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December 22, 1952

AEC 487/21

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ATOMIC ENERGY COMMISSION

TROOP PARTICIPATION IN CONTINENTAL TESTS

Note by the Secretary

The attached report by the Director of Military Application is circulated by request of the General Manager for consideration by the Commission during the week of December 22, 1952.

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ROY B. SNAPP

Secretary

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Date 4/3/79
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This document consists of 31 pages

Copy No. _____ of 25 Series A

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ATOMIC ENERGY COMMISSION

TROOP PARTICIPATION IN CONTINENTAL TESTS

Report by the Director of Military Application

THE PROBLEM

1. To consider the Department of Defense's request for troop participation in Continental tests.

BACKGROUND

2. Military troops and troop observers participated in Atomic Energy Commission atomic tests for the first time at Operation BUSTER-JANGLE. In connection with Operation TUMBLER-SNAPPER, the next operation where they participated, the Atomic Energy Commission was informed (see AEC 494) that the Department of the Army had a vital requirement for "participation to the maximum extent possible in all future atomic tests conducted in the continental United States where such participation is feasible." Atomic Energy Commission approval in principle of the concept of limited troop participation in atomic tests at the Nevada Proving Grounds was requested.

3. In a letter of December 28, 1951, (AEC 494/1) the Department of Defense was advised that the Atomic Energy Commission approved the concept of limited troop participation in continental tests, and was requested to outline the scope and

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objectives of such participation in advance to the Commission to permit integration of such operations into our development test programs. At Meeting 677 on April 1, 1952, after consideration of AEC 494/3, the Commission approved the initial DOD proposal for troop participation in TUMBLER-SNAPPER, but many subsequent requests for changes in scope were made by the DOD, all of which had to be referred to the Commission for approval.

4. In an attempt to obtain a firm program for troop participation early in the planning for UPSHOT-KNOTHOLE the Director of Military Application on August 20, 1952,* asked the Chief, Armed Forces Special Weapons Project, who has been designated to act for the Department of Defense on these matters, to provide such a plan. Interim correspondence was exchanged thereafter during which the Armed Forces Special Weapons Project was advised of the tentative shot schedule and the Atomic Energy Commission received copies of intra-Department of Defense correspondence* establishing a Department of Defense position on exposure limits.

5. In summary, the limits decided within the Department of Defense to be desirable as maxima were reported as being:

a. Ionizing Radiation

3 roentgens prompt whole-body nuclear radiation, plus an additional 3 roentgens in post-detonation maneuvering. (AEC: 3.9 roentgens per 13 weeks).

b. Thermal Radiation

1 calorie per square centimeter of exposed body surface. (AEC: 1 calorie per sq. cm. of exposed body surface plus goggles, or face away from blast).

c. Overpressure

5 pounds per square inch. (AEC: 2 pounds per square inch)

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* On file in the Division of Military Application.

US DOE ARCHIVES

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Charts were prepared on the above premises by AFSWP for use by field commanders in positioning troops.

6. A reconciliation of the recommendations of the Division of Biology and Medicine as to exposure limits was asked by the Division of Military Application (Appendix "C") and received (Appendix "D"). A final proposal was received from AFSWP on October 15, 1952 (Appendix "A") to which was attached the AFSWP plan for troop participation in UPSHOT-KNOTHOLE (Annex to Appendix "A").

DISCUSSION

7. The plan outlined in Enclosure I to the AFSWP letter appears to be a very sound one. It proposes that AEC approve an AFSWP "maximum participation" plan, with the provision that the implementation in any specific case will be on an equal or lesser basis as determined by the field situation and agreement between the Test Manager, Exercise Director, and a representative of AFSWP (Director Weapons Effects Tests, Field Command). This procedure will give the Commission a chance to rule on the maximum scope of participation without necessitating a subsequent series of letters to and from the Commission requesting and approving inevitable changes within that scope, as was the case during TUMBLER-SNAPPER. Similarly it will give the field a ruling on maximum allowable participation.

8. The proposed reply to AFSWP (Appendix "D") indicates general concurrence with their over-all proposal but amends several

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* On file in the Division of Military Application.

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details. The purpose of these amendments, which are set forth fully in Enclosure I to Appendix "B", is to make sure that the areas are positively outlined wherein the Test Manager and Exercise Director, respectively, control. In addition, the reply indicates non-currence with the DOD request to be assigned outright a sector of between 90° and 120° at each shot. This amendment in the plan is made to give the Test Manager freedom to decide this matter on the ground on the basis of requests from all agencies at the time. Similarly, there is reserved to the Test Manager the right to regulate admissions to the Nevada Proving Grounds as an inseparable part of his over-all responsibility for the area.

9. The controversial point arises in the last part of the proposal where AFSWP requests AEC concurrence in the policy that the DOD assume full responsibility for physical and radiological safety of troops and troop observers while in the Nevada Proving Grounds. If the AEC should concur as requested, it would obviously be possible that the DOD might set less conservative limits for exposure than the AEC, that military personnel might be injured, and that the fault might be attributed to the AEC's "failure to control the maneuver". A reaction somewhat similar to the one here envisioned followed the recent breaches of security by military members of JTF-132 at IVY. To avoid putting the AEC in this undesirable position three alternative procedures are possible. These are:

Alternative (a) To require the DOD to observe AEC safety limits at the Nevada Proving Grounds. A safety plan acceptable to the Test Manager would be required in this case. Responsibility for injury would then lie with the AEC if someone were injured due to faulty plan but with the DOD if it were due to faulty execution of the plan;

US DOE ARCHIVES

Alternative (b) To advise the DOD of our safety limits, recommend they observe them, but allow them to set their own safety limits within the exercise area. In this case transmittal of a safety plan to the AEC would still be required, outlining the manner by which observation of those limits would be enforced. We would require that the plan indicate in which particulars the AEC limits were being exceeded. The plan would, however, be only "for information" of the AEC. In this case responsibility for injury due either to faulty plan or faulty execution of the plan would lie with the DOD, but the AEC, having prior knowledge of the proposed plan, might still be subject to criticism in case of injury unless it had taken separate and additional exception to the DOD plan when received.

Alternative (c) To advise the DOD of our safety limits and recommend they observe them, but to turn over to them complete responsibility for safety of troops and troop observers within the exercise area.

10. The AEC has two courses of action regarding public notification of the change of responsibility under alternatives b and c above. We could either:

a. Note that the DOD is ready and willing to make a public announcement of their responsibility if accident or criticism results, but do not require it in advance; or

b. Require, as a preliminary to AEC relinquishing to DOD this responsibility, a public announcement of DOD's assumption of responsibility prior to the operation.

11. The staff analysis of these possible lines of action is as follows:

a. Alternative (a) places the AEC in the position of restricting the maneuver, on the one hand, while being responsible for injury in case the plan proves faulty on the other. If someone were injured, the DOD could not be expected to assume responsibility in this case. This alternative does not recognize sufficiently the DOD need to develop its own criteria and doctrine for the use of atomic weapons in the same way as for any other weapons. It is the staff opinion that the AEC should cooperate to the extent of allowing the DOD maximum freedom of action in these maneuvers short of unacceptable interference with AEC experiments or of jeopardizing, through unwarranted criticism, the AEC's ability to perform its own mission;

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b. Alternative (b) appears to be the most acceptable alternative in that it gives the DOD essentially complete control over its own maneuvers but keeps AEC advised of what they intend to do. It is a more liberal policy than that established for TUMBLER-SNAPPER, where a plan similar to that of alternative (a) was used. Receiving the Exercise Director's safety plan "for information" will allow the AEC to advise the DOD if, in its opinion the exercise is dangerous in any way. The safety plan must be carefully considered from this point of view. Also, once the precedent of complete release of control to the DOD is set, the DOD will never thereafter consent to any lesser degree. Thus, it is desirable to go very slowly in relinquishing control, making sure that the results each time are acceptable to AEC. The draft reply to AFSWP is written on the basis of this alternative.

c. Alternative (c), complete release of control of the Exercise within the designated area, does not yet appear necessary or desirable. It should be considered for use at Operation DOMINO if results from UPSHOT-KNOTHOLE are satisfactory.

d. Regarding the announcement of responsibility for safety measures, it would be to the advantage of the AEC to have such an announcement made prior to the Exercise. The objection, if any, to this arrangement would be raised by the DOD which might feel an advance announcement would make the issue assume undue importance. Informal agreement on the wording of the release contained in Enclosure II to Appendix "B" has been reached, however, with the Office of Public Information, OSD as well as an understanding that the release would test be made by the joint AEC-DOD information center at the press briefing prior to the Exercise.

12. The Deputy Manager, Santa Fe Operations Office, has stated (Appendix "E") that he has no doubt troop participation acceptable to both the DOD and the scientific test organization can be worked out in the field.

13. Experience of the test organization at past tests indicate that, once any troop participation program is approved in conjunction with an AEC test, an initial amount of AEC Test Organization staff effort must be made to integrate it. Increasing the number of troops, the amount of equipment, or the complexity of the maneuver causes much less than a proportional

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increase in AEC effort since all military activities are separate and self-supporting. Accordingly, as long as the numbers of participating troops and troop observers, the amount of equipment displayed, and the complexity of the maneuver stay within the orders of magnitude here discussed, there should be no objection from the AEC's point of view to changes in the scope of the exercise.

CONCLUSIONS

14. It is concluded that:

a. Troop participation at all shots of Operation UPSHOT-KNOTHOLE is permissible, subject to limitations imposed by scientific requirements;

b. The amount of troop participation proposed by AFSWP is acceptable as a maximum;

c. The limitations imposed by scientific requirements, which will cause reduction in troop participation from the maximum here approved, as well as reduction of the area assigned the exercise can only be determined in the field between the Test Manager, the representative of AFSWP, and the Exercise Director.

d. Responsibility for physical and radiological safety for troops and troop observers within the assigned exercise area can and should be delegated to the DOD to be exercised by the Exercise Director. A safety plan should, however, be required of the Exercise Director for the information of the AEC. The Test Manager should be instructed to consider this plan carefully for possible danger to military participants, consulting with the Washington Office in case of doubt. Should a truly dangerous situation be apparent, the DOD should so be advised by letter from the Commission. It is desirable from the AEC point of view, and believed to be acceptable to the DOD, to release a statement through the joint AEC-DOD information center at the press briefing prior to the Exercise. This statement will cover DOD responsibility for the Exercise, and will include the paragraph regarding DOD responsibility for safety criteria which has informally been agreed with the Office of Public Information, OSD, and which is outlined in Enclosure II to Appendix "B".

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STAFF JUDGMENTS

15. The Divisions of Biology and Medicine, Security, and Information Services, concur in the conclusions of this paper. The Office of General Counsel has no legal objections.

RECOMMENDATION

16. That the Atomic Energy Commission:

a. Approve delegation of responsibility for physical and radiological safety of troops and troop observers in the exercise area at UPSHOT-KNOTHOLE to the DOD, contingent upon the Exercise Director's transmitting to the Test Manager, for information, the safety plan for the exercise including statements as to which particular limits, if any, of the AEC's safety limits are being exceeded and by how much;

b. Approve issuance of a public statement by the Exercise Director through the joint AEC-DOD information office prior to the exercise, clarifying DOD responsibility for the safety of troops at the exercise and including the paragraph on responsibility for safety criteria outlined in Enclosure II of Appendix "B";

c. Approve the DOD plan for troop and troop observer participation in UPSHOT-KNOTHOLE (Annex to Appendix "A") subject to the amendments set forth in a and b above and to the additional amendments noted in Appendix "B" and Enclosure I thereto;

d. Approve dispatch of a letter such as that in Appendix "B" to the Chief, AFSWP advising of Commission action on the DOD plan for troop participation in UPSHOT-KNOTHOLE;

e. Note that copies of the letter to the Chief, AFSWP will be provided the NSC, and that the Joint Committee on Atomic Energy will be advised of this action by appropriate letter.

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DECLASSIFIED ON: 3 JUL 1980
BY DIRECTOR, FREEDOM OF INFORMATION & SECURITY REVIEW, OASD(PA) IN ACCORDANCE WITH DOD DIRECTIVE 5122.5, AS AMENDED.

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APPENDIX "A"

DEPARTMENT OF DEFENSE
ARMED FORCES SPECIAL WEAPONS PROJECT
P. O. Box 2610
Washington, D. C.

15 October 1952

Brig. Gen. K. E. Fields
Director, Division of Military Application
U. S. Atomic Energy Commission
1901 Constitution Avenue, N. W.
Washington 25, D. C.

Dear General Fields:

Reference is made to:

a. Letter, Acting Director, Division of Military Application, U. S. Atomic Energy Commission, to Chief, Armed Forces Special Weapons Project, file MAWT:RPC, dated 20 August 1952.

b. Letter, Chief, AFSWP to Director, Division of Military Application, U. S. AEC, file SWPWT/400.112, dated 9 September 1952.

Reference a is a request for information concerning the desires of the Department of Defense for Desert Rock type troop participation in Operation UPSHOT. Reference b is an interim reply outlining in general terms the scope of troop participation desired by the Department of Defense.

Tentative plans for troop participation in the UPSHOT-KNOTHOLE series of atomic tests have been received from the Services and are consolidated in Enclosure 1. Troop participation will be in the form of Desert Rock maneuvers, with troop observers, under an Exercise Director appointed by the Department of the Army. Since the schedule, yields and types of devices to be fired are not firm, it is not feasible to present a detailed plan at this time. Because of these unknowns and because of the delays and rearrangements in schedules that are likely to occur during the operation, concurrence is desired in a plan that will represent the maximum effort at any one shot and which will apply to all of the shots, regardless of the extent of the maneuvers planned. The details for implementation and determination of the scope of the operation, when less than the maximum effort is involved, can then be arranged in the field by the Test Manager and Exercise Director through the AFSWP Directorate of Weapons Effects Tests.

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BY DIRECTOR, FREEDOM OF INFORMATION & SECURITY REVIEW, OASD(PA) IN ACCORDANCE WITH DOD DIRECTIVE 5122.5, AS AMENDED.

The Department of Defense realizes that troop participation must not interfere with the successful accomplishment of the development tests. To meet this requirement, the Exercise Director will insure that troops abide by all restrictions necessary. The Military Services are prepared to accept full responsibility for the safety of all participating troops and troop observers.

Your concurrence is requested in:

a. The plan outlined in Enclosure 1, realizing that it represents the maximum effort at any one shot and will be executed either as planned or scaled down commensurable with the yield, types of devices fired and technical considerations.

b. The principle that the detailed implementation of the scope of Department of Defense troop participation at any one shot will be resolved in the field by the Exercise Director, Test Manager and the AFSWP-Directorate of Weapons Effects Tests, with due regard to considerations which might interfere with the development or effects experiments.

c. The policy that the DOD assume full responsibility for the physical and radiological safety of troops and troop observers while in the Nevada Proving Grounds.

/s/

HERBERT B. LOPER
Major General, USA
Chief, AFSWP

Encl:
DOD Plan for Troop Participation

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Appendix "A"

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DECLASSIFIED ON: 3 JUL 1980
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BY DIRECTOR, FREEDOM OF INFORMATION & SECURITY REVIEW, OASD(PA) IN ACCORDANCE WITH DOD DIRECTIVE 5122.5, AS AMENDED.

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ANNEX TO APPENDIX "A"

DEPARTMENT OF DEFENSE
PLAN FOR
TROOP PARTICIPATION IN OPERATION UPSHOT-KNOTHOLE

1. General

a. Title. The title of the maneuvers for the entire operation, regardless of the number of shots participated in, will be Desert Rock V.

b. Camp Desert Rock. Camp Desert Rock will be activated by the Army as a Class I installation. Approximately 1500 service troops will man the camp. Its capacity will be 2500 visiting troops and 540 troop observers. The Army will accommodate units and individual troop observers from the other Services.

c. Exercise Director. The U. S. Army will appoint an Exercise Director for Desert Rock V, who will be responsible for and supervise troop participation by all of the military Services, including airborne troop maneuvers.

d. Coordination. The staff agency, Directorate of Weapons Effects Tests under the Commanding General, Field Command, AFSWP, will coordinate all matters concerning troop participation between the Exercise Director, Desert Rock V and the Test Manager, SFOO.

e. Plan. The Army, Air Force and Marine Corps will conduct training exercises previous to, during and after several of the shots in Operation UPSHOT-KNOTHOLE, similar to those conducted at past continental atomic tests. These operations will consist of simulated tactical maneuvers with ground and airborne troops using appropriate military equipment, i.e., military vehicles, tanks, helicopters and other aircraft. Selected military equipment and animals will be exposed to the effects of the bomb for demonstration purposes. The maneuvers will be witnessed by several hundred military observers.

f. Number of Troops and Troop Observers. The maximum number of troops and troop observers present at Camp Desert Rock for any one shot will be approximately 3000 plus 1500 camp operating personnel. The over-all number and categories of troop participants will be approximately as follows:

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SERVICE	UNITS	NUMBER OF TROOPS	NUMBER OF TROOP OBSERV	NUMBER OF SHOTS	TOTAL NUMBER OF PERSONNEL
Army	2 BCT per shot	2500 per shot	500 per shot	3 or more	9000 or more
	Camp Oper. Pers.		1500	1	1500
Navy	Troop observers		100 per shot	4	400
Air Force*	1 Fighter Wing)	150	325 per shot	1	625
	1 Wing Main)	150			
	Training Team)	26	70 per shot	All	864
	Troop observers)				
Marine Corps	2 Inf Bn)	1900	100	1	2100
	1 Eq Gp)	100			
	Troop Observers		12-17 per shot	3 or more	50

* Will participate with Army or Marine Corps

2. Proposed Working Agreements

a. Number of Shots. The DOD will be authorized to conduct the maximum plan described herein at all shots in the UPSHOT-KNOTHOLE series, provided that such a program does not interfere with the development or effects tests and is agreeable to both the Test Manager and the Exercise Director.

b. Change in Plan. Any reduction in scope of the approved maximum plan or its elimination from a particular shot because of technical or other considerations will be resolved in the field by the Exercise Director and the Test Manager through the Directorate of Weapons Effects Tests, AFSWP.

c. Maneuver Area. For realistic maneuvers the DOD will require a maximum sector of 180 degrees around ground zero. A 90 degree sector will be the minimum required.

d. Positioning of Troops and Troop Observers. The positioning of troops and troop observers, as well as the conduct of the troop maneuvers, will be controlled by and be the responsibility of the Exercise Director, as long as the troops and observers are within the assigned maneuver area. All movements outside this area will be coordinated with the Test Manager.

e. Safety. The DOD will assume full responsibility for the safety of Desert Rock participants. In carrying out these responsibilities, the appropriate Service(s) will provide monitors, and the Exercise Director will supervise their activities. He will establish suitable safety criteria, including permissible radiation dosages. If the safety standards of the DOD are less conservative than those established by the AEC, and if accident or criticism results, the DOD will be prepared to make a public announcement of these facts. It will be necessary for the Test Manager to provide the Exercise Director with weather and other pertinent data which is obtained for the Test Director's Radiological Safety Organization, in order that the Exercise Director may carry out his safety responsibilities.

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BY DIRECTOR, FREEDOM OF INFORMATION & SECURITY REVIEW, OASD(PA) IN ACCORDANCE WITH DOD DIRECTIVE 5122.5, AS AMENDED.

f. Post Shot Training Exercise. Within the sector assigned for troop participation, the Exercise Director will be authorized to conduct demonstrations and training exercises at his discretion, so long as such activities do not interfere with the development or effects experiments.

g. Participation by Camp Desert Rock Operating Personnel. The Exercise Director will be authorized to have a limited number of the camp operating personnel participate in the exercises along with the other units at each shot.

h. Admittance of Military Personnel to Nevada Proving Grounds. The Exercise Director will be delegated the authority to admit to the Nevada Proving Grounds all the troops and troop observers, subject to existing security regulations.

3. Operations

Simulated tactical maneuvers at any one shot will consist of a maximum of 2 BCT's plus a limited number of camp operating personnel (total 3000) and approximately 500-600 troop observers. The Army plans participation on this scale at 3 or more shots; the Marine Corps at one shot. Air Force troop units will participate at each shot in which a Desert Rock maneuver is conducted. All maneuvers will be confined to an assigned area. Movement of troops outside the assigned area before and after the shot will be coordinated with the Test Manager.

4. Additional details are as follows:

a. Equipment Display. The DOD will have military equipment displays, including animals, within the sector assigned for troop participation at all shots attended by troops or troop observers.

b. Troop Training. Troop observers and most of the troops will be positioned in field fortifications at the time of detonation. Some (1 or 2 companies) of the troops will be enplaned at a safe distance in 15 to 75 helicopters or 5-10 drop aircraft. After detonation, previously assigned objectives in the vicinity of ground zero will be assaulted by helicopter-borne or air-borne troops and ground troops on foot and in military vehicles including up to 5-10 tanks. The troops and troop observers will also witness the equipment displays. Upon completion of the exercise, troops and troop observers will return to Camp Desert Rock in helicopters, trucks, buses and staff cars.

c. Indoctrination. The Exercise Director will conduct briefings and indoctrination programs for all Desert Rock participants.

5. Security

All troops and troop observers will have a minimum clearance of Confidential. No foreign nationals will be included in the Desert Rock participation.

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6. Public Information.

All news releases will be issued through a joint AEC-DOD Public Information Office as was done at Operation TUMBLER-SNAPPER.

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CONFIDENTIAL ON: .....
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APPENDIX "C"

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C.

September 19, 1952

MEMORANDUM

TO : Dr. John C. Bugher, Director
Division of Biology and Medicine

FROM : Captain John T. Hayward, USN
Chief, Weapons Research Branch

SUBJECT: EXPOSURE STANDARDS FOR PERSONNEL AT AEC WEAPON TESTS

SYMBOL : WAT:RPC

We have received correspondence from the Department of Defense indicating that they will soon transmit a formal request for troop participation in all shots at Operation UPSHOT-KNOTHOLE. In order that the paper presenting the proposed answer to the Commission may be based on the soundest possible considerations, it is requested that the Division of Biology and Medicine formulate and transmit to the Division of Military Application, for inclusion in this answer, its recommendations as to desirable upper limits for exposure of personnel at AEC tests.

These recommendations should set upper limits for thermal radiation, radioactive radiation and blast overpressures beyond which personnel engaged in tests, including troops, should not be exposed.

In formulating these limits consideration should be given to the fact that some people in the Department of Defense have felt the AEC was not realistic in setting present exposure limits. They point out, for instance, that *20R has been allowed crews of sampling aircraft without apparent ill effect while the limit for ground personnel has been maintained at 3R. Any discussion which might be included to substantiate the AEC position would be welcome.

The Commission paper will be presented to the Division of Biology and Medicine in draft for concurrence prior to being presented to the Commission.

John T. Hayward
Captain USN
Chief, Weapons Research Branch

* Should read – 20R

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APPENDIX "D"

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C.

October 20, 1952

MEMORANDUM

TO : Captain John T. Hayward, USN
Chief, Weapons Research Branch

FROM : Dr. John C. Bugher, Director,
Division of Biology and Medicine

SUBJECT: EXPOSURE STANDARDS FOR PERSONNEL AT AEC WEAPON TESTS

SYMBOL : BMM:CLD

Reference memorandum Captain Hayward to Dr. Bugher, September 19, 1952, same subject and memorandum Dr. Warren to Carroll Tyler, October 11, 1951.

The Division of Biology and Medicine makes the following recommendations concerning permissible exposures of test personnel for normal test operations as requested in your memorandum:

1. Ionizing radiation--the Division of Biology and Medicine recommends that there should be no change from the established AEC policy for test operations of a total exposure of not over 3.9 r of gamma radiation per 13 weeks, as outlined in the attached memorandum.

2. Thermal radiation--the Division of Biology and Medicine recommends a maximum permissible exposure to thermal radiation from an atomic blast of not over 1 calorie per square centimeter to the exposed surfaces of a fully clothed individual. This recommendation does not include exposure of the eyes. The latter should be protected with approved goggles or by assuring that personnel are looking in the opposite direction from the blast and not facing any nearby highly reflecting surfaces.

3. Blast--the Division of Biology and Medicine recommends that a total static over-pressure of 2 psi including direct, reflected, and reinforced effects is the maximum to which test personnel should be exposed. This is based on the belief that a total static over-pressure of 2 psi will not harm a human being. This figure of 2 psi does not take into account possible injury from (a) displacement, and (b) flying debris. It is known that flying debris can be a real hazard at a position where the over-pressure in free air is 2 psi.

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ANNEX TO
APPENDIX "D"

UNITED STATES
ATOMIC ENERGY COMMISSION
WASHINGTON, D.C.

October 11, 1951

MEMORANDUM

TO : Carroll Tyler, Manager, SFOO

FROM : Shields Warren, M.D., Director,
Division of Biology and Medicine

SUBJECT: PERMISSIBLE LEVELS OF RADIATION EXPOSURE FOR TEST PERSONNEL

SYMBOL : BMBP:WDC

In a letter dated September 28, Dr. Thomas L. Shipman was notified informally of the policy agreed upon within the Division of Biology and Medicine as to permissible levels of radiation exposure for the Buster-Jangle series.

This Division authorizes a permissible exposure of 3.9 r of gamma radiation for Buster-Jangle test personnel, without regard to the rate at which the dose is accumulated, providing this exposure represents the total integrated gamma dose over any period of 13 consecutive weeks which includes the test period. Specifically, this permissible dose of 3.9 r is not an extra allotment for people who might otherwise receive radiation during the 13-week period. Should you consider it desirable to set up somewhat more conservative levels for administrative purposes, that is of course your prerogative.

Authority to grant permission for deliberate over-exposure is deemed to reside in the hands of the Test Director. He may wish to seek the advice of the senior representative available from the Division of Biology and Medicine, but he does not need B&M concurrence to grant authorization for over-exposures.

On the other hand, this Division does not look lightly upon radiation excesses. Only true emergencies should be granted special privileges, and no upper limit for permissible doses can logically be set for a true emergency. The Test Director ought not to deputize project leaders with authority to exceed the level of 3.9 r, although he might deputize one or two competent individuals on his staff to make decisions for him. Each authorization should be based upon complete documentation as to need for exceeding 3.9 r, full explanation as to why the job cannot be performed in another manner, how many people are to be over-exposed, how much over-exposure, and for the record (possibly to be completed at a later date) the recent exposure history of

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the individuals and what is planned to enable them to pay off the over-exposure. This Division will require a copy of each such documentation for review.

Military requests for blanket permissible exposures greater than 3.9 r per quarter will not be granted by this Division. Military personnel cannot be prevented from making their own decisions, but insofar as they act as an integral part of this test organization, they are requested to fulfill the above requirements for documentation on over-exposure.

Monitors should not bear the responsibility of exercising police power over scientific groups in a contaminated area. On the other hand, it would be a good policy to expect such groups to withdraw from the areas calculated to give over-exposures until a permit could be obtained from the test director or from his deputy authorized to allow over-exposures. It would seem that in most cases, a short wait, or re-deployment of forces, would enable the job to be done within permissible levels of exposure. In other words, compliance with the permissible limit should become a mark of distinction in the exercise of ingenuity, rather than a concession to be avoided upon protest. Indoctrination of this attitude early in this series may save us much trouble, and possibly radiation injuries, in the several series to come.

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APPENDIX "B"

DRAFT LETTER TO THE CHIEF AFSWP

1. Reference is made to letter from Chief, AFSWP, to Director of Military Application, file SWPWT 400.112 dated October 15, 1952, on the subject of troop participation in Operation UPSHOT-KNOTHOLT.

2. Your letter of October 15 requests Atomic Energy Commission concurrence in three general proposals regarding this participation. The first two proposals call for a plan for maximum troop participation which will apply to all shots, but with the degree of implementation for each specific shot to be agreed in the field between the Test Director, Exercise Director, and a representative of AFSWP. The AEC concurs in the general concept of these proposals but desires to make several amendments to the specific arrangements. These amendments are desired because of our belief that diagnostic experiments must govern at UPSHOT in the same degree that military effects must govern at KNOTHOLT. Thus, though maximum possible freedom of operation will be granted the Exercise Director, the Operations Plan for Operation Desert Rock Five must be coordinated with the Test Manager's over-all Operations Plan for UPSHOT. This will necessitate:

a. Joint planning between the Test Manager, Exercise Director, and the representative of AFSWP of phases of the Exercise which involve activities outside the assigned maneuver area, and incorporation of these activities in the Test Manager's Operations Plan.

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b. Transmittal of the Exercise Director's plan for maneuvers within the assigned area to the Test Manager, for information only.

Where further detailed amendments are desired, they appear in Enclosure I to this letter and refer to corresponding sections of Enclosure I to your letter. As thus amended your first two proposals are acceptable to the AEC.

3. Regarding your last proposal, that the Department of Defense assume full responsibility for physical and radiological safety of troops and troop observers within the Nevada Proving Grounds, including establishment of safety criteria for them, the AEC concurs in part. Establishing general safety practices and criteria at the Nevada Proving Grounds is, and must continue to be, the responsibility of the Manager, Santa Fe Operations Office (Test Manager). We do, however, accept the proposal that the DOD assume full responsibility for physical and radiological safety of troops and troop observers within the maneuver areas assigned to Exercise Desert Rock Five, including establishment of suitable safety criteria. The AEC adopts this position in recognition that doctrine in the tactical use of atomic weapons, as well as the hazards which military personnel are required to undergo during their training, must be evaluated and determined by the DOD.

4. We wish to point out, however, that the AEC has established safety limits for personnel who are to be exposed to the effects of atomic detonations at AEC Proving Grounds. These have been reviewed by our biological and medical staff

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and are felt to be adequate and realistic. They are outlined in Paragraph 2.e of Enclosure I to this letter.

5. The Commission recommends that the DOD accept and observe these limits for tactical maneuvers at the Nevada Proving Grounds. Acceptance of these criteria, we believe, should reduce only slightly, if at all, the realism of the maneuvers. For example, radiological exposure cannot be detected at the time it is received by an individual without using instruments. Thus, a maneuver where individuals are exposed to 3.9r would be no less realistic from a radiological point of view than one where they received greater amounts.

6. So that the AEC may be kept apprised of the plans for the maneuver, we desire that the Exercise Director transmit to the Test Manager, for information only, a copy of his Safety Plan for the Exercise. This should indicate in which particulars and by how much the AEC safety standards are are being exceeded.

7. We note your undertaking to issue, in case of injury or criticism resulting from the Exercise, a public statement regarding the DOD's responsibility for the exercise. This question has been discussed with the Office of Public Information, OSD, and the text of a statement covering responsibility for safety standards at the Exercise has been agreed upon. It was further agreed that the most propitious time to issue this statement, from the point of view of both agencies, is during the pre-Exercise press briefing. Accordingly we propose that the statement be released at that time by the Exercise Director through the joint AEC-DOD Information

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Office. The text of this statement is attached hereto as Enclosure II for your information.

8. It is requested that you inform us of your acceptance or desire for further discussion, of these amendments to your proposals so that the field offices may be given mutually agreed instructions to govern their subsequent actions.

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Appendix "B"

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ENCLOSURE I

1. GENERAL

d. Coordination

The Atomic Energy Commission recognizes the desirability of including the Director Weapons Effects Tests in planning for the exercise. We desire, however, that direct communication between the Test Manager and the Exercise Director be authorized if necessary.

e. Plan

Although the movement of troops within the assigned exercise area is to be determined by the Exercise Director, specific provision must be made in the exercise plan to assure non-interference with scientific experiments, and equipment for collection of data, within that area. It is desired that the Exercise Director furnish a copy of the exercise plan in advance to the Test Manager for information. On the other hand, all movements of military personnel and vehicles outside that area of the Nevada Proving Grounds assigned to the Exercise will be incorporated in the Test Director's Operation Plan. All aircraft over the area whatsoever, including helicopters, drones, and TAC and SAC aircraft, will be under the control of the Test Director prior to, and immediately after, H-hour. Their participation must be included in the over-all air plan prepared by Hdqs., Special Weapons Center.

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2. PROPOSED WORKING AGREEMENTS

b. Change in Plan

Any change in the original plan which involves AEC support may, although otherwise acceptable under these provisions, become unacceptable to the Test Manager if submitted so late as to require excessive effort to effect its inclusion.

c. Maneuver Area

The area assigned the exercise on any one shot is a matter for solution between the field representatives. It can be determined only after consideration of the final requirements of all agencies for area at that particular shot and cannot reasonably be decided away from the site. The Commission will not place any restrictions before the fact on the decision of the Test Manager in this regard. It is anticipated, however, that a suitable and acceptable sector will ordinarily be available for troop maneuvers.

e. Safety

AEC maximum limits for exposure of personnel to the effects of atomic detonations are:

1. Ionizing Radiation: A total exposure to not over 3.9 Roentgens of gamma radiation per 13 weeks.
2. Thermal Radiation: Exposure to not over 1 calorie per square centimeter for a fully clothed individual. In addition, the eyes of a person so exposed must be protected either by approved goggles or by assuring that they are facing away from the blast and not facing any nearby highly reflecting surfaces.

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3. Blast: Exposure to not over a static overpressure of 2 pounds per square inch, including direct, reflected, and reinforced effects. This does not take into account possible injury from a. displacement, or b. flying debris. It is known that flying debris can be a real hazard at a position where the overpressure in free air is 2 psi.

f. Admittance of Military Personnel to the Nevada Proving Grounds.

Access of personnel to the Nevada Proving Grounds is, and must continue to be, solely the responsibility of the Test Manager. Only in this way can he execute his responsibility for safeguarding Atomic Energy Commission classified matter therein. He will, however, make satisfactory arrangements with the Director Weapons Effects Tests and the Exercise Director to admit participating troops and troop observers.

4. ADDITIONAL DETAILS ARE AS FOLLOWS:

c. Indoctrination

It is the opinion of the Commission that very few, if any, troops or troop observers will have a need to know the purpose or the details of construction of Atomic Energy Commission experimental devices being detonated in this series.

6. PUBLIC INFORMATION

Paragraph 6 should read:

"All public information, including releases, statements, interviews and backgrounding relating to the Exercise will be issued through or approved by the Joint AEC-DOD Public Information Office."

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ENCLOSURE II

DRAFT STATEMENT ON SAFETY PRECAUTIONS FOR TROOPS
(To be issued by Exercise Director's Unit or Joint
Information Office at Las Vegas or at press
briefing prior to first test)

"The Department of Defense has assumed responsibility for the safety of troops participating in military exercises at the U. S. Atomic Energy Commission's Nevada Proving Grounds.

"Military monitoring teams trained by AEC radiation safety monitors at previous tests will govern the movement of troops in test areas to prevent exposure to harmful radiation. The maximum permissible level of radiation for troops who will participate will be slightly higher than the AEC's standard industrial level. Individual troop units, however, will take part in only one test whereas the AEC standards were established for workers who are faced with possible exposure every day in laboratories and production facilities. *The maximum permissible level for troops under Department of Defense standards is far below that at which any detectable radiation effects have been found in the human body.

"Other hazards, such as heat and blast, will be controlled by the positions in which troops are placed and by the use of specially designed combat-type shelters."

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* This sentence will be included in the announcement only if the DOD permissible level established for troops actually is "far below that at which any detectable radiation effects have been found in the human body." Determination that the statement is factual will be made by Biology and Medicine and Military Application from the Exercise Director's Safety Plan with Information Services acting as coordinator.

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ATTACHMENT "E"

UNITED STATES
ATOMIC ENERGY COMMISSION

October 7, 1952

ATTACHMENT XIII

TO : Brig. Gen. K. E. Fields, USA, Director of Military Application, AEC, Washington, D. C.

FROM : George P. Kubler, Deputy Manager, SFO

SUBJECT: TROOP PARTICIPATION IN UPSHOT-KNOTHOLE

SYMBOL : T-6

ATTENTION: Captain John T. Hayward, USN

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Reference is made to your memorandum of September 19, 1952, reference DMT:MPC. Transmitted herewith is a copy of a letter dated September 22 from Colonel Preuss to Mr. Tyler outlining preliminary military concepts of "Desert Rock V." Your memorandum and Colonel Preuss' letter have been discussed with Dr. Graves and Dr. Clark at LASL and their comments are included in the following paragraphs.

With regard to exposure of troops, we recommend that the limits mentioned in your letter not be approved without qualification. It is assumed that the limit of 3.0 R per quarter applies to gamma radiation only. Either some limit for beta radiation and internal hazard should be established or this type exposure should be specifically excluded from the exposure limit approval.

The limit of 1 calorie per sq. cm. is regarded as probably safe provided protection is given to the eyes during the period of exposure. We feel that a qualification on eye protection is essential to approving any exposure limits. Dr. Graves calls attention to the fact that these thermal exposure limits are acceptable for personnel without previous heavy exposure. It is his understanding that thermal radiation can trigger an X-ray burn in cases where heavy X-ray exposures have preceded the thermal radiation exposure.

As far as pressure limitation is concerned, the pressure of 5 p.s.i. itself is probably safe. However, a wind velocity of the nature of 200 mph will exist in a blast area where there is a pressure of 5 p.s.i., and flying objects and debris will be real

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Appendix "E"

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hazards. Rocks of the approximate size of baseballs were observed in Greenhouse areas where such pressures existed. Origin of these missiles, their impact velocity, and effect they might have had on personnel are not known, but we feel that we should not approve exposure of personnel to such hazards. Observers stationed at 7,000 yards are subjected to a pressure of 1 p.s.i. and a wind velocity of 35 mph. Reports from observers indicate a considerable sand blast effect even under these conditions.

Our position is that we probably cannot dictate exposure limits to the military, but we do have the responsibility of informing them of the hazards in order that they may be fully aware of the responsibility which they assume.

With reference to Colonel Preuss' letter, there are several items of the preliminary concept which are of concern to us. Referring to paragraph d, it will probably not be possible to get a sector greater than 90° to DOD for tests in Yucca Basin. In Frenchman Flat even this may not be possible unless DOD can obtain permission for utilizing a portion of the Las Vegas Bombing Range. It should be possible to assign suitable space for drop zones for airborne troops provided the desired zones are not too close to ground zero.

It does not appear to be realistic to grant the Exercise Director unqualified freedom of movement in the assigned sector as indicated in paragraph e. I feel that I should require that the DOD operational plan be coordinated into the total operation. Particularly the Test Director must have sufficient authority to assure non-interference with the scientific experiments and equipment for collection of data.

The proposal in paragraph g does not seem to be compatible with our responsibility for control of Restricted Data and other classified information.

With reference to paragraph h, it will be most important that any aircraft or operating equipment in the test area be under control of the Test Director prior to and immediately after H-hour and participation must be coordinated through CWC. This applies to aircraft used by SAC and TAC, drop aircraft, helicopters, drone planes and others which might be proposed.

It is recognized that the program outlined in Colonel Preuss' letter is preliminary and there may be alterations before its final submittal. We have no doubt that troop participation acceptable to both the DOD and the scientific test organization can be worked out. In discussing troop participation with representatives of DOD, it is requested that you emphasize that, although maximum freedom will be granted to the Exercise Director, the Desert Rock V operation must be coordinated with, and under control of, the Test Manager and Test Director.

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ANNEX TO APPENDIX "E"

22 September 1952

Mr. Carroll L. Tyler, Manager
Santa Fe Operations, USAEC
P. O. Box 5400
Albuquerque, New Mexico

Dear Mr. Tyler:

A preliminary meeting was held on 3 September 1952 at Headquarters Armed Forces Special Weapons Project regarding troop participation in UPSHOT-KNOTHOLE. Representatives from Headquarters, AFSWP, and the Army, Navy, Marine Corps, and Air Force attended. Discussions were only in general terms and more formal considerations are to follow. These formal concepts and service requirements are to be forwarded by Headquarters AFSWP to the Atomic Energy Commission when received from the three Services. They are due in Headquarters, AFSWP on or before the 24th of September 1952.

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Forwarded herewith are pertinent extracts of the preliminary report. Only items that are believed to be of general interest to you are included.

The following concepts for troop participation were expressed by the Army and concurred in by the Navy, Air Force, and Marine Corps:

a. Camp Desert Rock will be activated by the Army as a Class 1 installation. Its capacity will be 2500 troops and 540 troop observers. Fifteen hundred service troops will man the camp. The Army will accommodate units from the other Services as was done at TUMBLER/SNAPPER.

b. The Army will appoint an Exercise Director to supervise and coordinate all troop participation.

c. The DOD will request participation in all shots. The scope of participation in each shot will vary depending upon the yield of the devices to be fired. The minimum effort at any one shot would be an equipment display.

d. The DOD will request a 180 degree sector around ground zero for maneuvers. A 90 degree sector would be the minimum acceptable. An additional drop zone for airborne troops may be required.

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e. The DOD will request freedom of movement as prescribed by the Exercise Director anywhere within the assigned sector. Troops on a volunteer basis will be dug in at progressively closer distances to ground zero with 3r of prompt radiation (plus 3r of residual radiation) or 5 psi overpressure as the limiting factor.

f. The DOD will request that the Exercise Director be responsible for radiological safety matters concerned with troops and troop observers. Each unit participating will have their own qualified radiological safety personnel.

g. The DOD will request that the Exercise Director be authorized to admit any military personnel to the test area that he sees fit.

h. The maneuvers will include the use of tanks, vehicles, helicopters, equipment displays, and animal exposure.

i. TAC and SAC units will probably participate in air maneuvers.

j. The code name for troop participation in Operations UPSHOT-KNOTHOLE will be "DESERT ROCK V".

k. The number and category of troop participants desired by the various Services are summarized below:

Service	Units	Number Persons	Number Troop Observers	Number of Shots	Total Number of Personnel
Army	2 BCT per shot	2500 per shot	500 1500 (Service Trps)	2 or more 1	6000 or more 1500
Navy			100	4	400
Air Force	1 Flt Wing 1 Wing Maint.	150 150	200		500
Marine Corps	2 BCT	2100	100 50	1 3 or more	2200 150 or more

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DECLASSIFIED ON: 3 JUL 1990

BY DIRECTOR, FREEDOM OF INFORMATION & SECURITY REVIEW, OASD(PA) IN ACCORDANCE WITH DOD DIRECTIVE 5122.5, AS AMENDED.

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1. Troop and Observer Indoctrination:

The Exercise Director will conduct a briefing and indoctrination program for all Desert Rock participants. In order to provide the best qualified briefing personnel it was decided to invite instructor assistance from the various Atomic Defense Schools (Army, Navy, and Air Force).

The tentative indoctrination program is as follows:

Time (Hours)	Topic
2	Weapons Effects
4	Tactical Application of Atomic Weapons
1	Small Unit Protective Measures
2	Exercise Director's Indoctrination
1	Technical Displays
1	Medical Aspects
3	Critique

Please bear in mind that these are not firm but are intended only as information to indicate the present trend of planning for troop participation (DESERT ROCK V). We intend to keep you further informed as the plans develop more fully.

Sincerely yours,

PAUL T. FREUSS
Colonel, USAF
Director,
Weapons Effects Tests

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