

# **Appendix I**

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*Munitions Debris/Munitions  
and Explosives of Concern Report  
(on CD included with this document)*



**AFTER ACTION REPORT**  
**MEC / UXO SURFACE SWEEP ACTIVITIES**  
**FORMER MILITARY ORDNANCE RANGE AREAS**  
**LOS ALAMOS NATIONAL LABORATORIES**  
**LOS ALAMOS, NM**

Prepared For

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Contract Number

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November 2006

## TABLE OF CONTENTS

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	<b>Page</b>
1.0 INTRODUCTION .....	1
2.0 MEC SITE SURVEYS.....	2
2.1 TASKS COMPLETED .....	2
2.2 FINDINGS .....	2
3.0 CONCLUSIONS AND RECOMMENDATIONS .....	4
3.1 CONCLUSIONS.....	4
3.2 RECOMMENDATIONS .....	4

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## LIST OF TABLES

Table 1	Item List
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## LIST OF ATTACHMENTS

Attachment A	Photo Log
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## LIST OF ACRONYMS, SYMBOLS AND ABBREVIATIONS

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DGPS	differential global positioning system
GPS	global positioning system
HGL	HydroGeoLogic, Inc.
LANL	Los Alamos National Laboratory
LSRS	LATA Sharp Remediation Services
MD	munitions debris
MEC	munitions and explosives of concern
mm	millimeter
OB/OD	open burn
OD	open detonation
PD	point detonating
SOW	Statement of Work
UXO	Unexploded Ordnance

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FORMER MILITARY ORDNANCE RANGE AREAS  
LOS ALAMOS NATIONAL LABORATORIES  
LOS ALAMOS, NM**

**1.0 INTRODUCTION**

LATA Sharp Remediation Services (LSRS) contracted HydroGeoLogic, Inc. (HGL) to provide Munitions and Explosives of Concern (MEC) site survey services for a total of 87.5 acres of the Guaje / Barrancas / Rendija Canyons Aggregate Area at TA-00, Los Alamos National Laboratory (LANL), New Mexico. Properties in the following areas that were once utilized, or are suspected of being utilized as Military Munitions practice ranges include:

- SWMU00-011(a): 28.5 acres (mortar impact area)
- SWMU00-011(c): 10.0 acres (possible mortar impact area)
- SWMU00-011(d): 5.0 acres (bazooka firing area)
- SWMU00-011(e): 14.0 acres (ammunition impact area)
- AOC C-00-020: 30.0 acres (possible mortar impact area)

**1.1 GENERAL**

HGL provided 3 UXO Technicians, a surveyor / DGPS operator, and a data recorder to provide MEC surface sweep services as outlined in the August 8, 2006 Scope of Work (SOW). The technicians conducted site reconnaissance and UXO surface sweep of the five sites from 24 October - 1 November 2006.

**1.2 SUMMARY**

This After Action Report presents the project objectives and tasks completed by HGL, as well as site specific findings and investigative conclusions.

## 2.0 MEC SITE SURVEYS

### 2.1 TASKS COMPLETED

The following tasks associated with the MEC site surveys were completed:

- HGL mobilized to the site, participated in 2.5 days of site briefings, mandatory health and safety and quality assurance training, and orientation for LANL and LSRS;
- LSRS provided escorts for site reconnaissance and boundary familiarization;
- Five HGL personnel performed MEC site surveys of all five areas. The surveys consisted of reconnaissance walks of the sites with 10-ft. to 15-ft. lane spacing. In areas with very steep grades and unstable ground, the maximum area that could safely be navigated was walked. The remaining area that could not be walked was given a thorough visual sweep from the top and the bottom of the grade. In areas overgrown with brush, a handheld metal detector was utilized to sweep for metallic debris in and under the brush. All identified metallic Munitions Debris (MD) or MEC-related items were recorded and photographed. Descriptions of items found, along with their GPS location coordinates, are provided in **Table 1**.

### 2.2 FINDINGS

The following entries present findings from the MEC site surveys:

Surface Debris: All sites are cluttered with cultural debris (e.g. cans, bottles, and misc. trash). Additionally, large portions of all areas except SWMU00-011(a) are strewn with downed trees from the 2002 forest fires. The downed trees are significant obstacles to moving over the sites and present a notable hazard to personnel working in the areas.

Topography / Vegetation: With the exception of SWMU00-011(a), which was relatively flat, all the areas contained steep, sloping grades and large rock / boulder formations, as well as sheer cliffs. All areas contained thick brush and trees. Flat portions of all areas were covered in tall grass and / or weeds.

MEC / MD: Located items consisted of a 60mm mortar fuze, point detonating (PD), 60mm mortar fin assembly, an expended bazooka rocket motor, rocket fragments, and several pieces of projectile fragmentation.

Cultural resources: A stone carving of a possible religious / ceremonial icon was located below the cliff dwellings in SWMU00-011(e) (Rendija Canyon) by one of HGL's UXO technicians. Photographs and GPS location were provided to LSRS project personnel.



**TABLE 1**

Item Description	Designation	Northing	Easting	Elevation	Photo ID - digitally imprinted #
Control point	Rendija1	1786768.862	1634522.644	6911.675	
Control point	Rendija2	1786877.200	1635188.080	6886.810	
Control point	Rendija2 (pm)	1786877.258	1635188.058	6886.843	
60mm mortar fuze, point detonating	SWMU00-11a-001	1786770.776	1634931.370	6892.485	IMGP0077, IMGP0078, IMGP0079
Projectile fragment	SWMU00-11a-002	1786775.723	1634780.828	6897.622	IMGP0080, IMGP0081, IMGP0082
Unknown, probable munitions debris	SWMU00-11a-003	1787046.387	1635285.058	6854.210	IMGP0083, IMGP0084, IMGP0085
Projectile fragment	SWMU00-11a-004	1786803.650	1634554.669	6911.398	IMGP0086, IMGP0087, IMGP0088
60mm mortar fin assembly	SWMU00-11a-005	1786751.904	1634492.825	6912.434	IMGP0089, IMGP0090, IMGP0091
Projectile fragment	SWMU00-11a-006	1786821.700	1634354.940	6919.568	IMGP0092, IMGP0093, IMGP0094
Projectile fragment	SWMU00-11a-007	1786939.444	1634282.183	6919.422	IMGP0095, IMGP0096, IMGP0097
Control point	Rendija1	1786768.862	1634522.644	6911.675	
Control point	Rendija2	1786877.200	1635188.080	6886.810	
Control point	Rendija2 (pm)	1786877.258	1635188.058	6886.843	
Control point	Parajito School	1784761.646	1621069.972	7434.200	
Control point	Golf	1783019.513	1625935.993	7331.434	
Control point	Golf (pm)	1783019.553	1625935.981	7331.463	
Rocket motor debris	SWMU00-011d-001	1783297.150	1626476.219	7241.801	IMGP0105, IMGP0106, IMGP0107
Rocket warhead debris	SWMU00-011d-002	1783341.782	1626478.240	7246.206	IMGP0108, IMGP0109, IMGP0110
Rocket motor (exp) and fragment	SWMU00-011d-003	1783355.813	1626502.668	7259.934	IMGP0111, IMGP0112, IMGP0116
Munitions debris and fragment	SWMU00-011d-004	1783317.556	1626522.524	7259.383	IMGP0113, IMGP0114, IMGP0115
Munitions debris, HEAT	SWMU00-011d-005	1783317.556	1626522.524	7259.383	IMGP0117, IMGP0118, IMGP0119
Control point	Rendija1	1786768.682	1634522.644	6911.675	
Control point	Rendija1	1786768.682	1634522.644	6911.675	
Control point	Rendija2	1786876.976	1635188.007	6886.884	
Control point	Rendija2 (pm)	1786876.965	1635188.053	6887.231	
37mm projectile fragment	SWMU00-011e-001	1788668.713	1632980.113	7052.236	IMGP0102, IMGP0103, IMGP0104
Control point	Parajito School	1784761.646	1621069.972	7434.200	
Control point	Golf	1783019.513	1625935.993	7331.434	
Control point	Golf (pm)	1783019.553	1625935.981	7331.463	

### **3.0 CONCLUSIONS AND RECOMMENDATIONS**

The following conclusions and recommendations have been developed from observations made during the MEC site surveys.

#### **3.1 CONCLUSIONS**

Surface finds of MD indicate fragmentation from mortar / projectile detonations, as well as a possible kick-out remnant (60-mm point detonating fuze discovered in SWMU00-011(a)) from ordnance disposal or open burn / open detonation (OB/OD) activities.

The area of greatest concern is the cliff face and surrounding area below the cliff in SWMU00-011(d) where the greatest concentration of fragmented MD was found, as well as an expended bazooka rocket motor. Additionally, sweeps with a hand-held magnetometer at the base of the cliff indicated possible significant concentrations of subsurface metal with the potential for MD or UXO/MEC hazards to be present.

The cliff faces in both SWMU- 011(d) and 011(e) indicate projectile / mortar penetration in the rock, there is a very good possibility that unexploded rounds are imbedded in the cliff and rocks. These entry holes may be caused from practice rounds, armor piercing or high explosive rounds.

#### **3.2 RECOMMENDATIONS**

Further intrusive investigation of sub-surface anomalies is highly recommended in SWMU-011(a), 011(d) and 011 (e). The digital geophysical mapping data should be evaluated and anomalies picked for intrusive investigation. Data gaps along impact areas and known MD sites should be investigated with a mag and dig approach utilizing hand held magnetometers.

The entry holes possibly caused by military munitions should be investigated to determine if UXO/MEC hazards exist.

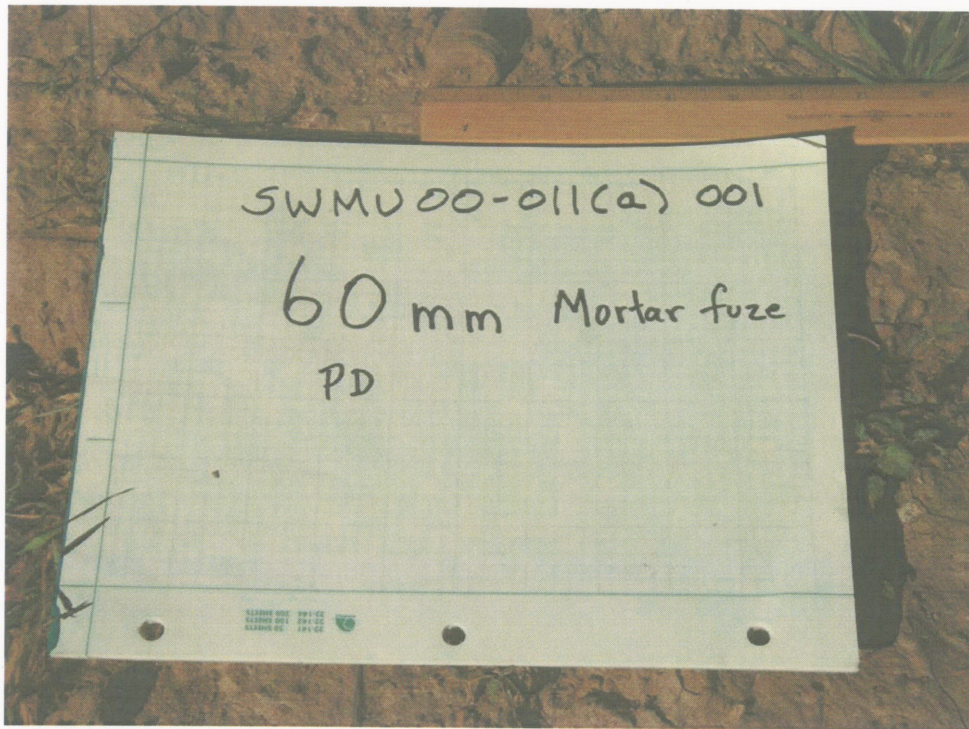
SWMU-00-011(c) and AOC C-00-020 did not have any surface indication of military munitions use and should be considered as no further action areas.

ATTACHMENT A  
PHOTO LOG

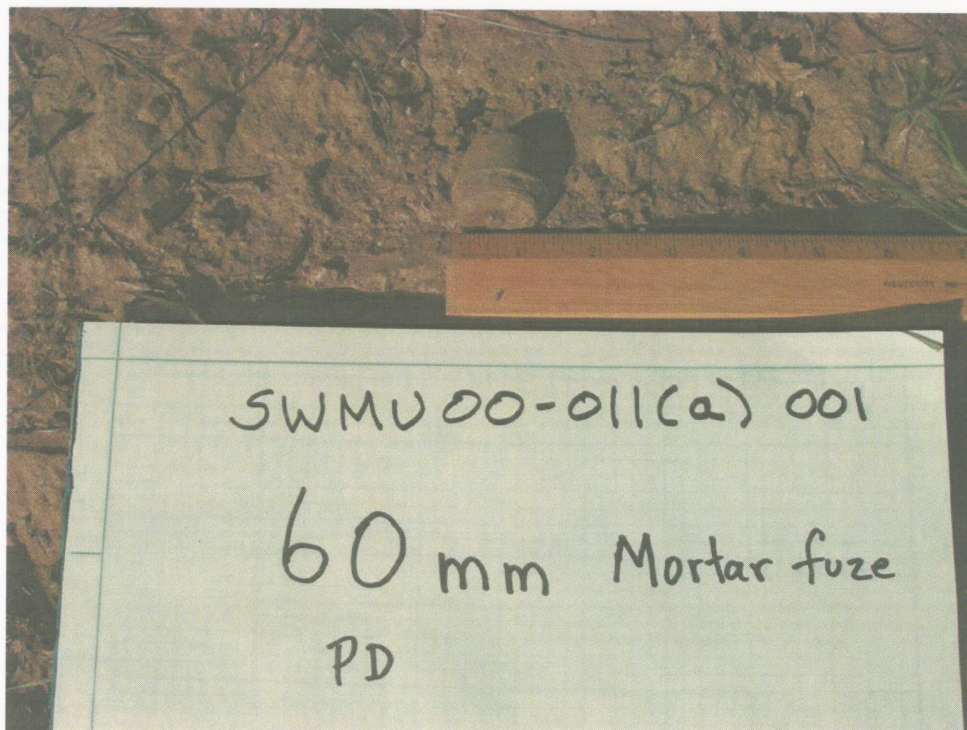
## **Photo Log**

This photo log includes photographs of items found in support of the MEC site surveys.





60-mm point detonating mortar fuze found in SWMU-011 (a).

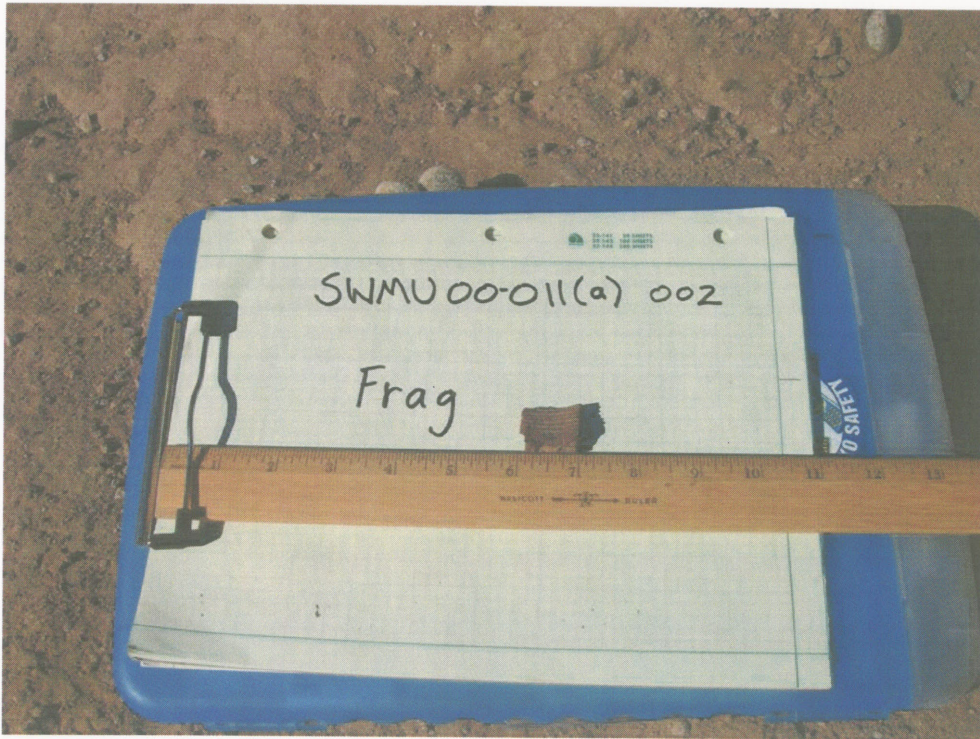


60-mm point detonating mortar fuze found in SWMU-011 (a).



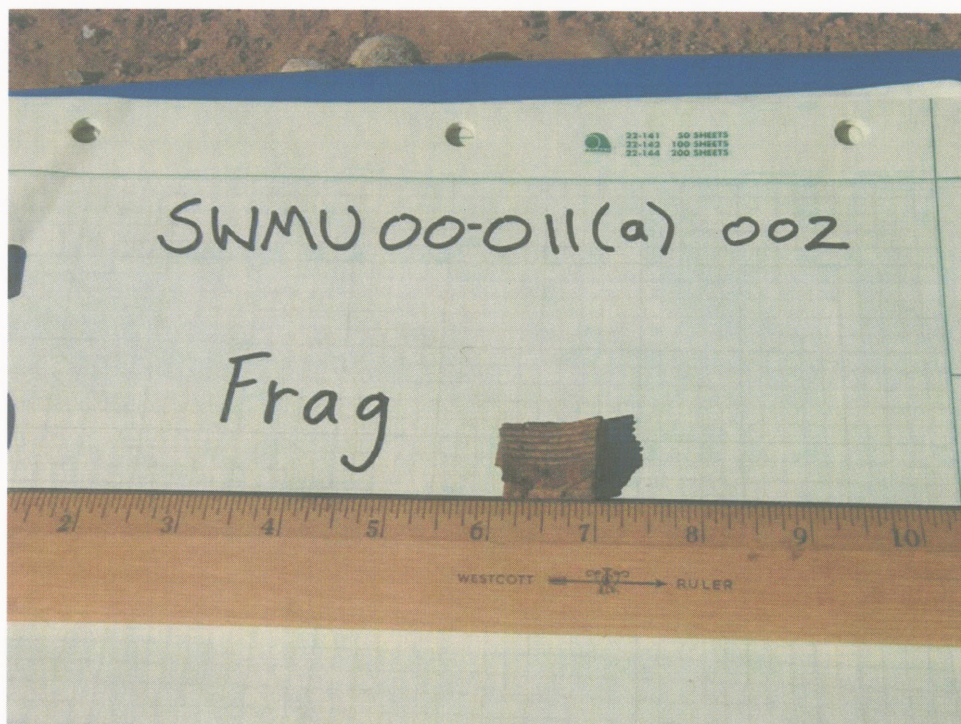


60-mm point detonating mortar fuze found in SWMU-011 (a).

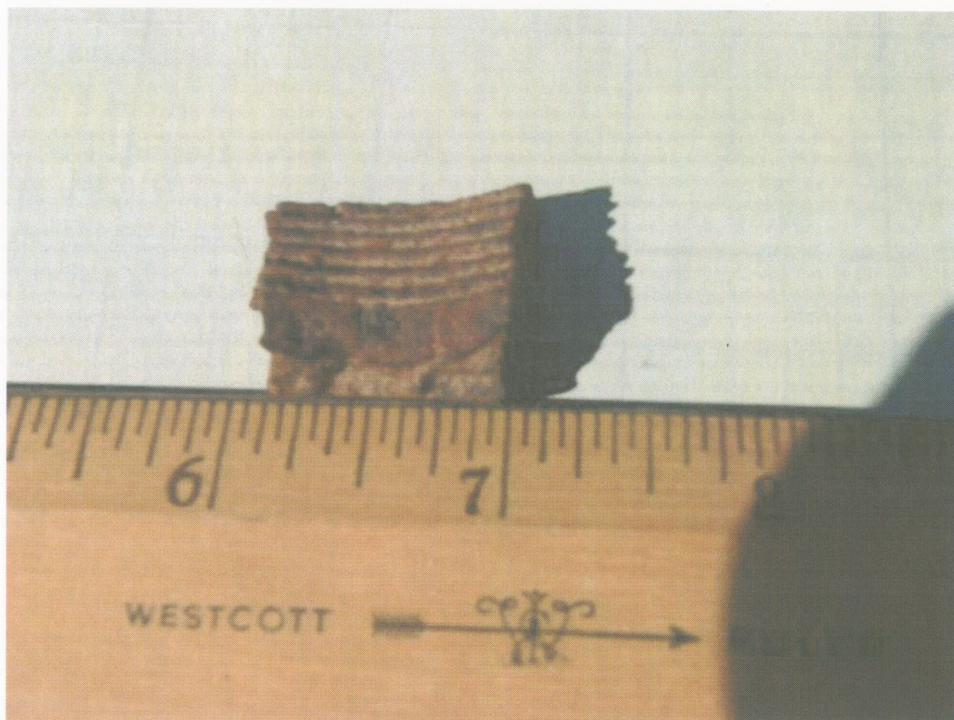


Projectile fragment found in SWMU-011 (a).





Projectile fragment found in SWMU-011 (a).

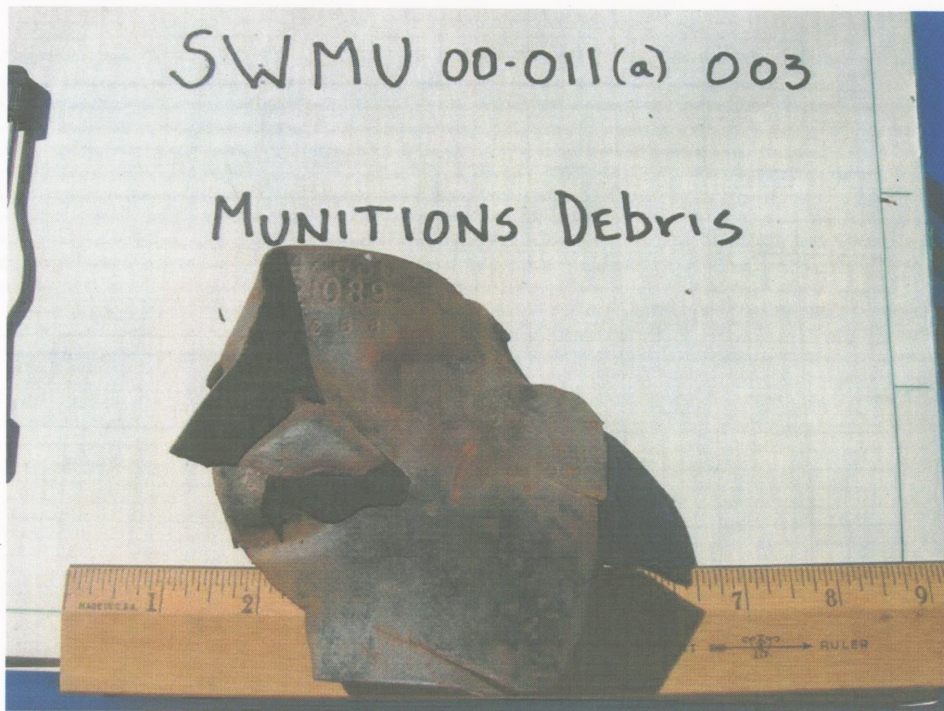


Projectile fragment found in SWMU-011 (a).



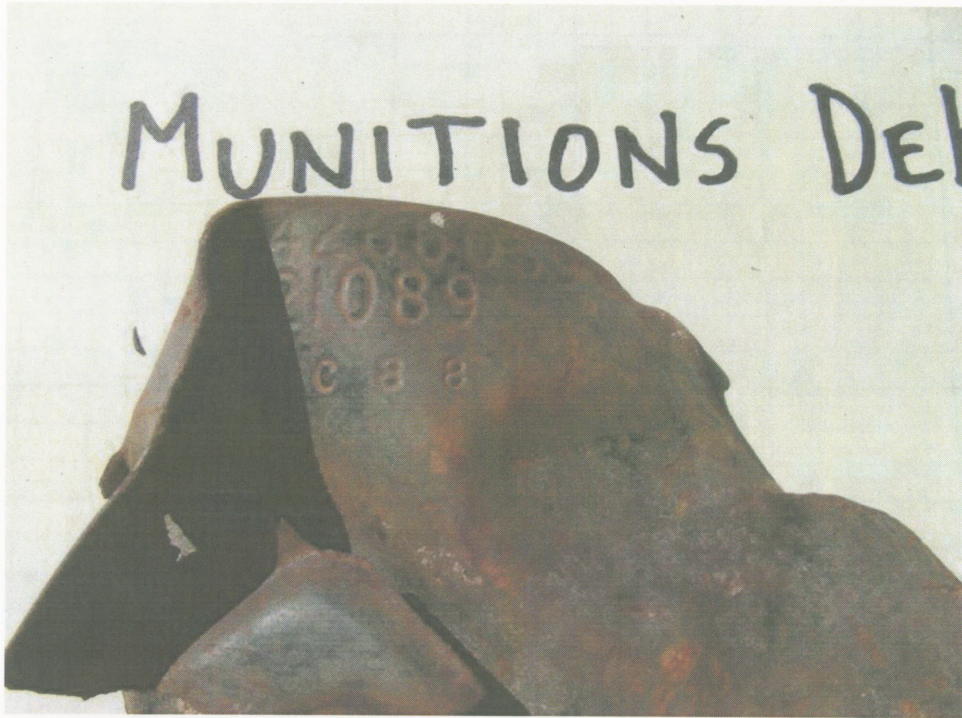


Unidentified item, probable munitions debris fragment found in SWMU-011 (a).

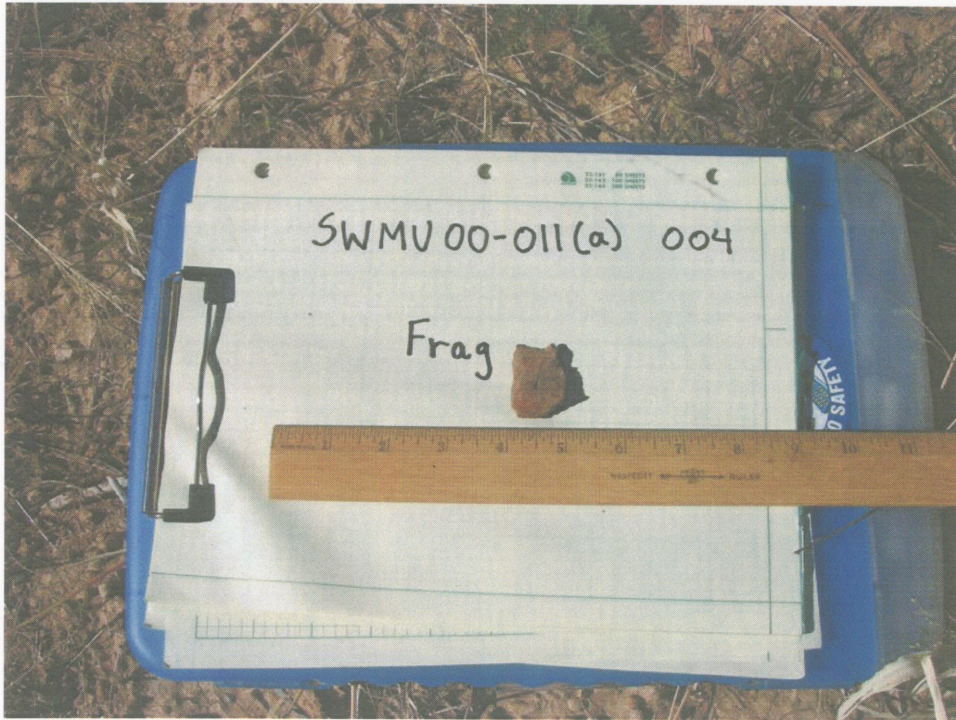


Unidentified item, probable munitions debris fragment found in SWMU-011 (a).



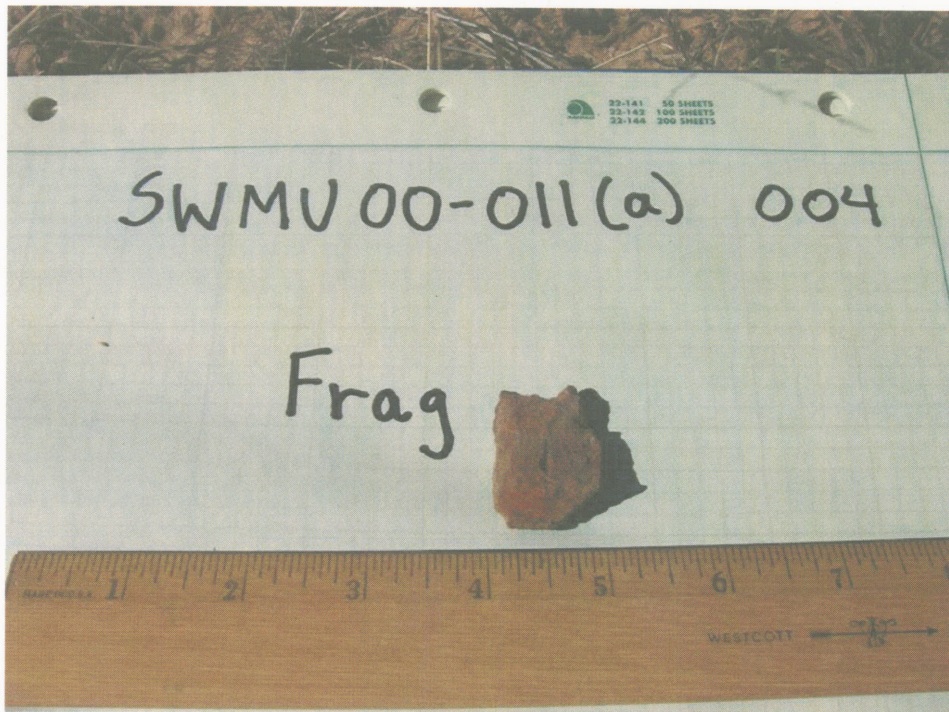


Unidentified item, probable munitions debris fragment found in SWMU-011 (a).



Projectile fragment found in SWMU-011 (a).



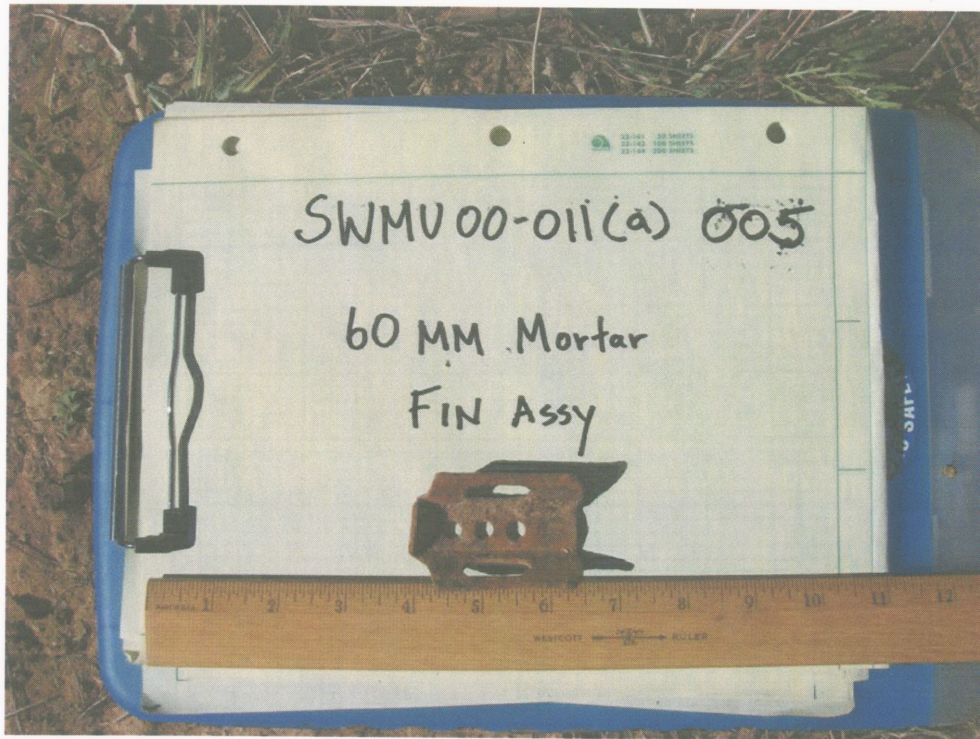


Projectile fragment found in SWMU-011 (a).

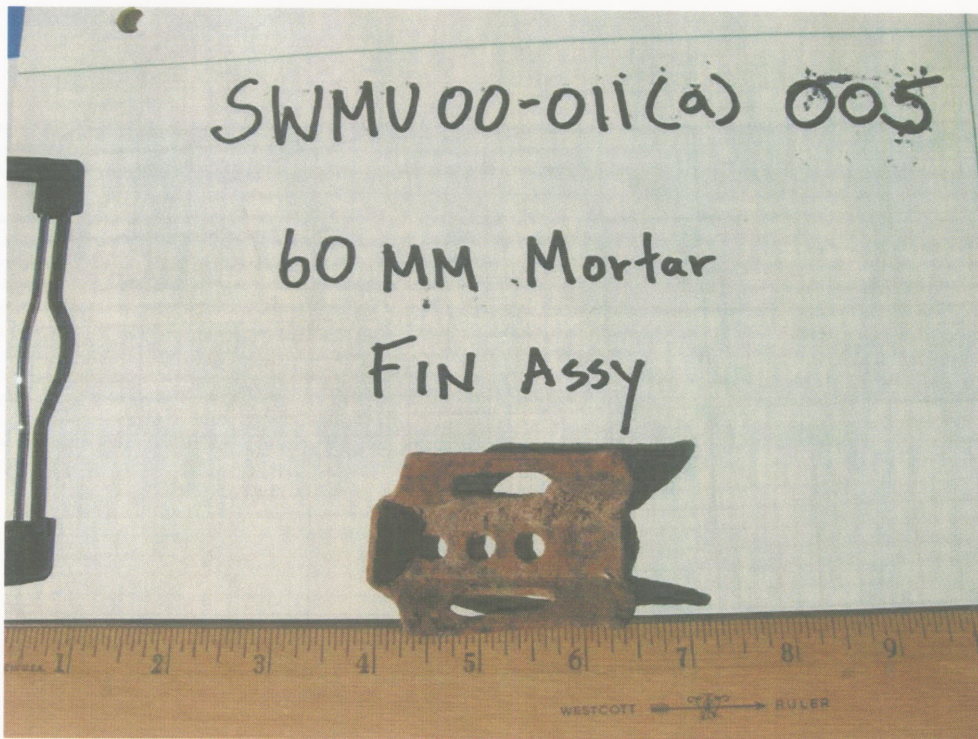


Projectile fragment found in SWMU-011 (a).





Mortar fin assembly found in SWMU-011 (a).

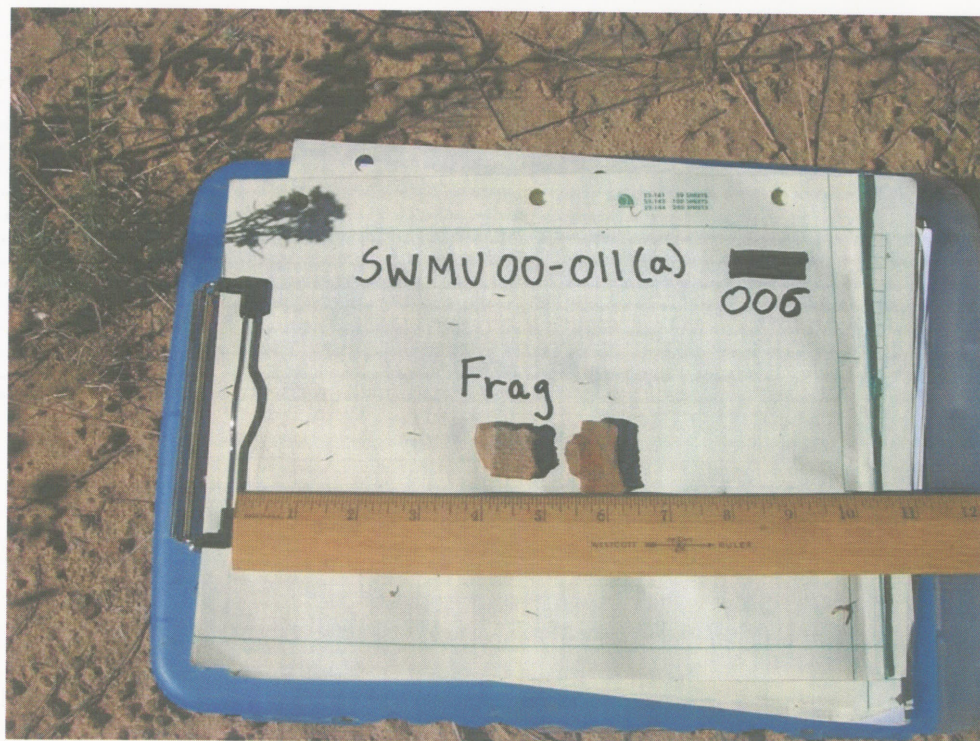


Mortar fin assembly found in SWMU-011 (a).



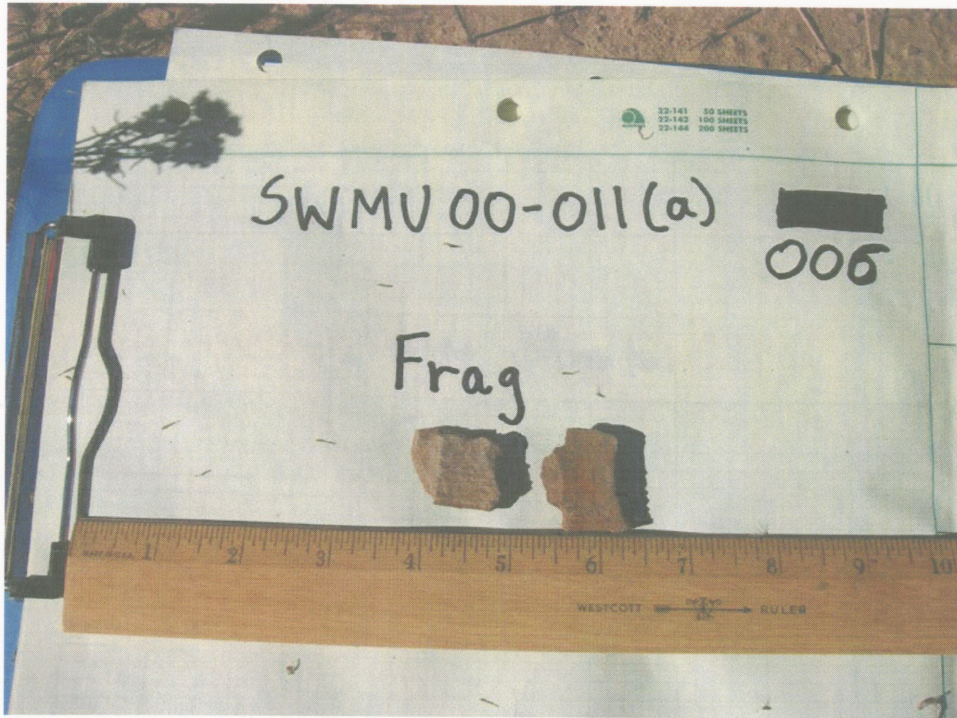


Mortar fin assembly found in SWMU-011 (a).



Projectile fragment found in SWMU-011 (a).



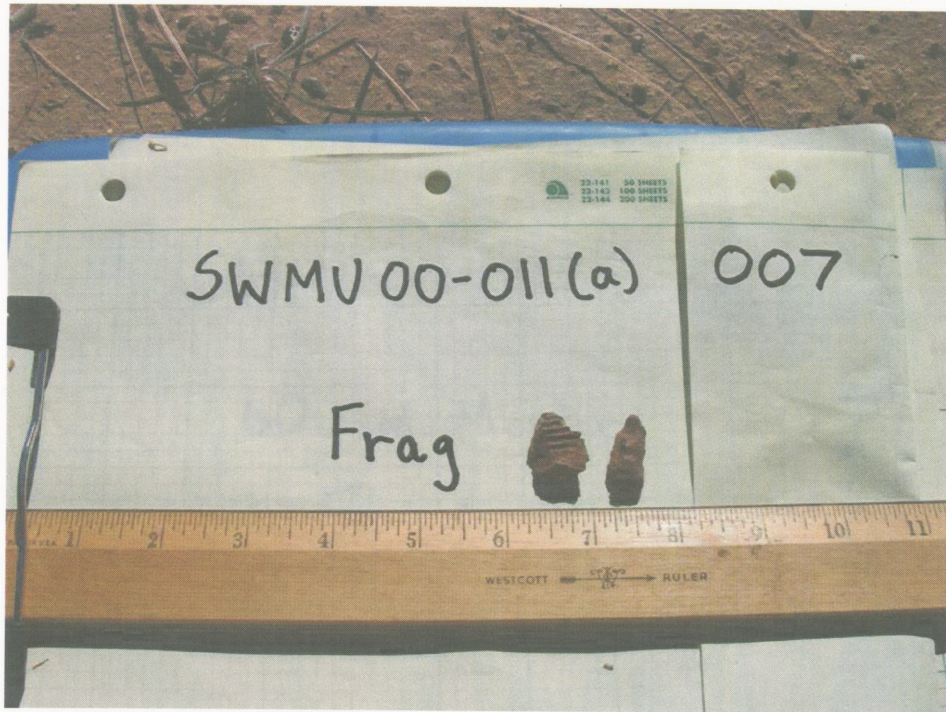


Projectile fragment found in SWMU-011 (a).

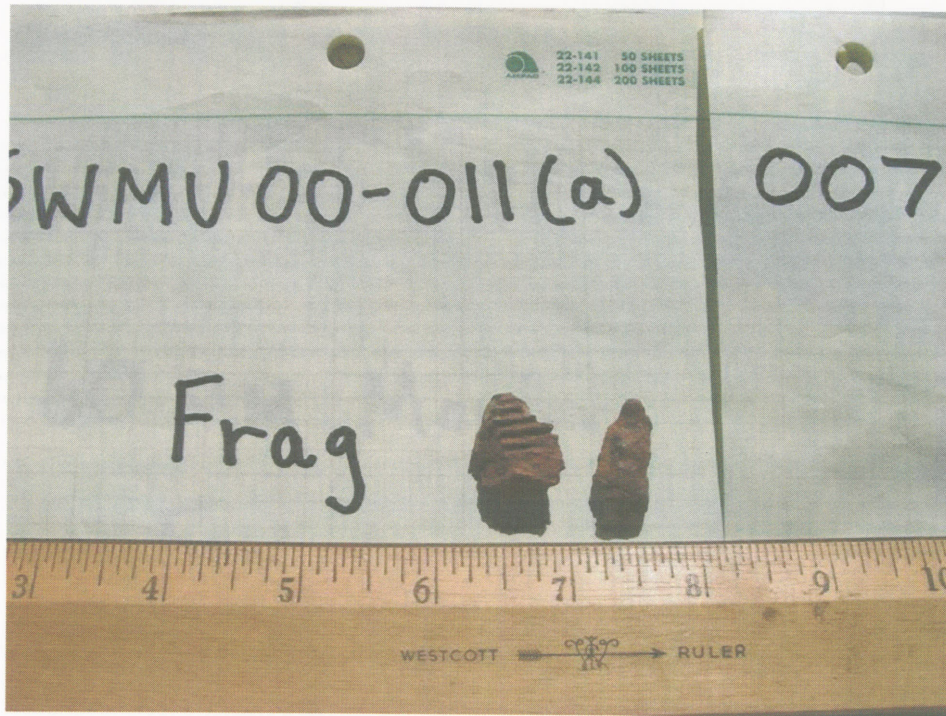


Projectile fragment found in SWMU-011 (a).





Projectile fragment found in SWMU-011 (a).

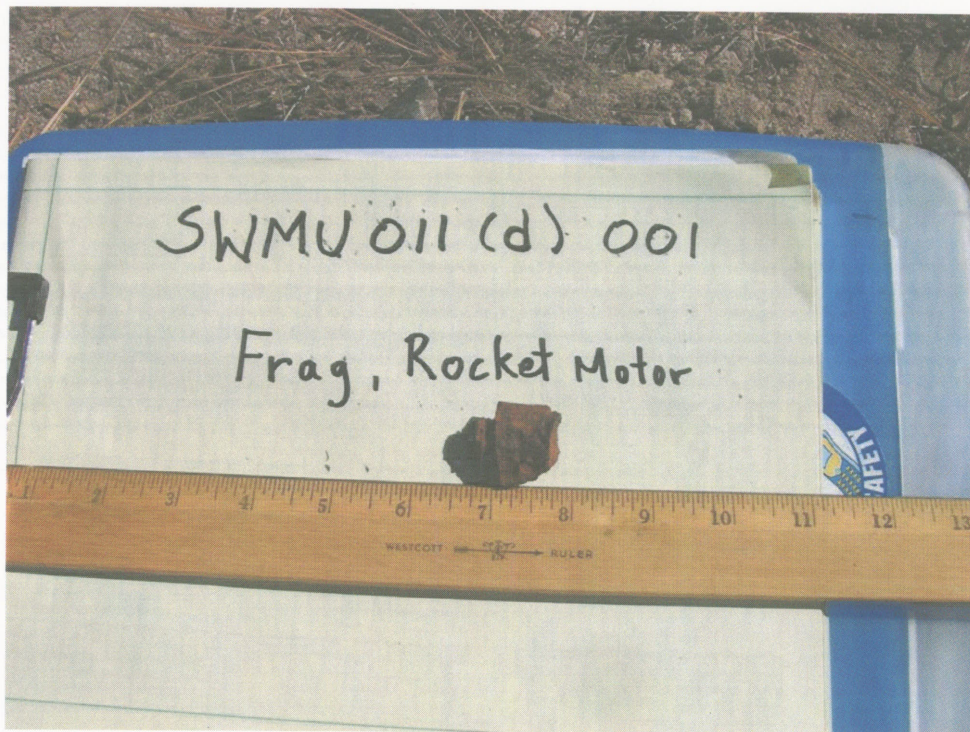


Projectile fragment found in SWMU-011 (a).



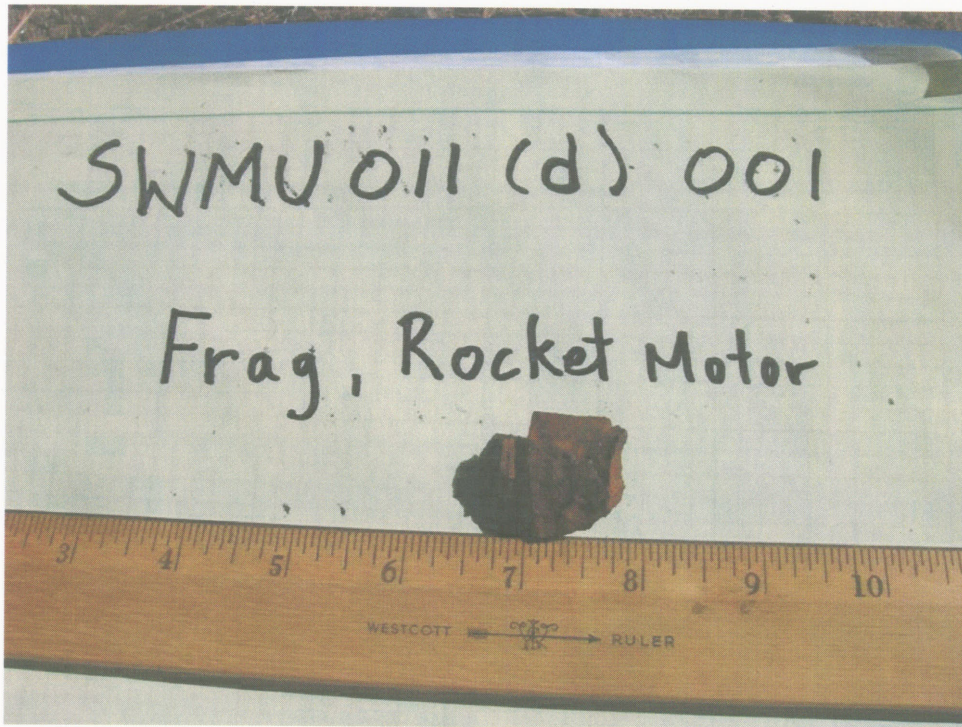


Projectile fragment found in SWMU-011 (a).



Rocket motor debris found in SWMU-011 (d).



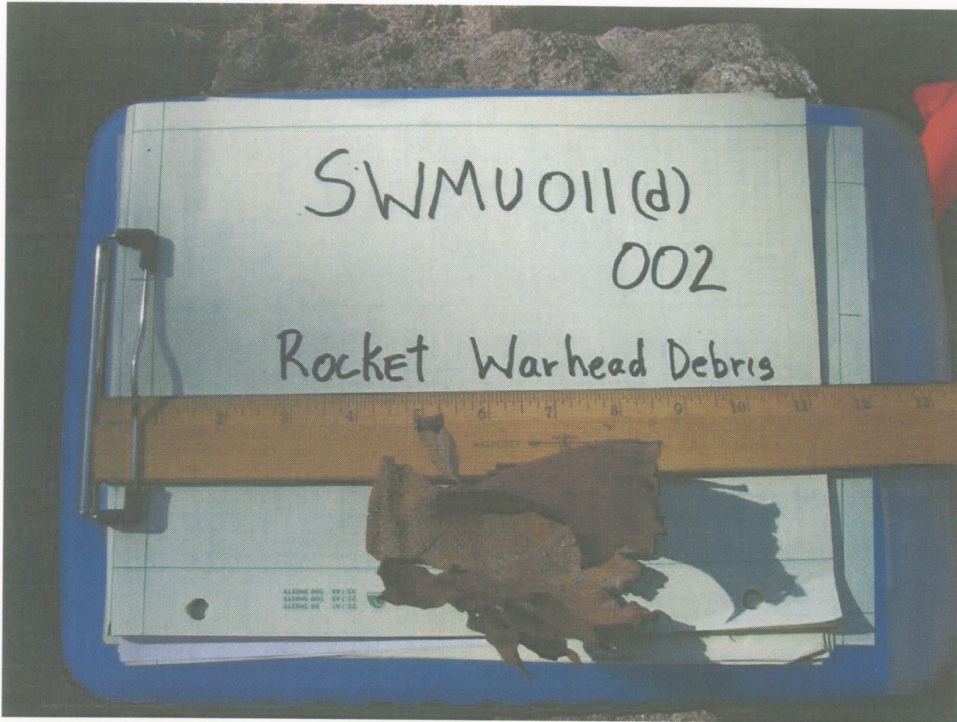


Rocket motor debris found in SWMU-011 (d).

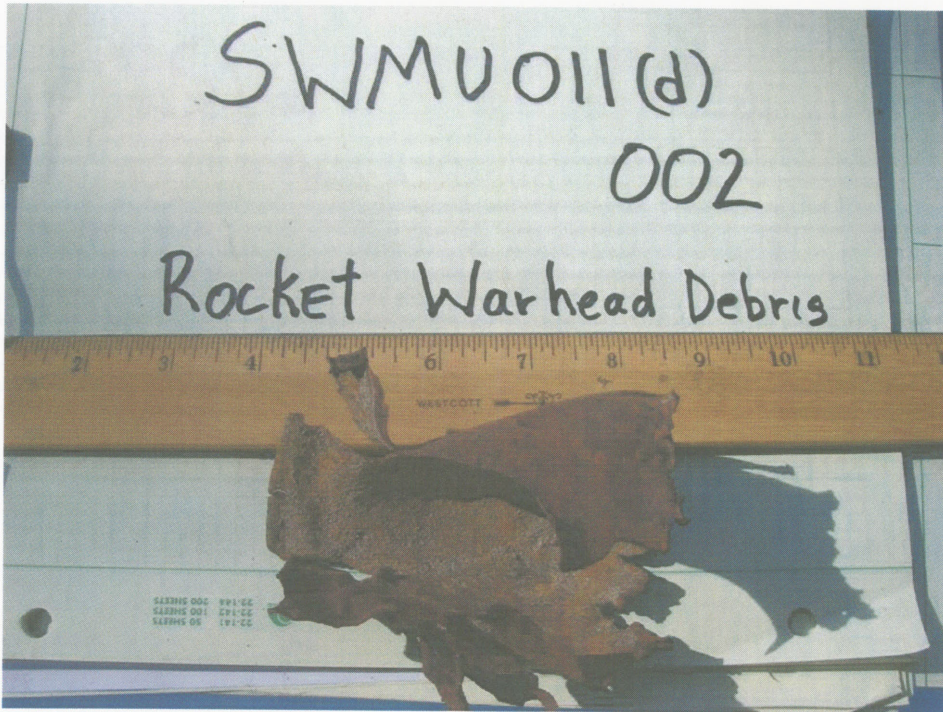


Rocket motor debris found in SWMU-011 (d).





Rocket warhead debris found in SWMU-011 (d).

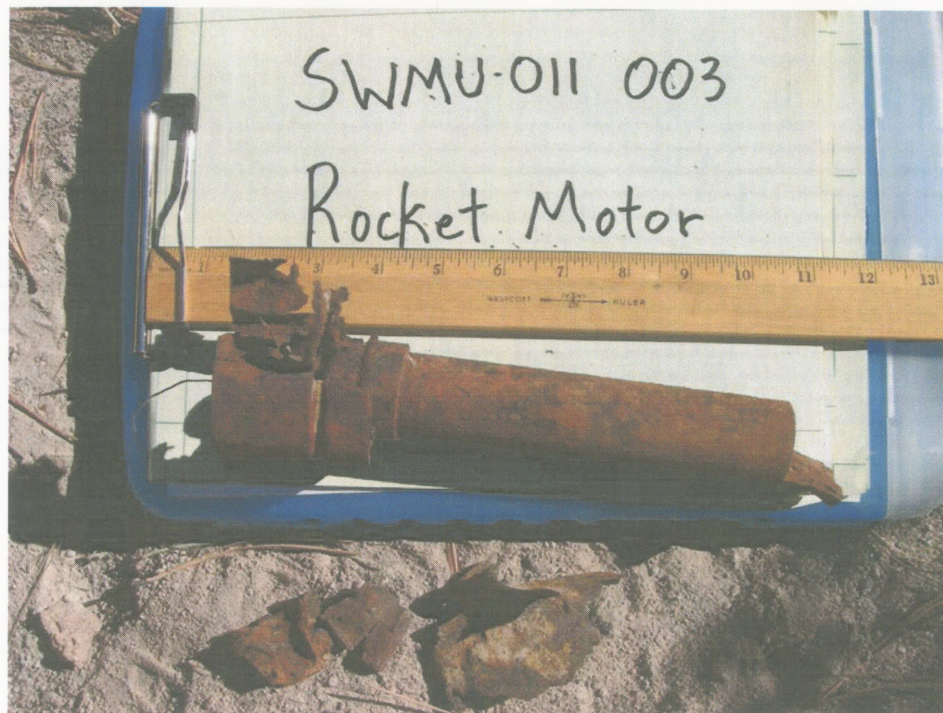


Rocket warhead debris found in SWMU-011 (d).



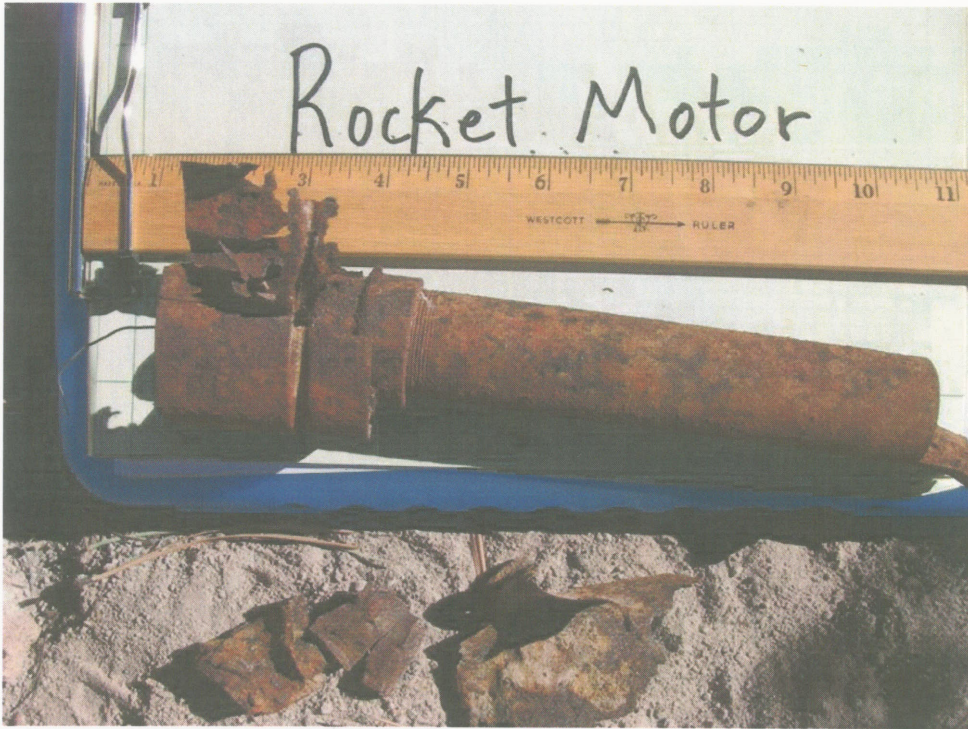


Rocket warhead debris found in SWMU-011 (d).



Expendable rocket motor and fragment found in SWMU-011 (d).



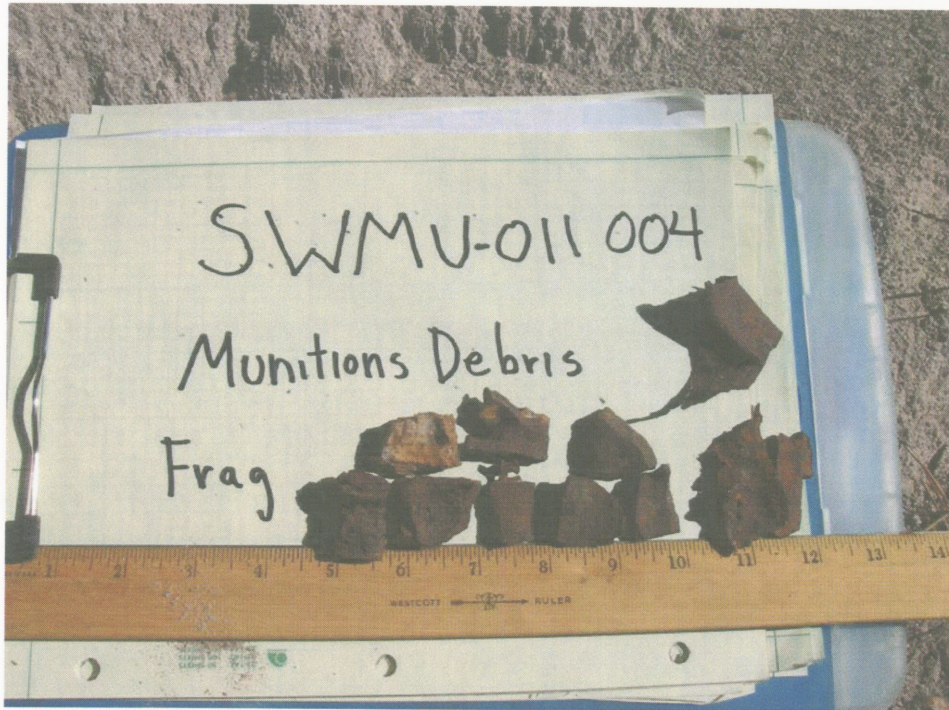


Expended rocket motor and fragment found in SWMU-011 (d).

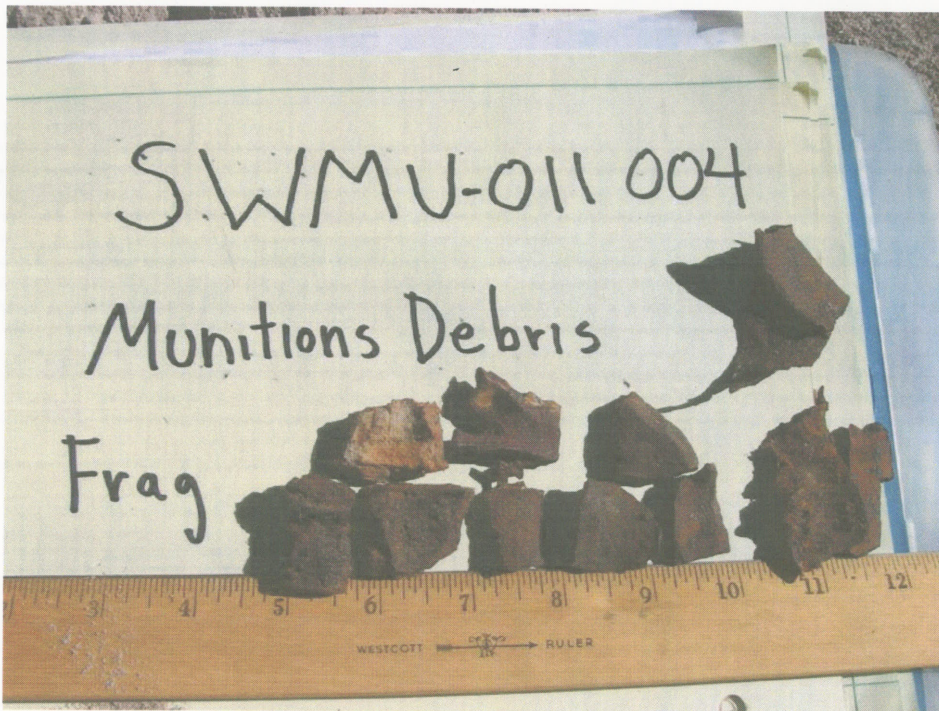


Expended rocket motor and fragment found in SWMU-011 (d).





Munitions debris and fragment found in SWMU-011 (d).

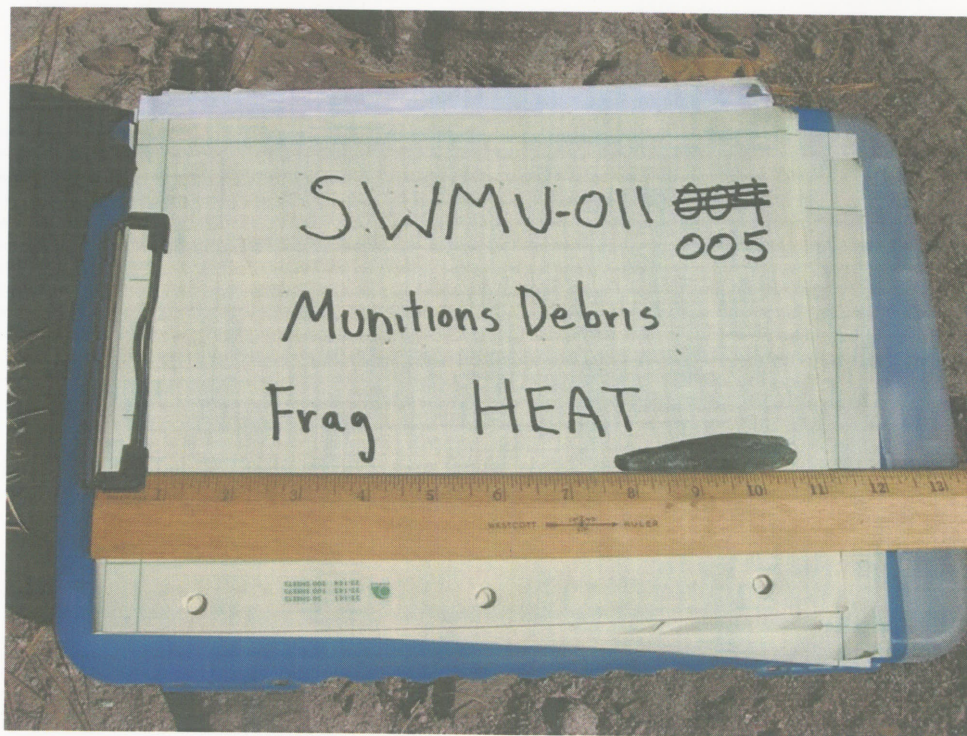


Munitions debris and fragment found in SWMU-011 (d).



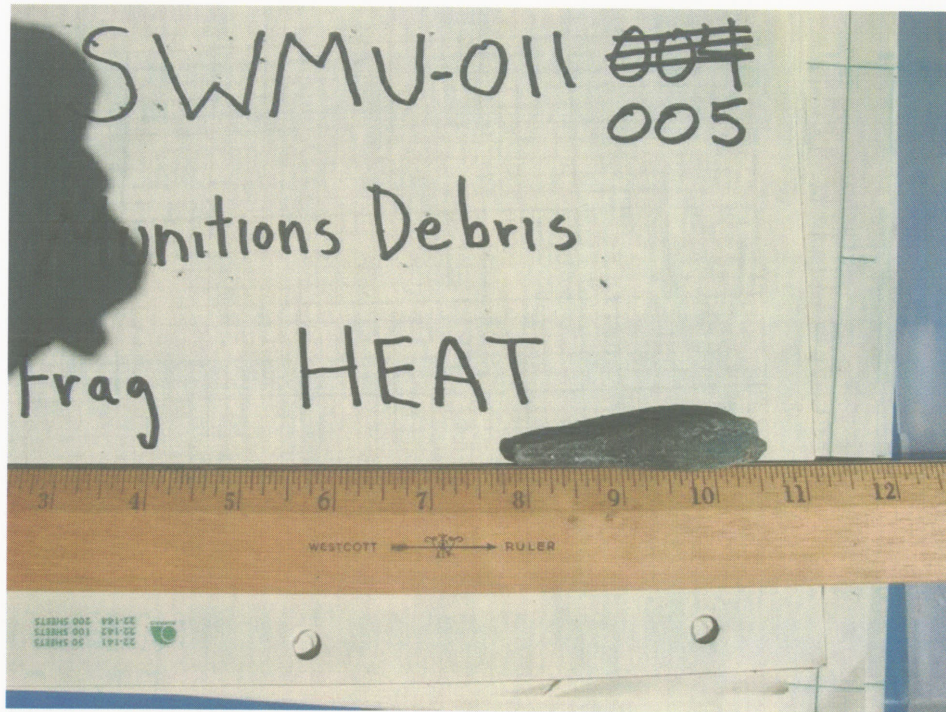


Munitions debris and fragment found in SWMU-011 (d).

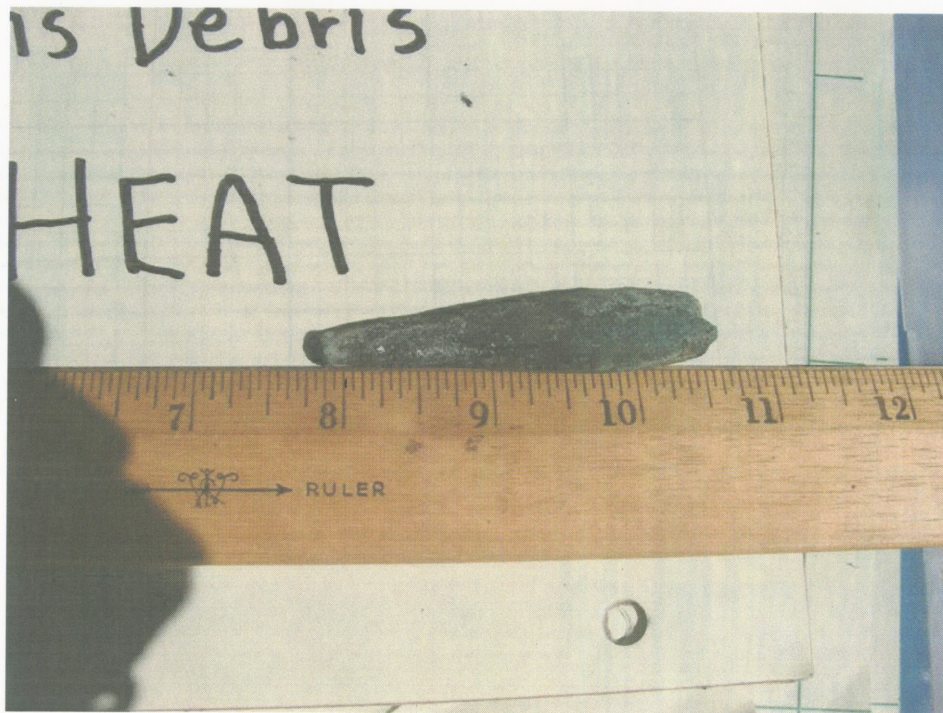


Munitions debris / fragment (high explosive anti-tank) found in SWMU-011 (d).



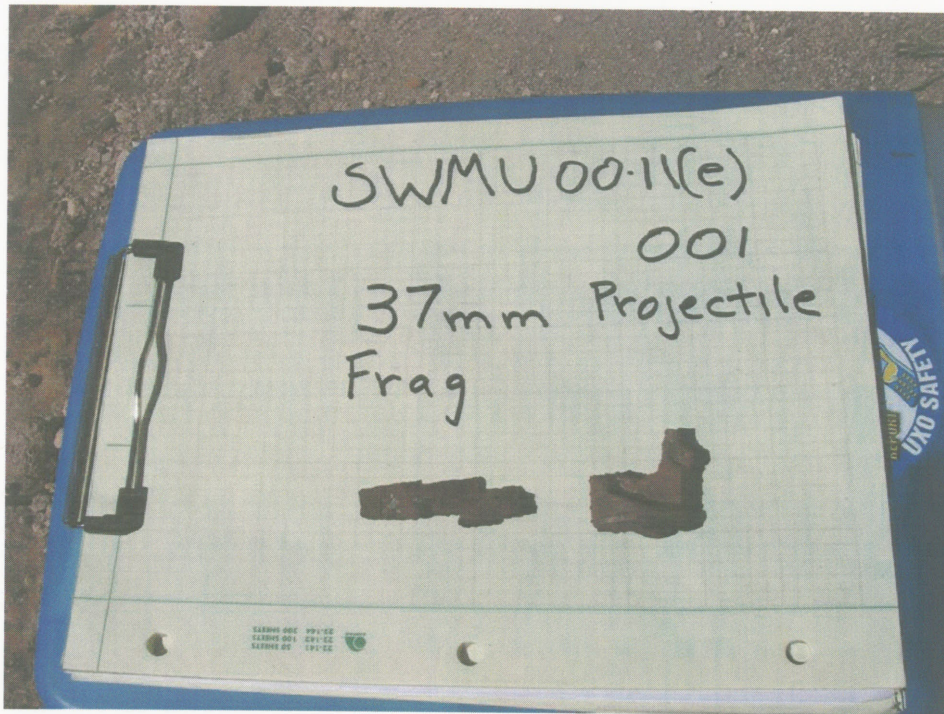


Munitions debris / fragment (high explosive anti-tank) found in SWMU-011 (d).

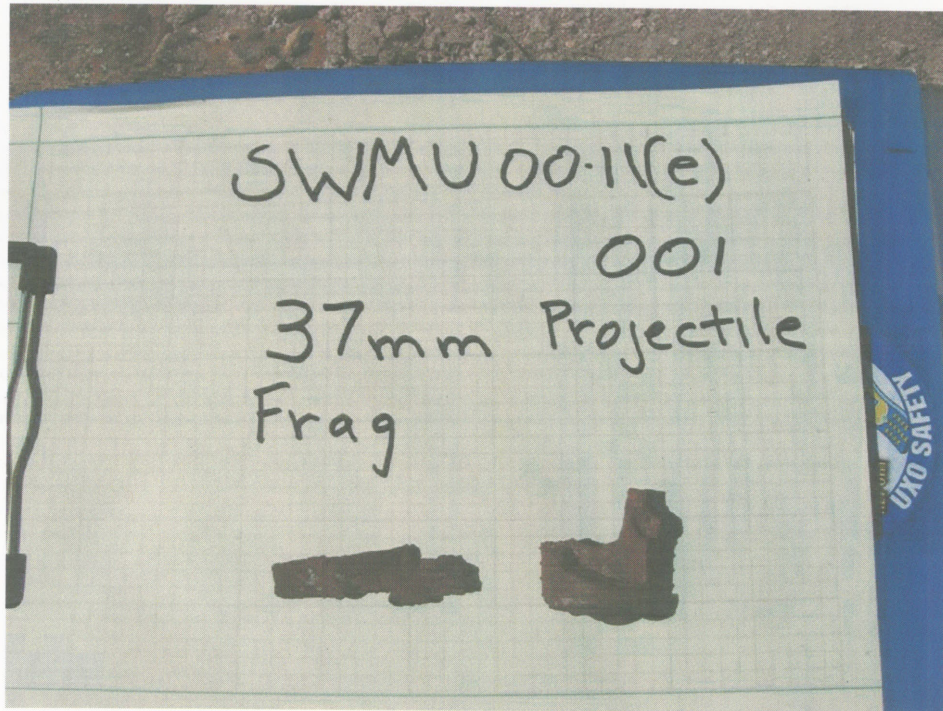


Munitions debris / fragment (high explosive anti-tank) found in SWMU-011 (d).



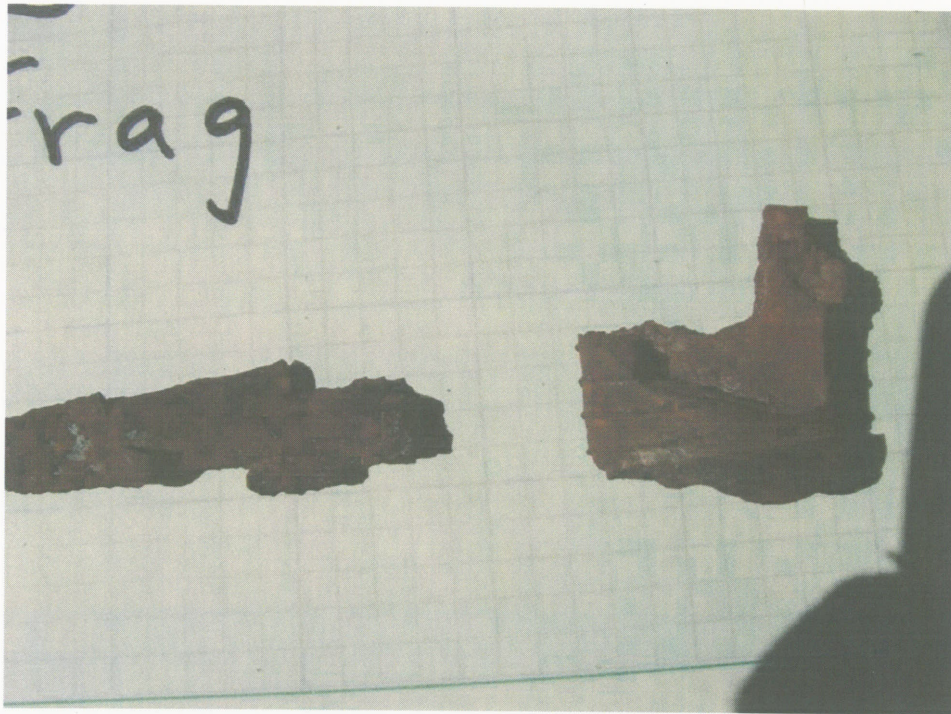


37-mm projectile fragment found in SWMU-011 (d).



37-mm projectile fragment found in SWMU-011 (d).





37-mm projectile fragment found in SWMU-011 (d).



SWMU-011(d) cliff face target area.





SWMU-011(d) cliff face target area.



SWMU-011(d) cliff face target area.





SWMU-011(d) cliff face target area.



SWMU-011(d) cliff face target area.





SWMU-011(d) cliff face target area.

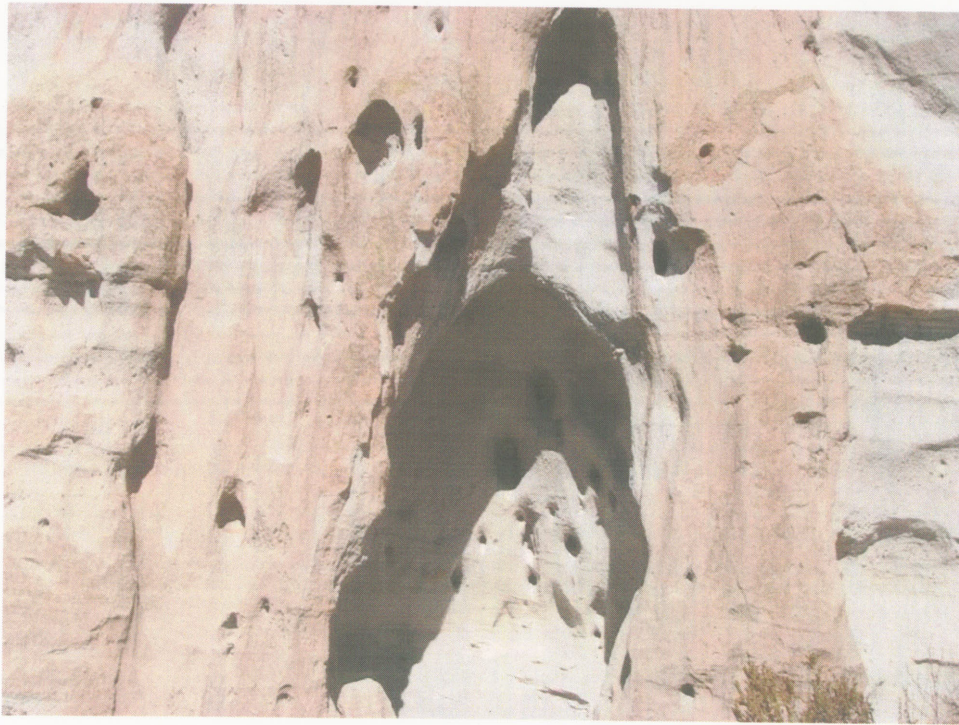


SWMU-011(d) cliff face target area.





SWMU-011(e) cliff face target area.



SWMU-011(e) cliff face target area.





SWMU-011(e) cliff face target area.



SWMU-011(e) cliff face target area.