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June 5, 1944

FINAL DETERMINATION
UNCLASSIFIED
L. M. Redman
1981

Major Robert Furman
P. O. Box 2610
Washington, D. C.

Dear Major Furman:

We have had a request from Dr. Morrison to send you some account of what sort of installation, equivalent to Y, the Germans might have or need. We have discussed this matter informally with you in the past and the present statement is only for the record.

1. The answer to this question is complicated to the point where it may be useless by the fact that the program of Y is a fairly ambitious one and that it may be paralleled in Germany, but that a possible program making less advantageous use of material and requiring a much greater production schedule could be carried out with much more meager facilities and less talented personnel.

2. In general we should say that any program involving the use of 49 would have as indispensable parts a large chemical and metallurgical group, a group working on nuclear physics experimentally, some strong theoretical advice, and an ordnance program, not necessarily very extensive but involving unconventional ordnance problems and at least one proving ground. We should doubt whether even with modest objectives and reasonably long time scale effective use could be made of 49 by an installation with a personnel under 200, and our estimate of the time needed for the development of the necessary methods would be at least two years from the foundation of the organization, and at least six months from the time when macroscopic amounts of 49 would be available.

3. In the case of an organization devoted exclusively to the application of 25 and operating along conservative lines we should again expect a group of experimental nuclear physicists, strong theoretical advice, and a metallurgy and engineering group which might operate with conventional means, but which would undoubtedly need a proving ground of some kind. For this problem we believe that a

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minimum of 100 people would be needed and that probably a year and a half would be required to carry out the necessary development. These estimates of time and personnel are minimal and imply no radical development work.

4. It is possible that the Germans may be contemplating other methods of solving the problems of Y than have occurred to us or seem to us promising. Any installation would have to have a rather strong group in experimental nuclear physics, would have to have competent theoreticians, engineers and metallurgists. An installation of the size of Y would imply on the part of the Germans an effort to make the most effective use of the material and to provide weapons of great military significance with a somewhat restricted production schedule.

5. It has already been pointed out to you that the position of Heisenberg in German physics is essentially unique. If we were undertaking the Y program in Germany, we should make desperate efforts to have Heisenberg as collaborator. It is hard for us to believe that they would be embarked on this program without taking advantage of his help.

Sincerely yours,

Luis Alvarez

J. R. Oppenheimer

cc: General Groves
Philip Morrison

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