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(English text only)PRELIMINARY REPORT ON PHASE II OF THE WORK PROGRAMME ON
FOLLOW-ON TACTICAL USE OF NUCLEAR WEAPONSNote by the Chairman

At their meeting at Airlie House on 11th and 12th November, 1969, the Ministers of the Nuclear Planning Group approved(1) a work programme for the study of follow-on tactical use of nuclear weapons. The Permanent Representatives of the Nuclear Planning Group were invited to monitor the programme.

2. Phase I (1969-1973) consisted of basic data inputs prepared in the form of studies(2). Phase II of the work programme (comparative analysis of the basic data inputs, synthesis of findings and identification of the policy questions) was initiated by the NPG Ministers at their Spring 1972 meeting in Copenhagen(3). To formulate a Phase II report, an Ad Hoc Study Team was set up by participants from the United States, the United Kingdom and the Federal Republic of Germany. The attached preliminary report on Phase II is now forwarded to the NPG.

3. In conformity with the approach(4) recommended by

This document consists of:

- 1 cover note of 2 pages
- 1 introductory letter of 1 page
- 1 contents page
- Main text of 24 pages
- Annex A of 3 pages
- Annex B of 16 pages

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- (1) NPG/D(69)9(Revised), 24th November, 1969
 (2) The major assumptions and results of these studies have been listed under Annex B to the attached preliminary report
 (3) NPG/D(72)7, 26th May, 1972, paragraphs 6-9
 (4) NPG/D(72)5, 24th April, 1972, paragraph 8

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Permanent Representatives and approved in Copenhagen in 1972, this preliminary report provides the basis for an exchange of views between the NPG Permanent Representatives and members of the Ad Hoc Study Team, at a meeting to be scheduled after receipt of initial written comments. This discussion will be held to assist the Study Team in finalising its report. All NPG countries are requested to circulate their views in writing not later than 20th January, 1975. NATO Military Authorities are invited to comment on the draft report by the same time, if they so desire.

4. For the Phase II report to become a possible item on the NPG Ministerial Agenda in the Spring of 1975, the revised final version should be submitted by the Ad Hoc Study Team to the NPG Permanent Representatives not later than 21st March, 1975.

(Signed) Joseph M.A.H. LUNS

NATO,
1110 Brussels.

UNITED STATES MISSION
TO THE
NORTH ATLANTIC TREATY ORGANIZATION
(USNATO)

Brussels, Belgium

November 22, 1974

Mr. Richard E. Shearer
Director, Nuclear Planning
Defense Planning and Policy Division

Dear Dick,

In compliance with procedural arrangements approved by the Permanent Representatives (1), the preliminary report on Phase II of the Follow-on Use Program, prepared by the Phase II Ad Hoc Study Team (US, UK, FRG), is submitted for consideration by members of the Nuclear Planning Group.

The contents and conclusions of the preliminary report do not necessarily represent the official views of the Study Team member nations.

Sincerely,



Enclosure
As stated (2)

John A. Woodworth
Defense Plans Division

(1) NPG/D(71)7 of July 27, 1971

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PRELIMINARY REPORT ON PHASE II OF THE STUDY ON FOLLOW-ON TACTICAL USE OF
NUCLEAR WEAPONS BY NATO

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PRELIMINARY REPORT ON PHASE II OF THE STUDY ON FOLLOW-ON TACTICAL USE OF
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1. The Follow-on Use Study Program

1. In November 1969 the Nuclear Planning Group approved "Provisional Political Guidelines for the Initial Defensive Tactical Use of Nuclear Weapons by NATO" ^{1/} as policy guidance for national authorities and as a directive to NATO military authorities. At the same meeting Ministers recognised the need for a study of follow-on tactical use of nuclear weapons, to examine the phases of tactical use subsequent to initial use by NATO, and to explore NATO responses to an initial use of nuclear weapons for tactical purposes by the Warsaw Pact. Rather than attempt this task in a single comprehensive study, they agreed to proposals put forward by the Permanent Representatives, which defined ^{2/} the objectives, general assumptions and broad structure of an overall work programme to be carried out in a series of interrelated steps. They invited Permanent Representatives to inaugurate and monitor the work programme and to propose, as appropriate, further work within its framework.

2. Annex A summarises the guidelines approved by Ministers for the conduct of the work programme, and the procedural arrangements for Phase I, which comprised the 8 regional Follow-on Use Studies considered by Ministers at NPG Meetings. Annex B summarises the content of the Studies themselves.

PHASE II

3. In May 1971 ^{3/} Ministers confirmed that further extensive consideration of follow-on use questions, taking account of the outcome of the Phase I Studies, would be necessary before conclusions and policy proposals could be developed. They also invited the Permanent Representatives to develop procedural arrangements for the subsequent stages of the follow-on use work programme.

4. In July 1971 the Permanent Representatives approved ^{4/} procedural arrangements for the subsequent stages of the work programme. They agreed that the purpose of the Phase II Team effort would be to conduct the comparative analysis and synthesis of the Studies in order to determine whether:

a. The military and non-military factors affecting follow-on use, as set out in the Studies, were of general applicability or relevant only to a specific study situation;

b. Political control of the nuclear engagement in follow-on use could be ensured while also ensuring military effectiveness;

^{1/} NPG/D(69)7 of 2 October 1969, superseded by DPC/D(69)58(Revised) of 10 December 1970.

^{2/} NPG/D(69)9(Revised) of 24 November 1969, Annex.

^{3/} NPG/D(71)6 of 2 June 1971

^{4/} NPG/D(71)7 of 27 July 1971

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c. Other specific military and political aspects of follow-on use might have to be further investigated. (Subsequently Ministers have initiated separate Studies on Warsaw Pact Politico-Military Strategy and Military Doctrine for the Tactical Use of Nuclear Weapons 1/ and on Political and Military Implications of Technological Developments Concerning Tactical Use of Nuclear Weapons 2/.)

This would be followed by the formulation of policy questions of a general nature and the definition of possible policy choices, as the basis for proceeding in Phase III to the formulation of policy guidance for follow-on tactical use of nuclear weapons.

5. In their report on the initiation of Phase II of the Follow-on Use Work Programme, the Permanent Representatives further agreed 3/ that general terms of reference for Phase II already existed in previously approved documents; that more detailed terms of reference might unduly restrict the flexibility that should be granted to the Study Team; and that in general the work programme 4/ for the conduct of further studies on the follow-on tactical use of nuclear weapons would be equally valid for the conduct of the Phase II effort.

6. Within this context the Phase II Team has designed its work programme to expand existing knowledge of, and appreciation for, the military and non-military factors which influence decisions concerning follow-on tactical use of nuclear weapons and which should be considered by national political authorities when addressing or consulting on questions concerning such use and by Allied Military Commanders when planning or implementing it. A principal aim has been to consider the role of NATO's tactical nuclear options in enhancing the deterrent 5/. The Team has tried to avoid pre-empting the arrangements for Phase III, although in line with the guidance of the Permanent Representatives, its overall objective has been to provide information from which political guidelines governing the possible follow-on tactical use of nuclear weapons might be derived.

11. Follow-on Use Within the Context of Agreed NATO Strategy

7. The Study Team believes that its findings have to be considered within the general context of agreed NATO strategy, of which the possible tactical use of nuclear weapons is an integral part.

- 1/ NPG/D(73)7 of 21 May 1973; and NPG/Study/45 of 8 March 1974
- 2/ NPG/D(74)3 of 10 April 1974
- 3/ NPG/D(72)5 of 24 April 1972
- 4/ NPG/D(69)9(Revised) of 24 November 1969
- 5/ NPG/D(69)9(Revised) of 24 November 1969, Annex

8. The overall defensive concept of NATO is to preserve peace and provide for the security of the North Atlantic Treaty area by establishing a credible deterrent, i.e., by confronting any threatened or actual aggression with adequate NATO forces and with clear willingness to escalate if necessary. To implement this concept, the requisite military forces should have the capability to counter an enemy attack at the appropriate level and to escalate to a level of conflict which will inflict on a potential aggressor a degree of damage which he will regard as unacceptable. An unacceptable level of damage can only be judged in relation to the enemy's objectives; however, it seems reasonable to suppose that the strike forces assigned to NATO and US national forces could, even after absorbing a first-strike, inflict on the Warsaw Pact a level of damage which would be disproportionate to any conceivable objectives and would render such objectives unattainable. Credible deterrence therefore requires that the Soviet Union clearly perceive that any attack on NATO territory would encounter a substantial defence with the risk that it could ultimately lead to strategic nuclear strikes on Soviet territory. Thus, conventional and nuclear forces of NATO countries as well as the credible will to employ any of these forces if needed are fundamental to deterrence and to the security of NATO.

9. For deterrence to be effective, military capability must be underwritten by close, positive and continuing collaboration within the Alliance, which thereby evinces the manifest will to defend its integrity and security, and the ability to take the requisite decisions in response to a threat at any level. The risk to an enemy implicit in NATO's capability acquires full significance for him only if he also perceives NATO's evident intent to use that capability if necessary, and to use it in timely fashion, and at the level appropriate to the nature and evolution of the conflict. In turn, the credibility of the will of the Alliance depends upon the preparedness of all member countries to accept the risks of escalation.

10. Since NATO's deterrent strategy as a whole must carry conviction in all circumstances, there is a certain artificiality in considering any part of it in isolation. However it is appropriate to assess the interconnection between the policy for the tactical use of nuclear weapons and deterrence. The Provisional Political Guidelines represent a first and major step towards fulfilling this task, primarily with respect to initial use. The Follow-on Use Study Program is designed to extend understanding of the contribution follow-on use could make to deterrence and defence.

11. An assumption underlying consideration of tactical use of nuclear weapons is that deterrence has failed and aggression has occurred and Allied conventional forces alone have been inadequate to prevail. In that eventuality NATO's objective would be to preserve or restore the integrity and/or the security of the North Atlantic Treaty area by employing such forces as might be necessary to fulfill the concept of forward defence and to re-establish the deterrent. This objective would be achieved by making the enemy cease his attack and with-

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draw because of unacceptable risks which might be involved or because his military forces were defeated.

12. In the first instance, as envisaged in the Provisional Political Guidelines, NATO's purpose in undertaking initial tactical use of nuclear weapons would be to restore the deterrent by showing that the enemy had misjudged NATO's resolve. Moreover initial use would imply the threat of further escalation by NATO, making it clear that the enemy would find that the price of pursuing his objectives exceeded their value. Thereafter, the Provisional Political Guidelines also envisage that the range of options for follow-on use would be the same as for initial use, but that the actual options selected could be different or be executed at a more intensive level. This suggests that the difference between initial and follow-on use is one of degree rather than kind.

13. This report considers how far that is the case, and, taking into account the findings of the Studies, attempts to define how distinctive the follow-on phase may be and what contribution it makes to deterrence. In doing this the Study Team has tried to assess how the balance between strictly military goals and wider political considerations would change in the case of follow-on use. It is also relevant to examine the basic assumption which is implied by the need to consider undertaking follow-on use: that initial use had failed to restore deterrence, and therefore had to be supplemented by further measures to ensure that the enemy was aware of the risks involved in persisting in aggression.

14. Although the Phase I Studies have been concerned with the military consequences of follow-on use in selected scenarios in the different geographical areas of NATO, this emphasis should not obscure the political importance of follow-on use in the spectrum of deterrence.

III. Comparative Analysis of the Phase I Studies

A. Results of the Phase I Studies

Scope of the Studies

15. The Studies were designed to serve a particular purpose and it is of importance that this should be kept in mind in considering their results. When they were commissioned, the Provisional Political Guidelines had already been developed; the question was then asked what NATO should do if initial use failed to restore the deterrent and bring a Warsaw Pact political decision to halt its aggression. One possibility is that NATO, in fighting on, should use nuclear weapons against military targets on the battlefield, and in areas directly related to it, in an attempt to halt the aggression and evict the enemy by the direct force of arms. The Follow-on Use Studies, in most cases, were designed

to test the possibility, i.e., that nuclear weapons could be used for direct military effect, to establish the conditions in which such action might hold reasonable prospect of military success, and to draw attention to any consequences of major importance, such as the level of collateral damage.

16. Thus the studies focused on the military aspects, and little or no examination was made of the political activity which would be taking place at the same time. This absence of any serious discussion of the politico-military interaction is an important limitation in the scope of the Studies which must be kept in mind in considering their results.

17. There is one other point important to remember in considering the Studies: since they were designed to examine the follow-on use of nuclear weapons by NATO, they had to assume an opening situation in which NATO necessarily had to resort to follow-on use. Such an opening situation might arise in one of two ways: either NATO was at a severe military disadvantage even though Warsaw Pact forces were using only conventional weapons; or Warsaw Pact forces had attacked using nuclear weapons.

18. The first possible opening scenario for a study of follow-on use is one which shows NATO at severe, indeed critical, military disadvantage. All the Studies, in one way or another, make this assumption. NATO authorities are currently engaged in studies designed to obtain a true appreciation of the balance of conventional forces. Without prejudging the outcome of these assessments, it can certainly be argued that - had there been warning of a deteriorating political situation, and had NATO adequately reinforced during this period - situations envisaged in the Phase I scenarios need not have arisen at all. On the other hand, the opening scenarios, based as they were on NATO agreed intelligence, must be judged realistic on the assumption that NATO had to meet the attack with forces no stronger than those deployed at the time the studies were conducted, either because there was not sufficient warning, or because inadequate reinforcement action had been taken during a period of increasing tension. Furthermore, Studies of NATO's follow-on use must necessarily assume that NATO's initial use had failed in its purpose of restoring deterrence. The situations postulated therefore had to combine two major assumptions, both unfavourable to NATO; but this is not to imply that such a combination is inevitable, or even likely.

19. The second possibility was not considered in the Studies. Such a scenario must assume either that the Warsaw Pact initially attacks with nuclear weapons, or that an enemy attack is failing to make its expected progress and that Soviet leaders authorize the use of nuclear weapons to restore its momentum. It should however be noted that the view of NATO agreed intelligence is that Warsaw Pact attacks on balance would be likely to be non-nuclear initially and that Soviet leaders, recognizing the consequences of general war, are highly unlikely deliberately to escalate limited conflicts. The Studies therefore concentrate on the most likely opening scenario. However, NATO plans for the possible employment of nuclear weapons should take Warsaw Pact first use into con-

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sideration, among appropriate options, much as they consider possible nuclear responses to NATO initial or follow-on use.

The Land-Air Battle

20. The Studies, which assumed (A) that the initial conventional force ratios were strongly in favour of the enemy and (B) that the enemy was determined to reinforce and continue the attack, indicated that small numbers of nuclear weapons, (10-20 on a corps front) were not decisive. The use of a larger number of nuclear weapons in these scenarios held up the enemy advance by a matter of days (the exact delay was calculated only on his military capability to bring up reinforcements), at the cost in some circumstances of high levels of civilian casualties and collateral damage. Both the NORTHAG and CENTAG Studies indicated that the use by or on behalf of a corps of between 50 and 120 weapons targetted both in the battlefield area and in depth could virtually destroy the enemy's leading echelons on that corps front. This denied the enemy the capability to advance for an estimated 2 or 3 days, but he retained possession of some NATO territory.

21. Where the enemy responded in kind, NATO succeeded in obtaining the same delay but subsequently found itself at a considerable disadvantage in face of the superior reserve and reinforcement strength of the Warsaw Pact. For example in the NORTHAG Study, a nuclear exchange made both sides temporarily unable to take offensive action with either ground or air forces but the Warsaw Pact, which had reinforcements, could ultimately resume its attack. In the scenario analysed the NATO corps commander in the region was assumed not to have adequate reinforcements available and thus was unable to conduct an effective defence.

22. In certain suitable scenarios where the choice of lines of advance was limited, the enemy build-up of forces was delayed by a few Atomic Demolition Munitions (ADMs); since suitable sites tended to be near NATO frontiers, timely authorisation and emplacement were considered to be crucial.

An Amphibious Assault

23. In the Denmark Study, a Warsaw Pact amphibious assault was defeated with the timely use of very few weapons and with no civilian casualties. The assumed presence of sufficient defending conventional forces required the enemy to concentrate during transit through defended waters. Further, the assault force was assumed to lack reserves from which to replace amphibious warfare vessels. This was a special case, since only in the Denmark Study was the Warsaw Pact unable to bring reserves to bear, and for the effect described nuclear weapons had to be used even before Warsaw Pact forces landed on NATO territory.

Maritime Operations

24. In those scenarios where NATO maritime forces engaged enemy surface forces, aircraft, submarines and missiles, the increase in defensive capability provided by nuclear weapons could be decisive on a local short term basis. Where Warsaw Pact forces could return to the attack, it is unclear whether in the face of assumed Warsaw Pact conventional superiority and use of megaton weapons the use of nuclear weapons would be to the overall military advantage of a NATO naval force. The ACLANT Study indicated that a naval task force, in this case NATO's, even in dispersed formation, could be severely damaged by a Warsaw Pact strike with a megaton warhead.

Conclusions from the Phase I Studies

25. The outcome in military terms of the Phase I Studies is critically dependent inter alia upon the assumptions, i.e. Warsaw Pact had a conventional superiority, was able to return to the engagement, and was prepared to respond with nuclear weapons of his own. Thus, given the assumptions of the Phase I Studies:

- a. NATO use, if timely and appropriate, could in certain specialised circumstances, for example against amphibious operations and in certain maritime situations, achieve a locally decisive result which may be beyond the capability of the available conventional forces alone.
- b. In other circumstances, NATO use of 50 to 150 weapons on a Corps front could delay the enemy advance by destroying his leading formations. However, he could continue to hold NATO territory and could resume his attack by accepting the risk of committing reinforcements.
- c. An enemy response in kind could inflict on NATO forces casualties of the same order as those inflicted on the enemy. Thus given a situation in which the enemy had an initial numerical superiority the numerical balance would clearly shift further in his favour.

26. The Phase I Studies do not provide sufficient certain evidence as to whether follow-on use could achieve NATO's overall political objective of restoring deterrence. In particular where follow-on use did not, because of enemy response, offset numerical inferiority in conventional forces it may be argued that the enemy's resolution might not be strong enough to enable him to make the decision to move his reserves and resume the offensive even though he retained the operational capability. Moreover, the results of the Studies take no account of the possibility of an enemy response to follow-on use outside the vicinity of the battle situation or region under study.

27. In sum, given the force ratios and capabilities that the Studies assumed, follow-on tactical use of nuclear weapons by NATO followed by Warsaw

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Pact nuclear response of equal or greater effectiveness could not compensate for conventional weakness and would alter the numerical balance of forces in favour of the Warsaw Pact. On the other hand, it could delay the enemy's advance and hence create conditions which might facilitate political negotiations.

B. Major Factors Influencing Consideration of Follow-on Use

28. Execution of the follow-on use option in specific circumstances depends on effective weapons, permission to use them, and the operational concepts and doctrines governing their employment. The Study Team identified the following principal factors from the Studies as having general applicability to the execution of follow-on use of nuclear weapons:

- a. Weaponry: the types of nuclear weapons and delivery systems available to NATO.
- b. Collateral Damage.
- c. Role of Conventional Forces.
- d. Timing of Use by NATO.
- e. Scale of Use by NATO.
- f. Enemy Response.

29. Taken together, these and other factors constitute a criterion of military effectiveness, which can be defined as the capability of a weapon or force to produce efficiently a result which contributes to the accomplishment of the force's mission or goal. Military effectiveness in this sense is dependent on factors which can relatively easily be determined - for example, how big a force or how many nuclear weapons would assuredly achieve a specific military effect such as neutralizing or destroying a major portion of an enemy force. However, the consequences of military action have to be considered in relation not just to specific military goals but above all to the ultimate political objective of persuading the enemy to cease his aggression and withdraw. Thus, the weight which is to be attached to each of the above factors will depend considerably not only on the military but also on the political requirements for the follow-on use and particularly on the need for political control.

Weaponry

30. To maintain the credibility of the strategy of flexible response, NATO must be seen by the enemy to possess the capability to execute a wide range of options. There must be a sufficient number of different types of weapons and delivery systems with the yields and ranges suited to the selected targets.

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31. Most of the Studies assumed this criterion was met. However, in cases where the appropriate yield weapons were not available, the Studies used offset target techniques to reduce collateral damage or assumed relatively higher collateral damage occurred.

32. Accurate target identification, acquisition and tracking systems are important for the employment of nuclear and conventional weapons. The Studies indicated that current means provide some capability, but that the degree of military effectiveness could be increased by improvements in these systems.

33. Other important elements include requirements for survivable nuclear weapons systems and for sophisticated command, control and communications systems to respond to political and military needs. These are necessary to retain a sufficient range of options for political and military effect, particularly when timing of use may be critical.

Collateral Damage

34. Collateral damage consists of undesired physical effects which may accompany the use of nuclear weapons: e.g., residual radiation, destruction of non-military infrastructure, and civilian casualties. In view of the central role, in deterrence and in escalation, of the will on either side to continue the conflict and pursue it at more intense levels, civilian casualties are a significant index of the level of collateral damage, and the one concentrated upon by the Studies. Other indices, such as loss of manufacturing capacity, housing, or communications facilities should also be taken into account. The civilian casualties index must be treated as providing an order of magnitude rather than precise figures. This is due to the hypothetical and illustrative nature of the Studies and their assumptions. Some Studies such as those of the Central Region, devote more attention to the problem than do others, notably the Maritime Studies, which indicate that collateral effects at sea may be small in certain circumstances.

35. As indicated in the discussion of weaponry, NATO can take various steps to minimize collateral damage. Much, however, depends on the manner of Warsaw Pact use. The indications are that the Warsaw Pact may be less capable of discrete targeting and that, in general, average weapon yields are estimated to be higher than those of NATO. In particular, NATO or Warsaw Pact counter-air strikes with the nuclear weapons assumed available in the Studies could be expected to inflict heavy casualties among civil populations.

36. A number of other factors influence the level of collateral damage: population density in the area concerned; warning time available; movement of the civil population either by evacuation or spontaneous flight; the timing of release and the depth of Warsaw Pact penetration into NATO territory. The forward defence strategy offers the option of intensifying the battlefield use of nuclear weapons without limiting collateral damage to NATO alone.

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37. It is not possible to forecast accurately what level of collateral damage each side might accept in the event of nuclear war. Even though conventional war, particularly if protracted, can exact a very heavy toll of civilian casualties, casualty levels brought about by use of nuclear weapons may cause a special psychological effect because of the possible magnitudes involved over a very short time. Thus, collateral damage is clearly an important factor to be taken into account in considering follow-on use.

Conventional Forces

38. Conventional forces would continue to have a significant role in complementing nuclear weapons in the conduct of NATO's defence including continued conventional defence, ground surveillance, target acquisition and damage assessment in support of nuclear operations. They would have particular value in specific localized situations in which they could force the enemy to concentrate. However, the Studies suggest that both NATO and Warsaw Pact conventional forces may after nuclear attack be unable to accomplish certain objectives including defence along the FEBA; compelling forces to concentrate in situations where they would be vulnerable to nuclear strikes; and exploiting the effects of nuclear weapons by initiating offensive action.

39. As paragraph 31 of the Provisional Political Guidelines pointed out with respect to initial use, NATO should not delay follow-on use of nuclear weapons to a point when the ability of its conventional forces to perform their role had been exhausted. It is clear that, assuming response in kind, follow-on use cannot ultimately compensate for conventional weakness, but may temporarily halt the enemy's advance in the sectors of employment without significantly altering the overall battlefield balance of forces. In these circumstances the availability of reinforcements could be decisive.

Timing of Use by NATO

40. Although it is evident that the timing of follow-on use by NATO is determined in part by the nature and scale of the preceding initial use, there could be a wide variation in how quickly NATO would need to undertake follow-on use. Much would depend upon the military position, and especially the enemy's response to NATO initial use, or the nature of his first use: if the enemy continued to advance NATO could not afford to wait long before making a positive response which could include follow-on use. In planning initial use, the possible requirement for follow-on use must also be considered. Final decisions would have to consider the prevailing political circumstances; the Studies offer no guidance in this respect although they provide some indication of the specific military constraints on timing in particular situations.

41. In general, decisions on timing must be neither too late to save a situation, nor so precipitate that the enemy overestimates the extent of the

escalation and responds accordingly. In specific situations, maximum military effect may depend on timing follow-on use as precisely as possible since targets may arise only fleetingly. This is particularly the case in maritime situations, which may give rise to the need for special command and control procedures to ensure that critical time constraints can be met. (However, SACLANT has pointed out that the current procedures allow an MNC to make a timely release if the conditions for that release are properly stated and if excessively stringent constraints are not imposed on the commanders concerned.) Other circumstances may not make the same demands, and there could be a wide variation in the length of time available between the request for nuclear release and the moment when the strikes have to be executed. The military need is for flexible release authority, appropriate deployments of nuclear weapons, and procedures and communications adequate to support the decision-making process in all foreseeable circumstances so as to maintain the range of available options.

42. To use nuclear weapons is to cross an absolute threshold and introduce into the conflict a profound qualitative change which is accompanied by profound risks to both sides. All instances of use after initial use and prior to general release are subsumed under the same category of follow-on use because they are in this respect less distinct from each other than from initial use and because most of the same considerations apply to all. One consideration which affects them to some extent individually concerns the continuity of follow-on use: one possibility is the deliberate introduction of delays between successive nuclear operations which give occasion for political reappraisal and reaction by the enemy, but which are from the military point of view artificial. However, the CENTAG and NORTHAG Studies concluded that, in a fast-moving land battle, deliberate delays would be militarily disadvantageous to NATO, nullifying the benefits of use for no apparent gain, by giving the enemy a respite for recovery, reinforcement and the further preparation of retaliation. This conclusion would not, of course, rule out delays in the follow-on use phase in response to overriding political considerations, but these would clearly have to be given very considerable weight if the case for such a delay were to be established.

43. It is necessary also to consider the contribution early follow-on use could make to military effectiveness and deterrence. This subject has already been treated in a separate NPG Study 1/. The main advantages of early use are that the enemy will often be most vulnerable in the early stages of an attack; the longer the conflict continues, unless early use is approved, the greater the collateral damage on NATO territory; and prima facie NATO conventional forces would be better placed to exploit any opportunities created by early use. On the other hand, the Studies indicate that, on the assumption that the Warsaw Pact will have adequate undamaged reserve formations, early use would not alter the assumed conventional imbalance although the enemy might be persuaded to cease his attack and withdraw in order to avoid the risk of further losses.

1/ See NPG/D(73)12 of 9 October 1973.

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44. Although follow-on use must be undertaken before it is too late for its purpose to be achieved, the criterion for deciding when the time for follow-on use has arrived will differ according to the way in which that purpose combines military and political objectives. On military grounds, it is important to preserve the option of early follow-on use in support of forward defence. If the enemy continues to advance, both sides will not only suffer greater attrition, but there will also be more severe collateral damage on NATO soil and NATO may well have to exercise heavier follow-on use to achieve the same military effect. If follow-on use is regarded as predominantly political, with relatively little weight attached to the achievement of specific military effects, timing must be geared to the reaffirmation of NATO's political will. Ultimately, however, military and political objectives are inseparable.

Scale of Use by NATO

45. There are two ways in which NATO could vary its scale of follow-on use: either alter the number and/or yields of the warheads involved; or, change the geographical extent of the use, for example, from immediate battlefield targets to strikes against interdiction, counter-air, and other targets deep in Warsaw Pact territory. The scale of use may range from a strike with a few low-yield weapons in a limited geographical area to a strike which may border on general release, with a large number of high-yield weapons against targets in an extended geographical area. The scale of follow-on use envisaged in the Phase I Studies tended to cover only the middle range of combinations although there were examples both including and excluding use in an extended geographical area. The presumption was that where initial use was by NATO, follow-on use would be on a greater scale than before, and that this might well require some extended use because of the military significance of the targets, or because of the political signal inherent in use on Warsaw Pact territory. Equally, where first use was by the Warsaw Pact, use in an extended geographical area would be by no means necessarily inconsistent with direct defence or response in kind. In either case, the scale of follow-on use, like timing, depends for its point of departure on the scale of initial use.

46. In terms of military effectiveness the Studies indicated that about 10-20 weapons may have a locally decisive effect in special circumstances, but that a large land battle on the central front might need something of the order of 100 weapons to achieve significant effect. Concerning the yields involved, the Studies assumed only present capabilities were used. It must be recognized, however, that some of the higher intensities of use might not be technically feasible for example because of targeting constraints, which in some cases higher yields were used than would be theoretically necessary to achieve the desired probability of destruction.

47. Use in an extended geographical area may be undertaken alone or with other follow-on use options, and might be an innovation in follow-on use or an intensification of an initial use option. Such use may offer the prospect of a

significant political and military advantage in terms of the conflict seen as a whole. It must be noted, however, that the Studies indicated that if the WP did respond with strikes against NATO targets beyond the battlefield area, then NATO would find itself confronted with a situation in which the balance would favour the enemy given his assumed conventional predominance. As indicated above, NATO could avoid further collateral damage on its own territory by use in an extended geographical area, but this would hold true only if the Warsaw Pact did not reply with similar strikes.

48. In identifying response in kind as the assumed Warsaw Pact response to use in an extended geographical area, the Studies selected only one possibility for illustrative purposes, and did not analyse the political and psychological factors which underly enemy response. Assessment of these factors, however, would be crucial in NATO consideration of follow-on use in an extended geographical area, and in assessment of the right scale of such use. The political objective would be to increase the enemy's perceived risk to such a level that he made the political decision to cease his attack and withdraw. Extended geographical use by either side is accompanied by risk of escalation. If this were on a scale commensurate with the scale of the NATO use, the Alliance might be forced seriously to consider still further escalation to attain the political objective. In doing so, NATO would have to face the dilemma that use against targets in Soviet territory carries the greatest risk of escalation, and yet might be the most effective way to dissuade further Soviet aggression. Use in an extended geographical area because of its strong escalatory risk has a high deterrent value, but to be credible it must clearly be seen to be supported by the threat to escalate to the strategic level if necessary.

49. With regard to intensity and geographical extent of tactical follow-on use, no general conclusions can be drawn as to the political acceptability of the scales of use contemplated in the Phase I Studies. The Studies did not speculate on the political effects of varying scales of use. From the political viewpoint, it should be borne in mind that individual situations should be assessed for their impact on the overall strategic situation. From the viewpoint of producing the desired military effects NATO should have at its disposal as wide a range of options in terms of scale of use as possible, together with the release procedures and communications facilities necessary to utilize them effectively.

Enemy Response

50. The Studies did not predict what attitudes political leaders would adopt or how they would react in the event of war between NATO and the Warsaw Pact. Any judgment about the nature and likelihood of enemy nuclear response must remain a speculation resting on assessments of political circumstances at the time of the assumed aggression, of the aims, interests, and objectives of the Warsaw Pact, of Soviet politico-military doctrine and capabilities, and of the extent to which NATO demonstrated its cohesion and determination. The range of responses which the enemy is capable of executing can be indicated. However,

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no reliable relative probability of adoption can be assigned to each. In order to assess fully the possible consequences of NATO follow-on use, in accordance with the guidance provided, the Studies considered one type of enemy response: "response in kind". Although all assumed responses are within the general capabilities of the Warsaw Pact, they may or may not reflect an actual Warsaw Pact capability which might be brought to bear in the specific situations.

51. "Response in kind" is an imprecise term. At one extreme it can be taken as suggesting only that the response is nuclear, with no implied limitations on weapon numbers and yields, or the types and locations of targets struck. At the other extreme, the phrase can be taken to imply that the enemy's use of nuclear weapons is precisely matched to NATO's in terms of assumed effectiveness, numbers, yields and the classes of target against which they are directed. Apart from three specific exceptions considered in the ACLANT, NORTHAG and Denmark Studies, the Studies in general steered a middle course between these extremes. Response in kind was taken to imply nuclear action directly related to the enemy's assumed military aim in each scenario, with strikes against military targets on the immediate scene of action, or in areas directly associated with it. The number of enemy strikes considered bore some relationship to the number of NATO strikes but the enemy was not assumed to equal that number where there were insufficient tactical targets, nor artificially to limit the number of his strikes where there was clear military advantage in making more. The yields of the weapons assumed used were selected from the range of yields which intelligence indicated were available to the Warsaw Pact, and taken to be determined primarily by military considerations and not be a possible enemy requirement to minimize collateral damage and casualties. The classes of target assumed struck by the enemy were much the same as but not in any artificial one-to-one correspondence to those attacked by NATO, so that the enemy retained a reasonable freedom of choice. There are two arguments for regarding a relatively restrained enemy response to NATO follow-on use as a realistic possibility.

52. The first argument is from military need. Given the force ratios which the Studies assumed, the enemy would have sufficient conventional forces to postpone escalation, and would not need to reply on a scale any greater than NATO's in order to restore the numerical military balance in his favour. Although the original battlefield force ratios in the Warsaw Pact's favour could generally be restored by fewer Warsaw Pact strikes against NATO forces, the military effect of NATO strikes could not be completely erased by Warsaw Pact reply, which could not undo the delay already occasioned by the need to bring forward reserves to replace front line forces.

53. The second argument is from the interpretation of the political implications of Soviet military doctrine. Current NATO agreed intelligence ^{1/} emphasises that the Warsaw Pact regard nuclear weapons as a normal part of their armoury, which they could use in a pre-emptive role, and that NATO use of nuclear

^{1/} MC 161/74.

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weapons would carry great risk that the Soviet Union, which apparently does not subscribe to a strategy of graduated response, might escalate abruptly in scale, nature of target, area or any combination of these. The possibility should not, however, be discounted that this is what the Warsaw Pact wishes NATO to believe. In any case, the Soviet Union has never publicly stated whether in a military conflict with NATO it would escalate immediately. NATO agreed intelligence suggests that, if NATO used nuclear weapons, the Soviets would at least initially limit their response to the theatre concerned and that in any conflict in which Warsaw Pact forces become involved they would, while taking all necessary measures to prepare for escalation, probably seek vigorously to limit the conflict and to end it through political means.

54. It is conceivable that the military engagement could include a period during which each side would try to strike a balance between demonstrating resolve and avoiding strategic nuclear exchange. Faced with controlled tactical use by NATO, and reluctant to cease the conflict or see it escalate to the strategic level, the Warsaw Pact could well respond "in kind" as assumed in the Phase I Studies; both sides seeking to obtain political or military advantages in preparation for subsequent attempts to seek a political resolution of the conflict but acting with a degree of caution and restraint in view of the risk of escalation. In practice the Warsaw Pact leaders might observe something akin to a doctrine of graduated response, avoiding unnecessarily violent or widespread strikes against unduly sensitive targets. This is a question that has been given particular attention in the NPG Study on Warsaw Pact Politico/Military Strategy and Military Doctrine for the Tactical Use of Nuclear Weapons. 1/

IV. Wider Political and Military Aspects of Follow-on Use

Limitations of the Studies

55. In developing any discussion of the wider political and military aspects of follow-on use it is necessary to draw general conclusions from the Studies. If this is to be done correctly, it is essential first to examine the Studies for limitations in their scope, assumptions, or methods of analysis that may affect the degree to which generalisation may be carried.

56. As has already been pointed out, the Studies dealt primarily with the military aspects and, of necessity, assumed an opening scenario which put NATO in a critical military situation. Apart from this, four major questions need to be examined:

- a. what significant and realistic opening situations did the Studies not examine?
- b. how were unquantifiable factors treated in the analysis?

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- c. did the Studies cover a sufficient spread of military activity?
- d. were there any detailed assumptions concerning weapons, equipment, and tactics on either side that may affect the general results?

57. On the first question, it must be noted that the guidance given for the Studies asked that NATO's follow-on use be considered in three situations:

- (1) after NATO initial use without Warsaw Pact nuclear response;
- (2) after NATO initial use with Warsaw Pact nuclear response; and
- (3) after Warsaw Pact initial use.

The Studies concentrated on the first of these three situations, and can also be regarded as having covered the second and third situations for those cases in which the Warsaw Pact nuclear response to NATO's initial use, or Warsaw Pact initial use, was restrained to the extent that it had no significant military effect, at least in the region concerned. But the studies did not consider in any comprehensive degree the situation that could arise, in cases (2) and (3) above, if Warsaw Pact response, or Warsaw Pact initial use, was on a scale sufficiently intense to cause significant military damage to NATO. The Study Team, however, takes the view that this is not a serious limitation in the scenarios of the Studies since it did not preclude the Studies from accomplishing their purpose of examining military consequences of tactical use in specific situations. If NATO's follow-on use could, in general, achieve no decisive military advantage in cases where the Warsaw Pact had not previously used nuclear weapons, or had used them in numbers that brought no significant military effect, NATO could hardly fare better in similar cases under (2) and (3) where the Warsaw Pact had used them to cause significant damage to NATO forces. However, either of these opening situations would undoubtedly affect the timing and scale of use by NATO if NATO is convincingly to convey its resolve by follow-on use in a situation in which the Warsaw Pact had taken an initiative in the use of nuclear weapons.

58. The second question concerns the treatment of unquantifiable factors. There are some factors in the Studies which defy quantification either because they are impossible, at least at present, to measure with any precision or because, even though they may be measurable, they cannot be predicted in advance. In the first class are factors such as the effects of nuclear strikes on morale, leadership, and command and control; in the second class is enemy response. In dealing with morale, leadership, and command and control, the Studies assumed that, on both sides, morale was maintained, military leaders continued to assess correctly the information available to them and to make sound decisions, and communications remained adequate for the exercise of command. In dealing with enemy response, the Studies in general assumed - as required by their guidance - a response in kind, and some of them analysed a range of variations around this

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central assumption. Since these various factors are, for different reasons, impossible to quantify, it is difficult to see what other approach could have been used. It would certainly be unwise, both in planning and in the development of policy, to assume that unquantifiable or unpredictable factors would combine consistently to NATO's advantage or disadvantage and thus produce a result, within the scenario assumptions, materially more favourable or unfavourable to NATO than the Studies suggest. This is not to deny that in any real battle the action might develop differently from that shown in the Studies; but it should be noted that what is sought here is a reasonable generalisation. The Study Team believes that the procedure adopted in the Studies does provide the basis for such a generalisation.

59. There are two aspects to the third question, of whether the Studies covered a sufficiently wide spread of military activity. First, whether the concentration in the Land-Air Studies on a single NATO corps distorted the picture in any way; second whether, even within this limited framework, all potentially rewarding actions by NATO were considered.

60. In the two Central Region Studies in particular, concentration on the corps battle was an artificiality which proved troublesome and, in fact, both NORTHAG and CENTAG Studies justifiably exceeded their terms of reference when they considered counter-air nuclear strikes. It must be accepted, however, that since the Studies did not consider the fortunes of adjacent NATO corps there is no foundation for any generalisation about the situation on any other part of the front. Indeed, it may reasonably be argued that even with forces immediately available to NATO and the WP - and even more, after a period of reinforcement by NATO - the balance of WP conventional force advantage postulated in the Central Region scenarios could not be built up across the front as a whole. As for whether the analysis considered military action wide enough in scope, or continued long enough in time, most of the Studies considered NATO strikes against a wide range of targets, such as battlefield units, immediate reserve forces, transport bottlenecks and enemy airfields (but excluding targets which might be struck for political impact - the Studies were concerned only with the military situation). On the whole, however, the Studies tended to focus their analysis on what might be called the first round of nuclear action by NATO and to examine briefly a response by the Warsaw Pact. The Studies did not go on to consider how the military action might further develop if nuclear strikes were continued, with the objective, on both sides, of preventing or disrupting the forward movement of reinforcement forces from their home bases. In principle, therefore, it could be argued that the Studies are not complete, and that no general conclusions about the final outcome of the postulated battles can be drawn until they have been extended to cover subsequent stages of the battle. On the other hand, the Study Team believes that, particularly in the CENTAG and NORTHAG Studies (in which nuclear actions amounting to an exchange of some hundreds of weapons were analysed), the study teams carried their Studies as far as was reasonable, considering the calculated levels of collateral damage shown as a consequence of the assumed nuclear activity.

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61. Finally, there is the fourth question, whether detailed assumptions concerning weapons, equipment and tactics on either side might affect the results of the Studies. The Studies were all based, as their terms of reference required, on existing NATO orders of battle, and on NATO agreed intelligence about Warsaw Pact forces, arms and equipment. On the NATO side, the weapons and delivery systems assumed in the Studies are correct; in some of the Studies however - such as NORTHAG, CENTAG, Denmark and North Norway - NATO's ability to lay on the strikes analysed may have been rather easily assumed. It was pointed out in the NORTHAG Study, for instance, that the options for counter-air strikes at the time assumed might not have been open to 2ATAF had the Warsaw Pact air forces concentrated on counter-air operations in the opening phase of conventional battle. Similarly, in the Denmark Study, the highly effective strikes made against the Warsaw Pact amphibious force during its transit of the Baltic were based on an assumption that the necessary aircraft could be made available from outside the area of action, and would be successful in locating their targets and delivering the strikes. Whether the introduction into NATO nuclear armouries of new weapon systems might increase the military effectiveness of NATO's nuclear actions was not discussed in the Studies -- indeed was specifically excluded by their terms of reference -- and must await further analysis.

62. On the Warsaw Pact side, the key assumptions that largely control the outcome of the actions analysed were that the Warsaw Pact forces could adequately locate and strike their targets and that the warheads were on hand to be used with the delivery systems which Warsaw Pact forces are known to have. These two assumptions cannot be proved to be correct. The Study Team believes, however, that they are proper assumptions because given significantly reduced capabilities in these areas the Soviet leaders would not countenance any attack on NATO.

63. In short, the Study Team accepts that the Studies have their limitations and that due care must be exercised in generalising from them. However, one important generalisation that appears well-founded, despite the limitations, is that NATO follow-on use could in most situations succeed only in delaying the enemy and not in preventing his renewed advance should he have the resolve to respond in kind and the capability to follow up his attack, assuming that NATO does not have additional major conventional reserve forces.

Military Effectiveness and Political Control

64. The basic criterion of military effectiveness in a narrow sense has been defined above as the capability of a weapon or force to produce efficiently a result which contributes to the accomplishment of the force's mission or goal. Military effectiveness depends on having resources which in any conflict could produce a clear military advantage on the battlefield. It can be enhanced by utilising to NATO's advantage many of the factors discussed in Section III - weaponry, ways of minimising collateral damage, coordination with conventional forces, appropriate timing and scale of use. In particular, in order to achieve the military effects demonstrated in the Studies, release procedures (as indi-

cated in paragraph 41 above) need to be timely, expeditious, and sufficiently flexible to cope with swiftly changing tactical situations. Commanders should be able to respond to local developments, and should not find themselves still awaiting reply when the requested release has ceased to be appropriate.

65. Maximising military effect may not from the overall view be the paramount concern in follow-on use. All possible courses of action open to NATO would have to be assessed in terms of the overall political objective, to determine whether the most militarily effective step might contribute to its attainment. Political authorities will wish to consider in particular whether recommendations on timing and scale of use require adjustment to take account of the overall military and political situation, and perhaps to consider the case for using nuclear weapons in an extended geographical area. Above all, they will wish to weigh the political as well as the military estimates of the likely enemy response since consideration of enemy response is crucial to a decision whether, and in what manner, to initiate follow-on use.

66. In considering follow-on use as a whole, political authorities will be particularly concerned with the nature of the political signal which they intend to make. Political signalling is the subject of a separate NPG Study on "Communicating NATO's Intentions" ^{1/}, but it is worth reiterating (on the basis of paragraph 38 of the Provisional Political Guidelines) that there must exist a means of convincing the enemy of NATO's readiness to defend itself and to escalate if need be, while minimising the risks of the enemy's misinterpreting the nature of NATO's tactical use. In the case of follow-on use, NATO will need a more emphatic signal since previous attempts have failed to produce the desired result. Some degree of escalation should therefore be considered.

Relationship of Follow-on Use to Initial Use

67. Which follow-on measures could constitute escalation over initial use, and by how much, would be a function of the measures and scale of initial use. These however cannot (as paragraph 58 of the Provisional Political Guidelines notes for initial battlefield use) be determined in advance at either stage: conceivably, initial use in one set of circumstances could be on a larger scale than follow-on use in another. Moreover although the Studies assumed (when they made any specific assumption) that the scale of initial use was small, paragraph 66 of the Guidelines allows for a wide range in the intensity of initial use.

68. Paragraph 66 of the Guidelines also lists the military options which should be available for tactical use of nuclear weapons at the initial stage: demonstrative use; use of ADMs; use in the air defence role including airborne and seaborne systems; maritime use; battlefield use including close air support; and use in an extended geographical area. Paragraph 91 of the Guidelines points

1/ NPG/D(73)7 of 21 May 1973

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out that the same options would exist at the follow-on stage; after initial use and in making another attempt to achieve its overall objective NATO would have to turn either to a more intensified use of the option(s) originally chosen or to one or more other options, or both. In follow-on as in initial use NATO would need to take an action which would produce sufficient impact to achieve the political objective, while taking full account of the risks of enemy miscalculation.

69. One important distinction between initial and follow-on use is that the first crosses the nuclear threshold. A second distinction is that the selection of an option for follow-on use would be influenced by the results of the initial use which may have clarified in two aspects the situation confronting NATO:

a. Enemy intentions, the kind of follow-on use required to deal with them, and the likely enemy response to follow-on use, may be indicated by his response to NATO initial use. In particular, there could be evidence which might support possible nuclear responses previously discussed.

b. The balance of military and political advantage may also have been partly demonstrated, for example in terms of how far NATO conventional forces, supported by initial use, could resist major conventional attack, or how much damage enemy nuclear response to NATO initial use could inflict on NATO's defensive capability.

70. Follow-on use would call for a more emphatic signal than initial use. This might be achieved in a number of ways: use of equal or greater numbers and yields, against a different or a greater range of targets, or over a wider area - not excluding use in an extended geographical area. The latter option might be particularly high in escalatory potential, but could also be necessary to convince the enemy of the gravity of the risks involved by bringing home to him that his territory was not sacrosanct.

V. Summary and Conclusions

Study Team's Initial Approach and Conclusions from the Phase I Studies
(Sections II - III)

71. This report examines the contribution which follow-on tactical use of nuclear weapons by NATO can make to NATO's deterrent strategy as laid down in MC 14/3. In Section II the Study Team drew particular attention to the importance of NATO's possessing a wide range of options to enable it to deter aggression, or in the event of an attack to dissuade the enemy at the earliest opportunity. It also set out the primary assumptions of the work programme that deterrence had failed and aggression occurred, and that initial use of nuclear weapons by NATO had not succeeded in re-establishing deterrence. From the Pro-

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visional Political Guidelines the Study Team inferred that follow-on use differed from initial use not so much in the set of military options available for use as in the selection to be made from those options, if NATO's further recourse to tactical use was to be more effective than the first in achieving the overall political objective of making the enemy cease his attack and withdraw. The Study Team turned to the results of the Phase I Studies to examine this inference and in particular to determine what consequences the achievement of specific military effects would have for the pursuit of this objective.

72. The Study Team found that the Phase I Studies require careful interpretation because of the limitations inherent in the assumptions which they made for analytical purposes and because of the illustrative and somewhat artificial nature of their region-by-region scenarios. Notwithstanding the limitations in the Studies, they generally reinforce the belief that the tactical use of nuclear weapons in sufficient numbers could be militarily useful in delaying the progress of an attack. They also yield the clear conclusion that, where the use of insufficient conventional forces and initial use of nuclear weapons did not achieve NATO's ultimate political objective, follow-on use on a larger scale might so reinforce the political signal as to achieve the overall objective. NATO could not however avoid the risk that the enemy might continue his attack, either by resuming his advance with reinforcements or by nuclear response at the same or a higher level. In the latter case NATO would suffer damage and casualties at least as serious as those it had meted out, and because of assumed conventional force imbalance could find itself ultimately worse off in that the balance of conventional military advantage would shift further in favour of the enemy. Although the use of nuclear weapons cannot, in military terms, compensate for conventional weakness, the political effect of initial, and if necessary follow-on use, would be to utmost importance. Therefore adequate conventional, theater nuclear, and strategic forces are necessary to support agreed NATO strategy.

73. On more detailed examination of the major factors influencing consideration of the follow-on use, the Study Team reached these principal conclusions:

a. Weaponry: NATO must have the requisite nuclear weaponry, means of delivery and associated systems to provide a credible and survivable capability to undertake a wide range of follow-on options;

b. Collateral Damage: although no prediction can be made of what levels of civilian casualties and collateral damage might be tolerated on either side in a nuclear war, it is desirable to minimise them: as far as NATO is concerned, accurate targeting, use of low yield weapons, constraints on target selection, and use in less densely populated areas would be principal means of doing so;

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c. Conventional Forces: Conventional forces (including reserves and reinforcements) have important roles to play at every stage of a conflict, notably conventional defence, and exploitation operations in support of nuclear operations: they are complementary to nuclear weapons and cannot be replaced by them;

d. Timing of Use by NATO: Although it is clear that NATO must not undertake follow-on use too late in an increasingly adverse situation nor so precipitately that the enemy overreacted, the timing of follow-on use would depend on the outcome of initial use. Political authorities would be required at the time to determine how soon NATO would require follow-on use, and what balance would have to be struck between the possible advantages and disadvantages of early use;

e. Scale of Use by NATO: As a function of the number and/or yields of weapons used, and of the geographical extent of use, the scale of NATO follow-on use would take the scale of preceding initial use as its point of departure in determining how to reconcile the apparent battlefield requirements, the desirability of limiting casualties and collateral damage, and the paramount need to make a sufficiently clear signal to achieve the overall objective (perhaps by use in an extended geographical area);

f. Enemy Response: Although NATO agreed intelligence indicates that Soviet nuclear capabilities enable the Warsaw Pact to respond to NATO follow-on use on a lesser, equal or greater scale, it cannot be predicted how the Pact would respond or whether indeed they would respond with nuclear weapons at all. Nevertheless, an important conclusion to be drawn from the Studies is that a relatively restrained "response in kind", equal to NATO's in intensity and effectiveness, and using approximately the same numbers and yields as NATO, against much the same classes of target, could suffice, given the enemy's conventional superiority and reinforcement capability assumed in the Studies, to leave NATO relatively worse off than before it had undertaken follow-on use.

Wider Political and Military Aspects of Follow-on Use (Section IV)

74. In order to reach a coordinated judgment of all the considerations involved, political authorities will require the opportunity to determine whether what seem to be the most militarily effective steps in specific battlefield situations would conflict with the ultimate political objective. In particular they will wish to make their own political assessments of likely enemy responses and other individual factors.

75. Of particular importance at the follow-on stage would be the need for an unmistakable signal. Follow-on use would primarily need to provide an appropriately clear indication of NATO's resolve and determination to escalate further if necessary. This could require NATO to achieve clear military effects, to prevent ambiguity, and it might be necessary to escalate to some degree over the scale of initial use. Follow-on use could comprise an intensification in options already used, and/or recourse to different but hitherto unused options. In military terms it would differ from initial use in degree rather than in kind. The principal characteristic of the follow-on phase lies in the political need to make a further effort to persuade the enemy to cease his attack and withdraw.

The Place of Follow-on Use in NATO Strategy

76. Although a distinction can be drawn between follow-on and initial use, there is a considerable affinity between the stages in terms of the contribution which a capability for tactical use can make to deterrence. The same basic questions so far as deterrence is concerned apply at both stages: how can NATO achieve its overall political objective of making the enemy halt, cease his attack and withdraw?

77. To ensure the effectiveness of deterrence NATO must convince the enemy that, whatever the stage of the conflict, the Allies could and would proceed to further defensive measures however extreme these eventually might be. If the strategy of flexibility in response is to be a credible strategy, these measures must include the option of tactical use of nuclear weapons on the battlefield and/or deep in enemy territory. Whether by way of initial use or follow-on use the employment of nuclear weapons must provide a convincing expression of NATO's determination in a critical battlefield situation which available conventional power could not resolve alone. Deterrence requires it to be clear from the outset that NATO would prefer escalation to surrender; for example, the Allies would not concede the enemy sanctuary in his own territory, but would be prepared to include in their follow-on measures use in an extended geographical area. While of all the available measures for tactical use this would carry the greatest risk of escalation, it would have high deterrent value, provided it were supported by the threat to escalate to the strategic level if necessary, and might therefore be the most effective way to dissuade the Soviet Union.

78. In the event of the failure of deterrence should NATO's initial tactical use of nuclear weapons not succeed in re-establishing the deterrent, NATO would have to consider resorting to follow-on use. If such use broke the enemy's political will, NATO would have achieved its objective without recourse to general nuclear response. If on the other hand the enemy continued the conflict, NATO could still escalate further. Thus the tactical use option is an essential link between the conventional battle and the strategic use of nuclear forces and might provide the means of bringing the conflict to an end. In possessing this option, NATO could not be threatened with a form of attack to which it could not reply,

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or it could resort to the tactical use option as a direct defence -- i.e., the defeat of aggression on the level at which the enemy chooses to fight. Therefore the option for the tactical use of nuclear weapons is a cardinal component in NATO's whole strategy of deterrence and flexibility in response.

79. We therefore derive three fundamental conclusions:

a. Follow-on tactical use of nuclear weapons does not provide a viable alternative to an adequate Alliance conventional defence posture. In a situation where deterrence had failed and conventional defence faltered, the battlefield effectiveness of such use would be critically dependent upon enemy perception of NATO's defensive effort and his consequent reaction.

b. Follow-on use could however provide an invaluable opportunity to compel the enemy to reassess the risk of further escalation up to and including the strategic level and so cease his attack and withdraw. As in initial use, the primary requirement would be for an unambiguous and convincing signal, although in the follow-on phase the Alliance might need to provide more escalatory evidence of its resolution.

c. Above all, the known possession of such weapons and the evident ability to execute a wide range of options for their use plays a key role in ensuring that Alliance deterrence does not fail. Though a substitute for neither, it constitutes a necessary link between the Alliance's conventional capabilities and its strategic nuclear forces.

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GUIDELINES FOR THE FOLLOW-ON USE WORK PROGRAMME

1. In November 1969 the Nuclear Planning Group approved proposals put forward by the Permanent Representatives 1/ which defined the objectives, general assumptions and broad structure of the work programme on the follow-on tactical use of nuclear weapons. Detailed arrangements for the first phase of the programme were approved by the Permanent Representatives in February 1970 2/ and arrangements for the subsequent stages similarly approved in July 1973 3/. This Annex summarises the guidelines governing the overall programme, together with the procedural arrangements for the Phase I Studies.

2. In examining the various options for follow-on use, the work programme has as its objectives:

- a. To expand, as far as analysis permits, knowledge and appreciation of the military and non-military factors affecting follow-on use, which may have to be taken into account by national authorities in addressing and consulting on questions concerning the selective tactical use of nuclear weapons.
- b. Thereby to assist Ministers evaluate, and where necessary refine or elaborate guidance for NATO military authorities.
- c. To consider the role of NATO's nuclear postures in enhancing the deterrent.
- d. To help strengthen the capability within NATO countries for the analysis of complex nuclear problems.

3. The main general assumptions governing the work programme and defining the range of follow-on use situations are that:

- a. NATO operations are to proceed from approved strategy, including provisional guidelines for the tactical use of nuclear weapons;
- b. Only existing and planned NATO and Warsaw Pact forces, as reflected in force planning and agreed intelligence, are to be considered.

1/ NPG/D(69)9(Revised) of 24 November 1969

2/ NPG/D(70)1 of 24 February 1970

3/ NPG/D(71)7 of 27 July 1973

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c. NATO has been attacked by Warsaw Pact forces and initial use of nuclear weapons by either NATO or the Warsaw Pact has occurred; follow-on use might therefore occur after initial use;

- (1) By NATO without Warsaw Pact nuclear response;
- (2) By NATO with Warsaw Pact nuclear response;
- (3) By the Warsaw Pact.

d. The various situations and options adopted for the purposes of analysis should not be intended to indicate expected situations or courses of action that might be adopted in the event of an actual emergency.

e. Neither the process leading to the political decision to initiate use of nuclear weapons, nor demonstrative use solely for political purposes, should be investigated further; nor should general nuclear war be part of the work programme.

4. In the first instance the work programme consisted of a series of individual Studies (the Phase I Studies) which examined in detail the effect of the various follow-on use options on the tactical evolution of specific situations governed by these general assumptions. For these Studies the following general guidance was provided:

a. Within the major assumption about the nature of follow-on use (as set out at 3(c) above) supplementary assumptions should be made as necessary about the circumstances and presumed consequences of initial use.

b. The situations envisaged should be seen as part of larger Warsaw Pact aggression against the Region concerned; but analysis should focus on consequences of use for the selected battle area on NATO or on Warsaw Pact territory, including appropriate related naval or air actions in contiguous areas and attacks against military targets directly related to the battle but located outside its vicinity, in an extended geographical area.

c. In order to involve as many NPG members as possible the Phase I Studies should comprise a set of parallel examinations of limited battlefield situations in each of the principal regions of ACE and of maritime situations in the ACE and ACLANT areas, to be carried out by study teams containing military and political representatives of the countries involved, and representatives of the NATO military authorities.

d. Analysis of situations covering a whole region or the entire European theatre should be deferred to a subsequent phase of study, in which appreciation should be developed for factors which would be important to political authorities in considering their decisions in the escalation process of follow-on use.

5. The primary aim of the Phase I Studies was defined as the preparation of basic data which would form most of the factual background for subsequent phases, and afford insights into the military and non-military factors affecting follow-on use. In accordance with the above guidance, eight regional studies were undertaken and subsequently considered by Ministers at NPG Meetings between May 1971 and May 1973 1/. A summary of each Study is at Annex B.

1/ Phase I Studies

1A: NORTHAG	NPG/STUDY(71)3 of 14 Apr 71
1B: CENTAG	NPG/STUDY(71)6 of 1 Aug 71
2A: MACEDONIA AND W. THRACE	NPG/STUDY(71)2 of 30 Mar 71
2B: TURKISH THRACE AND N.W. TURKEY	NPG/STUDY(71)7 of 15 Jul 71
3A: NORTH NORWAY	NPG/STUDY(71)1 of 18 Jan 71
3B: DENMARK	NPG/STUDY 20 of 1 Aug 72
4A: MEDITERRANEAN MARITIME	NPG/STUDY 17 of 24 Feb 72
4B: ACLANT	NPG/STUDY 19 of 1 Dec 72

SUMMARY OF THE PHASE I STUDIES

Introduction. The summaries in this Annex follow a broadly similar pattern to facilitate comparison of the Studies. They are intended to give a brief but balanced resume of the major aspects of each study, including general inferences drawn in its final report by the Study Team concerned. Thus none of the points made in any of the following summaries has the status of observations or conclusions of the Phase II Study Team, whose views are contained in the text of the report.

I. STUDY 1A: NORTHERN ARMY GROUP (NORTHAG)/2 ALLIED TACTICAL AIR FORCE (ATAF) AREA

A. ASSUMPTIONS AND SCENARIO

1. The Study took the view that, to show the consequences for NATO of tactical use of nuclear weapons in a deepening conflict after initial use had occurred, it should emphasise purely military aspects of the situation, without however prejudicing the fundamentally political character of follow-on use, eg as a step in the escalatory process.
2. The Study assumed that initial use had been by NATO without Warsaw Pact (WP) nuclear response. Stage 1 of the Study further assumed that there was no WP nuclear response to NATO follow-on use; Stage 2 assumed that there was. In both stages, follow-on use was analysed in 3 separate steps, in each of which 2 options as to scale of use were considered.
3. No attempt was made to analyse in detail consequences of follow-on use not directly related to the course of the corps battle under study, or to consider the counter-air campaign outside 2 ATAF, although it would probably be waged over the whole Central Front. For purposes of analysis, NATO nuclear delivery systems were assumed fully available.
4. After a period of tension during which both sides built up their forces, WP attacked along the entire Allied Command Europe (ACE) front, including the corps front of a fictitious NATO VI Corps, which equated roughly to 1st British Corps in position and strength and faced 2 Tank Army, which had 5 Tank Army in reserve. NATO prevented an enemy break-through in the NATO VII Corps sector to the south only by making initial tactical use on 4 Weser bridgeheads, but had shortly afterwards to seek authorisation for further strikes in the VI Corps sector, to prevent the enemy, who had regrouped his forces and intensified pressure towards the North, from reaching the Weser in strength.

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5. The number of strikes envisaged ranged from 7 to 91, on the assumption that VI Corps might select: 36 rocket and gun-delivered low-yield weapons, in support of the counter-attack, for use against targets on the immediate battlefield; 13 interdiction strikes to cover 7 choke points critical to the bringing forward of WP reinforcements; and 42 interdiction strikes against 42 of the 87 principal WP airfields (the smallest worthwhile counter air programme).

B. RESULTS OF THE STUDY

6. Stage 1. The Study assessed that if the enemy did not respond with nuclear weapons his advance to a major geographical objective could be delayed for perhaps 2 or 3 days by the use of 91 weapons delivered against targets in the battle area and including airfields in the German Democratic Republic (GDR) and Western Poland, at the cost of some 300,000 civilian casualties in the battle area, 20% of whom would be on NATO territory. Even this would leave the enemy in possession of some NATO territory, while at the end of the counter-attack VI Corps would be attempting to guard about 80km of front on a corps sector some 60km wide with a force equivalent to about 1-2 divisions, against an effective WP Tank Army strength of 3 divisions with another Tank Army of 3 divisions available as reinforcement. If VI Corps used a small number of weapons, say up to 15 on the corps front, it would achieve only temporary respite and have little chance of a successful counter attack to regain lost ground.

7. Stage 2. If WP responded with nuclear weapons at approximately the same level as NATO use, NATO could still achieve a similar delay in the WP advance; but a response of some 65 strikes (23 on battlefield and 42 on counter-air targets) would deprive VI Corps of about 75% of its combat forces and reduce 2 ATAF to about 50 of its original 350 aircraft. Although both sides would for the time being be incapable of organised offensive action, WP air and ground forces alike would be in the better position, particularly with 5th Tank Army still in reserve. Civilian casualties would be around 1 million (75% on NATO territory), with an additional million on NATO territory if WP used ground-burst weapons in counter-air strikes.

8. According to the Study, given nuclear parity the tactical use of nuclear weapons could not of itself significantly compensate for conventional inferiority on the ground or in the air, and would at best be of limited military value.

9. The Study raised the question of how political control in the follow-on phase could be exercised in accordance with the military requirements of a tactical situation changing so swiftly that for example the vulnerability of NATO's nuclear delivery systems to conventional or nuclear attack would clearly limit the time available for nuclear decision. The Study also showed that delays between steps of follow-on use, however desirable politically, would decrease military effectiveness, and indicated that the impracticality of

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case by case release would make it necessary to examine procedures which would give maximum tactical flexibility without prejudicing adequate political control.

II. STUDY IB: CENTRAL ARMY GROUP (CENTAG) AREA

A. ASSUMPTIONS AND SCENARIO

1. The Study assumed that NATO had undertaken initial use but had not been able to induce the enemy to cease his attack and withdraw. Without resorting to nuclear response, the enemy continued to press his attack conventionally.

2. The Study compared follow-on tactical use in an early and a later use situation (Situations I and II). When WP had penetrated 30-50km into NATO territory, NATO military commanders, finding themselves unable to hold the line conventionally or by initial use, sought authority for follow-on use. In Situation I it was approved; in Situation II it was not, and conventional fighting continued until enemy forces had penetrated about 125km, when a further request for follow-on use was granted.

3. The Study explored follow-on use over a wide range of 35 land, air and land-air options in a single corps area across the Hessian Corridor/Fulda Gap approaches to Frankfurt, where a hypothetical X NATO Corps (one US-style armoured division and one German-style Panzer-Grenadier division with an armoured cavalry regiment in reserve) faced WP forces including 2 armoured and 1½ motorized rifle divisions with 6 armoured divisions in reserve. For the air battle 2 and 4 ATAFs were opposed to WP air forces in the GDR, Poland and Czechoslovakia. Success was gauged by the delay imposed upon the enemy, measured in terms of the time the enemy would require to reinforce his manoeuvre elements, to the extent that NATO had been able to destroy them.

4. Two separate concepts for use of nuclear weapons in the land battle were compared in each situation for their effects on collateral damage. Both Concepts adhered to SACEUR's constraints. Under Concept Alfa almost all nuclear targets acquired were attacked regardless of collateral damage, but under Concept Bravo discrete and restrictive targetting was adopted in a deliberate effort to limit attacks near populated areas, and to cause minimal collateral damage without sacrificing military effect.

5. In order to assess the implications of follow-on tactical use, including collateral damage caused by WP, 24 possible WP nuclear options in response were analysed. "Response in kind" with a similar number of weapons but generally larger yields was taken as a base case, but no assumption was made about WP attempts to limit collateral damage.

6. The Study dealt with follow-on use in a particular area of the Central Region and its geographical extension, and with a limited analysis of

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the air battle as it might affect that area; but the entire air picture could not be assessed because the air forces which could be brought to bear on a single corps area are widely dispersed. It was assumed that NATO had sufficient remaining forces in Situations I and II to exploit the effects of NATO strikes.

B. RESULTS OF THE STUDY

7. The Study showed that follow-on use could halt the enemy attack for from 2-48 hours with 30-137 weapons in the land battle options, or for up to 60 hours in larger land-air options.

8. In the land options follow-on strikes in Situation I halted WP advance for 6-12 hours by destroying the required percentage of enemy forces in the immediate strike area; and for up to 48 hours by strikes in greater strength and depth. Civilian casualties ranged under Concept Alfa from 4,000 to a maximum of 30,000. Under Concept Bravo they could be reduced to about 10% of the Alfa figure. Strikes under Concept Alfa within a range of 0-4km of the FEBA halted the enemy for 2-4 hours for about the same cost in civilian casualties as Bravo strikes in a 0-100km range, which halted the enemy for 24-48 hours.

9. In the air options NATO strikes significantly affected WP air capability only in the larger options: if 54 (of 155) WP bases were destroyed the enemy's overall tactical air offensive capability would be neutralised - at the cost of 274,000 casualties all on WP territory, and at the risk (which could not be quantified) of provoking escalation.

10. In the combined land-air options, the larger counter-air options in both Situations I and II significantly reduced enemy air support capability, increasing the time during which he had to halt from about 48 to about 60 hours. To achieve this in Situation II, however, more land battle strikes, all causing collateral damage in NATO territory and in more populated areas would be needed to offset attrition of NATO forces and to counter WP momentum.

11. Given the disparity in conventional force levels in this Corps area, the Study demonstrated that use of nuclear weapons would be essential to defend against major non-nuclear WP aggression; but that to do so with most military effectiveness and least collateral damage and civilian casualties on the NATO side, such use would need to be in the very early stages of the battle, in forward areas and in sufficient numbers. Atomic demolition munitions (ADMs) would help to delay the enemy advance with minimal collateral damage provided they were used with other nuclear weapons and conventional barriers, and in favourable terrain as far forward as possible.

12. The Study found enemy response hard to determine; but assuming WP response in kind at a roughly equivalent level, it concluded that in the land battle NATO corps forces could be left with only a marginal capability to delay

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the enemy without external reinforcement, although they could still execute an additional strike at least as great as the original follow-on use. In the air battle the destruction of NATO strike bases would require subsequent NATO strikes to be executed by other surviving forces. Such WP response would cause additional civilian casualties ranging from 103,000 (Situation I land battle) to 850,000 (Situation I counter-air destruction of 46 NATO air bases with weapons up to 1 megaton).

13. Comparison of Concepts Alfa and Bravo showed collateral damage and civilian casualties could be significantly decreased by using offset DGZ and lower yields than normal, without reducing assurance of destruction below SACEUR's 90% minimum. This decrease could be enhanced by greater delivery accuracy and a wider variety of yields.

14. Close communication with political authorities would be essential to get timely release, given the present difficulty of acquiring and maintaining targets (especially in rearward areas) in a fluid land battle.

15. The Study acknowledged that it was unable to analyse certain criteria of military effectiveness other than ability to halt the enemy and to minimise collateral damage, i.e., capacity to enforce enemy withdrawal; provision of time for negotiation with WP and preserving clear channels of communication with WP for this purpose; and ability to exploit strikes by conventional counter-attack.

III. STUDY 2A: MACEDONIA AND WESTERN THRACE

A. ASSUMPTIONS AND SCENARIO

1. The Study examined the implications of a range of possible contingencies and options for follow-on use in a limited battle area in Greece and Bulgaria. It assumed that WP attack on Greece and W. Turkey, in the context of larger aggression against the Southern Region, had necessitated NATO initial use of nuclear weapons.

2. In Situation I of the Study, initial use of ADMs had delayed the enemy advance for a few days, and in Situation II use of battlefield nuclear weapons had scarcely slowed his progress. In each case WP continued the attack with superior conventional forces, but without resort to nuclear weapons in response.

3. The Study considered C' Army Corps (4 Infantry Divisions) in its area of responsibility in Hellenic Macedonia and Thrace, supported by 6 ATAF and opposed by 7 Motor Divisions and 2 Tank Divisions of WP. Follow-on use was assumed to occur after the arrival of the external conventional air, but not the

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ground, reinforcements provided for in NATO plans. The Allied Command Europe Mobile Force (AMF) was unavailable and required elsewhere. It was assumed that both NATO and WP forces had sufficient numbers of nuclear warheads available in the follow-on phase, and that release would be authorized when appropriate.

4. The follow-on options ranged from strikes with ground delivery means only against combat units in the immediate battlefield and solely on NATO territory, to air and ground-delivered strikes against combat and combat support units, Headquarters, nuclear delivery capability and airfields in the immediate and deeper battlefield and in the extended battlefield zone (up to 70km from FEBA), in NATO and WP territory. An additional option consisted of strikes delivered by the external air reinforcements against enemy military targets (bridges and airfields) in an extended geographical area of Bulgaria, beyond but directly related to the immediate battle.

5. This Study assessed that, except after this additional option, WP could respond by continuing the offensive with conventional forces provided they had reinforcements. After all NATO options, WP would also have the options of nuclear response in kind or escalation for even after NATO follow-on use WP would have a superiority in air delivery means of 3:1, and in ground delivery means of about 2:1, as well as a large number of IR/MRBMs and SLBMs.

B. RESULTS OF THE STUDY

6. The Study showed that NATO follow-on use could compel the enemy to suspend operations and replace heavily damaged forces with new echelons, for a limited period of between 2 and 5 days, giving time for negotiations, and, at least in the case of enemy conventional response, for the arrival of NATO reinforcements.

7. Continued enemy conventional attack would probably force NATO into repeated follow-on use; but the stronger this was the likelier WP would be to undertake nuclear response in kind to counteract losses - which would, however, be comparatively less than those such a response would inflict on NATO. NATO could therefore find itself relatively worse off after nuclear exchange, which would also leave less time for negotiation or reinforcement.

8. The Study noted that the dilemma for NATO is most extreme in the case of follow-on use in an extended geographical area: although this option could if NATO maintained its efforts force the enemy to cease and withdraw, it is also most likely to provoke response in kind or escalation (which would have even more unfavourable effects for NATO).

9. The Study concluded that Situation I had the advantage over Situation II that ADMs would win more time, and would, as defensive weapons, be less provocative to the enemy, who might therefore prolong the solely conventional

phase of his operations. ADMs were also an economical use of nuclear weapons and caused less collateral damage.

10. Follow-on use could be effective in the area studied only through a form of "packaged" (but not preconditioned) release: there would not be time for selective release, if NATO's smaller nuclear forces were to save the battle by depriving the enemy of the capability to respond immediately. For the same reason, ADMs would need to be in Greece before hostilities broke out and reinforcements had to be sent in.

11. The Study showed that locally available air forces were insufficient for executing the option of strikes in an extended geographical area, and that it was doubtful in view of enemy air superiority whether they could have struck even the targets they were assumed to. Sufficient and timely external air reinforcements for the conventional and nuclear roles would be essential.

IV. STUDY 2B: TURKISH THRACE AND NW TURKEY

A. ASSUMPTIONS AND SCENARIO

1. The Study assumed that WP territorial claims on Turkey aggravated East-West tension and caused NATO to declare the necessary alert measures and to deploy AMF and certain US units to E. Thrace. WP nevertheless attacked in Thrace, Anatolia and the Black Sea, and NATO resorted to initial use to counter severe air losses and to slow enemy momentum. WP did not respond with nuclear weapons, but did continue the attack undeterred.

2. The Study considered an early follow-on land situation in Thrace (Situation I) and an enemy amphibious operation on both sides of the Bosphorus (Situation II). Two follow-on use options were considered in each case, to determine the best course of action in the light of two NATO objectives in follow-on use: rectifying the critical military situation; and deterring enemy advance by showing NATO determination and threatening escalation.

3. In Situation I, follow-on use was authorized to assist NATO First Army in maintaining a successful defence against numerically superior enemy forces who could not be halted by conventional means, through nuclear strikes which could either inflict a 10% casualty rate on the enemy, neutralizing him (Option I); or a 35% casualty rate, destroying him (Option II).

4. In Situation II the enemy had inflicted heavy surface and subsurface losses on NATO, begun to clear minefields and with superior air, naval and amphibious capability, launched an amphibious assault whose landing NATO could not stop by conventional means, even with timely reinforcements.

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5. Estimated WP conventional forces available against W. Turkey at the time of the study included: 10 infantry and tank divisions by D-Day backed by 6-10 divisions after 5 days; 2-3 amphibious brigades backed by 2-3 motorized infantry divisions; an airborne division; over 500 combat ships in the Black Sea; and over 1,000 aircraft of various types. In nuclear support WP had about 50 land-based launchers with a range of between 48 and 150 nautical miles, with as many in reserve; over 250 ship-based launchers with a range between 10-450 n.m.; and intercontinental range ballistic missiles (IRBMs) and medium range ballistic missiles (MRBMs), and nuclear capable heavy and medium bombers and tactical aircraft.

B. RESULTS OF THE STUDY

6. In Situation I, only Option II could rectify the critical military situation by halting enemy advance through sufficient HONEST JOHN and howitzer strikes. As a stronger earnest of NATO determination and being more destructive, Option II could also be more escalatory than Option I, although provocation could be kept to a minimum by not attempting widespread use beyond the battlefield, and by executing any attacks on enemy nuclear delivery capability by conventional means.

7. In Situation II the best moment for follow-on use (through air-delivered strikes) would be when the enemy amphibious force was deploying for landing, when both landing craft and enemy troops could be destroyed. The risk of escalation would be too great to justify strikes during assembly of the force in WP ports, while the risk of destruction to NATO from WP response in kind would require strikes during the transit of the force to be restricted. In addition, the enemy would offer a dispersed target during transit, and after landing, when the larger yields therefore required and the proximity of civilian populations and friendly forces would greatly increase collateral damage at NATO's expense, especially if the enemy responded in kind to NATO strikes. Finally, the lack of depth or strength in conventional defences confirms that the principle must be to prevent the enemy landing.

8. The Study argued that the risk of enemy response at about the same level or above would stem from damage caused by NATO strikes and by denial of the WP objective, and could be minimized by carefully restricting the scale and timing of follow-on use to the most advantageous points, provided also that the enemy was fully aware of NATO's readiness to escalate if need be. The need to resort to follow-on use could be delayed, and deterrence strengthened, by improvements in local conventional forces and by plans for timely deployment of reinforcements.

9. The effectiveness of follow-on use would depend upon accurate and timely reconnaissance, surveillance and target acquisition, and upon timely

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requests for and authorization of release of nuclear weapons. Moreover, NATO would be better able to deter attack, and under less pressure to resort to early follow-on use, if local conventional forces were strengthened and plans made for timely deployment of reinforcements.

V. STUDY 3A: NORTH NORWAY AREA

A. ASSUMPTIONS AND SCENARIO

1. This Study made the especially significant basic assumption that there had been no change in Norwegian policy not to permit peacetime stationing of nuclear weapons or foreign troops on Norwegian territory. Particular attention was therefore given to the circumstances in which the requisite consent could be given for the introduction of nuclear weapons and other support, and to the rigorous time-scale which would need to be followed.

2. The Study assumed that after a period of political tension, WP had attacked NATO elsewhere, and that NATO had undertaken defensive initial use, demonstratively and in the form of ADMs but not on WP territory. This attack constituted a general warning enabling Norwegian mobilization and the partial deployment of external forces; but the follow-on situation in N. Norway resulted from a separate WP attack for which tactical warning was extremely short.

3. WP was assumed not to have used nuclear weapons yet; but to be capable of doing so in response to NATO follow-on use.

4. The Study assumed that follow-on use would be most needed against a major land, sea and air attack to seize vital naval, air and early warning facilities in N. Norway. Such an attack could involve WP in violating Finnish but not Swedish neutrality, and although the full nature of WP intentions would be unclear, would imply WP preparedness to undertake an even larger attack on the whole of NATO since WP could not, even in disregard of NATO initial use, exclude the possibility of NATO follow-on use.

5. In N. Norway, in the absence of external forces, NATO would face an overall WP advantage in force ratios of between 3 and 4:1, rising to 6:1 in certain areas. These figures must, however, be modified to take account of equipment, mobility, terrain, season of the year, and other factors. NATO could be reinforced by AMF and by RM Commandos from SACLANT's earmarked forces, if these could be combat-ready in time.

6. Nuclear support could include aircraft from SACLANT and aircraft, ADMs and nuclear artillery from SACEUR, subject to availability. WP tactical nuclear capability in terms of tactical aircraft and nuclear artillery would be numerically superior, and more immediately available.

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B. RESULTS OF THE STUDY

7. The Study estimated that, allowing for conventional defence, but not delays through bad weather, WP land forces could reach Lyngenfjord in regimental strength 7 days after crossing the Norway-USSR Border, while other forces could cross Finland within hours and arrive in Norway in force inside 2 days. A balanced amphibious assault could be launched on D-Day against the Tromso area. Airborne operations would be possible on D-Day about regimental level; and on a larger scale a day or two later.

8. Subject to timely decisions and arrangements for use (and given the absence in N. Norway of advance political agreement or physical preparation) ADMs proved most valuable as an unprovocative, defensive indication of NATO determination, particularly in difficult, sparsely populated terrain; they could delay enemy advance 3-10 times longer than conventional means, and achieve the same results more accurately than air-delivered weapons, with lower yields and less collateral damage.

9. The Study showed that fleeting battlefield targets such as troop concentrations would call for strikes by artillery (if available). Air-delivered weapons could be used only after greater delay and would be best suited for use against the (relatively few) static targets such as beachheads, where amphibious forces could perhaps best be attacked (provided collateral damage could be limited); or, airfields. Counter-air and interdiction use might be necessary against enemy-held airfields and facilities on Norwegian territory; but use against base airfields in USSR would have to be justified both militarily and in terms of escalatory effect.

10. The Study could not determine whether follow-on use would be required, or could succeed. While successful conventional resistance would be conceivable against an adverse force ratio of 3:1, especially given better conventional capability and timely and adequate reinforcement, this ratio could not be guaranteed. If follow-on use was needed, it could enable defence to be sustained until reinforcements arrived, provided the enemy responded only by conventional means; but was less certain of success if WP responded with its greater nuclear capability in the area, and without regard to the risk of escalation.

11. Enemy response could not be predicted; but the Study observed that it might be provoked because NATO follow-on use gave time for NATO reinforcements to arrive, or took the form of strikes delivered by aircraft which were capable also of striking WP territory, rather than artillery strikes or ADMs.

12. Collateral damage would not be as severe a problem in the sparsely populated N. Norway area as elsewhere, although it must still be minimized especially in certain key areas near the coast, or adjacent to neutral territory.

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13. According to the Study, selective release procedures were too strict to be really effective for timely decision-making, particularly for use against rapidly moving forces, given the vulnerability of communications between political authorities and commanders seeking and delivering nuclear weapons. More suitable would be "packaged" (but not preconditioned) release giving approval for use of groups of weapons defined by type, mode, area of use, etc.

14. The Study confirmed that many initial use considerations still applied to follow-on use, especially insofar as this was a regional decision: there was no reason to suppose that initial use in one area would necessarily solve the problems of decision which might arise for follow-on use in another area. This applied to Norway in a particular sense that, in the light of existing Norwegian policy, follow-on use would be especially difficult without adequate preparations such as prenegotiated arrangements for the stockpiling and custody of nuclear weapons, as a contingency basis for crisis management. The Study, however, acknowledged that any such steps must - but could - accord with existing Norwegian policy and its underlying political considerations.

VI. STUDY 3B: DENMARK AREA

A. ASSUMPTIONS AND SCENARIO

1. The Study examined WP amphibious assault on Denmark aimed at securing the Baltic straits and gaining naval access to and from the Baltic, and occurring at the same time as a wider attack on NATO.

2. The Study sought to identify crucial phases in an amphibious assault, when timely use could be especially advantageous; to determine how quickly NATO could have to react, and what numbers, yields and collateral effects would be involved, in exploiting such phases; and to assess how the enemy would respond.

3. The Study took WP concept of operations to be to airdrop forces to secure inland points, for an assault force of 2-3 amphibious brigades followed up by a main force of divisional strength. NATO operations would include mine-laying, and attacks on the enemy force at certain critical phases: transit, deployment for landing, landing and consolidation.

4. Provided that transit was through defended waters and landings were against a defended coast, the amphibious force would be compelled, if NATO conventional forces were sufficient, so to concentrate that it would be extremely vulnerable to nuclear attack.

5. NATO nuclear weapons could be provided by strike aircraft from 2 or 4 ATAF, the UK, or the Strike Fleet, if available in time. The Danish Army possess cannon capable of delivering sub-kiloton weapons in sufficient numbers for strikes in beach-head areas. Lest the possible advantages in defensive use

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of nuclear weapons be underestimated, NATO was assumed to have available sufficient nuclear weapons and delivery systems; timely release authorizations; and accurate reconnaissance and target information.

B. RESULTS OF THE STUDY

6. The Study showed that an enemy assault of the kind envisaged could be defeated outright by the successful delivery of low-yield weapons, as few as 7 strikes sufficing during transit or landing, or 20 after landing. However, the Study emphasized that this result was unique among the Phase I Studies, in showing that a few low-yield strikes could, in special circumstances, be militarily decisive and preclude effective enemy response, with minimal collateral effects.

7. Collateral damage would be minimal: none would be caused in Baltic countries by air-delivered low-yield airburst strikes on WP forces at sea; civilian casualties of strikes against WP forces in beach-head areas would be 5,000-6,000, or as low as a few hundred if sub-kiloton gun-delivered weapons were used.

8. The Study made it clear that to exploit the enemy's vulnerability demanded quick reaction by NATO: enemy forces would remain concentrated as briefly as possible, for only a few hours, during which time (with the war itself only a few hours old) NATO would need to locate and identify targets and prepare, deliver and authorize strikes. This would require timely authorization (probably through pre-conditioned authority despite the considerable political difficulties); and availability of weapons and delivery systems, which in the case of artillery would mean supplying weapons from elsewhere in ACE, and the conclusion of US-Danish storage, custodial and other agreements preferably, to avoid delay, negotiated in advance on a contingency basis, without prejudice to Danish policy on nuclear weapons.

9. A successful NATO strike would leave little scope for an enemy nuclear response of any military value: it could not be followed up because the extensive damage to WP forces would deprive them of essential specialized landing vessels. Nevertheless, the Study acknowledged that it did not investigate certain possible enemy nuclear responses: after a decisive NATO strike, for example, nuclear response despite having no military value might be undertaken against military or civilian targets in Denmark or elsewhere, as a political act. The Study did, however, conclude that enemy response could be provoked by alternative more escalatory NATO strikes undertaken under less pressure of time against WP ports or merchant shipping but causing heavy civilian casualties and only delaying the enemy without decisively affecting the battle.

10. The Study concluded that the decisive strike phase could only be created if NATO had sufficient conventional air, naval and land forces and defensive minefields in the Baltic approaches to compel the enemy to concentrate.

The stronger these forces, the longer the enemy must concentrate in transit and remain in beach-head areas, and the greater NATO's opportunity for executing and exploiting the results of strikes.

VII. STUDY 4A: MEDITERRANEAN MARITIME AREA

A. ASSUMPTIONS AND SCENARIO

1. The Study assumed that political tension had been exacerbated by territorial claims on NATO Mediterranean countries made by WP, whose part had effectively been taken by several non-NATO countries in the area. NATO Alert measures in the Thrace and Aegean areas had failed to deter WP attack aimed at securing the Turkish straits and penetrating Greek Thrace to the Aegean. Initial use of low-yield nuclear weapons had temporarily held the advance by WP, which had, however, responded in kind.

2. The Study examined defensive follow-on tactical use of nuclear weapons at sea and in sub-studies of anti-submarine, anti-aircraft, anti-ship and anti-coastal use in different parts of the Mediterranean, it considered whether conventional weapons were sufficient defence, and if not, what risks would be run and what release procedures required, in resorting to use of nuclear weapons.

3. A NATO naval task force escorting a vital reinforcements convoy from Gibraltar to the North Aegean was assumed to have adequate conventional capability against the serious submarine threat, against enemy surface ships and their missiles (provided that these did not attack in concert with enemy submarines, and that enough defending aircraft were available), and against bombers. The hardest threat to counter would be an anti-submarine (ASM) attack, even given the cover of the integrated air defences of the Southern Region. In addition a limited nuclear capability was available in each role.

4. For anti-coastal use the Study considered a sizeable amphibious action involving consolidation of a beach-head. A combat amphibious group with naval support and local air superiority had landed in territory from which civilians had been evacuated before it had been lost to enemy breakthrough to the Aegean littoral. The enemy threatened to destroy the Group by counter-attacking with its greater conventional forces. Both sides had sufficient nuclear weapons but the enemy had on-site launchers whereas NATO relied on fighter-bombers.

5. While due account was taken of the risk of provoking WP response, the effects of possible WP responses to NATO follow-on use were not analyzed.

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B. RESULTS OF THE STUDY

6. The Study showed that in all the situations the NATO commander would probably have to consider follow-on use at some stage, because of certain inadequacies in his air/naval conventional weapons systems, and because of considerable WP capability in tactical missilery, which could include nuclear warheads.

7. Conventional ASW capability would be greatly enhanced by use of nuclear weapons which such a capacity was available; but this would only be advantageous to NATO where target-identification and target-holding enabled it, and weakness in conventional firepower required it. Surface naval attack could be dealt with conventionally but air-launched follow-on use would have the advantages of requiring fewer aircraft and of being able to destroy the enemy force if it could be attacked in concentrated formation, and at a safe distance. The need to use nuclear weapons against enemy aircraft and in-flight missiles would increase as the convoy progressed eastwards when conventional forces and the integrated regional air defences would become less able to cope with larger enemy forces.

8. Follow-on use while augmenting NATO conventional capability where necessary and particularly in coastal use would if it provoked an enemy response prove disadvantageous in view of NATO's general conventional superiority (with the notable exception of missilery), of possible collateral effects on friendly units, and above all of the risk of provoking WP response, especially in the amphibious situation, where follow-on use should be confined to neutralising rather than destroying the enemy.

9. The Study noted that procedures must be adequate for authorisation of timely release, to cope with swiftly developing situations, especially in anti-submarine and anti-ship use, without prejudicing political control. In particular, since the enemy might resort more readily to first tactical use at sea because initial use on both sides had already occurred, NATO should be able to respond in kind without requesting on the spot release.

VIII. STUDY 4B: ALLIED COMMAND ATLANTIC (ACLANT) AREA

A. ASSUMPTIONS AND SCENARIO

1. The Study assumed that, in the general setting of a WP attack on the flank areas of NATO and of imminent aggression on the whole of the ACE front, NATO had already made initial use of nuclear weapons. The scenario was specifically drawn to illustrate a situation in which NATO might have to consider use of nuclear weapons in defence of a maritime force in the Atlantic area.

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2. A US amphibious force of about 30 transport ships with a marine brigade embarked, and about as many ASW and air defence escorts, was threatened with attack by enemy submarine, surface and air forces on its transit from USA to North Norway, at any point from south of Greenland to just short of its port of destination. The task force could receive some land-based air support along part of its track, and limited assistance from the US Strike Fleet, which was assumed to be in the general area.

3. To provide a sufficiently general basis for political and military insight to be gained, the Study considered five main offence-defence interactions involving defence launched from aircraft; surface escorts or submarines against enemy submarines; from aircraft against enemy surface ships; and from surface escorts against enemy missiles. The outcome was in each case assessed on the assumptions that conventional weapons only, and that nuclear weapons in addition, were used in the defence. On the latter assumption, possible WP nuclear response and the damage it could do to the task force was considered, and collateral damage assessed.

4. The Study assumed that targets had already been located and identified, that nuclear weapons were available (illustrative yields being selected), and that authority to use them had been granted. Particular attention was paid to the time factor in engaging 'fleeting targets', and its implications for political control over tactical use of nuclear weapons at sea.

B. RESULTS OF THE STUDY

5. The Study showed that in all 5 interactions defensive capability was significantly increased if nuclear weapons were used. There was in addition a valuable economy in weapon expenditure, particularly in the case of nuclear SAM defence against enemy missiles; and an important decrease in numbers of aircraft needed for strikes against surface ships.

6. The Study was unable to assess whether the enemy would respond with nuclear weapons or not, given the widely variable strategic context of the scenario, which might include previous nuclear exchanges; or which might afford a basis for deliberately escalatory nuclear action by NATO in this case. Such an assessment calls for careful examination of WP interests and intentions in the light of their tactical and strategic doctrine.

7. Collateral damage was not so prominent a factor as in land or coastal use: the main hazard to civilian populations in neighbouring countries would be radioactive fallout, which would occur only from WP megaton bursts on or below the surface.

8. The Study found it impossible to reach a clear conclusion on the over-all balance of advantage in the defensive use of nuclear weapons. The task

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force would undoubtedly be better off if the enemy halted his attack or continued it with conventional weapons only; but if he responded successfully with missiles with megaton warheads (his most suitable weapon), he would inflict severe damage on the task force even if it had sufficient warning to adopt dispersed formation, and would put in doubt its arrival as an effective force. It was however impossible to say whether or not despite the damage suffered the task force would be worse off than if the action had continued by conventional means on both sides.

9. The Study nevertheless emphasised the continued need for strong conventional defences in the maritime environment, and acknowledged that there would be clear advantages if the task force was able to use nuclear weapons in response to WP nuclear initiative or in reply to WP nuclear response to NATO's original follow-on use.

10. The Study emphasises how short nuclear engagements would be: from the time of detecting the target to the time of attack must be measured in seconds in the case of enemy missiles, and minutes in the case of submarines. It therefore argued for careful consideration of political control and release procedures: even if pre-conditioned authority for selective release had been given, it would not always be possible to get the necessary release authority from SACLANT in time for use of nuclear weapons against enemy conventional attack, in reply to enemy response, or in response to enemy nuclear initiative.

11. The Study acknowledged the dilemma that although it would be better to undertake any defensive use of nuclear weapons at an early stage, with defences relatively intact, it would be difficult for political authorities to take such a decision so long as the force did not face imminent conventional defeat.