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MIKE SHOT
CURSORY REPORTS

on

Experimental Programs

[redacted]

With
Very Mild Editing

by

William E. Ogle
and
John H. Lofland, Jr.

8 November 1952
Eniwetok, M. I.

Los Alamos Scientific Laboratory
of the
University of California

[redacted]

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INTRODUCTION

These reports are issued in order to give an early over-all picture of the recovery and data situation after Mike Shot. What data are presented here should in general be regarded with a jaundiced eye, since most of it has been determined by a very cursory investigation of the records. However, some of the numbers, for instance, ball-of-fire yield and [redacted] should be fairly close to the final values. In many cases only statements about recovery can be made, since it may take several months to reduce the data.

The reports are given in order of program. Some few projects have not been able to submit reports since their work either depends upon data collected by some other project, or is not directly connected with the immediate effects of the bomb.

Mike Shot was fired at 0714:59.4 ± 0.2 sec local time on 1 Nov 52 Elugelab Island of Eniwetok Atoll. [redacted]

Details of the device and of the experiments performed may be found in other publications, among which should be mentioned [redacted] meeting notes of the Los Alamos Scientific Laboratory, status reports of the various projects, and the "Turquoise Book", by P. Galentine.

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Project 1.3
CLOUD SAMPLING ON MIKE SHOT
Preliminary Report by H. F. Plank

1. SAMPLES

1.1 Number of Samples

Twelve samples were obtained by the F-84G aircraft, including the two used for early reconnaissance.

1.2 Sample Size

Samples obtained by Red Flight (1M, 2M, 3M), as well as one sample from White Flight (7M), were each approximately the size predicted and were satisfactory for yield determination. Samples 5M and 6M of White Flight and 9M, 10M, 11M, and 12M of Blue Flight were approximately one-third the size of the best four and were satisfactory for the purpose of ratio and detector studies. These samples were from five to ten times smaller than they should have been because of unforeseen operational limitations beyond the control of this project (see Par. 3.2). The two reconnaissance aircraft gave very small samples (15M and 16M) which would be useful for ratio checks.

1.3 Sample Quality

Sample quality is governed by the capability of penetrating the main body of the cloud. In general, all samples except 11M, 12M, 15M, and 16M, which were taken at radically different altitudes or sections of the cloud, are considered to be as representative of the cloud as possible. Excluding the exceptions, the samples were taken at altitudes between 42,000 and 44,000 ft, which was in the region of the juncture between the upper toadstool and its stem. Because of

formation flying some of the samples should be almost identical, so that the actual spread in the data may not be a true index of the randomness of sampling. By comparison, the excepted samples should afford an insight into the representativeness of the others.

2. RADIATION EXPOSURES

2.1 Magnitude

Only Red Flight aircraft approached the planned operational exposures. Failure to attain the planned exposure in the other flights is reflected in the lower sample sizes which they obtained. Red Flight exposures were in the 3 to 4 roentgen level, White Flight in the 0.5 to 1 roentgen level, and Blue Flight in the 0.2 to 0.4 roentgen level. Because the aircraft were carefully hand-polished by the F-84G personnel, the cockpit background was very much lower than expected. The total radiation exposures were therefore approximately 40% less than had been anticipated. In view of the fact that these aircraft saw radiation intensities in excess of 500 r/hr, the low exposures achieved by Red Flight should be considered a testimony to the skill of its pilots.

2.2 Effectiveness of Shielded Flight Clothing

Use of the shielded flight clothing by Red Flight apparently gave about a four- to five-fold reduction in radiation exposures. The effect did not appear to be significant for White Flight, although for Blue Flight there again appeared to be a significant protection. The protection afforded to Red Flight apparently corresponds to evidence that a considerable fraction of the radiation flux in the cloud during Red Flight penetrations may be due to the decay of U^{239} which gives a

73-kev gamma ray. This evidence was gained from an analysis of the decay rate of reported peak radiation intensities in the cloud.

3. OPERATIONAL PROBLEMS

3.1 Altitude Performance of Sampling Aircraft

The bomb burst formed an upper cloud about 100 miles in diameter with a stem in the center approximately 30 miles in diameter. A white vaporous undercloud was present forming a collar around the stem. It had a diameter about the same as the upper cloud. It was initially tangent to the upper cloud at the juncture of the stem with the upper cloud (45,000 ft) but during the course of the day appeared to subside to about 40,000 ft. Several projecting fingers were present in the neighborhood of the juncture of the stem and upper cloud, and some of the sampling aircraft were directed to sample in this region. Under these circumstances the altitude performance of the aircraft was satisfactory. The maximum altitude attained by any aircraft was 45,000 ft indicated. When such aircraft exist, it would be desirable for very high-yield devices in the future to have about 5,000 ft additional ceiling capability in order to sample well into the main body of the cloud.

3.2 Flight Times in Sampling Area

Successful sampling requires that the aircraft have a flight time capability long enough to permit radiation exposure to limit the duration of the mission. This condition was true only for Red Flight. The unforeseen operational limitation in flight times mentioned in Par. 1.2, above, arose because the radar equipment in the control B-29 ~~gave false blips~~ IFF blips from the sampling aircraft were obscured on the by the cloudy weather which existed at the time of sampling. As a result, the sample control B-36 was directed to fly farther from the main cloud mass than it should have been. Eventually, the details of the cloud were lost to those in the B-36 and the sampling aircraft were required to fly excessively long distances to reach the cloud vicinity. They then had to conduct a cloud search as well as a sampling mission, although the former was to have been the function of the B-36. After sampling, the aircraft then incurred the risk of running very low on fuel by having to return over a great distance to the refueling area. In view of these considerations, the F-84G aircraft in White and Blue Flights did not meet the requirement that they have the capability of spending two hours in the sampling area. Corrective measures have been discussed with the Commander, TG 132.4.2, and it is believed that this condition will have been corrected by King Shot.

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the positive Humidry samples. The quantity of radioactive gases collected in the B-31 device is unknown, as radiac readings were obscured by surface contamination on the B-31 containers. The value of these samples can better be ascertained after preliminary laboratory analyses. All the above samples are now in ZI laboratories and under process.

Project 7.4 - Propagation of Seismic Waves (J. Allen Crocker)

Current reports from Washington, D.C., indicate that six stations received strong signals, one station fair, one station questionable, and no report from one station. Another station reported "no signal"; it is believed that the negative result from this station was due to faulty instrumentation.

It has also been reported that some Coast and Geodetic Survey seismic stations have reported positive signals.

Details of the magnitude of these signals and their respective locations are not currently available at this headquarters.

Project 7.5 - Transportation of Airborne Debris (P. W. Allen)

Data were obtained to determine cloud height and movement after Mike Shot. Because of the conflicting data reflecting the true height of the Mike cloud, conclusions will be held in abeyance until such time that critical evaluation of all data will yield the most probable height and path of the Mike cloud.

Project 7.6 - Detection of Fireball Light at Distances (M. H. Oleson)

No results of this program are available at this time. Measurements

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Table A-1

RESIDUAL CONTAMINATION LEVELS*

Place	Time (Days) M	M + 1	M + 2	M + 3	M + 4	M + 5	M + 6
Runit	300	40	100g	40g	30g	30g	20g
Biijiri	20,000	3,000	1,800	2,000g	800	600	240
Engebi	50,000(a)	19,000	6,000	3,300	1,800	2,800g	1,400
Bokon	10,000(b)	--	10,000	14,000g	8,000	4,000	2,500
Ruchi	--	16,000	8,000	9,000	3,400	4,000	1,400
Bogallua	7,000(c)	14,000	7,000	6,000	3,000	4,000g	1,500

*Data taken from RadSafe maps. Numbers indicate intensity in milliroentgens/hour at 25 ft altitude unless otherwise specified. Intensity on ground was roughly four times air reading. These numbers should be considered with caution since they were taken under very adverse conditions and also are, in some cases, interpolated. M represents the day of Mike Shot.

(a) 150 ft altitude

(b) 500 ft altitude

(c) 1500 ft altitude

g on ground

[redacted]

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