LOS ALAMOS SCIENTIFIC LABORATORY
UNIVERSITY OF CALIFORNIA
LOS ALAMOS, NEW MEXICO

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OFFICE MEMORANDUM

404452

TO : Files

DATE: April 25, 1951

FROM : H. O. Whipple, M. D., Acting Health Division Leader

SUBJECT: FALL-OUT FROM DOG SHOT

SYMBOL : H

The following is a resume concerning the fall-out which occurred on Japtan, Parry and Eniwetok, beginning two to three hours following Dog Shot (April 8, 1951).

1. Meteorologic Situation

The weather was generally normal. There was considerable low cloudiness. Winds from the surface to about 20,000 feet were easterly. Above this level the winds gradually acquired a westerly direction. The fall-out hodograph (the locus of points at which a particle starting from various levels should reach the ground surface) swept far to the west of the atoll, recurved to the east and crossed the southern tip of the atoll. It thus would have been possible to predict that material from the 40 - 45,000 foot level might fall out on Japtan, Parry and Eniwetok. However, the time for a particle to reach the ground from these levels is so long that for all practical purposes it was assumed that fall-out would not occur to any significant degree. Particles of the order of 0.015 cm diameter, however, could fall from the 40,000 foot level in about three hours.

2. Personal Observations of Cloud Behavior

Because of the cloudiness previously mentioned it was not possible to observe cloud development and subsequent behavior in any detail. The lower section of the stem could be observed moving in a generally westward direction; about five minutes after the shot I was able to see through gaps in the clouds, the white cap of the mushroom to the north at an elevation of about seventy-five degrees. At about one hour post shot all that was visible of the cloud was a thin brownish haze to the northeast and east. Except for color, it resembled high cirrus cloud in appearance.

3. External Radiation Levels

Fall-out began about 0900 and continued most of the day. External radiation levels did not reach high values until some time after the initial indications of fall-out, but I think about 1100, levels began to rise sharply, and reached a maximum probably about 1500. At this time, out-of-doors levels as high as 1 r/hr were reported, though a mean value for the general background on Parry would probably lie between 0.1 and 0.2 r/hr. These values refer to gamma radiation, and skin dosage from beta radiation would probably have to be assessed at several times these levels. Levels on Japtan were slightly higher, and on Eniwetok, slightly lower. Total gamma

radiation is not measured. There is a difference of opinion among experts as to whether or not beta radiation is of sufficient importance so that it should be taken into account with the gamma radiation in a number of operations where the permissible gamma-ray limit is approached. It is believed that this difference of opinion will exist until some quantitative answers are obtained. Until these answers are obtained, and suitable action is taken, the rad-safety techniques used at Eniwetok will be open to some criticism.

Shipping requirements for this experiment would be minimal.

Personnel: Responsible Investigator: Simon Shlaer, Assistants: Ed Bemis and Hilery Storm.

Expt. III. ? To measure the recovery time of the human eye after seeing the ball of fire or clouds illuminated thereby. In connection with multiple bomb attack planning, HQ Strat Air Command has requested information on this problem from the Health Division recently. Si Shlaer, who is a vision expert, states that there are no vision data available at such illuminations, but that the information from lower illuminations, and the qualitative observations of personnel at former tests, indicate that this appears to be a serious practical problem. He is currently investigating whether applicable information can be obtained by looking at the sun for short periods of time. Depending on the outcome of this investigation, it may appear sensible to propose an experiment at Greenhouse. At the moment this is mentioned as a possibility.

4. If these proposals are approved in general, it will be understood that final approval will still be required on specific plans in which shipment requirements are stated.

It will also be understood that the experiments will not be undertaken unless the detailed planning shows a reasonable chance of obtaining answers that will be of future practical value.

5. By copy of this memo I am asking Red Spence for his views on the possibility of obtaining reasonably early answers from Expt. I. It is my understanding that his laboratory on Parry may be in a position to render some assistance in rad-safety problems of this type.

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UNCLASSIFIED

20 November 1950

A. C. Graves

T. N. White

EXPERIMENTS BY H-1 PERSONNEL AT GREENHOUSE

REFERENCE: SD- 4289

6. Manning Table

All Shots:	Tom White Maj. L. A. Eddy Robert Barker
First and Second Shots:	Charles Perry Ralph Gosline Kilery Storm Ed Bemis
Second and Later Shots:	Si Shlaer Bill Hoover Jack Aeby Vacancy.

It is understood that if Expt. I (Dust) is approved, Dr. Shipman would like Harry Schulte to go as a representative at large from the Health Division to help on this Expt. during part of Operation Greenhouse.

ORIGINAL SIGNED BY THOMAS N. WHITE

Thomas N. White
Alternate Leader Group J-9

TNW:jds

Distribution:

cy 1A - A. C. Graves
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" 4A - T. L. Shipman ←
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" 6A - H. F. Schulte
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radiation dose to personnel estimated from film badges placed in various locations, was estimated at approximately 1.5 r. Here again, skin dosage from beta radiation must be somewhat larger.

4. Internal Hazard

As previously indicated, the material which fell within a few hours post shot and which was responsible for the high ambient radiation levels, must have been in the form of large particles. Unfortunately, no air sampling was carried out, at least in the first few days. Such particles as were recovered were recovered by techniques which would admittedly discriminate against small particles. Virtually all particles which were recovered were in the size range of 100 microns and up. What fraction of activity was contained in smaller particles is unknown.

There is certain circumstantial evidence which suggests that the average particle size was large: a) Activity inside of buildings was very much lower than outdoors, although buildings were far from airtight. Beta radiation levels in particular were very low indoors. b) A large accumulation of fall-out material was found in the bed of a truck in the administrative compound on Parry. This material had the appearance of relatively coarse black sand. c) Activity tended to be highest on the lee of buildings and on the lagoon beach, where local turbulence could have caused the impingement of large particles on surfaces. d) Calvin Potts, Harold Plank and myself found no activity on Kleenex swipes from our respective noses. e) Activity caughton the hair of people outdoors was readily and completely removed by a single soap and water treatment. f) Lungs of three stray cats and one stray dog showed no detectable beta activity above normal background when assayed at this laboratory eighteen days later. In the human, significant percentages of retention in the lung occur only with particles below 10 microns in size.

5. Appraisal of Seriousness of the Situation

It seems unlikely that significant amounts of fission products were breathed and retained. Results of an assay on myself for urinary excretion of fission products have not yet been reported. Negative 4/26/51 How.

Because of the rapid decay of young fission product mixtures, effects resulting from chronic low-level irradiation of tissue are not to be anticipated. There is no clinical evidence of acute radiation damage.

You will recall that the Trinity cows, which were exposed to much higher levels of fall-out activity, showed no evidence of internal damage, nor did they have detectable deposition within their bodies of long-lived fission products.

The seriousness of the situation lies essentially in the large number of people unnecessarily irradiated.

Harry O. Whipple
HARRY O. WHIPPLE
Acting Health Division Leader

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