VECTER

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PRELIMINARY REPORT, Cloud Sampling on Mike Shot, Project 1.3

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1. SAPIES
1.1 Number of Semiles

Twelve samples were obtained by the ISIG aircraft, including the two SAACOSTYCOO Mand for early recommisance.

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, of Blue Flight

16M, 11M and 12M, 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 unforecent operational limitations beyond the control of this project. (see paragraph 3.2). The two recommaisance aircraft gave very small samples (15M and 16M) which should be useful for ratio checks.

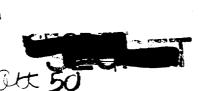
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1.9 Sample Quality

Sample quality is governed by the espability 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 and 44 thousand feet which was in the region of the juncture between the upper toadstool and its stem. Because of fernation 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.

RESTRICTED DATE

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as defined accress
act of 1954. Act of 1954 accress to Administrative and Criminal Sanction







2. RADIATION EXPOSUPES

2.1 Magnitude



only Red Flight Aircraft approached the planned epocational 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 tree to four reengten level, White Flight in the one-half to one reengten level and Blue Flight in the two-to four tenths reengten level. Because the aircraft were excefully hand polished by the Fühl personnel, the cockpit background was very much lower than exposure. The total radiation exposures were therefore approximately how 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 ashieved by Red Flight should be considered a testimony to the skill of its pilots.

2.2 Refestiveness of Shielded Flight Clothing

Use of the shielded flight elothing 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 U²³⁹ which gives a 73 her 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 sloud about 100 miles in diameter with a stem in the center approximately 30 miles in diameter. A white





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vaperous undercloud was present forming a coller around the stem. It had a dismeter 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 (ferty-five thousand feet) but during the course of the day appeared to subside to about 40 thousand feet. 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 those sircumstances, the altitude performance of the aircraft was natisfactory. The maximum altitude attained by any aircraft was 45 thousand feet indicated. When such aircraft exist, it would be desirable for very high yield devices in the future to have about five thousand feet 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 unforced
operational limitation in flight times mentioned in Paragraph 1.2 arose
because (1) the radar equipment in the control B-29 about taken high in the
cloudy weather which existed at the time of sampling, and (2) the operational
commander in charge and giving orders from the control B-29 appeared to be
unfamiliar with the limitations of this equipment, with the phenomena associated with a bomb burst, and with the nature of the sampling mission
itself. The consequence of this situation was that the sample control B-36
was repeatedly ordered further from the main cloud mass when the situation
the



the sampling aircraft were required to fly expossively lang distances to Eventually, the details of the sloud were lost to those in the B-36 and reach the chenk vicinity. They them had to conduct a cloud search as well of these someiderations the FOG aircraft in white and Blue Flights did not as a compling mission, the former being the function of the 3-36. After the sampling area. This failure has been brought to the attention of the by having to return ever a great distance to the refueling area. In view hoped that this condition will have been corrected by King Shot, formander, 70 132.4.2, and corrective measures here been discussed. It is med the regulrement that they here the expability of spending two hours in empling, the aircraft then insurred the risk of running very low on fuel

