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23 July 1945

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Authority of the U.S.
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Folder *MRA 7 TESTS & EXPERIMENTS*
Trinity
10/14/64

MEMORANDUM FOR Brigadier General T. F. Farrell
and
Captain W. S. Parsons, USN

It may be helpful for you to have a few notes cover-
ing some points in the initial combat operations:

1. As a result of the Trinity shot we are led to expect a very similar performance from the first Little Boy and the first plutonium Fat Man. The energy release of both of these units should lie in the range of 12,000 to 20,000 tons, and the blast should be equivalent to that from 8,000 to 15,000 tons of TNT. It will take a long time to obtain and analyse the relevant information from Trinity. Any changes in the anticipations here indicated will be communicated to you at once. It is of the utmost importance that blast measurements be made during combat delivery to confirm or disprove these anticipations.

2. Tentative fuse settings have been established to fire the units at points 1850 feet above terrain. It is possible that further Trinity information may cause us to revise these firing heights. It is essential that the nature of the target be taken into account in determining these firing heights. The figures given above are appropriate for the maximum demolition of light structures. Should the target include important heavy structures, the fusing heights should be revised downward. It is suggested that Drs. Ramsay, Penney, and Serber be consulted on this matter and that, if at all possible, the problem be referred back to Site Y.

3. With such high firing heights it is not expected that radioactive contamination will reach the ground. The Ball of Fire should have a brilliance which should persist longer than at Trinity, since no dust should be mixed with it. In general, the visible light emitted by the units should be even more spectacular. Lethal radiation will, of course, reach the ground from the bomb itself. The minimum height of firing for which these conditions are likely to prevail is 1,000 feet above terrain.

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4. The possibilities of a less than optimal performance of the Little Boy are quite small and should be ignored. The possibility that the first combat plutonium Fat Man will give a less than optimal performance is about twelve percent. There is about a six percent chance that the energy release will be under five thousand tons, and about a two percent chance that it will be under one thousand tons. It should not be much less than one thousand tons unless there is an actual malfunctioning of some of the components.

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5. It is probably not desirable to attempt at Destination to establish, on a statistical basis, the reliability of Fat Man Components. On the other hand, it is desirable to subject the components scheduled for hot use to inspection and testing with the greatest care. It is suggested, and requested, that if the tests of Fat Man components appear to involve a delay beyond the scheduled date in readiness to deliver this unit full information be transmitted to Site Y in order that we may assist in every way possible in clearing the matters up.

6. Good luck.

/s/
J. R. Oppenheimer

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Serial number: 1.054

Distribution:

- 1 A - General Farrell
- 2 A - Captain Parsons
- 3 A - General Groves
- 4 A - Oppenheimer's files
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