

UNCLASSIFIED

~~SECRET~~

TMG-M32

~~SECURITY INFORMATION~~
**Redacted
VERSION**

SAC 20006971000
Unique Document

THIS IS A COVER SHEET FOR A CLASSIFIED DOCUMENT

TRANSMITTAL OF THIS DOCUMENT MUST BE COVERED BY A SIGNED RECEIPT. IT MUST NOT BE LEFT UNATTENDED OR WHERE AN UNAUTHORIZED PERSON MAY HAVE ACCESS TO IT. WHEN NOT IN USE, IT MUST BE STORED IN A LOCKED FILE OR SAFE. WHILE THIS DOCUMENT IS IN YOUR POSSESSION AND UNTIL YOU HAVE OBTAINED A SIGNED RECEIPT UPON ITS TRANSFER TO AN AUTHORIZED INDIVIDUAL, IT IS YOUR RESPONSIBILITY TO KEEP IT AND ITS CONTENTS FROM ANY UNAUTHORIZED PERSON.

◆◆◆

RESTRICTED DATA

THIS DOCUMENT CONTAINS RESTRICTED DATA AS DEFINED IN THE ATOMIC ENERGY ACT OF 1946. ITS TRANSMITTAL OR THE DISCLOSURE OF ITS CONTENTS IN ANY MANNER TO AN UNAUTHORIZED PERSON IS PROHIBITED.

WD-family

UNCLASSIFIED

~~SECRET~~

~~SECURITY INFORMATION~~

At 40

96-502040001

~~SECRET~~

~~SECURITY INFORMATION~~

Symbol: TM-66

Group Ref: TMG-M32

UNCLASSIFIED

This document consists of 11 pages
No. Y1 of 11 copies.

June 28, 1952

MINUTES OF THE THIRTY-SECOND MEETING OF THE THEORETICAL MEGATON GROUP

25 June 1952

1. The thirty-second meeting of the TMG convened at 9:00 AM on Wednesday, 25 June 1952, in the W-Division Conference Room. Those present were:

H. A. Bethe
A. A. Broyles
D. Carter
K. M. Case
F. de Hoffmann
C. Evans
F. Evans
B. E. Freeman
R. W. Goranson
L. G. Henyey
M. G. Holloway
C. L. Longmire

J. C. Mark, Chairman
H. L. Mayer
L. W. Nordheim
H. P. Noyes
J. C. Potts
O. W. Rechard
A. Rosenbluth
M. Rosenbluth
J. Toll
S. M. Ulam
J. A. Wheeler
L. Willets

DEPARTMENT OF ENERGY DECLASSIFICATION REVIEW	DETERMINATION [CIRCLE NUMBER(S)]
1ST REVIEW DATE: <u>XX-37</u>	1. CLASSIFICATION REAINED TO:
AUTHORITY: CIAOC CIAOC BRADD	2. CONTAINS NO DOE CLASSIFIED INFO
NAME: <u>John J. Henyey</u>	3. COORDINATE WITH:
2ND REVIEW DATE: <u>XX-37</u>	4. CLASSIFICATION CANCELLED
AUTHORITY: <u>APC</u>	5. CLASSIFIED INFO BRACKETED
NAME: <u>John J. Henyey</u>	6. OTHER (SPECIFY):

Topics

2. Correction to 29th Minutes.
 3. Matterhorn Steady State Burning Calculations (continuation).
 4. Matterhorn Calculation on Ignition of Steady State Burning (UNIVAC).
 5.
 6. Investigation of Mixing.
 7.
- DOE
b(3)
- DOE
b(3)
2. Correction to 29th Minutes
- 76
(3)

UNCLASSIFIED

~~SECRET~~
~~SECURITY INFORMATION~~

RESTRICTED DATA

This document contains restricted data as defined in the Atomic Energy Act of 1946. Its transmission or the disclosure of its contents in any manner to an unauthorized person is prohibited.

~~SECRET~~

-2-

UNCLASSIFIED

3. Steady State Burning Calculations (continuation)

Toll reported on the results of the SWORDTAIL calculations performed so far by Matterhorn on the SEAC.

DOE
b(3)

the results are The principal qualifications on the validity of b(3)

DOE
b(3)

DOE
b(3)

A new version of the problem which includes these effects is being prepared, but the new version is believed to be only slightly more "conservative."

DOE
b(3)

~~SECRET~~
UNCLASSIFIED

UNCLASSIFIED

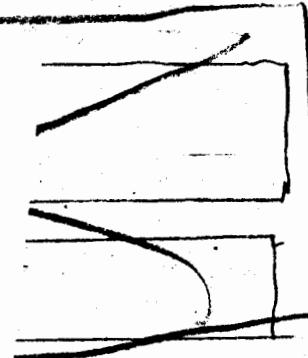
-3-

~~SECRET~~

DOE
b(3)

Future Plans for SWORDTAIL Calculations

It is planned to study the effect of variations in each of the following:



DOE
b(3)

DOE
b(3.)

4. Calculation on Ignition of Steady State Burning

Wilets reported on the results of the CHIEF calculation carried out by Matterhorn on the UNIVAC.

DOE
b(3)

Starting conditions were taken from SEAC implosion Problem 19.

DOE
b(3)

~~SECRET~~

UNCLASSIFIED

~~SECRET~~
~~UNCLASSIFIED~~

-4-

The results are given in the following graphs:

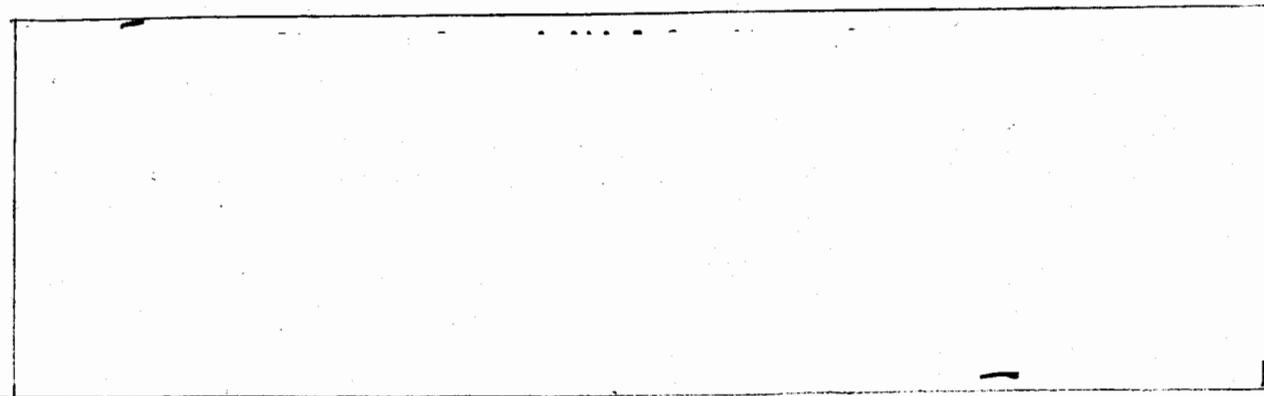
Fig. 1

Fig. 2

Fig. 3

Fig. 4

Fig. 5 Specific volume vs. distance at above specified times.



Future Plans for CHIEF Calculations

1.

2.

3.

~~SECRET~~
DOE
b(3)

~~SECRET~~
DOE
b(3)

~~SECRET~~

~~UNCLASSIFIED~~

UNCLASSIFIED

~~SECRET~~

-5-

5. []

DOD
b(3)

1

~~SECRET~~

UNCLASSIFIED

UNCLASSIFIED

-6-

~~SECRET~~

This is in essential agreement with the results obtained at LASL
(see 30th Minutes). DO-
b6C

6. Investigation of Mixing

If a system is accelerated by a series of sharp pulses, does mixing occur? If this were averaged, one would obtain mixing according to the usual formula. Under what conditions would this be justifiable?

Matterhorn has been investigating this problem and finds that recurrent shocks are capable of giving rise to Taylor instability.

Now

$$A = A_0 e^{\alpha t}$$

where A_0 is initial amplitude and

$$\alpha = \frac{1}{\Delta t} \operatorname{arc cosh} \left[1 + \frac{g}{2\lambda} (\Delta t)^2 \right]$$

where Δt is the time interval between pulses.

If the shocks are close together and λ is large the irregularities in the acceleration are not resolved so that one gets the ordinary expression

$$\alpha = \sqrt{g/\lambda} .$$

If the shocks are not closely spaced, then

$$\alpha = \frac{1}{\Delta t} \ln \left[g(\Delta t)^2 / \lambda \right]$$

so that

$$A = A_0 \left[g(\Delta t)^2 / \lambda \right]^n$$

where $n = t / \Delta t =$ number of shocks in time t .

~~SECRET~~

UNCLASSIFIED

~~SECRET~~
UNCLASSIFIED

-7-

DOK
b(3)

For the above calculations of E-F, C was assumed to be 5.

de Hoffmann reported some results obtained in cooperation with Kahn of Rand to study the effect of varying y.]

DDE
b(3)

~~SECRET~~

UNCLASSIFIED

UNCLASSIFIED

-3-

[Redacted]
It was decided to

DOE
b (3)

DOE
(3)

R.W. Goranson

R. W. Goranson

~~SECRET~~

UNCLASSIFIED

UNCLASSIFIED

ATTORNEY'S FEE STATE CO.

Re. 359-11 10 1/2 to the rail with 5% interest annual
beginning 7/11 in
paid in U.S.A.

UNCLASSIFIED

UNCLASSIFIED

Distribution:

1A - H. H. Barschall
2A - G. Bell
3A - H. A. Bethe
4A - W. Bouricius
5A - N. E. Bradbury
6A - S. W. Burriss
7A - B. G. Carlson
8A - E. D. Cashwell
9A - F. de Hoffmann
10A - F. Evans
11A - B. E. Freeman
12A - D. K. Froman
13A - R. B. Gibney
14A - R. W. Goranson
15A - A. C. Graves
16A - L. E. Hightower
17A - M. G. Holloway
18A - F. C. Hoyt
19A - E. R. Jette
20A - R. M. Landshoff
21A - R. B. Lazarus
22A - C. L. Longmire
23A - J. C. Mark
24A - H. L. Mayer
25A - N. Metropolis
26A - L. W. Nordheim
27A - W. E. Ogle
28A - J. R. Pasta
29A - F. Reines
30A - J. R. Reitz
31A - R. D. Richtmyer
32A - M. Rosenbluth
33A - R. W. Spence
34A - P. R. Stein
35A - E. Teller
36A - J. L. Tuck
37A - S. M. Ulam
38A - J. von Neumann
39A - M. C. Walske
40A - B. E. Watt
41A - J. A. Wheeler
42A - H. F. York
43A - E. J. Zadina
44A - Report Library
45A - Report Library
46A - File

~~SECRET~~

UNCLASSIFIED

~~SECRET~~

UNCLASSIFIED

UNCLASSIFIED

UNCLASSIFIED

UNCLASSIFIED

DoE b(3)