

DELETED VERSION ONLY

OPERATION HARDTACK

Project No. 2.8a

Title:

411016

Agency: NRDL & UCRL

Rocket Fallout Sampling

Shot Participation:

Project Officer:

[redacted] DELETED
(1 over land and 1 over water)

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Objectives:

To measure the distribution of certain isotopes, with respect to space and particle size, resulting from a large nuclear detonation on the surface, for the purpose of determining nuclear testing contributions to world-wide fallout.

Description and Experimental Procedures:

The sampling technique proposed is an extension of that currently being developed by UCRL in their "clean sweep" program of Operation PLUMBBOB. For each event, 24 rockets will be fired in salvo from launching platforms spaced at various distances from ground zero. Nearly vertical launching angles will be used to assure impact points within the lagoon. Symmetry of the detonation-produced radioactivity about a vertical line through ground zero is assumed, and rocket trajectories will be selected to assure collection of samples at different radii. To avoid the requirement for heavily protected launching sites near ground zero, a few rockets will necessarily be fired at small angles from the vertical to obtain data at small radii. An attempt will be made to incorporate an impact separator in the rocket-borne filter heads, to collect the larger particles (25 microns or greater) prior to filtration. This separator is visualized as using a system of obstructions to induce curvilinear flow, in turn causing the larger particles to separate by centrifugal force. The larger particles will thus be collected prior to impact of the remainder of the sample with the filter paper. In addition, specially developed sizing techniques will be used during analysis, to provide both a back up for the impact separator and more detailed information on particle size distribution. Two rockets will be fired along each trajectory. One will collect a sample from the base to the top of the debris. The other will be programmed to collect from an intermediate point (at or near the tropopause) to the top of the debris. After the filter head has been separated from the rocket body,

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Carroll Wilson 6/4/85
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US DOE ARCHIVES
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COMMISSION
PG
Collection *PBM-EP Files*
Box *2702 JB 2239*
Folder *Hardtack I - Operations*


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it will be lowered to the lagoon by parachute. The filter head will incorporate a radio transmitter, dye marker, and a Sonar transducer to assist in recovery. Location and recovery will be accomplished by both aircraft and surface vessels, after which the units will be shipped to the ZI for analysis. Each sample will be analyzed for approximately 10 selected isotopes. For the land surface shot, sample analyses will permit integration of a given isotope activity and thus allow separation of the local fallout (large particles) from the world-wide fallout (small particles). Analysis and results of this Project will be closely correlated with those of Project 2.8b.

Special Requirements:

1. One land-based and one barge-based surface burst of  **DELETED**
2. No aircraft should pass in the vicinity of the rocket trajectories from H/5 until H/30 minutes.
3. Vertical wind structure must be known but it does not represent a mandatory condition for firing.
4. One destroyer, two or three light aircraft, one crash boat with air/ground communications, and several smaller surface craft required for location and recovery of filter heads.
5. Incorporation of a suitable tracer in the land-based device, to allow correlation between the close-in measurements obtained by this Project and the several continuing world-wide fallout programs.

Construction:

Twelve rocket launching pads for each shot. Locations selected should permit maximum use of same pads for both shots.

Funding:

Total Estimated R&D Cost:	AFSWP	0
	AEC	<u>\$836,000</u>
	TOTAL	\$886,000

