

A-84-015
40-20

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L. M. Rodman
FEB 4 1981
Memorandum to File
G. B. Kistiakowsky

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24 May 1944

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Conclusions reached at the meeting on Jumbo May 23, 1944
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LANL Classification Group
2/25/85

JA 3/2/85 855-16 2/25/85

Present at this meeting were Messrs. J. R. Oppenheimer, Bainbridge, Bethe, Teller, Dr. Von Neumann, and G. B. Kistiakowsky. The discussion concerned mainly the problem of the manufacture of Jumbo but covered also the more general topic of the methods for full scale trials and "proof firing" of gadgets. The main reason for this discussion was the information brought back by Mr. Oppenheimer from Washington that General Groves, subject to the usual uncertainties of predicting future situations, looks favorably upon the possibility of proof firing implosion gadgets, even though the chance of complete recovery of active material in case of failure is small. Furthermore Mr. Oppenheimer reported that both steel companies approached previously on the subject of manufacture of the Jumbo were very skeptical about their ability to manufacture Jumbo to our specifications, the chances probably being four to one that no Jumbo up to specifications would be available by January 1945. Finally, the evidence presented by Mr. Bainbridge on the small scale shots in "Jumbino" spheres indicates that preliminary estimates of the destructive effect of the shock wave on the containing sphere were too low and that, therefore, even the Jumbo made to our specifications could easily turn out to be inadequate to take the estimated 2-ton explosion.

The following conclusions were reached:

- (a) No order for the Jumbo will be placed at present. This means that we give up the plan to use Jumbo for the proof firing of the full scale implosion gadget made to the present tentative specifications, and expected sometime late in 1944 or early in 1945.
- (b) Small scale work with the available 12" spheres and with the 14" spheres, which are to be true scale down models of the Jumbo, will be continued, with a lower priority than heretofore, in order to establish definitely what explosive charge can be fired in a full scale Jumbo made to certain specifications. This work is expected to supply data on the magnitude of the shock wave pressure near the explosive charge, which are unavailable at present but which are needed not only for the Jumbo but also for the purpose discussed under item (d) below.
- (c) The results of this small scale work will be reviewed at some later date this summer in light of the

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theoretical considerations of Mr. Teller on modified implosion gadgets. This may lead to placing an order for the Jumbo, to be delivered in late spring of 1945, and to be used not for the proof firing but for experimental work on special modifications of the implosion gadget, which may involve lesser quantities of H. E. than the present model and whose nuclear reactions may be held down in a controllable fashion. This development will become imperative if the presently contemplated type of implosion gadget fails to function, or if the directive of the Project is expanded to include work on modified gadgets, even though the first model may have functioned properly.

(d) Dr. Von Neumann will discuss with various people in the East (Aberdeen BRL, and Division 2 of NDRC) the feasibility of designing an armor plate-reinforced concrete chamber of such strength that it could withstand the explosion of something like one to two tons of explosive without serious damage, this chamber possibly being under-ground. In view of the difficulties of scaling down reinforced concrete, no experimental work by the Project on this structure is planned for the immediate future.

(e) Mr. Bainbridge will continue small scale experiments on containing explosion in sand piles to determine the size and nature of the sand piles necessary to contain explosions up to two tons of H. E., and also to determine, with the aid of the Chemical Engineering Group, the feasibility of the recovery of active material from such piles, if the nuclear reaction fails to occur.

(f) Mr. Bainbridge will also start and further with high priority the research on the feasibility of the recovery of active material from air shots using small scale charges.

(g) Mr. Kistiakowsky will explain to Conant, when he sees him on May 25, the nature of and the reasons for the above decisions.

G. B. Kistiakowsky

GBK:he

cc to Oppenheimer
Bainbridge
Bethe
Teller
cc to Capt. Parsons ✓

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