

MEDDH

Notes for Four-Minute Film Sequence on Project 4.1
of Operation PLUMBBOB

Deputy Chief, R&D

TSG

3 February 1958
LtColTimmerman/65983/ent

Per your verbal request, attached are notes to go with the four minute film
Sequence on Project 4.1 of Operation PLUMBBOB.

FOR THE SURGEON GENERAL;

1 Incl
a/s

F. W. Timmerman
F. W. TIMMERMAN, Lt. Colonel, M.C.
Asst Chief, Research and Development Division

413.53-3 (Plumbbob) 00

18-22 July 1994
Washington Federal Record Center
RG 112, Office of the Surgeon General
Department of the Army

Accession #: 61A 1527
Box #: 255
File: 413.53-3 (Plumbbob) 00 1958

NOTES FOR GENERAL WOOD:

Suggested Introduction — Or transition from prior remarks.

The majority of the Army R&D program is directed toward providing better destructive means and methods for the Army. Part of the program, however, has an opposite constructive objective, that is, providing better means for maintaining the effectiveness of our personnel, or if ill or injured, improved methods for returning the greatest number to duty with the least possible delay. Within that effort, the Army Medical Service is placing marked emphasis upon the problems of nuclear warfare.

To devise adequate medical services for nuclear battle, and to give tactical commanders proper medical advice, factual data on the medical effects of nuclear weapons on humans were required. An Army Medical Research project was carried out last summer, in Nevada, in connection with Operation Plumb-Bob, to obtain required answers. Obviously, the experiment could not be done on humans, and so, for a variety of reasons, swine were chosen as the test animals. The experimental investigation was designed and carried out to provide information on injuries incurred at various distances from ground zero, and on radiation effects involving both gammas and neutrons. Much useful data was obtained. The following film sequence will give you an idea of the test set-up, and results.

- 4-Minute Film Sequence -

(Commentary on movie, coordinated with order of scenes appearing.)

Animals were exposed under a variety of conditions. The first scene shows the containers used for pure radiation studies. Aluminum liners protected the animals from heat and blast. The range of exposure was from

18-22 July 1994

Washington Federal Record Center
RG 112, Office of the Surgeon General
Department of the Army

Accession #:

61A 1527

Box #:

255

File:

413.53-3 (Plumbbob) 00 1958

supra-lethal to minimal. You see a test subject being placed in a liner. Animals were also placed in tank crew positions, to determine protection afforded by armor. Test pens were of different types. The small square pen, close up, with a fox hole, exposed the animals to major radiation, thermal, and blast injury. Farther out, round pens were used to check on the missile effect of battlefield debris -- stones, water cans, helmets, and so on. Larger pens, with a forward glass wall were also used, as shown. The shattering glass simulated missiles which could be expected in built-up areas.

Here is the thermal pulse from an exploding weapon -- now the blast wave -- forward, then back -- and here is the shot from a distance (Priscilla). And here are the results - - - -

These animals, held broadside to the explosion, have severe burns and radiation injury. Here is one of the big pens, with glass wall, after the detonation. Many of the animals have wounds from the flying glass, as well as burns and radiation. Careful records were kept on each patient (recorder shown). Here you see a severe abdominal wound, with evisceration -- and an ear severely lacerated by a glass fragment. Closer in are animals with major radiation injury -- combined with large burns, and injuries due to the pre-cursor wave -- Up close no unprotected animals survived, in fact as you can see, even the pens were demolished.

Following, are early symptoms of radiation injury -- which come on two days to two weeks following injury, depending upon the dose received -- vomiting -- bloody diarrhea -- nosebleed, bloody urination -- bloody diarrhea and urination -- and bleeding into the skin. Later, he becomes apathetic

18-22 July 1994
Washington Federal Record Center
RG 112, Office of the Surgeon General
Department of the Army
Accession #: 61A 1527
Box #: 255
File: 413.53-3 (Plumbbob) 00

1958

(severe burn and radiation) and then before death, develops tremors and convulsions. These symptoms would be similar in a human.

The test subjects were followed closely and treated by the best known methods. X-rays were taken as necessary — Surgery was done to repair wounds, bacteriological studies on wound contamination were carried out — The changing blood picture was studied — And careful autopsies were conducted to determine cause of death.

- End of Sequence -

From this experiment a great deal of useful information about the medical effects of the newer type small nuclear weapon was obtained.

*From the test, it can be concluded that with this type weapon,

1. Ionizing radiation is the dominant injury in all ranges where casualties can be expected.
2. A living specimen exposed on the surface within the area of the precursor wave is dismembered or mortally injured, thus considerations of his displacement or the effect of missiles is not pertinent, in that area.
3. A foxhole protects against blast and thermal radiation, even within the precursor, and does attenuate (approx. .3) the radiation received.
4. Outside the precursor, blast or mechanical injury is not a factor, except in built up areas subject to falling debris or broken window glass.

* Note to General Wood — recommend the detailed conclusions be omitted.

Believe notes beginning with "From the test, it can be concluded *****" would add little but difficulty to your presentation. Suggest just the following —)

Such information will help provide better protection and treatment for our personnel. Certainly all the answers have not been obtained, so constructive medical field and laboratory research will continue in this very important field.

3

18-22 July 1994
Washington Federal Record Center
RG 112, Office of the Surgeon General
Department of the Army
Accession #: 61A 1527
Box #: 255
File: 413.53-3 (Plumbbob) 00

1958

5. Pure burns are not a consideration, but burns do lower the tolerance level for radiation injury.

6. Up to a range of 2000 units of radiation, exposed individuals will have an "effective" period prior to onset of terminal illness (assuming protection from other effects).

Other, more general conclusions were possible --

1. The living specimen, or man, is the most fragile of all items exposed on the Military effects shot. The tanks, which were very close in, were essentially undamaged, yet the crew (animals) received immediately incapacitating doses of radiation.

2. The midlethal dose of Weapon neutron and gamma radiation in swine is about twice the previously obtained value. Extrapolated to man, the midlethal dose of weapon radiation is higher than previously considered (approx. 750).

3. Environmental analysis within structures, fortifications, or vehicles is profitably and more accurately done with the use of a living specimen rather than pure physical measurement.

4. The midline dosage of radiation in the human is probably in the order of .9 the air dose.

5. The relative biological effectiveness of neutrons in producing lethality is probably 1.0 or greater, as compared to gammas.

18-22 July 1994
Washington Federal Record Center
RG 112, Office of the Surgeon General
Department of the Army
Accession #: 61A 1527
Box #: 255
File: 413.53-3 (Plumbbob) 00

1958