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LOS ALAMOS SCIENTIFIC LABORATORY  
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This document consists of 4 pages  
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August 11, 1947

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Mr. Carroll L. Tyler, Manager  
Office of Santa Fe Directed Operations  
United States Atomic Energy Commission  
P. O. Box 1539  
Los Alamos, New Mexico

CLASSIFICATION CANCELLED

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BY AUTHORITY OF DAE

DATE 6/14/73

Subject: Atomic Weapons Tests

Dear Mr. Tyler:

1 The Atomic Energy Commission has announced that it proposes to conduct a series of tests on atomic weapons at a proving ground in the Pacific Ocean, and it has been suggested that the Los Alamos Laboratory undertake the direction of the technical phases of this operation. The purpose of this letter is to describe in a preliminary way those technical activities which we believe it desirable to conduct and the assistance which we will require from various agencies external to the Atomic Energy Commission.

2 The Los Alamos Laboratory will supply to the Atomic Energy Commission organization conducting this operation an individual, responsible to them, for Technical Director and such additional technical staff as he may require. This individual will be a full-time Los Alamos employee—well grounded in the basic problems, philosophies, and techniques of the Laboratory. He may require, in addition to technical aides from Los Alamos, military aides from the Services. His approval will be required before any measurement or technical observation can be included in the test operation.

3 The Laboratory will assume the responsibility for the preparation of the atomic weapons used in the operation, and for the preparation of the associated firing circuits required for their static detonation. The Laboratory will require, however, the assistance of certain personnel for the assembly of the weapon who are currently under orders and in training at the AFSWP Sandia Base and Los Alamos. It will be necessary for the Commission to make arrangements, at the request of this Laboratory, for the transfer of certain of these individuals to the jurisdiction of the Laboratory to assist in the assembly of the weapons under the direction of Los Alamos personnel. It is estimated that the number of officers and men required will be of the order of 25, but it is desired to make clear that these will be requested by name and as a result of our contacts with them in the training program with AFSWP personnel at Sandia and Los Alamos.

4 The Laboratory proposes to set up a contract with some qualified organization, possibly the Division of Industrial Cooperation, Massachusetts Institute of Technology, to prepare the necessary firing circuits with appropriate safety and interlocking devices. The Laboratory, however, will assume the responsibility for the review and acceptance of any such system proposed.

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5 Director to accomplish this construction phase as well as other items of construction such as instrument shelters, camera towers, submarine cables, and other equipment which the technical program of the operation may require. It is probable that the towers will need to be provided with stabilized macadam areas at the bases.

6 The Los Alamos Laboratory and the Technical Director will prepare the specifications required of a firing center. At the present time, it is proposed that this firing center be located upon a barge which may be moved into an appropriate location at will. The modification of this barge will presumably have to be accomplished by some Naval Base activity.

7 The Los Alamos Laboratory will conduct, with its own personnel, radiochemical analyses of the fission product to determine the nuclear efficiency of each detonated weapon. It will require, however, a collection of samples in a manner completely similar to that employed in the Crossroads operation utilizing drone planes. It is a matter of indifference to the Laboratory whether the drone planes employed are B-17's or F6F's, although it must be pointed out that statistically a higher percentage of samples was obtained from the B-17's than from the F6F's in the Crossroads operation. In any event, specific arrangements must be made with the appropriate organization that this operation can be conducted to the satisfaction of the Technical Director. It should be emphasized that this particular measurement is of paramount importance and that sufficient drones must be employed so that at least three satisfactory samples can be guaranteed. It is our suggestion that six to eight drones be employed for this purpose in order to account for a certain possibility of failure. The Laboratory will also require transportation arrangements for the samples obtained by these drone planes back to the United States to arrive at Santa Fe, New Mexico, weather permitting, within 36 hours of each detonation.

8 The Los Alamos Laboratory proposes to conduct certain nuclear experiments such as a determination of the fast neutron intensity and comparable measurements which can be carried out with the use of self recording threshold detectors.

9 For another estimate of the efficiency of detonation, it is desirable that high speed motion pictures at approximately 1000 frames per second with 35 mm cameras be taken of the expanding ball of fire. It is proposed that this be done with two cameras at each of two locations. The proper photographic coverage will also require record photography and conventional speed motion picture photography of the detonation. The Los Alamos Laboratory will be unable to supply a photographic staff adequate to this operation and from the excellent results obtained by the Army Air Forces photographic units at Bikini, it is most strongly suggested that arrangements be made with this organization to supply the Technical Director with officers, men, and equipment to accomplish the technical photographic coverage of the tests.

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10 It is emphasized that all photography should be from ground mounted cameras. The Los Alamos Laboratory will supply a few individuals as consultants to this operation if desirable.

11 It is extremely important that there be at least minimal observations of pressure and blast from each detonation. The Los Alamos Laboratory believes that either the Bureau of Ordnance or Army Ordnance is far more qualified than Los Alamos to recommend and conduct a program of blast measurement. The experience gained by the Bureau of Ordnance and their excellent results at Bikini suggest that it would therefore be desirable to make arrangements with the Bureau of Ordnance to supply appropriate senior and junior personnel to the Technical Director to formulate and conduct, upon receipt of approval, a program of blast measurement. At the present time, it is thought that minimal observations would include only self recording deformation types of blast gages. However, the advisability of including devices which will give pressure as a function of time in the shock wave and shock wave velocity should be seriously considered.

12 There exists a number of technical observations which might be made in connection with the gamma radiation emitted by the detonating atomic weapon. The simplest of these involves placing shielded film at various distances and under various conditions of shielding in the vicinity of the bombs. From the degree of blackening, one may obtain some information as to spectrum and integrated intensity at each location. Since such a measurement has primary radiological health significance, it is proposed that such a measurement be conducted by the radiological safety group as a technical operation in addition to their function as a health safety organization. This technical operation would come under the specific direction of the Technical Director where as their health safety functions would come under the Atomic Energy Commission Director. In the event that it seems more desirable to conduct the film operation directly under the Technical Director, the Los Alamos Laboratory will investigate the possibility of obtaining under contract the services of Dr. Gerhardt Dessauer of the University of Rochester, and staff to conduct this measurement.

13 There exists another radiation measurement which would be desirable to conduct but which presents much more formidable difficulties. This deals with the spectrum of the emitted radiation as a function of time and is particularly concerned with the very penetrating radiation observed at Crossroads. The Los Alamos Laboratory will investigate the feasibility of conducting this experiment either with our personnel or with personnel under direct contract to the Laboratory. However, the Laboratory would welcome suggestions as to any possible agency of the Army, Navy, or public health service which might be competent to conduct this rather difficult measurement.

14 The Los Alamos Laboratory feels that measurements of the rate and time at which neutron multiplication occurs in the weapon at the start of the chain reaction are technical observations of the highest importance particularly in the event that other than the anticipated behavior of the weapon occurs. This measurement was accomplished successfully at Alamogordo but only with the greatest difficulty and the most skilled and senior personnel. The Los Alamos Laboratory will investigate the possibility of

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15 In view of the fact that other agencies of the Atomic Energy Commission may have a technical interest in certain phases of this over operation as well as have technical personnel both interested and compe to assist in the technical program, it is hoped that the Technical Dire may enlist the cooperation of other Atomic Energy Commission laboratori where this can be effectively employed.

For the purpose of forecasting weather from the point of view technical operation as well as the point of view of radiological safety believed that the Director of the operations for the Commission will re his staff in addition to his Director for Engineering and his Technical a meteorologist and a Director of Radiological Safety. It is suggested meteorological assistance be obtained from the Army Air Forces and it i specifically suggested that an effort be made to obtain the services of Col. Benjamin Holzman.

17 It is suggested that the entire program of radiological safet be conducted by personnel assigned to this operation from AFSWF and it urged that they acquire an individual such as Col. James P. Cooney to a the specific responsibility of direction. The closest liaison will be required between this individual and the Technical Director.

18 Although, the matter has doubtless received consideration, it may be desirable to point out that the Technical Director will r require the normal facilities which an overseas operation necessitates. This includes adequate quarters and laboratory facilities for technical persa adequate boat transportation at the scene of the operation, and adequat transportation from points in the continental limits to the location of the proving grounds. There must be set up simple and direct administra procedures concerning personnel policy, technical and administrative communication with Los Alamos, security, transportation, and similar pr

19 It must be pointed out that there exists among civilian perso at the present time a serious concern as to the adequacy and safety of aviation transportation, and it is urged that consideration be given to setting up a contract for the necessary aerial transportation with some commercial aviation company having long experience in trans-Pacific fly

The Technical Director should be in a position to furnish his personnel requirements, and his engineering requirements by October 1, and the technical program should be frozen at that time.

Yours truly,

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N. E. Bradbury  
Director