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August 9, 1957

AEC 952/10

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*Walter Colby Park*

ATOMIC ENERGY COMMISSION

*SI-58 Report*

PROPOSED ROCKET SAMPLING EXPERIMENT  
OPERATION HARDTACK

*7 Hardtack #1*

Note by the Secretary

1. The attached letter from the Director, UCRL - Livermore Laboratory, is circulated for the information of the Commission by request of the General Manager.

2. The Director of Military Application advises that:

"It is the opinion of DMA that Dr. York's proposed experiment should be implemented, particularly in view of the possibility of reaching some sort of agreement with the Soviets on test limitation which would involve an exchange of observers for on-site monitoring of nuclear test activities."

"DMA is currently experiencing difficulty finding money for previously planned HARDTACK tests."

"It is DMA's opinion that because of lack of funds we will not be able to authorize implementation of Dr. York's proposed experiment, and we are so advising Dr. York."

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W. B. McCool

Secretary

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SPECIAL REREVIEW	Reviewers	Class	Date
FINAL DETERMINATION	<i>Joe Diaz</i>		<i>9/2/57</i>
Class: UNCL	<i>W. Bue Sease 9/30/57</i>		

DOE 5650.2, III-12 (ADMIN)

CG-WF, Topic 3.14-33

By: *J. Linn* *A. Hales*

WITH ATTACHMENT  
*14 Aug 1957*

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*W. S.*

UNIVERSITY OF CALIFORNIA  
RADIATION LABORATORY  
LIVERMORE, CALIFORNIA

July 5, 1957

Brig. General A. D. Starbird  
Director of Military Application  
U. S. Atomic Energy Commission  
1901 Constitution Avenue  
Washington 25, D.C.

Dear General Starbird:

Several months ago you discussed with us the question of performing an experiment at Hardtack for the purpose of determining whether or not it is possible to determine by rocket sampling the ratio of fission to fusion yield in a nuclear shot. At that time we gave you our preliminary views of the subject which indicated that we believed the method was promising, and you advised us to examine the matter further with regard to cost and feasibility of such an experiment.

With this in mind, Cooper Development Corporation (they did the similar Redwing experiment for NRDL) was asked for cost estimates for two kinds of overseas rocket program. The first (called Program 1) is considered a reasonable optimum program with a good chance of success and thorough enough so that one should be able to say with confidence whether such a method is feasible or not. Program 2 is less complete (and somewhat less expensive) and is considered a minimal program. It would advance the state of the art significantly (from where NRDL left it) but would require further tests to achieve a high degree of confidence in the system.

Program 1 is envisaged as consisting of 76 rounds of rockets as follows:

2 large clean shots:	1 ground } 18 rockets each
	1 barge }
4 others:	Large - regular-barge or ground } 10 rockets each
	Small - regular-barge } 10 rockets each
	Small - regular or clean - ground } 10 rockets each
	Small - Clean - barge } 10 rockets each

TOTAL 76 Rockets

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The 18 rocket penetrations would be to determine that the variation of activity in the cloud is reasonable smooth and reproducible and hence susceptible to measurement by a reasonable number of rockets. The other rockets would check variation with size and shot conditions of the device. This program would cost about \$900,000.

Program 2 is envisaged as consisting of about 42 rounds of rockets which might be fired as follows:

1 large shot: ground or barge - 18 rockets

3 others (large or small) (clean or regular) - 8 rockets each

TOTAL 42 rockets

This program would cost about \$760,000.

It is probably worth pointing out that the kind of information obtained here would be useful in the fallout problem also. Knowledge of the initial distribution with altitude, particularly the distribution between the stratosphere and troposphere, would be of considerable value.

The Cooper Development Company states that work on this program must be commenced immediately in order to be accomplished in time for Hardtack. Since no money has yet been budgeted for this program, your immediate attention to this problem is urgently needed, so that we can inform Cooper of our intention as soon as possible. Please advise us as to whether we should submit a special budget request to cover this program through the regular channels.

Sincerely yours,

/s/ HERBERT F. YORK  
Director  
UCRL - Livermore