
Electrical Machinery and Equipment	39	61
Transportation Equipment	22	78
Instruments and Related Equipment	42	58
Petroleum Production Capacity	43	57
Processed Food and Kindred Products	39	61
Apparel and other Finished Fabric	49	51
Lumber and Wood Products	87	13
Textile Mill Products	81	19
National Total	43	57

^{7/} In most cases, destruction of industrial facilities was not complete, and the term "destroyed" as used here indicates destruction or damage to the extent that production would be lost for an indefinite period of not less than 90 days.

^{8/} The analysis of damage to US industry was based on data regarding large manufacturing plants, i.e., those employing more than 100 people.

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61. The capability of the US to rebuild or support its military force would be limited, as indicated by the loss in capacity of the following industries:

Ordnance and Accessories	72%	Motor Vehicles & Eqpt.	74%
Guided Missiles	58%	Communications Equipment	67%
Aircraft and Parts	85%	Electron Tubes	45%
Ship and Boat Building	71%	Avgas and Tetra Lead	54%

Eighty-four percent of military petroleum products tankage survived the attack, and most of the fuels therein would be immediately available. This should be adequate to support military efforts for some period; however, this resource would be difficult to replace due to the 50-60 percent destruction of various petroleum production and refinery capability, and the competition of military requirements with survival needs.

62. Survival Resources. A critical and continuing survival problem would be that created by the destruction of some 77 percent of drug and medicine productive capacity. Once the existing supplies were exhausted, new production would be inadequate to care for the remaining sick and wounded following the attack. There would be shortages of commercially processed foods, particularly in areas served by large processing plants, but nationally sufficient food stocks would exist and they could be processed by individuals and small establishments to provide for the surviving population. Total national farmlands were not materially affected, though there was heavy loss of crops in the midwest due to fallout. While 51 percent of wearing apparel production capacity was lost, cloth would be available since basic textile production lost only 19 percent of capacity. Although badly located for surviving population concentrations, lumber and wood products for survival needs were in good supply. Farm machinery production was only 15 percent destroyed, but would be limited in utility by petroleum products shortages.

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63. Transportation. Though the nation-wide system of transport was largely disrupted by the effects of the total attack, surviving means of transport could probably support the US requirement in matching materiel resources and surviving population. However, it would require time and effort to develop the necessary coordination and substitution of routing and conveyances. Furthermore, the loss of petroleum products in storage and of refinery capacity would set a limit on transport of other than essential survival resources and military materiel and transportation.

64. The rail system suffered most heavily. Fifty-nine percent of nation-wide railroad classification yard capacity was destroyed or severely damaged, with, predictably, heaviest damage in the northeastern US. While very few line haul engines were lost, 40 percent of the nation's freight cars were destroyed. Replacement of this equipment would be slow, since 66 percent of railroad equipment production capacity was lost.

65. Most of the major US ports which handle the bulk of overseas and coastal trade were heavily damaged; those handling Great Lakes and river traffic were not. Of approximately 3600 major berth spaces available at piers in the significant US ports, 42 percent were severely damaged, with about three fourths of these on the Northeast and Pacific Coasts. A substantial air transport capability survived. Of 370 principal commercial airfields in the US, only 11 percent were significantly damaged. Highway transport would have to bear the bulk of the transportation requirement in the immediate period after the attack. Because of the multiplicity of highway networks, routing throughout the country should not be a major problem, and

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surviving vehicles would undoubtedly suffice. Replacement of motor vehicles would be very limited, due to destruction of 74 percent of production capacity.

66. Effect on Government. Washington, D.C. was severely damaged by a Soviet seven-megaton ICBM warhead. With approximately 700 thousand casualties in the metropolitan area, the nation's capital could no longer function as a seat of government. It was assumed that key government personnel had evacuated to relocation and hardened control centers. However, since both the Civil Defense "classified" site and the Alternate Joint Communications Center were also destroyed, there would be difficulties in reorganizing a national government which could deal effectively with the problems of survival and reconstruction. To assist in the latter, seven Civil Defense Regional headquarters were still operational; moreover, though disrupted, the multiplicity of communications systems would be sufficient to provide minimum message transmission.

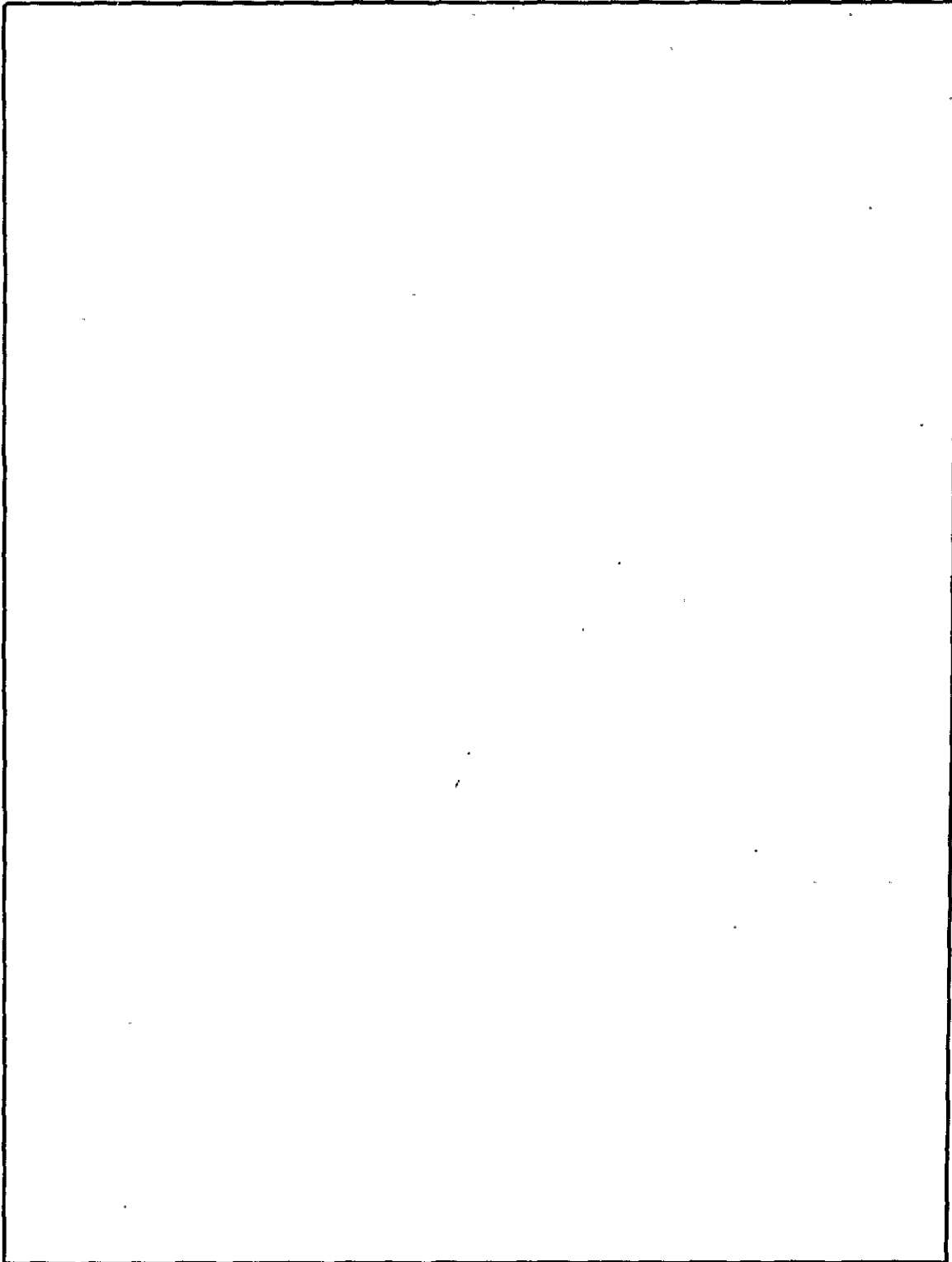
67. State and local governmental structures were largely intact, except in certain hard hit areas, such as the Northeast and California. Thirty-seven state capitals were affected by the attack in some degree, but only 16 suffered more than a third casualties.

The Total US Attack--Effect on the Sino-Soviet Bloc

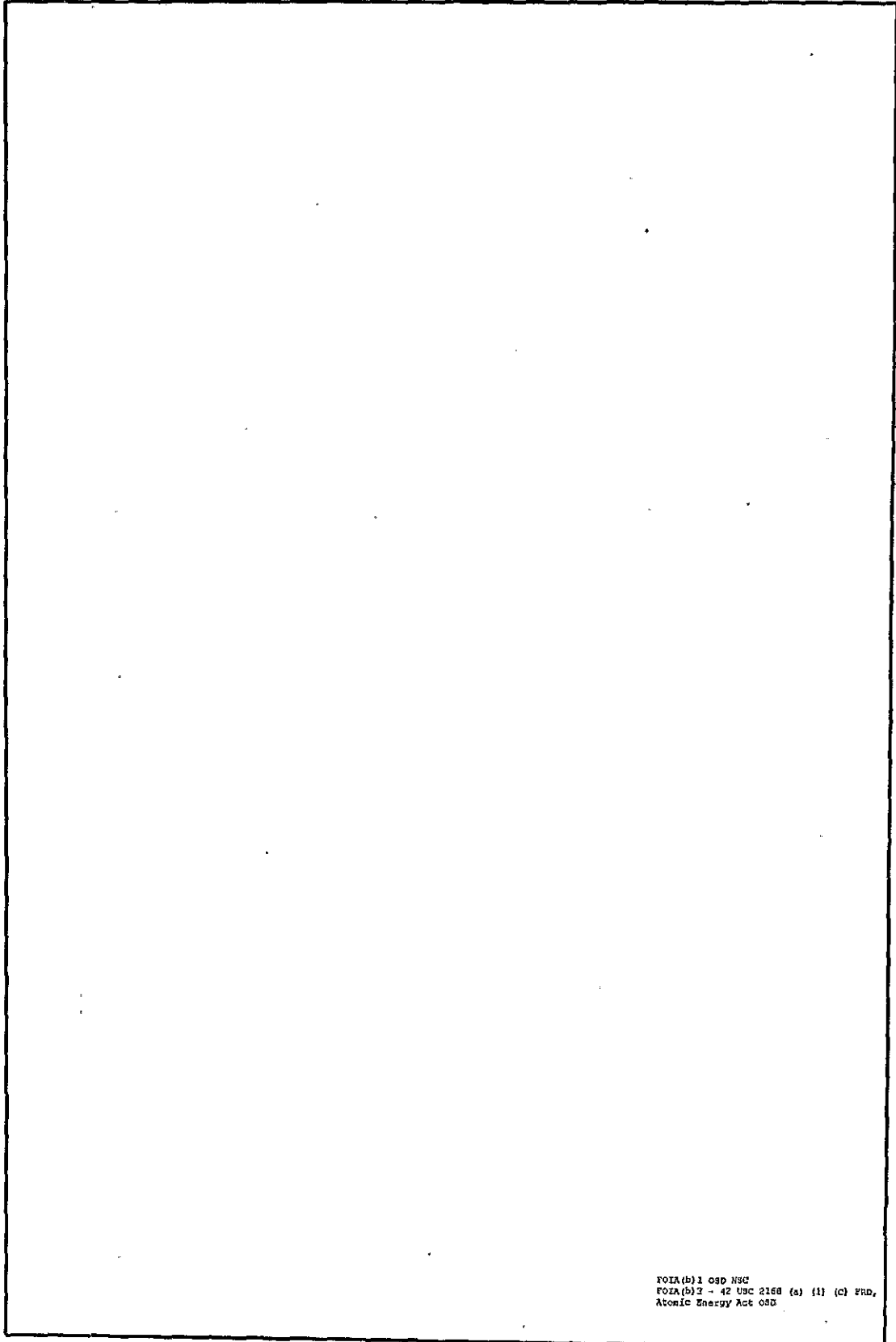
68. Immediately following the Soviet initiation of the second phase, the US directed a massive missile and aircraft attack against urban-industrial and military targets in the Soviet Union and Communist China. As a result, 216 Polaris and ICBMs, 217 GAM air-to-surface missiles and 744 bombs of the Strategic Air Command impacted in target areas.

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FOIA (b) 1 OSD NSC
FOIA (b) 2 - 42 USC 2168 (a) (1) (c) FRD,
Atomic Energy Act OSD

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69. In the combined counterforce and urban-industrial attacks, programmed US forces delivered [redacted] weapons as shown in the table following:

TABLE 11
COMBINED US ATTACKS AGAINST BLOC COUNTRIES

	<u>Weapons</u>	<u>Megatons</u>
Counterforce Attack	[redacted]	[redacted]
Soviet Union		
Communist China		
European Satellites		
Urban-Industrial/Military		
Soviet Union		
Communist China		
European Satellites		
Total		

All weapons were air burst except for 98, yielding [redacted] [redacted] in the urban-industrial attack against the Soviet Union. In addition to these programmed weapons, numerous theater weapons were available for subsequent attacks and most likely would have been used against theater-threatening targets. This study does not include an analysis of this phase of the action.

70. Effect on Sino-Soviet Military. The Sino-Soviet military forces suffered approximately 1.4 million casualties, or 18 percent of the total. Damage to selected categories of Sino-Soviet military installations resulting from the total US retaliatory attack is given in the table following:

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TABLE 12

DAMAGE TO SINO-SOVIET BLOC MILITARY INSTALLATIONS

<u>Category</u>	<u>Total Number</u>	<u>Number Damaged</u>	<u>Percent Damaged</u>
ICBM Launchers			69
LRAA Staging Bases			93
LRAA Home Bases			86
Other Bomber Capable Bases			51
Submarine Bases			88
MRBM Launchers			86
Fighter/Light Bomber Bases			79
Air Defense Control Centers			76
Major Naval Headquarters			88
Surface Ship Bases			59
Field Army Headquarters			53
Troop Installations			40
Aircraft Depots and Maintenance Bases			75
Army Materiel Depots			39
Naval Depots			46

DAMAGE TO SINO-SOVIET BLOC COMBAT AIRCRAFT

Bomber/Tankers (Medium and Heavy)			19
Tactical Aircraft			47

71. The Soviet strategic capability essentially had ceased to exist for an indeterminate period, as a result of commitment in the attacks or destruction on the ground. At best a small ICBM force could be reconstituted from spare or repaired out-of-commission missiles. There might be as many as 200 to 300 medium and heavy bombers surviving. But many of these would have been configured as tankers and these would have to be converted to bombers, some would have returned from attacks against the US over a period of perhaps two weeks, and most would be in need of maintenance. However, the home base and maintenance/repair depot systems had been largely destroyed. The only force which could be immediately effective would be the nuclear and conventional

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powered missile launching submarines, armed with 63 missiles. Even this force would require some means of reconnaissance, and control to select targets and direct any subsequent strikes.

72. The Bloc air defense system was badly damaged. While several thousand fighters had survived both the air battles with US and Allied forces and the destruction of a large portion of their bases, the essential control mechanism had been eliminated except for certain isolated areas. While many SAM point defense systems would probably still be intact, the most important of the installations which they had been protecting had been destroyed.

73. Though the Sino-Soviet ground forces were not badly hit, largely because they were assumed to have deployed away from their permanent bases, they could not be effective in a major campaign in the initial period after the US Composite Target System attack. They had lost headquarters and depots, transportation had been disrupted, and there were emergency survival requirements to be met. We did not include a discussion of the probability that a ground war would have occurred in Europe or its possible outcome.

74. The Sino-Soviet naval forces at sea, to the extent they survived US and Allied naval action, could remain effective until they required major shore-based support. The latter would be difficult to organize in view of the destruction of naval installations as well as civilian ports.

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75. The Total US Attack--Effects on the Sino-Soviet Bloc Civilian Sector. The total Bloc civilian casualties were 118 million ^{9/} distributed as follows:

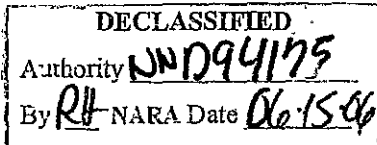
	<u>Fatalities</u>	<u>Casualties</u>	<u>Total Population</u>
Soviet Union	56 million	69 million	216 million
Communist China	40 "	47 "	706 "
European Satellites	1 "	2 "	99 "
	97 million	118 million	1,021. million

In the Soviet Union, 140 of the 171 cities with over 100 thousand population suffered casualties in excess of 65 percent; the six major cities with populations of over one million had between 93 and 98 percent casualties. In Communist China, the casualties were almost entirely restricted to the 69 cities targeted; since air bursts minimized fallout casualties beyond the immediate blast area. The casualties shown for the European Satellites are those registered in the counterforce phase only, and are relatively light because only small yield weapons were used against the air bases targeted. While there would undoubtedly have been additional strikes by US theater forces during subsequent phases of the war, and thus additional casualties, this part of the war was not analyzed.

76. Effects on Sino-Soviet Industrial Base. Direct damage assessment indicates clearly that the combined US attack succeeded in inflicting heavy damage to a large portion of the plant facilities and installations in the

^{9/} These casualty figures are based on a 90 percent shielding factor--the shielding factor refers to the percentage reduction in the potential radiation dose under different assumptions of population shelter. With a 60 percent shielding factor the casualties would have risen by about 12 million.

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most critical segment of Soviet and Chinese Communist industry. The chart which follows gives the physical damage inflicted on total known plant capacity and other installations in selected categories. Study of a number of additional categories indicated that the consistency of damage was sufficient to warrant the extrapolation of a similar degree of damage to virtually the entire Soviet industrial base and to the modern industrial sector of Communist China.

TABLE 13

SIGNIFICANT DAMAGE TO SELECTED INDUSTRIAL CAPACITY IN THE
USSR AND COMMUNIST CHINA

	<u>USSR</u> <u>(Percent)</u>	<u>Communist China</u> <u>(Percent) 1/</u>
Aluminum	93	67
Copper	89	81
Steel	81	73
Nitric Acid	89	98
Synthetic Rubber	85	
Machine Tools	69	54
Earth-moving Equipment	57	
Thermal Power	37	30
Radio-Radar Equipment (General)	87	75
Locomotives	59	84
Primary Railroad Yards	59	36
Port Facilities	70	48
Tires and Tubes	99	70
Motor Vehicles	94	82
Liquid Fuel Plants	79	86
Shipyard, Repair	77	83
Atomic Energy Feed Materials	100	
Nuclear Weapons Production	75	
Airframe Production/Assembly	96	56
Submarine Construction, General	100	
Guided Missile Production	89	

1/ The few blanks in the Communist China column indicate that it has no known capacity.

77. Transportation. Over one-half of the railroad yards of primary significance in the Soviet Union suffered significant damage. This figure can be extrapolated to

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those of lesser significance and it can be assumed that rail networks through many other urban complexes were interrupted as a result of damage to these complexes. No damage assessment was obtainable of residual rolling stock, but normal dispersion on trackage would insure that a sizable fraction would survive. Similarly, no damage assessment was obtainable of surviving motor transport equipment, but again a sizable fraction can be assumed to have survived and the attack produced little lasting damage to the relatively primitive Soviet road network. While the destruction wrought on Chinese Communist railroads was less than in the Soviet Union, the absence of a secondary rail net to provide by-pass routing and the relatively small number of trucks would combine to result in Communist China being worse off.

78. Survival Resources. Although critical to the initial post-attack period, no estimate was obtainable of residual stocks of food, clothing, drugs, and other supplies of immediate necessity to the casualties and displaced survivors of the attack. Similarly, no assessment was obtainable of many other residual assets for war survival or war support, such as petroleum stocks, finished manufactured products, supplies of conventional war materials and the like, but it can be assumed that normal dispersion would enable sizable quantities to survive in various locations.

79. Government. [redacted] were hard hit, especially in the Soviet Union. Moscow was destroyed and 154 of the 156 second and third level [redacted] suffered heavily. In Communist China, [redacted] was destroyed, along with many other cities containing major [redacted]

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Although it was assumed that ten percent of the total Soviet and Communist Chinese control force would have been evacuated and survived the attack, in view of the large number of casualties among the lower echelons plus the physical destruction of facilities and records, the Communist governments in both countries would require considerable time before they could regain a semblance of an integrated national effort. The Chinese Communist leadership, in particular, might also be faced with regional revolts against their central control.

The Total Nuclear Exchange--The Net National Postures

80. If the hostilities had not ended with the nuclear exchange against urban-industrial areas, the US would have been in a superior position to press the war to its conclusion--total Soviet defeat. The US had available some 300 missiles, 535 SAC bombers, plus carrier forces at sea. The Soviets had but a few missiles, except for MRBMs, and 200 to 300 bombers. The US would have the capability to launch additional limited attacks as requirements were developed on the basis of reconnaissance or other intelligence. Considerable additional time would have to elapse before US ground and tactical air forces could have been organized and brought to bear against surviving Soviet forces, if this would have been necessary.

81. In terms of the net balance between surviving national resources, it would appear again that the US emerged in a better position. The US had suffered 33 percent casualties, about the same as for the Soviets. However, because of the larger and broader based industrial structure, more flexible economy, and less centralized government, the recovery capability of the US should

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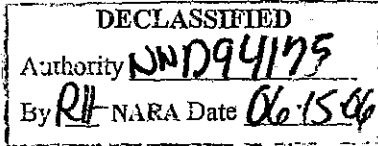
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be the better of the two. Furthermore, the destruction of plant capacity in the Soviet ran higher than in the US. If the war had ended without significant damage to the industry of Western and Eastern Europe, both the Soviet Union and the US could have gained assistance. But since the industrial base of Western Europe would be substantially greater than its eastern counterpart, the US should again have an advantage. However, it should be emphasized again that these general statements gloss over what would be a lengthy period during which the most difficult problems would have to be overcome on both sides.

82. The position of Communist China should be given special attention. Its tremendous population suffered only about seven percent casualties from the strategic attack--the prior US theater strikes undoubtedly had caused some additional casualties, but these would not have been large. However, its modern industrial base, which was considerably smaller than that of the Soviet Union, suffered perhaps fifty percent damage, and its centralized governmental control system was hard hit. Though tremendous masses of population would remain, its strength would add little to the balance of the Communist and Free World positions--in fact, it probably would be a negative factor.

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Estimates of Long Term Biological Effects of Fallout

83. The Atomic Energy Commission prepared an estimate of the longer term biological effects of fallout radiation to result from the postulated war. The estimates were limited to the effects on people, as in past years, and to livestock damage, general effects on agriculture, and broad ecological effects.

84. Among the assumptions underlying the nuclear war problem, the AEC viewed the following as of particular significance in preparing its estimates:

a. The date (time of year) assumed for the attack, the end of May, is significant in relation to the pattern of agriculture over much of the United States.

b. The civilian population of the United States was assumed to be very well sheltered as evidenced not only by the protection factors assumed but by the very large number of persons relatively untouched by the attack. Of the 194 million persons alive in the United States before the attack, 130 million are virtually unharmed insofar as direct blast, thermal, and radiation effects are concerned.

c. The weather conditions assumed were critical from the point of view of the resulting fallout patterns nation-wide.

d. The weapons lay-down, world-wide, assumptions were critical to estimate of effects and totaled 9045 MT of which 3451 were land surface bursts.

e. The estimates of effects on persons are based upon the assumption that no preventive measures, other than shelter, to reduce exposure were taken.

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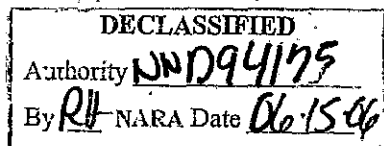
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85. Effects on Persons. For an average life expectancy of one half the normal or 35 years, the normal expected incidence of deaths in the US population is about 420 thousand from leukemia and about 70 thousand from bone cancer. For the conditions of the nuclear war, the maximum number of additional cases expected would be 600 thousand and 115 thousand, respectively. Similarly, an increase of 90 thousand cases of gross physical or mental defects in the first generation born of the survivors, or 900 thousand cases in all subsequent generations, would be estimated to result from the war.

86. Effects on Agriculture. Of some 332 million acres of cropland in the United States, two thirds are contaminated to such a low degree as to be regarded as immediately available for agricultural use. Within just over two weeks, all but about seven percent of the cropland is available. This does not mean that all such land is undamaged or that all previously planted crops are necessarily usable. Opportunity exists for more detailed radiological assessment of agricultural lands and crops in terms of possible use after the attack.

87. Effects on Livestock. About 40 percent of the cattle and calves, 40 percent of the milk cows, and 26 percent of the hogs and pigs are estimated to survive the direct blast, thermal, and radiation effects of the war virtually unharmed.

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D. THE OUTCOME OF THE FIRST GENERAL WAR
SOVIET "HIGH" ICBM FORCE

58. In this section, the use of a larger Soviet force is analyzed. The emphasis is placed on a comparison with the preceding "low" force attack, rather than on a presentation of the total effects. In general, if the "high" force of 780 rather than 446 ICBMs had been available, the Soviet leaders could have expected a nominal increase in the number of US missiles and bombers destroyed in the counterforce attack and a substantial increase in the destruction of urban-industrial and military targets in subsequent attacks.

The Counterforce Exchange--Soviet "High" ICBM Force.

89. The Soviet Counterforce Attack. With the "high" force, the Soviet Union would have had 406 missiles on launchers available for the counterforce attack. The Committee considered that the most logical application of the increased force of Soviet missiles was to target to achieve, to the extent possible, a higher expectancy of damage to the same categories of US strategic force installations as in the "low" force case--the scheduling of two rather than one weapon would raise the expectancy of at least one weapon reaching the vicinity of the target from .75 to .94. On this basis, two rather than one first salvo ICBMs could have been scheduled against each Atlas and Titan I launch complex, and one 100-MT missile against each of the sixteen Minuteman squadrons and four Titan II launchers. In addition, two rather than one missile could have been scheduled against all but six SAC bases and one against the remainder.

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90. The Soviet "high" missile force was gamed in a counterforce attack in the First General War, with weapon assignment as suggested in the preceding paragraph. Based on blast and fallout effects, the results were as follows:

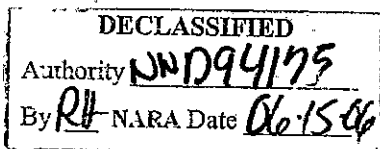
TABLE 14
 COMPARATIVE EFFECTS OF SOVIET COUNTERFORCE ATTACK--
 "HIGH" AND "LOW" CASES

	<u>"High" Force</u>	<u>"Low" Force</u>
Megatonnage Down	4326	2365
Damage achieved against:		
ICBMs	73	53
SAC Bombers	101	82
SAC Bases	47	40
Casualties to:		
Military Population	285 thousand	246 thousand
Civilian Population	7.2 million	4.6 million

91. On the basis of the above data, the Committee believes that even with the "high" force, the Soviet military could have little assurance that a pre-emptive counterforce attack would so degrade the US strategic force capabilities that the US would be unable to retaliate in an effective manner. In this situation, US strategic forces available for retaliating against the Soviet Union would still consist of 964 undamaged ICBMs, 800 SAC bombers which were airborne before the missiles could impact, and 432 Polaris missiles aboard 27 submarines deployed at sea before the Soviet attack was initiated.

92. The US Retaliatory Counterforce Attack. The Soviet "high" ICBM force would cause a substantial increase in the number of US weapons required. Scheduling three US

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missiles against each Soviet missile aiming point, "high" force targeting required 681 ICBMs and 182 Polaris, as compared to 468 ICBMs in the "low" force. This change was effected by reducing the use of missiles in the subsequent attack and by reducing the number of uncommitted or reserve missiles from 304 to 154. As a result, the US attack against "high" force missiles achieved the same relative damage as in the "low" case.

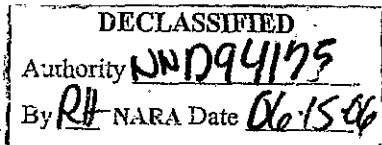
TABLE 15

COMPARATIVE EFFECTS OF US COUNTERFORCE
ATTACK ON SINO-SOVIET BLOC--"HIGH" AND
"LOW" CASES

	<u>"High Force"</u>	<u>"Low Force"</u>
Megatonnage Down	1750	1338
Damage achieved against:		
ICBMs	293 (38%)	169 (37%)
Casualties to:		
Military Personnel	490 thousand	410 thousand
Civilian Population	6.7 million	6.4 million

93. The Counterforce Exchange with Soviet "High" ICBM Force--Net US-USSR Military Position. Relatively, the total strategic force postures of the US and the USSR at the close of the counterforce exchange would have been as in the "low" case--though the US would have expended roughly five times the number of weapons as the Soviets (2094 compared to 427); the US would still retain a marked superiority. But the composition of the US force would have changed significantly. While the SAC bomber force of 800 would have remained unchanged, land-based ICBMs would have gone down from 220 to seven and Polaris from 357 to 175. The Soviets would have had available 125 land-based ICBMs and 63 SLEMs.

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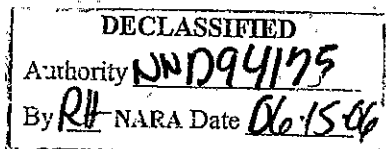
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94. The Committee retained the same scheduling of US missiles against Soviet missiles in both cases for purposes of comparison. One result was the Committee's conclusion that if the "high" case only had been considered, the number of US missiles used in the counterforce phase would have had to be reduced, to provide a more balanced force for subsequent attacks and for the reserve. The reduction of missiles against Soviet missile DGZs from three to two would have brought the expectancy of one missile arriving in the vicinity of each target in this category from approximately .97 to .86. Under the conditions assumed in this study, this would have meant the survival of some 37 additional ICBMs.

The Total Exchange--Soviet "High" ICBM Force

95. Soviet Total Attack. A total Soviet attack with the "high" ICBM force could have achieved considerably greater destruction and casualties than with the "low" force. A larger number of reload missiles would have been available to the Soviets to program against the US industrial base. Even though the US missile force was adequate to permit the targeting of each known Soviet launch or storage complex with three weapons, which would give an expectancy of damage of .96 to all but 300 psi missiles, still on a probability basis, four percent of the known missiles could escape and all of the unknown, which accounted for 30 percent of the total. Since the total number of missiles would be larger, the actual number represented by these percentages would have been larger than in the "low" force case. When gamed, the additional increment of weapons used in the total attack caused damage as follows (the damage below includes that from the counterforce attack):

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TABLE 16

COMPARATIVE EFFECTS OF SOVIET TOTAL ATTACK--
"HIGH" AND "LOW" CASES

	<u>"High" Force</u>	<u>"Low" Force</u>
Megatonnage Down	6944	4443
Damage to Industrial Capacity:		
Large Manufacturing Plants	64%	57%
Military Support Industries	74%	66%
Petroleum Production and Processing	76%	56%
Casualties:		
Military	558 thousand	508 thousand
Civilian	70.1 million	64.1 million

Since the additional second salvo ICBMs were scheduled only against urban-industrial targets, there was little or no change in damage to military installations as given in the "low" case, with the exception of ICBMs and SAC bases, as noted above.

96. In the Committee's view, the increment of increased damage and casualties resulting from the larger number of Soviet ICBMs would not substantially have changed the conclusions reached at the end of the "low" attack. This does not say, however, that the rehabilitation and rebuilding problems would not have increased nor the time required to reintegrate the national economy lengthened.

97. US Total Attack. For purposes of comparison, in the "high" case the Committee approached the targeting of the Sino-Soviet industrial sector in a different manner.^{10/} In the "low" case specified categories of critical industry were to be destroyed insofar as possible by using the centers

^{10/} For a full explanation of these two approaches to targeting the industrial sector, see Volume II, page 30.

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of population areas as aiming points in the 171 cities of over 100 thousand. Where necessary to achieve the level of damage to a specified category, additional weapons were to be programmed against specified industrial installations and capacity in these and other cities. In addition, weapons were programmed against cities not included above, which contained third level [redacted] In the "high" case US weapons were targeted only against specific [redacted] but to achieve the same level of damage to the same categories as in the "low" case. The specific destruction of third level [redacted] [redacted] was not a requirement. There was no change in the targeting of military installations.

98. The following table illustrates some of the more interesting differences. Strategic force installations are not shown because they were targeted the same in each case and received similar damage.

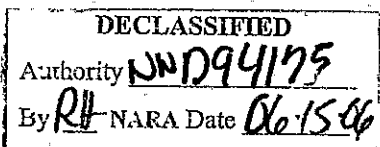
TABLE 17

COMPARATIVE EFFECTS OF US URBAN-INDUSTRIAL ATTACK ON THE SOVIET UNION--"HIGH" AND "LOW" CASES

	<u>"High" Case</u>	<u>"Low" Case</u>
Targeting (urban-industrial phase only):		
Number of Urban-Industrial Areas Targeted	171	278
Scheduled Weapons	1472	1968
Down Weapons	[redacted]	[redacted]
Megatonnage Down	[redacted]	[redacted]
Damage to Selected Industrial Categories not Specifically Targeted	(Percent)	(Percent)
Earth Moving Equipment	14	57
Locomotives	36	59
Thermal Power	15	37
Radio Equipment, General	58	95
Railroad Freight Cars	21	58
Primary Railroad Yards	32	59
Port Facilities	19	71
Submarine Construction, General	41	100
Damage to Total Industry	56	76
Casualties, Total Civilian Soviet Union	73 million	69 million

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99. Which of the two approaches to targeting would seem to be most efficient must be decided in terms of levels of damage desired relative to the number of weapons available. In terms of damage to specified categories, both attacks approximated desired levels although the "low" case approach required more weapons, and was in this sense less efficient. However, the 496 additional weapons required by the approach used in the "low" force achieved a more widespread effect by damaging more cities and in so doing achieved greater damage to industrial capacities not specifically targeted. In addition, the framework of Soviet Government was disrupted to a substantially greater degree.

100. With respect to casualties, the larger toll in the "high" case is due primarily to a greater number of ground bursts in this attack [redacted] in the total attack, compared to [redacted] in the "low" case. If all weapons had been air burst in both cases, the casualties (practically all from blast) in the "low" case would have been higher because more cities were hit in this attack. This is borne out by a comparison of the immediate casualties in the two cases (immediate generally meaning no fallout effects)--in the "high" case immediate casualties in the USSR were 44.5 million; in the "low" case, 57.6 million.

The Total Exchange with the Soviet "High" ICBM Force--
The Net National Postures,

101. The Committee concluded that had the increased number of Soviet ICBMs been used in the manner described, the "net" position arrived at after the total exchange in the "low" case would still be generally valid. This applies particularly to the relative strategic force

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postures--the US though expending greater forces still retains a superior position at the end of the urban-industrial phase. Nevertheless, in the "high" case, there would have been less of a difference between the probable rates of recovery in the US as compared to the Sino-Soviet Bloc. Though casualties went up on both sides, US industrial capacity suffered more heavily, in part because more cities were hit, while the Bloc suffered somewhat less damage, again in part because the numbers of Bloc cities damaged decreased.

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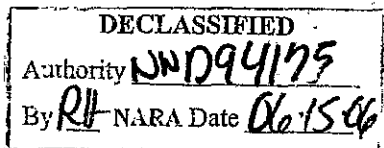
E. OUTCOME OF THE NUCLEAR EXCHANGE AS AFFECTED BY
POSSIBLE MODIFICATIONS IN CRITICAL FACTORS

102. Possible important modifications to the outcome of the Soviet initiated nuclear exchanges are discussed in the following section. The potential variations in critical factors introduced are not intended to be all inclusive of those deemed feasible by 1965, but rather are those the Committee believed to be the most significant. Moreover, the Committee sought to indicate only some of the more important effects on US forces committed to the retaliatory attack and the general levels of damage and casualties in the US which might be expected from a change in any one factor.

Variations in Time of Warning of Soviet Missile Attack

103. BMEWS detection of the Soviet ICBM attack 22 minutes prior to the first missile impact was an important factor in determining US capability to retaliate. Sufficient time was given for the US to launch its bombers under positive control. This amount of warning time was based on the Committee's assumption that the Soviet planned for simultaneous impact of all missiles. This in turn was based on a hypothetical Soviet estimate that the US would not launch retaliatory missiles on BMEWS warning, but would hold the launch until the unequivocal evidence of missile impact. The ICBMs were routed over the Arctic on

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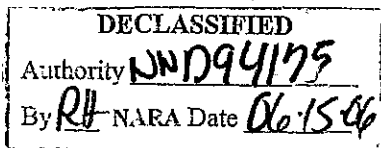
trajectories with re-entry angles between 15° and 30° in order to achieve optimum CEP. The launch of SLBMs (and IRBMs against overseas targets) was timed for simultaneous impact with the ICBMs. This tactic had the effect of affording essentially the same amount of warning to all potential targets, with the only difference being the time of transmission of the warning information and execution commands to individual locations.

104. Reduction of Warning Time by Change in Tactics.

The warning time afforded the US could have been reduced by different Soviet tactics. If, for instance, the Soviet had estimated that the US would launch its retaliatory missiles on BMEWS warning, it would have been advantageous to plan the attack, still using optimum CEP targeting, but for minimum warning rather than simultaneous impact. This would probably call for penetration of BMEWS by ICBMs simultaneously with the impact of SLBMs, for which no adequate warning system is programmed for 1965. In this case Soviet ICBMs would all use the minimum trajectory which would permit optimum CEP (approximately 15°). While there could be zero warning for SLBM targets, for ICBM targets it would vary according to relative geographic location of targets and launch areas; in the northern US it could be as little as 11 minutes.

105. Reduction in Warning Time by Modification of Trajectory. The Soviet could have used ICBM trajectories with re-entry angle less than 15° , to reduce missile flight time and BMEWS warning time. The use of 12° trajectories through BMEWS would reduce warning by 2-4 minutes and lower

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BMEWS sites, including cable and radio, could be destroyed or rendered ineffective simultaneously. In any event, the physical cutting of the primary routes alone would require a major effort in terms of resources and timing. Even if the Soviet deemed such an attack feasible, they would still be faced with the problem of assessing the US reaction when communication with all BMEWS sites was interrupted.

108. Effect of Reduction in Warning Time. If the Soviet had achieved a significant reduction in the time interval between warning and the impact of their missile attack, the US strategic capability could have been degraded. Reduction in the amount of warning would affect activation of alternate command/control locations and communications systems, passive defense protection measures, dispersal of forces or evasive action, and similar other measures appropriate to warning that an attack is imminent. Most pertinent is the relationship of warning time to the survival of weapon systems carrying the burden of the strategic nuclear exchange.

109. Under the assumption that the US would not launch retaliatory missiles prior to enemy missile impact, reduction in warning would have no appreciable effect on the survival of Titan II and Minuteman. They are constantly at minimum reaction time and cannot improve their survival posture. Neither would Polaris submarine survival be affected. An important advantage accruing from warning is time in which the Atlas, Titan I, and Polaris missile systems can be counted down to "final hold" and thus be prepared to respond rapidly to an order to launch. In the case of Atlas and Titan I missiles, this could reduce the number which would be destroyed before launch.

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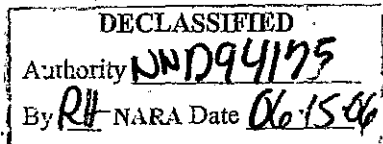
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110. On the other hand, warning is critical to the survival of aircraft. Even at the highest state of alert, aircraft on the ground must have some warning or they are subject to destruction. Because of effective operational systems which permit near-instantaneous transmittal of warning indications and launch orders and the employment of rapid take-off procedures, BMEWS warning 22 minutes prior to first missile impact is sufficient to permit alert aircraft in SAC, air defense units, and land-based theater forces to be airborne and beyond the effective radius of blast effects from warhead detonations on their bases. As the warning time is reduced below 15 minutes, an increasing number of aircraft would be at risk. The essentiality of warning to carrier aircraft is a function of the extent to which the aircraft carrier could be targeted--in any event 22 minutes would provide sufficient time for the launch of a large portion of strike aircraft, assuming 50 percent on alert.

Variations in the Functioning of US Command and Control

111. The Committee explored the manner in which the results of the Soviet counterforce attack might have been influenced by the operation of the US system of command and control. It was readily evident that the continued existence and functioning of an adequate command and control system in a war environment was essential to the implementation of a controlled response strategy. A crucial element would be the survival of the President, or, in the event he became a casualty, the rapid and effective passage of Presidential authority to a successor. Likewise, the command structure must be survivable and retain a capability to communicate down to the operational level.

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112. In a nuclear exchange where both sides restrict their attacks to counterforce targets, certain aspects of the problem of command and control would appear less critical than they might be in an initial exchange of nation-killing strikes. Both sides would believe it imperative that command and control continued to function, to insure that both could control their forces in the event negotiations should lead to a cease-fire.

113. However, it did appear that even under these circumstances there were time limits beyond which decision, for whatever reason, could not have been delayed without adversely affecting the capability of a given weapon system. For example, a delay of 15 minutes, after Soviet missiles began to impact, in the order to launch US IGEMs against their targets would have resulted in all US missiles remaining on their launcher for the full duration of the Soviet missile attack. Had this delay occurred in the First General War, the Soviet attack would have destroyed 83 Atlas and Titan missiles, rather than 53. However, because the DGZs against which these missiles were scheduled were also to be hit by more secure missile systems, the loss of these additional missiles, based on mathematical probabilities, would have resulted in only one or two additional Soviet missiles escaping destruction.

114. Although a delay in an order to execute would not have affected [redacted] survivability, possibly as a result of destruction of VLF stations in the US, the effectiveness of the [redacted] missile attack could have been reduced. Since [redacted] missiles were scheduled against LRAA home and staging bases and MREPM launch sites, any delay would decrease the probability that they could destroy bombers and missiles before launch. However, at best, the total enemy forces delayed in launch would have been small and since these

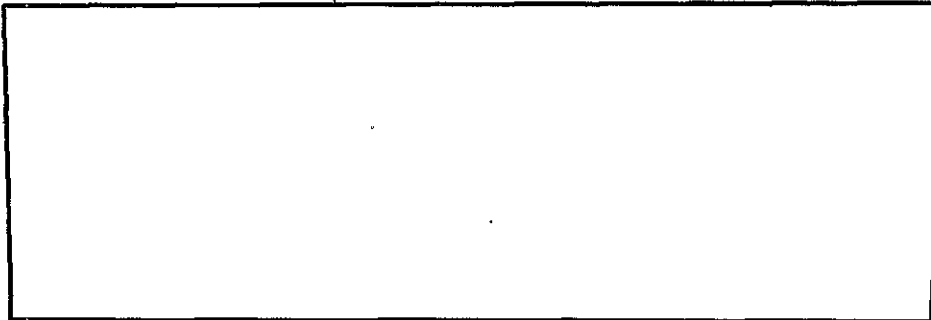
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installations were also cross-targeted with ICBMs, the delay in would have reduced the expectancy of damage by a very few percentage points. The primary objective of denying the installations for further operations would not be affected by a delay in launch.

115. SAC bombers, launched on BMEWS warning, would present a more serious problem. It was assumed that after take-off the bombers would proceed toward their targets,



If, for whatever reason, the delay were prolonged for many hours, the SAC bomber force would be significantly degraded. Since the Soviet attack would have destroyed many SAC bases, a large percentage of the force would have to seek reservicing on alternate fields which lacked repair and servicing facilities, and replacement crews. Perhaps even more importantly, on the ground the bombers would be in jeopardy of destruction by subsequent Soviet attacks.

116. US theater forces and Allied nuclear capable forces in Europe would present a much greater problem. Land-based fighter-bombers, concentrated on relatively few bases, were threatened by a large Soviet MREM force. Because of the latter's short flight time, any delay in the order to launch these aircraft could have been disastrous. In accordance with the Committee's view of counterforce targeting, only a modest number of US and Allied fighter bombers would have targets in this phase of an exchange.

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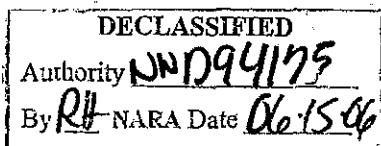
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Their principal role would be in subsequent phases, covering interdiction or other pre-planned theater targets, or being available for on-call missions, especially if and when the ground war began. Under these circumstances, the aircraft would have to be launched, orbit in relatively safe areas, and then be directed either to strike subsequent-phase targets or to land for reservicing. Because of fuel limitations, most of the fighter-bombers could orbit for only about one hour before their capability to reach assigned targets would begin to degrade. As the Committee believed that the Soviet would target home bases of the nuclear capable forces in a counterforce attack, there would be a complex problem of retaining sufficient command and control capabilities, during and following the counterforce phase of the attack, to control a force which could have become widely dispersed on the ground and in the air.

Possible Results from Variations in Other Selected Operational Factors

117. Effects Other than Blast of High Yield Nuclear Weapons. The Committee sought to include in this study the manner in which effects other than blast might have modified the calculations of damage inflicted by high yield weapons. Studies of nuclear explosions have revealed a number of effects which might have considerable significance, including ionization of large volumes of the atmosphere; thermal, x-ray, and gamma radiations; neutron flux; and biomedical effects. These effects could influence to an unknown degree command and control systems, electronic components of offensive and defensive systems, and the capability of the human being to perform his mission, be it civil or military.

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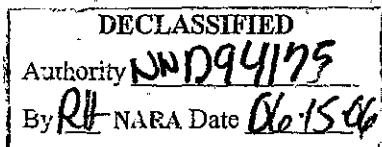
However, much of the discussion and study of these disruptive effects has so far been based on extrapolations of the results of tests of lesser yield nuclear devices, and the more precise determination of the nature of the effects and their operational significance in the conduct of general war must await the analysis of the results of actual tests.

118. Timing of the Soviet Missile Impact. The Committee assumed that the launch order to US missiles would not be given until after the first Soviet missile had detonated. Thus, timing of the Soviet missile impact became a critical factor. If the Soviet Union could have achieved a simultaneous impact, all US missiles would have been subject to attack on their launchers. However, given the CEP/yield combination of the Soviet missiles and the degree of hardness of most US missile launchers, under normal circumstances only Atlas D and E and, to a lesser extent, Titan I missiles would have been seriously affected. For example, if a simultaneous impact rather than a 15-minute spread had been achieved by Soviet "low" force missiles scheduled against Atlas D, 20 of the total force of 27, rather than the 15 indicated in the machine gaming, would have been destroyed; in the "high" force case the number destroyed would have risen to 24, as compared to 16.

119. Better timing of high yield weapons against 215 hardened missiles would have added little to the success of the Soviet attack. Even if a 100-MT warhead had fortuitously detonated in a Minuteman squadron area within a few seconds of a simultaneous launch, only three to five missiles could possibly have been affected by the blast wave.

120. CEP of Soviet Missiles. Soviet efforts to degrade the US counterforce missile attack could have been more effective if the Soviet missile CEP had been substantially

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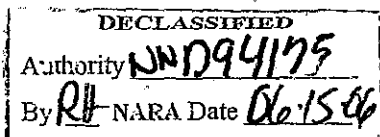
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better--for example, .5 rather than a one nautical mile CEP. Assuming a simultaneous impact prior to US missile launch, the "low" force equipped with a seven megaton/.5 nm CEP warhead combination could have rendered ineffective 145 Atlas D, E, F, Titan I, and Titan II missiles; with the "high" force this figure would have risen to 193. The expectancy of damaging a 300 psi hardened target with a seven megaton/.5 nm CEP warhead would be .54; a CEP of one nautical mile would decrease this expectancy to .23. But even with the "high" force the Soviet would not have had enough missiles to target each Minuteman launcher and, therefore, the better CEP would not have enabled the Soviet seriously to degrade the total US land-based ICBM forces.

121. Extent to which the Location of Soviet Missile Complexes were Precisely Known. The Committee believed that it would be reasonable to assume that at any given point in time the US would not have information sufficiently precise for targeting of all Soviet missile complexes. The 70 percent known figure in this study was chosen on this basis, and served to highlight the effect that intelligence information of this critical nature could have on the outcome of a nuclear exchange.

122. If the US had known all locations of Soviet "low" force launcher and support areas, there would have been 222 rather than 156 aiming points; in "high" force there would have been 410 rather than 288. Scheduling three US missiles per ICBM aiming point, as was done in the analysis of the First General War, 666 rather than 468 missiles would have been required for the Soviet "low" force, and 1230 rather than 864 for the "high" force. A US attack on this basis would have increased substantially the number of Soviet second salvo missiles destroyed--in the "low" force the number which could be expected to survive the US attack would have been

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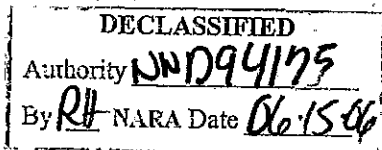
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13, as compared to 73 in the 70 percent case; in the "high" force these figures would have been 25 and 125.

123. Additional US missiles to cover the larger number of "known" ICBM sites could have been provided with little difficulty in the "low" force situation. Maintaining the same expectancy of damage to the Soviet missile launching complex as in the 70 percent case, only 666 of the total US ICBM and Polaris missile force of 1469 weapons would have been required. However, in the "high" force case the scheduling of three US missiles against each Soviet ICBM DGZ would have required a total of 1230 weapons. When the 274 missiles required to program two against each MRBM DGZ are added in, the total is 35 more than the combined US ICBM and Polaris forces. Unless modified, this programming of weapons would have meant that subsequent phases of the nuclear exchange would have been left solely to aircraft delivered weapon systems and that there would have been no missiles in the reserve. To do so, would have eliminated the cross-targeting of two or more different weapon systems against each critical target, thus sharply reducing an important element of insurance against unknown or better than estimated enemy defense systems. On the other hand, in terms of mathematical probabilities two rather than three missiles scheduled against "high" ICBM DGZs would have raised the number of surviving second salvo missiles from 25 to 56.

124. Soviet Anti-Ballistic Missile Defense (ABM). The United States Intelligence Board has estimated that the Soviet will probably begin the deployment of an ABM system sometime in the period 1964-1966. In this study, the Committee assumed that there would be an ABM system protecting a few urban-industrial areas, but ascribed no factor to degrade US missiles penetrating these areas. The tactics and targeting of US forces in the First General War were

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trajectories would reduce it even more. In addition, using lower trajectories it is possible to strike without detection portions of the US through "gaps" in BMEWS coverage. At re-entry angles slightly below 15° , a few missiles could be programmed to evade BMEWS through these gaps. As the re-entry angle decreases, the gaps in BMEWS coverage increase, reaching a point where an ICBM attack using $5-7^{\circ}$ re-entry angles for all missiles could avoid BMEWS completely. However, it is probable that through 1965 trajectories with re-entry angles less than 15° could only be achieved at the expense of CEP accuracy and payload. Without some form of terminal guidance, CEP increases as re-entry angle decreases, with the $5-7^{\circ}$ trajectories producing CEP probably 3-5 times optimum. There would also have to be major payload reduction.

106. Use of ECM against BMEWS. The Soviet could have attempted to deny warning of the missile attack by use of ECM against BMEWS. It would have been necessary, however, to jam effectively and simultaneously all three sites to conceal any major attack. BMEWS sites will have the ability to detect ECM being used against them, and also have a substantial ECCM capability. They could, therefore, have detected the Soviet ECM and passed warning of the condition at the same time they were attempting to overcome it by employing their ECCM measures.

107. Interruption of BMEWS Communications. Destruction of major BMEWS communication links with the US could delay transmission of the missile warning. It is very unlikely, however, that the several communication channels with the

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such that a few AEM systems defending urban-industrial areas would have had relatively little effect. The first phase of the US attack was against counterforce targets, most of which were not adjacent to large cities. The second phase, directed primarily against urban-industrial targets, was assigned largely to bombers--a principal threat to the bombers which had to penetrate would be Soviet air defense systems rather than AEM weapons.

125. However, if the Soviet had positioned their AEM units to include both urban-industrial areas and adjacent priority military targets, a degrade factor would have had to be applied to the US missiles. What this might have been, however, would have depended on a net assessment of the effectiveness of the Soviet AEM against US missiles equipped with penetration aids.

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~~RESTRICTED DATA~~F. EFFECTS OF POSSIBLE CHANGES IN SOVIET STRATEGY

126. In the analysis of the First General War, of particular importance were the assumptions that the Soviets believed that the US initially would respond with counterforce attacks, and that a Soviet counterforce strike against US land-based missiles would have significant effects. In the following, certain alternative Soviet assumptions are explored, with their effects on the outcome of the First General War being indicated in general terms.

Soviet Counterforce Tactics Where They Believe a Counter-Missile Attack to be of Little Value

127. If the Soviets had reached the conclusion that their missiles could do relatively little damage to US land-based hardened missiles, they might have shifted their tactics to give SAC bombers first priority as a target.

128. Basic to this approach would be the use of SLEMS to avoid BMEWS warning which in the First General War triggered the launch of SAC alert bombers. If the Soviets could have maintained 12 nuclear powered missile launching submarines on station, within three to four days' steaming time of launch points off the US coasts, there would have been enough missiles available to target the 48 SAC bases which are within range of 800 nm sea-launched missiles. The SOSUS system for detection of enemy submarines off the US Atlantic and Pacific coasts would in this period have

[REDACTED]

This approach would be an emulation of the Polaris forward deployment posture and would amount to some 60 percent of the Soviet missile launching submarines

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being continuously on station. If the Soviets could not maintain this number on station, or if there was not sufficient time to reinforce the on station force before H-hour, the number of SAC bases at risk would be reduced accordingly.

129. Soviet first salvo ICBMs would have been targeted against US Atlas D and E and Titan I complexes (though the latter are 200 psi hard, there are three missiles per launch control center), air defense installations, and as additional weapons against SAC bases. These missiles would have been scheduled to penetrate BMEWS immediately after the SLEMs began to detonate in the US. Using the Soviet "low" ICBM force, targets in these categories would have required the use of all first salvo ICBMs; with the "high" ICBM force, there would have been available 100 first salvo ICBMs for other targets. Rather than leaving the latter at risk on launchers, the Soviets could have scheduled them against other US military targets. Soviet MREMs would have been scheduled against US and Allied bases overseas, with launch times adjusted to avoid penetration of BMEWS prior to SLEM impact in the US.

130. Had the Soviet considered that an attack against US hardened missiles would be unproductive and provided the Soviet planners had come to accept US intentions to respond in kind to an attack against military installations, this variant on the counterforce strategy could have been advantageous from the Soviet view. Under this hypothesis, the Soviet planners could have rationalized that a large portion of the US missile force would be expended against strategic bases from which bombers and first salvo ICBMs would already have been launched. On the other hand, if the Soviet SLEM attack had been successful, the US capability to

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deliver subsequent attacks on the Soviet Union would have been sharply reduced. Thus, after the counterforce exchange the initial US advantage of a much larger strategic force would have been nullified. While the US at this point would probably have had more missiles than the Soviet, the Soviet bomber force, still airborne and intact, might well have been larger than the surviving SAC bomber force.

131. The point to be made is that as US missiles become unprofitable targets due to hardening and dispersal, it would appear logical that the Soviets would seek to take advantage of their capabilities to exploit other approaches. In this case, it was the Soviets utilizing their missile launching submarines to take advantage of the absence of a system which would give the US adequate warning of an SLEM attack.

Soviet Non-Acceptance of Counterforce Strategy

132. If the Soviet leaders were convinced both that the US would not respond with a counterforce attack and that their missiles could do little against US hardened land-based missiles, their strategy might well have been to inflict maximum damage to both military and urban-industrial targets in the US in as short a time as possible. They would have opened their attack with SLEMs against SAC bases as described in the preceding section. In both the Soviet "low" and "high" ICBM force cases, a portion of the first salvo ICBMs would have been shifted from military to urban-industrial and command and control targets. To deny the US the ability to detect the ICBM attack, and especially to estimate its size and general target areas, missiles would have been programmed against the EMEWS sites with the ICBM penetration timed to follow.

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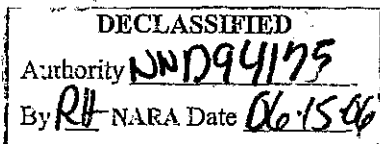
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133. Although the Soviet planners might not necessarily intend it, the initial SLEM attack against US military targets might cause the US to decide that the Soviets were in fact following a counterforce concept. Moreover, with EMEWS destroyed, US leaders would not be able to detect in advance the fact that the Soviet ICBM attack was not concentrated against US missile areas but rather was spread across the country. In these circumstances, the order to execute the counterforce option described in the First General War might be given. If this did occur, at the close of the initial exchange the Soviet attack would have caused widespread destruction to US military and urban-industrial targets while the US attack would have largely destroyed the Soviet bomber and missile base system, including the bulk of the Soviet second salvo missile capability.

134. At this point in the exchange, the US would have available a greatly reduced bomber force (assuming the Soviet SLEM attack had achieved near maximum effectiveness). Because of commitment in the counterforce attack, the US missile force available for subsequent attacks and reserve would be 577 in the case of the Soviet "low" ICBM force; 182 in the "high" force case. The variance in the US residual force was due almost entirely to the difference in targeting requirements in these two cases and not to the effects of the Soviet attack. The Soviets would have had about 100 second salvo missiles remaining and a bomber force virtually intact.

135. If this Soviet approach had been considered creditable in the First General War it would have meant, especially in the "high" force case, that fewer US missiles should have been used in the counterforce retaliation. This shift would have involved trading some reduction in expectancy

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of damage in that attack for an increase in the reserve. The latter would give added insurance that an adverse situation, such as given above, could not develop. In a more general sense, the foregoing emphasizes the critical importance of having available at any stage of a nuclear exchange uncommitted forces which are both survivable and have a retargeting capability.

Possible Effects of a Soviet Clandestine Attack Against Selected US Strategic Weapon Systems

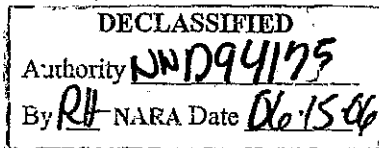
136. As another possible Soviet approach to initiating a counterforce attack, the Committee examined the Soviet capability to destroy by clandestine means those weapon systems deemed to be highly secure from attack by other methods. To this end, the Chairmen of the Interdepartmental Intelligence Conference (IIC) and of the Interdepartmental Committee on Internal Security (ICIS) were requested to determine, within the framework of the basic assumptions and scenario, feasible plans^{10/} for clandestine attack against the strategic weapons delivery systems of the United States.

137. Summary of the Studies. In the opinion of the IIC, the most feasible clandestine attack, under the foregoing circumstances, would put at risk 996 missiles and 80 B-58 bombers and would be carried out in the following manner:

a. Atlas F and Titan I missiles were to be destroyed or caused to malfunction by rifle fire as they emerged from their silos--90 agents armed with locally procured rifles were assigned to this task.

^{10/} For complete studies, see Annex E, Volume VII

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b. Titan II and Minuteman control center personnel were to be attacked by 134 Soviet agents, each equipped with one two-pound aerosol can of incapacitating chemical agent. In the attack against the Minuteman control centers the aerosols were to be released to enter the air conditioning systems of the surface buildings which normally furnish air to the control capsules. In the case of the Titan II attack, since a CBR filtering system precludes this type of direct introduction, relief crews were to be subjected to chemical attack shortly before H-hour while en route to the control centers.

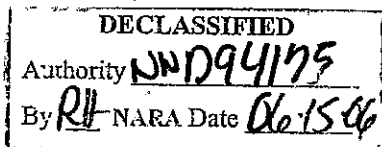
c. B-58 bombers on two bases were to be destroyed by the detonation of a 1.4 megaton nuclear device transported to each base by a three-man team in a station wagon. The nuclear devices, disguised as crated hot water tanks, were to be parked on a public highway near the air base and detonated by remote control or timer.

d. A Polaris submarine in Charleston Harbor was to be destroyed by 16 pounds of plastic explosive made up into timer-operated magnetic limpet charges and fixed to the hull just prior to H-hour by four Soviet agents using Scuba equipment. Prior to the attack, the agents had been posing as sports fishermen in the vicinity of the Naval Weapons Annex at Charleston.

e. Rendezvous information and confirmation of H-hour was to be sent in code to the Soviet Embassy and passed to agent groups by coded messages over commercial telephone.

138. Of the total of 236 Soviet agents required for the attacks, the ICIS estimated that 221 agents could have entered the US, through regular channels of entry or clandestinely, over a period of time prior to the attack as

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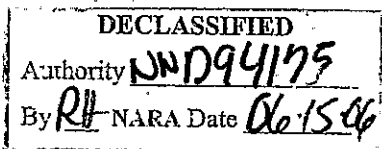
part of a long-range continuing operation. These agents would be properly documented and appear in all respects as native Americans. Movement of nuclear weapons and other equipment with accompanying agents would have commenced from the Soviet Union as part of a contingency plan implemented on the outbreak of limited war in Southeast Asia. During the five days prior to the attack the nuclear weapons, explosives and chemical containers could have been brought into the country accompanied by the remaining agents. Surreptitious entry could have been accomplished by transfer off the coast from neutral flag vessels to cabin cruisers purchased and operated by established agents.

139. In the opinion of the IIC and the ICIS, the projected attack plan presented relatively little risk of detection during the entry and movement of agents to their objectives, or in the final execution of the plan. The use of a minimum number of nuclear devices and the extensive employment of locally procured or easily disguised weapons and equipment reduced the level of risk of detection below what it would have been had the attack depended primarily on nuclear weapons.

140. Evaluation of the Studies. If executed according to plan, the attacks against the Atlas F and Titan I missiles, the two SAC air bases, and the Polaris submarine would achieve reasonably predictable results--destruction of or damage to 72 Atlas F and 54 Titan I missiles, 80 B-58 aircraft, and [redacted] containing 16 missiles. The results of the attacks against Titan II and Minuteman control centers were less predictable. If completely effective, the launch of 800 Minuteman and 54 Titan II missiles would be delayed for an indeterminate period. However, the efficacy of the chemical weapons utilized would

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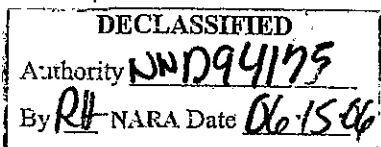
be relatively unpredictable, affected by weather, winds, and various local factors that might influence individual dosages. Further uncertainty would exist because of the capability of two Minuteman launch control centers to effect immediate launch of the entire squadron or of a single launch control center to initiate the launch sequence which after a preset delay would fire all missiles in a squadron.

141. Perhaps the greatest drawback to the use of incapacitating agents is that the effects are of a temporary nature and subsequent action is still required to destroy the missile capability. There is obvious advantage to the USSR in delaying our missile launch until all of their missiles have impacted. But unless the missiles remain incapacitated until Soviet bombers can attack US hardened missile sites, the Soviet still must suffer from an attack by the bulk of US missiles.

142. It should be noted that, as pointed out in the IIC study, a number of relatively simple security measures that might be taken at the missile sites could greatly increase the difficulty of achieving the above results. These measures include the continuous operation of the CBR filtering system in the Minuteman control capsules; the use of helicopter transport or random timing of control personnel reliefs; and a variety of increased patrol and surveillance measures in the squadron areas.

143. If the Soviet planners had integrated a clandestine operation into their plans for initiating a nuclear exchange with the US, they could have modified the commitment of their other forces. By timing the clandestine attacks to coincide with the detonation of SLEMS against SAC bases and the Atlas D launch complex at Vandenberg AFB, the Soviets would

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anticipate that the US strategic forces, based in the US, would have been sharply degraded--the actual severity of the attack would turn on the degree of success the Soviets achieved in a highly complex operation. Under these circumstances and provided the Soviet leaders were convinced that the US would retaliate against military targets, the Soviet planners could have withheld at least their 25 psi hardened missiles with considerable confidence that they would be available for subsequent attacks--again the amount of confidence would depend on the Soviet estimate of the success of their combined clandestine-SLEM surprise attack. This could have substantially improved the Soviet bargaining position in any negotiation with the US at the close of a counterforce exchange.

Possible Employment of Bacteriological and Chemical Warfare

144. The Committee also examined the potentialities of Bacteriological (BW) and Chemical Warfare (CW) weapon systems for use in a strategic attack. This was part of an effort to determine if other weapon systems now known could be as effective as nuclear weapons. On the basis of present information about US and Soviet programs, it was concluded that BW and CW could cause casualties, either fatal or incapacitating, in large numbers. In so doing it obviously would not produce the tremendous physical destruction which accompanies nuclear detonations. But much research and development must be performed, both with respect to agents and delivery means, before BW and CW weapons might fill a supplementary role in the total strategic attack mission.

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145. BW is usable only if time or rapid reaction of the agent used is not a criteria. Those agents that will be available in 1965 require days to act on humans and animals, and much longer periods to act on crops. In addition to the element of time, the dissemination of bacteriological agents in sufficient quantities over large areas to obtain meaningful results is an extremely difficult operation. Weather, winds, temperature, and moisture which are most difficult to forecast must all be carefully calculated in the determination of the time and quantity of agent to be employed. At present, it is estimated that the Soviets are placing more effort in this field than the US and probably have a capability to use BW agents in a clandestine operation or in a tactical situation--however, the Soviets do not appear to have developed delivery means for a large-scale attack on the US.

146. CW agents, generally, are very rapid in their actions and effects on living organisms. An almost instantaneous reaction can be obtained on humans and animals. The problems of dissemination and persistency of the agents and the difficulty of the production and proper storage of suitable amounts of agents to cover any but small areas have not yet been solved. Chemical agents may be applied to restricted areas either by overt or covert means to assist in the initial phase of a nuclear exchange by killing or disabling weapon crews. Again based on the US program and what is known of the Soviets, CW through 1965 will find its most effective use in the ground tactical battle. In this environment CW can be delivered by air or artillery against troop concentrations and supply installations. The persistent agents can be employed to deny ground areas to troops and to channelize their movements.

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147. Taking into consideration the assumed situation for this study and the developments in US and Soviet BW and CW capabilities forecast for 1965, the Committee did not incorporate either system in the US or Soviet forces used in the operational analysis. It was included in the clandestine attack as a presentation of a possible alternative Soviet approach. This latter analysis emphasizes the point that CW and BW could become important in those situations where nuclear systems cannot perform effectively.

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III. THE SECOND GENERAL WAR - US PRE-EMPTION

148. The Second General War is based on the same scenario as the First General War, but with the roles of initiator and retaliator reversed. The US was assumed to have gained conclusive evidence of Soviet intentions, during the four-day interval between the Soviet decision and the launch hour of their own "pre-emptive" attack. Thus, the analysis below portrays in gross terms what the outcome of a US initiated nuclear exchange might be under the general conditions and factors assumed in this study.

A. US WAR PLANS AND DEPLOYMENT OF FORCES

149. The US Strategic Plan for 1965 was assumed to have a pre-empt option, which called for an initial counterforce attack and, if necessary, subsequent strikes against urban-industrial complexes and other military targets. The objective of the counterforce strike was to so degrade the Soviet strategic forces that the USSR would desist from its planned attack, or failing this, reduce to a minimum the Soviet capability to retaliate.

150. In planning such an attack it would be necessary to develop factors relating to the Soviet warning capability and to the reaction time and deployment of Soviet strategic forces. To this end, the Committee made several critical assumptions. First, that by 1965 the Soviet would have the capability to detect the launch of US ICBMs in time to permit launch orders to be received at the operational level

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15 minutes after the US launch time.^{1/} Second, that the Soviet system could detect the launch of SLBMs with the warning time after launch varying according to the location of the launching submarine. Third, that in a high state of alert the launch of Soviet ICBMs could be initiated within 15 minutes of the receipt of orders, and that 50 percent of LRAA bombers and tankers, dispersed to staging and alternate fields, could be launched within 15 minutes of receipt of orders. And fourth, that in a situation where the Soviet leaders were on the verge of launching their own attack, they would order their forces to attack the US on receipt of warning and would not wait for first detonation, as did the US.

151. On the basis of these planning assumptions, the pre-empt option placed primary reliance on [] missiles to achieve detonation prior to launch time on LRAA fields, MRBM and ICBM complexes. It was essential to have Minuteman missiles impact as soon as possible after the initial Polaris missiles were down. This would increase substantially the assurance that Soviet strategic forces would be destroyed before launch. The GAM-87s carried by the 12 SAC airborne alert bombers were scheduled against bomber and Satellite air fields to arrive on target at about the same time as the initial [] missile. Optimum results could be obtained if the launch of US missiles was so adjusted that the time from first Soviet warning to impact of the

^{1/} NIE 11-3-61: Sino-Soviet Air Defense Capabilities through mid-1966 (Approved 11 July 1961; TS) estimates that the Soviet has a capability to develop high frequency ionospheric back scatter radars which it "probably has used to detect US nuclear detonations and possibly US missile launchings." On this basis and for purposes of this study, the Committee made the assumption that the Soviet would have a warning capability.

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first missile would be no greater than ten minutes. Even with instantaneous communication of an order to launch, under the best conditions the first LRAA bombers would just be taking off and there would still be five minutes before the first ICBM could be launched. US theater forces were to be launched so as not to give warning before that given by US missiles.

152. The scheduling of US weapon systems for the total pre-emptive attack are given in the table which follows.

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TABLE 18

TARGETING

US TARGETING--US PRE-EMPTION AGAINST SOVIET "LOW" FORCE

TARGET SYSTEM	US Weapons					TOTALS
	ICBM	POLARIS	SAC		THEATER BOMBS	
GAMS			BOMBS	BOMBS		
<u>Counterforce Attack</u>						
156 Sov ICBM	322	136				
123 Sov MRBM	123	123				
30 Sov Staging	60	30				
43 LRAA Bases	86	43				
132 Sov Bom/Car Aflds	229	17	18			
77 Sov ADC/Aflds					231	
17 Sino-Sov Sub Bases	17					
15 Sov [redacted]	15					
128 Eur Sat Aflds	150	4	30		200	
50 China [redacted]					157	
1 Sov VLF Station		2				
Total (Phase I)	1002	355	48		588	1993
<u>Urban-Industrial Attack</u>						
265 Sov U-I Complexes 1/				1544		
38 Sov AD Aflds			111			
27 Sov ADC Hqtrs			81			
31 Sov Bomr Can Bases			93			
60 Sov [redacted]				240		
72 China U-I Complexes 1/				365		
50 China Off/Def Aflds		15	135			
Total (Phase II)		15	420	2149		2584
Total (Phase I & II)	1002	370	468-2/	2149	588	4577
Reserve	35	62	48	250		

1/168 cities targeted on P-95 basis plus 97 additional targeted for critical industrial and military categories in USSR. 58 cities targeted on P-95 basis plus 14 additional for critical industrial and military categories in China.

2/200 additional GAMS were assigned as bomber penetration aids with no damage assessment performed.

COMMENTS:

- (a) Polaris utilized in counterforce role against Soviet missile sites and air bases to exploit short flight time. GAMS of airborne alert similarly programmed to exploit short flight time.
- (b) Requirements for US missiles in counterforce attack to achieve high assurance results in minimal missile reserve and almost total reliance on aircraft carried weapons for urban-industrial attack.
- (c) Allied and non-US NATO weapons not employed because of circumstances of initiation.

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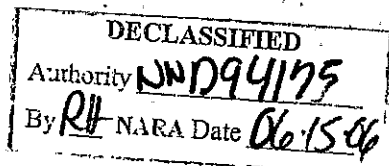
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It should be noted that other NATO forces were not included on the assumption that the US, because of the possibility of premature disclosure, would not have informed their government of its intentions.

153. US forces were in a high state of alert and deployed as discussed in the First General War and the planned employment of forces in this Second General War left uncommitted 35 ICBMs, 62 Polaris missiles, and 75 SAC bombers. Moreover, non-alert theater forces remained available to theater commanders.

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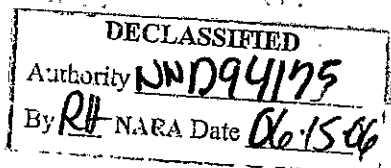
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5. SOVIET WAR PLANS AND DEPLOYMENT OF FORCES

154. The Committee concluded that in view of the Soviet force posture used in this study, the most logical course of action open to the Soviet leaders in responding to a US pre-emptive nuclear attack would have been to launch on warning, all alert weapon systems against a US target system which included both military and urban-industrial installations (a Composite Target System). Given the magnitude of the US missile salvo, the Soviet leaders could not afford to wait to determine whether the US attack was counterforce or otherwise. While a decision to attack US cities would make it almost certain that their own cities would be blasted, they could at least optimize the destruction that their surviving forces could inflict on US bases of power. They would have had the alternative to surrender immediately, in which case the Soviet Union would have escaped with relatively light damage to its industrial base. But by so doing, the Soviet leaders would have placed their own position in serious jeopardy.

155. The Committee ruled out the inclusion of a counterforce retaliatory alternative. As pointed out in the discussion of the First General War, Soviet forces had little capability to destroy US hardened missiles and none against on station Polaris. The expectancy of degrading US missile forces in this case would have been practically nil in the Soviet view since the bulk of US missiles had been launched in the US counterforce attack. Furthermore, the SAC bomber force would be airborne within minutes after the US had launched its missile attack. On the other hand, Soviet planners would have to take into account the possibility that a US pre-emptive attack would reduce substantially their own strategic air capability. Thus, it would appear that surviving Soviet strategic forces could have little

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effect on reducing the US capability to deliver subsequent attacks, but could so deplete Soviet strength that little or no capability would remain to carry out any subsequent attack. If the latter were attempted, it could be little more than a token show of force prior to surrendering.

156. In assuming the Soviet Union would launch on warning, the Committee took into account the vulnerability of the Soviet missile force. Any delay in the launch of missiles would increase substantially the risk that the bulk of the Soviet missile force would be destroyed on the ground. The Soviets then would have to rely on their small missile launching submarine force and modest number of bombers.

157. The Soviet planners were assumed to have made their plan for retaliation applicable regardless of the state of alert of their own forces and the amount of warning time. Various weapon systems were scheduled against each US target to ensure an expectancy of widespread damage even in the event of a surprise US counterforce attack--at least two, and in many cases, three different weapon systems were scheduled against each prime US urban-industrial and military target. In targeting, first priority was given to urban-industrial areas which encompassed the major elements of US industrial capacity essential to rebuilding power. Thus it was hoped that regardless of the extent of damage suffered by the Soviet Union, widespread devastation would be inflicted on the US. Second priority was given to SAC bomber bases with the objective of seriously damaging the US capability to recycle bombers upon returning from their initial attack missions. Command and control, both civilian and military, and other military resources were also included as important categories.

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158. In general terms, the Soviet retaliatory attack plan used SLEMs and first salvo ICBMs as prime weapons against US coastal targets in areas heavily defended against bombing attacks. SLEMs were assigned to these targets, even though there might be a delay in the submarines reaching their assigned launch points, because they had the greatest expectancy of survival. Moreover, except for a few SAC bases, time was not an essential element in this portion of the attack. Second salvo ICBMs were scheduled to raise the weapon arrival expectancy. With regard to the center of the US, ICBMs were the prime weapon against important targets. However, since bombers as well as second salvo ICBMs were scheduled as secondary weapons on these targets, some first salvo ICBMs as well as ASMs were scheduled against air defense installations in central Canada and the US to create a penetration corridor. This plan resulted in Soviet forces being scheduled against categories of US targets as follows:

TABLE 19

SOVIET TARGETING--US PRE-EMPTION AGAINST SOVIET "LOW" FORCE

	No. DGZs	SLBM	ICBM(Low Force)		ASM	Bomb
			1st Salvo	2nd Salvo		
Urban-Industrial Areas	111	48	81	132		315
Air Defense (not collocated with SAC bases)	21		26		89	
SAC Bases	51	6	82	65	50	98
Naval Bases	5		10	10		
National Hardened Command & Control	4		12	12		
Military Depots	15	12				18
Canadian: Air Defense	10		16		41	
Urban-Industrial	7				34	
Totals		66	227	219	180	465

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159. As part of their attack, the Soviet planners scheduled 192 MRBMs and 26 SLBMs against SAC reflex bases, British bomber and Thor missile bases, nuclear capable fighter-bomber bases in Europe and the Far East, Jupiter sites in Italy and Turkey, forward-based Polaris tenders, and BMEWS sites. The principal objective would be to destroy the base structure which could support restrike missions.

160. This retaliatory plan left uncommitted only 26 SLBMs at sea and 14 in port, carried by 24 conventional powered submarines, and 18 SLBMs in port carried by four nuclear powered submarines. The almost total commitment of the strategic forces was considered essential in view of the grave problem of survivability. If the US missile attack were a complete surprise it was conceivable that the bulk of the Soviet missile and bomber forces would be caught on the ground. This would be all the more probable if they were not in a high state of alert.

TABLE 20

SOVIET STRATEGIC FORCES--1965^{1/}

<u>Total</u>	<u>Number</u>	
	<u>Wpns/Bombs</u>	<u>Lochr/Garrier</u>
ICBMs: Low Force (High Force)	446(780)	
ICBM Launchers: Low Force (High Force)		227(406)
Submarine Launched Ballistic Missiles (SLBM)	150	
Missile Launching Submarines		44
Bombs	465	
Air-to-Surface Missiles (ASM) (excluding anti-shipping)	180	
Bombers		485
Medium Range Ballistic Missiles (MRBM) 2/	1250	
MRBM Launchers		450

1/ See Part II, Section A, for discussion of the sources from which these forces were derived and more detailed presentation of their assumed deployment.
 2/ Included are 300-700 nm missiles; 750-1100 nm missiles; and 200-2000 nm missiles.

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C. THE OUTCOME OF THE NUCLEAR EXCHANGE
THE SECOND GENERAL WAR
SOVIET "LOW" ICBM FORCE

The US Pre-emptive Counterforce Attack

161. The US pre-emptive counterforce attack was launched at 1830 EST, hypothetically some four hours before the Soviet missiles were scheduled to impact in the US. The principal weight of the US forces, principally ICBMs and Polaris missiles, delivered weapons on Sino-Soviet targets, with megatonnage distributed as follows:

TABLE 21

WEIGHT OF TOTAL US ATTACK

<u>Country</u>	<u>No. of Weapons</u>	<u>Megatonnage</u>
USSR	<input type="text"/>	<input type="text"/>
Communist China and		
European Satellites		
Total		

The great majority of the weapons were air burst, with the most significant exception being the large yield weapons scheduled against hardened nuclear weapon storage sites in the USSR.

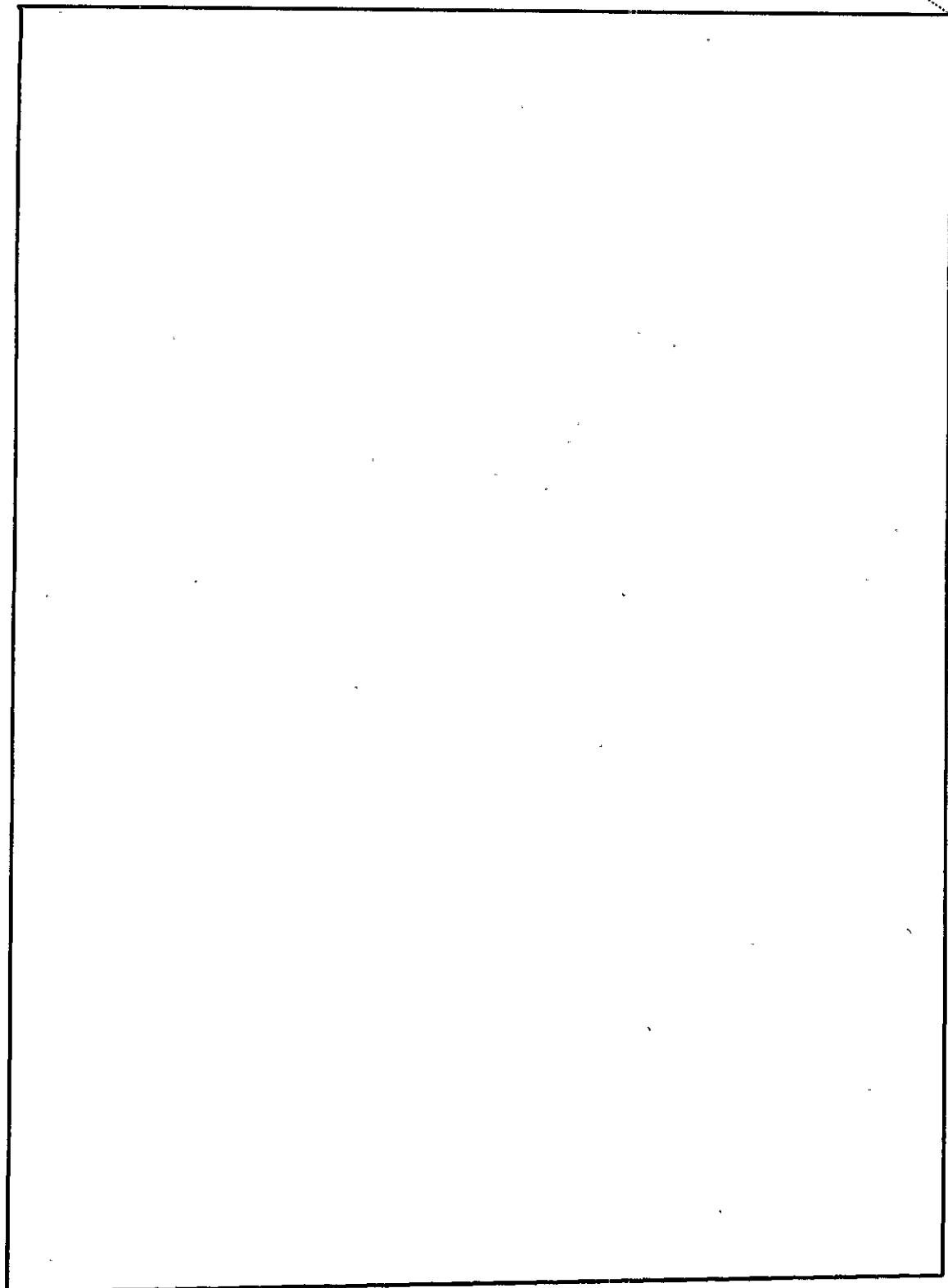
162. Effect on Strategic Forces. The attack destroyed or incapacitated all of the known ICBM launch complexes,^{2/} and all but one of the central support areas, resulting in a loss of 251 of 446 "low" force first and second salvo ICBMs. In addition, all but ten of the known MREM launch

^{2/} By assumption, the locations of 117 of the 167 total ICBM launch complexes were known and could be targeted and 50 were not known; 123 of the 137 MREM launch complexes were targeted and 14 could not be targeted.

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complexes were destroyed, accounting for 502 of 1250 first salvo and reload MRBMs located at these sites. The attack was also effective against the LRAA. Only two LRAA home bases, one staging base and 170 of 279 bomber capable airfields survived. Two hundred and eighty-eight of the 485 LRAA bombers scheduled against US targets were destroyed. However, because of the interaction of Soviet warning and immediate order to launch, and the time down of US missiles, the Soviets were able to launch 197 bombers, 121 first salvo ICBMs and 178 MRBMs. In addition, the Soviets had 74 second salvo ICBMs and 570 uncommitted reload MRBMs.

163. The US attack heavily damaged three bases which support the missile launching submarine force and, in so doing, destroyed the nine boats in port. In addition, in these and the other 11 naval bases hit, 104 of the 136 attack submarines were put out of operation, at least for a time, as were 144 of the 200 other major naval vessels.

164. Effect on Bloc Air Defense. The Bloc air defense was damaged but not to the same extent as the strategic forces, largely because it was not targeted as extensively. Somewhat less than half of the 8500 total Bloc fighter aircraft and about 50 percent of primary air defense control centers were destroyed. However, many of the strategically located prime defense air bases were badly hit, thus reducing the potential efficiency of the remaining air defense establishment. Relatively few SAM sites were affected, leaving the defenses of strategic points largely intact, but degraded by the loss of central control and early warning.

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165. Effect on Other Military Installations and on Military Personnel. Damage to other military installations and forces was not severe. The Army ground forces, in particular, escaped almost unscathed. Bloc military casualties were .7 million, or about nine percent of the total of 7.8 million.

166. Effect on the Bloc Civilian Sector. The intent of this attack was to destroy the military and avoid unnecessary damage to the urban-industrial area and casualties to the civilian population. From this point, the attack proved most successful in that from 94 to 100 percent of capacity of the USSR and Bloc, in most industrial categories, survived the attack undamaged. Moreover, considering the weight of attack, the civilian casualties were not high. The Sino-Soviet Bloc population suffered a total of 14 million casualties in the counterforce attack, including 11.5 million fatalities.

167. One unexpected development did appear, however. Though it was assumed essential in a controlled response strategy to keep intact the leadership of the enemy, in this particular war the winds, combined with heavy fallout from ground bursts on a regional nuclear storage site, negated the selectivity of targeting. Moscow, though undamaged, was subjected to heavy fallout which caused, within a week, some 3.1 million casualties. However, this would not have affected the communication with Soviet leadership in the critical early hours after the US attack.

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168. The Success of the Attack. The US attack just discussed seriously degraded the strategic weapon systems of the Soviet Union. Over half of the total Soviet ICBM force, and well over half of the LRAA bombers were destroyed. However, since by assumption the Soviet leaders chose not to end the war but to retaliate, it failed to achieve its principal objective of causing the Soviets to desist. Despite the damage suffered, the Soviet strategic forces were able to launch 195 ICBMs, 197 bombers and 66 SLEMs against the US in an effort to do grievous harm to the nation, not just its military establishment.

169. It should be emphasized at this point that the effectiveness of the US pre-emptive attack, and thus the size of the surviving Soviet force, was a direct resultant of the Committee's assumptions as to size of the Soviet force, its deployment and reaction time, degree of warning, the precision with which the US would know where the ICBMs and bombers were deployed, and finally, the degree to which Polaris and Minuteman missile forces could meet the rigid time requirements. A change in any one of these factors could have modified the outcome substantially.

170. The conclusion to be drawn from the above analysis is that a pre-emptive attack, the objective of which is to destroy the Soviet strategic capability, can be successful only if the planners have an extremely accurate assessment of the capabilities of both the US and the Soviet Union. In this respect, the study emphasizes the problems, rather than the potential advantages, of a pre-emptive attack.

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~~RESTRICTED DATA~~The Soviet Retaliatory Attack

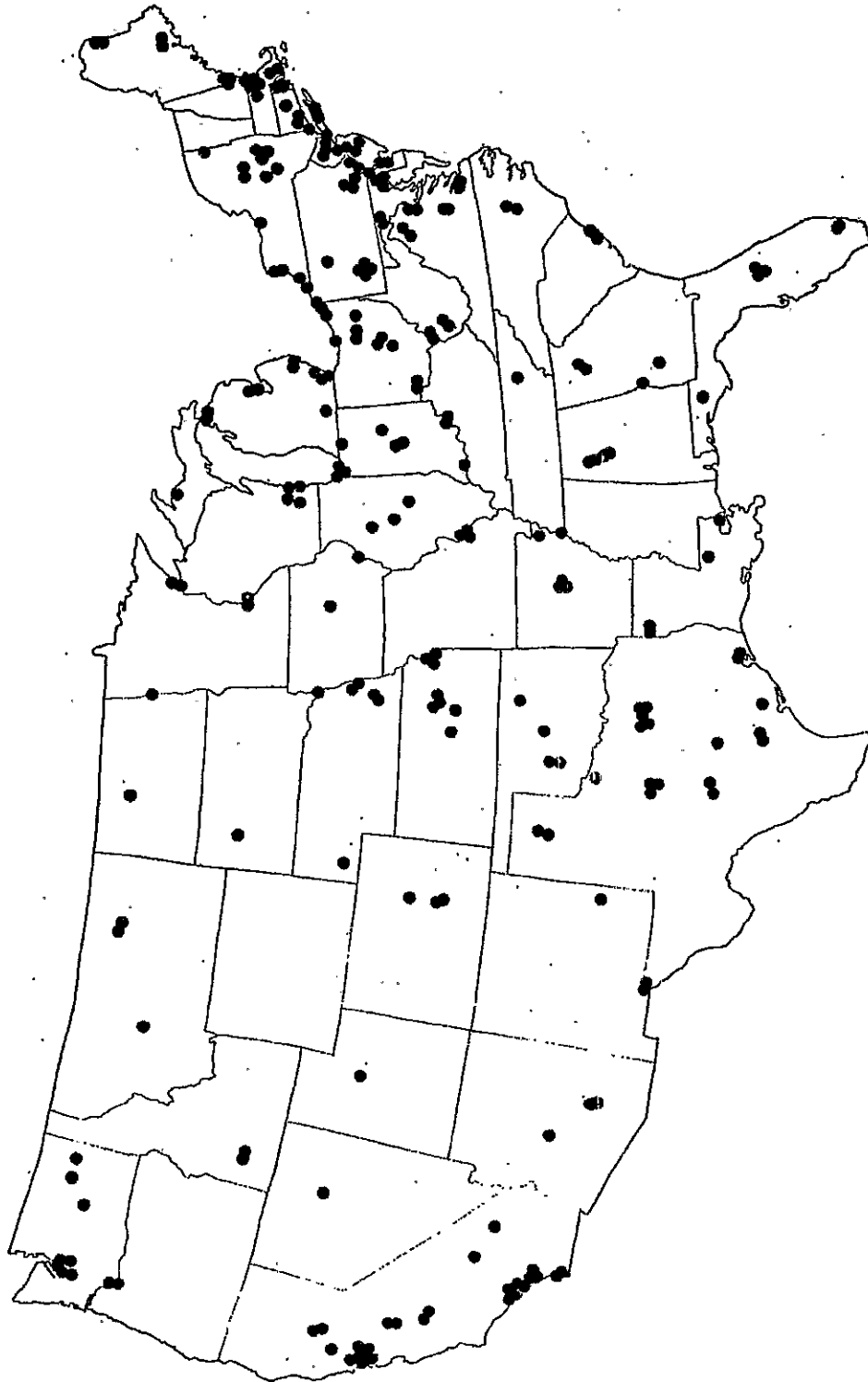
171. According to the Soviet retaliatory plan discussed above, the Soviet attack encompassed both urban-industrial and military targets. The first missiles were down at 1930 EST, and the bomber attack followed beginning about four hours later. For the purposes of this study it was assumed that the Soviet submarine force could reach its launch position shortly after the bomber attack began. The total Soviet attack delivered 167 ICBMs, 50 SLBMs, 74 bombs, 31 ASMs, totaling 2836 megatons. Of the 322 weapons down, 60 percent detonated on urban-industrial complexes and 40 percent on military targets. All weapons were ground burst to maximize the fallout effects.

172. Effect on US Military Forces. Approximately 513 thousand military personnel were fatally injured in this attack. Summarized below is the total damage to selected categories of military facilities in the US.

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**ACTUAL GROUND ZEROS
SOVIET TOTAL ATTACK "LOW" FORCE**



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TABLE 22

DAMAGE TO US MILITARY INSTALLATIONS

<u>Category</u>	<u>Number Installations</u>	<u>Number Damaged</u>	<u>Percent Damaged</u>
Hardened Nat'l Cmd/Ctrl	3	3	100
SAC Hdqts, Major	4	4	100
Army Hdqts, Major	10	3	30
Navy and Marine Hdqts, Major	19	8	42
ICBM LOC	260	0	0
SAC Bomber Bases	51	48	91
Other Active AF Bases	68	42	62
Navy and Marine Air Sta.	29	2	7
SAGE Centers	22	13	59
AC&W Sites	130	16	12
BOMARC Sites	8	4	50
Missile Master	10	4	40
NIKE-HERCULES Btrys	130	42	32
HAWK Btrys	36	0	0
Army, Major Troop Centers	26	4	15
Naval Sta., Shipyards, and Bases, Major	15	10	67
Marine Corps Bases	4	0	0
Air Logistics Depots	10	2	20
Army Depots, Major	14	0	0
Navy and Marine Supply Depots, Major	18	6	33
Nuclear Wpn Storage Sites	146	27	18

173. Major naval ships in CONUS ports suffered damage as follows:

TABLE 23

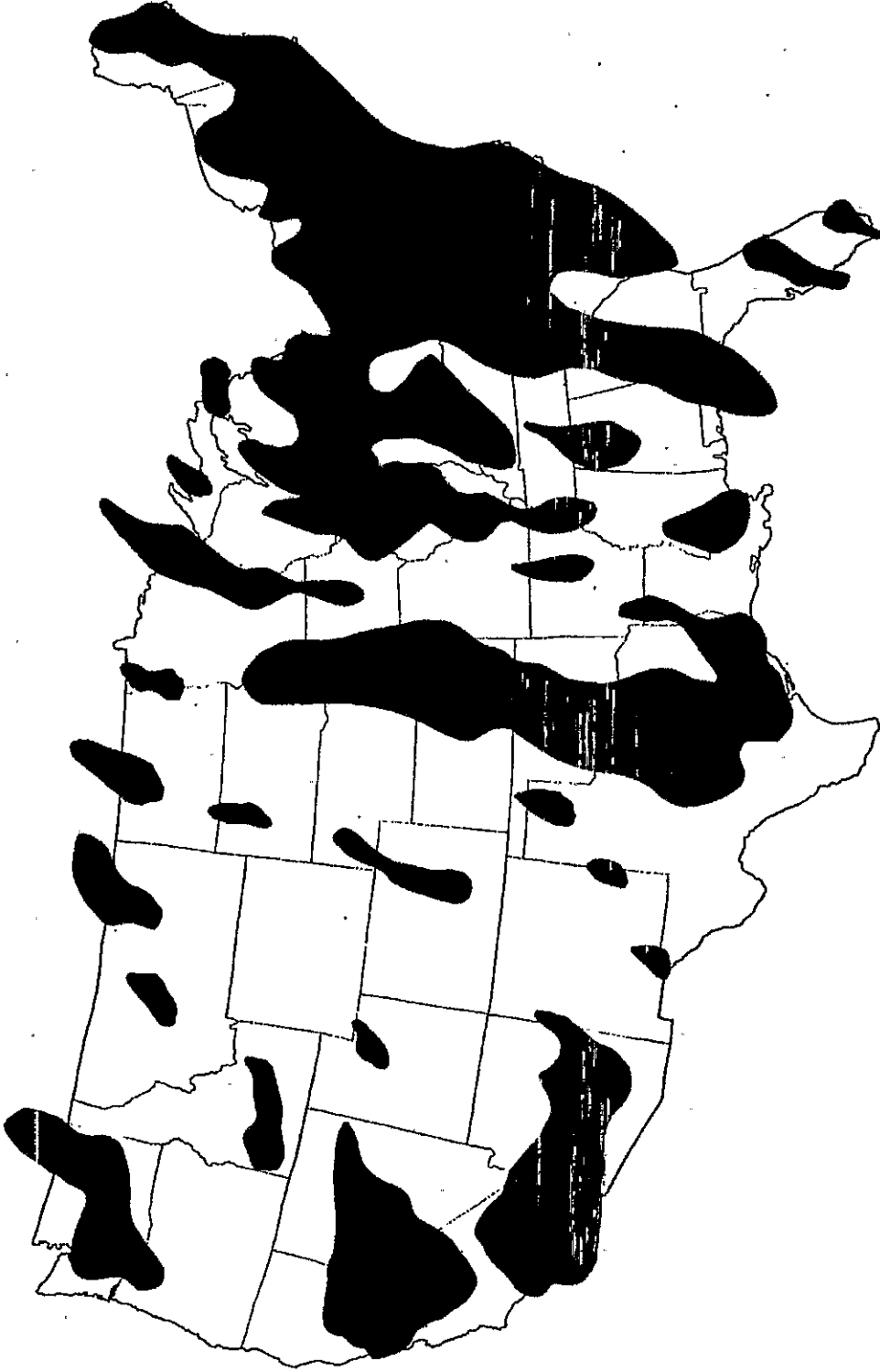
DAMAGE TO US NAVAL SHIPS

<u>Naval Ships</u>	<u>Total Number</u>	<u>Number Damaged</u>	<u>% of Total Damaged</u>
Submarines	137	19	14
Cruisers	14	6	43
Destroyers	223	44	20
Other Vessels	472	46	10

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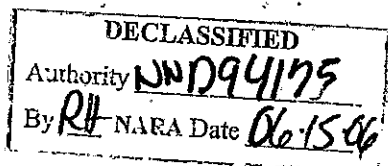
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**DISTRIBUTION OF FALLOUT
SOVIET TOTAL ATTACK "LOW" FORCE**



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174. Aircraft destroyed or severely damaged in CONUS are shown below.

TABLE 24
DAMAGE TO MILITARY AIRCRAFT DEPLOYED IN CONUS

<u>Military Aircraft</u>	<u>Total Number</u>	<u>Number Damaged</u>	<u>Percent of Total Damaged</u>
Naval Aircraft (combat type)	873	89	10
Marine Corps Aircraft (combat type)	420	0	0
Strategic Air Command	1650	192	12
Tactical Air Command	211	63	30
Air Defense Command	718	349	49
MATS	234	83	35
Air National Guard	1084	278	26
Air Reserve Forces	436	66	15

175. The losses suffered by the US forces as a result of the Soviet retaliatory attack had no effect on the capability of the US strategic forces to carry out subsequent planned attacks. Furthermore, assuming that national political and military leadership had moved to hardened and mobile headquarters prior to the initiation of the US pre-emptive attack, the Soviet attack could not have delayed appreciably any orders to airborne SAC bombers and Polaris submarines to deliver the urban-industrial phase of the attack. The Soviet attack was successful in its efforts to eliminate or seriously degrade US air defense installations in the center of the country, and, thus, permitted the Soviet bombers, which had survived the US attack against their bases, to reach their targets.

176. Effects on the Civilian Sector. As a result of this attack there were 92.3 million civilian casualties or 47 percent of the total population. Of these, approximately 46 million people were killed immediately by blast and another 17 million injured. Nation-wide fallout added

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another 29 million casualties, one third of whom would die. Over all, Civil Defense Region One, comprising the northeastern portion of the US, suffered 27 million casualties, or 77 percent. Since all weapons impacting in the US were ground burst to maximize casualties from fallout, there was a 21 million increase in casualties from this cause compared to the First General War.

177. The Soviet retaliatory attack achieved a level of destruction to US major industrial resources comparable to that achieved in their total attack in the First General War.

TABLE 25

DAMAGE TO US INDUSTRIAL CAPACITY

<u>Large Manufacturing Plants</u>	<u>Available Within 15 Days</u>	<u>Destroyed Indef- initely or Unavailable</u>
	(Percent of Total)	
Chemicals & Allied Products	17	53
Petroleum & Coal Products	43	57
Rubber Products	35	65
Leather Products	61	39
Primary Metal Industries	52	48
Fabricated Metal Products	41	59
Machinery except Electrical	39	61
Electrical Machinery & Equipment	38	62
Transportation Equipment	34	66
Instruments & Related Products	41	59
Petroleum Refineries	47	53
Processed Food & Kindred Products	33	67
Textile Mill Products	78	22
Apparel & Other Fin. Fab. Goods	46	54
Lumber & Wood Products	83	17
National Total	44	56

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The number of weapons down against urban-industrial complexes was approximately the same in both wars, though the megatonnage was greater in the Second General War. However, as a result of ground bursting all weapons in the Second General War to maximize casualties, the damage to factory type installations was not maximized. This tended to offset any increase in damage which might have been expected from the higher yield of a number of the down weapons.

178. Industrial capacity directly associated with supplying military requirements suffered more heavily than industry generally, again about comparable with the First General War, as shown by the following:

TABLE 26
DAMAGE TO US WAR INDUSTRY

	<u>Percent of Total Destroyed</u>		<u>Percent of Total Destroyed</u>
Ordnance and Acces- sories	76	Motor Vehicles and Equipment	67
Guided Missiles	45	Communications Equip.	67
Aircraft and Parts	67	Electronic Tubes	51
Ship and Boat Building	70	Avgas & Tetra Lead	87

179. The effects on other sectors of the economy were about the same as described in the First General War. Food was available but processing and distribution would be difficult problems to overcome in the short run. Transportation of all kinds would be available but the problem again would be integration of partially surviving systems to fill requirements. The increase in casualties, especially in major industrial areas would undoubtedly cause the recovery from the Second General War to move at a slower pace at least in the early post-war period.

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180. Government. Reorganization would be initiated again probably on the local and state level, perhaps regionally in some cases, because of the destruction of Washington, D.C., and the hardened national control centers. Roughly 20 state capitals suffered one third or more casualties.

The Total US Attack--Effect on the Sino-Soviet Bloc

181. The US responded to the Soviet retaliatory attack by attacking urban-industrial and selected additional military targets. On completion of the total attack, including the counterforce strikes, the US had detonated 2618 weapons in the Bloc, with megatonnage distributed as follows:

TABLE 27

WEIGHT OF TOTAL US ATTACK

	<u>No. of Weapons</u>	<u>Megatonnage</u>
USSR		
Communist China		
European Satellites		

In the urban-industrial attack, 88 percent of the megatonnage was ground burst.

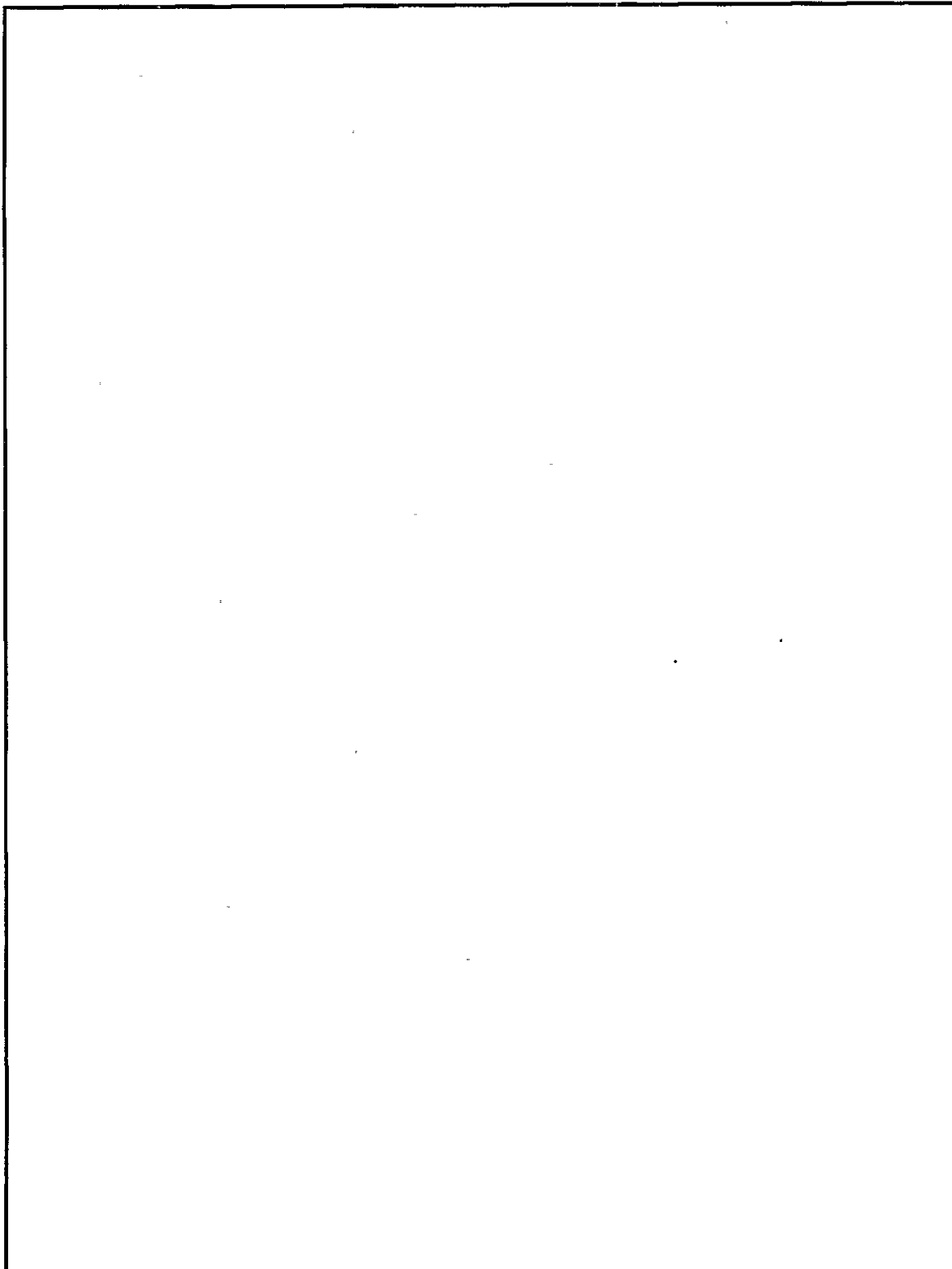
182. Effect on Sino-Soviet Military Forces. The Sino-Soviet Bloc military forces suffered approximately 1.9 million casualties, 24 percent of the total. Damage to selected military installations was as follows.

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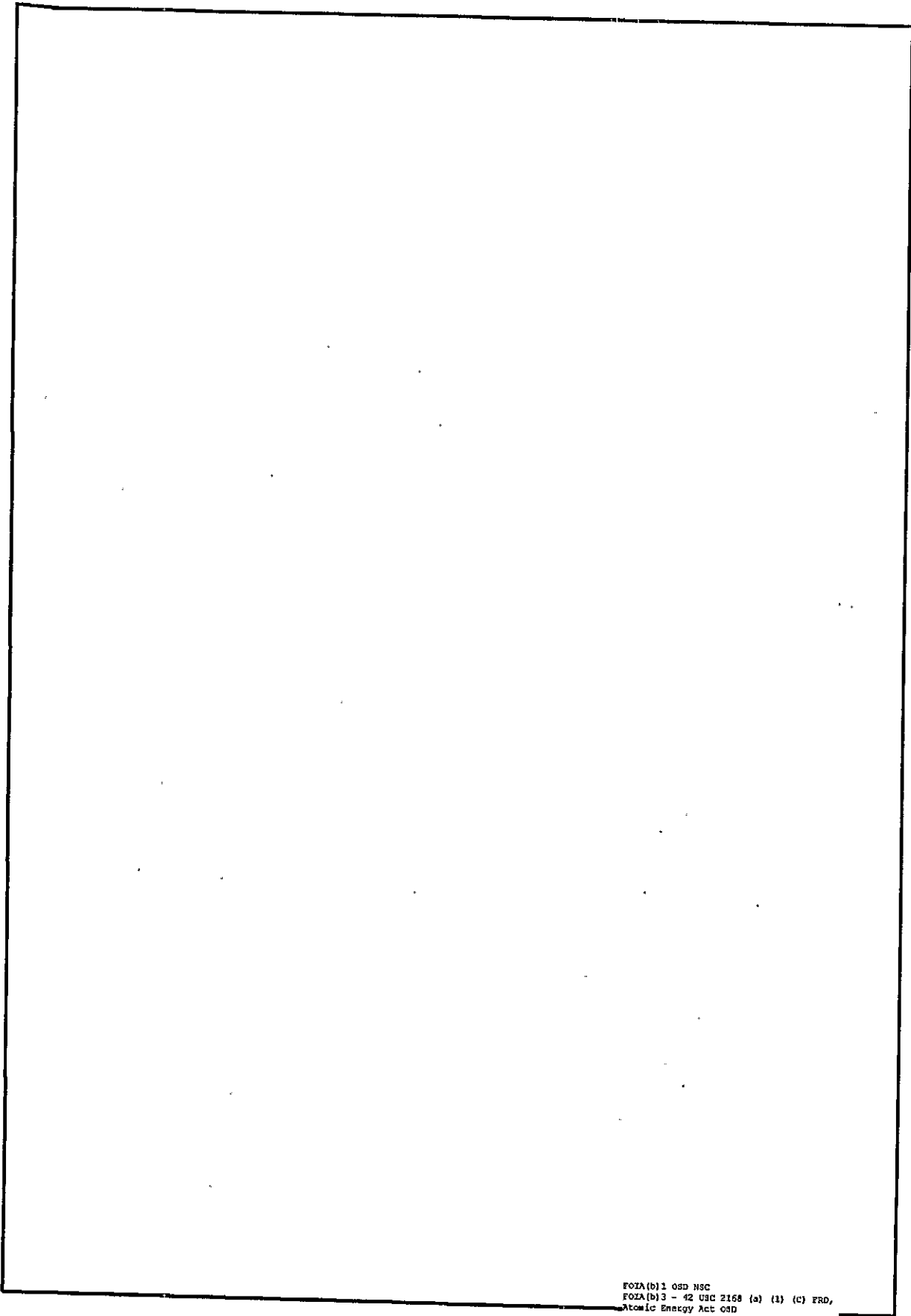
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TABLE 28

DAMAGE INFLICTED ON SINO-SOVIET MILITARY INSTALLATIONS

<u>Category</u>	<u>Total Number</u>	<u>Number Damaged or Destroyed</u>	<u>Percent Damaged or Destroyed</u>
ICBM Launchers	227	155	68
LRAA Staging Bases	30	29	98
LRAA Home Bases	43	43	100
Other Bomber Capable Bases	451	264	59
Submarine Bases	41	39	95
MRBM Launchers	450	381	85
Offensive Fighter and Light Bomber Bases	256	233	91
Air Defense Control Centers	180	141	78
Major Naval Headquarters	17	9	53
Surface Ship Bases	98	56	57
Field Army Headquarters	30	28	93
Troop Installations	713	366	51
Aircraft Depots and Maintenance Bases	180	147	82
Army Materiel Depots	289	44	15
Naval Depots	57	36	63
[Redacted]	[Redacted]	[Redacted]	66

DAMAGE INFLICTED ON SINO-SOVIET COMBAT AIRCRAFT

Bomber/Tankers (Medium and Heavy)	1300	509	39
Tactical Aircraft	9340	4625	50

183. The combined US counterforce and composite attacks against the Sino-Soviet Bloc military establishments drastically reduced the Bloc long range nuclear delivery capability and sharply reduced the potential of other military units through the widespread destruction of military bases and depots. The only immediate threat to the US was the 26 SLBMs at sea; European and the Far Eastern theaters were threatened by some 450 surviving MRBMs provided they could be mated with surviving launch sites. Bloc ground forces remained largely intact, having suffered personnel casualties of approximately 14 percent, 31 percent in the USSR. This force would be a threat to US Allies in Europe

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and Asia, at least in the short run, but its effectiveness was limited by the destruction of transportation facilities and support facilities.

184. The Total US Attack--Effects on the Sino-Soviet Bloc Civilian Sector. The total Bloc civilian casualties were 187 million distributed as follows:

TABLE 29
CIVILIAN CASUALTIES IN SINO-SOVIET BLOC

	<u>Fatalities</u>	<u>Casualties</u>	<u>Total Population</u>
	(In Millions)		
Soviet Union	74	93	213
Communist China	64	93	702
Satellites	<u>.8</u>	<u>1.1</u>	<u>98</u>
	138.8	187.1	1013

The total Sino-Soviet casualties in the Second General War were 69 million greater than in the First General War. In part this is accounted for by an increase of 819 in the total megatonnage down; probably of greater importance was the ground bursting of a large share of the weapons in the Second General War compared to only a few in the First General War.

185. Effects on Industry. Major categories of industry in the Bloc were damaged as follows:

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TABLE 30

DAMAGE TO USSR AND COMMUNIST CHINA

INDUSTRIAL CAPACITY

	<u>USSR</u> (percent)	<u>Communist China</u> ^{1/} (percent)
Aluminum	72	59
Steel	66	59
Synthetic Rubber	74	
Machine Tools	63	51
Earth Moving Equipment	69	
Thermal Power	23	
Locomotives	80	93
Primary Rail Yards	44	
Port Facilities	42	38
Motor Vehicles	77	70
Tires and Tubes	90	50
Liquid Fuel	72	40
Shipyards Repair	90	62
Airframe Production	94	
Submarine Construction	90	

^{1/} The blanks in Communist China column indicate either no known capacity or no assessment obtained.

The above damage was somewhat less than that achieved in the First General War. In large part this was a result of the majority of the weapons being ground bursts rather than air bursts--the latter achieves damage over a wider area to industrial type targets.

186. Despite the somewhat lower level of damage to plants, the status of the Sino-Soviet Bloc generally was probably worse in the Second as compared to the First General War. The larger casualty toll meant that the total fabric of economic life in the USSR and Communist China, in particular, was more extensively disrupted. Access to facilities in large areas would be denied for a period of two or three weeks by heavy radiation. All efforts directed toward survival, and subsequently toward rehabilitation would be less effective and the time required for reintegration would be substantially lengthened.

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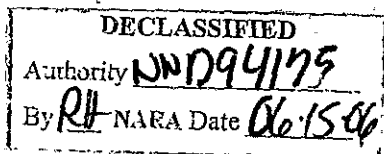
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187. The Net Effects. As in the First General War, the US strategic military posture would remain superior to that of the Soviet Union, although the US preplanned reserve was considerably smaller. Thirty-five ICBMs, 62 Polaris missiles, and 75 SAC bombers had never been committed; this force could be augmented in time by SAC bombers and carrier aircraft that returned from their strike mission. By contrast, the Soviet had immediately available only 26 SLEMs at sea in conventional powered submarines. There could be some small augmentation expected in time as a few bombers return home and surviving tankers were reconfigured as bombers, a few out-of-commission missiles were repaired, and, perhaps, as a few surviving missiles were reloaded in submarines.

188. In terms of net balance between surviving national resources, it would appear the US had also come out better-- though this must be considered in terms comparing levels of tremendous devastation. Both sides suffered heavier casualties in the Second General War. US casualties went from 33 to 48 percent of the total population and those of the Soviet from 32 to 44 percent. Soviet physical plants suffered more heavily than those of the US.

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D. THE OUTCOME OF THE NUCLEAR EXCHANGE
THE SECOND GENERAL WAR
SOVIET "HIGH" ICBM FORCE

The US Pre-emptive Attack

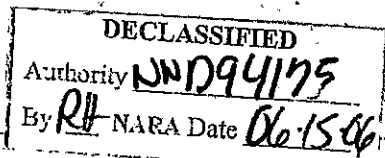
189. A US pre-emptive attack against the Soviet "high" ICBM force was not machine-gamed; however, from the similarities in targeting certain conclusions may be drawn as to the approximate level of Bloc military forces and its civilian sector.

190. A most important difference in this case versus the "low" case would exist in the actual size of the Soviet strategic force surviving the US pre-empt. As a result of the assumptions as to Soviet reaction time, US missile impact schedule, and the number of unknown launchers, the USSR would be able to launch approximately 218 first salvo ICBMs and have available 114 reload second salvo missiles. For comparative purposes, only 195 ICBMs in total survived the US pre-emptive attack in the "low" case.

191. The increased requirement for US missiles to attack more Soviet ICBM launchers probably would reduce the number scheduled against LRAA home and bomber capable bases. The timing of the first weapon down in most cases could be maintained, with the number of bombers surviving being increased by only a relatively small number. There would be a lowering of the damage expectancy to base facilities, and the result would probably be a greater remaining capacity to support returning bombers.

192. The effect of increased demand for US missiles to cover Soviet missile launchers would also substantially increase the threat to US and Allied theater forces. The targeting of all but 17 Satellite airfields would have to

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be allocated to theater forces. While there were ample forces to do this task, in most cases the fighter-bombers could be expected to arrive a few minutes to an hour or more after the Soviet had received warning. The result would be a substantially larger number of the Soviet fighter-bombers surviving than in the "low" case.

193. Another matter of major concern to the US would be the reduction in the number of ICBM missiles held in reserve. Without reducing the expectancy of arrival below that planned in the "low" case, US reserve ICBMs would have dropped from 64 to 22. The number of uncommitted Polaris in each case would have been the same, 48 at sea, en route to station. Any change to increase the reserve would mean some increase in the weight of megatonnage which could be delivered against the US.

194. The outcome of the subsequent US urban-industrial attack against the Bloc would not have been changed in the "high" case. All of the weapons were to be delivered by SAC bombers, airborne at the time of the pre-emptive missile launch, and the Polaris system. However, Soviet total casualties and, to some small degree, damage to military and civilian installations would have increased as a result of more total weapons down in the USSR in the "high" as compared to the "low" case.

The Soviet Retaliatory Attack

195. Rather than analyze the different results which might accrue from the "high" Soviet force in terms of the specific number of additional missiles, the Committee sought the same end by comparing the outcome if the probability of weapon arrival factor were varied.

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This approach serves to emphasize the series of critical elements, other than the number of weapon carriers, which can substantially influence the outcome. The most important of the elements are Soviet warning time, weapon carrier reaction time, US knowledge of Soviet strategic force deployment, and successful implementation of a properly timed attack. To illustrate the above and to obtain a machine calculation of damage, three sets of Soviet probability of arrival factors were established, which resulted in the following number of weapons down in the US:

TABLE 31

WEAPONS DOWN IN THE US--THREE CASES

	<u>Case I</u>	<u>Case II</u>	<u>Case III</u>
ICBM	167	59	183
SLBM	50	46	47
Bombs	74	53	177
ASM	<u>31</u>	<u>15</u>	<u>60</u>
Total	322 (2836 MT)	173 (1273 MT)	467 (3705 MT)

196. Case I is based on the calculated outcome of the US counterforce attack against the Soviet "low" force. Case II is to illustrate what that outcome might have been, for example, if Soviet warning systems had been less capable than assumed, or the US had known the location of more ICBM launchers. Case III is to illustrate the weight of the Soviet attack if, for example, the Soviet had had a larger ICBM force or if his forces had reacted more rapidly than anticipated.

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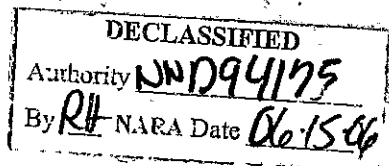
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197. When applied against the US, military and civilian casualties were as follows:

	<u>Case I</u>	<u>Case II</u> (Millions)	<u>Case III</u>
Military	.6	.4	.6
Civilian	92.3	53.8	113.4
Total	92.9	54.2	114.0

Damage to major US industrial categories ranged, in most instances, from roughly 40 to 50 percent in Case II to roughly 60 to 70 percent in Case III. A similar range occurred with respect to damage to many military categories.

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E. OUTCOME OF THE NUCLEAR EXCHANGE
AS AFFECTED BY POSSIBLE MODIFICATIONS
IN CRITICAL FACTORS

198. In this nuclear exchange, as that in the First General War, the results portrayed could have been substantially modified by changes in key factors. Of particular importance would be those reflecting the capabilities of Soviet forces to detect and to react to a US attack, and the extent to which the US had precise knowledge of the numbers and deployment of Soviet forces. These elements were included in the preceding discussion of the Soviet "high" force attack, to emphasize the potential effects which might result from variations.

199. In addition, much of the discussion of the effect of variations as they might effect the outcome of the First General War also apply to this war. In particular, the survival of an effective US national command and control structure, to direct subsequent commitment of US forces, would be of much greater importance in the Second General War because of the nature of the Soviet retaliation--a total rather than a military attack. Even a limited initial deployment of an effective ABM system to protect elements of the Soviet strategic forces could also be especially critical to the success of a US pre-emptive attack.

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F. EFFECTS OF POSSIBLE CHANGES IN STRATEGY

200. It should be noted that each side could have used alternative strategies or tactics in the situation portrayed in the Second General War. Two of these are discussed below, one possibility on each side.

201. On the US side, it might have been possible to reduce the weight of the Soviet attack by extending the time between decision and the initiation of the attack. Within a few hours a substantially larger number of SAC bombers equipped with GAM-87s could have been airborne and within launching range of all Soviet staging bases and a number of the LRAA home bases and ICBM launchers. The GAM-87s with a time of flight to target comparable to that of a Polaris missile could have augmented the Polaris now scheduled against these critical targets, resulting in a higher expectancy of destruction. However, there would be two dangers in this approach. The Soviets might learn of US intentions and beat the US to the punch by launching their own pre-emptive attack. Or if the US did not have definite information on the timing of the Soviet attack which the US was attempting to "spoil", the longer interval of time would raise the possibility it might occur before the US forces were in place.

202. On the Soviet side, it would have been possible for them to adopt a counterforce retaliatory option. Soviet preplanning of such an option would be based on a calculation that if the US should launch a pre-emptive attack it would be counterforce. Even though they estimated that the US would be successful in destroying the bulk of Soviet strategic forces, a token retaliation against US military would reduce US military capabilities to some extent, would

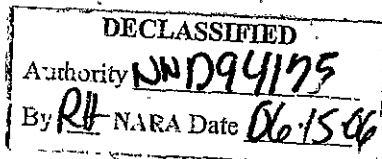
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satisfy national honor, and, most importantly, might save Soviet cities from destruction. If Soviet forces had largely been destroyed, they would probably have to pay for their cities by acceding to unfavorable terms in a cease-fire agreement. While there are many imponderables in any calculation of the outcome of a series of political and military actions, reactions, and interactions, the Soviets might believe the risks in this approach are outweighed by the possibilities of escaping widespread devastation to their nation.

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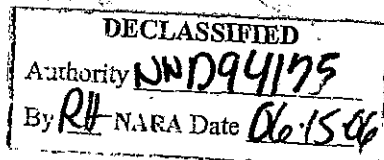
IV. CONCLUSIONS

203. As a result of these analyses, the Committee was led to a number of conclusions. It should be noted, however, that determinations resulting from a gross aggregate machine calculated study are neither conclusive nor categoric, but rather are indications of the possible magnitude of effects. The following conclusions are the outcome of the Committee's analysis of these effects combined with military experience and judgment.

204. Counterforce Strategy. There are many problems attendant to the implementation of a counterforce strategy which must be faced up to prior to making that decision. With the force structures and conditions of alert postulated, Soviet leaders cannot hope to achieve decisive destruction of US strategic nuclear forces. This derives from the comparison of the large numbers of relatively invulnerable US missile systems, with a smaller, more invulnerable Soviet missile force. However, if the Soviet leaders were convinced that a US counterforce attack was imminent, they might well employ such a tactic in a pre-emptive strike in an effort to mitigate the weight of the US attack. They would hope to save their cities by quickly obtaining a cease-fire.

205. On the other hand, the US, again due to the preponderance of its relatively survivable force, has considerable flexibility in choice of strategy. Thus it can employ a counterforce strategy either in initiation or in retaliation. However, with regard to the use of the counterforce strategy in a pre-emptive attack, the Committee concluded that while appealing, it is a highly difficult form of attack to plan and to carry out, with high assurance of achieving great destruction to the enemy's

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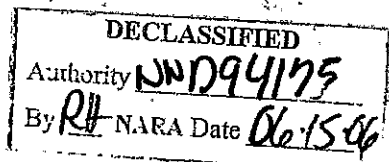
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strategic forces. In particular, there must be precise knowledge of the size and deployment of the enemy's forces. There must also be a capability to destroy these forces either before their launch or before they can impact.

206. Furthermore, should the US ever contemplate a pre-emptive counterforce attack, serious consideration must be given to the possibility that the Soviet retaliation would not be counterforce. For example, in the study, the Soviets responded with a heavy urban-industrial/military attack. Had they sued for peace, immediately after the launch of their missiles, stating that they had misinterpreted US intentions and that they were recalling their bomber forces, the US would have found itself at that time in a disadvantageous position. Though superior militarily, it would have lost 45 percent of industry and suffered almost 55 million casualties. The Soviets, even though admitting defeat, would have lost only six percent of their industrial capability and suffered only five and one-half million casualties. Under these circumstances it would appear that the US could not have accepted such overtures for peace, but would have had to launch a composite attack against the Soviet Union, even though this might have placed in jeopardy additional US lives and property.

207. To have any hope of success in limiting a nuclear war, the credibility of a counterforce strike must not be eroded by effects that could cause the enemy to misconstrue the designed purpose. Civilian casualties must be held to a minimum by programming weapons so as to minimize fallout. This is a difficult problem to deal with. In this study, despite considerable care in targeting, for example, ground burst warheads were used to attack a few

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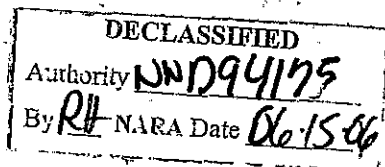
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hardened nuclear storage sites, and because of wind direction, resulted in heavy fallout on Moscow.

208. Decision Time. Timing of a decision as to the US response to a Soviet attack can be delayed for a period without seriously affecting the outcome of the war. US hardened missiles appear to have the capability to ride out a Soviet attack and US alert aircraft are airborne on warning. However, to achieve maximum effectiveness of the US counterforce attack to be delivered by missiles and US theater forces, it must impact on Soviet military targets as soon as possible. The timing of decision as to subsequent attacks becomes critical in a short period of time, if the maximum capability of airborne US aircraft is to be realized. For theater fighter-bombers this could be about one hour; for SAC bombers this would be several hours.

209. Reserve Forces. The retention of a reserve of survivable weapon systems sufficient to implement an urban-industrial/military attack is required under all conditions to ensure that the US is never placed in a position of military inferiority in a nuclear war. For example, if the Soviets were to strike SAC bases in a surprise attack, using SLBMs, then destroy EMEWS, and shortly thereafter launch ICBMs against urban-industrial targets, the US might have assessed this as a counterforce attack on the basis of the observed results of the SLBM attack. A US counterforce retaliation could then find the US with the majority of its bombers destroyed, most of its missiles fired, and many of its cities and industries in ruins. The Soviet Bloc, by comparison, would have experienced relatively little damage to its population and economy.

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210. Furthermore, essential to the effective employment of a reserve force is the capability to rapidly assess damage and to locate new targets, the destruction of which are essential to conclude the war.

211. Composition of Theater Forces. Should the US seek a strategy which allows a pause for negotiations between the counterforce attack and an urban-industrial attack, the composition of the theater forces should be changed. At the present time the majority of theater nuclear forces are exceedingly vulnerable. They must be employed on outbreak of hostilities or be lost on the ground. If they are released for an attack at the time of a US missile launch, in some cases they will not arrive at their targets for two or more hours; whereas the total missile attack would have been down on the enemy in less than an hour. In these circumstances, the pause between the counterforce phase of the attack and the urban-industrial phase has not been realized. Accepting the fact that such forces are essential for political, as well as military reasons, the need is for forces which are survivable and can be protected until such time as they are brought into action.

212. Net Evaluation. In summation, it appears to the Committee that under the conditions of alert and with the US and Soviet forces as given in this study, the net balance following a general war in 1965 would favor the US.

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