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ADWD-148
**Redacted
VERSION**

UNCLASSIFIED LAMD-327

FAMILY COMMITTEE
Minutes of Thirteenth Meeting
June 8, 1950

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DEPARTMENT OF ENERGY	CLASSIFICATION REVIEW
1ST REVIEW DATE: 03-20-76	TERMINATION (DATE)
AUTHORITY: 13 USC 3025	CLASSIFICATION (CODE)
REASON:	CLASSIFICATION CHANGED
2ND REVIEW DATE: 1-29-97	COORDINATE WITH:
AUTHORITY: ADD	CLASSIFICATION CANCELLED
REASON:	CLASSIFIED INFO BRACKETED

A. Attendance.

The thirteenth meeting of the Family Committee was held Thursday, June 8, 1950 at 1:15 P.M. in Room B-117. Those present were:

- | | |
|----------------|---------------------|
| H. M. Agnew | E. R. Jette |
| H. V. Argo | D. P. MacDougall |
| J. C. Clark | J. C. Mark |
| F. de Hoffmann | W. E. Ogle |
| D. K. Froman | F. Reines |
| R. W. Goranson | F. Seitz |
| A. C. Graves | R. F. Taschek |
| D. B. Hall | E. Teller, Chairman |
| M. B. Holloway | |

B. Minutes of the Twelfth Meeting.

The Committee unanimously adopted the minutes of the Twelfth Meeting reported in ADWD-146, with the following additions and corrections:

(1)

(2)

C. TENEX.

Agnew gave a summary of the conclusions which had led him and Argo to report favorably on the possibility of performing TENEX for the Spring '51 tests. (These arguments are outlined in detail in ADWD-142.) It was estimated that about two scopes would be required at both stations with possibly some more scopes as a timing tie-in. The scope figures are here reported in order to give an indication of the order of magnitude involved. The distant station is needed to measure the energy spread due to temperature in the 14 mev neutrons. The close station establishes the fact that the actual DT reaction occurred in a time short compared to the time signal in the distant station. The low number of scopes, in spite of the large ranges to be covered, is due to the fact that soft scopes, that is scopes driven at low voltage, will suffice for the time resolution required in this experiment.

It was reported that most likely the detecting chambers in the TENEX experiment would be of the hydrogen recoil type rather than fission chambers since in the former case one can get many more atoms per cm² so that the

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INTER-OFFICE MEMORANDUM

APPENDIX A

Date 7 June 1950

TO: The Family Committee
FROM: Emil Konopinski and Roy Goranson
SUBJECT:
REF: ADWD-3-3

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PART I. THEORETICAL CONSIDERATIONS

Presented herewith are the results of discussions in which the following have participated: Teller, Goranson, Mark, Wheeler, Smith, Taylor, Hammer and Konopinski.

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The types of advantage considered as possible are:

1. The increased H.E. dimensions will result in a greater compression of core and tamper if their mass is unchanged or if their mass is not scaled up fully together with the H.E. dimensions. The greater compression will produce higher central temperatures. This is partially offset, as far as the yield of radiation is concerned, by the greater density of core material which the radiation must penetrate on its way out.
2. The tamper may be thickened.
- 3.

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For a more quantitative comparison of the above advantages, Wheeler proposed as a criterion that the quantity

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should be maximized. Here ϕ is the undepleted efficiency, which primarily determines the temperature.

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The second column of the table gives the mass of 25 in kilograms. The third column gives the radius R of the compressed 25 in cm.

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ρ/ρ_0 is the core compression. ϕ and ϕ' are undepleted and depleted efficiencies, respectively. The column headed Y gives the expected final yields in kilotons. The final column lists the values for Wheeler's criterion.

The next two lines deal with models obtained by scaling up all radial dimensions from the first line, so as to keep the same compression.

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The models of lines 5 and 6 keep the same mass of tamper as obtained in line 3.

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Calculations at present indicate that this yield will be needed to assure adequate radiation temperatures.

The tamper mass in the line 6 model is the same as in lines 3 and 5

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The latter model has the added advantage that it

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makes the early energy evolution more secure against interruption by the tamper rarefaction. It is the model of line 6, therefore, which is recommended as the result of these discussions.

One qualification upon this recommendation was pressed by Teller.

This may constitute a hazard for the observers of the test, for the observation records of the test, or for the sites of subsequent tests. The main argument for the existence of this small chance of an excessive yield is the following: The Hippo calculations lead to much higher yields than were actually observed at Trinity.

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PART II - DESIGN CHARACTERISTICS

The figures are drawn to scale as presently conceived. However, dimensions have been omitted where there exists a possibility that later minor modifications may be found to be advisable.

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In Table II-

These figures are compared with the three earlier preliminary design considerations listed in columns 1 to 3 inclusive.

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I.B.M. calculations have been made on F-4 and F-5. The implosion of F-4 on 0.7 scale and of F-6 on 0.6 scale have also been studied photographically and by the pin technique. Compressions given in the third and fourth columns are estimated from those calculated for the first two columns.

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There exists a small but finite probability (perhaps 5%) that the calculated efficiency may be underestimated by a factor of 50% (or perhaps even by 75%).

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It should be pointed out, however, that the pre-detonation probability (a fizzle) is expected to be greater than the probability of an excessive yield.

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Emil Konopinski
Roy Goranson

RWG:rvc

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LAMD-332

FAMILY COMMITTEE
Minutes of Fourteenth Meeting
June 22, 1950

Redacted
VERSION

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Unique

A. Attendance.

The fourteenth meeting of the Family Committee was held Thursday June 22, 1950 at 1:15 PM in Room B-117. Those present were:

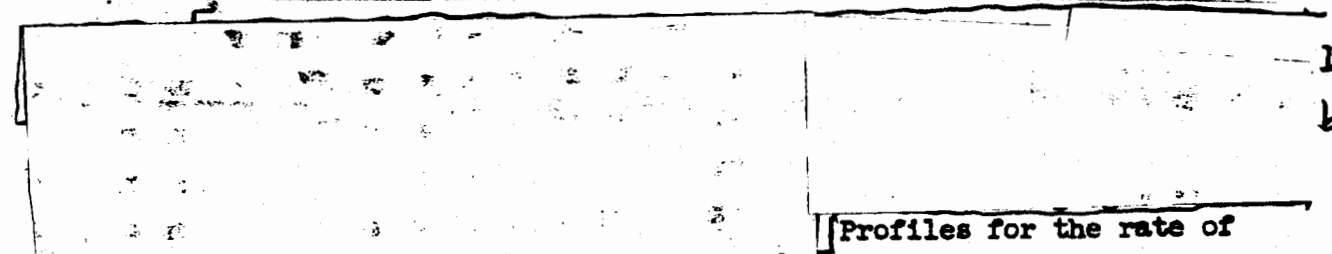
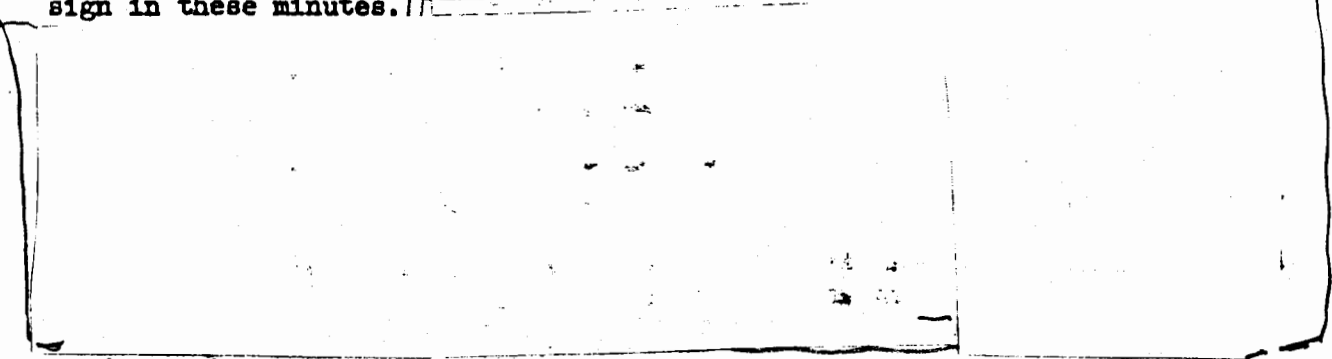
- | | |
|----------------|---------------------|
| J. C. Clark | J. M. Keller |
| F. de Hoffmann | D. P. MacDougall |
| B. Freeman | J. C. Mark |
| D. K. Froman | R. D. Richtmyer |
| R. W. Goranson | R. E. Schreiber |
| A. C. Graves | R. F. Taschek |
| E. F. Hammel | E. Teller, Chairman |
| E. R. Jette | J. A. Wheeler |

B. Minutes of the Thirteenth Meeting.

The Committee unanimously adopted the minutes of the Thirteenth meeting, reported in ADWD-148.

C.

This was the design considered to date (see for example, Fig. 1 of the 10th Minutes) and for ease of reference we shall call it the "conventional" design in these minutes.



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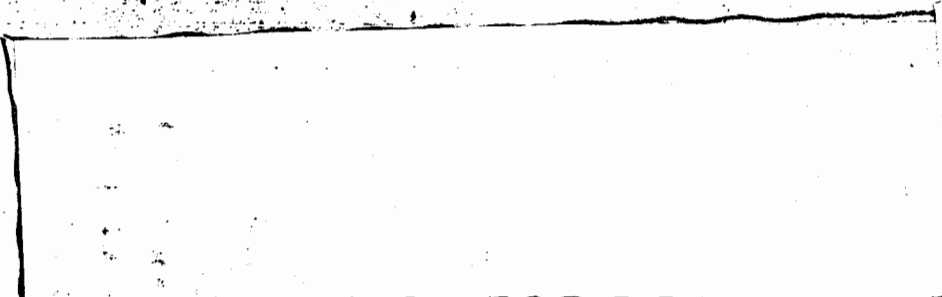
DEPARTMENT OF ENERGY DECLASSIFICATION REVIEW
1. DETERMINATION (CIRCLE NUMBER(S))
2. CLASSIFICATION CHANGED TO:
3. CONTAINS NO DOE CLASSIFIED INFO
4. COORDINATE WITH:
5. CLASSIFICATION CANCELLED
6. CLASSIFIED INFO BRACKETED
7. OTHER (SPECIFY):
1ST REVIEW DATE: 8/12/91
AUTHORITY: OAC/CDAC/BAAD
NAMED REVIEWER: [Signature]
2ND REVIEW DATE: 7/23/97
AUTHORITY: [Signature]

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change of electron temperature with time are indicated.



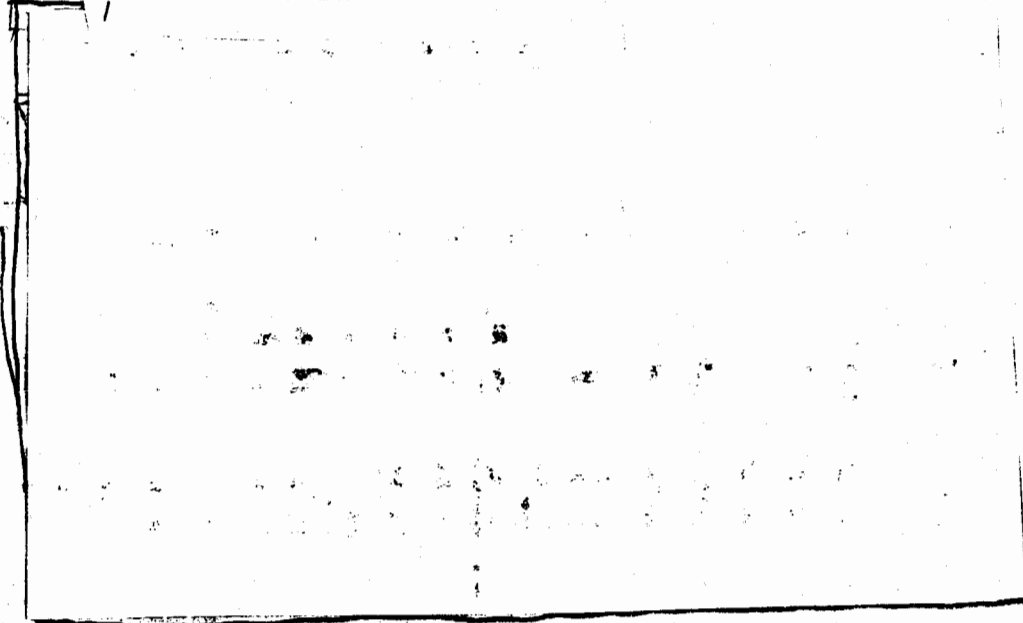
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These phenomena were treated in a more quantitative way and the results are shown in Figures 3, 4 and 5.

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possibilities were then considered which might enable one to nevertheless make the reaction go off.

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On the other hand, all these conditions are so marginal that it would seem to be unwise to rely on such a scheme unless it is absolutely necessary.

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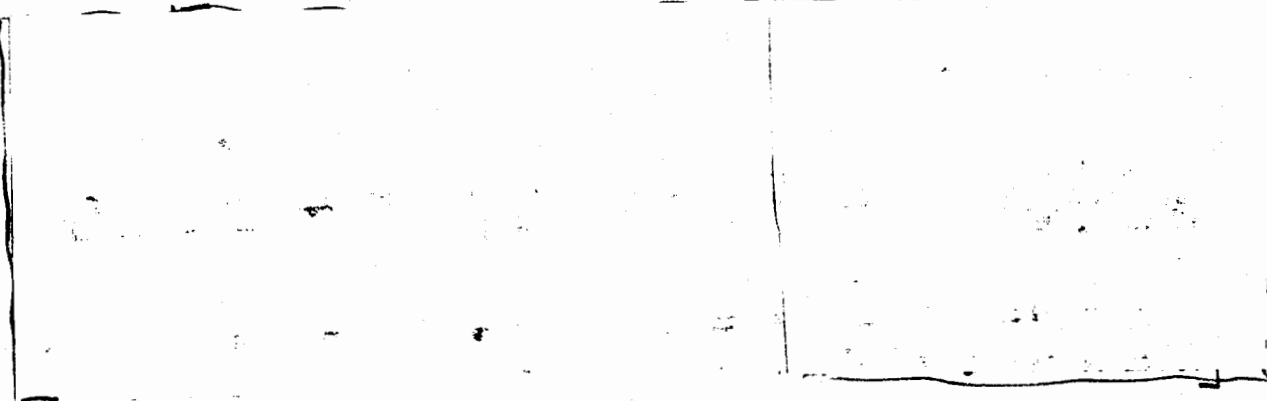
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Figure 6 shows such a tentative design.

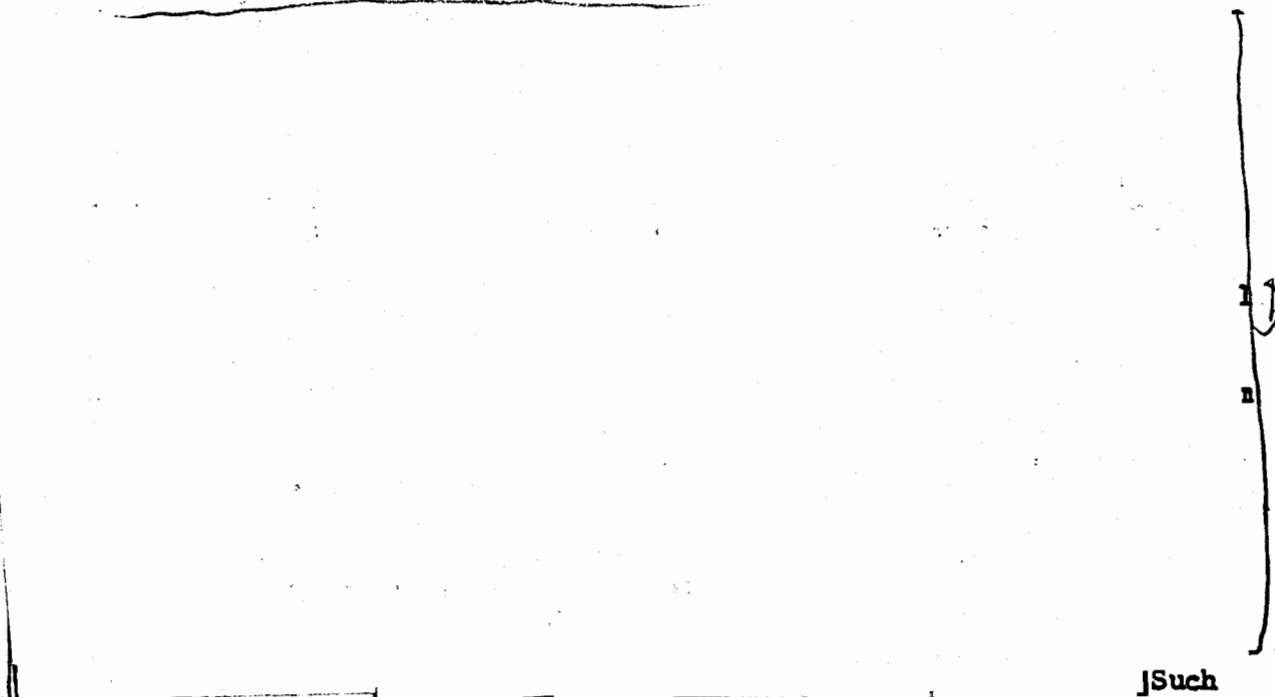
The Committee agreed that in view of the arguments presented, it would be essential to plan a design similar to the one given in Figure 6. The practical difficulties concerned with such a design were then discussed.

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Wheeler emphasized that the dimensions given in Figure 6 were rather preliminary and it was agreed that a committee consisting of Freeman, Hammel, Keller and Wheeler should attempt to produce a better first-order design by about July first. This would enable CMR and W Division to proceed with preliminary designs even though final dimensions could be frozen later in the summer.



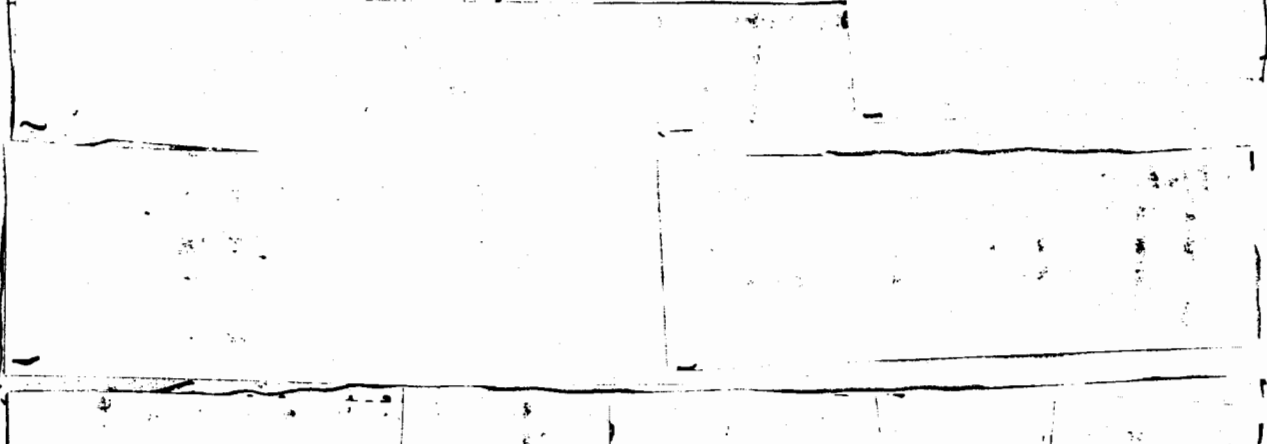
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Such design considerations will be examined by the above-mentioned committee consisting of Freeman, Hammel, Keller and Wheeler.

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This will lead to problems of two kinds. In the first place, the X-ray experiment will have a much smaller surface spot to look at and this will necessitate re-examination of the problem of heating up of X-ray pipes.

