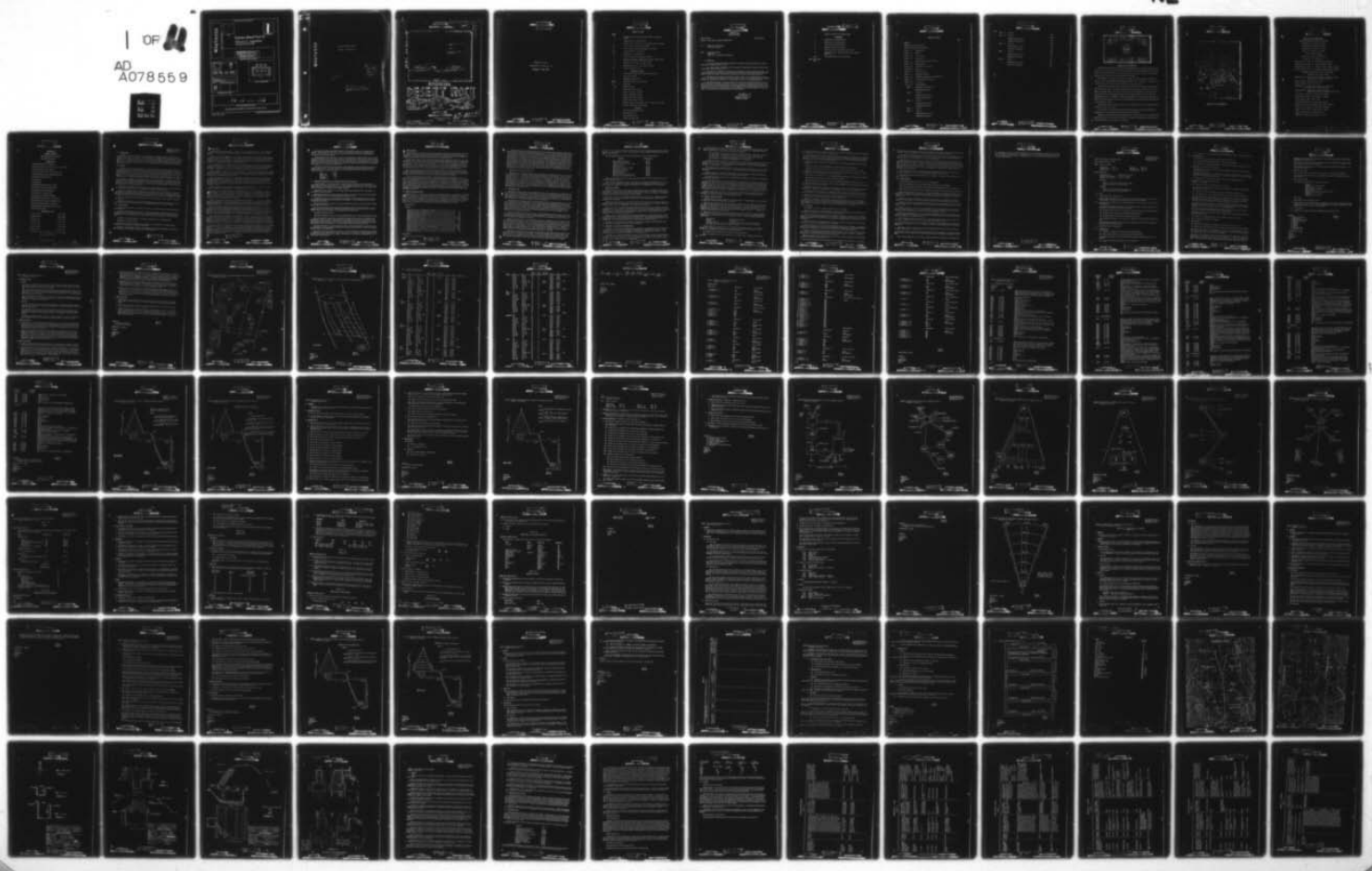
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HEADQUARTERS
CAMP DESERT ROCK
Las Vegas Nevada

AGCU 1699-0 16 July 1953

SUBJECT: Final Report, Exercise DESERT ROCK V

TO : Chief, Army Field Forces
Ft Monroe, Virginia

THRU : Commanding General
Sixth Army
Presidio of San Francisco, California

1. References:

a. Letter, OCAFF, file ATTNG-43 354/18 (C) (5 Feb 53), dated 5 February 1953, Subject: "Directive for Exercise DESERT ROCK V".

b. Letter, OCAFF, file ATTNG-43 354 (C), dated 17 February 1953, Subject: "Supplementary Instructions, Exercise DESERT ROCK V".

2. This report is submitted in compliance with paragraph 4a (15) of reference 1a, above. The report is submitted in two volumes, one concerning the operational aspects and one the administrative and logistical matters, as indicated in instructions set forth in the above reference.

3. The purpose of the report is to furnish a concise report of the overall exercise, conclusions and recommendations, supplemented by more detailed accounts of the participation and operations conducted in connection with each of the 9 atomic tests in which the military participated.

4. The principal mission of the exercise was the orientation and indoctrination of troop observers and troop participants. However, it was felt that this command would be remiss in its duties if it failed to make an evaluation of the damage to equipment, emplacements and animals used to visually demonstrate the damage effects of atomic weapons. As a result, annexes covering the details for each shot contain a visual evaluation of damage incurred by items placed in the display areas. This evaluation is factual and has no scientific basis.

W. C. Bullock
W. C. BULLOCK
Brigadier General, USA
Exercise Director

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HISTORY OF CAMP DESERT ROCK

Camp Desert Rock, Nevada, a Sixth Army Class I installation, was first established in September 1951 for the purpose of supporting troops participating in military maneuvers and atomic tests within the Nevada Proving Grounds. The camp was established under the supervision of Lieutenant General Joseph M. Swing, USA, Commanding General of Sixth Army.

The installation is primarily a tent camp with a maximum housing capacity of 5,000 troops; however, a few Butler type buildings have been constructed during the past year. An airfield, with a 4,200 foot runway, is located within a half mile of camp headquarters.

Situated some sixty miles northwest of the celebrated City of Las Vegas and some fifty miles east of equally well known Death Valley, Camp Desert Rock threw up its first tents in the wasteland of the Nevada Desert. Surrounding the camp area are such traditional and historic names as Spector Mountain to the south, Spector Range to the west, Skull Mountain to the north and the Spotted Range to the east. Despite the remoteness and desolation of its locality, Camp Desert Rock grew from a cleared area with a few tents to a comparatively comfortable semi-permanent field camp in a relatively short time.

Camp Mercury, Nevada, the Nevada Proving Ground headquarters for the Atomic Energy Commission, is located 4 miles north of camp.

The first atomic tests were conducted at the Nevada Proving Grounds from 21 September to 4 November 1951. The camp was again the site for atomic tests in 1952.

During the recent series of atomic detonations, Exercise DESERT ROCK V, more than 17,000 troop observers and troops were temporarily stationed at this camp while preparing for and participating in field maneuvers in conjunction with nuclear tests.

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AERIAL VIEW OF CAMP DESERT ROCK

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COMMAND AND STAFF ORGANIZATION

SIXTH ARMY COMMANDER AND EXERCISE SUPERVISOR

Lieutenant General Joseph M. Swing

CAMP COMMANDER AND EXERCISE DIRECTOR

Brigadier General William C. Bullock

DEPUTY POST COMMANDER - OPERATIONS

Colonel Edward F. Thelen

DEPUTY POST COMMANDER - ADMINISTRATION

Colonel James S. Moncrief Jr

ASSISTANT CHIEF OF STAFF, G1: Colonel Floyd A. Rutherford

ASSISTANT CHIEF OF STAFF, G2: Colonel Frederick K. Hearn

ASSISTANT CHIEF OF STAFF, G3: Lieutenant Colonel Anthony H. Shookus

ASSISTANT CHIEF OF STAFF, G4: Lieutenant Colonel Howard F. Kuenning

HEADQUARTERS COMMANDANT AND CHIEF VISITORS BUREAU:

Lieutenant Colonel Harry P. Smith

ADJUTANT GENERAL: Lieutenant Colonel Roland A. LeMay (Jan to Apr)
Major William R. MacLaren (Apr to Jun)

ARMY AIR OFFICER: Captain Daniel M. Lewis

CHEMICAL OFFICER: Colonel Roy W. Muth

JUDGE ADVOCATE: Captain George T. Foresell Jr (Feb to Apr)
Captain Robert R. Bowen (Apr to Jun)

ORDNANCE OFFICER: Captain Roy C. Petty (Jan to Mar)
Lieutenant Colonel John D. Bowersock (Mar to Jun)

POST ENGINEER: Lieutenant Colonel James O. Sorrell

POST EXCHANGE OFFICER: Captain Raymond H. Pickering

PROVOST MARSHAL: Major Austin P. Reid

PUBLIC INFORMATION OFFICER: Major Boyd H. Arnold

QUARTERMASTER OFFICER: Lieutenant Colonel James H. Herndon

SIGNAL OFFICER: Lieutenant Colonel Harold L. Heyman

SPECIAL SERVICES OFFICER: Captain Duane W. Bagley

SURGEON: Lieutenant Colonel Wilbur D. Dice

TRANSPORTATION OFFICER: Major Hilary E. DuVal

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STATION LIST

STATION COMPLEMENT

6012 ARMY SERVICE UNIT (DET F)

6020 ARMY SERVICE UNIT

SUPPORT UNITS

23rd Transportation Truck Company

26th Transportation Truck Battalion (Hq & Hq Company)

31st Transportation Truck Company

38th Transportation Truck Company (Detachment)

53rd Transportation Truck Company (Detachment)

50th Chemical Service Platoon

77th Army Band

93rd Army Band

94th Medical Detachment (Vet Food Insp)

163rd Quartermaster Laundry Detachment

360th Engineer Utilities Detachment

371st Evacuation Hospital (SMBL)

412th Engineer Construction Battalion

505th Military Police Battalion (Company C)

505th Signal Service Group (Composite Company)

705th Engineer Field Maintenance Platoon

762nd Quartermaster Subsistance Supply Company

3623rd Ordnance Company

PARTICIPATING UNITS

Composite Units	First Army
Composite Units	Second Army
Composite Units	Third Army
Composite Units	Fourth Army
Composite Units	Fifth Army
Composite Units	Sixth Army
Composite Units	U.S.Air Force

U.S. Marine Corps Provisional Atomic Exercise Brigade

Camp Desert Rock Troops

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HQ CAMP DESERT ROCK
LAS VEGAS (87.536) NEV
011200 June 1953

I. INTRODUCTION.

Exercise DESERT ROCK V, the U. S. Army designation for its participation in AEC operations UPSHOT/KNOTHOLE, began on 5 January 1953 with the arrival of permanent party personnel who were to administer Camp Desert Rock and conduct operations during the exercise. Military maneuvers, designed to give military personnel indoctrination training in tactical operations featuring tactical employment of atomic devices, were conducted in connection with the explosion of seven of the ten experimental atomic devices exploded by the AEC in its Nevada Proving Ground during the months of March, April, and May 1953.

II. MISSION.

The mission of Exercise DESERT ROCK V was to provide indoctrination training in tactical operations featuring tactical employment of atomic weapons; to provide training in essential physical protective measures; to provide indoctrination training for participating troops and troop observers on the effects of an atomic explosion on animals and equipment; to demonstrate, within limits or restrictions established by AEC and AFSWP, influence or modifying effects of atomic weapons on field fortifications and defensive structures; to measure the ability of trained staff officers to estimate target damage; and to observe psychological effects on individuals resulting from atomic explosions.

In general, the mission of Exercise DESERT ROCK V was a continuation of the four previous Exercises DESERT ROCK. However, in this exercise many of the previous restrictions placed on military participation by AEC were entirely removed. As a result it was possible to conduct realistic close-in military operations with each burst in which military personnel participated. The following advances were made in Exercise DESERT ROCK V:

Two Battalion Combat Teams were positioned at 3,500 yards from ground zero of a burst, which is the nearest any known large body of troops has been deliberately exposed to date.

A group of volunteer officers, having training and background in the compilation of effects of atomic weapon, were positioned at 2,000 yards from ground zero of a burst, the closest any known personnel have ever been so exposed in a training situation. This distance was selected after these volunteer officers had computed a safe distance based upon data found in TM 23-200 dated 1 Oct 1952.

The U. S. Army was given complete responsibility for radiological safety of participating military personnel.

Permission was given for troops to maneuver toward and around ground zero without restriction as long as there was no interference with AEC instrumentation lines or AFSWP test displays.

III. INDOCTRINATION.

To accomplish the mission of Exercise DESERT ROCK V, as outlined above, all military personnel participated in:

A pre-shot classroom type indoctrination on basic atomic theory, characteristics and effects of atomic weapons, protective measures to employ against atomic attack, tactical employment of atomic weapons, results of previous DESERT ROCK Exercises, and plan of operation for the forthcoming shot.

A rehearsal of shot day operation, including a pre-shot visit to the display area.

Observation of an atomic burst.

A post-shot visit to the display area and observation of the effects of an atomic burst on animals, military equipment, and field fortifications.

In addition, participating Battalion Combat Teams conducted a simulated attack on a military objective beyond or to the flank of ground zero after each burst.

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PARTICIPATION.

Military personnel participated in nine shots during exercise DESERT ROCK V. Troop observers were included in all shots and composite Battalion Combat Teams participated in six of the nine shots.

The tactical situation assumed for troop participation was based on the concept that Aggressor airborne troops, after an initially successful attack, were now on the defensive and had established a strong position which was holding up the attack by friendly troops. Decision was made to use atomic weapons to force a breakthrough. In each case the actual burst represented one burst out of a group of 5 to 7 employed to execute the planned maneuver.

In each case ground zero was assumed to be 1,500 yards in rear of the enemy lines. Protective trenches were prepared and occupied at 3,500 to 4,000 yards from ground zero in all tower shots and at greater ranges for air dropped and artillery delivered weapons. In planning the maneuvers all tower shots, regardless of KT yield, were assumed to be artillery delivered atomic weapons.

The first atomic explosion in this series occurred on 17 March 1953. This was a tower shot which developed a yield of 16.3 KT and was followed by an attack on an objective to the left (west) of zero from trench positions 3,500 yards from ground zero. This attack was made by two Army BCT's composed of Camp Desert Rock permanent party personnel.

On 24 March two Army BCT's composed of personnel from Second, Third, Fifth, and Sixth Armies entrenched 4,000 yards from GZ attacked an objective to the west of ground zero immediately after the second atomic burst, a tower shot of 24.5 KT yield. In addition, a group of nine volunteer Army, Air Force, and Navy officers were positioned in a trench at 2,500 yards from ground zero as the first step in an experiment to determine how close personnel may be positioned to a burst without harmful effects.

There was no military participation in the third atomic detonation on 31 March 1953. The experimental device used on this occasion developed a yield of only .21 KT.

No military personnel were scheduled to observe the air drop of an atomic weapon on 6 April. However, 75 Marine Corps officers scheduled to participate in Shot V-5 took advantage of the opportunity to witness this detonation in order to be better qualified to orient their troops. They were joined by 60 officers and enlisted men of Camp Desert Rock who had not previously witnessed an atomic detonation. This weapon, yielding 10.8 KT, was detonated 6150 feet above the terrain and was one of the most spectacular of the series.

The area to be used for Shot V-5 was contaminated by the detonation of Shot V-4. As a result Shot V-6 was advanced to 11 April. The detonation of this device, placed in a cab on a 100 foot tower and which yielded .22 KT, was witnessed by 63 observers originally scheduled to observe Shot 5 but who departed their home stations prior to receipt of the notice of the change in date.

The USMC Provisional Atomic Exercise Brigade formed into two Battalion Landing Teams totaling 2,318 officers and enlisted men, attacked toward ground zero after the detonation of Shot 5 on 11 April. In addition, a Marine Corps Helicopter Group airlifted one company to the vicinity of their objective. This weapon was placed in a cab on top of a 300 foot tower and developed a yield of 27.7 KT. A group of 6 Army and 6 Marine Corps officer volunteers were positioned in a trench 2,000 yards from ground zero to observe this burst. All withstood the atomic blast without incident.

Shot 7, the largest in the series was detonated on 25 April. This shot, an atomic device placed in a cab on top of a 300 foot tower, developed a yield of 51.5 KT. Troops from the Second, Fourth Fifth, and Sixth Armies, organized as two BCT's attacked toward objectives to the west of ground zero immediately after the detonation. These troops were halted 2,000 yards from ground zero because of the high radiation intensity in the area. Seven Army and one Navy officer volunteers were positioned in two trenches located 2,000 yards from ground zero. No unusual effects were noted by these officers.

On 8 May, a Mark 6 stockpile weapon was air dropped and detonated at a height of 2,423 feet above the terrain. This weapon, scheduled as Shot 9, is estimated to have developed a yield of approximately 26.4 KT. Two BCT's composed of personnel from the First, Third, and Fourth Armies plus a contingent of 326 officers and enlisted men of the Air Force attacked toward ground zero immediately after the detonation. A group of 60 of these officers and enlisted men were air lifted by helicopter to a point 1,500 yards from ground zero. This group reached ground zero one hour and two minutes after the detonation occurred.

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Shot 8, which had been rescheduled because of contamination of the area, was detonated on 19 May. This device placed in a cab on top of a 300 foot tower developed an estimated yield of 34 KT. A total of 903 military personnel observed this detonation and the resulting effects on equipment, emplacements and animals.

Exercise DESERT ROCK V reached its climax with the detonation of a Mark 9 atomic shell delivered by a 280-mm artillery gun on 25 May. Two RCT's composed of troops from all the continental armies, attacked towards objectives beyond ground zero after the detonation. The Secretary of the Army, two members of Congress, the Chief of Staff of the U.S. Army, the Chief of Army Field Forces, the Commanding General of Sixth Army and 787 additional military and civilian personnel observed the detonation from positions in the troop entrenchment area.

A total of 17,696 military and civilian personnel witnessed the nine detonations in which the military participated. This total includes the Exercise DESERT ROCK Control Group which participated in all shots. All of the services were well represented throughout the series, with the total participation for each as follows:

Army	13,364
Navy & USMC	2,921
Air Force	1,273
Civilian (All services)	139

V. PSYCHOLOGICAL REACTIONS OF TROOPS AT THE DESERT ROCK V MANEUVERS.

The investigation of troop psychological reactions at the DR-V maneuvers was undertaken by Army Field Forces Human Research Unit No. 2. Research personnel from this unit were present at all shots attended by provisional battalion combat teams composed of Army personnel. The research performed was designed to accomplish the following objectives:

Observation of troop behavior in the forward trench area immediately prior to and after the detonation of an atomic device.

Measurement of changes in troop attitudes and level of information about atomic warfare before and after participation in the indoctrination and maneuver at DR-V.

Assessment of some of the factors governing the degree to which information gained and attitudes formed at DR-V by troop participants were communicated to home station troops upon return of the maneuver participants.

Obtaining reactions and opinions of a group of officers who were in a special forward volunteer group on some of the shots.

At this date only preliminary analyses have been made of the data collected at DR-V. Consequently, the findings reported here should be regarded as tentative. A final report of the psychological findings will be published under separate cover at a later date.

Preliminary findings indicate:

There was no evidence of panic or even overwhelming anxiety on the part of participating troops.

That participating troops acquired considerable information by the end of the exercise which resulted in a decrease in self-rated anxiety about the danger of injury from all the effects of an atomic burst, except radiation. However, there is little evidence that the experience of the exercise produced changes in broader attitudes about atomic warfare, troops interviewed indicating they were neither more nor less willing for the United States to use atomic weapons in Korea.

That more information is gained by participants who, at their home stations prior to departure to the exercise, participate in group discussions and are provided with lists of questions that members of the group desire answered.

That well indoctrinated officers are willing to position themselves in forward trenches located at distances they have calculated to be safe. That such officers feel that they have learned nothing new about atomic effects but by their actions have added to the confidence of participating troops in this and future exercises.

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VI. DAMAGE EFFECTS.

Damage effects data contained in this report are based solely on visual evaluation of the effects of atomic burst on animals, equipment and fortifications and should not be construed as scientific. This visual evaluation was made in order that a comparison could be made between the damage predicted by trained staff officers and the actual damage incurred.

On all shots a diagram of the equipment display area was forwarded to the C&GSC in order that instructors of the Special Weapons Course could predict damage based on the layout of display area, the expected KT yield, and the predicted weather. In addition, members of the group of officers volunteering to take positions in trenches forward of the troop position were required by the Director to predict the damage for the shot in which they participated and recommend a safe distance from GZ at which the volunteer trench should be placed. In all cases predicted damage was based upon data contained in TM 23-200, "Capabilities of Atomic Weapons," dated 1 October 1953.

The comparison between predicted and actual damage caused by each burst is set forth in the separate annexes covering each shot. Based upon this data it is concluded that trained staff officers can, with weapons effects data now on hand, predict effects of atomic weapons with sufficient accuracy to enable the battlefield commander to employ these weapons effectively.

Caution must be exercised in studying the damage effects listed in Annexes 2, 3, 5, 7, 8, 9 and 10. With the exception of Shots V-9 and V-10 all were atomic devices detonated to test scientific principles developed by AEC personnel. Shots V-9 and V-10 were stockpile weapons and indicate results that might be expected if used in combat today. The displays of equipment, emplacements and animals were established primarily to add realism to the orientation and indoctrination of troops. Inasmuch as atomic weapons are rarely detonated, it was established prior to the exercise that a visual evaluation of the damage to all items in the display should be made for whatever value it might have in providing additional knowledge regarding this potent weapon. Attention is invited to the estimate of time, equipment and material required to restore equipment to an operable status under battlefield conditions.

VII. INTELLIGENCE AND SECURITY.

The major effort of the G2 Section during the exercise was devoted to the clearance of personnel and the securing permanent AEC passes for entrance into the Nevada Proving Grounds. The problem of securing AEC badges was complicated by failure of headquarters furnishing personnel to Camp Desert Rock to obtain security clearances on personnel prior to issuance of TDY orders, and by the constant turnover of personnel. In addition, the section made the necessary arrangements with AEC representatives to insure a smooth flow of troop observer and troop participant convoys into the Nevada Proving Ground on shot days. The work load of the section is summarized as follows:

Administration.

Security.

Cryptographic and "Q" clearances processed	4
Cryptographic and "Q" clearances issued	14
Cryptographic and "Q" clearances verified	11
Background Investigations initiated	20
Top Secret clearances issued	11
Observers processed	3,838
Members of BCT's processed	13,600
National Agency Checks initiated	194
Interim clearances issued	113
Final clearances certificates issued	77
Confidential clearances issued	1,874
G2 file checks initiated	1,879
Nevada Proving Ground badge request and issue	1,743
Nevada Proving Ground passes processed (Forms)	6,523
Action for verifying clearance	1,210
Security lectures given	91
Security inspections	2

VIII. MEDICAL.

Medical Support for Personnel.

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The general plan for the medical support on all shots was essentially the same. Some minor variations had to be made to meet special situations that occurred. This general plan was to have a mobile ambulance aid station manned by a medical officer and sufficient aid men to provide medical care for all participating troops. The aid station initially, after moving forward with the control group was established in the parking area. Immediately following H-Hour, the aid station was moved forward to the vicinity of the control trench where it remained until it rejoined the control column for the return to camp. Each BCT had 4 or more aid men to render immediate medical care. There were two company aid men with the observer group. Evacuation was provided by attaching an ambulance to each major serial that moved forward. These ambulances, unless called upon to evacuate a patient, remained with their respective serial. These could be controlled by the Surgeon by means of radio and thus could be dispatched to desired location. Evacuation from the aid station was to the dispensary at Camp Desert Rock. In addition to the ambulances, a helicopter equipped with litter pods was available for evacuation as necessary. This was stationed in close proximity to the aid station at all times.

Medical Evaluation of Test Items.

The evaluation of the medical test items was delegated to the Veterinary Officer, as the items concerned were sheep. These sheep were distributed in the test area as follows: They were placed in bunkers from 100 to the 500 yard line at 100 yard intervals. On the 500 yard line two sheep were in a bunker, two (2) in shallow trenches and one (1) above ground. This same procedure was repeated at 500 yard intervals to the 3,500 yard line. The evaluation team would move forward as soon after H-Hour as possible with a monitor to determine the immediate effects. The same day or as soon as possible thereafter all sheep not too seriously injured or killed were returned to camp where they were kept separate so that they could be observed for delayed radiation effects. All sheep, before being placed in their respective positions in the forward area, were carefully marked and this was recorded. The results of these will be found in the medical portion of each attached annex pertaining to a specific shot.

IX. INSTRUCTOR GROUP.

The instructor group operated as a special staff section of Camp Desert Rock, preparing and presenting orientation programs for observers, participating troops, and post personnel. Four Army officers, provided from four separate continental armies by Office, Chief of Army Field Forces for temporary duty during the exercise, formed the instructor group. An Air Force officer, a Naval officer, and an Army medical officer, representing Armed Forces Special Weapons Project, contributed specialized instruction which completed the general orientation program.

The four officers forming the basic Instructor Group reported to Camp Desert Rock in mid January 1953. No training aids or literature for use in formulating orientation programs in atomic energy were available at the camp. Therefore, the four officers attended refresher classes in the subject material at Armed Forces Special Weapons Project Field Command, Sandia Base, New Mexico, from 27 January to 20 February 1953 and accumulated source material, references, training aids and background data. All four officers had previously attended atomic weapons effects courses conducted at the Command and General Staff College or Armed Forces Special Weapons Project Field Command, but the intensive review was highly profitable.

At no time was specific instruction attempted. Broad orientation in atomic weapon characteristics and effect, the atomic weapon delivery means employed by the three services, medical aspects of the atomic explosion, personal protection, and general information designed to allay misconceptions held concerning atomic energy were presented.

During the rehearsal of the shot-day exercise instructors conducted tours of the equipment and animal display areas for all personnel. At that time predicted effects were discussed by the instructor. On shot day, following the tactical maneuver of troops, all troop participants in the exercise and troop observers were again led through the display areas by instructors and the actual damage to equipment and installations were pointed out and compared with the predicted effects. Because it was necessary to have all personnel in the trench area a full hour before shot time, a running orientation period was carried on during that hour by an instructor. Information about the shot area, safety precautions, and general background data were supplied at this time.

An orientation program of four hours and a program of eight hours duration were prepared in February 1953. The four hour curriculum limited to CONFIDENTIAL material, was for presentation to enlisted personnel of the battalion combat teams. The eight hour curriculum, limited to SECRET material, was for troop observers. For these observers not able to arrive at Camp Desert Rock in time for the orientation course of eight hours, a one hour orientation was conducted on the evening

prior to the shot. This period was limited to a description of the tactical maneuver and situation for the shot, presented by the AC of S, G3, and a brief general orientation and question period conducted by an instructor.

The following subjects were covered in orientations during the exercise period:

SUBJECT	REVISED TIME
Introduction and Security	30 min
Atomic Weapons Family	50 min
Characteristics and Effects of an Atomic Explosion	50 min
Medical Aspects	30 min
Protective Measures and Radiac	30 min
Army Delivery Means	40 min
Air Force Delivery Means	35 min
Navy Delivery Means	35 min
Tactical Employment	80 min
History of Desert Rock Exercises	20 min
Seminar and "TUMBLER/SNAPPER" Film	30 min

Training films concerning atomic matters were shown at night for RCT and officer personnel on a voluntary attendance basis.

The orientation periods were revised continuously as new material became available to the instructors. Lessons learned from experience and suggestions from officers operating in the field of atomic energy who attended the orientations contributed to the improvement of the orientations.

X. RADIOLOGICAL SAFETY.

The Directive for Exercise DESERT ROCK V, issued by OCAFF, made the Exercise Director solely responsible for providing radiological safety for all participants in the exercise. This marked the first time the military was given the entire responsibility for radiological safety of its personnel in maneuvers conducted in connection with an atomic burst.

The Directive provided the Exercise Director with criteria to be used in exposing participants to atomic weapons effects. These criteria provided for a maximum permissible dosage of six (6) roentgens for the exercise.

Based upon the above criteria the Rad-Safe Officer prepared an SOP for Radiological Safety covering all operations in the forward area. These procedures prescribed the use of radiac instruments and film badges, monitoring requirements and decontamination regulations.

Prior to each shot the Radiological Safety Section conducted a school for monitors selected by the participating RCT's. During the maneuver following each shot these monitors checked for nuclear radiation in the area used by their respective units. In addition, the Rad-Safe officer and his monitors surveyed the entire maneuver area, reported intensity levels to the Exercise Director, and exercised overall radiological safety control.

Prior to each shot the Rad-Safe Section placed film badges in the field fortifications located in the display area. These badges were recovered after the shot and the readings were studied to determine the radiation dosages received in the fortifications. In addition, where possible, these readings were compared with radiation effects predicted by trained staff officers.

After each shot radiological surveillance of the area was continued, decay predictions made, and a situation map showing intensity levels was maintained.

XI. PREPARATION OF MANEUVER AND DISPLAY AREAS.

The 412th Engineer Construction Battalion was assigned to Camp Desert Rock for the purpose of constructing troop trenches and preparing the display areas for Exercise DESERT ROCK V. In addition, this unit was to render engineer support, in so far as its capabilities permitted, to the Directorate of Weapons Effects Tests, AFSWP and to Camp Desert Rock.

Preparation of the Exercise DESERT ROCK V sector of each shot area required the expenditure of 26,361 man hours and 7,700 equipment hours during the period 12 January to the detonation of Shot 10 on 25 May. Approximately 10,000 feet of trenches were dug for Shot V-1, V-2, V-5, V-7, V-9, and V-10, with Shots V-6 and V-8 requiring a lesser amount.

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All display areas contained a standard layout of stakes, shallow trenches and bunkers, beginning at 500 yards from Ground Zero and at each 500 yards thereafter up to 3,500 yards. The following emplacements and stakes were placed on each 500 yard arc:

C-1 (C-9) Stake - A 4" x 4" wooden stake, extending 2' above the ground. Fig 1 (Page 77).
C-2 (C-8) Trench - A slit trench 4'6" long, 2' wide and 2' deep. Fig 2 (Page 77).
C-3 (C-7) Trench - A slit trench 4' long, 3' wide and 3'6" deep. Fig 3 (Page 77).
C-4 (C-6) Bunker - A one man covered emplacement. Fig 4 (Page 78).
C-5 "B" Bunker - A two man covered emplacement. Fig 5 (Page 79).

In addition, deep "A" type bunkers were dug at 100, 200, and 300, and 400 yards from ground zero for Shots V-2 and V-9. Various items of military equipment were also placed in the display areas to provide visible evidence of the damage effects of atomic weapons. Sheep were placed in selected A, B, and C type emplacements. Fig 6 (Page 80).

The Engineer support rendered to AFSWP TEST GROUP required an expenditure of 12,209 man hours and 2,318 equipment hours up to 25 May 1953. This effort was largely expended in the Frenchman Flat area.

Engineer support rendered to Camp Desert Rock for the construction of additional facilities required the expenditure of 17,929 man hours and 614 equipment hours.

The clean up of destroyed equipment in display areas for Exercise DESERT ROCK V and AFSWP will require additional effort.

Communication facilities for Exercise DESERT ROCK V were installed by Composite Company, 505th Signal Group. These facilities included telephone communication between the Control Group and the BCT Commanders, ASC Control Point, the vehicle parking areas, Camp Desert Rock and a forward line to Rad-Safe monitors. In addition, a radio net was established to duplicate the telephone system. A public address system was constructed in each trench and vehicle parking area to enable instructors to give "on site" orientation and instructions to the participants. The establishment of these communications facilities required the expenditure of 7,776 man hours and 2,340 equipment hours.

This unit also expended 10,080 man hours and 2,450 equipment hours in support of Project 3.20 (SIGNAL) in the AFSWP test area. This effort was expended in the construction of pole lines, buried lines, surface lines and construction of radio towers.

XII. VOLUNTEER OBSERVER PROGRAM.

Selected officer volunteers, capable of calculating effects of atomic weapons, were positioned in trenches at 2,500 and 2,000 yards on three shots.

Four Army, four Naval and one Air Force officer volunteers were positioned in a heavily revetted trench located 2,500 yards from ground zero on Shot V-2. For Shot V-5, the volunteer trench was located 2,000 yards from ground zero and was not revetted. This trench was occupied by 6 Army and 6 Marine Corps Officers. Two trenches, one revetted and one not revetted, located at 2,000 yards from ground zero were utilized by the volunteer officer group on Shot V-7. This group consisted of seven Army and one Naval officer.

The location of the trench in each case was based upon the determination of a safe distance by the volunteers. This distance was calculated for the criteria under which the program was established, using effects data listed in TM 23-200 dated 1 Oct 1952. These criteria, established by CCAFF, were:

"Overpressure	8 psi at ground level."
"Thermal	1 cal/cm^2".
"Nuclear radiation	10 r in any one test, of which no more than 5 r is prompt, whole body radiation, and with the further limitation that no volunteer shall take more than 25 r in this series of tests."

All calculations were based upon the above criteria and the predicted yield of the weapon to be detonated. The actual yield was less than the predicted yield for Shots V-2 and V-5, but exceeded the predicted yield of 40 KT by 25 percent on Shot V-7.

As a result of their experience these officer volunteers concluded:

That the volunteer trenches were located at a safe distance under the given conditions for each shot.

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That data in TM 23-200, dated 1 October 1952, can be used to determine safe observer positions properly qualified officers make the computations.

That troops could have observed these shots safely from positions located in the same areas as the volunteer trenches. However, it was further concluded that troops should be placed no closer than 3,500 or 4,000 yards to ground zero in troop orientation and indoctrination exercises, such as Exercise DESERT ROCK V, for the following reasons:

Troops can feel the effects of the detonation at these distances as well as they could at a closer point.

Troops can better observe the fireball and mushroom cloud at these distances.

Troops are sufficiently removed from the heavy dust cloud and possible radiation hazard.

Reduction of the distance between ground zero and the troop entrenchment area below 3,500 to 4,000 yards reduces the area available for troop maneuvers.

That a trench six feet deep and unrevetted gave adequate protection under the given conditions.

That there was no discomfort from blast or thermal effects.

That ground shock, at this distance, is not of sufficient magnitude to be of any concern.

That the existing volunteer program, with its present mission and limiting criteria, has served its purpose and should be discontinued.

That a volunteer program of this type, with a mission of indoctrination for personnel having special weapons training or assignments with special weapons programs, would be worthwhile.

That future volunteer programs would have greater value if volunteers were positioned in a variety of standard field fortifications and combat vehicles approximating actual combat conditions.

That instrumentation placed in trenches to record pressures, heat, ground shock, and nuclear radiation would be of assistance in evaluating observers reactions.

Study of the results of the volunteer program must be done with great care. Readers are cautioned to remember that all shots in which volunteers participated were tower shots. Different information might result if a similar program were undertaken for shots in which the detonation took place considerably higher than the 300 foot height of the tower used in these shots.

XIII. CONCLUSIONS.

From experience gained in Exercise DESERT ROCK V it is concluded:

That the overpressure and thermal radiation criteria used in determining troops positions for this exercise are sound and should be followed in future exercises.

That the criteria for nuclear radiation to be accepted should be increased to permit maneuver closer to ground zero than was possible in this exercise. The amount of increase should be determined by observation of the volunteer officers who accepted larger dosages than permitted for troop participants.

That the criteria for distances between ground zero and the troop trenches used in this exercise are sound and should be retained in future exercises.

That a volunteer program which would permit officers trained in special weapons or assigned to special weapons programs to be positioned in trenches closer to ground zero than the participating troops would be worthwhile for indoctrinating such officers in atomic weapons effects.

That atomic weapons effects data found in TM 23-200, dated 1 October 1952, can be used by qualified officers to determine safe troop positions and to predict damage to equipment, emplacements and personnel as the result of an atomic weapon detonation.

That indoctrinated soldiers show no evidence of fear of an atomic detonation and will willingly attack objectives at or near ground zero.

That continued detonation of atomic weapons over the same flat terrain found in the Yucca and

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Frenchman Flats of the Nevada Proving Ground precludes the obtaining of valuable data on the effects of atomic weapons detonated in rough terrain and under other than ideal conditions.

That improved military participation could be obtained by more direct contact between the Exercise Director and the Test Manager, AEC Nevada Proving Ground, rather than the Exercise Director being required to communicate through AFSWP to the Test Manager.

That emphasis in future atomic weapons tests should be placed upon tactical operations rather than weapons effects in order to increase our knowledge of the tactical employment of nuclear weapons. Although a great deal of theoretical work has been done on the tactical employment of nuclear weapons, a great deal remains to be done. Ultimately, and with as little delay as possible, armored and infantry divisions should attack behind multiple atomic detonations which have been incorporated into a fire plan involving all of the conventional weapons. A vast amount of data is presently available on weapons effects.

That the assignment of a photodosimetry team and laboratory to Camp Desert Rock would have made more accurate and complete Rad-Safe operations in Exercise DESERT ROCK V.

That dependence upon Camp Mercury sources for photographic coverage of Exercise DESERT ROCK V is unsatisfactory.

XIV. RECOMMENDATIONS.

To improve future Exercises DESERT ROCK, it is recommended:

That the overpressure and thermal criteria used in this exercise be retained.

That the nuclear radiation tolerances be increased to permit maneuver closer to ground zero.

That troops entrenching positions be located no closer to ground zero than 3,500 to 4,000 yards.

That future exercises of this type include a volunteer observer program with a mission of indoctrination for officers having special weapons training or assignments in special weapons programs, and that such a program be expanded to include larger numbers and less stringent prerequisites for participants.

That future exercises include attacks against fortified positions located in rough terrain, utilizing stockpile weapons that would be used under similar conditions in combat where possible.

That future exercises employ standard atomic weapons under adverse weather conditions to determine the effectiveness of these weapons under such weather conditions from offensive and defensive points of view.

That Department of the Army obtain the necessary authority to secure and utilize limited numbers of stockpile weapons in exercises for which it is completely responsible and which are free from artificial test detonations, equipment and electronic measuring devices.

That planning be started for a large scale exercise, employing two or more divisions attacking a simulated enemy after detonations of multiple burst of stockpile weapons and in conjunction with the coordinated fire of conventional weapons.

That the Department of Defense take steps to have greater emphasis placed upon tactical operations and troop participation in any future test series scheduled by the AEC.

That the Exercise Director for future exercises DESERT ROCK be made a deputy to the Test Manager in order to have direct contact on all matters pertaining to troop participation and tactical operations.

That steps be taken to obtain items of display equipment through technical service channels at least 4 months prior to the first shot.

That the quotas for troop observers and RCT's be held at the same level as quotas for Exercise DESERT ROCK V; that is, a maximum of 600 troop observers and two (2) RCT's with a strength of 1,200 each.

That in future exercises a photodosimetry team and laboratory be assigned to Camp Desert Rock.

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That steps be taken to obtain AEC permission for Camp Desert Rock photographers to cover Exercise DESERT ROCK activities within the Nevada Proving Ground, with the complete understanding that all photographs will be developed and classified within the Nevada Proving Ground and in conjunction with AEC personnel.

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HQ CAMP DESERT ROCK
LAS VEGAS (872536) NEV
211200 April 1953

Annex 1 (Model Copy of Operations Order)

Opn O 4 EXERCISE DESERT ROCK V

Maps: Scale 1: 50,000

Cane Spring	2757	I	Mercury	2857	III
Specter Range	2757	II	Papoose Lake	2858	III
Tippipah Spring	2758	II	Frenchman Lake	2857	IV

Task Organization:

Exercise Director - Brig Gen W. C. Bullock
Control Group Commander - Col E. F. Thelen
Observer Group Commander - Capt H. I. Jones

BCT ABLE

1 BCT (- 1 Inf Co and 1 Armd Co) Second Army
1 Inf Co and 1 Armd Co from Sixth Army

BCT BAKER

1 BCT (- 2 Inf Co and 1 Armd Co) Fifth Army
2 Inf Co and 1 Armd Co from Fourth Army

1. a. None

b. Tactical Situation: See Annex 1

c. Atomic Energy Commission detonates UPSHOT # 7 Nuclear Explosion, D-Day, H-Hour, in which approximately 3,000 Army troops and special observers will participate.

2. a. Hq Camp Desert Rock will conduct Exercise DESERT ROCK V, D-Day, H-Hour at the Nevada Proving Grounds to:

(1) Provide indoctrination training in the tactical employment of atomic weapons and the effects of such weapons on personnel and equipment.

(2) Provide realistic training for tactically disposed units supported by atomic weapons.

(3) Provide realistic training in essential protective measures.

(4) Determine physiological reaction of participating troops.

(5) Demonstrate the effects of the explosion on animals at selected distances from ground zero.

(6) Demonstrate the effects of the explosion on many types of ground force equipment at varying distances from ground zero.

b. D-Day and H-Hour to be announced.

3. a. Control Group

(1) Consists of personnel and vehicles as indicated in Annex 3.

(2) Move to forward area in accordance with Annex 2 (March Table).

(3) Provide commentary of events over PA System at entrenchment area from H-60 to H-5 minutes.

(4) Implement provisions of Annexes 1, 5, 6, 7, 8, and 9.

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(5) Participate in Exercise Desert Rock in accordance with Annex 4 (Schedule of Events).

b. Observer Group

(1) Consists of personnel and vehicles as indicated in Annex 3.

(2) Move to forward area in accordance with Annex 2 (March Table).

(3) Participate in Exercise Desert Rock in accordance with Annex 4 (Schedule of Events).

c. BCT ABLE (Second and Sixth Army Troops)

(1) Familiarize all personnel with the general and special situation and special exercise maneuver (Annex 1).

(2) Move to entrenchment area in accordance with Annex 2, (March Table) occupy previously prepared defensive positions. Attack on order, seize "Objective One" in zone. (See Annex 1). Prepare to continue attack on order.

(3) Participate in Exercise Desert Rock in accordance with Annexes 1 through 9.

d. BCT BAKER (Fourth and Fifth Army Troops)
Same as BCT ABLE above.

x. (1) Muster as directed in Annex 4 (Schedule of Events).

(2) All personnel will carry gas masks and film badges and be familiar with provisions of Rad-Safe Plan, Annex 7.

(3) All personnel will be familiar with provisions of Evacuation Plan, Annex 9.

(4) All personnel will enter trenches at H-10 minutes on order of Exercise Director.

(5) All personnel will be informed that two (2) minutes prior to H-Hour, a 30 second siren signal will be sounded. At this time the Exercise Director will order all participants to crouch in the trenches well below the surface of the ground, and remain in that position until the announcement to rise is made over the PA System.

(6) Positive control measures will be exercised by officers in charge of vehicles and march units during movement by motor to and from the forward area. During foot marches, personnel control will be exercised by BCT and company commanders.

(7) The officer and/or officers in charge of observer groups will maintain control of this group during motor march and walk through exercise area.

(8) Personnel will be cautioned not to pick up items in the equipment display area or in vicinity of ground zero.

(9) Animals in the display area will not be molested by observers or troops.

4. a. Current administrative instructions apply.

b. Transportation

(1) Vehicles and drivers name, as required, will be furnished by AC of S, G4.

(2) Vehicles will bear number and signs as indicated in Annex 3 (Personnel and vehicles).

(3) One (1) water trailer will be included at the end of the second march unit of each BCT. The vehicle towing the water trailer is an auxilary in event of a breakdown in order that personnel can continue to or from the test area.

(4) Two (2) wreckers will be located at the rear of the observer march unit. Vehicles breaking down during movement to test area will be moved to side of road and remain there until return to Camp Desert Rock, at which time wreckers will tow all non-operative vehicles to Camp Desert Rock. Vehicles breaking down at entrenchment area will be towed to

parking area. Wreckers will tow vehicles to Camp Desert Rock only after all march units have started return trip to camp.

(5) Vehicles in march units will have headlights turned on during day or night movement. Motors will be turned off at H-30 minutes.

(6) Drivers will dim headlights when passing through AFC check points at gates 1, 2 and 3 during night movement.

c. Medical - See Annex 8

(1) Aid station will be established in the vicinity of Parking Area A (838922).

(2) Litter equipped helicopter will be available in vicinity of aid station for evacuation purposes.

d. Uniform and Equipment

(1) Individual participants and non-tactical troops:

Fatigues
Combat Boots or Service Shoes
Field Jacket
Gloves, leather w/inserts
Pistol Belt
Canteen w/cover and cup. (Containing water)
First aid packet and pouch
Gas Mask
Helmet, steel, with liner

(2) Troops

Same as above. Carry individual weapons.

e. The G4 will distribute sandwich lunches to participating troops in the forward area prior to H-60 minutes. Troops will not eat in contaminated areas. Observer personnel will draw lunches from mess hall where they regularly mess.

5. a. SOI # 1 Annex 6

b. Forward CP, CDR opens H-60 minutes at entrenchment area control trench.

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ANNEXES:
1 Tactical Situation
2 March Table
3 Personnel and Vehicles
4 Schedule of Events
5 MP Control
6 Signal
7 Rad-Safe
8 Medical
9 Evacuation Plan
10 Evaluation Plan

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HQ CAMP DESERT ROCK
LAS VEGAS (872536) NEV
211200 April 1953

Annex 1 (TACTICAL SITUATION) to Opn O 4
EXERCISE DESERT ROCK V

1. General Situation

a. Enemy

(1) After a successful airborne landing in Southern Nevada during mid December, Aggressor Forces, an airborne army consisting of three (3) airborne corps, forced Third Army to take up the defense in the vicinity of Las Vegas.

(2) By 1 Jan 1953, Aggressors overwhelming strength caused a weakened Third Army to conduct a retrograde movement southwestward along Highway 91 towards Barstow, California. A rapid build up by Third Army in the Barstow area was completed by 15 Jan, causing Aggressor Forces to assume the defensive.

(3) By 19 April Aggressor Forces had fallen back to an organized defensive position on the Yucca Valley Floor. A second defensive line was being prepared in the Quartzite Mountain Gap Area. (See Appendix A, Site Overlay).

b. Friendly

(1) On 1 Feb 1953, after a build up in the Barstow Area, Third Army launched a counter offensive with the mission of recapturing Las Vegas and continuing the attack north to destroy the enemy forces.

(2) Aggresson Forces opposing Third Army have been executing a delaying action and by 19 April had fallen back to an organized defensive position on the Yucca Valley Floor, anchored on the Banded Mountain Ranges on the east and extending to the west and east thereof.

(3) After regrouping CG Third Army plans to resume the attack on 25 April to breach the enemy defenses in the west of his zone using atomic missiles to support the attack.

2. Special Situation:

a. V Corps, west (L) corps of the Third Army, consisting of the 10th and 40th Infantry Divisions on line and the 13th Armored and the 45th Infantry Division in reserve, will make the main effort of the Third Army to breach enemy defenses on the Yucca Valley Floor and be prepared to continue the attack to the northeast. V Corps regrouping for the attack will be completed night of 24-25 April.

b. During the past 96 hours, Aggressor has been conducting probing attacks as both sides continued to strengthen their forces. Intelligence sources indicate a lucrative enemy target, justifying the use of atomic missiles, will present itself during the period 24-25 April. V Corps has been alloted seven (7) atomic weapons to support the attack. Two (2) Mk 9 (Arty), three (3) Mk 6 (Air) and two (2) XW 7 (SSM) missiles are included in the allotted number. A battery of very heavy artillery (280 MM) and a Corporal Battery (SSM) will be available to support the attack.

3. Scheme of Maneuver:

a. V Corps conducts an offensive 25 April at H-Hour. The attack will be preceded by an artillery preparation followed by the shelling of Aggressor Forces with atomic projectiles.

b. V Corps will breach the first defensive zone and seize objectives short of the second defensive line. On seizure of these objectives, V Corps will use additional atomic weapons at points against the second defensive zone where a rupture is desired and make maximum use of the atomic support with a rapid continuation of the attack by infantry divisions which will insure the penetration of the final defensive zone. At this time, V Corps will pass through the gap to seize objectives to the northeast.

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c. The 10th Inf Division on the east (R) will make the main effort of the Corps. In mapping his scheme of manuever, CG 10th Inf Div will organize a hard striking force (30th Inf Regt (mtz) reinforced with armor and other necessary combat and service attachments) capable of indepenient action to attack deep objectives. The initial attack will be made with the 28th and 29th Inf Regts abreast, 28th Inf on the west (L) making the main effort of the division immediately following the atomic attack on the first defensive line.

d. Objectives 1 and 2, north of the defensive line, will be seized by the 28th and 29th Inf Regts when the zone is breached. When rupture of the defensive line is complete, the 30th Inf (Reinf) will be committed through the gap to seize Objective 3. The remainder of of the division will continue to mop up enemy resistance in zone.

e. On Corps order, an atomic attack on the final defensive line will be exploited by a division attack in an effort to breach the line. The main effort will be made by the 30th Inf on the west (L). Upon breaching the final defensive line and seizure of Objectives 4, 5, and 6, the 10th Inf Div will assist the passage of the armored and infantry (mtz) divisions through the Quartzite Mountain Gap and mop up enemy pockets of resistance by-passed by the exploiting force.

4. Special Exercise:

a. Participating troops, BCT ABLE (Second and Sixth Army Troops) and BCT BAKER (Fourth and Fifth Army Troops) are attached to 10th Inf Div and will be identified as the 28th Inf Regt.

b. BCT's will occupy prepared positions on the Yucca Valley Floor 4,000 yards from Ground Zero (Shot Tower), prior to H-hour on D-Day.

c. Shortly after the atomic explosion and on order of the Exercise Director, the BCT's will attack to seize Objective 1 in zone. On seizure of the objective and/or on order of the control officer BCT's will pass through the equipment and animal display area in an administrative march formation towards the rear to awaiting transportation for return journey to Camp Desert Rock.

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APPENDIX:
A - Situation Overlay
B - BCT's Route of Attack

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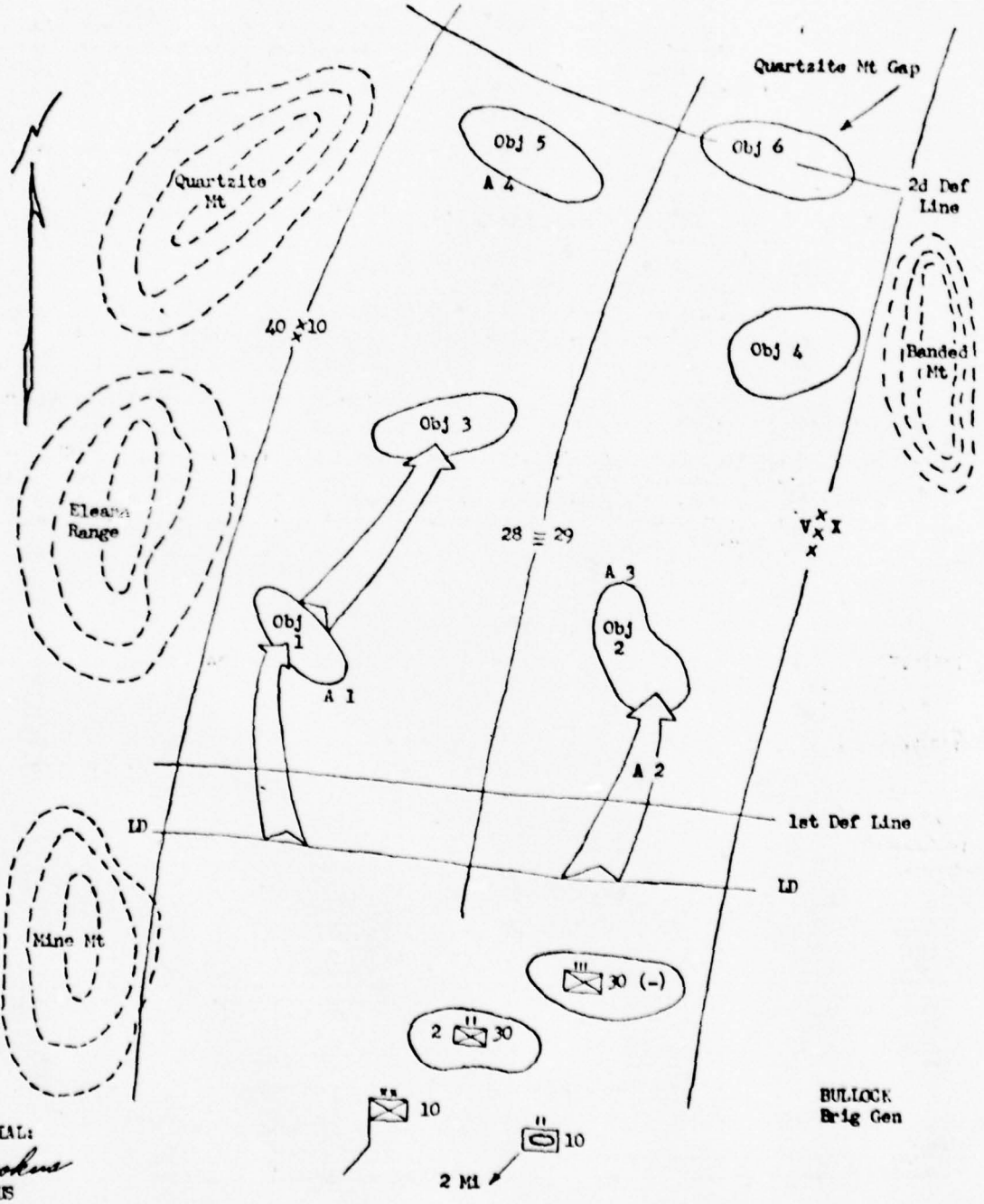
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Appendix A (SITUATION OVERLAY) to Annex 1 (Tactical Situation) to Opn O 4
EXERCISE DESERT ROCK V



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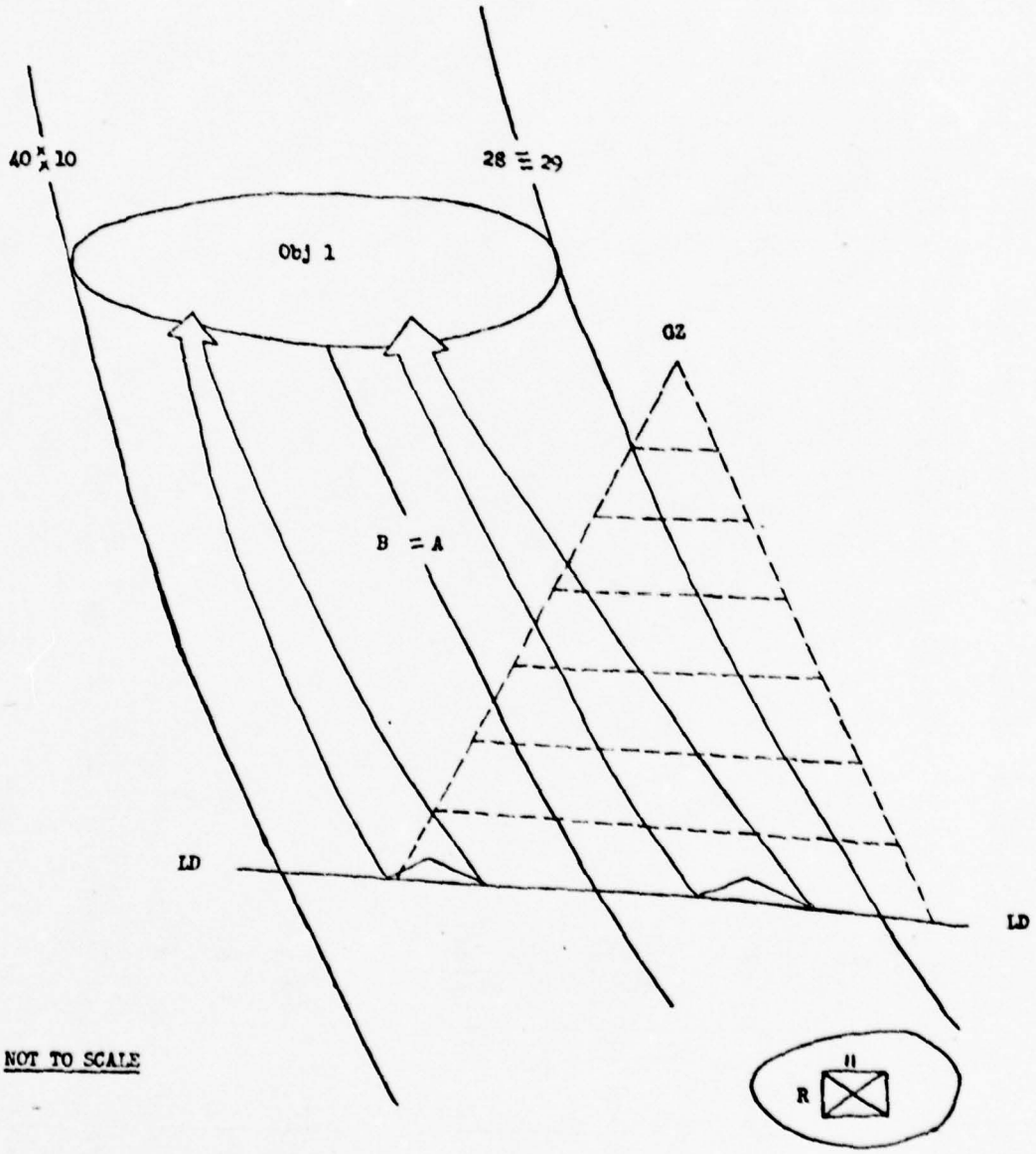
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Appendix B (RCT's ROUTE OF ATTACK) to Annex 1 (Tactical Situation) to Opn O 4
EXERCISE DESERT ROCK V



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Ar[illegible] 2 (MARCH TABLE) to Opn O 4
EXERCISE DESERT ROCK V

UNIT	FROM	TO	SPEED MPH	TIME LENGTH	TIME OF MOVEMENT	ARRIVE	CLEAR	CLOSE
Control	CDR	IP	15	3	H-240	H-236	H-233	
Group	IP	C.G. #1	25	3		H-230	H-227	
	C.G. #1	C.G. #2	25	3		H-222	H-219	
	C.G. #2	RJ 36	30	3		H-202	H-199	
	RJ 36	CP of AEC	30	3		H-182	H-179	
	CP of AEC	C.P. #3	25	3		H-178	H-175	
	C.P. #3	RJ 20	25	3		H-170	H-167	
	RJ 20	RJ 32	10	3		H-163	H-160	
	RJ 32	RJ 22	8	3		H-160	H-157	
	RJ 22	RJ 23	8	3		H-155	H-152	
	RJ 23	Parking Area	8	3	H-140	H-110		H-107
	RJ 23	RJ 20	10	3	H/200	H/215	H/218	
	RJ 20	C.P. #3	25	3		H/223	H/226	
	C.P. #3	C.G. #2	30	3		H/269	H/272	
	C.G. #2	C.G. #1	25	3		H/275	H/278	
	C.G. #1	IP	25	3		H/281	H/284	
	IP	CDR	15	3		H/285		H/288
BCT	CDR	IP	15	3	H-225	H-221	H-218	
(BAKER	IP	C.G. #1	25	3		H-215	H-212	
(1)	C.G. #1	C.G. #2	25	3		H-209	H-206	
	C.G. #2	RJ 36	30	3		H-187	H-184	
	RJ 36	CP of AEC	30	3		H-167	H-164	
	CP of AEC	C.P. #3	25	3		H-163	H-160	
	C.P. #3	RJ 20	25	3		H-155	H-152	
	RJ 20	RJ 32	10	3		H-148	H-145	
	RJ 32	RJ 22	8	3		H-145	H-142	
	RJ 22	RJ 23	8	3		H-140	H-137	
	RJ 23	Parking Area	8	3	H-120	H-90		H-87
	RJ 23	RJ 20	10	3	H/160	H/175	H/178	
	RJ 20	C.P. #3	25	3		H/183	H/186	
	C.P. #3	C.G. #2	30	3		H/229	H/232	
	C. G. #2	C.G. #1	25	3		H/235	H/238	
	C.G. #1	IP	25	3		H/241	H/244	
	IP	CDR	15	3		H-245		H/248
BCT	CDR	IP	15	3	H-215	H-211	H-208	
(BAKER)	IP	C.G. #1	25	3		H-208	H-205	
(2)	C.G. #1	C.G. #2	25	3		H-202	H-199	
	C.G. #2	RJ 36	30	3		H-180	H-177	
	RJ 36	CP of AEC	30	3		H-160	H-157	
	CP of AEC	C.P. #3	25	3		H-156	H-153	
	C.P. #3	RJ 20	25	3		H-148	H-145	
	RJ 20	RJ 32	10	3		H-141	H-138	
	RJ 32	RJ 22	8	3		H-138	H-135	
	RJ 22	RJ 23	8	3		H-133	H-130	
	RJ 23	Parking Area	8	3	H-111	H-81		H-78
	RJ 23	RJ 20	10	3	H/170	H/185	H/188	
	RJ 20	C.P. #3	25	3		H/193	H/196	
	C.P. #3	C.G. #2	30	3		H/239	H/242	
	C.G. #2	C.G. #1	25	3		H/245	H/248	
	C.G. #1	IP	25	3		H/251	H/254	
	IP	CDR	15	3		H/255		H/258
BCT								
(ABLE)	CDR	IP	15	3	H-206	H-196	H-193	
(1)	IP	C.G. #1	25	3		H-190	H-187	
	C.G. #1	C.G. #2	25	3		H-184	H-181	
	C.G. #2	RJ 36	30	3		H-162	H-159	
	RJ 36	CP of AEC	30	3		H-142	H-139	
	CP of AEC	C.P. #3	25	3		H-138	H-135	

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UNIT	FROM	TO	SPEED MPH	TIME LENGTH	TIME OF MOVEMENT	ARRIVE	CLEAR	CLOSE
	C.P. #3	RJ 20	10	3		H-130	H-127	
	RJ 20	RJ 32	8	3		H-123	H-120	
	RJ 32	RJ 22	8	3		H-120	H-117	
	RJ 22	RJ 23	8	3		H-115	H-112	
	RJ 23	Parking Area	8	3	H-95	H-65		H-62
	RJ 23	RJ 20	10	3	H/180	H/195	H/198	
	RJ 20	C.P. #3	25	3		H/203	H/206	
	C.P. #3	C.G. #2	30	3		H/249	H/252	
	C.G. #2	C.G. #1	25	3		H/255	H/258	
	C.G. #1	IP	25	3		H/261	H/264	
	IP	CDR	15	3		H/265		H/268
BCT (ABLE) (2)	CDR	IP	15	3	H-190	H-186	H-183	
	IP	C.G. #1	25	3		H-180	H-177	
	C.G. #1	C.G. #2	25	3		H-174	H-171	
	C.G. #2	RJ 36	30	3		H-152	H-149	
	RJ 36	CP of AEC	30	3		H-132	H-129	
	CP of AEC	C.P. #3	25	3		H-128	H-125	
	C.P. #3	RJ 20	10	3		H-120	H-117	
	RJ 20	RJ 32	8	3		H-113	H-110	
	RJ 32	RJ 22	8	3		H-110	H-107	
	RJ 22	RJ 23	8	3		H-105	H-102	
	RJ 23	Parking Area	8	3	H-85	H-55		H-52
	RJ 23	RJ 20	10	3	H/190	H/205	H/208	
	RJ 20	C.P. #3	25	3		H/213	H/216	
	C.P. #3	C.G. #2	30	3		H/259	H/262	
	C.G. #2	C.G. #1	25	3		H/265	H/268	
	C.G. #1	IP	25	3		H/271	H/274	
	IP	CDR	15	3		H/275		H/278
OBSERVER	CDR	IP	15	3	H-175	H-171	H-168	
	IP	C.G. #1	25	3		H-165	H-162	
	C.G. #1	C.G. #2	25	3		H-159	H-156	
	C.G. #2	RJ 36	30	3		H-137	H-134	
	RJ 36	CP of AEC	30	3		H-117	H-114	
	CP of AEC	C.P. #3	25	3		H-113	H-103	
	C.P. #3	RJ 20	10	3		H-105	H-102	
	RJ 20	RJ 32	8	3		H-98	H-95	
	RJ 32	RJ 22	8	3		H-95	H-92	
	RJ 22	RJ 23	8	3		H-90	H-87	
	RJ 23	Parking Area	8	3	H-75	H-45		H-42
	RJ 23	RJ 20	10	3	H/125	H/140	H/143	
	RJ 20	C.P. #3	25	3		H/148	H/151	
	C.P. #3	C.G. #2	30	3		H/194	H/197	
	C.G. #2	C.G. #1	25	3		H/200	H/203	
	C.G. #1	IP	25	3		H/206	H/209	
	IP	CDR	15	3		H/210		H/213
VIP's	CDR	IP	30	1	H-126	H-124	H-123	
	IP	C.G. #1	50	1		H-122	H-121	
	C.G. #1	C.G. #2	30	1		H-118	H-117	
	C.G. #2	RJ 36	50	1		H-105	H-104	
	RJ 36	CP of AEC	50	1		H-94	H-93	
	CP of AEC	C.P. #3	30	1		H-91	H-90	
	C.P. #3	RJ 20	30	1		H-84	H-83	
	RJ 20	RJ 32	20	1		H-81	H-80	
	RJ 32	RJ 22	10	1		H-79	H-78	
	RJ 22	RJ 23	10	1		H-75	H-74	
	RJ 23	Parking Area	10	1		H-50		H-49
	RJ 23	RJ 20	20	1	H/120	H/129	H/130	
	RJ 20	C.P. #3	30	1		H/136	H/137	
	C.P. #3	C.G. #2	50	1		H/163	H/164	
	C.G. #2	C.G. #1	30	1		H/167	H/168	
	C.G. #1	IP	50	1		H/168	H/169	

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UNIT	FROM	TO	SPEED MPH	TIME LENGTH	TIME OF MOVEMENT	ARRIVE	CLEAR	CLOSE
	IP	CDR	30	1		H/171		H/172

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HQ CAMP DESERT ROCK
LAS VEGAS (872536) NEV
211200 April 1953

Annex 3 (VEHICLES AND PERSONNEL) to Opn O 4
EXERCISE DESERT ROCK V

CONTROL GROUP

March Unit 1	Vehicle #1	1/4 Ton (MP)
1. DAVISON, R. G.	Pvt	Driver
2. STAPLER, J. S.	Lt	Veh Commander
	Vehicle #2	1/4 Ton (DPCO)
1. RIDGEMOND, G. E.	Cpl	Driver
2. THELEN, E. F.	Col	Veh Commander
	Vehicle #3	1/2 Ton (G 3)
1. DODGE, M. C.	Cpl	Driver
2. SHOOKUS, A. H.	Lt Col	Veh Commander
	Vehicle #4	3/4 Ton (G3 Sect)
1. FLEMMING, P. Jr.	Pfc	Driver
2. ENOCH, R. D.	Capt	Veh Commander
3. ALLEN, L. B.	WOJG	
4. RAMIL, A	MSgt	
5. PATTON, R. E.	Pfc	
6. KERN, K. R.	Pfc	
	Vehicle #5	1/4 Ton (RAD)
1. NEPTUNE, J. L.	Cpl	Driver
2. JAMISON, T. L.	2nd Lt	
3. BARTA, E.	Col	Veh Commander
4. FRISTEDT, P. M.	Pfc	Radio
	Vehicle #6	1/4 Ton (RAD)
1. SAGE, K. O.	Cpl	Driver
2. COOKE, C. W.	Maj	Veh Commander
3. MOREFIELD, G. S.	2nd Lt	
4. DUNCAN, R. T.	Pfc	Radio
	Vehicle #7	1/4 Ton (RAD)
1. STUGLIK	Pfc	Driver
2. RAVICZ, A. E.	2nd Lt	Veh Commander
	Vehicle #8	1/4 Ton (RAD)
1. JOHNSON, D.	Pfc	Driver
2. HALL, H. B.	Capt	Veh Commander
3. KAUL, L. K.	Cpl	Radio
	Vehicle #9	1/4 Ton (RAD)
1. BRUNNI, R. R.	Sgt	Driver
2. WHEELER,	Capt	Veh Commander
3. CLOUSE	Cpl	Radio
	Vehicle #10	3/4 Ton (RAD)
1. PRIVOTT, G.	Cpl	Driver

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	Vehicle #10	3/4 Ton (RAD)
1. WALTON, C.	Pvt	
3. FOULKES, J. L.	Cpl	Veh Commander
4. PEREZ, I. S.	Pfc	
	Vehicle #11	3/4 Ton (RAD)
1. GRAVES, C. M.	Pfc	Driver
2. UNDERWOOD, T. J.	Sgt	Veh Commander
3. HAMBY, C. H.	Pvt	
4. EBERHARDT, R. L.	Pvt	
	Vehicle #12	1/4 Ton (TC)
1. MOORMAN, H.	Sgt	Driver
2. DUVAL, H. E.	Maj	Veh Commander
	Vehicle #13	Bus 29 Pass (RAD SAFETY GP)
1. SALUADO, F. Q.	Cpl	Driver
2. VALDEZ, A. G.	Sgt	
3. TURNER, L. R.	Pvt	
4. WASHINGTON, J. C.	Pvt	
5. BEAUDOIN, J. F.	Pfc	
6. HOHNSTINE, C. W.	Pfc	
7. LUND, G. C.	Sgt	
8. MESA, J. A.	Pfc	
9. ALMARAZ, C.	Pfc	
10. DANIELS, E.	Pvt	
11. FISHBURNE, E.	Pvt	
12. BOHNERT, W. M.	Pfc	
13. MCCAULLEY, S. W.	Pvt	
14. HARRISON, D.	Pvt	
15. WHEELER, A. A.	Pvt	
CARROLL, R. O.	Sgt	
17. LIME, F. A.	Pvt	
18. CICHY, C.	Pfc	
19. GUY, C.	Sgt	
20. BOWMAN, W. F.	Pfc	
21. MAKAULA, J. K.	Pfc	
22. MUTH, R. W.	Col	Veh Commander
	Vehicle #14	Ambulance
1. JACKSON, R. F.	Cpl	Driver
2. DICE, W. D.	Lt Col	Veh Commander
	Vehicle #15	Ambulance
1. FRIES, R. L.	Sgt	Driver
2. PETERSON, F. R.	Capt	Veh Commander
3. GUTIERREZ, R.	SFC	
4. OLIVER, M. M.	SFC	
5. HARRIS, R. L.	Sgt	
6. SHUFORD, H.	Cpl	
	Vehicle #16	3/4 Ton (Air Sec)
1. FINCH, R. H.	Pfc	Driver
2. FELIX, R. L.	Lt	Veh Commander
3. PODY, E. J.	Lt	
	Vehicle #17	3/4 Ton (PA & Instr)
1. BRADSHAW, M. J.	Cpl	Driver
2. SCHIFFMAN, M. K.	Lt Col	Veh Commander

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	Vehicle #18	**3/4 Ton (PA & Instr)**
1. CRAWLEY, W. G.	Cpl	Driver
2. OPPENHIMER, J. S.	Maj	Veh Commander
	Vehicle #19	**3/4 Ton (PA & Instr)**
1. MCBRIDY, A. E.	Cpl	Driver
2. HIRANO, R. M.	Capt	Veh Commander
	Vehicle #20	**3/4 Ton (PA & Instr)**
1. ROBINSON, J. A.	Pfc	Driver
2. HARTNELL, G. W.	Lt	Veh Commander
	Vehicle #21	**3/4 Ton (Volunteer)**
1. MILTON, L.	Pvt	Driver
	Vehicle #22	**3/4 Ton (Volunteer)**
1. MARTIN, O. T.	Cpl	Driver
	Vehicle #23	**3/4 Ton (Volunteer)**
1. MACKEY, W. V.	Pfc	Driver
	Vehicle #24	**5 Ton Van (QM)**
1. OSBORNE, W. W.	SFC	Driver
2. HAYES, W. G.	Sgt	Veh Commander
	Vehicle #25	**2 1/2 Ton (RAD)**
1. SOUTHHALL, C. H.	Pfc	Driver
2. STRECKER, E. H.	1st Lt	Veh Commander
3. GABRIEL, R. N.	Pfc	
4. PRITCHARD, B. L.	2nd Lt	
	Vehicle #26	**2 1/2 Ton (Cml)**
1. CHRISTY, N. P.	Cpl	Driver
2. SLATER, E.	Sgt	Veh Commander
3. ANDREWS, M. L.	Cpl	
4. BRYAN, R. G.	Cpl	
5. MANSFIELD, D. W.	Pfc	
6. ROBERSON, F. R.	Pvt	

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SECURITY INFORMATION

HQ CAMP DESERT ROCK
LAS VEGAS (872536) NEV
211200 April 1953

Annex 4 (SCHEDULE OF EVENTS) to Opn O 4
EXERCISE DESERT ROCK V

1. Camp Desert Rock Control Group

TENTATIVE TIME		ADJUSTED TIME	
2350	H - 280		March Unit commander will muster, check film badges, and have personnel entruck. Make five (5) corrected copies of Annex 3 (Personnel and Vehicles) and give to messenger. Messenger will leave 10 minutes before March Unit departs.
0030	H - 240		Depart Camp Desert Rock
0034	H - 236		Arrive IP
0040	H - 230		Arrive Control Gate # 1
0046	H - 224		Arrive Control Gate # 2
0108	H - 202		Arrive at RJ 36
0128	H - 182		Arrive at CP of AFC
0132	H - 178		Arrive at Control Point # 3
0140	H - 170		Arrive at RJ 20
0147	H - 163		Arrive at RJ 32
0150	H - 160		Arrive at RJ 22
0155	H - 155		Arrive at RJ 23 (Control Point for detrucking)
0210	H - 140		Vehicles depart for Parking Area A (837925). See Appendix A (Traffic Circulation)
0240	H - 110		Vehicles arrive at Parking Area A
0330	H - 60		Indoctrination and Orientation talk over the PA System.
0430	H - Hour		SHOT
0435	H ∤ 5		Rad-Safe teams depart to comply with Annex 7
ON L			Vehicles return to entrenchment area. See Appendix B (Traffic Circulation).
0500	H ∤ 30		Control Group depart entrenchment area for forward area. One officer to remain at CP at all times, keep in constant touch with CP of AFC.
0700	H ∤ 150		Control Group returns to entrenchment area
0710	H ∤ 160		Vehicle commander will muster and have personnel entruck
0750	H ∤ 200		Depart for Camp Desert Rock. Arrive at the following:
0805	H ∤ 215		RJ 20
0813	H ∤ 223		Control Point # 3
0859	H ∤ 269		Control Gate # 2
0905	H ∤ 275		Control Gate # 1
0911	H ∤ 281		IP
0915	H ∤ 285		CDR. Detruck and return film badges to issuing party.

2. a. BCT (BAKER) (1)

0005	H - 302		March Unit commander will muster, check film badges, and have personnel entruck. Make five (5) corrected copies of Annex 3 (Personnel and Vehicles) and give to messenger. Messenger will leave 10 minutes before March Unit departs.
0045	H - 225		Depart Camp Desert Rock. Arrive at the following:
0049	H - 221		IP
0055	H - 215		Control Gate # 1
0101	H - 209		Control Gate # 2
0123	H - 187		RJ 36
0143	H - 167		CP of AFC
0147	H - 163		Control Point # 3
0155	H - 155		RJ 20
0202	H - 148		RJ 32
0205	H - 145		RJ 22
0210	H - 140		RJ 23 (Control Point for detrucking)

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TENTATIVE TIME	ADJUSTED TIME	
0230	H - 120	Vehicles depart for Parking Area A (837925). See Appendix A (Traffic Circulation)
0300	H - 90	Vehicles arrive Parking Area A
0330	H - 60	Indoctrination and orientation talk over the PA System
0430	H - Hour	SHOT
0435	H ∕ 5	Rad-Safe depart to forward area to comply with Annex 7
ON CALL		Vehicles will return to entrenchment area. See Appendix B (Traffic Circulation)
0440	H ∕ 10	Attack on order of Exercise Director to secure objective as outlined in Annex 1 (Tactical Situation). The BCT commander will be equipped with radio and will be in constant contact with Rad-Safe Control Officer and Exercise Director. Instructions pertaining to limit of advance will be forthcoming from Exercise Director.
0610	H ∕ 100	Depart objective area for walk through equipment display area.
0630	H ∕120	March Unit commanders will muster and entruck personnel. Radio contact, via MP jeep, will be used to notify CP when all personnel are accounted for an entrucked. CP will give order to depart.
0710	H ∕ 160	Depart for CDR. Arrive at the following:
0725	H ∕ 175	RJ 20
0733	H ∕ 183	Control Point # 3
0819	H ∕ 227	Control Gate # 2
0825	H ∕ 235	Control Gate # 1
0831	H ∕ 241	IP
0835	H ∕ 245	CDR. Detruck personnel and return film badges to issuing party.

2. b. BCT (BAKER)(2)

0015	H - 255	March Unit commander will muster, check film badges and have personnel entruck. Make five (5) corrected copies of Annex 3 (Personnel and Vehicles) and give to messenger. Messenger will leave 10 minutes before March Unit departs.
0055	H - 215	Depart Camp Desert Rock. Arrive at the following:
0059	H - 211	IP
0105	H - 208	Control Gate # 1
0111	H - 202	Control Gate # 2
0133	H - 180	RJ 36
0153	H - 160	CP of AEC
0157	H - 156	Control Point # 3
0205	H - 148	RJ 20
0212	H - 141	RJ 32
0215	H - 138	RJ 22
0220	H - 133	RJ 23 (Control Point for detrucking)
0240	H - 111	Vehicles depart for Parking Area A (837925). See Appendix A (Traffic Circulation).
0310	H - 81	Vehicles arrive Parking Area A.
0330	H - Hour	SHOT
0435	H ∕ 5	Rad-Safe depart to forward area to comply with Annex 7.
ON CALL		Vehicles will return to entrenchment area. See Appendix B (Traffic Circulation).
0440	H ∕ 10	Attack on order of Exercise Director to secure objective as outlined in Annex 1 (Tactical Situation). The BCT commander will be equipped with radio and will be in constant contact with Rad-Safe Control Officer and Exercise Director. Instructions pertaining to limit of advance will be forthcoming from Exercise Director.
0610	H ∕ 100	Depart objective area for walk through equipment display area.
0640	H ∕ 130	March Unit commanders will muster and entruck personnel. Radio contact, via MP jeep, will be used to notify CP when all personnel are accounted for and entrucked. CP will give order to depart.
0720	H ∕ 170	Depart for CDR. Arrive at the following:

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TENTATIVE TIME		ADJUSTED TIME	
0735	H / 185		RJ 20
0743	H / 193		Control Point # 3
0829	H / 239		Control Gate # 2
0835	H / 245		Control Gate # 1
0841	H / 251		IP
0845	H / 255		CDR. Detruck personnel and return film badges to issuing party.

2. c. BCT (ABLE) (1)

0030	H - 240		March Unit commander will muster, check film badges and have personnel entruck. Make five (5) corrected copies of Annex 3 (Personnel and Vehicles) and give to messenger. Messenger will leave 10 minutes before March Unit departs.
0110	H - 200		Depart CDR. Arrive at the following:
0114	H - 196		IP
0120	H - 190		Control Gate # 1
0126	H - 184		Control Gate # 2
0148	H - 162		RJ 36
0208	H - 142		CP of AEC
0212	H - 138		Control Point # 3
0220	H - 130		RJ 20
0227	H - 123		RJ 32
0230	H - 120		RJ 22
0235	H - 115		RJ 23 (Control Point for detrucking)
0255	H - 95		Vehicles depart for Parking Area A (837925). See Appendix A (Traffic Circulation)
0325	H - 65		Vehicles arrive Parking Area A
0330	H - 60		Indoctrination and orientation talk over the PA System.
0430	H - Hour		SHOT
0435	H / 5		Rad-Safe teams depart to forward area to comply with Annex 7.
ON CALL			Vehicles will return to entrenchment area. See Appendix B (Traffic Circulation)
0440	H / 10		Attack on order of Exercise Director to secure objective as outlined in Annex 1 (Tactical Situation). BCT commander will be equipped with radio and will be in constant contact with Rad-Safe Control Officer and Exercise Director. Instructions pertaining to limit of advance will be forthcoming from Exercise Director.
0610	H / 100		Depart objective area for walk through equipment display.
0650	H / 140		March Unit commander will muster and entruck personnel. Radio contact, via MP jeep, will be used to notify CP when all personnel are accounted for and entrucked. CP will give order to depart.
0730	H / 180		Depart for CDR. Arrive at the following:
0745	H / 195		RJ 20
0753	H / 203		Control Point # 3
0839	H / 249		Control Gate # 2
0845	H / 255		Control Gate # 1
0851	H / 261		IP
0855	H / 265		CDR. Detruck personnel and return film badges to issuing party.

2. d. BCT (ABLE) (2)

0040	H - 230		March Unit commander will muster, check film badges, and have personnel entruck. Make five (5) corrected copies of Annex 3 (Vehicles and Personnel) and give to messenger. Messenger will leave 10 minutes before March Unit departs.
0120	H - 190		Depart CDR. Arrive at the following:
0124	H - 186		IP
0130	H - 180		Control Gate # 1
0136	H - 174		Control Gate # 2

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TENTATIVE TIME		ADJUSTED TIME	
0158	H - 152		RJ 36
0218	H - 132		CP of AEC
0222	H - 128		Control Point # 1
0230	H - 120		RJ 20
0237	H - 113		RJ 32
0240	H - 110		RJ 22
0245	H - 105		RJ 23 (Control Point for detrucking)
0305	H - 85		Vehicles depart for Parking Area A (837926). See Appendix A (Traffic Circulation)
0330	H - 60		Indoctrination and orientation talk over the PA System.
0335	H - 55		Vehicles arrive Parking Area A.
0430	H - Hour		SHOT
0435	H ∤ 5		Rad-Safe teams depart to forward area to comply with Annex 7.
ON CALL			Vehicles will return to entrenchment area. See Appendix B (Traffic Circulation).
0440	H ∤ 10		Attack on order of Exercise Director to secure objective as outlines in Annex 1 (Tactical Situation). BCT commander will be equipped with radio and will be in constant contact with Rad-Safe Control Officer and Exercise Director. Instructions pertaining to limit of advance will be forthcoming from Exercise Director.
0610	H ∤ 100		Depart objective area for walk through equipment display.
0700	H ∤ 150		March Unit commander will muster and entruck personnel. Radio contact, via MP jeep, will be used to notify CP when all personnel are accounted for and entrucked. CP will give order to depart.
0740	H ∤ 190		Depart CDR. Arrive at the following:
0755	H ∤ 205		RJ 20
0803	H ∤ 213		Control Point # 3
0849	H ∤ 259		Control Gate # 2
0855	H ∤ 265		Control Gate # 1
0901	H ∤ 271		IP
0905	H ∤ 275		CDR. Detruck personnel and return film badges to issuing party.

3. Observers.

0055	H - 215		March Unit commander will muster, check film badges, and have personnel entruck. Make five (5) corrected copies of Annex 3 (Vehicles and Personnel) and give to messenger. Messenger will leave 10 minutes before March Unit departs.
0135	H - 175		Depart CDR. Arrive at the following:
0139	H - 171		IP
0145	H - 165		Control Gate # 1
0151	H - 159		Control Gate # 2
0213	H - 137		RJ 36
0233	H - 117		CP of AEC
0237	H - 113		Control Point # 3
0245	H - 105		RJ 20
0252	H - 98		RJ 32
0255	H - 95		RJ 22
0300	H - 90		RJ 23 (Control Point for detrucking)
0315	H - 75		Vehicles depart for Parking Area A (837925). See Appendix A (Traffic Circulation)
0330	H - 60		Indoctrination and orientation over the PA System.
0345	H - 45		Vehicles arrive Parking Area A.
0430	H - Hour		SHOT
ON CALL			Vehicles will return to entrenchment area. See Appendix B (Traffic Circulation).
0500	H ∤ 30		Leave entrenchment area for walk through display area.
0600	H ∤ 90		Personnel will brush off, be mustered and entruck. Radio contact, via MP jeep, will be used to notify CP when all personnel are accounted for and entrucked. CP will give order to depart the test area.

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TENTATIVE TIME		ADJUSTED TIME	
0635	H ∕ 125		Depart for CDR. Arriving at the following:
0650	H ∕ 140		RJ 20
0658	H ∕ 148		Control Point # 3
0744	H ∕ 194		Control Gate # 2
0750	H ∕ 200		Control Gate # 1
0756	H ∕ 206		IP
0800	H ∕ 210		CDR. Detruck and return film badges to issuing party.

4. VIP's.

March Unit commander will muster, check film badges, and have personnel entruck. Make five (5) corrected copies of Annex 3 (Vehicles and Personnel) and give to messenger. Messenger will leave 10 minutes before March Unit departs.

0224	H - 126		Depart CDR. Arrive at the following:
0226	H - 124		IP
0228	H - 122		Control Gate # 1
0232	H - 118		Control Gate # 2
0245	H - 105		RJ 36
0256	H - 94		CP of AEC
0259	H - 91		Control Point # 3
0306	H - 84		RJ 20
0309	H - 81		RJ 32
0311	H - 79		RJ 22
0315	H - 75		RJ 23 (Control Point for detrucking)
0320	H - 70		Vehicles depart for Parking Area A (837925). See Appendix A (Traffic Circulation).
0330	H - 60		Indoctrination and orientation over the PA System.
0345	H - 45		Vehicles arrive Parking Area A.
0430	H - Hour		SHOT
CP CALL			Vehicles will return to entrenchment area. See Appendix B Traffic Circulation)
0500	H ∕ 30		Leave entrenchment area for walk through display area.
0600	H ∕ 90		Personnel will be brushed off, mustered and entrucked. Radio contact, via MP jeep, will be used to notify CP when all personnel are accounted for and entrucked. CP will give order to depart the test area.
0630	H ∕ 120		Depart CDR. Arrive at the following:
0639	H ∕ 129		RJ 20
0646	H ∕ 136		Control Point # 3
0713	H ∕ 163		Control Gate # 2
0717	H ∕ 167		Control Gate # 1
0719	H ∕ 169		IP
0721	H ∕ 171		CDR. Detruck and return film badges to issuing party.

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APPENDIX:
A - Movement Plan to Entrenchment Area
B - Movement Routes Following Walk Through

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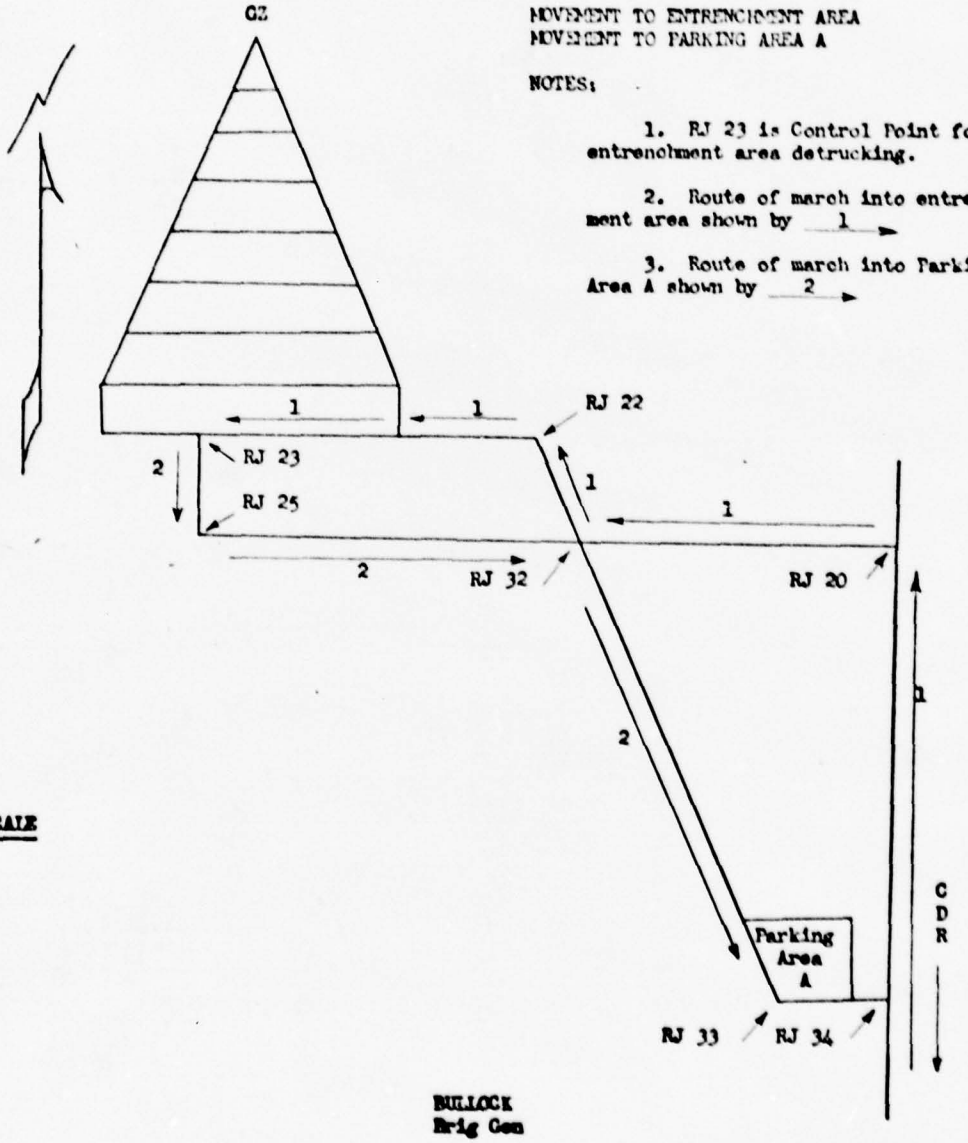
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HQ CAMP [illegible] ROCK
LAS VEGAS ([illegible]) NEV
211200 April 1953

Appendix A (TRAFFIC CIRCULATION) to Annex 4 (Schedule of Events) to Opn O 4
EXERCISE DESERT ROCK V



MOVEMENT TO ENTRENCHMENT AREA
MOVEMENT TO PARKING AREA A

NOTES:

1. RJ 23 is Control Point for entrenchment area detrucking.

2. Route of march into entrenchment area shown by 1 →

3. Route of march into Parking Area A shown by 2 →

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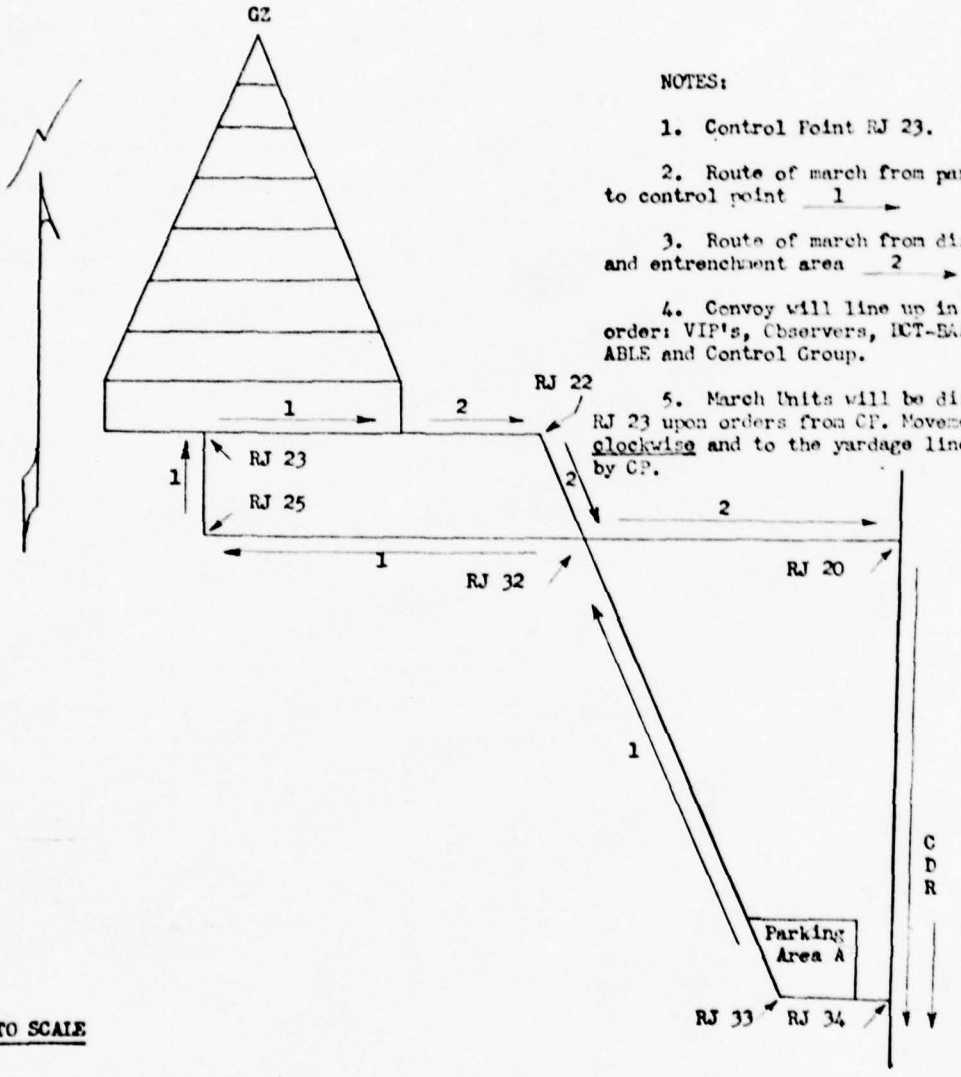
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HQ CAMP DESERT ROCK
LAS VEGAS (8726-36) NEV
211200 April 1953

Appendix B (TRAFFIC CIRCULATION) to Annex 4 (Schedule of Events) to Opn O 4
EXERCISE DESERT ROCK V

LOCATION OF VEHICLES AND EXIT ROUTES
FOLLOWING WALK THROUGH DISPLAY AREA



NOTES:

1. Control Point RJ 23.

2. Route of march from parking Area A to control point 1 →

3. Route of march from display area and entrenchment area 2 →

4. Convoy will line up in the following order: VIP's, Observers, HCT-BAKER, HCT-ABLE and Control Group.

5. March Units will be dispatched from RJ 23 upon orders from CP. Movement will be clockwise and to the yardage line indicated by CP.

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HQ CAMP DESERT ROCK
LAS VEGAS (872536) NEV
211200 April 1953

Annex 5 (MP CONTROL PLAN) to Opn O 4
EXERCISE DESERT ROCK V

1. Mission:

To provide control of all military vehicular movement in the Nevada Proving Ground Area during Exercise Desert Rock V, Shot V-7.

2. Operational Tasks:

a. The PM, CDR is responsible for the implementation of the plan as outlined herein.

b. CO, Co C (Det), 505th Military Police Bn, will provide necessary personnel and equipment to accomplish tasks prescribed herein.

3. Detailed Plan:

a. Three (3) MP's with one (1) 1/4 ton radio equipped vehicle each, will report to the AC of S, G2, CDR, at 2305 hours, 24 April 1953.

b. One (1) officer with one (1) MP and one (1) 1/4 ton radio equipped vehicle with each March Unit, Total: Six (6) March Units; six (6) officers; six (6) MP's and six (6) 1/4 ton radio equipped vehicles.

c. One (1) MP and one (1) 1/4 ton radio equipped vehicle assigned to the AC of S, G3, CDR.

d. One (1) MP and one (1) 1/4 ton radio equipped vehicle assigned to the DTC-Opns, CDR.

e. One (1) MP and one (1) 1/4 ton radio equipped vehicle assigned to the PM, CDR.

f. Two (2) MP's at the Main Gate, CDR.

g. One (1) MP at RJ 34 (845921), to direct traffic.

h. Two (2) MP's at RJ 20 (844960), to direct traffic

i. One (1) MP at RJ 32 (818959), to direct traffic.

j. One (1) MP at RJ 22 (816973), to direct traffic.

k. One (1) MP at RJ 23 (798972), to direct traffic.

l. One (1) MP at RJ 25 (799959), to direct traffic.

m. One (1) MP at RJ 33 (835920), to direct traffic.

n. One (1) MP Officer and one (1) MP with radio equipped 1/4 ton vehicle at RJ 32 (818959). This officer has the following responsibilities.

(1) Post MP's and traffic control at RJ 32, RJ 22, RJ 23 and RJ 25.

(2) Control of 3/4 ton vehicle used to post MP's along designated route.

(3) Return of posted MP's to Parking Area A when all personnel have reached the entrenchment area and vehicles have moved out to the parking area.

(4) Repost MP's at assigned road junctions after detonation.

o. One (1) MP with 1/4 ton radio equipped vehicle posted at RJ 36 (881736) to direct traffic.

p. One (1) MP with 1/4 ton radio equipped vehicle posted at RJ 35 (845878) to direct traffic.

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1. One (1) officer and one (1) MP with 1/4 ton radio equipped vehicle stationed at Parking Area A (837925). This officer has the following responsibilities:

   (1) Post MP's at RJ 20, RJ 33, RJ 34, RJ 35 and RJ 36.

   (2) Control of 3/4 ton vehicle used to post MP's along designated route.

   (3) Return of posted MP's to Parking Area A when all personnel are in the entrenchment area and vehicles have moved out to the Parking Area.

   (4) Repost MP's at assigned RJ's after detonation.

r. CO, Co C, 505th Military Police Bn, will be responsible for

   (1) Liaison with PM, Camp Desert Rock.

   (2) Report to PM when all MP's are in Parking Area A prior to detonation.

s. The PM, Camp Desert Rock, is responsible to:

   (1) Supervise posting of MP's to insure all are in position thirty (30) minutes prior to arrival of first March Unit.

   (2) Supervision of the Traffic Circulation Plan.

   (3) Insure that MP personnel entering Nevada Proving Grounds on Shot day are in possession of an individual AEC badge.

   (4) Submit report to AC of S, G2, CDR, of the number of vehicles in MP convoy for entry into the Nevada Proving Grounds, including time of arrival at AEC Gate #1. The report will contain a certificate stating that all personnel are badged and cleared.

   (5) Submit a report to AC of S, G2, CDR, when forward area is cleared of participating personnel and vehicles.

4. Requirements:

   a. Personnel

      (1) Officers: eleven (11)

      (2) E. M.: twenty eight (28).

   b. Vehicles:

      (1) 1/4 ton radio equipped: seventeen (17).

      (2) 3/4 ton 4 x 4: two (2).

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APPENDIX:
A - Traffic Circulation Plan

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HQ CAMP DESERT ROCK
LAS VEGAS (872536) NEV
211200 April 1953

Appendix A (TRAFFIC CIRCULATION PLAN) to Annex 5 (MP Control) to Opn O 4
EXERCISE DESERT ROCK V

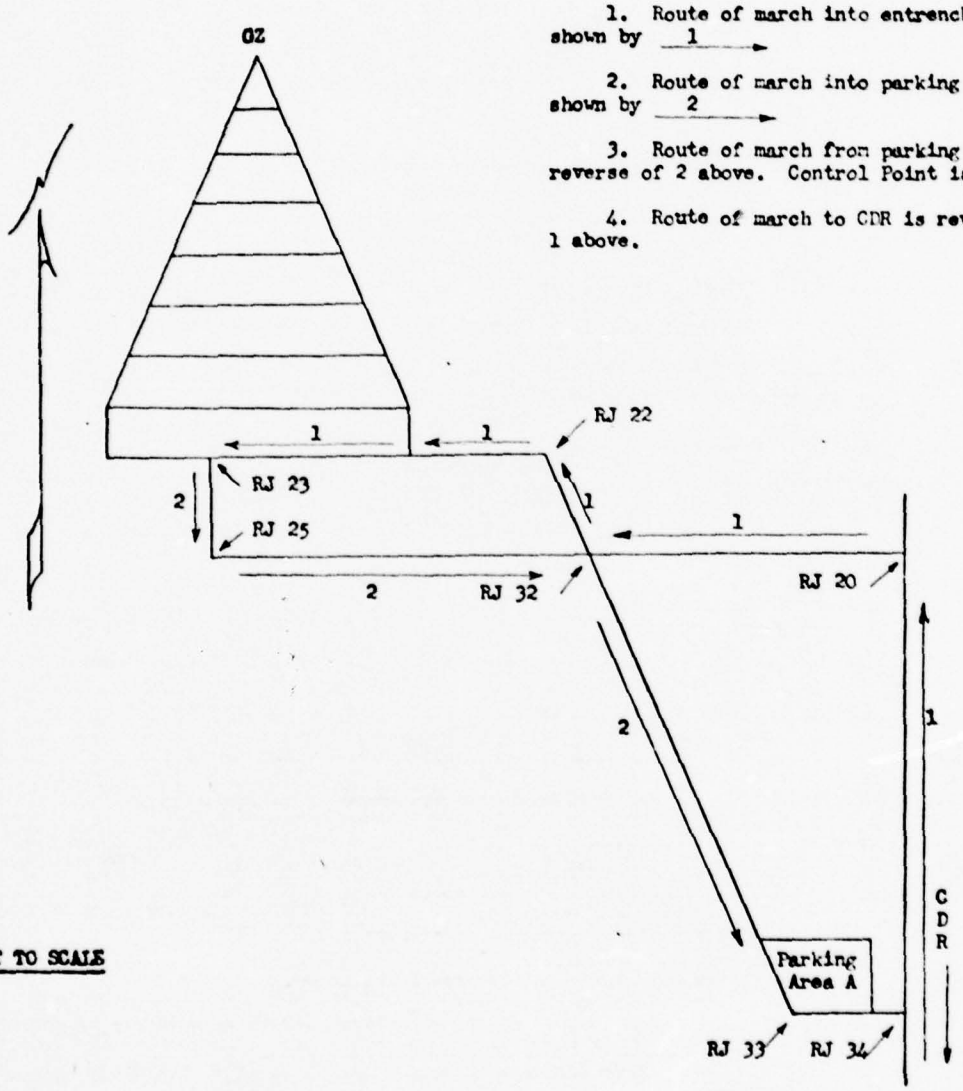
NOTES:

1. Route of march into entrenchment Area is shown by 1 →

2. Route of march into parking area is shown by 2 →

3. Route of march from parking area is reverse of 2 above. Control Point is RJ 23.

4. Route of march to CDR is reverse of 1 above.



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HQ CAMP DESERT ROCK
LAS VEGAS (872536) NEV
212000 April 1953

Annex 6 (SIGNAL) to Opn O 4
EXERCISE DESERT ROCK V

Maps: Scale 1:50,000

Cane Spring	2757	I	Mercury	2857	III
Specter Range	2757	II	Papoose Lake	2858	III
Tippipah Spring	2758	II	Frenchman Lake	2857	IV

1. General: Continuous and reliable communications between all elements of this command will be installed, maintained and operated.

2. Mission: Signal Detachment, Camp Desert Rock, will install, operate and maintain all radio, wire, systems including switchboard, public address and teletypewriter service. They will also be responsible for the operation of the Camp Desert Rock Concenter.

3. Wire Communications: (Reference: Appendices A and A 1)

a. Installation - Signal Detachment will: (Reference: Appendix B)

(1) Install two (2) spiral four cable lines from Desert Rock Base Camp to Desert Rock forward switchboard.

(2) Install four (4) telephone lines from forward switchboard to Exercise Director's CP.

(3) Install one (1) telephone line to forward area aid station.

(4) Install one (1) telephone line to each of the parking areas.

(5) Install one (1) telephone line from forward area switchboard to decontamination area.

(6) Install one (1) telephone line from forward area switchboard to RJ 23 and RJ 32.

(7) Install one (1) public address line from Exercise Director CP to each of the parking areas.

(8) Install one (1) telephone line from forward switchboard to each RCT Commander.

(9) Install one (1) telephone line from forward switchboard to the observer group.

(10) Install one (1) telephone line from forward switchboard to Signal Officer.

(11) Install one (1) telephone line from forward switchboard to helicopter port.

(12) Install following lines from Mercury CP:

(a) Two (2) dial lines to forward area switchboard.

(b) One (1) public address line to Exercise Director CP.

(c) One (1) direct line (Hot Line) to Exercise Director CP.

(d) Install one (1) telephone line from forward switchboard to volunteer's trench.

(13) Install one (1) direct telephone line from Exercise Directors CP to volunteer's trench.

(14) Install one (1) telephone line from forward switchboard down each side of "pie" for Rad Safe officers. (These lines to extend as far as 1000 yards from ground zero with terminals at each 500 yard line).

b. Public address system - Public address system will be controlled from Exercise Director's CP. (Reference: Appendix C).

(1) Mobile Public address systems will move into equipment display area when cleared by Rad Safe Officers.

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(2) Public Address line from Mercury Forward CP will be coupled in multiple with Army Public Address System.

4. Radio Communications: (Reference: Appendices D and E).

a. Radio silence will be observed from H-30 to H-Hour.

b. Signal Detachment will provide Mobile Radio Net for control and supervision of exercise, to include Rad Safe Net.

c. Signal Detachment, will provide alternate radio net for Rad Safe and Exercise Control using SCR-300 radio sets.

5. Supply and Maintenance:

a. Signal supply and maintenance will be located at Camp Desert Rock.

b. Signal supply will procure, issue and process all film badges.

c. Signal maintenance will service all wire, radio and radiac equipment.

6. Photography - Signal photographic detachment will be assigned missions as required.

7. Miscellaneous - See SOI, Appendix F, for radio call signs and frequencies, call words and directory names.

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APPENDIX:
A - Telephone Circuit Diagram
A1- Traffic Diagram
B - Circuit Diagram (Troop Area)
C - Troop Unit PA System
D - Guard Radio Net
E - AN/PRC-10 Troop Area Control Net
F - SOI, CDR

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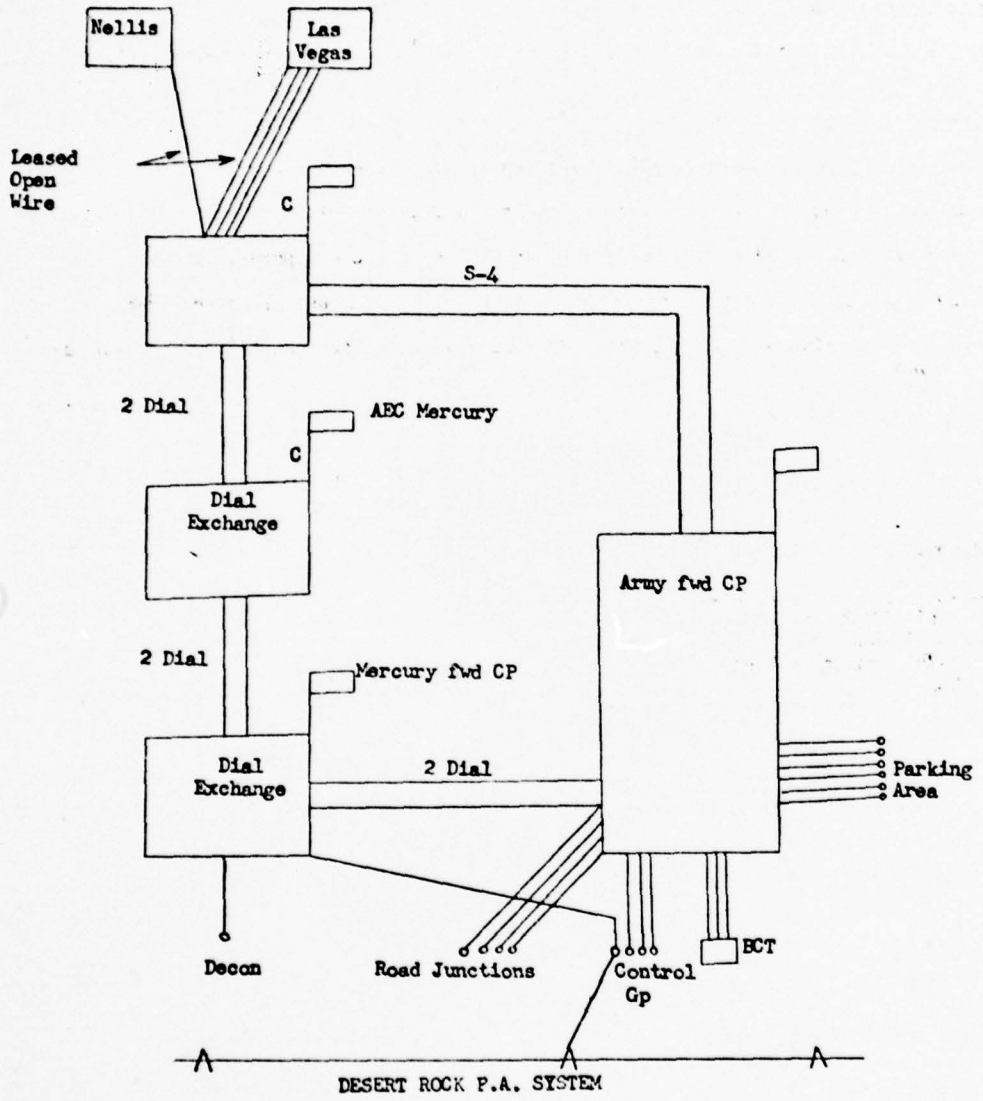
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LAS VEGAS (872536) NEV
211200 April 1953

Appendix A (TELEPHONE CIRCUIT DIAGRAM) to Annex 6 (Signal) to Opn O 4
EXERCISE DESERT ROCK V



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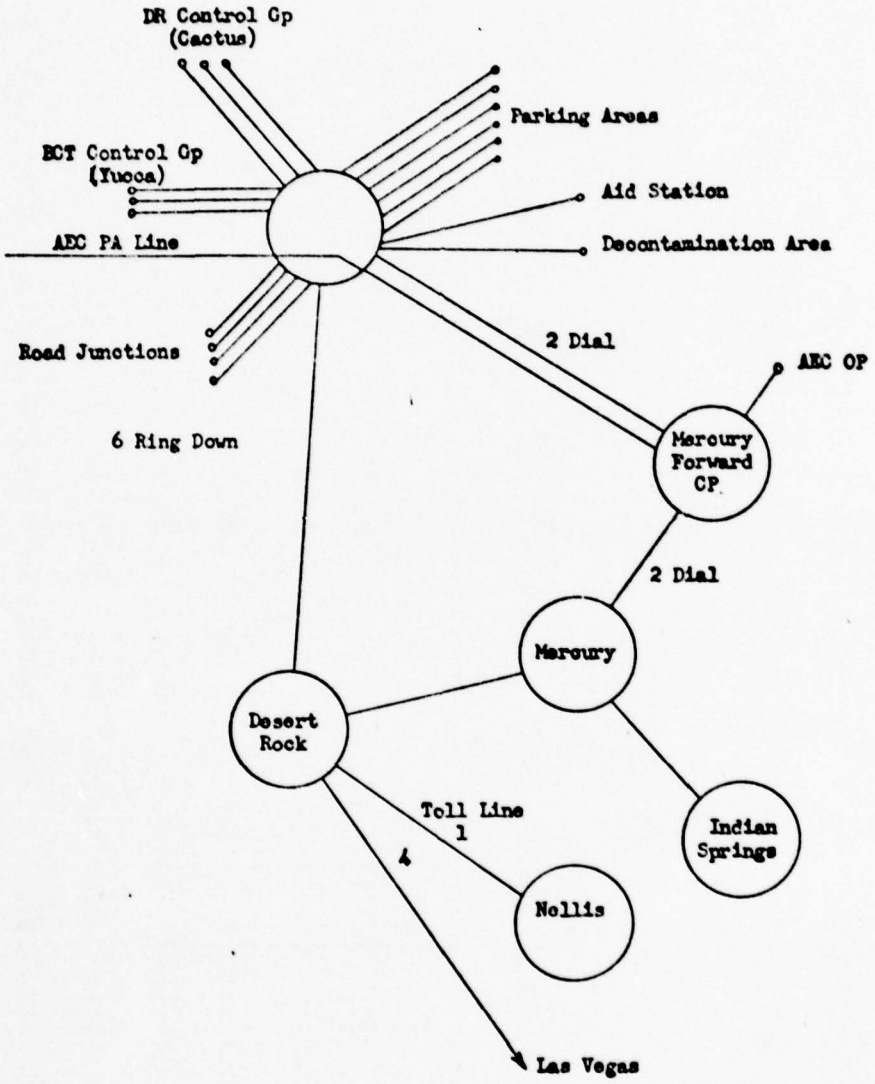
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LAS VEGAS (8725X6) NEV
211200 April 1953

Appendix A1 (TRAFFIC DIAGRAM) to Annex 6 (Signal) to Opn O 4
EXERCISE DESERT ROCK V



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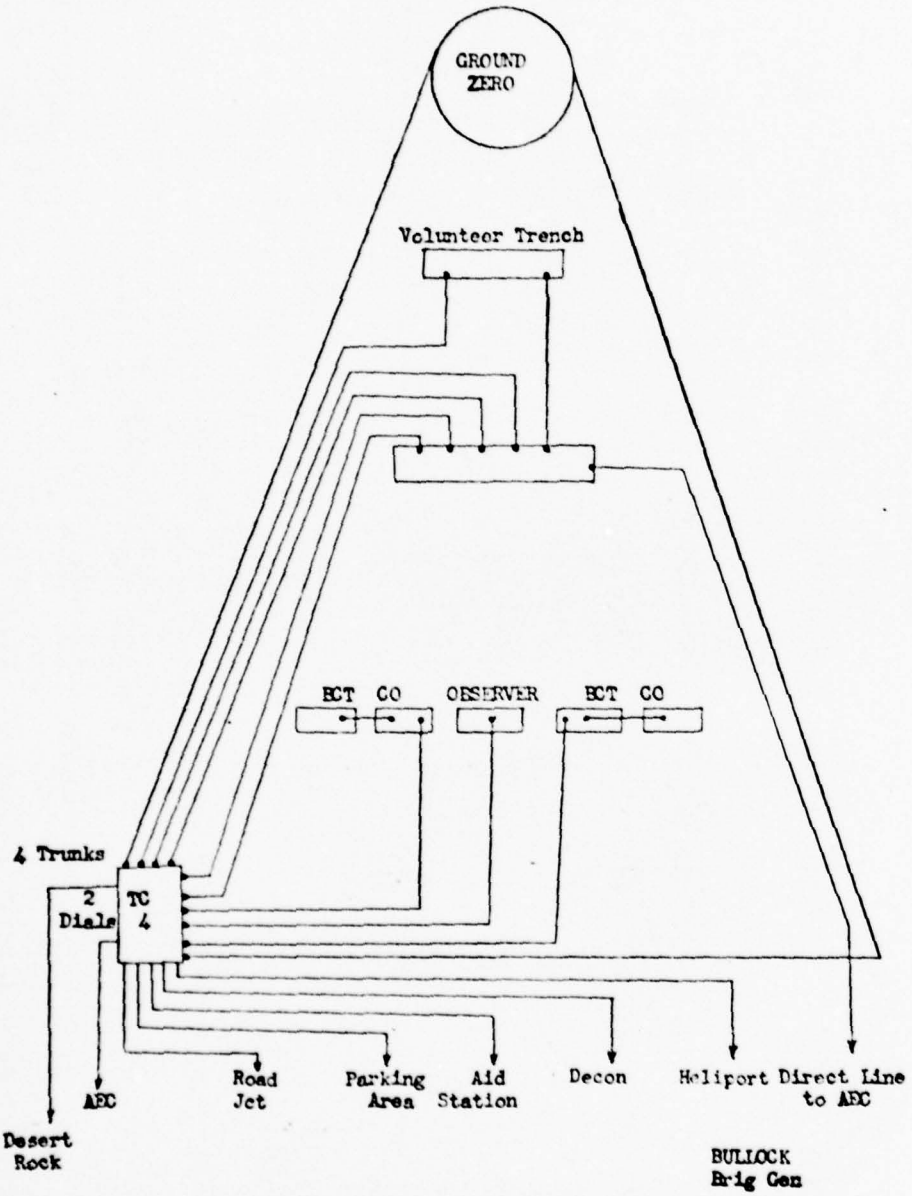
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211200 April 1953

Appendix B (CIRCUIT DIAGRAM - TROOP AREA) to Annex 6 (Signal) to Opn O 4
EXERCISE DESERT ROCK V



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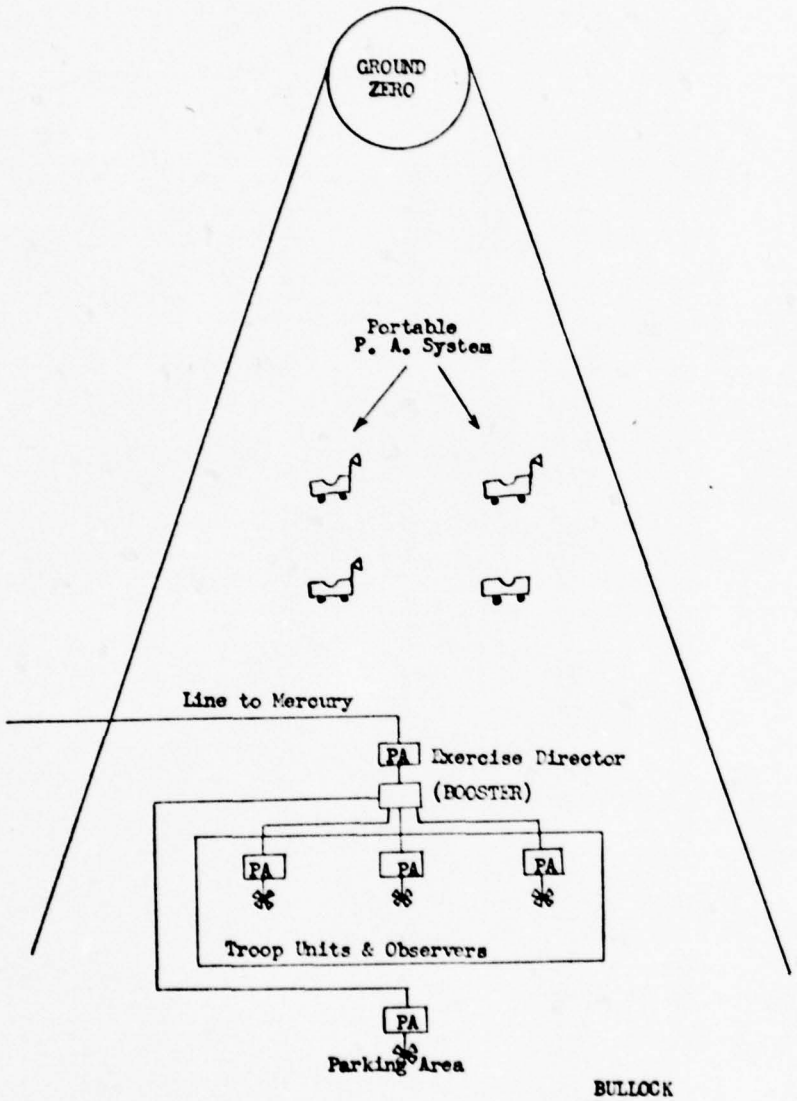
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LAS VEGAS (872536) NEV
211200 April 1953

Appendix C (TROOP UNIT P.A. SYSTEM) Annex 6 (Signal) to Opn O 4
EXERCISE DESERT ROCK V



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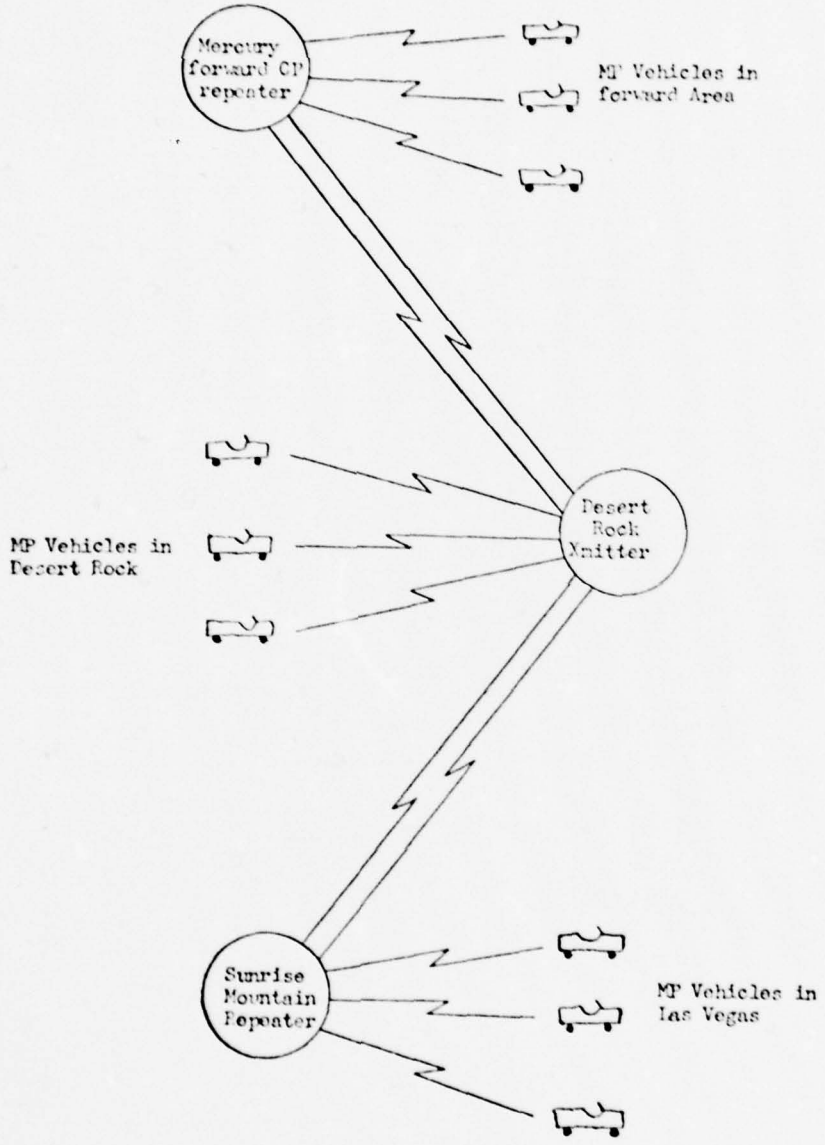
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HQ CAMP DESERT ROCK
LAS VEGAS (872536) NEV
211200 April 1953

Appendix D (GUARD RADIO NET) to Annex 6 (Signal) to Opn O 4
EXERCISE DESERT ROCK V



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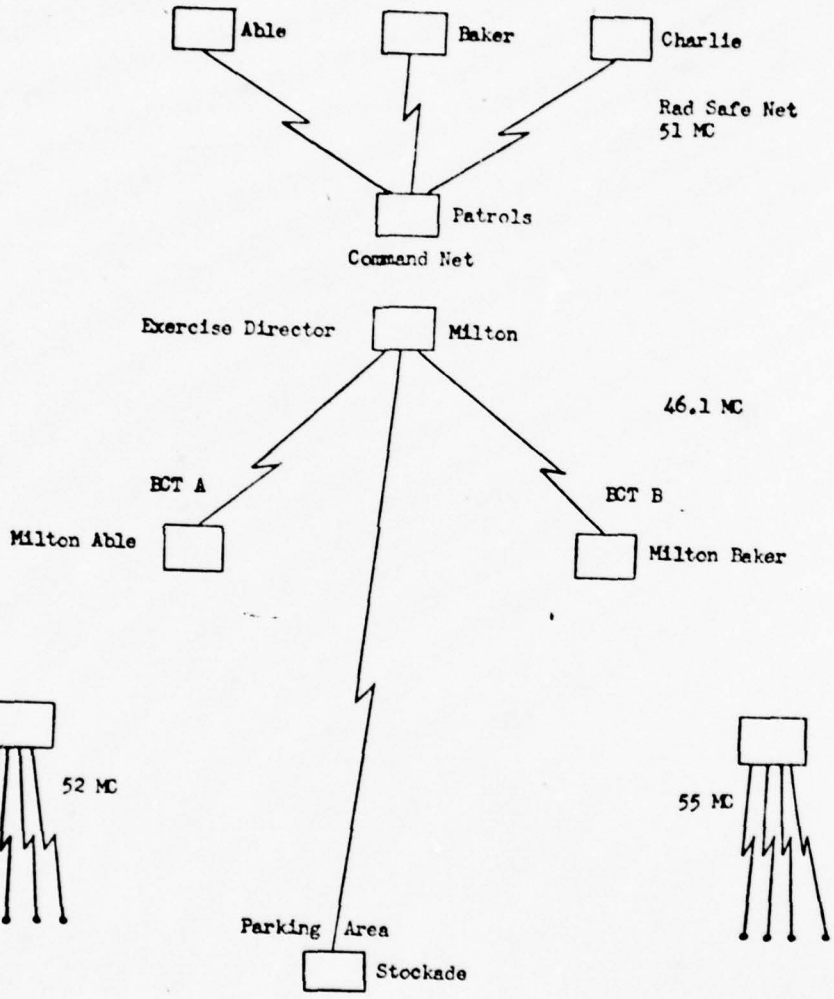
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Appendix E (AN/PRC 10 RADIO NETS) to Annex 6 (Signal) to Opn O 4
EXERCISE DESERT ROCK V



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LAS VEGAS (872536) NEV
211200 April 1953

Appendix F (SIGNAL OPERATIONS INSTRUCTIONS) to Annex 6 (SIGNAL)
to Opn O 4 EXERCISE DESERT ROCK V

ITEM NO. 1-1

INDEX

Effective: 230001U Mar 53

Signal operation instruction listed below will govern the operation of all signal communication at Camp Desert Rock, Nevada.

ITEM	SOI ITEM NO.	EFFECTIVE
GENERAL SECTION		
Index	1-1	Mar 53
Distribution "S"	2-1	Mar 53
General Communication Instructions	3-1	Mar 53
Official Time	4-1	Mar 53
Use of SOI	5-1	Mar 53
Messenger Routes and Schedules	6-1	Mar 53
CRYPTOSYSTEM SECTION		
List of system holders	7-1	Mar 53
RADIO SECTION		
Radio Nets, Call Signs & Frequencies	8-1	Mar 53
WIRE SECTION		
Telephone Directory Names	9-1	Mar 53

ITEM NO. 2-1

DISTRIBUTION "S"

Effective: 230001U Mar 53

	A	B
Commanding General, Camp Desert Rock	1	
G 3	1	
G 4	1	
Signal Section		
Signal Officer	1	
Signal office file	1	
Comcenter	1	
Wire Section	1	
Signal Supply Officer	1	
Signal Repair Officer	1	
CO, 505th Sig Gp, Cp San Luis Obisop, Calif	1	
CO, 16th Sig Bn, Corps, Cp San Luis Obispo, Calif	1	
CO, 412th Engineer	1	

ITEM NO. 3-1

GENERAL COMMUNICATION INSTRUCTIONS

Effective: 230001U Mar 53

1. General.

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a. Signal communication within Camp Desert Rock will be governed by the signal operation instructions listed in current Index 1-1.

b. New items and revisions of existing items take effect as indicated in the heading of each item. At such time, previous editions are superseded and then destroyed in accordance with AR 380-5.

2. Classification of Messages.

a. The classification of messages must receive careful consideration by the originator. Overclassification and underclassification are to be avoided.

b. It is the responsibility of the originator to insure that the proper classification is indicated on the message before it is forwarded for transmission.

c. All messages of a tactical nature are classified "CONFIDENTIAL" unless otherwise indicated.

3. Telephone

a. Telephone communication is not secure and is authorized for handling matters that are of an unclassified nature.

b. Application for installation, changes or removals of telephone must be submitted in writing to the Post Signal Officer, Camp Desert Rock, Nevada.

c. An urgent call will interrupt any call in progress except another urgent call. The use of this procedure will be confined to cases of extreme emergency.

d. The basis for telephone operating practice is FM 24-20 and ACP 134 (A). Telephone communication is not secure and is authorized for handling classified matter only when the emergency is greater than the need for security.

4. Teletype.

a. Maximum use will be made of teletypewriter service in matters where direct conversation is not required.

b. Teletypewriter procedure will be in accordance with ACP 126 and appropriate JANAP's and ACP's, including ACP 122 (B).

c. The attainment of reliability, speed and security depends, to a large extent, on the operator. It is essential that he be well trained, maintain circuit discipline and understand his responsibility.

d. Adherence to prescribed procedure is mandatory. Unauthorized departures or variations in prescribed procedures invariably create confusion, reduce reliability and speed, and tend to nullify security precautions.

5. Radio.

a. Radio practices, operation and procedure will comply with ACP 124 (A), and appropriate JANAP's. Operating signal are prescribed in JANAP 131 (A), Appendix 1, operating signals, Change 1. Radiotelephone procedure will be as prescribed in ACP 125 (A) and appropriate JANAP's and ACP's, including ACP 122 (B).

b. "Radio Silence", when ordered by this headquarters will be rigidly enforced.

c. Cases of interference or unauthorized use of frequencies will be reported to this headquarters without delay.

6. Cryptographic Security.

a. Section IV, AR 380-5 will be complied with implicitly.

b. Crypto technicians will be trained to detect and bring to the attention of the cryptosecurity officer all violations of cryptosecurity in message traffic.

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c. The cryptosecurity officer will ensure:

(1) That all personnel having access to crypto material are periodically warned of the danger of loose talk in public and private places.

(2) Safe combinations are changed when required.

(3) Cryptomaterial is invariably locked up when no in use.

(4) That special containers are used for all classified waste material, an such material is properly destroyed.

ITEM NO. 4-1

OFFICIAL TIME

Effective: 230001U Mar 53

1. Time Group.

a. The 24 hour clock system will be used for expressing time within this command. Time is expressed by means of a six-figure group of numerals, the first two expressing the day of the month, the name of the month and the year. The time zone suffix letter is obtained as outlined in paragraph 3. When reference is made to a message by its time of origin, the method of expressing such time will be exactly as presented in the original message.

2. Greenwich Civil Time.

a. Greenwich Civil Time (GCT), with the zone designation "Z" sometimes known as Greenwich Mean Time (GMT), will be used in both the heading and text of the following types of messages:

(1) To the Department of the Army.

(2) Communications with the U S Navy.

(3) Messages which cross time zones, except other when security or convenience require otherwise.

3. Local Time.

a. Local time will be used in all messages other than those listed on paragraph 2, above, its variation from GCT is indicated by suffix letters, as follows:

HOURS AHEAD OF GREENWICH	SUFFIX	HOURS AHEAD OF GREENWICH	SUFFIX
0	Z	(Greenwich Civil Time)	
1	A	1	N
2	B	2	O
3	C	3	P
4	D	4	Q
5	E	5	R
6	F	6	S
7	G	7	T
8	H	8	U
9	I	9	V
10	K	10	W
11	L	11	X
12	M	12	Y

For time midway between zones, use both letters.

4. Time Check.

a. The Post Signal Office will keep official time. Each unit can obtain the correct time by calling Extension 10.

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b. The following schedules of standard time and frequency broadcasts are observed by the National Bureau of Standards, Station WWV:

Frequency	Time	Modulation
20.0 MC	Continuously	440 Cycles and 4000 Cycles
25.0 MC	Continuously	440 Cycles and 4000 Cycles
30.0 MC	Continuously	440 Cycles
35.0 MC	Continuously	440 Cycles

c. Accurate time announcements are made in telegraphic codes during a precise one-minute interruption, one minute before each hour, and at each succeeding five-minute period. On each carrier frequency, a pulse of 0.005 second duration occurs at intervals of precisely one second. The pulse consists of five cycles, each of 0.001-second duration, and is heard as a faint Tick when listening to the broadcast. The one-minute interruption affords an interval for checking of radio frequency measurements.

5. Time Equivalents.

HONOLULU	PST	MST	CST	EST	GCT
1400W	1600U	1700T	1800S	1900R	2400Z

GCT - Greenwich Civil Time
EST - Eastern Standard Time
CST - Central Standard Time
MST - Mountain Standard Time
PST - Pacific Standard Time

ITEM NO. 5-1

USE OF SOI

Effective: 230001U Mar 53

1. Signal Operation Instructions (SOI) listed in Item 1-1 will govern signal communication of all units in this camp.

2. The number at the top of the sheet, to the left of the dash is the item number and the number on the right of the dash is the issue which is in effect. The index will indicate which issue is in effect.

3. New items become effective as indicated at the heading of each item. At such time, previous editions are superseded and will be destroyed by burning. No destruction report is necessary.

4. This SOI will be retained at the CP of the unit to which issued and extracts made as required, subject extracts to be kept to a bare minimum necessary to meet the operation needs of the unit or organization or subordinate units and/or organizations.

5. Provisions of AR 380-5 and ACP 122 (D) will be carefully observed by all units to insure the safeguarding of these items of SOI at all times. Loss of this SOI, or items or extracts thereof, will be reported by the fastest means available to this headquarters, Attn: Post Signal Officer.

6. When the need of these Signal Operation Instructions are no longer needed by a unit, due to change in status, all copies will be returned to this headquarters, Attn: Post Signal Officer.

ITEM NO. 6-1

MESSENGER ROUTES AND SCHEDULES

Effective: 230001U Mar 53.

1. Messenger routes are operated by Camp Desert Rock Concenter as follows:

a. Route I - Motor Messenger (On Post)

Lv - Camp Desert Rock 0900 1100 1400 1600

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Ar - 506th MP Co
Ar - 562d T Staging Co
Ar - 77th Army Band
Ar - 360th Engineer Co
Ar - 3623d Ord Co
Ar - Comp Co, 505th Sig Gp
Ar - 412th Engineers
Ar - 705th Engineer Co
Ar - Sig Supply Area
Ar - Chemical Area
Ar - QM Area
Ar - 94th Med Det
Ar - Post Engineer
Ar - Post Ordnance
Ar - 163d QM
Ar - 50th Chemical
Ar - 762d QM
Ar - Aff Unit
Ar - 31st Trk Co
Ar - 23d Trk Co
Ar - 6020th ASU

b. The motor messenger will leave the Camp Desert Rock Concenter at the times indicated in paragraph a above and will proceed from one unit to the other, stopping only to distribute and receive correspondence and messages from the various units.

c. Route II - Motor Messenger (To Camp Mercury)

Lv - Camp Desert Rock Concenter	0930	1500
Ar - Camp Mercury	0940	1510

2. Hours of operation are as follows:

a. Motor Messenger (On Post)

Monday - Friday	0900	1100	1400	1600
Saturday	0900	1100		

b. Motor Messenger (Camp Mercury)

Monday - Friday	0930	1530
Saturday	0930	

3. Speed limits are as follows:

a. Company Streets - 10 miles per hour

b. Engineer Road - 15 miles per hour

c. Desert Rock Drive - 25 miles per hour

d. Desert Rock Drive - 30 miles per hour (beyond 8th St).

4. Priority of Motor Messenger Vehicles.

Motor messenger vehicles will have priority over all traffic with the exception of ambulances and other emergency vehicles.

5. Messenger Delays.

All delays in delivering messages will be reported to the Post Signal Officer, Camp Desert Rock, Nevada.

ITEM NO. 7-1

LIST OF SYSTEM HOLDERS

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Effective: 230001U Mar 53.

1. This headquarters will transmit all encoded message traffic to Hq Sixth Army for protection to other units and/or organizations.

2. System held between Sixth Army and this headquarters are as follows:

   a. Vernus

   b. Diana

ITEM NO. 8-1

RADIO NETS, CALL SIGNS AND FREQUENCIES

Effective: 230001U Mar 53.

The following is a listing of the radio nets, call signs and frequencies:

NAME	UNIT	CALL SIGN	FREQUENCY
Col Muth	Rad Safe	Patrol	51
	Car 1	Patrol 1	51
	Car 2	Patrol 2	51
	Car 3	Patrol 3	51
Exercise Director		Milton	46.1
Deputy Exercise Director		Peacock	46.1
Charlie BCT	Observers	Milton Charlie	46.1
Signal Officer		Sunshine	46.1
Parking Area		Stockade	46.1
CO, Able BCT		Milton Able	55 & 46.1
Co A		Able 1	55
Co B		Able 2	55
Co C		Able 3	55
Co D		Able 4	55
CO, Baker BCT		Milton Baker	46.1 & 52
Co A		Baker 1	52
Co B		Baker 2	52
Co C		Baker 3	52
Co D		Baker 4	52

ITEM NO. 9-1

TELEPHONE DIRECTORY

Effective: 230001U Mar 53.

1. Preparation of telephone directories for tactical units will be in accordance with FM 24-20 and 24-5.

2. There are two principal parts to a military telephone directory: directory names and directory numbers.

3. Telephone directories are intended primarily to simplify and expedite the operation of the telephone system by placing in the hands of subscribers the telephone directory names and numbers of units which may be reached by telephone. Telephone directory names and numbers are designed to speed up switchboard service but have no security value. Tactical telephone directories will be classified "CONFIDENTIAL" because they contain order of battle information.

4. Telephone directory names or numbers will not be used as radio call signs or over commercial telephone facilities.

5. Directory names are as follows:

ORGANIZATION	NAME
Camp Desert Rock	Desert Rock

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412th Engineer
Army Forward CP

412th Engineer
Yucca

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HQ CAMP DESERT ROCK
LAS VEGAS (87[illegible]36) NEV
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Annex 7 (RADIOLOGICAL SAFETY PLAN) to Opn O 4
EXERCISE DESERT ROCK V

1. Mission

To provide for radiological safety to include equipment, monitors, tactical dosimetry in the target area, decontamination, and detailed operating procedures for all military participants based on tolerances prescribed by the Department of Defense for Exercise Desert Rock V.

2. Operations

a. Radiological Survey

(1) Test Area

(a) Upon command of the Rad-Safe O, two radiological survey teams consisting of one radiological safety monitor and two enlisted men, driver and communicator from the 50th Cml Svc Plat will proceed north from their stations at the Parking Area, one on each of the roads bounding the area of the test. For route of survey team, see Appendix A.

(b) Radiation intensities will be noted continuously from the initial point (see Appendix A) and reported and posted at the following readings: 10 mr/hr, 100 mr/hr, 1000 mr/hr, 2000 mr/hr, 2500 mr/hr and 5000 mr/hr.

(c) Isolated areas (hot spots) having intensities of 100 mr/hr or over will be indicated to the officer in charge of the following marking and posting team for posting.

(d) The 2500 mr/hr iso-intensity line will be delineated by the first team surveying the area of that intensity and indicated to the officer in charge of the following marking and posting team for marking with engineer tape as the forward limits of observer and troop movement on foot through the test area.

(2) Maneuver Area

(a) One radiological survey team consisting of one radiological safety monitor and two enlisted men, driver and communicator from the 50th Cml Svc Plat will station itself, approximately 150 yards on the east (right) flank of the foremost elements of the maneuvering troops. It will proceed slightly in advance of the line monitoring continuously as it moves forward.

(b) Upon noting increasing intensity (approaching 2000 mr/hr) of radiation the survey party will proceed obliquely to the north west until the instrument records below that intensity. Right flank units of the maneuvering troops will conform to this movement by a similar change in direction.

(c) One survey team consisting of one radiological safety monitor, and one enlisted man, driver, from the 50th Chemical Service Platton will accompany the battalion commander of each RCT. These teams will check the monitoring of the preceeding unit CBR personnel by patroling across the zone of attack of their respective battalion commanders upon indication that the unit CBR personnel have noted readings of 1000 or more mr/hr, these teams will proceed to the spot to check the reports and inform the battalion commander of their determinations for such action as he may deem necessary. Areas reading 5000 mr/hr not be traversed.

(d) Unit CBR personnel accompanied by such troops as the company commanders designate will precede the advance elements of the attacking forces by 150 yards. They will monitor continuously, reporting back to the company commanders areas reading 100 mr/hr or more. Company commanders will report to battalion commanders reports of readings of 1000 mr/hr or more.

b. Marking and Posting

Test Area - One marking and posting team consisting of one officer and six enlisted men will follow each survey team operating in the test area. These teams will post "hot spots" and

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by means of stakes marking tape establish a line along the 2500 mr/hr iso-intensity line and along the 500 yard road on the lower side of the 5000 mr/hr area. No personnel will proceed beyond this line in the test area.

c. Personnel and Vehicle Monitoring. See Appendix B (SOP for Monitoring)

d. Emergency Evacuation. See Annex 9 (Evacuation Plan)

x. (1) Individuals will don protective masks on the order of the Exercise Director, Maneuver Control Officer, Radiological Safety Officer, Unit Commanders, and Officers in charge of Observer groups. They will unmask on order from the initial source of the order for masking or higher authority.

(2) Individuals will have trousers tucked securely in boot tops, and sleeves and collars will be tightly buttoned to keep out the dust.

(3) Individuals will not smoke, eat, drink, or chew gum in the area following the shot until after they have been monitored.

(4) Primary means of communication will be by telephone. Radio communication will be used only when telephone fails.

3. Requirements

a. Radiological Survey Teams (Test Area and Flank Patrol).

3 ea	1/4 ton truck
3 ea	AN/P DR TIB
3 ea	AN/PDR 27A
4 ea	AN/PRC 10
1 ea	Portable electronic megaphone
3 ea	Field telephone - EE 8
6 ea	Pocket chamber dosimeter 0 - 10,000 mr

b. Radiological Survey Teams (BCT Cmdrs).

2 ea	1/4 ton truck
2 ea	AN/PDR TIB
2 ea	Pocket chamber dosimeter 0 - 10,000 mr.

c. Unit CBR Personnel.

8 ea	AN/PDR TIB
8 ea	AN/PRD 27A
8 ea	Pocket chamber dosimeter 0 - 5000 mr.
8 ea	Pocket chamber dosimeter 0 - 50,000 mr.

d. Troops.

1 per platoon Pocket chamber dosimeter 0 - 50,000 mr.

e. VIP's.

20 ea (1 per individual as desired) Pocket chamber dosimeter 0 - 10,000 mr.

f. Marking and Posting

2 ea	3/4 ton truck
2 ea	Hammer, sledge, 8 lbs
40 ea	Marker, radioactive contamination
60 ea	Stakes
5000 ft	Tape, engineer marking

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APPENDIX
A - Route of Monitors in Test Area
B - SOP for Field Decontamination and Monitoring

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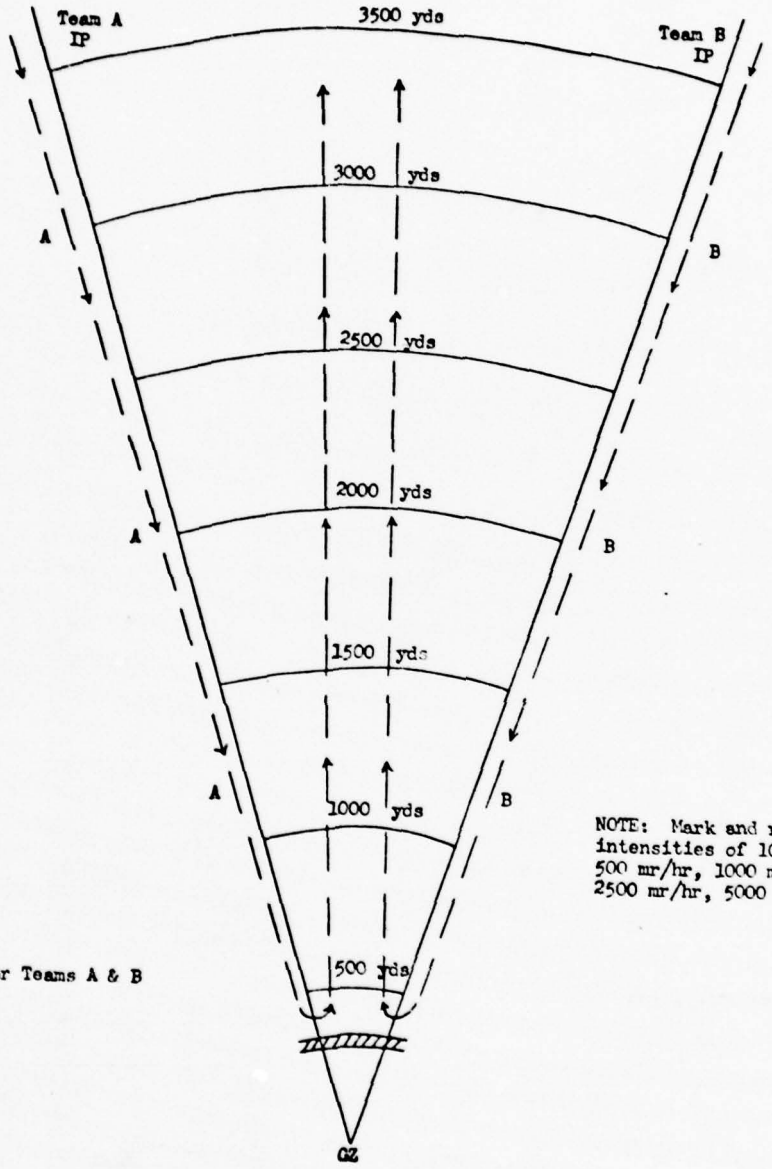
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Appendix A (ROUTE OF MONITOR TEAMS) to Annex 7 (Rad-Safe) to Opn O 4
EXERCISE DESERT ROCK V



Route of Monitor Teams A & B

NOTE: Mark and report intensities of 10 mr/hr 500 mr/hr, 1000 mr/hr 2500 mr/hr, 5000 mr/hr

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Appendix B (DECONTAMINATION) to Annex 7 (Rad Safety Plan)
to Opn O 4 EXERCISE DESERT ROCK V

SOP FOR FIELD DECONTAMINATION OF PERSONNEL
AND VEHICLES

1. Purpose.

The purpose of this SOP is to establish procedures for monitoring and field decontamination of personnel and equipment.

2. General.

Radiological contamination is the deposit of dust and dirt containing radioactive materials upon the surface of the skin, clothing, equipment or vehicles. Field decontamination will consist of removal of the dust and dirt by brushing and sweeping.

3. Responsibilities.

a. Participating Troops.

Field decontamination is a function of command. Unit commanders are responsible for the field decontamination of their personnel and equipment to include radiological monitoring.

b. Observers.

Field decontamination of observers (except VIP's) will be the responsibility of the officer in charge of each bus. A Rad-Safe monitor will be provided at the entrucking time for each bus by the Rad-Safety Officer to monitor the vehicle and personnel.

c. Light Vehicles.

The decontamination section of the 50th Chemical Service Platoon will be responsible for the decontamination of all light vehicles, and their occupants, (except those vehicles assigned to RCT's). For the purpose of this SOP, light vehicles are defined as sedans, 1/4 ton trucks and ambulances.

4. Equipment.

a. Monitors.

(1) Troop monitors will be issued two survey meters: one AN/PDR 27A which will be used for personnel, equipment and vehicle monitoring. The AN/PDR 27A will not be carried on the attack march but may be left in the vehicle.

(2) Observer monitors will carry the survey meter AN/PDR T1B.

(3) Rad-Safe Monitors for vehicles and personnel will be equipped with the AN/PDR 27A. Monitors will report personnel and vehicles withdrawn from the column to be decontaminated at the 50th Chemical Service Platoon decontamination-station to serial commanders in writing as follows:

Personnel - Name, Rank, Organization.
Vehicles - Type, vehicle number, organization.

(4) On return to camp the decontamination station commander will report to G2 those personnel and vehicles which they decontaminated after the shot. The same information as required by section (3) above will be given.

b. Vehicles.

Trucks and busses which will be exposed to possible contamination will be equipped with two brooms each.

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Procedures:

a. Personnel.

(1) Decontamination - At the conclusion of the exercise and prior to boarding trucks and busses, personnel will assemble 100 ft, downwind from the vehicles. Using the vehicle brooms as brushes, individuals will assist each other, in turn, in brushing the dust from their clothing. Particular attention should be given the shoes and web equipment. Personnel being brushed will be down-wind from the group waiting to be brushed. After brushing, personnel will proceed to the monitor for checking and, if not contaminated in excess of the levels set forth in par 6 below, will board the vehicle. Decontamination procedures will be repeated if contamination exceeds permissible levels. Personnel who cannot be field decontaminated to permissible levels will be sent to the 50th Chemical Service Platoon Decontamination Section at Yucca Pass.

(2) Monitoring - Using the Survey Meter AN/PDR 27A monitors will check the contamination of individuals, paying particular attention to the hands, face, hair line (headgear will not be removed) eyebrows and shoes.

b. Vehicles.

(1) Decontamination - Windows of vehicles will be open until the shock wave passes. They will then be closed to prevent possible contamination of the interior. Upon arriving at the entrucking point, drivers will sweep out vehicles inside and outside.

(2) Monitoring - Monitors will check the level of contamination of the vehicles prior to boarding of personnel. Any vehicles which cannot be decontaminated to sufficiently low levels will be sent to the 50th Chemical Service Platoon Decontamination Station at Yucca Pass. "Hot" vehicles will not be allowed to pass the AFSWP check point but will be turned back for further decontamination.

6. Permissible Radiation Levels.

Personnel and equipment contaminated in excess of 20 mr/hr above background will require decontamination prior to return to Camp Desert Rock.

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Annex 8 (MEDICAL) to Opn O 4
EXERCISE DESERT ROCK V

1. Mission:

To furnish medical care and evacuation of all personnel participating in Shot V-7, Exercise Desert Rock V.

2. Operation:

a. The surgeon will accompany the control group to the forward area and remain at the forward CP through the exercise.

b. A medical detachment consisting of one (1) medical officer and four (4) enlisted men from permanent party personnel will move in an ambulance with the control party, and upon arrival in the forward area will establish an aid station in Parking Area A (837925).

c. After H-Hour, on order of the Surgeon this aid station will displace forward to the vicinity of the forward CP.

d. Prior to departure from camp two (2) enlisted men will be attached to the observer group to act as company aid men for the duration of the exercise.

e. One ambulance from the control group will be dug in the vicinity of the trench area to be available for emergency evacuation prior to H-Hour.

f. The organic medical detachment with each RCT will furnish necessary medical care for their respective RCT.

g. All medical groups will leave with and return to camp in the same march unit to which they are assigned.

3. Evacuation of Casualties.

a. Ambulance.

(1) Route of evacuation will be most direct route of Camp Desert Rock.

(2) An ambulance will be attached to each RCT prior to leaving Camp Desert Rock for the forward area.

(3) Additional supporting ambulances will move forward with the control group.

(4) All casualties arriving at an aid station will be treated and then either returned to duty or evacuated. All cases evacuated will be reported to the surgeon by name and organization.

(5) Ambulances when needed may be requested from the control group by radio or phone.

(6) All cases evacuated to the dispensary Camp Desert Rock will, if needing further evacuation to Nellis AFB Hospital will be transferred to the metropolitan ambulance if available. Unless immediate evacuation is imperative to safe life or prevent undue suffering the patient will be held and treated in the ward tent until an ambulance load is available.

(7) In case of heavy casualties the dispensary at Camp Desert Rock will be prepared to support and reinforce the medical units in the forward area to their maximum capacity.

(8) The litter busses will be made available to the medical section for use in the evacuation of patients if the number of casualties should justify their use.

b. Air Evacuation.

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The helicopter will be stationed in the vicinity of Parking Area A (837925) and will be on call to evacuate patients. This may be requested either by radio or by telephone from the forward control point. Only serious cases will be evacuated by air.

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Annex 9 (EMERGENCY EVACUATION PLAN) to Opn O 4
EXERCISE DESERT ROCK V

1. This annex outlines the procedure to be followed to accomplish the total evacuation of the forward area during Exercise Desert Rock V. The Exercise Director through the Control Group Commander, will direct the implementation of this plan.

2. Personnel in Annex 3 will be prepared to execute a total evacuation of the forward area at any time during D-Day.

   a. The direction of evacuation will be to the south to a designated place of safety in the following order:

      (1) Parking Area A (837925).

      (2) Check Gate # 2 (913604).

      (3) Camp Desert Rock Motor Pool (875539).

   b. BCT Commanders will be responsible for the movement of their vehicles during the evacuation and for maintaining the proper march unit order of vehicles under their command.

   c. The following procedure will be followed for personnel in the ENTRENCHMENT AREA.

      (1) VIP and Observer personnel will assemble behind the observer trenches, entruck in vehicles under the supervision of the March Unit Commanders. Vehicles will be in the lead of the column moving into area, and embarking will take place at the point of debarkation.

      (2) BCT Commanders will assemble their personnel behind their respective trenches and move to entrucking area immediately behind the trenches.

      (3) Control Group will assemble behind their control trench and move to loading area and entruck in their respective vehicles upon orders of Control Group Commander.

      (4) Vehicles will be dispatched from Parking Area in March Unit order to the entrucking Area. (See Appendix A).

   d. The following procedure will be followed by BCT's if they are deployed in ATTACK.

      (1) Units will move to the west (left) flank and assemble facing west on the road with BCT - ABLE on the right of BCT - BAKER.

      (2) Commanders will immediately check for missing personnel.

      (3) Trucks transporting these units will be immediately dispatched north from RJ 23 in March Unit order. See Appendix B.

      (4) Trucks will be halted when they arrive in front of their respective units and the troops will embark.

      (5) Trucks will then move to the designated place of safety. (Note: Rad-Safe monitors of Camp Desert Rock Control Group will traverse the area evacuated by the troops to ensure no troops remain therein. They will then proceed as ordered by the Control Group Commander).

   e. When personnel are in DISPLAY AREA the procedure will be as follows:

      (1) BCT Commanders will move their units to the nearest 500 yard cross road as directed by the Control Group Commander. The location of the BCT will be relayed via radio to Officer at Control Point CP. This office will in turn call control point RJ 23 and have vehicles of the BCT dispatched immediately. Vehicles will remain in march unit order through out the operation.

      (2) The column will move under the direction of the March Unit Commander to the designated

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place of safety. (Note: There will be no set time distance between march units).

f. The Control Group will evacuate the test area on order of the Exercise Director when it is assured that all groups have been evacuated.

x. (1) Maximum vehicle speed will be 35 miles per hour.

(2) Vehicle march units will remain intact during all movements.

(3) Command, MP and Medical units will have road priority during the movement.

(4) The decontamination team of the 50th Chemical Service Platoon will move mobile and portable decontamination equipment to the designated place of safety to perform such decontamination as directed.

(5) Decontamination of Personnel will be carried out on order.

(6) Code designation for the evacuation plan will be "CONDITION BLACK".

(7) "CONDITION BLACK" will be transmitted by most readily available means and authenticated by Camp Desert Rock Rad-Safe Officer. "CONDITION BLACK" will be transmitted to the BCT Commanders leading the troop columns via radio. When "CONDITION BLACK" is received by BCT Commanders, this information will be transmitted immediately to the troops. The siren operated at Control Group CP will operate.

(8) Upon receipt of "CONDITION BLACK" BCT Commanders will order all personnel to put on gas masks and wear them until ordered to remove them by the Exercise Director.

(9) Windows in vehicles will be closed where practical.

(10) Individuals will not eat or smoke during evacuation.

/ Medical Evacuation.

a. Aid station in Parking Area A (837925) will cease operations upon the evacuation of all personnel from the forward area and join the Control Group March Unit.

b. Casualties will be evacuated to the Medical Detachment at Camp Desert Rock.

c. Route of evacuation will be the most direct route available.

5. Miscellaneous.

a. Emergency Signal: Continuous blowing of siren.

b. Forward CP will move from entrenchment area upon receipt of "CONDITION BLACK". New location to be announced at time of movement.

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APPENDIX:
A - Movement Plan from Entrenchment Area
B - Movement Plan from Attack and Display Area

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Appendix A (TRAFFIC CIRCULATION) to Annex 9 (Emergency Evacuation Plan) to Opn O 4
EXERCISE DESERT ROCK V

MOVEMENT FROM ENTRENCHMENT AREA

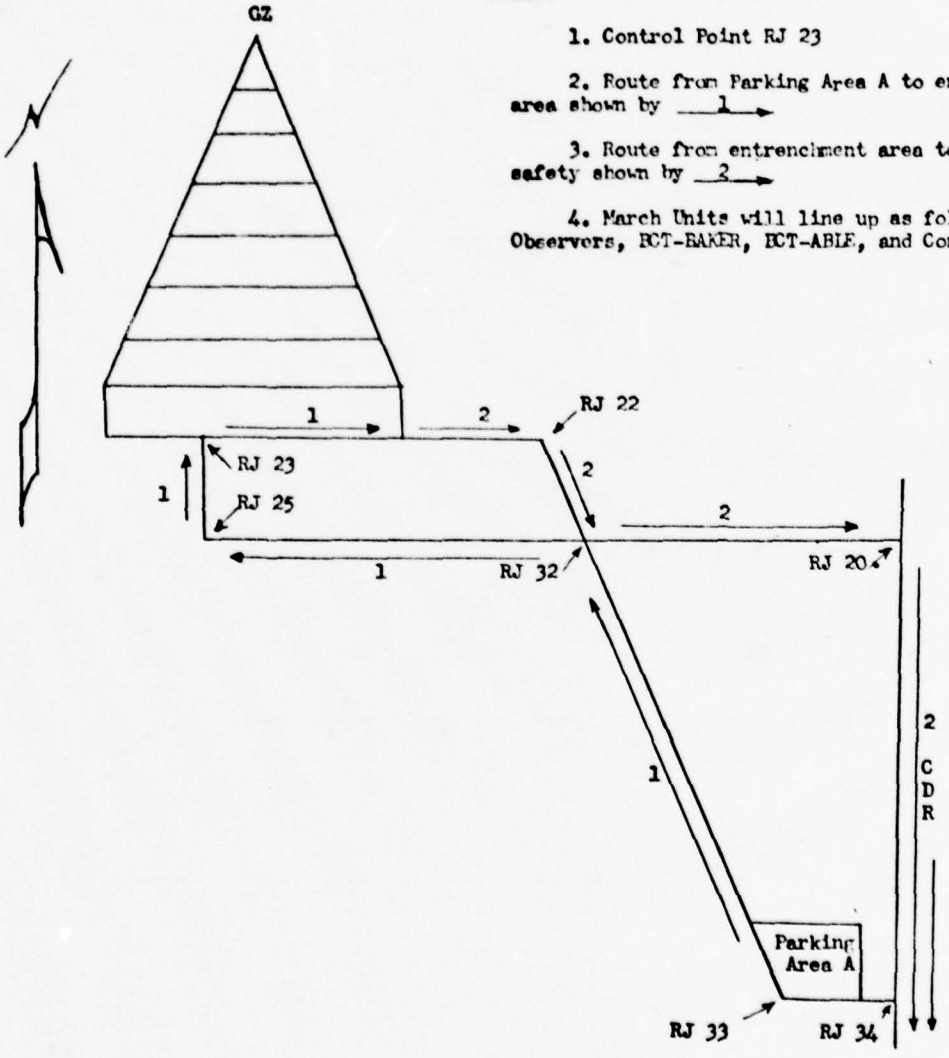
NOTES:

1. Control Point RJ 23

2. Route from Parking Area A to entrenchment area shown by —1→

3. Route from entrenchment area to place of safety shown by —2→

4. March Units will line up as follows: VIP's Observers, RCT-BAKER, RCT-ABLE, and Control Gp.



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Appendix B (TRAFFIC CIRCULATION) to Annex 9 (Emergency Evacuation Plan) to Opn O 4
EXERCISE DESERT ROCK V

MOVEMENT FROM ATTACK OR DISPLAY AREA

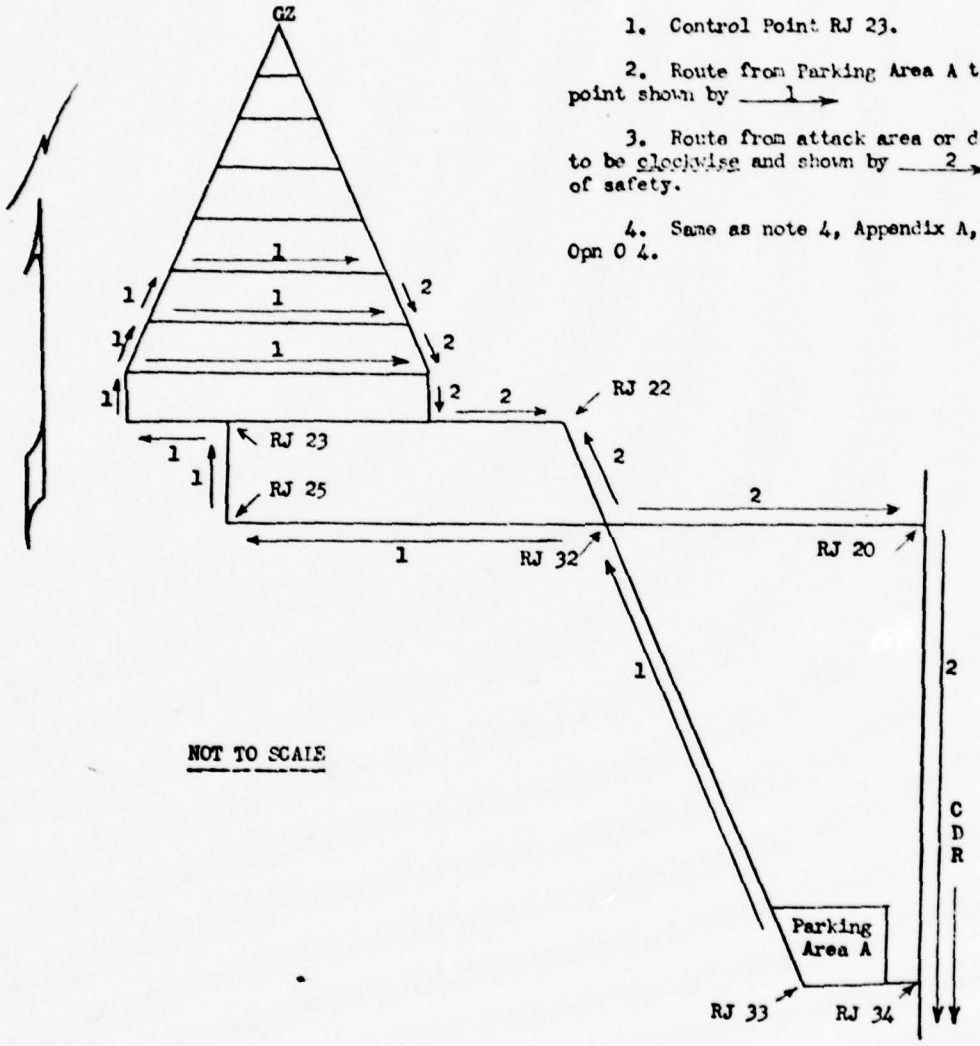
NOTES:

1. Control Point RJ 23.

2. Route from Parking Area A to control point shown by ——1→

3. Route from attack area or display area to be clockwise and shown by ——2→ to place of safety.

4. Same as note 4, Appendix A, Annex 9 to Opn O 4.



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Annex 10 (EVALUATION PLAN) to Opn O 4
EXERCISE DESERT ROCK V

1. Purpose.

The purpose of this plan is to set forth types of teams to be provided and outline procedures to be followed for the purpose of evaluating the visual effects of Atomic Blast upon emplacements, materiel and animals.

2. Teams.

a. Teams will formed as follows:

(1) One chemical team, to be formed by the Chemical Officer, to evaluate effects of burst upon items of chemical equipment. In addition, this team will evaluate radiation effects within its capability.

(2) One engineer team, to be formed by the CO 412th Engr Const Bn to evaluate effects of the burst upon emplacements constructed by his unit.

(3) One medical team, to be formed by the Veterinarian, to evaluate the visual effects of the burst upon animals.

(4) One ordnance team, to be formed by the Ordnance Officer, to evaluate the effects of the burst upon items of ordnance equipment.

(5) One quartermaster team, to be formed by the Quartermaster, to evaluate the effects of the burst upon items of quartermaster equipment.

(6) One signal team, to be formed by the Signal Officer, to evaluate the effects of the burst upon items of signal equipment.

3. Equipment.

Each of the above named teams will obtain all available equipment deemed necessary to accomplish an accurate and detailed evaluation of effects of the burst upon material or emplacements for which the team is responsible. Full use will be made of the following equipment which is available to all teams:

a. Film badges.

b. Geiger counters and other mechanical dosimetry measuring devices.

4. Procedures.

The following procedures will be followed by all teams:

a. Prior to burst.

Make a detailed survey of the condition of equipment, emplacement or animals to include, where necessary, a technical inspection. This survey will be reduced to writing on forms to be provided by the G3.

b. After burst.

(1) Make detailed survey of the condition of equipment, emplacements or animals. This survey will be made as soon as possible, consistent with safety after the burst. This survey will be reduced to writing on forms provided by G3.

(2) Each team will render a written report to CG (ATTN: G3) on the damage effects of the burst on installations, equipment or animals for which it is responsible. This report will include the following:

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a. Narrative description of the damage in such nontechnical language as may be understood by the average soldier.

b. Narrative description of damage in technical language, as appropriate.

c. A realistic estimate of personnel, parts, equipment and time needed to put material or installation in operable condition under battlefield conditions.

d. Readings of instruments, if used, and the development of pertinent charts, graphs or diagrams therefrom.

e. Where applicable, an estimate of personnel casualties that might occur as a result of the damage to equipment, fortification, etc, or the burst itself.

5. Reports:

Reports on Shot V-7 will be submitted to the AC of S, G3, prior to 30 April 1953.

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APPENDIX A
Evaluation Form

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Appendix A (EVALUATION FORM) to Annex 10 (Evaluation Plan) to Opn 0 4
EXERCISE DESERT ROCK V

Item of Equipment or emplacement	Distance to GZ	Orientation to GZ	Description of Condition, Etc, Prior to Shot	Description of Condition After Shot	Estimate of Time, Equip and Parts to Restore to Operable Condition, Battlefield Conditions

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HQ CAMP DESERT ROCK
LAS VEGAS (872536) NEV
211200 April 1953

Operational Instructions 4-1 to Opn O 4
EXERCISE DESERT ROCK V

1. General: The Camp Desert Rock Control Group, RCT-ABLE, RCT-BAKER, Observers, and VIP's this station will conduct a rehearsal 23 April 1953. This rehearsal is in preparation for D-Day.

2. Purpose: To familiarize all participants and observers with location of March Units in camp area, (Annex 4) Entrucking Plan, route of march, terrain in test area, location of trench positions and task assignments.

3. a. Camp Desert Rock Control Group.

(1) Move in accordance with Annex 1 (March Table).

(2) Participate in exercise in accordance with Annex 2 (Schedule of Events).

(3) Implement the provisions of Annexes 1, 5, 6, 7, 8 and 9, of Opn O 4.

b. Observer Group.

(1) Move in accordance with Annex 1.

(2) Participate in exercise in accordance with Annex 2.

c. RCT-ABLE.

(1) Familiarize all personnel with the general and special situation and special exercise maneuver in accordance with Annex 1 to Opn O 4.

(2) Move to entrenchment area in accordance with Annex 1.

(3) Participate in the exercise in accordance with all annexes of Opn O 4.

(4) Attack on order of Exercise Director to seize objective as outlined in Appendix B (Route of Attack), to Annex 1 (Tactical Situation) to Opn O 4.

d. RCT-BAKER.

(1) Same as (1) through (4) of RCT-ABLE above.

x. (1) Muster and entrucking of all personnel will be held by each vehicle commander 40 minutes before departure time. At the same time each individual participant will be checked for film badge, camera's and field glasses.

(2) Messengers with five (5) corrected copies of Annex 3 (Personnel and Vehicles) and clearance verification certificates, attached to each, will precede the March Unit Movement by ten (10) minutes.

(3) Paragraphs, (1) and (2) above, will apply on shot day.

(4) All personnel will be informed that two (2) minutes prior to H-Hour a thirty (30) second siren signal will be sounded. At this time the Exercise Director will order all participants to crouch in their entrenchments well below the surface of the ground and remain in that position until the announcement to rise is made over the PA System.

(5) Movement of personnel north of objectives will be on order only.

(6) Positive control measures will be enforced by officers and NCO's in charge of vehicles during movements by convoy to and from the test area.

(7) During the attack on objective and foot march through display area, personnel control will be exercised by RCT Commanders and Company Officers.

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(8) There will be NO CAMERAS or FIELD GLASSES taken into the test area by the participating troops, staffs, observers, or VIP's.

(9) All personnel will be cautioned not to pick up any items in the equipment display area.

4. Administration:

a. Class I.

(1) Obeerver personnel will draw lunches from mess hall where they regularly mess.

(2) The AC of S, G4, Camp Desert Rock will supervise the preparation and distribution of lunches for the RCT's.

(3) Lunches will not be eaten while enroute to test area.

(4) Personnel will not eat in contaminated areas.

b. Transportation.

(1) Instructions outlined in Opn O 4 apply.

(2) Speedometer multiplier of two (2) will be used.

(3) Maximum speed - 35 MPH.

(4) The Officer in charge of the observer group will maintain control over the group during the motor march and walk through exercise display area.

(5) Vehicles in march units will have headlights turn on during day or night. Drivers will dim headlights when passing AEC check points and gates 1 and 2 during the night movement. Drivers will turn motors and lights off at 30 minutes prior to H-Hour.

c. Medical.

(1) Instructions outlined in Opn O 4 apply.

d. Uniform and Equipment.

(1) Instructions outlined in Opn O 4 apply, with the following exceptions: Gas Mask and Helmet steel w/liner need not be worn or carried for the rehearsal.

5. a. Forward CP Camp Desert Rock opens H-30 minutes at the entrenchment area CP.

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ANNEXES:
1 March Table (omitted)
2 Schedule of Events (omitted)
3 Vehicle and Personnel (omitted)
4 Entrucking Plan
5 Traffic Circulation (omitted)

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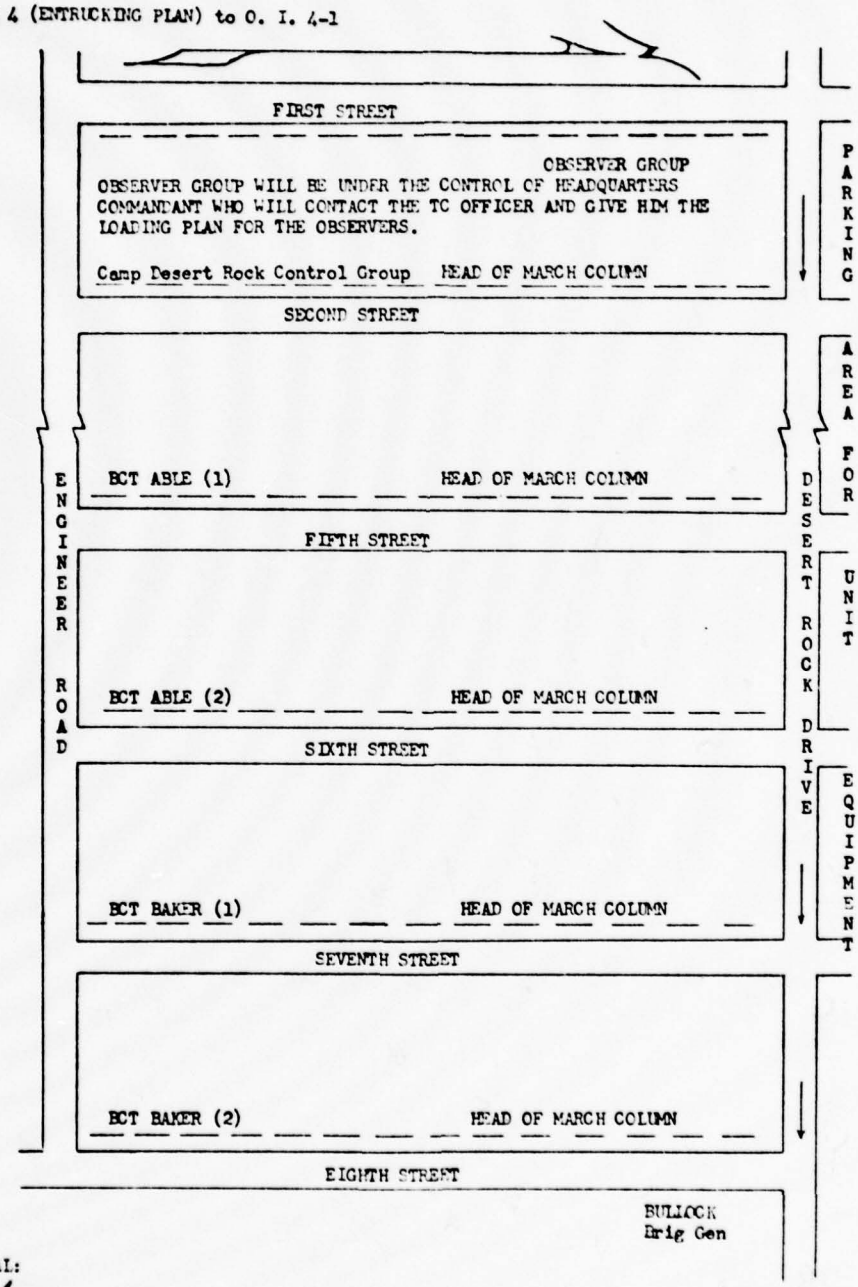
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Annex 4 (ENTRUCKING PLAN) to O. I. 4-1



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Trucks and busses which will be exposed to possible contamination will be equipped with two brooms each.

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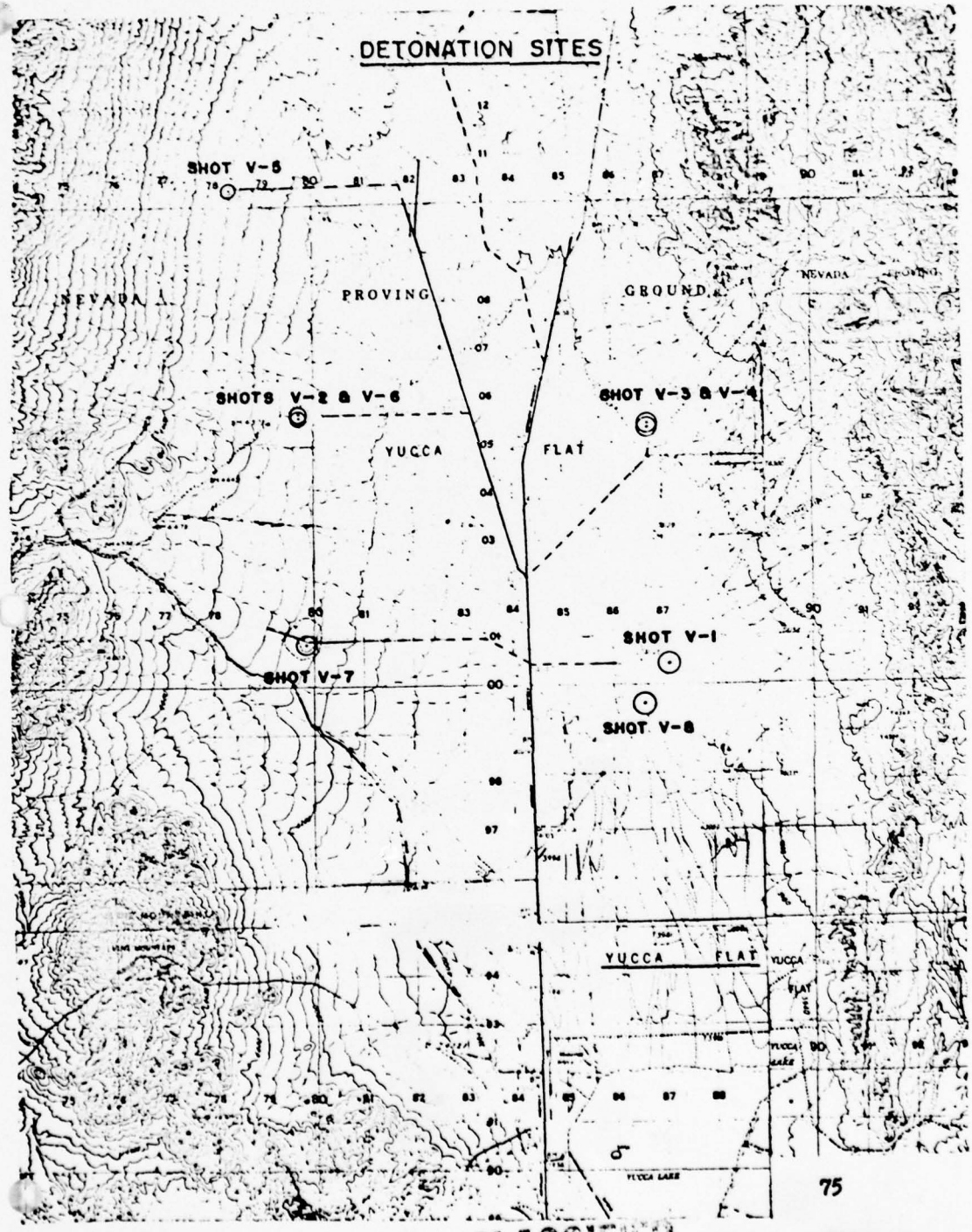
DISTRIBUTION

UNIT	COPY NO.
Sixth Army	1
Instr Gp - CDR	2
G3 - CDR	3
G4 - CDR	4
DPCO - CDR	5
CG - CDR	6
G1 - CDR	7
AG - CDR	8 - 9
G2 - CDR	10
CO - HQT ABLE	11 - 12
DPCA - CDR	13
CO - HQT BAKER	14 - 15
Cml-Rad-Safe Officer - CDR	16 - 17
PM - CDR	18
Trans Officer - CDR	19
Signal Officer - CDR	20
Surgeon - CDR	21
Hq Comdt - CDR	22
Ord Officer - CDR	23
OCAFF	24 - 29
DA - G3	30 - 35
AFSWP, Cp Mercury	36 - 41
G3 - CDR	42 - 43
AG Files	44 - 45
CO 2d Marine Corps (Hold)	46 - 47
PIO - CDR	48
C&GSC	49
CO, 26th Trans Trk Bn	50

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ATOMIC ENERGY ACT

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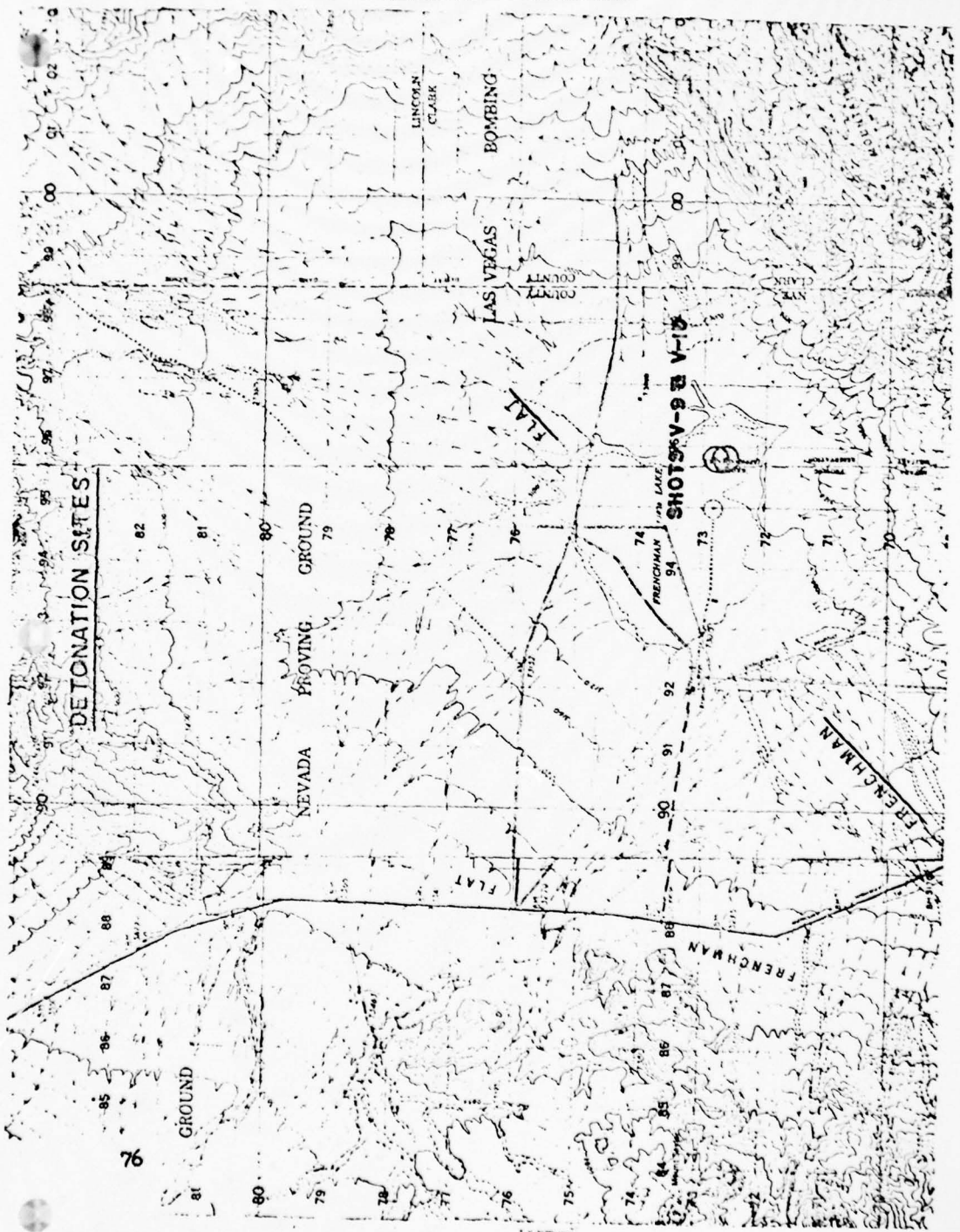
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...use of patients if the number of casualties should justify their use.

b. Air Evacuation.

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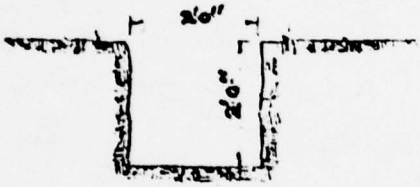
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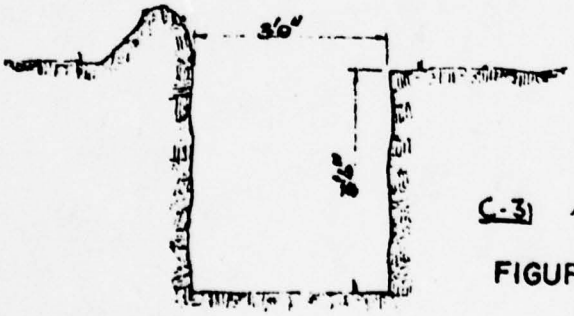
C-1 WOODEN STAKE

FIGURE 1



C-2 4'0" LONG

FIGURE 2



C-3 4'0" LONG

FIGURE 3

SYMBOL	DESCRIPTION	DATE	APPROVAL
	REVISIONS		

SANDIA BASE, NEW MEXICO

TEST COMMAND
ARMED FORCES SPECIAL WEAPONS PROJECT

DES
DRWN TH
CHK
LDR
SUPV
HEAD
MGR
ENGR CONS
PROJ MGMT
DIRECTOR

SIXTH ARMY
EMPLACEMENTS

DRAWINGS NO. C-1, C-2, C-3 [redacted]

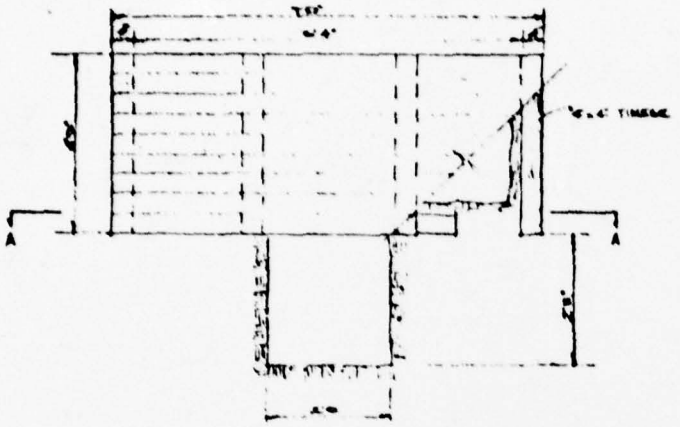
APPROVED _____ DATE _____
FOR THE COMMANDER

SATISFACTORY TO _____
DATE _____

SCALE _____ SPEC _____
SHEET 1 OF 1 77
TC DRAWING NO _____

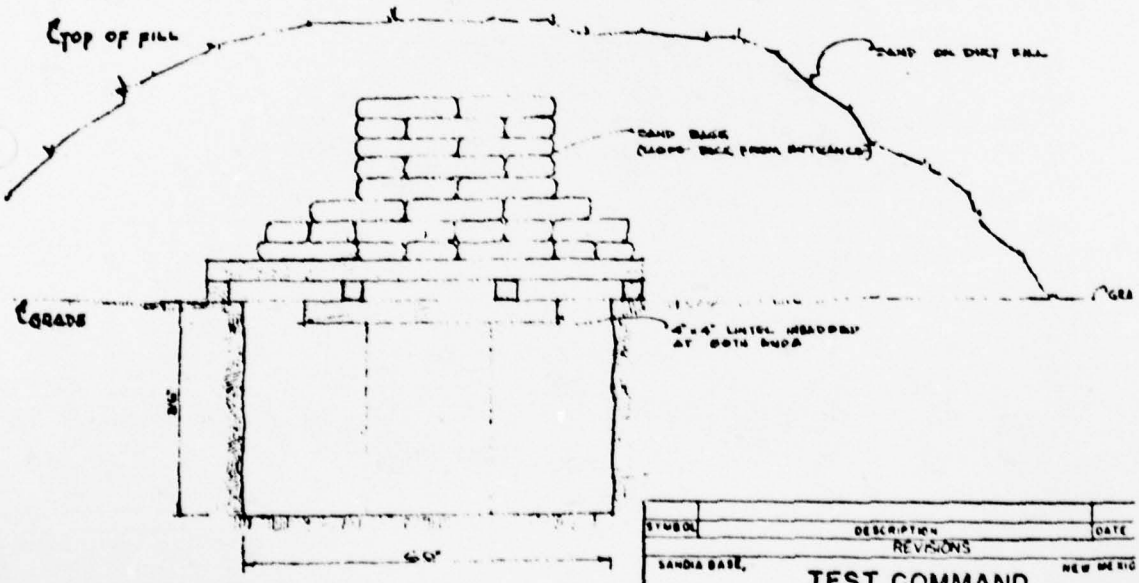
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UNCLASSIFIED SECRET
SECURITY INFORMATION



C-4

FIGURE 4



SYMBOL	DESCRIPTION	DATE
	REVISIONS	

SANDIA BASE, NEW MEXICO

TEST COMMAND
ARMED FORCES SPECIAL WEAPONS PROJECT

DES
DRWN TR
CHK
LOK
SURV
HEAD
BGR
ENGINEERS
PROJ MGMT
DIRECTOR
SATISFACTORY TO
DATE

SIXTH ARMY EMPLACEMENTS

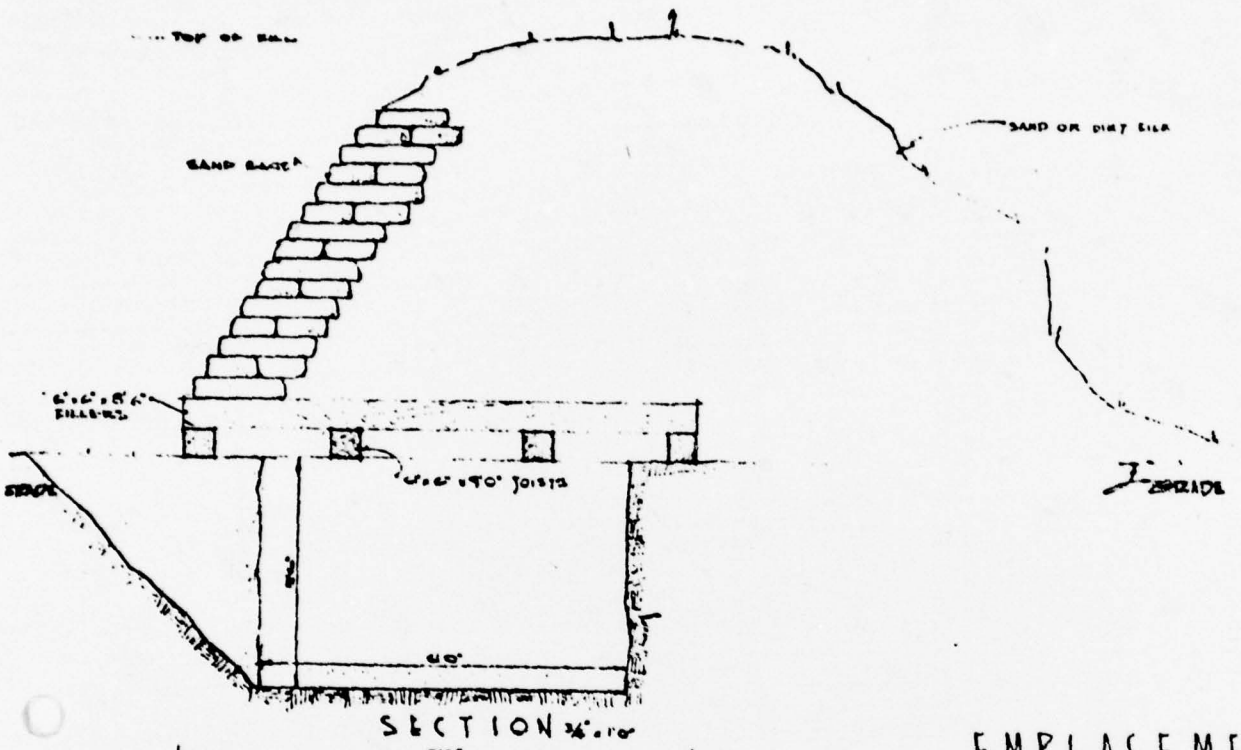
DRAWINGS NO [redacted] C-4

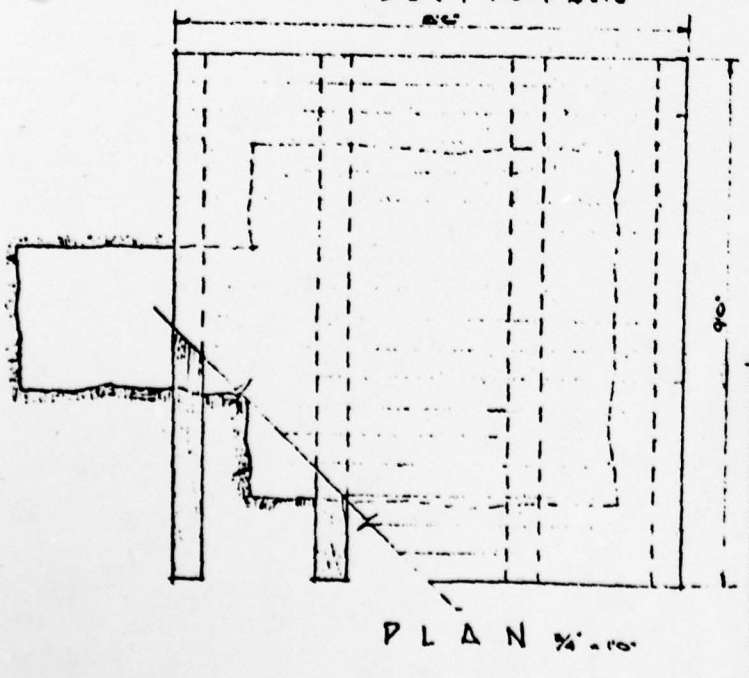
APPROVED _____ DATE _____
FOR THE COMMANDER

SCALE SPEC
SHEET 1 OF 1
TO DRAWING NO

SECRET UNCLASSIFIED RESTRICTED DATA
SECURITY INFORMATION ATOMIC ENERGY ACT 1946

[redacted]





EMPLACEMENT
"B"
C-5

FIGURE 5

SYMBOL	DESCRIPTION	DATE	APPR.
	REVISIONS		

SANDIA BASE, NEW MEXICO

TEST COMMAND
ARMED FORCES SPECIAL WEAPONS PROJECT

SIXTH ARMY EMPLACEMENTS
EMPLACEMENT "B"
DRAWING "B"

DES
APPVD TR
CHK
CON
SUPV
HEAD
MGR
ENGINEER
PROJ MGMT
DIRECTOR

APPROVED _____ DATE _____
FOR THE COMMANDER
SATISFACTORY TO _____
SCALE _____ SPEC
SHEET 1 OF 1

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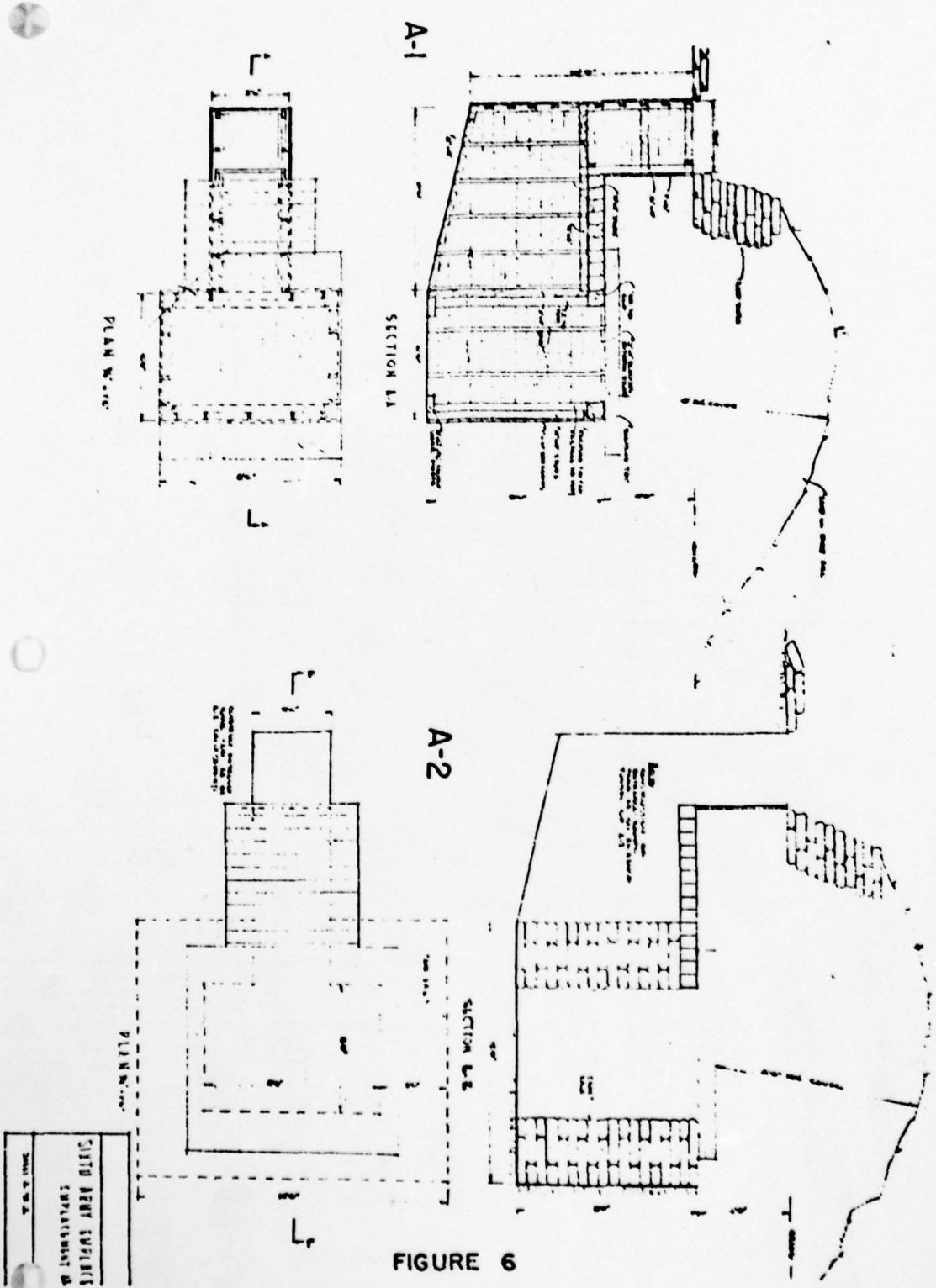


FIGURE 6

A-1 and A-2 Type Emplacements

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HQ CAMP DESERT ROCK
LAS VEGAS (872536) NEV
011200 June 1953

Annex 2 (SHOT VICTOR 1) to Final Report
EXERCISE DESERT ROCK V

I. GENERAL.

Planning for Shot V-1 was completed 13 March 1953. Incoming observers arrived in camp at the same time.

Due to the commitments of the Exercise Director on 15 March, a full dress rehearsal for Shot 1 was held on 14 March in the Yucca Flat area.

The two (2) BCT's participating in the tactical maneuver consisted of personnel from the permanent party of Camp Desert Rock. Although composite units, organized in a short space of time, they functioned rather well in the field.

Rehearsal day found the BCT's and observers leaving camp at 0800 hours. A well conducted road march was completed on schedule and all personnel were in the trenches at the prescribed time.

Actual shot day conditions were assumed during the rehearsal and troops attacked at 1200 hours, maneuvered through the attack phase of the exercise (approximately 1,000 yards) and were then marched through the equipment display area.

Shortly after the troops attacked, the observers were marched through the equipment display area to observe emplaced equipment.

Transportation arrived in the display area and transported the observers and troops to Camp Desert Rock without incident.

At 0153 on 17 March, the control group departed Camp Desert Rock for Yucca Flat. All march units closed in the entrenchment area at 0400. Drivers closed in the parking area, 5 miles south of ground zero, at 0405.

An orientation on atomic bomb detonations and procedures to be followed before, during, and subsequent to the blast was delivered in the entrenchment area from 0420 to 0510 hours.

At H-Hour minus 10 minutes (0510 hours) the Exercise Director ordered all personnel into the prepared trenches 3,500 yards from ground zero. At H-Hour minus 2 minutes, all personnel were ordered to crouch down in the trenches and remain in that position. A siren was sounded for 30 seconds at this time and personnel in the vehicle park were also ordered to crouch down in the trenches.

The Atomic Energy Commission took over on the public address system at H-Hour minus 90 seconds and announced the time in 30 second increments until 10 seconds remained. At this time the announcer started counting each second remaining "9, 8, 7, 6, 5, 4, 3, 2, 1 and NOW."

The first indication of the detonation was an extremely bright light. This was followed by a very noticeable shaking and rolling of the ground. At H plus 8 seconds the blast wave passed over the trench. The command to rise came over the address system at H plus 9 seconds. At that time a large fireball was observed and the area between the trenches and ground zero was completely engulfed in a cloud of dust.

The BCT's started to attack at 0535 although the area was still very dusty. The attack progressed on schedule and the commanders of the units exercised good control over their subordinate units by means of radio communication.

The objective, 1,200 yards to the west and adjacent to ground zero, was reached at 0700 hours, a distance of 3,800 yards from the line of departure (entrenchment area).

The observer group departed for the display area at 0545 escorted by a member of the instructor group. Equipment displayed for indoctrination purposes was observed during the march. Rad-Safe halted the observers at 700 yards from ground zero.

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A Marine Corps Helicopter Group (H-19) provided an airlift from the trenches to the 2,500 yard line, a distance of 1,000 yards, shortly after the attack started. A total of sixteen (16) men were transported in this manner.

Observers and HCT personnel entrucked at 0800 for return trip to Camp Desert Rock. All units closed in Camp Desert Rock at 1040 hours 17 March.

The shot was open to newsmen, photographers, radio and television broadcasters. Newsmen and radio personnel were present in trenches before, during and after the detonation. Immediately after the detonation, numerous soldiers were airlifted, via helicopter, to News Nob to be interviewed by radio commentators and newspaper reporters.

Damage to equipment and displays was slight beyond 1000-1500 yards from ground zero. Bunkers were generally in good condition, although partially filled with sand. A windshield on a 3/4 ton truck was broken and paint on the body was scorched at 1,500 yards.

A total of 1741 persons participated in the exercise including 1686 military personnel, 30 civilians, 20 representatives of the press, 3 radio broadcasters, and the Director of the Federal Civil Defense Administration and his assistant.

At ground level, in the entrenchment area, temperature was recorded at 36.9 degrees Fahrenheit. Winds were variable at 3 knots per hour.

II. INTELLIGENCE AND SECURITY.

The first detonation of the series was declared an open shot by the Atomic Energy Commission and the Department of Defense in order to publicize the effect of nuclear explosions to the civilian populace in support of the Civil Defense Program. Twenty reporters were chosen by lot to go with the troops in the forward trenches. These 20 reporters, and the newsmen, cameramen, television representatives and newsreel cameramen present on News Nob , were uncleared personnel but were permitted to interview troops. Security was maintained by pre-briefing military personnel to be interviewed.

Desert Rock photographers were allowed to operate with Secret clearance. These photographers were assigned duties in support of the Department of the Army Public Information Office detachment.

III. INSTRUCTOR GROUP.

On 14 March 1953 a rehearsal was held for the personnel attending Shot V-1. This consisted of a trip to the forward area, a running comentary by a member of the Instructor Group of what was required of the individual observers, an orientation of the shot area, discussion of the events to take place prior to the shot, and a trip through the display area with a discussion of the predicted damage to equipment. This discussion was presented on the CONFIDENTIAL level due to the security problems in the shot area.

On 15 March the first group of observers received the first half of the following eight hour orientation course:

SUBJECT	TIME
Introduction and Security	30 min
Atomic Weapons Family	40 min
Characteristics and Effects	50 min
Medical Aspects	30 min
Protective Measures and Radiac Instruments	30 min
Army Delivery Means	30 min
Air Force Delivery Means	40 min
Navy Delivery Means	40 min
Tactical Employment	80 min
History of Desert Rock	20 min
Seminar	20 min

The remaining orientation was completed on 16 March. During the evening of 16 March an orientation of the tactical situation and procedures on shot day was given to the late arrivals.

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On 17 March Shot V-1 was detonated on schedule. Following the detonation a tour was made of the display areas and actual damage was observed. The conduct of orientation for the observer group in the display areas was accomplished by the Instructor Group using mobile power loud speakers mounted on 3/4 ton trucks, and, for the ICT's, hand power megaphones. An instructor met each ICT in the tactical objective area and led the formation through the display area as far forward as radiological safety would permit. Instructors led the observer group to the first display area and discussed the damage to equipment found in that area. By leapfrogging one another at 500 yard intervals (3000-2500-2000-1500) each sound truck was operative, and the instructor waiting for the group as it moved forward toward ground zero. This procedure was continued until the radiological safety limit was reached. This method of operation allowed each instructor time to arrive at the position in advance of the observer group, inspect the damage to equipment in the area, and prepare a brief discussion of the effects of the explosion.

On 18 March a study was made of damage and effects and a report was submitted to the Deputy Post Commander for Operations.

During the period 19-20 March revisions in lesson plans were made. Informal and formal rehearsals were conducted by the instructors to incorporate what had been learned from the first shot.

IV. SIGNAL.

Preparations for this and subsequent shots commenced early in January. Two (2) spiral four cables were installed from Camp Desert Rock to a point terminating in the Yucca Flat Area. An additional two (2) lines in the Camp Mercury cable were made available to the Exercise Director for use with the public address system. This address system was centrally located to provide coverage for the entire entrenchment area. In addition, telephone communication was used to issue instructions to battalion commanders when desired.

The Battalion Combat Team commander was furnished a AN/PRC-10 radio to communicate with the Exercise Director and also with his subordinate commanders. Due to lack of skilled operators, and numerous sets operating on a common channel, communications were not completely satisfactory during the attack phase of the exercise.

One 1/4 ton vehicle used by the Rad-Safe officer laid wire from a dispenser during the movement towards ground zero. This was extended to keep the Rad-Safe personnel in communication with the control trench.

V. RADIOLOGICAL SAFETY.

Shot Day Operations.

As soon as the blast from the atomic explosion passed, the monitor parties moved to their initial positions from which they proceeded on their missions. The "pie" sector monitors had little difficulty. They reached the 2.5 r/hr limit (500 yds from GZ on the left and 700 yards on the right) quickly, and marked it with engineer tape. The 5 r/hr line was not more than 100 yards beyond. Because of the heavy dust cloud, the right monitor had some difficulty in keeping the right flank unit of the attacking force in view. After about 10 minutes the cloud dispersed and no further difficulty was encountered. The CER personnel moved somewhat too far ahead of their units to properly signal their unit commanders. Otherwise, except for photographers roaming at will, events transpired as planned.

Special Operations.

Recording of immediate intensities was accomplished by exposing film badges in National Bureau of Standards holders on the parapets and in various emplacements of the test area. Although many were lost by being blown away or covered by cave-in, enough were recovered to indicate the protection from radiation provided by these emplacements.

Evaluation of Operations.

This topic will be discussed under Shot 2.

Immediate Radiation Dose in Roentgens Received in Emplacements.

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Distance from Ground Zero Yards	C 1 Expost Post	C 2 Slit Trench	C 4 1 Man Emplacement	C 5 2 Man Emplacement
1000	Not Over 1500	238	112	106
1500		16.2-18.0	6.75	3.9
2000	34		1.2	.6
2500	6.4	.15	.15	.6
3000	1.47		0	
3500	.3	0	0	0
3700	.1	-	-	-

NOTE: These data represent the dosages from immediate radiation personnel protected by emplacements and unprotected at the same distance from GZ would have received. Films were exposed in National Bureau of Standards holders.

VI. MEDICAL.

Medical Support for personnel.

Medical support for this shot involved more personnel than normally would have been used because of two factors. These were the fact that Camp Desert Rock personnel formed the two participating RCT's, and the shot being an open one there were numerous newspaper, radio and television men as well as civil defense personnel involved and requiring medical care.

The support given was as follows: Each march unit was assigned an ambulance for evacuation purposes. In addition, an ambulance, equipped with supplies and personnel to act as an aid station, was assigned to the control group and to the news and civil defense column. A medical officer accompanied each of these ambulances. The surgeon was a member of the control group. The aid station remained at News Nob to support the civilian group throughout the exercise. The aid station for the participating troops, originally established in the parking area, moved forward to the vicinity of control trench immediately following the shot. Four company aid men were assigned to each RCT and two company aid men were with the observer group.

There were no casualties of any kind with either the military or civilian groups during either the rehearsal or the actual exercise.

A helicopter equipped for litter evacuation was available for use. This was stationed at the helicopter strip well to the rear. Both radio and telephone communication was available for its dispatch.

Medical Evaluation of test items.

As no medical test items were involved in this shot, no evaluation was carried out.

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DAMAGE EVALUATION REPORT

SHOT V - 1

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 15 KT	Condition of equipment or emplacement after shot. Actual yield 16.3 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Vehicle, Landing Tracked (Unarmored) Mk 4, LVT (4)	GZ	Facing tower on angle of approximately 45 degrees. Switches and instruments in good condition. Drivers window open. Glass on left hand side of assistant drivers window broken. Batteries missing, right exhaust pipe bent, plug wire on right engine disconnected. Fan belts on right engine loose. No oil in engines. Fire extinguishers discharged. Right air cleaner bent and damaged, left rear idler worn. Fuel tank bent and open. Body on right side bent from previous blast. Tool compartment covers on left side broken off, hinges and cover bent.	Completely destroyed. Highly contaminated.	Major item completely destroyed. Internal part of controlled differential and steering band laying under M24 tank 520 yards from GZ. Boggie wheel and bracket were thrown 540 yards. Sprocket was thrown 550 yards. Large sections of body were laying at the 500 yard line. A section of track was found at the 1000 yard line.	Major item totally unrepairable.
Double apron barbed wire obstacle	100 yds	Long axis, broadside to blast. 25 feet standard double apron fence.	Severe, wire blown from stakes. Stakes bent and displaced.	Completely destroyed.	Material: 3 long pickets 6 short pickets 1/3 reel barbed wire Man hrs: Two (2)
Double apron barbed wire obstacle	200 yds	Long axis, broadside to blast. 25 ft standard 4 x 3 pace double apron fence	Severe, wire blown from stakes. Stakes bent and displaced.	Completely destroyed.	Material: 3 long pickets 6 short pickets 1/3 reel barbed wire Man hrs: Two (2)

SHOT V - 1

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 15 KT	Condition of equipment or emplacement after shot. Actual yield 16.3 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Double apron barbed wire obstacle	300 yds	Long axis, broadside to blast. 25 ft standard 4 x 3 pace double apron fence.	Severe, wire blown from stakes. Stakes bent and displaced.	Completely destroyed.	Material: 3 long pickets 6 short pickets 1/3 reel barbed wire Man hrs: Two (2)
Double apron barbed wire obstacle	400 yds	Long axis, broadside to blast. 25 ft standard 4 x 3 pace double apron fence.	Wire blown from stakes. Stake bent and displaced.	Completely destroyed.	Material: 3 long pickets 6 short pickets 1/3 reel barbed wire Man hrs: Two (2)
C-1 Stake	500 yds	4" x 4" x 2'	Severe, stake will probably be heavily scorched and displaced	No trace of stake could be found.	Material: 1 - 4" x 4" x 4'10" stake Man hrs: ½ with auger and shovel
C-2 Trench	500 yds	Broadside to blast. 2' x 4'6" x 2' deep	None	Completely filled	Ditcher ½ hr Hand labor 2 man hrs
C-3 Trench	500 yds	Broadside to blast. 3' x 4' x 3'6" deep	None	Completely filled	Ditcher ½ hr Hand labor 2 man hrs
C-4 Bunker	500 yds	Entrance facing GZ. 6' x 4' x 3'6" deep	None (Some spalling damage only)	Totally destroyed.	Material: 12 - 4"x4"x16' 90 1"x6"x16' Man hours 2½ hrs Dozer ¾ hrs Ditcher ¼ hr Hand labor 7½ hrs
Double apron wire obstacle	500 yds	Long axis, broadside to blast. 25 ft standard 4 x 2 pace double apron fence.	Severe, wire blown from stakes	Completely destroyed.	Material: 3 long pickets 6 short pickets 1/3 reel barbed wire Man hrs: Two (2)

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DAMAGE EVALUATION REPORT

SHOT V - 1

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 15 KT	Condition of equipment or emplacement after shot. Actual yield 16.3 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
C-5 Bunker	500 yds	Entrance facing GZ. 6' x 6' x 5'6" deep	None. (Some spalling damage only)	Emplacement completely destroyed. Material scattered over 50' radius. 80% of lumber salvageable.	Material: 20-6"x6"x9' 18-1"x6"x16' 150 sand bags Man hrs: 12 hrs Ditcher: ½ hr Hand labor: 10½ man hrs Dozer: 1 hr
Tank, Light M24, with 75 MM Gun	500 yds	Facing GZ. Two tachometers were missing but all other instruments were in operating condition. The ventilation blower was missing and the glass in defroster was broken. Right distributor cap was not clamped. Generator belt on left engine missing. Left starter relay cover missing. Right front dust shield torn loose. Vehicle was fueled and lubricated.	May be overturned with moderate damage to tracks.	Vehicle had been pushed back about 60 ft. Front of vehicle was burned. Instrument panel and interior wiring ripped loose. Defroster, spot light and headlamps torn off. Dust shields were torn loose and fenders were buckled. Largest damage was done to left side of vehicle. Periscope cover was bent. Oil filler caps on both engines were opened. There was no sign of fuel having burned.	Repair and check all wiring. Change batteries. Drain oil and refill all gear cases. Replace head lights. Replace defroster and spot lights. Clean entire vehicle. Would take about 60 hours to repair.
Gun 75 MM, mounted	500 yds	Facing GZ. Excessive leaks in recoil mechanism. Turret safety lock and safety features in good condition. Breech mechanism handle missing and breech frozen and slightly rusted. Paint condition is good.	Moderate damage to gun (elevating and traversing mechanism)	Gun tube burned badly. No damage to lands and grooves. No damage to recoil mechanism. Front shield badly burned.	Would take up to 40 man hrs to repair.
Machine gun, Cal 30	500 yds	Facing GZ. Outside of gun in good condition and gun mount in working order. Gun is missing a few internal parts.	Moderate, barrel and major parts may be distorted. Will be displaced which may damage sights.	Major item thrown 80 yards. Mount thrown 31 yards to left and forward of weapons position after shot. Mount was ripped very badly and	Weapon not repairable.

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 15 KT	Condition of equipment or emplacement after shot. Actual yield 16.3 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Machine gun, Cal 30 (Cont'd)				middle leg torn off and thrown 70 yards from the mount. Machine gun burned very badly.	
C-1 Stake	1000 yds	4" x 4" x 2'	None	Scorched but still intact.	None
C-2 Trench	1000 yds	Broadside to blast. 2' x 4'6" x 2' deep	None	Slightly caved in. Still serviceable.	10 minutes with shovel.
C-3 Trench	1000 yds	Broadside to blast. 3' x 4' x 3'6" deep	None	Caved in badly. Unserviceable.	½ hour with ditcher or 2 man hours
C-4 Bunker	1000 yds	Entrance facing GZ. 6' x 4' x 3'6" deep	None	Entrance scorched. All sandbags need replacing. Structure shaken up, but serviceable.	100 sand bags 1 dozer hour 3 man hrs
HMG Emplacement	1000 yds	Facing away from GZ.	None	Unserviceable. Replace	½ hour ditcher or 1 hour hand labor.
C-5 Bunker	1000 yds	Entrance facing GZ. 6' x 6' x 5'6" deep	None	All sandbags burnt and need replacing. Sand fell into emplacement. Wall back of entrance scorched. Emplacement still serviceable.	150 sanibags, 3½ man hours 1 dozer hour.
LMG Emplacement	1000 yds	Facing from GZ.	None	Slight cave in. Still serviceable	½ man hour
LMG Cal 30	1000 yds	Weapon facing away from GZ. Sights, body and barrel of weapon in good condition. Few missing parts from internal sections.	None	No damage done to weapon. Weapon was not moved at all	½ hour to clean
Browning Machine Gun	1000 yds	Facing away from GZ. Barrel operating handle, tripod sights and main body of gun	None	Blast did not move gun. Foxhole caved in putting rear legs of mount	½ hour to clean

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DAMAGE EVALUATION REPORT

SHOT V - 1

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 15 KT	Condition of equipment or emplacement after shot. Actual yield 16.3 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Browning Machine Gun (Cont'd)	1000 yds	in good condition. Few parts missing from internal part of weapon.		slightly in hole. Handles burnt slightly. Front of barrel scorched. No other damage.	
Telephone, EE8	1000 yds	Broadside to blast. Serviceable condition.	Light. May displace.	Serviceable.	None required.
Flamethrower, M2A1	1500 yds	Top toward GZ, laying on ground	None	Paint in good condition, hose intact, and not burnt or broken. The mount had been blown away and the equipment moved about 1 ft. It could have been filled and fired.	None
C-1 Stake	1500 yds	4" x 4" x 2'	Will receive heavy scorch but will not displace.	Slightly scorched but still useable.	None
C-2 Trench	1500 yds	Broadside to blast. 2' x 4'6" x 2' deep	None	No damage	None
C-3 Trench	1500 yds	Broadside to blast. 3' x 4' 3'6" deep	None	No damage	None
C-4 Bunker	1500 yds	Entrance facing GZ. 6' x 4' x 3'6" deep	None	Sandbags burned, need replacing. Entrance needs cleaning out. Slight cave in inside emplacement. Easily repaired.	100 sandbags, 3 man hours 3/4 dozer hours
C-5 Bunker	1500 yds	Entrance facing GZ. 6' x 6' x 5'6" deep	None	Replace all sandbags. Slight amount of cleaning out necessary.	150 sandbags, 3½ man hours 1 dozer hour
Foxhole	1500 yds	Broadside to blast.	None	Slight cave in. Cleaning out necessary. Still serviceable.	½ man hours

DAMAGE EVALUATION REPORT

SHOT V - 1

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 15 KT	Condition of equipment or emplacement after shot. Actual yield 16.3 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
60 MM Mortar emplacement	1500 yds	Facing from GZ.	None	Caved in on all sides. Still serviceable.	½ man hour
HMG emplacement	1500 yds	Facing from GZ.	None	Slight cave in. Needs some cleaning out	½ man hour
Foxhole	1500 yds	Broadside to blast.	None	Slight cave in. Clearing out necessary	½ man hour
Truck, 3/4 ton 4 x 4, weapons carrier	1500 yds	Facing GZ. Fire extinguisher missing. Service brakes did not work. Rear view mirrors and right hand dash light were missing. Glass in speedometer broken. Right windshield broken and left windshield badly cracked. Radiator hood missing. Tips on spark plugs missing. Oil filter and oil line missing and oil seals on transfer case leaking badly. Pinion shaft bearing and seal worn out on front axle. Front propellor shaft bent and universal joints badly worn. Gas cap missing. Left front fender slightly bent. Right side of cowl next to right fender slightly bent. Tail gate badly bent. Tarpaulin and bows missing. Both running boards and brackets badly bent. Right rear tire flat. Spare tire and wheel missing.	Light damage, glass broken, top may tear.	Windshield was blown completely out and frame bent. Paint was burned and blistered on parts facing GZ. Tires were scorched but not burned. Tail gate was blown off vehicle and laying about one foot behind vehicle. Vehicle was moved backwards about one inch. No other visible damage.	It would take approximately 30 hours to repair this vehicle.

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JUN 53

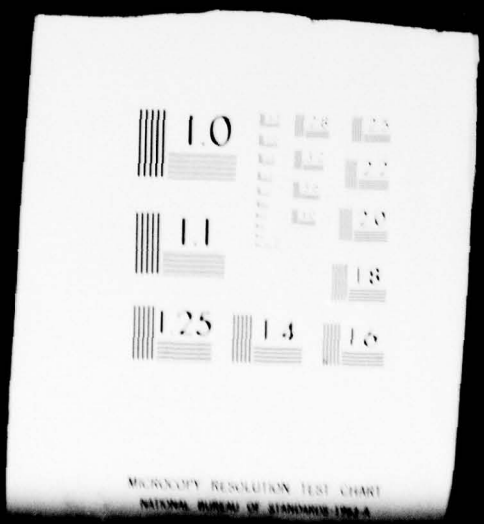
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DAMAGE EVALUATION REPORT

SHOT V - 1

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 15 KT	Condition of equipment or emplacement after shot. Actual yield 16.3 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Rifle, U.S. Cal 30 M1	1500 yds	Facing GZ. Rifle needed cleaning but otherwise in good condition. Sling missing.	None	Not moved or damaged	30 minutes to clean
Mortar, 60 MM, M5	1500 yds	Facing away from GZ. Paint in good condition. Sight missing.	None	No visible damage. Weapon not moved.	30 minutes to clean
MG Cal 30, Water cooled	1500 yds	Facing away from GZ. Outside of gun in good condition. Water plug and sight missing. Gun not mounted due to missing parts.	None	No visible damage. Weapon not moved.	30 minutes to clean
Carbine, Cal 30	1500 yds	Pointing away from GZ. Rear sight group, stock and hand guard missing.	None	Weapon not damaged or moved. Covered with dirt.	20 minutes to clean
Aiming Circle, M1	1500 yds	Facing GZ. Glass and leveling device broken. Tripod in good condition.	Light damage to optical parts. Knocked down.	Did very little damage to aiming circle other than push it over away from blast.	20 minutes to clean
Case, Aiming Circle	1500 yds	Facing away from GZ. Hole in middle of case 1" in diameter. Case painted.	None. May be displaced.	Blew top off case and threw it 15'. Moved body 3'.	Replace top on case.
SCR-300 Radio	1500 yds	Serviceable.	Light damage. Antenna bent. May be displaced	Serviceable. Surface of case in direction of GZ scorched.	None
C-1 Stake	2000 yds	4" x 4" x 2'	Light scorch. Not displaced.	Slightly scorched.	None
C-2 Trench	2000 yds	Broadside to blast. 2' x 4'6" x 2'	None	No damage.	None

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DAMAGE EVALUATION REPORT

SHOT V - 1

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 15 KT	Condition of equipment or emplacement after shot. Actual yield 16.3 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
C-3 Trench	2000 yds	Broadside to blast. 3' x 4' x 3'6" deep	None	No damage.	None
C-4	2000 yds	Entrance facing GZ. 6' x 4' x 3'6" deep.	None	Sandbags need replacing.	100 Sandbags 3/4 dozer hrs 2½ hours labor.
EMG emplacement	2000 yds	Broadside to blast.	None	Slight cave in.	½ hour shoveling
81 MM Mortar emplacement	2000 yds	In position, facing GZ.	None	Slight cave in.	½ hour shoveling
60 MM Mortar emplacement	2000 yds	In position, facing GZ.	None	Slight cave in.	½ hour shoveling
57 MM Recoilless rifle emplacement	2000 yds	Long axis, broadside to blast.	None	Slight cave in.	½ hour shoveling
C-5 Bunker	2000 yds	Entrance facing GZ. 6' x 6' x 5'6" deep	None	Half of sandbags need replacing. Entrance partially caved in. Still serviceable otherwise.	75 sandbags 3 man hours 1 dozer hour
Mortar, 81 MM	2000 yds	Facing away from GZ. Generally good condition. Paint good condition. Sight and cross level missing.	None	No visible damage. Not moved by blast.	½ hour to clean
Carbine, Cal 30 M1	2000 yds	Laying on left side pointing toward GZ. Stock and hand guard burned on left side. Otherwise in good condition.	None	Not moved or damaged by blast.	½ hour to clean
105 MM Howitzer, mounted on motor Gun carriage, M7B1	2000 yds	Weapon facing GZ. Recoil mechanism, cradle and paint in good condition.	None	No visible damage. Not moved by blast.	None

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DAMAGE EVALUATION REPORT

SHOT V - 1

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 15 KT	Condition of equipment or emplacement after shot. Actual yield 16.3 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
105 MM Howitzer, mounted on Motor Gun carriage, M7B1 (Cont'd)	2000 yds	Lanyard missing. Breech mechanism functions properly but is slightly rusted. Powder chamber slightly rusted.			
Carriage, Motor, for 105 MM Howitzer	2000 yds	Facing GZ. Glass broken in tachometer and instrument panel burned. Steering linkage binding. Clutch pedal and accelarator frozen half way down. Left tail light and air hose broken. Seats burned. Engine hatches and storage boxes bent. Oil level low. Right exhaust deflector and batteries missing. Number 5 and 6 road wheels on left should be replaced. Also numbers 1, 2 and 4 on right side. Volute spring on left side weak.	None	Slightly burned in front.	None
57 MM Recoilless Rifle	2000 yds	Facing away from GZ. Sight group missing. Otherwise bluing, firing mechanism, rifling in tube, outside of weapon in good condition.	None	No visible damage. Not moved by blast.	30 minutes to clean
MG, Cal 30 water cooled	2000 yds	Facing away from GZ. General condition good. Paint good.	None	No visible damage. Not moved by blast.	30 minutes to clean
Mortar, 60 MM	2000 yds	Facing away from GZ. Cross level missing otherwise in good condition.	None	No material damage to weapon although base plate turned to left by blast.	30 minutes to clean
SCR-300 Radio	2000 yds	Broadside to blast. Serviceable	None	No damage	None required.

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DAMAGE EVALU[illegible]N REPORT

SHOT V - 1

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 15 KT	Condition of equipment or emplacement after shot. Actual yield 16.3 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Telephone EE8	2000 yds	Broadside to blast. Serviceable	None	No damage.	None required.
C-1 Stake	2500 yds	4" x 4" x 2'	None	Face to GZ charred.	None
C-2 Trench	2500 yds	Broadside to blast. 2' x 4'6" x 2' deep	None	No damage	None
C-3 Trench	2500 yds	Broadside to blast. 3' x 4' x 3'6" deep	None	Slight cave in	½ man hour with shovel
C-4 Bunker	2500 yds	Entrance facing GZ. 6' x 4' x 3'6" deep	None	Sandbags slightly singed. Slight cave in.	None
C-5 Bunker	2500 yds	Entrance facing GZ. 6' x 6' x 5'6" deep	None	Sandbags slightly singed. Slight cave in on sides.	None
57 MM recoilless rifle emplacement	2500 yds	Long axis, broadside to blast.	None	No damage	None
81 MM Mortar emplacement	2500 yds	In position, facing GZ.	None	No damage	None
HMG emplacement	2500 yds	Broadside to blast.	None	No damage	None
Rifle, Cal 30 M1	2500 yds	Facing away from GZ. Rear sight nut missing. Weapon serviceable.	None	No apparent damage. Not moved by blast.	20 minutes to clean
Rifle, 57 MM recoilless	2500 yds	Pointing toward GZ. Paint and outside of weapon in good condition. Sight missing.	None	Not moved and no damage done	30 minutes to clean
MG, Cal 50, with mount AA M63	2500 yds	Pointing toward GZ. Rear sight missing otherwise in good condition.	None	Not moved and no damage done	20 minutes to clean

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DAMAGE EVALUATION REPORT

SHOT V - 1

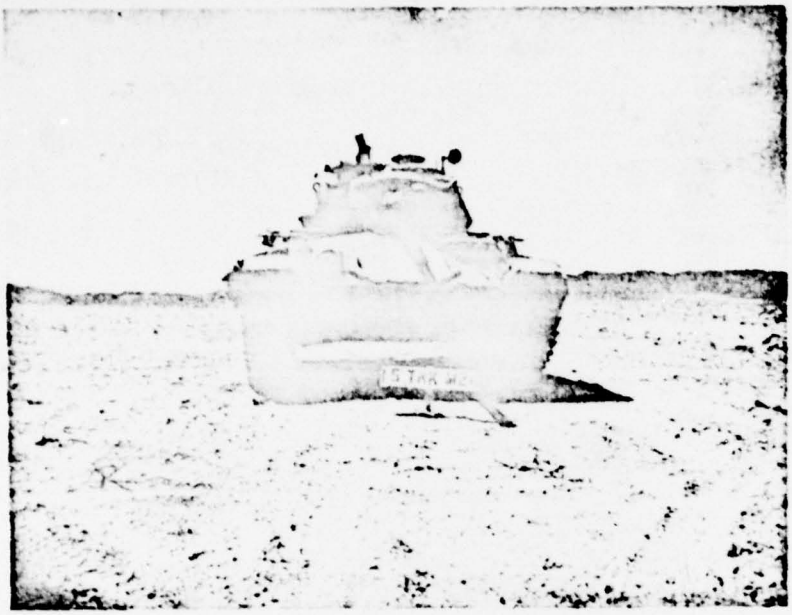
Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 15 KT	Condition of equipment or emplacement after shot. Actual yield 16.3 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Mortar, 81 MM	2500 yds	Facing away from GZ. Sight missing. Paint and general condition good.	None	Not moved and no damage done	20 minutes to clean
Tank, Medium, M4 with 75 MM Gun, 2" Mortar and 50 Cal Machine Gun	2500 yds	Facing GZ. Tachometer, speedometer, ventilation blower and all head lights missing. Instrument panel loose. Right tail light and auxiliary generator missing. Batteries were discharged and laying on side. Fire extinguishers discharged. 5 and 6 road wheels on left side need replacing. Volute springs weak. Track blocks burned and cracked. Fenders, dust shields, emergency escape hatch, right engine compartment door all missing. Final drives need new gaskets. Left engine door bent and hinges broken.	None	Slightly singed in front otherwise no damage.	None
75 MM gun, mounted on tank, medium M4	2500 yds	Facing GZ. Breech had been frozen but now working. Recoil mechanism working. Paint good. Lubrication poor.	None	No damage	None
Mortar, 2", mounted on tank, Medium M4	2500 yds	Facing GZ. Not in working condition due to missing parts. Outside of mortar slightly rusted.	None	No damage	None
MG, Cal. 50, mounted on tank, Medium, M4	2500 yds	Paint, mount and outside gun in good condition. Bolt and many internal	None	No damage	None

DAMAGE EVALUAT[illegible] REPORT

SHOT V - 1

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 15 KT	Condition of equipment or emplacement after shot. Actual yield 16.3 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
MG, Cal. 50, mounted on tank, Medium, M4(Cont'd)	2500 yds	parts missing.			
C-1 Stake	3000 yds	4" x 4" x 2'	None	No damage	None
C-2 Trench	3000 yds	Broadside to blast, 2' x 4'6" x 2' deep	None	No damage	None
C-3 Trench	3000 yds	Broadside to blast, 3' x 4' x 3'6" deep	None	No damage	None
C-4 Bunker	3000 yds	Entrance facing GZ, 6' x 4' x 3'6" deep	None	Sandbags slightly singed very slight cave in.	None
BAR Emplacement	3000 yds	Broadside to blast.	None	No damage	None
C-5 Bunker	3000 yds	Entrance to GZ, 6' x 6' x 5'6" deep	None	Sandbags slightly darkened	None
C-1 Stake	3500 yds	4" x 4" x 2'	None	No damage	None
C-2 Trench	3500 yds	Broadside to blast, 2' x 4'6" x 2' deep	None	No damage	None
C-3 Trench	3500 yds	Broadside to blast, 3' x 4' x 3'6" deep	None	No damage	None
C-4 Bunker	3500 yds	Entrance facing GZ, 6' x 4' x 3'6" deep	None	No damage	None
C-5 Bunker	3500 yds	Entrance facing GZ, 6' x 6' x 5'6" deep	None	No damage	None

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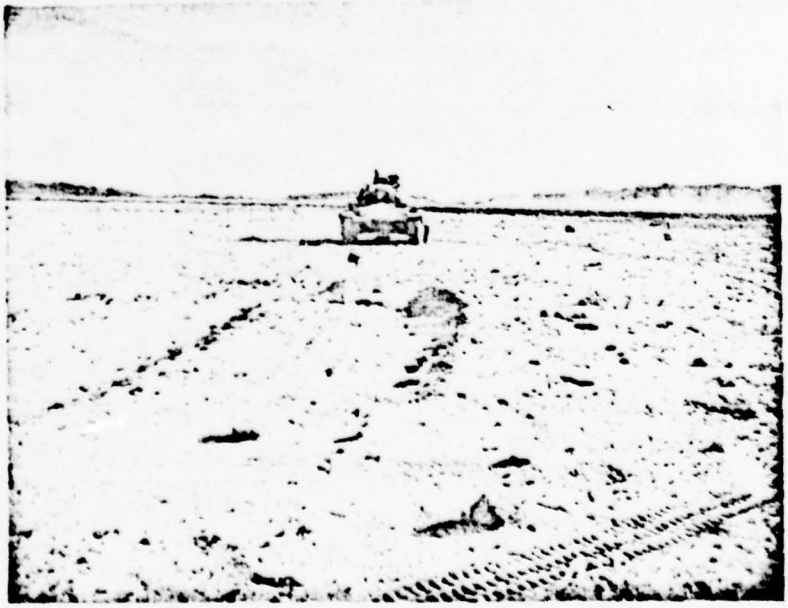


BEFORE

Tank, Light M24 w/ 75 MM Gun mounted 500 yds from Ground Zero

AFTER

Vehicle pushed straight back 60 ft. Front of vehicle burned interior wiring ripped loose



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BEFORE

HMG Cal. 50, 1000 yds from Ground Zero

AFTER

Fox hole caved in
Handles burned slightly. Front of barrel scorched



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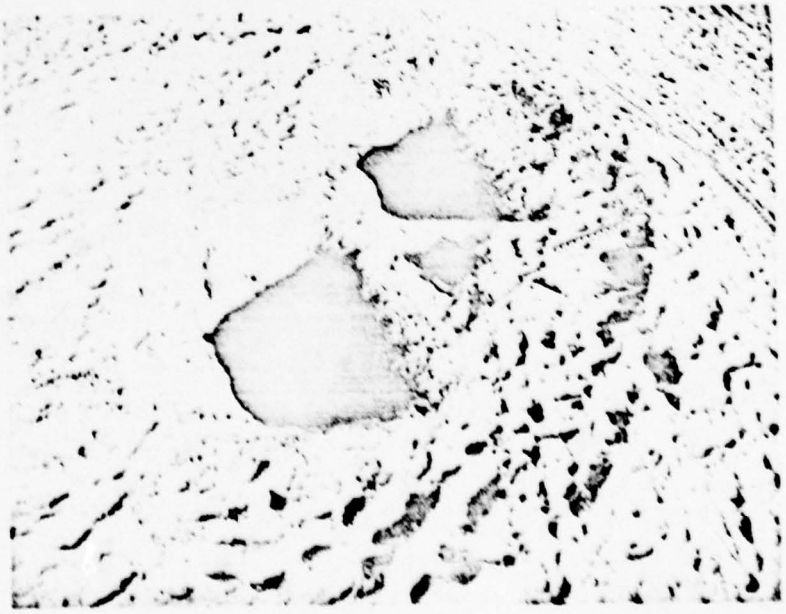


BEFORE

IMG 1000 yds from Ground Zero

AFTER

No damage done



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BEFORE

Aiming Circle M1
1500 yds from Ground
Zero

AFTER

Very little damage,
Blew top of case
off moved Aiming
Circle 3 ft.



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BEFORE

LMG 500 yds fr Ground Zero

AFTER

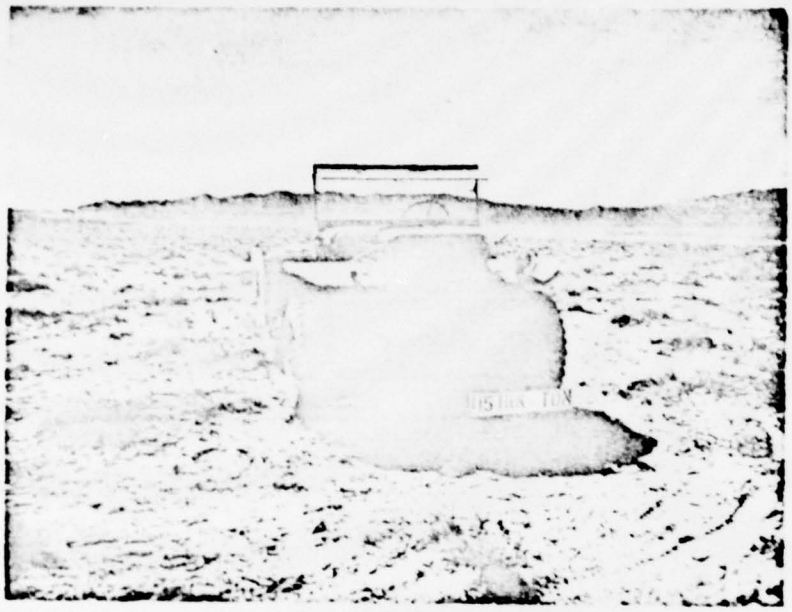
LMG thrown 80 yds, Mount thrown 31 yds to the left & forward of position. Mount ripped & burned badly



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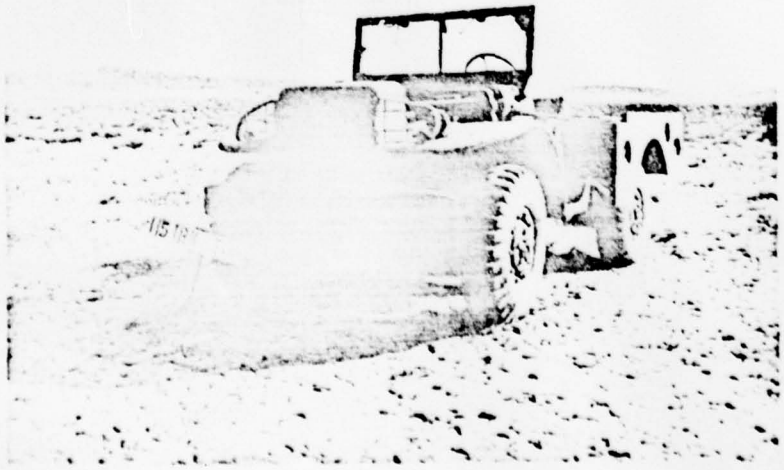


BEFORE

Truck, 3/4, 4x4
Weapons Carrier
1500 yds from
Ground Zero

AFTER

Windshield blown completely out, Frame bent , paint burned and blistered on parts facing Ground Zero. Tail gate blown off.



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BEFORE

HMG Cal. .30 1500 yds from Ground Zero

AFTER

No visible damage



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HQ CAMP DESERT ROCK
LAS VEGAS (87536) NEV
011200 June 1953

Annex 3 (SHOT VICTOR 2) to Final Report
EXERCISE DESERT ROCK V

I. GENERAL.

Incoming observers and troop personnel for Shot 2 closed in Camp Desert Rock on 20 March. Troop participants were from the Second, Third, Fifth, and Sixth Army Areas.

A full dress rehearsal was conducted on 22 March in the Yucca Flat Area, actual site for this shot. The control group departed Camp Desert Rock at 0807 hours and all units closed in the entrenchment area at 1045 hours.

Actual shot day conditions were in order during the rehearsal. One of the RCT commanders experienced some difficulty in placing members of his command in the allotted trenches. Another "dry run" remedied this situation.

The arrival and detrucking of approximately 3,000 officers and men at the entrenching area was accomplished in the one (1) hour allotted for this purpose. It was surprising to note the crowded conditions that existed when troops detrucked in the relatively small area.

The RCT started the simulated attack from the trenches at 1200 hours. The attack continued for 1,500 yards and at that point the advance was halted. This concluded the tactical phase of the rehearsal.

The observers and troop personnel were taken through the equipment and animal display area shortly after the tactical phase ended. Later the observers were taken to the site of Shot 1 to observe the damage to equipment from a previous detonation.

Movement for return trip started at 1350 hours and all personnel closed in Camp Desert Rock at 1632 hours. The rehearsal progressed on schedule and much experience was gained by the staff in executing this phase of the exercise.

The control group departed camp for Shot 2 at 0041 hours, 24 March. A total of 135 vehicles were required to transport the Control group, observers and troops to the shot site. All personnel closed in the entrenchment area at 0340 hours. Vehicles were moved to a motor park, 8.5 miles from ground zero.

A pre-shot indoctrination and orientation was delivered over the public address system from 0410 to 0500 hours.

At H-Hour minus 10 minutes the Exercise Director ordered all personnel into the trenches.

At H-Hour minus 2 minutes, all personnel were ordered to crouch low in the trenches. A siren blast of 30 seconds duration was sounded at this time.

At H-Hour minus 90 seconds, the Atomic Energy Commission took over the public address system and counted off the remaining time at 30 second intervals until reaching H-Hour minus 10 seconds. Once more came the now well remembered "9, 8, 7, 6, 5, 4, 3, 2, 1 and MCW count" (0510 hrs).

A very bright light, which seemed to linger longer than the light noticed during the first shot, was observed in the trenches. Very little ground shock was received but the noise was deafening. Debris falling into the trenches in large quantities, followed by dust conditions, obscured the vision of personnel. None of the debris was large enough to cause injury.

A large fireball, engulfed in a huge dust cloud, was observed initially. Soon after the blast, the wind direction changed and caused a dust cloud to blow over the troops in the entrenchment area. A reading of 18 mr was noted at the trenches.

At 0533 hours the RCT's attacked objectives 4,000 yards to the north. The unit on the east, nearest to ground zero, had to sideslip to the west as the advance neared ground zero because of radiation intensities. Troops were able to move to within approximately 500-700 yards of their objectives when halted by Rad-Safe personnel as no further advance could be made under the established radiation criteria.

[redacted]

Nine (9) volunteer officers were positioned in a trench 2,400 yards from ground zero during the blast. They were in constant wire communication with the control trench, 1,500 yards to the rear, before, during and after the blast. None of the volunteers experienced any ill effects and all felt their combat efficiency would have been unimpaired.

A Marine Corps Helicopter Group (H-19) conducted experiments during the shot. Four (4) helicopters were on the ground approximately 16,500 yards from ground zero during the detonation. Three (3) of the aircraft became airborne immediately after the detonation and prior to the arrival of the blast wave. One of the airborne aircraft proceeded towards the burst after the arrival of the blast wave and was flown to within 3,500 yards of ground zero. Dust and airborne radiation limited any further movement toward ground zero.

The shock wave produced no adverse effects on either airborne or parked helicopters. It was determined that the initial intense light from a detonation would not noticeably affect the pilot of an airborne helicopter providing the pilot was observing 180 degrees from the blast area.

An Army helicopter (H-23) was used to perform a rapid survey of the equipment and animals in the display area two (2) hours after the detonation. Using this mode of travel, it was possible to proceed to within 400 yards of ground zero.

The observer group departed the entrenchment area at 0631 hours for a tour of the equipment and animal display. Troop units also visited the display area at the conclusion of the tactical maneuver. Shortly after 0800 hours, march units started the return trip and all closed in Camp Desert Rock at 1032 hours.

The maneuver, motor movement and other portions of the exercise were executed according to schedule and without incident.

No damage occurred in protective trenches at 1,500 yards and beyond. Sheep positioned in the open were alive and walking around after the blast. All sand bags, facing ground zero, were burned at this distance.

Participating in the exercise were 2,848 military and 16 civilian personnel, a total of 2,864 persons.

At ground level, in the entrenchment area, at shot time, temperature was recorded at 50.7 degrees Fahrenheit. Wind velocity, from a direction of 310 degrees true north, was 2 knots per hour. Almost simultaneously with the burst, a wind of 4 - 6 knots from approximately 5 degrees developed.

II. INTELLIGENCE AND SECURITY.

The two Battalion Combat Teams arrived properly cleared, were briefed, performed in a most cooperative manner and presented no security problems before, during, or after the shot.

The vehicle convoy was cleared through the forward area more smoothly than on the previous shot.

Newspaper representatives were not allowed to be present in the Shot Area for this shot. The problem of safeguarding of classified information was greatly reduced because of the absence of news interviews.

Signal photographers were barred by the Atomic Energy Commission from taking pictures unless the photographers were "Q" cleared. No "Q" clearances have been received for any of the photographers although more than six weeks have elapsed since application for such clearance was initiated. In order for the exercise to receive proper documentation it is extremely necessary that certain photographs of the area be secured. Because of this new ruling Desert Rock must rely on photographers within Camp Mercury, who are already assigned other committments, in order to secure these photographs.

III. INSTRUCTOR GROUP.

On 21 March the orientation of one RCT in two groups of approximately 600 men each and the observer group for shot V-2 began. A rehearsal was held on 22 March which included a trip for the observer group to the display areas for Shot V-1. A discussion of the damage to equipment and the general condition of the area of the shot was presented.

The second RCT and remainder of the observer group instruction was completed on 23 March. A

1 hour evening orientation was given to late arrivals. This was followed by a showing of Training Film "Operation TINDLER-SNAPPER" (SECRET) to all observer personnel, on a voluntary attendance basis. This training film was favorably received. The same evening, in the open air theater, the following training films were shown on a voluntary basis to the BCT's: "The Effects of Atomic Explosion" (RESTRICTED), "Medical Aspects of Nuclear Radiation" (RESTRICTED), "Self-preservation in A-bomb Attack" (RESTRICTED), and "The Great Gun" (UNCLASSIFIED).

Shot V-2 was fired on 24 March and BCT's and observers were conducted through the equipment display area to observe, and receive orientation as to the effects of the detonation.

The conduct of the orientation for shot V-2 was improved both in the training auditorium and the forward area as a result of the use of proper equipment and training aids which were unavailable for shot V-1. Mobile sound trucks were furnished to the instructors with the BCT's to further assist in the orientation and control in the forward area.

IV. SIGNAL.

The requirements for this shot were generally the same as for Shot V-1. A few changes were made to provide a better communication system in the forward area.

Public address loudspeakers were installed on three (3) thirty (30) foot poles in the entrenchment areas. This provided a good coverage for all parts of the trench area.

Once more the battalion commanders were provided AN/PRC-10 radios for command and control purposes. More frequencies were assigned to the Exercise Director and, although radio communication was improved considerably, some transmission difficulty was experienced when the battalions were 2000-3000 yards from the control trench.

A more satisfactory wire communications service was provided in the display area than on Shot 1. This was accomplished by burying the wire along both sides of the equipment display triangle prior to the shot. This wire system terminated at stakes which were located at 500 yards intervals as far forward as 1000 yards from ground zero. Rad-Safe personnel installed telephones at these locations when wire communications with the control trench was desired.

V. RADIOLOGICAL SAFETY.

Shot Day Operations. The 2.5 r/hr limit was reached by the monitors at 850 and 1250 yards from ground zero on the right and left sides of the sector respectively. The 5 r/hr line was less than 100 yards beyond. Intensities ranging from 5 mr/hr upward were encountered over the entire test area. Rad-Safe Operations for Shot 2 were the same as for Shot 1 with two exceptions:

The monitor and marking party trucks were used to transport the volunteer observers to and from their trenches on the 2500 yard line.

A change in the direction of the wind caused part of the radioactive cloud to pass over the trenches. There was no appreciable fall-out in the trench area, but radiation intensities at ground level reached 18 mr/hr while the cloud was overhead. There was rather heavy fall-out of radioactive material in the maneuver area, particularly in a draw which lay between the attacking troops and their objective. The deposit in the draw was of high enough radiation intensity (about 14 r/hr) and of sufficient extend to call for withdrawal of the troops from the contaminated ground. The CBR monitors of the BCT's proceeded into the area without giving any indication of their readings to their unit commanders. Upon being directed by the Rad-Safe Officer, the unit commanders seemed to experience difficulty in withdrawing their men. However, little time was spent in the area. The first of these deficiencies may be attributed to training which emphasizes techniques and does not train the monitor in what to do when radiation fields of high intensity are approached and entered. The second deficiency probably resulted from the provisional organization of the attacking troops.

Special Operations.

Immediate radiation intensities were recorded in the same manner as in Shot 1.

The unexpected fall-out in the area west of Shot 2 ground zero extended over positions being prepared for Shot 5. Since the radiation intensity was approximately 2 r/hr work was discontinued. Prediction of decay rates and calculation of time of stay in the area was necessary to plan for engineer operations. Future intensities and conditional dosages were calculated. Early morning surveys were made daily to check the calculations. It was found that the actual reduction in intensi-

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readings was more rapid than calculated from the decay law for fission products. This can be attributed to dispersal by wind and a fortuitous rain. Contact was maintained with the Military Liaison Officer to obtain early information of the Atomic Energy Commission's intentions with regard to delaying the shot. All this information was essential to planning and the Exercise Director's decisions on participation of troops and observers. The urgency for continuing work in the area was removed when the AEC postponed the shot because the fall-out prevented completion of its preparation for the shot as scheduled.

Evaluation of Operations - Review of Shot 1 and Shot 2 operations lead to the following conclusions:

The work load on the photo dosimetry organization was excessive. This caused delay in reporting results of the film badge readings and dosage data. In view of the Surgeon General's policy that one-time exposures need not be reported, it was decided that maneuver troop units would be issued one film badge per platoon and observers would be issued one (1) film badge per bus. On this basis the average dose received by the group would be known. It was also decided to detail two (2) men from the 50th Cml Svc Plat to assist the photo dosimetry group for the day immediately after the shot.

The troop units were delayed too long in clearing the area because they were slow at decontamination and monitoring their personnel. It was decided to use Rad-Safe monitors to assist the troops as soon as the observers and VIP's had been monitored.

Observers showed little enthusiasm toward being monitored and less interest in the readings on the survey instruments as they passed through the area. It was decided that in addition to those key personnel to whom pocket chambers were issued all Chemical Corps observers and as many other as requested would be issued pocket dosimeters.

Immediate radiation dose in roentgens received in emplacements.

Distance from GZ in yards	Type Emplacement C1 Exposed post	C2 Shallow slit Tr	C3 Deep Slit Trench	C4 1 Man emplacement	C5 2 Man emplacement
1000	Over 3560	840	460	154	___
1500	Under 1000	34	9-12	6	1.85
2000	14	1.6	1.4	1	.1
2500*	8-10	.2	.15	.1	0
3000	3.2	.1	0	0	0
3500	.5	0	0	0	0

*Troops in 6 foot Trench at 2500 yards received .4 r.

NOTE: These date represent the dosages from immediate radiation personnel protected by the emplacements and unprotected at the same distance from Ground Zero would have received. Films were exposed in National Bureau of Standards holders.

VI. MEDICAL.

The medical support for this shot was furnished by the permanent party personnel and medical department enlisted men from the participating RCTs. The RCT personnel furnished their own company aid men. The permanent party medical section furnished the ambulance for each serial, the aid station to the control group, and the two company aid men for the observers. The helicopter was again available to the medical section for evacuation purposes. This and the aid station were moved forward to the vicinity of the control trench immediately following H-Hour. During the rehearsal two men suffered mild sprains of the ankle and were held by the aid station and left the area by ambulance at the conclusion of the exercise. During the actual shot one soldier, on arrival in the trench area, was found to be suffering from nausea and vomiting. He was checked by the company aid men and a doctor and although this was felt to be psycogenic in nature he was evacuated immediately after H-Hour.

Medical evaluation of Test Animals.

On the day prior to the shot, 43 sheep were placed at varying distances from ground zero. Two (2) sheep were placed in each B-type bunker at 100 yard intervals from 100 through 400 yards from

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ground zero. Commencing at 500 yards, five (5) sheep were placed at 500 yard intervals through 3,500 yards from ground zero. The sheep employed from 500 through 3,500 yards were placed one (1) to each C-type position. Positions descriptions are as follows:

(1) C-1, wooden stake in open.
(2) C-2, open tranch, 2' x 2' x 4'5".
(3) C-3, open trench, 3' x 3'6" x 4'.
(4) C-4, covered trench, 3'6" x 4' x 6', covered with 4 foot layer of timber, sandbags, and earth. Two (2) foot aperture facing ground zero.
(5) C-5, covered trench, 5'5" x 6' x 8'5", covered with 6 foot layer of timbers, sandbags, and earth. Two and one-half foot aperture facing ground zero.

The veterinary officer and two enlisted men accompanied the control party on shot day and immediately following the shot moved out by truck with a monitor to evaluate the sheep.

The sheep placed at 3,500 yards were all found to be normal.

At 3,000 yards the sheep at positions C-1 and C-2 had very minor wool burns on their backs.

At 2,500 yards the sheep at position C-1 had second degree burns on the face. Sheep at positions C-2 and C-3 had minor wool burns.

At 2,000 yards the sheep at position C-1 had extensive wool burns across the back and one side. The sheep at position C-2 and C-3 had second degree burns on the face and extensive wool burns.

At 1,500 yards the sheep at position C-1 had third degree burns on the face, and about one-half the body area had wool burns. This animal was apparently making an excellent recovery until 6 April. Epilation, i.e., loss of hair then commenced, accompanied by inappetence. Death ensued 1600 hours, 7 April. This animal was exposed to a median lethal dose of radiation. The reading at this position was recorded as "less than 1000", and it is assumed that the actual dose was approximately 400 r. At position C-2 the sheep had second degree burns on the face and approximately one-half of the body area had wool burns. This animal appeared normal until 6 April when epilation appeared followed by inappetence 7 April. Death occurred the morning of 8 April. This sheep received a median lethal dose of radiation.

The sheep located at C-5, 1000 yards broke loose during the night and was found shortly following the detonation at C-5, 1500 yards. It had second degree burns on the ears and extensive wool burns on the back. Epilation commenced 6 April, and death occurred the morning of 8 April. This animal probably received the same amount of radiation as the one located at C-1, 1500 yards (400 r).

At 1,000 yards the sheep at position C-1 had third degree burns on the face and extensive wool burns. This sheep was further suffering from blast effects which progressed to the extent that it became prostrate and was destroyed approximately eight hours following the shot to prevent further suffering. It received over 3560 r. The sheep at position C-2 suffered third degree burns on the face and extensive wool burns. It developed in-coordination the morning of 25 March, and became prostrate the afternoon of 25 March. This sheep was destroyed 26 March, to prevent further suffering. An autopsy was performed and it was determined that this sheep was suffering from radiation sickness. Radiation received was 860 r. The sheep at position C-3 was found to have second degree burns on the face and extensive wool burns. It developed in-coordination the afternoon of 25 March and diarrhea the morning of 26 March. Death occurred at approximately 2400 hours, 26 March. The recorded dosage at this position was 460 r, but the sheep probably received a more massive dose. The film badge was located in the bottom of the trench and the sheep's back was level with the ground. The sheep at position C-4 suffered third degree burns on the face and extensive wool burns. It refused food and water after 25 March and developed a typical diarrhea the morning of 26 March. Prostration ensued the afternoon of 27 March, and it was destroyed to prevent further suffering. The dosage recorded for this position was 154 r, but here again the badge was protected by the ground and the sheep actually received over 600 r. The sheep at position C-5 has previously been mentioned in this report as the one that broke loose during the night and strayed back to the C-5, 1500 yard position. It subsequently developed epilation and died.

At 500 yards the sheep at position C-1 was blown back for a distance of approximately 200 yards. Its abdominal cavity was torn open and the right rear leg that had a cast on it was dismembered from the body. This is very graphically portrayed in the following photographs. At position C-2 the sheep was blown back approximately 50 yards. This is also shown in the series of

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...ographs. The sheep at position C-3 and C-4 were both killed by blast effects. The sheep at position C-5 had first degree burns on the face and negligible wool burns. On first observation it was suffering no other visible effects. This sheep continued to eat and drink through 26 March 53. It developed a diarrhea at noon 26 March 53, and in-coordination developed the morning of 27 March 53. Prostration developed at noon 27 March 53 followed by death at 1610 hours 27 March 53. The radiation dosage was over 600 r.

It was not possible to advance past the 500 yard line on 24 March 53, and this was not finally effected until the afternoon of 25 March 53. The B-type bunker at 400 yards was found to have a collapsed entrance, so it is assumed all of the sheep from 400 yards through 100 yards were killed directly from blast effects or died from suffocation as a result of the bunker entrance collapsing.

The number of sheep exposed totaled forty-three, thirteen were killed directly or indirectly from blast (suffocation). Four died from acute lethal doses of radiation. Three died from median lethal doses of radiation. At the present time twenty-three of the original forty-three are still alive and they will apparently survive.

VII. VOLUNTEER OBSERVER PARTICIPATION.

Volunteer trench was located 2500 yards from ground zero on an azimuth of approximately 200 degrees. This trench was approximately 6 feet deep, 3 feet wide, and heavily revetted and sandbagged.

The volunteer group consisted of four (4) Army Officers, four (4) Naval Officers (including one (1) Medical Officer) and one (1) Air Force Officer.

The atomic weapon exploded was an experimental device placed on a 300 foot tower. The actual yield was between 30 and 35 KT.

Weather data for GZ at the time of burst was as follows:

Temperature	50.7 degrees F
Wind Direction	310 degrees T
Wind Speed	2 Knots
Visibility	50 miles
Pressure	868 millibars

Almost simultaneously with the burst a wind of 4-6 knots from approximately 5 degrees developed.

Volunteers reported the following effects were noted:

A white flash followed by a color change through orange to rosy brown.

A rolling motion of the ground followed by a distinct bump which knocked all forward from the wall of the trench but did not knock anyone down.

A very loud air blast and following shock which shook everyone violently but which was not of sufficient magnitude to toss anyone around or even down. No effect on the ears was noted.

Debris falling into the trench in large quantities followed by dust condition which obscured vision in the trench. None of the debris was large enough to cause any injury.

When personnel rose from the trench the fireball was visible for only a few seconds. Dust obscured everything for about 1 minute, at which time the mushroom effect became visible.

Using radiac instruments provided them, the volunteers observed a prompt gamma radiation reading of 1 to 2 roentgens/hr on the floor of the trench and 4.5 roentgens/hr at shoulder height in the entrance of the trench. Film badges placed in the trench and recovered within one hour gave a total accumulated dose reading of .4 roentgens. Film badges worn by individuals gave readings between 300 and 545 milliroentgens.

The sudden wind that developed just at burst time caused a cloud of dust to move toward the trench. The volunteers decided to evacuate to the rear as the cloud approached the trench and a reading of 90 milliroentgens was observed on radiac instruments. Transportation from the control

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trench met them after a walk of 500 yards. At this point a reading of 20 milliroentgens was observed.

From reading of instruments volunteers believed highest total dosage received was 1 roentgen. Film badges indicate less than 1 roentgen was received.

The following conclusions were made by the volunteer observers:

"The 2500 yard position for Shot V-2 was a safe distance under the given conditions".

"The date in TM 23-200 can be used to determine a safe observer position if properly qualified officers make the computations".

"The majority of the volunteers (8 out 9) believed that the troops could observe the shot (safely) from 2500 yards in properly constructed and revetted trenches".

The medical officer present expressed the belief that no one over the age of 45 should be accepted as a volunteer because of possible coronary troubles.

The trench should be dug according to Field Manual specifications to make the experiment more realistic.

DAMAGE EVALUATION REPORT

SHOT V - 2

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 35 KT	Condition of equipment or emplacement after shot. Actual yield 24.5 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Tank, Medium M4A3 with 76 MM Gun	GZ	Facing GZ. Fire extinguisher in crew compartment, wire, windshield, wipers and windshield wiper devices all missing. Right exhaust pipe broken. Engine compartment is very dirty. Left rear exhaust deflector hanging down. Auxiliary generator not in operating condition. Batteries in case and connected but are completely discharged. Cover is off battery case. Rubber on both tracks is cracked. Dustshields missing, cable and front hooks missing. All hatches open. Glass in commanders hatch covered with tape. Gas in tank. Paint on tank in good condition.	Overturned, extensive damage approaching complete destruction. Highly contaminated.	Major item completely destroyed. One track link found at the 450 yard line. One road wheel and parts of track found around the 400 yard line. Rest of tank in immediate vicinity of GZ. 75 MM Gun not visible, apparently collapsed. Due to radiation, it was impossible to get closer than 400 yards.	Major item not repairable.
Gun, 75 MM mounted on Tank, Medium M4A3	GZ	Facing GZ. Gun is very dirty but is in operating condition. Sight is missing. Paint is in good condition.	Extensive damage approaching complete destruction.	Gun pushed into body of tank.	Gun not repairable.
A-2 emplacement	400 yds	Entrance facing GZ. 6' x 8' x 12' deep covered bunker with 2' sandbag walls.	No damage.	Entrance caved in, could not get inside; however, it appeared as if inside was intact, all sandbags on outside were destroyed.	Clean out 8 hrs 10'2" x 4" x 8' Timbering 10'1" x 6" x 8' 10 hrs 50 sandbags 3 hrs Back fill 1 equip hr or 3 man hrs Total 24 man hrs

DAMAGE EVALUATION REPORT

SHOT V - 2

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of (35) KT	Condition of equipment or emplacement after shot. Actual yield 24.5 KT	Estimated time, equipment and parts to repair to operable condition, Battlefield Conditions
A-2 emplacement (cont'd)					or 21 man hrs & 1 equip hr
Fence	400 yds	Long axis broadside to blast. 25' of standard 4 x 3 pace double apron fence.	Severe. Wire blown from stakes. Stakes bent and displaced.	Complete destruction.	3 long pickets 6 short pickets 1/3 reel barbed wire. 2 man hrs
Tank, light, M-24 with Gun, 75 MM T33E1.	500 yds	Facing GZ. Fire extinguishers, batteries, and right exhaust pipe missing. Oil level in engine is at full. Appearance of engine compartment is good. Equipment laying on fighting compartment floor. Pistol port is open. Towing cable and hooks missing. Covers for batteries missing. Glass in windshield and paint in good condition.	Moderate. Maybe overturned. Tracks will be damaged. Moderate radioactivity.	Tank moved back about 75 feet and into a 12 foot ravine. Windshield glass broken and frame bent. Siren and front lights destroyed. Left dust shield bent out and right section missing. Right fender and dust shields bent and torn. Rear section of dust shield missing. Cover for asst. drivers hatch mechanism torn loose. Right track loose. Dust shield laying 100 yds away from GZ and 15 yds to left. Another dust shield laying 150 yds to left. Paint on entire vehicle burned badly. Glass on commanders hatch burned on three sides. Entire commanders hatch moved to right. Covers for periscope bent and torn loose on drivers and asst. drivers and gunners position.	At least 200 man hours would be needed to repair this vehicle.

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DAMAGE EVALUATION REPORT

SHOT V - 2

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 35 KT	Condition of equipment or emplacement after shot. Actual yield 24.5 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Gun, 75MM T33E1 mounted on Tank, light M-24	500 yds	Facing GZ. Sights missing. Oil in recoil mechanism low and dirty. Gun very hard to operate.	Slight damage	Paint on weapon badly scorched. Otherwise little damage was caused by blast.	It would take about 3 hrs to put gun in serviceable condition.
Light Machine Gun Cal 30, w/tripod	500 yds	Facing away from GZ. Elevating and traversing mechanism mission, otherwise gun is in serviceable condition.	Severe. Barrel & major parts distorted.	Weapon moved approximately 18 feet to rear laying with cover blown open. Gun and tripod badly sandblasted and all paint burned off.	It would take about 2 hrs to put gun in serviceable condition
Rifle, U.S.M1 Cal 30	500 yds	Facing away from GZ. Sling missing and weapon very dirty, but it will function.	Severe. Barrel and major parts distorted. Moderate radioactivity.	Stock badly scorched and metal parts badly sandblasted.	About 1/2 hr would be needed to restore weapon to serviceable condition.
C-1 Stake	600 yds	4" x 4" x 2' Stake	Bent and displaced.	Completely destroyed.	4"x4"x2' 1/4 man hr
C-2 Trench	600 yds	2' x 4' x 6'2" deep. Broadside to blast.	None	One-half filled w/dirt	Ditcher 1/2 hr or 2 man hrs
C-3 Trench	600 yds	3' x 4' x 3'6" deep. Broadside to blast.	None	One-half filled w/dirt	Ditcher 1/2 hr or 2 man hrs
C-4 Bunker	600 yds	6' x 4' x 3'6" deep.	None. (Spalling damage only)	Top blown off, can be cleared out and re-used 50% of bunker is salvagable.	Clean out 5 hrs Cover top 2 hrs 12 ea 6"x6"x9' 150 sandbags 3 hrs Total 10 hrs
Fence	600 yds	Long axis broadside to blast. Standard 4 x 2 pace barbed wire double apron fence.	Severe. Wire blown from stakes.	Completely filled	1/2 man hr
Fox hole	600 yds	Broadside to blast.	Moderate cave in.	Completely filled.	1/2 man hr

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DAMAGE EVALUATION REPORT

SHOT V - 2

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 35 KT	Condition of equipment or emplacement after shot. Actual yield 24.5 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
C-5 Bunker	600 yds	Entrance facing GZ. 6' x 6' x 5'6" deep covered shelter.	Moderate cave in.	Sandbags destroyed, structure still serviceable after cleaning out.	150 sandbags 3 1/2 man hrs Cleaning out 2 man hrs Total 5 1/2 man hrs
C-1 Stake	1000 yds	4" x 4" x 2' Stake	None	Carried out reuseable	None
C-2 Trench	1000 yds	Broadside to blast. 2' x 4' x 6'2" deep.	None	Slight cave in.	1/4 man hr
C-3 Trench	1000 yds	Broadside to blast. 3' x 4' x 3'6" deep.	None	No damage	None
C-4 Bunker	1000 yds	Entrance facing GZ. 6' x 4' x 3'6" deep.	None	All sandbags need replacing. Structure slightly damaged and full of dirt and sand.	150 sandbags 3 1/2 man hrs 2 ea 4"x4"x6' 1/2 man hr Cleaning out 1 man hr Total 5 man hrs
C-5 Bunker	1000 yds	Entrance facing GZ. 6' x 6' x 5'6" deep.	None	All sandbags destroyed. No structural weakening.	Cleaning out 1/2 man hr 150 sandbags 3 1/2 man hrs Total 4 man hrs
HMG emplacement	1000 yds	Entrance facing GZ.	None	No damage	None
Mortar, 60 MM	1000 yds	Facing away from GZ. Sight missing. Weapon is serviceable.	Light damage - thrown about.	Strap and grip on bipod burned by blast. Blast turned weapon around and moved it approximately 1 1/2 feet to the rear. Weapon was badly sandblasted.	About 1/2 hour would be needed to clean and service weapon.
HMG Cal 30	1000 yds	Facing GZ. Rear sight, pintle, and water jacket plug missing. Gun laying on tripod w/o connection. All other component parts in operating condition.	Light damage. Thrown about.	Gun moved approximately 35 feet to rear and laying on right side with cover open. Legs of tripod and left side of water jacket dented by flying debris. Gun and tripod badly sandblasted.	It would take about 2 hrs to clean and repair gun.

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SHOT V - 2

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of (35) KT	Condition of equipment or emplacement after shot. Actual yield 24.5 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
EE-8A	1000 yds	Broadside to blast. Serviceable.	No damage, maybe displaced & covered with debris.	Serviceable.	None required.
Flamethrower M2A1	1500 yds	Laying on ground top to GZ. Enclosed on three(3) sides away from blast by sandbags. Fair condition - operable.	None	Intact with slight scorching of hose and paint. The sandbags were badly scorched. The flamethrower was in operable condition.	Could be placed in acceptable working order by trained personnel in 15 minutes.
C-1 Stake	1500 yds	4" x 4" x 2' Stake	None	Scorched but useable.	None
C-2 Trench	1500 yds	Broadside to blast. 2' x 4' x 6'2" deep.	None	No damage.	None
C-3 Trench	1500 yds	Broadside to blast. 3' x 4' x 3'6" deep.	None	No damage.	None
C-4 Bunker	1500 yds	Entrance facing GZ. 6' x 4' x 3'6" deep.	None	All sandbags destroyed.	150 sandbags 3 1/2 man hrs
Fox hole	1500 yds	Broadside to blast.	None	Slight cave in.	Cleaning out 1/4 man hrs
HMG emplacement	1500 yds	Broadside to blast.	None	Slight cave in.	Cleaning out 1/4 man hr
57 MM emplacement	1500 yds	Broadside to blast.	None	Slight cave in.	Cleaning out 1/4 man hr
C-5 Bunker	1500 yds	Entrance facing GZ. 6' x 6' x 5'6" deep covered.	None	All sandbags destroyed.	150 sandbags 3 1/2 man hrs
Fox hole	1500 yds	Broadside to blast.	None	Slight cave in.	Cleaning out 1/4 man hrs

DAMAGE EVALUATION REPORT

SHOT V - 2

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of [35] KT	Condition of equipment or emplacement after shot. Actual yield 24.5 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
HMG Cal 30	1500 yds	Facing away from GZ. Gun mounted on tripod with all component parts in operating condition.	None	Weapon was not moved by blast. There were some dents in the water jacket and the strap on tripod was scorched.	About 1/2 hr would be required to clean and service this gun.
LMG Cal 30	1500 yds	Facing GZ. Locking pin on tripod and elevating mechanism missing. All other parts in serviceable condition.	None	Weapon was not moved and no visible damage was caused by blast.	About 1 hr would be needed to clean and service this gun.
Carbine, Cal 30 M2	1500 yds	Facing away from GZ. Stock on left side and sling missing. Weapon is serviceable.	None	Weapon was not moved and no visible damage was caused by blast.	It would take about 1/2 hr to clean and service this gun.
Tank, Light, M-24 w/Gun, 75 MM T33E1 mounted	1500 yds	Facing GZ. Fire extinguishers, front light, windshield devices, and covers for batteries missing. Engine compartment door will not open. Batteries in case but completely discharged. Glass in commanders hatch covered w/tape. Dustshields on right side missing. Left fender and dustshields completely torn away. Towing cable and right front and left rear hooks missing. Gas tank is about 1/2 full. Paint is in good condition.	Damage to antenna.	Right front and left side track were blackened. Front of tank sandblasted and paint blackened. Paint covering glass in commanders hatch blistered. Shield was torn from asst. drivers hatch mechanism. Tank was not moved.	About 6 hrs would be needed to put tank in serviceable condition.
Gun, 75 MM T33E1 mounted on Tank Light M-24	1500 yds	Facing GZ. Sights missing. Oil in recoil mechanism leaking.	None.	Gun was burned by blast but was not materially damaged.	It would take about 1 hr to clean and service gun.

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SHOT V - 2

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 35 KT	Condition of equipment or emplacement after shot. Actual yield 24.5 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Mortar, 60 MM	1500 yds	Facing away from GZ. Sight missing. Weapon is serviceable.	None	Grip and strap on bipod slightly scorched. Weapon moved about 8 inches to left.	About 1/2 hr needed to clean and service weapon.
HMG Cal 50 with mount	1500 yds	Facing away from GZ. Pintle is missing and gun is laying in cradle on tripod. Gun is in working condition.	None	Grips and retracting handle scorched. Weapon was not moved by blast.	It would take about 1 hr to clean and service this weapon.
Truck, 1/4 ton 4 x 4	1500 yds	Facing GZ. Vehicle total wreck. Should be salvaged.	Light to moderate damage. Glass broken. Paint and top scorched.	Tires slightly scorched. No other damaged caused by blast. Vehicle was not moved by blast.	None
SCR-300	1500 yds	Broadside to blast. Serviceable.	Light damage. Displaced.	Serviceable. No noticeable damage.	None required.
EE-8A	1500 yds	Broadside to blast. Serviceable.	None	Serviceable.	None required.
C-1 Stake	2000 yds	4" x 4" x 2' Stake	None	Blackened - useable.	None
C-2 Trench	2000 yds	Broadside to blast. 2' x 4' x 6'2" deep.	None	No damage.	None
C-3 Trench	2000 yds	Broadside to blast. 2' x 4' x 6'2" deep.	None	No damage	None
C-4 Bunker	2000 yds	Engrance facing GZ. 6' x 4' x 3'6" deep.	None	All sandbags destroyed.	150 sandbags 3 1/2 man hrs Cleaning out 1/4 man hr
HMG emplacement	2000 yds	Broadside to blast.	None	No damage	None
81 MM emplacement	2000 yds	Broadside to blast.	None	No damage	None
C-5 Bunker	2000 yds	Entrance facing GZ. 6' x 6' x 5'6" deep covered shelter	None	Sandbags destroyed.	150 sandbags 3 1/2 man hrs

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DAMAGE E. ATION REPORT

SHOT 7 - 2

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 35 KT	Condition of equipment or emplacement after shot. Actual yield 24.5 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
57 MM emplacement	2000 yds	Broadside to blast.	None	No damage.	None
60 MM emplacement	2000 yds	Broadside to blast.	None	No damage.	None
FMG Cal 50 with mount	2000 yds	Gun pointed skyward with cover away from GZ. Cocking lever missing. Other parts in operating condition.	None	Mount slightly scorched. Barrel slightly scorched and sand-blasted.	About 1/2 hour would be required to clean and service this weapon.
Carbine, Cal 30 M2	2000 yds	Pointing away from GZ. Stock broken and trigger mechanism missing. Weapon is unserviceable.	None	Barrel slightly scorched. Weapon was not moved by blast.	20 minutes would be needed to clean weapon.
Carriage, Motor 105 MM Howitzer M7B1	2000 yds	Facing GZ. Front lights, fenders, dust shields, tow cable, left rear and front hooks missing. Clutch seems to drag. Back of drivers seat torn. Batteries discharged and fixed fire extinguishers have been discharged. Voltage regulator cover off. Four and five left road wheels, and three, four and five right road wheels should be replaced. Hatches open. Gas in tank and oil in engine and transmission. Paint in good condition.	None	No damage to vehicle. It was not moved by blast.	None
105 MM Howitzer mounted on carriage Motor	2000 yds	Facing GZ. Sights missing. Gun very dirty and hard to operate. Oil in recoil mechanism low.	None	Weapon was not moved or damaged by blast.	None

DAMAGE EVALUATION REPORT

SHOT 7 - 2

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of (35) KT	Condition of equipment or emplacement after shot. Actual yield 24.5 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Mortar, 81 MM, M-4	2000 yds	Facing away from GZ. Base plate and sights missing. Weapon is setting on top of ground.	None	No damage was caused by blast. Weapon was not moved.	None
Aiming Circle with case	2000 yds	Facing GZ. Leveling bubbles and all glass broken. Aiming device is missing. Equipment completely unserviceable. Case unserviceable.	Displaced, light damage.	Aiming circle blown over by blast. Paint on legs or tripod scorched.	None
Rifle, Recoilless 57 MM	2000 yds	Facing away from GZ. Sights, safety mechanism, grips, and shoulder pad all missing. Firing mechanism unserviceable. Weapon in unserviceable condition.	None	Weapon was not moved and no damage was caused by blast.	None
SCR-300	2000 yds	Serviceable.	None	Serviceable.	None required.
C-1 Stake	2500 yds	4" x 4" x 2' Stake	None	Blackened but useable.	None
C-2 Trench	2500 yds	Broadside to blast. 2' x 4' x 6'2" deep.	None	No damage.	None
C-3 Trench	2500 yds	Broadside to blast. 2' x 4' x 3'6" deep.	None	No damage.	None
C-4 Bunker	2500 yds	Entrance facing GZ. 6' x 4' x 3'6" deep.	None	60% of sandbags need replacing.	85 sandbags 2 man hr
Volunteer Trench	2500 yds	Broadside to blast. Trench 4' wide, 24' long, 6' deep. Line with 1" x 6" with 2" x 4" posts, 2' on center with cross braces, top and bottom center,	None	Completely undamaged.	None

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of [25] KT	Condition of equipment or emplacement after shot. Actual yield 24.5 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Volunteer Trench (cont'd)			also braced with 2' high sandbag wall every 6'.		
C-5 Bunker	2500 yds	Entrance facing GZ. 6' x 6' x 5'6" deep shelter.	None	75% of sandbags need replacing.	120 sandbags 2 man hrs
Fox hole	2500 yds	Broadside to blast.	None	No damage.	None
57 MM emplacement	2500 yds	Broadside to blast.	None	No damage.	None
81 MM emplacement	2500 yds	Broadside to blast.	None	No damage.	None
LMG emplacement	2500 yds	Broadside to blast.	None	No damage.	None
Browning Automatic Rifle M1918A2	2500 yds	Facing away from GZ. Sling and bipod missing. All other component parts present but weapon is unserviceable due to dirt in weapon.	None	Weapon was not moved and no visible damage was caused by blast.	None
81 MM Mortar	2500 yds	Facing away from GZ. in a four foot hole. Sights missing. All other component parts in serviceable condition.	None	Weapon was not damaged or moved by blast.	None
Rifle, Recoiless, 57 MM	2500 yds	Facing away from GZ. Sight and shoulder pad missing. Weapon will not fire due to dirt in firing mechanism.	None	Check pad slightly scorched, Weapon was not moved by blast.	None

DAMAGE EVALUATION REPORT

SHOT V - 2

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 35 KT	Condition of equipment or emplacement after shot. Actual yield 24.5 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Tank, Medium, M4A3	2500 yds	Facing toward and at an angle of 15 degrees to the right of GZ. Hand fire extinguishers, windshield wipers and devices, dust shields, tow cable and hooks all missing. Clutch hard to operate. Air cleaner to engine breather tube broken. Appearance of engine compartment dirty. Auxiliary generator not operating. Batteries discharged. Gas tank is about 1/2 full. Paint outside is in good condition.	None	Tank was not moved by blast. Tape covering glass in commanders hatch burned. Paint on front and left side of tank blistered. Glass in front lights broken.	None
Gun, 76 MM M1A2	2500 yds	Facing toward and at an angle of about 15 degrees to the right of GZ. Sights and solenoid missing.	None	Gun not damaged by blast.	None
C-1 Stake	3000 yds	4" x 4" x 2' Stake	None	Slightly scorched.	None
C-2 Trench	3000 yds	Broadside to blast. 2' x 4' x 6'2" deep.	None	No damage.	None
C-3 Trench	3000 yds	Broadside to blast. 3' x 4' x 3'6" deep.	None	No damage.	None
C-4 Bunker	3000 yds	Entrance facing GZ. 6' x 4' x 3'6" deep.	None	Bags scorched. Serviceable.	None
C-5 Bunker	3000 yds	Entrance facing GZ. 6' x 6' x 5'6" deep.	None	Bags scorched. Serviceable.	None

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DAMAGE EVALUATION REPORT

SHOT V - 2

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of [35] KT	Condition of equipment or emplacement after shot. Actual yield 24.5 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Volunteer Trench	3000 yds	Broadside to blast. 4' wide, 25' long, 6' deep, 1" x 12" siding w/4" x 4" posts 6' on center, 4" x 4" spreaders at top and bottom. 1/2 covered with 6' x 6" x 8'.	None	No damage.	None
Rifle, Cal 30 M1	3000 yds	Muzzle pointed skyward and toward GZ, in foxhole. Sling missing. Weapon not in operating condition due to an excessive amount of dirt.	None	Weapon found laying on ground to rear of hole with bolt open pointing away from GZ. This rifle had obviously been handled by someone. It is believed that the rifle was not moved by the blast.	None

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C-1 at 500 yds. This sheep had a fractured right metatarsal bone. The fracture was reduced with a plaster of Paris cast. Following the detonation the right rear leg was dismembered at the line drawn above the cast.

C-1 at 500 yds. This sheep following the detonation was blown back approx 200 yds from the stake. The abdominal cavity was torn open, and the right rear leg was located 50 yds away from the carcass.

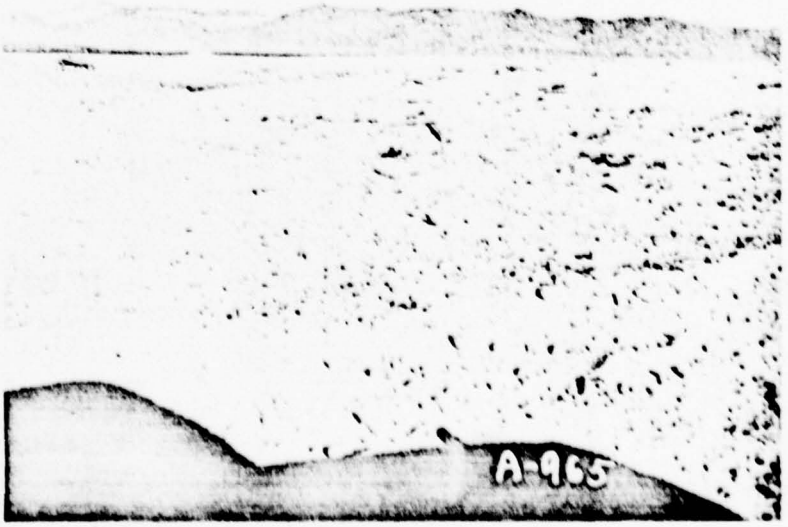


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C-2 at 500 yds. This sheep was killed by blast effects. The pen was completely destroyed and the sheep was blown back for a distance of approx 50 yds.

C-2 at 500 yds. This is a view of the above sheep following the detonation. It was blown clear of the trench and back to this point. Sheep circled.





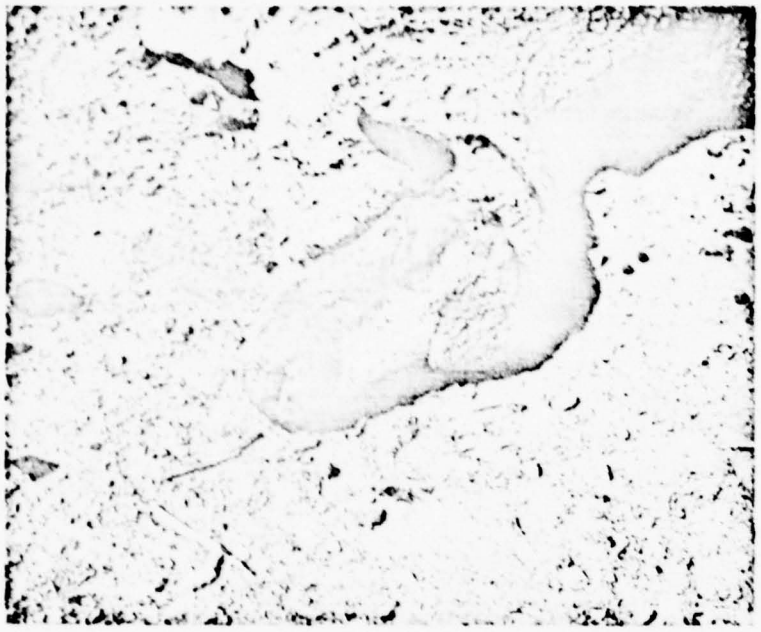
C-5 at 500 yds. This sheep had first degree burns on the face and negligible wool burns. On first observation it was suffering no other visible effects.



C-5 at 500 yds. This is another picture of the above animal. The evidence of diarrhea seen here developed 26 Mar, and in-co-ordination developed the morning of 27 Mar followed by death the afternoon of 27 Mar.

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C-2 at 1000 yds. This is a close-up of the preceding sheep shortly before death.

C-3 at 1000 yds. Second degree burns on the face and extensive wool burns. Death occured 26 Mar. and was attributed to acute lethal radiation sickness.



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C-1 at 1000 yds. This sheep suffered third degree burns on the face and extensive wool burns. It became prostrate from blast effects the afternoon of the detonation and was destroyed to prevent further suffering.

C-2 at 1000 yds. This sheep suffered third degree burns on the face.



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C-4 at 1000 yds. This sheep had third degree burns on the left side of the face and left ear. Death occured 27 Mar and was attributed to acute lethal radiation sickness.

C-4 at 1000 yds. This is a picture of the above animal taken shortly before death. Note the third degree burns on the face and ear.



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C-3 at 1000 yds. This is a picture of the preceding sheep taken after death. From all outward appearances there was little wrong with this animal.

C-3 at 1000 yds. This is a picture of the above animal. Note the evidence of diarrhea which is a typical symtom of radiation sickness.



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C-1 at 1500 yds. This sheep had third degree profile burns on the right side of the face and ear. Epilation ensued 6 April followed by death 1600 hrs, 7 Apr



C-1 at 1500 yds. This is a picture of the above sheep taken a few hrs before death. The epilation seen here is quite extensive.

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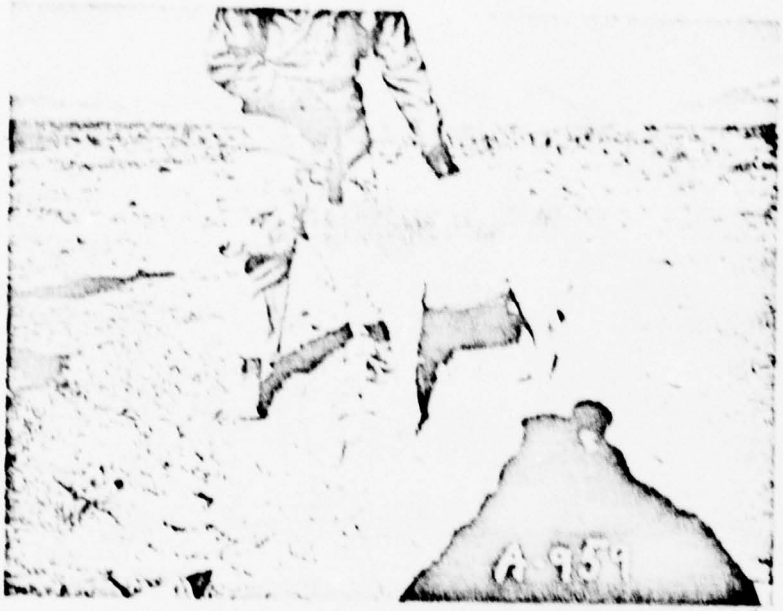
C-1 at 1500 yds. This is another picture of the preceding sheep. Note its comatose condition. The epilation would have continued to be progressive if death had not intervened.

C-1 at 1500 yds. This is the same sheep as viewed in the three proceeding pictures. The nasal discharge is hemorrhagic in nature.



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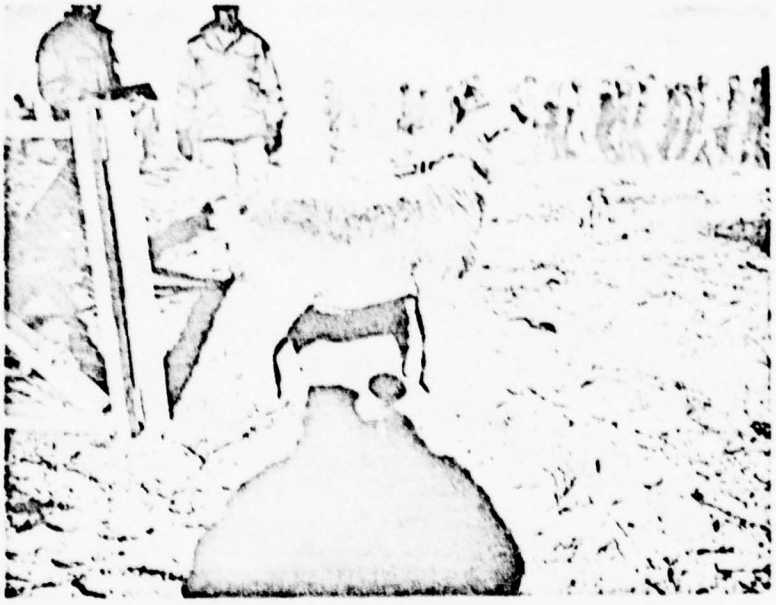
C-2 at 1500 yds. This sheep had second degree burns on the face and extensive wool burns. Epilation developed 6 Apr followed by death the morning of 8 Apr.

C-5 at 1500 yds. This sheep initially suffered second degree burns on the ears and extensive wool burns on the back. Epilation commenced 6 Apr and death occured the morning of 8 Apr.



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C-2 at 2000 yds. This sheep had second degree burns on the face and extensive wool burns.

C-3 at 2000 yds. This sheep had second degree burns on the face. Note collapse of sheep pens.



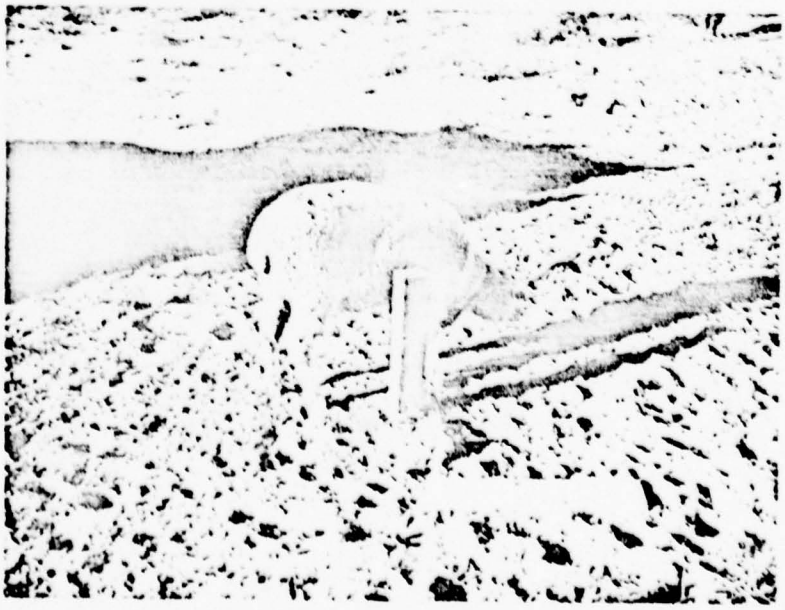
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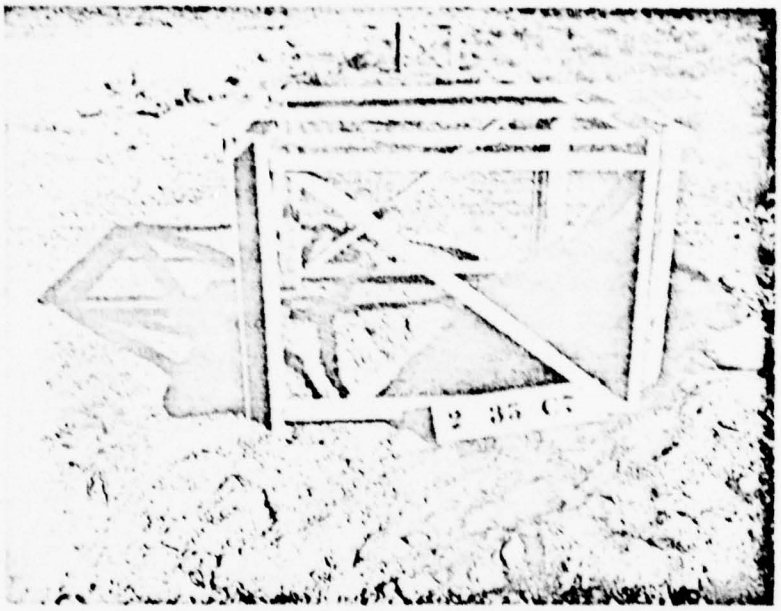


C-1 at 2500 yds. The sheep at this position had second degree burns on the face.

C-1 at 2000 yds. The sheep at this position had extensive wool burns across the back and one side.

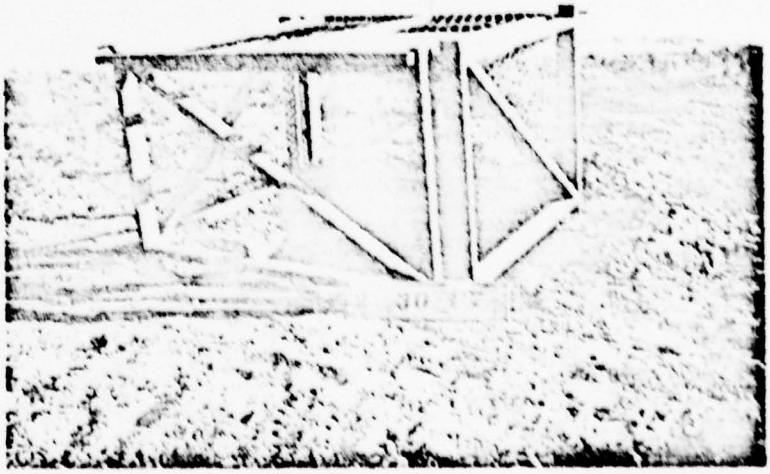


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C-7 at 3500 yds. The sheep at this position had no visible effects. Pen was undamaged.

C-7 at 3000 yds. The sheep at this position had light wool burns across the back. Pen was undamaged.



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GZ.Tank, Mod M4A3 w/76MM Gun. Major items completely destroyed. One track link, road wheel & Parts found around the 450 yd line.



500 yds. Tank, light M24 w/75MM Gun. Tank facing GZ moved back 75 ft & into a 12 ft ravine, frame bent, driver hatch mechanism torn loose.



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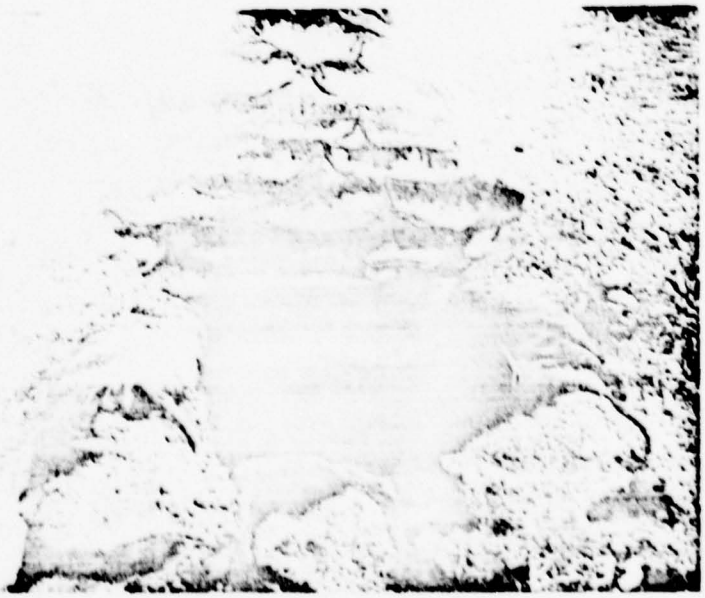


BEFORE

C-4 1,500 yds. Bunker facing GZ

AFTER

C-4 1,500 yds. All sand bags destroyed, no structural weakening.



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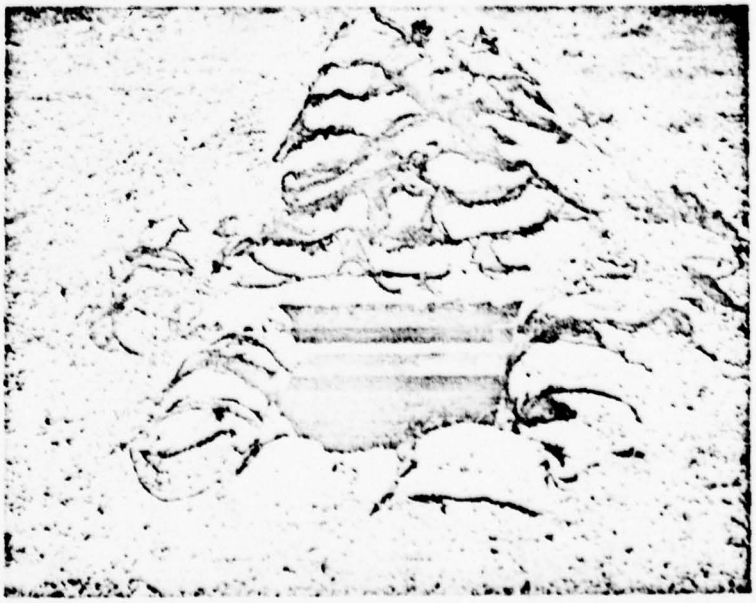


BEFORE

C-4 1,000 yds. Bunker facing GZ.

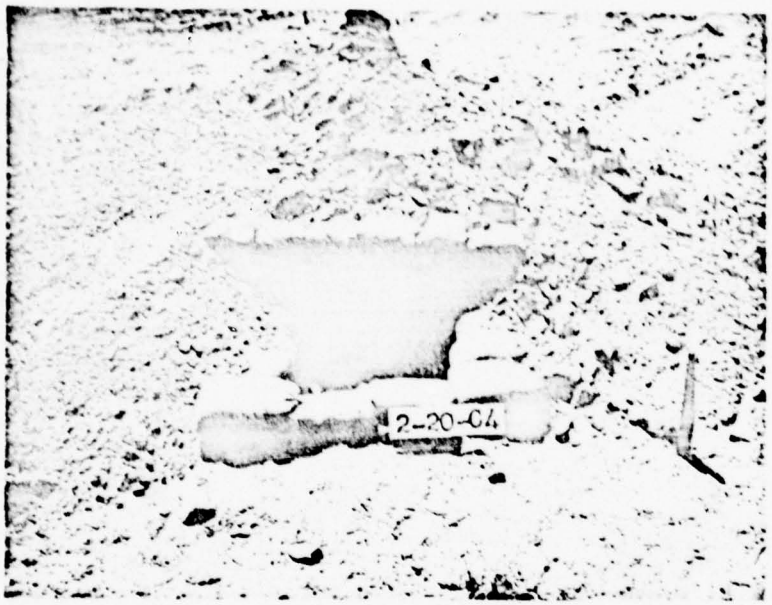
AFTER

C-4 1,000 yds. All sand bags needed replacing. Structure slightly damaged & full of sand.



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BEFORE

C-4 2,000 yds. Bunker facing GZ.

AFTER

C-4 2,000 yds. All sand bags destroyed.



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BEFORE

C-5 1,000 yds. Bunker facing GZ

AFTER

C-5 1,000 yds. All sand bags destroyed.



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2,500 yds from GZ. Volunteer trench, long axis, broad side to GZ. Completely undamaged.



4,000 yds from GZ. Control Group Trench, long axis, broad side to GZ. Completely undamaged.

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BEFORE

C-6 2,000 yds. Bunker facing GZ.

AFTER

C-6 2,000 yds. Sand bags destroyed.



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HQ CAMP DESERT ROCK
LAS VEGAS (872536) NEV
011200 June 1953

Annex 4 (SHOT VICTOR 4) to Final Report
EXERCISE DESERT ROCK V

GENERAL.

Shot V-4 took place in Yucca on 6 April 1953. The missile was delivered by a B-50 aircraft from an altitude of 31,000 feet. The height of burst was 6,150 feet above ground zero.

The observer group departed Camp Desert Rock at 060520 April to witness the detonation. The group arrived at News Nob (8.8888) at 0630 hours. An orientation was conducted from 0645 to 0715 hours by a member of the Camp Desert Rock Instructor Group. Flight patterns, altitude of delivery aircraft and other information was presented to the observers. No material higher than confidential was presented due to the mixed security clearance status of the observer group.

The detonation took place on schedule at 0730 hours. At ten and one half (10½) miles from ground zero, the observers noticed the thermal effects from the shot. The blast wave which arrived thirty five (35) seconds after detonation, was such that it removed the hat from a soldier's head at this distance. The noise from the detonation was deafening.

The atomic cloud formed as a result of the detonation was more pictureque than the clouds formed by tower shots observed in previous tests. The familiar mushroom stem was not observed and dust contitions were negligible.

No radiation readings were observed on the radiac instruments located at News Nob .

The Marine Helicopter Group (H-19 Type) participated in the exercise utilizing four helicopters. Prior to the detonation the helicopters were positioned on the south end of the airstrip at Yucca Flat, 19,200 yards from ground zero. The engines were functioning and the aircraft were on the ground at the time of the detonation. Immediately after the detonation and prior to the arrival of the blast wave, the aircraft became airborne and were hovering at ten (10) feet when the blast wave arrived. At H plus 10 minutes all aircraft proceeded to fly towards ground zero at approximately 200 feet above the terrain. No radiation readings were observed during the flight to and through ground zero. The return flight covered the same area.

Flight characteristics of the helicopters were not affected by the blast wave. For this particular type of shot, the aircraft could have landed troops at or near ground zero immediately after detonation.

The observer group departed News Nob at 0800 and closed in Camp Desert Rock at 0845 hours.

A total of 135 personnel comprised the observer group. Included were seventy-five Marine Corps officers and enlisted men from Camp Pendleton, California.

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HQ CAMP DESERT ROCK
LAS VEGAS (872536) NEV
011200 June 1953

Annex 5 (SHOT VICTOR 5) to Final Report
EXERCISE DESERT ROCK V

I. GENERAL.

Incoming observers closed into camp 17 April. The 2nd Marine Corps Provisional Atomic Exercise Brigade (2MCPAEB) consisting of 1st Bn., 8th Marines and 2nd Bn., 3rd Marines closed into camp on 13 April.

A full dress rehearsal was conducted on 16 April in the Yucca Flat area, actual site for the atomic detonation. Camp Desert Rock Control Group departed camp at 0600 hours. All march units closed into the exercise area 41.1 miles from camp at 1005 hours.

An "on site" orientation was conducted in the entrenchment area by a member of the Instructor Group. Actual shot day conditions were simulated during the rehearsal. Time selected for H-Hour was 1051 hours. All personnel crouched in trenches and immediately after the simulated shot, troops attacked north toward an assigned objective. The attack was halted at a pre-designated location and the troops moved through the equipment display area.

The First Marine Helicopter Group landed in rear of the entrenchment area at 1103 hours. Some difficulty was experienced in lifting a cargo of five (5) soldiers due to the high altitude, 4,600 feet. Helicopter loads were reduced to three (3) men and the first wave took off for the objective area at 1115 hours. No further difficulty was experienced in the air lift.

The observer group moved to the equipment display area and was given an opportunity to observe the excellent equipment display set up by the Marine Corps. Later the observers were taken to the display area used for Shot V-2 on 24 March.

All helicopters departed for Camp Desert Rock at 1220 hours. The motor movement from the enchment area started at 1345 hours and all units closed into camp at 1645 hours without incident.

On 17 April, at 2302 hours, the Camp Desert Rock Control Group departed camp to participate in Shot V-5. A total of 173 vehicles were required to transport the control group, observers and the Marine Brigade to the shot site. All march units closed in the entrenchment area, 4,000 yards from ground zero, at 0255 hours, 18 April. The vehicles were moved to a motor park, 4.9 air miles from ground zero.

The usual pre-shot orientation and indoctrination was conducted over the public address system from 0335 to 0425 hours. Last minute instructions and data pertaining to the atomic device, distance to tower (ground zero) and other information was made available to the observers and troops.

At H-Hour minus 10 minutes, the Exercise Director ordered all personnel into the prepared trenches, and at H-Hour minus 2 minutes, personnel were instructed to crouch low in the trenches, well below the surface of the ground. A siren blast, of 30 seconds duration, was sounded at this time.

An Atomic Energy Commission spokesman, from the control point, took over the public address system at H-Hour minus 90 seconds and counted off the remaining time at 30 second intervals until reaching H-Hour minus 10 seconds. Then came the now well remembered final count, "9, 8, 7, 6, 5, 4, 3, 2, 1 and MOW" (0435 hours).

A very bright light of approximately 3 seconds duration illuminated the trenches. The ground shock was severe but ended quickly. The noise from the detonation did not appear to be unusual. Dust conditions, followed by falling sand and stones, obscured the vision of personnel in the trenches. None of the debris was large enough to cause injury to personnel in the trenches.

A large fireball, engulfed in a huge dust cloud was observed initially. Soon after the blast, the fireball turned into a huge purple cloud. A sudden change in wind direction caused a dust cloud to drift over the troops in the eastern portion of the trenches. A reading of 1 r/hr was recorded at the trench area.

The Marine Brigade attack started immediately after the blast wave passed over the trench area.

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ATOMIC ENERGY ACT 1946

The 1st Bn., 8th Marines, after advancing approximately 500 yards towards ground zero had to turn to the west in order to avoid a highly contaminated area. Dosimeters, carried by personnel, registered more than six (6) roentgens at this location and the battalion was moved back to the entrenchment area and "taken out of action".

The 2nd Bn., 3rd Marines advanced towards its assigned objective and secured it at H-Hour plus 90 minutes (0605).

Immediately after the detonation (0447) the Marine Helicopter Pathfinder Team (2 helicopters) arrived in the entrenchment area and at H plus 15 minutes, landed the team on the objective. Communication difficulties from the team to the embarkation area delayed the Helicopter Group from transporting personnel to the objective in the forward area. The first airborne troops departed the entrenchment area at 0510 hours enroute to the forward area. The entire airlift was completed in rapid order without further incident.

The Marine Brigade, minus the 1st Bn., 8th Marines, marched through the equipment and animal display area after assigned objectives were secured.

Approximately 600 members of the observer group inspected the equipment and animals in the display area after the tactical phase of the exercise was completed.

Twelve (12) volunteer officers, six (6) army and an equal number from the Marine Corps, were positioned in a trench 2,000 yards from ground zero during the detonation. Wire communication between the control and volunteer trench kept the twelve officers informed of the situation prior to the shot. All volunteers withstood the atomic blast without incident.

Two (2) army helicopters (H23) were utilized on shot day. One (1) equipped with litters, was used for evacuation and the other for reconnaissance purposes subsequent to the detonation.

The return movement to camp was completed at 1103 hours without incident.

Participating in the exercise were 2,729 military and 10 civilian personnel, a total of 2,739 persons.

Temperature at ground zero, altitude 4491.1 feet, was recorded at 45.8 degrees Fahrenheit. Surface winds were from 360 degrees at 9 knots per hour. The sky was clear and visibility was 50 miles. Shortly after the detonation a wind from the northwest caused a heavy radiation fall-out in the eastern portion of the equipment display area.

Of unusual interest, after the blast, was the igniting of a Joshua tree, located approximately 100 yards in front of the control trench (4,000 yards from ground zero).

II. INTELLIGENCE AND SECURITY.

No security problems of note were observed prior to or during shot day. After the detonation, reporters interviewed several Marines at the training auditorium in quest of participating troop reactions. Although the questions presented the Marines could have resulted in violation of Department of Defense orders, any chance of violation was averted by forestalling answers to any question which may have resulted in the violation of security regulations.

A slight delay resulted at gate number 3 due to a reversal of an Atomic Energy Commission decision to permit permanently badged military police and signal personnel to precede the march units through all gates. These groups were permitted to proceed through gates number 1 and 2 but were required to halt at gate number 3 for an "on station" type badge. Eventually all personnel were permitted entry through this gate. This requirement was not presented to the Camp Desert Rock AC of S, G2, prior to the movement to the forward area.

III. INSTRUCTOR GROUP.

Instructor Group participation in Shot Y-5 consisted of orientation programs for observers from all services prior to shot day. Orientation at the trenches on rehearsal day, and pre-shot walk through briefings for observers in the display areas prepared the observers to make a comparison of the condition of equipment before and after the blast. Since the Marine Corps Provisional Atomic Exercise Brigade provided its own instructors for orientation of brigade troops participating in the exercise, the Instructor Group, Camp Desert Rock, did not provide an orientation program but assisted the Marine Brigade instructors.

Shot V-5 was detonated on schedule at 0435 hours, 18 April. In order to prepare for the participation of official observers in the exercise, the Instructor Group prepared and received approval for an eight hour course of orientation for the observers. The course covered the general phenomena associated with a tower burst and the other burst heights. The basic physics involved in fission and a description of stockpile weapons, medical considerations, means available to the three services to deliver the weapons, and atomic bomb employment were covered, as well as means of protection against the atomic weapon effects.

On 16 April the field rehearsal for Shot V-5 was conducted. An officer of the Instructor Group conducted a pre-shot orientation in the trench area for all personnel taking part in the exercise. This orientation, of twenty-five minutes duration, described the terrain of the shot, the procedure to be followed by observers and landing teams, safety precautions, the phenomena of the burst, and Air Force activity in the shot area, such as cloud sampling and air photography.

Following the trench orientation, which included a count down to H-Hour by the instructor and a simulation of the passage of the shock wave over the trench, two instructors conducted members of the observer group through the display areas, pointing out the expected condition of material and sheep after the detonation. This walk through on rehearsal day gave the observers an excellent basis for evaluation of the effects of the detonation. Following the rehearsal, instructors conducted the observers through the display area of a previous shot, allowing an examination of previous results of blast and heat applied to material.

The full eight hour orientation for observers was conducted on 17 April. Although opportunity was given for all observers who had been previously oriented to forego the orientation at Camp Desert Rock, only a small number failed to attend the entire lecture period.

Observers arriving too late on 17 April to attend the eight hour orientation were briefed at 1930 hours by a Marine Officer, assisted by a member of the Camp Desert Rock Instructor Group. This instructor provided technical aid to the briefing officer and answered questions of a general nature not immediately pertaining to the field maneuver of the Marine units.

As in the rehearsal, an instructor provided pre-shot orientation in the trenches prior to H-Hour on shot day, 18 April. From H-Hour minus 60 minutes until H-Hour minus 2 minutes the trench orientation was continued, at which time the loudspeaker received transmissions from the AFOC Control Point.

Following the detonation, observers were conducted through the display area by two instructors employing sound trucks for voice amplification. The results of the burst generally followed predicted results stated by the instructors on rehearsal day.

IV. SIGNAL COMMUNICATION.

Requirements for Shot V-5 were basically the same as those required for previous shots in this area.

It was felt that a better operating public address system could be installed, therefore, changes were made that provided improved results. Changes included the operation of a separate public address system at each group of speaker locations, all controlled from the master station in the Exercise Directors Control Trench. This system was a decided improvement over the previous installations.

The telephone system was similar to that used in previous shots, but some difficulty was experienced in completing the installation prior to shot time due to engineer construction being performed in the area. Considerable wire had to be laid simultaneously with construction work going on in the area.

V. RAD-SAFE.

Although the Marine Corps participants in this exercise were self supporting as far as radiological safety capabilities were concerned, no change was made in the organization and operations of the Camp Desert Rock Rad-Safe organization. Pre-shot tasks were reduced by the elimination of the monitor refresher training course and test provided for Army units.

The shot was characterized by an unusually high intensity radioactivity along the east (R) leg of the "pie" sector. Initial reconnaissance measured 40 to 50 r/hr which quickly fell to 14 r/hr. It is believed that the rapidity with which the monitors reached the area to be surveyed

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resulted in them being subjected to radiation from part of the cloud which passed over the sector. The residual radioactivity, while high, did not approach these early readings.

The troop participation by the two Marine Corps battalions was excellent. Right flank commanders, upon being notified of the high intensities in the right portion of their zone of attack quickly changed the planned formation to avoid this unpredicted hazard.

Rad-Safe operations in the field of providing for collection of information were considerable enlarged. In addition to the previously required film badges to measure intensities inside and outside of trenches and dugouts, three new measurements were attempted. First, badges were attached to collars which were placed around the necks of test animals (sheep). Second, thermal effects were measured by heat sensitive paints on plaques placed at various distances from ground zero. And, third, pressure was measured at two points in the area. This task with its preparation, placement, and collection of recording devices and subsequent presentation of data is an important portion of the Rad-Safe program, requiring approximately seven (7) man-days per shot.

Post shot evaluation of the operation brought out the following:

Orientation personnel traversed areas in which they were ignorant of radiation intensities.

Observers moved too freely throughout the area.

Monitors reached the area before conditions became stabilized.

Corrective action was taken to cover each deficiency. The limitation of 2.5 r/hr for foot movement and 5 r/hr for vehicular movement were re-emphasized. Orientation personnel were instructed to have accompanying monitors and to caution observers to remain in close proximity to the loud speaker trucks.

Listed below are the results of radiation measurement made in various emplacements for Shot V-5. Where data are missing, the badges were either destroyed or lost due to collapsed emplacement.

Pressure gauges were set in the trenches at 2000 yards and 1500 yards from ground zero. The gauge at 1500 yards recorded 3.96 psi. The gauge at 2000 yards was recovered by the forward observers. Since the clock mechanism was not released prior to moving the data was lost.

An attempt was made to record thermal effects both inside and outside the trenches at 1500 yards, 2000 yards, and 2250 yards by placing paper with heat sensitive paint at these location. No effects were noted in the trenches, therefore the thermal radiation was less than .45 cal/cm^2. On the outside at 1500 yards the paint was evaporated off the paper with light charring indicating about 17 cal/cm^2. The paper was lost at 2000 yards due to blast. The paper at 2250 yards indicated about cal/cm^2.

Radiation dose in roentgens received in emplacements.

Distance from GZ in yards	C1 Exposed post	C2 Shallow slit Trench	C3 Deep slit Trench	C4 1 Man emplacement	C5 2 Man emplacement
1000	_____	Approx. 800	_____	210.0	132.0
1500*	Approx. 640	34.0	80.0	12.0	5.6
2000*	110.0	48.0	5.3	4.6	4.7
2500	52.0	14.0	12.0	3.7	1.7
3000	56.0	64.0	36.0	9.7	6.5
3500	8.0	7.8	3.2	5.5	.4

*Badges placed in 6 ft. trenches at 1500 yards, 2000 yards and 2250 yards recorded 13.5 r, 2.94 r and 1.08 r respectively.

These data represent radiation personnel protected by the emplacement and unprotected at the same distance from ground zero would have received. The anamalous results at 2500, 3000 and 3500 yards were caused by heavy fall out in the area which delayed badge recovery. Badges were exposed in National Bureau of Standards holders.

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MEDICAL.

Medical Support for Personnel.

The medical support for operation V-5 was handled exactly as that for V-2 with the exception that one ambulance was dug in to the rear of the trenches and remained there during the detonation of the atomic device. This was done so that in the event any evacuation became necessary after the vehicles had returned to the parking area, an ambulance would be available for dispatch. This forward ambulance was equipped so it could be used to furnish aid facilities at the volunteer trench if required. In the event of an accident to this group, the surgeon planned to accompany the ambulance to the trench.

Arrangements were made to have a large helicopter (H-19 type), from the Marine Corps Helicopter Group, available for evacuation purposes. This was in addition of the smaller helicopter (H-23) provided for from Army sources. There were no actual casualties on either the rehearsal or shot days.

Medical Evaluation of Test Items.

On the day prior to the detonation 37 sheep were place at varying distances from ground zero. Commencing at 500 yards, five sheep were placed at each 500 yard interval extending through 3500 yards from ground zero. The sheep employed at each of the 500 yard intervals were placed one to each C type position (C-1, C-2, C-3, C-4 and C-5). In addition to the above positions there were two special trenches, one at 1500 yards and one at 2250 yards.

The veterinary officer and one enlisted man accompanied the control group to the forward area. Immediately following the detonation a medical technician accompanied by a Rad-Safe moniter moved forward by truck to observe the sheep. The veterinary officer accompanied the loading party later in the morning and at this time evaluated the effects of the detonation in relation to the effects incurred by the sheep.

Most of the evaluation results are covered in the evaluation forms or the picture captions, but following are some of the more pertinent results.

The sheep at 3500 yards were all found to be normal.

The sheep at positions C-1 and C-3, 2500 yards, had slight wool burns.

The sheep at position C-1 2000 yards, had slight wool burns.

The sheep placed in the conventional type trenches at 2250 and 1500 yards were both normal.

At 1500 yards the sheep at position C-1 had extensive wool burns on the back. This animal suffered no other ill effects until epilation, i.e., loss of hair, appeared 27 April. This animal maintained a normal appetite until 4 May. Death ensued the following day. The radiation received by this animal was 678 r. At position C-2 the sheep had third degree face burns. Epilation commenced 24 April followed by inappetence 26 April and death 28 April. The radiation data for this animal was lost, but it can safely be assumed that the dose was in excess of 500 r. At position C-3 the sheep had third degree profile burns on the left side of the face and extensive wool burns. Epilation appeared 30 April. This animal has yet shown no inappetence and it is considered to have a better than average chance to effect a recovery. The dose of radiation this animal is supposed to have received is 515 r. The sheep at position C-4 and C-5 have both remained normal.

At 1000 yards the sheep at position C-1 had third degree burns on the face and extensive wool burns. It was further suffering from an extensive shrapnel type wound of the right shoulder. This animal died 19 April with death being attributed to radiation sickness. The dose of radiation this animal received was 6641 r. At position C-2 the sheep had third degree profile burns on the right side of the face and extensive wool burns. It developed in-coordination and diarrhea the morning of 21 April and became prostrate the afternoon of 21 April and died during the night of 21 April. Death was attributed to acute radiation sickness. The dose of radiation the animal received was 3913 r. At position C-3 the sheep received extensive wool burns on the back. It developed in-coordination the morning of 20 April and diarrhea the morning of 20 April. Prostration ensued the afternoon of 21 April followed by death the night of 21 April. The wool burns received by this animal were of little consequence and this can be considered a typical case of acute radiation sickness. The radiation dosage for this animal was 2038 r. The sheep at position C-4 has shown no illness of any nature. It's radiation dosage was 369 r. The sheep at position C-5 developed epilation 29

April. It has shown no inappetence at any time and it is assumed this animal will effect a complete recovery. The radiation dosage received was 298 r.

At 500 yards the sheep at position C-1 was killed by blast effects. It was found in the trench at position C-2 and it is assumed that it was there at the time of the detonation. The sheep at positions C-2, C-3 and C-4 were killed by blast effects. The bunker at position C-5 was collapsed, so it is assumed the sheep at this location died directly from blast effects or indirectly from suffocation.

Total number of sheep exposed: thirty-seven (37). Five were killed directly or indirectly from blast (suffocation). Three died from acute lethal doses of radiation. Two died deaths characteristic of those having received median lethal doses of radiation, but the doses they received were actually in the lethal scale. At the present time twenty seven of the original thirty seven sheep are still alive and they will apparently survive.

VII. VOLUNTEER OBSERVER PROGRAM.

The trench for volunteer observers was located 2000 yards from ground zero on an azimuth of approximately 195 degrees. This trench was 6 feet deep, 3 feet wide and was not revetted. The soil consisted of fine silt and rocks.

The volunteer group consisted of 6 US Marine Corps and 6 US Army officers. All officers were capable of calculating the predicted effects for the device being detonated and had agreed that the trench was located at a safe distance for the criteria given.

The Atomic Weapon exploded was an experimental device placed in a cab set on a tower 300 feet high. A yield of 40 KT was predicted for this device and all computations were based thereon. However, preliminary calculation indicate a yield of 27.7 KT. The nature of the experimental device was such that greater than normal thermal effects were expected.

Weather data for ground zero at the time of burst were as follows:

Temperature	45.8 degrees F
Wind Direction (Surface)	From 0 degrees
Wind Speed	9 knots per hour
Visibility	50 miles
Pressure	838 millibars

Volunteers reported the following effects were noted:

Initial flash. The light was reported by all as exceedingly brilliant. Five officers, having previously witnessed an atomic detonation, reported the light as of unusually long duration. Five officers reported the light produced a temporary blindness or blurring of sight.

Thermal effects. No thermal effects were noted by the observers who were crouched in the trench well below ground surface. Heat measuring instruments placed in the trench were not activated.

Blast effects. Only one officer reported feeling any increase in pressure. The air shock was reported as being extremely loud but no discomfort was noted. The blast effect produced a shower of small pebbles and sand from the sides of the trench.

Ground shock. With one exception the ground shock was sensed as mild and described as a rolling motion. Tremor and vibration in the trench walls occurred, probably caused by a combination of blast effect and ground shock.

Nuclear radiation effects. Accurate nuclear radiation readings appear difficult to obtain. One set of film badges furnished by the AEC Rad-Safe Officer indicated dosages received varied from 5.2 to 9.5 roentgens. Another set furnished by CDR Rad-Safe Section indicated dosages received varied from 6.8 to 14.9 roentgens. Dosimeters carried by volunteers indicated dosages varying from 5.25 to 9.5 roentgens. It would appear that the film badges furnished by AEC are most accurate. The film badges furnished by CDR Rad-Safe contain two pieces of film. The portion covering low intensity is accurate to 5 roentgens and the portion measuring high intensity is accurate above 25 roentgens. Between 5 and 25 roentgens accurate readings are difficult to obtain.

No impairment of faculties, other than a slight period of temporary blindness, was noted.

All but one officer agreed that they could have engaged in close combat in an efficient manner immediately following the blast.

The following conclusions were made by volunteer observers:

That a trench 6 feet deep was adequate for an atomic burst under the given conditions.

That the trench need not be revetted.

That there was no discomfort from any of the blast or thermal effects.

That ground shock, at this distance, is not of a magnitude great enough to be of any concern.

That properly indoctrinated troops could engage in close combat after being subjected to an atomic detonation under similar conditions.

That troops should be placed no closer than 4000 yards to ground zero in troop orientation and indoctrination exercises, such as Exercise DESERT ROCK V for the following reasons:

Observation of explosion phenomena is greatly reduced when personnel are positioned closer to ground zero.

In the event of an adverse fall out the evacuation of large numbers of troops is made more difficult.

The period of delay prior to viewing the effects upon displayed equipment is increased.

Reduction of distance between ground zero and the troop entrenchment area to less than 4000 yards reduces the available area for tactical maneuvers.

VIII. MARINE CORPS AIR (HELICOPTER).

Helicopters "A" and "B" took off from Yucca Airstrip four (4) minutes prior to H-Hour and proceeded northward toward the blast area. At the time of detonation both helicopters were in the air facing the blast, approximately 15,700 yards from ground zero. The pilots of helicopters "A" and " protected their eyes by adjusting the bills of their caps so as to shield their eyes from the flash. The pilots experienced no flash blindness. The co-pilots wore the standard 4.2 density goggles at the time of detonation and were prepared to assume control of the helicopters should the pilots be blinded by the flash. At the time the shock wave passed, helicopters "A" and "B" were approximately 14,500 yards from ground zero. The shock wave did not affect the control of the helicopters.

After the shock wave passed, helicopters "A" and "B" proceeded toward ground zero. Due to the heavily contaminated dust cloud which drifted southward helicopter "A" was forced to land about 6,000 yards from ground zero. Helicopter "B", which was to accompany helicopter "A", lost visual contact with "A" and proceeded around the west side of ground zero and into a clear area. Since the wind direction was from the northwest the entire area north of ground zero was clear. Helicopter "B" proceeded into this clear area and encountered minimum radiation. The pilot of helicopter "B" concluded that troops could have been landed in this area approximately 3,000 yards from ground zero eight (8) minutes after detonation.

Helicopters "C" and "D" were positioned approximately 14,000 yards from ground zero at the time of detonation. Both helicopters were facing the blast and hovering about ten (10) feet above the terrain. The pilots protected their eyes from the direct rays of the blast by adjusting the bills of their caps and concentrated their vision on the flight instruments. Pilots reported experiencing no appreciable flash blindness and noted that the instruments were visible and legible at all times. Co-pilots of both helicopters wore 4.2 density goggles.

After passage of the shock wave both helicopters proceeded to, and landed approximately 8,000 yards from ground zero. These helicopters were forced to land at this distance because of a heavily contaminated dust cloud which rapidly drifted over the approach route.

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DAMAGE EVALUATION REPORT

SHOT V - 5

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 35 KT	Condition of equipment or emplacement after shot. Actual yield 27.7 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
C-1 Stake	500 yds	Standard steel U picket.	Severe, stake will probably be heavily scorched and displaced	Undamaged	None
C-2 Trench	500 yds	Broadside to blast. 2' x 4'6" x 2' slit trench	None	½ filled with dirt	Ditcher 2 — 1/4 hr or man hrs
C-3 Fox hole	500 yds	3' x 4' x 3'6" Fox hole	None	½ filled with dirt	Ditcher 2 — 1/4 hr or man hrs
C-4 Bunker	500 yds	Entrance facing GZ. 6' x 4' x 4'6" covered emplacement.	None (some spalling damage only).	Total destruction. Caved in, about ½ of timber is salvageable. Easier to build new emplacement than repair.	Excavation Ditcher — 1/4 hr Hand — 7 1/2 man hrs Timbering 12 ea 4x4x16 — 6 hrs Sandbagging 150 bags — 2 1/4 hrs Dozer — 3/4 hr Equipment 1 equip hr — 8 1/2 man hrs No equip — 15 3/4 man hrs
C-5 Bunker	500 yds	Entrance facing GZ. 6' x 6' x 5'6" covered emplacement, revetted with 1 x 6 timber.	None (some spalling damage only)	Total destruction. Caved in, about ½ of lumber is salvageable. Easier to build a new bunker.	Excavation Ditcher — 1/2 hr Hand — 10 1/2 hrs Timbering 20 ea 6x6x9 & 18 ea 1x6x16 — 12 hrs 150 sandbags — 3 hrs Dozer — 1 hr Total 1½ equip hr - 15½ man hrs or 25 ½ man hrs
Sheep	500 yds	C-1 Normal.	Fatal burns. Lethal Radiation.	Killed by blast effects	NA
Sheep	500 yds	C-2 Normal.	Burned severely on top. Lethal radiation (2 hrs).	Killed by blast effects.	NA

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of [35] KT	Condition of equipment or emplacement after shot. Actual yield 27.7 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Sheep	500 yds	C-3 Normal.	Lethal radiation, Wool scorched on back.	Killed by blast effects.	NA
Sheep	500 yds	C-4 Normal.	250 to 300 r. Fatality doubtful. Will sicken in 2 hrs.	Killed by blast effects	NA
Sheep	500 yds	C-5 Normal	No damage.	Killed by blast effects.	NA
C-1 Stake	1000 yds	Standard steel U shaped picket.	None	Undamaged	None
C-2 Trench	1000 yds	Broadside to blast.	None	Some cleaning out necessary, but still useable.	1/2 man hr
C-3 Fox hole	1000 yds	Broadside to blast.	None	Some cleaning out necessary, but still useable.	1/2 man hr
C-4 Bunker	1000 yds	Entrance facing GZ.	None	All sandbags destroyed. Debris from sandbags fell into entrance. Easily cleaned out.	150 sandbags 3 1/2 man hrs Cleaning out 1/2 man hr Total 4 man hrs
C-5 Bunker	1000 yds	Entrance facing GZ.	None	All sandbags destroyed. Header and back of wall in line with entrance scorched but structurally sound. Some cleaning out required due to sandbag fill falling into entrance way.	150 sandbags 3 1/2 man hrs Cleaning out 1/2 man hr Total 4 man hrs
Sheep	1000 yds	C-1 Normal.	Lethal dosage of radiation.	Third degree burns on face and extensive wool burns. This animal further suffered an extensive laceration of the right shoulder which was apparently caused by some fragment object. Died of radiation sickness.	NA

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DAMAGE EVALUATION REPORT

SHOT V - 5

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 7357 KT	Condition of equipment or emplacement after shot. Actual yield 27.7 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Sheep	1000 yds	C-2 Normal.	Lethal dosage of radiation.	Third degree burns on right side of face and extensive wool burns. Died of radiation sickness.	NA
Sheep	1000 yds	C-3 Normal.	Will be sick. May receive lethal radiation.	Wool burns covering 1/2 of body area. Radiation sickness but still alive.	NA
Sheep	1000 yds	1 each in C-4 and C-5 positions sheep. Normal.	No damage	No visible effects. Sheep at C-5 develop radiation sickness but has a good chance to recover.	NA
C-1 Stake	1500 yds	Standard U steel picket.	Will receive heavy scorch but will not displace.	Undamaged	None
C-2 Trench	1500 yds	Broadside to blast.	None	Slight cleaning out required	1/2 man hr
C-3 Fox hole	1500 yds	Broadside to blast.	None	Slight cleaning out required.	1/2 man hr
C-4 Bunker	1500 yds	Entrance facing GZ.	None	Slight cave in of inside corners of entrance. All sand bags need replacing. Entrance easily shored with 4 x 4's	150 sandbags 3 1/2 man hrs Cleaning 1/2 man hr Shoring 2 pcs. 4x4x4 1/2 man hr Total 4 1/2 man hrs
C-5 Bunker	1500 yds	Entrance facing GZ.	None	Replace all sandbags. No structural damage.	150 sandbags 3 1/2 man hrs Cleaning out 1/2 man hr Total 4 man hrs
Sheep	1500 yds	C-1 Normal.	Wool scorch. Damage to eyes. Possible lethal radiation.	Extensive wool burns on back. Died of radiation sickness 4 May.	NA

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 35/ KT	Condition of equipment or emplacement after shot. Actual yield 27.7 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions	
Sheep	1500 yds	C-2 Normal.	Wool scorch. Damage to eyes. Possible lethal radiation.	Third degree burns on face and very extensive wool burns on body. Died of radiation sickness 28 April	NA	
Sheep	1500 yds	C-3 Normal.	Radiation sickness within 2 hours expected.	Third degree burns on left side of face and extensive wool burns. Developed radiation sickness but has good chance to recover.	NA	
Sheep	1500 yds	1 each in C-4 and C-5 positions. Sheep Normal.	No damage	No visible effects	NA	
Sheep	1500 yds	Conventional type trench 6 ft. in depth (similar in design to the trench used by volunteers) Normal.	No damage	No visible effects	NA	
C-1 Stake	2000 yds	Standard steel U picket.	Light scorch. Not displaced.	Undamaged	None	
C-2 Trench	2000 yds	Broadside to blast.	None	Slight cleaning out required.		1/4 man hr
C-3 Fox hole	2000 yds	Broadside to blast.	None	Slight cleaning out required		1/4 man hr
C-4 Bunker	2000 yds	Entrance facing GZ.	None	Replace all sandbags, slight cleanout. No structural damage.	150 sandbags Clean out. Total	3 1/2 man hrs 1/4 man hr 3 3/4 man hrs
C-5 Bunker	2000 yds	Entrance facing GZ.	None	Replace all sandbags. Header slightly darkened by heat. No structural damage.	150 sandbags Clean out. Total	3 1/2 man hrs 1/4 man hr 3 3/4 man hrs
Sheep	2000 yds	C-1 Normal.	Wool scorched. Eyes, face burned.	Wool scorched.	NA	

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SHOT V - 5

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 35 KT	Condition of equipment or emplacement after shot. Actual yield 27.7 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions	
Sheep	2000 yds	C-2 Normal.	Wool on back scorched.	No visible effects.	NA	
3 Sheep	2000 yds	1 each C-3 and C-5 positions. Sheep Normal.	No damage.	Slight wool burns.	NA	
Sheep	2250 yds	Conventional type trench 6 ft. in depth (similar in design to the trench used by volunteers). Normal.	No damage	No visible effects.	NA	
C-1 Stake, C-2 Trench, C-3 Fox hole	2500 yds	Stake facing GZ. Trench and fox hole broadside to GZ.	None	Undamaged.	None	
C-4 Bunker	2500 yds	Entrance facing GZ.	None	Replace about 60% of sandbags. Some cleaning out. No structural damage.	90 sandbags Cleaning out Total	3 man hrs 1/2 man hr 3 1/2 man hrs
C-5 Bunker	2500 yds	Entrance facing GZ.	None	Replace 75% of sandbags. No structural damage.	120 sandbags Cleaning out Total	3 1/4 man hrs 1/4 man hr 3 1/2 man hrs
Sheep	2500 yds	C-1 Normal.	Slight wool scorch.	Moderate wool burns on back.	NA	
4 Sheep	2500 yds	1 each in C-2, C-3, C-4 and C-5 positions. Sheep normal.	No damage	No visible effects.	NA	
C-1 Stake, C-2 Trench, C-3 Fox hole	3000 yds	Stake facing GZ. Trench and Fox hole broadside to GZ.	None	Undamaged.	None	
C-4 Bunker	3000 yds	Entrance facing GZ.	None	Some darkening of sandbags not bad enough to replace. No structural damage.	None	
C-5 Bunker	3000 yds	Entrance facing GZ.	None	Replace about 15 sandbags, no other damage.	15 sandbags	1 man hr

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SHOT V - 5

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 35 KT	Condition of equipment or emplacement after shot. Actual yield 27.7 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
10 Sheep	3000 yds	1 each in C-1, C-2, C-3, C-4 and C-5 positions at both 3000 and 3500 yds.	No damage	No visible effects	NA
C-1 Stake, C-2 Trench, C-3 Fox hole	3500 yds	Stake facing GZ. Trench and Fox hole parallel to GZ.	None	Undamaged.	None
C-4 Bunker	3500 yds	Entrance facing GZ.	None	Some darkening of sandbags. No other damage.	None
C-5 Bunker	3500 yds	Entrance facing GZ.	None	Some darkening of sandbags. No other damage.	None

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THE FOLLOWING DAMAGE EVALUATION FORMS WERE PREPARED BY THE 2ND MARINE CORPS PROVISIONAL ATOMIC EXERCISE BRIGADE (MCPAEB) ON ITEMS OF MARINE EQUIPMENT DISPLAYED DURING SHOT V-5. MARINE CORPS PROVIDED THE TACTICAL UNIT PARTICIPATING IN THIS OPERATION.

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DEMONSTRATION OF EFFECTS OF ATOMIC EXPLOSION
ON EQUIPMENT AND CLOTHING

1. PURPOSE OF THE DEMONSTRATION:

a. To demonstrate the effects of the atomic explosion on Marine Corps equipment, and on personnel, at various distances and in various attitudes and degrees of cover.

2. a. To accomplish the above, equipment and clothing (on dummies to simulate personnel) layouts were prepared in five (5) positions at different distance as follows:

(1) Position #1 - 500 yards, extending to 650 yards, from ground zero.

(2) Position #2 - 1000 yards, extending to 1100 yards, from ground zero.

(3) Position #3 - 1700 yards, extending to 1750 yards, from ground zero.

(4) Position #4 - A special dummy position 1700 yards from ground zero.

(5) Position #5 - A special dummy position (similar to #4) 2600 yards from ground zero.

b. In position #1, #2 and #3, various items of equipment, and dummies clad in utility clothes and khaki, were placed in varied attitudes and directions with respect to the point of the burst and, further, were situated with various degrees of protection in the form of foxholes and emplacements. Positions #4 and #5 each contained three dummies, two standing and one prone, clad in different combat uniforms.

c. Appendix (1) "Apparent Effects of Atomic Explosion", lists the items placed in the respective positions in the order of proximity to ground zero, and indicates (1) distance of each item from GZ, (2) degree and attitude of exposure, and (3) apparent effect of the explosion on items displayed. In general, and as far as equipment available would allow, similar items, in similar disposition, were displayed in all positions (particularly #1 and #2) to show the contrast of effects in different distances.

d. To facilitate the examination of the demonstration by the troops in the exercise, positions #1, #2 and #3, were split, so that half of the items of each of these positions were on either side of the allocated sector. For details of layout, see Appendix (2).

3. The following general effects were produced at the respective position:

a. Position #1.

(1) With one or two minor exceptions, all of the equipment situated in this position was severely damaged or totally destroyed. With the exception of the tank and the 105mm motor carriage M7, all of the exposed vehicles were demolished, with parts scattered great distances. The vehicles that were dug in were noticeably less damaged than those exposed but they, too, were heavily damaged. With exception of the emplaced 81mm mortar and the rifle and carbine in the foxhole with the dummy, all of the light equipment was severely damaged or destroyed, the emplaced items as well as those exposed. Although parts were blown from the M7 and the turret blown from the tank, both landed upright with tracks apparently undamaged, and it is possible that they might have been capable of moving under their own power. Though covered with a thin layer of dirt, the dummy in the foxhole was still intact (an individual in this foxhole would have received a lethal dose of radiation). His clothing was slightly tattered, due apparently to the drag associated with the high overpressure in that region. In contrast to the exposed fuel dump, which was scattered for some 200 yards by the blast, the emplaced fuel dump was intact though partially buried.

(2) It is estimated that the energies transmitted to the position were approximately:

(a) Forward end:
Blast - 45 psi
Thermal - 240 cal/sq cm
Nuclear - 65,000 r

(b) Rear end:
Blast - 18 psi
Thermal - 150 cal/sq cm
Nuclear - 23,000 r

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b. Position #2.

(1) In contrast to the effects at position #1, the heavy vehicles (Tank, M7 and LVT) suffered comparatively little damage at this position. The two trucks, however, were severely buffeted by the blast, both being thrown nearly 50 feet and landing upside down. They appeared severely damaged. Infantry weapons, even those exposed, stood up well in this position. Those in emplacements, for the most part were undamaged. Small, but light equipment (radios, switchboards, etc.) suffered moderate to severe damage if exposed, but little or no damage if dug in. One exception to the latter was a switchboard in a rather poor emplacement. The ration dump excellently illustrated the value of cover, the exposed dump being littered over a broad area while the emplaced dump was comparatively undisturbed. The dummy in the foxhole was entirely shielded from all effects of blast and thermal radiation.

(2) It is estimated that the energies transmitted to the position were approximately:

(a) Forward end:
Blast - 12 psi
Thermal - 70 cal/sq cm
Nuclear - 3200 r

(b) Rear end:
Blast - 10 psi
Thermal - 55 cal/sq cm
Nuclear - 2000 r

c. Position #3.

(1) At this position, approximately one mile from Ground Zero, all items with the exception of the trucks and dummy received slight damage. The truck sustained damage from both blast and thermal radiation and the exposed dummy was burned. Had this dummy been in a foxhole, even a relatively shallow one, it is considered that it would have escaped all effects of the weapon, including nuclear radiation, since the latter was at a low enough level at this distance to have been effectively shielded out. The estimated energies transmitted to this position are approximately:

Blast - 4.5 psi
Thermal - 24 cal/sq cm
Nuclear - 200 r

d. Positions #4 and #5.

(1) These positions were designed to show the contrast of the effects on exposed personnel at the two distances, particularly the thermal effects. It was felt with little doubt that the dummies at the nearer position would burn, and it was hoped that those at the further position would suffer no more than scorching. It turned out that all standing dummies in both positions were burned to some extent, while the prone dummies at both positions were relatively unharmed.

APPENDIX 1 (Apparent Effects of Atomic Explosion)

POSITION #1 (Unless specified otherwise, items were placed unprotected on open ground. Angles are with reference to a line from item to GZ).

NO.	ITEM	DISTANCE (yds)	PRE-SHOT SITUATION	APPARENT EFFECT
1-1	Tank, M4A3	500	45 degrees to left	Thrown 30'. Turret sheared off and thrown 20' from tank. Paint sandblasted off.
1-2	How, 105mm w/ telescope sight	500	Dug in at 45 degrees	Turned 90 degrees in emplacement. Pushed back 5'. Apparently operable.
1-3	Aiming circle M-1	500	Dug in, mounted on tripod	Destroyed

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NO.	ITEM	DISTANCE (yds)	PRE-SHOT SITUATION	APPARENT EFFECT
1-4	105mm Mortar Carriage, M-7	500	45 degrees to right	Thrown 60'. Moderate damage to carriage (plates blown off) Paint sandblasted off.
1-5	Mortar, 81mm	550	Dug in; aimed at GZ.	Tube detached from base plate and thrown half out of emplacement. Bipod damaged.
1-6	MG Cal. 30 M1917A1	550	Dug in; aimed 30 degrees	Blown out of emplacement. Barrel and jacket bent. Damaged beyond repair.
1-7	Rifle and Carbine	550	Wedged on sandbags, pointed at GZ.	Both thrown about 50'. Carbine stock broken, both stocks badly scarred.
1-8	MG, Cal 50 AA	550	Dug in; aimed 30 degrees and elevated 60 degrees.	Blown out of emplacement and destroyed.
1-9	LVT (4)	570	45 degrees to right.	Thrown approx. 300', landing upside down. Hull severely bent and twisted, apparently beyond repair.
1-10	Truck, 2½ ton	580	45 degrees to left.	Thrown approx. 150', and demolished (wreckage in pieces).
1-11	Truck, ¼ ton	580	45 degrees to right	Thrown approx. 300', and demolished (wreckage in pieces).
1-12	Flame thrower M-2	625	Strapped to sandbags in simulated prone position	Thrown 60'. Severely damaged, twisted and bent.
1-13	Rocker launcher, M-9	625	On sandbags.	Thrown 150'. Severely bent. Beyond repair.
1-14	Van, Radar set SP-1M	625	Dug in, side-on to blast.	Unmoved. All sides and top blasted in. Damaged beyond repair.
1-15	Van, Radar set SP-1M	625	45 degrees to right	Blasted approx. 400'. Demolished.
1-16	Power unit, radar set SP-1M	630	45 degrees to right	Unmoved. Dented and bent. Damage moderate to severe.
1-17	Dehumidifier, Radar set SP-1M	630	Side-on	Thrown approx. 200' and demolished.
1-18	Dummy in khaki w/rifle and carbine	650	In prone foxhole 4'x6' x 2'6" feet deep.	Trousers on back slightly tattered. Rifle and carbine apparently undamaged.
1-19	Rifle, Carbine and telephone (EE-8)	650	Wedged in sandbags.	All thrown (distance unmeasured). Stocks of rifles badly scarred and partially burned. Telephone burned, hand set broken.

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NO.	ITEM	DISTANCE (yds)	PRE-SHOT SITUATION	APPARENT EFFECT
1-20	Wire on DR-4	650	Lying flat in open.	Thrown 50'. Wire insulation burned.
1-21	Fuel dump (Six 55 gal. drums of gasoline).	650	Standing on end in open	Drums scattered for distance of over 500'. Slightly bent, none ruptured.
1-22	Fuel dump (Six 55 gal. drums of gasoline).	650	Dug in, standing on end	Dump partially buried, but intact. No apparent damage.
Position #2.				
2-1	Tank, M4A3	1000	45 degrees to left.	Apparently unmoved. Paint burned and sandblasted.
2-2	IVT (4)	1000	45 degrees to right.	Thrown 50'. Turned 180 degrees. Side to blast slightly dished. Apparently operable. Paint burned and sandblasted.
2-3	How, 105mm w/telescope sight	1000	Dug in at 45 degrees.	No apparent damage.
2-4	Aiming circle, M-1	1000	Dug in, mounted on tripod	Pulled out of position and destroyed.
2-5	105mm Motor Carriage M7	1000	45 degrees to right	Displaced 3'. Front shield blown 100'. Apparently operable. Paint burned and and sandblasted.
2-6	Mortar, 81mm	1015	Aimed at GZ.	Tube detached from baseplate and thrown 8'. Apparently operable after re-assembly, (No sight).
2-7	Mortar, 81mm	1015	Dug in, aimed at GZ.	Undamaged, apparently unmoved.
2-8	MG, Cal. 30, M1917A1	1015	Aimed 30 degrees.	Slightly displaced, light damage but apparently operable.
2-9	Aiming circle M-1	1015	Mounted on tripod.	Thrown and destroyed.
2-10	MG, Cal. 30, M1917A1	1015	Dug in, aimed 30 degrees	Apparently undamaged.
2-11	MG, Cal. 50 AA	1025	Aimed 30 degrees and elevated 60 degrees	Thrown 60 feet. Shield blown off. Sight twisted out of shape. Apparently operable following repair.
2-12	MG, Cal. 50 AA	1025	Dug in. Aimed 30 degrees, elevated 60 degrees.	Blown out of emplacement. Sight and shield damaged, but operable following repair.
2-13	Truck, 2½ ton	1025	45 degrees to left	Thrown 45 feet, overturned. Appeared severely damaged.
2-14	Truck, ¼ ton	1025	45 degrees to right.	Thrown 40', overturned. Appeared severely damaged.

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No.	ITEM	DISTANCE (yds)	PRE-SHOT SITUATION	APPARENT EFFECT
2-16	Flame Thrower, M2	1040	Strapped to sandbags in simulated prone position.	Thrown 20'. Light damage. Bent tank and gun.
2-17	Flame Thrower, M2	1040	Dug in, strapped to sandbags in simulated prone position	No apparent damage.
2-18	Rocket Launcher M-9	1050	On sandbags.	Thrown 10' but apparently undamaged.
2-19	Rocket Launcher M-9	1050	Dug in	Partially buried but undamaged.
2-20	Switchboard BD-72	1050	Standing in open	Thrown 30' and damaged beyond repair.
2-21	Switchboard, BD-72	1050	Dug in, standing.	Torn apart, appeared severely damaged.
2-22	Radio, TBX	1060	Standing in open.	Thrown 40'. Bent, twisted and torn apart. Appeared damaged beyond repair.
2-23	Radio, TBX	1060	Dug in	Blown over, but appeared only slightly damaged.
24	Radio, SCR-300	1060	Standing, propped by sandbags.	Thrown 90'. Appeared severely damaged.
2-25	Radio, SCR-536	1060	Lying on sandbags.	Thrown 12'. Slightly bent. Appeared only slightly damaged.
2-26	DR-4 (w/wire) on RL-31	1070	Axle 90 degrees.	Drum broken from reel. Both thrown 40'. Wire insulation charred.
2-27	Wire on DR-4	1070	Lying flat.	Thrown 6'. Wire insulation slightly charred.
2-28	Wire Dispenser, MX-306/G	1070	Lying flat.	Thrown 30'. Dispenser case scorched.
2-29	Reel, CE-11	1070	Lying on ground.	Thrown 50'. Wire charred.
2-30	Telephone, EE8	1080	Propped by sandbags.	Thrown 10'. Case scorched. Hand set broken.
2-31	Telephone, EE8	1080	Dug in.	Undamaged.
2-33	Dummy in utilities w/rifle and carbine.	1080	Prone, pointed at GZ, rifles wedged on sandbags.	Dummy thrown approximately 140', clothing burned, stocks of rifles badly scarred. Rifles apparently undamaged.
2-34	Dummy in utilities w/rifles and carbine	1080	In foxhole 4'x6'x2'6", positioned as above.	Covered by thin layer of dirt. No damage.

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NO.	ITEM	DISTANCE (yds)	PRE-SHOT SITUATION	APPARENT EFFECT
2-35	Ration dump (50 cases "C" ration)	1090	Stacked in squares 6 cases high.	Scattered for approximately 350'. Cases scorched but intact.
2-36	Ration dump (50 cases "C" ration)	1090	Dug in, stacked as above.	Top layer of cases slightly deranged.
Position #3.				
3-1	Mortar, 81mm	1700	Dug in Aimed at GZ.	Undamaged, still in original position.
3-3	Truck, 2½ ton	1700	45 degrees to left.	Cover burned and ripped off, all bows broken. All windows blown in. Hood dented. Paint scorched.
3-4	MG, Cal. 30 M1917A1 and aiming circle	1710	Dug in, aimed 30 degrees.	Undamaged, still in original position.
3-5	MG, Cal. 50 AA	1710	Dug in, aimed 30 degrees, elevated 60 degrees.	Undamaged, still in original position.
3-6	Flame Thrower, M2	1710	Strapped to sandbags in simulated prone position.	Undamaged and unmoved.
3-7	Rocket launcher, M-9	1710	Laid on sandbags at 30 degrees.	Moved 3'. Undamaged.
3-8	Radio, SCR-300	1720	Propped by sandbag.	Moved 3'., apparently undamaged.
3-9	Radio, SCR-536	1720	Propped by sandbag.	Overturned. Apparently undamaged.
3-10	RL 31	1720	Standing	Overturned.
3-11	Telephone EE8	1720	Propped by sandbag.	Thrown 6'. Apparently undamaged.
3-12	Wire dispenser, MX-306/G	1730	Lying on ground	Canvas case scorched.
3-13	Reel, CE-11	1730	Lying on ground.	Undamaged.
3-15	Dummy in utilities w/rifle and carbine.	1730	Prone, pointed at GZ, rifles lying on sandbags.	Clothing on dummy burned. Rifles not moved or damaged.

Position #4.

NO.	ITEM	DISTANCE (yds)	PRE-SHOT SITUATION	APPARENT EFFECT
4-1	Dummy (Manikin)	1700	Clad in cold weather uniform w/supplementary items.	All clothing burned and blasted off except winter underwear. Thrown 20'.
4-2	Dummy (Manikin)	1700	Clad in utilities w/ helmet, standing facing GZ.	Thrown 20', clothing and dummy almost entirely burned.
4-3	Dummy (home-made)	1700	Clad in utilities w/ helmet, armored vest and torso armor.	Outer jacket burned on shoulders only (shoulders were pointing to GZ.) Moved 4'.

Position #5.

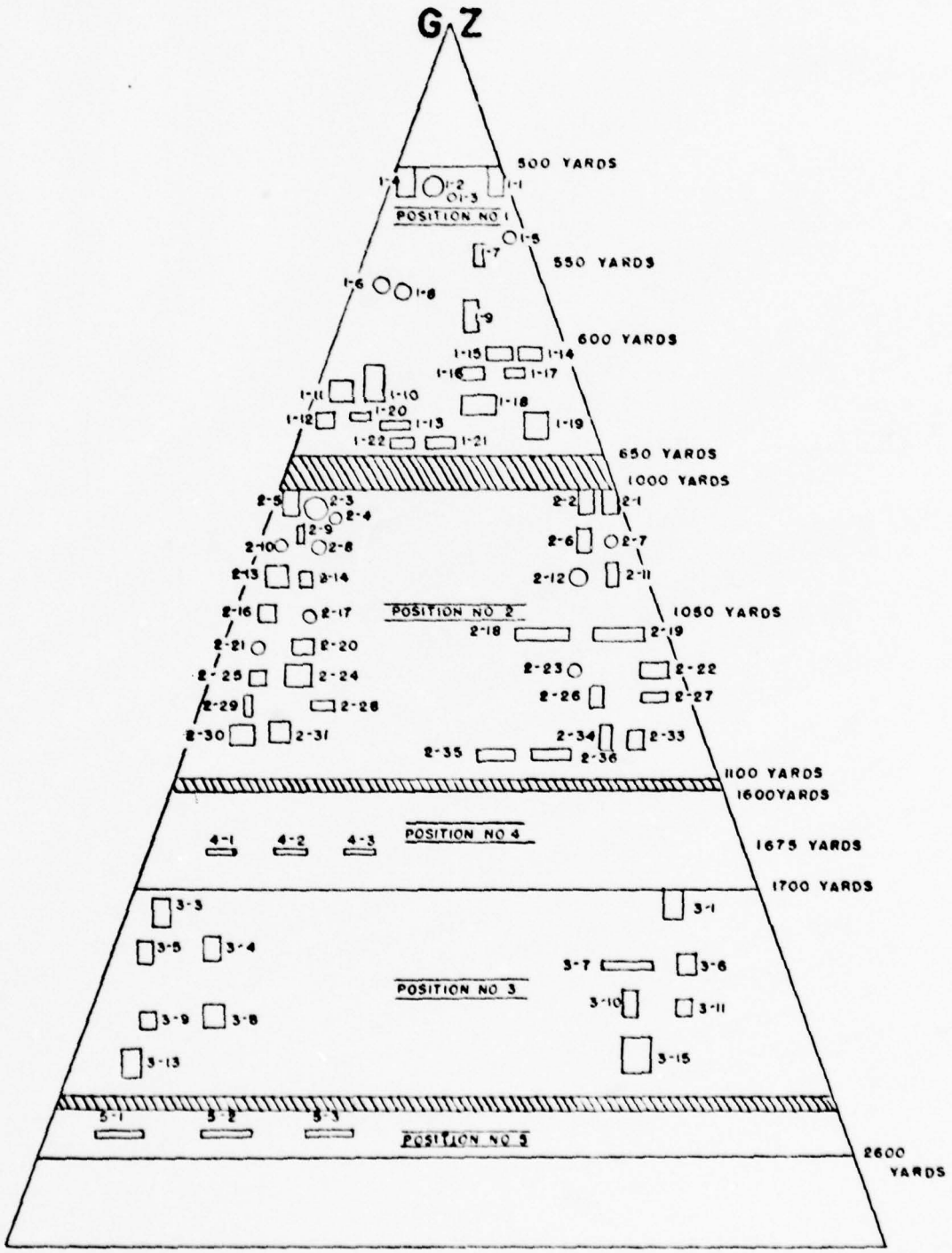
5-1	Dummy (Manikin)	2600	Clad in utilities w/helmet, standing facing GZ.	Blown down. All clothing burned.
5-2	Dummy (Manikin)	2600	Clad in cold weather uniform, standing facing GZ.	Blown down. Outer layer of trousers charred and torn.
5-3	Dummy (Home-made)	2600	Clad in khaki, w/helmet, armored vest and torso armor.	Undamaged.

* Refer Appendix 2 for relative position of item.

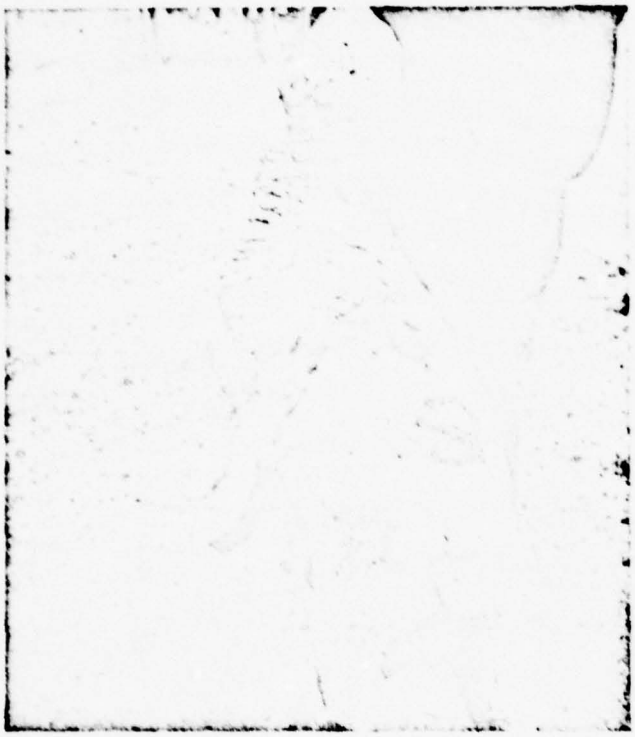
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Appendix 2 (DIAGRAM OF EQUIPMENT DEMONSTRATION)

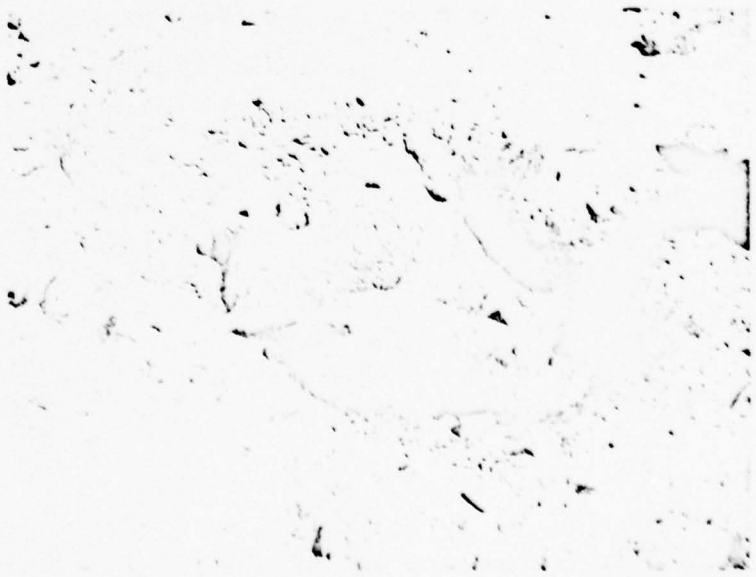


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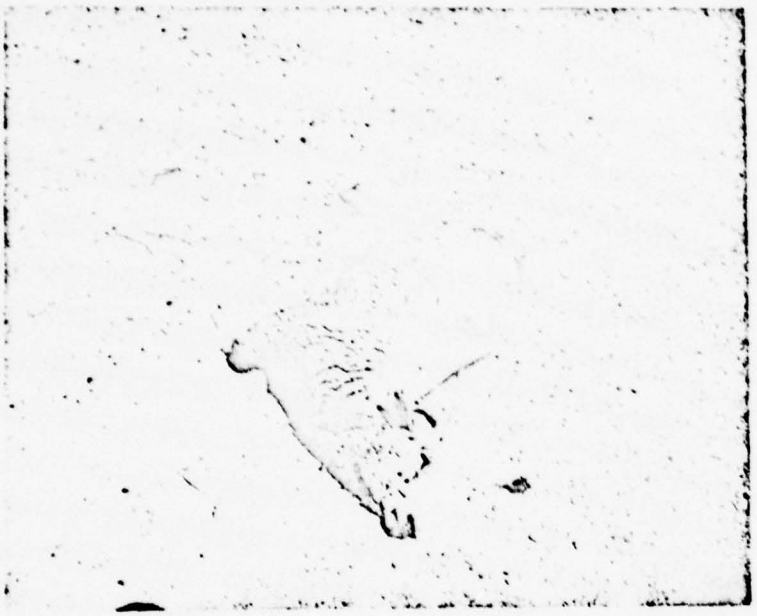


C-5, 1000 yds. The sheep at this position initially showed no visible effects from the detonation. Epilation commenced 29 April. This animal has as yet shown no inappetence.

C-2, 500 yds. Both of these sheep were killed by blast effects. The one at the left was originally staked at position C-1, 500 yds.



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C-2, 1000 yds. This is a picture of the preceding animal. Note the evidence of diarrhea which is a typical symtom of radiation.



C-3, 1000 yds. This is another picture of the above animal. The only visible symptoms are those of wool burns, and death was considered solely to radiation sickness.

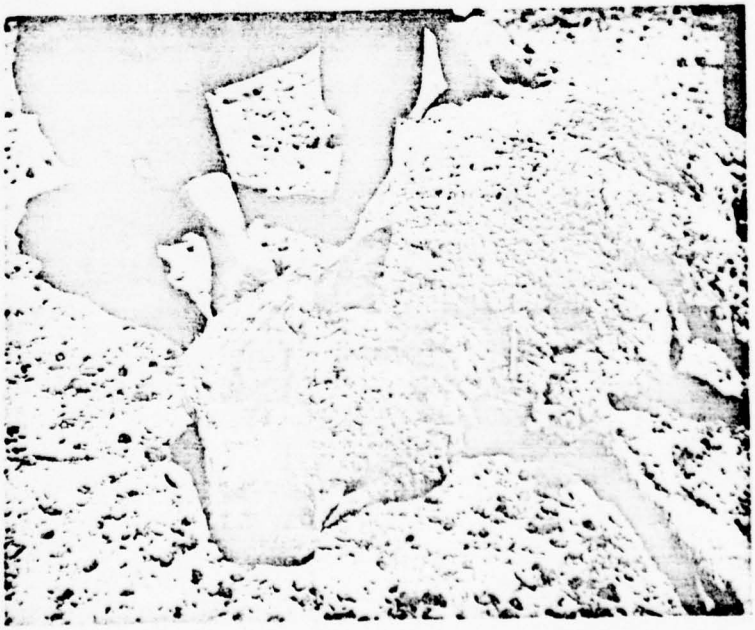
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C-1, 1000 yds. This is a picture of the preceding animal showing the wound received. Death occurred 19 April and was attributed to radiation sickness.

C-1, 1000 yds. This is another view of the above sheep showing the third degree burns on the face.



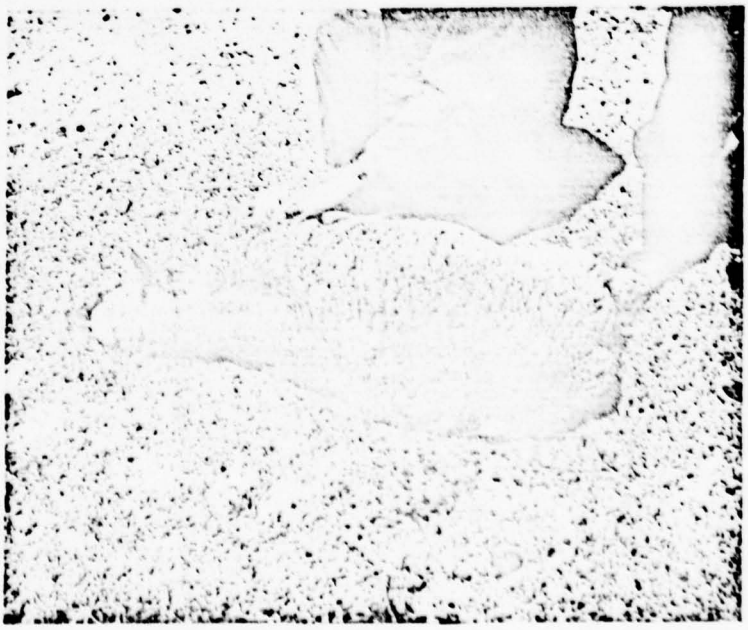
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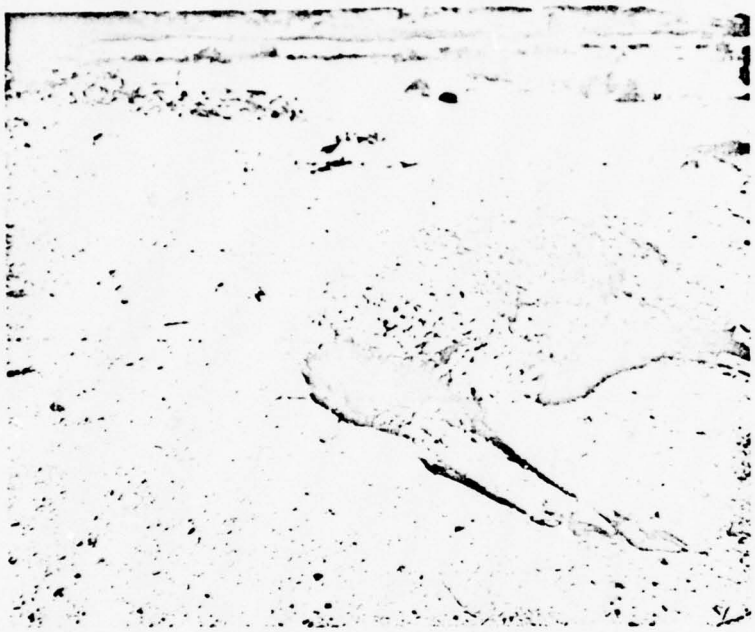
C-2, 1000 yds. This sheep had third degree burns on the face and extensive wool burns. Death occurred the night of 21 April, and was attributed to radiation sickness.

C-2, 1000 yds. This is another picture of the above animal showing the extensive wool burns.



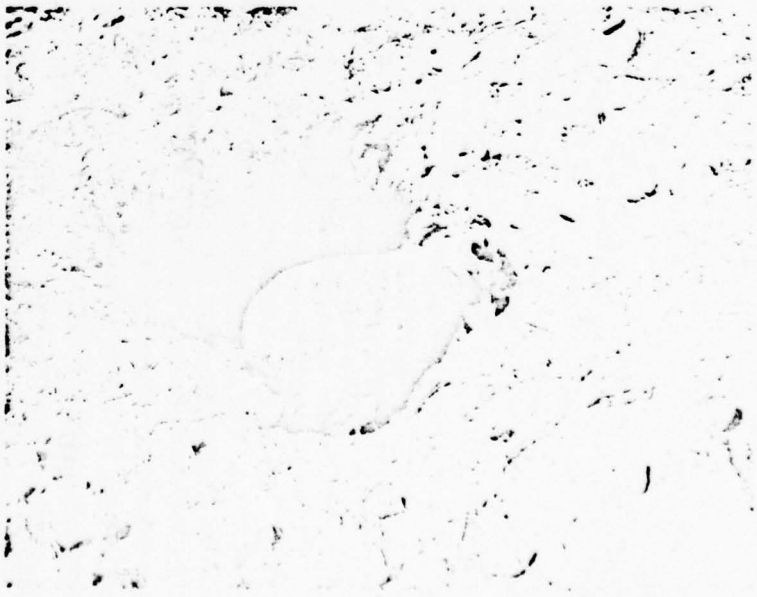
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C-3, 1000 yds. This is a picture of the preceding animal taken shortly after death. The nasal discharge is hemorrhagic in nature.

C-3, 1000 yds. This sheep had wool burns covering most of the back. It developed in-co-ordination 20 April. Diarrhea, prostration and death occurred 21 April.



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C-2, 1500 yds. This is another view of the preceding animal showing the extensive epilation.

C-1 & 2, 1000 yds. Both these sheep suffered third degree burns on the face and extensive wool burns. The sheep on the left was originally at position C-1, 1000 yds before it broke loose after the shot. It was found to have an extensive shrapnel like wound over the right shoulder.



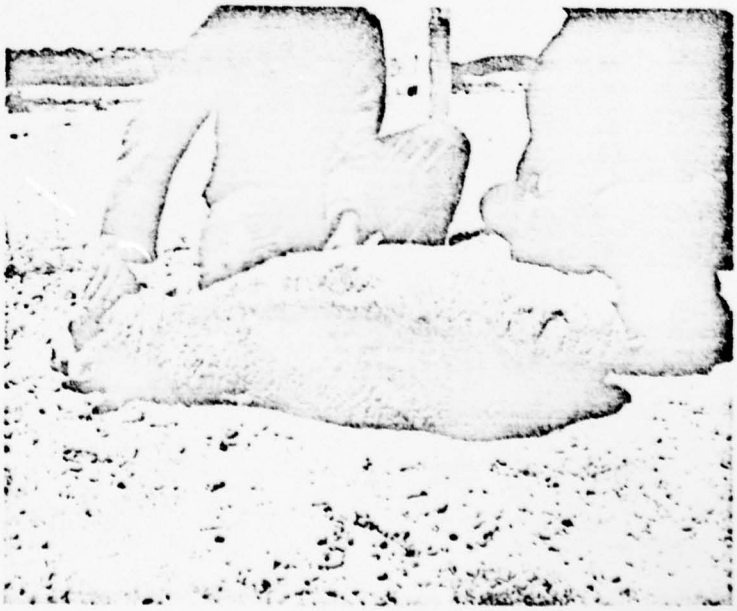
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C-2, 1500 yds. This animal suffered third degree profile burns on the face and extensive wool burns. Epilation commenced 24 April followed by death 28 April. Radiation sickness was the cause of death.

C-2, 1500 yds. This is a view of the above animal showing in detail the wool burns and third degree burns on the face.



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C-1, 1500 yds. This sheep suffered extensive wool burns on the back half of the body. Epilation commenced 27 Apr followed by death 5 May. Death resulted from radiation sickness.

C-1 1500 yds. This is another picture of the above animal. The epilation seen here is quite extensive. This animal showed no illness or inappetence until the day before death.





C-1 2500 yds. The sheep with the wool burns was staked at position C-1, 2500 yds and the one beside it was at position C-2, 2500 yds. The sheep at position C-2 showed no visible effects. Both sheep pulled their stakes from the ground shortly after the detonation.

C-2, 2000 yds. The sheep in the foreground was at position C-2, 2000 yds, and was normal. The one on the left suffered slight wool burns, and was from C-1, 2000 yds. The one on the right was normal, and was from C-2, 2000 yds.



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BEFORE

C-4 Bunker 500 yards from GZ. Entrance facing GZ.

AFTER

Totally collapsed.



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BEFORE

C-5 Bunker 500 yards from GZ. Entrance facing GZ.

AFTER

Completely collapsed. About half of the lumber is salvageable.



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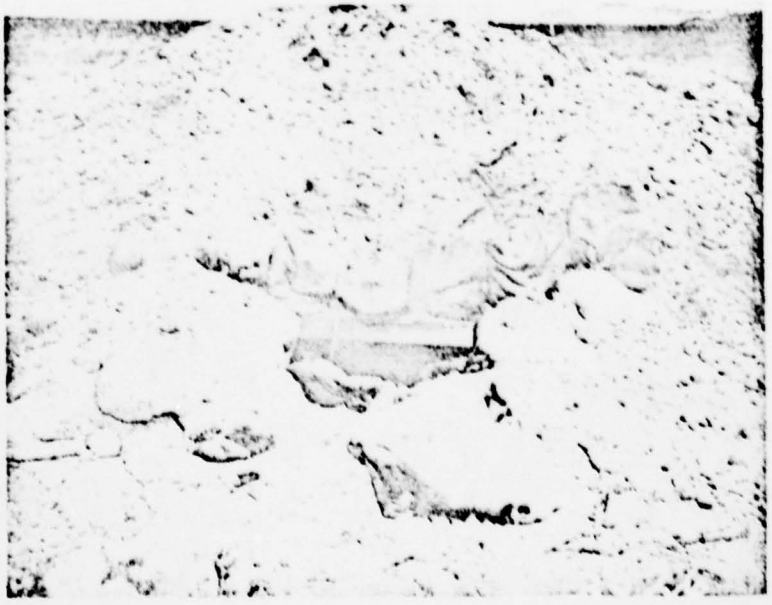


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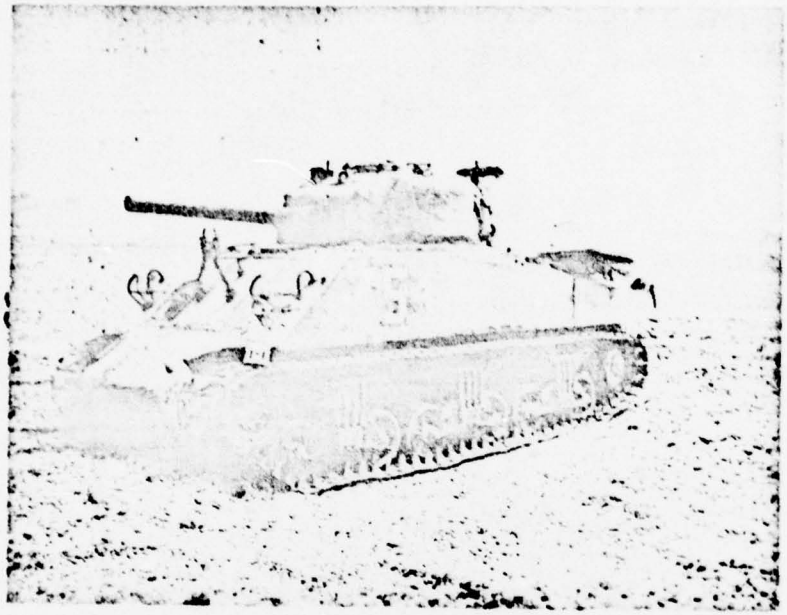
C-4 Bunker 1000 yards from GZ. Entrance facing GZ.

AFTER

All sandbags destroyed. Entrance blocked by sandbag fill falling into it.



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BEFORE

Tank, M4A3, facing GZ at 500 yards.

AFTER

Displaced 30 feet. Turret sheared off and thrown 20 feet from tank. Paint sand-blasted off.



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BEFORE

105 MM Howitzer with sight, dug in 500 yards from GZ.

AFTER

Turned 90 degrees in emplacement. Pushed back 5 feet. Apparently operable.



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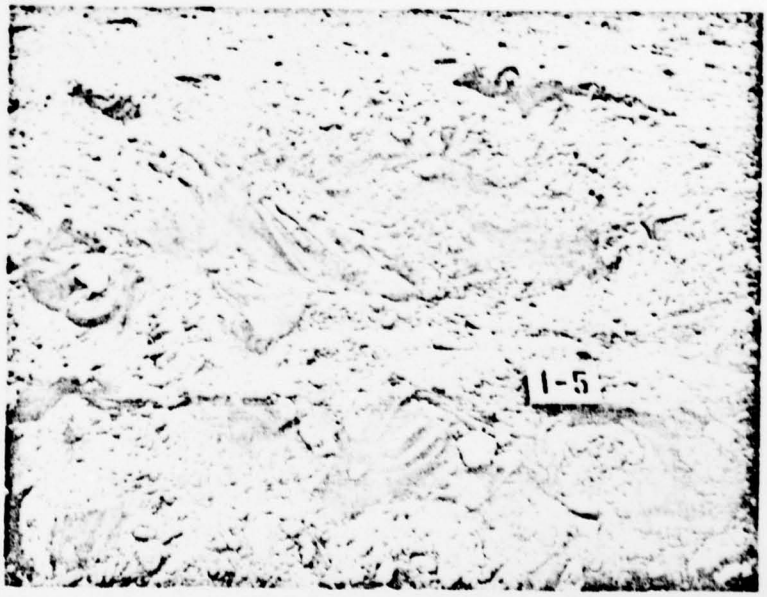


BEFORE

81 MM mortar in emplacement 550 yards from GZ.

AFTER

Tube detached from base plate and thrown half out of emplacement. Bipod damaged.



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BEFORE

Machine Gun Cal. 30, M1917A1, dug in 550 yards from GZ.

AFTER

Blown out of emplacement. Barrel and jacket bent. Damaged beyond repair.



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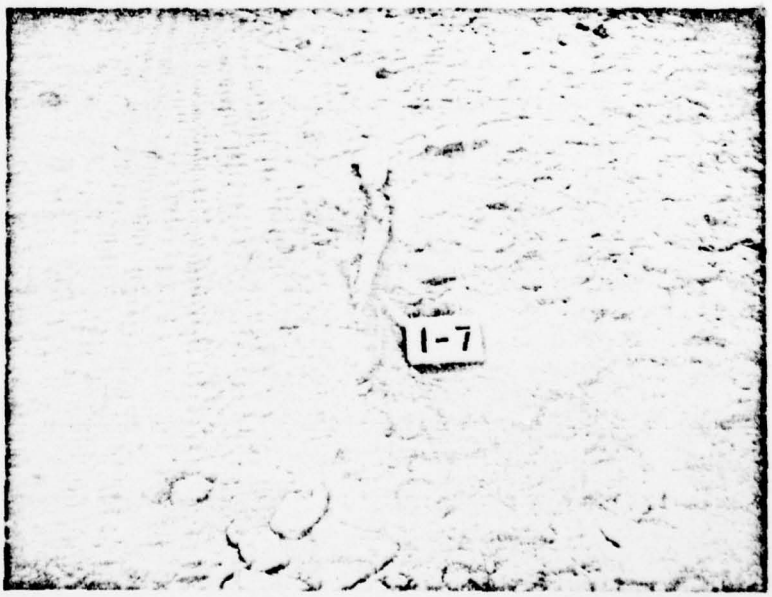


BEFORE

Rifle and Carbine wedged on sandbags and pointing at GZ from 550 yards.

AFTER

Both weapons thrown about 50 feet. Carbine stock broken, both stocks badly scarred.



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Machine Gun Cal. 50, AA, dug in 550 yards from GZ.

AFTER

Blown out of emplacement and destroyed.



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LVT (4) 570 yards from GZ.



AFTER

Thrown approximately 300 feet, landing upside down. Hull severely bent and twisted. Damaged beyond repair.

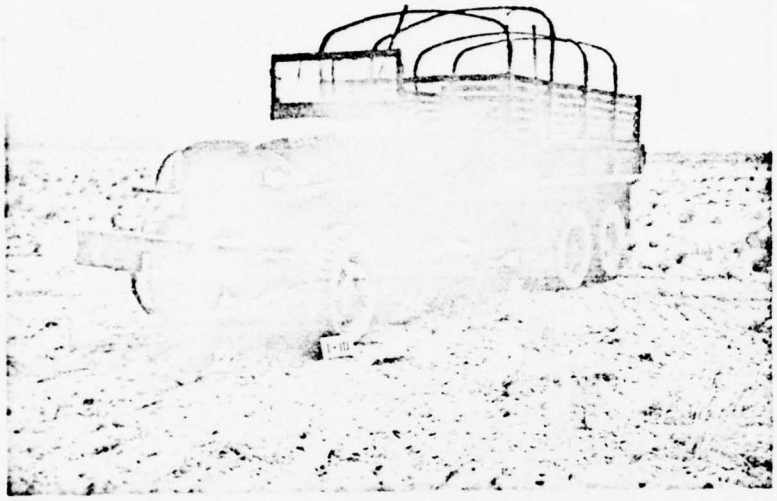


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ATOMIC ENERGY

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BEFORE

Truck, 2½ ton, 380 yards from GZ.



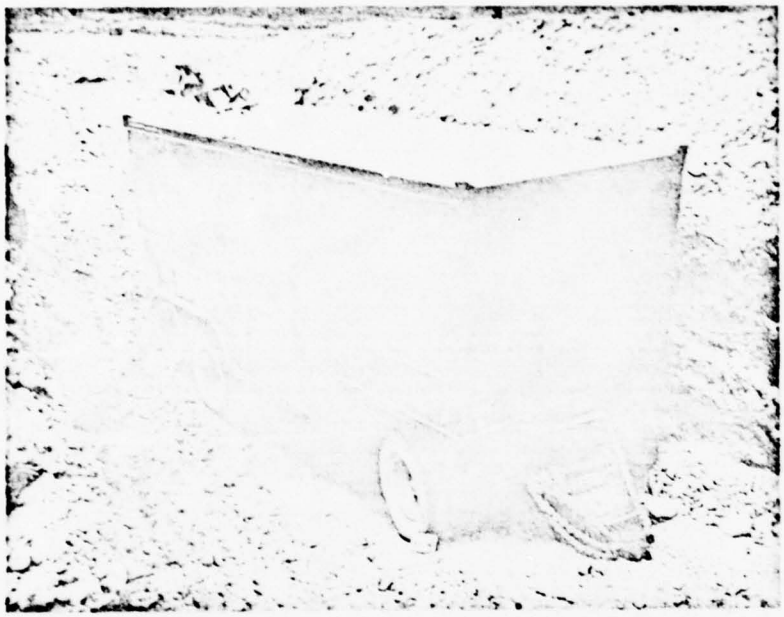
AFTER

Thrown approximately 150 feet and demolished. Wreckage in pieces.



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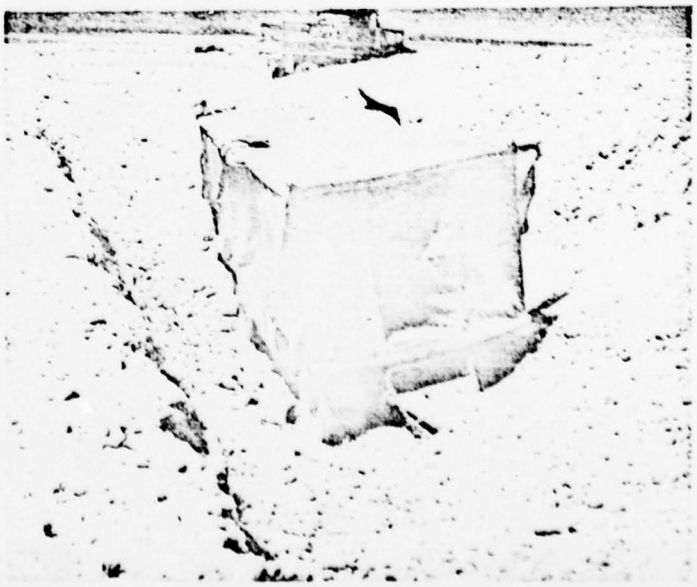


BEFORE

Van, Radar Set, SP-1M, dug in, side to blast 625 yards from GZ.

AFTER

Unmoved. All sides and top blasted in. Damaged beyond repair.

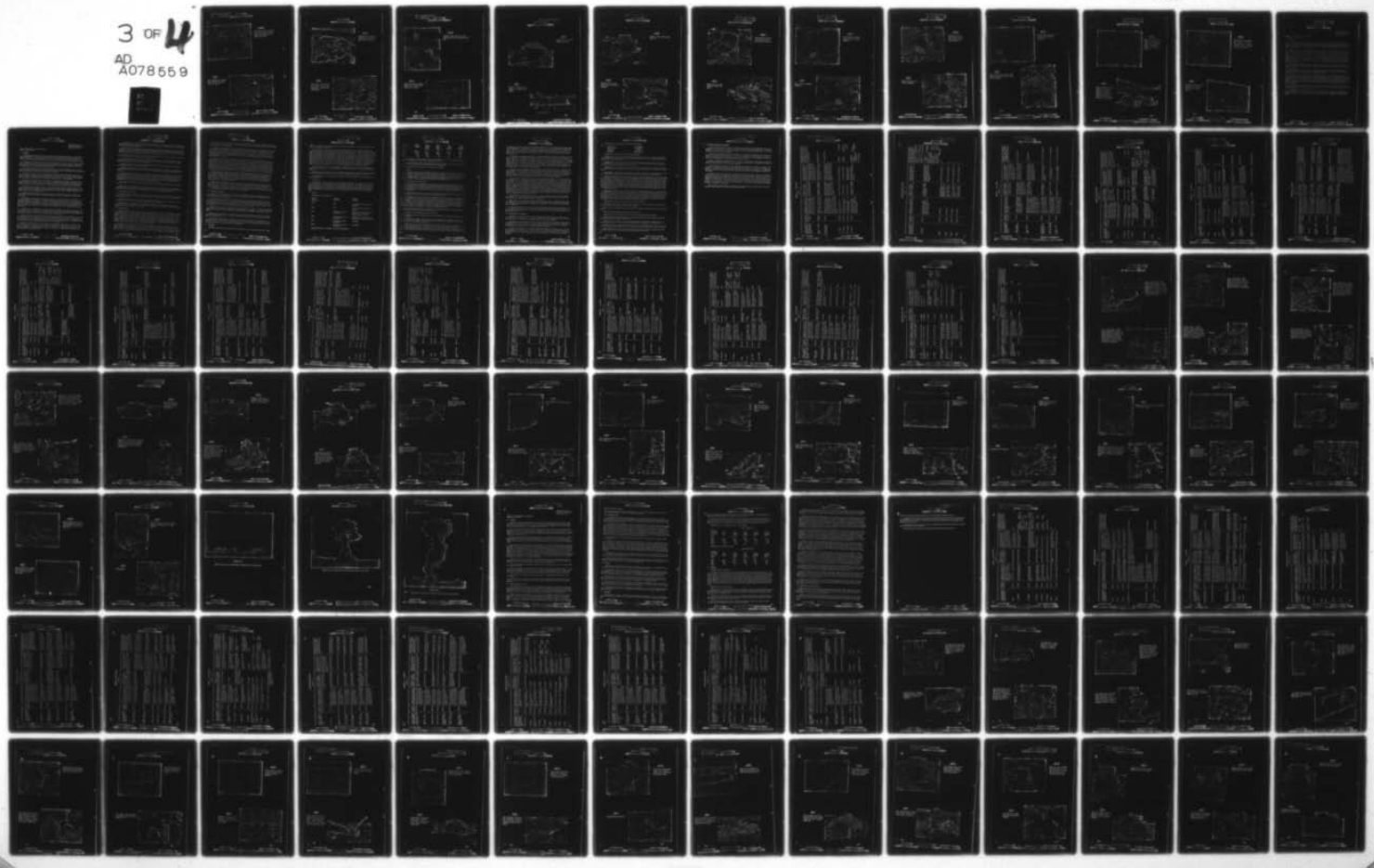


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AD-A078 559 EXERCISE DESERT ROCK LAS VEGAS NV F/G 18/3
EXERCISE DESERT ROCK V. JANUARY-JUNE 1953. VOLUME I. OPERATIONS--ETC(U)
JUN 53

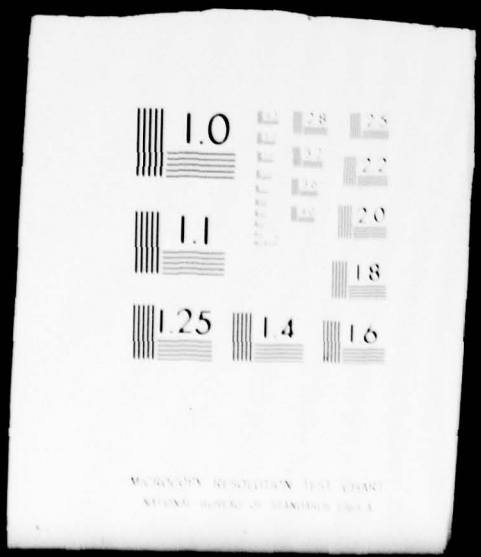
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3 OF 4
AD
A078559



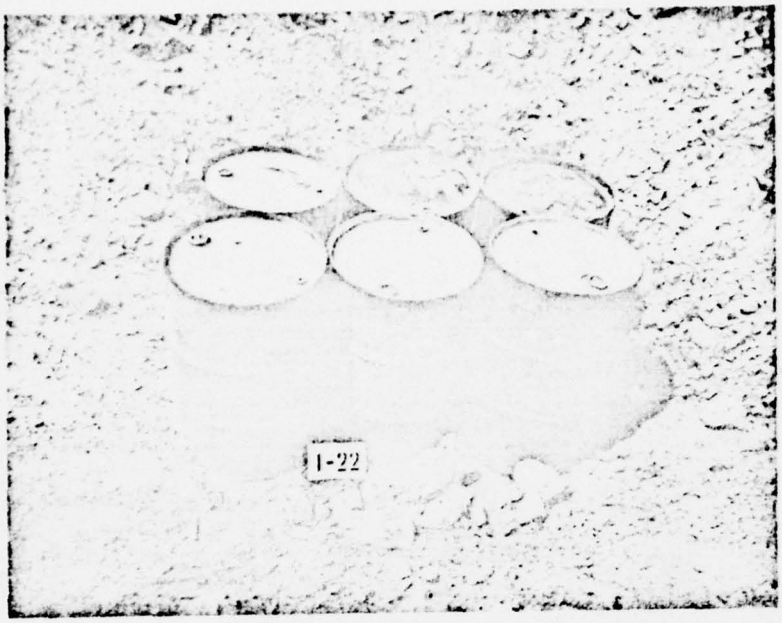
3 OF 4

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BEFORE

Fuel dump (6-55 gallon drums of gasoline) dug in, drums on end 650 yards from GZ.

AFTER

Dump partially buried but intact. Gasoline did not ignite.



SECRET SECURITY INFORMATION UNCLASSIFIED RESTRICTED DATA ATOMIC ENERGY ACT 1946

UNCLASSIFIED



BEFORE

Machine Gun, Cal 30 M1917A1, dug in at 1015 yards from GZ.

AFTER

Gun swung 180 degrees and muzzle depressed to ground. Apparently undamaged.



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BEFORE

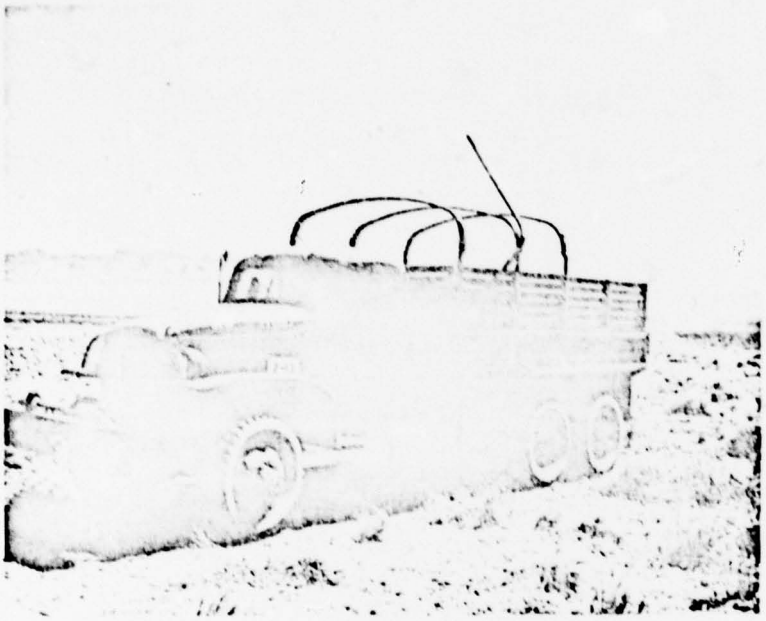
Machine Gun, Cal. 50, AA, ground level 1025 yards from GZ.

AFTER

Thrown 60 feet. Shield blown off. Sight twisted out of shape.



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BEFORE

Truck, 2½ ton, 1025 yards from GZ.

AFTER

Thrown 45 feet, overturned. Severely damaged.



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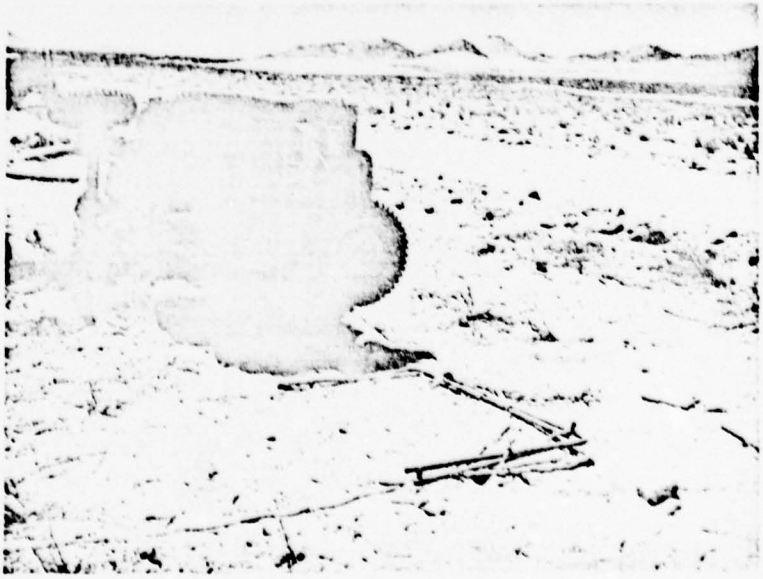


BEFORE

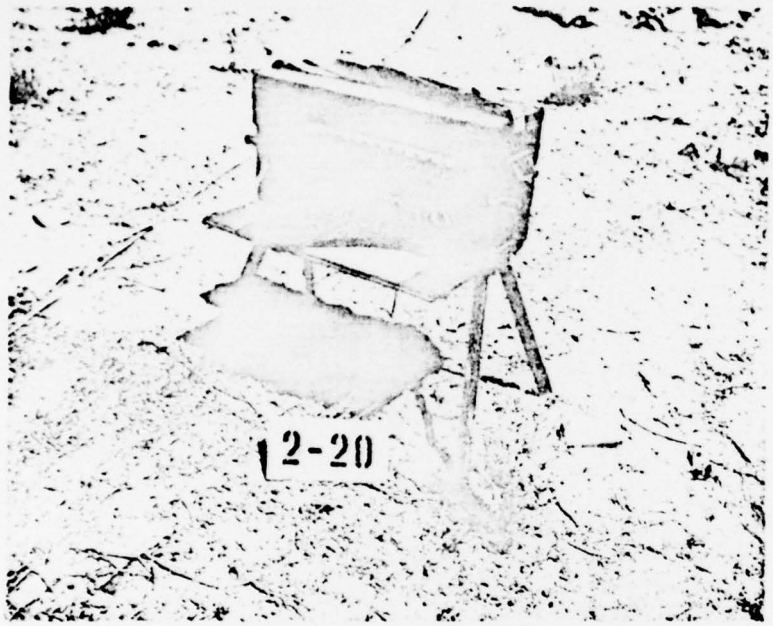
Truck, ¼ ton 1025 yards from GZ.

AFTER

Thrown 40 feet and overturned. Severely damaged.



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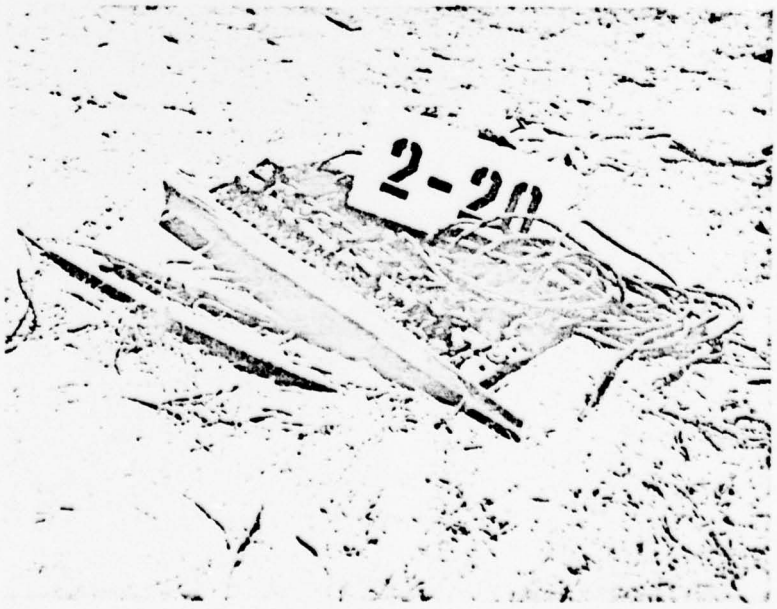


BEFORE

Switchboard, BD-72, standing in open 1050 yards from GZ.

AFTER

Thrown 30 feet and damaged beyond repair.



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BEFORE

Switchboard, BD-72, dug in, 1050 yards from GZ.

AFTER

Torn apart, severely damaged.



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BEFORE

Radio, SCR-300, standing, propped by sandbag 1060 yards from GZ.

AFTER

Thrown 90 feet. Severely damaged.



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BEFORE

DR-4 (with wire) on RL-31, 1070 yards from GZ.

AFTER

Drum broken from reel. Both thrown 40 feet. Wire insulation charred.



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BEFORE

Dummy in Marine Utility Uniform with rifle and carbine, prone on top of ground 1080 yards from GZ.

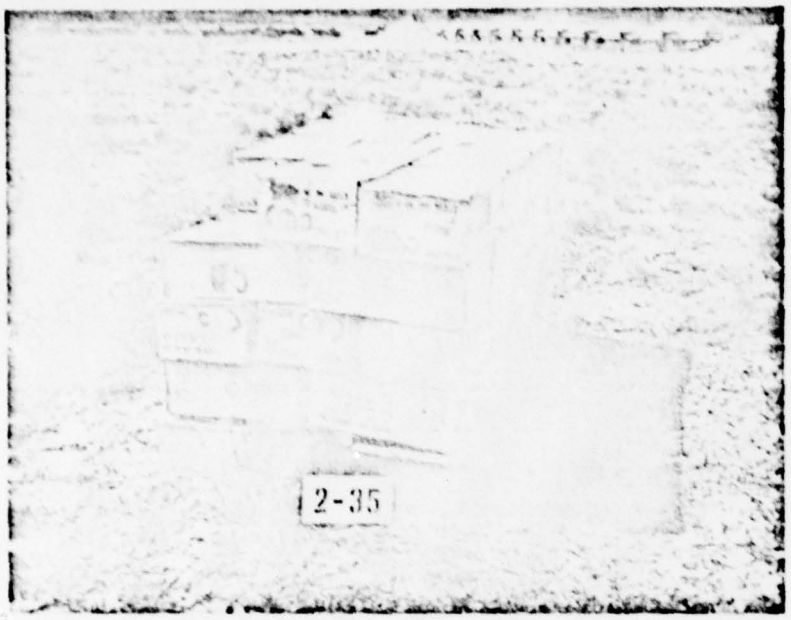
AFTER

Dummy thrown approximately 150 feet, clothing burned, stocks of rifles badly scarred. Rifles apparently otherwise undamaged.



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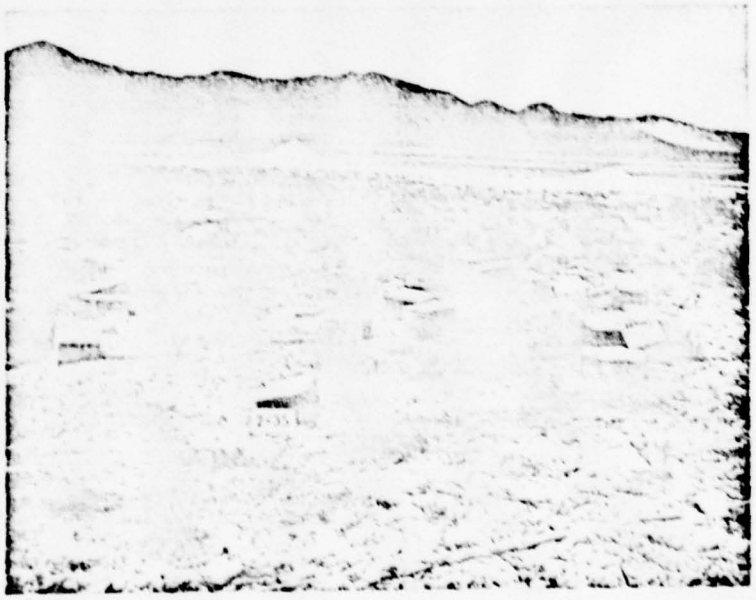


BEFORE

Ration dump (50 cases "C" ration) stacked in squares 6 squares 6 cases high. Stacked on top of ground.

AFTER

Scattered for approximately 350 feet. Cases scorched but intact.



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HQ CAMP DESERT ROCK
LAS VEGAS (872626) NEV
011200 June 1953

Annex 6 (SHOT VICTOR 6) to Final Report
EXERCISE DESERT ROCK V

GENERAL.

Shot V-6 was detonated on a 300 foot steel tower at 0445 hours, 11 April. Observers from all services witnessed the explosion from a vantage point on News Nob, a small hill near the Atomic Energy Commission Control Point at the entrance to Yucca Flat. The steel tower containing the nuclear device was located in the west-central portion of Yucca Flat, approximately ten (10) miles from the observers.

This shot was a low yield experiment and no troop exercise was conducted in connection with it. Participating as an observer group from Camp Desert Rock, were thirty three (33) Army, twenty five (25) Marine, four (4) Air Force and one (1) Navy officers. The twenty five (25) Marine personnel were commanders and staff officers of the Marine Corps Provisional Atomic Exercise Brigade who came to Camp Desert Rock as members of the advance party of the Brigade to prepare for Marine participation in shot V-5 which followed Shot V-6 due to a change in AEC schedules. The purpose of having these Marine officers attend the V-6 shot was to familiarize them with atomic phenomena so that they could disseminate the information to the Marine units. The effectiveness of having commanders view a detonation prior to directing troops in an atomic exercise was well demonstrated in later operations.

The observers, totaling 63 personnel, departed Camp Desert Rock at 0300 hours, 11 April for News Nob, a distance of twenty five (25) road miles. The convoy arrived at News Nob at 0412 hours without incident.

Vehicles were parked in a parking area 100 yards from News Nob near the observation point. A member of the Camp Desert Rock Instructor Group gave all observers a twenty minute briefing and orientation on the burst phenomena at the observation point.

Since the burst was small, and the observers were 10 miles from the detonation, no shelter was necessary for personnel or equipment. The observers were required to face away from the tower immediately prior to H-hour and remain faced away until after the flash of detonation. The observers witnessed the formation of the mushroom cloud and the subsequent action of the fireball very clearly. No blast wave was felt, but a sharp crack of sound reached the observation point. Four Marine helicopters (H19 type) participated in the shot and were clearly seen from the observation point on News Nob.

The return trip to Camp Desert Rock was completed without incident at 0540 hours. No assistance from the Rad-Safe personnel was required at any time during the operation. No measurable radiation was received at the observation point.

Communications for the operation consisted of direct telephone lines into the Proving Ground Command Post and into the AEC switchboard. A loudspeaker system tied into the AEC command post circuit was also used to broadcast the count down sent out by an AEC announcer from the control point.

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HQ CAMP DESERT ROCK
LAS VEGAS (872536) NEV
011200 June 1953

Annex 7 (SHOT VICTOR 7) to Final Report
EXERCISE DESERT ROCK V

I. GENERAL.

Troop observers arrived at Camp Desert Rock during the period 21-24 April. Arrival times were so separated that less than one half of the observers were present the first day the orientation course was conducted. Troops from the Second, Fourth, Fifth and Sixth Armies closed in camp on 22 April and were organized into two (2) RCT's for participation in the tactical maneuver.

A rehearsal of the tactical maneuver and the observer program was conducted in the Yucca Flat area on 23 April. Actual site positions to be occupied on shot day were utilized. The Control Group departed Camp Desert Rock for the forward area at 0700 hours and all march units closed in the exercise area, 33.2 miles from camp, at 0945 hours.

An on site orientation program was conducted by a member of the Instructor Group. Time selected for H-Hour was 1030 hours. At this time all personnel positioned themselves in the trenches and troop units started the simulated attack at 1035 hours.

The attacking forces moved very rapidly and at the end of thirty five (35) minutes had advanced a distance of 2500 yards. Attacking waves of troops formed solid masses in some instances and the commander experienced difficulty in controlling his units. Upon arrival at the 2000 yard line, the attack was halted and this completed the tactical phase of the maneuver.

Troop units and observers were taken through the equipment display area. Later the observer group was taken to the site of Shot V-5 (18 April) to observe damage incurred on equipment by a previous detonation. Return motor movement to camp started at 1300 hours and the last march unit closed in Camp Desert Rock at 1505 hours. No unusual incidents occurred during the rehearsal.

The control group departed camp for Shot V-7 at 0030 hours 25 April. Transportation requirements to move the control group, observers and troops to the shot site totaled 179 vehicles. All march units and personnel closed in the entrenchment area at 0322 hours. Vehicles were moved to a parking area 5.9 miles from ground zero.

A member of the Instructor Group conducted a pre-shot orientation from 0330 to 0420 hours. Information pertaining to an atomic device detonated from a tower was presented to the observers and troops.

The Exercise Director ordered all personnel to enter the trenches at H minus 15 minutes and at H minus 2 minutes all personnel were instructed to crouch low in the trenches. A siren warning of 30 seconds duration was sounded at this time. With 90 seconds remaining prior to the detonation, an Atomic Energy Commission spokesman from the command post took over on the public address system and counted off the remaining time at 30 second intervals until reaching H minus 10 seconds. At H minus 5 seconds, the final count down started with the familiar "4, 3, 2, 1 and NOW." It was now 0430 hours.

A bright light, of approximately 3 seconds duration, was noted at the time of detonation. The ground shock was heavy, and the earth appeared to roll for a moment. Noise accompanying the blast was deafening, loudest of this series of shots. Dust conditions following the blast and debris falling into the trenches obscured the vision of personnel in the trenches.

As usual for tower shots, the fireball was engulfed in a large dust cloud initially. The cloud rose steadily and actually formed the well known "atomic mushroom." This was by far the most picturesque atomic cloud to be observed, from a tower shot, in this series of shots. An initial radiation intensity of 5 r/hr registered on survey meters in the trenches; however, the radiation lasted for such a short time, the initial radiation dose was less than 25 mr.

Both RCT's started the attack at 0444 hours towards objectives 4000 yards to the north. The RCT on the east (R) advanced to within 2000 yards of ground zero at 0600 hours. At this time the attack was halted by the Rad-Safe monitors due to a reading of 2.5 roentgens at this point. The RCT on the west (L) encountered no areas having a high radiation intensity and advanced until the attack was halted for other reasons.

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Upon completion of the tactical phase of the maneuver, observer and troop personnel were moved through the equipment and animal display area. Movement forward was limited to the 2000 yard line due to radiation levels encountered.

Eight (8) volunteer Army and Navy officers were positioned in trenches 2000 yards from ground zero during the blast. Telephone communication was established from the control trench to the volunteers and the Exercise Director was able to keep all volunteers informed prior to, during and after the shot. All volunteers withstood the blast without incident.

The Marine Corps Helicopter Group (H-19 type) conducted experiments during the shot. A full report on this participation is included in paragraph VIII.

An army helicopter (H-23) was used for reconnaissance purposes after the detonation. It was possible to observe the equipment and animals in the forward area during these flights. Another helicopter was available for evacuation purposes.

Return movement to Camp Desert Rock started at 0625 hours and all march units and personnel closed in camp at 0957 hours without incident.

Sand bags in the entrenchment area, 4000 yards from ground zero were singed. Joshua trees, located 400 yards west and 200 yards north of the entrenchment area were ignited shortly after the detonation.

Of unusual interest, occurring as a result of this shot, was the caving in of a C-4 type bunker at the 1500 yard line. A sheep, tied to a stake, was placed in this bunker on 24 April, prior to time of cave-in. On 13 May, a working party removed the top portion of the bunker and the trapped sheep leaped from the emplacement. Even though the animal had been without food and water for nineteen (19) days, it appeared in good condition and was able to walk. The animal recovered completely and was used in an animal display for a subsequent shot.

Participating in the exercise were 3,102 military and 24 civilian personnel, a total of 3,126 persons.

At ground level, in the entrenchment area, temperature was recorded at 53 degrees Fahrenheit. Wind velocity, from a direction of 340 degrees, true north, was 5 knots per hour and visibility was 50 miles. Measured humidity was 26 percent and atmospheric pressure was 870 millibars.

II. INTELLIGENCE AND SECURITY.

The major difficulty encountered during the convoy movement was the identification of vehicles within the march units. Only two march units dimmed their lights at check points. Signs were dusty and hard to decipher.

Once again observers arrived without security clearance indicated on their orders. This was corrected by sending messages to observers home station for clearances.

Late arrivals created a problem as to checking attendance at orientation briefings in that rosters could not be completed prior to check-in time at the theater. No security violations were reported for the group attending this shot.

III. INSTRUCTOR GROUP.

In preparation for Shot V-7, the Instructor Group presented three types of orientation programs. An eight hour period of SECRET classification was presented to those troop observers who arrived at Camp Desert Rock on or before 22 April. A four hour periods of orientation was presented to those observers who arrived after 22 April, and another four hour presentation was provided on the CONFIDENTIAL level for RCT's and all observers not cleared above the CONFIDENTIAL access level. In general, the change in arrival plans of certain contingents of observers was such that they arrived at Camp Desert Rock on the day prior to the shot rather than three days before caused a hurried rearrangement of orientation programs. Each group, however, received adequate orientation prior to the shot, though not the full eight hours originally planned.

Two hundred and ten (210) observers for Shot V-7 arrived at Camp Desert Rock prior to 0700 hours 22 April. All RCT personnel were present prior to this time. The Instructor Group presented a four hour CONFIDENTIAL orientation for RCT ABLE during the morning of 22 April and for RCT BAKER in the afternoon. All classes were conducted in the open air auditheater. Ample seating was available for the full twelve hundred men oriented at one time. No difficulty was encountered in hearing

the instructor from any part of the amphitheater, the Signal Corps amplifiers completely filling the requirement for sound. Training aids such as charts set up on the stage could be seen very well from the rear of the amphitheater.

The 210 observers arriving on 21 April received a four hour portion of the standard eight hour orientation for observers on the SECRET level beginning at 0730 and concluding at 1155 hours, 22 April. For this same group, two films were shown during the afternoon. "Operation Greenhouse", a documentary of the AEC tests on Eniwetok Atoll in the spring of 1951, and "Operation Tumbler Snapper", a documentary of military participation in the spring tests at Nevada Proving Ground in 1952, were screened on a voluntary basis. A total of one hundred and sixty hour (164) observers attended the film showing.

On 23 April, a rehearsal of the troop and observer participation in Shot V-7 was conducted. Although one half of the observers had not yet arrived, those present went through the rehearsal and were able to pass on instructions and assistance to later arrivals. Both BCT's took part in the rehearsal. In the trench area, at a time simulated as H minus 20 minutes, a member of the Instructor Group carried out a terrain orientation followed by instructions for procedure in the trenches prior to H hour. Following H-Hour, an instructor escorted the observer group and other instructors conducted each BCT through the display areas so that a basis for comparison of damage could be made following the actual shot. It was carefully pointed out to all that contamination might deny the area to observers and troops on shot day, nearer the tower than 1500 or 2000 yards.

On 24 April, those observers who had received the first four hour period of orientation on 22 April were presented the second four hours. During the afternoon of 24 April, 250 observers were oriented in weapon delivery means available to the services and in tactical employment of atomic weapons. At 1930 hours, 24 April, late arrivals and general officers were briefed as to the tactical problem of the exercise and, in general, procedures to follow while in the forward area. At this time technical questions, within the limits of SECRET classification, were answered by a member of the Instructor Group.

From H minus 60 minutes to H minus 2 minutes on shot day, a member of the Instructor Group conducted a pre-shot orientation of a general nature as to terrain, safety, and air participation in the exercise. Following the shot, instructors conducted each BCT and the observer group through the display area to the 2000 yard line. Closer approach was prohibited by radiation levels. Damage results at ranges closer than 2000 yards were obtained by the instructors and presented to all personnel, though viewing by all was not possible.

IV. SIGNAL COMMUNICATION.

The layout of the trench area for this shot was generally the same as for previous shots in the forward area and the communication installations generally conformed to the plan followed in prior shots detonated in this area.

Three speaker poles were installed in the trench area, mounted with four speakers pointing in four directions to cover all troops within the general area of the speaker pole. Each group of four speakers were fed from one public address system and the three systems were all tied in to one central system in the Exercise Director's trench for control. This installation proved to be very satisfactory and is now the standard installation used in all shots.

Telephones were installed in the forward trench of each BCT commander. In addition, telephones were installed in the observers trench, the parking area and the heliport. Communication with Camp Mercury and Camp Desert Rock was provided through the forward switchboard located in the trench area.

Normal radio communication was installed with the Rad-Safe officers in one net, the Exercise Director and the BCT commanders, the parking area and the heliport in another net and each of the BCT's in a separate net.

Four mobile public address systems were used for orientation purposes in the display area. The public address systems worked out very well and were in place ready for operation prior to the arrival of the troop units. Two power megaphones were used by the BCT commanders for oral orders to their respective units and proved quite satisfactory.

V. RAD-SAFE.

No changes were made in the organization and operation of the Camp Desert Rock Rad-Safe orga-

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nization. Pre-shot tasks included conducting a 6 hour radiological monitor refresher course and test for participating army units.

This shot was characterized by an apparent higher yield and more wide-spread radiological contamination than previously encountered. There was little wind at shot time. The cloud drifted eastward with a heavy fall-out in that direction. Radiological Safety monitors for the troop units were in position at H plus 5 minutes in spite of the heavy dust cloud which hung over the area. The display area survey teams reached their initial points at approximately H plus 15 minutes. The 2.5 r/hr intensity was reached on the east (R) side of the display area at 2200 yards from Ground Zero with the 5 r/hr intensity being reached at 2000 yards. On the west (L), the 2.5 r/hr intensity was reached at 2500 yards with the 5 r/hr intensity at 2100 yards. Intensities in the troop trench area slowly rose to 120 mr/hr but quickly receded to about 30 mr/hr. Due to the high intensities encountered in the test area and on the access roads, final personnel and vehicle monitoring was impossible in the test area. Troops and vehicles were moved to the decontamination station at Yucca Pass and to Parking Area A (837925) for field decontamination and final monitoring.

The performance of the unit CBR personnel as radiological monitors was considerably improved over the previous army units. Troop participation from the stand point of radiological safety was excellent.

Rad-Safe operations in the field of providing for the collection of information were continued on the same scale as for Shot V-5, except no pressure gauges were available for this shot.

Post shot evaluation of the operation indicated that the corrective measures taken after Shot V-5 were effective.

Procedure:

Heat sensitive paper was placed in positions exposed to direct thermal radiation and in positions shielded from direct radiation but exposed to reflected or scattered radiation at 500 yard intervals from ground zero from 500 yards to 3000 yards. The exposed papers were placed in vertical position so as to receive near maximum radiant energy. The sheltered ones were placed in a horizontal position, face up to measure radiation in the trenches. At 1500 yards and 2000 yards papers were exposed in a horizontal position on the surface of the ground with no thermal shilding.

Results:

Values given are approximations:

Distance from GZ in yards	Sheltered Position	Exposed Position
500	Lost	Paper destroyed, more than 34 cal/cm^2.
1000	Lost	Paper destroyed, more than 34 cal/cm^2.
1500	No effect, less than .45 cal/cm^2.	Vertical paper destroyed, more than 34 cal/cm^2. Horizontal paper, about 5 cal/cm^2.
2000	No effect, less than .45 cal/cm^2.	Vertical paper, 25 cal/cm^2. Horizontal paper, about 5 cal/cm^2.
2500	No effect, les than .45 cal/cm^2.	4 cal/cm^2.
3000	No effect, less than .45 cal/cm^2.	25 cal/cm^2.

Immediate Radiation in roentgens received in emplacements.

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Distance from GZ in yards	C1 Exposed post	C2 Shallow slit Trench	C3 Deep slit Trench	C4 1 Man emplace-ment	C5 2 Man emplace-ment
1500	1150.0	lost	lost	24.5 r	lost
2000	175.0	lost	80.0	3.2	4.6
2500	22.0	18.5	11.0	.2	1.0
3000	5.6	1.7	.7	.5	.5
3500	.95	.25	.1	0	0

Badges placed in 6 ft trenches at 1500 yards recorded 28.1 r. The film badge in the 1750 yard trench was lost. Trench at 2000 yards received 8.75 r.

These data represent the immediate radiation personnel protected by the emplacements and unprotected at the same distance from ground zero would have received.

Badges were exposed in National Bureau of Standards holders.

VI. MEDICAL.

The medical support for this operation was carried out in an identical manner to that for [illegible]. The same plan for emergency medical care for the volunteer group was prepared, but as no casualties occurred it was not implemented. The only casualty reported was one of the enlisted men from [illegible] Baker. This man developed a rather severe nose bleed just prior to the detonation. He was treated immediately after H-Hour. It was felt that he should not participate with the troops and he was therefore held at the aid station until the conclusion of the exercise.

Medical evaluation of test items:

On the day prior to the detonation 37 sheep were placed at varying distances from ground zero. Commencing at 500 yards five sheep were placed at each 500 yard interval extending through 3500 yards from ground zero. The sheep employed at each of the 500 yard intervals were placed one to each C-type position (C-5, C-6, C-7, C-8 and C-9). In addition to the above positions there were two special trenches, one at 1500 yards and one at 1700 yards. One sheep was placed in each of these two positions.

The two special trenches at 1500 yards and 1700 yards are conventional type trenches 6 ft. in depth similar in design to the trenches used by volunteer observers.

The veterinary officer and one enlisted man accompanied the control group. Immediately following the detonation a medical technician accompanied by a monitor moved forward by truck to observe the sheep. A veterinary technician accompanied the loading party later in the morning to aid in rendering a tentative evaluation of the effects of the detonation in relation to the effects incurred by the sheep. When the sheep were returned to Camp Desert Rock a final evaluation was rendered by the veterinary officer. The veterinary officer, because of previously acquired radiation, was not permitted to advance past the control trench, so it was necessary to follow the above procedures in relation to evaluating the effects incurred by the sheep.

Most of the evaluation results are covered in the evaluation forms or the picture captions, but following are some of the more pertinent results.

The sheep at 3500 yards were all found to be normal.

The sheep at position C-9, 3000 yards had moderate wool burns. The other sheep at this distance were normal.

At 2500 yards the sheep at position C-9 had second degree burns on the face and wool burns covering 1/4 of the body area. The sheep at position C-7 had moderate wool burns. The sheep at positions C-5, C-6 and C-8 were all normal.

At 2000 yards the sheep at position C-9 had second degree burns on the ears and extensive wool burns covering 1/2 the body area. This animal suffered no other ill effects until epilation, i.e., loss of hair, appeared 8 May. This animal has as yet shown no inappetence and it is considered to have a better than average chance to effect a recovery. The dose of radiation this animal received was 253 r. The sheep at position C-8 had third degree burns on the face and moderate wool burns.

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It suffered no other ill effects until epilation appeared 10 May. This animal has, as yet, shown no inappetence and it is believed that it will recover. The radiation dosage for this animal was 175 r. The sheep at position C-7 suffered no visible effects from the detonation. Epilation ensued 10 May. This animal has, as yet, shown no inappetence and it is believed that it will recover. The radiation dosage for this animal was 113 r. The sheep at position C-5 and C-6 were both normal.

At 1500 yards the sheep at position C-9 had third degree burns on the face and extensive wool burns. It refused food and water after being returned to the sheep pens and died the night of 26 April. The data on the amount of radiation received by this animal was lost, but it is assumed to have received in excess of 1000 r. The sheep at position C-8 had moderate wool burns. It remained normal until 3 May when epilation ensued. This animal has not shown any inappetence, but it is inconceivable that this animal will survive since the radiation dosage it received was 950 r. The sheep at position C-6 and C-7 have shown no visible effects. The radiation dosage reported for them was 464 r and 427 r respectively. At position C-5 the entrance to the bunker collapsed so the sheep is assumed to have died from suffocation.

The sheep in the conventional type trenches at 1500 and 1700 yards initially suffered no visible effects. Epilation appeared in the sheep placed at 1700 yards on 3 May. It has shown no inappetence, so it is assumed this sheep will recover. The radiation dosage received by this animal was 173 r. Epilation appeared in the sheep placed at 1500 yards on 10 May. This sheep has shown no inappetence, so it is assumed it will recover. The radiation dosage received by this sheep was 222 r. Both sheep have previously been exposed to an atomic detonation.

At 1000 yards the sheep at position C-9 was killed by blast effects. It was blown back approximately 50 yards. The sheep at position C-8 was killed by blast effects. It was blown clear of the trench and back approximately 40 yards. The sheep at position C-7 had extensive wool burns on the back. It developed in-coordination the morning of 26 April and became prostrate the afternoon of 27 April. Death occurred the night of 27 April. Death was attributed to acute radiation sickness. The radiation dosage this animal received was 10,735 r. The sheep at position C-6 initially suffered no visible effects. It became prostrate the afternoon of 28 April and died the night of 28 April. There was a complete absence of external injuries, and this can be considered a typical case of acute lethal radiation sickness. The radiation dosage received by this animal was 4,638 r. The sheep at position C-5 initially suffered no visible effects. Epilation appeared 10 May. This animal has shown no inappetence, but it is doubtful that this animal will recover since the radiation dosage received was 623 r.

At 500 yards the sheep at position C-6, C-7, C-8 and C-9 were all killed by blast effects. At position C-5 the bunker was collapsed, so it is assumed the sheep at this position died directly from blast effects or indirectly from suffocation.

Total number of sheep exposed thirty-seven; eight killed directly or indirectly from blast (suffocation); three died from acute lethal doses or radiation. At the present time twenty-six of the original thirty-seven are still alive. It is considered that at least two of this total will eventually die.

It will be noted that the picture section of this report is rather brief in comparison with the two proceeding reports. This is due to the fact that there was too much radiation present in the display area, and consequently a photographer could not enter this area for several days following the detonation.

VII. VOLUNTEER OBSERVER PROGRAM.

Volunteer observer trenches were located 2000 yards from ground zero on an azimuth of approximately 180°. Trenches were 6 feet deep and 3 feet wide. One trench was revetted with sandbags and timber. The second was an unrevetted trench with a sandbag parapet.

The volunteers consisted of 7 Army Officers and 1 Naval Officer. All officers were well indoctrinated in the field of special weapons and capable of calculating effects of atomic weapons, utilizing TM 23-200, dated 1 Oct 1952. After careful calculation all agreed that the trenches were located at a safe distance for a weapon of the yield predicted.

The atomic weapon exploded was an experimental device placed on a 300 foot tower. The predicted yield was estimated as 35 KT, plus or minus 5 KT. Calculations of volunteers were based on the highest predicted possibility, 40 KT. It is estimated that the actual yield, although not available at this time, will probably exceed the highest predicted possibility by as much as 25 percent.

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Weather data for Ground Zero at the time of burst were:

Temperature	53 degrees F
Wind Direction	040 degrees T
Wind Speed	7 Knots
Visibility	50 miles
Pressure	870 millibars

Volunteers reported the following effects were noted:

Initial flash. The light was reported as being of great intensity. Objects in the trench could not be distinguished during the period of greatest intensity. Normal vision returned immediately after the light subsided.

Thermal effects. All observers reported feeling heat from above at the time of the light. This heat was not intense but was distinctly noticeable. There were no instruments available for measuring the amount of heat received in the trench.

Blast effects. The air blast was reported as a very loud sharp noise. Concussion pressure was felt but no pain or after effects were noted. Sand and dirt blown into the trenches by the air blast.

Ground shock. The ground shot was described as being short vibration-like motions similar to a mild earthquake. The duration of the shock was short and no separate pulses were felt.

Nuclear radiation effects. First reading noted on radiac instruments gave a rate of 100 roentgens per hour. During the 5 minute period the volunteers remained in the vicinity of the trenches this rate fell to 20 roentgens per hour. As the group moved toward the road, to meet vehicles sent forward to evacuate them, they passed through a heavy fall out of sand sized particles carrying a radiation reading of 50 roentgens per hour. As they evacuated to the rear radiac instrument readings declined rapidly to 1 roentgen per hour 1000 yards in rear of the trenches they had occupied. Dosimeters carried by the volunteers registered an average total dosage of 10.4 roentgens. Developed film badges registered total dosages ranging from 11.7 to 16.3 roentgens. The wide range of the readings of these film badges raises a question as to the reliability that should be assigned readings so obtained.

Miscellaneous effects. At the instant of first light several observers felt a shock variously reported as similar to an earth tremor or air blast. One observer holding a telephone, connected to a direct line between volunteer trench and control trench, received a distinct electric shock and a tingling sensation about the neck. The operator holding the telephone in the control trench (at 4000 yards from Ground Zero) reported receiving a shock equivalent to that received when holding a bare 110 volt electric wire. All observers reported a generally reduced efficiency during the first 5 minutes after the blast because of heavy dust conditions.

The following conclusions were made by the volunteer observers:

That troops would gain very little by being entrenched closer to Ground Zero than 4000 yards during orientation and indoctrination exercises because:

They can feel the effects of the detonation at this distance as well as they could at a closer point.

They can better observe the fireball and mushroom cloud.

They are sufficiently removed from the heavy dust and possible radiation hazard.

That the present volunteer observer program, with present mission and limiting criteria, has served its purpose and should be discontinued.

That a volunteer program of this type with a mission of indoctrination for personnel having special weapons training or assignments with special weapons programs would be worthwhile.

That future volunteer programs would have greater value if volunteers were positioned in a variety of standard field fortifications and combat vehicles approximating actual combat conditions.

That instrumentation placed in the trenches to record pressures, heat, ground shock, and nuclear radiation would be of assistance in evaluating observer's reactions.

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VIII. MARINE CORPS AIR (HELICOPTER).

Marine Helicopters "A" and "B" were positioned at approximately 12,440 yards from ground zero. Helicopter "A" was positioned with its left side exposed and "B" was facing the blast. From one (1) minute prior to the blast until after the passage of the shock wave, Helicopters "A" and "B" hovered at about ten (10) feet above the ground.

The pilots of Helicopters "A" and "B" protected their eyes by lowering the bills of their caps so as to shield their eyes from the flash. The pilots experienced no flash blindness. The co-pilots wore standard 4.2 density goggles at the time of detonation and were prepared to assume control of the helicopter should the pilot be blinded by the flash.

Helicopters "A" and "B" were subjected to .59 psi at their position. The control of the helicopters was not effected; however, a window in the passenger compartment of Helicopter "A" was blown out of the rubber molding. No other damage occurred.

After passage of the shock wave, Helicopters "A" and "B" proceeded toward the shot area. Helicopter "A" skirted the dust column noting radiological conditions up to 50 r/hr. Helicopter "B" proceeded to a position 2000 yards west of ground zero and landed. The monitor in "B" disembarked and continued on foot to a position 950 yards from ground zero recording radiological readings up to 10 r/hr.

Helicopter "C" took off from Camp Desert Rock twenty two (22) minutes prior to detonation and arrived at the south end of Yucca Lake two (2) minutes prior to detonation. Helicopter "C" was continuing its flight toward the shot area at the time of detonation and during the passage of the shock wave maintaining 400 feet altitude and 60 knots indicated air speed. The pilot protected his eyes from the direct rays of the flast by lowering the bill of his cap and concentrating his vision on the flight instruments. No flash blindness was noted. The co-pilot wore standard 4.2 density goggles. The passage of the shock wave, which subjected "C" to .55 psi, did not effect the control or harm the helicopter in any way.

After passage of the shock wave, Helicopter "C" proceeded around the upwind side of the dust column and landed about 2200 yards northwest of ground zero.

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Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 35 KT	Condition of equipment or emplacement after shot. Actual yield 51.5 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Carriage, Motor, 105mm Howitzer, M7B1	Est 250 yds	Facing GZ. Paint in good condition. Gas in Tanks and oil in engine. Tracks in good condition. Engine not in running condition.	Completely destroyed. Highly contaminated.	Major item completely destroyed. Parts of tank laying at 750 yard line. Vehicle moved back approximately 150 feet laying with tracks in air.	Salvage vehicle.
Howitzer, 105mm M2A1	Est 250 yds	Facing GZ. Sights missing Paint in good condition. Weapon in operating condition.	Completely destroyed. Highly contaminated.	Howitzer laying on 750 yard line. Weapon completely destroyed.	Salvage vehicle.
Truck, 2½ ton, GMC 6x6 M-135	400 yds	Leftside to GZ. Right door glass and windshield missing. Hood and body rack, right and left side bent in. Paint on right side scorched. Canvas torn and 1st and 3rd bows broken. Spare tire missing. Vehicle in operating condition.	Glass and bows cracked. Rubber and canvas scorched. Displaced & possibly overturned hood and cab collapsed. Frame bent. Highly contaminated.	Major item completely destroyed, Engine laying on 500 yard line. Other parts laying at 700 yard line. Frame and wheels laying at approximately the 500 yard line.	Salvage vehicle.
C-1 Stake	500 yds	4"x4"x4' wooden stake embedded 2'	Burned and displaced.	Completely destroyed.	4"x4"x4' 1/4 man hr
C-2 Trench	500 yds	Broadside to blast. 2' x 4'6" x 2' slit trench.	Caving of walls.	Completely destroyed.	Ditcher 1/4 hr By hand 1 1/2 man hrs
C-3 Fox hole	500 yds	Broadside to blast. 3' x 4' x 3'6" Fox hole	Caving of walls.	2/3 filled requiring cleaning out only.	1 man hr
C-4 Bunker	500 yds	Entrance facing blast. 6' x 4' x 3'6" covered shelter with 4"x4" top and supports covered with earth unrevetted.	Scorching of exposed sandbags and timbers.	Completely destroyed. About 50% fo lumber salvageable.	Excavation Ditcher 1/2 hr By hand 7 1/2 man hrs Timbering 6 man hrs 12 pcs 4"x4"x 16' Sand bagging

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Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 35 KT	Condition of equipment or emplacement after shot. Actual yield 51.5 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
C-4 Bunker(Cont'd)	500 yds				(150 bags) 2 1/4 man hrs Dozer 3/4 hr w/equip 1 equip hr 8 1/4 man hrs By hand 3/4 equip hr 15 3/4 man hrs
C-5 Bunker	500 yds	Entrance facing blast. 6' x6' x 5'6" covered shelter with 6" x 6" posts & top covered with earth. Unrevetted.	Scorching of timber and sandbags. Caving of entrance.	Top completely blown off. Excavation ½ filled but easily cleaned out & reused. About 80% of timber salvageable.	Cleaning out (Clam) 1/4 man hr By hand 5 man hrs Timbering 4 pcs. 6"x6"x9' and salvage material 8 man hrs Sandbagging (150) bags 3 man hrs Dozer w/equip 1¼ equip hr 11 man hrs By hand 1 equip hr 16 man hrs
Sheep	500 yds	C-9 Normal	Lethal radiation, severe wool scorch. Blast may pull sheep loose from stake	Killed by blast effects.	NA
Sheep	500 yds	C-8 Normal.	Burnt severely on back. Lethal radiation.	Killed by blast effects.	NA
Sheep	500 yds	C-7 Normal.	Scorching of portion of back. Lethal radiation.	Killed by blast effects.	NA
Sheep	500 yds	C-6 Normal.	Radiation sickness. Doubtful fatality.	Killed by blast effects.	NA

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Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 35 KT	Condition of equipment or emplacement after shot. Actual yield 51.5 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Sheep	500 yds	C-5 Normal	Radiation sickness. Doubtful fatality.	This bunker collapsed so it is assumed the sheep died directly from blast effects or indirectly from suffocation.	NA
Truck, 2½ ton GMC, 6x6, M-135	500 yds	Facing GZ. Spare tire and outside rearview mirrors missing. Vehicle in running condition. Paint in good condition.	Overturned and displaced. Frame bent. Hood collapsed. Severe secondary damage due to overturning. High degree of contamination.	Major item completely destroyed. Vehicle moved approximately 80 feet. Laying with wheels in air.	Salvage vehicle.
Tank, Medium M4A3	500 yds	Facing GZ. Front two hooks A.A. tow hook, escape hatch missing. Paint in good condition. Glass in both headlights and tail light glass broken. Both front fenders bent. Rear engine door open. Gas in tanks but engine not in running condition.	Displaced several yards. Possibly overturned. Severe damage to turret.	Major item destroyed beyond repair. Turret blown loose but still on top of tank. Tank badly burned. Vehicle moved back approximately 20 feet.	Salvage vehicle
Gun, 75mm M3 mounted on Tank, Medium M4A3	500 yds	Facing GZ. Sights missing. Gun is in serviceable condition pointing up at an angle of approximately 10 degrees.	Severe damage to gun control mechanism.	Gun badly burned and sand blasted. Gun should be salvaged.	Gun should be salvaged.
Machine Gun Light Cal. 30, M1919-A4	500 yds	Facing GZ in bunker 4 feet below surface. Elevating mechanism missing. Gun is in serviceable condition.	Gun functional after blast.	Gun apparently buried. It could not be found.	Could not be determined.
Rifle, US Cal. 30, M1	500 yds	Facing GZ in bunker 4 feet below surface. Sling and forward stock missing. Weapon is not serviceable	Gun functional after blast.	Rifle apparently buried. It could not be found.	Could not be determined.

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DAMAGE EVALUATION REPORT

SHOT V - 7

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 35 KT	Condition of equipment or emplacement after shot. Actual yield 51.5 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Gun, 57mm	500 yds	Facing away from GZ. Sights missing. Trails together. Gun is in operating condition. Barrel elevated at an angle of approximately 15 degrees.	Displaced and overburned. Paint scorched. High degree of contamination.	Gun moved approximately 60 feet away from blast. Laying with wheels in air.	Approximately 6 hours would be needed to clean and service gun and put it back in serviceable condition.
C-1	1000 yds	4"x4"x4' wooden stake embedded 2' into ground.	Burnt & displaced.	Face of stake is pitted and torn by blast, not blackened and still serviceable.	None
C-2 Trench	1000 yds	Broadside to blast. 2'x4'6"x2' slit trench	Caving of walls.	½ filled in.	2 man hrs
C-3 Fox hole	1000 yds	Broadside to blast. 3'x4'x3'6" Fox hole	Caving of walls.	½ filled in.	2 man hrs
C-4 Bunker	1000 yds	Entrance facing to blast. 6'x4'x3'6" covered shelter with 4"x4" top and supports covered with earth-unrevetted.	Scorching of exposed sandbags and timbers. Slight caving at entrance.	All sandbags destroyed. Rear wall fell in & top caved in in rear-can be shored & made serviceable.	Shoring 4 pcs 4"x4"x4' 9 pcs 1x6"x6' 2 man hrs Sand bagging (150) bags 3 man hrs Dozer 1 hr Cleaning out 2 man hrs Total 8 man hrs
C-5 Bunker	1000 yds	Entrance facing to blast. 6'x4'x3'6" covered shelter with 4"x4" top and supports covered with earth-unrevetted.	Scorching of exposed sandbags and timbers. Slight caving at entrance.	All sand bags destroyed. Entrance about ½ filled in. Top twisted counter-clock wise (facing GZ) about 1 degree	Cleaning out 1 man hrs Sand bagging (150 bags) 3 man hrs Total 4 man hrs
Sheep	1000 yds	C-9 Normal.	Lethal radiation, severe wool scorch.	Killed by blast effects. This sheep was blown back approximately 50 yards.	NA

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DAMAGE EVALUATION REPORT

SHOT V - 7

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 35 KT	Condition of equipment or emplacement after shot. Actual yield 51.5 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Sheep	1000 yds	C-8 Normal.	Burnt severely on back. Lethal radiation.	Killed by blast effects. This sheep was blown back approximately 40 yards.	NA
Sheep	1000 yds	C-7 Normal.	Scorching of wool and back. Radiation sickness, doubtful fatality.	Extensive wool burns	NA
Sheep	1000 yds	C-6 Normal	Possible radiation sickness.	No visible effects.	NA
Sheep	1000 yds	C-5 Normal.	Doubtful radiation sickness.	No visible effects.	NA
Truck, ¼ ton, 4x4 M38	1000 yds	Facing GZ. Both doors, rearview mirror, gearshift knob and spare tire missing. Paint in good condition. Vehicle not in running condition.	Cracked windshield and mirror. Scorched paint, canvas and rubber. May be overturned and displaced	Major item completely destroyed beyond repair.	Salvage vehicle
Truck, ¼ ton, 4x4 M38	1000 yds	Facing GZ. Top, side curtains, and doors missing. Mirror missing. Windshield down. Vehicle in operating condition.	Cracked windshield and mirrors. Scorched paint, canvas and rubber. May be overturned and displaced.	Major item destroyed beyond repair.	Salvage vehicle
Truck 2½ ton, C1C, 6x6 M-135 w/o winch	1000 yds	Facing GZ. Paint in good condition. Spare tire missing. Tires and glass in good condition. Windows rolled up. Gas in tanks and engine in running condition. Canvas on and in good condition.	Cracked bows, windshield and mirror. Scorched paint, canvas and rubber. May be displaced.	Major item destroyed beyond repair. Engine compartment nearly destroyed, canvas and bows destroyed. All glass blown out.	Salvage vehicle.
Carbine, Cal. 30 M1	1000 yds	Placed in hole. Butt of stock is all that is present	No damage	Item covered with dirt.	1/2 hour to clean

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Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 35 KT	Condition of equipment or emplacement after shot. Actual yield 51.5 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Mortar, 60mm	1000 yds	Facing away from GZ in a fox-hole 2 ft deep. Sights missing. Mortar and mount in good condition.	May be turned over. Sight disaligned. Paint scorched.	No damage caused by blast.	None
Gun, 57mm	1000 yds	Facing GZ. Sights missing Breech block open. Trails closed. Barrel elevated approximately 15 degrees.	Maybe turned over. No more than light damage. Paint scorched.	Tires and paint scorched. Weapon sand-blasted.	It would take approximately two hours to clean and service weapon.
Howitzer, 105mm M2A2	1000 yds	Facing away from GZ. Left shield and right tire missing. Direct fire sight missing. Breech open. Sights for indirect fire on weapon. Trails closed. Weapon elevated at approximately 15 degrees.	Light damage. Scorched paint and rubber. If sights are mounted they may be disaligned.	Glass in sights and tires scorched. Weapon sand-blasted. Weapon moved to rear approximately 50 ft.	Approximately 4 hours would be needed to clean, service, and replace damaged parts.
Radio, SCR-300	1000 yds	Broadside to GZ. Placed flat on ground. In operable condition.	Antenna bent and broken. Displaced with severe damage to components.	Scorched and damaged extensively. Battery container blown off. Cover hinge blown off. Tubes all damaged.	Damaged beyond repair.
Flamethrower Portable M2A1	1500 yds	In small defilade with back to GZ. In fair condition, operative, slightly scorched	Displaced. Nozzles and fittings damaged or bent. Hose charred.	Wire band holding tanks together broken. Nozzle catch assembly inoperative and unable to assemble or disassembly. Pressure valve operative hose badly scorched. Flame and fuel triggers operative. Pressure regulator system in normal condition. Tanks not damaged except for scorching of paint. Filler plugs operative.	Estimate equipment could be placed in operating condition in 30 minutes. With a crew throughly familiar with the equipment. Could probably use the parts of the original flamethrower. However, hose should be replaced, and possibly the fire nozzle assembly.

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 35 KT	Condition of equipment or emplacement after shot. Actual yield 51.5 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
C-1 Stake	1500 yds	4"x4"x4' wooden stake embedded 2' into ground.	Burnt and displaced.	Blackened on 3 sides and top, but still serviceable	None
C-2 Trench	1500 yds	Broadside to blast. 2'x4'6"x2' slit trench	Caving of walls.	Undamaged.	None
C-3 Fox hole	1500 yds	Broadside to blast. 3'x4'x3'6" Fox hole	Caving of walls.	Slight cave in of back. Still serviceable.	None
C-4 Bunker	1500 yds	Entrance facing blast. 6'x4'x3'6" covered shelter with 4"x4" top & supports covered with earth-unrevetted.	Scorching of exposed sandbags and timbers slight caving at entrance.	Replace all sandbags-Header blackened. But no structural damage. Slight reshaping at top required.	Cleaning out 1/2 man hr Sand bagging (150 bags) 3 man hrs Shaping top 1 Dozer hr 1½ equip hr 13¼ man hrs
C-5 Bunker	1500 yds	Entrance facing blast, 6'x6'x4'6" covered shelter with 6"x6" posts & top covered with earth. Unrevetted.	Scorching of timber and sandbags. Caving of entrence.	Completely caved in. Entrance & front of emplacement fell in. Lumber salvageable - Easier to build new emplacement.	Excavation Ditcher ¼ man hrs By hand 10 ¼ man hrs Timbering 3 man hrs Sandbagging (150) bags 3 man hrs Dozer w/ditcher 1½ equip hr 6 man hrs By hand 3/4 equip hr 16 ½ man hrs
Sheep	1500 yds	Normal conventional type trench 6 ft in depth similar in design to the trench used by volunteers.	No damage	No visible effects	NA
Sheep	1500 yds	C-9 Normal	Sensitive tissue scorched. Wool slightly scorched. Possibly radiation sickness.	Third degree burns on face and severe burns on wool.	NA

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Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 35 KT	Condition of equipment or emplacement after shot. Actual yield 51.5 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Sheep	1500 yds	C-8 Normal	Slight scorching of wool. No radiation sickness.	Moderate wool burns.	NA
Sheep (2)	1500 yds	1 each in C-7 and C-6 positions. Normal	No damage	No visible effects	NA
Sheep	1500 yds	C-5 Normal	No damage	This bunker collapsed so it is assumed the sheep died directly from blast effects or indirectly from suffocation.	NA
Tank, Light, M-24	1500 yds	Facing GZ. Front lights, left rear tail light, left side batteries, right and left side battery covers, right front tow hook, and left rear tow hook missing. Paint on front of tank burned. Left fender and dust shields torn away. Rear section of right fender bent up. Engine not in operating condition. Gas in tanks. Hatch burned.	Scorching of paint. Antennas broken. No other blast damage.	Paint and tracks badly scorched. No other damage from blast.	At least 10 hours would be required to restore tank to serviceable condition.
Gun, 75mm, T32	1500 yds	Facing GZ. Sights and sight mount missing. Gun is in serviceable condition.	No damage	No damage caused by blast	None
Rifle, Cal. 30 M1	1500 yds	In hole pointed up. Sling missing and stock pitted. Weapon is in serviceable condition.	No damage	Upper part of stock burned. Rifle buried in 6 to 8 inches of dirt.	One hour would be required to clean and service the rifle.

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 35 KT	Condition of equipment or emplacement after shot. Actual yield 51.5 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Mortar, 60mm M2	1500 yds	Weapon is in hole facing away from GZ. Sights missing. Weapon is in serviceable condition.	Scorch paint. Sight equipment damaged.	No damage caused by blast. Mortar buried in 8 inches of dirt.	It would take approximately one hour to clean and service.
Truck, 2½ ton, GMC, 6x6 M-135	1500 yds	Facing away from GZ at approximately 45 degrees right side toward GZ. Vehicle in running condition. Door glass rolled down. Ventilators open. Troop seats down. All canvas in good condition.	Rubber and canvas scorched. Glass broken.	Vehicle turned over on left side. All glass broken. Hood blown open and bent. Right Door scorched and bent. All canvas torn off and bows and racks broken. All tires scorched.	Approximately 30 hours would be required to restore this vehicle to serviceable condition.
Machine Gun, Heavy Cal. 50, M2	1500 yds	Facing away from GZ. Elevating and traversing mechanism missing. Pintle bolt missing. Gun is serviceable.	No damage caused. Paint scorched. May be blown over. Gun will be functional.	No damage caused by blast.	None
Carbine, Cal. 30 M1	1500 yds	Facing away from GZ laying on ground. Sling missing stock scratched. Weapon is serviceable.	No damage	Weapon could not be found	Could not be determined.
Machine Gun, Light, Cal 30	1500 yds	In bunker facing GZ. Elevating and traversing mechanism and sights missing. Gun is in serviceable condition.	No damage	Weapon could not be checked because bunker was caved in	Could not be determined.
Truck, ¼ ton, 4x4, M-38	1500 yds	Facing GZ. Windshield down. All canvas, doors, and curtains missing. Vehicle in serviceable condition.	Some scorching of rubber and canvas. Glass broken.	Hood and cowl blown open. Steering wheel, lights, and paint scorched. Windshield frame bent and glass blown out. Cover on asst. drivers seat burned off.	Approximately 15 hours would be required to restore this vehicle to serviceable condition.

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Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 35 KT	Condition of equipment or emplacement after shot. Actual yield 51.5 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Gun, 57mm	1500 yds	Facing 30 degrees to right from GZ. Sights missing. Trails closed. Gun in serviceable condition.	Paint scorched. No other damage.	Tires, barrel, and armor plate scorched.	It would take approximately 2 hours to clean and service this weapon.
Rifle, Browning Automatic, Cal. 30 M1918A2	1500 yds	Facing 10 degrees to right of GZ. Rifle on bipod. Sights down. Weapon in serviceable condition.	No damage.	Rifle laying on right side. Weapon scorched lightly.	One hour would be required to clean and service this weapon.
Truck, ¼ ton, 4 x 4, M-38	1500 yds	Left side toward GZ. Engine in running condition. Paint in good condition. Gas in tank. Canvas on vehicle, but doors off and laying in vehicle. Glove compartment door hanging loose. Windshield glass intact.	Scorching of rubber and paint. Glass broken.	Vehicle turned over on left side. Top torn completely off and bows bent. Glass blown out of frame and frame bent forward over hood. Hood unlatched and badly bent. Asst. drivers seat thrown from vehicle. Spare tire bracket bent up toward top. Left front fender bent. Engine not in running condition.	At least 90 hours would be required to restore this vehicle to serviceable condition.
Sheep	1700 yds	Conventional type trench 6 ft in depth similar in design to the trench used by volunteers. Normal.	No damage	No visible effects	NA
C-1 Stake	2000 yds	4"x4"x4' wooden stake embedded 2' into ground.	Burnt and displaced.	Face blackened - still useable.	None
C-2 Trench	2000 yds	Broadside to blast. 2'x4'6"x2' slit trench.	No damage.	No damage.	None
C-3 Fox hole	2000 yds	Broadside to blast. 3'x4'x3'6" Fox hole	No damage.	No damage.	None

DAMAGE EV. ATION REPORT

SHOT V - 7

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 35 KT	Condition of equipment or emplacement after shot. Actual yield 51.5 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
C-4 Bunker	2000 yds	Entrance facing blast. 6'x4'x3'6" covered shelter with 4"x4" top and supports covered with earth-unrevetted.	No damage	All sand bags need replacing. Entrance needs cleaning out. Header slightly darkened. No structural damage.	Sand bagging 3 man hrs (150 bags) Clean out 1 man hr Dozer ½ man hr ½ equip hr 4 man hrs
C-5 Bunker	2000 yds	Entrance facing blast. 6'x6'x5'6" covered shelter with 6"x6" posts & covered with earth. Unrevetted.	No damage	Sand bags need replacing. Entrance needs cleaning out. Header slight darkened. No structural damage.	Sand bagging 3 man hrs (150 bags) Clean out 1 man hr Dozer ½ hr ½ equip hr 4 man hrs
Sheep	2000 yds	C-9 Normal.	Severe burns to sensitive tissue.	Second degree burns on ears and wool bruned.	NA
Sheep	2000 yds	C-8 Normal.	Slight scorching of exposed surfaces. Doubtful radiation sickness.	Third degree burns of face and moderate wool burns.	NA
3 Sheep	2000 yds	1 each in C-7, C-6 and C-5	No damage	No visible effects.	NA
Carriage, Howitzer Motor, M-37	2000 yds	Facing GZ. All dust shields, front fenders, batteries, front lights, horn, right rear exhaust deflector missing. Paint and tracks in good condition. Engine not in running condition. Gas in tanks.	Slight scorch of paint only. Antenna bent.	No blast damage	None
Howitzer, 105mm M2A1	2000 yds	Facing GZ. Sights missing. Weapon is serviceable. Paint in good condition.	Slight scorch of paint.	No damage caused by blast.	None

DAMAGE EVALUATION REPORT

SHOT V - 7

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 35 KT	Condition of equipment or emplacement after shot. Actual yield 51.5 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Truck, 2½ ton GMC 6x6, M-135 w/winch	2000 yds	Facing approximately 15 degrees to left of GZ. Paint, canvas, and all windows in good condition. Gas in tank and engine in running condition. Spare tire missing. Lights in working order.	Canvas and rubber scorched. Glass broken.	Right windshield blown out and left windshield shattered. Right door glass shattered. Hood badly bent cab top torn and burned off. Canvas torn and burned, and bows broken. All tires, bumper, and seats slightly scorched.	Approximately 10 hours be required to restore this vehicle to serviceable condition.
Truck, ¼ ton, 4 x 4 M-38	2000 yds	Facing 35 degrees to right of GZ. Overall condition of vehicle very good. Canvas on. Gas in tank and engine in running condition Dummy sitting in drivers seat.	Canvas and rubber scorched. Glass broken.	Hood blown open and bent. Windshield blown out and frame bent. Top torn and burned off. Headlights, tires, paint, and drivers seat scorched. Engine will not operate.	At least 8 hours would be required to restore this vehicle to serviceable condition.
Aiming Circle M-1	2000 yds	Facing GZ, in upright position. Previous blast damage.	Slight scorch of paint. No other damage.	Item blown to rear approximately 5 yards.	None.
Machine Gun, Heavy, Cal. 50 M2	2000 yds	Facing away from GZ at an elevation of approximately 60 degrees. Bolt missing. Pintle bolt missing. Gun has no sights.	Slight paint scorch. No other damage	No damage caused by blast.	None
Mortar, 81mm (T-106)	2000 yds	Facing away from GZ. Sights missing, but weapon is serviceable.	Slight paint scorch. No other damage.	No damage caused by blast.	None
Machine Gun, Light Cal. 30, M1919A4	2000 yds	Facing 30 degrees to right of GZ. Weapon is serviceable. Weapon is coated with cosmolene.	Slight scorch of paint. No other damage.	Cosmolene scorched but weapon not damaged by blast.	None
Machine Gun, Light, Cal. 30 M1919A4	2000 yds	Facing 45 degrees to right of GZ. Elevating and traversing mechanism missing. Sights down.	Slight Paint scorch. No other damage.	No damage caused by blast.	None

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DAMAGE EVA. ION REPORT

SHOT V - 7

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 35 KT	Condition of equipment or emplacement after shot. Actual yield 51.5 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Machine Gun, Heavy Cal. 30	2000 yds	Facing GZ. Sights down. Barrel elevated at angle of 45 degrees. Gun in good condition. Coated with commolene.	Slight scorch. No other damage.	Commolene scorched at muzzle end of water jacket. No other damage caused by blast.	None
Rifle, Browning Automatic, Cal. 30	2000 yds	Facing 15 degrees to left of GZ. Weapon is good condition. Mounted on bipod. Coated with commolene.	No damage.	No damage caused by blast.	None
Howitzer, 105mm M2A2	2000 yds	Facing 30 degrees to left of GZ. Weapon is in serviceable condition. Sights missing. Trails together. Breech block closed.	Slight scorch of paint. No other damage.	Tires and muzzle end of barrel slightly scorched. No other damage due to blast.	None
Gun, 57mm M1	2000 yds	Facing 15 degrees to left of GZ. Gun is in good condition. Sights missing and trails closed. Breech block closed. Barrel elevated at 15 degrees.	No damage.	Canvas on barrel scorched. Tires slightly scorched.	None
Rifle, Recoilless, 57mm	2000 yds	Facing 55 degrees to left of GZ and in fox hole. Grips on trigger, check pads, shoulder pads, and safety missing.	No damage	Blast caused no damage.	None
Morter, 60mm M2	2000 yds	Facing away from GZ in fox hole 2 feet deep. Sights and carrier sling missing but weapon in good condition in all other respects.	Slight scorch of paint. No other damage.	No damage due to blast.	None
C-1 Stake	2500 yds	4"x4"x4' wooden stake embedded into ground.	No damage.	Face blackened - still useable.	None

DAMAGE EVALUATION REPORT

SHOT V - 7

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 35 KT	Condition of equipment or emplacement after shot. Actual yield 51.5 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
C-2 Trench	2500 yds	Broadside to blast. 2'x4'6"x2' slit trench.	No damage	No damage.	None
C-3 Fox hole	2500 yds	Broadside to blast. 3'x4'x3'6" Fox hole	No damage	No damage	None
C-4 Bunker	2500 yds	Entrance facing blast. 6'x4'x3'6" covered shelter with 4"x4" top & supports covered with earth-unrevetted.	No damage.	Bags need replacing. Entrance needs cleaning out. Header slightly darkened. No structural damage.	Sand bagging (150 bags) 3 man hrs Clean out 1 man hr Dozer ½ hr ½ equip hr 4 man hrs
C-5 Bunker	2500 yds	Entrance facing blast. 6'x6'x5'6" covered shelter with 6"x6" posts & top covered with earth. Unrevetted.	No damage.	Sand bags need replacing. Entrance needs cleaning out. Header slightly darkened. No structural damage.	Sand bagging (150 bags) 3 man hrs Clean out 1 man hr Dozer ½ hr ½ equip hr 4 man hrs
Sheep	2500 yds	C-9 Normal.	Moderate burns on exposed tissue.	Second degree burns on face and wool burns on ¼ of body area.	NA
4 Sheep	2500 yds	1 each in C-8, C-7, C-6 and C-5 positions. Sheep normal.	No damage	No visible effects in C-8 C-6 and C-5. Moderate wool burns in C-7	NA
Gun, 57mm	2500 yds	Facing 90 degrees to right of GZ. Muzzle and breech sealed. Gun in good condition.	Slight scorch of paint. No other damage.	Left tire scorched and paint on left side of barrel scorched.	None
Tank, Medium	2500 yds	Facing GZ. Front lights, exhaust deflector, and dust shields missing. Paint on front of tank slightly burned. Road wheels and track in good condition.	Slight scorch of paint. No other damage.	Paint on front of tank and tracks scorched. No other damage caused by blast.	None

DAMAGE [illegible]UATION REPORT

SHOT 7 - 7

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 35 KT	Condition of equipment or emplacement after shot. Actual yield 51.5 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Gun, 76mm mounted in tank.	2500 yds	Facing GZ. Gun in gun rest and locked down. Sights missing. Gun is serviceable. Paint in good condition.	Slight scorch of paint	No damage caused by blast.	None
Truck, ¼ ton, 4 x 4, M-38	2500 yds	Facing GZ. Top and curtains on glass, paint and engine in good condition.	Glass broken. Slight scorch of paint.	Windshield blown out and top torn off. Paint on bumper and rubber around windshield frame scorched.	It would take approximately 3 hours to restore this vehicle to serviceable condition.
Machine Gun, Light Cal. 30, M1919A4	2500 yds	Facing 90 degrees to right of GZ. Gun in good condition. Covered with heavy coat of cosmolene.	No damage.	Weapon was not moved or damage by blast.	None
Machine Gun, Light Cal. 30, M1919A4	2500 yds	Facing 45 degrees to right of GZ. Gun in good condition. Covered with heavy coat of cosmolene.	No damage	No damage caused by blast.	None
Machine Gun, Heavy Cal. 50 M2	2500 yds	Facing 45 degrees to right of GZ. Gun in good condition. Covered with heavy coat of cosmolene.	No damage.	No damage caused by blast.	None
Machine Gun, Heavy Cal. 30, M1917A1	2500 yds	Facing 160 degrees to left of GZ. Sights broken. Water plugs and pintle bolt missing.	No damage.	No damage caused by blast.	None
Mortar, 81mm M1	2500 yds	Facing away from GZ. Base plact and sights missing.	No damage to weapon	Weapon not damaged by blast.	None
Rifle, Browning Automatic Cal. 30	2500 yds	Facing away from GZ. Bolt, sling, and bipod missing.	No damage other than slight paint scorch.	No damage caused by blast.	None
Rifle, Recoilless, 75mm	2500 yds	Facing away from GZ. Bipod and sight missing.	No damage.	No damage caused by blast.	None

DAMAGE EVALUATION REPORT

SHOT V - 7

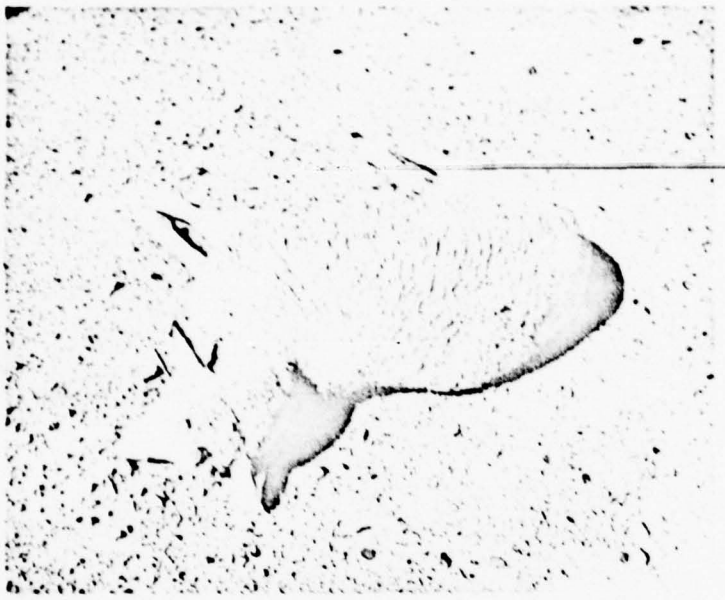
Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 35 KT	Condition of equipment or emplacement after shot. Actual yield 51.5 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Radio, SCR-300	2500 yds	Standing upright with long (10 foot) whip antenna	No damage	Completely blown apart. Top and bottom blown off. All tubes and most interior wiring torn out.	Damaged beyond repair.
C-1 Stake	3000 yds	4"x4"x4' wooden stake	No damage.	Face blackened.	None
C-2 Trench and C-3 Fox hole	3000 yds	Broadside to blast.	No damage.	No damage.	None
C-4 Bunker	3000 yds	Entrance facing blast.	No damage.	Sandbags need replacing. Header darkened. No structural damage.	Sandbagging (150 bags) 3 man hrs Dozer ½ hr Clean out 1 man hr
C-5 Bunker	3000 yds	Entrance facing blast.	No damage	Sandbags need replacing. Header darkened. No structural damage.	Sandbagging (150 bags) 3 man hrs Dozer ½ hr Clean out ½ man hr
Machine gun, Heavy Cal. .30 M1917A1	3000 yds	Facing away from GZ. Pintle bolt missing. Slight leaf up. Gun serviceable.	No damage.	No damage caused by blast.	None
Machine Gun, Heavy Cal. 50, M2	3000 yds	Facing 30 degrees left of GZ. Elevating and traversing in good condition.	No damage.	No damage caused by blast.	None
Truck ½ ton	3000 yds	Facing 45 degrees to right of GZ. Paint, windshield lights, and tires in good condition. Canvas on vehicle. Vehicle in running condition.	No damage.	Rubber windshield molding scorched. No other damage.	None
Sheep	3000 yds	C-9 Position. Normal.	Slight burn of exposed tissue.	Moderate wool burns.	NA

DAMAGE EVALUATION REPORT

SHOT V - 7

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 35 KT	Condition of equipment or emplacement after shot. Actual yield 51.5 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
4 Sheep	3000 yds	1 each in C-8, C-7, C-6 and C-5 positions. Sheep normal.	No damage.	No visible effects.	NA
C-1 Stake, C-2 Trench, C-3 Foxhole C-4 Bunker, and C-5 Bunker	3500 yds	4"x4"x4' wooden stake Trench and Fox hole broadside to blast. Bunkers with entrance opening towards GZ.	No damage.	No damage.	None
5 Sheep	3500 yds	1 each in C-1, C-2, C-3, C-4 and C-5 positions. Sheep normal.	No damage	No visible effects.	NA

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C-6, 1,000 yards. This sheep initially suffered no visible effects. Death occured 28 April and was attributed to acute lethal radiation sickness. There is a complete lack of external symptoms.

C-7, 1,000 yards. This sheep initially suffered extensive wool burns. Incoordination developed 26 April followed by death 27 April. Death was attributed to acute lethal radiation sickness.



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ATOMIC ENERGY ACT

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C-9, 1500 yards. This sheep had third degree burns on the face and extensive wool burns. It died 26 April from acute lethal radiation sickness.

1,500 yards - 6 feet trench. This sheep initially suffered no visible effects from the detonation. Epilation commenced 10 May and can be seen in the picture.



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C-9, 2000 yards. This sheep initially suffered second degree burns on the face and extensive wool burns. Epilation commenced 8 May which is shown by the denuded area on the head.

C-7, 2000 yards. This sheep initially suffered no visible effects from the detonation. Epilation commenced 10 May, and is shown on the back.



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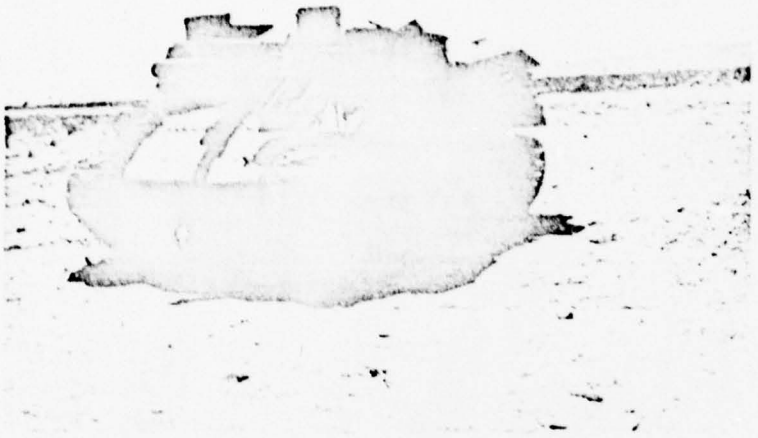
1700 yards - 6 feet trench. This sheep initially suffered no visible effects from the detonation. Epilation commenced 3 May. Note the two defined areas.

C-8, 1,500 yards. This sheep initially suffered moderate wool burns. Epilation commenced 3 May and is clearly shown in this picture.



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BEFORE



105 MM Howitzer, SP, M7B1 facing ground zero at 250 yards.

AFTER

Completely destroyed. Parts of carriage laying at 750 yard line. Vehicle moved backward approximately 150 feet and overturned.



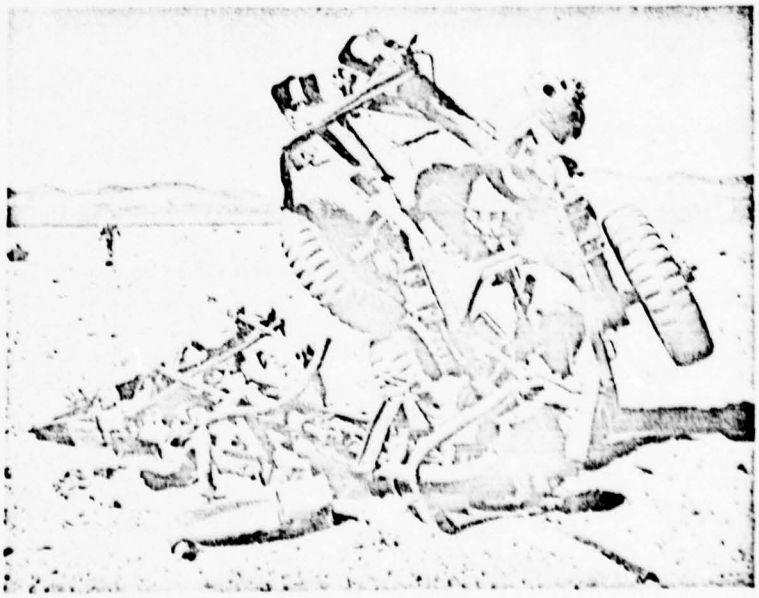


BEFORE

Truck, 2½ ton, GMC, M-135, with left side to GZ at 400 yards.

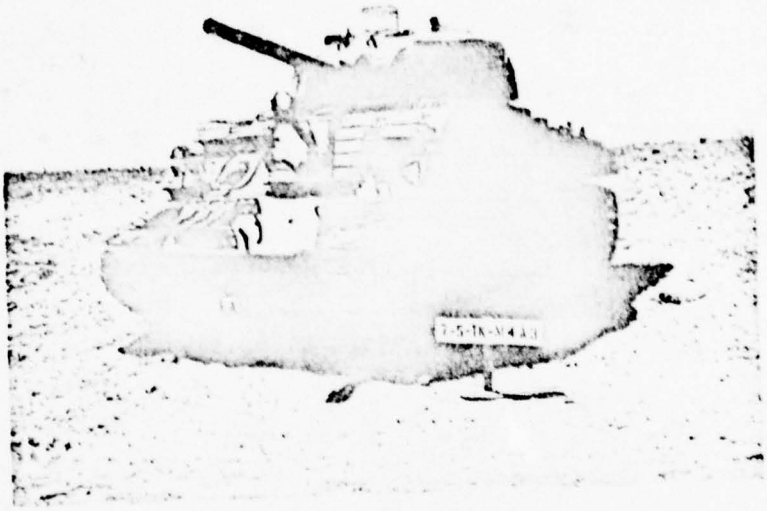
AFTER

Completely destroyed. Engine laying 500 yards from GZ. Other parts laying 700 yards from GZ. Frame and wheels found approximately 500 yards from GZ.



RESTRICTED DATA
ATOMIC ENERGY ACT

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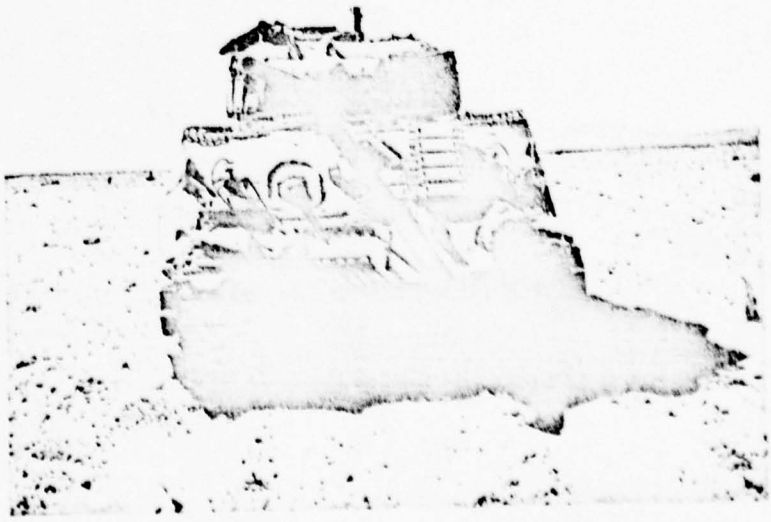


BEFORE

Tank, Medium, M4A3, facing GZ at 500 yards.

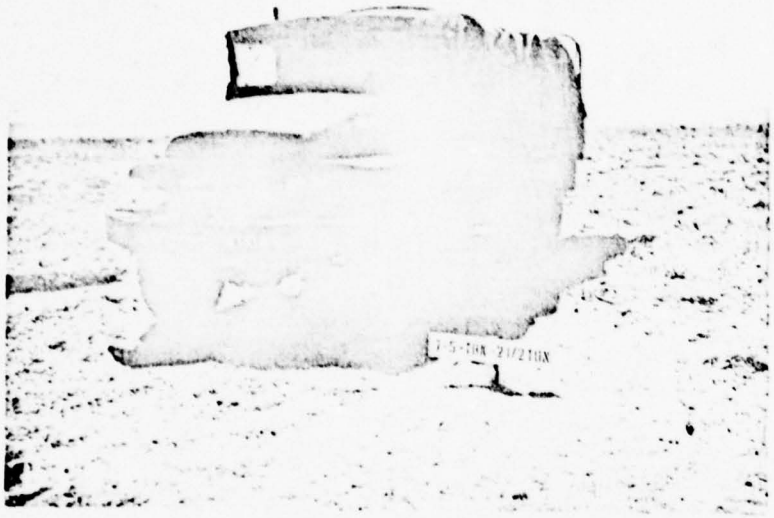
AFTER

Destroyed beyond repair. Turret blown loose but still on top of tank. Vehicle was moved back about 20 feet and badly burned.



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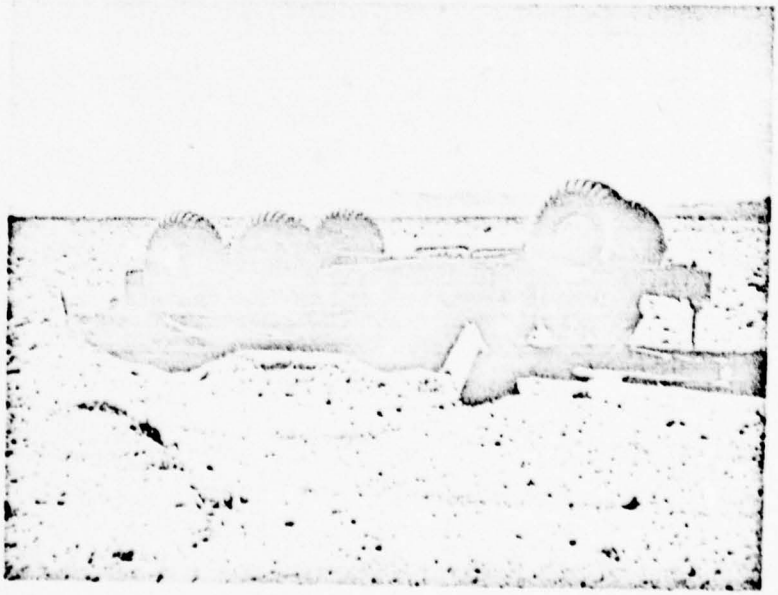


BEFORE

Truck, 2½ ton, GMC, M-135, facing GZ at 500 yards.

AFTER

Completely destroyed. Vehicle moved about 80 feet and turned over.



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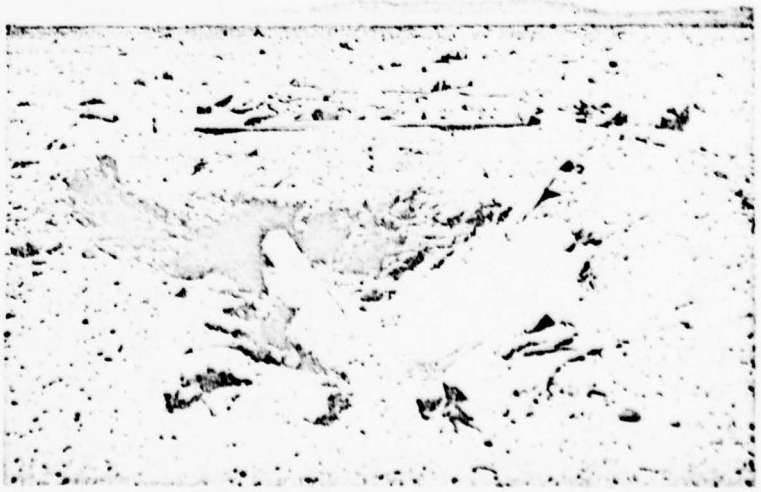


BEFORE

C-5 Bunker at 500 yards from GZ.

AFTER

Top blown completely off and excavation half filled with earth.



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BEFORE

C-6 Bunker at 1000 yards from GZ.

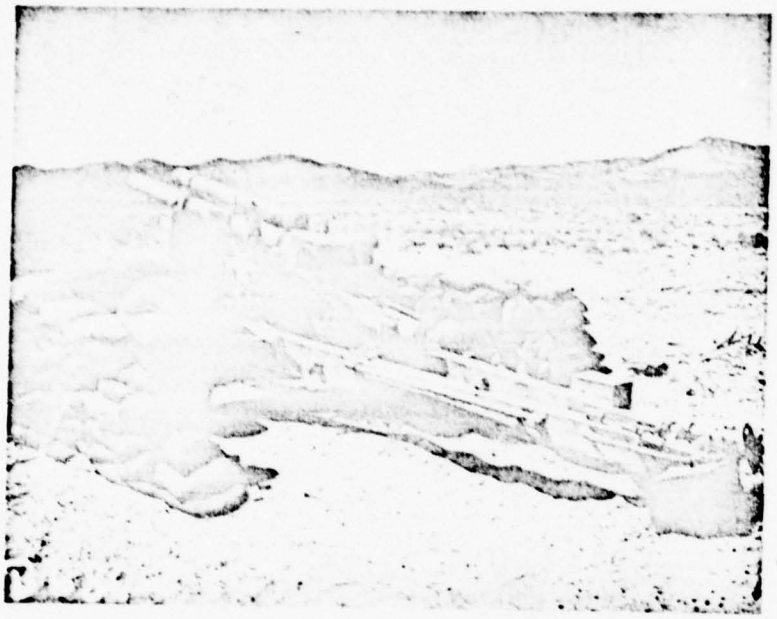
AFTER

All sandbags destroyed and rear wall caved in.



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ATOMIC ENERGY ACT

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BEFORE

105 MM Howitzer, M2A2, facing away from GZ at 1000 yards.

AFTER

Howitzer moved away from GZ 50 feet. Glass in sights and the tires scorched. Entire weapon sand-blasted.



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ATOMIC ENERGY ACT 1946

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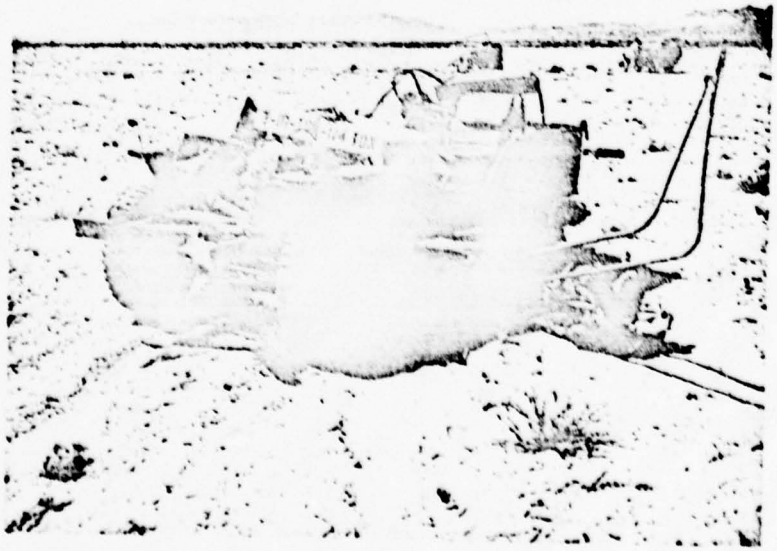
BEFORE

Truck, ¼ ton, 4 x 4, M-38 facing GZ at 1000 yards.



AFTER

Destroyed beyond repair. Moved backward 100 feet.



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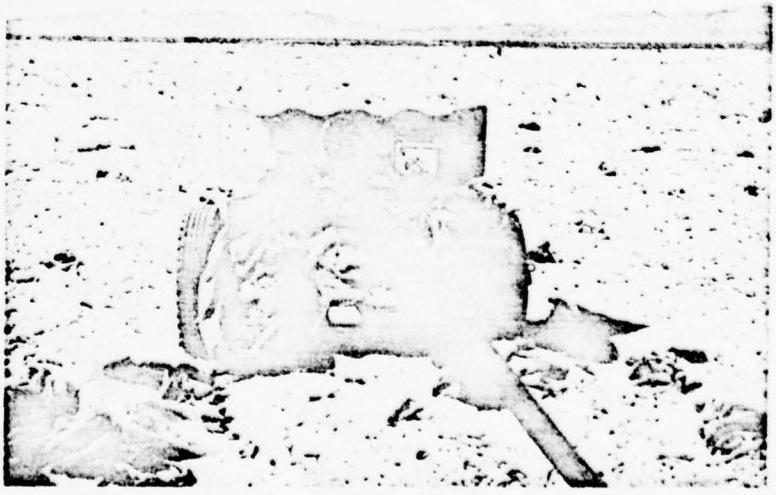


BEFORE

57 MM gun in revetment facing GZ 1000 yards.

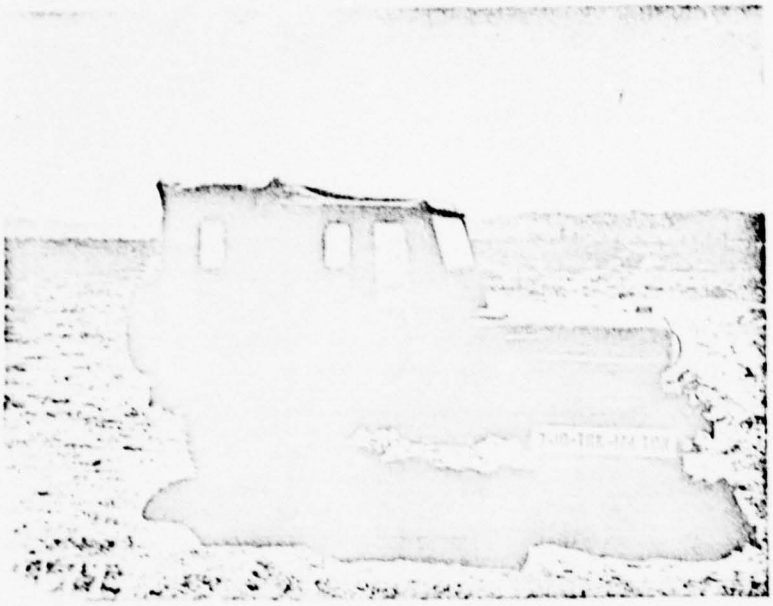
AFTER

Moved to rear 15 feet. Tires and paint scorched. Revetment material blown on gun.



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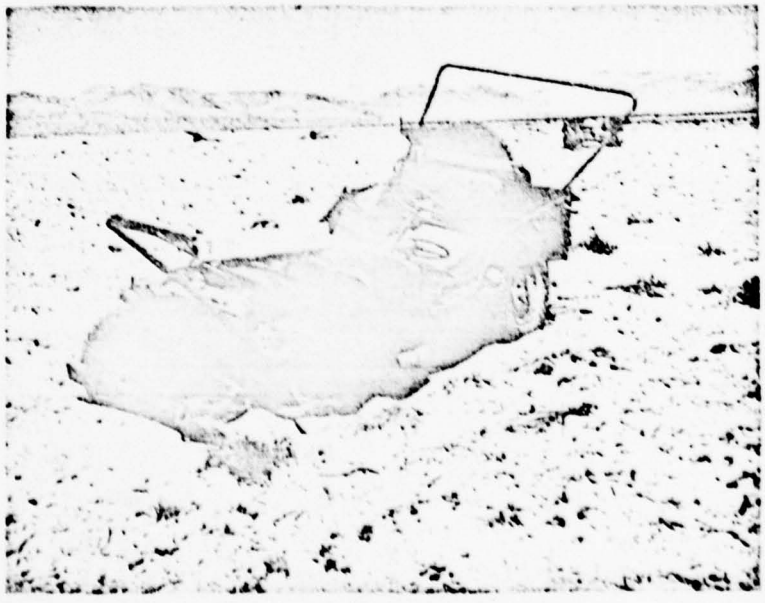


BEFORE

Truck, ¼ ton, 4 x 4, M-38 facing GZ at 1000 yards.

AFTER

Completely destroyed.



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BEFORE

Truck, ¼ ton, 4 x 4, M-38, facing GZ at 1500 yards.

AFTER

Hood and cowl blown open. Steering wheel, lights and paint scorched. Windshield frame bent and glass blown out. Cover on assistant drivers seat burned off.



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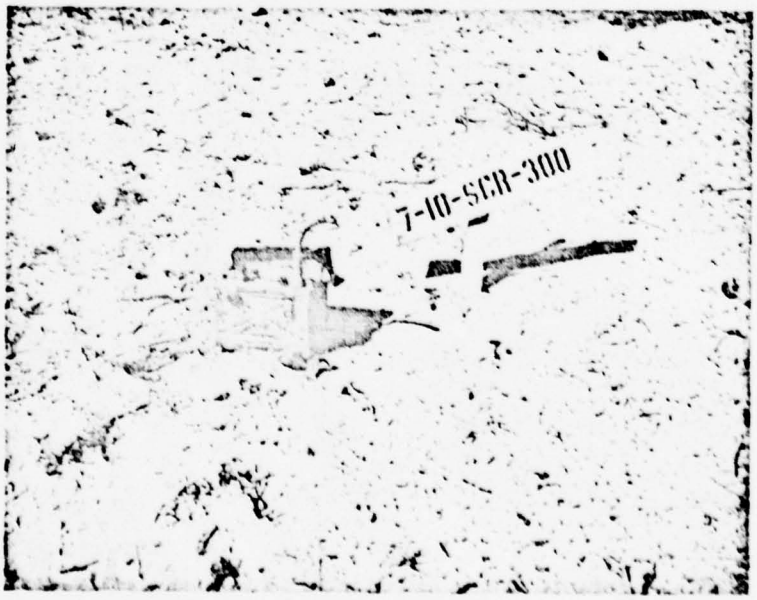


BEFORE

Radio, SCR-300, placed flat on ground 1000 yards from GZ.

AFTER

Battery container blown off. Cover hinge blown off. Scorched extensively inside of case.



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BEFORE

Portable flamethrower, M2A1, in small defilade with back to GZ, 1500 yards from GZ.

AFTER

Band holding tanks together is broken. Hose and harness badly scorched.



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BEFORE

Radio, SCR-300, standing upright beside dummy soldier 2500 yards from GZ.

AFTER

Blown completely apart. All tubes and most of the interior wiring torn out.



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BEFORE

81 MM Mortar, (T-106), dug in facing away from GZ at 2000 yards.

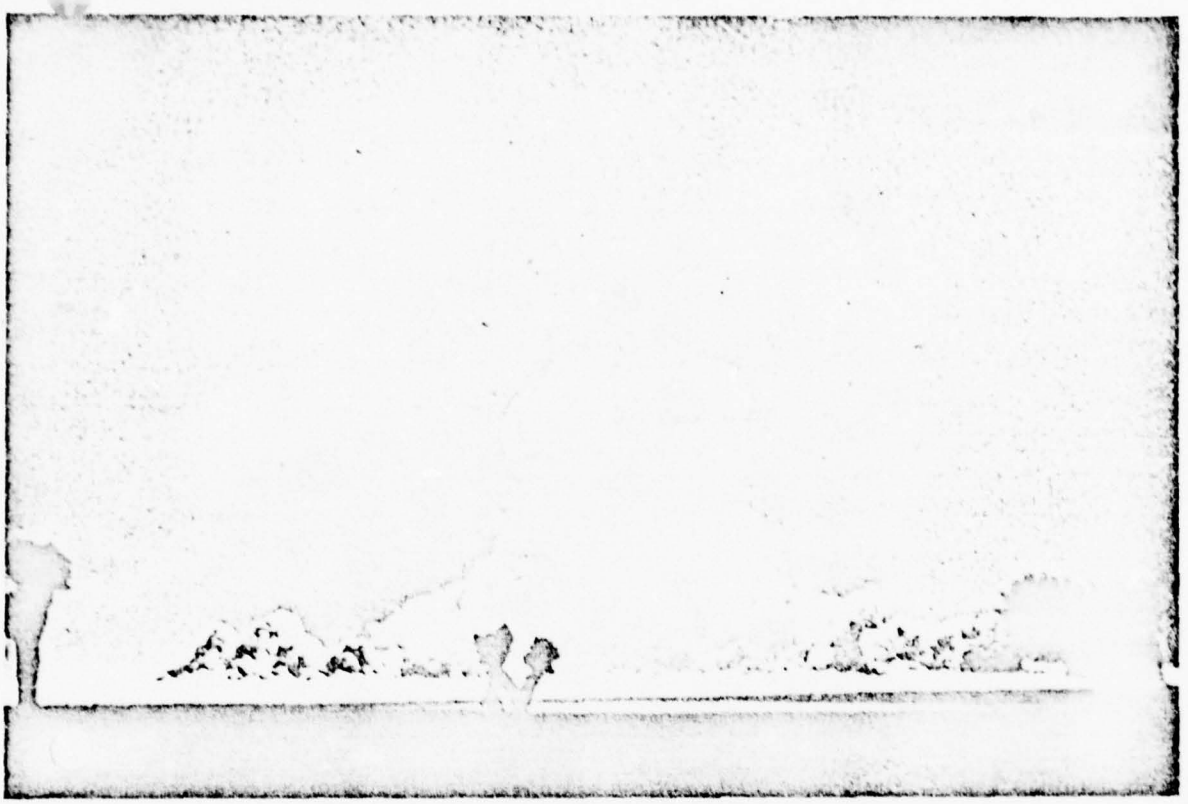
AFTER

Undamaged.



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SECURITY INFORMATION

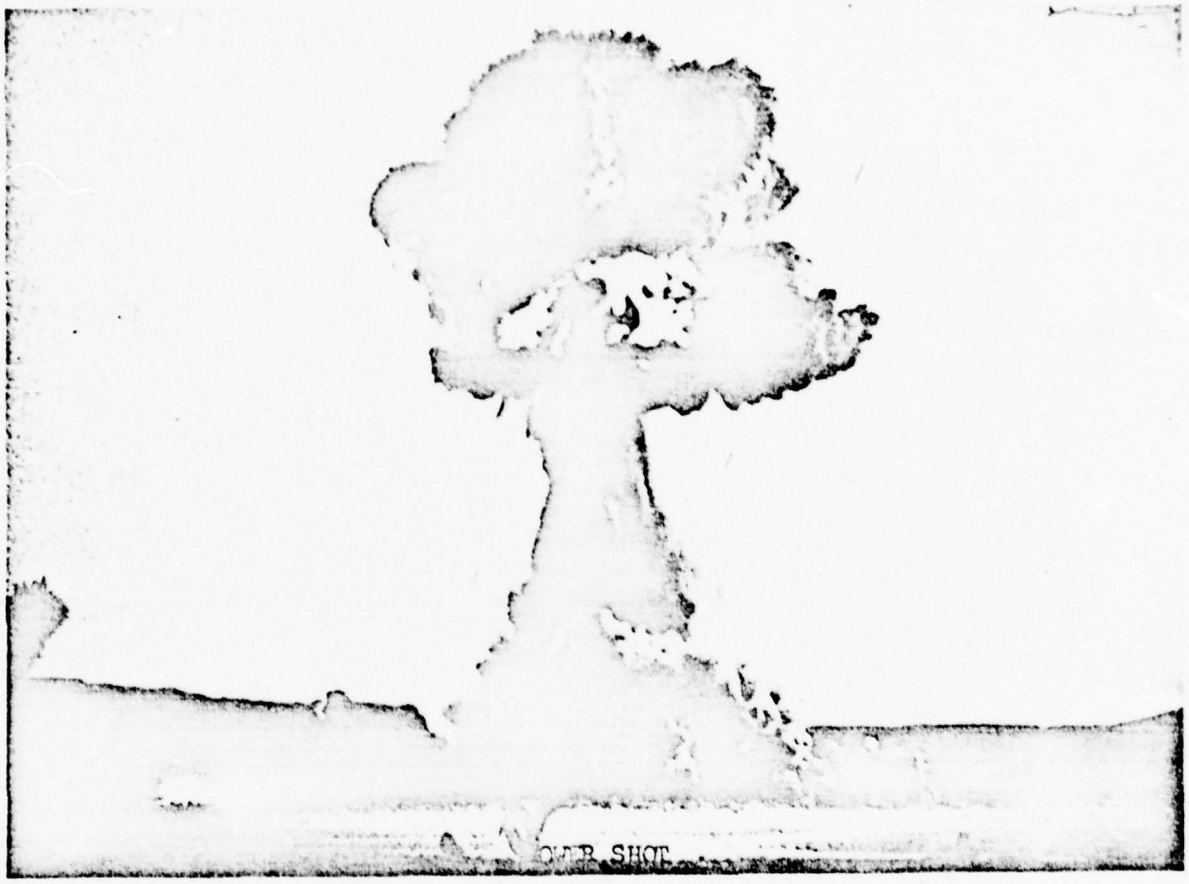


TOWER SHOT

Shot Seven approximately four seconds after detonation

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Shot Seven approximately six seconds after detonation

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TOWER SHOT

250 Shot Seven approximately eight seconds after detonation

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LAS VEGAS (87256) NEV
011200 June 1953

Annex 8 (SHOT VICTOR 8) to Final Report
EXERCISE DESERT ROCK V

I. GENERAL.

The observers for Shot V-8 arrived at Camp Desert Rock during the period 12-15 May. There was no troop participation for this shot. The observers were from the Air Force and the Armed Forces Special Weapons Project. In addition to these observers, approximately five hundred officers and men from Camp Desert Rock, participated in Shot V-8.

Shot V-8 was originally scheduled to be detonated on 2 May. The shot was postponed by the Atomic Energy Commission until 16 May due to excessive radiation in the shot area caused by heavy fall-out from Shot V-7. This shot was again postponed for three (3) sucessive twenty-four hour periods due to unfavorable weather conditions. After being postponed time and again Shot V-8 was detonated at 0505 hours, 19 May.

For Shot V-8, the control group departed Camp Desert Rock at 0210 hours on 19 May. Transportation required to move the control group and observers to the shot site was 112 vehicles. All March Units closed in to the entrenchment area by 0335 hours, 19 May. The entrenchment area was located 4000 yards from ground zero. All vehicles were moved to a motor park 5.3 miles from Ground zero.

The usual pre-shot indoctrination and orientation was conducted in the entrenchment area from 0415 and 0435 hours. The Exercise Director ordered all personnel to enter the trenches at H minus 15 minutes. At H minus 2 minutes a 30 second siren blast was sounded in the entrenchment area and all personnel were directed to crouch low in their trenches and look down. At this time an Atomic Energy Commission spokesman took over the public address system and started the count down. Once again the familiar announcement of "one minute, thirty seconds, ten seconds, 5, 4, 3, 2, 1 and NOW," was heard from the Control Point. At the announcement of NOW a brilliant white light appeared, followed by a heavy ground tremor and then, after a few seconds, the heavy blast of the detonation reach the entrenchment area. Following the passing of the shock wave all personnel in the trenches were able to observe the very colorful fire ball.

At 0522 hours, all personnel departed the entrenchment area to observe the damage effects in the equipment and animal display area. Members of the instructor group provided a commentary on damage effects to the assembled observer personnel in the display area.

The return movement to camp started at 0651 hours, and all march units closed in camp at 0900 hours without incident.

Of unusual interest occuring during this shot was the caving in of personnel trenches. A few soldiers were partially buried in the sand as a result of the ground tremor and subsequent cave in. Only one individual had to be evacuated as a result of this incident. This individual was held under medical observation for one day and the fact there had been no injury was confirmed.

Participating in the exercise were 938 military and 7 civilian personnel, a total of 945 individuals.

The temperature at ground zero at shot time was 57.8 degrees Fahrenheit. Wind was from the North at five knots and visibility was 50 miles. Atmospheric pressure at ground zero was 874 millibars.

II. INTELLIGENCE AND SECURITY.

A 72 hour delay in the shot time as originally scheduled caused some difficulties that would not have ordinarily occurred. After rosters of personnel to enter the forward area were submitted to military security at Camp Mercury, additional observers reported in, making adjustments of the rosters necessary. Addition of names to rosters, once submitted, imposed a heavy work load on all concerned and in this case, threatened to prevent the timely movement of the march unit.

All personnel reporting in did not have proper security clearance as prescribed by existing regulations. An example of this was a group of Air Force personnel reporting in through Nellis Air Force Base. The majority of the group were enlisted men who were certified to be cleared only for Confidential while actually they were all cleared for access to Secret or Top Secret material. The delay in ascertaining their proper clearance prevented them from receiving a portion

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of the orientation program.

Troop and observer convoys moved into and out of the forward area in good order. No outstanding discrepancies of security discipline were observed.

III. INSTRUCTOR GROUP.

Successive 24 hour delays in the detonation of Shot V-8 moved shot day from the scheduled date of 16 May to 19 May. Additional orientation periods presented to fill the gap in time caused by the delays were the most radical change in orientation procedures normally followed by the Instructor Group, Camp Desert Rock.

In preparation for the originally planned shot-day of 16 May, Camp Desert Rock troops scheduled to witness the shot were presented a four hour orientation program in two (2) two hour increments, the first two hours being presented on 13 May and the second two hour increment on 14 May. All presentations were made in the training auditorium as this facilitated the showing of slides and motion pictures. All observers were oriented in one group. On 15 May, observers present for this shot witnessed the first registration firing of the 280 mm gun using conventional projectiles. At the gun position, from 0600 to 0650, the observers were briefed on the characteristics of the gun and ammunition by a member of the Artillery Test Unit from Fort Sill, Okla. Camp Desert Rock troops witnessed the firing at the gun position from 0715 to 0745 hours.

The regular observer orientation program (eight hour) was conducted in the training auditorium on 16 May.

Because of the delay, on 17 May a special observer lecture series was conducted for the Instructor Group by officials of the Atomic Energy Commission and Armed Forces Special Weapons Project from 0830 to 1200. All observers attended these lectures which covered activities of the Atomic Energy Commission, Directorate of Weapons Effect Test and Armed Forces Special Weapons Project located at the Nevada Proving Ground. These lectures were limited in scope because of the security restrictions placed on personnel of Atomic Energy Commission in speaking to non-Q cleared military personnel. The material covered, though limited in factual data, was new to the observers and well accepted.

Another delay of this shot on 18 May caused a need for planned observer activities for 18 May. Motion pictures on atomic subjects were available throughout the day in the training auditorium for observers possessing Secret clearance.

Trench orientation and walk through orientations on actual shot day, 19 May, were normal. Radiation limits were raised from the normal 2.5 r limit so that observers were escorted well in toward GZ, to the 6 r per hour line, 450 yards from ground zero.

IV. SIGNAL.

Normal wire communication facilities were installed for this operation. No communication interruptions occurred before, during or after the detonation on shot day.

A single public address system was installed in the center of the entrenchment area. The system, consisting of a telephone pole on which four speakers were mounted, proved satisfactory since the trench area was quite small as compared to those utilized in previous operations. A spare system was installed in the control trench to provide for any possible amplification failures.

Radio nets using AN/PRC-10 radio sets were used by the Rad-Safe personnel and the same type sets were operative in the Exercise Directors net for contact with Rad-Safe personnel while they were on the move, and also as a back up in case of failure of the telephone system.

The four mobile PA systems used during the forward move of the observer group, were parked in the parking area and were called for immediately after the shot for movement forward. Each of these mobile units was utilized and functioned without interruption.

Considering all phases of the operation, this was the most successful from a signal standpoint, since all communications facilities remained fully operative throughout the entire exercise without interruption.

V. RAD-SAFE.

From the Rad-Safe point of view this exercise followed the pattern of Shot V-1. Location of contaminated areas was approximately the same and the intensities similar. The absence of maneuver-

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ing troops facilitated the conduct of observers through the test areas. Radio communication was excellent and the operation was the best conducted thus far.

One outstanding difference in Rad-Safe control should be noted. Heretofore, observers on foot did not approach closer to GZ than the 2.5 r/hr iso-intensity line. On this shot, the 5 r/hr line was used as a caution, but observers were permitted into areas of higher radiation intensity using 6 r dosage indicated by the pocket dosimeter as the governing limitation.

Radiation Dosage in Roentgens Received in Emplacements.

Distance from Apex of Display Area in yards	Type Emplacements C-1 Open Stake	C-2 Shallow slit Trench	C-3 Deep slit Trench	C-4 One Man emplacement	C-5 Two Man emplacement
1500	____	____	4400	____	____
2000	2250	116	80	44	12
2500	288	21.3	4.2	6.3	1.46
3000	58	8	5	1	3.8
3500	1.8	1.57	____	____	____

Radiation Dosage Received by Sheep.

Distance from Apex of Display Area in yards	Type Emplacements C-9 Open Stake	C-8 Shallow slit Trench	C-7 Deep slit Trench	C-6 One Man emplacement	C-5 Two Man emplacement
1000	____	4400	3995	2400	____
1500	3150	158	71	73	10
2000	535	____	2900	468	124
2500	80	90	5	9	5
3000	13	3	3	3	0

VI. MEDICAL.

Medical Support to Personnel.

The medical troops for this exercise were again distributed as in previous operations. Company aid men and ambulances were attached to each major unit to furnish immediate medical care as required prior to departure from camp. Additional medical support to include a mobile aid station and ambulances moved into the forward area with the Control Party. Immediately following the detonation a portion of a trench caved in striking one of the enlisted men and partially covering him in the trench. Examination by a medical officer realed no injuries but the soldier was in moderate shock and a cataleptic state. He was returned to the Dispensary at Camp Desert Rock where he was held under observation for one day and the fact there had been no physical injury was confirmed. Except for this one incident the exercise was of a routine nature from a medical standpoint.

Medical Evaluation of Test Items.

On the day prior to the detonation 26 sheep were placed at varying distances from ground zero. Commencing at 250 yards one sheep was placed in position C-7. Starting at 500 yards and at each 500 yards interval thereafter through 2500 yards 5 sheep were deployed, one to each C-type position (C-5, C-6, C-7, C-8 and C-9).

The Veterinary Officer, a monitor, and an enlisted veterinary technician accompanied the control group. Immediately following the detonation these men moved forward by vehicle to observe and evaluate the effects of the blast on sheep.

Most of the evaluation results are covered in the evaluation forms and picture captions. Some of the more prominent and results are enumerated hereon.

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The sheep placed in positions C-7, 240 yards from ground zero was killed by the blast effects of the detonation. This animal was literally torn apart. Due to the fact that the collar containthe dosimeter was missing, the amount of radiation absorbed by this animal could not be recorded.

The sheep deployed 500 yards from ground zero in positions C-7 and C-8 were both killed by blast effects of the detonation. (It should be noted that the sheep in position C-8 was suffering from acute lethal radiation sickness incurred from SHOT V-9). The radiation dosages absorbed by the sheep in positions C-7 and C-8 were 3,995 r and 4,400 r. The sheep in position C-9 was never found and it is assumed the animal was disintegrated by the blast. The sheep in position C-5 died indirectly from the blast effects, (i.e., suffocation) as the bunker collapsed on the animal. The sheep in position C-6 showed no visible effects the day following the detonation but on 21 May it was noted that this animal was developing in-coordination. This sheep attained a radiation dosage of 2,400 r and died from acute lethal radiation sickness on 22 May.

The sheep placed 1000 yards from ground zero in positions C-7, C-8, and C-9 all acquired third degree burns of the face and ears combined with extensive wool burns over the back. The sheep from position C-8 was given euthanasia on 19 May to prevent further suffering. This animal had acquired a radiation dosage of 158 r. The sheep in positions C-7 and C-9 developed symtoms of epilation, bloody nasal discharge, and in-coordination on 21 May and were subsequently destroyed to prevent further suffering on the same day. These two sheep received radiation dosages of 71 r and 3,150 r. The sheep in positions C-5 and C-6 incurred no visible effects from the blast and recorded radiation dosages of 10 r and 73 r. These animals are in good condition at the present time.

The sheep deployed 1500 yards from ground zero in positions C-5, C-6, C-7 and C-8 received no visible effects from the detonation and will apparently survive unless latent radiation sickness occurs. The radiation dosages recorded by the first three mentioned animals was 124 r, 468 r and 2900 r. The sheep at C-8 had lost his collar so that no dosage could be estimated. The sheep in position C-9 received third degree burns of the face and ears with extensive wool burns over the back. The radiation dosage recorded by this animal was 523 r. This sheep will apparently die from acute lethal radiation sickness.

The sheep deployed 2000 yards from ground zero in positions C-5 and C-6 acquired no visible effects from the detonation. They recorded a radiation dosage of 5 r. These animals are in good condition at the present time. The sheep in position C-7 acquired moderate wool burns on the back and should survive unless latent radiation sickness sets in. This animal had a radiation dosage of r. The sheep in position C-8 received third degree burns on the left side of the face and acquired a radiation dosage of 90 r. This animal is in good condition at this time. The sheep in position C-9 incurred second degree burns on the face and ears combined with extensive wool burns over the back. This animal received a radiation dosage of 80 r and developed symptoms of radiation sickness on 20 May. He was then given euthanasia on 21 May to prevent further suffering.

The sheep deployed 2500 yards from ground zero acquired no visible effects from the blast other than the moderate wool burns over the back suffered by the sheep in positions C-7 and C-9. The sheep in this group received the following radiation dosages C-5 0 r, C-6 3 r, C-7 3 r, C-8 3 r and C-9 13 r. These animals should all survive unless latent radiation sickness sets in.

Out of the original 26 sheep submitted to SHOT V-8, 4 sheep were killed by blast effects of the detonation, 5 sheep died of acute lethal radiation sickness, and 1 sheep was killed indirectly from blast effects, (i.e., suffocation). Two (2) of the 4 sheep killed by the blast effects were already suffering from radiation sickness incurred on Shot V-9. Sixteen (16) sheep still remain alive and at present are in good condition.

As the reader may observe in the reading of this report there are instances where sheep died from radiation sickness even though they had very low radiation dosages. This is due to the fact that these sheep have been exposed on two or three occassions to other detonations at which time they have acquired higher r values.

VII. MARINE CORPS AIR (HELICOPTER).

Marine helicopters "A" and "B" were on the ground turning up at 2000 rpm about 12,600 yards from ground zero from time of detonation until after the shock wave passed. Both helicopters were positioned with their port side exposed to the blast. Effects of light intensity on the pilots and overpressure on the aircraft were negligible.

Upon passage of the shock wave, "A" and "B" proceeded around the west side of the shot area. Helicopter "A" skirted the upwind region of the dust column recording radiological conditions in the air. Helicopter "B" landed about 3200 yards north of ground zero. The monitor in "B" disem-

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barked to record early radiation levels from the landing point toward ground zero.

Helicopters "C" and "D" departed Camp Desert Rock in formation about 21 minutes before H-Hour and proceeded directly toward the shot area. At the time of detonation "C" and "D" were about 18,000 yards from ground zero. Effects of light intensity on the pilots and overpressure on the aircraft were negligible.

After passage of the shock wave "C" and "D" proceeded around west of the shot area and landed about 3000 yards north of ground zero.

Upon completion of their mission all helicopters returned to Camp Desert Rock.

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Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of (58) KT	Condition of equipment or emplacement after shot. Actual yield 34 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Howitzer, 105mm	GZ	Muzzle and breech open. Sights missing. Trails closed. Right shield torn loose. Paint is burned and sandblasted.	No prediction given	Major item completely destroyed. Weapon blown back 180 yards. Parts of weapon laying as far back as the 500 yard line.	Replace weapon.
Sheep	250 yds	C-7 position. Sheep normal.	No prediction given.	Animal torn apart and killed by blast effects. Dosimeter reading lost.	NA
C-5 Bunker	500 yds	South and slightly east of GZ. Entrance facing north.	Some spalling damage.	Completely destroyed. Timber 70% salvageable.	Ditcher ½ hr Hand labor 10½ man hrs 20 pcs. 6"x6" x9' 12 hrs 18 pcs. 1"x6" 16' 3 hrs 150 sandbags 1 hr
C-6 Bunker	500 yds	South and slightly east of GZ. Entrance facing north.	Some spalling damage.	All sandbags destroyed and scattered. Header over entrance gave way. Entrance filled with sand. Can be repaired.	Clean out 6 man hrs Bracing header 1 man hr 150 sandbags 3 man hrs Recover-1 Dozer ½ hr
C-7 Trench	500 yds	South and slightly east of GZ. Long axis east and west.	Some spalling damage.	Completely filled.	1 ditcher ½ hr Hand labor 2 hrs
C-8 Trench	500 yds	South and slightly east of GZ. Long axis east and west.	Some spalling damage.	Completely filled.	1 ditcher 1 hr Hand labor 2 hrs
C-9 Stake	500 yds	South and slightly east of GZ.	Burned and displaced.	Stake was not found.	Replace stake.
Sheep	500 yds	C-5 position. Sheep normal.	If not in doorway no damage.	Animal died indirectly from blast effects by suffocation.	NA
Sheep	500 yds	C-6 position. Sheep normal.	Lethal radiation dose.	No visible effects imme-	

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DAMAGE EVALUATION REPORT

SHOT V - 8

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of (38) KT	Condition of equipment or emplacement after shot. Actual yield 34 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Sheep (Cont'd)	500 yds			diately. Developed radiation sickness and died 21 May. Received dosage of 2,400 r.	NA
Sheep	500 yds	C-7 position. Sheep normal.	Wool on back scorched. Lethal radiation dose.	Animal killed by blast effects. Received dosage of 3,995 r.	NA
Sheep	500 yds	C-8 position. Sheep suffering from radiation sickness incurred in Shot V-9.	Badly burned. Lethal radiation dose.	Animal killed by blast effects. Received dosage of 4,400 r.	NA
Sheep	500 yds	C-9 position. Sheep suffering from radiation sickness incurred in Shot V-9.	Badly burned. Lethal radiation dose. Blown about.	No trace of body. Believed disintegrated by blast.	NA
Truck 3/4 ton 4 x 4	500 yds	Facing right of GZ 15 degrees. Head lights, hood carburetor, battery, windshield, spare tire, rear compartment cover, ignition switch and gas tank cap missing. Both running boards bent. Cowl bent. Windshield frame bent and cracked. Speedometer broken. Tail gate laying in bed. Paint burned all over. Tire flat.	Frame distorted, body bent, glass broken, paing scorched on exposed surfaces. Not serviceable.	Major item completely destroyed. Vehicle blown back 110 yards. Parts laying at 800 yard line.	Replace vehicle.
Howitzer, 105mm	500 yds	Facing GZ. Sights missing. Muzzle open, breech closed and trails spread. Weapon is dirty but is in serviceable condition.	Blown to pieces.	Weapon moved back 15 feet. Recoil mechanism torn loose. Frame badly sprung. Weapon badly burned and sandblasted. Weapon is a total loss.	Replace weapon.
Gun, 57mm, M1	500 yds	Facing away from GZ. Breech open, muzzle taped shut, and trails spread. Sights	Displaced and overturned. Paint scorched. Sighting equip-	Weapon blown 65 feet by blast. Right trail bent. Right wheel bent and	Replace weapon.

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Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of (38) KT	Condition of equipment or emplacement after shot. Actual yield 34 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Gun, 57mm, M1 (Cont'd)	500 yds	missing. Weapon is dirty but in serviceable condition.	ment bent. Surfaces contaminated. Lethal dose in emplacement.	shields blown off. Tube sticking in ground approximately 4 feet. Tube probably bent.	
Truck, Utility, ¼ ton, 4 x 4 M-38	500 yds	Vehicle facing 10 degrees to right of GZ. Vehicle is in serviceable condition. Canvas and side curtains missing. Drivers seat torn.	Frame distorted, body bent, glass broken, paint scorched on exposed surfaces. Not serviceable.	Major item completely destroyed. Vehicle moved back approximately 150 feet. Parts of vehicle found at the 800 yard line.	Replace vehicle.
Tank, Medium M4A3	500 yds	Tank facing 10 degrees to right of GZ. Dust shields, right rear engine door, front lights, and horn missing. Vehicle not in running condition. Batteries dead. Drivers hatch open. Floor in turret torn up. Instrument panel loose. Paint slightly burned.	Overturned or displaced damage to turret, tracks and gun control mechanism. Lethal radiation dose in interior of tanks.	Tank turned over on right side. Right track off road wheel, third sprocket. Assistant drivers and commanders hatch blown off. Tank badly burned and sandblasted.	Approximately 40 man hours would be required to replace track and road wheels, replace assistant drivers and commanders hatch, and paint tank.
Gun, 75mm, M3 (Mounted in Tank)	500 yds	Facing 10 degrees to right of GZ. Sights missing. Breech closed. Weapon dirty but serviceable.	Weapon burned and control mechanism damaged.	Weapon badly burned and sandblasted No other damage.	Approximately 6 man hours would be required to clean and service this gun.
Machine Gun, heavy, Cal. 50, M2 (mounted on tank)	500 yds	Gun facing 10 degrees right of GZ. Weapon very dirty. Operation lever missing. Sight in down position.	Severe damage. Bent, displaced, not functional.	Gun blown approximately 30 feet to rear of tank. Pintle bent. Mount bent.	Approximately 3 hours would be required to clean gun and replace mount and pintle.
C-9 Stake	1000 yds	South and slightly east of GZ.	Scorched and displaced.	Blown out of ground. Salvaged.	Reset stake ¼ hr
C-8 Trench	1000 yds	South and slightly east of GZ. Long axis east and west.	Some spalling damage.	Partially filled and sides caved in.	1 ditcher ¼ hr Hand labor 2 hrs

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DAMAGE EVALUATION REPORT

SHOT V - 8

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 38 KT	Condition of equipment or emplacement after shot. Actual yield 34 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
C-7 Trench	1000 yds	South and slightly east of GZ. Long axis east and west.	Some spalling damage.	Sides caved in and partially filled.	1 ditcher ½ hr Hand labor 2½ hrs
C-6 Bunker	1000 yds	South and slightly east of GZ with entrance facing north.	Some spalling damage.	All sandbags destroyed and sand fell into entrance.	110 sandbags 3 hrs Clean out 1 hr
C-5 Bunker	1000 yds	South and slightly east of GZ with entrance facing north.	Sandbags burned. Partially covered entrance.	All sandbags destroyed and sand fell into entrance.	150 sandbags 3½ hrs Clean out 1 hr
Sheep	1000 yds	C-5 position. Sheep normal.	If staked in door will receive a lethal radiation dose. If inside there will be no damage.	No visible effects. Received dosage of 10 r.	NA
Sheep	1000 yds	C-6 position. Sheep normal.	Possible radiation sickness.	No visible effects. Received dosage of 73 r.	NA
Sheep	1000 yds	C-7 position. Sheep normal.	Possible lethal radiation dose. No burns.	3rd degree burns on face and ears. Extensive wool burns on back. Destroyed 21 May. Received dosage of 71 r.	NA
Sheep	1000 yds	C-8 position. Sheep normal.	Badly burned on exposed portions. Lethal radiation dosage.	3rd degree burns on face and ears. Extensive wool burns. Bloody nasal discharge. Destroyed 19 May. Received dosage of 158 r.	NA
Sheep	1000 yds	C-9 position. Sheep normal.	Badly burned. Lethal radiation dosage. Blown about.	3rd degree burns on face and ears. Moderate wool burns on back. Destroyed 21 May. Received dosage of 3150 r.	NA

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of [illegible] KT	Condition of equipment or emplacement after shot. Actual yield 34 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Tank, M24	2000 yds	Facing 10 degrees right of GZ. Lights and horn missing. Paint on front of tank burned. Dust shields torn loose. Tank not in running condition. Right rear fender bent up. All hatches open.	No prediction given.	Front fender bent in. Front of tank burned. No other damage caused by blast.	If tank had been in operating condition before blast, it would have been in operating condition after the blast.
75mm gun, M6	2000 yds	Facing 10 degrees right of GZ. Sights missing. Breech open. Dirty and paint burned.	No prediction given.	Weapon sandblasted and burned. Gun very dirty.	Approximately 6 man hours would be required to clean and service this gun.
Truck, 2½ ton, GMC, 6 x 6, M-135, w/o winch.	2000 yds	Facing 10 degrees to the right of GZ. Vehicle is in running condition. Hood up, windows closed. Canvas on vehicle. End curtain missing.	Displaced and may be overturned. Broken glass and bows. Canvas and paint scorched or burned. Functional.	Vehicle turned completely over. Racks and canvas torn off. All glass broken. Bows broken. Vehicle badly burned. Cab destroyed. Vehicle will run.	Approximately 300 man hours would be required to replace all glass, racks, canvas, repair cab, and paint vehicle.
Truck, Utility, ¼ ton, 4 x 4 M-38	2000 yds	Facing GZ. Vehicle will not start as batteries are low. Loose laying inside vehicle. Paint in good condition.	Top burned and torn, glass broken, functional.	Windshield blown out and windshield frame bent. Hood torn off. Seats badly burned. Cowl bent. Vehicle badly burned and scorched.	Approximately 75 man hours would be required to replace windshield and straighten frame, to replace hood, seats, straighten cowl and paint vehicle.
Rifle, Cal. 30, M1	2000 yds	In fox hole pointing up. Stock scarred. Sling missing. Weapon very dirty.	No damage.	Weapon covered with dirt.	Approximately 1 hour would be required to clean weapon.
Rifle, Browning Automatic, Cal. 30 M1918A2	2000 yds	In fox hole pointing up. One foot of barrel exposed. Upper hand guard broken. Sling missing. Rifle is very dirty.	No prediction given.	Weapon covered with dirt. Sandblasted and burned.	Approximately 2 hours would be required to clean and service weapon.

DAMAGE EVALUATION REPORT

SHOT 7 - 8

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 33 KT	Condition of equipment or emplacement after shot. Actual yield 34 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Gun, 57mm	1000 yds	Facing GZ. Sights missing. Muzzle taped shut. Breech taped shut. Trails spread. Gun in good condition.	Scorched, blown over, tires may burn, functional.	Weapon slightly scorched and very dirty.	It would take approximately 6 man hours to clean and service gun.
Truck, Utility, ¼ ton, 4 x 4 M-38	1000 yds	Facing GZ. Side curtains and doors missing. Vehicle is in serviceable condition	Top burned and torn, glass broken, functional.	Vehicle laying with wheels in air. All glass blown out and hood blown off. Left rear of body crushed. Vehicle badly scorched. Steering mechanism torn from frame.	Approximately 150 man hours would be required to replace glass, seats, straighten rear of vehicle and repair steering mechanism.
Truck, 2½ ton, GMC, 6 x 6, M-135	1000 yds	Facing 90 degrees to the right of GZ. Vehicle is in serviceable condition. Door glass is up. Canvas not on last bow.	Displaced and may be overturned. Broken glass and bows. Canvas and paint scorched or burned. Functional.	Hood blown off. Windshield blown out and windshield frame broken. Canvas blown off and all bows broken. Paint and wiring badly burned. Vehicle will run.	Approximately 100 man hours would be required to repair damage caused by blast.
Mortar, 60mm M2	1000 yds	Facing away from GZ. Sights missing. Weapon is very dirty.	Paint scorched, blown over, functional.	Weapon blown approximately 20 feet to rear but was not damaged.	Approximately ½ hour would be required to clean mortar.
Mortar, 60mm M2	1000 yds	Facing away from GZ. Sights missing. Weapon is very dirty.	Paint scorched, blown over, functional.	Weapon blown approximately 15 feet to rear. No material damage caused by blast.	Approximately ½ hour would be required to clean mortar.
Rifle, Cal. 30 M1	1000 yds	In fox hole pointing up. Sling missing. Bolt open. Rifle very dirty.	No damage.	No effect from blast.	Approximately 1 hour would be required to clean and service gun.
Machine Gun, Light Cal. 30, M1919A4	1000 yds	Facing away from GZ. Gun is not mounted. Laying on top of ground. Weapon is serviceable.	No prediction given.	No damage caused by blast. Weapon became very dirty.	Approximately 2 hours would be required to clean and service gun.

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 38 KT	Condition of equipment or emplacement after shot. Actual yield 34 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Machine Gun, Heavy Cal. 50, M2	1000 yds	Facing 30 degrees to the right of GZ. Laying on AA mount in fox hole. Weapon is serviceable.	No Prediction given.	No material damage caused by blast but weapon became very dirty.	It would take approximately 2 hours to clean and service gun.
Machine Gun, Light Cal. 30	1000 yds	Facing away from GZ. Mounted on tripod. Elevating and traversing mechanism missing. Sights down.	No damage.	Weapon turned over on left side. Gun was slightly sandblasted and is very dirty.	Approximately 2 hours would be required to clean and service gun.
Radio, SCR-300	1000 yds	Facing GZ. Sitting on ground. In operating condition.	Antennas bent and broken. Blown about, damage to component parts. Not functional.	Thrown back 25 feet from GZ. Handset cord cracked. Tubes damaged.	3 days work by 4th echelon.
Flamethrower	1500 yds	Rear area towards GZ. Completely reconditioned. In good shape.	No damage.	General condition after shot good.	Could be put in battlefield operating condition in 20 minutes by trained crew.
C-9 Stake	1500 yds	Wooden stake embedded 2' in ground.	No damage.	Undamaged.	None
C-8 Trench and C-7 Trench	1500 yds	South and slightly east of GZ. Long axis east and west.	No damage.	Caved in slightly but useable.	Clean out ½ hr
C-6 Bunker and C-5 Bunker	1500 yds	South and slightly east of GZ. Entrance facing north.	No damage.	Sandbags burned and broken open. Dirt fell into entrance.	110 sandbags 3 hrs Clean out ½ hr Recover-Dozer ½ hr
3 Sheep	1500 yds	C-5, C-6 and C-7 positions. Sheep normal.	No damage.	No visible effects. Received dosages as follows: C-5 124 r, C-6 468 r, C-7 2900 r.	NA
Sheep	1500 yds	C-8 position. Sheep normal.	Badly burned on exposed wool surfaces. Possible radiation sickness.	No visible effects. Dosimeter reading lost.	NA

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DAMAGE EVALUATION REPORT

SHOT V - 8

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of [32] KT	Condition of equipment or emplacement after shot. Actual yield 34 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Sheep	1500 yds	C-9 position. Sheep normal.	Badly burned. Near lethal dose of radiation.	3rd degree burns on face and ears. Extensive wool burns on back. Received dosage of 523 r and will probably die.	NA
Gun, 57 mm	1500 yds	Facing away from GZ. Sights missing. Trails are spread and muzzle and breech are taped shut. Gun in good condition.	Paint scorched. Maybe blown over. Functional.	Gun became very dirty but no other damage caused by blast.	Approximately 5 hours would be required to clean and service this weapon.
Recoilless Rifle 57mm	1500 yds	Facing away from GZ. Weapon is unserviceable. Sights, shoulder pad, and safety missing.	No prediction given.	No damage caused by blast.	It would take approximately 1 hour to clean weapon.
Machine Gun, Heavy, Cal. 30 M1917A1	1500 yds	Facing away from GZ. Weapon is not serviceable. Cover is up. Extractor is bent. Sights burned off.	Paint scorched. Maybe blown over. Functional.	No damaged caused by blast	Approximately 2 hours would be required to clean gun.
Machine gun, Light, Cal. 30 M1919A4	1500 yds	Facing away from GZ. Weapon mounted on tripod. Sights down and cover is closed. Weapon in good condition.	Paint scorched. Maybe blown over. Functional.	No damage caused by blast.	Approximately 2 hours would be required to clean gun.
Truck, 2½ ton, GMC, 6 x 6, M-135	1500 yds	Facing GZ. Vehicle in good condition. Door glass rolled up. Canvas is good condition.	Paint scorched. Tires and top burned where exposed. Glass broken. Functional.	All glass blown out. Canvas destroyed. Paint on front of vehicle burned.	Approximately 50 hours would be required to replace all glass and canvas and to paint vehicle.
Machine Gun, Light, Cal. 30, M1919A4	1500 yds	Facing away from GZ. Weapon is in good condition. Gun is mounted on tripod. Traversing mechanism not clamped. Sights down.	Paint scorched. Maybe blown over. Functional.	No damage caused by blast. Gun became very dirty.	It would take approximately 2 hours to clean gun.

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of [38] KT	Condition of equipment or emplacement after shot. Actual yield 34 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Machine Gun, Heavy, Cal. 50, M2	1500 yds	Facing away from GZ. Weapon is in good condition. Gun is mounted on tripod. Traversing mechanism not clamped. Sights down.	Paint scorched. Maybe blown over. Functional.	No damage caused by blast. Gun became very dirty.	It would take approximately 2 hours to clean gun.
Howitzer, 105mm M3	1500 yds	Facing GZ. Right armor shield missing. Muzzle covered and breech open. Trails spread. Weapon in good condition.	No prediction given.	Cover for muzzle burned. Shields and tires scorched.	Approximately 5 hours would be required to clean and service this weapon.
Mortar, 60mm M19	1500 yds	In foxhole facing away from GZ. Sights missing. Weapon is very dirty.	Paint scorched, blown over. Functional.	No damage caused by blast.	Approximately ½ hour would be required to clean weapon.
Mortar, 81mm M1	1500 yds	In foxhole facing away from GZ. Sights missing and weapon is dirty.	No prediction given.	No damage caused by blast.	Approximately 1 hour would be required to clean weapon.
Rifle, Browning Automatic, Cal. 30 M1918A2	1500 yds	Facing away from GZ. Weapon is in good condition. Mounted on bipod with sights down.	Stock charred. Blown over. Functional.	No damage caused by blast.	Approximately 2 hours would be required to clean weapon.
Truck, Utility, ¼ ton, 4 x 4, M-38	1500 yds	Facing GZ. Vehicle will not run as batteries are dead. Canvas on vehicle but doors off and laying inside vehicle. Paint and glass in good condition.	Paint scorched. Tires and top burned where exposed. Glass broken. Functional.	Windshield broken and windshield frame bent. Hood blown open and cowl bent. Canvas torn off. Front end of vehicle badly scorched.	Approximately 100 man hours would be required to replace glass, hood, straighten windshield frame and cowl, and paint vehicle.
Carriage, Mortar, 105mm, Howitzer M7E1 M3	1500 yds	Facing GZ. Batteries, dustshields, and front lights and horn missing. Vehicle not in running condition. Paint in good condition.	No prediction given.	Front of carriage scorched. No other damage caused by blast.	If this carriage had been in operating condition before blast, it would have been in operating condition after blast.

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DAMAGE EVALUATION REPORT

SHOT V - 8

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of [38] KT	Condition of equipment or emplacement after shot. Actual yield 34 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Howitzer, 105mm M2A1 (mounted on carriage listed above)	1500 yds	Facing GZ. Sights missing. Breech open. Weapon is very dirty.	No prediction given.	No damage caused by blast. Weapon very dirty.	Approximately 4 hours would be required to clean weapon.
Telephone, EE8	1500 yds	Facing GZ. Setting on ground in operating condition.	No prediction given.	Singed black, cord on handset cracked.	Phone could be used in the same condition, to restore it would need canvas cover.
C-9 Stake	2000 yds	Wooden stake embedded 2' in ground.	No damage.	Scorched but otherwise undamaged.	None
C-8 Trench and C-7 Trench	2000 yds	South and slightly east of GZ. Long axis east and west.	No damage	Caved in but useable after clean out.	Clean out ¼ hr
C-6 Bunker	2000 yds	South and slightly east of GZ. Entrance facing North.	No damage.	All sandbags burned. Sand fell into entrance.	Replace 50 sandbags 1½ hrs Clean out ¼ hr
C-5 Bunker	2000 yds	South and slightly east of GZ. Entrance facing North.	No damage.	Front layer sandbag burned and broken. Dirt in Entrance.	Replace 75 sandbags 2 hrs Clean out ½ hr
2 Sheep	2000 yds	C-5 and C-6 positions. Sheep normal.	No damage.	No visible effects. Received 5 r in both C-5 and C-6 positions.	NA
1 Sheep	2000 yds	C-7 position. Sheep normal.	No damage.	Moderate wool burns on left. Received 9 r.	NA
1 Sheep	2000 yds	C-8 position. Sheep normal.	Exposed wool badly scorched.	3rd degree burns of left side of face. Received 90 r.	NA
1 Sheep	2000 yds	C-9 position. Sheep normal.	Severe burns to all exposed surfaces.	2d degree burns on face and ears. Extensive wool burns on back. Received 80 r. Destroyed 21 May.	NA

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DAMAGE EVALUATION REPORT

SHOT V - 8

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 38 KT	Condition of equipment or emplacement after shot. Actual yield 34 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Truck, 2½ ton, GMC, 6 x 6, M-135 w/o winch	2000 yds	Facing GZ. Vehicle is in running condition. End curtain and spare tire missing. Glass in both doors rolled down. Canvas on but off rear bow. Tail gate open.	Light damage. Tires and top scorched. Bows broken. Glass broken.	All glass shattered. Canvas burned and torn. Paint and front lights burned.	Approximately 50 hours would be required to repair damage caused by blast.
Machine gun, Heavy Cal. 50, M2	2000 yds	Facing away from GZ. Rear sight, operating lever, pintle bolt, elevating and traversing mechanism missing. Weapon not serviceable.	Paint scorched. No other damage.	No damage caused by blast except gun became dirty.	Approximately 2 hours would be required to clean gun.
Machine Gun, Heavy, Cal. 30, M1917A1	2000 yds	Facing away from GZ. Weapon in good condition. Covered with rust preventative compound. Rear sights up.	Paint scorched. No other damage.	No damage caused by blast.	Approximately 2 hours would be required to clean gun.
Truck, Utility, ¼ ton, 4 x 4, M-38	2000 yds	Facing GZ. Vehicle will not run. Top, doors and curtains missing. Windshield glass broken out and frame bent down.	Light damage. Tires and top scorched. Glass broken	Paint and seats burned. Remaining glass in windshield broken out.	Approximately 20 man hours would be required to repair damage done by blast.
Rifle, Browning Automatic, Cal. 30 M1918A2	2000 yds	Weapon facing away from GZ. Weapon in good condition. Mounted on bipod. Sling missing. Sights down.	Stock charred. No other damage.	No damage from blast. Gun very dirty.	It would take approximately 2 hours to clean gun.
Machine Gun, Light Cal. 30, M1919A4	2000 yds	Facing away from GZ. Elevating and traversing mechanism missing. Gun is unserviceable. Sights are down.	Paint scorched. No other damage.	No damage caused by blast. Gun very dirty.	Approximately 2 hours would be required to clean weapon.

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DAMAGE EVALUATION REPORT

SHOT V - 8

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 38 KT	Condition of equipment or emplacement after shot. Actual yield 34 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Rifle, 57mm Recoilless	2000 yds	Facing GZ. Weapon is unserviceable. Grips, safety check pad, sights, shoulder pad missing. Breech open.	Paint scorched. Blown over. No other damage	No damage caused by blast other than weapon becoming dirty.	Approximately 1 hour would be required to clean weapon.
Mortar, 81mm, M1	2000 yds	Facing away from GZ. Sights missing. Weapon dirty.	No damage.	No damage caused by blast.	Approximately 1 hour would be required to clean weapon.
Machine Gun, Light Cal. 30, M1919A4	2000 yds	Facing away from GZ. Gun in good condition. Mounted on tripod. Sights down.	Paint scorched. No other damage.	No damage caused by blast	It would take approximately 2 hours to clean gun.
Gun, 57mm, M1	2000 yds	Facing away from GZ. Gun in good condition. Muzzle closed and breech open. Trails spread. Sights missing.	Paint scorched on exposed surface.	No damage caused by blast.	Approximately 6 hours would be required to clean gun.
Radio, SCR-300	2000 yds	Facing GZ. In operating condition. Sitting in hole 2 feet in depth.	No prediction given.	Cord singed. Plug burned and straps singed. Antenna bent 1½ inches from connection where it hit the earth.	Radio would need only a antenna.
C-9 Stake	2500 yds	South and slightly east of GZ.	No damage.	Scorched but useable.	None
C-8 Trench and C-7 Trench	2500 yds	South and slightly east of GZ. Long axis east and west.	No damage.	Slightly caved in but useable.	Clean out ½ hr
C-6 Bunker and C-5 Bunker	2500 yds	South and slightly east of GZ. Entrance facing north.	No damage.	Sandbags scorched but useable.	None
2 Sheep	2500 yds	C-5 and C-6 positions. Sheep normal.	No damage	No visible effects. Received: C-5 0 r, C-6 3 r.	NA

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DAMAGE EV[illegible]TION REPORT

SHOT V - 8

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of (38) KT	Condition of equipment or emplacement after shot. Actual yield 34 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
1 Sheep	2500 yds	C-7 position. Sheep normal	No damage.	Moderate wool burns on back. Received 3 r.	NA
1 Sheep	2500 yds	C-8 position. Sheep normal	Exposed wool surface burned.	No visible effects. Received 3 r.	NA
1 Sheep	2500 yds	C-9 position. Sheep normal	Exposed wool surface burned. Exposed tissue 3rd degree burns.	Moderate wool burns on back. Received 13 r.	NA
Truck, ¼ ton 4 x 4, M-38	2500 yds	Facing GZ. Vehicle not in running condition. Windshield missing and frame laying down. Canvas missing. Hood bent and paint burned.	Light damage.	Windshield frame bent back Hood bent more. Seat and paint burned.	Approximately 20 hours would be required to repair damage caused by blast.
Machine Gun, Heavy Cal. 30, M1917A1	2500 yds	Facing away from GZ. Pintle and pintle bolt missing. Weapon is in serviceable condition.	No damage.	No damage caused by blast.	Approximately 2 hours would be required to clean gun.
Machine Gun, Heavy Cal. 50, M2	2500 yds	Facing away from GZ. Pintle and pintle bolt, elevating and traversing mechanism missing. Sights up. Weapon is very dirty.	No damage.	No damage caused by blast.	It would take approximately 2 hours to clean gun.
C-9 stake	3000 yds	South and slightly east of GZ.	No damage.	No damage.	None
C-8 Trench and C-7 Trench	3000 yds	South and slightly east of GZ. Long axis east and west.	No damage.	No damage.	None
C-6 Bunker and C-5 Bunker	3000 yds	South and slightly east of GZ. Entrance facing north.	No damage.	Sandbags scorched but useable.	None

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C-6 500 yards. No visible effects. Developed radiation sickness and died 21 May. Received radiation dosage of 2,400 r.

C-7 500 yards. Animal killed by blast effects. Received dosage of 3,995 r.



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C-8 500 yards. Animal killed by blast effects. Received dosage of 4,400 r.

C-7 1000 yards. 3rd degree burns of face and ears. Extensive wool burns. Destroyed 21 May to prevent suffering. Received dosage of 71 r.



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C-8 1000 yards. 3rd degree burns on face and ears. Extensive wool burns. Bloody nasal discharge. Destroyed 19 May to prevent suffering. Received 158 r.



C-9 1000 yards. 3rd degree burns on face and ears. Moderate wool burns on back. Destroyed 21 May to prevent suffering. Received 3,150 r.

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C-7 1500 yards. No visible effects. Received 2,900 r.

C-8 1500 yards. No visible effects. Dosimeter reading lost.



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Item of equipment or emplacement						
C-7 Trench	Sheep	Sheep	Sheep	Sheep	Sheep	259
C-6 Bunker						
C-5 Bunker						

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C-9 1500 yards. 3rd degree burns on face and ears. Extensive wool burns. Received 523 r and will probably die.



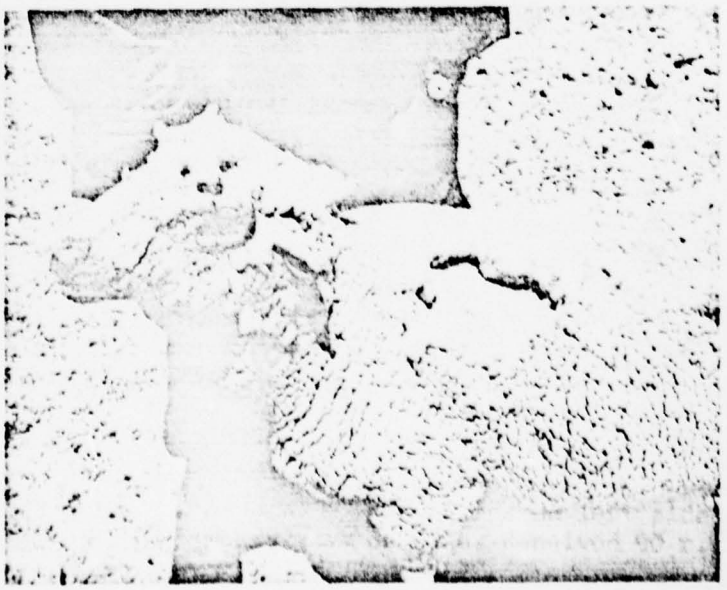
C-7 2000 yards. Moderate wool burns on left side. Received 9 r.

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C-8 2000 yards. 3rd degree burns on left side of face. Received 90 r.



C-9 2000 yards. 2nd degree burns on face and ears. Extensive wool burns on back. Received 80 r. Destroyed 21 May to prevent suffering.

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C-7 2500 yards. Moderate wool burns on back. Received 3 r.

C-9 2500 yards. Moderate wool burns on back. Received 13 r.



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BEFORE

105mm Howitzer M2A1, at ground zero with muzzle elevated 35 degrees.

AFTER

Weapon completely destroyed. Parts laying as far away as the 500 yard line



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BEFORE

57 mm Gun, M1, facing away from GZ at 500 yards.

AFTER

Weapon moved 65 feet. Right trail and wheel bent. Shields blown off. Tube embedded about 4 feet in ground and is probably bent.



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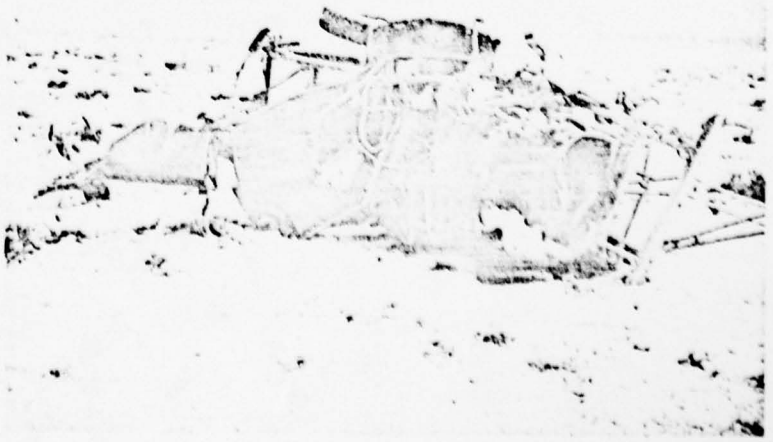
BEFORE



Truck, ¼ ton 4 x 4, M-38 facing 10 degrees right of GZ at 500 yards.

AFTER

Completely destroyed. Major part moved 150 feet. Parts of vehicle found at 800 yard line.



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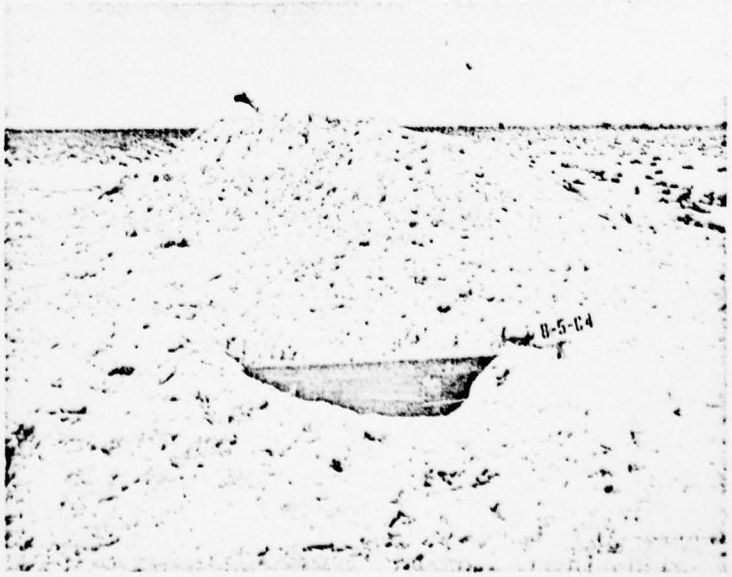


BEFORE

C-4 bunker 500 yards south and slightly east of GZ. Entrance is facing north.

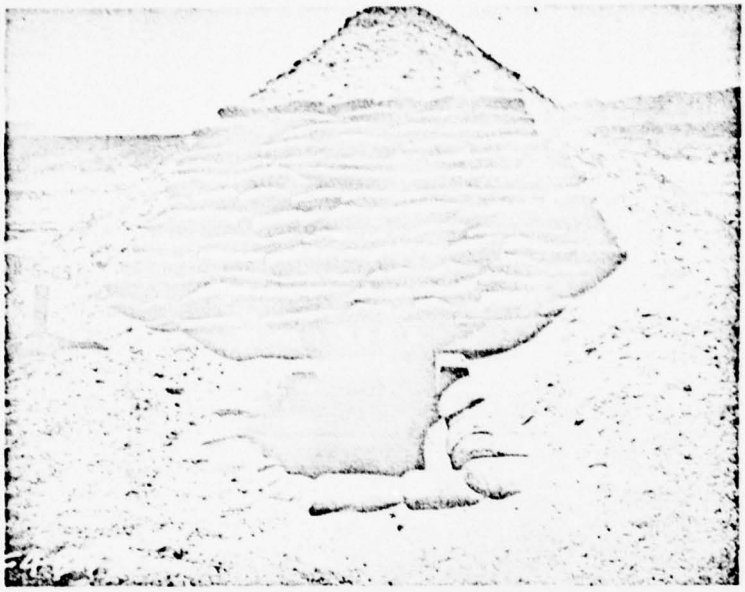
AFTER

All sandbags destroyed and scattered. Header over entrance gave way. Entrance filled with sand.



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BEFORE

C-5 bunker 500 yards south and slightly east of GZ. Entrance is facing north.

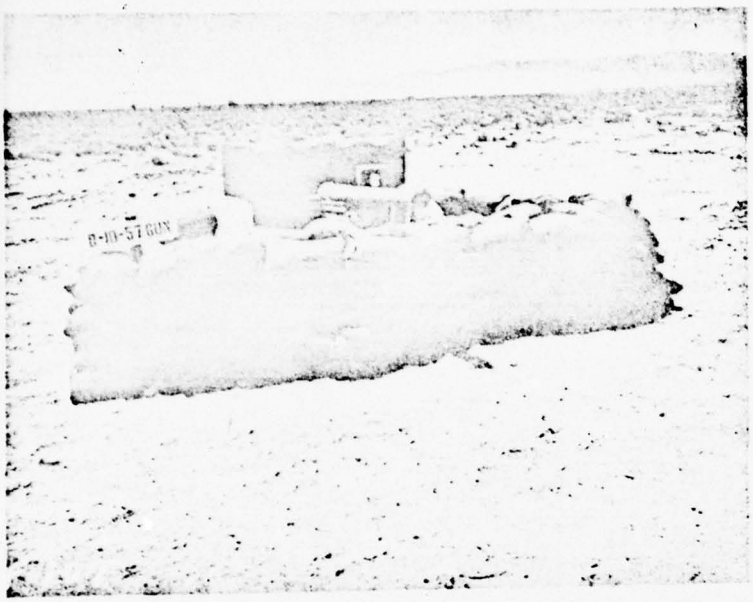
AFTER

Completely destroyed.



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BEFORE

57mm Gun facing GZ at 1000 yards. Gun is inside sandbag revetment.

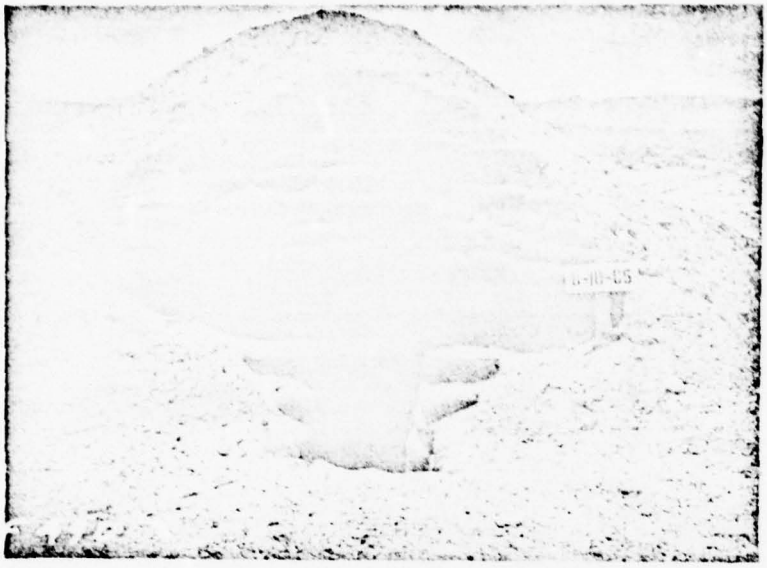
AFTER

Weapon slightly scorched. Revetment destroyed in front and revetment material blown on gun.



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BEFORE

C-5 bunker 100 yards south and slightly east of GZ. Entrance is facing north.

AFTER

All sandbags are destroyed. Fill from sandbags fell into bunker entrance.



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BEFORE

C-6 bunker 1000 yards south and slightly east of GZ. Entrance is facing north.

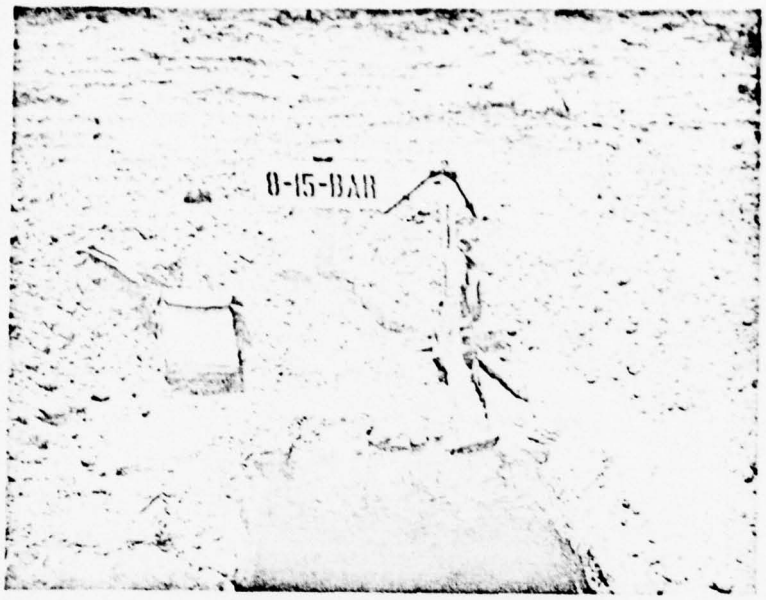
AFTER

All sandbags destroyed. Fill from sandbags fell into bunker entrance.



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BEFORE

BAR Cal. 30, M1918A2 facing away from GZ at 1500 yards. Rifle is at slit trench with EE8 telephone.

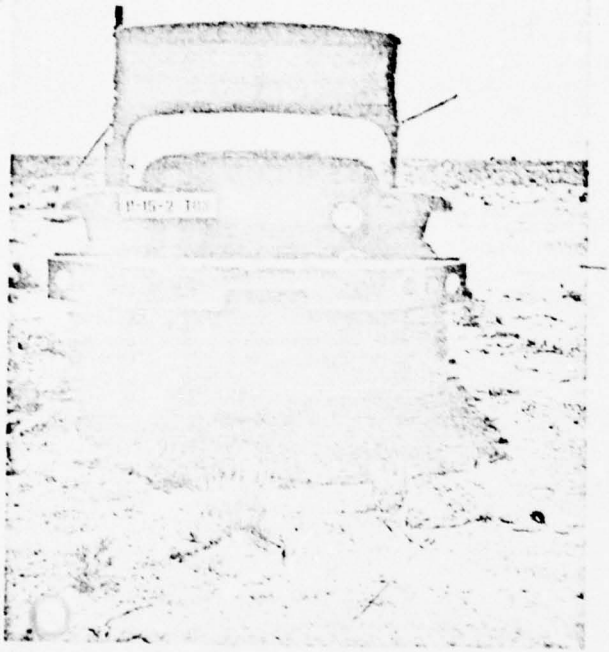
AFTER

No damage to rifle. Cover on telephone singed.



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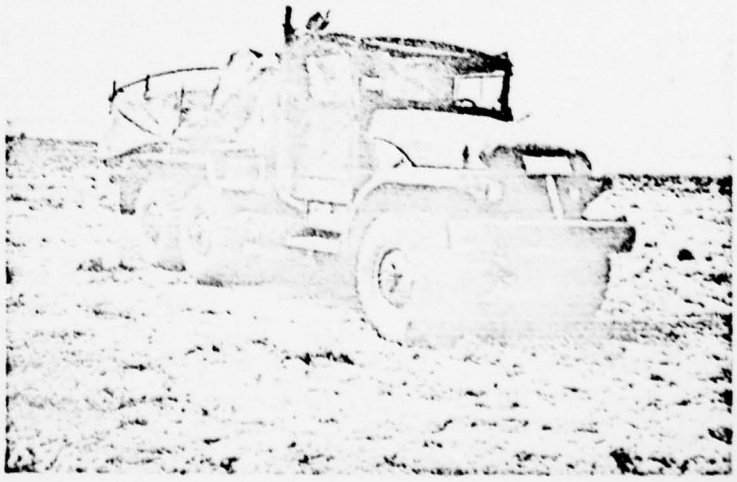


BEFORE

Truck 2½ ton 6 x 6, M-135 facing GZ at 1500 yards.

AFTER

All glass blown out and canvas and bow destroyed. Paint on front burned.

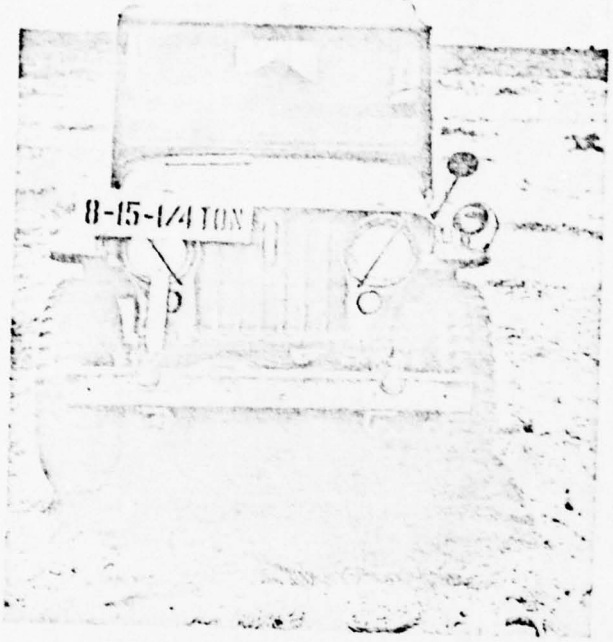


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BEFORE

Truck, ¼ ton 4 x 4, M-38 facing GZ at 1500 yards.



AFTER

Windshield broken and frame bent. Hood blown open and cowl bent. Canvas torn off.

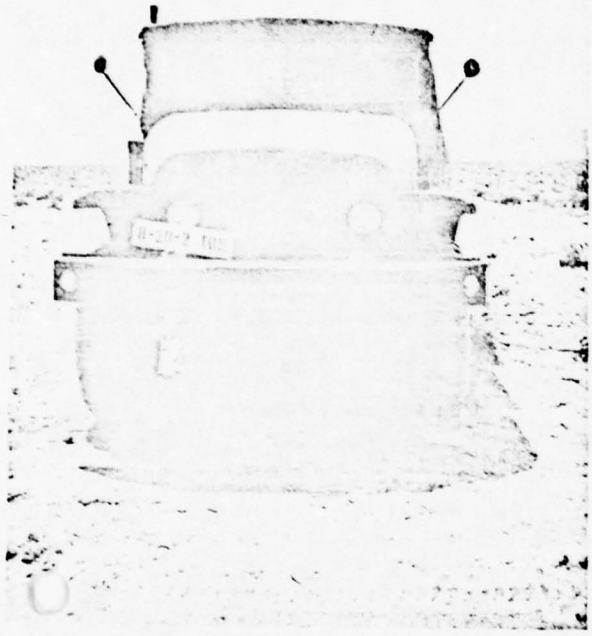


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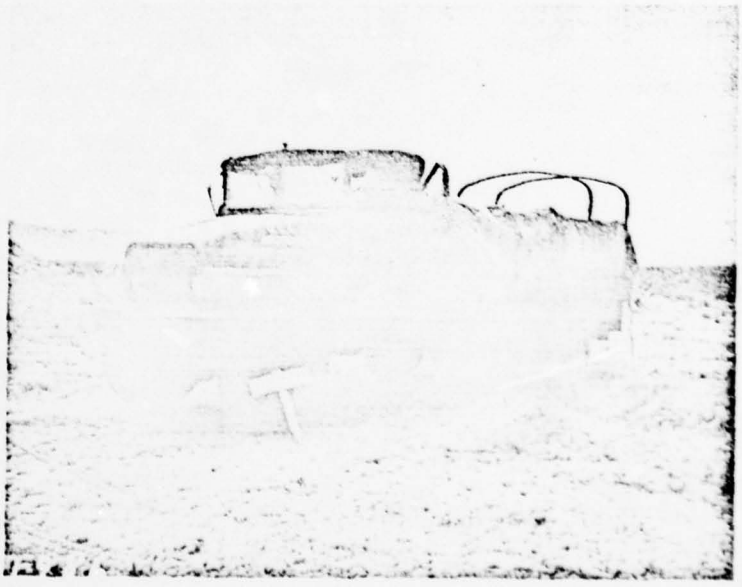
BEFORE

Truck, 2½ ton 6 x 6, M-135 facing GZ at 2000 yards.



AFTER

All glass shattered.
Canvas torn and burned.

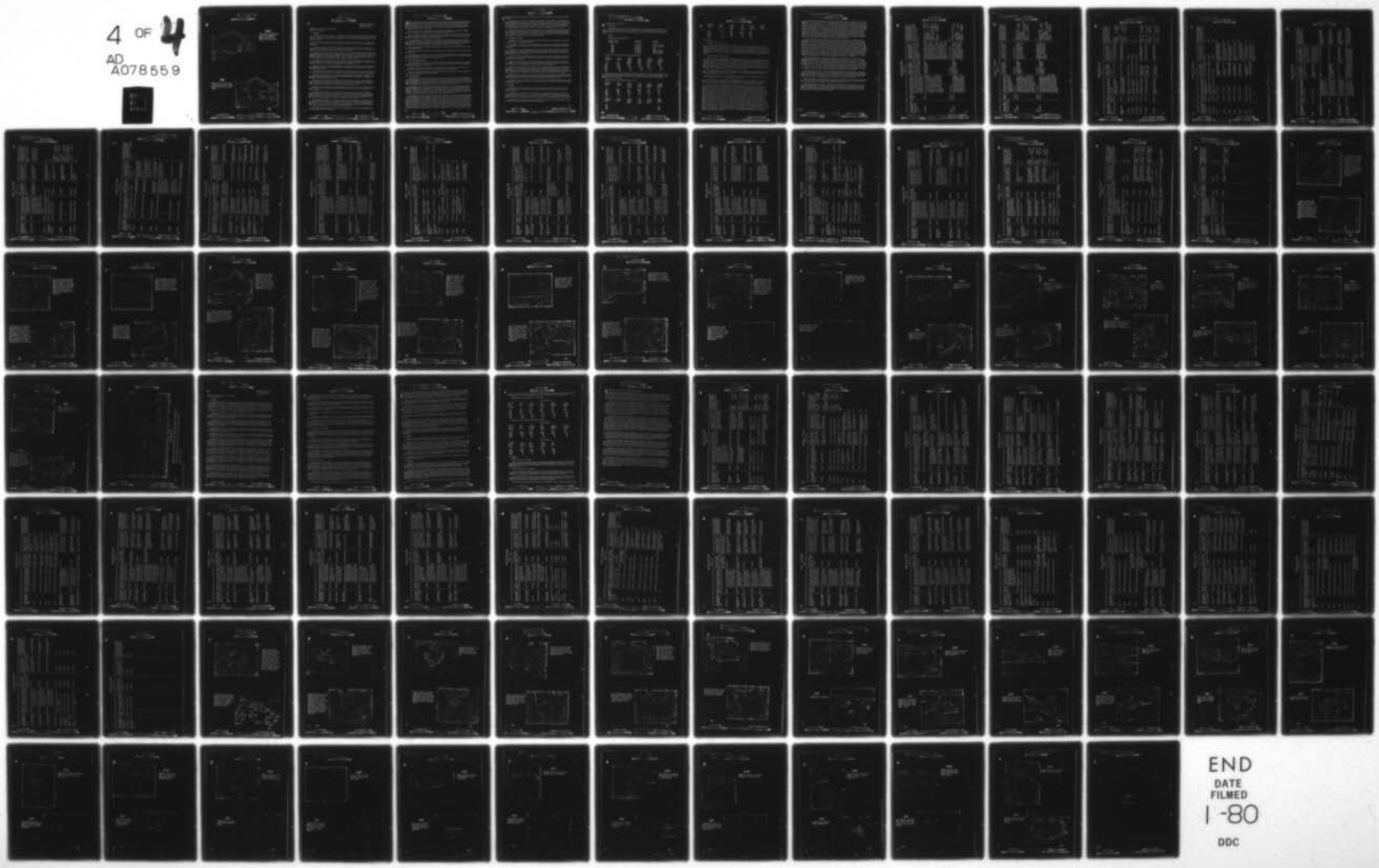


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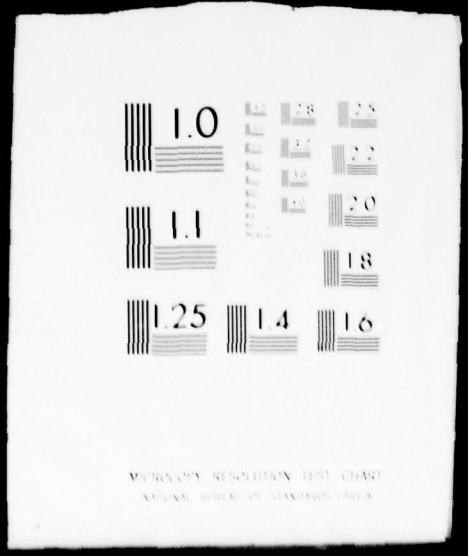
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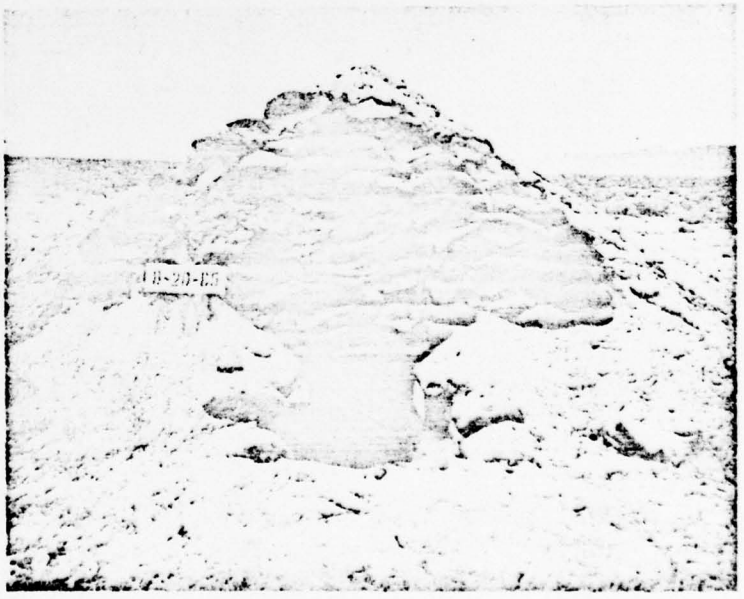


BEFORE

C-5 bunker 2000 yards south and slightly east of GZ with entrance facing north.

AFTER

Front layer of sandbags burned and broken. Sandbag fill fell into entrance.



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HQ CAMP DESERT ROCK
LAS VEGAS (872536) NEV
011200 June 1953

Annex 9 (SHOT VICTOR 9) to Final Report
EXERCISE DESERT ROCK V

I. GENERAL.

Observers and troop personnel arrived at Camp Desert Rock during the period 2-6 May. Troop participants were from the First, Third and Fourth Army areas. Additional troop personnel were provided by the Air Force. Two (2) RCT's were organized from troop personnel for participation in the tactical maneuver.

A full dress rehearsal was conducted in the Frenchman Flat area on 5 May. The control group departed camp for the forward area at 0610 hours. All march units closed at the trench site at 0755 hours.

Positions occupied, and maneuver area used, for this rehearsal were the same as those to be used for the actual maneuver. Actual shot day conditions were in order during the rehearsal. No difficulties were encountered during this portion of the exercise.

The selected time for H-Hour was 0830. The RCT's started the simulated attack at 0840 hours. Simultaneously with the start of the attack, seven (7) army helicopters (H-19) from the 506th Transportation Helicopter Company (Army) airlifted a platoon of infantry from the trench site to an objective, 1,500 yards south east of ground zero. This operation was completed without difficulty and the troops were on the objective 15 minutes after the attack started.

The ground attack progressed rapidly and Objective 2, 4,500 yards forward of the trench site, was secured at 1015 hours. This concluded the tactical phase of the rehearsal. At this time troop personnel were mounted in vehicles and transported to the display area.

Members of the Camp Desert Rock Instructor Group guided the observers through the display area and provided a commentary on the expected damage to the equipment and sheep placed in the area for orientation purposes.

Movement from the display area for the return trip to Camp Desert Rock started at 1325 hours. The control group closed in camp at 1410 hours, bringing the rehearsal to a successful conclusion.

On 6 May, at 2230 hours, the Atomic Energy Commission announced that atomic activities scheduled for 7 May were postponed for 24 hours. An additional orientation program was prepared for observer personnel and presented on 7 May.

For Shot V-9, the control group moved from camp at 0535 hours on 8 May. Transportation requirements to move the control group, observers and troops to the shot site amounted to 170 vehicles. All march units closed in the entrenchment area, 9,800 yards from ground zero. At 0725 hours. Vehicles were moved to a motor park 6.5 miles from ground zero.

The usual pre-shot indoctrination and orientation was conducted at the trench site from 0735 to 0810 hours. During this time, many Air Force planes were making their practice bombing runs over the target.

The Exercise Director ordered all personnel to enter the trenches at H minus 15 minutes. A siren blast of 30 seconds duration was sounded at H minus 2 minutes at which time all personnel were ordered to crouch low in their trenches. At this time, an Atomic Energy Commission spokesman took over on the public address system and started the count down and also announced "bombs away". A B-50 aircraft, flying at 22,000 feet had released the atomic bomb.

The count down was accurate and the bomb detonated at the announced time (0830) at a height of 2,423 feet above the terrain. Even though it was daylight, the light from the detonation was very bright. No blast or ground tremor was noted. The fireball was very colorful and did not dissipate as rapidly as in previous blasts. Veteran atomic observers stated the atomic fireball was the most picturesque ever seen at the Nevada Proving Grounds.

The combat teams started the attack at 0835 hours toward objectives 4,500 and 10,000 yards from the line of departure. (Trenches).

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Seven H-19 helicopters arrived at the trench site at 0843 hours to begin the airlift to the objectives area. Two platoons (60 individuals), one from each combat team were airlifted to the objective area in 2 echelons. This move was completed at 0912 hours without incident. Upon arrival on objective, both platoons deployed and moved towards ground zero arriving there at 0932 hours, one hour and two minutes after the detonation. A reading of 260 mr/hr was recorded at ground zero upon arrival of troops.

The combat teams secured Objective 1 at 0943 hours and continued to Objective 2, arriving there at 1045 hours. This concluded the tactical phase of the exercise.

Observers and troop personnel were taken through the equipment and animal display area shortly after the tactical phase ended. Members of the Instructor Group provided a commentary on damage effects to assembled groups in the display area.

Two companies of airborne infantry troops were used as subjects for an experimental sweat test. This test was administered to these men several times before, during, and after the shot by the Human Resources Research Organization. The testing is part of a program in the development of physiological measures of stress which can be administered under field conditions.

The return movement to camp started at 1100 hours and all march units closed in camp at 1414 hours without incident.

Participating in the exercise were 3,049 military and 21 civilian personnel, a total of 3,070 individuals.

The temperature at ground zero at shot time was 62.0 degrees Fahrenheit. Wind velocity, from a southerly direction, was five (5) knots per hour and visibility was 50 miles. Measured humidity was 19 percent and atmospheric pressure was 900 millibars.

II. INTELLIGENCE AND SECURITY.

Convoys and March Units entered and left the area without noticeable difficulty. No security problems existed beyond the routine of securing clearance confirmation for observers who arrived without clearance indicated in orders.

Delay of the shot increased the number of observers who desired special consideration for passes into the forward area. This did not, however, become a major problem.

From an operational standpoint this shot was characterized by extreme cooperation among this section, AFSWP Security and AEC security forces.

III. INSTRUCTOR GROUP.

The Instructor Group, Camp Desert Rock, oriented two battalion combat teams and approximately six hundred troop observers in preparation for Shot V-9. For the first time in the current shot series, supplementary orientation for observers beyond the scope of the regular course was presented because of a twenty-four hour delay of H-Hour. No additional orientation was presented to the battalion combat teams beyond the standard four hour CONFIDENTIAL level period.

Orientation for RCT ABLE was completed during the morning of 6 May and orientation for RCT BAKER was completed the same afternoon, thus improving the schedule of such presentations by eliminating the carry over of such instruction to two days. One full day sufficed for the presentation of this confidential level material to both RCT's. The same evening was used to show training films pertaining to atomic energy subjects to these same personnel. Although the films were shown on a voluntary basis, approximately four hundred soldiers attended.

All regularly scheduled orientation for official observers with SECRET clearance was planned for presentation on one day, 6 May. This material consisted of eight hours of general orientation as to the tactical situation, weapons, characteristics, effects, and medical treatment of injury due to atomic explosions. This eight hour orientation was generally the same as for previous shots with the exception that the period on tactical employment of atomic weapons was presented in a novel way. Officers of The Artillery School and AFF Board No. 1 were invited to present specific data as to problems envisioned in the delivery of tactical atomic weapons in support of a field army. This included logistical problems of ordnance as well as artillery units. The participating officers were experienced in the field considered and all had helped to prepare doctrine on the subject for army training publications. To balance this program, an Air Force member of the ins-

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tructor group presented the collateral problems of Air Force support of the field army in atomic warfare.

A twenty four hour delay in shot time made it necessary to prepare and conduct orientation periods on 7 May for troop observers desiring further information than that covered in the regular eight hour orientation. From 0830 to 1600 hours 7 May the Instructor Group presented more detailed information on the SECRET level pertaining to past tests, the family of atomic weapons, the present test series, and SAC activities in delivering atomic strikes. The films "Greenhouse" and "Tumbler Snapper" were also shown during this period to illustrate past shot series.

Trench orientation for Shot V-9 was normal, with the exception that personnel were permitted to rise prior to the arrival of the shock wave due to the long distance from trenches to ground zero. No safety hazard was entailed. Following the shot, normal BCT and observer orientations in the display area were conducted by the Instructor Group. Because this was an air burst of extended height, contamination close to ground zero was small.

IV. SIGNAL COMMUNICATION.

The trench area for this shot was generally more concentrated, consequently the installation of communications was somewhat simplified.

Three public address speaker poles were located in the trench area. Each pole was equipped with its own system which was, in turn, connected to the main public address system in the control trench.

Prior to shot time all communications, including the public address system were tested and proven operative. However, a short time later the AEC "hot line" went out and the trouble was determined to be located in the Bell Telephone lead cable and it was impossible to get the line back into service prior to shot time.

In order to relay the "count down" over the public address system, the signal was taken on a telephone line and relayed over the public address system. This proved satisfactory as it had been used in a previous shot.

Telephones were installed in the forward and fifth trench of each BCT and also in the observers trench. This made it possible for the BCT Commander to contact his rearmost company and it also provided communications from the Exercise Director to the observers.

Normal radio communications were established with Rad-Safe officers on one net, the Exercise Director and the BCT commanders and the parking area on another net, and each of the BCT's on a net of their own. Four mobile public address systems were used to follow the BCT's and the observers during their orientation in the target areas. These public address systems worked out very satisfactorily and were in place ready for operation prior to the arrival of the troop units.

Two power megaphones were used by the BCT commanders for oral orders to their respective units. These power megaphones are on loan to the Signal Section from the Signal Corps Electronics Laboratories for test purposes only. They have proven quite useful in all shots to date.

Two telephone lines which went out of service at shot time were later determined to have been damaged by heat from the shot melting the insulation on the wires at points where they were exposed too high above the ground.

V. RAD-SAFE.

As expected, the airburst resulted in residual radiation on the order of 250 mr/hr. This considerably simplified the radiological safety problem and permitted free movement within the military segment.

An innovation of this shot was the use of one of the Rad-Safe monitors as a member of the pathfinder team in the air lifted force which seized an objective in the vicinity of ground zero. After determining that the landing zone was safe for the follow up force, the monitor remained in the area to monitor for the attacking force which seized ground in close proximity of ground zero.

Personnel and vehicle monitoring was accomplished at the 50th Chemical Service Platoon decontamination point which had been relocated at Check Point Pass.

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Thermal Effects for Shot V-9

Procedure:

Heat sensitive paper was placed in positions exposed to direct thermal radiation and in positions shielded from direct radiation but exposed to reflected or scattered radiation at 500 yards intervals from 500 to 3500 yards from the target. The papers were placed in a vertical position.

Results:

Values given are approximations -

Distance from Target in yards	Sheltered Positions	Exposed Positions
500	No effect	About 17 cal/cm^2
1000	No effect	About 17 cal/cm^2
1500	No effect	Lost
2000	No effect	Lost
2500	No effect	About 5 cal/cm^2
3000	No effect	About 5 cal/cm^2
3500	No effect	About 1 cal/cm^2

Radiation Dose in Roentgens received at Emplacements.

Range to Target in Yards	C-9 Exposed Post	C-8 Shallow slit Trench	C-7 Deep slit Trench	C-6 One Man Emplacement	C-5 Two Man Emplacement
500	Lost	4100	7600	9050	Lost
1000	Lost	1500	Lost	875	Lost
1500	Lost	122	Lost	Lost	32
2000	128	12.5	1.48	Lost	3.4
2500	22.5	.8	.15	.21	.38
3000	4.8	.3	.1	0	0
3500	1.4	0	0	0	0

Badges were exposed in National Bureau of Standards type holders. These values represent initial radiation personnel would have received in the same locations. Stations C9 were along a line of azimuth 180° from the target. Ground zero was 15 feet West and 837 feet South of target. Height of burst was 2423 feet.

Radiation Doses in Roentgens Received by Sheep.

Range to Target in Yards	C-1 Exposed Post	C-2 Shallow slit Trench	C-3 Deep slit Trench	C-4 One Man Emplacement	C-5 Two Man Emplacement
500	5372	5461	3188	1056	236
1000	2188	2301	1561	951	280
1500	438	333	343	51	57
2000	79	48	38	27	6
2500	17	12	3	2	1
3000	3	2	0	0	0

Range to Target in Yards	C-9 Exposed Post	C-8 Shallow slit Trench	C-7 Deep slit Trench	C-6 One Man Emplacement	A-Type Deep Bunker
100					8
200					12
300					Lost
400					32

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Range to Target in Yards	C-9 Exposed Post	C-8 Shallow slit Trench	C-7 Deep slit Trench	C-6 One Man Emplace-ment	A-Type Deep Bunker
500	18,164	8916	5113	971	
1000		2560	1960	1108	
1500		406	159	129	
2000	96	53	8	22	
2500	0	0	0	0	
3000	0	0	0	0	

VI. MEDICAL.

Medical support to personnel.

The disposition of the medical troops and equipment followed the same pattern as on previous exercises where troops were involved. There were more men treated by the medical section than in any of the previous operations. This was due to the length of the march forward to the objective. All casulties treated were for foot ailments, primarily blisters and chafed areas. Many were given emergency treatment by the company aid men and then continued the operation. Twelve men came to the aid station where they were treated and then sent forward with the truck convoy to rejoin their units.

Medical Evaluation of test items.

On the day prior to the detonation 50 sheep were placed at varying distances from ground zero. Starting at 100 yards and continuing at 100 yard intervals through 400 yards from ground zero, one sheep was placed in each A-type bunker. Commencing at 500 yards, 9 sheep were placed at 500 yard intervals extending through 2000 yards from ground zero. The 9 sheep deployed at each of the above 500 yard intervals were placed one to each C-type position (C-1, C-2, C-3, C-4 and C-5). At 2500 yards and 3000 yards from ground zero 5 sheep were deployed at each interval, the 5 at 2500 yards being placed one to each C-type emplacement (C-5, C-6, C-7, C-8 and C-9). At 3000 yards one sheep was placed in each C-type position (C-1, C-2, C-3, C-4 and C-5).

The veterinary Officer, a Navy Monitor Officer, and an enlisted man accompanied the control group. Immediately following the detonation these men moved forward by vehicle to observe and to evaluate the effects of the blast on the sheep.

Most of the evaluation results are covered in the evaluation forms and picture captions, but following are given some of the more prominent and results.

The sheep placed in the A-type bunkers at 100, 200 and 400 yards from ground zero showed no visible effects from the detonation. These sheep received radiation dosages of 5 r, and 32 r. The sheep at 300 yards died apparently from suffocation due to the collapse of the bunker.

At 500 yards all the sheep in positions C-1 with the exception of the sheep at position C-6 received third degree burns on the face and ears and extensive wool burns over the back. The sheep at position C-2 and C-9 were destroyed immediately after the detonation as both were near death and would have survived only a few hours at the most. The radiation received by the sheep at C-2 was 5,461 r while that received by the sheep at C-9 was 18,164 r. The sheep at position C-1 became prostrate on the day after the blast, dying during the night of 9 May from acute lethal radiation sickness. The radiation received by the sheep at C-1 was 5,372 r. The sheep at position C-6 showed inappetence, purulent nasal discharge, diarrhea, an in-coordination on 10 May. The animal died during the night of 11 May from radiation sickness. The sheep in position C-6 received a radiation dosage of 971 r. The sheep from position C-3 and C-7 showed inappetence, diarrhea, and in-coordination on 9 May. These two animals were destroyed on 10 May to prevent further suffering. The radiation dosage received by the sheep at C-3 was 3,188 r, while the dosage for the animal at C-7 was 5,113 r. The sheep at position C-4 showed diarrhea, and in-coordination on 11 May. The animal died on 12 May from acute lethal radiation sickness. The radiation dosage received by the sheep at C-4 was 1,056 r. The sheep at position C-8 developed diarrhea and in-coordination on 9 May. Death of this animal followed on 11 May from radiation sickness. The radiation dosage received by the animal at position C-8 was 8,916 r. The sheep at position C-5 received second degree burns on the right side of face and extensive wool burns on the right side of the body. The radiation dosage received was 236 r. This animal will apparently survive unless latent radiation sickness occurs.

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The sheep placed at 1000 yards all showed third degree burns of the face and ears and extensive wool burns over the back with the exception of those sheep placed in position C-4 and C-5. The sheep in C-4 position began to show epilation, diarrhea, and nasal discharge on 13 May. This sheep received a radiation dosage of 951 r. The sheep at position C-5 had no visible effects and incurred a radiation dosage of 280 r. The sheep in positions C-1, C-2, C-8 and C-9 all developed diarrhea, inappetence, in-coordination on 9 May, which resulted in death on 10 May from acute lethal radiation sickness. These sheep received the following radiation dosages; C-1 2,158 r, C-2 2,301 r, and C-8 2,560 r. Due to the fact that the sheep at C-9 got loose after the detonation and his collar became lost, no radiation dosage could be recorded. The sheep at position C-3 started symtoms of epilation, diarrhea, bloody nasal discharge, and in-coordination on 12 May. This sheep received a radiation dosage of 1,561 r. The sheep in position C-6 and C-7 developed epilation, diarrhea, and nasal discharge on 12 May. These sheep received a radiation dosage of 1,108 r and 1,960 r and will apparently die from radiation sickness.

The sheep at 1500 yards in positions C-1, C-2, C-3 and C-8 received third degree burns on the face and ears with extensive wool burns over the back. The sheep at C-1 and C-8 developed epilation on 12 May. C-1 received radiation dosage of 438 r while C-8 received radiation dosage of 406 r. The sheep at C-2 and C-3 had dosages of 333 r and 343 r. The sheep in positions C-4 and C-6 received moderate wool burns on the back and apparently will survive unless latent radiation sickness occurs. The sheep in position C-4 acquired 51 r while that in position C-6 acquired 129 r. The sheep in position C-5 was down following the detonation and was suffering from radiation sickness incurred in Shot V-5. The animal died on the night of 8 May. This animal acquired 57 r during Shot V-9. The sheep in position C-7 received second degree burns on the face and ears with moderate wool burns on the back. This sheep received 159 r during the blast but will apparently recover unless latent effects set in. The sheep at position C-9 incurred second degree burns on the face and ears with extensive wool burns over the back. This animal lost its collar during the detonation with the result that no radiation dosage could be recorded.

The sheep at 2000 yards in position C-9 received third degree burns on the face and ears combined with extensive burns on the back. Epilation appeared on 12 May. This animal received a radiation dosage of 96 r and should recover unless latent radiation effects occur. The sheep in positions C-1, C-2 and C-8 received second degree burns on the face and ears with moderate wool burns on the back. These sheep received radiation dosages of 79 r, 48 r, and 53 r. These sheep in positions C-4, C-5, C-6 and C-7 received no visible effects from the detonation and are at the present time in good condition. These sheep received radiation dosages of 27 r, 6 r, 22 r, and [illegible]. The sheep in position C-3 incurred moderate wool burns over the back and acquired a radiation dosage of 38 r. This animal should recover unless latent effects take place.

The sheep at 2500 yards in position C-9 had third degree burns on the face and ears with extensive wool burns on the back. This animal developed epilation and purulent nasal discharge on 12 May. The radiation dosage incurred by this animal was 17 r. This sheep should survive unless latent effects occur. The sheep in positions C-5, C-6, C-7 and C-8 had no visible effects and are in good condition. They received radiation dosages of 12 r, 3 r, 2 r, and 1 r.

The sheep at 3000 yards in positions C-1, C-2, C-3, C-4 and C-5 showed no visible effects and are in good condition. The animals in positions C-1 and C-2 received radiations dosages of 3 r and 2 r, while those in the remaining three positions received 0 r.

Fifty (50) sheep were exposed to detonation V-9. One sheep was killed indirectly by blast effects (suffocation). Two sheep were killed by blast effects and fifteen sheep died as a result of radiation sickness in two to six days following the blast. One sheep was prostrate the day of the blast and died that evening, most likely from radiation dosages incurred on Shot V-5. Of the original 50 sheep exposed 31 remain alive.

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DAMAGE EVALUATION REPORT

SHOT V - 9

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of (38) KT	Condition of equipment or emplacement after shot. Actual yield 26.4 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Truck, 2½ ton, GMC M-135, 6 x 6 w/ winch.	GZ	Left windshield missing. Right windshield and right door glass shattered. Rear canvas has been burned off in previous blast. Bows broken. Hood bent. Vehicle is in running condition.	Moderate damage. Paint scorched. Glass broken. Tarps burned. Hood bent in. Cushions burned. Wood charred.	All glass broken. All upholstering, painting, and racks burned. Body caved in vehicle is in running condition.	Approximately 75 man hours would be required to repair body and replace glass.
A-1 Bunker	100 yds	Entrance facing GZ. Covered emplacement with bottom of bunker 12' underground. Bunker size is 6'6"x8'x8' revetted with 1x6 and 2x6 studs. Top is railroad ties. Passageway from shaft is revetted and covered as bunker and is 5' long. Entrance shaft is 10' deep and 3'6" x 3'6" with some revetting. Passageway slopes 2' trim shaft to bunker.	Considerable spalling of earth. Entrance may be blocked.	Sandbags destroyed. Bottom of sides of entrance shaft gave way. Entrance was not entirely closed. A man could still get in and out of bunker. Bunker could be rendered serviceable by cross bracing bottom of shaft and cleaning out. However, it would be better to rebuild and strengthen shaft. Passageway from shaft to bunker undamaged but requires cleaning out. It is recommended that heavier studding be used in entrance shaft and passageway.	Cleaning out 6 man hrs Rebracing 8 man hrs 20 pcs 1x6x16 8 pcs 2x6x12 2 man hrs 2 hydraulic jacks 6 hrs Replacing sandbags and reshaping top. (75) bags 8 man hrs Dozer 1 equip hr 7 Equip hr 22 man hrs
Sheep	100 yds	A-1 Normal.	No damage	No visible effects	NA
A-2 Bunker	200 yds	Entrance facing GZ. Covered emplacement with bottom of bunker 12' underground. Bunker size is 6'6"x8'x8', revetted with sandbags walls 3' thick. Top is railroad ties. Passage way from shaft is revetted and covered as bunker and is	Considerable spalling of earth. Entrance might be partially blocked.	Slight damage to entrance and passageway, but still serviceable. To restore to pre-shot condition, replace two posts and caps in passageway. Recommend heavier studding. All sandbags destroyed.	Replace posts & caps 4 man hrs 6 pcs 2x6x6 Replace sandbags(75 bags) 8 man hrs Reshape top Dozer 1 hr 1 Equip hr 12 man hrs

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Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 38 KT	Condition of equipment or emplacement after shot. Actual yield 26.4 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
A-2 Bunker (Cont'd)		10' deep and 3'6" x 3'6" with some revetting. Passageway slopes 2' trim shaft to bunker			
Sheep	200 yds	A-2 Normal.	No damage.	No visible effects.	NA
A-1 Bunker	300 yds	Entrance to GZ. Covered emplacement with bottom of Bunker 12' underground. Bunker size is 6'6"x8'x8' revetted with 1x6 and 2x6 studs. Top is railroad ties. Passageway from shaft is revetted and covered as bunker and is 5' long. Entrance shaft is 10' deep and 3'6" x 3'6" with some revetting. Passageway slopes 2' trim shaft to bunker.	Considerable spalling of earth. Entrance might be partially blocked.	Entrance entirely caved in but it appears as though bunker was undamaged. Replace all sandbags. Salvage 50% of lumber in entrance.	Rebuild entrance Cleaning out 6 man hrs Retracing 10 man hrs 10 pcs 2x6x12 6 pcs 1x6x12 Replace sandbags and reshape top (75 bags) 8 man hrs Dozer 3/4 hr 3/4 equip hr 14 man hrs
Sheep	300 yds	A-3 Normal.	No damage.	Bunker collapsed, animal killed by suffocation.	NA
A-2 Bunker	400 yds	Entrance to GZ. Covered emplacement with bottom of bunker 12' underground. Bunker size is 6'6"x8'x8' Revetted with sandbags walls 3' thick. Top is railroad ties. Passageway from shaft is revetted and covered as bunker and is 5' long. Entrance shaft is 10' deep and 3'6"x3'6" with some revetting. Passageway slopes 2' trim shaft to bunker.	Considerable spalling of earth. Entrance might be partially blocked.	Entrance entirely caved in but it appears as though bunker was undamaged. Replace all sandbags. Salvage 50% of lumber in entrance.	Rebuild entrance Cleaning out 6 man hrs Retracing 10 man hrs 10 pcs 2x6x12 6 pcs 1x6x12 Replace sandbags and reshape top (75 bags) 8 man hrs Dozer 1 hr 1 equip hr 24 man hrs

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DAMAGE EVALUATION REPORT

SHOT V - 9

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of [38] KT	Condition of equipment or emplacement after shot. Actual yield 26.4 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Sheep	400 yds	A-4 Normal	No damage	No visible effects.	NA
T-6 Bridge Section	500 yds	Broadside to GZ. 1 bay of standard T-6 bridge on timber footing.	No prediction given.	Bridge lifted off footing, but structurally undamaged	Replace on footing 6 man hrs 1 Crane 2 hrs 2 equip hrs 6 man hrs
Bailey Bridge Section	500 yds	Broadside to GZ. 1 Section of standard single Bailey bridge without stringers.	No prediction given.	Bridge lifted off footing, but structurally undamaged	Replace on footings 4 man hrs 1 Crane 1 hr 1 equip hr 4 man hrs
C-1 Stake	500 yds	Facing GZ. Standard steel pickets	May be displaced	Undamaged	None
C-2 Trench	500 yds	Broadside to blast. 2' x 4'6" x 2' slit trench	Some spalling damage.	No damage.	None
C-3 Fox hole	500 yds	Broadside to blast. 3' x 4' x 3'6" Foxhole	Some spalling damage.	No damage.	None
C-4 Bunker	500 yds	Entrance to GZ. 6' x 4' X 4'6" Covered emplacement	Sand bags may be scorched. Some spalling damage	All sandbags need replacement. No other damage.	Replace sandbags 3½ man hrs Reshape top 2 man hrs
C-5 Bunker	500 yds	Entrance facing GZ. 6' x 6' x 4'6" covered emplacement	Sand bags may be scorched. Some spalling damage	All sandbags need to be replaced. No other damage.	Replace sandbags 3½ man hrs Reshape top 2 man hrs Dozer 1 hr 1 equip hr 5½ man hrs
C-6 Bunker	500 yds	Entrance facing GZ. 6' x 6' x 4'6" covered emplacement	Sand bags may be scorched. Some spalling damage	All sandbags need to be replaced. No other damage.	Replace sandbags 3½ man hrs Reshape top 2 man hrs Dozer 1 hr 1 equip hr 5½ man hrs

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Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of [38] KT	Condition of equipment or emplacement after shot. Actual yield 26.4 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
C-7 Fox hole	500 yds	Broadside to GZ. 3' x 4' x 3'6" Fox hole	Some spalling damage.	Undamaged.	None
C-8 Trench	500 yds	Broadside to GZ. 2' x 4'6" x 2' Trench	Some spalling damage.	Undamaged.	None
C-9 Stake	500 yds	Facing GZ. Standard steel picket.	No damage.	Undamaged.	None
Sheep	500 yds	C-1 Normal	Burned to death. Fatal gamma. Thrown by blast.	Prostration and 3rd degree burns of face, ears, and body. Died 9 May. Received 5,372 r.	NA
Sheep	500 yds	C-2 Normal	Burned to death. Fatal gamma.	3rd degree burns on face, ears and body. Died 9 May. Received 5,461 r.	NA
Sheep	500 yds	C-3 Normal	Fatal gamma. Seriously burned on backs.	3rd degree burns on face, ears and body. Died 10 May. Received 3,188 r.	NA
Sheep	500 yds	C-4 Normal	50% probability of gamma fatalities.	Moderate wool burns on back. Died 11 May. Received 1,056 r.	NA
Sheep	500 yds	C-5 Normal	No thermal damage. Gamma not lethal.	2d degree burns on right side of face and extensive wool burns on right side. Received 236 r.	NA
Sheep	500 yds	C-6 Normal	50% probability of lethal gamma.	No visible effects. Died 10 May. Received 97 r.	NA
Sheep	500 yds	C-7 Normal	Fatal gamma. Seriously burned on backs.	3rd degree burns on face and ears, extensive wool burns on sides and back. Died 10 May. Received 5,113 r.	NA

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SHOT V - 9

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of (38) KT	Condition of equipment or emplacement after shot. Actual yield 26.4 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Sheep	500 yds	C-8 Normal	Burned to death. Fatal gamma.	3rd degree burns on face and ears, extensive wool burns on sides and back. Died 11 May. Received 8,916 r.	NA
Sheep	500 yds	C-9 Normal	Burned to death. Fatal gamma. Thrown by blast.	3rd degree burns on face and ears, extensive wool burns on sides and back. Destroyed to prevent suffering. Received 18,164 r.	
Machine Gun, Heavy, Cal. 30 M1917A4	500 yds	Facing away from GZ. Muzzle elevated 30 degrees. Pintle missing. Gun in good condition. Gun is coated with compound, rust preventative.	Displaced. Sights bent.	No damage caused by blast.	It would take approximately 30 minutes to clean gun.
Gun, 57mm	500 yds	Facing GZ. Muzzle elevated 15 degrees. Sights missing. Trails spread, breech closed and muzzle taped shut. Gun is in good condition.	Displaced. Light damage. Optical instrument damaged. Paints blistered.	No damage caused by blast.	Approximately 1 hour would be needed to clean and service gun.
Machine Gun, Light, Cal. 30 M1919A4	500 yds	Facing GZ. Muzzle elevated 40 degrees. Elevating and traversing mechanism missing. Sights raised. Gun is in good condition.	Displaced. Sights bent.	Weapon was not moved and no damage was caused by blast.	Approximately ½ hour would be required to clean and service this gun.
Truck, Utility, ¼ ton 4x4 M-38	500 yds	Facing GZ. Placed in 2 ft hole. Canvas on vehicle. Doors closed. Paint in good condition. Gas in tank and vehicle in running condition.	Moderate damage. Paint scorched. Glass broken tarps burned. Hood bent in. Cushions burned. Wood charred.	Top completely burned off. Hood and cowl bent in. Windshield blown out. Right seat burned and paint badly scorched.	Approximately 12 man hours would be required to restore this vehicle to serviceable condition.

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Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of (38) KT	Condition of equipment or emplacement after shot. Actual yield 26.4 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Carbine, Cal. 30 M1	500 yds	Inside truck, ¼ ton laying against drivers seat. Sling missing. Weapon is in operating condition.	Stock burned. Displaced.	No damage caused by blast.	It would take approximately ½ hour to clean weapon.
Gun, 90mm, M1A2	500 yds	Facing GZ. Barrel elevated 160 degrees. Emplaced in pit 4 feet deep. Recoil mechanism leaking. Sights missing. Weapon in good condition. Breech block closed. Elevating and traversing mechanism in good condition.	Paint blistered. Instruments damaged. Light damage.	Paint and glass burned slightly. Elevating mechanism damaged.	Approximately 5 hours would be required to clean gun and repair elevating mechanism.
C-1 Stake	1000 yds	4"x4"x4' wooden stake embedded two ft into ground.	No damage.	Top and sides burned black, still serviceable.	None
C-2 Trench and C-3 Foxhole	1000 yds	Broadside to blast. Foxhole and trench.	No damage.	Undamaged.	None
C-4 Bunker	1000 yds	Entrance facing GZ.	No damage.	Replace all sandbags and reshape top.	Replace 100 sandbags 3½ man hrs Reshape top 1½ man hrs Dozer ½ hr ½ equip hr 5 man hrs
C-5 Bunker	1000 yds	Entrance facing GZ.	No damage.	Replace all sandbags and reshape top. Clean out entrance.	Replace 100 sandbags 3½ man hrs Reshape top 1½ man hrs Dozer ½ hr Clean entrance 2 man hrs ½ equip hr 7 man hrs
C-6 Bunker	1000 yds	Entrance facing GZ.	No damage.	Replace all sandbags and reshape top.	½ equip hr 5 man hrs
C-7 Fox hole	1000 yds	Broadside to blast.	No damage.	Undamaged.	None

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Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of [38] KT	Condition of equipment or emplacement after shot. Actual yield 26.4 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
C-8 Trench	1000 yds	Broadside to blast.	No damage.	3/4 full of sand.	Clean out 2 man hrs
C-9 Stake	1000 yds	Broadside to blast. Steel picket.	No damage.	Undamaged.	None
2 Sheep	1000 yds	C-1 and C-9 sheep normal.	Severely burned. Lethal gamma radiation.	3rd degree burns on fact and ears, extensive wool burns on sides and back. Died 10 May. Received 2,158 r.	NA
2 Sheep	1000 yds	C-2 and C-8 sheep normal.	Severely burned. Lethal gamma radiation.	3rd degree burns on face and ears, extensive wool burns on sides and back. Died 10 May. Received 2,301 r, and 2,560 r, respectively	NA
1 Sheep	1000 yds	C-3 sheep normal.	Severely burned on top of body. Lethal gamma radiation.	3rd degree turns on face and ears, extensive wool burns on sides and back.	NA
2 Sheep	1000 yds	C-4 and C-6 sheep normal.	Severely burned on body exposed to incident thermal ray through entrance. No burns if shielded. Lethal gamma if major portion of body exposed through entrance.	No visible effects. Died 13 & 12 May, respectively. Received 951 r and 1108 r.	NA
1 Sheep	1000 yds	C-5 sheep normal.	No damage unless sheep are standing directly in front of and very close to the entrance.	No visible effects.	NA
1 Sheep	1000 yds	C-7 sheep normal.	Severely burned on top of body. Lethal	3rd degree burns on face and ears, extensive wool	NA

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of [illegible] KT	Condition of equipment or emplacement after shot. Actual yield 26.4 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
1 Sheep (Cont'd)	1000 yds	C-7 sheep normal.	gamma radiation.	burns on back. Died 12 May. Received 1,960 r.	
Howitzer, 105mm M3	1000 yds	Facing GZ. Muzzle elevated 10 degrees. Sights missing. Breech closed and trails spread. Muzzle open. Weapon is in good condition.	Sights, optical instruments damaged from thermal. No damage to gun. Paint damage from heat.	No damage caused by blast.	Approximately 1 hour would be required to clean weapon
Machine Gun, Light Cal. 30, M1919A4	1000 yds	Facing away from GZ. Muzzle elevated 10 degrees. Sights up and gun is in operating condition.	No damage.	No damage caused by blast.	Approximately ½ hour would be needed to clean gun.
Mortar, 81mm	1000 yds	Facing GZ, in fox hole. Barrel is only part present.	No damage.	No effect from blast.	½ hour would be needed to clean gun.
Machine gun, Heavy, Cal. 30, M1917A1	1000 yds	Facing GZ. Muzzle elevated 10 degrees. Gun is in serviceable condition. Sights are down.	No damage.	No damage caused by blast.	Approximately ½ hour would be required to clean gun.
Machine Gun, Heavy Cal. 30 M1917A1	1000 yds	Facing GZ. Muzzle level. Gun is in serviceable condition. Sights are down.	No damage.	No effect from blast.	Approximately ½ hour would be required to clean gun.
Rifle, Browning Automatic, Cal. 30, M1918A2	1000 yds	Facing GZ. Muzzle elevated 10 degrees. Rifle mounted on bipod. Condition of rifle is good. Sights are up.	No damage.	Sights were down. No other damage caused by blast.	It would take approximately ½ hour to clean weapon.
Gun, 57mm	1000 yds	Facing 30 degrees to right of GZ. Sights missing. Trails spread, breech closed and muzzle open. Weapon is in good condition.	Sights, optical Instruments damaged from thermal. No damage to gun. Paint damage from heat.	Paint burned lightly. No other damage.	Approximately 1 man hour would be required to clean and service gun.

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Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of [32] KT	Condition of equipment or emplacement after shot. Actual yield 26.4 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Truck, Utility, ¼ ton 4 x 4 M-38	1000 yds	Facing 35 degrees to right of GZ. Dug in approximately 2 feet. Mound of dirt 6 feet high in front of vehicle. Vehicle is in running condition. Windshield up and canvas and side curtains laying inside vehicle.	If below level of parapet. No damage.	Windshield blown out and windshield frame bent back asst driver seat torn loose. Drivers seat destroyed. Hood bent. Paint burned on hood.	Approximately 4 man hours would be required to restore this vehicle to serviceable condition.
Truck, Utility ¼ ton 4 x 4, M-38	1000 yds	Facing 35 degrees to the right of GZ. Vehicle dug in a 2 ft depression. 6 ft mound of dirt in front of vehicle. Vehicle is in running condition. Canvas and side curtains laying inside vehicle. Windshield in upright position	If below level of parapet. No damage.	Vehicle will not run. Windshield blown out and windshield frame bent back. Drivers seat badly burned and asst. drivers seat torn loose. Hood torn loose. Paint on front of vehicle burned.	It would take approximately 5 man hours to return this vehicle to serviceable condition.
Machine Gun, Light Cal. 30, M1919A3	1000 yds	Facing away from GZ. In emplacement. Both sights down. Gun in serviceable condition.	No damage.	No damage caused by blast.	½ hour would be needed to clean gun.
Truck, 2½ ton, GMC 6 x 6, M-135, w/o winch.	1000 yds	Facing GZ in a 3 foot depression. 7 foot mound of dirt in front of vehicle. Vehicle is in running condition. Glass in both doors rolled down. Canvas and bows laying in bed of vehicle. Cab canvas off. Paint in good condition.	No damage (If shielded)	Windshield blown out and door glass broken.	At least 4 man hours would be required to restore this vehicle to serviceable condition.
Radio, SCR-300	1000 yds	Operable condition. Standing upright facing GZ.	Displaced. Antenna damage.	Displaced about 7 ft. Battery case crushed. Antenna fused, cover bent back, straps singed not burned.	Not repairable.

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 738 KT	Condition of equipment or emplacement after shot. Actual yield 26.4 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Radio, SCR-300 Cont'd)				Paint burnt off front and sides. Rubber cracked. Plastic melted.	
C-1 Stake	1500 yds	4"x4"x4' wood stake embedded 2' in ground.	No damage.	Face scorched but still serviceable.	None
C-2 Trench, C-3 Foxhole, C-7 Foxhole and C-8 Trench.	1500 yds	Trenches and foxholes broadside to blast.	No damage.	About half full of sand.	Clean out 1 man hr
C-4 Bunker, C-5 Bunker and C-6 Bunker	1500 yds	Bunker entrances facing GZ.	No damage.	All sandbags need to be replaced.	½ equip hr 5 man hrs.
C-9 Stake	1500 yds	Steel picket.	No damage.	No damage.	None
3 Sheep	1500 yds	One each in C-1, C-2 and C-8 positions. Sheep normal	Third degree burns on skin. Wool scorched.	3rd degree burns on face and ears. Extensive wool borns on back.	NA
1 Sheep	1500 yds	C-3 position. Sheep Normal	No damage.	3rd degree burns on face and ears. Extensive wool burns on back.	NA
2 Sheep	1500 yds	One each in C-4 and C-6 positions. Sheep normal.	No damage.	Moderate wool burns on back.	NA
1 Sheep	1500 yds	C-5 position. Animal used in Shot V-5 at 1500 yards. Epilation incurred from previous shot.	No damage.	Animal down, suffering from radiation incurred in shot V-5.	NA
1 Sheep	1500 yds	C-7 position. Sheep normal.	No damage.	2nd degree burns on face and right ear. Extensive wool burns side and back.	NA

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Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of (38) KT	Condition of equipment or emplacement after shot. Actual yield 26.4 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
1 Sheep	1500 yds	C-9 position. Sheep normal.	3rd degree burns on skin. Wool scorched.	2nd degree burns on face and ears. Extensive wool burns on back.	NA
Rifle, Browning Automatic, Cal. 30 M1918A2	1500 yds	Facing GZ. Weapon in serviceable condition. Mounted on bipod. Sights down.	No damage	No damage from blast.	Approximately ½ hour needed to clean and service rifle.
Machine Gun, Light Cal. 30 M1919A4	1500 yds	Facing away from GZ. Weapon in serviceable condition. Elevating and traversing mechanism missing. Sights down and barrel elevated 30 degrees.	No damage.	No damage caused by blast.	Approximately ½ hour required to clean and service gun.
Machine Gun, Light Cal. 30, M1919A4	1500 yds	Facing GZ. Elevating and traversing mechanism missing. Sights down and barrel elevated 45 degrees.	No damage.	No damage caused by blast.	½ hour would be required to clean and service weapon.
Launcher, Rocket 3.5, M-20	1500 yds	Facing GZ. Barrel elevated 30 degrees. Sights open weapon in good condition.	No damage if in horizontal position with slight defilade. Otherwise will be thrown and bent. Wiring and electrical system damaged.	Weapon moved to rear approximately 30 feet. Sights and paint burned.	Approximately ½ hour required to clean weapon.
Mortar, 81mm M1	1500 yds	Facing GZ in foxhole. Leaning against forward wall. Barrel only part of weapon present. Barrel in good condition.	No damage.	No damage caused by blast.	Approximately ½ hour would be required to clean weapon.
Truck, Utility ¼ ton, 4x4 M-38	1500 yds	Facing 45 degrees to the right of GZ. Top and curtains missing. Vehicle in serviceable condition.	Light to moderate damage. Vehicle moved.	Vehicle turned over on right side. Hood bent and blown open. Windshield blown out and frame bent. Steering wheel and all	Approximately 50 man hours would be required to restore this vehicle to serviceable condition.

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of (38) KT	Condition of equipment or emplacement after shot. Actual yield 26.4 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Truck, Utility ¼ ton, 4x4, M-38 (cont'd)				seats burned. Cowl bent and radiator leaking. Vehicle will not start.	
Machine Gun, Heavy Cal. 50, M2	1500 yds	Facing GZ. Muzzle elevated 30 degrees. Elevating and traversing mechanism missing. Weapon in good condition. Mounted on tripod. Sights down.	No damage.	No damage caused by blast.	Approximately ½ hour would be needed to clean gun.
Machine Gun, Heavy, Cal. 50, M2	1500 yds	Facing 45 degrees to the right of GZ. Elevating and traversing mechanism missing. Weapon mounted on tripod and is in good condition.	No damage.	No damage caused by blast.	Approximately ½ hour would be needed to clean gun.
Gun, 57mm	1500 yds	Facing GZ. Muzzle elevated 30 degrees. Sights missing. Trails spread. Gun in serviceable condition.	No damage.	Paint on barrel burned. No other damage caused by blast.	Approximately 8 man hours would be required to clean gun.
Launcher, Rocket 2.3, M9A1	1500 yds	Facing GZ. Sights missing Weapon is in Serviceable condition.	No damage if in Horizontal position with slight defilade. Otherwise will be thrown and bent.	Weapon turned completely around but not materially damaged.	It would take approximately one hour to clean weapon.
Gun, 57mm	1500 yds	Facing GZ. Muzzle elevated 10 degrees. Sights missing. Trails spread. Breech closed. Weapon is in serviceable condition.	No damage.	Paint on barrel burned.	Approximately 8 man hours required to clean weapon.
Tank, Medium, M4A3	1500 yds	Right side of tank to GZ. Paint in good condition. Tracks and road wheels in good condition. Engine	Damage to radio antennas. Fenders on side toward ground zero bent. Light	Spot light blown off. Paint burned.	Except for dead batteries, vehicle in serviceable condition.

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Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 738 KT	Condition of equipment or emplacement after shot. Actual yield 26.4 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Tank, Medium, M4A3 (Cont'd)		will not start because batteries are dead. Drivers hatch open.	damage to tank.		
Gun, 76mm M1A2 (Wet)	1500 yds	Gun mounted on tank. Right side facing GZ. Sights missing. Weapon is in serviceable condition, but needs cleaning.	No damage.	Paint burned but no other damage caused by blast.	Approximately 3 hours would be required to clean gun.
Truck, Utility, ¼ ton 4x4, M-38	1500 yds	Facing GZ. Vehicle is in serviceable condition. Paint is in good condition. Canvas and side curtains laying inside vehicle. Bows for canvas up. Spare tire laying in rear floor of vehicle.	Light damage.	Hood blown off and laying approximately 100 feet to rear of vehicle. Vehicle will not run. Windshield blown out and frame bent. Paint and steering wheel burned. Radiator leaking.	Approximately 55 man hours would be required to restore vehicle serviceable condition.
Morter, 60mm M19	1500 yds	Facing GZ. Sights missing. Weapon is in serviceable condition but need cleaning.	No damage.	No damage caused by blast.	Approximately ½ hour would be required to clean weapon.
Carbine, M1	1500 yds	Facing GZ. Leaning on emplacement. Sling missing. Weapon in operating condition but needs cleaning.	No damage.	Could not be located.	Could not be determined.
Truck, 2½ ton	1500 yds	Right side to GZ. Vehicle is in running condition. Door glass rolled down. Cab canvas off and rear canvas laying in bed. Paint in good condition. Spare tire missing.	Light damage.	Vehicle laying on left side. Right windshield blown out. Windshield frame bent. Hood bent and right door bent in. Drivers seat, wooden rack, glass on instrument panel burned. Left windshield shattered.	Approximately 80 man hours would be required to restore this vehicle to serviceable condition.

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Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of (38) KT	Condition of equipment or emplacement after shot. Actual yield 26.4 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Gun, 90mm, M1A2	1750 yds	Facing GZ with muzzle elevated 10 degrees. Weapon is in good condition. Muzzle is taped shut. Breech block closed. Weapon emplaced in 4 foot hole.	No damage.	Weapon very dirty but not damaged by blast.	Approximately 3 hours would be required to clean weapon.
C-1 Stake	2000 yds	4"x4"x4' wooden stake embedded in ground 2'	No damage.	Face blackened, but still serviceable.	None
C-2 Trench, C-3 Fox hole, C-7 Fox hole and C-8 Trench.	2000 yds	Broadside to blast.	No damage.	Undamaged.	None.
C-4 Bunker and C-5 Bunker	2000 yds	Entrance facing GZ.	No damage.	Sandbags over entrance need replacing. Should be cleaned out.	½ equip hr 5 man hrs
C-6 Bunker	2000 yds	Entrance facing GZ.	No damage.	All sandbags need replacing.	½ equip hr 5 man hrs.
C-9 Stake	2000 yds	Steel picket.	No damage.	Undamaged.	None
3 Sheep	2000 yds	One each in C-1 and C-2 and C-8 positions.	3rd degree burns to skin and wool scorched.	2nd degree burns on face and ears and extensive burns on back.	NA
1 Sheep	2000 yds	C-3 sheep normal.	No damage.	Moderate wool burns on back.	NA
4 Sheep	2000 yds	One each C-4, C-5, C-6 and C-7 positions.	No damage.	No visible effects.	NA
1 Sheep	2000 yds	C-9 sheep normal.	3rd degree burns on skin and wool scorched.	3rd degree burns on face and ears and extensive wool burns on back.	NA

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Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of [38] KT	Condition of equipment or emplacement after shot. Actual yield 26.4 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Truck, Utility ¼ ton 4x4, M-38	2000 yds	Facing away from GZ with right side forming an angle of 135 degrees with GZ. Vehicle is in running condition. Canvas and side curtains laying inside vehicle windshield up and glass in right side broken. Paint in good condition.	No damage.	Windshield blown out. Steering wheel, paint on top of hood, instrument panel, and glass in instrument panel burned.	Approximately 3 hours would be required to restore this vehicle to serviceable condition.
Mortar, 60mm M19	2000 yds	Facing GZ in an emplacement. Sights missing. Weapon is serviceable but needed cleaning.	No damage.	No damage caused by blast.	One half hour would be required to clean weapon.
Truck, 2½ ton, GMC 6x6, M-135 w/o winch	2000 yds	Right side to GZ. Vehicle is in running condition. Canvas on rear but is rolled up. End curtain laying in rear of vehicle. Glass in both doors rolled down. Paint in good condition. Windshield glass intact.	Light damage.	Vehicle will run, hood bent and open. Paint on right side and seats burned. One bow broken. Right door bent in and glass shattered. Left door glass broken. Canvas blown approximately 25 feet to rear.	Approximately 15 man hours would be required to restore this vehicle to serviceable condition.
Machine Gun, Heavy, Cal. 30 M2.	2000 yds	Facing GZ. Muzzle elevated 10 degrees. Gun mounted on tripod. Gun in serviceable condition. Sights down.	No damage.	No damage caused by blast.	Approximately ½ hour would be needed to clean and service weapon.
Machine Gun, Heavy Cal. 50, M2	2000 yds	Facing away from GZ. Muzzle elevated 15 degrees. Gun mounted on tripod, M1917A1. Sights down, gun in serviceable condition.	No damage.	No damage by blast.	Approximately ½ hour would be required to clean and service weapon.
Gun, 57MM	2000 yds	Facing GZ. Muzzle elevated 10 degrees. Sights	No damage	No damaged caused by blast	Approximately 2 man hours would be required to clean

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of [38] KT	Condition of equipment or emplacement after shot. Actual yield 26.4 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Gun, 57mm(Cont'd)		missing trails are spread. Muzzle taped shut. Breech closed. Weapon is in good condition.			and service gun.
C-1 Stake	2500 yds	Facing GZ. 4"x4"x4' wooden stake embedded in ground.	No damage.	Face blackened still serviceable.	None.
C-2 Trench, C-3 Foxhole, C-7 Foxhole and C-8 Trench.	2500 yds	Broadside to blast.	No damage.	Undamaged.	None
C-4 Bunker	2500 yds	Entrance to GZ. 6'x4'x4'6" covered emplacement with sandbags walls 2' thick.	No damage.	60% of the bags over entrance need replacing. Back wall in line with entrance darkened.	Replace 60 bags 3 man hrs Dozer 1 hr 1 equip hr 3 man hrs
C-5 Bunker	2500 yds	Entrance to GZ. 6'x6'x5'6" covered emplacement with sandbag walls 2' thick.	No damage.	90% of bags over entrance need replacing. Back wall in line with entrance darkened.	Repalce 90 bags 3½ man hrs Dozer 1 hr 1 equip hr 3½ man hrs
C-6 Bunker	2500 yds	Entrance to GZ. 6'x4'x4'6" emplacement with sandbag walls 2' thick.	No damage.	All bags over entrance need replacing. Back wall in line with entrance darkened.	Replace 100 bags 3½ man hrs Dozer 1 hr 1 equip hr 3½ man hrs
C-9 Stake	2500 yds	4"x4"x4' wooden stake embedded in ground.	No damage.	Undamaged.	None
3 Sheep	2500 yds	One each in C-5, C-6 and C-7 positions.	No damage.	No visible effects.	NA
2 Sheep	2500 yds	One each in C-8 and C-9 positions.	3rd degree burns to flesh not covered by wool.	No visible effects.	NA

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Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of [38] KT	Condition of equipment or emplacement after shot. Actual yield 26.4 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Truck, Utility, ¼ ton, 4x4, M-38	2500 yds	Facing GZ. Vehicle is in running condition. Canvas side curtains laying in vehicle. Paint in good condition. Windshield cracked in two places on left side.	Light damage such as broken glass and scorched canvas.	No damage caused by blast.	Vehicle in serviceable condition
C-1 Stake and C-9 Stake.	3000 yds	4"x4"x4' wooden stake embedded in ground.	No damage.	Darkened.	None
C-2 Trench, C-3 Foxhole, C-7 Foxhole and C-8 Trench	3000 yds	Broadside to blast.	No damage.	Undamaged.	None
C-4 Bunker	3000 yds	Entrance facing GZ.	No damage.	About 20% of bags need to be replaced. Back wall darkened in line with entrance.	Replace 20 bags 2½ man hrs Dozer 1 hr 1 equip hr 2½ man hrs
C-5 Bunker	3000 yds	Entrance facing GZ.	No damage.	About 30% of bags need to be replaced. Back wall darkened in line with entrance.	Replace 30 bags 3 man hrs Dozer 1 hr 1 equip hr 3 man hrs
C-6 Bunker	3000 yds	Entrance facing GZ.	No damage.	About 15% of bags need to be replaced. Back wall darkened in line with entrance.	Replace 15 bags 2¼ man hrs Dozer 3/4 hr 3/4 equip hr 2¼ man hrs
2 Sheep	3000 yds	C-1 and C-2 sheep normal.	3rd degree burns on exposed flesh.	No visible effects.	NA
3 Sheep	3000 yds	C-3, C-4 and C-5 sheep normal.	No damage.	No visible effects.	NA
Truck, Utility, ¼ ton 4x4, M-38	3000 yds	Facing 45 degrees to the right of GZ. Vehicle in running condition. Canvas	Light damage such as glass broken.	No damage caused by blast.	Vehicle in serviceable condition.

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Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of (38) KT	Condition of equipment or emplacement after shot. Actual yield 26.4 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Truck, Utility, ¼ ton 4x4, M-38 (Cont'd)		and side curtains laying in vehicle. Spare tire missing. Bows up and wind shield down.			
C-1 Stake and C-9 Stake	3500 yds	Facing GZ. 4"x4"x4' wooden stake embedded in ground.	No damage.	Darkened.	None
C-2 Trench, C-3 Foxhole, C-7 Foxhole and C-8 Trench.	3500 yds	Broadside to blast.	No damage.	Undamaged.	None
C-4 Bunker, C-5 Bunker and C-6 Bunker	3500 yds	Entrance facing GZ.	No damage.	About 5% of sandbags need replacing.	Replace 6 bags 2 man hrs Dozer ½ hr ½ equip hr 2 man hrs

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C-1 500 yards. This animal suffered 3rd degree burns on the face and extensive wool burns. The 3rd degree burns are clearly shown in this picture. Death occurred 9 May, and was attributed to acute radiation sickness.

C-3 500 yards. This animal suffered 3rd degree burns of the face and ears as shown in this picture. This animal developed symtoms of radiation sickness on 9 May and was destroyed 10 May to prevent further suffering.



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C-4 500 yards. This animal initially suffered only moderate wool burns. In-coordination and diarrhea appeared 11 May followed by death 12 May. Death was attributed to acute lethal radiation sickness.

C-6 500 yards. This animal suffered no visible effects from the detonation. Inappetence, nasal discharge, diarrhea and in-coordination began 10 May and death occured 11 May. Here death can only be attributed to acute lethal radiation sickness.



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C-7 500 yards. This animal suffered 3rd degree burns on the face and extensive wool burns, it became prostrate on 10 May and was destroyed to prevent further suffering.

C-2 500 yards. This animal suffered 3rd degree burns of the face and ears and extensive wool burns over the body. This animal was destroyed after the detonation.



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C-8 500 yards. This animal received 3rd degree burns on the face and ears and extensive wool burns on the back and sides. This animal died of acute lethal radiation sickness on 11 May.

C- 500 yds. This animal was killed by blast effects and received 3rd degree burns of the face and ears with extensive wool burns over the entive body as can be seen by this picture.



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C-8 1000 yards. This animal suffered 3rd degree burns on the face and extensive wool burns on the body. Inappetence, diarrhea, and in-coordination developed on 9 May and death occurred 10 May from acute lethal radiation sickness.

C-9 1000 yards. This animal suffered 3rd degree burns on the face and extensive wool burns on the body. Inappetence diarrhea, and in-coordination developed on 9 May followed by death on 10 May from acute radiation sickness.



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C-2 1000 yards. This animal suffered 3rd degree burns on the face and extensive wool burns. This sheep developed inappetence, diarrhea, and in-coordination on 8 May and death occurred 10 May from acute lethal radiation sickness.

C-3 1000 yards. Along with 3rd degree burns over the entire body this animal showed symptoms of epilation, diarrhea, and in-coordination on 12 May. Death followed on 14 May.



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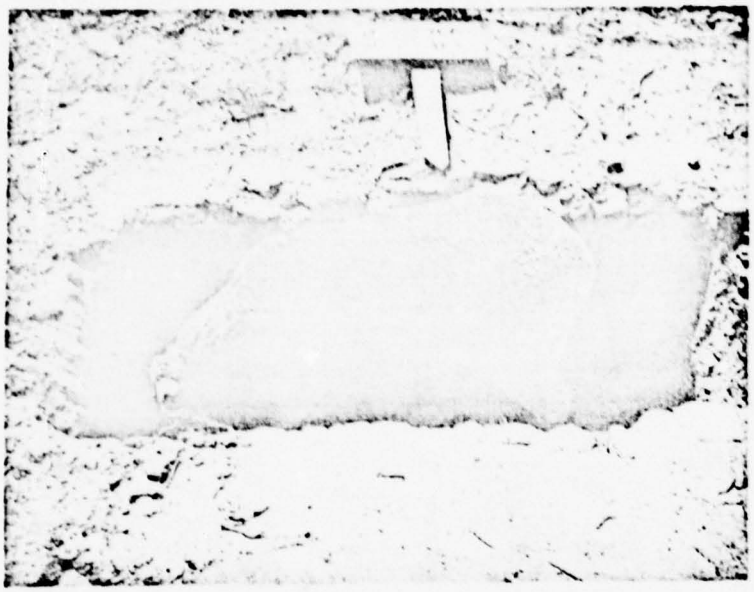
C-3 1500 yards. This sheep received 3rd degree burns on the face and ears and extensive wool burns over the back.

C-1 & C-2 2000 yards. Both animals show 2nd degree burns on the face and ears with moderate burns on the back. They will apparently recover from the effects of the detonation.



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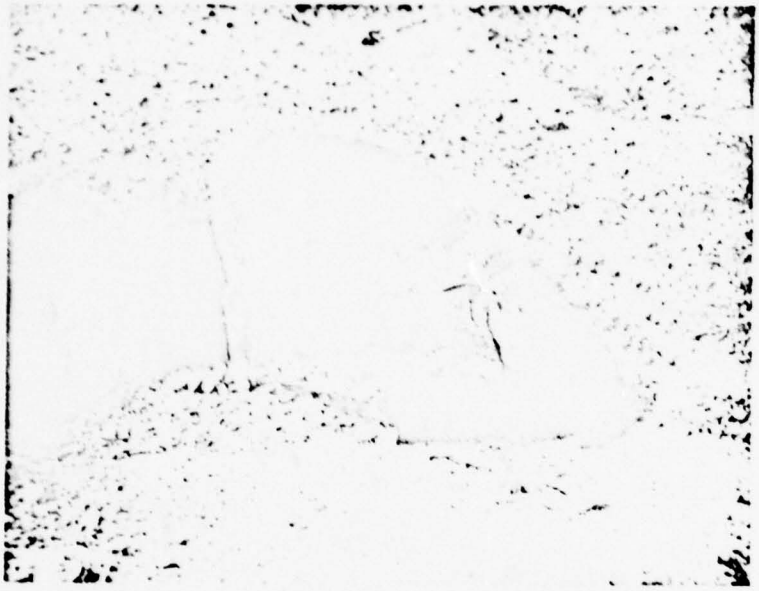


C-2 1500 yards. This sheep received 3rd degree burns on the face and ears and extensive wool burns over the back.



C-1 1500 yards. This sheep received 3rd degree burns on the face and ears and extensive wool burns over the back. This animal developed symptoms of radiation sickness on 12 May.

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C-8 2000 yards. This animal received 2nd degree burns on the face and ears with extensive wool burns on the back and will apparently recover from the effects of the detonation.

C-1 3000 yards. This animal showed no visible effects from the detonation. This is the typical reaction found on all the animals placed at 2500 and 3000 yards.



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C-3 2000 yards. This animal showed moderate wool burns on the back and is in good condition.

C-7 2000 yards. This animal showed no visible effects from the detonation.



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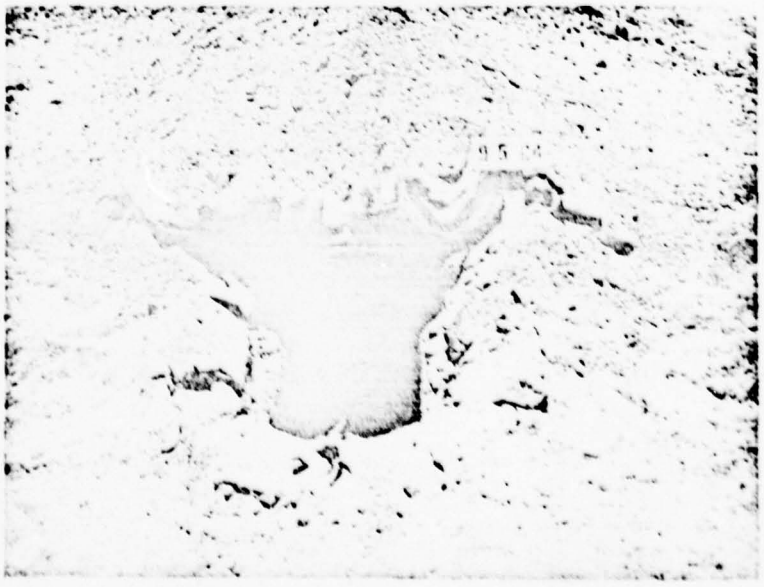


BEFORE

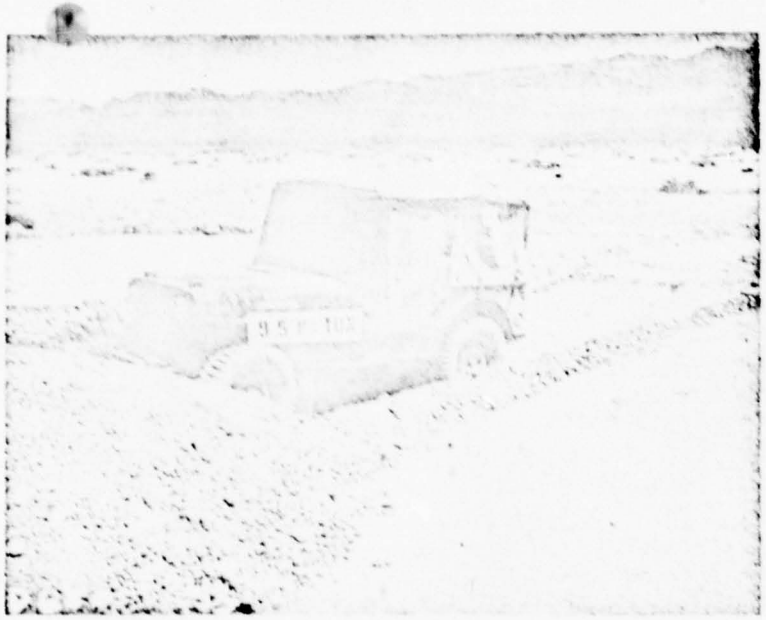
C-4 bunker at 500 yards with entrance facing GZ.

AFTER

All sandbags burned and blasted open and need replacing. No other damage.



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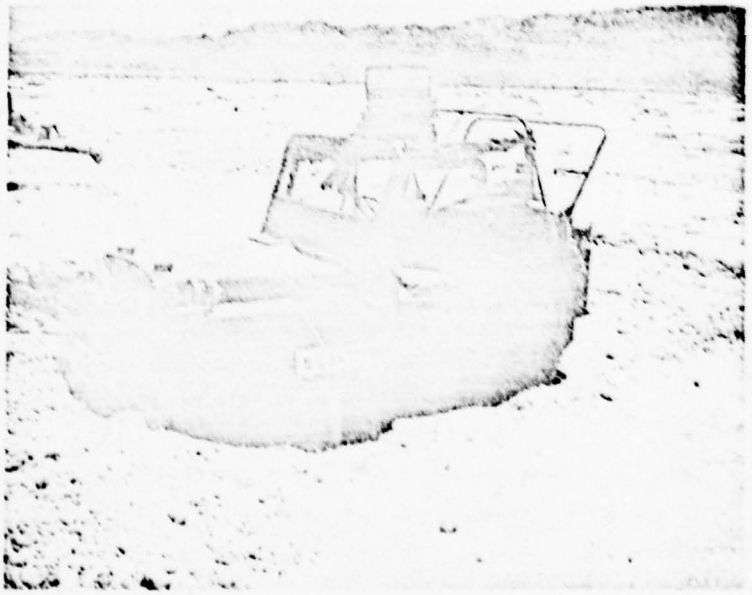


BEFORE

Truck, 1/4 ton 4 x 4, M-38, 500 yards from GZ. Vehicle is facing GZ and placed in a 2 foot hole.

AFTER

Top burned off. Hood and cowl bent. Windshield blown out. Right hand seat and paint on side burned.



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BEFORE

Radio, SCR-300, standing upright 1000 yards from GZ.

AFTER

Radio displaced approximately 7 feet. Battery case crushed. Antenna fused. Cover bent. Rubber cracked and plastic melted.



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BEFORE

Machine gun, Cal. 30, M1919A4, facing away from GZ at 1000 yards, in emplacement with dummy.

AFTER

No damage to gun. Upper exposed portion of dummy completely burned.



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BEFORE

Rifle, Browning Automatic, Cal. 30, M1918A2, facing GZ at 1500 yards.

AFTER

Not damaged. Turned on side.



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BEFORE

Truck 2 1/2 ton 6 x 6 GMC, at 2000 yards with right side toward GZ.

AFTER

Hood opened and bent. Paint and seats on right side burned. Right door bent and glass shattered. Left door glass broken. Canvas body top blown 25 feet to rear.



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FRENCHMAN FLAT

Battery A, 267th Field Artillery Battalion (280mm) registering with high explosive projectile prior to firing first atomic artillery shell.

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HQ CAMP DESERT ROCK
LAS VEGAS (872536) NEV
011200 June 1953

Annex 10 (SHOT VICTOR 10) to Final Report
EXERCISE DESERT ROCK V

I. GENERAL.

Observers and troop personnel arrived at Camp Desert Rock during the period 18-24 May. Troop participants represented each of the Continental Armies and were formed into two RCT's for all formations during the exercise. Observer personnel represented each army area, the District of Columbia and distant overseas stations. In addition to the troop and observer personnel, a group of top government and military officials attended this historic atomic firing of the 280 mm gun. Included in this group were the Honorable Mr. Robert T. Stevens, Secretary of the Army; General J. Lawton Collins, Chief of Staff, U. S. Army; the Honorable Mr. G. R. Ford, Congressman from Michigan; and the Honorable Mr. R. F. Sykes, Congressman from Florida.

A rehearsal was conducted in the Frenchman Flat area on 23 May. The Control Group departed camp for the forward area at 0657 hours and all march units closed into the entrenchment area at 0853 hours. Positions occupied and maneuver area used for the rehearsal were the same as those used for the actual maneuver on shot day.

The selected time for H-Hour was 0930 hours. The RCT's started the tactical maneuvers at 0940. The attack progressed rapidly and the troops were in the display area at 1120 hours when the maneuver was halted. This concluded the tactical portion of the exercise. At this time, RCT personnel moved into the equipment and animal display area, but a severe dust storm limited the movement through the area.

Members of the Camp Desert Rock Instructor Group guided the observers through a portion of the display area and provided a commentary on the expected damage to the sheep and equipment placed at various distances from ground zero.

Movement from the display area for the return trip to Camp Desert Rock started at 1125 hours. The Control Group closed into camp at 1417 hours, without incident. The full benefit of a rehearsal was not realized due to the wind and dust conditions.

For Shot V-10 the Control Group moved from camp at 0452 hours 25 May. Transportation required to move the Control Group, Observers and troops to the shot site was 184 vehicles. All march units closed into the entrenchment area, 5,000 yards from ground zero, at 0730 hours. Vehicles were moved to a motor park 5.6 miles from ground zero. While in the trench area, personnel were able to observe the 280 mm gun (Amazon Annie) registering with conventional high explosive rounds prior to firing the first atomic projectile.

The usual pre-shot orientation was conducted at the trench site from 0735 to 0810 hours. At this time Brigadier General William C. Bullock, Exercise Director, introduced General J. Lawton Collins, Chief of Staff, U. S. Army, who briefly addressed the observers and troops. General Collins presented the background which led to the development of the T 131 Rifle (280 mm gun) and paid tribute to the Artillery and Ordnance Corps for the research and development of the weapon.

At the conclusion of General Collins address, the Exercise Director ordered all personnel to enter the trenches and at H minus 12 minutes all personnel were in the trenches. A siren blast of 30 seconds duration was sounded at H minus 2 minutes at which time all personnel were ordered to crouch low in their trenches. At this time the Atomic Energy Commission spokesman took over the public address system and started the count down and also announced the gun would be fired 19 seconds prior to H hour.

The count down was accurate and the projectile detonated at the announced time for H hour (0830) at a height of 524 feet above the terrain. All personnel were directed to rise and observe the fire ball 3 seconds after the detonation and prior to the arrival of the blast at the entrenchment area. No ground tremor was noted. A very sharp blast was received 13 seconds after detonation. The fire ball was not as colorful as in previous shots and dissipated very rapidly.

The battalion combat teams started their attack at 0841 hours towards Objectives 2 and 4, 8,000 and 6,500 yards from the line of departure. The attack progressed well and the troops arrived at the display area at 0950 hours. Due to the high winds and severe dust conditions encountered, the tactical portion of the maneuver was concluded at this time.

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The observer personnel departed the entrenchment area at 0905 hours to observe the damage effects in the equipment and animal display area. Members of the Instructor Group provided a commentary on damage effects to assembled groups in the display area, even though dust conditions limited observation.

Personnel from RCT-Baker were taken through a portion of the equipment and animal display area, whereas, the personnel of RCt Able were unable to enter the area to observe the damage effects due to the intense dust conditions in the display area.

The return movement to camp started at 1100 hours and all march units closed into camp at 1247 hours. The successful completion of Shot V-10 was a fitting climax to a series of ten shots detonated during EXERCISE DESERT ROCK V.

Participating in the exercise were 3,228 military and 31 civilian personnel, a total of 3,259 individuals.

The temperature at ground zero at shot time was 54.7 degrees Fahrenheit. Wind was from the north at 4 knots. Visibility was 50 miles. Atmospheric pressure at ground zero was 901 millibars.

Of unusual interest was the severe damage caused by the detonation out to a radius of 800 yards from ground zero. On D plus 1 day, and aerial view of this area revealed complete damage to all installations and equipment. The sight was comparable to an area over which a battle had raged for days. This was by far the most severe damage inflicted on equipment and installations during any shot of this series.

II. INTELLIGENCE AND SECURITY.

In this shot, as on all previous shots, several observers reported with no security clearance indicated on their orders. This made it necessary to send wires to verify clearances. In all cases, clearances were verified. However, this procedure is not in accordance with the directives which specify that all personnel will be cleared prior to reporting and clearance will be shown on travel orders.

As some observers arrived in camp a week prior to the shot, many trips to the forward area and orientation were scheduled simultaneously. Some difficulty was encountered in providing sufficient security personnel at all orientations and security check points.

There was difficulty in getting clearance certificates from the RCT's as the commanders were unable to ascertain exactly the number of personnel actually present for the exercise. Conversely, the S2 of the 9th Ordnance Bn., acting as advance party, established the clearance of each individual of that unit prior to the units arrival at the post.

There was some difficulty during the movement of convoys on shot day. After informing the G2 office that there would be only two gates used during the movement, AEC Security established a temporary control gate on the road leading into the trench area. The control group march unit was held up at this gate until permission was received from AEC Security to move the convoy through. This was an unnecessary delay as rosters could have been provided if the existence of the gate had been known prior to the movement.

III. INSTRUCTOR GROUP.

Camp Desert Rock participation in Shot V-10 was conducted on a broader scale than for any previous shot of the current series. From the view point of the Instructor Group, this shot presented more problems that any previous exercise. This was mainly because of the presence of a very large observer group, a large group of VIP's, and special groups such as the party of the Secretary of the Army and the party of the Chief of Staff of the Army. In addition, two battalion combat teams participated in this exercise and required orientation.

Routine four hour orientation courses, including a thirty minute orientation period on the 280 mm gun, were presented to the two battalion combat teams on 20 May and 21 May in the open air amphitheater. These periods were supplemented by showing motion pictures on nuclear subjects such as personnel protective measures and basic physics of the atomic bomb to the RCT personnel. Groups of two hundred soldiers were shown the films at intervals throughout their day of instruction. Both RCT's were escorted through the 280 mm gun position of the Artillery Test Unit preparing to fire the atomic round into Frenchman Flat.

Normal rehearsal for troops and observers was held on 23 May. The trench orientation by an

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instructor was routine, with the exception that information about trench procedure included permission to rise three seconds after the shot. Personnel were not required to stay down in the trenches until the shock wave passed due to the distance (5000 yards) of the trenches from ground zero. Excessive blowing of sand after deployment of troops for the attack caused the cancellation of a pre-shot walkthrough of the display area to observer the condition of equipment and bunkers.

An orientation of eight hours duration, including two and one half hours of data pertaining to the 280 mm gun and shell, was presented to observers on 22 May. This orientation also included a trip to the gun position to observe registration firing of the piece.

On 24 May, (D minus 1 day) a group of approximately thirty two general officers were escorted through the 280 mm gun position at 1500 hours. A briefing which covered the procedures to be followed by the test unit was conducted at the gun site by the commanding officer of the Artillery Test Unit. Following this briefing, General Collins and his party arrived at the gun position and received a thorough briefing on the same subject, followed by an examination of the gun itself. The party remained at the gun position approximately one hour.

At 1630 hours, 24 May, a field briefing covering the exercise for the following day was conducted by the Camp Desert Rock G3 for the benefit of officers who arrived too late for the May 22 briefing.

At 1930 hours, 24 May, a special briefing was conducted for the Secretary of the Army, the Chief of Staff, United States Army and their parties. This briefing, of two hours duration, covered very comprehensively the ground and air plans for the artillery shot and also reviewed the events of all previous shots in this spring series. Finally, conclusions were drawn by the Exercise Director concerning troop participation in these exercises, stating that invaluable indoctrination has been afforded by the exercise participation.

Trench orientation and procedures followed on shot day were normal. A severe sand storm in the display area precluded the examination of equipment and animals closer to ground zero that 1500 yards. A portion of RCT Baker went to the 500 yard line but observed little due to the dust conditions.

IV. SIGNAL.

The communication facilities for this operation were generally the same as for preceding shots. More extensive wire system was required since the trench areas were widely dispersed.

The public address system, used for the orientation of troops and to receive information from the Atomic Energy Commission Control Point, consisted of three poles evenly dispersed in the trench area. Each pole had four speaker horns mounted, each horn focused in a different direction. This system proved adequate for all observer and troop personnel. One (1) pole, with four speakers mounted, was installed in the parking area. This provided the vehicle drivers the same orientation as the observer and troop personnel received at the trench area.

Telephones were installed in all of the control trenches and to the more prominent road junctions. Lines were installed on the right (E) side of the display area providing Rad-Safe personnel with telephone communication in case of radio failure.

AN/PRC-10 radios were used in the Rad-Safe, Command and RCT nets. This provided a back-up to the wire communication system.

V. RAD-SAFE.

Radiological Safety plans for the concluding shot of Exercise DESERT ROCK V conformed to those used on previous shots with the exceptions that troop commanders and orientation leaders were held responsible that their groups received no more than 6 r as measured by pocket dosimeters. This meant that areas of higher radiation intensity could be inspected for damage effects.

Operationally, the presence and interest of the senior military officers of the Department of Defense required the use of a monitor guide to provide early and safe conduct of special observer group through the Army display area. For the same reason the personnel monitoring section of the decontamination station had to be supplemented to expedite the departure of observers from the forward areas. Monitors from permanent camp personnel, other than the 50th Chemical Service Platoon, assisted in the operation. The initial training of reserve monitors in this group eliminated any strain caused by these requirements.

Another problem of this exercise was the dense dust clouds stirred up by the atomic explosion

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and high winds. This imposed a requirement of extreme alertness on the part of the Rad-Safe monitors to prevent individuals from straggling and wandering in areas of high radiation intensity.

Radiation in Roentgens received in emplacements:

Distance from Target in yards	C1 Post open	C2 Shallow slit Trench	C3 Deep slit Trench	C4 One Man emplace-ment	C5 Two Man emplace-ment
		Type Emplacement			
500	lost	lost	lost	lost	lost
1000	lost	lost	lost	90	166
1500	88	51	52	44	6.9
2000	43	39	7.2	5.3	1.34
2500	7.2	.60	.73	.57	.47
3000	2.39	.49	lost	.56	.46
3500	1.32	.48	.48	.50	.55

Radiation Dose in Roentgens received by the sheep.

Distance from Target in yards	C1 Post open	C2 Shallow slit Trench	C3 Deep slit Trench	C4 One Man emplace-ment	C5 Two Man emplace-ment
		Type Emplacement			
500	lost	lost	lost	3,774	lost
1000	3,610	2,760	1,985	1,401	96
1500	408	lost	185	61	41
2000	53	44	14	23	10
2500	16	15	9	5	6

Distance in yards from target	C6 One Man emplace-ment	C7 Deep slit Trench	C8 Shallow slit Trench	C9 Open post
		Type Emplacement		
500	3,915	3,915	lost	lost
1000	1,140	1,965	3,202	3,715
1500	124	158	328	488
2000	13	13	35	63
2500	5	3	7	14

VI. MEDICAL.

Medical Support to Personnel:

Medical support was handled in the same manner as on the previous exercises. One very minor injury occurred when one of the enlisted men from BCT Able slipped while dismounting from the truck and suffered a mild abrasion of his left knee. This case was treated and the soldier did not require evacuation.

Medical Evaluation of Test Items:

On the day prior to the shot, 45 sheep were placed at varying distances from ground zero. Commencing at 500 yards and at each 500 yards interval thereafter through 2500 yards 9 sheep were placed, one to each C-type position (C-1, C-2, C-3, C-4, C-5, C-6, C-7, C-8 and C-9).

The Veterinary Officer, a monitor, and an enlisted technician accompanied the Control Group to the forward area on shot day. Immediately following the detonation these men moved forward by vehicle to observe and evaluate the effects of the blast on the sheep.

Most of the evaluation results are covered in the evaluation forms and picture captions. Lis-

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ted below are some of the more prominent end results.

The sheep at 500 yards in positions C-1, C-2, C-3, C-5, C-8 and C-9 were all killed by the blast effects of the detonation and in all instances the collars of these animals were missing so that the radiation dosages could not be determined. The sheep in positions C-4 and C-6 were in a dying condition when found after the blast and were given euthanasia to prevent further suffering. These sheep had a radiation dosage of 3,774 r and 3,915 r. The sheep in position C-7 was killed by the blast effects of the detonation and incurred a radiation dosage of 3,915 r.

The sheep at 1000 yards from ground zero in position C-9 died from strangulation although it was severely burned. It acquired a radiation dosage of 3,715 and would have died eventually from the blast effects combined with acute lethal radiation sickness. The sheep in position C-5 had a broken right front leg during the blast due to the fact that the leg became entangled in the tether chain. This animal was destroyed to prevent further suffering. It received a radiation dosage of 96 r and would have in all probability survived the effects of the detonation. The sheep in positions C-1, C-2, C-3, C-6 and C-7 showed no visible effects from the blast but they acquired the following radiation dosages; C-1 3,610 r, C-2 2,760 r, C-3 1,985 r, C-6 1,140 r and C-7 1,965 r. These animals would all eventually die from acute lethal radiation sickness due to the large number of roentgens absorbed by them.

The sheep placed 1500 yards from ground zero in positions C-7 and C-9 received slight wool burns over the head and back. These animals received a radiation dosage of 158 r and 488 r. The sheep in position C-7 should survive unless latent radiation sickness sets in. On the other hand the sheep in position C-9 will eventually die from radiation sickness. The sheep in position C-4 received slight wool burns over the left shoulder region and received a radiation dosage of 61 r. This animal should survive the effects of the detonation. The sheep in position C-8 received slight wool burns over the left side of the body and a radiation exposure of 328 r. The sheep should survive the effects of the detonation. The sheep in positions C-1, C-2, C-3, C-5 and C-6 have no visible effects from the detonation and absorbed the following radiation dosages: C-1 408 r, C-2 collar lost, C-3 185 r, C-5 41 r and C-6 124 r. These animals should all survive unless latent radiation sickness sets in.

The sheep deployed at 2000 yards from ground zero in positions C-2 and C-5 received slight wool burns over the sides and back acquiring radiation dosages of 44 r and 10 r. The sheep in positions C-1, C-3, C-4, C-6, C-7, C-8 and C-9 acquired no visible effects from the blast and had the following radiation dosages: 53 r, 14 r, 13 r, 13 r, 35 r and 63 r. All the animals in this group (deployed at 2000 yards) should survive the effects of the detonation.

The sheep deployed 2500 yards from ground zero in positions C-9 received slight wool burns on the right front and right rear legs. This animal received a radiation dosage of 14 r. The sheep in the other eight positions acquired no visible effects from the blast and received the following radiation dosages: C-1 16 r, C-2 15 r, C-3 9 r, C-4 5 r, C-5 6 r, C-6 5 r, C-7 3 r and C-8 7 r. The sheep deployed at 2500 yards should all survive unless latent radiation sickness set in.

Forty five (45) sheep were exposed to the detonation of Shot V-10. Of this number seven sheep were destroyed by blast effects, one sheep was killed indirectly by blast effects (strangulation), one sheep was given euthanasia because of a broken leg not due to the blast directly, two sheep were so badly hurt by the blast and thermal effects that they were destroyed to prevent further suffering and one sheep died of acute lethal radiation sickness. Thirty three (33) sheep remain alive although some will eventually die from radiation sickness.

It should be kept in mind that all the sheep exposed to Shot V-10 had been previously exposed to other atomic detonations. These animals for the most part had recovered from their previous exposure. Death of acute lethal radiation sickness in most cases of the above animals still alive would be dependent upon the roentgen value received in previous blasts plus the roentgen value received in Shot V-10. It is safe to assume that many of the sheep exposed in Shot V-10 have accumulated the minimum lethal dose required to produce the characteristic symptoms of radiation sickness followed by death.

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Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 14 KT	Condition of equipment or emplacement after shot. Actual yield 15.7 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Truck, 2½ ton, GMC, 6 x 6, M-135 w/winch.	GZ	At GZ. Hood bent, floor plates bent up. Gastank and both doors bent in. All glass broken and canvas missing. Bows and spare tire missing. Windshield frame folded down. Right rear tire low. Paint in good condition.	No prediction given.	Major item completely destroyed. Some parts laying 500 yards to rear of vehicle.	Replace vehicle.
T-6 Bridge Section	500 yds	Broadside to GZ. 1 Bay of standard T-6 bridge on 6" x 6" timber footing.	No prediction given.	Blown about 20'. Slight damage to deck, sway brace pin broken angle braces torn loose. Striker split at end about 2".	Repair of Bridge 8 man hrs Replace Footing 6 man hrs 1 Crane 2 hrs
Bailey Bridge Section	500 yds	Broadside to GZ. 1 Section of standard single-single Bailey Bridge without stringers and decking, on 6 x 6 timber footings.	No prediction given.	Blown about 60 feet. Bent sway braces, bent stringers twisted panel supports. One panel bent.	Repair 2 Sway braces 2 man hrs Replace 1 Stringer ½ man hr Repair panel supports 2 man hrs Replace 1 panel 1 man hr 1 Crane 1 hr
C-1 4"x4" wooden stake	500 yds	Wooden stake embedded 2' in ground.	Scorched and displaced.	Charred but still in ground.	None
C-2 Trench	500 yds	Broadside to blast.	Filled in.	Completely filled.	1 ditcher ½ hr Hand labor 2 man hrs
C-3 Foxhole	500 yds	Broadside to blast.	Some spalling damage.	Completely filled.	1 ditcher ½ hr Hand labor 2 man hrs
C-4 Bunker	500 yds	Entrance to GZ.	Severe scorching of exposed sandbags and timbers.	Earth cover caved in by blast. Completely destroyed. 50% of timber recoverable.	Ditcher ½ hr Hand labor 10½ man hrs 20 pcs 6"x6"x9'12 man hrs 150 sandbags 3 man hrs 1 Dozer 1 hr

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Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 14 KT	Condition of equipment or emplacement after shot. Actual yield 15.7 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
C-5 Bunker	500 yds	Entrance facing GZ.	Severe scorching of exposed sandbags and timbers.	Structural failure inside caused cave in. Timber salvageable. Completely filled it.	Hand labor 12 man hrs Hand labor 14 man hrs Sand bags 3 man hrs
C-6 Bunker	500 yds	Entrance facing GZ.	Severe scorching of exposed sandbags and timbers.	Blast caved in cover. Complete destruction.	Ditcher ½ hr Hand labor 10½ man hrs 20 pcs 6"x6"x9'12 man hrs 150 sandbags 3 man hrs 1 Dozer 1 hr
C-7 Foxhole	500 yds	Broadside to blast.	Some spalling damage.	Completely filled.	1 Ditcher ½ hr Hand labor 2 man hrs
C-8 Trench	300 yds	Broadside to blast.	Some spalling damage.	Completely filled.	1 ditcher ½ hr Hand labor 2 man hrs
C-9 Stake	500 yds	Standard steel picket.	Scorched and maybe displaced.	Picket bent flat.	Straighten picket 1 man hr
2 Sheep	500 yds	C-1 and C-9 position. Sheep normal.	Lethal radiation both thermal and nuclear.	Killed by the blast effects. Dosimeter readings of both animals lost.	NA
2 Sheep	500 yds	C-2 and C-8 position. Sheep normal.	Burnt severely on back. Lethal dose of nuclear radiation.	Killed by blast effects. Dosimeter readings of both animals lost.	NA
Sheep	500 yds	C-3 position. Sheep normal.	Maybe scorching of portions of the back. Lethal dose of nuclear radiation.	Killed by blast effects. Dosimeter reading lost.	NA
Sheep	500 yds	C-4 position. Sheep normal	Lethal nuclear radiation. No blast damage.	Euthanasia given to prevent further suffering. Received 3,774 r.	NA
Sheep	500 yds	C-5 position. Sheep normal.	Lethal radiation. No blast damage.	Killed by blast effects. Dosimeter reading lost.	NA

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DAMAGE EVALUATION REPORT

SHOT V - 10

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 14 KT	Condition of equipment or emplacement after shot. Actual yield 15.7 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Sheep	500 yds	C-6 position. Sheep normal.	Lethal radiation. No blast damage.	Euthanasia given to prevent further suffering. Received 3,915 r.	NA
Sheep	500 yds	C-7 position. Sheep normal.	Maybe scorching of portion of the back. Lethal dose of nuclear radiation.	Killed by blast effects. Received 3,915 r.	NA
Truck, 2½ ton, GMC, 6 x 6, M-135	500 yds	Left side facing GZ. Canvas missing. Vehicle not in running condition. Stake slightly bent. Paint in good condition.	Windshield broken, hood caved in, and tarpaulins torn.	Major items completely destroyed. Vehicle blown 120 yards to rear. Engine was thrown 50 feet from chassis.	Replace vehicle.
Machine Gun, Light Cal. 30, M1919A4	500 yds	Facing GZ. Traversing mechanism missing. Weapon in good condition. Slight down.	Thrown about, light damage from blast. Exposed surface severely scorched. Gun is functional.	Weapon could not be located.	Weapon could not be located.
Machine Gun, Light Cal. 30, M1919A4	500 yds	Facing away from GZ. Pintle missing. Weapon in good condition.	Thrown about. Light damage from blast. Surfaces severely scorched. Gun is functional.	Gun could not be located.	Could not be evaluated.
Truck, ¼ ton, 4 x 4, M-38	500 yds	Facing away from GZ. Vehicle in serviceable condition. Canvas in good condition. Windshield intact. Paint in good condition.	Overturned, moderate damage. All exposed surfaces severely scorched.	Major item completely destroyed. Vehicle blown 100 yards to rear.	Replace vehicle.
Mortar, 81mm M1	500 yds	Facing away from GZ. Sights missing. Weapon in in good condition. Paint in good condition.	Turned over, and light damage from blast. Sighting equipment destroyed. Surfaces severely scorched.	Weapon moved to rear approximately 15 feet. Barrel and tripod scorched. Base plates not damaged.	Approximately 2 hours would be required to clean and service weapon.

DAMAGE EVALUATION REPORT

SHOT V - 10

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 1/4 KT	Condition of equipment or emplacement after shot. Actual yield 15.7 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Mortar, 60mm	500 yds	Facing away from GZ. Sights missing. Weapon is serviceable.	Turned over, light damage from blast.	This weapon could not be located.	Damage to this weapon could not be evaluated.
Machine Gun, Heavy Cal. 50 M2	500 yds	Facing away from GZ. Sights bolt, and receiver group cover missing. Gun unserviceable.	Thrown about, light damage from blast. Surfaces severely scorched.	Major item completely destroyed. Gun blown 300 yards to rear. Barrel broken in two and part of it missing.	Replace Gun.
Machine Gun, Heavy Cal. 50 M2	500 yds	Facing GZ. Elevating and traversing mechanism, pintle bolt missing. Sights down. Gun is serviceable.	No damage.	Gun blown 50 feet to rear but not damaged by blast.	Approximately 3 hours would be required to clean and service this weapon.
Truck, 2½ ton, GMC, 6 x 6, M-135	500 yds	Right side facing GZ. Vehicle in running condition. Top and bows missing. Hood bent in. Windshield down, glass intact.	Windshield broken, hood caved in and tarpaulins torn.	Major item completely destroyed. Vehicle blown 300 yards to rear. Frame twisted into a pretzel. Parts laying at 1000 yard line.	Replace vehicle.
Gun, 57mm	500 yds	Right side facing GZ. Towed by M-135. Muzzle covered. Weapon is serviceable.	Turned over. Damage sighting equipment.	Major item completely destroyed. Weapon blown 175 yards to rear. Breech and tube torn completely loose from carriage. Some parts laying at 800 yard line.	Replace weapon.
Truck, Utility, ¼ ton, 4 x 4, M-38	500 yds	Left side to facing GZ. Vehicle will not run. Top and side curtains missing. Windshield down and glass missing. Paint in good condition.	Overturned, moderate damage. All exposed surfaces severely scorched.	Major item completely destroyed. Vehicle blown 200 yards to rear. Parts laying at 800 yard line.	Replace Vehicle.
Mortar, 60mm	500 yds	Facing GZ. Sights missing. Paint chipped. Weapon is serviceable.	Turned over, light damage from blast.	Weapon could not be located.	Damage to weapon could not be evaluated.

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DAMAGE EVALUATION REPORT

SHOT V - 10

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 14 KT	Condition of equipment or emplacement after shot. Actual yield 15.7 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Mortar, 60mm	500 yds	right side facing GZ. Sight missing. Paint chipped. Weapon is serviceable.	Turned over. Sighting equipment destroyed. Severe scorching.	Weapon could not be located.	Damage to weapon could not be evaluated.
Truck, Utility, ¼ ton, 4 x 4, M-38	500 yds	Facing 45 degrees to the right of GZ. Vehicle in running condition. Canvas, glass, and drivers seat missing. Hood bent. Windshield frame down.	Overturned, moderate damage. Severe scorching on exposed surfaces.	Major item completely destroyed. Vehicle moved to rear 100 yards. Engine could be salvaged.	Replace vehicle.
Rifle, Browning, Automatic, Cal. 30 M1918A2	500 yds	Facing GZ. Magazine, sights, and bipod missing. Sling missing. Weapon is in serviceable condition.	Thrown about, slight damage from blast.	Weapon could not be located.	Damage to weapon could not be evaluated.
Rifle, Browning, Automatic, Cal. 30 M1918A2	500 yds	Facing GZ. Weapon is in serviceable condition. Sling missing. Sights down.	Thrown about, light damage from blast.	Weapon thrown to rear 110 yards. Stock burned. Bipod missing. Weapon not in firing condition.	Approximately 4 hours would be required to clean weapon and replace parts damaged by blast.
Truck, Utility, ¼ ton, 4 x 4, M-38	500 yds	Facing GZ. Vehicle will not run. Top windshield glass and all seat missing. Windshield frame down. Hood bent slightly. Right front head light broken. Left rear tire flat.	Moderate damage. Vehicle displaced and possible overturned. Severe scorching on exposed surfaces.	Major item completely destroyed Vehicle moved approximately 5 feet to rear. Body bent and torn up.	Replace vehicle.
Radio, SCR-300	500 yds	Sitting on ground facing GZ. In operating condition.	Thrown about and parts broken by blast.	Completely destroyed. All blast effects, not heat. Tubes and wiring damaged extensively.	Beyond repair.
Radio, SCR-300	500 yds	Sitting on ground facing GZ. Serviceable and operating condition.	Thrown about and parts broken by blast.	Only the top was found.	Beyond repair.

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DAMAGE EVALUATION REPORT

SHOT V - 10

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 14 KT	Condition of equipment or emplacement after shot. Actual yield 15.7 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Mortar, 81mm M1	500 yds	Facing 90 degrees to the right of GZ. Sights missing. Paint in good condition.	No damage.	Tube blown 400 feet to rear. Weapon scorched but is in fair condition. Base plate not damaged.	Approximately 2 hours would be needed to clean and service weapon.
Truck, 2½ ton, GMC, 6 x 6, M-135	500 yds	Facing GZ. Canvas and glass missing. Windshield frame down. Hood bent in. Right seat burned. Vehicle is in running condition. Paint in good condition.	Displaced. Windshield broken, hood caved in and bows broken. Exposed surfaces and tarpaulins severely scorched.	Hood and windshield could not be found. Body and cab badly bent in. Engine and power train appear to be in serviceable condition.	To restore vehicle to same condition as before blast would require approximately 130 man hours.
Machine Gun, Light Cal. 30, M1919A4	500 yds	Facing GZ. Traversing and elevating mechanism missing. Sights down. Weapon in operating condition.	Thrown about, light damage from blast. Exposed surface severely scorched. Gun is functional.	Trigger group bent. Bolt burned. Receiver group missing.	Approximately 5 hours would be required to replace damaged parts and clean gun.
Maching Gun, Light Cal. 30, M1919A4	500 yds	Facing away from GZ. Elevating and traversing mechanism missing. Sights down. Pintle bolt missing. Weapon is in firing condition.	Thrown about, light damage from blast. Surfaces severely scorched. Gun is functional.	Weapon could not be located.	Damage could not be evaluated.
Aiming Circle, M1	500 yds	Facing GZ. Item in good condition. Mounted on tripod.	Blown over. Unshielded glass surfaces toward GZ severely burned. Surfaces severely scorched.	Aiming Circle could not be located.	Damage to Aiming Circle could not be evaluated.
Truck, Utility, ¼ ton, 4 x 4, M-38	500 yds	Facing GZ. Hood, windshield assistant drivers seat, top and side curtains missing. Vehicle is in running condition. Paint very badly burned.	Moderate damage. Vehicles displaced and possible overturned. Severe scorching on exposed surfaces.	Body badly bent. Seats completely burned out. Tires scorched.	To restore this vehicle to same condition as before blast, would require approximately 70 man hours.

DAMAGE EVALUATION REPORT

SHOT V - 10

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 1/4 KT	Condition of equipment or emplacement after shot. Actual yield 15.7 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
C-1 Stake	1000 yds	Wooden stake embedded 2' in ground.	Slightly scorched.	Undamaged.	None
C-2 Trench	1000 yds	Broadside to blast.	Some spalling damage.	Undamaged.	None
C-3 Foxhole	1000 yds	Broadside to blast.	Some spalling damage.	Undamaged.	None
C-4 Bunker	1000 yds	Entrance facing GZ.	Sandbags and exposed wood severely scorched.	Cover blown partially off. Inside partially filled.	1 Dozer ½ hr Hand labor 3 man hrs Clean out 2 man hrs
C-5 Bunker	1000 yds	Entrance facing GZ.	Sandbags and exposed wood severely scorched.	Slight cave in entrance. Sandbags destroyed.	Clean out 2 man hrs Sandbags (60) 1 man hr
C-6 Bunker	1000 yds	Entrance facing GZ.	Sandbags and exposed wood severely scorched.	Sandbags partially destroyed.	Replace 20 sandbags 1 man hr
C-7 Foxhole	1000 yds	Broadside to blast.	Some spalling damage.	Undamaged.	None
C-8 Trench	1000 yds	Broadside to blast.	Some spalling damage.	Slightly caved in and filled.	Clean out ½ man hr
C-9 Stake	1000 yds	Standard steel picket.	Slightly scorched.	Undamaged.	None
Sheep	1000 yds	C-1 position. Sheep normal.	Lethal radiation dose. Severe thermal burns.	No visible effects received 3,610 r. Will eventually die.	NA
Sheep	1000 yds	C-2 position. Sheep normal.	Lethal radiation. Burnt severely on back.	No visible effects. Received 2,760 r. Will eventually die.	NA
Sheep	1000 yds	C-3 position. Sheep normal.	Radiation sickness. Doubtful fatality.	No visible effects. Received 1,985 r. Will eventually die.	NA

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 14 KT	Condition of equipment or emplacement after shot. Actual yield 15.7 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Sheep	1000 yds	C-4 position. Sheep normal.	Radiation sickness. Doubtful fatality.	No visible effects. Received 1,401 r. Will eventually die.	NA
Sheep	1000 yds	C-5 position. Sheep normal.	Radiation sickness. Doubtful fatality.	Right front leg broken in twisted chain, and destroyed to stop suffering. Received 96 r.	NA
Sheep	1000 yds	C-6 position. Sheep normal.	Radiation sickness. Doubtful fatality.	No visible effects. Received 1,140 r. Will eventually die.	NA
Sheep	1000 yds	C-7 position. Sheep normal.	Radiation sickness. Doubtful fatality.	No visible effects. Received 1,965 r.	NA
Sheep	1000 yds	C-8 position. Sheep normal.	Lethal radiation. Burnt severely on back.	3rd degree burns on face and ears and extensive wool burns over back.	NA
Sheep	1000 yds	C-9 position. Sheep normal.	Lethal radiation dose. Severe thermal burns.	Severely burned but killed by strangulation. Received 3,715 r.	NA
Carriage, Motor, 105mm Howitzer, M7	1000 yds	Facing 90 degrees to left of GZ. Floor boards, driver seat, armored shield right side, and batteries missing. Right engine hatch open. Vehicle unserviceable.	No damage.	Right side bent in slightly. Right engine hatch blown shut. Right side burned and sandblasted.	If the carriage had been in serviceable condition before blast, it would have been in serviceable condition after blast.
Howitzer, 105mm mounted on Carriage Motor, M7	1000 yds	Facing 90 degrees to left of GZ. Weapon is in serviceable condition. Muzzle and breech block open.	No damage.	Weapon burned and sandblasted, and became very dirty.	Approximately 4 hours would be required to clean and service this weapon.
Machine Gun, Light, Cal. 30, M1919A4	1000 yds	Facing 90 degrees to left of GZ. Weapon dirty, but	Surface scorched. Weapon functional.	Weapon sandblasted and burned. Not materially	Approximately 2 hours would be required to

DAMAGE EVALUATION REPORT

SHOT V - 10

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 14 KT	Condition of equipment or emplacement after shot. Actual yield 15.7 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Machine Gun, Light, Cal. 30, M1919A4 (Cont'd)	1000 yds	in serviceable condition. Mounted on tripod. Sight down.		damaged by blast. Turned over on left side.	clean and service this gun.
Machine Gun, Light, Cal. 30, M1919A4	1000 yds	Facing 90 degrees to right of GZ. Weapon dirty but serviceable. Mounted on tripod. Sights up.	Surface scorched. Weapon functional.	Weapon turned over on right side. Weapon badly burned and sandblasted.	It would take approximately 2 hours to clean and service this weapon.
Machine Gun, Light, Cal. 30, M1919A4	1000 yds	Facing GZ. Elevating and traversing mechanism and pintle missing. Gun laying on tripod. Sights down. Gun is firing condition.	No damage	Weapon blown off tripod. Badly burned and sandblasted.	Approximately 2 hours would be required to clean and service gun.
Truck, 2½ ton, GMC, 6 x 6, M-135	1000 yds	Facing GZ. Vehicle unserviceable. All glass, canvas and bows troop seats, and upper section of tail pipe missing. Hood torn loose and bent. Windshield frame bent. Left side of cab bent in. Left rear of cargo bed bent in. Engine will not start. Rear-view and side mirrors broken.	Glass broken. Surface severely scorched.	Hood, windshield frame, tail gate torn loose. Seats burned out. Vehicle badly burned and sandblasted.	Approximately 16 man hours would be required to repair damage caused by the blast.
Rifle, Cal. 30 M1	1000 yds	laying in cab of truck. Sling missing. Weapons is dirty but will operate.	No damage.	No damage, other than becoming dirtier, done by blast.	Approximately 1 hour would be required to clean and service this weapon.
Howitzer, 105mm M3	1000 yds	Facing away from GZ. Weapon is in serviceable condition. Trails spread. Breech and muzzle open. Sights missing.	No damage.	Weapon sandblasted and dirty. No other damage caused by blast.	Approximately 14 man hours would be required to clean and service this weapon.
Howitzer, 105mm M2A2	1000 yds	Breech and muzzle open.	No damage.	Weapon became very dirty.	It would take approximately 2 hours to clean.

DAMAGE EVAL ION REPORT

SHOT V - 10

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 14 KT	Condition of equipment or emplacement after shot. Actual yield 15.7 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Machine Gun, Heavy, Cal. 50, M2	1000 yds	Facing GZ. Pintle broken and bolt missing. Barrel laying on AA mount. Mount unserviceable.	No damage.	Weapon knocked off mount. Badly sandblasted and very dirty.	Approximately 2 hours be required to clean and service this weapon.
Rifle, Recoiless 57mm	1000 yds	Facing GZ. Trigger grip, sights, safety, check and shoulder pads missing. Weapon is unserviceable.	No damage.	Weapon dirty and badly sandblasted.	Approximately 2 hours would be required to clean weapon.
Truck, Utility, ¼ ton, 4 x 4, M-38	1000 yds	Facing GZ. Vehicle unserviceable. Lights, part of windshield, frame, and assistant drivers seat, canvas, bows, glove compartment door, and spare tire missing. Hood, right front fender, and windshield frame bent. Radiator torn open. Rear seat torn loose.	Surfaces severely scorched.	Hood blown 30 yards to rear of vehicle. Cowl torn open.	Approximately 8 man hours would be required to repair damage caused by blast.
Rifle, Browning, Automatic, Cal. 30, M1918A2	1000 yds	Placed in above truck. Sights up. Weapon dirty but serviceable.	Surface scorched.	No damage except for becoming very dirty.	Approximately 2 hours would be required to clean and service weapon.
Machine Gun, Heavy, Cal. 30, M2	1000 yds	Placed facing away from GZ. Weapon serviceable. Operation handle torn off. Elevating and traversing mechanism loose. Mounted on tripod.	No damage.	Weapon sandblasted and dirty. No other damage caused by blast.	It would take approximately 2 hours to clean and service gun.
Machine Gun, Heavy, Cal. 30, M1917A1	1000 yds	Facing away from GZ. Weapon unserviceable. Cover open, sights up. Weapon mounted on tripod.	No damage.	Weapon turned over and sandblasted. No other damage caused by blast.	It would take approximately 2 hours to clean and service gun.

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DAMAGE EVALUATION REPORT

SHOT V - 10

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 14 KT	Condition of equipment or emplacement after shot. Actual yield 15.7 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Aiming Circle, M1	1000 yds	Facing 90 degrees to right of GZ. Lens missing from eye-piece. Mounted on tripod. Item is unserviceable.	No prediction given.	Aiming Circle blown 20 feet to rear. Tripod badly bent. Item badly scorched.	Replace Aiming Circle.
Mortar, 81mm M1	1000 yds	In foxhole facing GZ. Sights missing. Weapon is mounted on bipod and baseplate.	No damage.	Weapon turned 5 degrees to right. Weapon very dirty.	Approximately 3 hours would be required to clean weapon.
Mortar, 81mm, M1	1000 yds	Facing 90 degrees to right of GZ. Sights and baseplate missing. Rest of weapon is serviceable.	Surface scorched.	Weapon turned over on right side. Dirty and sandblasted.	Three hours would be required to clean weapon.
Truck, 2½ ton, GMC, 6 x 6 M-135	1000 yds	Facing away from GZ. Dug in position. All glass, both mirrors, top section of tail-pipe, and canvas, and bows missing. Hood and cowl badly bent. Seats scorched. Both doors caved in. Tail-gate bowed out. Batteries dead. Vehicle will not start.	No prediction given.	Top bent in slightly.	Approximately 35 man hours would be required to repair damage caused by blast.
Power unit, radar set SP-1M	1000 yds	Facing GZ. Fuel pump, distributor cap, wiring, fan, generator, and batteries missing. Engine loose from electrical plant. All instruments beyond repair.	No prediction given.	Top bent in slightly.	Approximately 4 hours would be required to repair damage caused by blast.
Trailer, 4 wheel USMC	1000 yds	Facing GZ. Left rear jack leg broken off and right rear and right front jack legs bent. Right rear tire unserviceable.	No prediction given.	Trailer turned completely over. Badly sandblasted.	Approximately 2 hours would be required to clean and service this weapon.

DAMAGE EVALUATION REPORT

SHOT V - 10

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 14 KT	Condition of equipment or emplacement after shot. Actual yield 15.7 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Truck, Utility, ¼ ton, 4 x 4, M-38	1000 yds	Facing GZ. Rear-view mirror canvas, bows, glove compartment door, and glass missing. Seats scorched.	Glass broken.	Windshield frame, cowl, and hood ripped loose and bent back over drivers compartment. Vehicle badly sandblasted.	Approximately 34 man hours would be required to repair damaged caused by blast.
Gun, 57mm, M1	1000 yds	Facing 90 degrees to left of GZ. Sights missing. Muzzle covered with canvas and breech open. Trails closed and hooked to truck, M-135. Weapon serviceable but dirty.	Surfaces severely scorched.	Weapon sandblasted and very dirty. No other damage caused by blast.	It would take approximately 2 hours to clean and service weapon.
Truck, 2½ ton, GMC, 6 x 6, M-135	1000 yds	Facing 90 degrees to right of GZ. Windshield glass, outside mirrors, all canvas and bows missing. Drivers seat torn loose. Both doors with shattered glass. Hood bent. Vehicle will run.	Glass broken. Surfaces severely scorched.	Vehicle burned over on right side. Hood blown off and laying 30 yards to rear. Racks torn up. Both doors sprung.	Approximately 80 man hours would be required to repair damage caused by blast.
Launcher, Rocket 2.36, M9A1	1000 yds	Facing GZ. Sling missing. Sight lens missing. Weapon is serviceable.	No damage.	Weapon badly sandblasted. Weapon moved to rear 10 feet. Tube bent.	Replace launcher.
Truck, Utility, ¼ ton, 4 x 4, M-38	1000 yds	Facing away from GZ. Vehicle unserviceable. Hood, batteries, windshield glass, assistant driver seat, canvas and bows missing. Head-lights out. Grill, front, fenders, and steering column bent. Windshield frame laying down.	No damage.	No visible damage caused by blast.	Vehicle in same condition as before blast.

DAMAGE EVALUATION REPORT

SHOT V - 10

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 14 KT	Condition of equipment or emplacement after shot. Actual yield 15.7 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Rifle, Cal. 30 M1	1000 yds	Laying in above truck. Sling missing and stock scarred. Weapon is serviceable.	No damage.	Weapon became very dirty No other damage caused by blast.	It would take approximately 1 hour to clean rifle.
Truck, Utility, ¼ ton, 4 x 4, M-38	1000 yds	Facing away from GZ. Windshield down, glass and canvas missing. Vehicle will not start.	No damage.	Vehicle sandblasted. No other visible damage.	Vehicle in same condition as before blast.
Gun 57mm	1000 yds	Facing GZ. Weapon in good condition. Trails spread. Paint good. Weapon dirty.	No damage.	Weapon sandblasted and very dirty. No other damage caused by blast.	Approximately 2 hours would be required to clean and service this weapon.
Gun, 90mm, M1A2	1000 yds	Facing 90 degrees to right of GZ. Tube level. Glass broken and shattered in indicators. Weapon is dirty but serviceable.	No damage.	Sandblasted and dirty, but no other damage to weapon.	It would take approximately 6 hours to clean weapon.
Flamethrower, Portable, M2A1	1500 yds	Behind 1 ft embankment. New.	No damage.	In good condition. Tanks very slightly scorched.	15 minutes by trained repairman for cleaning.
C-1 Stake and C-9 Stake	1500 yds	Wooden stake embedded 2' in ground.	No damage.	No damage.	None
C-2 Trench	1500 yds	Broadside to blast.	No damage.	No damage.	None
C-3 and C-7 Foxhole	1500 yds	Broadside to blast.	No damage.	No damage.	None
C-4 Bunker	1500 yds	Entrance facing GZ.	No damage.	Cover partially blown off.	Reshape cover 3 man hrs
C-5 Bunker	1500 yds	Entrance facing GZ.	No damage.	Cover partially blown off and entrance partially filled.	Reshape cover 3 man hrs Clean out 1 man hr

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SHOT V - 10

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 14 KT	Condition of equipment or emplacement after shot. Actual yield 15.7 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
C-6 Bunker	1500 yds	Entrance facing GZ.	No damage.	Entrance partially filled.	Clean out 1 man hr
C-8 Trench	1500 yds	Broadside to blast.	No damage.	Slight cave-in	Clean out 1 man hr
Sheep	1500 yds	C-1 position. Sheep normal.	Wool scorched on portions of surface oriented to blast.	No visible effects. Received 408 r. Should survive.	NA
Sheep	1500 yds	C-2 position. Sheep Normal.	Wool scorched on back.	No visible effects. Radiation received unknown. Dosimeter lost.	NA
Sheep	1500 yds	C-3 position. Sheep normal.	No effects.	No visible effects. Received 105 r.	NA
Sheep	1500 yds	C-4 position. Sheep normal.	No effects.	Slight wool burns over the left shoulder region. Received 61 r. Should survive.	NA
Sheep	1500 yds	C-5 position. Sheep normal.	No effects.	No visible effects. Received 41 r. Should survive.	NA
Sheep	1500 yds	C-6 position. Sheep normal.	No effects.	No visible effects. Received 124 r. Should survive.	NA
Sheep	1500 yds	C-7 position. Sheep normal.	No effects.	Slight wool burns over the head and back. Received 148 r. Should survive.	NA
Sheep	1500 yds	C-8 position. Sheep normal.	Wool scorched on back.	Slight wool burns over the left side of the body. Received 328 r. Should survive.	NA

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Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 14 KT	Condition of equipment or emplacement after shot. Actual yield 15.7 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Sheep	1500 yds	C-9 position. Sheep normal	Wool scorched on portions of surface oriented to blast.	Slight wool burns over the head and back. Received 488 r. Will eventually die.	NA
Gun, 57mm, M2	1500 yds	Facing GZ in emplacement two feet deep. Weapon dirty but serviceable. Sights missing. Cover on muzzle and breech. Tube elevated 5 degrees. Trails spread. Left tire slightly burned.	No damage.	Paint on left side of gun burned. No other damage caused by blast.	It would take approximately 2 hours to clean and service this weapon.
Rocket Launcher, 2.36, M18	1500 yds	Facing away from GZ. Firing mechanism bent. Part of sight missing. Weapon in good condition.	Possibly overturned. No damage.	Weapon became dirty, but no other damage was caused by blast.	Approximately ½ hour would be required to clean this weapon.
Machine Gun, Heavy Cal. 50, M2	1500 yds	Facing away from GZ. Traversing and elevating mechanism missing. Gun very dirty but will operate. Mounted on tripod.	No damage.	Weapon sandblasted on left side and very dirty. No other damage caused by blast.	It would take approximately 2 hours to clean and service gun.
Machine Gun, Heavy Cal. 50, M2	1500 yds	Facing GZ. Weapon unserviceable. Elevating and traversing mechanism missing. Cocking handle bent. Weapons very dirty.	No damage.	Weapon sandblasted on left side and very dirty. No other damage caused by blast.	It would take approximately 2 hours to clean and service gun.
Truck, 2½ ton, GMC, 6 x 6, M-135, w/o winch	1500 yds	Facing GZ. Vehicle not in running condition. Canvas, hood and bows missing. All glass broken out. Radiator unserviceable. Front fender cab, and grill bent. Steering mechanism broken. Batteries dead. Front light out. Paint in good condition.	Glass damage only. Paint scorched.	No damage caused by blast.	Vehicle in same condition as before blast.

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DAMAGE EVALUATION REPORT

SHOT V - 10

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 14 KT	Condition of equipment or emplacement after shot. Actual yield 15.7 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Gun, 57mm	1500 yds	Facing away from GZ. Weapon will operate. Sights missing. Muzzle closed. Breech very dirty. Trails spread.	No damage.	No damage caused by blast. Weapon became very dirty.	Approximately 2 hours would be required to clean and service weapon.
Machine Gun, Light, Cal. 30, M1919A4	1500 yds	Facing GZ. Weapon very dirty but is in operating condition. All component parts present.	No damage.	Weapon very dirty, but no other damage caused by blast.	Approximately 2 hours would be required to clean and service weapon.
Truck, Utility, ¼ ton, 4 x 4, M-38	1500 yds	Facing GZ. Vehicle will run. Hood and windshield frame bent. Glass, canvas and spare tire missing. Windshield frame down. Part of drivers seat missing. Upper part of drivers seat burned.	No damage.	Hood torn off and blown 50 feet to rear. Windshield frame in up position. Paint burned slightly. Vehicle will run.	It would take approximately 1 hour to repair damage caused by blast.
Machine Gun, Light, Cal. 30, M1919A4	1500 yds	Facing GZ. Weapon unserviceable. Bolt handle missing. Weapon very dirty.	No damage.	No damage caused by blast. Weapon became dirtier.	Approximately 2 hours would be required to clean and service gun.
Machine Gun, Heavy, Cal. 30, M1917A1	1500 yds	Facing GZ. Mounted on tripod. Weapon unserviceable. Water plug, and rear sight missing. Water jacket dented. Cover bent. Mechanism in receiver group bent.	No damage.	Sandblasted on left side. No other blast effects.	It would take approximately 2 hours to clean and service gun.
Mortar, 81mm, M1	1500 yds	In foxhole facing away from GZ. Tube only part present. It is serviceable	No damage.	Muzzle of tube sandblasted slightly. No other damage caused by blast.	Approximately ½ hour would be required to clean tube.

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DAMAGE EVALUATION REPORT

SHOT V - 10

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 14 KT	Condition of equipment or emplacement after shot. Actual yield 15.7 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Tank, Light, M24	1500 yds	Left side of facing GZ. Left fenders and dust shields, right dust shield, front lights, windshields, and batteries missing. Tank not in running condition.	No damage.	No damage caused by blast.	If tank had been serviceable before blast, it would have been serviceable after blast.
Gun, 75mm mounted on above tank	1500 yds	Left side facing GZ. Sight missing. Breech is closed. Weapon dirty but will operate.	No damage.	No damage caused by blast. Weapon became very dirty.	It would take approximately 3 hours to clean weapon.
Mortar, 70mm, M19	1500 yds	On top of ground facing GZ. Sights missing. Weapon is dirty but is in serviceable condition.	No damage.	Weapon became dirtier but no other damage caused by blast.	Approximately 1 hour would be required to clean and service mortar.
Launcher, Rocket 3.5, M-20	1500 yds	On top of ground facing away from GZ. Rubber missing from eyepiece. Weapon dirty but is in serviceable condition.	No damage.	Weapon move approximately 8 feet to rear. Paint slightly scorched. No other damage caused by blast.	It would take approximately ½ hour to clean.
Machine Gun, Light, Cal. 30, M1919A4	1500 yds	Facing away from GZ. Windage knob missing. Gun mounted on tripod. Weapon dirty but is in firing condition	No damage.	Right side sandblasted slightly. No other damage caused by blast.	It would take approximately 2 hours to clean gun.
Rifle, Browning, Automatic, Cal. 30, M1918A2	1500 yds	Facing GZ. in gun emplacement 1' deep. Left side of butt burned slightly. Weapon dirty but in firing condition	No damage.	Left side sandblasted. No other damage caused by blast.	Approximately 2 hours would be required to clean weapon.
Truck, Utility, ¼ ton, 4 x 4, M-38	1500 yds	Facing GZ. Windshield glass, canvas, bows, and assistant drivers seat	No damage.	Hood blown off and laying 75 feet to rear. Front of vehicle burned and sand-	Approximately 3 hours would be required to replace hood and paint

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 14 KT	Condition of equipment or emplacement after shot. Actual yield 15.7 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Truck, Utility, ¼ ton, 4 x 4, M-38 (Cont'd)	1500 yds	missing. Hood and windshield frame bent. Windshield frame laying on hood. Vehicle not in running condition. Paint in good condition.		blasted slightly.	front of vehicle.
C-1 Stake	2000 yds	Wooden stake embedded 2' in ground.	No damage.	No damage.	None
C-2 Trench and C-8 Trench	2000 yds	Broadside to blast.	No damage.	No damage.	None
C-3 Foxhole and C-7 Foxhole	2000 yds	Broadside to blast.	No damage.	No damage.	None
C-4 Bunker, C-5 Bunker and C-6 Bunker	2000 yds	Entrance facing GZ.	No damage.	No damage.	None
C-9 Stake	2000 yds	Standard steel picket.	No damage.	No damage.	None
Sheep	2000 yds	C-1 position. Sheep normal.	Severe burns around the mouth tissues.	No visible effect. Received 53 r. Should survive.	NA
Sheep	2000 yds	C-2 position. Sheep normal.	Severe burns around the mouth tissues if exposed.	Slight wool burns on the sides and back. Received 44 r. Should survive.	NA
Sheep	2000 yds	C-3 position. Sheep normal.	No effects.	No visible effects. Received 14 r. Should survive.	NA
Sheep	2000 yds	C-4 position. Sheep normal.	No effects.	No visible effects. Received 23 r. Should survive.	NA

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DAMAGE EVALUATION REPORT

SHOT V - 10

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 14 KT	Condition of equipment or emplacement after shot. Actual yield 15.7 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Sheep	2000 yds	C-5 position. Sheep normal.	No effects.	Slight wool burns over the sides and back. Received 10 r. Should survive.	NA
Sheep	2000 yds	C-6 position. Sheep normal.	No effects.	No visible effects. Received 13 r. Should survive.	NA
Sheep	2000 yds	C-7 position. Sheep normal.	No effects.	No visible effects. Received 132 r. Should survive.	NA
Sheep	2000 yds	C-8 position. Sheep normal.	Wool scorched on back. Light radiation sickness with no after-effects.	No visible effects. Received 35 r. Should survive.	NA
Sheep	2000 yds	C-9 position. Sheep normal.	Wool scorched on portions of surface oreinted to blast. Face and eyes heavily burned if oriented toward blast.	No visible effects. Received 63 r. Should survive.	NA
Machine Gun, Heavy, Cal. 50, M2	2000 yds	Facing away from GZ. Sights down. Weapon dirty but is in serviceable condition.	No damage.	Weapon became very dirty. No other damage caused by blast.	It would take approximately 2 hours to clean and service gun.
Truck, 2½ ton, GMC, 6 x 6, M-135	2000 yds	Facing GZ. Glass in windshield and glass in right door cracked. Top missing and only one bow in place Vehicle will run.	No damage.	No damage caused by blast.	Vehicle in same condition as before blast.
Truck, Utility, ¼ ton, 4 x 4, M-38	2000 yds	Facing 45 degrees to left of GZ. Top and windshield glass missing. Windshield down. Vehicle will not run.	Surfaces scorched.	Hood blown open but not damaged. No other damage caused by blast.	Vehicle in same condition as before blast.

DAMAGE EVALUATION REPORT

SHOT V - 10

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 14 KT	Condition of equipment or emplacement after shot. Actual yield 15.7 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Truck, Utility, ¼ ton, 4 x 4, M-38	2000 yds	Facing GZ. Top and windshield glass missing. Seats torn. Vehicle will run.	Broken glass. Surface scorched.	Hood blown off. Windshield blown up and back over drivers compartment.	Approximately 10 man hours would be required to repair damage caused by blast.
Morter, 4.2	2000 yds	Facing GZ. Sights missing. Weapon in serviceable condition.	No damage.	Weapon became very dirty. No other damage caused by blast.	It would take approximately 2 hours to clean and service weapon.
Machine Gun, Heavy, Cal. 50, M2	2000 yds	Facing GZ. Sights down. Weapon is in good condition.	No damage.	Weapon became very dirty. But not damaged by blast.	Approximately 2 hours would be required to clean and service weapon.
Machine Gun, Light, Cal. 30, M1919A4	2000 yds	Facing GZ. Weapon in firing condition. Sights down. Gun is dirty.	No damage.	No damage caused by blast. Weapon became very dirty.	It would take approximately 2 hours to clean and service gun.
Rifle, Browning Automatic, Cal. 30, M1918A2	2000 yds	Facing GZ. Weapon not in serviceable condition. Sights down.	No damage.	Weapon not damaged by blast. Rifle did become very dirty.	Approximately 3 hours would be required to clean weapon.
Gun, 57mm	2000 yds	Facing GZ. Weapon in good condition. Sights missing. Muzzle open, breech closed. Trails spread.	No damage.	No damage caused by blast. Weapon become very dirty.	It would take approximately 2 hours to clean and service weapon.
Truck, Utility, ¼ ton, 4 x 4, M-38	2000 yds	Facing GZ. Vehicle in serviceable condition. Top and side curtains missing. Windshield down, glass intact. Paint in good condition.	No damage.	No damage caused by blast.	Vehicle in same condition as before blast.
C-1 Stake and C-9 Stake	2500 yds	Wooden stake embedded 2' in ground.	No damage.	No damage.	None
C-2 Trench and C-8 Trench	2500 yds	Broadside to blast.	No damage.	No damage.	None

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DAMAGE EVALUATION REPORT

SHOT V - 10

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 14 KT	Condition of equipment or emplacement after shot. Actual yield 15.7 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
C-3 Foxhole and C-7 Foxhole	2500 yds	Broadside to blast.	No damage	No damage.	None
C-4 Bunker, C-5 Bunker and C-6 Bunker	2500 yds	Entrance facing GZ.	No damage.	No damage.	None
Sheep	2500 yds	C-1 position. Sheep normal.	Second degree burns exposed tissue.	No visible effects. Received 16 r. Should survive.	NA
Sheep	2500 yds	C-2 position. Sheep normal.	Second degree burns exposed sensitive tissue. Very light fleece scorching.	No visible effects. Received 15 r. Should survive.	NA
Sheep	2500 yds	C-3 position. Sheep normal.	No damage.	No visible effects. Received 9 r. Should survive.	NA
Sheep	2500 yds	C-4 position. Sheep normal.	No damage.	No visible effects. Received 5 r. Should survive.	NA
Sheep	2500 yds	C-5 position. Sheep normal.	No damage.	No visible effects. Received 6 r. Should survive.	NA
Sheep	2500 yds	C-6 position. Sheep normal.	No damage.	No visible effects. Received 5 r. Will survive.	NA
Sheep	2500 yds	C-7 position. Sheep normal.	No damage.	No visible effects. Received 3 r. Will survive.	NA
Sheep	2500 yds	C-8 position. Sheep normal.	Second degree burns to exposed sensitive tissue. Very light fleece scorching.	No visible effects. Received 7 r. Will survive.	NA

DAMAGE EVALUATION REPORT

SHOT V - 10

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 14 KT	Condition of equipment or emplacement after shot. Actual yield 15.7 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
Sheep	2500 yds	C-9 position. Sheep normal.	Second degree burns exposed sensitive tissue.	Slight wool burns on right legs. Received 14 r. Should survive.	NA
Truck, Utility, ¼ ton, 4 x 4, M-38	2500 yds	Facing GZ. Vehicle not in running condition batteries dead. Windshield glass and top missing. Paint in good condition.	No damage.	Hood blown open but not damaged. No other damage caused by blast.	Vehicle in same condition as before the blast.
Truck, Utility, ¼ ton, 4 x 4, M-38	2500 yds	Left side to GZ. Vehicle is in running condition. Canvas, side curtains, and spare tire missing. Paint in good condition.	No damage.	No damage caused by blast.	Vehicle in same condition as before blast.
Truck, Utility, ¼ ton, 4 x 4, M-38	2500 yds	Facing away from GZ. Vehicle in running condition. Doors and left side curtain laying in vehicle. Paint in good condition.	No damage.	No damaged caused by blast.	Vehicle in same condition as before blast.
C-1 Stake and C-9 Stake	3000 yds	Wooden stake embedded 2' in ground.	No damage.	No damage.	None
C-2 Trench and C-8 Trench	3000 yds	Broadside to blast.	No damage.	No damage.	None
C-3 Foxhole and C-7 Foxhole	3000 yds	Broadside to blast.	No damage.	No damage.	None
C-4 Bunker, C-5 Bunker, C-6 Bunker	3000 yds	Entrance facing GZ.	No damage.	No damage.	None
C-1 Stake and C-9 Stake	3500 yds	Wooden stake embedded 2' in ground.	No damage.	No damage.	None

DAMAGE EVALUATION REPORT

SHOT V - 10

Item of equipment or emplacement	Distance from GZ	Condition of equipment or emplacement prior to shot	Predicted damage based on estimated yield of 14 KT	Condition of equipment or emplacement after shot. Actual yield 15.7 KT	Estimated time, equipment and parts to repair to operable condition. Battlefield Conditions
C-2 Trench and C-3 Trench	3500 yds	Broadside to blast.	No damage.	No damage.	None
C-3 Foxhole and C-7 Foxhole	3500 yds	Broadside to blast.	No damage.	No damage.	None
C-4 Bunker, C-5 Bunker, C-6 Bunker	3500 yds	Entrance facing GZ.	No damage.	No damage.	None

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C-1 at 500 yards. This animal was not found after the detonation but was found two days later 500 yards from the original position. The sheep was burned extensively and killed by the effects of the blast. Dosimeter reading lost.

C-6 at 500 yards. This sheep was found in dying condition after the blast and was given euthanasia to prevent further suffering. Received 3,915 r.



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C-8 at 500 yards. This sheep was killed instantly by the blast effects of the detonation. Dosimeter reading lost.

C-8 at 1000 yards. This animal received third degree burns of the face and ears with extensive wool burns over the body. It showed symtoms of radiation sickness on 26 May and put to death the same day to prevent further suffering. Received 3202 r.



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C-9 at 1000 yards. Severely burned but killed by strangulation. Received 3,715 r.

C-4 at 1500 yards. This sheep received slight wool burns over the left shoulder region and will survive the effects of the detonation. Received 61 r.



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C-7 at 1500 yards. This animal acquired slight wool burns over the head and back and will survive. Received 158 r.

C-8 at 1500 yards. This sheep incurred slight wool burns over the left side of the body and will survive. Received 328 r.



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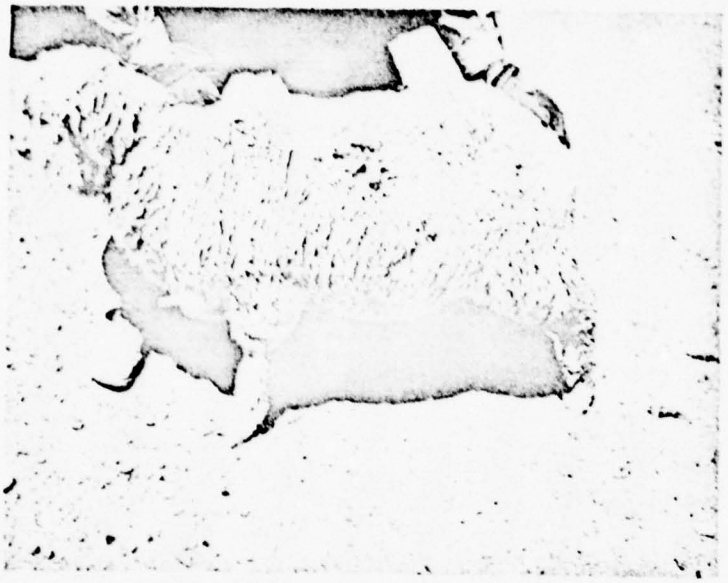
C-9 at 1500 yards. This animal received only slight wool burns over the head and back but will die from acute lethal radiation sickness. Received 488 r.

C-3 at 2000 yards. This animal acquired no visible effects from the detonation and will survive. Received 14 r.



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C-5 at 2000 yards. This animal received slight wool burns over the sides and back and will survive. Received 10 r.

C-6 at 2500 yards. This sheep incurred no visible effects. Received 5 r and will survive.



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BEFORE

Truck 1/4 ton 4 x 4 M-38 facing 45 degrees right of GZ at 500 yards.

AFTER

Completely destroyed.



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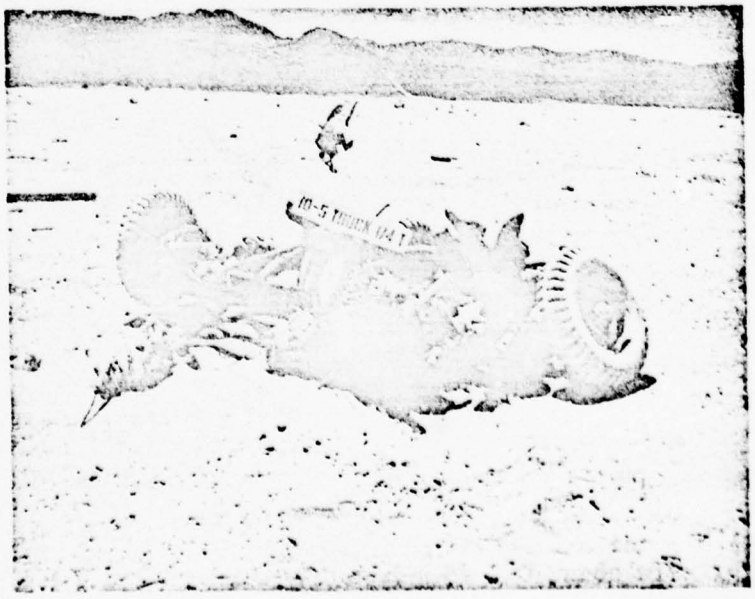


BEFORE

Truck, 1/4 ton 4 x 4 M-38 at 500 yards with left side toward GZ.

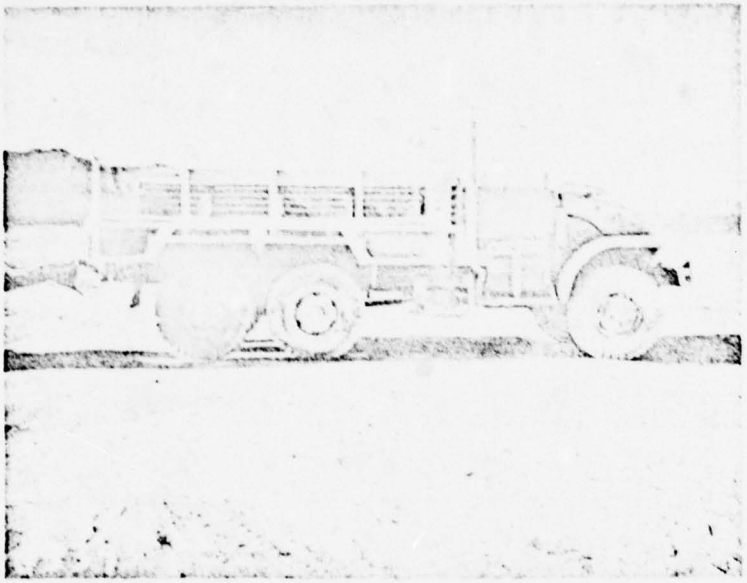
AFTER

Completely destroyed. Major part blown 200 yards to rear. Other parts laying at 800 yard line.



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BEFORE

Truck, 2½ ton 6 x 6 GMC, M-135 at 500 yards with right side toward GZ.

AFTER

Completely destroyed. Parts laying as far away as 1000 yard line.



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Item of equipment or emplacement	
Sheep	
Sheep	
Sheep	
Sheep	
Sheep	
Machine Gun, Cal. 50,	
Truck, 2½ GMC, 6 x	
Truck, Utility, ton, 4 x	355

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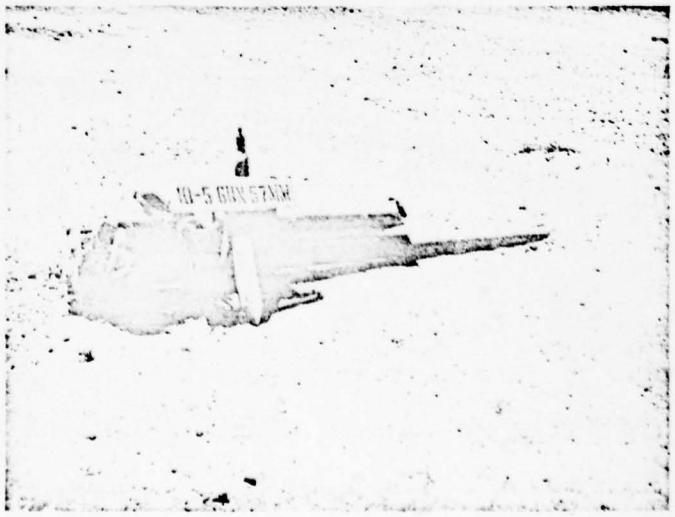


BEFORE

Gun, 57mm with right side toward GZ at 500 yards.

AFTER

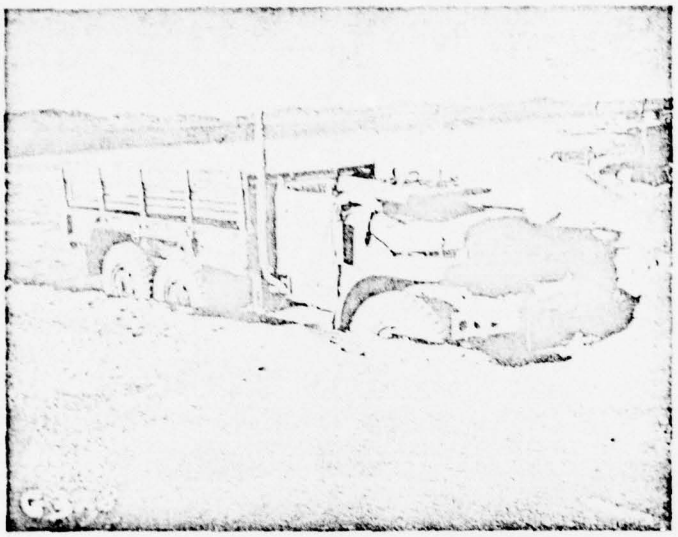
Completely destroyed. Breech and tube torn completely loose from carriage. Some parts laying at 800 yard line.



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BEFORE

Truck, 2½ ton 6 x 6 GMC M-135 facing GZ. at 500 yards.

AFTER

Hood and windshield could not be found. Body and cab badly bent.



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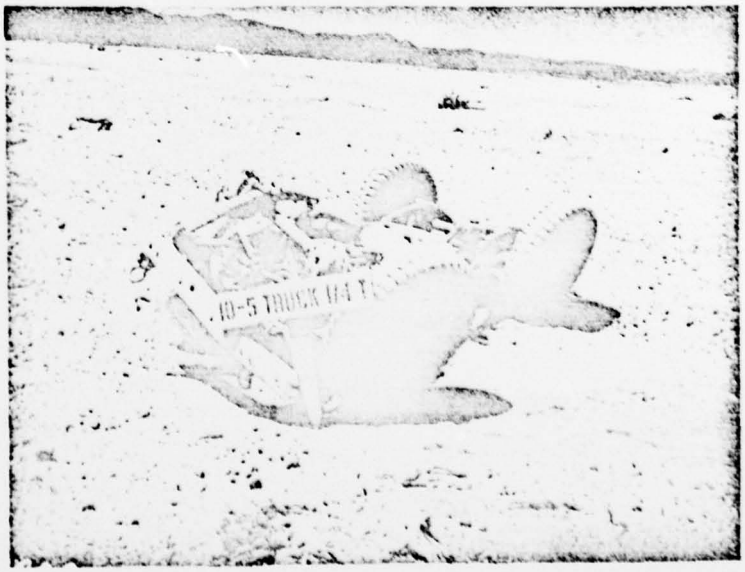


BEFORE

Truck, 1/4 ton 4 x 4, M-38 facing GZ at 500 yards.

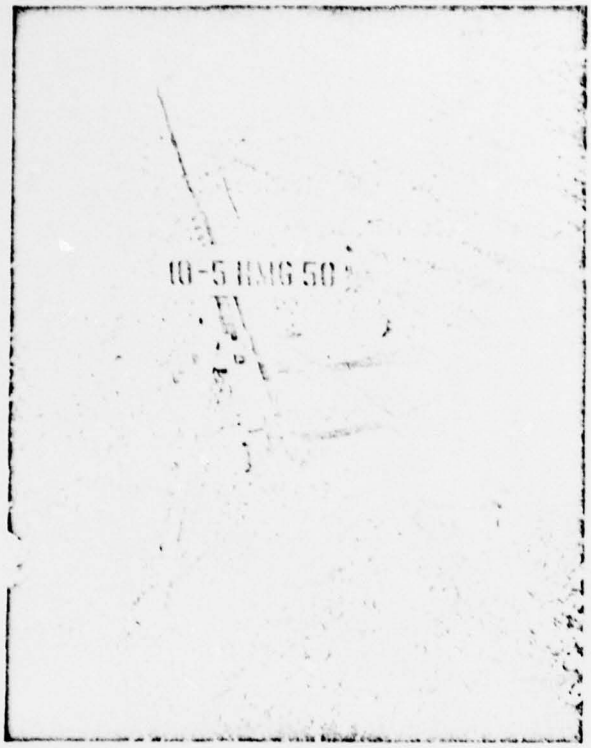
AFTER

Completely destroyed. Moved 5 feet to rear.



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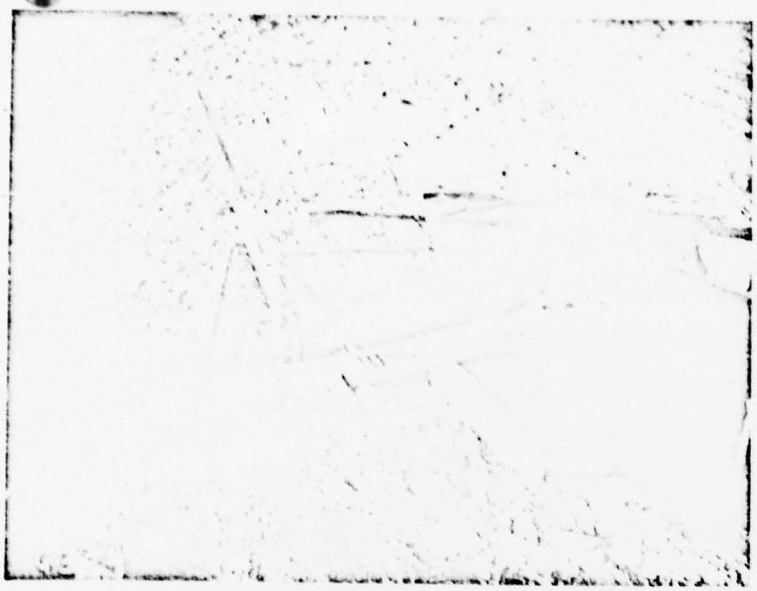
BEFORE

Machine Gun. heavy, Cal. 50, M2. Facing away from GZ at 500 yards.

AFTER

Completely destroyed. Blown 300 yards to rear. Barrel broken and part missing.



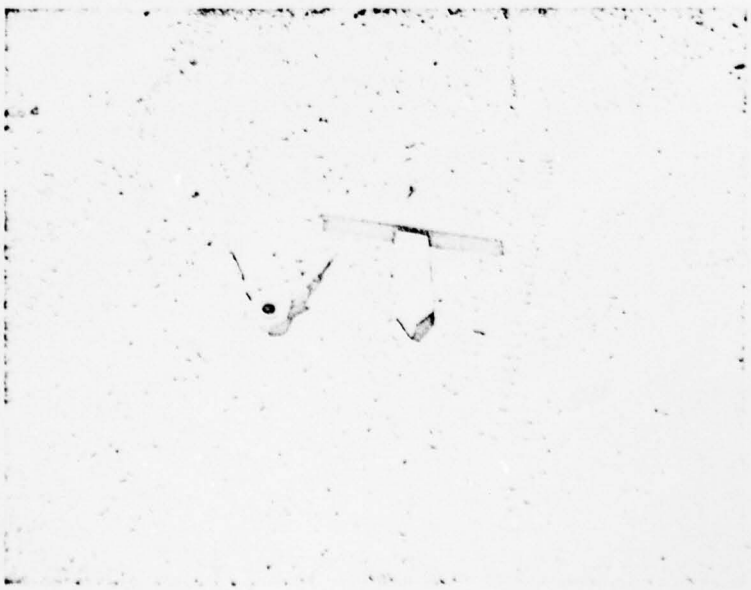


BEFORE

Machine Gun, light, Cal. 30, M1919A4 facing away from GZ at 500 yards.

AFTER

All that could be found was part of tripod. Balance of gun lost.



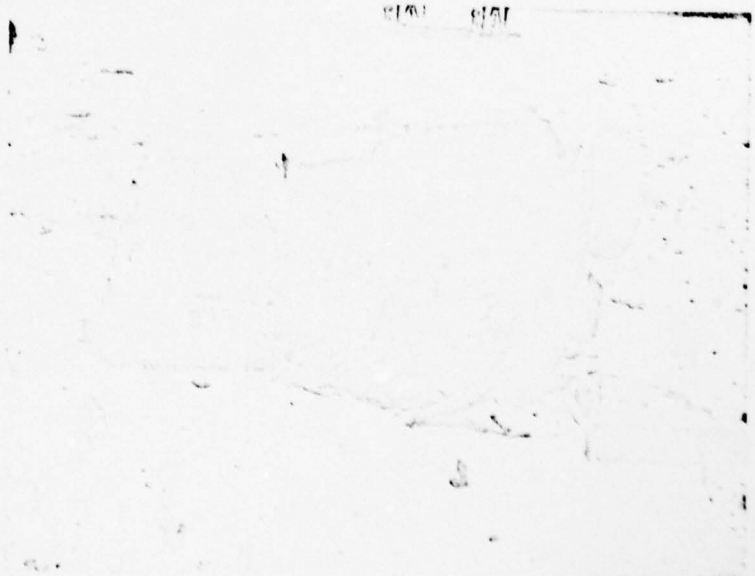
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BEFORE

Truck, 1/4 ton 4 x 4 M-38 facing away from GZ at 500 yards.



AFTER

Completely destroyed. Blown 100 yards to rear.

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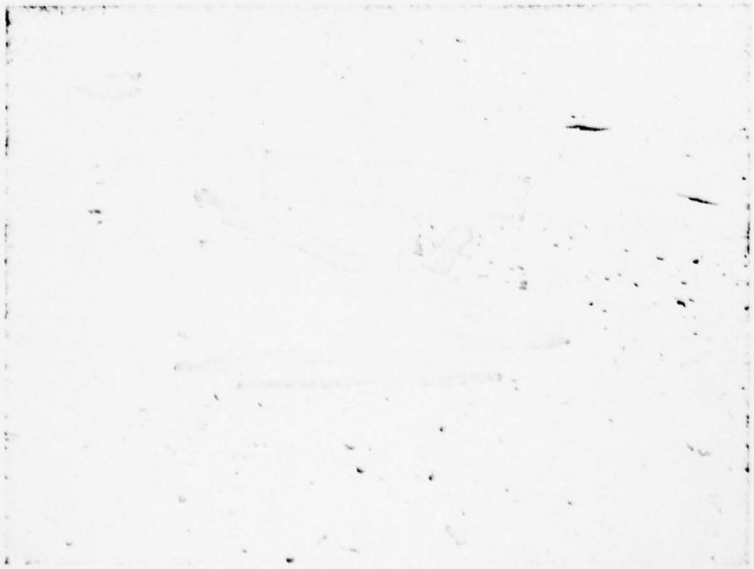


BEFORE

Mortar, 81mm, M1 facing away from GZ at 500 yards.

AFTER

Weapon moved to rear about 15 feet. Barrel and tripod scorched. No damage to base plate.



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BEFORE

Bailey bridge section broadside to GZ at 500 yards.

AFTER

Blown back 60 feet. Bent sway braces, stringers and panel supports.



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BEFORE

Truck, 1/4 ton 4 x 4, M-38 facing GZ at 1000 yards.

AFTER

Hood blown 30 yards to rear of vehicle. Cowl torn open.



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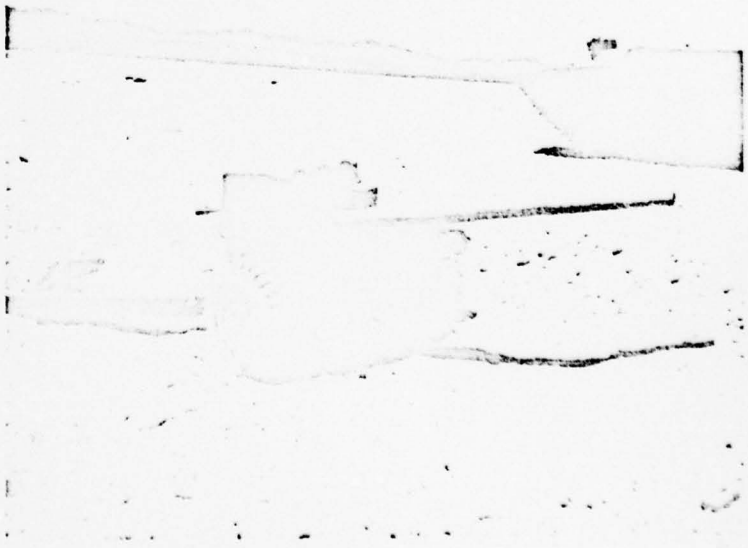


BEFORE

Gun, 57mm, M1, facing 90 degrees left of GZ at 1000 yards.

AFTER

Sandblasted and dirty. Small wheel on trail missing.



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BEFORE

Truck, 1/4 ton 4 x 4, M-38 facing GZ at 1000 yards.

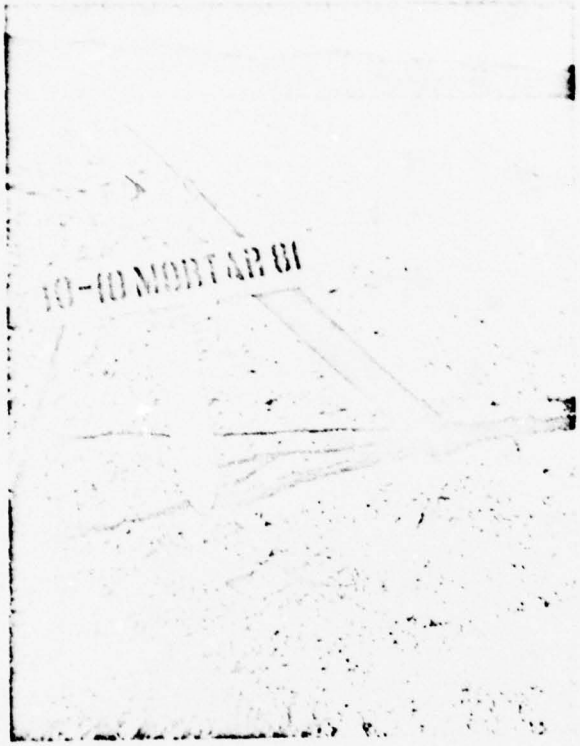
AFTER

Windshield frame and hood ripped loose and bent back over drivers compartment.



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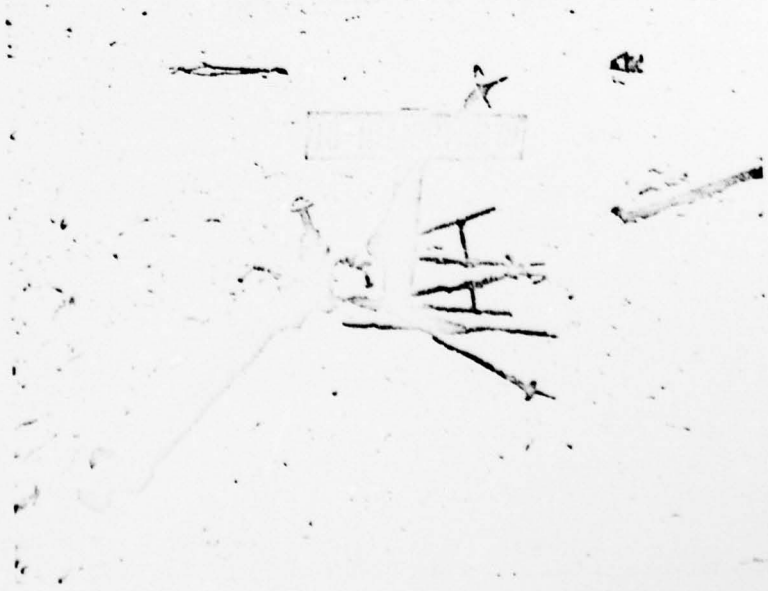


BEFORE

Mortar 81mm, M1 facing 90 degrees right of GZ at 1,000 yards.

AFTER

Turned over on right side. Sandblasted.



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BEFORE

Truck, 2½ ton 6 x 6 M-135 facing 45 degrees left of GZ at 1500 yards.

AFTER

Hood opened and bent over windshield frame. Additional tearing of canvas.



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BEFORE

Truck, 1/4 ton 4 x 4, M-38 facing GZ at 1500 yards.

AFTER

Hood torn off and blown 50 feet to rear. Paint burned.



SECRET
SECURITY INFORMATION

UNCLASSIFIED

RESTRICTED DATA
ATOMIC ENERGY ACT 1954

UNCLASSIFIED SECRET
SECURITY INFORMATION

END

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SECRET UNCLASSIFIED
SECURITY INFORMATION
RESTRICTED DATA
ATOMIC ENERGY ACT 1946