~~SECRET~~ RESTRICTED DATA

SUMMARY OF JCS POSITIONS AND STATEMENTS ON NUCLEAR TESTING, PROLIFERATION, WEAPONS AND MATERIALS 1977-1979

Historical Division
Joint Secretariat
Joint Chiefs of Staff
30 May 1980

1 Mar 77

CTB

~~(C)~~ In response to a NSC review (PRM/NSC-16) of comprehensive test ban (CTB) issues, the JCS forwarded to SecDef their views on this matter. They did not believe a CTB was in the best intersts of the US at that time because of: (1) potential adverse effect on military capabilities [redacted] (b)(1) (2) (3) (4) [redacted] If a decision was made to proceed with CTB negotiations, the JCS considered the following points pertinent: (1) an unverified or unilateral moratorium should be avoided; (2) nuclear testing should continue during CTB negotiations and the effective date of a CTB should be selected so as to permit the completion of testing for key systems; (3) consideration should be given to initiating an increase in US production capability for SNM; (4) PNEs should not be permitted in a CTB environment; (5) all nuclear powers should eventually be signatory to a CTB; (6) the TTBT and Peaceful Nuclear Explosions Treaty should be ratified as soon as possible. The JCS requested SecDef to consider their views in concluding his review of PRM/NSC-16.

PNE = Peaceful Nuclear Explosion

~~(C)~~ JCSM-52-77 to SecDef, 1 Mar 77, JMF 730 (25 Jan 77) sec 2.

15 Mar 77

UGT

~~(S-RD)~~ The JCS repeated their conviction that it was essential to continue an aggressive, comprehensive underground test (UGT) program in keeping with the safeguards to the LTBT. Such a program would be impossible, however, until a specific review procedure was developed within the NSC apparatus. The JCS forwarded to the Assistant to SecDef (AE) a proposed memorandum for the Assistant to the President for NSA requesting institution of immediate procedures for review and approval of the UGT program.

~~(S-RD)~~ MJCS-71-77 to Asst to SecDef (AE), 15 Mar 77, JMF 733 (15 Mar 77).

11 Apr 77

Nuclear Free Zone Treaty of Tlatelolco

~~(S)~~ The ASD(ISA) and the DJS provided SecDef their position on US adherence to Protocol I to the Treaty for the Prohibition of Nuclear Weapons in Latin America (Treaty of Tlatelolco). The Protocol would prohibit use, deployment, and any form of possession of nuclear weapons in territories for which the US was responsible (b)(1) (b)(1) , including territorial waters and air space. Of several possible options under consideration, the ASD and the DJS favored option 1, opposing adherence to the Protocol. The Acting CJCS approved this position on 12 Apr 77.
~~(C)~~ Memo, ASD(ISA) and DJS to SecDef, 11 Apr 77, Att to JCS 2482/354, 29 Apr 77, JMF 922/731 (11 Apr 77).

9 May 77

UGT

~~(S-RD)~~ In response to a request by SecDef, the JCS provided their views on prioritization of weapon systems to assist the Energy Research and Development Administation (ERDA) in adjusting the UGT program in the event of a CTB. The JCS views were in the form of a list of warhead development programs for use in adjusting test schedules in case adequate resources were not available or unanticipated delays were encountered. The JCS emphasized that this list was to be used only if testing programs had to be deleted and when all other avenues to obtain necessary support had been exhausted.
~~(S-RD)~~ JCSM-198-77 to SecDef, 9 May 77, JMF 733 (18 Apr 77).

30 Jun 77

CTB

~~(S)~~ In response to a NSC request, the JCS provided the ASD(ISA) their comments on an interagency paper entitled, "Comprehensive Test Ban: Issues for Decision." The JCS believed that the paper addressed the verification and PNE issues in a comprehensive manner but that other key issues raised during the bilaterals with the Soviets (e.g., adherence, moratorium, withdrawal versus release) should be fully addressed prior to the issuance of a Presidential directive. They recommended that any draft Presidential directive covering these issues be circulated once again for comment prior to issuance. The JCS requested the ASD to forward their views and recommendations to the NSC Staff.
~~(S)~~ MJCS 208-77 to ASD(ISA), 30 Jun 77, JMF 730 (25 Jan 77) sec 2.

19 Jul 77

LTBT

~~(S RD)~~ The JCS forwarded to SecDef the 15th status report for the period 1 Jul 75 to 30 Sep 76 on the adequacy of fulfilling LTBT safeguards. They concluded that support for Safeguard C (readiness to test) was adequate and that support for Safeguards A (underground nuclear testing) and B (laboratory facilities) was marginally adequate. The JCS reported, however, that support for Safeguard D (b)(1) (b)(1) The JCS emphasized their support for: (1) increased funding for ERDA nuclear weapons laboratories and continued support of DOD laboratory programs; (2) improvements, (b)(1) The JCS also noted that present US initiatives concerning a possible TBT, if successful, should be cause to increase emphasis on Safeguards B and D. If underground testing was not available in the future, activities of laboratories would become critical to maintenance of a viable nuclear weapons deterrent force. Responsibility for CTBT verification would require that appropriate improvements, beyond those contained in the current report, be made in the capabilities of the AEDS.
~~(S RD)~~ JCSM-303-77 to SecDef, 19 Jul 77, JMF 730 (17 Dec 76) sec 2.

6 Sep 77

UGT

(U) In response to an ERDA request, the JCS commented on a proposed letter to the President requesting approval of the FY 1978 Underground Nuclear Testing Program (CRESSET). They recommended that the letter be forwarded to the President as proposed, indicating concurrence with the proposal for approval of the entire 12-month program.
(U) MJCS-265-77 to ERDA, 6 Sep 77, JMF 733 (6 Sep 77).

6 Oct 77

UGT

~~(S)~~ CJCS and SecDef recommended approval of the 12-month FY 1978 Underground Nuclear Test Program (CRESSET) as proposed by ERDA. This recommendation was made with understanding that a one-year program would not abridge any review agency's rights or responsibilities relative to the UGT program. CJCS and SecDef thought that an update as the end of the first six months of the program neared would be appropriate.
~~(S)~~ Memo, SecDef to Pres, 6 Oct 77, JMF 733 (6 Sep 77).

30 Nov 77

CTB

~~(S RD)~~ At the request of the Director, DNA, the JCS informed SecDef that the national security and technical aspects of a CTB were of such importance as to require significantly increased attention within the DOD and closer DOD-DOE cooperation. Moreover, this matter should be addressed as an urgent matter in the Special Coordination Committee (SCC) prior to resumption of substantive negotiations. The JCS also recommended the following specific actions: (1) raising the issue of "permitted experiments under a CTB" at the national level prior to the departure of the US negotiating team for the 5 Dec plenary session in Geneva; (2) establishment of a temporary DOD CTB task force; (3) achieving "a fully effective working relationship" with DOE for continuing communication on pertinent CTB issues.

~~(S RD)~~ JCSM-445-77 to SecDef, 30 Nov 77, JMF 730 (16 Nov 77).

23 Dec 77

CTB

~~(C)~~ The JCS commented on a proposed DOD memorandum for the Assistant to the President for NSA concerning permitted nuclear experiments under a CTB. The JCS noted that US national policy addressing maintenance of the nuclear stockpile in the context of a CTB had not been enunciated and they believed that the proposed memorandum should state what the DOD felt the national policy should be. They also pointed out that the proposed memorandum did not address the significant contributions to maintaining confidence in stockpile reliability that could be achieved if permitted experiments above (b)(1) and up to (b)(1) were allowed. They felt that DOD should not arbitrarily limit discussion to levels below (b)(1) and recommended that levels up to (b)(1) be addressed in the memorandum so that the national authorities understood the role such a level could play in maintaining the nuclear deterrent. The JCS observed an optimism in the proposed memorandum that future technological innovations might provide solutions to the stockpile reliability problem. The JCS believed that commitment to such a fundamental national security issue as a CTB should not be predicated on speculation as to future enhanced technological capabilities. Finally, the JCS did not consider it necessary at that point to include numerical values in the illustrative example of a definition of a nuclear explosion to be included in the treaty. Substituting blanks in place of the numerical values, they said, would tend to eliminate political sensitivity to "kiloton" levels and premature judgments with respect to a lowered threshold.

~~(C)~~ MJCS-380-77 to SecDef, 23 Dec 77, JMF 730 (23 Dec 77).

19 Jan 78

CTB

~~(C)~~ The Actg ASD(ISA) and the DJS presented SecDef and CJCS recommended positions for a SCC meeting on key CTB issues. With regard to the issue of on-site inspections (OSI) and whether and when the US should table a proposal for a form of voluntary OSI, the ASD and the DJS agreed with an ACDA proposal for a form of "voluntary" as opposed to "mandatory" OSI to be tabled as soon as possible to avoid an impasse in the negotiations. The JCS also believed that OSI should be addressed as part of the overall verification problem, to include how to deal with permitted nuclear experiments. On the issue of internal seismic installations and whether the US should table a specific proposal which could include a specified maximum number of installations, the ASD and the DJS believed the US should not table any specific number. The SCC Working Group had agreed to 20 internal seismic installations. While the ASD and the DJS thought that number probably safe for negotiating purposes, they found no authoritative technical analysis to support such a position. On the question of the PNE protocol and whether the US should reaffirm its position on such a protocol, the ASD and the DJS stated that the US must remain firm in the position that the protocol must run concurrently with the treaty. The reason for this position was that unconstrained resumption of PNEs by the Soviets would result in unilateral military advantage in the absence of a US PNE program. Moreover, resumption of PNEs would undermine the US non-proliferation objectives since it could be interpreted by some states to justify nuclear explosions.

~~(C)~~ Joint TP, ASD(ISA)/DJS to SecDef and CJCS, 19 Jan 78, Att to JCS 2482/427-1, 23 Jan 78, JMF 730 (2 Dec 77).

31 Mar 78

Cutoff of Fissionable Material Production

~~(S-RD)~~ The ASD(ISA) and the DJS commented to SecDef on a State/ACDA recommendation for an interagency study on the desirability of proposing at the UN Special Session on Disarmament negotiations on a cutoff of fissionable materials for nuclear weapons and the transfer of enriched uranium from stockpiled weapons to non-aligned nations for peaceful purposes. The ASD and DJS stated that such a proposal would impact on US weapons programs and might not be in the US national security interest. Therefore they opposed initiation of such a study at that time,

preferring to await the outcomes of the current CTB and SALT negotiations before considering proposals to constrain further US freedom of action in the nuclear weapons area. They requested that their views be forwarded to the Assistant to the President for NSA.
~~(S-RD)~~ Memo, ASD(ISA)/DJS to SecDef, 31 Mar 78, Att to JCS 2501/52-2, 17 Apr 78, JMF 723 (30 Mar 78).

18 Apr 78

CTB

~~(C)~~ The JCS provided SecDef their views regarding a Comprehensive Test Ban (CTB) and possible negotiations with the Soviet Union. They believed that certain minimum nuclear testing requirements were needed to assure high confidence in the nuclear deterrent. These requirements included: (1) identification and correction of reliability and potential safety problems in existing nuclear weapons; (2) replacement of weapons reaching the end of their stockpile life; (3) adaptation of existing warhead designs to new delivery systems with high confidence; (4) incorporation of systems into existing warheads to enhance safety, security, and command and control; (5) insurance of survivability of current and future US weapon systems in a nuclear effects environment, including effects from new enemy weapon systems. Therefore continued testing was essential to maintain the US nuclear deterrent. Consequently, the JCS could not support a test ban that did not specifically provide for the degree of testing necessary to maintain confidence in stockpile reliability or that could lead to asymmetries because of the inability of the US to verify compliance. The JCS reserved judgment on the numbers of tests and yields required pending further technical review and consideration of a Department of Energy (DOE) position on these questions. They requested that their views be conveyed to the President.
~~(C)~~ JCSM-119-78 to SecDef, 18 Apr 78, JMF 730 (3 Apr 78).

12 May 78

Cutoff of Fissionable Material Production

~~(S-RD)~~ The JCS provided SecDef their views on proposals for cutting off production of fissionable materials for nuclear weapons and transferring enriched uranium from the stockpile to peaceful uses. They opposed any such proposal as not in the US national security interest based on the following reasons:

[redacted] (b)(1)

[redacted] (2) verification of a

cutoff agreement with an acceptable degree of assurance could not be expected; (3) it was mandatory that the US continue to produce highly enriched uranium (HEU) fuel for naval reactors and tritium to maintain operational nuclear warheads now in the stockpile; (4) if HEU and tritium production were permitted under an agreement, the verification issue would be severely complicated. The JCS requested SecDef to support their views. ~~(S RD)~~ JCSM-164-78 to SecDef, 12 May 78, JMF 723 (5 May 78).

30 May 78

~~(S)~~ The JCS referred to a recent Presidential decision (PD/NSC 38) that the US should propose a fixed-duration CTB treaty of 5 years, with provision for nuclear weapon experiments of (b)(1) . Also included in such a treaty would provision for resumption of testing at the expiration of the treaty, for safety and reliability purposes only, unless testing was shown not to be necessary. The JCS believed that such a test ban as outlined above would involve "significant military risks." They referred to their views of 18 Apr 78, wherein they stated that a test ban must allow continued testing at a level sufficient to maintain high confidence in the reliability of US nuclear weapons and to avoid undesirable asymmetries which might otherwise result in the inability of the US to verify compliance with the test ban. With regard to the negotiating position approved by the President, the JCS considered the issue to be the adequacy of the US nuclear deterrent forces--both perceived and actual--and the equivalence of those forces to those of the Soviet Union. The magnitude of the risks and the potential consequences compelled the JCS to conclude that such a negotiating position could result in a treaty that would adversely affect the national security interests of the US. The JCS asked SecDef to forward their views to the President. ~~(S)~~ JCSM-188-78 to SecDef, 30 May 78, JMF 730 (30 May 78).

CTB

3 Jun 78

~~(S)~~ The JCS informed the Director of the Arms Control and Disarmament Agency (ACDA) that they had reviewed a draft instruction to the US CTB delegation in Geneva concerning the duration of a treaty and did not concur. The JCS believed that an overall approach to the negotiations, addressing all elements involved, should be developed in Washington before any instruction to the delegation.

CTB

Therefore the JCS reserved judgment on any part of the instructions until the entire approach was presented.

~~(S)~~ DJSM-910-78 to Dir ACDA, 3 Jun 78 JMF 730 (CY 1978).

5 Jun 78

CTB

~~(S)~~ The JCS again informed the Director, ACDA, that the US should not proceed with negotiations on a CTB until the negotiating strategy had been developed. They believed that the SCC should be given the opportunity to review the complete guidance on this matter when developed.

~~(S)~~ The JCS repeated this position the following day.

~~(S)~~ DJSM-914-78 to Dir ACDA, 5 Jun 78; DJSM-925-78 to Dir ACDA, 6 Jun 78; JMF 730 (CY 1978).

16 Jun 78

CTB

~~(S)~~ The JCS reviewed a draft instruction to the CTB delegation reflecting a position reached in a SCC meeting on CTB on 12 Jun on national seismic stations. They recognized that the SCC discussion had led to a consensus that the number of arrays in the USSR could be relatively small compared to the number of seismic stations. The network of stations prescribed in the draft instruction, however, would make a zero-yield CTB essentially unverifiable. Therefore the JCS did not concur in the draft instruction.

~~(S)~~ On 21 Jun 78, the JCS expanded the above position. They recognized the decision to proceed with a zero-yield CTB had been made by the President. They also recognized that the proposed instruction accurately reflected the majority view of the SCC relative to the seismic station network issue. Nonetheless, the JCS had serious reservations about verification and did not want to convey the impression that they believed the proposed network would assure adequate verification of the treaty. The JCS accepted the proposed instruction as an adequate reflection of the majority view at the SCC and therefore posed no objection to it, recognizing that their position on verification had been overruled.

~~(S)~~ DJSM-1001-78 to NSC Staff, 16 Jun 78; DJSM-1012-78 to NSC Staff, 21 Jun 78; JMF 730 (CY 1978).

29 Jun 78

CTB

~~(S)~~ The JCS provided SecDef their views on a CTB with the following characteristics: (1) a fixed duration of 3 years; (2) nuclear weapons testing limited to yields up to (b)(1) while the treaty was in force; (3) treaty termination after 3 years, with any replacement treaty subject to advice and consent of the Senate for ratification. In addition, the JCS understood that, following treaty termination, underground testing up to (b)(1) (b)(1) would resume without restriction on number or purpose of tests. The JCS believed that a nuclear test ban should permit testing at the (b)(1) range. They also believed

that a treaty of 3 years' duration that provided for testing at the expiration thereof would incur less risk than a treaty of 5 years' duration with no testing assured at expiration. They concluded that the military risks to national secuirity were still serious for a treaty of 3 years' duration. This risk could be offset to some extent, the JCS believed, if a safeguards program were implemented that assured, among other things, resumption of testing at treaty expiration. Acceptability of such a treaty depended on judgments concerning its contribution to US nonproliferation goals as compared with these military risks. On balance, the JCS continued to believe a CTB with testing permitted up to levels at which verification was adeadequate best served US national security interests. The JCS requested that their views be submitted to the President.

~~(S)~~ JCSM-223-78 to SecDef, 29 Jun 78, JMF 730 (3 Apr 78).

6 Jul 78

CTB

~~(S-RD)~~ A J-5 talking paper for the CJCS for a SCC meeting on CTB issues set out the following recommended positions: (1) level of low-yield testing permitted by a CTB should be consistent with seismic verification capability and sufficient to maintain high confidence in nuclear deterrent, avoid asymmetries developing due to verification limits, preserve national nuclear weapon design capability, and allow weapons effects testing for survivability; (2) level of testing should be in (b)(1) range with (b)(1) preferred from standpoint of identification and usefulness to stockpile reliability; (3) proposed (3- or 5-year) CTB would be a threshold test ban for the USSR, but a complete test ban for the US; (4) JCS views remained valid independent of the treaty duration; (5) continued testing was the key element in maintaining stockpile reliability and hence confidence in the nuclear deterrent; (6) verification was key element for ensuring compliance with treaty and for ensuring no asymmetries due to treaty violations; (7) if the Soviets tested below US monitoring threshold, their confidence in stockpile would remain high, they might be able to design new warheads, and their weapon designers

would retain expertise while the US would not be able to design new warheads or retain design expertise.
~~(S-RD)~~ J-5 TP for CJCS, 6 Jul 78, Att to JCS 2179/760-1, 11 Jul 78, JMF 730 (CY 1978).

23 Sep 78

UGT

(U) CJCS and SecDef recommended that the President approve execution of the FY 1979 Underground Nuclear Test Program (QUICKSILVER). They noted that some changes to QUICKSILVER I would be needed to respond to changed or additional DOD requirements, adjusted priorities, and underground test results and requested that DOE be allowed to make appropriate test substitutions within the approved test program.
(U) Memo, SecDef to Asst to Pres for NSC, 23 Sep 78, JMF 733 (7 Sep 78).

26 Sep 78

CTB Nonproliferation

~~(S)~~ The JCS commented on Dept of State/ACDA views on the nonproliferation value of a CTB. They informed the SecState that, while agreeing that proliferation of nuclear weapons was a serious national security issue, they remained unpersuaded by the evidence presented by State/ACDA of the potential nonproliferation benefits of the CTB then under discussion. The JCS had been unable to establish to their satisfaction any "causative" relationship between a ban on nuclear testing and the cessation of the development of nuclear weapons by states without such weapons. They felt that a nation's decision to develop nuclear weapons was dependent upon perceptions of vital self-interest, not upon the existence of a CTB. Moreover, the JCS qustioned the nonproliferation benefits to be derived from a CTB of 3- to 5-year duration with an announced option to resume testing, the type then under consideration. Clearly there were divergent views on this last aspect, and the JCS recommended development of an interagency paper for the NSC weighing the nonproliferation impacts and national security risks of a CTB. The JCS had so advised SecDef.
~~(S)~~ JCSM-301-78 to SecState, 26 Sep 78, JMF 730 (10 Jul 78).

11 Dec 78

CTB

~~(S)~~ The Joint Staff reviewed an OASD(ISA) proposal for a CTB review conference empowered "to review the operation of the [CTB] Treaty and to consider the question of whether there should be subsequent treaty prohibitions, depending on the effect of the Treaty on the security interest of its parties and on the extent to which the objectives of the Treaty have been achieved." The Joint Staff did not concur in the proposal for the following reasons: (1) PD/NSC-38 stated " . . . there would be a review conference to determine whether to negotiate a replacement treaty" which clearly placed emphasis and limits on the review conference function

which was to decide "whether to negotiate." The ISA proposal significantly changed that emphasis to address ". . . whether there should be subsequent treaty prohibitions . . . ." The extent of deviation was such that a readdressal of the Presidential guidance would be required. (2) The words "depending on the effect of the Treaty on the security interest of its parties and on the extent to which the objectives of the Treaty have been achieved" were unclear and misleading. The Joint Staff considered the current ad referendum treaty text representative of the intent expressed in the Presidential Decision and thought any change to that text should be adopted through the SCC.
~~(S)~~ DJSM-1982-78 to USecDef for Policy, 11 Dec 78, JMF 730 (CY 1978).

1979

1 Feb 79

CTB

~~(S)~~ The ASD(ISA) and the DJS presented SecDef and CJCS their views on the US position in the CTB negotiations with respect to the role of the review conference which would be convened during the final year of the treaty. In May 1978, the US had adopted the position that a review conference would be convened during the final year of the treaty "to determine whether to negotiate a replacement treaty." A SCC paper proposed that the US could either hold to its present language or propose a new formulation, inserting one of the following phrases after the words "review the operation of the treaty and": Option A - "consider the question of extending its provisions"; Option B - "consider the question of subsequent treaty prohibitions"; and Option C - "consider the question of whether there should be future treaty arrangements." OSD believed that the US should modify its position and favored Option C because it protected all future options while providing some movement to support US goals of obtaining Soviet agreement to US verification proposals and obtaining as widespread adherence as possible. The JCS believed the ad referendum text best represented the intent expressed in the Presidential Decision (PD/NSC-38). If policy considerations required modification of this position, the JCS recommended Option C. Neither OSD nor JCS favored pursuing an agreed understanding at this time. They also recommended adoption of a final clause to add the phrase" taking into account all relevant factors."
~~(S)~~ JT TP, ASD(ISA)/DJS to SecDef and CJCS, 1 Feb 79, Att to JCS 2179/767-1, 5 Feb 79, JMF 730 (24 Jun 79).

17 Sep 79

CTB

~~(S)~~ The JCS approved various position on CTB issues required for participation in the CTB decision-making process and to respond to evolving developments in the negotiations. They reiterated their consistent position that any test ban must specifically provide for adequate nuclear testing in order to: (1) maintain high confidence in the reliability of US nuclear weapons and hence confidence in the US nuclear deterrent; (2) avoid undesirable asymmetries that might otherwise result from the inability of the US to verify compliance with the test ban; (3) preserve the nuclear technology base, including retention of facilities and skilled personnel. The JCS continued to believe that a CTB should permit testing in the (b)(1) range. They recognized that the current US position was that only nuclear experiments of up to 100 pounds' yield would be permitted under a CTB regime and they offered the following views on the issue of permitted experiments: (1) US should neither accept nor impose on itself any restrictions on types, locations, or purpose of permitted experiments as those parameters were unverifable and restrictions would in all likelihood affect the US to a greater degree than the USSR; (2) US should not accept restrictions relating to specific methods of containment for permitted nuclear experiments; (3) US should insist that the permitted experiments provision be explicitly and publicly documented in the multilateral CTB treaty. The JCS repeated their position that the adequacy of verifying a CTB agreement was dependent on ability to assure national authorities unequivocally that no potential adversary was achieving military benefits through nuclear testing. Such assurances, they said, could not be given under the CTB as then being negotiated.

~~(S)~~ The JCS offered the following views on national seismic stations (NSS) issues: (1) US national interest required installation of best technical network possible at the earliest time possible; (2) US should insist that all equipment installed in USSR be of US design and manufacture; (3) US should continue to insist on transmission of authenticated seismic ~~data~~ in real time or with a delay normally no greater than 1 hour; (4) current US position was to have 10 upgraded NSSs installed in USSR within 24 months after entry into force of a treaty, and US should continue to insist that each station be upgraded as improved equipment became available and

that the improved NSS network in the USSR be installed and operational as soon as possible after entry into force of the Separate Verification Agreement (SVA); (5) sale of US seismic components and the transfer of NSS should be related to our over all verification objectives; (6) US should not accept the arbitrary Soviet concept of "equal obligation." In addition, the JCS believed that the US should not stop nuclear testing until the CTB, its attendant protocol, and the SVA with its technical annexes entered into force. With regard to the issue of language for the purpose of the review conference, the JCS believed that the currently tabled treaty text preserved the necessary options for the US and that the US delegation should remain resolute in that negotiating position. Finally, the JCS believed that the preamble of a CTB treaty shold take into account the finite duration of the treaty, should not place any restrictions--real or implied--on the US after the automatic termination of the treaty, and should exclude language representing a ban on nuclear testing for all times.

~~(S)~~ JCS 2179/768-1, 24 May 79 (approved 17 Sep 79), JMF 730 (9 Mar 79).

3 Oct 79

~~(S-RD)~~ The JCS forwarded to SecDef the 16th status report for the period 1 Oct 76 to 30 Sep 78 on the adequacy of fulfilling LTBT safeguards. They found support for Safeguard A (underground nuclear testing) marginally adequate and support for Safeguards B (laboratory facilities and programs) and C (nuclear readiness to test) adequate. Overall support for Safeguard D

(b)(1)

Actions underway or planned, if successfully implemented, should meet the requirements of Safeguard D monitoring in the early 1980's. The JCS requested full support for these actions. They also emphasized the need for: (1) adequate support and funding for the future weapons research, development, and testing requirements; (2) continued support and adequate funding for DOE nuclear weapons laboratories and test site and DOD laboratory programs, including replacement or modernization of laboratory and test site equipment and facilities; (3) improvements, including feasible interim measures, to the US nuclear test monitoring capability. The JCS repeated the caution contained in the previous report that, if current initiatives concerning a possible CTBT were successful, increased emphasis should be given to Safeguards B and D.

~~(S-RD)~~ JCSM-292-79 to SecDef, 3 Oct 79, JMF 730 (26 Mar 78) sec 2.

~~SECRET~~

THE JOINT CHIEFS OF STAFF
WASHINGTON, D. C. 20301

12 December 1977
MJCS 380-77

MEMORANDUM FOR THE SECRETARY OF DEFENSE

Subject: Permitted Nuclear Experiments Under a Comprehensive Test Ban (U)

1. (U) The proposed memorandum* for the Assistant to the President for National Security Affairs, subject as above, has been reviewed, and the following comments are offered.

2. ~~(S)~~ The second paragraph states national policy as a fact. However, US national policy addressing maintenance of the nuclear stockpile in the context of a Comprehensive Test Ban has not been enunciated. It is believed that the paragraph should state what the Department of Defense feels the national policy should be.

3. ~~(S)~~ The memorandum does not address the significant contributions to maintaining confidence in stockpile reliability which could be achieved if permitted experiments above (b)(1) and up to (b)(1) were allowed. It is felt that the DOD should not arbitrarily limit discussion in this paper to levels below (b)(1) It is recommended that levels up to (b)(1) be addressed in the paper, so that the national authorities understand the role such a level could play in maintaining the nuclear deterrent.

4. ~~(S)~~ Further, it should be noted in the memorandum that this level (b)(1) approximates current US verification capability (unless exceptional evasion measures are employed), so that provision for such a limit would minimize the risk of US-Soviet weapon development and reliability asymmetries which could develop under a CBT. In addition, (b)(1) also corresponds roughly to the needs of the US nuclear weapons effects test program, which investigates the vulnerabilities of US weapons systems and verifies their hardness.

* Attached

~~SECRET~~

5. ~~(S)~~ The proposed memorandum indicates optimism that future technological innovations may provide solutions to the stockpile reliability problem. The Joint Chiefs of Staff have previously stated their view* that commitment to such a fundamental national security issue as a CTB should not be predicated on speculation as to future enhanced technological capabilities.

6. ~~(S)~~ Finally, in the illustrative example of a definition of a nuclear explosion to be included in the treaty, it is not considered necessary at this point to include numerical values. Substituting blanks in place of the numerical values would tend to eliminate political sensitivity to "kiloton" levels and premature judgments with respect to a lowered threshold.

7. (U) Consistent with the above, specific recommended changes have been incorporated into a revised memorandum which is being provided separately to your staff.

For the Joint Chiefs of Staff:

SIGNED

PATRICK J. HAMILTON
Vice Admiral, USN
Director, Joint Staff

* JCSM-52-77; Appendix to JCS 2179/745-2

Prepared by:
LTC R. W. SMith, USAF
Nuclear Division, J-5
Ext 57064

~~SECRET~~
~~SECRET~~

ASSISTANT SECRETARY OF DEFENSE
WASHINGTON, D.C. 20301

INTERNATIONAL
SECURITY AFFAIRS

In reply refer to:
I-250006/77

MEMORANDUM FOR THE SECRETARY OF DEFENSE

SUBJECT: Permitted Nuclear Experiments Under a CTB (U) -- ACTION MEMORANDUM

(U) The purpose of this memorandum is to obtain your signature on a proposed memorandum (next under) for the Assistant to the President for National Security Affairs, which outlines the national security issues associated with "permited nuclear experiments" under a comprehensive test ban (CTB).

(U) The proposed memorandum was prepared by an ad hoc DOD working group composed of representatives from Office of the Assistant Secretary of Defense for International Security Affairs, Under Secretary of Defense for Research and Engineering, Office of the Assistant to the Secretary of Defense for Atomic Energy, the Joint Staff, and the Defense Nuclear Agency. The Department of Energy also provided informal assistance.

~~(S)~~ The memorandum defines various options for SCC considerations and recommends that a SCC be convened to review this question in January, prior to the reconvening of the negotiations. In addition, I recommend you ask that a briefing be presented to SCC principals on the subject of Soviet capabilities to pursue nuclear experiments under a CTB. If you agree, I will arrange such a briefing.

~~(S)~~ While the attached memorandum deals with the question of maintaining high confidence in our nuclear deterrent forces under a CTB environment, it should be noted that the Joint Chiefs of Staff continue to believe that a CTB is not in the best interests of the U.S. at this time

[redacted] (b)(1) (JCSM-52-77, dated 1 March 1977).

Assistant Secretary of Defense (ISA) Director, Joint Staff

Coordination: _____
Under Secretary of Defense (Research and Engineering)

~~SECRET~~
~~SECRET~~

Assistant to the Secretary of Defense (Atomic Energy)

Chairman, Joint Chiefs of Staff: Approved _____

Disapproved _____

Attachment 1
a/s

NOTE TO THE JOINT CHIEFS OF STAFF

on

US POSITION ON CUTOFF IN PRODUCTION AND TRANSFER OF FISSIONABLE MATERIALS FOR USE IN NUCLEAR WEAPONS (U)

(U) The attached joint memorandum by the Assistant Secretary of Defense (International Security Affairs) and the Director, Joint Staff, 31 March 1978, subject as above, with its Tab A, is circulated for information.

Joint Secretariat

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ASSISTANT SECRETARY OF DEFENSE
WASHINGTON, D.C. 20301

INTERNATIONAL
SECURITY AFFAIRS

MEMORANDUM FOR THE SECRETARY OF DEFENSE

SUBJECT: U.S. Position on Cut-Off in Production and Transfer of Fissionable Materials for Use in Nuclear Weapons -- ACTION MEMORANDUM

ACDA and State have forwarded to the President, without DOD or DOE coordination, a recommendation that he direct a study on the desirability of reaffirming a U.S. proposal on a cut-off in the production of fissionable materials for nuclear weapons at the UN Special Session on Disarmament (SSOD). The National Security Council forwarded this proposal to DOD yesterday (Tab B)* and asked us to provide our reactions, although it is scheduled to go to the President today irrespective of our input.

The "current cut-off policy" which is frequently cited was first advanced formally in 1963 under very different world circumstances than now exist. The U.S.-U.S.S.R. strategic balance has changed significantly since then with the U.S. no longer in a position of marked superiority.

Such a proposal will impact our weapons programs and may not be in our national security interest. Reaffirming the previous U.S. proposal at the current SSOD before successfully concluding a SALT and CTB treaty would preclude several weapons and force structure options that may be required. Only after there is sufficient information on future weapons requirements will we be able to evaluate our requirements for weapons grade materials.

In addition, the State/ACDA recommendation contains several inaccuracies to support its position. In particular:

- Our estimates of the relative U.S./U.S.S.R. HEU and plutonium stockpiles differ from the estimates cited in the State/ACDA memorandum. In addition, there is uncertainty associated with the estimates of the Soviet nuclear material stockpile, particularly in HEU. (b)(1),(b)(3):42 USC §2162(a)-- (RD)

- In light of the Soviets historic refusal to accept such a proposal, we do not believe that it would be productive to reaffirm the proposal at the SSOD since it could be construed as an empty gesture.

* Attachment to JCS 2501/52

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In addition, the United Kingdom is extremely concerned over the prospect that such a proposal may be endorsed at the SSOD. They recently requested U.S. assistance in encouraging the Canadians to drop their plans to table a similar proposal at the Preparatory Conferences at the Special Session.

- Verification of a U.S./U.S.S.R. bilateral cut-off or transfer agreement would be extremely difficult. The Soviets have consistently opposed IAEA safeguards for their facilities and current National Technical Means do not provide adequate verification of plutonium production in Soviet dual facilities.

We recommend that you sign the attached memorandum to the Assistant to the President for National Security Affairs (Tab A)

David E. McGiffert
Assistant Secretary of Defense, ISA

Patrick J. Hannifin V. ADM 31 Mar 78
Director, Joint Staff

COORDINATION: Gerald P. Dinneen
Under Secretary of Defense for Research & Engineering

William W. Lewis March 31, 1978
PO Assistant Secretary of Defense for Program Analysis and Evaluation

[signature] 3/31
Deputy Under Secretary for Policy

Milton E. Key, Deputy
Assistant to the Secretary of Defense for Atomic Energy

Chairman, Joint Chiefs of Staff: Approved [signature] 31 Mar 78

ODUSDRE (S&SS) R.N. Williams 3/31/78 Disapproved ____________

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THE SECRETARY OF DEFENSE
WASHINGTON D C. 20301

MEMORANDUM FOR THE ASSISTANT TO THE PRESIDENT FOR NATIONAL SECURITY AFFAIRS

SUBJECT: U.S. Position on Cut-Off in Production and Transfer of Fissionable Materials for Use in Nuclear Weapons

Yesterday, I was informed that a memorandum for the President had been sent to the National Security Council asking that an inter-agency study be conducted on the desirability of proposing at the UN Special Session on Disarmament (SSOD) negotiations on a cut-off of fissionable materials for nuclear weapons and the transfer of enriched uranium from stockpiled weapons to non-aligned nations for peaceful purposes. While I agree that a thorough analysis of these important issues may be useful, I do not believe that it would be in our best interest at this time to initiate a study leading to a reaffirmation of a cut-off or transfer proposal at the upcoming SSOD. Rather, we should await the outcomes of the current CTB and SALT negotiations before we consider proposals to further constrain our freedom of action in the nuclear weapons area. Only when these negotiations are completed will we have a firm understanding of our future weapons needs and be in a position to address a cut-off of production and transfer of fissionable materials.

The strategic situation has changed since the United States first advanced a cut-off proposal in 1963. At that time, we enjoyed a signif-icant advantage over the Soviet Union in terms of nuclear weapons materials.

(b)(1),(b)(3):42 USC §2162(a)-- (RD)

There has obviously been a considerable change in the U.S./U.S.S.R. balance since the time of the initial U.S. cut-off proposal. Consequently, the potential political advantages of reaffirma-tion of the cut-off and transfer proposal must be weighed against current and projected U.S. need. The projections may have to be modified based on SALT outcomes. A situation we must avoid is being constrained on future weapons decisions because of a lack of availability of weapons grade materials.

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To meet the fissionable material requirements of the FY 78-80 Nuclear Weapons Stockpile Plan approved by the President in PD/NSC-26 and the FY 81-85 projections as noted by the President will require all the material currently available, plus the output of the Department of Energy's three operating production reactors through 1985. Should a SALT agreement not be reached, options to increase our strategic forces capability (e.g., cruise missile carriers) are likely to require all the above material and the restart of some reactors currently maintained in standby status. In addition, some strategic options such as the MX would require more highly enriched uranium than is currently available for the weapons program. Thus, a cut-off or transfer could pre-empt our ability to deploy systems currently under development. Additionally, continued production of tritium is mandatory to maintain presently stockpiled operational warheads.

Verification of a U.S.-U.S.S.R. bilateral cut-off or transfer agreement would be extremely difficult. The Soviets have consistently opposed IAEA safeguards for any of their facilities. It is therefore unlikely that they would agree to any intrusive verification provisions that allowed for on-site inspection. Many Soviet reactors are dual purpose facilities, capable of producing both plutonium and electricity. It would be virtually impossible with current National Technical Means to verify that plutonium was not being produced for use in weapons programs in such installations. Moreover, National Technical Means would not be capable of accurately determining whether low-enriched uranium (LEU) or HEU was being produced at Soviet enrichment facilities, much less the end use of such nuclear products.

In addition to the technical difficulties associated with a cut-off initiative, the diplomatic utility of such an effort is also open to serious question. The U.S. has offered similar proposals on at least four other occasions, and the Soviets have rejected each one. It is no more likely that the U.S.S.R. will accept this initiative than it has the others. Consequently, given that this initiative would be only a reintroduction of a very old idea that has never produced any tangible results, and given that the Soviets are likely to respond negatively, the effort could be attacked by some non-nuclear weapon states as a calculated and empty gesture on the part of the United States.

Some of our closest allies are strongly opposed to the idea of a cut-off or transfer. For example, the British, in reaction to a similar Canadian proposal, argued in February that a cut-off would be "injurious to the development and refurbishment of UK nuclear weapons," and thus harmful to the UK as well as the NATO nuclear deterrent. They noted that a cut-off would be "completely unverifiable," and went so far as to enlist U.S. support in helping dissuade the Canadians from pursuing this proposal.

Finally, I want to call to your attention the lack of prior consultation with the Department of Defense in the formulation of the memorandum that has been forwarded to the President on this issue. I would expect that the Department of Defense would have been consulted at an earlier stage on an issue that so clearly carries with it significant implications for the national security of the United States.

The Chairman of the Joint Chiefs of Staff shares these views.

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THE JOINT CHIEFS OF STAFF
WASHINGTON, D.C. 20301

JCSM-119-78
18 April 1978

MEMORANDUM FOR THE SECRETARY OF DEFENSE

Subject: Comprehensive Test Ban (U)

1. ~~(S)~~ On 1 March 1977, the Joint Chiefs of Staff provided* their views regarding a Comprehensive Test Ban (CTB) and possible negotiations with the Soviet Union. These views have not changed. In light of the initiation of formal trilateral negotiations last October and the ongoing interagency studies, the Joint Chiefs of Staff believe it appropriate to address a matter of principal concern--maintenance of, and confidence in, the US nuclear deterrent posture under a CTB.

2. ~~(S)~~ The Joint Chiefs of Staff continue to believe that a complete ban on all nuclear testing is not in the best interest of the United States. They believe any test ban must specifically provide for adequate nuclear testing in order to:

a. Maintain high confidence in the reliability of US nuclear weapons and hence confidence in the US nuclear deterrent.

b. Avoid undesirable asymmetries which are otherwise likely to result due to the inability of the United States to verify compliance with the test ban.

3. ~~(S)~~ To assure high confidence in the nuclear deterrent, certain minimum nuclear testing requirements must be fulfilled. These requirements include:

a. Identifying and correcting reliability and potential safety problems in existing nuclear weapons.

b. Replacing nuclear weapons reaching the end of their stockpile life.

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(14)

c. Adapting existing warhead designs to new delivery systems with high confidence.

d. Incorporating into existing warheads systems to enhance safety, security, and command and control.

e. Insuring survivability of current and future US weapon systems in a nuclear effects environment, including effects from new enemy weapon systems.

These minimum requirements should be able to be fulfilled at the level of testing necessary to assure confidence in nuclear stockpile reliability.

4. ~~(S)~~ At the Special Coordination Committee meeting of 22 March 1978, three options were discussed which might be applied under a CTB regime.

a. Option A--Self-Regulation. This option would ban testing without defining what activities were permitted or precluded.

b. Option B--Periodic Treaty Review. This option would also ban testing but would include explicit provision for periodic review with the understanding that serious problems with the US stockpile could prompt action to seek treaty amendments to allow limited testing.

c. Option C--Provision for Continued Testing. This option would allow some nuclear tests limited by yield, number of tests, agreed phaseout period, or date of entry into force.

The Self-Regulation and Periodic Treaty Review options, which would preclude necessary weapons testing, would contribute to long-term strategic instability because the United States would be unable to meet the criteria stated in paragraph 2 above. Further, the Periodic Treaty Review option, by deferring the question of testing, might place the United States in an unacceptable position should the need arise to seek treaty amendment. The political consequences of seeking treaty amendment, or failing that, unilateral abrogation of the treaty, are such that the United States might find itself in the position of having to accept a high military risk. The Appendix provides additional discussion of the Periodic Treaty Review option.

5. ~~(S)~~ The Joint Chiefs of Staff conclude that continued testing is essential to maintain the US nuclear deterrent posture. Therefore, they cannot support a test ban which:

a. Does not specifically provide for the degree of testing necessary to maintain confidence in stockpile reliability.

b. Could lead to asymmetries because of the inability of the United States to verify compliance.

The Joint Chiefs of Staff reserve judgment on the numbers of tests and yields required pending further technical review and consideration of a Department of Energy position on these questions.

6. (U) The Joint Chiefs of Staff request that you support their views and that you also convey these views to the President prior to his decision on the negotiating position for the next round. In this connection, a decision should be reached as a matter of urgency since the level of testing could impact significantly on the US approach to verification and peaceful nuclear explosion issues.

For the Joint Chiefs of Staff:

David C. Jones

DAVID C. JONES
Acting Chairman
Joint Chiefs of Staff

Attachment

Reference:
* JCSM-52-77, 1 March 1977, "Comprehensive Test Ban Issues (U)"

APPENDIX

DISCUSSION OF PERIODIC TREATY REVIEW OPTION

The Periodic Treaty Review option does not allow for activities which are essential for stockpile reliability and, in view of limitations on verification capabilities, would contribute to undesirable asymmetries and subsequent strategic instability. Proponents of this option state that it addresses stockpile reliability problems by providing a possible opportunity to amend the treaty to permit testing after a specified period. The Joint Chiefs of Staff, however, do not support this option because:

1. Adoption of this option assumes that the stockpile will remain reliable for the specified period--an assumption contrary to past experience. When failure indications are first observed, (b)(1) Safety deficiencies which disable an entire warhead type could also occur unexpectedly (b)(1) Moreover, requirements for replacement warheads and for adaptation of existing warheads to new delivery systems--both of which may require testing--will likely occur before the end of the specified period. Examples of such requirements which will require testing are replacement of the W48 warhead (155mm projectile) with the W82 and adaptation of the modified B-43 bomb to provide an improved delivery capability. The lack of testing could result in stockpile deficiencies of sufficient magnitude to degrade seriously the US nuclear

deterrent before the end of the initial treaty period. Thus, the assumption that the US nuclear weapons stockpile and consequently the US deterrent forces are necessarily secure and reliable for the period does not appear valid.

2. Under this option, there would be no way to incorporate those improvements in safety, security, command, and control which require nuclear testing for certification. With the worldwide increase in terrorism, heavy pressures for such improvements can be expected, and the alternative to these improvements could be severe constraints on operational flexibility and reduced effectiveness of US nuclear forces.

3. With regard to the review conference itself, the issue of stockpile reliability is so fundamental to the credibility of the US nuclear deterrent that it is unlikely that the United States would reveal such problems in order to support its case for testing.

ENCLOSURE A

THE JOINT CHIEFS OF STAFF
WASHINGTON, D.C. 20301

JCSM-164-78
12 May 1978

MEMORANDUM FOR THE SECRETARY OF DEFENSE

Subject: Cutoff of Production and Transfer of Fissionable Materials (U)

1. ~~(S)~~ On 31 March 1978, you informed the Assistant to the President for National Security Affairs of your views, shared by the Chairman, Joint Chiefs of Staff, on cutting off production of fissionable materials for nuclear weapons and transferring enriched uranium from the stockpile to peaceful uses.

2. ~~(S/RD)~~ The Joint Chiefs of Staff firmly believe that US support for any proposal on the cutoff of production and transfer of fissionable materials is not in the best interest of the US national security for the reasons discussed in the Appendix and outlined below:

a. The limited availability of special nuclear materials

(b)(1)

[redacted]

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b. Verification of a cutoff agreement with an acceptable degree of assurance cannot be expected. Unilateral national technical means cannot adequately verify that fissionable materials are not being produced, and it is extremely unlikely the Soviet Union would permit the onsite inspection necessary for adequate verification. Even with inspection of reactors and reprocessing facilities, detection of undeclared facilities in the closed Soviet society would not be expected. It is unlikely that the International Atomic Energy Agency would be able or permitted by the Soviet Union to detect violations, and that agency lacks enforcement authority. Verification of a transfer agreement would also be impossible without intrusive onsite inspection.

c. It is mandatory that the United States continue to produce highly enriched uranium (HEU) fuel for naval reactors and tritium to maintain operational nuclear warheads now in the stockpile. Without sufficient fuel for the manufacture of new reactor cores, there would be long-term impact on the mobility of the nuclear-powered warships for both strategic and tactical missions.

d. If HEU and tritium production were permitted under an agreement, the verification issue would be severely complicated. Neither the United States nor the Soviet Union is likely to permit its naval HEU or tritium production facilities to be sufficiently monitored to insure that SNM for weapons is not also being manufactured. This must be of particular concern because any facility producing tritium is also capable of producing plutonium and, for any given amount of preprocessed material, 72 times more plutonium can be produced than tritium.

3. ~~(S)~~ The Joint Chiefs of Staff conclude that a cutoff and transfer proposal should not be reaffirmed, initiated, or supported by the United States, and they request that you support their views.

For the Joint Chiefs of Staff:

Signed

DAVID C. JONES
Acting Chairman
Joint Chiefs of Staff

Attachment

APPENDIX TO ENCLOSURE A

VIEWS OF THE JOINT CHIEFS OF STAFF ON CUTOFF OF PRODUCTION AND TRANSFER OF FISSIONABLE MATERIALS (U)

1. ~~(S/RD)~~ The Joint Chiefs of Staff emphasize that the limited availability of special nuclear materials (SNM)

(b)(1)

(b)(1),(b)(3):42 USC §2162(a)-- (RD)

[redacted]

3. (S/RD) It is mandatory that the United States continue to produce highly enriched uranium (HEU) fuel for naval reactors and tritium to maintain operational nuclear warheads now in the stockpile. Without sufficient fuel for the manufacture of new reactor cores, there would be long-term impact on the mobility of the nuclear-powered warships which fulfill both strategic and tactical missions. Even if HEU production for naval reactors and tritium production were permitted under a cutoff and transfer agreement, the verification issue would be severely complicated. Neither the United States nor the Soviet Union is likely to permit

its naval HEU or tritium production facilities to be sufficiently monitored to insure that SNM for weapons production is not also being manufactured. Associated with verification problems is the fact that any facility producing tritium is also capable of producing plutonium. Of particular concern is that for any given amount of preprocessed material, 72 times more plutonium can be produced than tritium.

ENCLOSURE B

DISCUSSION

1. ~~(S)~~ It is appropriate for the Joint Chiefs of Staff to convey to the Secretary of Defense their views regarding the cutoff of fissionable materials for weapons use and the transfer of fissionable material to peaceful uses. The cutoff and transfer (COAT) of fissionable materials is not in the best interest of the US national security. A COAT proposal could restrict US force options which are already likely to be constrained by the outcome of the Comprehensive Test Ban negotiations and a new SAL treaty. Additionally, should a SALT II agreement not be reached, a COAT agreement could prevent the United States from meeting the resulting nuclear weapon requirements of the force structure.

2. ~~(S/RD)~~ The limited availability of special nuclear materials

(b)(1)

[redacted]

* JCS 2430/315-3
** JCS 2143/511

(b)(1) [redacted]

3. ~~(S)~~ Verification of a cutoff agreement would at best be inexact and subject to large uncertainties. It is extremely unlikely that the USSR would permit onsite inspection to the extent necessary to adequately verify the treaty. Even if the Soviets accepted inspection of reactors and reprocessing facilities, detection of undeclared facilities in the closed Soviet society will be a major problem. [redacted] (b)(1),(b)(3):42 USC §2162(a)-- (RD) Bypassing International Atomic Energy Agency (IAEA) controls (possible if the Soviets build in restrictions on inspections), using new power reactors with online refueling, and use of newer uranium enrichment processes at hidden sites are additional means by which the Soviets could continue to produce SNM without detection. Depending on IAEA to verify a cutoff agreement for highly enriched uranium (HEU) is not realistic. IAEA has not yet been able to devise an effective means of safeguarding any kind of enrichment plant because of the problem of access to proprietary information. There is no reason to believe the Soviets would be any more accommodating in permitting IAEA inspectors in their facilities. Additionally, IAEA inspects declared facilities only; it has no mandate to look for undeclared facilities. Also, a major problem in verification is that HEU has legitimate and important nonweapon applications that further complicate verification. Plutonium verification offers the same problems as in the case of HEU.

* JCS 2458/993

4. (S) To evaluate the desirability of a cutoff, the impact that such a proposal would make on the Soviet nuclear stockpile should be considered. However, there is no direct method for estimating Soviet nuclear material requirements for their stockpile. While many of the current strategic delivery systems can be estimated with good confidence, estimates of Soviet nuclear material requirements for individual warheads are imprecise at best. This is due to the fact that nuclear material requirements are, in many cases, a strong function of the yield desired for the system. This, in turn, is a function of the intended use of the weapon systems and other system characteristics, such as accuracy.

ENCLOSURE

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THE JOINT CHIEFS OF STAFF
WASHINGTON, D.C. 20301

JCSM-188-78

30 MAY 1978

MEMORANDUM FOR THE SECRETARY OF DEFENSE

Subject: Presidential Decision on Comprehensive Test Ban (U)

1. ~~(S)~~ Presidential Decision (PD)/NSC 38 announced that in view of the importance of maintaining confidence in safety and reliability of US stockpiled nuclear weapons, the President has decided that the United States should propose a fixed-duration Comprehensive Test Ban (CTB) treaty of 5 years, with provision for nuclear weapon experiments of (b)(1) [redacted] In forwarding the treaty to the Senate for ratification, the President would state that the United States intends to resume testing at the expiration of the treaty, for safety and reliability purposes only, unless testing is shown not to be necessary. Any further agreement on testing limitations after the 5-year treaty would be presented to the Senate for ratification.

2. ~~(S)~~ The Joint Chiefs of Staff consider that the test ban, as outlined, would involve significant military risks. In a memorandum* which you forwarded to the President on 22 April 1978, the Joint Chiefs of Staff stated they believe that a test ban must allow continued testing at a level sufficient to:

a. Maintain high confidence in the reliability of US nuclear weapons and hence confidence in the US nuclear deterrent.

b. Avoid undesirable asymmetries which are otherwise likely to result due to the inability of the United States to verify compliance with the test ban.

3. ~~(S)~~ Recent discussions which the Joint Chiefs of Staff have held with Department of Energy officials and their laboratory directors, upon whom the United States must rely for technical judgments concerning the reliability of US nuclear weapons, have further underscored the requirement for continued testing to maintain stockpile reliability. These experts have stated that, under a CTB with zero testing over an extended period, stockpile reliability will be degraded. They have taken the

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(16) Enclosure

position that the most current nuclear warheads and bombs in the US stockpile cannot be maintained without nuclear testing. Their current best estimate is that the required nuclear yield for that purpose is at least (b)(1) With nuclear testing permitted at (b)(1), it is likely that the current nuclear weapon stockpile could be maintained in a safe and reliable condition. The Joint Chiefs of Staff have found these assessments persuasive.

4. ~~(S)~~ Based on available information, Soviet reliability problems may not be as severe, since the Soviets' typically heavier weapons and larger payloads have allowed them to use coarser design criteria which are not as susceptible to problems as the high-technology US designs. This is likely to cause an asymmetric degradation of the stockpiles. Assuming that the Soviets recognize this, they may eventually perceive a strategic advantage, and the asymmetry therefore would become destabilizing.

5. ~~(S)~~ The announced intention to restrict resumption of testing to that necessary for weapons safety and reliability appears to preempt decisions concerning weapons development which are better made in the context of other arms control agreements. The United States may be unilaterally restricting development of new strategic weapons, without any similar restraint upon the Soviets if a SAL agreement or other agreements reached do not restrict new strategic weapons development. Moreover, such an unfavorable asymmetry may also be imposed on the development of new theater/tactical nuclear weapons, at least until an arms control agreement with reciprocal restraints might be achieved.

6. ~~(S)~~ (b)(1) Current technical analyses of present and projected US monitoring capabilities indicate that the Soviets would be able to conduct nuclear testing in the (b)(1) Experts advise that, even if the most capable network of internal seismic stations now being considered (which would require several years to install) is agreed to by the Soviets, this detection and identification limitation will still apply. Thus, the United States will face a situation wherein the Soviets could test without detection and the United States will not test--a situation that could lead to asymmetries detrimental to the credibility of the US deterrent.

JCS 2482/

Enclosure

7. ~~(S)~~ Experience with the nuclear stockpile has demonstrated that serious problems can arise during a 5-year ban on nuclear testing. The decision in PD/NSC 38 does not provide for testing to address stockpile reliability problems which may arise during the period of the treaty. In the event that a serious problem arises, the United States would either have to exercise the "supreme national interest" withdrawal clause or depend on a less reliable deterrent force. The Joint Chiefs of Staff believe that, rather than accept the prospect of placing the United States in this undesirable situation, the United States should initially seek to negotiate a treaty which lowers the testing threshold to the level of verification capability. Such a lowered threshold could provide an opportunity to learn how to deal more confidently with stockpile reliability problems in an environment of ~~restricted~~ testing, while at the same time observing Soviet performance under the treaty and upgrading US monitoring capabilities.

8. ~~(S)~~ JCS discussions with the nuclear laboratory directors also have confirmed the belief of the Joint Chiefs of Staff that retention of skilled scientists and engineers at the US nuclear weapons laboratories is essential to maintain the stockpile and retain a nuclear weapons design capability. The Joint Chiefs of Staff concur with the judgment of the laboratory directors that it is unlikely that the necessary number of skilled scientists and engineers can be retained throughout a 5-year test suspension, even under the incentives of a strong safeguards program.

9. ~~(S)~~ In addition to the military and technical considerations expressed above, there are also politico-military implications which should be given consideration. The Joint Chiefs of Staff recognize that it is in the US national interest to stop nuclear proliferation. However, they are not at all certain the balance of considerations with respect to a test ban, as outlined, would contribute substantially to nonproliferation. Further, if US allies were to lose confidence in the ability of the United States to maintain a credible and reliable stockpile and, hence, in the deterrent quality of US nuclear guarantees, they could be disposed to develop or increase nuclear stocks.

10. ~~(S)~~ The Joint Chiefs of Staff judge the military risks to national security to be serious. The issue is considered to be the adequacy of the US nuclear deterrent forces--both perceived and actual--and the equivalence of those forces to those of the Soviet Union. The magnitude of the risks and the potential consequences compel the Joint Chiefs of Staff to conclude that the negotiating position could result in a treaty which would adversely affect the national security interests of the United States.

DCS 2482/

11. ~~(S)~~ The Joint Chiefs of Staff request that you forward this memorandum to the President.

For the Joint Chiefs of Staff:

David C Jones

DAVID C. JONES
Acting Chairman
Joint Chiefs of Staff

Reference:
* JCSM-119-78, 18 April 1978, "Comprehensive Test Ban (U)"

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THE JOINT CHIEFS OF STAFF
WASHINGTON, D.C. 20301

JCSM-52-77
1 March 1977

MEMORANDUM FOR THE SECRETARY OF DEFENSE

Subject: Comprehensive Test Ban Issues (U)

1. ~~(S)~~ The purpose of this memorandum is to transmit the views of the Joint Chiefs of Staff on the Comprehensive Test Ban (CTB) issues and to provide a basis for the DOD response to PRM/NSC-16.

2. ~~(S)~~ After a careful review of the Interagency Working Group's response to the PRM, the Joint Chiefs of Staff have concluded that, although the facts developed in the response do not support a CTB at this time, the presentation of the substantive issues in the Executive Summary could result in misleading conclusions upon which future US security policy and negotiating strategy may be based. It is, therefore, essential that these issues be clarified. The issues of utmost importance concern the impact of a CTB or moratorium on US military capabilities and the adequacy of US intelligence capabilities both to ascertain the status of Soviet weapons programs and to monitor compliance with a CTB agreement.

3. ~~(S)~~ The Joint Chiefs of Staff recognize the longstanding US policy regarding a comprehensive ban on nuclear testing within the context of an adequately verified agreement, including the commitments made in the Limited Test Ban Treaty (LTBT), Non-Proliferation Treaty, and Threshold Test Ban Treaty (TTBT). It must be pointed out, however, that this policy was developed at a time when the United States was in a position of clear strategic superiority. Presumably, a CTB at that time would have slowed the rate at which the Soviet Union could have improved its strategic forces and would have delayed the point at which it could have achieved parity. The strategic situation has changed drastically in the last few years, and, although there are differing opinions as to the relative military advantages held by either the United States or the Soviet Union in specific areas, it is generally agreed that the two powers are now in a state of overall rough equivalence.

4. (S) Whether the trend of increasing strength of the Soviet Union relative to the United States will taper off in the future is a matter of considerable debate within the Intelligence Community; but a key point missed in the PRM-16 Executive Summary is that [redacted] (b)(1) [redacted] It is impossible to project the threat which may now be developing and which may not be clearly perceived by the United States until such time as a CTB would make it difficult or impossible to respond.

5. (S) Current US force improvement initiatives have been taken primarily to respond to threats which have been postulated with some certainty. A CTB agreement will limit US ability to develop military systems which are essential to respond to these postulated threats. It is recognized that a CTB which includes prohibition of peaceful nuclear explosions (PNEs) will constrain the Soviet Union's ability to develop new initiatives. However, the Joint Chiefs of Staff emphasize that a CTB may render the United States virtually unable to respond to the future threat which may now be developing and, thus, is unconstrained by the effects of a CTB.

6. (S) National policy calls for development and maintenance of a deterrent and warfighting capability across the spectrum of warfare, ranging from strategic nuclear offensive and defensive operations through tactical nuclear, conventional, and unconventional operations. To support this policy, the existing strategy provides for forces which are highly selective, effective, flexible, and responsive to the requirements of the National Command Authorities. By continuing a strong technological capability made possible under the constraints of the LTBT through the maintenance of a viable underground test program, the United States has continued the development of nuclear capabilities which will assist in the fulfillment of national policy objectives. However, without the present underground testing capability, the US Armed Forces could not confidently exploit advanced nuclear weapons development technology or nuclear weapons effects technology to provide these capabilities nor could they assure the reliability either of new designs, of older nuclear weapons which have been stockpiled over long periods of time, or of replications of older tested designs. Therefore, the Joint Chiefs of Staff believe that, for the foreseeable future, continued nuclear testing will be necessary.

7. (S) Of concern to the Joint Chiefs of Staff are weapon system cost implications attendant to a CTB, especially in terms of special nuclear materials (SNM) and (b)(1) (b)(1) Specific tests are planned to address these considerations for a number of weapon systems. If nuclear testing is not allowed to confirm the viability of specific designs for low SNM usage, particularly for M-X, TRIDENT II, and cruise missiles, it will be necessary to adapt existing designs which use relatively large amounts of SNM. Currently planned availability of SNM would be insufficient to meet projected force levels of these and other systems, and a significant investment (up to $2 billion) may be required to supply an adequate SNM stockpile, provided the technological problems of reactor restart are solvable and that satisfactory environmental impact statements can be quickly approved. Further, (b)(1) designers must be extremely conservative and will overcompensate to insure an adequate margin of safety. The cost penalties associated with this approach can mount rapidly, and system effectiveness can be reduced drastically (b)(1)

8. (S) In the view of the Joint Chiefs of Staff, the adequacy of verifying a CTB agreement is dependent on the ability unequivocally to assure the national authorities that no potential adversary is achieving military benefits through nuclear testing. Although the PRM-16 response points out that improvements to US national technical means could reduce the likelihood of undetected tests, the Executive Summary fails to note that the US capability (b)(1)

9. (S) The Executive Summary overemphasizes the probabilities that the leadership of the Soviet Union would be unwilling to conduct an evasion program. In the past, the United States has officially notified the Soviet Union of 21 violations of the LTBT, but all charges have been denied by the Soviet Union. There is also some question by experts in the United States about two Soviet detonations which may have exceeded the 150 kt limit in the informal understanding regarding the TTBT. It is recognized that these instances may be considered by some as of a different nature than a violation of a CTB. However, it must still be pointed out that a significant probability of undetected clandestine testing exists, that unambiguous detection and identification may be impossible in many cases, and that even when clear evidence of a violation exists, any charges against the Soviet Union may be meaningless.

10. (S) In view of the above, the Joint Chiefs of Staff believe that a CTB is not in the best interests of the United States at this time because of:

a. (b)(1)

b. (b)(1)

c. (b)(1)

d. (b)(1)

11. (S) If a decision is made to proceed with negotiations for a CTB, the Joint Chiefs of Staff consider the following points to be pertinent:

a. An unverified or unilateral moratorium should be avoided.

b. Nuclear testing should continue during CTB negotiations, and the effective date of a CTB should be selected so as to permit the completion of testing for key systems.

Although some systems now under development might be placed in the stockpile without further planned testing, it would be at the cost of significantly reduced effectiveness and reliability. It should be noted that testing requirements for (b)(1) (b)(1) was ignored throughout most of the PRM-16 response but particularly in the table in the Executive Summary which outlines the accelerated test plan.

c. Consideration should be given to initiating an increase in US production capability for SNM.

d. PNEs should not be permitted in a CTB environment. Despite a lengthy exploration in the PRM-16 response to find ways of accommodating PNEs in a CTB with minimum risk to national security, there appears to be no feasible way to prevent military advantages accruing from the conduct of PNEs.

e. All nuclear powers should eventually be signatory to a CTB. In the short term, only the Soviet Union threatens US security. However, long-term advances by the PRC or other countries also could become a factor. Therefore, any cessation of testing must allow for periodic review and a clear opportunity to renew testing if all nuclear weapon states do not adhere within a reasonable period of time.

f. The TTBT and Peaceful Nuclear Explosions Treaty should be ratified as soon as possible.

12. (U) The Joint Chiefs of Staff request that you consider their views in concluding your review of PRM/NSC-16.

For the Joint Chiefs of Staff:

George S. Brown

GEORGE S. BROWN
Chairman
Joint Chiefs of Staff

Copy to:
Director, DIA
Director, DNA

~~SECRET~~

ENCLOSURE

THE JOINT CHIEFS OF STAFF
WASHINGTON, D.C. 20301

JCSM-223-78
29 June 1978

MEMORANDUM FOR THE SECRETARY OF DEFENSE

Subject: Comprehensive Test Ban (U)

1. (S) The purpose of this memorandum is to provide the views of the Joint Chiefs of Staff on a Comprehensive Test Ban (CTB) with the following characteristics:

a. Fixed duration of 3 years.

b. Nuclear weapons testing limited to yields up to (b)(1 (b)(1) while the treaty is in force.

c. Treaty termination after 3 years, with any replacement treaty subject to advice and consent of the Senate for ratification.

Moreover, the Joint Chiefs of Staff understand that, following treaty termination, underground nuclear weapons testing up to (b)(1) would resume without restrictions on number or purpose of tests.

2. (S) The Joint Chiefs of Staff believe that a test ban must:

a. Insure high confidence in the reliability of US nuclear weapons and hence confidence in the US nuclear deterrent.

b. Avoid undesirable asymmetries which are otherwise likely to result due to the inability of the United States to verify compliance with the test ban.

3. (S) The Joint Chiefs of Staff also:

a. Find persuasive the Department of Energy (DOE) assessments underscoring the requirement for continued testing to maintain stockpile reliability. DOE's current best estimate for that purpose is at least (b)(1)

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~~SUBJECT TO GENERAL DECLASSIFICATION~~
~~SCHEDULE OF EXECUTIVE ORDER 11652~~
~~AUTOMATICALLY DOWNGRADED AT TWO~~
~~YEAR INTERVALS~~
~~DECLASSIFIED ON DECEMBER 31, 1986~~

(b)(1)

These views of the Joint Chiefs of Staff remain valid independent of treaty duration. The proposed treaty as outlined in paragraph 1 above fails to meet these concerns.

4. (S) A treaty of 3 years' duration would be an improvement over 5 years because the risk of stockpile degradation and undesirable asymmetries should be lower. However, serious unexpected stockpile problems could occur at any time. It should be noted that, based on present techniques, stockpile reliability problems would not be solved by testing at (b)(1 (b)(1) Such experiments would, however, assist to a small degree in maintaining design expertise in the weapons program, furthering US knowledge of nuclear technology, and helping to prepare for resumption of testing at treaty termination. Verification under the proposed 3-year treaty would still be inadequate, and the USSR could conduct undetected nuclear tests of significant yields.

5. (S) To make certain that the reliability of the US nuclear stockpile is maintained by the resumption of underground nuclear testing at the expiration of the treaty, it is imperative that the United States make preparations during the treaty period to reinitiate testing. To this end, programs should be developed and annual funding should be provided to permit immediate resumption of testing at the expiration of the treaty. A safeguards program should be structured accordingly. This safeguards program, including a guarantee of resumption of testing, should be an integral part of the ratification process.

6. (S) Advocates of a CTB state such action will provide significant benefits for nonproliferation. The Joint Chiefs of Staff have found no persuasive evidence to support this contention.

7. (S) In summary, the Joint Chiefs of Staff continue to believe that a nuclear test ban should permit testing at the (b)(1) At this level, DOE has estimated that stockpile reliability could be maintained. Additionally, technical (b)(1)

of 3 years' duration which provides for testing at the expiration thereof incurs less risk than a treaty of 5 years' duration with no testing assured at expiration. During a 3-year period, barring surprises, there likely would be less degradation of stockpile reliability; and the asymmetries resulting from the lack of verification would be less. With respect to nonproliferation benefits of the proposed 3-year treaty, the Joint Chiefs of Staff believe that the entire nonproliferation issue should be addressed in greater depth at the interagency level.

8. (S) The Joint Chiefs of Staff conclude that the military risks to national security are still serious for a treaty of 3-years' duration. They believe that the adverse military risks to US national security of a 3-year test ban could be offset to some extent if a safeguards program were implemented that assured, among other things, resumption of testing at treaty expiration. Acceptability of such a treaty depends on judgments concerning its contribution to US nonproliferation goals as compared with these military risks. On balance, the Joint Chiefs of Staff continue to believe a CTB with testing permitted up to levels at which verification is adequate best serves US national security interests.

9. (U) The Joint Chiefs of Staff request that you forward this memorandum to the President.

For the Joint Chiefs of Staff:

David C Jones

DAVID C. JONES, General, USAF
Chairman, Joint Chiefs of Staff

THE JOINT CHIEFS OF STAFF
WASHINGTON, D.C. 20301

JCSM-292-79
3 October 1979

MEMORANDUM FOR THE SECRETARY OF DEFENSE

Subject: Status Report on the Adequacy of Fulfilling the Limited Test Ban Treaty Safeguards (U)

1. (U) The Appendix contains the 16th Status Report on the adequacy of fulfilling the safeguards to the Limited Test Ban Treaty during the period 1 October 1976 to 30 September 1978.

2. (S) The Joint Chiefs of Staff conclude that support for Safeguard A (Underground Nuclear Testing) was marginally adequate, Safeguard B (Laboratory Facilities and Programs) was adequate, and Safeguard C (Nuclear Readiness to Test) was adequate. Overall support for Safeguard D (b)(1) Treaty Monitoring Capabilities) (b)(1),(b)(3):50 USC §403(g) Section 6 Actions are underway or planned, which, if successfully implemented, are expected to meet the requirements of Safeguard D monitoring in the early 1980's. These actions should be fully supported.

3. (U) The Joint Chiefs of Staff support the recommendations in the Appendix and specifically emphasize the need for:

a. (U) Adequate support and funding for the future weapons research, development, and testing requirements.

b. (U) Continued support and adequate funding for the Department of Energy (DOE) nuclear weapons laboratories and test site and the DOD laboratory programs, including replacement or modernization of laboratory and test site equipment and facilities.

c. (U) Improvements, including feasible interim measures, to the US nuclear test monitoring capability.

(b)(1)

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4. (S) If current initiatives concerning a possible Comprehensive Test Ban Treaty (CTBT) are successful, increased emphasis should be given to Safeguards B and D. If underground nuclear testing is not permitted in the future, support of weapons laboratory activities becomes even more critical to maintaining a viable nuclear weapons deterrent force. Additionally, the responsibility for CTBT monitoring will require that appropriate improvements, beyond those outlined in the Appendix, be made in US monitoring capabilities.

5. (U) Without attachment, this memorandum is removed from the ~~RESTRICTED DATA~~ category and the following markings may be removed: (b)(1)

For the Joint Chiefs of Staff:

JAMES E. DALTON
Major General, USAF
Vice Director, Joint Staff

Attachment

Copy to:
Director, Office of Military Applications, DOE
Director, DIA
Director, DNA

~~SECRET-RESTRICTED DATA~~

SIXTEENTH STATUS REPORT ON THE ADEQUACY OF FULFILLING THE LIMITED TEST BAN TREATY SAFEGUARDS (U)

APPENDIX

to

JCSM-292-79

(b)(1)

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(b)(1)

SIXTEENTH STATUS REPORT ON THE ADEQUACY
OF FULFILLING THE LIMITED TEST BAN
TREATY SAFEGUARDS
TABLE OF CONTENTS

GLOSSARY

ABL	atmospheric burst locator
ADM	atomic demolition munitions
AEC	Atomic Energy Commission
AEDS	Atomic Energy Detection System
AFAP	artillery fired atomic projectile
AFSATCOM	Air Force Satellite Communications
AFSC	Air Force Systems Command
AFTAC	Air Force Technical Applications Center
ALCM	air-launched cruise missile
ANFO	ammonium nitrate and fuel oil
APACHE	Assessment of Pacific Communications for Hardening to EMP
ARES	Advanced Research Electromagnetic Pulse Simulator
AS	Air Station
ASW	antisubmarine warfare
AUTODIN	Automatic Digital Network
AUTOVON	Automatic Voice Network
BMD	ballistic missile defense
cal	calories
C^3	commmand, control, and communications
CEP	circular error probable
CIA	Central Intelligence Agency
CINCPAC	Commander in Chief, Pacific
cm	centimeter
CONUS	continental United States
CTB	comprehensive test ban
CTBT	Comprehensive Test Ban Treaty
CW	continuous wave
DARPA	Defense Advanced Research Projects Agency
DCA	Defense Communications Agency
DMSP	Defense Meteorological Satellite Program
DNA	Defense Nuclear Agency
DOD	Department of Defense

DOE	Department of Energy
DOS	Digital O System
DSP	Defense Support Program
EMP	electromagnetic pulse
ER	enhanced radiation
FRS	forward recording site
FY	Fiscal Year
GMT	Greenwich mean time
GPS	Global Positioning System
HE	high explosive
HEST	high explosive simulation tests
HF	high frequency
HUMINT	human source intelligence
IHE	insensitive high explosive
INCA	Integrated Nuclear Communications Assessment
IONDS	Integrated Operational NUDET Detection System
IR	infrared
(b)(1)	
kg	kilogram
km	kilometer
kt	kiloton
kw	kilowatt
LES	Lincoln Laboratories Experimental Satellite
LIDAR	Light Detection and Ranging
LTBT	Limited Test Ban Treaty
LWIR	long-wavelength infrared
m	meter
MAC	Military Airlift Command
mb	magnitude, body wave
MIRV	multiple independently targetable reentry vehicle
MPS	multiple position system
Mt	megaton
M-X	Missile-X

NAS	Naval Air Station
NATO	North Atlantic Treaty Organization
(b)(1)	
NICS	NATO Integrated Communications System
NICSMA	NATO Integrated Communications Systems Management Agency
NOSTS	Nuclear Operation Systems Tests
NS	Naval Station
NTS	Nevada Test Site
NUDET	nuclear detonation
O&M	operations and maintenance
OSTP	Office of Science and Technology Policy
PACOM	Pacific Command
PNE	peaceful nuclear explosion
(b)(1)	
PREMPT	Program for EMP Testing
Pu	plutonium
R&D	research and development
RADEC	radiation detection
RDT&E	research, development, test, and evaluation
RRR	reduced residual radiation
RV	reentry vehicle
SAFCA	Safeguard Communications Agency
SAC	Strategic Air Command
SAMSO	Space and Missile Systems Organization
SDS	Satellite ~~Data~~ System
SGEMP	system generated electromagnetic pulse
SHAPE	Supreme Headquarters Allied Powers, Europe
SLBM	submarine-launched ballistic missile
SLCM	submarine-launched cruise missile
SNM	special nuclear material
SOSUS	Sound Surveillance Systems
SPS	solar power satellite
STP	Space Test Program
STS	stockpile-to-target sequence
SWIR	short wavelength infrared

TEMPS	Transportable EMP Simulator
TN	thermonuclear
TNT	trinitrotoluene
TTBT	Threshold Test Ban Treaty
USAF	US Air Force
USSR	Union of Soviet Socialist Republics
UTV	Universal Test Vehicle
VHF	very high frequency
VLF	very low frequency
V/m	volts per meter
VONSIM	AUTOVON Simulation

~~SECRET RESTRICTED DATA~~

SIXTEENTH STATUS REPORT ON THE ADEQUACY
OF FULFILLING THE LIMITED TEST BAN
TREATY SAFEGUARDS (U)

PART I

SUMMARY

1. ~~(S)~~ Adequacy of Fulfillment. During the period 1 October 1976 to 30 September 1978, support of Safeguard A (Underground Nuclear Testing) was marginally adequate, Safeguard B (Laboratory Facilities and Programs) was adequate, and Safeguard C (Nuclear Readiness to Test) was adequate. Overall support for Safeguard D (b)(1) Monitoring Capabilities) was

(b)(1),(b)(3):50 USC §403(g) Section 6

Actions are underway or planned which, if successfully implemented, are expected to meet the requirements of Safeguard D monitoring in the early 1980's.

2. (U) SAFEGUARD A (UNDERGROUND NUCLEAR TESTING)

(U) "The conduct of comprehensive, aggressive, and continuing underground nuclear test programs designed to add to our knowledge and improve our weapons in all areas of significance to our military posture for the future."

a. (U) Problems

(1) (S) Budget constraints precluded DOE from conducting the number of tests desired to support all applicable R&D objectives. However, all major weapons programs were supported, and essential testing was done to certify these new weapons. Other tests were desirable but were not done because of budget constraints. If

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this trend continues, DOE may be unable to conduct a viable advanced R&D effort. The overall DOE testing level should be greater than has been funded during the past few years; more tests should be done to support advanced development for future weapons applications. While reduced funding for FY 1977-1978 may not be critical now, future funding that covers all the needed areas of advanced weapons research should be maintained.

(2) ~~(C)~~ National policy decisions and DOD funding limitations continue to reduce the strategic and tactical nuclear weapon systems selected for upgrading or replacement by new systems. New systems effects requirements for addition to the DOD long-range test planning are being prepared by the US Air Force to support the M-X, but depend upon the decision to proceed with full scale development. No additional systems effects requirements have been identified by the other Services. Due to this lack of firm new system requirements, as well as the increased test costs, the time interval between tests in the FY 1980-1984 timeframe is 18 months. For example, no effects tests were conducted in FY 1977, and the last underground test, DIABLO HAWK, was executed in September 1978. The next major event, MINERS IRON, will not be conducted until September 1980. This frequency is insufficient to permit the most economical, efficient preparation of test beds and has led to high overhead costs because of the requirement to maintain the minimum cadre of NTS personnel, i.e., miners and uniquely skilled craftsmen and technicians required

during peak activity periods during any single test. The development of suitable very (b)(1) radiation sources in the (b)(1) range is being pursued to make the DOD program more aggressive. The development of these sources will lead to decreased "per-test" costs and permit increased frequency of testing. Current budget constraints as well as DOE priorities, however, are hampering progress in this area; DOE development efforts should be accelerated.

b. (U) Conclusion. Support for Safeguard A was marginally adequate.

c. (U) Recommendations

(1) (U) Support the DOE in developing justification for increased funding to support anticipated future weapons R&D and testing requirements.

(2) (S-RD) The Department of Defense should plan and fund for future testing at the level required to maintain a viable cost effective underground nuclear weapons effects test program. Effects test requirements associated with currently programmed military systems and new and replacement nuclear weapons should be identified by the Services and should be used to establish a DOD experimentation plan for the conduct of underground weapons effects tests. Additionally, support should be given to the effort to develop very (b)(1) radiation sources in the (b)(1) yield range to decrease per-test cost and permit increased test frequency.

3. (U) SAFEGUARD B (LABORATORY FACILITIES AND PROGRAMS)

(U) "The maintenance of modern nuclear laboratory facilities and programs in theoretical and exploratory nuclear technology which will attract, retain, and insure the continued application of our human scientific resources to those programs on which continued progress in nuclear technology depends."

a. (U) Problems

(1) (U) The postponement of replacing obsolete equipment and improving facilities because of budget constraints, if allowed to continue, will lead to a serious erosion of laboratory and testing capabilities. Plant and capital equipment funding is not included in the R&D funding.

(2) (U) The inflation rate, budget constraints, policy decisions, and emphasis on development efforts necessitated by the implemention of the TTBT and anticipation of a CTB have resulted in a reduction of advanced development efforts.

b. (U) Conclusion. Support for Safeguard B was adequate, but the recent trend of reduced support of advanced development efforts and replacement and improvement of facilities and equipment must be corrected in order to continue to maintain this safeguard.

c. (U) Recommendations

(1) (U) Adequate funding should be provided to enable the DOE nuclear weapons laboratories to continue supporting the immediate nuclear weapons requirements of the Department of Defense and to restore advanced development efforts that have been severely reduced, especially those for improved safety, security, and reliability.

(2) (U) Equipment and construction funding should be provided to enable the DOE nuclear weapons laboratories and test sites to replace obsolete equipment on an orderly basis and modernize the facilities required to meet future needs.

4. (U) SAFEGUARD C (NUCLEAR READINESS TO TEST)

(U) "The maintenance of the basic capability to resume nuclear testing in the atmosphere should that be deemed essential to national security."

a. (U) Problems

(1) (U) The maintenance of the basic capability to resume nuclear testing in the atmosphere includes the retention of personnel with expertise in atmospheric testing and closely related fields. Activities such as laboratory research, weapons design, nuclear effects simulation, and underground nuclear testing help retain some of these personnel. Although working in different capacities, personnel with actual atmospheric testing experience could still be retrieved from the system. As time passes, attrition of those personnel, and of others with related expertise, can be anticipated. Failure to retain sufficient numbers of personnel with expertise applicable to atmospheric testing could prove detrimental to planning and conducting any future atmospheric tests, should resumption of testing be deemed essential to national security. This increases the importance of maintaining viable laboratory and underground test programs to provide a nucleus of experienced personnel capable of transitioning to atmospheric testing. The current level of activity is insufficient to maintain adequate support of Safeguard C beyond the next few years.

(2) (U) Because of the greatly reduced funding level for research activities related to atmospheric testing, much of the technology associated with diagnostic instrumentation required in conducting an atmospheric test series has not evolved with the current state of the art.

(3) (U) The maintenance of Johnston Atoll and its facilities is being conducted as prescribed by the DOD transition plan. Essentially, this means that available resources will be dedicated to maintenance efforts concerned with weather tightness and structural integrity of priority facilities. There will be no upgrading/restoration of any of the facilities. This minimum maintenance program should be reappraised within the next few years.

b. (U) Conclusion. Support for Safeguard C was adequate.

c. (U) Recommendations

(1) (U) The Department of Defense and DOE should continue their support of research areas, which will help to retain sufficient numbers of personnel with expertise in atmospheric testing and closely related fields. They should maintain the remaining capability to support atmospheric testing for as long as possible.

(2) (U) The Department of Defense should support DNA/DOE efforts to maintain O&M funding for Johnston Atoll at the level necessary to retain a basic capability to resume atmospheric testing, in accordance with Presidential and DOD guidance.

5. (U) SAFEGUARD D (b)(1) TREATY MONITORING CAPABILITIES)

(U) "The improvement of our capability, within feasible and practical limits, to monitor the terms of the treaty, to detect violations,

(b)(1)

a. (U) Problems

(1) (S)

(b)(1),(b)(3):50 USC §403(g) Section 6

b. (U) Conclusions

(1) (S) The overall ability to carry out Safeguard D

(b)(1),(b)(3):50 USC §403(g) Section 6

However, actions are underway or planned

which, if successfully implemented, are expected to meet the requirements of LTBT monitoring in the early 1980's. Additionally, there are numerous R&D activities underway that may improve the US ability to achieve the objectives of Safeguard D.

(2)

(b)(1),(b)(3):50 USC §403(g) Section 6

c. (U) Recommendations

(1) ~~(S)~~

(2) ~~(S)~~

(b)(1),(b)(3):50 USC §403(g) Section 6

PART II

SAFEGUARD A--UNDERGROUND NUCLEAR TESTING (U)

(U) "The conduct of comprehensive, aggressive, and continuing underground nuclear test programs designed to add to our knowledge and improve our weapons in all areas of significance to our military posture for the future."

CRITERIA

1. (U) In 1963, the Chairman, Joint Chiefs of Staff, submitted the following criteria to the Senate Armed Services Committee for use in subsequent examinations of programs to insure that this safeguard is fulfilled:

"The underground test program should be comprehensive. Therefore, it should be revised to include all feasible objectives of the tests which we would otherwise do under conditions of unrestricted testing.

"The underground test program should be vigorous. It should proceed at a pace that will fully exploit the capabilities of existing AEC and DOD weapons laboratories. If these capabilities prove inadequate for meeting established requirements, they should be expanded.

"The underground test program should be a continuing program which insures the highest practicable progress in nuclear technology.

"The standards established to govern the type and magnitude of tests to be conducted should not be more restrictive than the spirit of the Treaty limitations."

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SCOPE

2. (C) The underground test program has consisted primarily of DOD-directed weapon effects tests and DOE-directed weapon development tests. The overall underground test program for FY 1975 through FY 1979 and related fiscal year costs are summarized below:

TYPES AND NUMBER OF TESTS[1/]

Types of Tests	FY 76+7T Tests	FY 77 Tests	FY 78 Tests	FY 79 Tests Planned
DOD				
Weapon Effects	2(2)	0(0)	1(1)	0(0)
(b)(1),(b)(3):42 USC §2162(a)-- (RD)				
Total Underground Tests	(b)(1),(b)(3):42 USC §2162(a)-- (RD)			

1/ Because some of the tests conducted have involved simultaneous detonation of 2 or more devices, the number of devices tested has been shown in parentheses to indicate the actual level of testing.
2/ HYBLA GOLD was the first DOD physics test. Refer to paragraph 5 below for additional information.
3/ Includes 1 test carried over from FY 1978.

FUNDING (In Millions of Dollars) 1/

	FY 76/7T Actual	FY 77 Actual	FY 78 Actual	FY 79 Planned
DOD	45.0 (42.3)	37.7 (33.2)	27.6 (22.9)	22.9 (17.8)
DOE	259.2 (243.4)	219.1 (193.2)	236.7 (196.0)	210.5 (163.6)
TOTAL	304.2 (285.7)	256.8 (226.4)	264.3 (218.9)	233.4 (181.4)

1/ Figures in parentheses represent constant dollars using FY 1975 as a base. An average inflation rate of 6.5 percent was used, and this inflation rate was based on price escalation indexes contained in a memorandum by the Assistant Secretary of Defense (Comptroller), 30 June 1978, "FY 1979 Revised and FY 1980 Budget Estimates Guidance."

DOD PROGRAMS

3. ~~(S-RD)~~ Objectives.

(b)(1),(b)(3):42 USC §2162(a)-- (RD)

4. (S) Tests. No underground nuclear effects tests were conducted during FY 1977. Two underground nuclear tests were conducted in FY 1978: HYBLA GOLD and DIABLO HAWK. Three tests (unfunded) related to seismic monitoring research are planned for FY 1979 and FY 1980. The next major effects test, MINERS IRON, is scheduled for late FY 1980.

5. (U) Program Highlights

a. (U) HYBLA GOLD

(1) (U) A massive effort at NTS was required during FY 1977 to prepare the test bed and experiments for this event. There were only 11 months from test conception to the test event.

(2) (S) The objectives of the HYBLA GOLD event were to obtain energy flow data that will aid in the design of the M-X trench basing concept and to develop the instrumentation necessary for a simulation test of the M-X trench model. The energy flow program will: (a) use data on the physics phenomena relating to pressure profile in a tube and study the expansion and ablation effects on that profile; (b) correlate experimental results with calculations; and (c) apply results to the design criteria of the M-X basing concept.

(3) (S-RD)

(b)(1),(b)(3):42 USC §2162(a)-- (RD)

(4) ~~(S)~~ The primary measurements of interest were pressure-time history, shock times-of-arrival, wall ablation, and pipe expansion. Data were collected on containment phenomena, background environment, debris and shock precursor. This matrix provided experimental data for refining an ablation model, verifying scaling effects, and determining the effectiveness of water versus wall ribbing as an ablator. The results will be used in design considerations of basing concepts that cannot be confidently calculated.

b. (U) DIABLO HAWK

(1) ~~(S-RD)~~ The DIABLO HAWK nuclear effects test was conducted on 13 September 1978.

(b)(1),(b)(3):42 USC §2162(a)-- (RD)

Diagnostic experiments were also fielded to document the yield and the weapons effects environments generated by the device.

(2) ~~(S)~~ Major experiments involved the MK-12A reentry vehicle currently under development for the MINUTEMAN missile system, basing mode

investigations for the developmental M-X system, and the US Navy C-4 missile system. (b)(1) An M-X, in-trench, EMP phenomenology experiment was conducted in a separate drift. The objectives were to develop basic source region EMP data, to improve the definition of EMP generation and coupling for a realistic trench geometry, and to determine the level and complexity of EMP protection required for the in-trench system. The C-4 missile body and guidance electronics were exposed in a separate scatterer. (b)(1),(b)(3):42 USC §2162(a)-- (RD) Also, experiments were conducted in support of advanced systems development, advanced technology related to reentry vehicles, (b)(1)

(4) (S) Ground shock experiments were conducted reusing the MIGHTY EPIC structures complex. These experiments studied structural response of new design concepts to high intensity ground shock loading, continued laboratory scale model response studies, and constituted the first time underground structures have been exposed to a second shock

loading from a nuclear device. Several saturated sand tunnel experiments were conducted to obtain design information for a deep-based missile egress concept. An experiment was conducted to determine the survivability and transmission performance of hardened buried cables exposed to ground shock.

c. ~~(S)~~ MIDNIGHT BLUE. Preliminary planning was begun in support of a test series requested by DARPA to determine the seismic generation source function for hard rock. Three shots are envisioned: one in FY 1979 and the last two in FY 1980.

d. ~~(S-RD)~~ HURON KING. This event is planned for execution in 3d quarter FY 1980.

(b)(1),(b)(3):42 USC §2162(a)-- (RD)

e. ~~(S-RD)~~ MINERS IRON. This event is planned for execution in late FY 1980.

(b)(1),(b)(3):42 USC §2162(a)-- (RD)

DOE PROGRAMS

6. ~~(S-FRD)~~ Test Program. During FY 1977, DOE sponsored (b)(1) at the NTS. During FY 1978, (b)(1)

(b)(1)

(b)(1),(b)(3):42 USC §2162(a)-- (RD)

7. ~~(S RD)(NF)~~ Highlights of FY 1977 Test Program. During FY 1977, the development engineering (Phase 3) of four nuclear weapon systems progressed smoothly.

(b)(1),(b)(3):42 USC §2162(a)-- (RD)

(b)(1),(b)(3):42 USC §2162(a)-- (RD)

9. (S-RD) Weapon Feasibility (Preweaponization Tests).

(b)(1),(b)(3):42 USC §2162(a)-- (RD)

Various parameter tradeoffs have been demonstrated by these tests. The results of these tests are discussed in more detail in the following sections.

(b)(1),(b)(3):42 USC §2162(a)-- (RD)

(b)(1),(b)(3):42 USC §2162(a)-- (RD)

12. ~~(S RD)~~ Weapon Feasibility (Preweaponized Tests). Nuclear testing continued to develop tested options for future strategic RVs appropriate for the M-X or TRIDENT II missile systems currently in the early stages of development by the Department of Defense. Size, weight, yield, and SNM tradeoffs have been pursued in these nuclear tests.

(b)(1),(b)(3):42 USC §2162(a)-- (RD)

PROBLEMS

13. ~~(S)~~ Budget constraints precluded DOE from conducting the number of tests desired to support all applicable advanced R&D objectives. However, all major weapon programs were supported. Essential testing was done to certify these new weapons. If this trend continues, the DOE may be unable to conduct a viable advanced R&D effort. The overall DOE testing level should be greater than has been funded in the past few years; more tests should be conducted to support advanced development for future weapons applications. While the recent funding level may not be critical for a few years, future funding should be increased if a viable program is to be maintained.

14. (S) National policy decisions and DOD funding limitations continue to reduce the strategic and tactical nuclear weapon systems selected for upgrading or replacement by new systems. New systems effects requirements for addition to the DOD long-range test planning are being prepared by the US Air Force to support the M-X but depend upon the decision to proceed with full scale development. No additional systems effects requirements have been identified by the other Services. Due to this lack of firm new system requirements, as well as the increased test costs, the time interval between tests in the FY 1980-1984 timeframe is one every 18 months. For example, no effects tests were conducted in FY 1977, and the last underground test, DIABLO HAWK, was executed in September 1978. The next event, MINERS IRON, will not be conducted until September 1980. This frequency is insufficient to permit the most economical, efficient preparation of test beds and has led to high overhead costs because of the requirement to maintain the minimum cadre of NTS personnel, i.e., miners and uniquely skilled craftsmen and technicians required during peak activity periods during any single test. The development of suitable very (b)(1) radiation sources in the (b)(1) range is being pursued to make the DOD program more aggressive. The development of these sources will lead to decreased per-test costs and permit increased frequency of testing. Current budget constraints as well as DOE priorities, however, are hampering progress in this area; DOE development efforts should be accelerated.

CONCLUSION

15. (U) Support for Safeguard A was marginally adequate.

RECOMMENDATIONS

16. (U) Support the DOE in developing justification for increased funding to support anticipated future weapons R&D requirements (including nuclear testing).

17. (S-RD) The Department of Defense should plan and fund for future testing at the level required to maintain the DOD capability to conduct a viable cost-effective underground nuclear weapons effects test program. Effects test requirements associated with currently programmed military systems and new and replacement nulcear weapons should be identified by the Services and should be used to establish a DOD experimentation plan for the conduct of underground weapons effects test. Additionally, support should be given to the effort to develop very (b)(1) radiation sources in the (b)(1) range to decrease per-test costs and permit increased test frequency.

PART III

SAFEGUARD B--LABORATORY FACILITIES AND PROGRAMS (U)

(U) "The maintenance of modern nuclear laboratory facilities and programs in theoretical and exploratory nuclear technology which will attract, retain, and insure the continued application of our human scientific resources to those programs on which continued progress in nuclear technology depends."

CRITERIA

1. (U) The following are the criteria submitted by the Chairman, Joint Chiefs of Staff, to the Senate Armed Services Committee for evaluating the fulfillment of this safeguard:

> "Broad and forward-looking research programs should be carried on which will attract and retain able, imaginative personnel capable of ensuring the highest practicable rate of progress that can be attained in all avenues of potential value to our offensive and defensive posture."

SCOPE

2. (U) Nuclear technology R&D has been progressively expanded in Government laboratories and contractor facilities since the ratification of the LTBT. DOE, through its three weapons laboratories (Sandia Laboratories, Los Alamos Scientific Laboratory, and Lawrence Livermore Laboratory), and the Department of Defense, through many Service laboratories and DNA, have expanded facility capabilities and research efforts.

3. (U) Funding for DOE and DOD programs is shown in the following table:

FUNDING (In Millions of Dollars)1/

	FY 76+7T Actual	FY 77 Actual	FY 78 Actual	FY 79 Planned
DOD	114.8(107.8)	102.2(90.1)	121.6(100.7)	145.7(113.3)
DOE	366.2(343.8)	329.2(290.2)	355.8(294.5)	371.2(288.5)
TOTAL	481.0(451.6)	431.4(380.3)	477.4(395.2)	516.9(401.8)

1/ Figures in parentheses represent constant dollars using FY 1975 as a base. An average inflation rate of 6.5 percent was used, and this inflation rate was based on price escalation indexes contained in memorandum by the Assistant Secretary of Defense (Comptroller), 30 June 1978, "FY-1979 Revised and FY 1980 Budget Estimates Guidance".

DOD PROGRAMS AND FACILITIES

4. ~~(S-RD)~~

(b)(1)

(b)(1)

5. (U) High Explosive Simulation Tests. Several tests were conducted to obtain nuclear weapons effects information for use in strategic structures hardness assessments.

a. (S) DICE THROW.

(b)(1)

b. (U) MISERS BLUFF

(1) ~~(C-FRD)~~ MISERS BLUFF was a series of HE test events to investigate ground motions generated by single and multiple burst detonations. Ground motion data from multiple, near simultaneous detonations were obtained as a data base supporting development of an analytic model to predict multiburst ground motion effects. The model will be used to investigate ground motions generated by massive attack on an MPS system such as the M-X system.

(2) ~~(C-FRD)~~ The test program was conducted in two phases. Phase I, a series of eight events using small (b)(1) spheres, was fielded at the White Sands Missile Range, New Mexico, from August to December 1977. Phase II, a series of two events using (b)(1) charges, was fielded at the Planet Ranch in western Arizona, from April to August 1978. The Phase I tests, including three multiburst events of hexagonal array pattern, provided a large quantity of baseline data from which analysts can refine and prove the model both for the larger yield and in a different (M-X typical) geology.

(3) (C-FRD) Ground motion data measurements included accelerations, particle velocities, soil stress, and soil strain (displacement). Measurements were taken both in the strong motion regions and in the far field or seismic regions surrounding the test bed. Extensive airblast data were taken, particularly on the multiple burst events. Approximately 850 channels of ground

motion and airblast data were obtained in the Phase I testing and, similarly, 550 data channels were obtained in Phase II testing.

(4) (C-FRD) The large explosive charges of Phase II provided an airblast environment useful for target response testing and a dust cloud for electromagnetic transmission testing. A number of DOD Agencies and five allied governments tested structures such as personnel shelters, scaled freeway bridges, communications shelters and antennas, and industrial factories. Electromagnetic beam experiments were conducted measuring radar and radio frequency transmission through the dust cloud. Also, laser dust cloud transmission and scattering measurements were made. Data from active instrumentation were collected and posttest inspection of the blast damage was accomplished on all items fielded.

c. (C) M-X Related Testing. HEST techniques were used to load generic M-X horizontal shelters and trench sections. A modified dynamic airblast simulator was employed to provide an in-trench airblast. Half-sized structures were used in all tests.

d. (C) HARDPAN Tests. A modified version of HEST was developed to simulate air-induced ground motions in a scaled Wing IV MINUTEMAN site geology.

(b)(1)

Information gained from this program will be used in the MINUTEMAN Upgrade Program.

6. (U) Command, Control, and Communications Assessments

a. (U) INCA. This project was initiated to develop sufficient analytical tools to allow a continuing analysis of the capability of strategic and supporting tactical communications systems to adequately support essential functions when subjected to various nuclear environments. Evaluation of strategic and theater C^3 survivability was continued during FY 1978. Onsite support to SHAPE was completed in October 1978, with particular emphasis on nuclear survivability issues associated with the development of the NICS architecture. The trans-Atlantic communications study, "MEDIA MIX," was completed and the results presented to the DCA, who requested the effort. Also completed was the communications degradation assessment for the ELITE TROOPER exercise. New efforts were initiated to evaluate the nuclear survivability of US Navy tactical C^3 systems, with emphasis on the North Atlantic (Strike Fleet) and Mediterranean Sea (Sixth Fleet) areas.

b. (U) APACHE

(1) (U) This program, a joint effort of DNA and CINCPAC, will assess the performance of Pacific area communications in an environment produced by high-altitude nuclear detonations. The program considers both EMP effects on nodes and propagation effects on links and will provide an estimate of the combined end-to-end performance of 22 critical Pacific communications networks.

(2) (U) During FY 1978, assessments of all propagation links and of the Pacific AUTOVON and AUTODIN systems were completed. Additionally, site visits to support

planned assessments of communications nodes were completed. Development of new methods of assessment of nodes against EMP was continued with concentration on microwave terminals and technical control facilities. Completion of the APACHE TEMPS test, described below, contributed significantly to the evaluation of existing methods and the development of simpler assessment methods. Project APACHE testing in Hawaii was successfully completed on 19 September 1978, some 2 years after the first test planning meeting in Hawaii. The test program provided the first simulated high-altitude EMP exposure of an element of the PACOM control, communications, and computer network. A major communication station in Hawaii was selected as the test site because of its high concentration of diverse and complex communications and computer equipment. Final test results are not yet available; however, preliminary data review indicates that: (a) pretest predictions of facility functional response have been confirmed by testing at field strength levels up to and including (b)(1) (b) a significant data base has been developed for evaluating the accuracy of voltage and current predictions; (c) data have been collected to allow a qualitative evaluation of assessment methodologies based on less complex visual, CW direct inject, and CW radiated surveys; and (d) the effectiveness of recommended hardness improvements has been demonstrated both by the lack of damage to the facility and by measurements. The results were obtained without significant disruption to the normal operations of the station.

c. (U) PREMPT. The joint DCA/DNA PREMPT was essentially completed during FY 1978. All data collected from testing of various switches were incorporated into the VONSIM computer code. An analysis of the SAFCA data was used to provide information on access lines, and this information was also folded into VONSIM. VONSIM was then exercised to assess the performance of the entire CONUS AUTOVON network in a nuclear environment. Results were briefed to DCA and to SAC.

d. (U) Support to NATO. At the request of NICSMA, DNA assembled a team to provide EMP vulnerability assessment consultation for the NATO EMP Protection Working Group. During the period 10-11 July 1978, the DNA team conducted an EMP Protection Symposium at NICSMA, Brussels, Belgium, for the NATO EMP Working Group. During the period 12-19 July 1978, the team visited selected Static War Headquarters sites in Italy and Turkey to collect data on shielding and penetration problems incident to EMP protection. DNA recommended to NICSMA a program of support to enhance the development of a NATO capability for assessing vulnerability and hardening measures against nuclear weapons detonation EMP. The cornerstone of the proposed support is DNA planning for transfer to NATO, in a systematic manner, the technology it has been developing over the past years for vulnerability assessments of C^3 facilities and to assist NATO in developing its own capability to use the technology.

7. (U) High-Altitude Effects Simulation

(b)(1)

[redacted]

b. (U) Satellite Transmission Effects Simulations. This experiment was conducted in February-March 1977. In this experiment, the communications link performance of the LES 8/9 and the AFSATCOM system signal processors were measured when the propagation path passed through an environment perturbed by a (b)(1) was ionized by sunlight, and the interaction of these ions with the earth's magnetic field and the neutral winds caused a varying electron density. The LES 8/9 radio frequency signal propagating through these variations suffered phase and amplitude fluctuations. The effects of these fluctuations on the performance of the LES 8/9 system using AFSATCOM signal processors were measured. The data are now being reduced.

c. (U) EXCEDE. The EXCEDE program, which uses rocketborne electron accelerators to produce high-altitude ionization, successfully launched a low-power SWIR experiment. The emissions a (b)(1) were measured. These data will help identify the specific species radiating at these wavelengths. A higher power accelerator package instrumented with a SWIR interferometer, an LWIR spectrometer, and other infrared and visible diagnostic instruments was launched in December 1977. (b)(1) These experiments provide valuable data not available from high-altitude nuclear tests. Excellent ground-based data were collected from EXCEDE tests at White Sands Missile Range, New Mexico, in December 1977. Tests of accelerators of approximately 25 kW have been conducted successfully. An EXCEDE Spectral Experiment was launched in October 1978. The experiment was unsuccessful because of failure associated with payload mechanical design and operation. Steps are now being taken to improve the rocketborne configuration for follow-on experiments. Simulation experiments using the excitation produced by the natural aurora are also conducted in coordination with the EXCEDE program.

8. (U) Laboratory Simulators of Nuclear Effects. Major activities conducted in the simulation program are indicated below:

a. (U) TEMPS. TEMPS was used at Pickens Mississippi for testing of an ESS-1 type AUTOVON switch. The test was completed in November 1976 and represents the final

test to be conducted under the joint DNA/DCA PREMPT Program. TEMPS was also used at a major PACOM communications station in Hawaii. The test supports work being accomplished under Project APACHE discussed in subparagraph 6b above. Because the APACHE test program was the final test currently scheduled to use TEMPS, the simulator will be stored at Kirtland Air Force Base, New Mexico.

b. (C-FRD) CW Development. Large, threat-level EMP simulators such as the TEMPS are costly to operate and pose siting problems near facilities under test. In addition, the very nature of the high-level pulse testing is potentially disruptive to the operations of tested facilities. To avoid these problems, DNA has developed a CW radiated system for use in communications facility testing. The system is easily transported, requires much less space than the TEMPS, and incorporates programmable control for power levels and frequency output. The system was used (see subparagraph 6b) to collect test data that can be compared to data collected using TEMPS pulsing. The data comparison is underway, and preliminary results are very encouraging. Modifications are planned for the CW radiated system to improve the measurement and recording of test data. After modification, the improved CW radiated system will be used as a tool in the assessment of military communications equipment vulnerability to the EMP threat.

c. (C-~~FRD~~) ARES. ARES at Kirtland Air Force Base, New Mexico, is being reconverted to its normal high-altitude EMP mode from the dispersed EMP mode. Reconversion was completed in 1978. It is currently being prepared for high-altitude EMP tests of the (b)(1),(b)(3):42 USC §2168(a) (1)(C), (FRD) system scheduled for FY 1979.

d. (C-~~FRD~~) CASINO. The CASINO simulator is located at the Naval Surface Weapons Center, White Oak, Maryland. It was designed to provide a hot filtered

(b)(1),(b)(3):42 USC §2162(a)-- (RD)

CASINO is operating satisfactorily at approximately 50 percent of the baseline fluence over 100 cm^2. Concurrently, modifications are underway to increase the dose-area product substantially and to reduce the magnetic field associated with the electron beam guidance. The latter modification is required to eliminate spurious effects on magnetic memory arrays when they are exposed to (b)(1)

e. (C-~~FRD~~) AURORA. The AURORA, located at Harry Diamond Laboratories, Adelphi, Maryland, is used to determine the effects of ionizing radiation on electronic subsystems and components. It has been, and will continue to be, employed for assessing the effects of gamma rays on

strategic offensive and defensive missile systems; tactical missile systems; satellites; certain categories of tactical communications equipment; RVs; and for evaluating nuclear effects phenomenology. AURORA has been modified so that it may be easily converted to a high current mode to drive plasma heating experiments. This modification was completed in late 1978 and will permit experiments leading to the production of (b)(1) (b)(1) The results are expected to be useful in understanding (b)(1) could be produced in the laboratory for survivability tests of full-scale RVs.

e. (C-FRD) Advanced Simulation Concepts Program. The development of techniques and hardware (b)(1) production is also under investigation in the DNA Advanced Simulation Concepts Program. The overall objective is to extend simulation state of the art to provide energy stores, conditioning, switching, electron beam control, and (b)(1) capable of providing threat level fluences for space and reentry systems tests. Existing, upgraded, and modified pulse power sources are currently being employed to optimize energy storage and switching and to drive exploding wires and other plasma radiators. In FY 1978, (b)(1) from these sources were used in the first experiments to compress a capsule containing fusionable material. This element of the Advanced Simulation Concepts Program is being conducted in cooperation with DOE laboratories. It should, after optimization, provide a method for multiplying the energy of pulsed power generators at the point (b)(1) If successful, this multiplication will be a major step in achieving a system test capability now available only

in underground nuclear weapon effects tests. This laboratory capability could prove crucial under a long-term comprehensive test ban.

f. ~~(C-FRD)~~ COCHISE. The liquid-cooled laboratory facility (COCHISE) at the US Air Force Geophysics Laboratory is designed to measure IR emissions from atmospheric molecular species. The resulting IR emissions are measured to detect radiant output in spectral regions that could

(b)(1) [redacted] COCHISE was brought into operation during FY 1976. Presently, the atmospheric processes that lead to the formation of ozone are being investigated as part of an overall survey of chemical species, which are LWIR emitters. IR emissions in the wave length range from (b)(1) have been detected for several vibrational levels of excited ozone. An effort has also started to determine which vibrationally excited

(b)(1) [redacted] The facility is being improved by increasing the energy of the electron beam. This increase will permit investigations of important LWIR emitters. An understanding of SWIR emission is required to determine what LWIR wavelengths should be considered for use by system planners.

g. ~~(C-FRD)~~ LABCEDE. The LABCEDE is a laboratory facility at the US Air Force Geophysics Laboratory, developed to investigate the production of SWIR and, perhaps, LWIR by collisions of energetic electrons with atmospheric

gaseous species. LABCEDE produces higher electron execution levels than are possible in the COCHISE facility. Taken together, the two facilities produce a wide range of emissions in the optical and IR spectral regions for nuclear effects simulation. LABCEDE and COCHISE measurements are coordinated with rocketborne IR field experiments.

DOE PROGRAMS AND FACILITIES

9. (U) Laboratory Facilities and Equipment. The three nuclear weapons laboratories--Lawrence Livermore Laboratory, Los Alamos Scientific Laboratory, and Sandia Laboratories--have continued to receive sufficient funds for meeting high priority programmatic needs. However, equipment and construction funding for replacement of obsolete equipment and needed facility improvements has been minimal.

10. (U) Test Facilities and Equipment. The local test facilities at the weapons laboratories, NTS, and Tonopah Test Range, have continued to receive funds sufficient for meeting high priority weapons program needs. However, equipment and construction funding for replacement of obsolete equipment and needed facility improvements have been minimal.

11. (U) Research and Development Programs. During FY 1977 and FY 1978, weaponization efforts supported immediate DOD requirements at the expense of advanced development.

PROBLEMS

12. (U) If allowed to continue, the postponement of replacing obsolete equipment and improving facilities because of budget constraints will lead to a serious erosion of laboratory and testing capability. Plant and capital equipment funding is not included in the R&D funding.

13. (U) The inflation rate, budget constraints, policy decisions, and emphasis on development efforts necessitated by the implementation of the TTBT and anticipation of a CTBT have resulted in a reduction in advanced development efforts.

CONCLUSION

14. (U) Support for Safeguard B was adequate, but the recent trend of reduced support for advanced development efforts and replacement/improvement of facilities and equipment must be corrected in order to continue to adequately support this Safeguard.

RECOMMENDATIONS

15. (U) Adequate funding should be provided to enable the DOE nuclear weapons laboratories to continue supporting the immediate nuclear weapons requirements of the DOD and to restore advanced development efforts that have been severely reduced, especially those for improved safety, security, reliability, and effectiveness of nuclear weapons. In addition, equipment and construction funding should be provided to enable the DOE nuclear weapons laboratories and test sites to replace obsolete equipment on an orderly basis and to modernize the facilities required to meet future needs.

~~SECRET~~

PART IV

SAFEGUARD C--NUCLEAR READINESS TO TEST (U)

(U) "The maintenance of the basic capability to resume nuclear testing in the atmosphere should that be deemed essential to national security."

CRITERIA

1. (U) On 7 January 1976, in a letter to the Chairman of the subcommittee on Arms Control, Committee of the Armed Services, US Senate, the President redefined Safeguard C to reflect current needs and conditions. The central theme of the new definition deletes the requirement for a "prompt" return to atmospheric testing. The support envisioned does, however, retain the basic capability to resume atmospheric testing should that be deemed essential. The President went on to state that:

"While a period of two to three years would probably be required to initiate a comprehensive, integrated weapon effects test program, demonstration tests could be immediately conducted by operational forces should national priorities dictate."

"Johnston Atoll will be retained to insure its availability in the event of atmospheric testing resumption, although it will not remain in active status for this use alone."

"The conduct of nuclear research and testing will insure retention of personnel with expertise in atmospheric testing and closely related fields."

~~CLASSIFIED BY DIRECTOR, J-5~~
~~REVIEW ON 7 SEPTEMBER 1999~~
~~EXTENDED BY DIRECTOR, J-5~~
~~REASON: 5210.1R, Para 2-301.3~~

BACKGROUND

2. (U) Deputy Secretary of Defense Clements tasked the Director, DNA, to coordinate a support program for the revised Safeguard C.

a. Transition to the revised Safeguard C was founded on the following key assumptions:

(1) (S) A decision to resume atmospheric testing is not expected in the near future; therefore, the requirement to maintain costly facilities, personnel, and equipment in a ready status was not appropriate. Should it be deemed necessary to resume nuclear testing in the now prohibited environments, a sufficient national priority will exist to insure provision of necessary funds and other required support.

(2) (U) Johnston Atoll will be retained by the Department of Defense to insure the atoll's availability, should atmospheric testing be necessary. Retention of existing facilities on Johnston Atoll is based on the assumption that at least 1 year will be available for rehabilitation or construction of required structures prior to any use of Johnston Atoll as a test base.

(3) (U) There will be no continuance or maintenance of other specific test facilities or equipment for atmospheric testing unless separately and explicitly agreed to by DOE and Department of Defense.

(4) (S) From the time a decision is made to conduct comprehensive nuclear testing, 2 to 3 years will be required to conduct such testing.

b. (S) In addition to the assumptions stated above, criteria for disposition of facilities on Johnston Atoll were based on the DOD guidance that facilities would not

be retained in an active status solely to support the revised Safeguard. The criteria indicated that such facilities could be used for other DOD programs provided that such use would not preclude a resumption of nuclear testing operations. Retention of existing facilities was based on the assumption that at least 1 year would be available for rehabilitation or construction of required structures prior to use of Johnston Atoll as a test base. Exceptions to the general rule included only those facilities of substantial construction that would form the core of a new test complex. These facilities would remain in an active or caretaker status. Remaining facilities were inactivated or abandoned, with and without maintenance, contingent upon existing construction replacement costs, intended use, and whether equipment and facilities would be obsolete for future testing. There has also been a corresponding decrease in the number of personnel assigned to support Safeguard C. Some of the facilities and necessary utilities and services are being used daily to support personnel and activities on Johnston Atoll not related to Safeguard C. These activities also help maintain facilities that could be used in the event that atmospheric testing is required. Johnston Atoll continues to operate under the management of the Director, DNA.

c. (U) The remaining Pacific test support facilities have been placed in a caretaker status, with the exception of those facilities that DOD activities are using for operations that will not preclude a resumption of atmospheric testing. Support agreements guaranteeing reentry rights have been finalized.

d. (S) All actions to transition to the redefined Safeguard C have been completed. DNA estimates that it would take 2 to 3 years and at least $600 million to prepare for and execute an atmospheric test series from which meaningful scientific data could be gathered. "Demonstration" type tests could be conducted by operational forces in a significantly shorter time, should national priorities dictate.

SCOPE

3. (U) Safeguard C provides for the following:

a. (U) Maintenance of test resources to include certain facilities and test equipment. Johnston Atoll is to be maintained to insure its availability in the event of atmospheric testing resumption.

NOTE: The prescribed maintenance is based upon a philosophy of minimum maintenance and gradual deterioration and the assumption that at least 1 year will be available for rehabilitation or construction prior to use of facilities. Thus, maintenance essentially is directed at weather tightness and structural integrity of priority facilities.

b. (U) Preparation and annual update of a list of current scientific needs and objectives for nuclear testing that cannot be satisfied by underground nuclear tests or laboratory simulation.

c. (U) Retention of technically capable personnel who are presently supported in other productive efforts but who could be reassigned to the atmospheric test program should it be necessary.

4. (U) Funding for DOD and DOE programs is shown in the following table:

~~SECRET~~

FUNDING (In Millions of Dollars)1/

	FY 76+7T Actual	FY 77 Actual	FY 78 Actual	FY 79 Planned
DOD RDT&E	.2 (.2)	---	---	---
O&M2/	11.3 (10.6)	7.5 (6.6)	6.7 (5.5)	7.3(5.7)
DOE	5.5 (5.2)	0 ----	0 ----	0 ----
TOTAL	17.0(16.0)	7.5 (6.6)	6.7 (5.5)	7.3(5.7)

1/ Figures in parentheses represent constant dollars using FY 1975 as a base. An average inflation rate of 6.5 percent was used, and this inflation rate was based on price escalation indexes in a memorandum by the Assistant Secretary of Defense (Comptroller), 30 June 1978, "FY 1979 Revised and FY 1980 Budget Estimates Guidance."

2/ O&M funding providing for Johnston Atoll operations, excluding tenant reimbursements.

DOD/DOE ACTIVITIES

5. (U) Johnston Atoll and its facilities are being maintained as prescribed in the DOD Transition Plan for Revised Safeguard C Support, of 21 April 1976. Since the FY 1976+7T Status Report, the following changes have occurred.

a. (U) The US Air Force retired its B57 sampler aircraft and placed them in storage.

b. (U) Bendix Corporation has closed its Baker-Nunn facility and vacated Johnston Atoll.

c. (U) The US Air Force has disposed of all herbicide orange chemical defoliant, which was formerly stored at Johnston Atoll.

d. (U) The Joint Chiefs of Staff notified the Services and DNA notified DOE that all requirements for NOSTS and Nuclear Tactical Exercises were canceled.

6. (U) DNA and DOE, in conjunction with the Services, have compiled the current list of scientific needs and objectives that cannot be satisfied by underground nuclear tests or laboratory simulation. That list and a sample list of possible demonstration tests are updated annually and are in Annexes A and B to Part IV.

7. (U) High-altitude effects simulation programs, explained in Part III, Safeguard B, contributed to the maintenance of the DOD testing capability by exercising unique R&D instrumentation, support systems, and personnel.

8. (U) Several activities and experiments related to readiness to test were conducted during FY 1977. The first, Operation LAGOPEDO, consisted of two rocket launches with experiments on board to study ion depletion of the F-layer of the ionosphere. This operation was primarily supported by DOE. The second, Operation STRESS, was a DNA project with DOE laboratories participating in the data collection on late time decay of striations of the barium plasma cloud.

a. (U) Operation LAGOPEDO--Two Ionospheric Depletion Experiments

(1) (U) Los Alamos Scientific Laboratory and Sandia Laboratories, Albuquerque, with the cooperation of other research organizations, conducted two chemical releases into the F-layer ionosphere over the Hawaiian Islands during early September 1977. These experiments, nicknamed LAGOPEDO, were directed toward investigation

of the chemical kinetics that follow a high altitude injection of several molecular species (H_2O, CO_2, N_2) and prediction of subsequent chemistry using nuclear weapon effects computer models.

(2) (U) The prompt ionizing radiation produced by a nuclear explosion at high altitude creates a plasma volume tens to hundreds of kilometers in diameter. The effect of this plasma on the propagation of electromagnetic waves is potentially detrimental to a number of planned or operational systems involving command, control, communications, navigation and positioning, reconnaissance, and radar detection and tracking. To evaluate these nuclear weapon effects, elaborate computer codes have been constructed that model the physics and chemistry of the plasmas produced by atmospheric detonations. Portions of codes have been validated through observations of the natural ionosphere; however, only limited data are available to validate those portions specific to weapon-induced perturbations. Project LAGOPEDO was designed to test the models used in the codes for several interactions that strongly affect the charged-particle inventory and spatial distribution following a nuclear event.

(3) (U) TERRIER-SANDHAWK rockets carried to altitude explosive mixtures of nitromethane and ammonium nitrate that were detonated to inject the detonation products (H_2O, CO_2, and N_2) into the ionosphere.

Diagnostics included optical observation of the resulting enhanced airglow, HF ionospheric sounders, and four rocketborne instruments that sampled the volume surrounding the release point for several minutes following the release. For each LAGOPEDO release, the results, which were based on widely different experimental techniques, are in excellent agreement.

(4) (U) The LAGOPEDO experiments were unqualified successes, meeting all experimental objectives. It is considered to be the one opportunity experienced during FY 1978 that applied in a truly meaningful way the human resources and the rocketry and diagnostic systems that were developed in support of a readiness-to-test capability and that are so critical to maintenance of any future capability. With the expenditure of the two TERRIER-SANDHAWK rocket systems on these experiments, Sandia Laboratory's inventory of the SANDHAWK motors is nearly depleted and will require moderate replenishment if the laboratory is to maintain the capability to field this highly dependable system for future operations.

b. (U) Satellite Transmission Effects Simulation Experiments

(1) (U) This DNA project involved several rocketborne, barium thermite release experiments. The principle objective of the investigation was to determine the

late time spatial decay of plasma striations imbedded within the barium ion cloud. The release or injection of barium has now become a standard technique for simulation of the highly structured plasmas that follow a high-altitude nuclear detonation. Complex computer models, which predict nuclear weapons effects, are validated by application to such simulation events. From a scientific viewpoint, barium experiments aid greatly in the understanding of the dynamics of plasma processes that ultimately affect a number of planned or operational systems. The performance of those systems that depend on electromagnetic propagation can be severely degraded when a transit through highly disturbed environments is necessary.

(2) (U) Numerous observations of the behavior of ionized barium clouds and jets have resulted in a relatively thorough understanding of the plasma processes leading to the formation and growth of striations within a plasma cloud. Little experimentation to date has been directed to those processes that result in striation decay. Excellent optical data were collected on the series of experiments. Those data are now being analyzed.

9. (U) Readiness Related Activities and Experiments. Only one small rocket operation was conducted during FY 1978. Operation AVEFRIA, jointly funded by DOE and DNA, consisted of two small rocket launches from the Tonopah Test Range during May 1978. These experiments will be discussed in more detail in succeeding paragraphs. Two additional experiments indirectly related to Safeguard C were also conducted. A summary of the status of these programs

resources, and facilities, which have been retained, is provided in later subsections.

a. (U) Operation AVEFRIA. Operation AVEFRIA, sponsored jointly by DNA and DOE, consisted of the latest experiments to inject barium plasma into the ionosphere; it was successfully conducted at the Tonopah Test Range Rocket Facility. Shaped-charge barium payloads produced promptly striated barium plasmas near 195 km in altitude. Simultaneous phenomenology and communications-degradation experiments were performed, and sufficient data to achieve all experimental objectives were obtained. These rocketborne, high-altitude nuclear-effects simulation experiments were conducted:

(1) (U) To simulate the plasma physics processes that occur following nuclear detonations at high altitude, and, by investigating these processes.

(2) (U) To determine and understand the quantitative degradation that simulated nuclear effects induce in ground-to-satellite channels used for C^3 functions.

Knowledge of the nuclear-degraded message-handling capacity of these channels is a critical input to national defense. Whereas the rocket experiments themselves are not nuclear, they are specifically designed to simulate aspects of the nuclear case. Simulation experiments like those of AVEFRIA are the only way that needed high-altitude nuclear-effects information can currently be obtained.

Prior to the cessation of atmospheric testing, high-altitude nuclear detonations were studied phenomenologically, and serious degradations of ground-to-ground communications channels were recorded. However, ground-to-satellite channels were not then in existence and could not be investigated. From the phenomenological data, it can be inferred that serious degradations would have occurred.

(b)(1),(b)(3):42 USC §2162(a)-- (RD)

Based on current models, plasmas of the character observed on CHECKMATE would seriously degrade the transmission of radio frequencies. Because propagation measurements were not made on CHECKMATE or the other high-altitude events, all of the direct measures of communications degradation on ground-to-satellite channels must now be obtained through simulation. During AVEFRIA, coordinated measurements were made of plasma-striation morphology and electromagnetic propagation. The experiments were designed to elucidate mechanisms of striation formation, to determine parameters needed for the propagation codes, and to validate propagation computations. Significant measurements were obtained providing pertinent data addressing the AVEFRIA objectives:

(1) (U) Communications-channel scintillations were observed for both AVEFRIA events by all three fixed sites, and were observed by the mobile station on the first event.

(2) (U) AVEFRIA is the first shaped-charge barium injection to show, without ambiguity, the presence of two distinct striation-onset times (prompt and late). In particular, there is remarkable and unique similarity

between the AVEFRIA plasma morphology and the horseshoe-shaped ion cloud observed on CHECKMATE.

The analysis of these unique data is underway.

b. (U) LIDAR Tracking of Atmospheric Pollutants. LIDAR, a complex state-of-the-art digital laser-radar system, is under development. Originally, this system was conceived and designed for installation on the LASL C-135 aircraft for investigation of the atmospheric ozone layer. Since the demise of the C-135, the hardware has been mounted in a 40-foot trailer, and the study objectives have been modified to include the investigation of atmospheric-pollutant species (NO, SO, and O). Nevertheless, the tie-in to Safeguard C continues to exist: it is planned eventually to fly a LIDAR; and to use it in nuclear-effects simulation programs, such as simulating the dispersal of fireball-fixed NO by studying the dispersal from natural occurrences (fires, lightning).

c. (U) Solar Power Satellite Environmental Assessment. Studies are underway of the effects of microwave-induced ionospheric heating, needed to assess the environmental changes associated with the NASA-proposed SPS system. The tie-in to Safeguard C is tenuous but definite: Some physical processes excited in the microwave-heated ionosphere are also pertinent to high-altitude nuclear-effects studies, which are clearly Safeguard-C-related activities in their own right. These experiments were conducted from the Arecibo Facility in Puerto Rico. The correlation between SPS-ionospheric research and Safeguard C may increase when small rockets are used to perturb or diagnose the ionosphere for SPS simulations.

PROBLEMS

10. (U) The maintenance of the basic capability to resume nuclear testing in the atmosphere includes the retention of personnel with expertise in atmospheric testing and closely related fields. Activities such as laboratory research, weapons design, nuclear effects simulation, and underground nuclear testing help retain some of these personnel. Although working in different capacities, personnel with actual atmospheric testing experience could still be retrieved from the system. As time passes, attrition of those personnel, as well as others with expertise in related fields, can be anticipated. Personnel with experience in atmospheric testing have been transferred and are continuing to transfer to other areas of research with active funding. While some individuals are retrievable from the system, others have since retired and are no longer available. Failure to retain sufficient numbers of these types of personnel could prove to be detrimental to planning and conducting any future atmospheric tests, should they be deemed essential to national security. This increases the importance of maintaining viable laboratory and underground test programs to provide a nucleus of experienced personnel capable of transitioning to atmospheric testing. The current level of activity is insufficient to maintain adequate support of Safeguard C beyond the next few years.

11. (U) Because of the greatly reduced funding level for research activities directly related to atmospheric testing, much of the technology associated with diagnostic instrumentation required in conducting an atmospheric test series has not evolved with the current state of the art.

12. (U) The maintenance of Johnston Atoll and its facilities is being conducted as prescribed by the DOD Transition Plan. Essentially, that means that available resources will be dedicated to maintenance efforts concerned with weather tightness and structural integrity of priority facilities, and there will be no upgrading/restoration of any of the facilities. This minimum maintenance program will require a complete reappraisal within the next few years.

CONCLUSION

13. (U) Support for Safeguard C was adequate.

RECOMMENDATIONS

14. (U) The Department of Defense/DOE should continue their support of research areas, which will help retain sufficient numbers of personnel with expertise applicable to atmospheric testing, and should maintain the remaining capability to support atmospheric testing for as long as possible.

15. (U) The Department of Defense should support DNA/DOE efforts to maintain O&M funding for Johnston Atoll at the level necessary to retain a basic capability to resume atmospheric testing, in accordance with Presidential and DOD guidance.

ANNEX A TO PART IV

SCIENTIFIC NEEDS AND OBJECTIVES FOR NUCLEAR TESTING IN THE ENVIRONMENTS (U)*

Technical Objectives	Rationale	Delivery Environment	Remarks
PRIORITY I			
To measure and evaluate the high altitude EMP environment. To determine the striated structure of the nuclearly disturbed atmosphere--its formation, transfer functiog, decay, and effects on the C³ network to include communication signal effects such as absorption, noise, multipath, refraction, and scintillation effects of amplitude and phase variation. To determine the striation effects on IR emission. To measure debris tube formation and motion, beta tube formation and motion, fission electron injection efficiencies, cross-L diffusion, and electron flux limitation. To measure the effects of blackout on strategic and tactical communications/electronics systems.	(b)(1)	A. Rocket B. (b)(1) C. 10-300 km	(b)(1)

* (1) Operational forces participation will be included whenever practical.
(2) Current inventory of weapons will be used when practical.
(3) Demonstration tests, when selected for implementation to satisfy urgent political needs, will be exploited to the fullest extent practicable to obtain desired test data and satisfy the prioritized technical objectives. Sample demonstration tests are shown in Annex B to Part IV.
(4) Priorities are generally identified (I, II and III) to facilitate annual review vis-a-vis changing test objectives. No attempt has been made to establish rigid subpriorities, as it is recognized that priorities are subject to continual change.

Technical Objectives	Rationale	Delivery Environment	Remarks
To determine the energy partition between airblast, crater excavation, and ground shock; coupling of ground shock into structures; response and vulnerability of hardened structures; dust and hydrometeor phenomena; and close-in EMP strength and effects at (b)(1)	(b)(1),(b)(3):50 USC §403 (g) Section 6	A. Emplaced B. (b)(1) C. Surface to optimum height of burst	The (b)(1) tests would produce large amounts of local fallout.

(b)(1),(b)(3):42 USC §2162(a)-- (RD)

PRIORITY II

Technical Objectives	Rationale	Delivery Environment	Remarks
To determine multiburst phenomena at high altitude--to include measurement of the nuclear environment from BMD warheads--effects considered are absorption, scintillation, noise, refraction, clutter, blast, fireball density, and thermal radiation.	Required to confirm theoretical computations of multiburst environments and effects.	(b)(1),(b)(3):42 USC §2162(a)-- (RD)	Damage to unhardened satellites for high-altitude, (b)(1) tests is a serious hazard.
To determine low-altitude multiburst phenomena--to include measurement of the nuclear environment for BMD warheads--effects considered are absorption, scintillation, noise, refraction, clutter, blast, fireball density, thermal radiation, radar clutter, (b)(1) neutron effects, electron quenching, ejecta, dust and water/ice cloud phenomena.	Required to confirm theoretical computations of multiburst environments and effects and to assess RV fratricide.		Desirable to use current tactical systems. (b)(1) (b)(1) tests (surface) will produce significant fallout.
(b)(1),(b)(3):42 USC §2162(a)-- (RD)			
To determine: the energy partition between airblast, crater excavation, and ground shock; crater dimensions and physical distribution of ejecta; coupling of ground shock into structures; dust and hydrometeor phenomena; and close-in EMP strength and effects on tactical systems.	Required to verify effects data and/or determine the adequacy of hardening techniques based on various simulators or simulation methods currently in use.	A. Emplaced B. (b)(1) C. Buried	(b)(1) test might enable use of tactical system.

Technical Objectives	Rationale	Delivery Environment	Remarks
PRIORITY III			
To determine the phenomenology of the nuclearly disturbed environment out to the time of magnetospheric relaxation. To measure nuclear bubble formation, debris tube formation and motion, beta tube formation and motion, beta tube dissolution, fission electron injection efficiencies, and magnetospheric disturbances that might substantially modify nuclear event phenomenology. To investigate close-in EMP.	No data exist that are directly applicable to nuclear weapon phenomenology in an environment not principally determined by residual atmosphere. No nuclear data from any nuclear test exist at semisynchronous altitudes or beyond an altitude of about 8,000 miles. Close-in EMP data are needed for evaluation of flyout operations in a pindown mode.	A. Rocket B. (b)(1) C. 10,000 to 50,000 km	Use of a (b)(1) device will yield the required data. The device must be super-clean and the (b)(1) to minimize satellite damage. Choice of the specific test location must also consider damage limitation.

(b)(1),(b)(3):42 USC §2162(a)-- (RD)

Technical Objectives	Rationale	Delivery Environment	Remarks
(b)(1),(b)(3):42 USC §2162(a)-- (RD)			

ANNEX B TO PART IV

POSSIBLE DEMONSTRATION TESTS (U) *

Delivery Mode	Location	Device/Weapon	Yields	Remarks
(b)(1),(b)(3):42 USC §2162(a)-- (RD)				

* These tests are listed only to show a range of examples that could be considered for demonstration by operational forces should they be required for national security.

~~SECRET RESTRICTED DATA~~

PART V

SAFEGUARD D--(b)(1) TREATY MONITORING CAPABILITIES (U)

(U) "The improvement of our capability, within feasible and practical limits, to monitor the terms of the treaty, to detect violations.(b)(1)

CRITERIA

1. (U) In 1963, the Chairman, Joint Chiefs of Staff, submitted the following criteria to the Senate Armed Services Committee to be employed in subsequent examination of programs to insure that this safeguard is fulfilled:

(b)(1)

(b)(1)

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~~RESTRICTED DATA~~
This material contains ~~Restricted Data~~ as defined in the Atomic Energy Act of 1954. ~~Unauthorized~~ disclosure subject to administrative and criminal sanctions.

(b)(1)

(b)(1),(b)(3):50 USC §403(g) Section 6

PROGRAMS, ACHIEVEMENTS, AND PLANS

3. (U) (b)(1)

Safeguard D

a. (U) Safeguard D is implemented by a spectrum of organizations, facilities, and techniques, collectively (b)(1)

b. (S) (b)(1) Safeguard D, are largely concentrated in the US AEDS. While comprising the assets of many agencies, (b)(1),(b)(3):50 USC §403(g) Section 6 the AEDS is managed and coordinated by AFTAC. AFTAC is the recipient of the product of all parts of the AEDS (b)(1) The following systems programs and techniques comprised the AEDS as of 30 September 1978:

(1) (b)(1),(b)(3):50 USC §403(g) Section 6

(2) (S) (b)(1) are well past their expected design life and have suffered losses in capability or redundancy such that each might become totally inoperable at any time. Power system degradation has continued to cause frequent reductions in capability to monitor for space event and occasional reductions in capability to detect atmospheric events.

(b)(1)

(3) (S) (b)(1) (b)(1) This satellite carried a gamma sensor with directional sensitivity.

(b)(1)

(4) (S) (b)(1)

(5) (S) (b)(1)

(b)(1)

(S) Six MAC WC-135B aircraft are dedicated to the aerial debris collection mission and are programmed to remain in the inventory through FY 1983. Augmenting this force are SAC B-52H (two) and U2R and C aircraft, which provide the high-altitude collection capability (above 12-km altitude); and MAC/WC-130E aircraft, which occasionally assist in collection at lower altitudes. Primarily oriented to debris collection efforts over the Arctic and Pacific Oceans, the sampling force does have a limited response capability for other Northern Hemisphere as well as Southern Hemisphere nuclear testing. Response limitations are due to the small number of dedicated aircraft as well as suitable bases of operations.

(b)(1),(b)(3):50 USC §403(g) Section 6

At a low frequency of multiple testing and the restricted geography of operation, the dedicated and available aircraft will probably remain adequate in number to satisfy the Safeguard D requirements. The aircraft are being used also in a program to intercept possible debris from potential atmospheric nuclear detonations (b)(1)

(b)(1) This program has been conducted in conjunction with other sampling requirements on a noninterference basis.

(7) ~~(S)~~ Aircraft sampling operations are supplemented by ground filter units (b)(1) (b)(1) which collect particulate debris from foreign atmospheric nuclear tests. Radio chemical and materials analyses of debris collections are performed by the McClellan Central Laboratory and are augmented by two field detachments. The field laboratories are oriented directly to operational support of collection activities to produce a timely assessment of sample quality, quantity, and constituent abundances. A collaborative mass spectrometry analysis capability is provided by the DOE Knolls Atomic Power Laboratory.

(8) ~~(S)~~ A seismic network of 13 stations (plus 5 unmanned outposts of the Alaskan facility) is located in 9 countries surrounding th(b)(1) landmass. Of these stations, the one in has been in standby status for the last 3 years. The Governments of the United States ave resolved the problems that led to the closing of the station, and operations are to be resumed in FY 1979, but may shift from US Government to Government operation. Data from the AEDS seismic network are supplemented with data from the (b)(1),(b)(3):50 USC §403(g) Section 6 the Seismic Research Observatories and stations reporting

(b)(1),(b)(3):50 USC §403(g) Section 6

(b)(1),(b)(3):50 USC §403(g) Section 6

(b)(1),(b)(3):50 USC §403(g) Section 6

to the National Earthquake Information Service. (The status of AEDS groundbased facilities is summarized in Annex A to Part V).

(9) (S) The hydroacoustic network of seven stations monitors the North Pacific Ocean, the North Atlantic Ocean, and limited areas of the South Atlantic and South Pacific Oceans. In addition, two research hydroacoustic stations were installed off the coast of California in FY 1976. These two stations, when they become fully operational, will add significantly to US ability to detect low-yield underground explosions

(b)(1),(b)(3):50 USC §403(g) Section 6

(b)(1),(b)(3):50 USC §403(g) Section 6

(b)(1),(b)(3):50 USC §403(g) Section 6

[redacted]

c. (U) In addition to the systems and techniques in operation as of 30 September 1978, the following AEDS improvements are planned or programmed.

(b)(1)

[redacted]

(b)(1),(b)(3):50 USC §403(g) Section 6

(3) (S) As a first step in improving the capability of the seismic network to detect and identify seismic events, a number of modifications to the existing stations are programmed. To improve signal detection capability, arrays of expanded short-period sensors are planned for stations in Alaska, (b)(1),(b)(3):50 USC (b)(1),(b)(3):50 USC §403(g) Sect New long-period arrays also are planned for the stations in (b)(1),(b)(3):50 (b)(1),(b)(3):50 These improvements are planned for implementation during the period FY 1979-1982. Seismic data processors were installed at several AEDS stations during FY 1978, and capability exists to obtain edited digital data from the stations in (b)(1) (b)(1),(b)(3):50 US The processors will be installed at stations in (b)(1),(b)(3):50 USC §403(g) Section 6 during FY 1979. (b)(1),(b)(3):50 USC §403(g) Section 6

(b)(1),(b)(3):50 USC § have been programmed. The seismic data processors, coupled with an improved digital data collection system (FY 1981), automatic signal detection and an improved headquarters seismic system, will provide data for the evaluation of seismic events of interest within a few hours after their occurrence. More effective discrimination between earthquakes and explosions and improved estimates of explosion parameters should be obtained from these efforts.

(b)(1),(b)(3):50 USC §403(g) Section 6

d. (U) See Annex B for a discussion of the current and projected intelligence capabilities to monitor foreign nuclear testing.

e. (b)(1) the following intelligence community assets contribute routinely to knowledge of foreign nuclear test programs and, consequently, to US capabilities to carry out Safeguard D.

(b)(1)

(b)(1),(b)(3):50 USC §403(g) Section 6

(b)(1),(b)(3):50 USC §403(g) Section 6

(b)(1),(b)(3):50 USC §403(g) Section 6

(b)(1),(b)(3):50 USC §403(g) Section 6

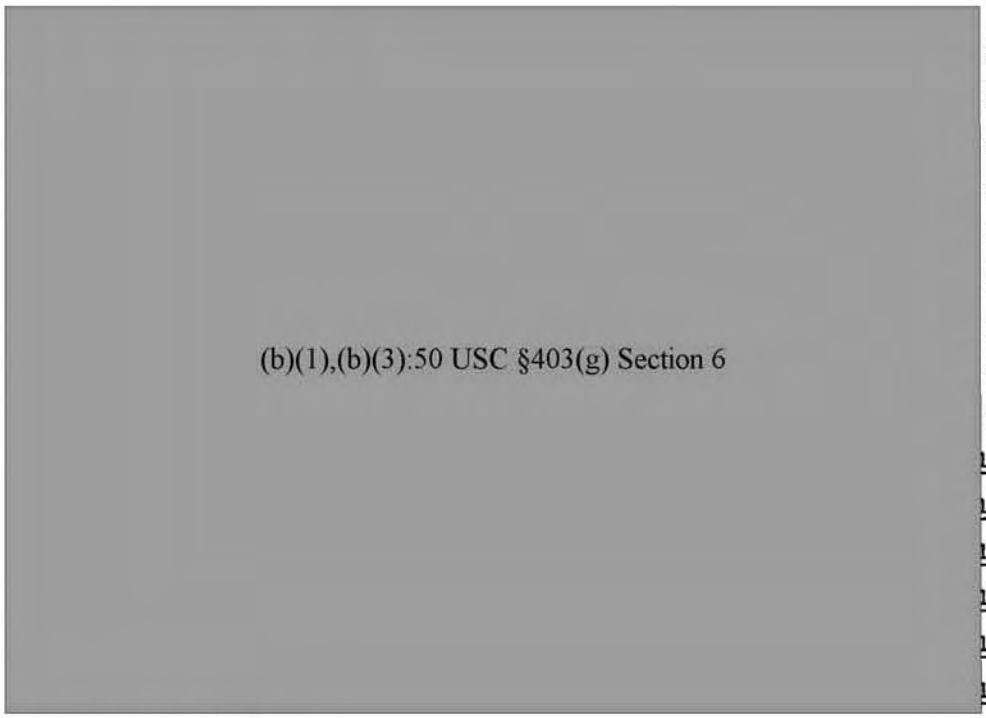
(b)(1),(b)(3):50 USC §403(g) Section 6

(b)(1),(b)(3):50 USC §403(g) Section 6

CONCLUSIONS

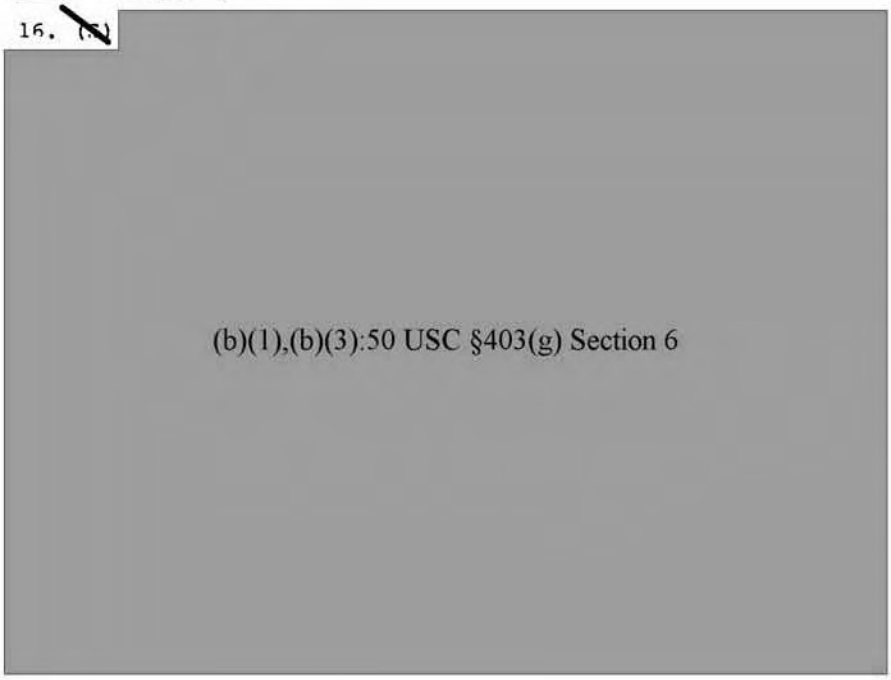
14. (S) The overall ability to carry out Safeguard D

(b)(1),(b)(3):50 USC §403(g) Section 6

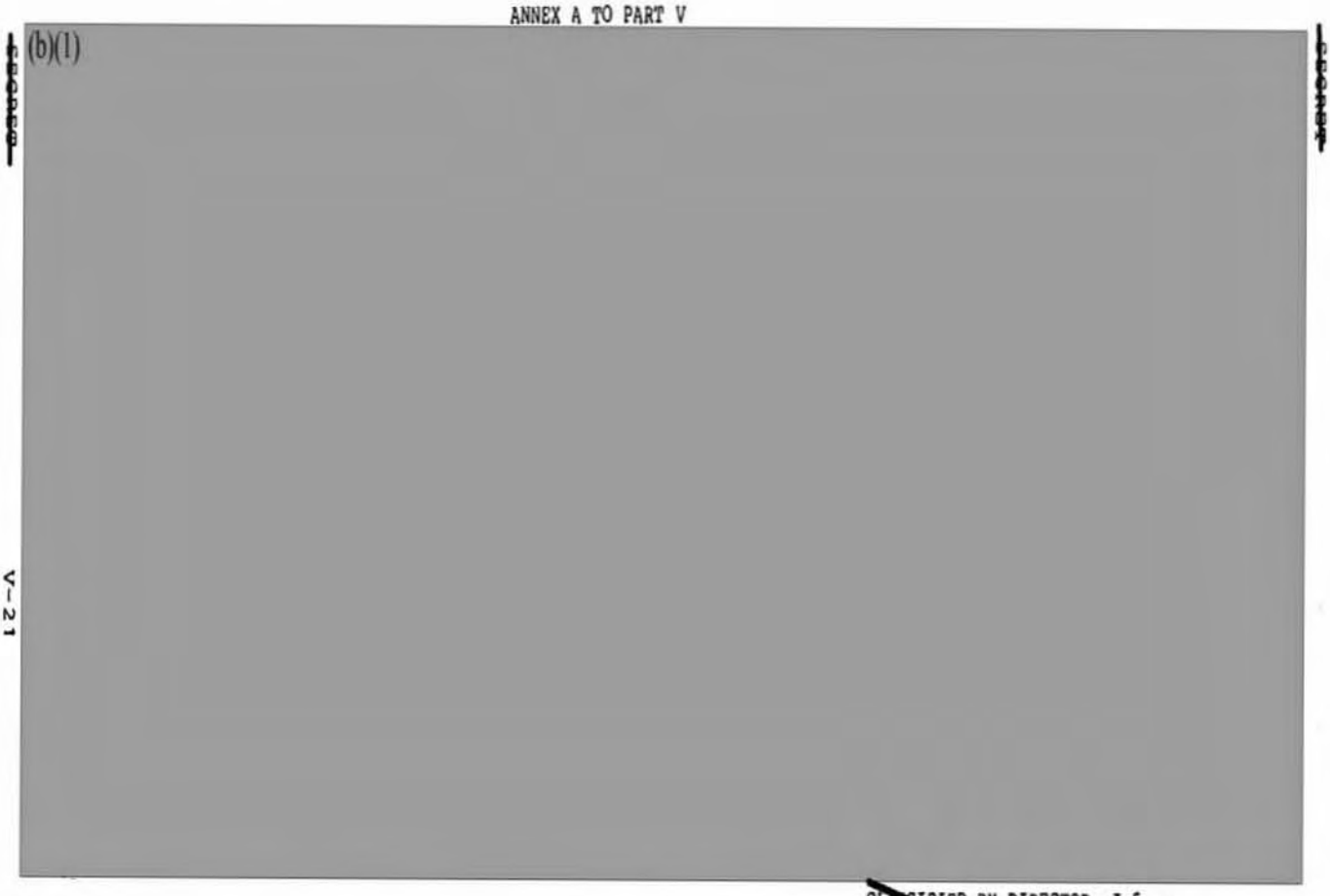


RECOMMENDATIONS

16. (S)



(b)(1)



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REASON: 5200.1R, PARA 2-301c3

ANNEX B TO PART V

(b)(1)

1. (S) Tables I, II, and III of this Annex present the

(b)(1)

The capabilities expressed in the table for underground tests are

(b)(1),(b)(3):50 USC §403(g) Section 6

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(b)(1),(b)(3):50 USC §403(g) Section 6

(b)(1),(b)(3):50 USC §403(g) Section 6

(b)(1),(b)(3):50 USC §403(g) Section 6

(b)(1),(b)(3):50 USC §403(g) Section 6

(b)(1),(b)(3):50 USC §403(g) Section 6

(b)(1),(b)(3):50 USC §403(g) Section 6

(b)(1),(b)(3):50 USC §403(g) Section 6

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(b)(1),(b)(3):50 USC §403(g) Section 6

(b)(1),(b)(3):50 USC §403(g) Section 6

(b)(1),(b)(3):50 USC §403(g) Section 6

(b)(1),(b)(3):50 USC §403(g) Section 6

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ANNEX D TO PART V

(b)(1),(b)(3):50 USC §403(g) Section 6

(b)(1)

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(b)(1),(b)(3):50 USC §403(g) Section 6

(b)(1),(b)(3):50 USC §403(g) Section 6

(b)(1),(b)(3):50 USC §403(g) Section 6

(b)(1),(b)(3):50 USC §403(g) Section 6

(b)(1),(b)(3):50 USC §403(g) Section 6

(b)(1),(b)(3):50 USC §403(g) Section 6

(b)(1),(b)(3):50 USC §403(g) Section 6

(b)(1),(b)(3):50 USC §403(g) Section 6

(b)(1),(b)(3):50 USC §403(g) Section 6

(b)(1),(b)(3):50 USC §403(g) Section 6

ANNEX H TO PART V

RESEARCH AND DEVELOPMENT SUPPORTING SAFEGUARD D

1. (U) The R&D programs presented in this Annex describe those efforts, by technique, applicable to current Safeguard D support. Some of these activities also represent efforts directed at the growing concern with nuclear proliferation, as well as the development of capabilities important for monitoring future test ban treaties.

2. (U) Satellite Technique

a. (S)

(b)(1),(b)(3):50 USC §403-3(c)(7)

b. (S) Advanced Radiation Detection System on the Defense Support Program.

(b)(1)

(b)(1),(b)(3):50 USC §403(g) Section 6

(b)(1)

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~~EXTENDED BY DIRECTOR, J-5~~
~~REASON: 5200.1R, PARA 2-301c3~~

(b)(1),(b)(3):50 USC §403(g) Section 6

(b)(3):50 USC §403(g) Section 6,(b)(6)

(b)(1),(b)(3):50 USC §403(g)
Section 6

[redacted]

4. (U) Advanced Technology Remote Sensing Program

(b)(1)

[redacted]

(b)(1),(b)(3):50 USC §403(g) Section 6

~~SECRET~~

5. (U) Debris Collection Techniques. The four debris collection programs applicable to Safeguard D are:

(b)(1),(b)(3):50 USC §403(g) Section 6

(b)(1),(b)(3):50 USC §403(g) Section 6,(b)(3):42 USC §2162(a)--(RD)

6. (U) Seismic Technique

a. (U) Digital Data Collection System. This system is being designed to digitize seismic data at each sensor to increase the dynamic range to insure that high quality waveform data are recorded from both small and very large explosions and earthquakes. This program will improve the capability to locate seismic events

(b)(1),(b)(3):50 USC §403(g) Section 6

b. (U) Auxiliary Seismic Network. A relatively simple station system is being designed to monitor underwater tests and potential tests [redacted] (b)(1),(b)(3):50 USC §403(g) Section 6 [redacted] This system will be capable of operating unmanned in remote areas or as a minimally manned site.

c. (U) Headquarters Seismic System Data Terminal. A large increase in data volume will result from expansion of the AEDS arrays, the addition to the Auxiliary Seismic Network, increase in number of stations reporting to the AEDS through the National Earthquake Information Center, and the addition of data from the National Seismic System. A system is being designed as a headquarters terminal to manage, store, and display this large volume of data as necessary to maximize and enhance data analysis and evaluation.

d. (U) Advanced Interactive Display System. The interactive display device will provide the analyst with the capability to display [redacted] (b)(1),(b)(3):50 USC §403(g) Section 6 [redacted] seismic signals [redacted]

e. (U) Identification Studies. Better identification of earthquakes and explosions is needed for proliferation monitoring and verifying a CTB. Explosion identification studies were initiated in FY 1978. Earthquake identification studies directed specifically for monitoring a CTBT will be initiated in FY 1979.

f. (U) Waveform Analysis. The waveform analysis studies are expected to improve the US ability to [redacted] detect and identify underground explosions [redacted] (b)(1),(b)(3):50 USC §403(g) Section 6 [redacted]

g. (U) Evasion Detection. The purpose of this project is to examine the various evasion techniques and identify possible counterevasion techniques.

7. (U) Hydroacoustic Technique

a. (U) The Digital O System. The DOS will replace the present obsolescent analog equipment with a single rack of modern digital equipment, which will be unattended in host facilities, transmitting data in real time to the headquarters for immediate analysis and reporting of events.

b. (U) R&D Studies and Analysis. The tasks in this program element--Source Characterization Studies, Propagation Studies, and Single Analyses Studies--are continuing studies with the combined purpose of providing the knowledge needed to identify and describe hydroacoustic signal sources by analysis of the signals recorded at long range on the AEDS hydroacoustic net.

c. (U) Analysis System Upgrade. The hydroacoustic technique analysis and evaluation capability will be increased by development of automatic signal detection and editing capability, display of data through the use of interactive graphics applied specifically to hydroacoustic signal analysis, and development of a new computer program for evaluating hydroacoustic events.

8. (~~S~~) VELA Seismological Center/DARPA Program. APTAC manages a significant portion of the DARPA Seismic Research Program. This is accomplished through the APTAC operated VELA Seismological Center, which was originally established for this purpose. The research is concentrated in areas

~~SECRET~~

that potentially could add to the AEDS capability. For example, research is conducted for the purpose of obtaining improved identification criteria, improved yield estimates, new and improved long-period sensors, etc.. Specific research programs managed by the VELA Seismological Center include:

a. ~~(S)~~ Identifcation Studies. The objective of this program is to improve the national capability to detect and identify seismic signals from underground nuclear explosions. Identification research has included the formulation and study of various processing and signal analysis methods for identifying the source characteristics of recorded seismic signals. Identification criteria developed have been applied to earthquakes

(b)(1),(b)(3):50 USC §403(g) Section 6

~~SECRET~~

c. (U) Network Management and Evaluation. The objective of this program is to develop the capability to collect, merge, and store large quantities of seismic data to achieve increased signal detectability and increased signal processing capability.

(b)(1)

[redacted]

(b)(1),(b)(3):50 USC §403(g) Section 6

(b)(1)

11. (U) Department of Energy Satellite-Based Test Detection Program

a. (S) Safeguard D is supported by the Department of Defense through satellite nuclear detection projects at Sandia Laboratories and Los Alamos Scientific Laboratory involving instrumentation development programs. The instrumentation is designed to provide timely and accurate information on nuclear detonations in the atmosphere and in space. The DOE and AFTAC programs are closely coordinated so that the development efforts of the DOE laboratories meet operational requirements of AFTAC to the extent permitted by budgetary and manpower constraints. The DOE laboratories provide hardware design and fabrication, test calibration, prelaunch and postlaunch evaluation, and data analysis services in support of the various satellite projects.

b. (S) Because of the continuing operation of the early DSP satellites well beyond their designed lifetime, the laboratories are continuing efforts to lengthen the design life of the unlaunched instrumentation components. In addition, sensor packages for future satellite systems are in various states of development. Specific activities at the Sandia Laboratories include the following projects:

(1) (S) Design and development of new downward-looking instruments to match the increased performance requirements of the advanced ABL being developed on a reimbursable basis for the Air Force (SAMSO). Because of the complementary nature of the burst locator and downward-looking instrumentation and associated logic package, these must be of comparable sensitivity.

(b)(1)

(4) (S) Continued design and development of sensor optical and electrical components to improve future detection and diagnostic capabilities.

(5) (S) Development, fabrication, installation, and testing of sensor packages on various satellites. Three sets of flight hardware have been delivered and development of flight hardware is underway for two additional satellites.

~~SECRET~~

(6) (S) Continued development of instrumentation required for exoatmospheric and atmospheric background measurements.

c. (U) Specific activities at Los Alamos Scientific Laboratory include the following projects:

(1) (S)

(2) (S)

(3) (S)

(b)(1)

12. (U) DOE Underground Test Detection Research Program

a. (U) The DOE sponsors a broad-based, long-term seismic research program at its Lawrence Livermore Laboratory. This program, in existence since 1965, provides the technical capability and versatility to meet both immediate and long-term goals as well as to respond to changes to political direction. The two principal objectives are (1) to develop a better theoretical and experimental understanding of the generation and propagation of underground nuclear explosions from various types of

seismic waves as a function of explosion yield and geological and geophysical parameters, and (2) to apply this understanding to treaty verification problems. During the period 1965-1974, primary emphasis was placed upon evasion and verification under a CTBT. In 1974, emphasis shifted somewhat to explosion yield determination under the TTBT. In 1977, negotiations on a CTB began, which required that part of the activities be shifted back to CTBT problems. Commencing in FY 1979, regional seismic research is being expanded to support the in-country seismic stations that are expected to be part of any CTBT verification activity. This research will support both single-borehole stations and regional arrays.

b. (b)(1),(b)(3):50 USC §403(g) Section 6 The solution to yield determination requires an understanding of the effect of the properties of the rock surrounding the explosion, the local test site geological structure, and the geophysical properties of the region.

c. (U) Specific activities during FY 1977 included both theoretical and experimental studies to:

(1) (S) Determine the effect of measurable rock properties at the underground explosion sites upon the strength of the resultant seismic signals.

(2) (S) Develop a correction factor for the propagation path through the upper mantle in order to reduce the statistical scatter in the (b)(1),(b)(3):50 USC §403(g) Section 6

(3) (S) Analyze regional seismic data to improve the correlation between regional and teleseismic data. Four wideband seismic stations, located 200 to 400 km

(b)(1) [redacted]

d. (U) During 1978, the highlights were:

(1) (U) The establishment of the potential of regional monitoring of crustal and upper mantle seismic waves for verification [redacted]

(b)(1) [redacted]

(3) (U) The deployment of two arrays at regional and near-regional ranges showed the usefulness of a compact array for phase identification by velocity across the array and for determining the effects of local structure on the coherency of regional phases.

(4) (U) The delineation of the Soviet Union into tectonic regions based on in-depth survey and analysis of Soviet literature.

e. (U) During FY 1978, the DOE Sandia Laboratories designed and fabricated an engineering model of a regional seismic station of the type that could be deployed anywhere in the world for monitoring underground nuclear explosion. This station is highly reliable and operates unattended without frequent maintenance. The seismometer, signal

conditioning equipment, and a data authenticator are located at the bottom of a 100-meter borehole. This assembly is protected by a tamper-detecting device that would reveal attempts to gain access for the purpose of altering the data output. A propane-fueled thermo-electric power supply, transmitter, antenna, backup tape recorders, and ancillary equipment are located on the surface. Data are to be transmitted to a US receiving station (b)(1) Test and evaluation of this model is underway and will be completed in 4th quarter FY 1979.

~~SEC~~

THE JOINT CHIEFS OF STAFF
WASHINGTON, D. C. 20301

MJCS-71-77

15 March 1977

MEMORANDUM FOR THE ASSISTANT TO THE SECRETARY OF DEFENSE
(ATOMIC ENERGY)

Subject: Underground Nuclear Test Program Review (U)

1. ~~(S)~~ Reference is made to NSDM 18, which charged the Under Secretaries Committee (USC) with the review of the Underground Nuclear Test Program.

2. ~~(S)~~ Presidential Decision (PD) Number 2, established the revised National Security Council organization, which in effect abolished the USC, but did not prescribe the manner in which the functions of the USC would subsequently be performed.

3. ~~(S/RD)~~ The Underground Nuclear Test Program has taken on increasing significance in recent months, with the restrictions resulting from the Threshold Test Ban Treaty agreement, and consideration of the Comprehensive Test Ban Treaty.

(b)(1),(b)(3):42 USC §2162(a)-- (RD)

4. ~~(S)~~ The Joint Chiefs of Staff have stated that it is essential to continue an aggressive, comprehensive underground test program, in keeping with the Safeguards to the Limited Test Ban Treaty. However, this will be impossible until a specific review procedure is developed within the NSC apparatus. Further delays can be expected in securing permission to proceed with nuclear tests. For example, under the old procedures, the second half of the FY 1977 test program, FULCRUM II, would have been under review by the USC at this time. A memorandum for the President

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~~Classified by Director, Joint Staff~~

~~SECRET~~ ~~RESTRICTED DATA~~

requesting approval would have been prepared, and a smooth transition to the FULCRUM II program would be foreseen. This is not the case.

5. (U) It is recommended that a memorandum be forwarded to the Assistant to the President for National Security Affairs which requests that immediate procedures be instituted for review and approval of the UGT program. Since it is DOD requirements which the UGT program is designed to fulfill, it is recommended that the DOD have the lead in conducting required reviews. A proposed draft is at the Enclosure.

SIGNED

RAY B. SITTON
Lieutenant General, USAF
Director, Joint Staff

Prepared by:
LTC R. W. Smith, USAF
Nuclear Division, J-5
Ext 50322

~~SECRET~~

ENCLOSURE

DRAFT

MEMORANDUM FOR THE ASSISTANT TO THE PRESIDENT FOR NATIONAL SECURITY AFFAIRS

Subject: Underground Nuclear Test Program Review (U)

1. (S) Presidential Decision (PD) Number 2, announced the reorganization of the National Security Council (NSC) without specifically stating the procedures which would be followed to accomplish the functions of the NSC groups, such as the Under Secretaries Committee (USC), which were abolished.

2. (S) The underground nuclear test program, which is developed by the Energy Research and Development Administration (ERDA) in response to DOD requirements, is quite sensitive to externally imposed delays.

(b)(1),(b)(3):42 USC §2162(a)-- (RD)

Further delay in approval of this event will have an impact on future tests.

3. (U) The second half of the FY 1977 program, FULCRUM II, should begin in less than three weeks. Under previously established procedures, the USC would already have completed

Classified by Director, Joint Staff
SUBJECT TO GENERAL DECLASSIFICATION SCHEDULE OF EXECUTIVE ORDER 11652 AUTOMATICALLY DOWNGRADED AT TWO YEAR INTERVALS
DECLASSIFIED ON 31 DECEMBER 1985

Enclosure

~~SECRET~~

review of the program, and a memorandum would have been forwarded to the President requesting approval. As yet, however, no formal procedures have been established for review and approval of the program, and there is concern that in the absence of specified procedures, confusion will result and additional delays will be encountered.

4. (U) It is recommended that the PRC be charged with the review of the underground nuclear test program. Because the program is developed to respond to DOD requirements, further recommend that the DOD chair the PRC for this purpose, and that additional membership be composed of State, Arms Control and Disarmament Agency, Energy Research and Development Administration, Central Intelligence Agency, Joint Chiefs of Staff, and National Security Council. If this is approved, a working group will quickly be established by DOD to accomplish the administration of the specific tasks pertinent to such a review.

5. (U) In view of the national importance of the underground test program, it is requested that this issue be resolved as soon as possible.

~~SECRET~~

COPY NO. 31

JCS 2482/354

DISTRIBUTION C

29 April 1977

NOTE TO THE JOINT CHIEFS OF STAFF

on

PROTOCOL I TO THE TREATY OF TLATELOLCO (C)

(U) The attached Action Memorandum for the Secretary of Defense, I-21611/77, 11 April 1977, subject as above, with it attachments, is circulated for information.

Joint Secretariat

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~~SECRET~~

ASSISTANT SECRETARY OF DEFENSE
WASHINGTON, D.C. 20301

INTERNATIONAL SECURITY AFFAIRS

11 APR 1977

In reply refer to:
I-21611/77

MEMORANDUM FOR THE SECRETARY OF DEFENSE

SUBJECT: Protocol I to the Treaty of Tlatelolco (U) -- ACTION MEMORANDUM

ISSUE: ~~(S)~~ Whether the U.S. should adhere to Protocol I of the Treaty for the Prohibition of Nuclear Weapons in Latin America (Treaty of Tlatelolco).

BACKGROUND:

~~(S)~~ The Arms Control and Disarmament Agency drafted the attached NSC decision memorandum on U.S. Adherence to Protocol I to the Treaty for the Prohibition of Nuclear Weapons in Latin America (Treaty of Tlatelolco) (Tab B). Department of Defense preferences on the options are requested by Monday evening, April 11, to allow the President time to consider inclusion of an announcement on U.S. adherence to Protocol I in his Pan American Day Speech on April 14.

DISCUSSION:

~~(S)~~ Adherence to Protocol I would prohibit use, deployment, and any form of possession of nuclear weapons in territories for which we are responsible (b)(1) [redacted], including territorial waters and airspace.

~~(S)~~ The options for Presidential decision are:

1) Continue existing policy (oppose adherence to Protocol).

2) Adhere to Protocol I without conditions.

3) Adhere to Protocol I when Cuba joins the Treaty and the U.S.S.R. signs Protocol II.

4) Adhere to Protocol I when all other requirements for entry into force of the Treaty of Tlatelolco are fulfilled.

~~(S)~~ Differing legal opinions exist with respect to certain aspects of U.S. adherence. ACDA contends U.S. adherence would not affect transit rights. DOD lawyers, Joint Staff, AE, and others in Services and OASD/ISA believe that U.S. adherence would abridge transit rights

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Classified by NSC
SUBJECT TO GENERAL DECLASSIFICATION SCHEDULE OF EXECUTIVE ORDER 11652. AUTOMATICALLY DOWNGRADED AT TWO YEAR INTERVALS; DECLASSIFIED ON 31 Dec 83

and freedom of navigation. Further study is necessary to determine both the legal and operational implications of U.S. adherence.

(S) Further, U.S. adherence would eliminate the use of bases, ports, training areas, and calibration facilities in Puerto Rico and the Virgin Islands by nuclear armed ships and aircraft (Tab C).

(b)(1)

(S) To encourage Soviet adherence to Protocol II the Secretary General of the Latin America Nuclear Weapons Free Zone organization (OPANAL) recently made a new proposal. The new OPANAL formulation would interpret the treaty as "prohibiting" transit of nuclear weapons through the treaty territory. This interpretation, if accepted, would prohibit transit of U.S. nuclear weapons in the treaty area (Tab D) under Protocol II.

(S) The memorandum states that U.S. adherence is crucial to Brazil and Argentina's decision to develop a nuclear explosive capability. This is only one factor in the larger U.S.-Latin American relationship, including the U.S. non-proliferation strategy.

(S) Until a thorough legal and military analysis is completed, there are no compelling reasons to accept major restrictions on operational deployment and contingency options important to our national security predicated on achieving possible undetermined future political benefits.

RECOMMENDATION: (U) That you sign the attached memorandum (Tab A), stating Department of Defense preference for Option One with further study to determine the effects on U.S. transit rights.

Assistant Secretary of Defense (ISA) — Attached
Director, Joint Staff

COORDINATION: Attached
General Counsel, OSD

Attached
Assistant to the Secretary of Defense (Atomic Energy)

Chairman, Joint Chiefs of Staff: Approved J L Holloway IV 12Apr77
Acting

Disapproved _____

Attachments 4
a/s

~~SECRET~~
SECRET

THE SECRETARY OF DEFENSE
WASHINGTON, D. C. 20301

12 APR 1977

MEMORANDUM FOR DR. ZBIGNIEW BRZEZINSKI, ASSISTANT TO THE PRESIDENT
FOR NATIONAL SECURITY AFFAIRS

SUBJECT: Protocol I of the Treaty of Tlatelolco (U)

(S) The Department of Defense has reviewed the draft decision memorandum on U.S. Adherence to Protocol I of the Treaty of Tlatelolco and prefers Option One with further study to determine the legal and operational implications, particularly for U.S. transit rights in the geographic area of the Treaty.

(S) The DOD does not support the premise that U.S. adherence to Protocol I would not affect the right of U.S. warships and aircraft to conduct transits, port visits, training exercises, and patrols within the Caribbean area. Freedom of navigation which is fundamental to our national security could be jeopardized by adherence to this protocol. The precedent of accepting limitations on U.S. sovereignty over U.S. territory, plus constraints on operational use, deployments, and contingency options in the Caribbean is inadvisable at this time.

(S) To encourage Soviet adherence to Protocol II, the Secretary General of the Latin America Nuclear Weapons Free Zone organization (OPANAL) recently made a new proposal. The new OPANAL formulation would interpret the treaty as "prohibiting" transit of nuclear weapons through the treaty territory. This interpretation, if accepted, would prohibit transit of U.S. nuclear weapons in the treaty area under Protocol II (Tab D).

(U) When other requirements for full entry into force of the Treaty of Tlatelolco are fulfilled, the U.S. should re-examine its policy regarding U.S. adherence. Presently there appears to be no compelling reason to accept constraints on U.S. freedom in the Caribbean.

(U) The Chairman of the Joint Chiefs of Staff concurs in this matter.

Harold Brown

SEC DEF CONTR No. X-1077

THE WHITE HOUSE

WASHINGTON

SECRET/NOFORN

April 7, 1977

MEMORANDUM FOR:

THE SECRETARY OF STATE
THE SECRETARY OF DEFENSE
THE DIRECTOR, ARMS CONTROL AND DISARMAMENT AGENCY

SUBJECT: Protocol I of the Treaty of Tlatelolco

Attached is a decision memorandum on whether the United States should adhere to Protocol I of the Treaty of Tlatelolco on creating a Nuclear Free Zone in Latin America.

Please state your Department's preferences on the options presented by COB Monday, April 11, 1977, so that the President will have time to consider whether or not he would like to include an announcement on adherence in his Pan American Day speech on April 14.

Zbigniew Brzezinski

~~SECRET~~ ~~GDS~~

Sec Def Cont No. 1088

TAB P

~~SECRET GDS~~

5

April 6, 1977

DECISION MEMORANDUM

SUBJECT: U.S. Adherence to Protocol I of the Treaty of Tlatelolco

The Issue

Whether we should adhere to Protocol I to the Treaty for the Prohibition of Nuclear Weapons in Latin America (Treaty of Tlatelolco), which would obligate us to prohibit and prevent the testing, use, manufacture, storage, installation, deployment, or possession of nuclear weapons in territories located in Latin America for which we are internationally responsible -

(b)(1)

Background

The U.S. supported the negotiation of the Treaty of Tlatelolco, which was concluded in 1967, and in 1971 adhered to its Protocol II, under which nuclear weapon states undertake to respect the nuclear-free zone and to refrain from using nuclear weapons against its parties. (The UK, France, and China have also joined Protocol II, while the USSR has not.) However, citing primarily the integral relationship to the U.S. of Puerto Rico as well as its importance to hemispheric defense, we have stated that we were not prepared to adhere to Protocol I. (Of the three other states eligible to adhere, the UK and the Netherlands have joined, while France has not.)

U.S. adherence to Protocol I would eliminate one of the few remaining requirements specified in the Treaty of Tlatelolco for the full entry into force of the nuclear-free zone regime, which would involve commitments by all Latin American states to forswear acquisition of nuclear weapons and to accept IAEA safeguards on all their nuclear facilities. (The remaining requirements would be Soviet adherence to Protocol II, French adherence to Protocol I, and Cuban and Argentine ratification of the Treaty of Tlatelolco. Brazil has already ratified, but unlike most other Latin American states that have done so, has exercised its right under the Treaty not to be bound until all the specified conditions are met.)

~~SECRET GDS~~

(b)(1),(b)(3):42 USC §2168(a) (1)(C)--(FRD)

A potentially controversial legal matter involves a provision of the Treaty of Tlatelolco specifying that, upon fulfillment of all requirements for full entry into force, the Treaty's zone of application would expand to a large area extending at some points up to 1500 miles from the Latin American coast. While the authors of the Treaty presumably intended this provision to have some constraining effect, our legal analysis indicates that the activation of this "extended zone of application" would not have any practical effect on U.S. obligations under Protocol I and II, and would therefore not in any way restrict U.S. freedom of navigation on the high seas surrounding Latin America. However, to insure against future controversy, we would want to place our interpretation of this provision on crecord at the time we signed the Protocol and deposited our instrument of ratification (presumably after consulting with key treaty parties and determining that they would not object to our interpretation).

Advantages of U.S. Adherence

-- Would have a favorable effect on U.S. relations with Latin America, particularly with Mexico, the principal sponsor of the Treaty, and Panama.

— Would generate pressures for Soviet adherence to Protocol II, which would obligate the Soviets not to store or deploy nuclear weapons in any Latin American territory.

— Would enhance prospects for adherence to the Treaty of Tlatelolco by Brazil, Argentina, and Cuba, although the latter two would still have the legal power to block the Treaty's full entry into force if they considered it in their interest to do so. (In the absence of such adherence, there is a serious risk that Argentina and Brazil will follow the Indian route to a nuclear explosive capability.)

— Would not affect any current U.S. operational requirements or deployments.

Disadvantages of U.S. Adherence

—

(b)(1),(b)(3):42 USC §2168(a) (1)(C)--(FRD)

—

— If we adhered without requiring adherence by other holdouts (e.g., Cuba, USSR), could be perceived as giving up military options in the Caribbean area without requiring reciprocal restraints and as reducing the leverage we might otherwise have for inducing those holdouts to take corresponding actions.

Options

(1) Continue existing policy.

(2) Adhere to Protocol I without conditions. If this option were chosen, it could be announced in the April 14 Pan American Day speech, although it would be important to contact the Puerto Rican government before any announcement in order to confirm that they would not have objections.

(3) Adhere to Protocol I when Cuba joins the Treaty and the USSR joins Protocol II. If this option were chosen, it is assumed that, in view of the sensitivity of current discussions with Cuba, we would proceed through diplomatic channels rather than through an announcement in the April 14 speech, which might be resented by the Cubans as placing public pressure on them. While this option would reduce possible criticism on the grounds that we had not required reciprocal restraints by others, it could entangle Protocol I in other U.S.-Cuban and U.S.-Soviet matters, and thereby delay U.S. adherence and any benefits resulting therefrom.

(4) Adhere to Protocol I when all other requirements for full entry into force of the Treaty of Tlatelolco are fulfilled. Since the focus on Cuba would be diluted, this could be announced on April 14 or pressed through diplomatic channels. Although this option would ensure full reciprocity, it could delay U.S. adherence indefinitely and might be criticized by Latin Americans as imposing unreasonable conditions on U.S. adherence.

Approve option _____

Date _____

OF THE ASSISTANT SECRETARY OF [illegible]NSE
WASHINGTON, D. C. 20301

7

INTERNATIONAL SECURITY AFFAIRS

April 5, 1977

MEMORANDUM FOR MR. THOMAS DAVIES, DEPUTY DIRECTOR, ACDA/NWT

SUBJECT: U.S. Adherence to Protocol I of the Treaty of Tlatelolco

(U) The Department of Defense has completed a staff level review of the ACDA draft issue and option paper on U.S. adherence of Protocol I. The following comments are forwarded in response to your request of March 29, 1977.

(S) The study premise that U.S. adherence to Protocol I would not affect the right of U.S. warships carrying nuclear weapons to conduct transits, port visits, training exercises, patrols, and routine deployments in and around U.S. territories in the Caribbean is of great concern to the Department of Defense. The same perception of applicability to overflight, staging, and routine deployments of aircraft carrying nuclear weapons in this region reflects a questionable realization of the operational implications for national security.

(S) The study conclusions (pp. 6-7), pertaining to Article 4 of the treaty about Extended Zone of Application, are questionable. Inclusion of the high seas as far as 1,500 miles in some instances, needs further study of national security implications.

(S) Current U.S. policy regarding Nuclear Weapons Free Zones requires provisions for adequate verification. OPANAL and IAEA inspection procedures require further review to determine adequacy. A question arises about the right of the U.S. to call for inspections as well as be subjected to them in U.S. territory.

(S) The discussion of the implications (p. 13) of U.S. adherence for non-proliferation reflects unrealistic optimism by stating that the only outstanding requirements would be certain compliance by the Soviets, French, Cubans, and Argentineans. It fails to pragmatically assess the likelihood of these occurrences given the importance attached to these actions by the respective states.

(S) The security implications of U.S. adherence (pp. 17-23) reflect a lack of appreciation of the essentiality of retaining maximum flexibility

(b)(1),(b)(3):42 USC §2168(a) (1)(C)--(FRD)

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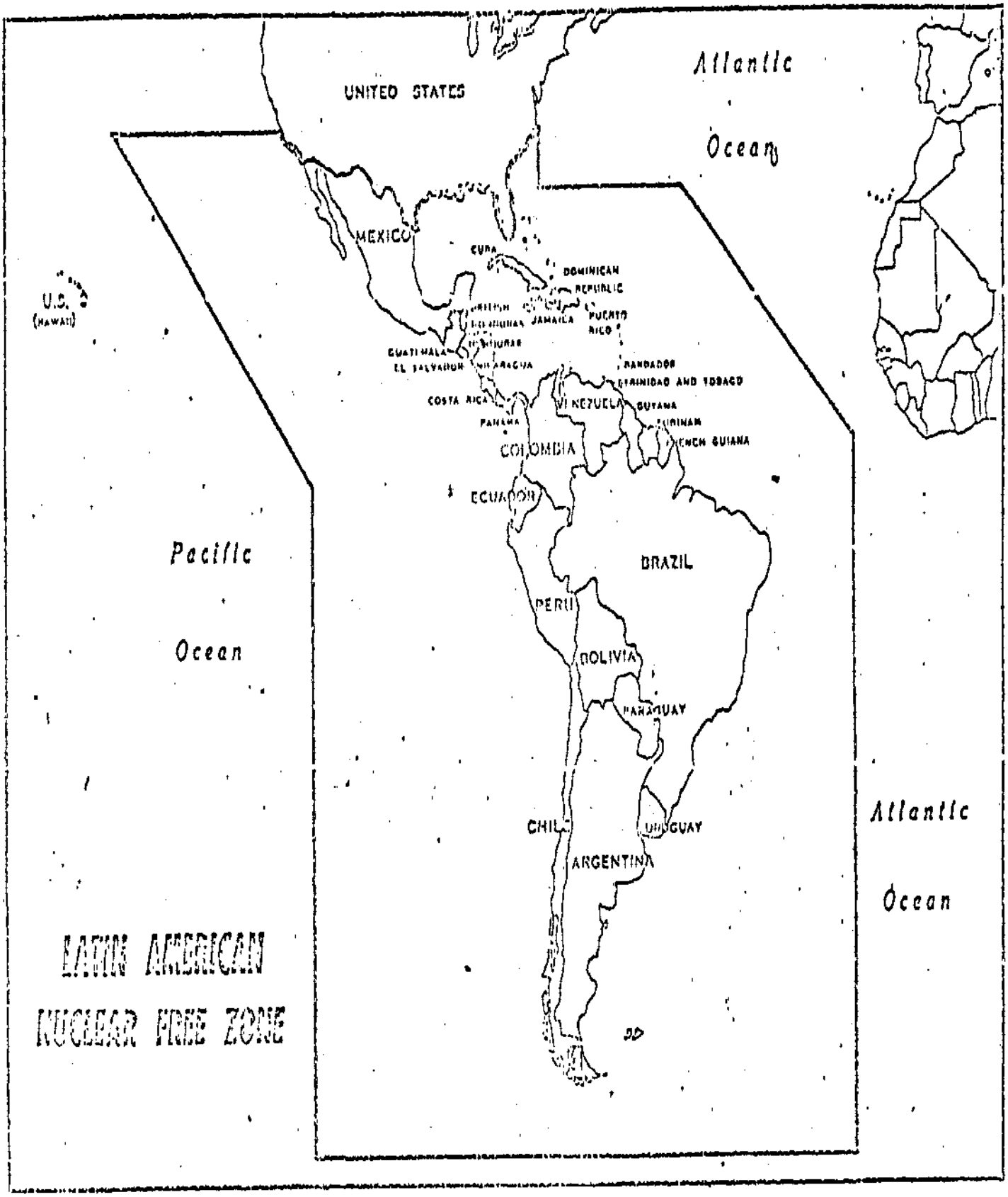
10

(S) Although Latin American states are critical of many U.S. policies, U.S. adherence to Protocol I would only be one factor in the larger U.S.-Latin American relationship. Some states might perceive U.S. adherence as specifically directed at them as a lever to achieve U.S. non-proliferation objectives.

(S) There appear to be differing legal opinions about certain aspects of U.S. adherence which I believe have not been resolved.

(S) At the DOD-ACDA meeting where the implications to U.S. national security of adherence to Protocol I were discussed, the DOD representatives clearly stated that at this time there appear to be no compelling reason to accept major restrictions on operational deployment and contingency options important to our national security in the hope of achieving possible (not probable) undetermined future political benefits.

James H. Thompson
Brigadier General, USA
Director, Policy Plans
and NSC Affairs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VENEZUELA
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PANAMA
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PERU
BOLIVIA
PARAGUAY
CHILE
URUGUAY
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LATIN AMERICAN
NUCLEAR FREE ZONE

ENCLOSURE RESTRICTED DATA ATOMIC ENERGY ACT 1954

THE JOINT CHIEFS OF STAFF
WASHINGTON, D.C. 20301

JCSM-198-77
9 May 1977

MEMORANDUM FOR THE SECRETARY OF DEFENSE

Subject: Underground Nuclear Weapons Test Program (U)

1. (S/RD) Reference your memorandum, 18 April 1977, subject as above, which stated that the views of the Joint Chiefs of Staff were essential in developing a priority ordering of weapon systems. These views would be used in developing guidance to the Energy Research and Development Administration (ERDA) on adjusting the test schedule in the event of a test moratorium or a comprehensive test ban (CTB).

2. (S) The reference forwarded an ERDA-proposed schedule which was based on ERDA's understanding of DOD weapon systems priorities. Subsequently, during development of an inter-agency Policy Review Paper which is to be used for guidance to the US delegation to Geneva for CTB discussions with the Soviets, ERDA has proposed another revision to the test schedule (Annex A to Appendix). This schedule, according to ERDA, was developed by condensing the schedule for each warhead program independently and then merging all programs into a master schedule. When developed in this manner, provided that adequate resources are available and no delays are introduced, the schedule should support development of each warhead in the minimum amount of time and should be relatively insensitive to weapon systems priorities.

3. (S) Accordingly, ERDA should be provided guidance as to those warhead programs which could be deemphasized or canceled in the event available resources are insufficient or delays are encountered. The Appendix contains a proposed letter for ERDA which would provide guidance consistent with the above assumptions.

4. (S) The rationale behind each of the proposed adjustments in the warhead development and testing program is supported by the previous DOD/ERDA assessment of CTB implications conducted during preparation of the response to PRM-16.

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Classified by Director, J-5

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~~RESTRICTED DATA ATOMIC ENERGY ACT 1954~~

Tabulated below are brief statements of the impact that curtailment of testing would have on each warhead program proposed in the Appendix:

Warhead	Impact
[redacted]	

(b)(1),(b)(3):42 USC §2162(a)--(RD)

5. (S) In addition, the Joint Chiefs of Staff believe that it would be appropriate, in view of the apparent national level decision to seek a CTB, to recommend that ERDA initiate action now to accelerate the nuclear weapons test program, to include acquiring necessary resources while maintaining required development and production schedules.

6. (U) The Joint Chiefs of Staff recommend that a letter, substantially like that contained in the Appendix, be forwarded to the Acting Administrator, ERDA.

7. (U) Without attachments, this memorandum is ~~SECRET~~ ~~FORMERLY RESTRICTED DATA.~~

For the Joint Chiefs of Staff:

Signed

PHILIP D. SHUTLER
Major General, USMC
Vice Director, Joint Staff

Attachments

APPENDIX AND ANNEXES A AND B

(5 Pages)

APPENDIX

DRAFT

Dr. Robert Fri
Acting Administrator
Energy Research and Development
Administration
Washington, D. C. 20545

Dear Dr. Fri:

(S/RD) On 15 March 1977, the Director of Military Application, Energy Research and Development Administration (ERDA), forwarded a letter to the Military Liaison Committee with a proposed revised underground nuclear test schedule which was prepared in anticipation of a test moratorium or comprehensive test ban (CTB). General Bratton's letter noted that the revised schedule was based on ERDA understanding of DOD weapon systems priorities and requested concurrence in the program and its associated priorities.

(S) Subsequently, during the development of an interagency Policy Review Paper which was prepared as a basis for guidance to the US delegation to Geneva for CTB discussions with the Soviets, a further revision of the test schedule (Annex A) was proposed by ERDA. This second revision was developed by compressing the schedule for each weapon program independently, then merging all the programs into a master schedule. As developed, it is understood that this revised program is relatively insensitive to weapon system priorities and should provide each required warhead in the minimum amount of time, provided that adequate resources are available and delays are not encountered.

(S) For this reason, it is felt that the type of information needed in response to General Bratton's letter is a DOD determination of which systems or warhead development could

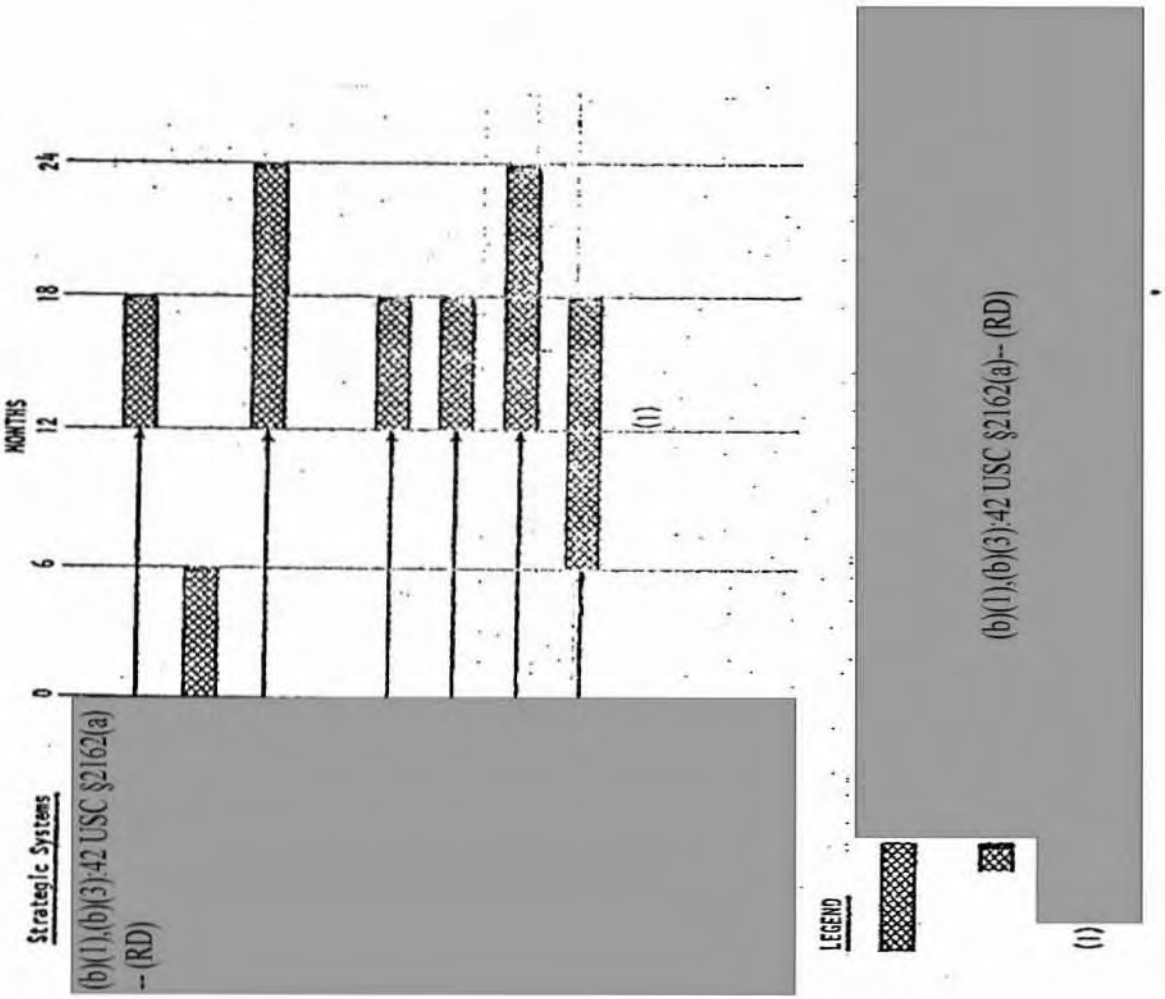
be deemphasized or canceled only in the event resource or scheduling problems arise. Accordingly, the list of developments contained in Annex B is provided to assist ERDA in restructuring the underground test program in the event adequate resources are not available or unanticipated delays are encountered. It is to be emphasized that this list is to be used only in the event that testing programs must be deleted and that all other avenues to obtain necessary support have been exhausted. The Joint Chiefs of Staff have concurred in this listing.

(S) One additional thought: in view of the apparent national level decisions to seek a CTB as soon as possible, it would appear prudent to take all necessary action, including insuring that adequate funds are available, to accelerate the test schedule while maintaining current development and production schedules. I assure you that the Department of Defense will support you in every way possible.

(U) Without attachment, this letter is ~~SECRET FORMERLY RESTRICTED DATA.~~

ANNEX A

WEAPON DEVELOPMENT SCHEDULE (U)



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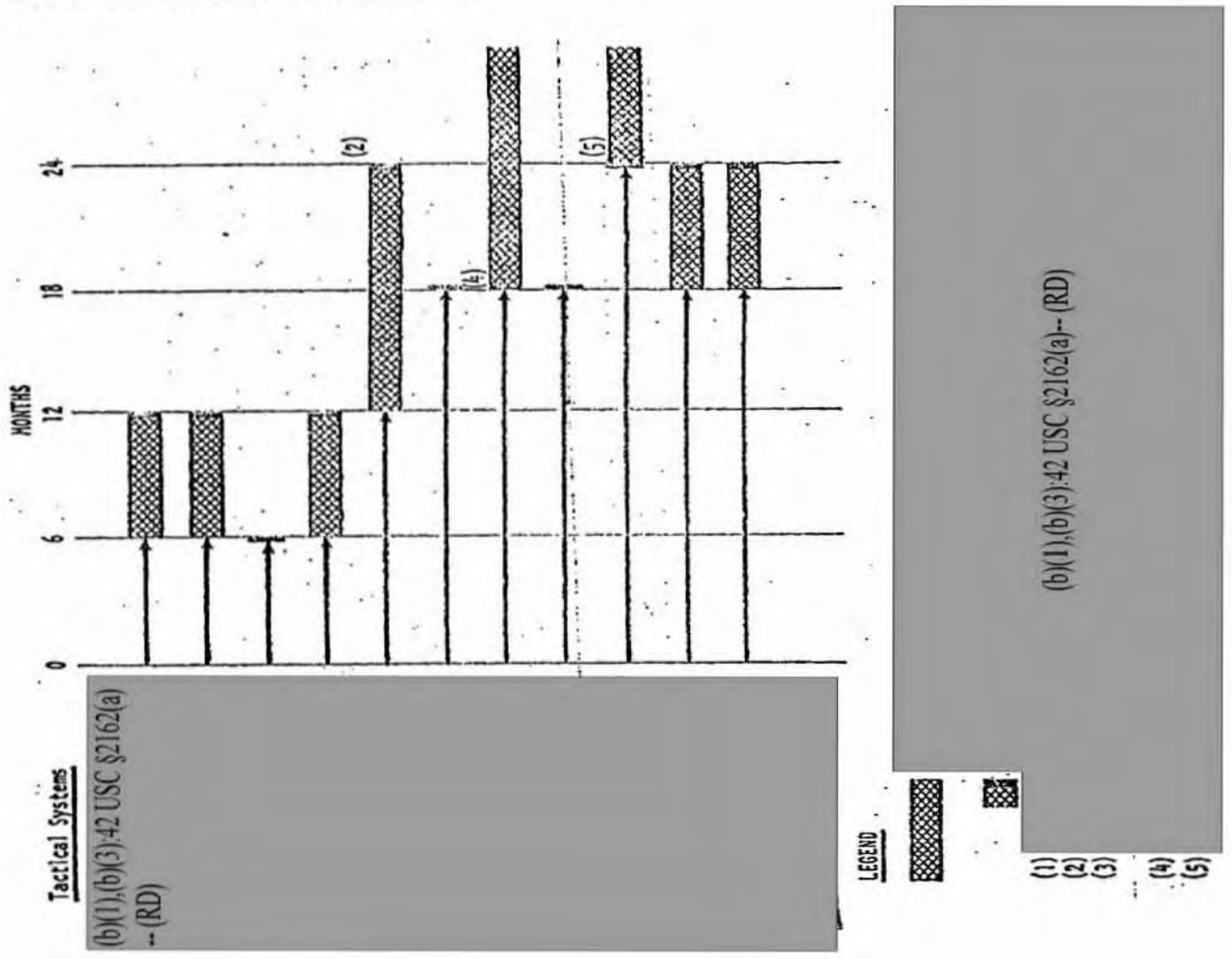
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(b)(1),(b)(3):42 USC §2162(a)-- (RD)

ANNEX B

WARHEAD DEVELOPMENT PROGRAMS (U)

The following list of warhead development programs is provided for use in adjusting test schedules in the event unanticipated schedule delays or constraints in funding, manpower, equipment, or facilities prevent accomplishment of all DOD desired test objectives prior to the effective date of cessation of testing under a comprehensive test ban or moratorium. The programs are listed in three categories. Category I contains those developments which should be considered first for deferral under the scenario described above. Category II systems should be considered only if deferral of Category I systems proves to be insufficient. Category III systems should be deferred only as a last resort and only after consultation with the Secretary of Defense.

Category I

(b)(1),(b)(3):42 USC §2162(a)-- (RD)

Category II

(b)(1),(b)(3):42 USC §2162(a)-- (RD)

Category III

(b)(1),(b)(3):42 USC §2162(a)-- (RD)

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THE JOINT CHIEFS OF STAFF
WASHINGTON, D. C. 20301

MJCS 208-77
30 June 1977

MEMORANDUM FOR THE ASSISTANT SECRETARY OF DEFENSE
(INTERNATIONAL SECURITY AFFAIRS)

Subject: Preparation for Trilateral CTB Negotiations (U)

1. ~~(S)~~ Reference is made to NSC memorandum,* subject as above, dated 25 June 1977, which requested agency recommendations on verification alternatives as outlined in an interagency paper entitled, "Comprehensive Test Ban: Issues for Decision".

2. ~~(S)~~ The yield thresholds which are identified in the paper are such that the Soviet Union could conduct a militarily significant program, including both weapons development and weapon effects, without an unacceptably high risk of detection. This would be true even if the US successfully developed and fielded the most effective verification means addressed in the paper. It should also be noted that the most effective verification means addressed in the paper are also the most intrusive, and therefore the least likely to be successfully negotiated with the Soviets. It must be concluded that the detection thresholds which will be attainable will be the higher ones. This serves to emphasize a previous conclusion of the Joint Chiefs of Staff that a CTB is not in the best interests of the US at this time.

3. ~~(S)~~ It must be noted that the revised table on page 21 and its introduction on page 20 do not track with the text of the paper and are incorrect. The table identifies a range of yields above which explosions may be identified, but not necessarily with high confidence. For example, in

* On file in Joint Secretariat

~~CLASSIFIED BY DIRECTOR, JOINT STAFF
SUBJECT TO GENERAL DECLASSIFICATION
SCHEDULE OF EXECUTIVE ORDER 11652
AUTOMATICALLY DOWNGRADED AT TWO
YEAR INTERVALS
DECLASSIFIED ON 31 DECEMBER 1985~~

~~SECRET~~

(6)

[redacted] (b)(1) could be tested without being seismically detected outside the USSR. Presumably, identification of such an explosion, which is more difficult than mere detection, could not be carried out with high confidence.

4. ~~(S)~~ Assuming, however, that a decision is made to continue to seek a CTB, the verification alternatives which offer the lowest thresholds and highest confidence should be pursued. Therefore, Option A is recommended with regard to automated seismic stations, to include a sufficient number of stations to drive the detection threshold as low as reasonably possible. Option C for On-Site Inspection is also recommended, since it involves a greater deterrent to treaty violations. Option B is least preferable, since Bloc veto would guarantee non-access to Soviet territory. The argument that Bloc veto would involve political costs, thus constituting an improvement over the Soviet offer of voluntary inspection, is not considered valid, particularly where issues of Soviet national security are concerned.

5. ~~(S)~~ A point which was missed in the paper but should be taken into account by the decisionmakers is the fact that the current US capability to detect nuclear tests in environments other than underground is inadequate, and that under a CTB regime, atmospheric testing may become more attractive than underground testing. Improvements to US atmospheric detection capability, although not programmed for completion until 1984, should be considered in conjunction with other improvements (e.g. seismic) to US national technical means (NTM) in order that a balanced detection capability be maintained.

6. ~~(S)~~ Concurrent with a decision on the verification options above, it is considered essential to initiate improvements to US NTM, regardless of which options are selected. It is recommended that the Presidential Directive which sets forth the US negotiating position also direct the initiation of the necessary work to develop the appropriate instrumentation, including that required to update the Atomic Energy Detection System (AEDS), on a priority basis.

7. (U) In conclusion, the paper addresses the verification and PNE issues in a comprehensive manner. However, other key issues raised during the bilaterals with the Soviets (for example, adherence, moratorium, withdrawal versus release) should be fully addressed prior to the issuance of a Presidential Directive. It is recommended that any draft Presidential Directive covering these issues be circulated once again for comment prior to its issuance.

8. (U) It is requested that these views and recommendations be forwarded to the NSC Staff.

SIGNED

RAY B. SITTON
Lieutenant General, USAF
Director, Joint Staff

ENCLOSURE

(b)(1)

THE JOINT CHIEFS OF STAFF
WASHINGTON, D.C. 20301

~~Restricted Data~~ Atomic Act 1954

JCSM-303-77
19 July 1977

MEMORANDUM FOR THE SECRETARY OF DEFENSE

Subject: Status Report on the Adequacy of Fulfilling the Limited Test Ban Treaty Safeguards (U)

1. (U) The Appendix contains the 15th Status Report, which reviews the adequacy of fulfilling the safeguards to the Limited Test Ban Treaty during the period 1 July 1975 to 30 September 1976. The Appendix presents a historical summary of events pertinent to the support of the safeguards.

2. ~~(S)~~(b)(1) Current and future problems for each of the safeguards are addressed, as well as conclusions and recommendations. The Joint Chiefs of Staff conclude that support for Safeguard C (Readiness To Test) was adequate. Support for Safeguards A (Underground Nuclear Testing) and B (Laboratory Facilities) was marginally adequate. However, the Joint Chiefs of Staff conclude that support for Safeguard D

(b)(1),(b)(3):50 USC §403(g) Section 6

3. (U) The Joint Chiefs of Staff support the recommendations contained in the Appendix and specifically emphasize their support for the following:

a. Increased funding for Energy Research and Development Administration (ERDA) nuclear weapons laboratories, and continued support of DOD laboratory programs.

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~~Classified by Director, J-5~~

(b)(1)

~~Dissemination and Extraction of Information Controlled by Originator~~

(b)(1)

~~Restricted Data~~ Atomic Act 1954

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~~Restricted Data Atomic Act 1954~~

(b)(1)

b. Improvements, including all feasible interim measures, to the US Atomic Energy Detection System (AEDS) verification capability.

4. (S) The Joint Chiefs of Staff note that present administration initiatives concerning a possible Comprehensive Test Ban Treaty (CTBT), if successful, should be cause to increase emphasis on Safeguards B and D. If underground testing is not available in the future, activities of laboratories become critical to the maintenance of a viable nuclear weapons deterrent force.

(b)(1)

5. (U) Without attachment, this memorandum is removed from the ~~RESTRICTED DATA~~ category and the following markings may be removed:

(b)(1)

For the Joint Chiefs of Staff:

Signed

PHILIP D. SHUTLER
Major General, USMC
Vice Director, Joint Staff

Attachment

Copy to:
Director of Military Application, ERDA
(b)(1)
Director, DNA

(b)(1)

~~Restricted Data Atomic Act 1954~~

(b)(1)

~~SECRET RESTRICTED DATA~~

APPENDIX

(99 pages)

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ADEQUACY OF FULFILLING THE LIMITED TEST BAN TREATY SAFEGUARDS (FIFTEENTH STATUS REPORT, FY 1976+TQ)

TABLE OF CONTENTS

FIFTEENTH STATUS REPORT (FY 1976 + 197T) ON THE ADEQUACY OF FULFILLING THE LIMITED TEST BAN TREATY SAFEGUARDS (U)

PART I

SUMMARY

ADEQUACY OF FULFILLMENT

(b)(1)

2. (S/RD) SAFEGUARD A

"The conduct of comprehensive, aggressive, and continuing underground nuclear test programs designed to add to our knowledge and improve our weapons in all areas of significance to our military posture for the future."

(b)(1)

~~Classified by Director, J-5~~

(2) National policy decisions and DOD funding limitations have reduced the number of strategic and tactical nuclear weapon systems selected for upgrading or replacement by new systems. This in turn has caused a reduction in the aggregate of systems effects test requirements that are needed to justify a dedicated underground test program (i.e., tests of hardware in engineering or production phases). As a result, the periods of time between weapons effects tests have continued to increase.

(b)(1)

Some underground tests carefully chosen to support either advanced technology programs or to develop new experimental underground testing techniques or justified by a combination of these purposes should therefore be permitted. Alternatively, the choice is one of extremely high costs per event

(b)(1)

is another important point to be kept in mind. The probability is low that atmospheric testing will ever be resumed. Underground effects experiments can now be performed that once were thought to be impossible except with tests in the forbidden environment. An "aggressive" underground effects test program can be expected to provide breakthroughs in this vital area. The last underground effects test, MIGHTY EPIC, was executed in May 1976. The next event, HYBLA GOLD, will not be conducted until November 1977. This is not an aggressive test program. Following DIABLO HAWK, in the FY 1979 through FY 1981 timeframe, one event per year is programmed and will be executed only if the Air Force's MX system enters accelerated development.

b. Conclusions

(b)(1)

c. Recommendations

(1) Support increased ERDA test funding to satisfy anticipated future weapons research and development requirements.

(2) The level of DOD future experimentation should continue at no less than that needed to maintain a viable underground nuclear weapons effects test program.

(b)(1)

(b)(1)

3. (S) SAFEGUARD B

"The maintenance of modern nuclear laboratory facilities and programs in theoretical and exploratory nuclear technology which will attract, retain, and insure the continued application of our human scientific resources to those programs on which continued progress in nuclear technology depends."

(b)(1)

Plant and capital equipment funding is not included in the research and development funding.

(b)(1)

b. Conclusions

(1) Although support for this safeguard has been adequate in the past, there continues to be a need for realignment of priorities and funding due to the high level (DOD, CINCs, etc.) of interest in nuclear weapons effects, particularly as they affect communications, tactical considerations, and targetry options.

(2) ERDA support for Safeguard B was at a minimum level during FY 1976+197T based on the effects of inflation and budget constraints on equipment and facilities.

c. Recommendations

(1) Support funding of DOD nuclear effects programs. This would increase the opportunities available to DOD and DOD contractor laboratory personnel to participate in nuclear effects research, and this would, in turn, enhance the retention and experience level of personnel supporting Safeguard B. This would also help to maintain sufficient, adequately trained personnel to implement Safeguard C, should that be deemed necessary.

(2) Support funding for ERDA's nuclear weapons laboratories to facilitate their continued support for the immediate nuclear weapons requirements of the Department of Defense

(b)(1)

(b)(1)

4. (S) SAFEGUARD C

"The maintenance of the basic capability to resume nuclear testing in the atmosphere should that be deemed essential to national security."

a. Problem. ERDA considers that the failure to retain personnel with expertise in atmospheric testing may lead to a problem should atmospheric testing be resumed. As time passes, normal attrition of personnel with expertise in atmospheric testing can be anticipated. This increases the importance of maintaining viable laboratory and underground testing programs to provide a nucleus of experienced personnel capable of transitioning to atmospheric testing.

b. Conclusion. Support for the revised Safeguard C was adequate.

c. Recommendation. ERDA and DOD laboratories should emphasize their support of Safeguards A and B to insure retention and training of personnel with expertise in atmospheric testing and closely related fields.

5. (S)(b)(1) SAFEGUARD D

"The improvement of our capability, within feasible and practical limits, to monitor the terms of the treaty, to detect violations,

(b)(1)

(b)(1),(b)(3):50 USC §403(g) Section 6

(b)(1),(b)(3):50 USC §403(g) Section 6

c. Recommendations

(1) (b)(1)

responsible for collection, analysis, and evaluation of technical information required to satisfy the provisions of Safeguard D.

(2)

(b)(1),(b)(3):50 USC §403(g) Section 6

(b)(1),(b)(3):50 USC §403(g) Section 6

PART II

SAFEGUARD A--UNDERGROUND TEST PROGRAM (U)

SAFEGUARD A

"The conduct of comprehensive, aggressive, and continuing underground nuclear test programs designed to add to our knowledge and improve our weapons in all areas of significance to our military posture for the future."

CRITERIA

1. (U) In 1963, the Chairman, Joint Chiefs of Staff, submitted the following criteria to the Senate Armed Services Committee for use in subsequent examinations of programs to insure that this safeguard is fulfilled:

"The underground test program should be comprehensive. Therefore, it should be revised to include all feasible objectives of the tests which we would otherwise do under conditions of unrestricted testing.

"The underground test program should be vigorous. It should proceed at a pace that will fully exploit the capabilities of existing AEC and DOD weapons laboratories. If these capabilities prove inadequate for meeting established requirements, they should be expanded.

"The underground test program should be a continuing program which insures the highest practicable progress in nuclear technology.

"The standards established to govern the type and magnitude of tests to be conducted should not be more restrictive than the spirit of the Treaty limitations."

SCOPE

2. ~~(C)~~ The underground test program has consisted primarily of DOD-directed weapon effects tests and ERDA-directed weapon development tests. The overall underground test program for FY 1973 through FY 1977 and related fiscal year costs are summarized below:

a. ~~(C)~~ TYPES AND NUMBER OF TESTS[1/]

Types of Tests	FY 73 Tests	FY 74 Tests	FY 75 Tests	FY 76+7T Tests	FY 77[2/] Tests Planned
DOD					
Weapon Effects	2(2)	2(2)	2(2)	2(2)	0(0)
(b)(1),(b)(3):42 USC §2162(a)-- (RD)					
ERDA					
(b)(1),(b)(3):42 USC §2162(a)-- (RD)					
PLOWSHARE	1(3)	0(0)	0(0)	0(0)	0(0)
Total Underground Tests	(b)(1),(b)(3):42 USC §2162(a)-- (RD)				

1/ Because some of the tests conducted have involved simultaneous detonation of two or more devices, the number of devices tested has been shown in parentheses to indicate the actual level of testing.

2/ The numbers provided for FY 1977 are based on the programmatic request and may or may not be affordable with available funding.

3/ STILTON/HUSHED ECHO was a cooperative DOD/ERDA test and counted separately by both; therefore, this column does not add.

b. (U) FUNDING (In Millions of Dollars)[1/]

	FY 73 Actual	FY 74 Actual	FY 75 Actual	FY 76+7T Actual	FY 77 Planned
DOD	38.3	20.8(19.5)	33.1(29.2)	44.9(37.2)	37.1(28.8)
ERDA	123.6	107.3(100.8)	172.3[2/](151.9)	259.2 (214.6)	216.3 (168.1)
Total	161.9	128.1(120.3)	205.4(181.1)	304.1(251.8)	253.4(196.9)

1/ Figures in parentheses represent constant dollars, using FY 1973 as the base year. An average inflation rate of approximately 6.7% was used, and this average was based on price escalation indexes contained in a memorandum by the Assistant Secretary of Defense (Comptroller), 13 August 1976, "FY 1977 Revised and FY 1978 Budget Estimates Guidance."

2/ Represents first time that laboratory participation has been included.

DOD PROGRAMS

(b)(1),(b)(3):42 USC §2162(a)-- (RD)

4. (S) Tests. Two underground nuclear weapons effects tests were conducted during FY 1976+197T at the Nevada Test Site. HUSKY PUP was executed on 24 October 1975, and MIGHTY EPIC was executed on 12 May 1976. HYBLA GOLD is scheduled for execution in November 1977 and is a physics experiment involving the characterization of high enthalpy flow in pipes. It is a unique event, having two separate short drifts, and instrumented concrete pipes. DIABLO HAWK is scheduled for execution in June 1978 and is the second event of a "two-for-one" concept wherein a second event is executed reusing a substantial portion of the test bed (tunnels, cable, apparatus, and equipment) from a previously executed event (MIGHTY EPIC in this case). The "two-for-one" concept has made significant resources available for DIABLO HAWK and permits an expanded add-on experiment program without exceeding budget limitations.

5. ~~(S/RD)~~ Test Highlights

a. No containment problems were encountered on the HUSKY PUP or MIGHTY EPIC events.

b. HUSKY PUP

(1) (b)(1),(b)(3):42 USC §2162(a)-- (RD) The recovery of active ~~data~~ was approximately 90 percent successful.

(3) (b)(1),(b)(3):42 USC §2162(a)-- (RD) Extensive post-test analysis of the four Special Test Units has revealed no significant damage. (b)(1),(b)(3):42 USC §2162(a)-- (RD)

(b)(1),(b)(3):42 USC §2162(a)-- (RD)

Measurements were made to characterize the impact of nuclear debris onto an earth medium. The results of the debris coupling experiment provide a basis for modifying analytical models

(b)(1)

c. MIGHTY EPIC

(1)

(b)(1),(b)(3):42 USC §2162(a)-- (RD)

Experimental prototype models of deep based structures were also exposed to the underground shock from the nuclear blast.

(2) There were three structures drifts for deep basing technology experiments. The objective of the structures experiments was to study the response of new structural

design concepts to withstand high intensity shock loading. The test structures consisted of two types:

(b)(1),(b)(3):42 USC §2162(a)-- (RD)

Post-shot examination revealed some severe damage to (b)(1) at the highest stress level, (b)(1) Further analysis is required on each strucutre to define the response to each shock loading. These same structures will be reloaded during the DIABLO HAWK event. MIGHTY EPIC was the first major underground test of deep basing structures technology since the PILE DRIVER test in 1966.

(b)(1),(b)(3):42 USC §2162(a)-- (RD)

(4) The first effort by the Air Force in an underground effects test to obtain test ~~data~~ (b)(1) (b)(1) was also fielded during MIGHTY EPIC. (b)(1) Excellent ~~data~~ records were obtained.

These ~~data~~ generally fall within the range of predictions and will be used to improve the computer calculational codes and to reduce the spread in those predictions.

ERDA PROGRAMS

6. ~~(S/RD)~~ Present Program of Testing. During FY 1976+197T, 18 ERDA-sponsored underground nuclear tests involving 18 devices were conducted.

(b)(1),(b)(3):42 USC §2162(a)-- (RD)

7. ~~(S/RD/CNWDI)~~ Highlights of FY 1976+197T.

(b)(1),(b)(3):42 USC §2162(a)-- (RD)

(b)(1),(b)(3):42 USC §2162(a)-- (RD)

PROBLEMS

10. (S/RD) The emphasis placed on the development of high-yield weapons, as well as budget constraints during FY 1976-197T, precluded ERDA from conducting sufficient tests to maintain advanced development and supporting research.

(b)(1)

While reduced funding can be accommodated in the short term, it must be increased in the future if a viable program is to be maintained.

11. (S) National policy decisions and DOD funding limitations have reduced the strategic or tactical nuclear weapon systems selected for upgrading or replacement by new systems. This in turn has caused a reduction in total systems effects test requirements of sufficient size to justify a dedicated underground test (i.e., tests of hardware in engineering or production phases). As a result, the periods of time between tests have continued to increase.

(b)(1)

(b)(1) Some underground tests carefully chosen to support either nonsystems technology programs or to develop new experimental underground testing techniques or justified by a combination of these purposes should therefore be permitted.

(b)(1) Underground effects experiments can now be performed that once were thought to be impossible except with tests in the forbidden environment. An "aggressive" underground effects test program can be expected to provide breakthroughs in this vital area. The last underground effects test, MIGHTY EPIC, was executed in May 1976. The next event, HYBLA GOLD, will not be conducted until November 1977. This is not an aggressive test program. Following HYBLA GOLD, in the FY 1979 through FY 1981 timeframe, one event per year is programmed and will be executed only if the Air Force's MX system is placed in accelerated development.

CONCLUSIONS

12. (C/FRD) ERDA support for Safeguard A was marginally adequate in FY 1976+197T (b)(1)

13. (C/FRD) DOD support for Safeguard A was adequate in FY 1976+197T, (b)(1)

RECOMMENDATIONS

14. (U) Support increased ERDA test funding to satisfy anticipated future weapons research and development requirements.

15. (U) The level of DOD future experimentation should continue at no less than that needed to maintain underground nuclear weapons effects test program. Based upon current projections this would dictate that about three major underground nuclear weapons effects tests should be conducted during every 2-year period and at least one event per fiscal year.

PART III

SAFEGUARD B--LABORATORY FACILITIES AND PROGRAMS (U)

SAFEGUARD B

"The maintenance of modern nuclear laboratory facilities and programs in theoretical and exploratory nuclear technology which will attract, retain, and insure the continued application of our human scientific resources to those programs on which continued progress in nuclear technology depends."

CRITERIA

1. (U) The following are the criteria submitted by the Chairman, Joint Chiefs of Staff, to the Senate Armed Services Committee for evaluating the fulfillment of this safeguard:

"Broad and forward-looking research programs should be carried on which will attract and retain able, imaginative personnel capable of ensuring the highest practicable rate of progress that can be attained in all avenues of potential value to our offensive and defensive posture."

SCOPE

2. (U) Nuclear technology R&D has been progressively expanded in Government laboratories and contractor facilities since the ratification of the Limited Test Ban Treaty (LTBT). ERDA, through its three weapons laboratories (Sandia Laboratories, Los Alamos Scientific Laboratory, and Lawrence Livermore Laboratory), and the Department of Defense, through many Service laboratories and DNA, have expanded facility capabilities and research efforts.

3. (U) Funding for ERDA and DOD programs is shown in the following table:

~~SECRET/FORMERLY RESTRICTED DATA~~

FUNDING (In Millions of Dollars)[1/]

	FY 73 Actual	FY 74 Actual	FY 75 Actual	FY 76+7T Actual	FY 77 Planned
DOD	81.3	93.4(87.7)	84.6(74.6)	114.5(94.8)	103.9(80.8)
ERDA	275.7	247.7(232.6)	260.2[2/](229.4)	366.2(303.2)	324.3(252.1)
TOTAL	357.0	341.1(320.3)	344.8(304.0)	480.7(398.0)	428.2(332.9)

1/ Figures in parentheses represent constant dollars, using 1973 as the base year. An average inflation rate of approximately 6.7% was used, and this average was based on price escalation indexes contained in a memorandum by the Assistant Secretary of Defense (Comptroller), 13 August 1976, "FY 1977 Revised and FY 1978 Budget Estimates Guidance."

2/ Changed from Fourteenth Status Report.

DOD PROGRAMS AND FACILITIES

4. ~~(S/FRD)~~

(b)(1)

(b)(1)

There is a chance for reasonable success in this venture if underground tests are continued for at least the next 4 or 5 years; however, there will probably never be an identical one-to-one substitute in the laboratory for underground testing.

5. ~~(S)~~ High Explosive Simulation Tests. Several tests were conducted to obtain nuclear weapons effects information for use in strategic structures hardness assessments.

a. DICE THROW. DICE THROW,

(b)(1)

b. MX-Related Testing. A dynamic airblast simulator (DABS) is being developed to provide an economical technique for simulating the dynamic and reflected pressures on MX structures. During the past year, a series of small-scale tests was conducted to provide design and calibration ~~data~~ for development of the full-scale concept. It is anticipated that the DABS will be ready for use in the 1978-1980 timeframe to test the land mobile option of the MX, at least to half scale.

c. Ship Testing. A series of tests was conducted to provide surface ship vulnerability ~~data.~~ (b)(1) The results of this series of tests will be used to better understand ship vulnerability to deep water shock loading. Test evaluation will be completed in FY 1977.

d. HARDPAN Tests. A modified version of high explosive simulation technique was developed to simulate air-induced ground motions in a scaled Wing IV MINUTEMAN site geology. (b)(1) Information gained from this program will be used in the MINUTEMAN Upgrade Program.

6. (U) Command, Control and Communications (C^3) Assessment

a. Integrated Nuclear Communications Assessment (INCA). Project INCA was initiated to develop sufficient analytical tools to allow a continuing analysis of the capability of Worldwide Military Command and Control Systems and supporting tactical communications systems to adequately support essential functions when subjected to various nuclear environments. These analytical tools will be applicable to any complex C^3 network, current or future. The program will address both equipment survivability and communication links survivability and be in a form useful for determining C^3 employment tactics.

b. Assessment of Pacific Area Communication for Hardening to EMP (APACHE). This project was started to provide CINCPAC

with an assessment of present PACOM C^3 assets. Results of the APACHE program will recommend fixes or alternate means of performing command and control functions. Efforts to organize the program to meet the specific needs of CINCPAC have been completed, and the actual assessment has been started.

7. (U) High-Altitude Effects Simulation

a. The Wideband Satellite Experiment was launched 22 May 1976. It is now in a 1,000 kilometer sun-synchronous, near-polar orbit. (b)(1) Amplitude and phase scintillation and the spatial correlation of the satellite signals are being recorded. The ~~data~~ are now being reduced, and a model of the scintillation of the naturally disturbed ionosphere is being developed. In situ measurements of the scintillating structure will be conducted in (b)(1) (b)(1) by the end of FY 1977. These experimental ~~data~~ will then be used to benchmark weapons effects codes.

(b)(1)

c. The EXCEDE Program which uses rocketborne electron accelerators to produce high-altitude ionization successfully launched a low-power short wave infrared (SWIR) experiment.

(b)(1) [redacted]

8. ~~(C/FRD)~~ Laboratory Simulators of Nuclear Effects. Major activities conducted in the simulation program are indicated below:

a. A Transportable EMP Simulator (TEMPS) was refurbished and shipped to Pickens, Mississippi, for the testing of an ESS-1 type AUTOVON switch. This represents the final testing phase being conducted under the joint DNA/DCA Predictive EMP Testing (PREMPT) program. After testing is completed in November 1976, TEMPS may be sent to Hawaii for testing of undersea cables, major airborne and seaborne communications modes, and satellite ground terminals to support the APACHE program discussed in subparagraph 6b above.

b. The Advanced Research Electromagnetic Pulse Simulator (ARES) located at Kirtland Air Force Base, New Mexico,was converted in 1975 to provide a dispersed EMP environment in anticipation of a satellite system test. It was placed in caretaker status in mid-CY 1976 pending reconversion to provide its normal high altitude EMP environment for tests [redacted]

(b)(1) [redacted]

c. The CASINO simulator, located at the Naval Surface Weapons Center, White Oak, Maryland,is designed to simulate a hot

filtered [redacted] (b)(1),(b)(3):42 USC §2162(a)-- (RD) [redacted] It is presently operating at approximately 50 percent of the design goal. Efforts are underway to bring the output up to the full design goal. Also, modifications of the magnetic beam transport system are being examined to determine if the magnetic fields now associated with beam transport can be reduced or avoided altogether. If feasible, that modification would make the CASINO facility useful for tests of magnetic memories.

d. AURORA, located at the Harry Diamond Laboratories, Adelphi, Maryland, is used to determine the effects of ionizing radiation on subsystems and components. AURORA is being modified to provide a peak current capability of (b)(1) It will be employed in the low-impedance mode to drive plasma heating experiments for the production of (b)(1) and thus provide a potential photon source for either SGEMP experiments or (b)(1) exposure of reentry vehicle systems. The AURORA modification is scheduled for completion in early FY 1978.

e. Work continues under the DNA Advanced Simulation Concepts Program to provide laboratory sources capable of meeting both the near-term (1-3 years) SGEMP objectives and the far-term BACCARAT goals of testing a full-sized reentry vehicle at threat levels.

f. COCHISE is a liquid-nitrogen-cooled laboratory facility at the Air Force Geophysics Laboratory designed to measure infrared (IR) emissions from atmospheric molecular species. [redacted] (b)(1) [redacted] COCHISE was brought into operation during FY 1976. Presently, the atmospheric

processes which lead to the formation of ozone are being studied. IR emissions in the region of (b)(1) have been detected for several vibrational levels of excited ozone.

(b)(1)

ERDA PROGRAMS AND FACILITIES

9. (U) Laboratory Facilities and Equipment. The three ERDA nuclear weapons laboratories have continued to receive sufficient funds for meeting high priority warhead needs. However, equipment and construction funding for replacement of obsolete equipment and needed facility improvements was minimal.

10. (U) Test Facilities and Equipment. The ERDA weapons test facilities, Nevada Test Site and Tonopah Test Range, have also continued to receive sufficient funds for meeting high priority weapons program needs. However, equipment and construction funding for replacement of obsolete equipment and needed facility improvements was minimal at these facilities also.

11. (U) Research and Development Programs. During FY 1976, weaponization efforts supported immediate DOD requirements at the expense of advanced development.

PROBLEMS

12. (U) The reduced rate of underground weapons effects testing has also had a deleterious effect on Safeguard B (Laboratory Programs). The reduced rate of testing has limited the opportunities for meaningful exchange of knowledge and experience between personnel supporting both Safeguards A and B. This has led to a notable decrease in the number of DOD and DOD contractor laboratory personnel working on nuclear effects and a decrease in the expertise of those working on simulation and modeling. Should this trend continue, fewer DOD and DOD contractor organizations will be capable of designing meaningful effects experiments or models, and a marginal rate of return may well be experienced on those few underground tests conducted in the future. Personnel retention and training deficiencies, described above, could reduce our capability to return to atmospheric nuclear testing in the future (Safeguard C).

13. (U) ERDA considers that its laboratory and testing capabilities are being reduced by obsolete equipment and deficient facilities. Continuation of this trend will lead to a serious erosion of those capabilities. Plant and capital equipment funding is not included in the research and development funding, previously mentioned.

14. (U) ERDA has curtailed advanced weaponization development efforts due to the inflation rate, budget constraints, and efforts in support of the Threshold Test Ban Treaty.

CONCLUSIONS

15. (U) Although support for Safeguard B has been adequate in the past, there continues to be a need for realignment of priorities and funding due to the high level (DOD, CINCs, etc.) of interest in nuclear weapons effects, particularly as they affect communications, tactical considerations, and targetry options.

16. (U) ERDA support for Safeguard B was at a minimum level during FY 1976+197T based on the effects of inflation and budget constraints on equipment and facilities.

RECOMMENDATIONS

17. (U) Support funding of DOD nuclear effects programs. This will increase contractor laboratory personnel to participate in nuclear effects research, and this would, in turn, enhance the retention and experience level of personnel supporting Safeguard B. This would also help to maintain sufficient, adequately trained personnel to implement Safeguard C, should that be deemed necessary.

18. (U) Support funding for ERDA's nuclear weapons laboratories to facilitate their continued support for the immediate nuclear weapons requirements of the Department of Defense and to restore advanced development efforts that have been significantly reduced, especially those for improved safety, security, reliability,and effectiveness of nuclear weapons.

19. (U) Support ERDA in funding requests to update its nuclear weapons laboratories and test sites by replacing obsolete equipment on an orderly basis and modernizing facilities required to meet future needs.

PART IV

SAFEGUARD C--READINESS TO TEST (U)

SAFEGUARD C

"The maintenance of the basic capability to resume nuclear testing in the atmosphere should that be deemed essential to national security."

CRITERIA

1. ~~(S)~~ On 7 January 1976, in a letter to the Chairman of the Subcommittee on Arms Control, Committee of the Armed Services, US Senate, the President redefined Safeguard C to reflect current needs and conditions. The central theme of the new definition deletes the requirement for a "prompt" return to atmospheric testing. The support envisioned does, however, retain the basic capability to resume atmospheric testing should that be deemed essential. The President went on to state that:

"While a period of two to three years would probably be required to initiate a comprehensive, integrated weapon effects test program, demonstration tests could be immediately conducted by operational forces should national priorities dictate."

"Johnston Atoll will be retained to insure its availability in the event of atmospheric testing resumption, although it will not remain in active status for this use alone."

"The conduct of nuclear research and testing will insure retention of personnel with expertise in atmospheric testing and closely related fields."

SCOPE

2. (U) Safeguard C provides for:

a. Maintenance of test resources to include certain facilities and test equipment. Note: These assets are greatly reduced from previous years.

b. Preparation of a list of currently conceived scientific needs and objectives for nuclear testing which cannot be satisfied by underground nuclear tests or laboratory simulation.

c. Retention of technically capable personnel who are presently supported in other productive efforts but who could be reassigned to the atmospheric test program should it be necessary.

3. (U) DNA and Energy Research and Development Administration (ERDA) have been tasked to develop, on an annual basis, a list of scientific needs and objectives (subparagraph 2b above) and to determine the types and priority of tests necessary to obtain the objectives. Commencing with this status report, this assessment will replace the National Nuclear Test Readiness Program (NNTRP) and become the only listing of atmospheric nuclear weapons effects ~~data~~ requirements.

4. (U) Funding for DOD and ERDA programs is shown in the following table:

FUNDING (In Millions of Dollars)[1/]

	FY 73 Actual	FY 74 Actual	FY 75 Actual	FY 76+7T Actual	FY 77 Planned
DOD					
RDT&E	3.9	2.8(2.6)	1.9(1.7)	1.5(1.3)	0
O&M[2/]	8.3	9.4(8.8)	9.7(8.6)	11.5(9.4)	8.6(6.7)
ERDA	6.7	7.5(7.1)	8.0(7.0)	5.5(4.6)	2.0(1.5)
Total	18.9	19.7(18.5)	19.6(17.3)	18.5(15.3)	10.6(8.2)

1/ Figures in parentheses represent constant dollars, using FY 1973 as the base year. An average inflation rate of approximately 6.7% per year was used, and this average was based on price escalation indexes contained in Assistant Secretary of Defense (Comptroller) memorandum, 13 August 76.

2/ O&M funding provides for Johnston Atoll operations excluding tenant reimbursements.

DOD ACTIVITIES

5. (U) The Presidential redefinition of Safeguard C to the 1963 Limited Test Ban Treaty requires preparation, on an annual

basis, of a list of scientific needs and objectives for nuclear testing which cannot be satisfied by underground nuclear tests or laboratory simulation. DNA and ERDA have been tasked to develop the list, determine the types and priority of tests necessary to obtain the objectives, and incorporate this assessment into this year's Annual Status Report. DNA hosted the joint meeting in September 1976, and a list of nuclear tests by type and priority necessary to obtain current scientific needs and objectives is contained in Annex A, Part IV. A second result of the meeting was the determination of the types of demonstration tests which could be conducted by operational forces should national priorities dictate (Annex B to Part IV).

6. (U) DNA Auroral and Disturbed Type Atmosphere Investigation. In 1968, DNA initiated the ICECAP program of field measurements to acquire data on infrared emissions from a disturbed ionospheric environment. In this successful annual series of experiments DNA has developed and used many highly sophisticated and unique instruments on sounding rockets to acquire and establish the data base to formulate infrared optical codes. These codes are used by infrared systems designers to predict the behavior of specific systems in the nuclear case. Experiments were conducted through March 1976, and the program now consists primarily of data reduction and interpretation.

ERDA ACTIVITIES

7. (S) ERDA Readiness Related Activities and Experiments

a. Operation PERIQUITO

(1) PERIQUITO was conducted in November-December 1975 by the Los Alamos Scientific Laboratory, Sandia Laboratories, National Research Council of Canada, and the University of Alaska Geophysical Institute. PERIQUITO was a continuation of a series of experiments that use

(b)(1)

(b)(1) PERIQUITO was a follow-on study of the magnetospheric cleft begun during Operation TORDO in January 1975. The principal objectives of PERIQUITO were;

(b)(1)

PERIQUITO consisted of two rocket launches from the Canadian Forces Distant Early Warning site at Cape Parry, Northwest Territories, Canada.

(b)(1)

(2) Plasma and charged particle diagnostic measurements were made using instruments located in the booster section of the rocket, which was some 500 meters from the explosive payload section at detonation time. In contrast to the TORDO experiments, when diagnostic instruments were located in the explosive payload section, the PERIQUITO arrangement allowed for successful operation of these instruments until booster atmospheric reentry, providing much more diagnostic ~~data~~ than was possible in TORDO.

(3) Four instrument packages were in the booster stage:

(a) A LASL-University of Texas soft-particle spectrometer;

(b) A LASL high-energy particle detector;

(c) A SLA two-axis magnetometer; and

(d) A Canadian National Research Council plasma detector assembly consisting of a high energy particle detector, two thermal ion sensors, and an electron spectrometer.

(4) Optical observations of the motion of the barium plasma streak were made from three sites: namely, a ground site at the Canadian Communications Research Center's facility at Resolute Bay, North West Territory, Canada, and two US Air Force/ERDA-instrumented NC-135 aircraft, one flying near Isachsen, Ellef Ringnes Island, North West Territory, Canada, and the other flying over Hudson Bay approximately 200 miles east of Churchill, Manitoba, Canada.

b. Operation BUARO. Although BUARO was funded on a reimbursable basis and did not use readiness funds, it did use scientific and technical personnel associated with the readiness effort at the ERDA laboratories. The experiment involved a rocket launch of a cluster of seven shaped charges used to inject barium plasma into the ionosphere.

(b)(1)

Preliminary analysis of the experimental ~~data~~ taken indicates these objectives were achieved.

TRANSITION STATUS

8. ~~(S)~~ Transition to the Revised Safeguard C Support

a. Background. Deputy Secretary of Defense Clements tasked the Director, DNA, to coordinate a support program for the revised Safeguard. Transition to the revised Safeguard has been founded on the following key assumptions:

(1) Should it be deemed necessary to resume nuclear testing in the now prohibited environments, a sufficient national priority will exist to insure provision of necessary funds and other required support.

(2) Retention of existing facilities on Johnston Atoll should be based on the assumption that at least 1 year will be available for rehabilitation or construction of required structures prior to any use of Johnston Atoll as a test base.

(3) Two to 3 years will be required to plan and conduct comprehensive nuclear testing from the time a decision is made to conduct such testing.

(4) A decision to resume atmospheric testing is not expected in the near future, and therefore the requirement to maintain costly facilities, personnel, and equipment in a ready status is negated.

b. Facilities

(1) In addition to the assumptions stated above, criteria for disposition of facilities on Johnston Atoll were based on the guidance that facilities would not be retained in an active status solely to support the revised Safeguard. The criterion indicates that such facilities may be utilized for other DOD programs with the provision that

such utilization would not preclude a resumption of nuclear testing operations. Exceptions to this general rule included only those facilities of substantial construction which would form the core of a new test complex. These facilities would remain in an active or caretaker status. Remaining facilities would be inactivated or abandoned contingent upon existing construction replacement cost and intended use. As of 30 September 1976, all DNA actions to implement the transition of Johnston Atoll facilities to support the revised Safeguard C have been completed with minor exceptions necessitated by Bendix Corporation. Bendix, which operates an Air Force Baker-Nunn facility, is expected to close this operation and vacate the facilities that it now occupies during 1977. Of the 318 buildings at Johnston Atoll, 179 will remain active, 3 will be mothballed, 109 will be inactive, and 27 will be abandoned. Johnston Atoll will continue to operate under the management of the Director, DNA.

(2) The remaining Pacific test support facilities have been placed in a caretaker status, with the exception of those facilities which DOD activities are using for operations which will not preclude a resumption of atmospheric testing. Support agreements guaranteeing reentry rights are being finalized.

c. Equipment. The disposition of RDT&E equipment has been determined as shown below.

	No. of Items	% of Total	Value ($K)	% of Total
Equipment Retained	2141	47	10,636.5	52
Equipment Disposed of	2418	53	9,649.8	48
Total	4559	100	20,286.3	100

As of 30 September 1976, all major actions required to implement equipment support of the revised Safeguard or disposal of excess equipment have been completed. Overall disposition percentages are shown below:

	No. of Items	% of Total	Value ($K)	% of Total
Excess	884	19	2,138.2	11
Continued Use	2110	46	10,420.6	51
Reutilization	981	22	6,644.5	33
To O&M Account	584	13	1,038.0	5
Total	4559	100	20,286.3	100

d. Personnel. The Presidential commitment to Congress to support Safeguard C by retaining personnel with expertise in atmospheric testing and closely related fields of nuclear research and testing is a growing concern to ERDA, and a potential impediment to implementing Safeguard C, should it be necessary. As time passes, normal attrition of personnel experienced in atmospheric testing will increase the requirement to train and retain personnel who are capable of transitioning to atmospheric testing. ERDA believes that for the present, most of these people, although working in different capacities are still available somewhere in the system. They conclude that it is unlikely that at present levels of activity in laboratory and underground test programs, that adequate personnel resources will be available far into the future.

e. Documentation. The Joint Nuclear Atmospheric Testing Documents Repository has been established by the Logistics Planning Group, Holmes & Narver, Inc, at ERDA, Nevada Operations Office, Las Vegas, Nevada. Indexing and filing of all atmospheric testing documentation have been completed, and the Logistics Planning Group is prepared to provide atmospheric testing information on request.

ERDA RESOURCES

9. (C) Status of ERDA's Safeguard C Resources

a. ERDA is completing documentation of its instrumentation design and is finishing the engineering work required to interface ERDA systems with US Air Force drone aircraft.

b. Thirteen RB-57 sampler aircraft are in storage at Davis Monthan AFB. The US Air Force has stated it does not have a valid requirement for further retention of the aircraft and have proposed the outright transfer of 12 aircraft to ERDA. ERDA is currently examining this proposal.

c. Sandia Laboratories have retained a limited number of test vehicles. The US Air Force has transferred B-52 suspension systems to Sandia for retention along with the test vehicles.

d. The Sandia small rocket inventory has been retained; however, the personnel required to support an ongoing rocket launch capability have been transferred to other projects.

e. Certain critical equipment not required for ongoing program activities but applicable to any future atmospheric test programs is being retained in storage. This includes high-value, state-of-the-art equipment, such as optical diagnostic equipment and airborne radiological sampling systems requiring long-lead procurement time.

PROBLEMS

10. (C) ERDA considers that the failure to retain personnel with expertise in atmospheric testing may lead to a problem should atmospheric testing be resumed. As time passes, normal attrition of personnel with expertise in atmospheric testing can be anticipated. This increases the importance of maintaining viable laboratory and underground testing programs to provide a nucleus of experienced personnel capable of transitioning to atmospheric testing.

CONCLUSION

11. (S) Support for the revised Safeguard C was adequate.

RECOMMENDATION

12. (S) ERDA and DOD laboratories should emphasize their support of Safeguards A and B to insure retention and training of personnel with expertise in atmospheric testing and closely related fields.

ANNEX A TO PART IV

SCIENTIFIC NEEDS AND OBJECTIVES FOR NUCLEAR TESTING IN THE PROHIBITED ENVIRONMENTS (U)

Technical Objectives*	Rationale	Delivery Environment	Remarks
(b)(1)			
To determine the energy partition among airblast, crater excavation, and ground shock; crater dimensions and physical distribution of ejecta; coupling of ground shock into structures; response and vulnerability of hardened structures; dust and hydrometeor phenomena; and close-in EMP strength and effects at (b)(1)	(b)(1),(b)(3):50 USC §403(g) Section 6	A. Emplaced B. (b)(1) C. Surface	The (b)(1) tests would produce large amounts of local fallout.

* 1. (b)(1)

2.. Troop participation will be achieved whenever practical and the environment permits.

3. Current inventory of weapons will be used when practical.

Technical Objectives	Rationale	Delivery Environments	Remarks
	PRIORITY I (Cont'd)	(b)(1),(b)(3):42 USC §2162(a) -- (RD)	
To determine the nuclear environment produced by low altitude tactical weapons to include integrated nuclear effects and mission impairment resulting from the exposure to this environment; radiation, thermal, EMP, airblast, energy coupling and the resulting cratering and ground motion, ejecta dust, and fallout. To evaluate collateral damage effects. To determine integrated nuclear effects and mission impairment resulting from the exposure of complex military systems to the total environment generated.	There are no analytical and experimental capabilities to evaluate all nuclear effects interacting together on a complex system. Available ~~data~~ are not sufficient to verify analytical predictions of weapon environment for tactical effectiveness studies and survival and collateral damage assessments. EMP, non-ideal blast and fallout predictions are particularly deficient. Current vulnerability assessments of complex military systems do not include analytical and experimental ~~data~~ to evaluate all nuclear effects interaction.		Fallout may constrain location. May be able to use tactical nuclear system.
	PRIORITY II		
(b)(1)			
To determine multiburst phenomena--to include measurement of the nuclear environment for BMD warheads--absorption, radio signal, scintillation, noise, refraction clutter, blast, fireball density, thermal radiation, radar clutter, (b)(1) and neutron effects.	Required to confirm theoretical computations of multiburst environments and effects; and to assess reentry vehicle fratricide.		Desirable to use current tactical system.

(b)(1),(b)(3):42 USC §2162(a)-- (RD)

[redacted]

Technical Objectives	Rationale	Delivery Environment	Remarks
	PRIORITY III (Cont'd)		
To determine the energy partition among airblast, crater excavation, and ground shock; crater dimensions and physical distribution of ejecta; coupling of ground shock into structures; response and vulnerability of hardened structures; dust and hydrometeor phenomena; and close-in EMP strength and effects for tactical systems.	Verify extensive simulator development already accomplished.	A. Emplaced B. (b)(1) C. Buried	(b)(1) test might enable use of tactical system.

ANNEX B TO PART IV

POSSIBLE DEMONSTRATION TESTS (U)

Delivery Mode	Location	Device/Weapon	Yields	Remarks
(b)(1),(b)(3):42 USC §2162(a)-- (RD)				

PART V

SAFEGUARD D (b)(1)

SAFEGUARD D

"The improvement of our capability, within feasible and practical limits, to monitor the terms of the treaty, to detect violations, (b)(1)
(b)(1)

CRITERIA

1. (U) In 1963, the Chairman, Joint Chiefs of Staff, submitted the following criteria to the Senate Armed Services Committee to be employed in subsequent examination of programs to insure that this safeguard is fulfilled:

(b)(1)

2.

(b)(1),(b)(3):50 USC §403(g) Section 6

(b)(1)

(b)(1),(b)(3):50 USC §403(g) Section 6

PROGRAMS, ACHIEVEMENTS, AND PLANS

3. (S) (b)(1)

Safeguard D

a. (U) Safeguard D is implemented by a spectrum of organizations, facilities, and techniques (b)(1)

(b)(1),(b)(3):50 USC §403(g) Section 6

(b)(1)

(b)(1)

(b)(1)

This sampling force is primarily oriented to debris collection efforts

(b)(1),(b)(3):50 USC §403(g) Section 6

(7) ~~(S)~~ Radiochemical and materials analyses of debris collections are performed (b)(1)

(b)(1)

(b)(1),(b)(3):50 USC §403(g) Section 6

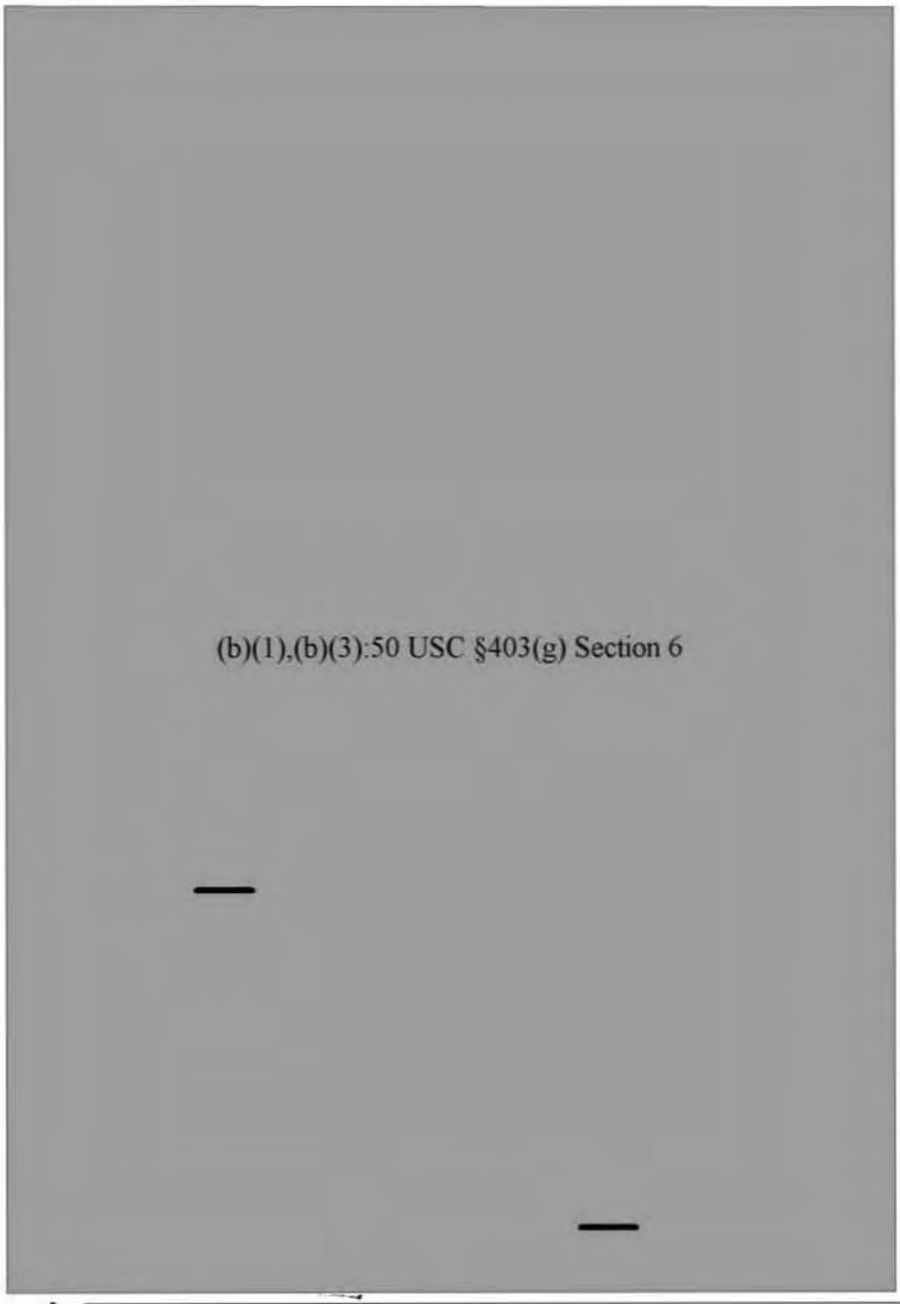
Seismic ~~data~~ processors and digital ~~data~~ collection systems are being procured for most of the seismic stations. The processors, when coupled with automatic detection software, improvements in communications between headquarters and seismic stations and the development of an interactive graphic display capability, will permit identification and reporting within a few hours of an event.

(b)(1)

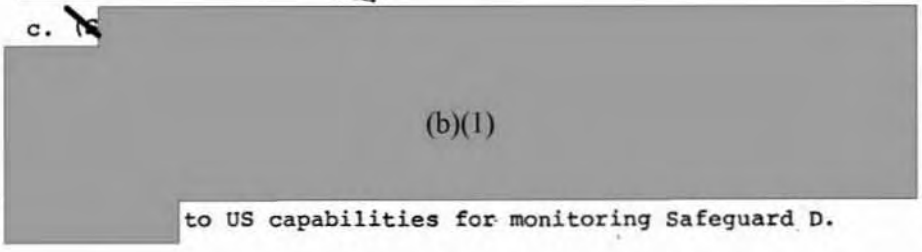
(9) (S

(b)(1),(b)(3):50 USC §403(g) Section 6

(b)(1),(b)(3):50 USC §403(g) Section 6



c. [redacted]



to US capabilities for monitoring Safeguard D.

(b)(1),(b)(3):50 USC §403(g) Section 6

(b)(1),(b)(3):50 USC §403(g) Section 6

(b)(1),(b)(3):50 USC §403(g) Section 6

(b)(1),(b)(3):50 USC §403(g) Section 6

(b)(1),(b)(3):50 USC §403(g) Section 6

(b)(1),(b)(3):50 USC §403(g) Section 6

(b)(1),(b)(3):50 USC §403(g) Section 6

RECOMMENDATIONS

8. (b)(1)

(b)(1),(b)(3):50 USC §403(g) Section 6

(b)(1),(b)(3):50 USC §403(g) Section 6

ANNEX A TO PART V

(b)(1)

(b)(1),(b)(3):50 USC §403(g) Section 6

~~Classified by Director, J-5~~
~~EXEMPT FROM GENERAL DECLASSIFICATION~~
~~SCHEDULE OF EXECUTIVE ORDER 11652~~
~~EXEMPTION CATEGORY 2~~
~~DECLASSIFY ON 31 DECEMBER 2007~~

(b)(1),(b)(3):50 USC §403(g) Section 6

TAB A TO ANNEX A TO PART V

(b)(1),(b)(3):50 USC §403(g) Section 6

CLASSIFIED BY DIRECTOR, J-5
EXEMPT FROM GENERAL DECLASSIFICATION
SCHEDULE OF EXECUTIVE ORDER 11652
EXEMPTION CATEGORY 2
DECLASSIFY ON 31 DECEMBER 2007

(b)(1),(b)(3):50 USC §403(g) Section 6

(b)(1),(b)(3):50 USC §403(g) Section 6

(b)(1),(b)(3):50 USC §403(g) Section 6

(b)(1),(b)(3):50 USC §403(g) Section 6

(b)(1),(b)(3):50 USC §403(g) Section 6

(b)(1),(b)(3):50 USC §403(g) Section 6

(b)(1),(b)(3):50 USC §403(g) Section 6

ANNEX C TO PART V

2.

(b)(1),(b)(3):50 USC §403(g) Section 6

3.

CLASSIFIED BY DIRECTOR, J-5
EXEMPT FROM GENERAL DECLASSIFICATION
SCHEDULE OF EXECUTIVE ORDER 11652
EXEMPTION CATEGORY 2
DECLASSIFY ON 31 DECEMBER 2007

(b)(1)

(b)(1),(b)(3):50 USC §403(g) Section 6

(b)(1),(b)(3):50 USC §403(g) Section 6

(b)(1),(b)(3):50 USC §403(g) Section 6

(b)(1),(b)(3):50 USC §403(g) Section 6

(b)(1),(b)(3):50 USC §403(g) Section 6

(b)(1),(b)(3):50 USC §403(g) Section 6

ANNEX F TO PART V

NEW RESEARCH AND DEVELOPMENT SUPPORTING SAFEGUARD D (U)

1. (U) The research and development programs presented in the following paragraphs describe those elements, by technique, which are applicable to current Safeguard D support. Some of these efforts represent reprogramming, within available resources, to accommodate areas perceived as necessary to meet the broadening interest in nuclear proliferation, shortfalls in satellite sensor capabilities, and the capabilities required to monitor treaties which await ratification. The timeliness and the magnitude of resources which can be brought to bear on these current problems is limited, however.

2. ~~(S)~~(b)(1) Air Force Technical Applications Center Sponsored Research and Development

a. ~~(S)~~

(b)(1),(b)(3):50 USC §403(g) Section 6

Classified by Director, J-5
EXEMPT FROM GENERAL DECLASSIFICATION SCHEDULE OF EXECUTIVE ORDER 11652
EXEMPTION CATEGORY (2)
DECLASSIFY ON DECEMBER 31, 2007

(b)(1)

(b)(1)

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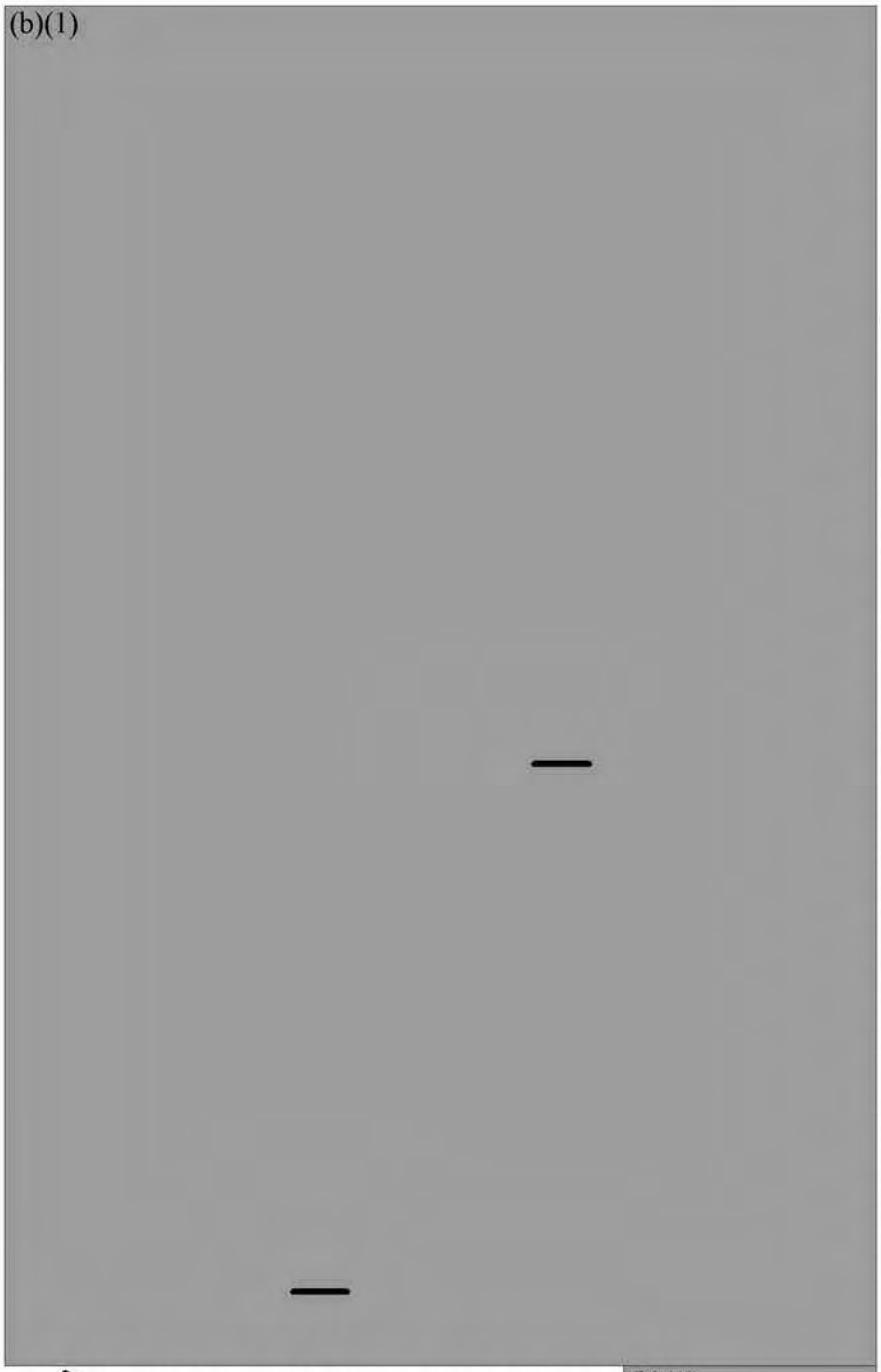
(b)(1)



f. ~~(S)~~ Seismic Technique. In FY 1976/197T (b)(1)

(b)(1) development of seismic data collection, processing,

and evaluation subsystems to enhance the technical quality and timeliness of technique data. (b)(1) From this base, stronger support of future Threshold Test Ban Treaty verification can also be derived. New hardware and data handling techniques are under investigation, some of which are described below: (U)

(1) (U) The existing short period analog system of data transmission has known limitations in dynamic range. This limitation will be overcome by using digital gain ranging and data transmission techniques developed by the Defense Advanced Research Projects Agency (DARPA).

(2) (S) (b)(1)

(3) (U) Station processors are being procured for most field locations to interface with the data terminal in the AEDS headquarters analysis center. This equipment will format detection and identification. Development of automatic signal detection techniques is also being initiated to overcome current system limitations. The development and application of an automatic signal detection capability will not only automate signal analysis and reporting from field locations but will also provide all required station wave form data.

(4) (U) Development of the headquarters data terminal, in conjunction with the station processor, provides a means for receipt of high quality digital data. The availability of digital waveform data within about two

hours will allow the application of event discriminants requirements. A feasibility study will be initiated in FY 1977 to provide an advanced interactive graphic display capability to provide for more comprehensive analysis/ evaluation of seismic data for event reporting.

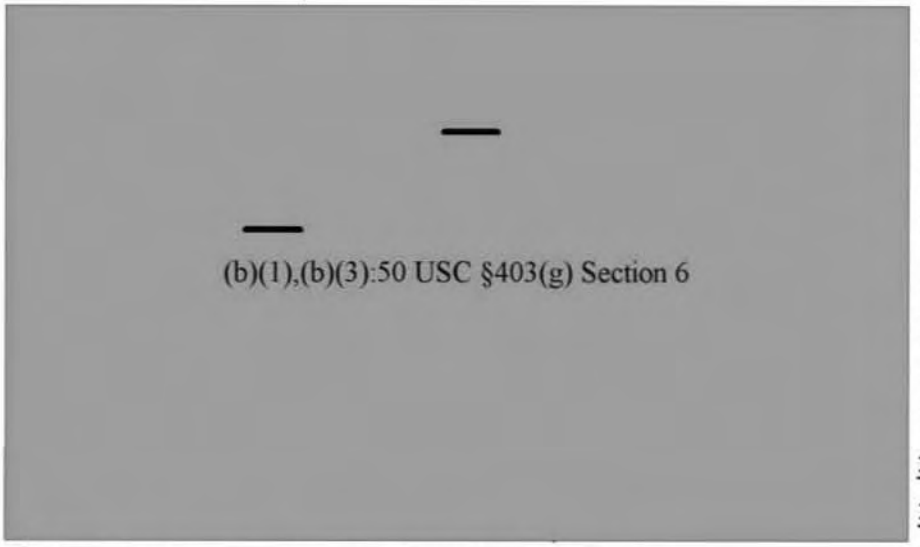
(5) (U) Development of a seismic system terminal will be initiated in FY 1978 for data handling and processing of data from auxiliary stations and for satellite relay of data communications from the worldwide seismic network. It will have the capability of obtaining additional data as needed from the stations in real or near real time and provide data required for final analysis and evaluation within hours after an event.

(6) (U) Present equipment limitations affecting seismic data include insufficient bandwidth, as well as operability, reliability, and support techniques. A program has been initiated to deploy KS 36000 instruments at most of the seismic stations. These instruments, developed by DARPA, will provide increased dynamic range required for detection of a wide range of event magnitudes. This instrument is capable of handling both short-period and long-period seismic data; deployment in the detection network will enhance data quality and increase the network detection capability, while improving equipment reliability and supportability. Studies were conducted to categorize selected source regions in terms of expected geophysical characteristics with particular emphasis on seismic areas which produce earthquakes with explosion-like signatures. Correlation of tectonic features and use of detailed source mechanism studies point to usable methods to discriminate these events.

(b)(1),(b)(3):50 USC §403(g) Section 6

(b)(1),(b)(3):50 USC §403(g) Section 6

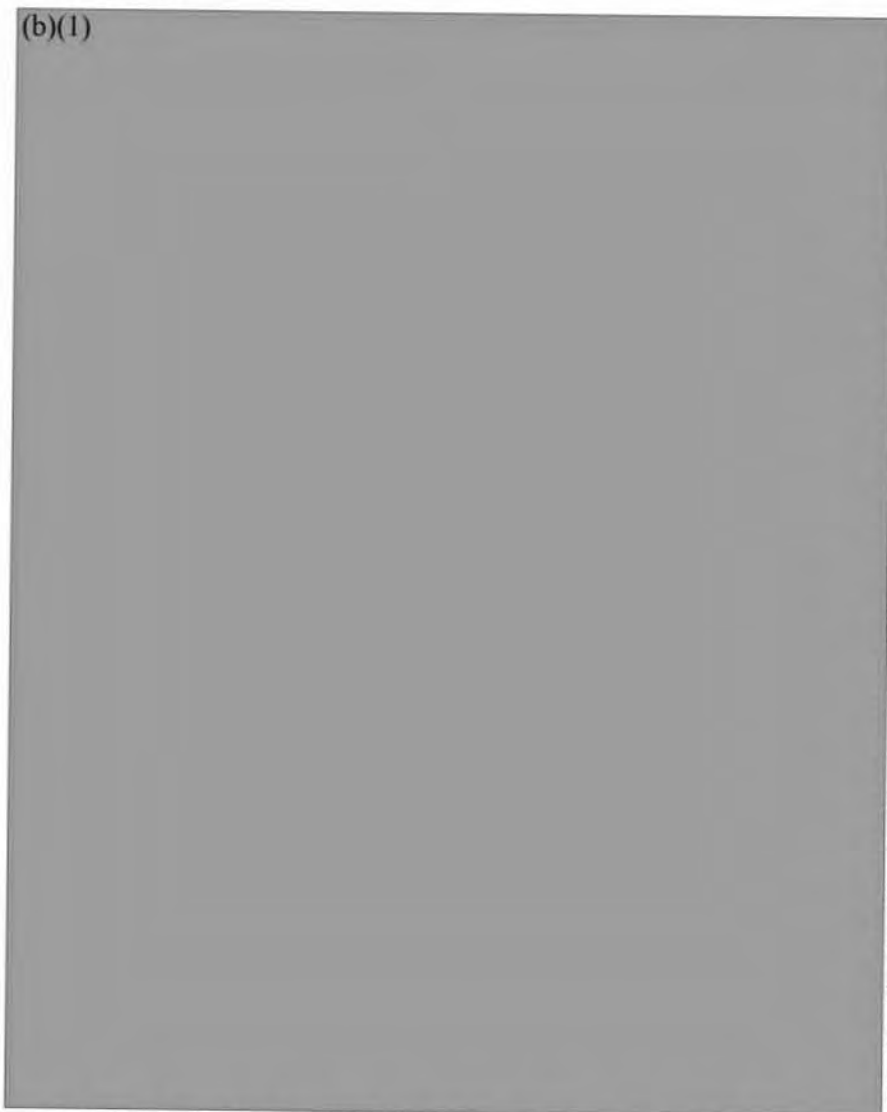
(b)(1),(b)(3):50 USC §403(g) Section 6



3. (S) ERDA Sponsored Research and Development

design life of the RADEC instrumentation components. In addition, sensor packages for future satellite systems are in various stages of development. Specific activities at Sandia Laboratories include the following projects:

(b)(1)



(3) ~~(S)~~ Specific activities at Los Alamos Scientific Laboratories include the following projects: (U)

(b)(1)

(b)(1),(b)(3):50 USC §403(g) Section 6

~~SECRET~~ (b)(1)

4. (S) (b)(1) Sponsored Research and Development. A study was prepared by the US Geological Survey to provide a geologic base on the (b)(1)

(b)(1)

ANNEX G TO PART V

HISTORY OF THE "SAFEGUARDS" (U)

1. (U) The "safeguards" of the Treaty Banning Nuclear Tests in the Atmosphere, in Outer Space and Underwater (better known as the "Limited Test Ban Treaty," or the "LTBT") represent conditions imposed by the US Senate to the ratification of the treaty in August 1963. These conditions (safeguards) were accepted by the Executive Branch in correspondence between the Department of Defense and the Committee on Armed Services of the United States Senate.

2. (U) The "safeguards" originated on 14 August 1963 when, in testimony before the Preparedness Investigating Subcommittee, the Chairman, Joint Chiefs of Staff, General Maxwell D. Taylor, stated that the Joint Chiefs of Staff had found the military risks inherent in the Limited Test Ban Treaty to be acceptable only if adequate safeguards were established.

a. "The conduct of comprehensive, aggressive, and continuing underground nuclear test programs designed to add to our knowledge and improve our weapons in all areas of significance to our military posture for the future."

b. "The maintenance of modern nuclear laboratory facilities and programs in theoretical and exploratory nuclear technology which will attract, retain, and insure the continued application of our human scientific resources to these programs on which continued progress in nuclear technology depends."

c. "The maintenance of the facilities and resources necessary to institute promptly nuclear tests in the atmosphere should they be deemed essential to our national security or should the treaty or any of its terms be abrogated by the Soviet Union."

d. "The improvement of our capability, within feasible and practical limits, to monitor the terms of the treaty, to detect violations, and to maintain our knowledge of Sino-Soviet nuclear activity, capabilities and achievements."

3. (U) Immediately following General Taylor's testimony, Senator Henry M. Jackson moved that the Joint Chiefs of Staff "submit to the Senate Armed Services Committee...a statement of its specific requirements to implement the safeguards proposed by the Joint Chiefs of Staff for reducing the risks and disadvantages of the Limited Test Ban Treaty, which safeguards are set forth in the statement presented by the Chairman of the Joint Chiefs of Staff to this committee on August 14, 1963...." The motion was transmitted by memorandum to the Secretary of Defense on August 11.

4. (U) On 23 August 1963 the Deputy Secretary of Defense (Roswell Gilpatrick) and General Taylor replied to the Senate Armed Services Committee. (b)(1) as applicable to the maintenance and improvement of capabilities to monitor compliance with the treaty. Specifically, the memorandum stated that:

a. "The administration...has under consideration proposals by which our present AEDS resources can be augmented to enhance our capabilities. The proposals now being reviewed are summarized in the separate, classified annex. The standards for the program and plans are these:

b. "The current capability of the Untied States to detect and identify nuclear tests conducted by the (b)(1) will be improved to a degree which is both feasible and remunerative. (Specific proposals for this purpose are currently under consideration.)

c. "A vigorous research and development program will be pursued in order to improve equipments and techniques for nuclear test detection and identification."

d. (b)(1)

5. (U) During Senate debate which preceded the vote for ratification, the Armed Services Committee was charged with responsibility for assuring, on behalf of the Senate, that the four safeguards were implemented effectively. That Committee subsequently passed the responsibility to its Preparedness Investigating Subcommittee and it, in turn, named Senator Jackson to conduct periodic investigations and to report annually to the status of the safeguards program. The Preparedness Investigating Subcommittee has since become inactive, but Senator Jackson continues to be responsible for oversight of the safeguards in his capacity as Chairman of the Subcommittee on Arms Control of the Committee of the Armed Services.

6. (S) Within the Executive Branch, implementation of Safeguards A, B, and C (testing, laboratories, and readiness) became the joint responsibility of the Department of Defense and the Energy Reserach and Development Administration, nee Atomic Energy Commission.

(b)(1)

(b)(1)

These reports would present factual and estimative data and conclusions, but would not include judgments as to whether or not specific Soviet activities constitute a violation of the Test Ban Treaty."

7. (U) On 10 January 1976, President Gerald R. Ford, in a letter to Senator Henry M. Jackson, Chairman of the Sub-committee on Arms Control, Committee of the Armed Services, US Senate, which reported the revision of Safeguard C, re-affirmed his continued support of the other three safeguards to the LTBT.

8. (S) (b)(1),(b)(3):50 USC §403(g) Section 6

(b)(1)

(b)(1),(b)(3):50 USC §403(g) Section 6

THE JOINT CHIEFS OF STAFF
WASHINGTON, D.C. 20301

MJCS 265-77
6 September 1977

MEMORANDUM FOR MAJOR GENERAL J. K. BRATTON, USA
DIRECTOR OF MILITARY APPLICATION
US ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION

Subject: FY 1978 Underground Nuclear Test Program (CRESSLT)

1. Reference is made to your letter* of 24 Aug 77, which requested concurrence in the proposed letter to the President requesting approval for the FY 1978 Underground Nuclear Test Program (CRESSLT).

2. It is recommended that the package be forwarded as you have proposed, indicating concurrence with the proposal for approval of the entire 12-month program.

For the Joint Chiefs of Staff:

Signed

PHILIP D. SHUTLER
Major General, USMC
Vice Director, Joint Staff

Prepared by:
LTC R. W. Smith, USAF
Nuclear Division, J-5
Ext 57064

* On file in Joint Secretariat

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UNITED STATES
ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION
WASHINGTON, D.C. 20545

AUG 24 1977

TO : Distribution

SUBJECT: FY 1978 UNDERGROUND NUCLEAR TEST PROGRAM (CRESSET)

The FY 1978 underground nuclear test program (CRESSET) and the associated cover letter to the President were circulated in draft form by ERDA memoranda of July 1, 1977, and August 11, 1977. Insofar as practicable, individual comments and recommendations have been incorporated in the enclosed draft.

Request that addressees provide an indication of their agency's concurrence/nonconcurrence with respect to the CRESSET package by COB September 2, 1977.

ERDA plans to transmit the letter with its enclosures to the White House NLT September 9, 1977.

J. K. Gratton
Major General, USA
Director of Military Application

Enclosure:
Draft Ltr to President fm Fri
w/Encls.

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The President
The White House

Dear Mr. President:

The Energy Research and Development Administration (ERDA) requests approval for the FY 1978 underground nuclear test program, CRESSET.

The FY 1978 underground nuclear test program has been formulated with cognizance of your stated intention to achieve an early cessation of nuclear testing. It includes (a) those tests which can be effectively conducted to achieve weaponization and certification of currently requested DOD systems in the shortest possible time, and (b) tests which address survivability problems of weapons systems. It also includes an adequate number of advanced development tests to sustain laboratory activities for some period of time subsequent to initiation of a comprehensive test ban, or to support future requirements in the event a comprehensive test ban is not forthcoming.

CRESSET is sponsored by ERDA and the Department of Defense, (b)(1),(b)(3):42 USC §2162(a)-- (RD) The ERDA-sponsored tests in CRESSET will be directed toward the development of nuclear warheads for specific DOD systems, investigation of new nuclear design concepts to meet expected future national defense needs, and experiments in physics understanding, which is the basis for future nuclear weapons improvements.

(b)(1),(b)(3):42 USC §2162(a)-- (RD)

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CRESSET consists of 32 tests

(b)(1)

As in the past, several more tests than can be executed within available funding have been included in CRESSET to provide flexibility within the test program. It is estimated that the FY 1978 ERDA budget will provide for 22 ERDA tests, the DOD will support two tests, and the UK one test. A summary table of the CRESSET program is provided as Enclosure 1.

For the past few years, the proposed ERDA/DOD test program has been reviewed semiannually by the President. Normally the President has approved in principle the entire fiscal year's test program and approved specifically the tests proposed for the first six months. Halfway through the fiscal year he then specifically has approved those tests proposed for the second half of the year.

ERDA plans and budgets for the test program more than a year in advance of actual test dates in order to meet DOD projected requirements and to justify the test portion of the budget; therefore, the information needed for approval of the full year's program is available, has been briefed to the NSC ad hoc panel, and is provided herein. In order to reduce unnecessary workload on the President and his staff and to provide ERDA and DOD with more flexibility in carrying out the test program, we recommend that the entire CRESSET program be approved at this time. This recommendation is concurred in by the DOD, JCS, _____, and _____.

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State, ACDA, _____, and _____ do not concur with requesting approval for the entire FY 1978 test program, contending instead that a 12-month program is not in keeping with your desire for an early comprehensive test ban. They suggest that the current procedure of semiannual review is adequate.

(b)(1)

With respect to the first observation, history has shown that the review and approval process of the underground nuclear test program is a lengthy one (e.g., FULCRUM I, which was approved on December 30, 1976, had been submitted by ERDA on August 10, 1976; FULCRUM II, submitted by ERDA on January 17, 1977, was approved on June 29, 1977); this process inevitably results in test delays and schedule realignments. We believe that elimination of the midyear review and approval would help alleviate this situation.

Despite the concern of (b)(1) (b)(1), we believe that established policy and procedures, reaffirmed by White House memorandum of June 29, 1977, will insure compliance with the TTBT.

Since there are differing agency recommendations concerning CRESSET, we are submitting two options for your consideration: CRESSET, the total program, or CRESSET I, the program for the first half of FY 1978 (see enclosure 1).

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The President

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Option 1

Approval of the CRESSET program including specific approval of each test (32 tests) requested for CRESSET.

(b)(1),(b)(3):42 USC §2162(a)-- (RD)

Option 2

Approval of the CRESSET program in principle, but specific approval of only those tests (19 tests) in CRESSET I requested for the first half of FY 1978.

(b)(1),(b)(3):42 USC §2162(a)-- (RD)

A brief description of each test and its relationship to specific weapons systems is provided as Enclosure 3.

The total CRESSET program has been presented both verbally and in writing to representatives of the NSC, State, DOD, JCS, OMB, ACDA, and the CIA. These agencies, with the exceptions noted above, concur with ERDA in forwarding the FY 1978 underground nuclear test program, CRESSET, for Presidential approval.

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The President

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All of the nuclear tests proposed for CRESSET are designed to be fully contained, have design yields of (b)(1) and will be conducted underground at the Nevada Test Site. Each test will be reviewed carefully and will be conducted only with very high assurance that it can be carried out safely and in compliance with the Limited Test Ban Treaty, the Threshold Test Ban Treaty, and the National Environmental Policy Act.

Respectfully yours,

Robert W. Fri
Acting Administrator

Enclosures:
1. FY 1978 Underground Nuclear Test Program (CRESSET)
2. CRESSET Test Program
3. CRESSET I Test Program

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FY 1978 UNDERGROUND NUCLEAR TEST PROGRAM

(CRESSET)

Category	No. of Tests CRESSET	No. of Tests CRESSET I	No. of Devices CRESSET	No. of Devices CRESSET I	Yield Range(kt) CRESSET
(b)(1),(b)(3):42 USC §2162(a)-- (RD)					

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Classified by:
Colonel H. G. McClenny, USAF
Assistant Director for Research,
Development, and Testing
Division of Military Application

CRESSET TEST PROGRAM

I. ERDA Weapons Development Tests

A. Current Weaponization

Experiments in this category are required in the development engineering of specific nuclear weapons

(b)(1),(b)(3):42 USC §2162(a)-- (RD)

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(b)(1),(b)(3):42 USC §2162(a)-- (RD)

(b)(1),(b)(3):42 USC §2162(a)-- (RD)

(b)(1),(b)(3):42 USC §2162(a)-- (RD)

(b)(1),(b)(3):42 USC §2162(a)-- (RD)

B. Advanced Development

Experiments in this category are required to advance nuclear weapon design technology in order to provide design concepts to meet future design needs and are required also to establish the feasibility and desirability of proceeding with the development engineering of specific designs for particular weapon applications.

(b)(1),(b)(3):42 USC §2162(a)-- (RD)

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SAFETY

(b)(1),(b)(3):42 USC §2162(a)-- (RD)

[redacted]

C. Development Capability

Experiments in this category are required to provide increased understanding of physical and engineering sciences and technologies that are not directly related to any of the systems and concepts in the current weaponization and advanced development categories. This understanding is the basis for future nuclear weapons improvements, and the data obtained is to be used to improve the nuclear design computer codes.

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(b)(1),(b)(3):42 USC §2162(a)-- (RD)

[redacted]

D. Stockpile Proof Test

Experiments in this category are required to provide confidence in stockpile reliability, particularly for systems which have been in stockpile for a number of years and/or have undergone

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modifications to improve warhead reliability and operational flexibility.

(b)(1),(b)(3):42 USC §2162(a)-- (RD)

II. DoD Tests

A. Nuclear Weapons Effects

Experiments in this category are required to assess the vulnerability and hardness of strategic weapons systems and study the response of underground structures in a nuclear burst environment.

(b)(1),(b)(3):42 USC §2162(a)-- (RD)

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components will be addressed. The test will include experiments in support of DoD shock hardened, deep based strategic structures programs. Also included are experiments which address Satellite Systems Generated Electromagnetic Pulse, Reentry Vehicle (RV) decoy designs, and advanced material and component designs.

III. (b)(1)

(b)(1),(b)(3):42 USC §2162(a)-- (RD)

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Classified by:
Colonel H. C. McClaney, USAF
Assistant Director for Research,
Development, and Testing
Division of Military Application

CRESSET I TEST PROGRAM

I. ERDA Weapons Development Tests

A. Current Weaponization

Experiments in this category are required in the development engineering of specific nuclear weapons.

(b)(1),(b)(3):42 USC §2162(a)-- (RD)

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(b)(1),(b)(3):42 USC §2162(a)-- (RD)

(b)(1),(b)(3):42 USC §2162(a)-- (RD)

[redacted]

[redacted]

[redacted]

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(b)(1),(b)(3):42 USC §2162(a)-- (RD)

1/ Ibid

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(b)(1),(b)(3):42 USC §2162(a)-- (RD)

C. Development Capability

Experiments in this category are required to provide increased understanding of physical and engineering sciences and technologies that are not directly related to any of the systems and concepts in the current weaponization and advanced development categories. This understanding is the basis for future nuclear weapons improvements, and the data obtained is to be used to improve the nuclear design computer codes.

(b)(1),(b)(3):42 USC §2162(a)-- (RD)

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(b)(1),(b)(3):42 USC §2162(a)-- (RD)

(b)(1),(b)(3):42 USC §2162(a)-- (RD)

ENCLOSURE B

DRAFT

MEMORANDUM FOR MAJOR GENERAL J. K. BRATTON, USA
DIRECTOR OF MILITARY APPLICATION
US ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION

Subject: FY 1978 Underground Nuclear Test Program (CRESSET)

1. Reference is made to your letter of 24 Aug 77, which requested concurrence in the proposed letter to the President requesting approval for the FY 1978 Underground Nuclear Test Program (CRESSET).

2. It is recommended that the package be forwarded as you have proposed, indicating concurrence with the proposal for approval of the entire 12-month program.

For the Joint Chiefs of Staff:

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THE SECRETARY OF DEFENSE
WASHINGTON, D C. 20301

6 OCT 1977

MEMORANDUM FOR THE ASSISTANT TO THE PRESIDENT FOR NATIONAL SECURITY AFFAIRS

SUBJECT: FY 78 Underground Nuclear Test Program

The Chairman of the Joint Chiefs of Staff and I recommend approval of the twelve-month CRESSET program as proposed by the Acting Administrator, ERDA, in his letter* to the President dated September 16, 1977.

This recommendation is made with the understanding that a one-year program would not abridge any review agency's rights or responsibilities relative to the underground test program. Indeed, an update as the end of the first six months of the program nears would be appropriate. Program changes and test reviews within the Presidentially-approved program would be handled as they have in the past during the six-month cycles and would be subject to review and comments by the concerned agencies. The one-year CRESSET program would provide DoD and DoE with additional test schedule flexibility--particularly in view of a potential CTB--to complete ongoing programs and to develop warhead options that may be required for future weapon systems. Relatively prompt, as opposed to semiannual, adjustments to the test program may also be required in response to foreign policy requirements or new arms control initiatives. In this regard, we note the accomodation, made without formal review and approval, of a State Department request this past March, just prior to the bilaterals in Moscow, to delay the execution of a high yield test until the Secretary of State's return to the U.S.

As to concerns expressed by some about a number of tests near the [redacted] TTBT limit, we make two observations. First, given the potential for a CTB in the near future, these tests are required to complete warhead candidates for possible future strategic systems, such as the M-X and TRIDENT II missiles. And second, in the light of Soviet underground testing subsequent to March 31, 1976, we see no reason to unilaterally assume an asymmetry in the U.S. program by adjusting downward the number or the yield of the tests proposed for CRESSET. We will be abiding by the limit.

(b)(1),(b)(3):42 USC §2168(a)(1)(C)--(FRD)

Harold Brown

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* Attachment to JCS 2179/753

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