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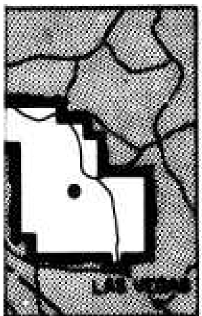
PRELIMINARY REPORT

OPERATION

PLUMBBOB

ADA995067



NEVADA TEST SITE
MAY-SEPTEMBER 1957

Project 36.3

RADIOLOGICAL DEFENSE OPERATIONS PHOTOGRAPHY

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CIVIL EFFECTS TEST GROUP

This is a preliminary report based on all data available at the close of this project's participation in Operation PLUMBBOB. The contents of this report are subject to change upon completion of evaluation for the final report. This preliminary report will be superseded by the publication of the final (WT) report. Conclusions and recommendations drawn herein, if any, are therefore tentative. The work is reported at this early time to provide early test results to those concerned with the effects of nuclear weapons and to provide for an interchange of information between projects for the preparation of final reports.

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AEC Technical Information Service Extension
Oak Ridge, Tennessee

Operation PLUMBBOB Preliminary Report

Project 36.3

RADIOLOGICAL DEFENSE OPERATIONS PHOTOGRAPHY

By

Martin Lobdell

Approved by: H. D. Ivey
Director
Program 36

Approved by: R. L. Corsbie
Director
Civil Effects Test
Group

Issuance Date: October 11, 1957

Federal Civil Defense Administration

August 1957

ABSTRACT

The purpose of this project was to prepare a motion picture of Radiological Defense operational and training procedures encompassed in Civil Effects Test Group Program 36 for use as a visual orientation device in the Federal Civil Defense Administration Radiological Defense Training Program.

Photography and sound recording at the site was based on a shooting script prepared and approved prior to production.

Because the completed motion picture will be unclassified, inclusion of restricted information in the script or picturization of restricted areas in the original photography was carefully avoided. All footage was processed and reviewed according to prescribed security regulations.

ACKNOWLEDGMENTS

The author wishes to express appreciation for the cooperation and assistance of: Robert L. Corsbie, Director, Civil Effects Test Group; Edward R. Saunders, FCDA Assistant to the Director, Civil Effects Test Group; Hugh D. Ivey, Program Director, CETG Program 36; Benjamin C. Killian, Project Officer, CETG Project 36.1; Fred R. Rehm, Project Officer, CETG Project 36.4; Charles T. Rainey, Project Officer, CETG Project 36.5; James Gibson, Chief, Calle A. Carrello, Chief of Production, Gilbert R. Courtney, Production Director, and associated staff of the Motion Picture Service, United States Department of Agriculture.

The services of Colonel Ralph M. LeChausie are gratefully acknowledged. His cooperation and time, generously given, permitted the successful production of a very long orientation briefing sequence in which he was the narrator.

CONTENTS

RADIOLOGICAL DEFENSE OPERATIONS PHOTOGRAPHY

1 INTRODUCTION

The objective of Project 36.3 was the preparation of a motion picture based on activities of personnel in Projects 36.4 and 36.5 for later use in orienting Civil Defense Radiological Defense trainees in monitoring techniques and operations exercises employed during Operation Plumbbob.

The film was designed to demonstrate the techniques used by ground and aerial units in monitoring radiation levels resulting from fallout over a wide area, as distinct from training exercises employing point sources of radiation.

2 PROCEDURE

The services of an appropriately cleared production crew from the Motion Picture Service of the U. S. Department of Agriculture were secured to write, photograph, and edit this picture under the general supervision of the Project Officer.

After preliminary planning involving conferences with the Program Director, Program 36, Project Officers for 36.4 and 36.5, and a familiarization visit to the Test Site, an outline of the structure and content of the film was submitted to the Program Director for review and approval.

On securing authorization to proceed, the writer prepared and submitted to the Project Officer and Program Director a completed shooting continuity for the picture. This script, as modified and approved, provided the guidelines for production (see Appendix).

The director assigned to the picture prepared a shooting schedule after collaborating with the Program Director and Project Officers. Every effort was made to ensure a steady continuity of production work without undue interference with other program activities.

Briefing sessions for project personnel were photographed and recorded to provide the background information essential to an understanding of test activities which were featured. Short sequences of animation and graphics were used to enhance this information. Whenever possible, activities were simulated to avoid the necessity for uncontrolled newsreel type coverage. Sequences were planned to exclude any material which might be subject to security classification.

The production crew included a first and second unit director, two first cameramen, two assistant cameramen, and one sound engineer. The picture was filmed on 16-mm Commercial Kodachrome, and sound was recorded on 17½-mm magnetic tape. Photography was done with two blimped 16-mm Mitchell cameras and two Cine Kodak Specials. A magnasyne magnetic-tape recorder was used for sound work. Other related equipment was also of standard manufacture. Precautions were taken to minimize exposure of film stock to excessive heat. Film magazines, camera aperture plates, and box interiors were maintained as free of dust and grit particles as was practicable under the circumstances. Approximately 11,000 ft of film stock was exposed, and 20,000 ft of magnetic tape was recorded. Based on a finished printing length of 1700 ft, the over-all shooting ratio was 6.5 to 1.

Except for certain sequences involving synchronized sound, the greater portion of photography was exterior. Reflectors were used to decrease contrast in illumination.

Handling and classifying of all material was performed in accordance with security regulations.

When photography at the Test Site was completed according to the approved shooting continuity and the resulting footage was reviewed for classification, finishing and editorial work was undertaken. Titles, graphics, and animation were prepared and photographed, narration was recorded, and the film was assembled for interlock review.

After approval of the interlock by the Project Officer and the Program Director, the producing organization was authorized to prepare music and effects tracks, mix the sound, conform the original Kodachrome to the work print, and prepare an answer print. The completed film was four reels in length, and screening time was 45 min.

Upon final approval and acceptance of the answer print, the project was formally terminated.

3 RESULTS

Because Project 36.3 was not established as a test or a developmental study, no data were accumulated, no evaluations were made, and no conclusions in the usual sense were reached.

The "result" of this project was the successful completion of a motion picture detailing activities of personnel associated with Projects 36.4 and 36.5 in CETG Program 36.

4 CONCLUSIONS AND RECOMMENDATIONS

It is believed that the motion picture referred to in this report will satisfy a definite need for an orientation device useful in monitor training programs. In addition to providing basic information on the nature of radioactive fallout, from the standpoint of the monitor, and an introduction to the design and use of principal detection instruments, it will serve as a vicarious experience for the many trainee monitors who will be unable to visit the Test Site to gain direct experience in monitoring broad field radiation.

For the benefit of others who may wish to prepare films of a similar nature (i.e., controlled production as against documentary or newsreel type coverage) as an official project at the Nevada Test Site, the following recommendations are made:

1. Because of the extended time necessary to prepare the script and shooting schedule, ample time must be allowed between initial planning or contracting for the film and filming the picture.

2. It is impossible for many test group participants to obligate their time because of the constantly changing shot schedule and its demands on them; therefore, as much on-site filming as possible should be done prior to the first shot of the series.

3. To avoid as much interference as possible with the test group's activities, firm agreements should be made on administrative procedures and operating methods.

APPENDIX - SCRIPT

FEDERAL CIVIL DEFENSE ADMINISTRATION

MISSION -

FALLOUT

Robert L. Corsbie	Director, CETG
Edward R. Saunders	FCDA Assistant to the Director
Hugh D. Ivey	Director, Program 36
Martin H. Lobdell	Project Officer, 36.3
Fred R. Rehm	Project Officer, 36.4
Charles T. Rainey	Project Officer, 36.5

PRODUCTION STAFF

United States Department of Agriculture

Motion Picture Service

Script..Gil Courtney
Direction...Dan Chapman, Gil Courtney
Director of Photography............. ....Bob Keifer
Cameraman...Richard Milstead
Second Cameraman....................................Tony Kalsavage
Assistant Cameraman.................................Ralph Sandler
Recording Engineer..................................Pat Sanders

	PICTURE	SOUND
	FADE IN:	FADE IN SND EFX: Wind.
1.	XLS - Desert, showing huge expanse of landscape. Hills in extreme bkgd. HOLD static for 6 ft. before narration begins.	NARRATOR: The Nevada Desert. Some of the most desolate acres to be found anywhere in
	Start SLOW PAN over desert to frame base of shot tower. HOLD on activity at base of tower until narration is completed.	the United States. Home of the Nevada Test Site -- Continental locale of the Atomic Energy Commission's nuclear testing program.
	Begin SLOW TILT-UP tower to follow ascending elevator.	TITLE MUSIC IN
2.	Fade in <u>Title Overlay</u>: THE FEDERAL CIVIL DEFENSE ADMINISTRATION PRESENTS	
	Continue TILT-UP tower, HOLD when elevator reaches top.	
	Fade Out Presents <u>Title Overlay</u> Fade In Main <u>Title Overlay</u>	
	MISSION -- FALLOUT	TITLE MUSIC UNDER
	DISSOLVE TO:	NARRATOR:
3.	LS - Frenchman Flat. Shown are various structures built for tests which have been exposed to blast. MONTAGE various angles of civil and military structures.	Here, on some 600 square miles of desert waste, the United States detonates the latest of its nuclear devices. These detonations have helped the Nation maintain its military strength. They have made important contributions toward the development of weapons needed for defense. Because of them, the United States fights the cold war from a position of strength.
	DISSOLVE TO:	
4.	MONTAGE of pre-test activities and equipment. Scientists, engineers, workmen engaged in a variety of tasks.	But aside from weapons development, these tests serve other vital purposes. Since the United States has no nuclear monopoly, it must be prepared to weather atomic attack. Accordingly, the Federal Civil

	PICTURE	SOUND
		Defense Administration conducts experiments to evaluate the civil effects of atomic explosion....experiments that will help the Nation's citizens withstand possible enemy attack.
	DISSOLVE TO:	
5.	LS - Mercury. PAN or STATICS to show different types of buildings - Dorms, Quonsets, Hutments, Warehouses.	To house, feed, and provide the many other services needed by test personnel, a small city has been built on the edge of the test site -- a city of dormitories, hutments, quonsets, and warehouses called Mercury.
6.	MS - CETG building. Activity showing personnel coming in and leaving,	And it is at Mercury that the Atomic Energy Commission's Civil Effects Test Group has its headquarters. The Federal Civil Defense Administration works through CETG with the express purpose of obtaining data on the effects of nuclear weapons essential to the survival of
7.	CS - CETG sign.	civilian populations in the event of a nuclear assault. How will homes, factories, and public utilities stand up under atomic blast? How will survivors of devastated
8.	MS - Interiors - Corsbie, Saunders, etc., at work.	cities be relocated? And, perhaps most important of all, how will the deadly menace of radiation from fallout affect everyone's chances for survival? The answers to these and other perplexing problems are sometimes found only in the presence of an actual nuclear explosion.
	DISSOLVE TO:	
9.	MLS - Security checkpoint - entrance to Mercury. California group with Mobile Laboratory and Squad Trailers pulls up. They stop at guardhouse. Car pulling trailer is first.	As a result, specialists are brought to the Nevada Test Site to gain experience under realistic circumstances. These men journey to Mercury to learn more about

	PICTURE	SOUND
		fallout .... to assess its hazards .... and to develop ways to cope with it.
10.	MS - Security guards check identification badges. At least one guard for each piece of mobile equipment.	Already highly trained in radiological defense, they bring with them the necessary skills and equipment to evaluate the fallout danger.
11.	MCS - Guard standing beside auto. Angle to show Squad trailer behind. Guard finishes checking identification, steps back and waves car and trailer through gate.	
12.	LMS - Car and trailer pull away from gate. Angle to show Mobile Lab in GF. Hold then pan with Lab as it pulls through checkpoint. DISSOLVE TO:	
13.	MLS - Two Milwaukee aircraft taxi into parking position. A ground crewman directs. A jeep is parked in FG with driver.	Others flying aircraft touch down on Yucca Flat to help usher in a new and faster means of assaying fallout fields. They hope to develop further a way by which civilian pilots flying light aircraft can quickly and accurately survey large areas for radiation hazard.
14.	MS - Pilot and passenger climb out of a/c. Ground crewman walks up and pilot gives instructions on care of plane. Both pilot and passenger then walk towards tail.	And they, too, are well-equipped to do their job. Before coming to Mercury, they have undergone rigorous training courses in their home communities under FCDA auspices. In fact, they were picked to come to the Test Site only after they demonstrated proficiency in radiological defense measures.
15.	LMS - Two as in Sc. 14 reach tail of a/c where they are joined by two more of Milwaukee group from second aircraft.	But in spite of their abilities and qualifications, these men start again at Mercury. They review the complex field of radiation hazard.
16.	MS - All four Milwaukee personnel walk to jeep and get in. Jeep drives off. Hold on jeep. DISSOLVE TO:	

	PICTURE	SOUND
17.	LMS - INTERIOR - WAREHOUSE #5. Indoctrination session on bomb phenomenology. Instructor is seated casually on edge of table facing combined California and Milwaukee groups. The instructor is speaking. In back of room is projector threaded and ready for screening. Near table is projection screen.	From the ground up, the awe-inspiring phenomenology of atomic explosion is re-surveyed. INSTRUCTOR (LIP-SYNC) .... and that's roughly the schedule we hope to follow. As you can see, we're going to have a lot of work to do in a very short time. So, with that, let's get
18.	Instructor talking.	on with the job. First of all, we're going to review some of the basic data on bomb phenomenology. All of you are familiar with what is commonly called the "nominal" bomb -- the twenty kiloton weapon dropped on Hiroshima. We base many of our civil effects projections on what we know this bomb did. Some of the shots here at the site are faily close
19.	MCS - Same.	in yield to the "nominal" bomb. None even approach the megaton yields of our thermo-nuclear devices. But, apart from magnitude, the principal effects of detonation are the same -- blast, heat, and radiation. Of course, our chief interest is in the radiation effect.
20.	MS - Audience reaction.	We all know that the detonation of a nu-clear device or weapon brings with it the potential threat of severe radiation hazard -- both from the neutrons and gamma rays released at the instant of
21.	MS - Instructor talking. He stands up, motions to projectionist who starts projector. Instructor remains near screen.	detonation, and from fallout. But before we take up the subject of radiation from nuclear explosion, let's look at radiation in general. Marlow, if you will -- roll that film.
22.	LMS - Reverse angle showing pro-jector and audience.	

	PICTURE	SOUND
23.	Darkened to simulate room ready for projection.	First of all, man didn't start radiation with the atomic bomb. It's been with us a long time -- in fact, since the world began.
24.	ANIMATION - Above and below ground perspective of earth's crust. Above ground, man is enjoying typical "Sunday afternoon" on patio. He is in hammock sipping cool drink. Portable radio is nearby. Below ground soil is "active" - indicated by sparkle effect. From these sparkles rays emanate toward man.	The very crust of the earth on which we live contains radioactive elements. No matter where we live, we are exposed to radiation from the earth. On the average, each of us receives yearly about 40 milliroentgens from thorium, about the same amount from potassium, and about 20 mr from radium and uranium.
25.	ANIMATION - Man as in Scs. 24-25 in Swiss climber's outfit starting up mountain. Dotted lines indicate low cosmic effect at low altitude. DISSOLVE TO climber at top of mountain planting flag at summit. More dotted lines striking man indicate higher cosmic effect at high altitudes.	Man is also exposed to radiation from outer space in the form of cosmic rays. At sea level, we each get about 35 milliroentgens a year from this source. If we're inclined toward mountain climbing as a form of exercise we're apt to get even more, for the higher we go on this earth, the more radiation we get from cosmic rays. For example, at 5,000 feet above sea level, we pick up about 60 milliroentgens a year -- 30 or more than at sea level.
26.	ANIMATION - Interior, doctor's office. Doctor is standing in front of fluoroscope; patient (same man as in Sc. 24) is behind screen. Head and feet of patient protrude. The machine is turned "on" and skeleton of man is revealed.	Even in our quest for better health, we expose ourselves to radiation. Since the discovery of x-rays, man has increased his radiation exposure many hundreds of times over that which he receives from natural sources. A routine chest x-ray, for instance, gives up to one roentgen per exposure, while a fluoroscopic examination runs from ten to twenty R per minute.
27.	MS - Reverse angle showing audience. Instructor is in foreground; projector in background.	Now, what is the situation relative to radiation from nuclear explosion? Whenever atomic energy is released -- either by fission or fusion -- there are released

	PICTURE	SOUND
		with it certain powerful radiations. These radiations are caused by the transmutation, eruption, or explosion of atoms. To sum it up very briefly, we have to contend with two types of radiation whenever an atomic device is detonated.
28.	ANIMATION - Stylized rendering atomic explosion occurs. Radiating from it are symbols indicating blast, heat, initial radiation.	The first, initial radiation, concerns the release of neutrons and gamma rays at the instant of explosion. From a practical standpoint, this immediate radiation does not present a serious problem beyond the area devastated by blast and heat.
29.	MS - Instructor talking.	The second type of radiation, and by far the more important from the civil defense viewpoint, is residual. This residual radiation comes from three sources: the fission products or bomb ashes, the neutron induced activity in materials close to Ground Zero, and the unfissioned or unreacted materials of the device itself. This residual radiation is our primary concern in radiological defense. It constitutes the fallout problem.
30.	ANIMATION - Symbols to indicate three different sizes of atomic weapons.	All atomic detonations produce fallout, but the nature and extent of it depends on the conditions under which a bomb or device is fired.
31.	ANIMATION - Stylized illustration of falling weapon. Weapon is fragmentized. Symbols for fission products attach to weapon fragments. ZOOM IN to feature a single fragment with attached symbol. Cartoon-type parachute opens, and fragment drifts slowly down out of frame.	In an air burst, the fission products produced are very fine in nature -- almost like an aerosol. Since they have only the dust and moisture in the air on which to condense, they tend to remain aloft for long periods of time and to fall out slowly.
	DISSOLVE TO:	
32.	ANIMATION - Nuclear explosion creates fireball which touches ground.	But in a surface or near-surface burst in

	PICTURE	SOUND
	Earth is drawn up to indicate thermal effect. ZOOM IN and center on single particle which is shown grossly magnified as a boulder. Symbol for fission product attaches to boulder, and both drop rapidly from frame.	which the fireball touches the ground, huge quantities of earth and other materials are drawn up behind the rising fireball into the cloud. The radioactive atoms produced by the explosion adhere to these particles. Since much of this material is heavy, it descends while still highly radioactive.
33.	ANIMATION - PULL BACK to disclose cluster of fragments as in Scene 26. Several debris particles (much larger by comparison) as in Scene 27, fall rapidly through cluster.	The deposition of this radioactive debris constitutes the fallout danger.
34.	ANIMATION - OVERLAY POP-ON captions: CLOSE-IN, INTERMEDIATE, and DELAYED. DISSOLVE TO:	Fallout can be divided into three categories: close-in, intermediate, and delayed.
35.	ANIMATION- Mushroom shaded atomic cloud. Entire cloud moves as it spreads. Right side of cloud becomes extended and drawn out. As the cloud continues to move and become extended, small, flashing particles drop from it to indicate fallout.	The first, close-in fallout is our main concern. This close-in fallout will occur within a few hundred miles of the burst, and is usually on the ground within 10 to 20 hours. Furthermore, in a surface explosion, about 70 to 80 percent of all the fission products produced descend in the form of close-in fallout.
36.	ANIMATION - Horizon perspective clear sky speckled to indicate fission products. Dark rain cloud moves in frame. Rain falls through sky taking with it flashing symbols. Symbols sparkle on ground. DISSOLVE TO:	The second, intermediate fallout, tends to descend very slowly. Although gravitational settling has some effect on this downward diffusion of radioactive debris, the primary cause for removal of such debris is precipitation. This intermediate fallout usually occurs within a few weeks after the detonation.
37.	ANIMATION - Hemisphere with upper air strata indicated. Show sparkle effect in stratosphere. PULL BACK to show sparkles spreading around globe.	The third class of fallout -- delayed -- is the result of the extreme heights reached by the debris from thermonuclear explosions. We actually know very little about the behavior of this high-altitude debris. Eventually, of course, it, too, descends, but this may take months or even years, and

PICTURE	SOUND
	by this time decay has lessened the hazard. We know also that stratospheric storage of radioactive debris serves to disperse it, thus minimizing the chances of locally high concentrations.
38. LMS - INTERIOR - Instructor talking to group as established in Sc. 16. Projector stops and lights go on. Instructor turns from screen direction to full audience view.	For all intents and purposes then, delayed fallout is of less concern to us than close-in fallout -- that which occurs within the first 10 to 20 hours. To outline the areas of this fallout, to report the varied intensities of its field, and to evaluate its hazards is our job. Since an enemy attack with nuclear weapons will almost certainly result in the contamination of large areas, the survival of persons within those areas will depend on us.
39. MS - Audience Reaction.	None of our senses can detect the presence of radiation. We must, therefore, rely on instruments that can detect and measure radiation. Of course, all of us are familiar with these instruments, but I don't think it will hurt a bit to review some of the
40. CS - Instructor.	pertinent information about the operation and use of the instruments we have on hand. In fact, throughout your stay here at Mercury, we're going to retrace much of the groundwork -- just to make sure that all of us have the same background of information. As members of the radiological defense team -- whether as monitors, or radiological defense officers -- it is our job to detect, measure, analyse, and make accurate judgments as to the hazard involved in a given fallout field.
41. LMS - Full view instructor and audience. Instructor picks up dosimeter.	To carry out that responsibility, we have to take precautions ourselves. A RADEF worker is of little use in an emergency

PICTURE	SOUND
	if he has allowed himself to receive exposures in excess of the maximum permissible levels. Part of the equipment you'll use here are these personal dosimeters. They'll help you to keep track of your own personal exposures.
42. CS - Series each dosimeter as it is shown. (NOTE: Shown are those in use by California and Milwaukee groups.) Included is the film badge furnished by NTS.	The first is the CD V-138. This is an ion chamber instrument, as are the other two. I'll show you in a moment, with a range of from 0 to 200 mr. Because of its low range, it is used most effectively for training purposes.
43. CS - CD V-138.	Operating principle for the CD V-138 simply stated is this: It is first charged to 160 volts. This charge causes a quartz fibre to be repelled from a metal plate. When exposed to radiation, the air in the chamber surrounding the fibre is ionized and ion pairs are formed. This decreases
44. MS - Instructor holds dosimeter up to eye.	the charge and allows the fibre to again approach the plate. By holding the dosimeter up to the light, the fibre can be seen in relation to the scale.
45. ANIMATION - Rendering of view through dosimeter.	The position of the fibre on the scale corresponds to the amount of radiation to which the instrument has been exposed. The operation of this type of dosimeter is like that of a voltmeter, with the decreased voltage being converted and indicated as an increase in absorbed radiation.
46. MS - Instructor hold up other two dosimeters.	These other two dosimeters are the same in operating principle. They each have, however, an added condenser which allows a greater initial charge; hence, more radiation is needed to reduce that charge.

	PICTURE	SOUND
47.	CS - CD V-730.	The CD V-730 dosimeter has a range of from 0 to 20 roentgens ....
48.	CS - CD V-740.	..... while the CD V-740 registers from 0 to 100 R.
49.	MS - Instructor puts down dosimeters and picks up film badge. It has been opened, and he removes two pieces of film. He holds both film and wrapper in his fingers.	The final dosimeter we'll use here at NTS is the film badge given you upon arrival. The Test Site Rad-Safe organization re-
50.	XCS - Film and wrapper.	quires everyone to wear it. Inside the wrapper are two pieces of film, one low-range, the other high. Together they will register exposures from 15 to 8,000 mr. The lead shield cuts out beta and low-energy gamma. Gamma rays passing through this shield are powerful enough to penetrate five centimeters into the body, and thus constitute a personal hazard.
51.	MS - Instructor places last dosimeter on table and picks up in turn survey meters to be used by monitors. Included are V-700 and V-710 instruments.	The survey meters you'll use are all multi-range instruments.
52.	MS - Instructor picks up CD V-700 and removes probe from holder.	The CD V-700 is a portable survey meter using a geiger tube as a detector. It is sensitive to both beta and gamma radiation, but its beta sensitivity is restricted to moderate and high energy levels.
53.	CS - Probe as beta shield is opened, then closed.	The geiger tube is encased in a shield. It is gas-filled, and detects radiation through ionization of that gas. With the shield open, it detects both beta and gamma radiation closing the shield on the probe .... the instrument becomes sensitive to gamma only.
54.	CS - Face of CD V-700.	Three ranges of operation are provided. X1 requires 500 pulses per minute for full scale operation; X10, 5,000 pulses, and X100, 50,000. In terms of milliroentgens, these settings correspond to 0.5 mr per

PICTURE	SOUND
	hour; 5 mr per hour; and 50 mr per hour of radium-equivalent radiation. Because of
55. MS - Instructor still holding CD V-700. He starts to remove instrument from case.	these low ranges, the V-700 is essentially a training instrument. In addition, it is useful in personnel and vehicle monitoring. On the side of the instrument, under the name plate, a beta source has been provided for use in calibration.
56. XCS - Meter as it is removed from case. Rotate, and HOLD on calibration.	Inside the casing -- if you'll wait a moment while I remove the instrument -- you'll find the circuit box, which comprises the batteries, high voltage supply, and pulse shaping and metering circuit, with calibration screw.
57. MS - Instructor puts down CD V-700 and picks up CD V-710.	The other instrument we'll use is the CD V-710. This is a gamma measuring, air ionization instrument with ranges from 0 to
58. CS - Face of CD V-710. Range switch is turned to "Circuit Check" position.	.5r, 0 to 5r, and 0 to 50r per hour. The range selector switch also serves to indicate <u>zero</u> and <u>circuit check positions</u>.
59. XCS - Dial as needle reaches proper "Circuit Check" position.	This particular instrument is zeroed by turning the control until the needle indicates zero on the dial. Inside, the 710 is much like the 700, with the addition, of course, of the ionization chamber. The chamber, incidentally, is hermetically sealed to minimize the effects of temperature and eliminate altitude and moisture factors. The V-710 will be the workhorse in any attack situation.
61. CS - CD V-720 on table top. Instructor's hand enters frame and picks it up.	We have one other instrument here today -- The CD V-720 -- and although we won't be
62. CMS - Instructor as he brings instrument to him. He turns it over.	using it in our exercises, it might be well

PICTURE	SOUNDS
	to say a few words about it. It, too, is an ionization chamber instrument, but unlike the 710, it can measure beta radiation.
63. CS - Base of CD V-720. Beta window is opened, then closed.	The beta shield is located on the bottom, and when opened'....
	.... exposes the beta window in the chamber. The 720 is a high-range instrument, measuring up to 500 roentgens.
64. LMS - Full view instructor and group as he replaces CD V-720, then dismisses group. They arise and begin to leave.	Now if you will, before we break for lunch, check out your survey meters and dosimeters. At 1300 today, we'll meet back here for transportation to the calibration ranges. Those of you with the 700's will go to the
DISSOLVE TO:	range near the Decontamination Building. The 710 people will go to the 200 curie source just beyond the forward area check point. That's all for now.
65. LS - CALIBRATION RANGE at Control Point. Trainees are zeroing instruments.	Since the survey meter is the sole means by which the monitor may detect and measure the varied intensities in a fallout field, accurate functioning of the instrument is of vital importance. Here ranges have been set up to enable monitors to calibrate their instruments.
66. MS - MASTER SCENE - Two trainees zeroing V-700 instruments. Beta shield is opened; probe is held next to side source; instrument is removed from case, and adjustment screw is turned while trainee watches dial reading. Instrument is put back in case and beta shield is closed.	Operating as two-man survey teams, the monitors calibrate their meters according to well defined procedures.
67. CS - Probe as beta shield is opened.	After waiting 30 seconds for the circuitry to stabilize, operability of the instrument is checked by opening the beta shield ....

PICTURE	SOUND
68. CS - Probe as it is placed against side source.	.... and the placing probe next to the side beta source. When the instrument is operating properly, the indicator should fall between 1.5 mr and 2.5 mr.
69. CS - Dial face with meter rading improperly.	If the indicator falls above or below this range, the instrument is removed from the
70. MCS - Instrument is removed from case.	case ....
71. XCS - Calibration adjusting screw being turned.	.... and the calibration screw adjusted.
	Rotating the screw clockwise increases the reading ....
	.... while counter-clockwise rotation decreases it.
72. CS - Dial face reading properly.	When the instrument is reading properly, it
73. MS - Two trainees as in Sc. 66 as the instrument is returned to case. Beta shield is closed.	is returned to its case, and the beta shield is closed. If the instrument does not re-
74. MLS - Calibration showing at least three legs of range with trainees putting instruments back into cases and closing beta shields.	spond to this procedure, it will not calibrate properly and should be repaired.
As this action is being completed, Instructor enters range carrying CO 60 source. PAN as he walks to source stand and places source down Source is removed from pig and placed on stand. Instructor places dosimeter next to it.	The completion of these steps by all monitors is the signal for a known intensity source to be brought onto the range. Here, a ____ millicurie Cobalt-60 source is being employed.
75. CS - Cobalt 60 source on stand with dosimeter nearby. NOTE: Use case only. Avoid use of actual source.	The source is put on its stand, and a dosimeter is placed nearby for later use in emergency-type calibration procedures.
76. MS - MASTER SCENE - Two trainees with V-700 instrument as in Sc. 66. One holds probe directly over measured mark on leg. He reads dial and calls off reading to second trainee. The reading is written down. Both then move to second measured mark on leg and process is started again.	Extending from the source stand are seven wooden legs. Measured distances from ____ to ____ are marked on these legs, taking into consideration the known strength of the source.
	The monitors select one of these points at which the dose rate in milliroentgens per hour has been calculated.

PICTURE	SOUND
77. CS - Down shot showing relationship of probe to measured mark.	With the probe held carefully over the mark, the intensity reading is noted and recorded.
78. CS - Dial showing correct reading for V-700 instrument. NOTE: This reading will depend on actual source used or implied as being used and distance of mark from source.	Using this source at ____ meters, the V-700 should indicate ____ mr. If it does not, the scale reading is again corrected by rotation of the calibration screw.
79. MLS - Calibration range showing trainees calibrating instruments. The two-man teams are at various distances from source. One team has just completed its calibration. The instructor joins them, and the three walk to source stand. Instructor picks up dosimeter near source.	The monitors then take readings at all points on the range. At each subsequent point, the reading is noted and logged. No further adjustment of the calibration screw is made, since the results for each instrument will be graphed and maintained as the meter's characteristics. In an emergency situation, calibration of survey meters on a known source range may not be possible. Yet, to protect himself and others, the monitor must be sure that his instrument is reasonably accurate. In such a situation, the V-700 and other survey meters may be calibrated using a source of unknown strength.
80. CS - Dosimeter held in instructor's hand.	To accomplish this, a zeroed dosimeter is placed at a known distance from this source for a specified period of time. The accumulated dose as indicated by the dosimeter then serves as a fairly accurate
81. MS - MASTER SCENE - Instructor and two trainees as they look at dosimeter. Tube dosimeter: Instructor holds tube up to sky and looks through it. Hands it to trainee who repeats.	measure of the source intensity. A meter placed near the source in the same relationship as the dosimeter should indicate a dose rate that corresponds to the
82. CS - View through tube-type instrument showing scale. DISSOLVE TO:	dosimeter's indicated reading.
83. MS - Entrance to 200 curie range.	Calibration of the V-710 and higher-range instruments is accomplished in much the same manner as with the V-700, but ....

	PICTURE	SOUND
84.	CS - Warning sign.	warning signs ....
85.	LMS - Side angle source shielding and trailer. PAN to group in distance with telescope.	.... and massive concrete shielding indicate the use of a source of much greater intensity. So intense is the radiation from the 200 curie source in use here that it is necessary for calibration to be effected
86.	MS - Reverse angle group with telescope, source stand in B.G. ZOOM IN to meter on platform. DISSOLVE TO:	through the use of a telescope. Time and care are necessary ingredients of this operation. Before the monitor can make an adjustment or move the meter, the source must be lowered into a 4,000 pound lead pig beneath the platform.
87.	LMS - Four mobile trailers opened up and ready for operations. Feature single trailer in F.G.; others in B.G. Around each trailer is complete survey squad made up of four two-man teams, one squad leader, and assistant leader. Squad leaders are explaining equipment to team members. Transportation for squads is nearby.	.... the monitors begin field exercises designed to give them practical experience in field survey techniques and procedures. The ground monitors are organized as Field Survey Squads, with .... each squad employing a mobile trailer equipped with survey
88.	MCS- Inside of trailer showing equipment - survey instruments, handy-talkies, etc. Squad leader's hand reaches in and picks up handy-talkie.	meters and portable radio equipment.
89.	MS - Squad leader with handy-talkie.	before moving into a fallout field, the monitors are briefed by the squad leader. Final reviews of record keeping and communications procedures are held .... the key iso-intensity map is studied
90.	MS - Feature squad leader and survey team near front of trailer. Leader puts down handy-talkie, takes map, unfolds it and kneels to ground. Squad gathers around.	....
91.	MCS - Squad and leader as they look over map. They then all rise.	
92.	LMS - showing all teams starting out. NOTE: Depending on circumstances, featured survey teams either walk or get into vehicles for survey. Other trailers and teams depart for their respective site areas.	.... then, under direction of the Control Center, the monitors -- in two-man survey teams -- move into the field for survey exercises.
93.	MS - Follow and hold on one survey team as it departs, either on foot or by vehicle.	

	PICTURE	SOUND
	DISSOLVE TO:	
94.	MLS - Two aircraft parked, with Milwaukee personnel busy making planes ready. Two men are working on each a/c. One man is inside each a/c while other stands outside with survey meters. Nearby is power wagon containing Co 60 source or pail of soil from previous shot encased in protective shielding.	Meanwhile, pilots of the aerial survey units ready their aircraft and instruments for their part in the exercise. While here, these air-borne monitors will develop altitude correlation factors for the V-710 instrument and continue their study of aerial monitoring techniques.
95.	MS - Feature one aircraft and two men working. Man on outside hands V-710 instrument to man on inside. He begins to install. Film badges are in place on this a/c.	Inside the airdraft, three V-710's are installed, with each meter set on a different range to eliminate the need for scale switching.
96.	MCS - Inside a/c installation of meter. Two meters are already in place.	
97.	XCS - The last of three meters as it is put in position. Feature ion chamber marking on side of instrument to indicate its exact positioning.	
98.	MS - Exterior of a/c. Man inside climbs out and both men walk to second plane. PAN as they go. Other two are outside of their a/c placing film badges on exterior surfaces.	Two aircraft will be utilized by the group, with one flying criss-cross broad survey flights, and the other flying detailed patterns over ....
	DISSOLVE TO:	
99.	XLS - HIGH ANGLE - Marker pattern on desert. The main legs are complete and 1/10 mile markers have been completed on three of the four legs. Men are at work completing 1/10 mile markers on fourth leg.	.... markers drawn on the desert floor with lime. The main legs of these markers are one mile long, with cross lines every one-tenth mile.
100.	MS - Men working on marker spreading lime. They are starting 1/10 mile line. Visible is distance stake.	
	DISSOLVE TO:	
101.	ANIMATION - Diagram of completed marker. To left of marker is shot tower. A flash occurs at tower location and mushroom cloud is formed.	Several of these will be laid out so that at least one will be in the path of fall-out from a test device.
	Cloud begins to drift R. to L. over limed marker and dotted lines begin to extend down from cloud to marker to simulate fallout.	In flight, the aircraft will fly the full length of the primary leg of the pattern, then bank right and fly the secondary leg.
	Cloud passes out of frame and airplane enters R. to L. It flies in same direction as cloud until it reaches marker. It then flies over marker in a cloverleaf pattern.	It will then turn right and retrace its path over the secondary leg.

	PICTURE	SOUND
		In this manner, each point in the pattern will be passed over from both directions,
	DISSOLVE TO:	minimizing the ballistic effect of the meter.
102.	XLS - AERIAL DOWN VIEW - Completed marker.	In flight, the survey crew is composed of pilot ....
103.	MS - INTERIOR of a/c. Over the pilot's shoulder view of marker in distance.	
104.	MS - INTERIOR of a/c. Meter reader and location spotter in position.	.... location spotter ....
		.... and reader.
105.	MS - Same as 103. Plane is just about to fly over pattern. Pilot makes hand signal to reader and spotter.	When the plane enters the pattern ....
106.	MS - Spotter and meter reader. Spotter bends over and looks out a/c. He holds hand ready to signal.	.... the spotter leans into position. As the aircraft passes the tenth-mile crosses
107.	LS - Ground as a/c passes line marker.	....
108.	MCS - Spotter signals reader.	.... he signals the reader ....
109.	MCS - Reader as he looks at instruments. He logs reading.	.... who notes and logs the intensity measurements.
110.	LS - Hold until a/c passes three 1/10 mile markers.	
	DISSOLVE TO:	
111.	CS - INTERIOR - BROCKHOUSE - Radio speaker. DOLLY BACK to reveal communicators at work. One writes down message, turns around and holds form out. PAN from communicators to plotters and Radef Chief. One of the plotters exits scene in direction of communicator. Radef Chief and other plotters continue activity.	Meanwhile, at the Radiological Control Center, methods and procedures for the upcoming exercises are being evolved and perfected. As messages from units in the field are received and recorded by trained radio specialists ....
	Plotter who picked up message re-enters scene, hands copy to Radef Chief. Plotter still retaining another copy exits frame.	they are relayed to the plot staff through the Radef Chief. On the basis of this field radiation data, the chief and plot staff are able to determine the intensities and boundaries of the fallout field.
112.	MS - RESOURCES MANAGER'S office. Manager and clerk are busy maintaining resources plot.	Copies of incoming messages are also relayed to the Resources Manager who is responsible for maintaining accurate records
	Plotter as in Sc. 111 enters and	

	PICTURE	SOUND
	hands Manager second copy, then exits.	on the number and location of units in the
113.	MCS - Over the shoulder angle as manager marks location of operating unit (source of message) on map of NTS.	field.
	DISSOLVE TO:	
114.	MLS - California Mobile Laboratory. Laboratory is parked near Brockhouse at Control Point.	In addition to the ground and serial units, resources of the combined group include a mobile laboratory.
115.	MS - INTERIOR mobile lab. Three technicians are at work. One at glove box preparing soil sample cards; another preparing water samples; the third taking readings from previously prepared soil samples. All samples are properly identified.	Despite the care and attention to detail taken to insure the accuracy of field survey instruments, certain vital information can only be determined through more precise measurements. The mobile laboratory unit is equipped to perform this service.
116.	MCS - Technician at glove box making soil sample cards. He takes portion of soil already in box and affixes it to sample card. This card is placed aside and another started.	By preparing and measuring samples brought
117.	XCS - Sample card being prepared.	in by the monitors, highly trained labora-
118.	MCS - Same as 115 then PAN across trailer to technician. Technician there is taking reading from previously prepared samples and is recording same. In B.G., third technician is preparing water samples.	tory technicians can provide accurate information based on the actual type of contamination. Thus, significant departures from normal decay rates can be determined. This is important since there is nothing to prevent an aggressor from "rigging" his weap-
119.	CS - Sample is put into sample holder.	ons so that isotopes other than normal fission products are deposited as fallout. In such a situation, stay-time limits based on
120.	CMS - Low angle shot as technician completes putting sample into holder. Featured is counter above sample holder.	"typical" fallout would become useless, or would require modification. Hence, samples of soil from fallout fields are given top
121.	CS - Face of counter as count is made.	laboratory priority. The prompt determination of decay rates based on actual type of contamination is vital to the determination of radiation exposures, stay-time limits, and inhalation and ingestion hazards.

	PICTURE	SOUND
122.	LS - Yucca Flat, showing several shot towers.	While the training units are developing and shaping their techniques and procedures, activity leading up to the shot itself is underway. Throughout the week preceding a detonation, a vast and complex system of instruments is made ready to record necessary effects data.
123.	MS - CS MONTAGE - Various instruments used to record effects. These include COLLIMATOR SYSTEMS, INDENTER GAUGES, THERMAL INSTRUMENTS, CAMERAS, and BLAST GAUGES, shot at various angles to build up total impression of complex nature of test series.	Collimator systems .... Thermal instruments .... Blast and .... Indenter gauges are among the hundreds needed.
124.	MS - Underground instrument bunker. Entrance.	Cables from these and other instruments run to massive steel and concrete bunkers where recording machines wait to receive the signals.
125.	MS - Interior bunker. Technicians are finishing last checks. The technicians make final adjustments and start to leave bunker.	Prior to the shot, hundreds of switches for the recording machines are pre-set -- then the bunker is evacuated.
126.	MS - Reverse angle as technicians leave. The last one to door pauses and turns off light. He leaves and door is shut.	
127.	CS - Heavy shielded door closing.	Once the heavy lead-lined doors swing shut, the bunker is ready to receive signals from the instruments aboveground -- instruments which may be vaporized at the instant of detonation. But in the millionth of a second before they are destroyed, they transmit their all-important data.
128.	INTERIOR - BROCKHOUSE - BRIEFING ROOM. Radef Chief, Resource Manager, squad leaders, and pilots being given weather briefing.	As H-Hour approaches, weather briefings by Test Site meteorologists are conducted for unit project officers. Meteorologist (LIP SYNC)

	PICTURE	SOUND
129.	MS - Briefing officer talking. Behind him is map of NTS and nearby areas. He points out direction in which wind will probably carry fallout.	Gentlemen, that seems to be the picture as of this moment. With regard to your operation, the prospects for fallout within the limits of the test site and the adjacent bombing and gunnery range are good. The winds as they are now will result in very little off-site fallout. If the winds maintain their present direction -- and this I
130.	MS - Reverse angle as assembled personnel listen. Feature Milwaukee pilots.	know is going to make you fly-boys happy -- the fallout should pass directly over your
131.	MCS - Briefing officer as he makes announcement that the shot is on.	number two marker pattern. Any questions? (PAUSE) If not, goodnight, and happy fallout hunting!
		NARRATOR:
132.	LMS - Assembled group as briefing officer makes announcement. All get up and leave. Pick up and feature Radef Chief as he leaves.	Everyone has waited for this moment. Now, an actual situation is in the making -- a situation that, barring enemy attack, cannot be duplicated anywhere in the United States. Everything that has gone before -- the careful planning, development of techniques and review of procedures -- has led to this. All along the line, the units begin to function.
133.	LMS - Radef Chief as he leaves Briefing Room and joins plotters. He begins to draw fallout patterns, as indicated by latest weather information, on cell overlayed on map of NTS.	The Radef Chief and plotting staff draw the fallout prediction based on the latest weather information.
134.	CS - Fallout pattern as it is drawn.	
135.	MS - Radef Chief and plotters as he draws map. PAN to communicators at their stations.	Communications are established between the Radiological Control Center and the operating units in the field.
136.	MCS - Communicator talking into mike.	
137.	CS - MONTAGE - Operating units being alerted by radio. Each operator listens with handy-talkie, then replies. NIGHT EFFECT.	Every man .... every unit .... in proper position.
138.	CS - Radio contact with laboratory. NIGHT.	

	PICTURE	SOUND
139.	CS - Radio contact with aircraft (on the ground). NIGHT.	
140.	Radio contact with trailer. NIGHT.	
	DISSOLVE TO:	
141.	LS to MS - PRE-DAWN EFFECT. Shot Tower. ZOOM IN to fill screen.	Then .... the long wait!
142.	CS - INTERIOR - BROCKHOUSE. Radef Chief as he studies predicted fall-out map. He looks up and off to side PAN AND TILT up to clock on wall. Time: 4:48 a.m. (H-Hour minus two minutes).	
	DISSOLVE TO:	
143.	MS - NIGHT EFFECT - Low angle trailer and assembled squad on desert. Squad members are standing quietly looking off into distance.	
	DISSOLVE TO:	LOUDSPEAKER VOICE:
144.	MS - NIGHT EFFECT - Milwaukee flight crews standing by parked aircraft. They, too, are looking off across the desert.	This is Dragnet. The next time tone will be H-minus one minute. At H-minus one minute, all observers with flash goggles
145.	CS - PRE-DAWN EFFECT - Dragnet P.A. speaker.	will put them on. Those without goggles
146.	MLS - Assembled observers at Control Point. Some put on flash goggles; other turn backs from shot direction.	will turn their backs. Do not remove goggles or face around until the fireball has diminished.
147.	CS - MONTAGE - Observers and others looking out across desert. Goggles on.	SOUND EFFECT: Time tone.
		H-minus one minute.
		H-minus thirty seconds.
		Fifteen seconds.
		Ten seconds.
		Five, four, three, two, one ....
		SOUND EFFECT: Time Tone.
148.	LS - PRE-DAWN - Nuclear explosion. Hold on explosion to get cloud formation, and relationship of cloud to ground. ZOOM IN to top of mushroom formation.	Colors that rival the rainbow.
		And silence. This is nuclear explosion.

	PICTURE	SOUND
149.	LMS - Reverse angle observers as they watch fireball.	Then, some forty seconds later, the awesome sound and fury of the detonation reaches the observers ....
150.	CMS - Two observers as they react to shock wave.	.... startles them with the tremendous power and force of the atom split apart.
151.	XLS - Cloud over desert. DISSOLVE TO:	High above the desert the lethal mushroom hangs, until wind begins to scatter it. Already, tiny radioactive fission products adhering to debris are starting to fall. Within the hour, the largest will reach the ground.
152.	MLS - EARLY MORNING - Rad-Safe monitors checking fallout area. They are dressed in full radex clothing.	Later, when on-site fallout has occurred, monitors of the permanent Rad-Safe unit
153	MS - Same. DISSOLVE TO:	penetrate the shot area. Once the fallout field has been surveyed and the level of radioactivity certified as being within permissible limits, the test groups begin their exercises.
154.	MS - PAN take off first Milwaukee aircraft.	Taking off from Yucca Flat, the two aerial survey planes head for the shot area. One
155.	MS - PAN take off second Milwaukee aircraft.	will fly the marker pattern .... the other will criss-cross the fallout field.
156.	MS - INTERIOR AIRCRAFT. Pilot at the controls.	Approaching the marker, the pattern aircraft descends to 1,000 feet for the first run.
157.	CS - Instrument panel, feature altimeter which reads 1200 feet then descends to 1000 feet where it holds.	
158.	MCS - Pilot's hands on yoke or stick.	Tricky -- this desert flying! Thermal updrafts and swirling eddies complicate the pilot's job of maintaining altitude and course. But hold them he must.
159.	MS - Reverse angle reader and location spotter in position. Spotter is looking outside then signals reader.	For in this flight, precision is essential. The crew seeks to establish altitude correlation factors for the V-710 instrument.

	PICTURE	SOUND
160.	MCS - Reader bent over instrument. He makes reading on signal from spotter and records same in log.	What is the dose rate at 1,000 feet, and how does it compare with the reading on the ground?
161.	MCS - Instruments in aircraft. Needles move as plane files pattern. Feature air speed indicator (70 knots).	Since the aircraft passes identification points at 70 knots, allowance must be made for the meter's time-lag factor. What corrections, then, need be made for this ballistic effect?
162.	CS - One instrument dial as needle indicates radiation level.	What is the shielding, or attenuation factor of the aircraft itself? The answers to these and other questions are found only by flying an exact pattern and by making precise readings.
163.	MCS - Instrument panel of aircraft. Altimeter is at 1,000 feet then descends to 800 feet.	Down the plane drops to 800 feet .... the pattern is repeated. And so it goes until
164.	MS - Reader and spotter as they continue procedure at lower altitude.	the last run .... a mere 200 feet above the desert floor.
165.	MLS - Ground view as aircraft traverses marker.	
166.	MCS - Reader as he makes and records readings. PAN and TILT to pilot who picks up mike. He begins to talk.	To correlate the readings thus obtained with ones taken from a stationary position ....
167.	MS - Helicopter in flight - AIR TO AIR.	.... a helicopter is utilized. As soon as the last pattern is completed, the whirly bird moves in to repeat the process. But this time, because of the copter's ability to hover, the ballistic effect of the meter is overcome.
168.	MCS - Helicopter pilot at controls. He picks up mike and talks. He replaces mike and puts helicopter into turn.	
169.	LS - Desert through windshield of turning helicopter. Limed marker comes into view as helicopter turns. Just completing flight over pattern in Milwaukee aircraft. It banks to right and leaves frame. HOLD on pattern as helicopter moves toward pattern.	

	PICTURE	SOUND
170.	MLS - GROUND TO AIR - Helicopter moves to camera. TILT as helicopter moves to position directly above. HOLD as helicopter descends rapidly until it fills frame. DISSOLVE TO:	At each altitude, and over each tenth-mile marker, readings are taken.
171.	XCS to LS - Mile marker by roadside. TILT up to SECOND Milwaukee aircraft. PAN with aircraft.	Meanwhile, the second aircraft is completing its mission. Using roads and other topographical marks, it criss-crossed the fallout area to determine its boundaries and intensities.
172.	LS to CS - Second Milwaukee aircraft as it comes to camera. HOLD until plane passes directly overhead. TILT down to roadside and pick up ground monitoring vehicle approaching.	These readings will be compared with those taken by the ground survey groups.
173.	LS to MS - LOW ANGLE - Monitoring vehicle approaching to camera. In F.G. is mile marker. Vehicle stops next to marker. Monitor wearing booties and carrying field survey instrument hops out of vehicle. Driver waits in vehicle.	Fanning out from their trailer headquarters, the ground monitors, in two-man survey crews, rapidly cover the area. To minimize personal exposure and to gather the needed information as quickly as possible, the crews move in with jeeps. Readings are taken at each mile post and other predetermined landmarks.
174.	MS - SIDE ANGLE. Monitor hopping out of vehicle. He moves rapidly into desert for several yards. He stops and takes reading by turning in all four directions.	The monitor quickly moves into the desert for several yards to negate any shielding effect of the vehicle.
175.	MCS - Monitor as he makes reading. HOLD as he makes complete turn.	All four major compass points are faced to obtain an accurate reading.
176.	MLS - Monitor completes reading, rapidly moves back to vehicle and jumps in. Vehicle moves off.	As the driver heads for the next location, the reader logs his findings. Position, time, and intensity are carefully noted.
177.	MS - INTERIOR OF JEEP - Monitor hopping in as vehicle starts off. Monitor picks up log, and makes note of count.	
178.	CS - Monitor filling out log. Shown is all needed information, including location, radiation level, and time.	
179.	MS - INTERIOR JEEP - Monitor finishes logging just as jeep pulls up to another line marker. Monitor hands	At subsequent stops the steps are repeated. While the monitor is taking his reading,

	PICTURE	SOUND
	log to driver as he hops out to make another reading.	the driver radios information from the previous stop to the squad leader at the
	HOLD on driver as he takes log and radios information to squad leader at trailer.	mobile trailer.
	DISSOLVE TO:	
180.	CS - UPVIEW TRAILER antenna against sky. TILT DOWN and ZOOM BACK to reveal squad leader and assistant at trailer. Squad leader is receiving report over handy-talkie. He is repeating information to assistant.	At the trailer, the location, intensity levels, and times are transferred to grid maps of the area ....
181.	MS - Squad leader at handy-talkie. He finishes with instrument and puts it down. He turns towards assistant.	
182.	MS - Two shot, leader and assistant as assistant hands report he has just written to leader. Squad leader consults report then begins to mark levels and locations on grid map.	
183.	CS - Grid map as locations and levels are marked.	
	DISSOLVE TO:	
184.	CS - INTERIOR BROCKHOUSE - Radio report form. Hand is finishing filling in form. When finished, hand picks up form and hands it on SCREEN RIGHT angle back to camera.	.... and the information relayed to the Control Center, where reports from all units in the field are flowing in.
185.	CS OVERLAP as form is handed back. Another hand takes form. HOLD as hand and form move away from camera to reveal plotter with message as he heads for plotting section of Brockhouse.	Each incoming message is recorded in writing and sent to the plot staff. Grid maps identical with those at the trailers are used to plot the fallout.
186.	MS - Brockhouse as plotter reaches plotting section. In right F.G. Radef Chief and several members of ADVISORY BOARD are conversing while plotters are noting latest information on map. Behind Radef Chief is map of a large metropolitan area. (Use whatever is available.)	
187.	MS - Radef Chief and staff conferring. They look up and in direction of plotting section.	
188.	MCS - Plotter as in Sc 186 with message form transferring information to map.	
189.	MS - Radef Chief staff - Reverse angle showing plotter as in Sc. 186 marking map. They look down at grid map on table in front of them. Radef Chief takes grease pencil and begins to draw iso-intensity lines on map.	Gradually, the limits and intensities of the field are established. Slowly, at first -- then rapidly, as more of the units report.

	PICTURE	SOUND
190.	CS - MAP as iso-intensity lines are drawn. Lines are being drawn on cell over map of NTS.	
191.	CS - FACIAL Radef Chief as he looks down at map. He pauses, looks up and speaks at right angle to camera.	
192.	MS - Three shot Radef Chief and two staff members. Radef Chief is talking. One staffer responds. They all look down to map. Radef Chief begins to draw additional lines.	Finally, the fallout picture is complete.
193.	CS - Map as more iso-intensity lines are drawn. Grease pencil is laid down, as last line is drawn. Cell is picked from map.	Properly evaluated by trained radiological defense officers, these multi-colored iso-intensity lines mean more than ten thousand words. They mean the difference between life and death in an attack situation. Not here in Nevada, of course, because every precaution is taken to insure that off-site fallout is minimal
194.	MS - Radef Chief with cell overlay turns to map of Metropolitan district behind him. He places cell over map.	But in the event of enemy attack ....
195.	CS - Cell with iso-intensity lines across map. DISSOLVE TO:	.... in cities and towns .... in villages and hamlets ....
196.	LS - DOWNVIEW - Busy city business district. OVERLAY iso-intensity lines as in Sc. 165. Fade out lines. DISSOLVE TO:	.... on farms .... anywhere and everywhere in our Nation, services established to minimize the effects of nuclear attack could function effectively only by knowing and understanding what these lines mean. Police and fire departments, medical and welfare services -- all would rely on the judgment of the Radiological Defense Staff as the constantly changing pattern of radiation hazard is drawn with these lines.
197.	MS - INTERIOR MOBILE LAB. Three technicians at work.	And so, men come to Nevada to work and plan for the day that all hope never comes.

	PICTURE	SOUND
	DISSOLVE TO:	
198.	MLS - AIR TO AIR - Both Milwaukee a/c. Second a/c is flying "wing" position to first, stacked up.	But until that day when international trust is firmly secured, still others will come .... to train for Civil Defense.
199.	MS - INTERIOR - BROCKHOUSE - Communicators at work. PAN to plotting section. Busy scene as plotters and Radef Chief carry on their operation.	
	DISSOLVE TO:	
200.	MCS - LS FULL SCREEN survey instrument. It begins to move away until two-man survey team is revealed. The men continue to walk across the desert. They stop and reader turns in four directions. They start again and walk into distance.	END TITLE MUSIC UP AND FULL:
	OVERLAY TITLE:	
	THE END	
	Produced By	
	Motion Picture Service	
	FADE OUT:	