

UNCLASSIFIED

10/21/98  
RB Craver  
10/26/98  
White  
DeRosier

RECEIVED

JUL 10 1967

CENTRAL TECH FILE

TCG-NNT-1

T-12426

JUL 7 - 1967

File: P-20

SLED TEST OF BECKETT GYRO  
CONTROLLED VEHICLE (GCV-2)

Organization 7300 Environmental Test Report

D. L. Preston - 7344

Approved by [Signature]  
D. C. Bickel - 7344

Approved by [Signature]  
7331 Test Project Engineer

CENTRAL TECHNICAL FILE	
ACCOUNTABILITY CARD	[Signature]
FILE NO.	P-20
	alpha

- Distribution:
- R. T. Othmer, 1541
  - W. R. Hoagland, 1545  
Attn: L. W. Mecklenburg
  - H. E. Walker, 2151
  - D. S. Bliss, 2562
  - D. C. Henry, 5613  
Attn: R. L. Wilde
  - B. G. Edwards, 7222  
Attn: W. D. Love
  - D. C. Bickel, 7344  
Attn: D. L. Preston
  - K. F. Crowder, 9224  
Attn: T. T. Shishmar
  - J. K. Cole, 9325  
Attn: A. D. Foster
  - E. White, 7331  
Central Techn

SANDIA SYSTEMATIC DECLASSIFICATION REVIEW DOWNGRADING OR DECLASSIFICATION STAMP	
CLASSIFICATION CHANGED TO: U	AUTHORITY: WCLagne
PERSON CHANGING MARKING & DATE: [Signature] 10/21/98	RECORD ID: 995N0228
PERSON VERIFYING MARKING & DATE: [Signature] 10/30/98	DATED: 10/26/98

UNCLASSIFIED

[REDACTED]  
UNCLASSIFIED

2241

T-12426

TABLE OF CONTENTS

	Page
Introduction	3
Summary	3
Procedure and Results	3-5
Table I                    Location of Components After Test	6
Table II                   Meterological Data For GCV-2	7
Figures 1 - 2              GCV-2 Prior to Testing	8-9
Figures 3 - 13             GCV-2 Components After Testing	10-20

UNCLASSIFIED

UNCLASSIFIED

T-12426

SLED TEST OF BECKETT GYRO  
CONTROLLED VEHICLE (GCV-2)

## Introduction

The object of this test was to provide functional flight testing of the GCV-2 by ejecting and retrofiring it from an ejector sled on the Area III 3,000-foot track. The unit was to be ejected at 20 fps, ignite, pitch up, and negotiate the zero velocity transition, and fly back downrange some 1,600 feet from the ejection point. At unit ejection, the sled velocity was to be 410 fps. Ejection apogee was theoretically six feet, and the apogee was supposed to be at about 87 feet.

This test was requested by D. D. Frasier, 1543, on May 10, 1967. D. L. Preston, 7344, was Test Engineer. The test item was received June 9, 1967, and the test was completed June 10, 1967.

## Summary

On Saturday, June 10, 1967, a GCV-2 sled test was conducted on the 3,000-foot test track in Area III. The unit was mounted atop an ejector sled; the electrical circuits checked and armed; the hydraulic control system pressurized, and the sled launched at 10:37 A.M. The sled, on its way to a 410 foot-a-second velocity at ejection, passed through two screen box systems. These systems performed the necessary switching and initiating function inside the unit. The unit was ejected upward at 20 feet a second. A malfunction inside the GCV resulted in the pitch-yaw gyro failing to uncage. The GCV, after ejection, flew a series of loops before impacting at Station 1675, some 130 feet West of the track.

## Procedure and Results

The Beckett GCV-2 was mounted, in the retrofire position, on an ejector sled by containing the units two lugs in special pneumatically operated latches. Two military ejection rack sway braces were then positioned against the unit and the ejector pad (saddle) snugged underneath the unit center of gravity. The lugs and sway braces were located as follows:

Unit Front Lug	Unit Station 25.12
Unit Front Sway Brace	Unit Station 30.57
Ejection Pad Center (Unit cg)	Unit Station 38.23
Unit Rear Sway Brace	Unit Station 48.70
Unit Rear Lug	Unit Station 56.19

UNCLASSIFIED

UNCLASSIFIED

T-12426

The unit remained electrically accessible until just prior to ejection by two connectors attached to the unit aft end (sled forward end). The electrical cords were attached to two sled mounted, squib operated, connector extractors for quick removal immediately before ejection. Two external power supplies were available to the unit prior to ejection. Before sled launch, a battery placed on the ground, was connected through a launch pull-out connector. This battery provided external telemetry and gyro power. At sled launch, this battery was disconnected; the TM placed on internal power, and the gyros allowed to spin down throughout the remainder of the test. During the sled run, and prior to unit ejection, all external unit power was obtained from a sled mounted battery.

For the sled run, there were two screen box cutter-bar systems. The first screen box, located at track Station 301, pulsed a redundant MC824 switch circuit that connected the sled mounted battery to the unit. This connection served to fire two Conox explosive valves, readying the unit control system, and to uncage the two already spinning control gyros. The second screen box (Station 342), contacted 100 milliseconds after the first; closed a second redundant MC824 circuit that fired the two plug extractors removing the electrical connections from the unit, and fired an explosive valve opening the pneumatic latches and ejecting the unit. The ejection yielded vertical maximums of 16 g's and 20 fps.

Sled rocket power consisted of four live HVAR rockets and three empty motors for ballast. Sled ejection pressure was 306 psi while the cushion pressure used to retain the ejection piston was 118 psi. Only two-thirds of the available cushion volume was used in order to shorten the ejection stroke and provide a cleaner unit-sled separation.

The sled was launched Northward from Station 95 at 10:37 A.M. on Saturday, June 10, 1967. The entire sled trajectory was followed without alteration, but the unit encountered some internal control difficulties. The roll gyro uncaged without difficulty, but the pitch-yaw gyro did not uncage. On ejection from the sled (sled velocity 410 fps), the unit rocket motor ignited, the vanes deflected to full pitch to make the unit climb, and remained there. The unit then flew a series of loops before impacting the ground some 130 feet West of the track at track Station 1675.

On impact, the unit broke into three main sections; the breaks occurring at the joint between the nose cone and main body, and between the rocket motor and aft control section. After several impacts, all four jet vanes came out of the aft control section and were subsequently found.

Figures 3 through 13 depict various pieces of the unit after testing. Table I lists several unit components and the positions where they were found.

Table II lists meteorological data recorded at the time of the test.

UNCLASSIFIED

  
**UNCLASSIFIED**

Instrumentation for the test consisted of photometric coverage and unit internal information related by a telemetry system.

Some of the major events monitored by the TM system include:

1. Gyro uncage signal
2. Rocket Motor Ignition
3. Vane Position
4. Servo valve position
5. Gyro outputs
6. Three accelerometers in the unit nose

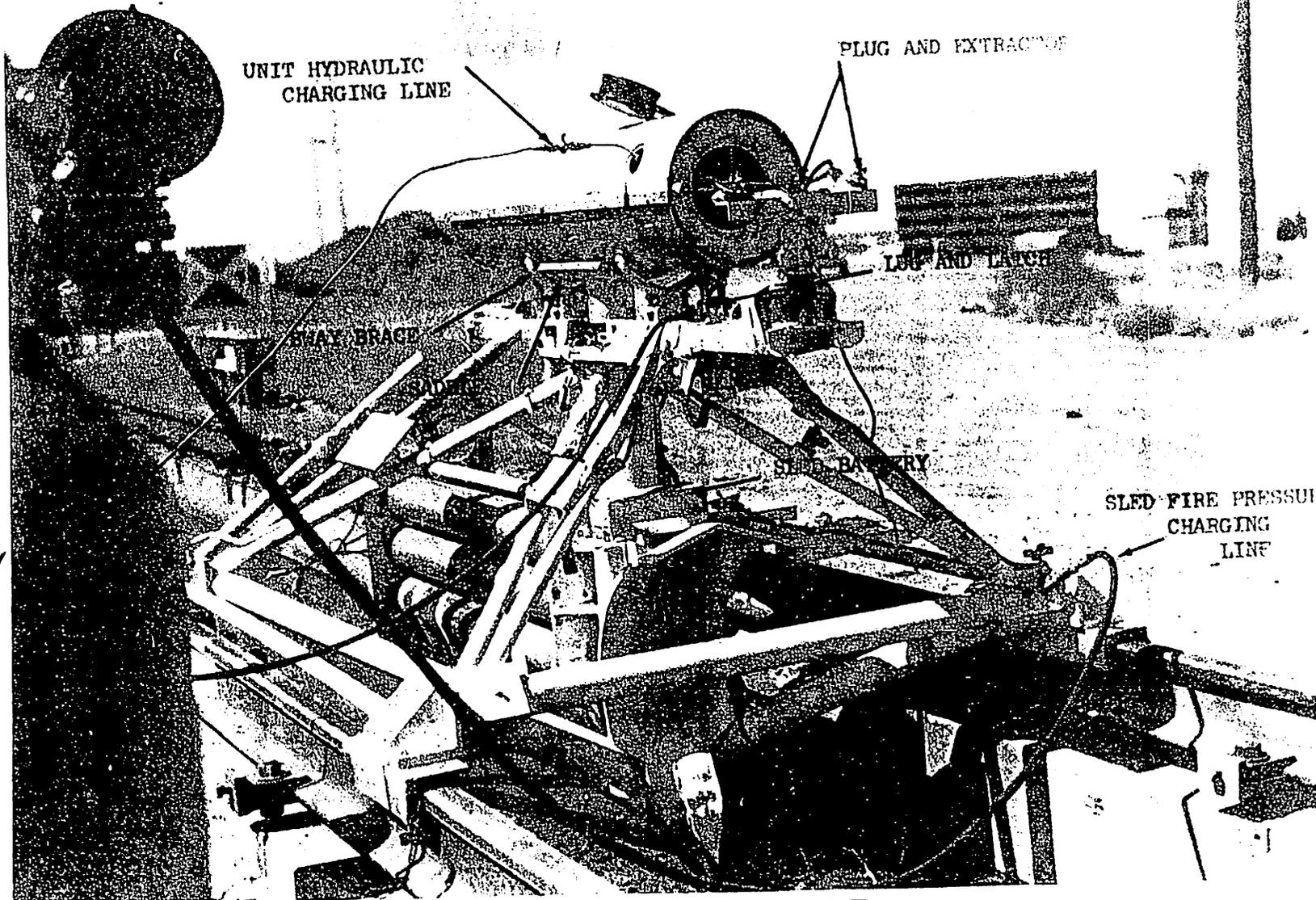
DLP:7344:vb

**UNCLASSIFIED**  






UNCLASSIFIED



UNIT HYDRAULIC  
CHARGING LINE

PLUG AND EXTRACTOR

LEG AND LATCH

SWAY BRACE

SLED BATTERY

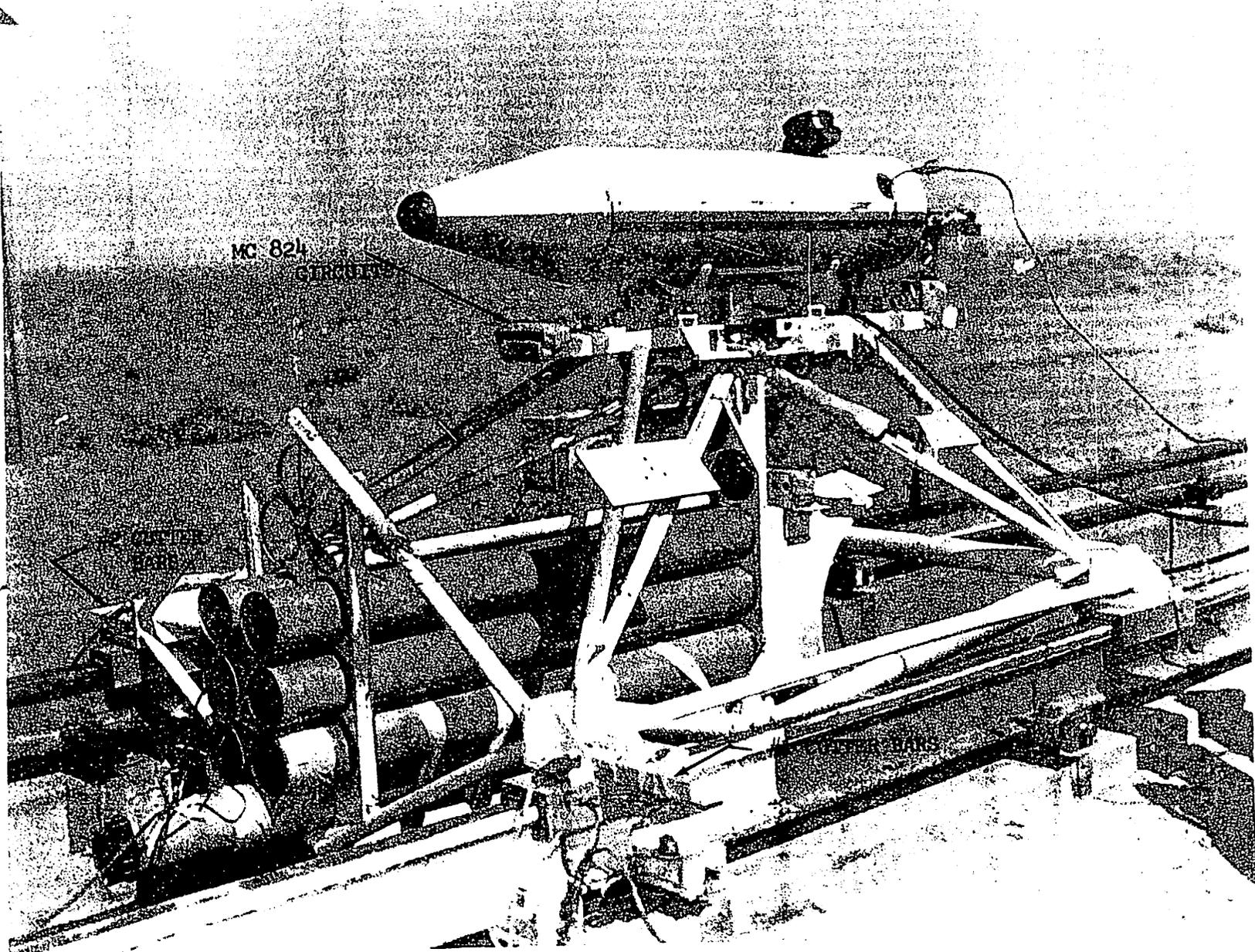
SLED FIRE PRESSURE  
CHARGING  
LINE

6769-29#

6769#

UNCLASSIFIED

UNCLASSIFIED



MC 824

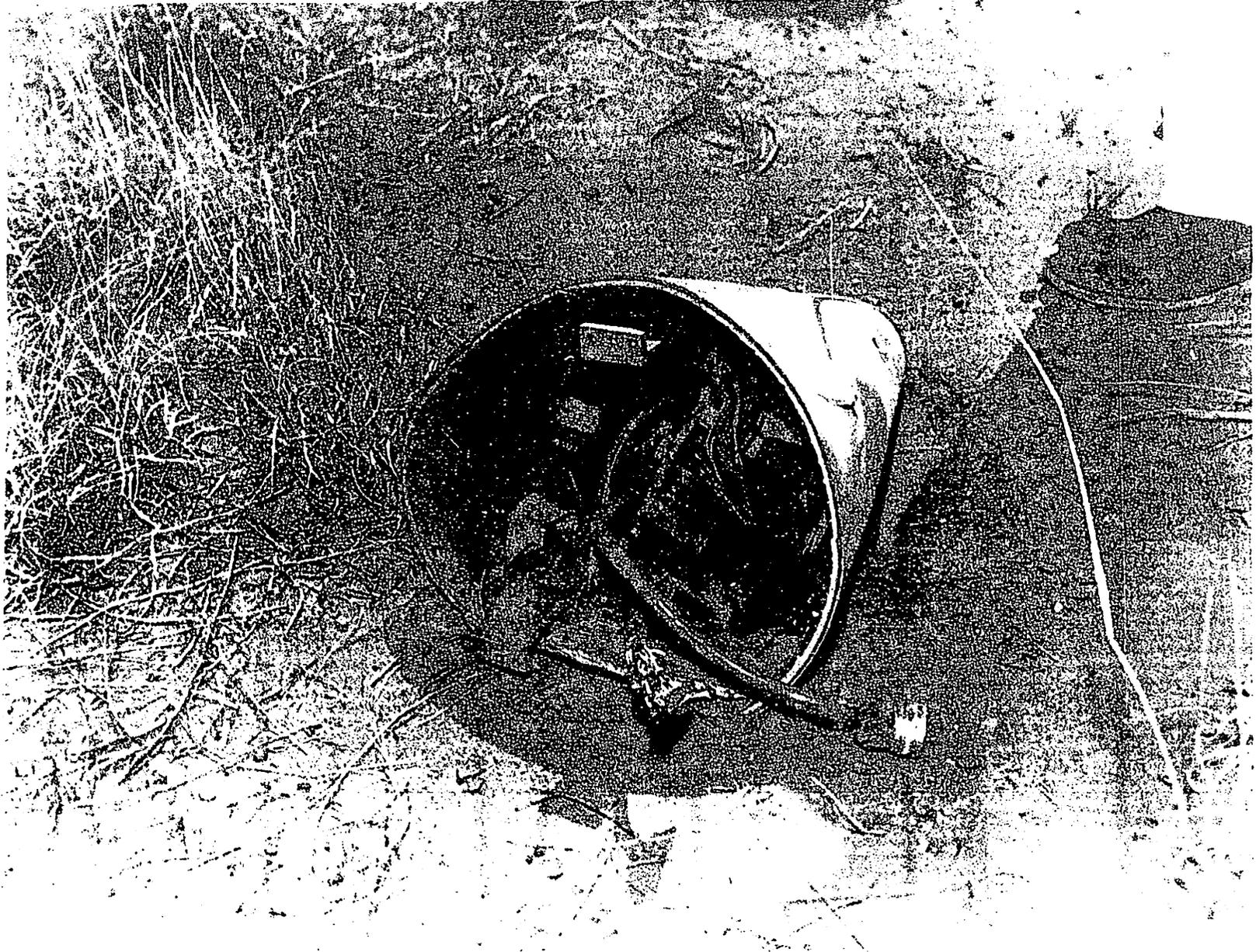
6180000

#67-6750

#2248

UNCLASSIFIED

UNCLASSIFIED

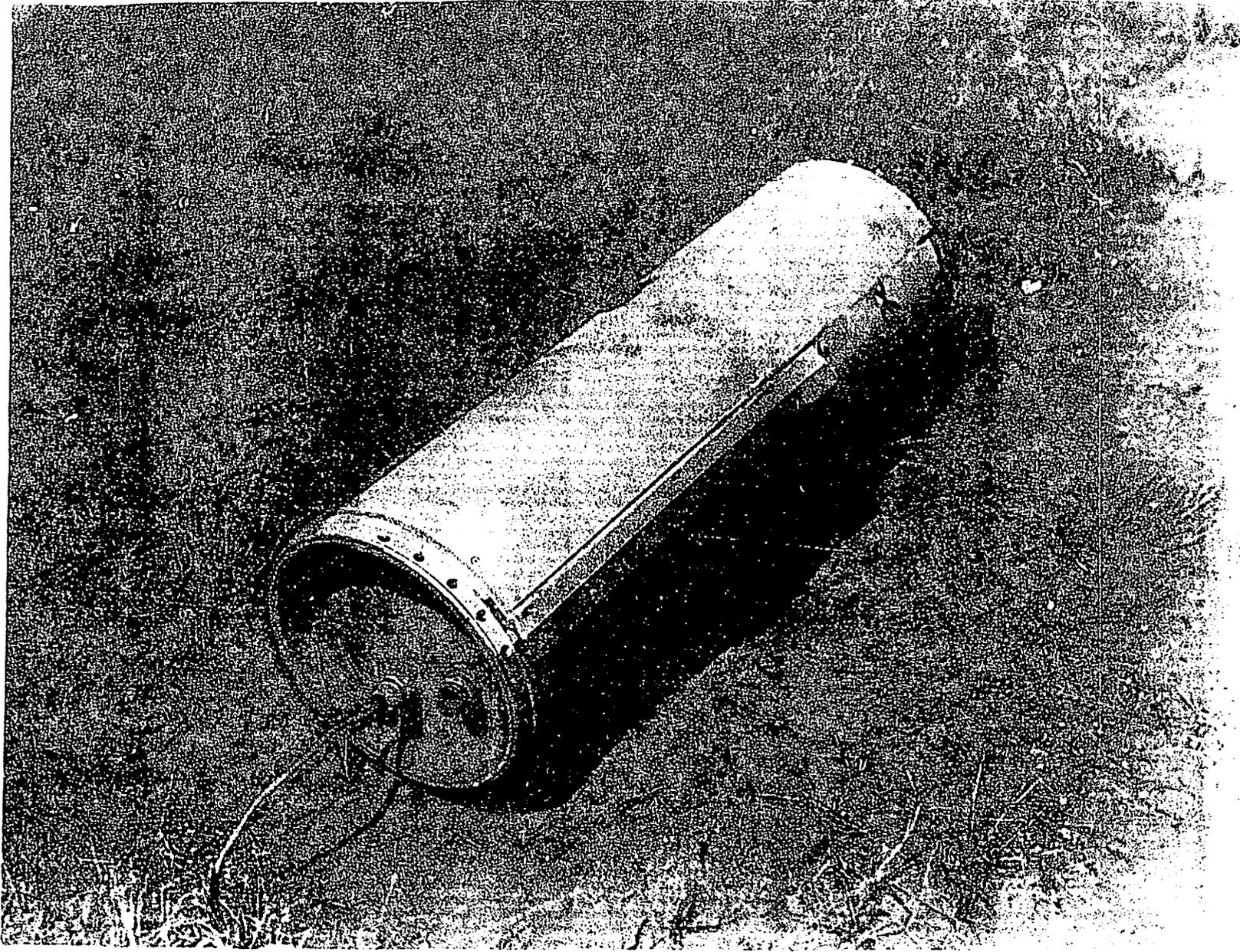


D# 69-6959

brief

UNCLASSIFIED

UNCLASSIFIED

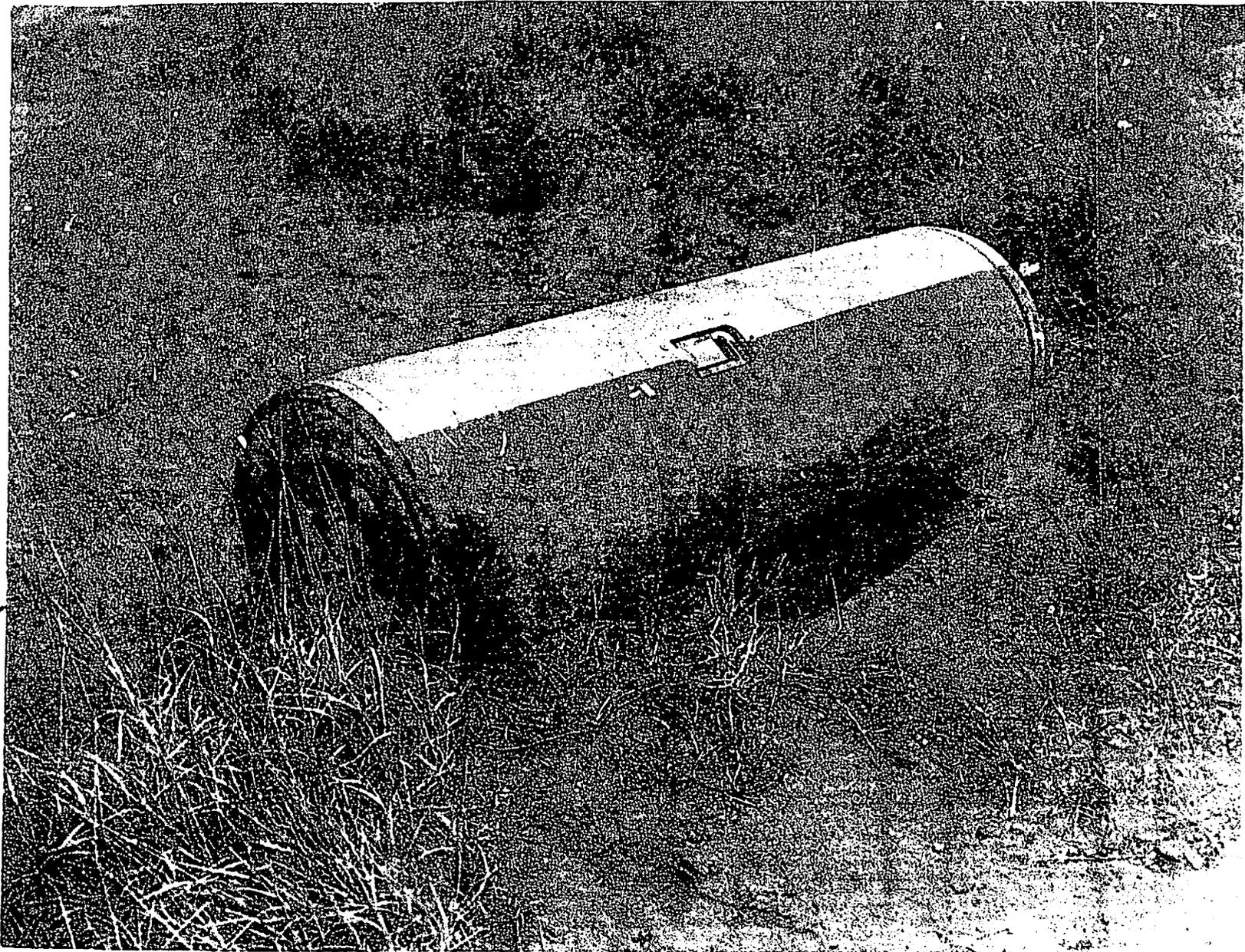


D#69-6962

#2250

UNCLASSIFIED

UNCLASSIFIED

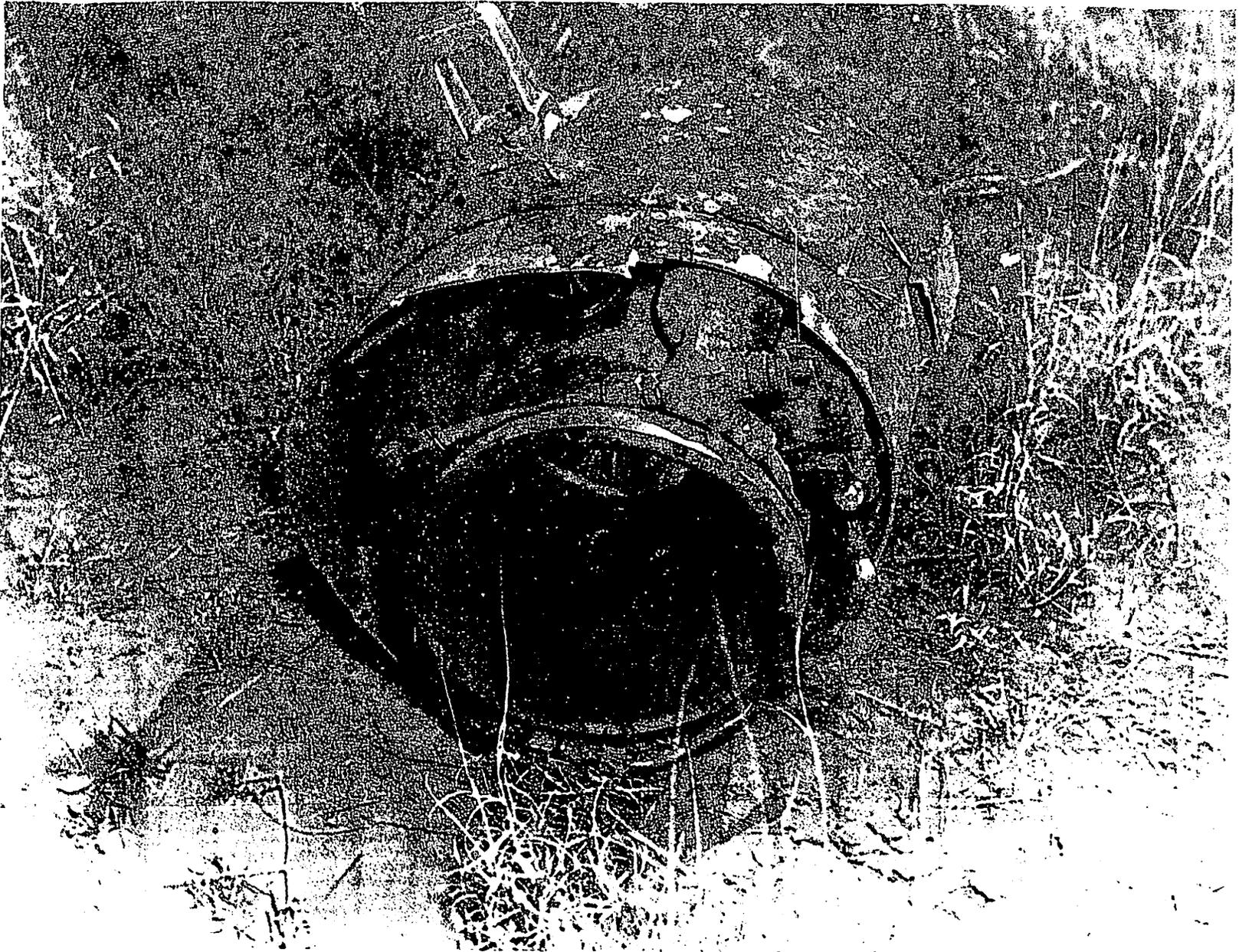


1969-69#

#2251

UNCLASSIFIED

UNCLASSIFIED



[REDACTED]

[REDACTED]

D#69-1763

#2252

UNCLASSIFIED

UNCLASSIFIED



[REDACTED]

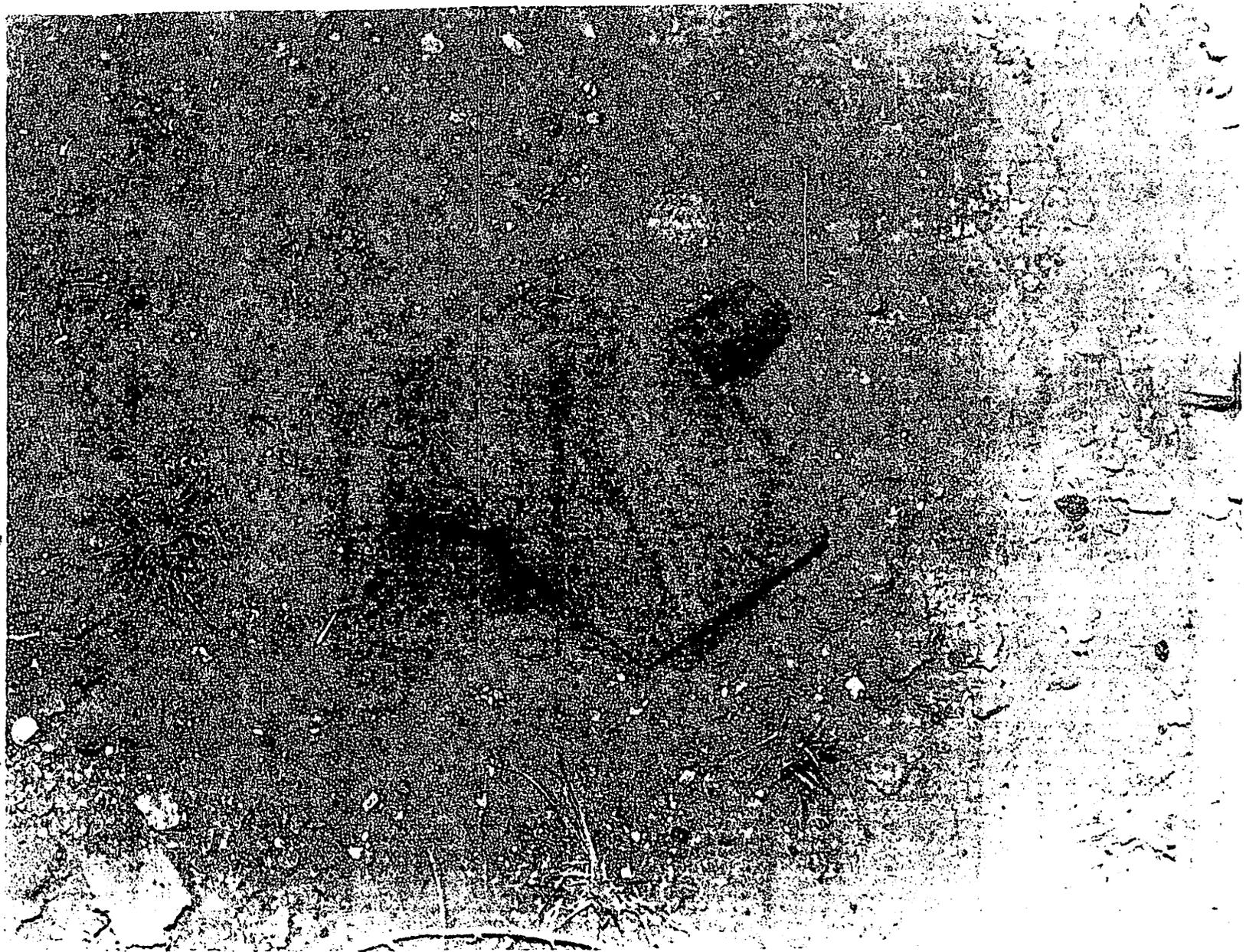
[REDACTED]

#67-6964

#2253

UNCLASSIFIED

UNCLASSIFIED

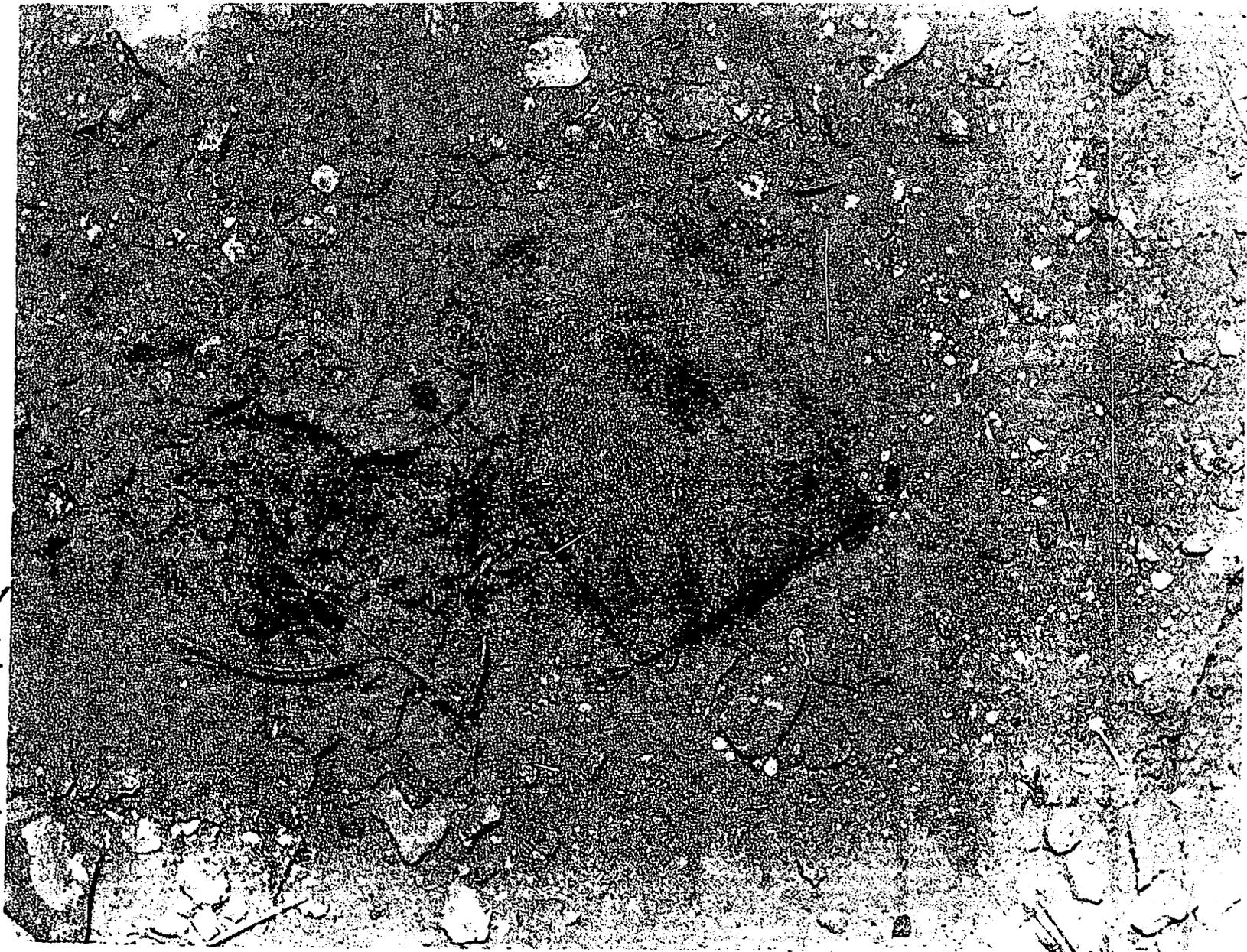


D#67-6754

#2254

UNCLASSIFIED

UNCLASSIFIED

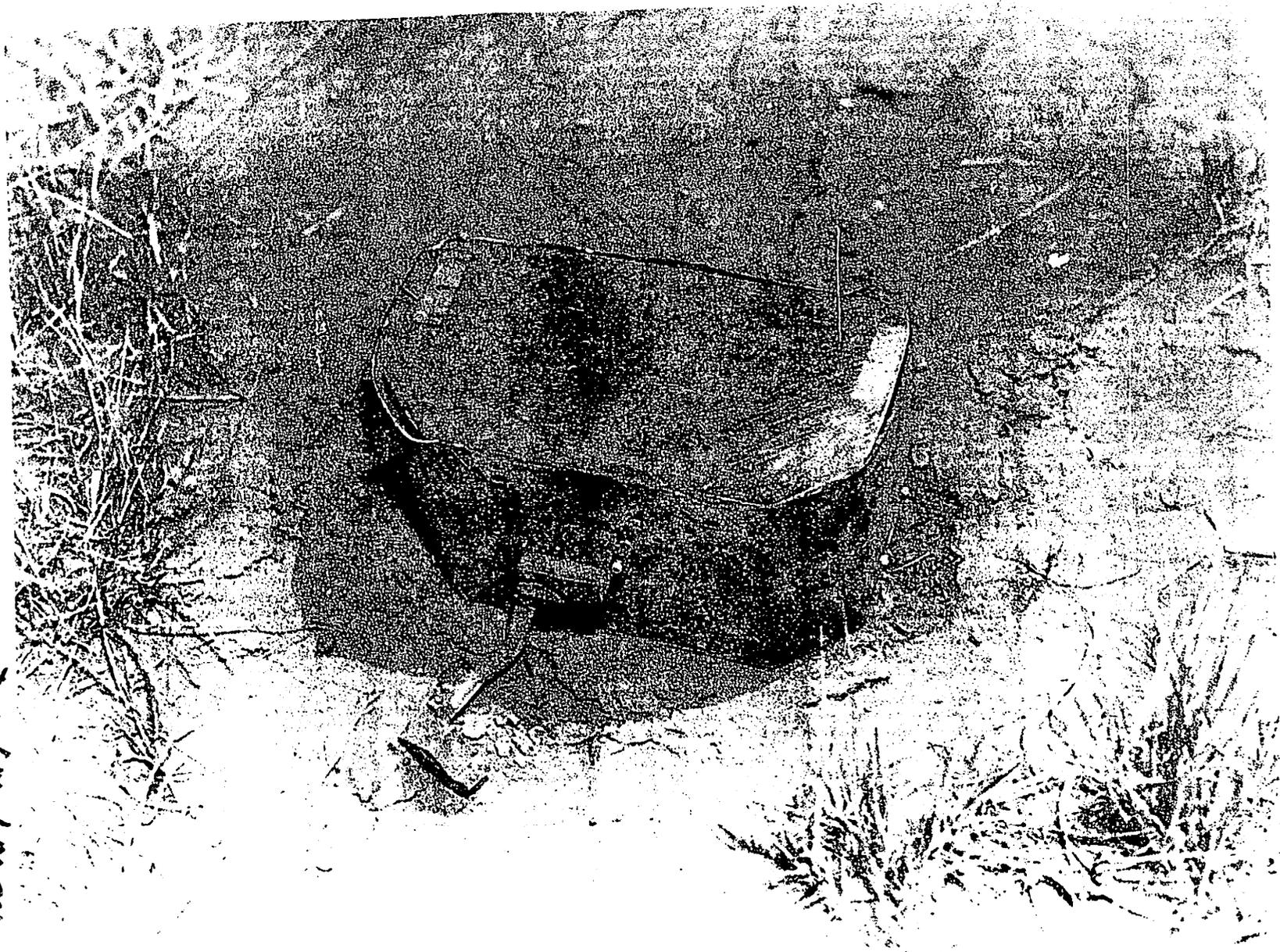


D# 67-6953

#2255

UNCLASSIFIED

UNCLASSIFIED

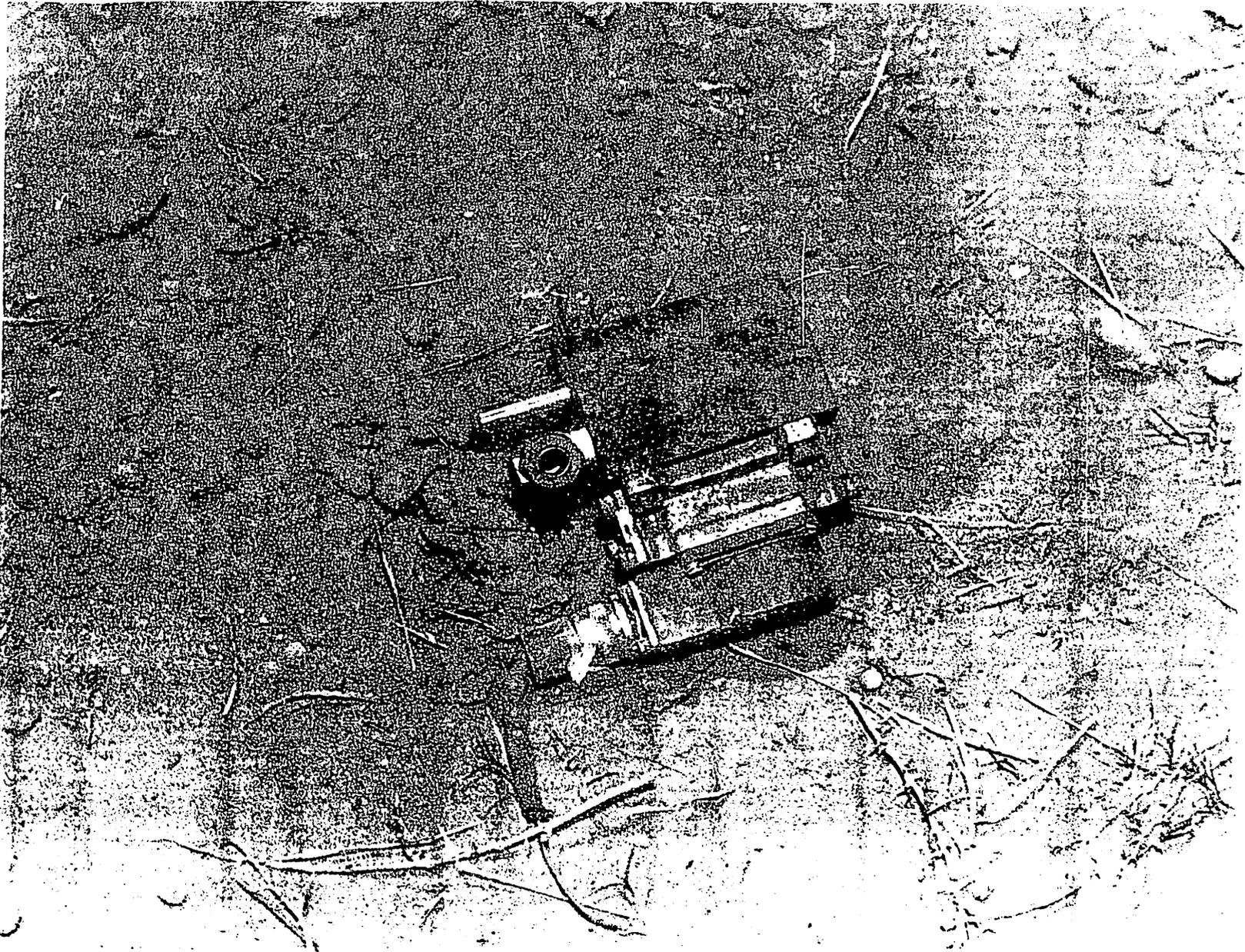


D# 67-6758

#2254

UNCLASSIFIED

UNCLASSIFIED



DF#67-6955

#2257

UNCLASSIFIED

UNCLASSIFIED

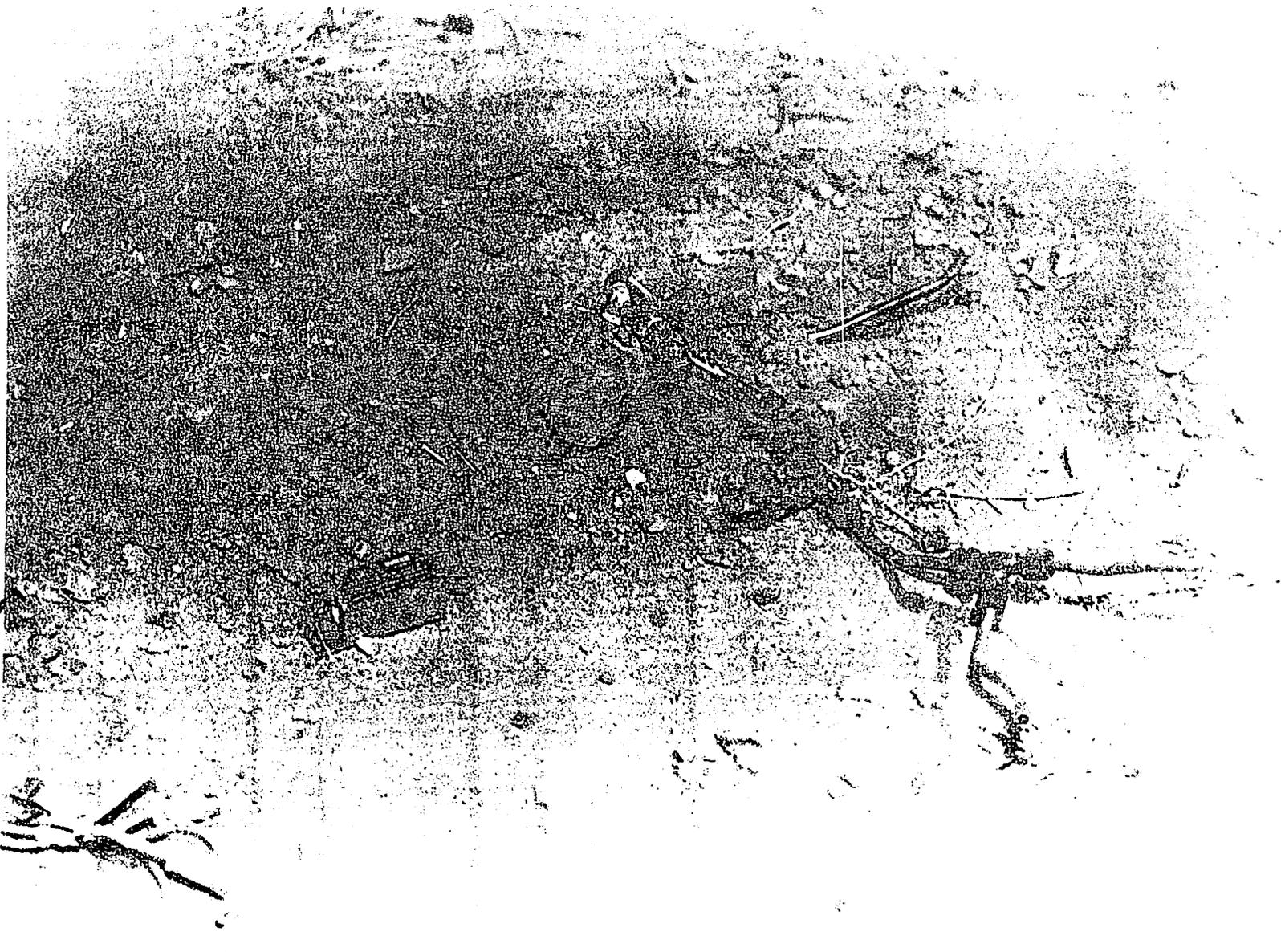


2#69-6959

#2258

UNCLASSIFIED

UNCLASSIFIED



#67-6760



#2259

UNCLASSIFIED