[redacted]

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1 - 2

C. 9

SANDIA SYSTEMATIC DECLASSIFICATION REVIEW DOWNGRADING OR DECLASSIFICATION STAMP	
CLASSIFICATION CHANGED TO: U	AUTHORITY: R. B. Craner
Emelda Selph 4/21/97 PERSON CHANGING MARKING & DATE	RECORD ID: 97SW1122
Carmela M Gallegos 5/5/97 PERSON VERIFYING MARKING & DATE	DATED: 4/8/97

Technical Memorandum

[redacted]

SANDIA SYSTEMATIC DECLASSIFICATION REVIEW	
1st Review Date: 4-01-97	Determination (Circle Numbers):
Authority: ☐ADC ☒ADD	1. Classification Retained
Name: W. Layne	2. Classification Changed to: U
2nd Review Date: 4/8/97	3. Contains No DOE Classified Information
Authority: ADD	4. Coordinate With:
Name: RB Craner	5. Contains UCAI?
	6. Comments: OK for Openmet

SCTM-85-53-53

A SUMMARY AND EVALUATION OF DATA ON 75 MM

PROJECTILE TESTS OF A TX6-X4 CASE ON

MAY 27, 1953 AND JUNE 12, 1953

William R. Joy

INVENTORIED
DEC 11 1958
BY ORG. 3243

INVENTORIED
SEP 24 1957
BY ORG. 2743

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ABSTRACT

This report presents the data results of 75 MM Projectile Tests of TX6-X4 welded cases with 3/8" thick nose doors.

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Case No. 574.0

August 3, 1953

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[redacted]

JAN 29 1960

ENCLOSURES

A. Tabulated results - May 27, 1953
B. Tabulated results - June 12, 1953
C. General orientation sketch - May 27, 1953
D. General orientation sketch - June 12, 1953
E. Projectile penetration sketch - Net #1 - May 27, 1953
F. Projectile penetration sketch - Net #2 - May 27, 1953
G. Projectile penetration sketch - Net #1 - June 12, 1953
H. Projectile penetration sketch - Net #2 - June 12, 1953
I. Curve of Peak Voltage vs. Shunting Resistance
J. Curve of Peak Voltage vs. Shunting Capacitance

A SUMMARY AND EVALUATION OF DATA ON 75 MM
PROJECTILE TESTS OF A TX6-X4 CASE ON
MAY 27, 1953 AND JUNE 12, 1953

In order to more completely analyze the capability of the contact fuzing system for the TX6-X4 weapon, it was subjected to a series of 75 MM projectile impacts. The test consisted of eight impacts by projectiles possessing a velocity of 1000 ft. per second.

On May 27, 1953, a TX6-X4 case was subjected to four shots and on June 12, 1953, another TX6-X4 case was subjected to four shots. On all shots, except shoot #2 on June 12, 1953, an assimilated MC-132 trigger circuit was used. Shoot #2 was wave form analysis.

Projectile penetrations are computed on the basis that the projectile maintains a velocity of 1000 ft. per second during passage through the weapon.

On May 27, 1953, the total capacitive value for both networks was 960 micro-microfarads. On June 12, 1953, the instrumentation cable capacitance plus contact unit capacitance was as follows:

NETWORK #1

Instrumentation cable capacitance	- 230 μμf
Contact Units	- 320 μμf

NETWORK #2

Instrumentation cable capacitance	- 180 μμf
Contact Units	- 320 μμf

For the 2D21, the plate voltage was 305 volts and the cathode voltage was 22 volts.

Both cases were welded and had a 3/8" thick nose door. On shoot #3, enclosures C, E, and F, the case split for approximately 180° along the weld and it is believed that the splitting of the case absorbed most of the impact energy and the contact units were not able to generate trigger voltage. But for shoot #4, enclosures D, G, and H, the case did not split and the contact units were able to generate trigger voltage.

After the shots on June 12, 1953, the contact units were disassembled and subjected to a visual check. The results of this check are as follows: (Refer to enclosure D)

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Unit #5

Barium titinate chipped
Spring slightly deformed

Unit #10

Barium titinate shattered
Spring deformed

Unit #6

Barium titinate shattered
Spring slightly deformed

Unit #1

Barium titinate unaltered
Spring deformed

Unit #8

Barium titinate shattered
Spring slightly deformed

Unit #7

Barium titinate shattered
Spring deformed

Unit #2

Barium titinate shattered
Spring deformed

Unit #3

Barium titinate shattered
Spring slightly deformed
Pigtail stripped

It is not known after what shot this damage occurred, but the system did perform satisfactorily. After shoot #1 on May 27, 1953, all contact units were replaced.

The sketches of projectile penetration serve as visual aids only, and the only conclusion that can be drawn from the same is whether or not the over-all

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system is satisfactory. Because an assimilated MC-132 trigger circuit was used, an analysis of load on voltage output cannot be done, for such an analysis should be made considering the absolute values of the generated voltage and not projectile penetration. The effects of load on generated voltage can be seen from enclosures I and J.

CONCLUSIONS

The performance of the contact system appears to be satisfactory and the data consistent.

The splitting of the case along the welded seam is a mechanical problem to be decided upon by the weapon group.

Load impedance presented to the contact units is critical. Maximum generated voltage can be attained by using a very high resistance and a very low capacitance in shunt with the contact system.

WILLIAM R. JOY - 5341

DISTRIBUTION:

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Case No. 574.0
August 3, 1953

Unit TX6-X4 Date May 27, 1953	Net #1: Consists of four MC-300 in parallel MC-132 Trigger Circuit	Net #2: Consists of four MC-300 in parallel MC-132 Trigger Circuit
Shot #1: Impact at station 0".	Produced trigger voltage in 175 usecs (triggered at 22.7v) Projectile Penetration = 2.10"	Produced trigger voltage in 155 usecs. (triggered at 28v) Projectile Penetration = 1.86"
Shot #2: Impact at station 6".	Produced trigger voltage in 165 usecs. (triggered at 27.5v) Projectile Penetration = 1.98"	Produced trigger voltage in 85 usecs. (triggered at 29v) Projectile Penetration = 1.02"
Shot #3: Impact at station 13½".	No Trigger Voltage	No Trigger Voltage
Shot #4: Impact at station 0".	Produced trigger voltage in 90 usecs. (triggered at 28v) Projectile Penetration = 1.08"	Produced trigger voltage in 50 usecs. (triggered at 23.4v) Projectile Penetration = 0.6"
Shot #5:		
Shot #6:		
Shot #7:		

Enclosure A

Unit TX6-X4 Date June 12, 1953	Net #1: Consists of four MC-300 in parallel	Net #2: Consists of four MC-300 in parallel
Shot #1: Impact at station 0". MC-132 trigger	Triggered at 35.6v and 150 usecs Projectile Penetration = 1.80"	Produced trigger voltage in 160 usecs (triggered at 28 volts) Projectile Penetration = 1.92"
Shot #2: Impact at station 6½". Wave shape analysis	39.5v at 250 usecs 38.5v at 500 usecs 32.0v at 850 usecs Projectile Penetration = 3.0"	18v at 275 usecs 39v at 500 usecs 19.4v at 800 usecs Projectile Penetration = 6.0"
Shot #3: Impact at station 5½". MC-132 trigger	Triggered at 46.0v and 160 usecs Projectile Penetration = 1.92"	Triggered at 28.6v and 500 usecs Projectile Penetration = 6.0"
Shot #4: Impact at station 15⅜". MC-132 trigger	Triggered at 40v and 330 usecs Projectile - Penetration = 3.95"	Triggered at 25.6v and 250 usecs Projectile Penetration = 3.0"
Shot #5		
Shot #6:		
Shot #7:		

Enclosure B

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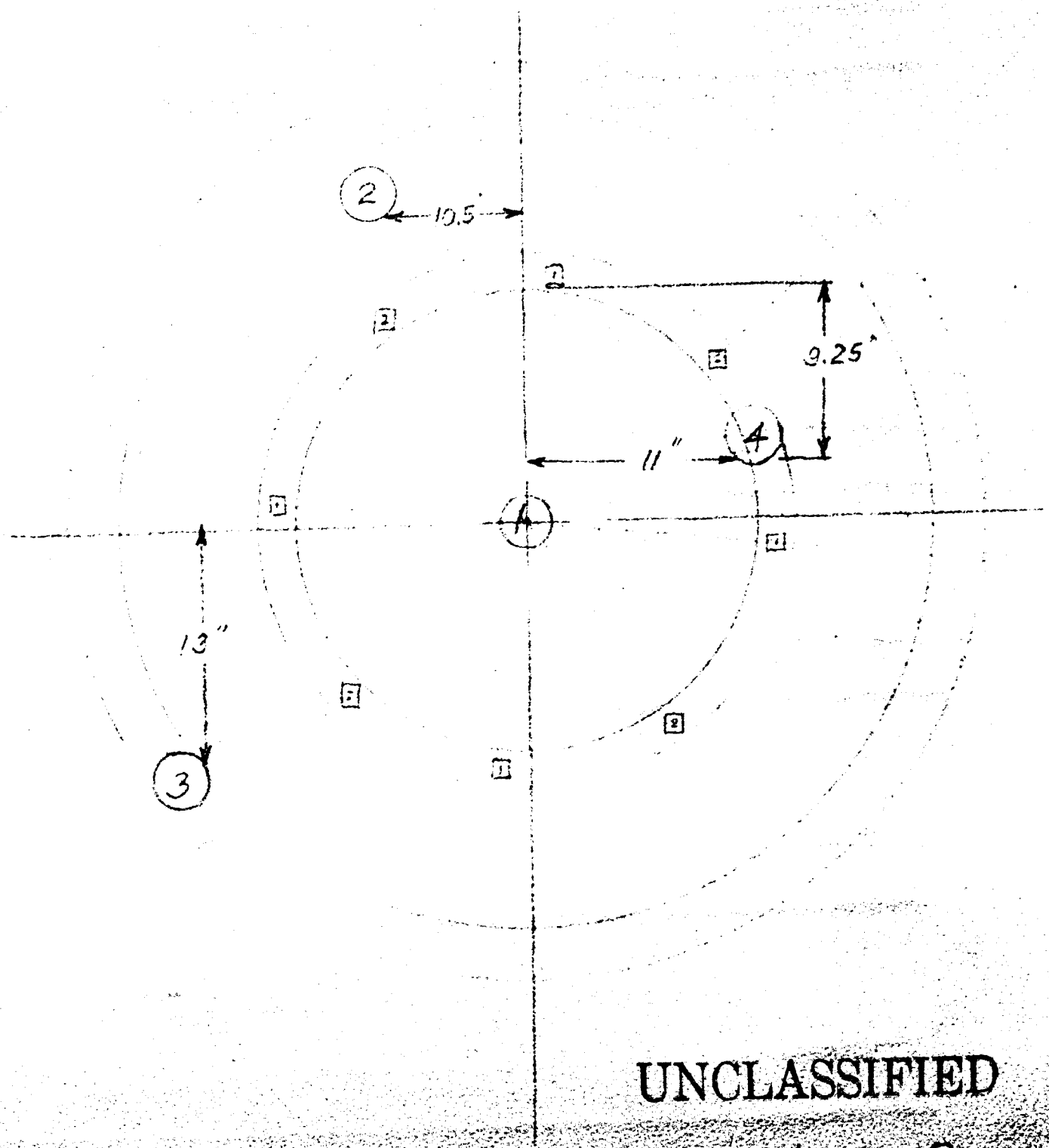
GENERAL ORIENTATION SKETCH TX-6

May 27, 1953



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Enclosure C

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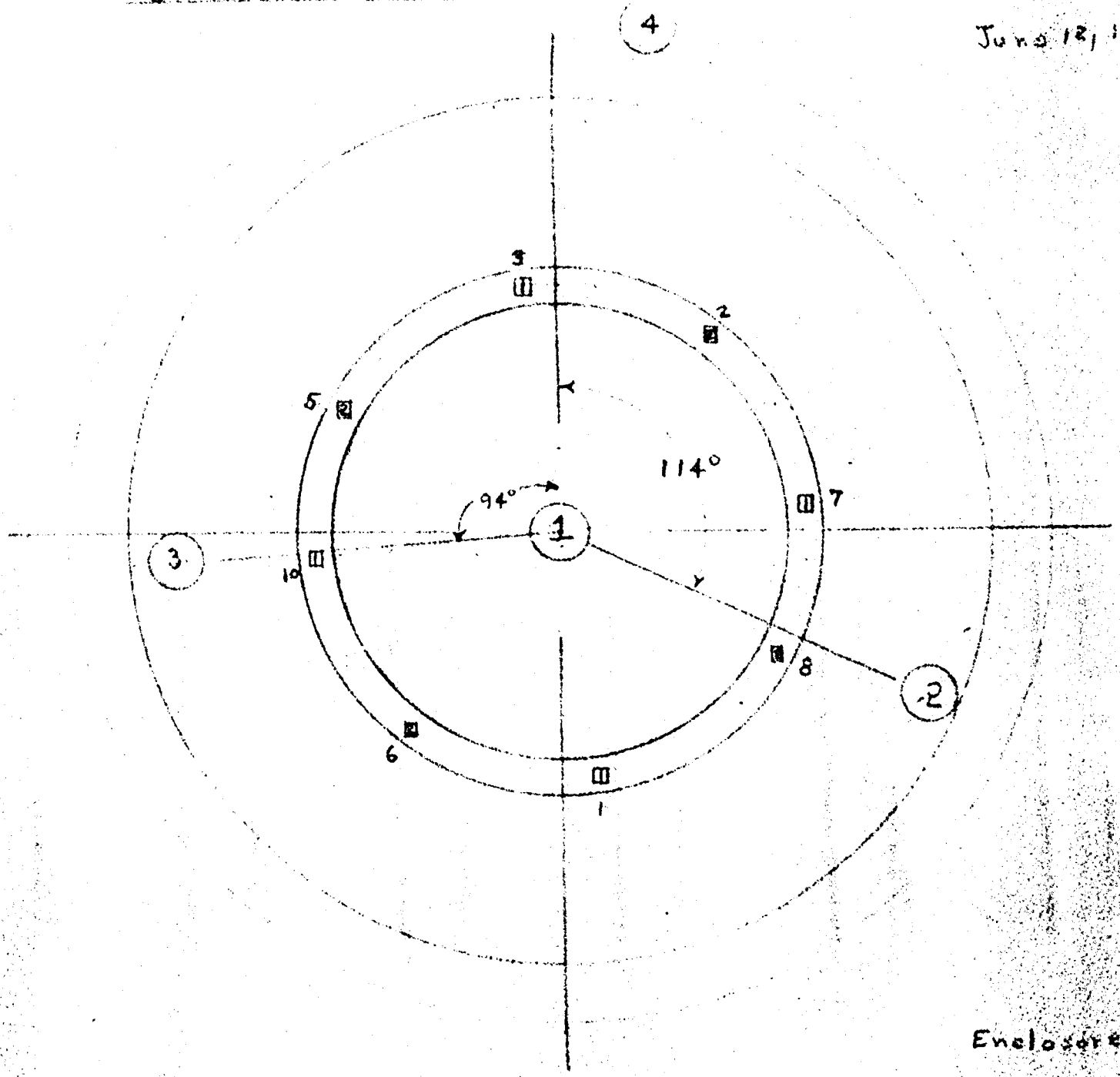
General Orientation Sketch

June 12, 1953



Enclosure D

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PROJECTILE PENETRATION SKETCH

Net 1

May 21, 1963

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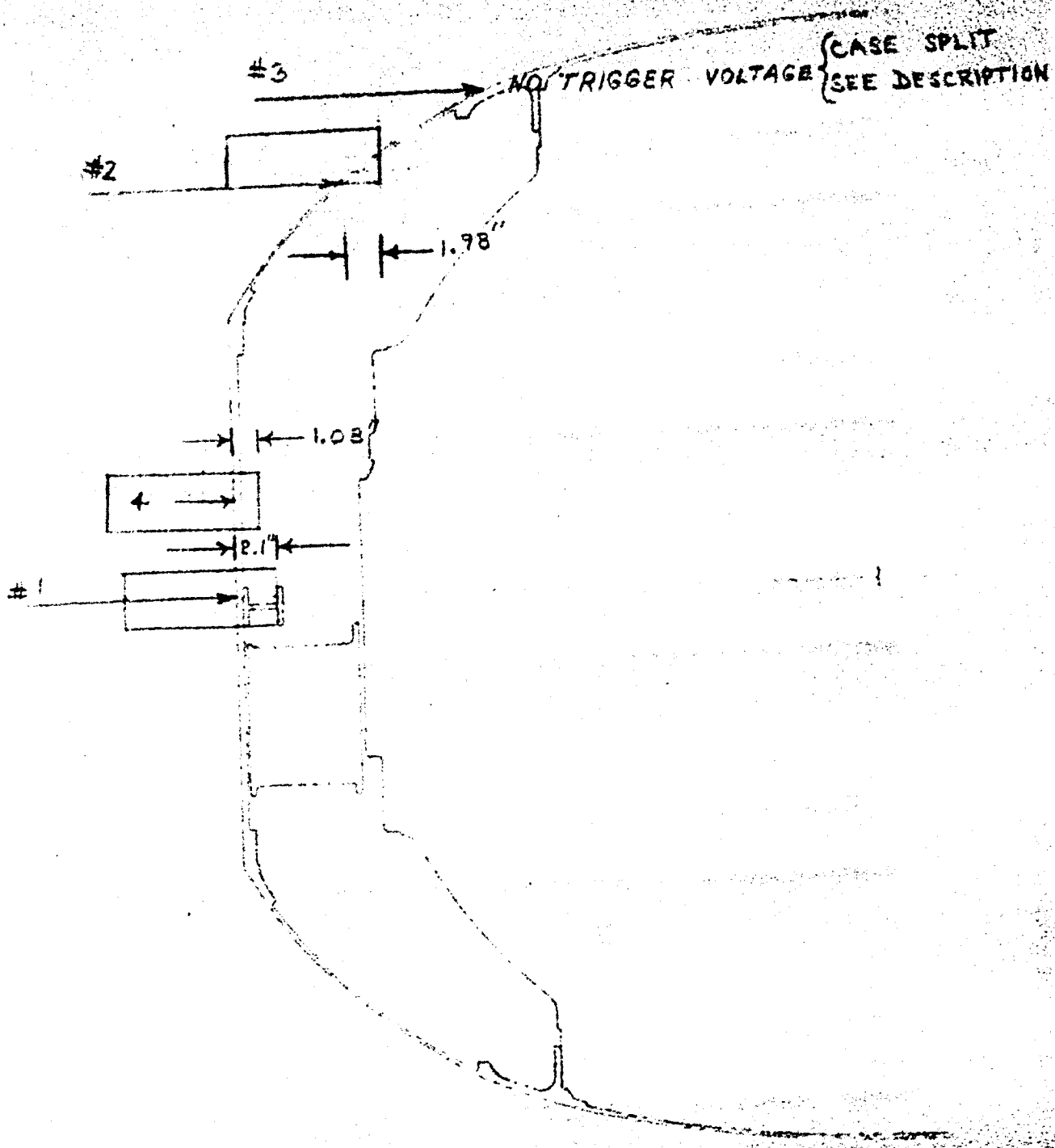

Enclosure E

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PROJECTILE PENETRATION SKETCH

Net 2

May 27, [illegible]

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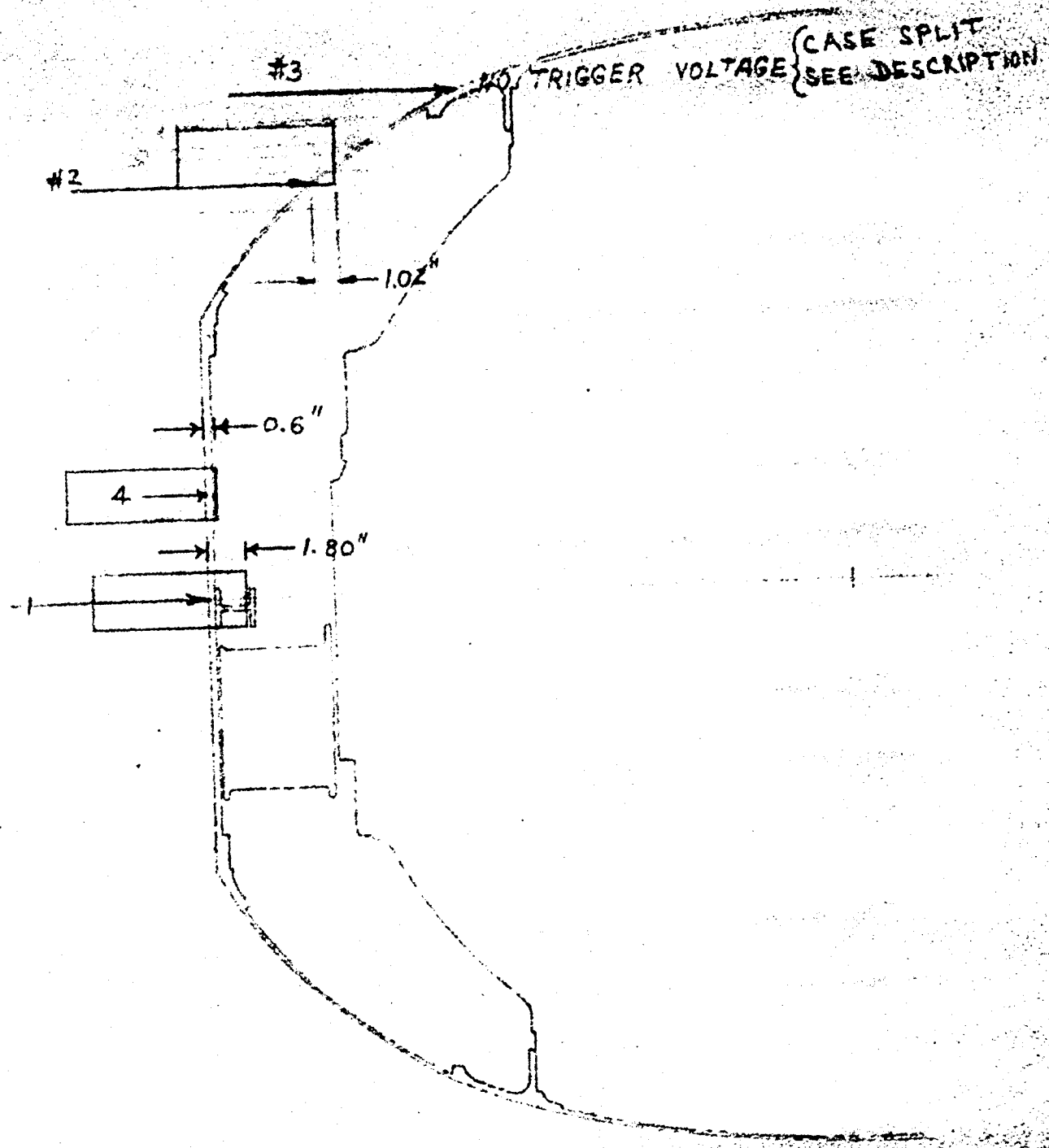

Enclosure F

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PROJECTILE PENETRATION SKETCH

TX6 X-4 No. 1 June 12, 1953

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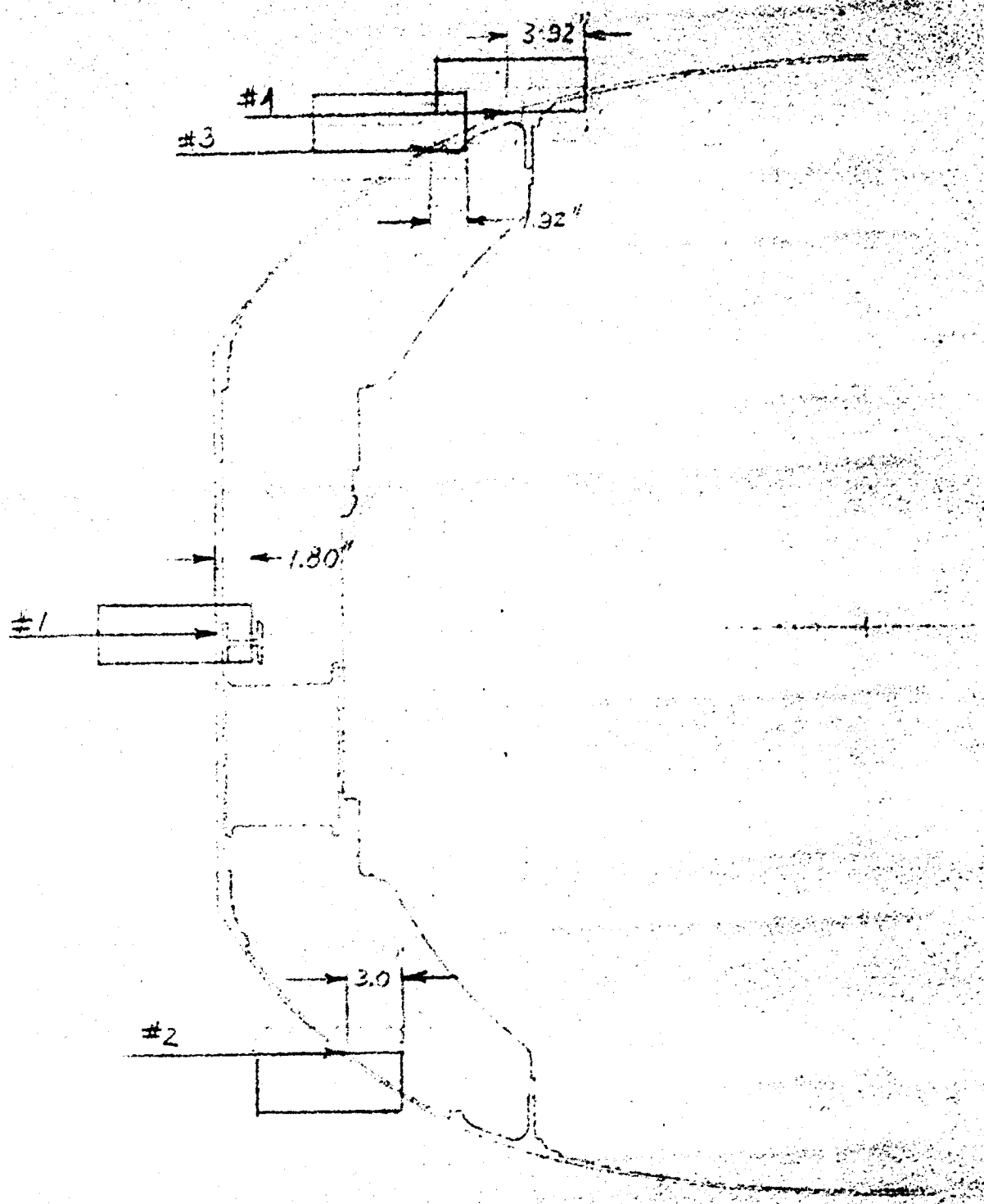

Enclosure G

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[redacted]

PROJECTILE PENETRATION SKETCH

7X6 X-4 NET [redacted] JUNE 12, 1973

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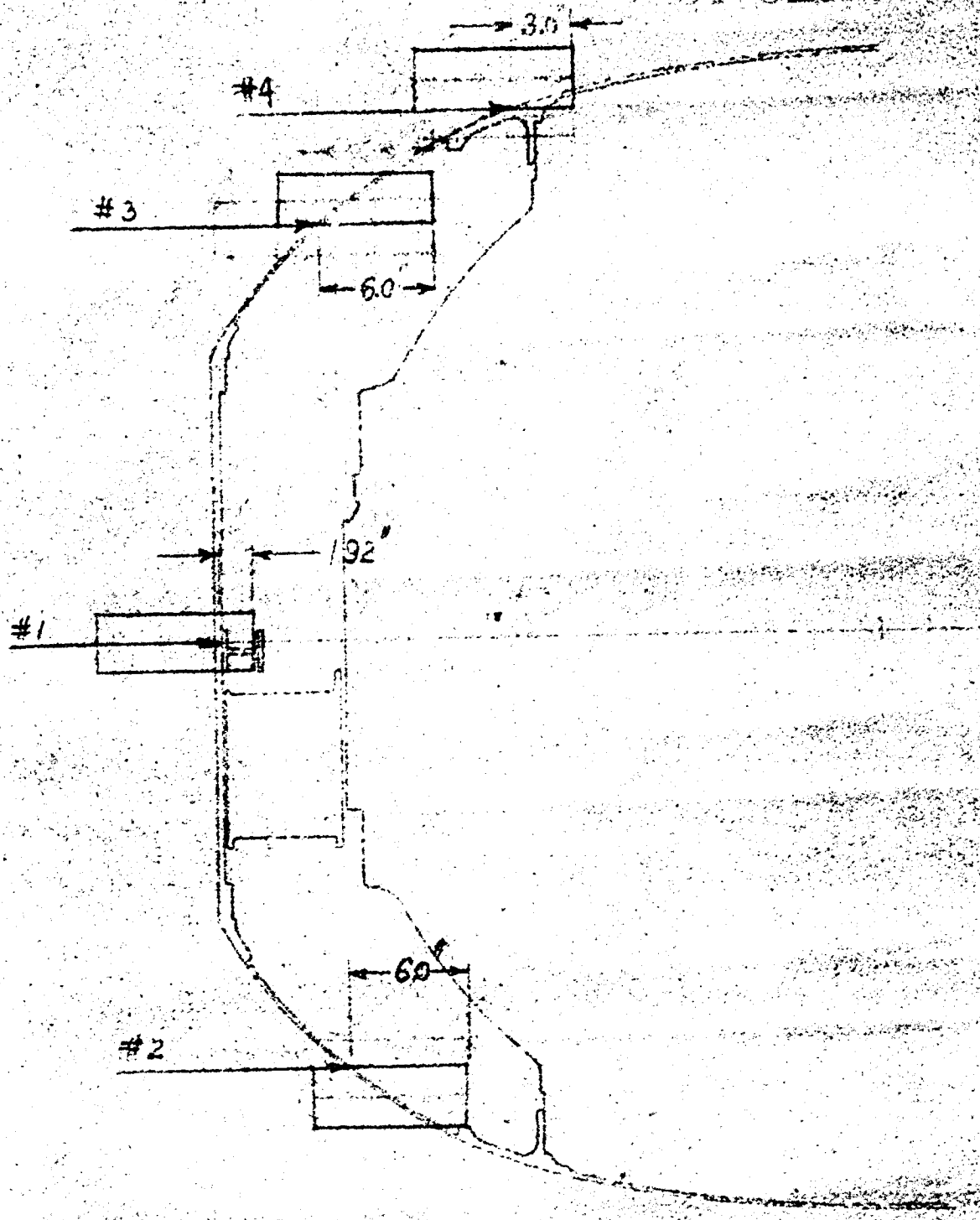

Enclosure H

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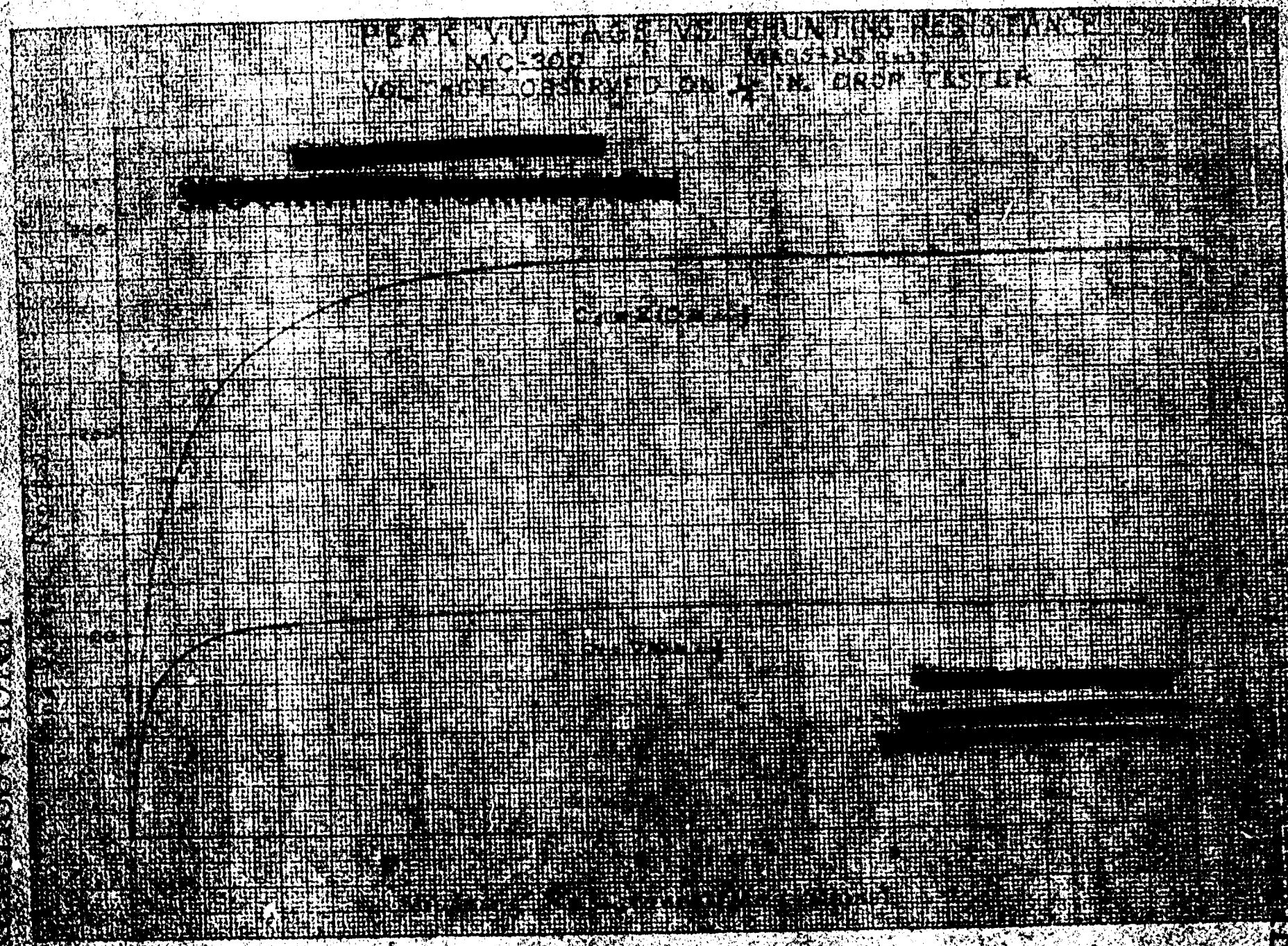

Enclosure 1

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[redacted]

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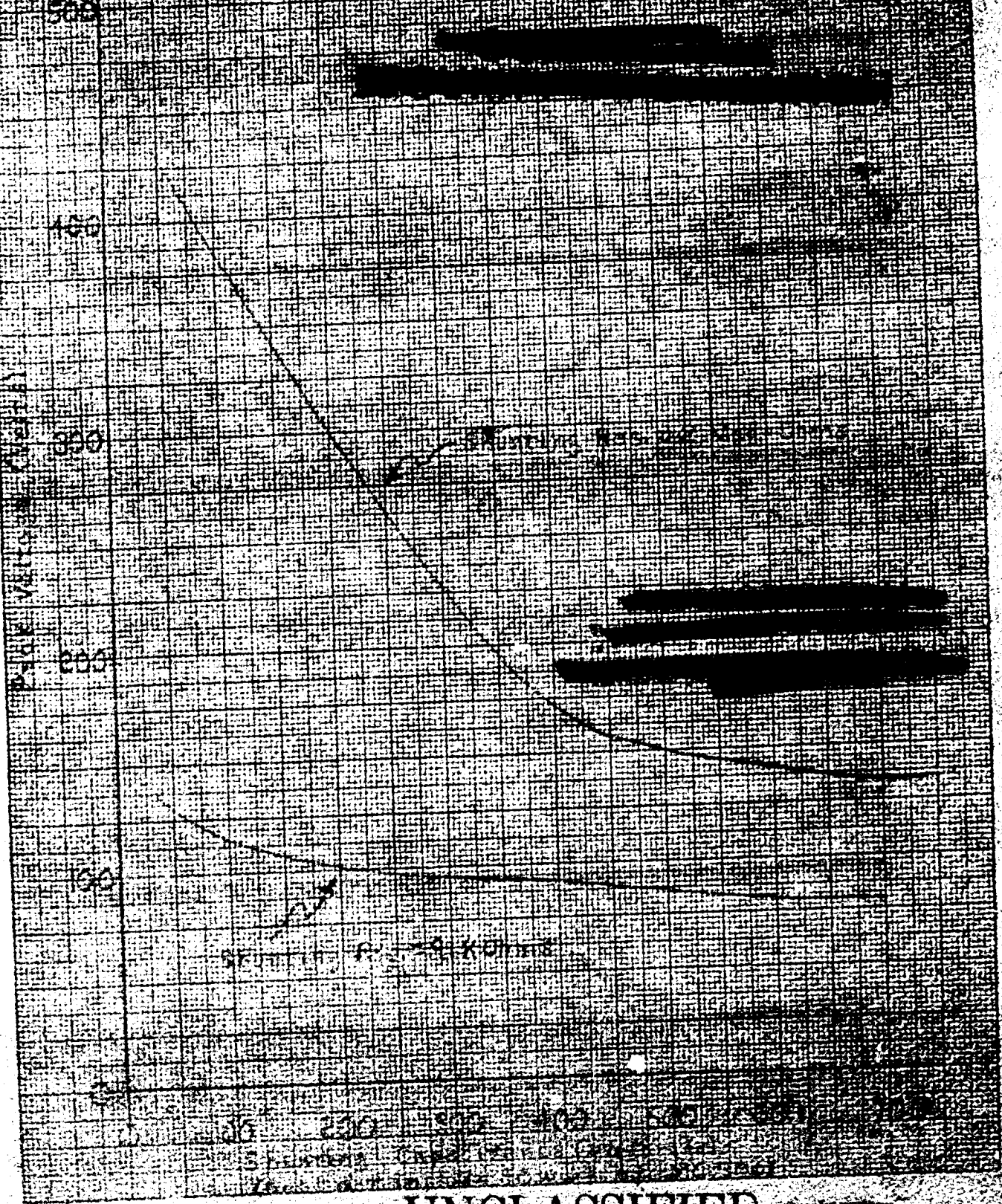
[redacted]



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