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December 10, 1953 COPY NO. 15

ATOMIC ENERGY COMMISSION

OPERATION CASTLE - STATUS OF LASL AND UCRL PROGRAMS

Note by the Secretary

The Division of Military Application has submitted for the information of the Commission the two attached letters which give a brief resume of the status of the programs at the Los Alamos Scientific Laboratory and the University of California Radiation Laboratory. The Division of Military Application has advised LASL to proceed at once with their proposed program from a technical viewpoint, but stated that the date of CASTLE will not be firm until discussions with the DOD have been completed and agreement has been reached on the proposed programs.

ROY B. SNAPP

Secretary

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This [redacted] as [redacted] Energy Act of 1946. [redacted]

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By Authority of U. S. Atomic Energy Commission
Per Brig. Gen. K. E. Fields
Document No. LXI-2165-15A
(Classification changed per memo from DMA dtd 2/20/53)

ENCLOSURE "A"

UNIVERSITY OF CALIFORNIA
LOS ALAMOS SCIENTIFIC LABORATORY
(CONTRACT W-7405-ENG-36)
P.O. BOX 1663
LOS ALAMOS, NEW MEXICO

In Reply
Refer To: DIR-778

28 November 1952

Brig. General K. E. Fields
Director of Military Application
U. S. Atomic Energy Commission
Washington 25, D. C.

Via: C. L. Tyler, Manager, Santa Fe Operations Office

Dear General Fields:

Although the annual program submission of the Los Alamos Scientific Laboratory does not ordinarily occur until about the first of each calendar year, recent events strongly suggest the advisability of furnishing your office with advance information concerning the general nature of the test program which we will propose in our forthcoming formal presentation.

The extremely successful behavior of the recent MIKE shot has emphasized, not only the important future of radiation implosion, but the practical fact that a cryogenic thermonuclear system works. Subject, of course, to important additional information to be obtained regarding thermonuclear systems and radiation implosion engineering in Operation UPSHOT, we believe that the main outlines of Operation CASTLE can now be forecast for planning purposes along the following lines.

The Los Alamos Scientific Laboratory may presently be expected to propose four shots for CASTLE having the following general characteristics:

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The Los Alamos Scientific Laboratory further wishes to propose that Operation CASTLE now be firmly scheduled for the spring of 1954. We recognize that this date differs from that tentatively discussed up to the present time, but there now appear to us to be a number of compelling reasons which support this proposal, and which make an earlier date impractical and

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inadvisable. These reasons are enumerated below:

1. The UPSHOT program, although it has not been formally proposed as yet, will contain at least two and perhaps three shots which will bear directly upon the specific design of the [redacted] and [redacted] devices above. The UPSHOT program is now extending well into May 1953 and may be subject to still further delays. The Los Alamos Scientific Laboratory believes that several months are required for the evaluation and proper application of UPSHOT results to CASTLE designs, and that an earlier date for CASTLE will make it unlikely that there will be full use of the earlier results. This could have the effect of either jeopardizing the subsequent program or of making it impossible to employ the otherwise possible technical achievements.

2. The time scale of availability of Li^6 for the [redacted] tests has long been problematical and has been subject to further and further delay. There is now a real question as to whether any earlier date than the spring of 1954 for CASTLE would be possible in any event for devices requiring this substance. Such a date is also necessary because of the production time required for the Li^6 for the [redacted] form of the [redacted] a Los Alamos decision which, itself, will not be firmly made until after UPSHOT.

3. From the practical standpoint of test operations the time between UPSHOT and CASTLE as earlier proposed is too short and is becoming even more so with UPSHOT delays and postponements. Furthermore, the length of the CASTLE test operation proposed (particularly when supplemented by the Livermore proposals) makes it essential that a season at Eniwetok be picked when the weather is as good as possible and, when the inevitable shot day postponements occur, the consequent delay in the program does not lead to times of still worse weather but rather to better weather. Finally, we believe it impractical, if not impossible, to require civilian test personnel and task force personnel to be overseas during the latter part of December.

4. The time required to prepare [redacted] for test is, in the opinion of the Los Alamos Scientific Laboratory, an absolute minimum on the schedule proposed and that no earlier test of [redacted] is possible under any set of circumstances. Indeed, it is a serious concern of the Los Alamos Scientific Laboratory that appropriate military logistic support for a system of this nature can be ready in time to provide this feature of real capability for emergency use in the event of war.

[redacted]

[redacted]

The Los Alamos Scientific Laboratory is aware of the problem presented by the fact that a test of a very large yield system has been successfully conducted, but that actual weapon capability exists in this field only for the [redacted] The emergency capability for the [redacted] is primarily dependent upon the availability of Li^6 and the amount required per weapon and not strictly a function of when the device may or may not have been tested. The actual national capability, assuming the device being made is reasonably likely to work as predicted, is essentially unaffected by the actual date of a test as long as devices are fabricated at the maximum rate permitted by the availability of materials. On the other hand, if the device is not workable, the national capability remains in the [redacted] field until extensive further investigation has been carried out or some other type of device [redacted] as an example) is provided.

We are also aware that a suggestion may be made to divide the operation into two phases - one in the fall of 1953 and one in the spring of 1954. We are strongly opposed to such a proposal on both practical and technical grounds. Not only does it require almost continual overseas residence for task force and technical personnel for a six months period and conflicts with a possible DOMINO operation (see below) but, we believe, would lead to no earlier capability. We have pointed out earlier strong reasons for providing a longer time interval between UPSHOT and CASTLE as well as the extreme doubt as to Li^6 availability. If the [redacted] were shot earlier than the availability of the [redacted] or [redacted], its firing would be forced in the [redacted] system. This, of course, would not lead to a weapon capability even in the unlikely possibility that such a shot were to have a yield of military interest. We are very much of the opinion that the [redacted] firing should be chosen on technical grounds only between a [redacted] system and a [redacted] system and that, accordingly, its firing should occur at the same time as the latter systems. Presumably, if the UPSHOT model is successful, a [redacted] could be shot some time after this prototype scale test. However, since yields of this size or greater are already available in other geometries, this situation presumably is not the origin of any concern.

Operation DOMINO, originally tentatively suggested as occurring in the spring of 1954 period, may either be still further postponed, or may occur, on a very limited basis, in Nevada in the fall of 1953. In the latter event, only the simplest experiments on fission devices would occur in which only measurements of yield on air drops were required. We wish to save this period for the possible exploitation of [redacted] in case this experimental program at Los Alamos continues to show promise. However, in this event, we hope to carry out a test operation in a manner which will much more resemble the RANGER operation of 1951 than the large joint task force spectacles which have more recently characterized the Nevada Proving Ground.

We are presenting this advance information on this phase of the formal Los Alamos Scientific Laboratory program in view of the urgency of making decisions relating to Eniwetok at the earliest possible date. In view of the concurrence which we have already received in informal discussions, we are proceeding to implement these decisions as rapidly as possible. We recognize that a test

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program of this magnitude, particularly if still further extended by experiments for Livermore, will place a serious burden on the task force and its technical staff. We are, however, of the opinion that this does not yet present an insuperable problem if certain technical administrative assistance can be received from Livermore in addition to the particular experimental program which they have agreed to undertake in this operation. This matter, however, will be the subject of separate correspondence.

Sincerely yours,

/s/

N.E. Bradbury
Director

Enclosure "A"

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ENCLOSURE "B"

UNIVERSITY OF CALIFORNIA
RADIATION LABORATORY
BERKELEY 4, CALIFORNIA

November 24, 1952

Brig. Gen. K.E. Fields
Atomic Energy Commission
Division of Military Application
Washington, D.C.

Dear General Fields:

As you know, UCRL Livermore spent the first few months of its existence working out plans and working over ideas to see what it could do to best carry out its mission of increasing the effort in the thermonuclear program. These plans began to have some semblance of firmness on about November 1, 1952, and it is only since then that our engineering and service organizations have been able to make a study of the feasibility and possible timing of the proposed weapons research program. The proposed device test program was as follows:

I. Operation Upshot
UCRL was to produce and test two moderated [redacted] and with Radiochemistry and Alpha as the only necesssary diagnostic experiments.

II. Operation Castle
a) UCRL was to assist in the LASL program by carrying out the sort of diagnostic experimentation which had previously been done by NRL.

b) UCRL was to design, produce, and test two thermonuclear devices, namely, the [redacted] The absolute minimum diagnostic experimentation is in each case alpha, ganex, and radiochemistry; but additional experiments such as phonex, very fast photography, and tenex are also very desirable. It was further proposed that the [redacted]

The feasibility and timing study of the above program has brought out the following points:

I. The Operation Upshot program can be carried out as planned barring major accidents or unexpected difficulties in processing.

II. The diagnostic experiments for LASL can be done if Castle should be as early as September 1953.

III. The preparation of our own devices could probably not be done in time for a test as early as September 1953, but could be done if Castle were in late winter or early spring 1954

IV. Any delay beyond spring 1954 in testing these devices would in our present opinion, result in an equal delay not only in our immediate objectives, but also in our long term contribution to the weapons program.

We therefore recommend that, in order to optimize the UCRL contribution to both the long range and short range program, Operation Castle be held in spring 1954.

Sincerely,

/s/

HERBERT F. YORK