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IN REPLY REFER TO: DIR-806

20 February 1953

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:

1. Reference is made to TWX S-125 dated 17 February from Huston to Tyler quoting Bethe on the question of the advisability of substituting an air drop for a surface shot [redacted] in Operation CASTLE. We find ourselves in strong disagreement with this suggestion for Operation CASTLE although we have, of course, no objection to a DOD effects program at a later date under appropriate circumstances if this seems necessary to them. Our reasons for preferring the present operational plan follow.

2. In spite of the fact that the devices to be tested in Operation CASTLE are being designed with "emergency capability" in mind, the operation is primarily an experimental test program in the field of weapon development. Accordingly, the diagnostic experiments are still of the highest importance for it is not expected that the design of radiation implosion weapons or their further improvement will stop with this test program. Therefore, we strongly believe that no step should be taken which diminishes the amount of appropriate and relevant experimental information which can be obtained. Every effort is being made to simplify the experimental program and to include only those experiments which are essential and have a proper balance between their cost and the information which they give. However, all shots presently are expected to carry as a minimum some experimental observations including the behavior of the primary bomb (alpha), the radiation transit time to the secondary bomb, and the photographic behavior of the case.

3. [redacted] is presently planned not as a barge shot but as an island shot and it is likely that the most extensive instrumental observations will be carried out on this experiment. The remainder of the Los Alamos shots are planned as barge shots located near atoll islands so that photographic and other observations can be made on them. We would regard it as absolutely impossible, were it otherwise desirable, to drop the [redacted]

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MILITARY APPLICATION

32

at the time of the presently planned test shot inasmuch as the associated [redacted] logistics and test drops are actually coming to completion at or shortly after the test date.

4. The dropping of the [redacted] would, presumably, be a task within Air Force capabilities. However, the [redacted] is the last of the devices scheduled for final design freezing and will be the last to be constructed. This is necessarily so in view of the state of knowledge of systems of this nature. Accordingly, only the [redacted] is actually available as a device for consideration for a drop test. We would regard the sacrifice of the experimental observation of the [redacted] as far too high a price to pay for an extremely dubious demonstration of "emergency capability". Actually, emergency capability is far more easily, cheaply, and effectively demonstrated by methods other than using a live bomb. Moreover, it should be recognized that the yield of the [redacted] is probably more unknown than any of the devices to be tested and may vary [redacted] Such a priori ignorance would seem to be extremely unfortunate for any effects instrumentation and might seriously jeopardize its effectiveness.

5. It should be recalled that the developmental status of the [redacted] in emergency capability closely parallel the status of the Nagasaki and Hiroshima bombs in the sense that the actual reliability of any of the components will be far from exactly known. Thus, there will exist the possibility of failure or malfunction due to completely minor and extraneous reasons. These reasons will not be known, but an unnecessary stigma will be attached to the device which may be impossible to remove and which would not have occurred had a proper experiment been made. It must be recalled that the definition of "emergency capability" is that only non-known characteristics of the device will prevent its delivery by existing aircraft in time of war. Models of these devices that have the same reliability now expected of conventional weapons will require long and arduous further study, development, and field testing of the Sandia Corporation type.

6. The certainty of any air drop cannot be guaranteed at this time. Thus it would be necessary for J-Division to plan on both an air drop and a barge capability for a given test if this philosophy were agreed upon. Accordingly, for this reason alone, the introduction of an air drop does not simplify the test program but rather complicates it. Even were it certain that an air drop were possible, the resulting operation is not necessarily less complicated except for the fact that few observations are made. Not to do a test at all, of course, is a simplification of the same sort. That air drops themselves present

complications is apparent when the question is raised as to whether the strip at Eniwetok (and by the same yardstick, Kwajalein) is long enough to permit the take-off of a B-36 [redacted] If it is not, then probably one must go back to Hickam - and the question of taking off in the vicinity of Honolulu under these circumstances is a very dubious one. Finally, the accuracy of a drop under parachute conditions is such as to complicate enormously the photographic problem. Furthermore, if the parachute should stream (for which there is always a probability), all such observations would be lost. Accordingly, we cannot agree that an air drop under these circumstances and in the present stage of development really simplifies the Eniwetok test operation.

7. The Los Alamos Scientific Laboratory is less well able to argue the question of the importance of effects measurements which could be obtained in a free air burst and which could not be obtained (or obtained less well) from a surface shot. If this is truly an important question, we believe that it should be answered by a shot devoted to this problem - as, indeed, the effects shot program is currently being conducted at the Nevada Test Site. It has been repeatedly demonstrated that the attempt to combine a Los Alamos Weapon Development Test with a DOD effects test leads only to both jobs being done far less well than they would be if done separately. In the particular instance, we are less inclined to regard specific effects of weapons of this class as exceedingly important. Our reason for this belief stems primarily from the fact that this is the biggest weapon that we know how to build. It will give the largest effects of any weapon we know how to build, but a knowledge of precisely what these effects are seems not to be of crucial importance in advance of actual use.

Very truly yours,

N. E. Bradbury
Director

NEB/hrg

1A - Brig. Gen. K. E. Fields
2A - C. L. Tyler
3A - A. C. Graves
4A - M. G. Holloway
5A - Reading File
6A - File