

Office Memorandum • UNITED STATES GOVERNMENT

TO : Brig. Gen. K. E. Fields, Director of Military Application DATE: December 29, 1952

FROM : Roy B. Snapp, Secretary to the Commission

SUBJECT: COMMISSION ACTION ON AEC 487/21 - TROOP PARTICIPATION IN CONTINENTAL TESTS

SYMBOL: GMS:JHS

1. At Meeting 794 on December 23, 1952, the Commission:

a. APPROVED 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. APPROVED 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. APPROVED 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. NOTED that the draft letter to the Chief, AFSWP, attached as Appendix "B" to AEC 487/21 would be revised in accordance with the discussion at the meeting;

e. APPROVED 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;

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

2. The General Manager requests that you take the action necessary to implement this decision.

CLASSIFICATION CANCELLED

BY AUTHORITY OF DOE/DPC

LEONARD H. SAFRANSKI

REVIEWED BY

DATE

12/29/52

Final 1953

~~SECRET~~

~~SECURITY INFORMATION~~

~~RESTRICTED~~

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DNA1.940923.026

December 29, 1952

3. It is further requested that a copy of any implementing papers be furnished this office.



Roy B. Snapp
Secretary

cc: General Manager
Director of Biology & Medicine
Director of Information Services

~~RESTRICTED DATA~~

This document contains restricted data as defined in the Atomic Energy Act of 1946. Its transmittal or the disclosure of its contents in any manner to an unauthorized person is prohibited.

~~SECRET~~

~~RESTRICTED INFORMATION~~

January 8, 1953

Major General H. B. Loper, Chief
Armed Forces Special Weapons Project
P. O. Box 2610
Washington 25, D. C.

Dear General Loper:

Reference is made to letter from Chief, Armed Forces Special Weapons Project, to Director of Military Application, file SMPAT 400.112 dated October 15, 1952, on the subject of troop participation in Operation UPSHOT-KNOTHOLE.

Your letter of October 15 requests Atomic Energy Commission concurrence in three general proposals regarding this participation. The first two proposals are 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 Armed Forces Special Weapons Project. The Atomic Energy Commission 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 KNOTHOLE. 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-KNOTHOLE. This will necessitate:

a. Joint planning between the Test Manager, Exercise Director, and the representative of Armed Forces Special Weapons Project of phases of the Exercise which involve activities within the Nevada Proving Grounds but outside the assigned maneuver area, and incorporation of these activities in the Test Manager's Operations Plan.

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

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 Atomic Energy Commission.

REVIEWED TO BE UNCLASSIFIED,
AUTHORITY: [unclear] [unclear]
BY J. K. Hartsock DATE 1/27/79

* Circulate in AEC 457/A1 - Appendix "A"

CLASSIFICATION CANCELLED
BY AUTHORITY OF [unclear]
REMOVED BY [unclear]
DATE 12/3/76



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 Atomic Energy Commission concurs in part. Establishing general safety practice 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 [Department of Defense assume full responsibility for physical and radiological safety of troops and all observers accompanying troops within the maneuver areas assigned to Exercise Desert Rock Five, including establishment of suitable safety criteria. The Atomic Energy Commission adopts this position in recognition that doctrine on 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 Department of Defense.

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on one copy

note # 2 (cont.)
7/11/50

The Atomic Energy Commission has, however, established safety limits (outlined in paragraph 2a, Enclosure I) for personnel who are to be exposed to the effects of atomic detonations at Atomic Energy Commission Proving Grounds. We consider these limits to be realistic, and further, are of the opinion that when they are exceeded in any Operation, that Operation may become a hazardous one. So that we may know in which particulars and by how much these safety standards are being exceeded, we desire that the Exercise Director transmit to the Test Manager a copy of his Safety Plan for the Exercise.

We note your undertaking to issue, in case of injury or criticism resulting from the Exercise, a public statement regarding the Department of Defense's responsibility for the exercise. This question has been discussed with the Office of Public Information, Office of Secretary of Defense, 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 Atomic Energy Commission - Department of Defense Information Office. The text of this statement is attached hereto as Enclosure II.



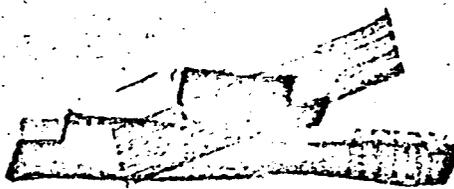
It is requested that you inform us of your acceptance, or desire for further discussion, of these amendments to your proposals so that the field offices may be given mutually agreed instructions to govern their subsequent actions.

Sincerely yours,

M. W. Boyer
General Manager

Enclosure:

1. Enclosure I (Cys 1&2A)
2. Draft Statement on Safety Responsibility for Troops (2 Cys.)



1. GENERAL

d. Coordination

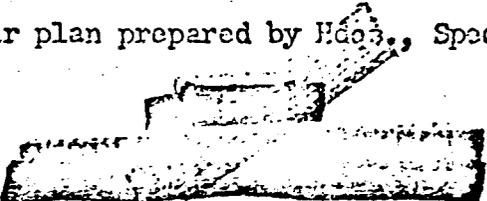
The Atomic Energy Commission recognizes the desirability of including the Director Weapons Effects Tests in planning for the exercise. We desire, however, that direct communication between the Test Manager and the Exercise Director be authorized if necessary.

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 overall air plan prepared by Hq. 3, Special Weapons Center.

CLASSIFICATION CANCELLED
OR TO
BY AUTHORITY OF
LEONARD H. SHERMAN
REVIEWED BY
DATE



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DGF
1/31/79

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.

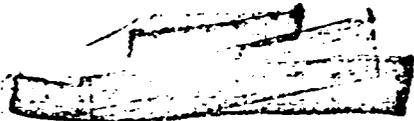
c. Maneuver Area

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

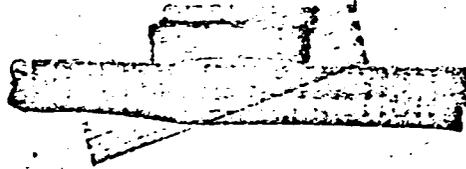


per square centimeter for a fully clothed individual. In addition, the eyes of a person so exposed must be protected either by approved goggles or by assuring that they are facing away from the blast and not facing any nearby highly reflecting surfaces.

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:

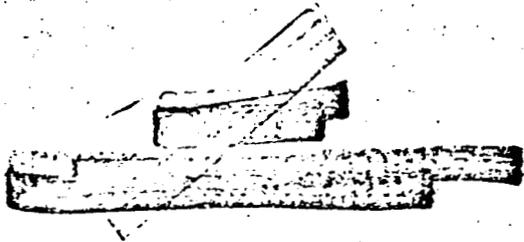
c. Indoctrination

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."



DRAFT STATEMENT OF SAFETY RESPONSIBILITY FOR TROOPS

(To be issued by Exercise Director through
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."

*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.

OFFICIAL USE ONLY



DEPARTMENT OF THE ARMY
OFFICE OF THE CHIEF OF STAFF
WASHINGTON 25, D.C.

CS 471,6

February 10, 1953

MEMORANDUM FOR: CHAIRMAN, MILITARY LIAISON
COMMITTEE

SUBJECT: Positioning of Troops at Atomic Weapons Tests

1. In accordance with the letter from the General Manager of the Atomic Energy Commission, dated 8 January 1953,* in which it is agreed that the Department of Defense will assume responsibility for the safety of military personnel participating in maneuvers such as the Desert Rock maneuver in Nevada, the Army has prepared safety criteria for participation of its troops. These criteria are as follows:

a. Overpressure - five (5) pounds per square inch.

b. Nuclear radiation - six (6) roentgens at any one test, of which no more than three (3) roentgens is prompt, whole body radiation, with the further provision that no individual will receive more than six (6) roentgens in any six months' period.

c. Thermal radiation - one (1) calorie per square centimeter.

2. Recognizing that there are certain variables in the expected yield of weapons, in meteorological conditions, and other factors associated with these tests, the maneuver commander will be required to use the following detailed criteria as a basis for positioning troops at the forthcoming series of atomic tests:

a. For tower shots -

<u>Maximum Predicted Yield</u>	<u>Troops In Open</u>	<u>Troops In Trenches</u>
1 to 5 KT	4,500 yds	3,500
5 to 10	6,500	3,500
10 to 15	8,000	3,500
15 to 20	9,000	3,500
20 to 25	10,000	3,500
25 to 30	11,000	3,700
30 to 35	12,000	3,800
35 to 40	12,000	4,000

* See Serial Note: copy on file in Division of Military Application.

This material contains information affecting the national defense of the United States within the meaning of the espionage laws, Title 18, U.S.C., Sec. 793 and 794, the transmission or revelation of which in any manner to an unauthorized person is prohibited by law.

~~CONFIDENTIAL~~

DO NOT WRITE IN THESE SPACES
 BY AUTHORITY OF THE SECRETARY OF DEFENSE
 REC'D 11/1/59

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b. For 280mm gun delivered missiles - add 1,000 yards to distances given in paragraph 2a, above.

c. For aircraft delivered bombs - add 3,000 yards to distances given in paragraph 2a, above.

d. Troop positions must be located so that a gun or aircraft delivered weapon is delivered along a line in front of and parallel to the troop position.

3. In addition to the above exposure criteria that will apply to large numbers of troops, there is a very basic need to explore troop reactions in foxholes as close as 1,500 yards to ground zero. This need is based on the fact that detailed analyses of weapons effects have led us to furnish doctrine to our field commanders which would indicate that troops in deep foxholes would expect to receive little or no injury when stationed as close as 1,500 yards to a 20 kiloton explosion at operational heights of burst. Accordingly, discretionary authority is being issued to the maneuver commander which will permit stationing of a small number of selected volunteers who are cognizant of atomic weapons effects, in foxholes as close as 1,500 yards to tower shots. The minimum distance to be selected at the maneuver will be based on advice of the technical director as to the certainty of the estimated yield, the local meteorological conditions and similar influencing environmental conditions, as well as the limitation that these selected volunteers shall not be exposed to overpressures above eight (8) lbs P.S.I. measured at ground level, nuclear radiation greater than ten (10) roentgens at any one test of which no more than five (5) roentgens shall be prompt, whole body radiation, or thermal radiation greater than one (1) calorie per square centimeter. In addition, no volunteer shall be permitted to receive more than twenty-five (25) roentgens of nuclear radiation during the whole UPSHOT-KNOTHOLE operation. There will be no more than twelve (12) volunteers at any one shot.

4. It is hoped that the careful use of these small groups of informed volunteers will help us to confirm our published doctrine, or give us some basis to change it.

5. It is requested that this plan be called to the attention of the Atomic Energy Commission for their information.

BY DIRECTION OF THE CHIEF OF STAFF:

/s/ John C. Oakes

JOHN C. OAKES
Brigadier General, GS
Secretary of the General
Staff

~~CONFIDENTIAL~~

H. W. Boyer, General Manager

MAR 9 1953

DIRECTIVE FOR OPERATION UPSHOT-KROCKHOLE

SYMBOL: NATIQA

Reference is made to my letter, subject as above, dated February 25, 1953, and to your memorandum on the same subject to General Fields dated February 26, 1953.

It is requested the following modifications to the subject directive be made to broaden your authority and to clarify responsibility relating to the troop observer program.

- a. Change the last sentence of the second paragraph to read "It is understood, however, that you may designate appropriate members of your staff to exercise direct command for you."
- b. In paragraph 9, second sentence, after troop observers add "(including civilian participants and civilian observers of DESERT ROCK V Operations.)"
- c. The operation plan and joint organization noted in paragraphs 2 and 6 respectively are to be submitted for information in lieu of Commission approval.

In addition, the Commission has recommended and the Department of Defense through the Military Liaison Committee has approved the operational phase for UPSHOT-KROCKHOLE to be that period beginning March 2, 1953 and terminating on the date two weeks subsequent to the date of the last shot.

62589

GRAVITORY
admission of your Secretary
PLEASE RETURN TO COMMO

H. W. Boyer
General Manager

CLASSIFICATION CANCELLED
 Date 12-1-1955
 For the Atomic Energy Commission
Charles V. ...
 Office of Classification

COPY FOR SECRETARIAT

UNCLASSIFIED
SECURITY INFORMATION

This material contains information affecting the national defense of the United States within the meaning of the espionage laws, Title 18, U.S.C. Sec. 793 and 794, the transmission or revelation of which in any manner to an unauthorized person is prohibited by law.

Brigadier General A. R. Lucdecke
Acting Chief
Armed Forces Special Weapons Project
The Pentagon, Room 1D573
Washington 25, D. C.

Dear General Lucdecke:

This is in reply to your letter of 6 March 1953 concerning the press release on safety responsibility for troops during UPHOT-KNOTHOLE.

Our concern has been only that the Commission should be informed of the text of the one-line announcement proposed by the Department of Defense in lieu of that which they approved with the original plan for troop participation in UPHOT-KNOTHOLE.

We understand informally, however, that this announcement is to the effect that the Department of Defense is responsible for the safety of troops and troop observers participating in UPHOT-KNOTHOLE. Since this is the key point of the release from our point of view, the rest being merely guidance as to answers to amplifying questions the press might ask, and since the operation has progressed almost to the point of execution, with all interested agencies being represented in the field, it appears that our chief aim will be accomplished and that the question cannot further be pursued profitably here in Washington.

Accordingly, we have referred this matter to the field for handling by the Joint Information Office in accordance with this understanding and other approved policy.

Sincerely yours,

K. E. Fields
Brigadier General, USA
Director of Military Application

- SO&CC: Addressee
- CC: M. Salisbury, DIS
- CC: TG Reader
- CC: Reader File
- CC: File - DIA

Reference: MA#3-2379

RPCampbell:ja

CLASSIFICATION CANCELLED
 BY AUTHORITY OF DOE/DPC
 LENARD M. SADRANSKI
 REVIEWED BY
 DATE

This material contains information affecting the national defense within the meaning of the Espionage Laws, Title 18, U.S.C., of which the transmission or revelation of its contents in any manner to an unauthorized person is prohibited by law.

OFFICE	MAT:VGHuston	MAR:JHayward	MAE:JLArmstrong	Mr. Trapnell	MA:KEFields
SURNAME		JA	ja		ja
DATE	3-12-53	3-16-53	3-17-53	3-17-53	3-17-53

Captain William L. Guthrie, USN

MARCH 24 PRESS RELEASE

SYMBOL: MAT:RPC

The information plan for UPSHOT-KNOTHOLE says all releases on the series will be cleared thru the joint AEC-DOD information office, as this one was. It specifies among the releases that the office may make "Explanation of the use of animals in test operations," and "Details of troop participation, including assumption of responsibility for troop safety by the Armed Services."

Hence this release is in accordance with the plan.

Approval of a low-key release on animals, such as this one, appears still to be good tactics since it is voluntary and implies no need to hide the facts. If the use of animals was determined only after the fact in response to reporters' questions, it would assume greater importance to them and be worth more sensational treatment. As a practical matter, no sheep were allowed at the open shot because of the increased effect actually seeing their condition would have had on the reporters' emotions and stories. There is a continuing small stream of correspondence to SFOO criticizing the use of animals, but none (known here) as a result of this particular release. Interestingly, the Division of Information Services reports there are many more letters criticizing the fact that atomic tests are being held at all than criticizing the use of animals.

As to release of information on exposure of troops, DIS agrees this is entirely a matter of concern to the Department of Defense who are responsible not only for safety of troops but also for security of military information.

William L. Guthrie
Captain, USN

CAMPELL:bn
SO: Addressee
CC: TG Reader
CC: DMA Reader
CC: DMA Files
Reference:

MAR 25 1953
71-15

OFFICE ▶	MAT:RPCampbell	MAT:WLGuthrie	MAT: Jouston		
SURNAME ▶	<i>Campbell</i>	<i>Guthrie</i>	<i>Jouston</i>		
DATE ▶	3-25-53	3-25-53	3-25		

Office Memorandum • UNITED STATES GOVERNMENT

TO : Test Manager
Nevada Proving Grounds

DATE: 24 April 1953

FROM : Deputy for Military Operations
Nevada Proving Grounds

Paul P. Preuss ✓

SUBJECT: Troop Participation - Shot SIMON

1. Forwarded for your information is a D/F from DPCO, Camp Desert Rock (MOT 68-299D, Secret) covering the Volunteer Observer Program for Shot SIMON. For your information ~~one of the volunteers has participated previously. He has received to date 37.~~

2. In addition the following information is noted:

a. There will be approximately 2215 troops and 250 observers participating in the Desert Rock Exercise.

b. Troops will be entrenched at 4000 yards south of Ground Zero. The predicted effects upon troops will be well below the criteria for troop participants, namely, ~~100, 0.001, and 1.001e-2.~~

c. The Marines will conduct a separate helicopter operational maneuver (4 helicopters) from Yucca Lake area to an area northwest of Ground Zero. This helicopter operation has already been approved by the Test Director in ltr, Office of the Test Director, Symbol J-17400, dated 23 April 1953.

1 Incl
D/F "Volunteer
Observer Program"
dtd 24 Apr 53

Distribution:

Addressee 1a & 2a w/incl 1A
Col Preuss - 3a w/incl 2A
Maj Connelly - 4a w/incl 3A
DRET Files - 5a

WET 53-201

Office Memorandum

UNITED STATES GOVERNMENT

DMA Files - MR&A 7 Upshot-Knothole, Vol. VIII

TO : Brigadier General K. E. Fields

DATE: May 8, 1953

FROM : Lt. Colonel R. P. Campbell, Jr.

SUBJECT: RADIOACTIVE FALLOUT FROM UPSHOT-KNOTHOLE.

Symbol: MAR:RPC

CLASSIFICATION CANCELLED

~~OR CHANGED TO~~

BY AUTHORITY OF I. L. Cucchiara, DPC, 6

BY B. Wise DATE 6/20/79

A. Summary

(1) Maximum Levels Allowed by Atomic Energy Commission:

- (a) Measured by counters: 3.9 R per quarter, whole body gamma radiation.
- (b) Air content: 1 micro curie per cubic meter averaged over 24 hour period as of 3 days after shot.
- (c) Water content: 5×10^{-3} micro curie per cubic centimeter averaged over 24 hours as of 3 days after shot.

(2) Maximum Readings Obtained by Atomic Energy Commission:

- (a) Shot No. 7 - 50 KT on 300' tower - level equivalent to 7 R per quarter at Riverside Cabins, Nevada, population 14 people. This equals a life-time dose of 11 R.
- (b) Shot No. 2 - 32 KT on 300' tower - level equivalent to 5.5 R per quarter at Bunkerville, Nevada, population about 250 people. This equals a life-time dose of 8 R.
- (c) Shot No. 2 - 32 KT on 300' tower - level equivalent to 3 R per quarter at Lincoln Mine, Nevada, population about 200 people. This equals a life-time dose of 3.8 R.

[REDACTED]

[REDACTED]

[REDACTED]

2 copies, given HQ for DMA - 12/2/77 - Lt

10/1 Series B info for Roger Anderson/Hunt 1-17-73 [Signature]

- (d) Shot No. 1 - 18 KT on 300' tower - level equivalent to 2.1 R per quarter at Rockville, Utah, population about 300 people. This equals a lifetime dose of 2.85 R.
- (e) Maximum air content: .17 micro curies per cu.m. which is lower than maximum allowable by a factor of 6. Found at Mesquite, Nevada.
- (f) Maximum water content: 8.7×10^{-5} micro curies per cc. which is lower than maximum allowable by factor of 100. Found in Virgin River, Nevada irrigation canal.

B. Discussion

(1) Qualifications:

Figures in A, (2) (a), (b), (c), and (d) cannot fairly be used without stating the circumstances (a) under which fallout occurred, (b) under which the radioactive levels were measured, and (c) which were assumed in calculating the ultimate exposure such levels would transmit to humans.

In cases A, (2), (a), (b), and (d) above, fallout occurred in a narrow, concentrated path extending roughly east of the Proving Ground within 6-7 hours after shot time. This was followed by a strong wind which, because of the peculiar area of fallout, blew the particles only away from the area. This reduced the concentration which was later measured since there was no contamination elsewhere to be blown back in. It also removed any airborne particles which might otherwise have been present. In other words, measurements on the ground were low by this amount of weathering. Since measurements at Lincoln Mine were taken before the wind, no reduction of readings took place due to weathering in that case.

Calculations of what the quarterly and lifetime doses would be, using the readings obtained in fallout areas, were based as usual on three assumptions:

- (a) Persons receiving the dose stay in contaminated area continuously during the period involved.

- (b) There is no weathering of the fallout.
- (c) No attenuation due to walls of buildings, etc., i.e., persons stay outside.

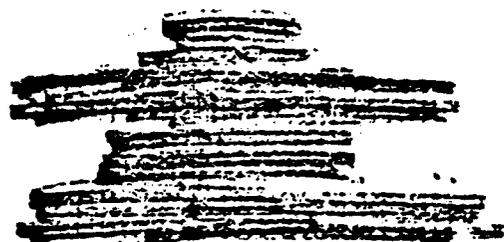
These rather extreme general assumptions necessarily do not reflect actual conditions or individual behaviours. If persons were to stay indoors, for example, during about half the 24 hour day as is usual, this would reduce overall exposures about 25%. On the other hand, having early morning shots means fallout on people near Nevada Proving Ground occurs chiefly during the daylight hours immediately following so the reduction above is not effective. Also, weathering effects are often very prominent.

(2) Effect on the Population:

There are so many unknowns about the biological effects of radiation no one can really say what the effects of this radiation are. Dr. Failla, member of the Sub-committee on External Exposure of the National Committee on Radiation Protection, and one of our best authorities, is publishing a book which says .3 R per week (3.9 R/quarter) exposure is acceptable, but that this must be reduced by a factor of 10 for minors. This is because of the effect of radiation on bone and tissue formation which is going on so rapidly during a child's growth. ~~On the other hand, the Army is allowing a maximum dose of 10 R for soldiers participating in Desert Rock. Their basis probably is that the danger of injury from radiation even at that level can be accepted as less than danger of injury from more orthodox causes faced during manoeuvres and combat.~~

(3) Effect on Future tests:

The level of radiation here is such that, if fallout occurred in a populated area immediately adjacent to the Proving Ground, beta burns might be experienced. This would be a serious situation indeed since these burns cause hair to fall out and blisters or ulcers to form. This would probably arouse immediate public clamor for the closing of the Proving Ground.



[REDACTED]

Fallout in a populated area such as Las Vegas is quite possible. Winds for Shot No. 2 shifted 30° to the south from predicted azimuth. Another 15° would have caused the fallout to hit Las Vegas.

High levels of radioactivity appears to occur only in connection with large shots fired on towers, probably because of the large number of dust particles sucked up by afterwinds as well as particles of the tower material. These provide nuclei around which the volatilized fission products and fragments condense to form radioactive pellets which fall out rapidly while still very active. If the high-yield shots are fired as air bursts, this effect is greatly reduced because of lack of dust and tower particles. In fact, no important contamination has ever been detected offsite after an airburst.

It is apparent from the above that the Test Organization should consider carefully the upper limit of size of tower shots with a view to perhaps holding such shots below some maximum, perhaps 25 KT. The alternates will otherwise almost certainly be ultimate over-exposure of nearby populations and conceivably the enforced closure of the Nevada Proving Ground.

R.P. Campbell, Jr.
R. P. Campbell, Jr.
Lt. Colonel, ARMOR

Office Memorandum • UNITED STATES GOVERNMENT

TO : Carroll E. Tyler, Manager
Santa Fe Operations

DATE:

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

16693

SUBJECT: TROOP PARTICIPATION IN UFSMOT-MICROHOLD

UNCLAS: MAF:RFG

Forwarded herewith for your information is a copy of General Loper's letter on troop participation at UFSMOT-MICROHOLD.

In answer to his request we propose to give Armed Forces Special Weapons Project the current tentative shot program for UFSMOT-MICROHOLD.

We also propose to include in that letter a general statement of the maximum allowable exposures to blast, heat, and radioactivity at the Nevada Proving Grounds with the requirement that, if the Department of Defense expects to have any of their personnel exceed those exposures, they make prior announcement of the fact that the Atomic Energy Commission exposure limits are being exceeded on DOD responsibility. The Division of Biology and Medicine has informally stated that 3.0 R per quarter, 1 caloria per sq. cm, and 5 p.p.s.v. are the upper limits they will approve, but we are asking them to confirm for the record.

We recognize, of course, that exposure limits at AEC tests is a matter of primary interest to you. Biology and Medicine's recommendations are being requested because the policy to be established by the Commission will be AEC-wide but your comments or suggestions on the matter from the operational point of view are also necessary. Since we hope to establish the Commission position before receiving the DOD proposals to avoid confusion at that time, will you please forward them at your early convenience.

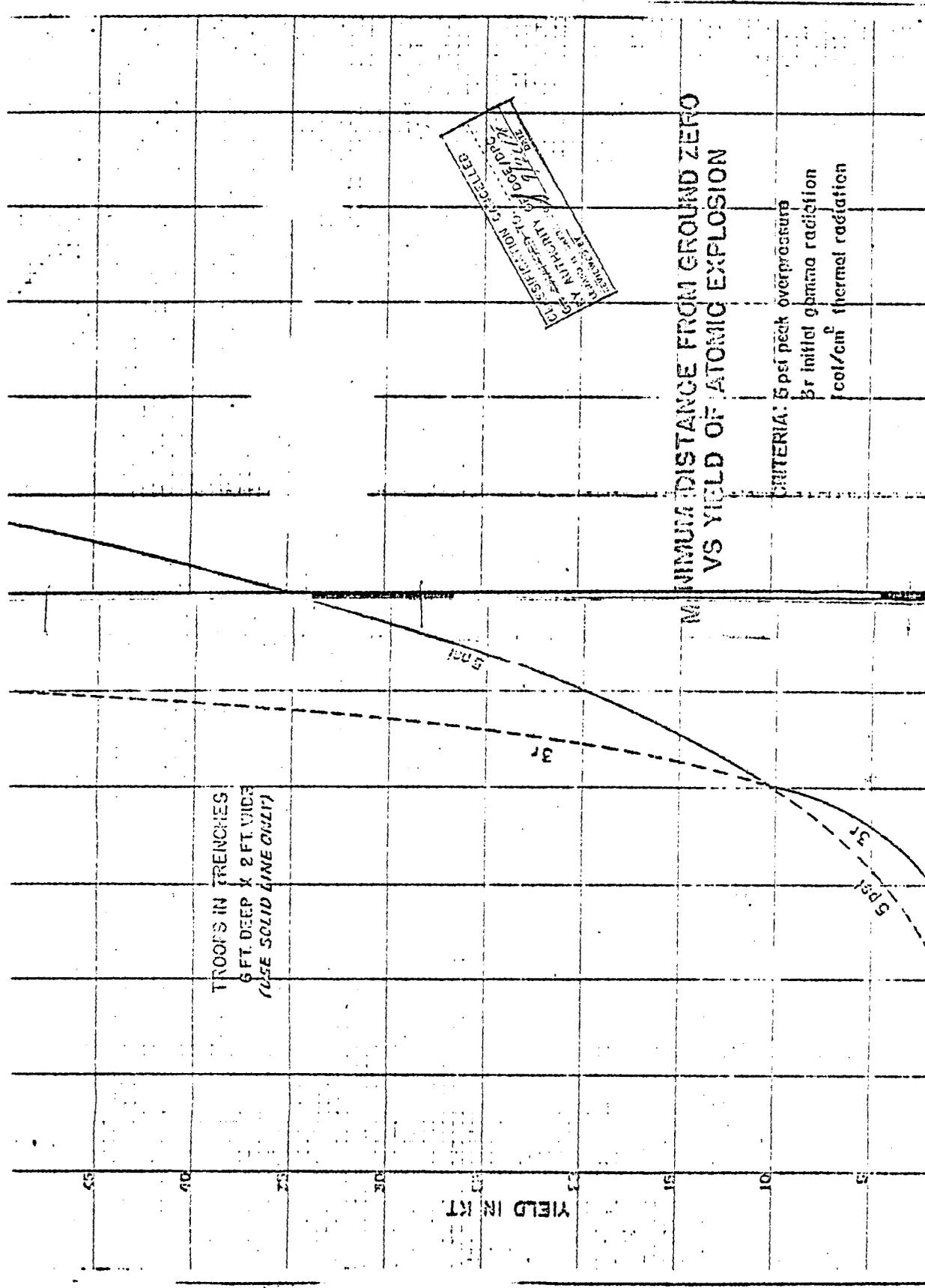
John T. Hayward
John T. Hayward
Captain, USN
Chief, Weapons Research Branch

Enclosure:
Cy 22 of 107 22 AFMOT
to DDA dtd 9-9-52

~~This material contains information affecting the national defense of the United States within the meaning of the espionage laws, and its transmission or revelation in any manner to an unauthorized person is prohibited by law.~~

1. ADD 2000' TO RESULTANT FIGURE TO ACCOUNT FOR BOMBING ERROR.
2. ADD 20% TO PREDICTED MAXIMUM YIELD FOR POSSIBLE ERROR IN PREDICTION OF YIELD BY LASL.
3. ADD 20% TO TOTAL TO ACCOUNT FOR ERROR IN BLAST CURVE.
4. ADD 5% TO TOTAL TO ACCOUNT FOR ERROR IN RADIATION CURVE.
5. ADD 8% TO TOTAL TO ACCOUNT FOR ERROR IN THERMAL CURVE.
6. NOTE: OVER 2000' FROM BLAST, NEUTRONS ARE NOT THOUGHT TO BE A SAFETY HAZARD.

DEPENDENT
WHICH CURVE
GOVERNS



MINIMUM DISTANCE FROM GROUND ZERO
VS YIELD OF ATOMIC EXPLOSION

CRITERIA: 5 psi peak overpressure
3r initial gamma radiation
1col/cm² thermal radiation

TROOPS IN TRENCHES
6 FT DEEP X 2 FT WIDE
(USE SOLID LINE ONLY)

REVISION CANCELLED
DATE 1/1/50
BY AUTHORITY OF JCS
REF ID: A66573

YIELD IN KT