

UNCLASSIFIED

17
8/19/87

~~SECRET~~

This document contains information affecting the national defense of the United States within the meaning of the espionage laws, the transmission or the revelation of its contents in any manner to an unauthorized person is prohibited by law.

THIS DOCUMENT CONSISTS OF 3 PAGE(S)
NO. 3 OF 5 COPIES, SERIES A

March 10, 1944

FINAL DETERMINATION
UNCLASSIFIED
L. M. Redman
JUL 17 1979
M.../...
8/19/87

Copied from Los Alamos
National Laboratory Archives

A-84-019

16-6

Brig. Gen. L. R. Groves
P. O. Box 2610
Washington, D. C.

Dear General Groves:

During the discussions at the time of your recent visit here of the possibilities and plans for a containing sphere for proof firing, there were a number of points made which I should like to have down in the record, so that there may be no possibility of a misunderstanding of our conclusions. I am writing to you my own account of the situation. If you should find that this is in any respect defective I should very much appreciate it if you would write me to that effect.

1. It was agreed to proceed as rapidly as possible with the design of a container which would be capable of withstanding blast and static pressure from an explosive charge of approximately two tons of composition B. The design of this container was not frozen since it was not known to us whether it could be made in the form of a single sphere or would have to be built up from plates. Excluding the extra weight introduced by man-holes and reinforcements, the weight of the sphere was given by us as 90 tons provided steel could be obtained of yield strength 60,000 psi or better. You expressed the conviction that individual castings in excess of a hundred tons would introduce very serious transportation problems which should be avoided if possible. The first figures quoted to us by Colonel Ruhoff give a yield strength of under 40,000 psi and would make it impossible to work with a single casting.

2. It was stated by us that we were not now in a position to design a proof firing arrangement in which there was a reasonable probability that the nuclear reaction would be initiated and at the same time a high probability that the energy release from the nuclear reaction would be small compared to that from the primary explosive. It was our opinion that the design of such an arrangement would be beyond our actual knowledge at the time when enough material would be available for proof firing, but we agreed to investigate this possibility as vigorously as the requirements of the development of the weapon itself permitted. It was our expressed opinion that methods of safeing the nuclear reaction so far proposed would be unsatisfactory both because of the complication of the arrangements

OK... 7/17/79
CLASSIFICATION CANCELLED
PER DOC REVIEW JAN. 1973

2
2
5
2
0
4
6
8

~~SECRET~~

~~SECRET~~

Brig. Gen. Groves
Page 2
March 10, 1944

UNCLASSIFIED

needed, and their consequent unpredictability, and because of the wide deviation between these arrangements and those contemplated for the weapon.

3. It was therefore recognized that any significant proof firing would be likely to involve a serious risk of a large nuclear explosion. The consequences of this are in the first instance that the material involved would be irrecoverably lost, and further that the site for the proof firing would have to be chosen with the probability of a violent reaction clearly in mind. It was recognized that the problems of security, safety, and commitment of material involved would require careful consideration, and that no commitment could at the present time be made by you to the effect that such proof firing could actually be carried out.

4. We shall undertake the acquisition of the necessary equipment and personnel, and the necessary process development, for the recovery of the active material in the case that the container is not shattered. It is anticipated that no difficulties will be introduced if the total activity of the material is of the order of 100 curies or less. The probability that the activity will exceed this and that the reaction will not have shattered the container is so small that no present plans will be made for recovering material which is extremely radioactive.

5. We shall attempt to have a container fabricated and completely assembled by September so that it may be proved by the firing of explosive charges without active material and may play as useful a part as possible in the later stages of implosion development. As soon as the over-all design for the container has been frozen, recommendations will be presented to you for the final proof firing location as well as for the handling of the container during the experimental period.

6. You will, of course, be promptly informed of any developments here which offer promise of a proof firing which does not involve the risk of loss of material, or of a violent nuclear explosion. You will also be kept informed of any development in our understanding of implosion and of the nuclear

OK LMR 7/17/79
CLASSIFICATION CANCELLED
P-R DOC REVIEW JAN. 1973

~~SECRET~~
UNCLASSIFIED

9
6
4
0
2
4
4

~~UNCLASSIFIED~~
~~SECRET~~

This document contains information affecting the national defense of the United States within the meaning of the Espionage Laws, Title 18, United States Code, Section 793 and 794, and the revelation of which in any manner to an unauthorized person is prohibited by law.

Brig. Gen. Groves
Page 3
March 10, 1944

physics involved which makes it possible to guarantee with reasonable certainty that a given amount of active material suitably disposed has a very high probability of reacting and a firm upper limit on the extent of the reaction. As a provisional determination of the amount of active material that might be used in proof firing, we proposed to take the minimum amount of material which under the actual circumstances of implosion would, according to our information, be essentially certain to sustain a divergent chain reaction. It is my opinion that this procedure would probably not permit an upper limit on the possible energy evolution in the chain reaction lower than about 1,000 tons of TNT equivalent. It is clear that a reconsideration of these questions will be necessary and we shall keep you informed of any factors which affect them.

Sincerely yours,

J. R. Oppenheimer

2
2
5
2
0
0
4
7
0

~~SECRET~~

UNCLASSIFIED

OK LMP 7/17/74
CLASSIFICATION CANCELLED
PER DOC REVIEW JAN. 1973