US Army Corps
of Engineers
Rock Island District

Defense Environmental Restoration Program
for
Formerly Used Defense Sites
Ordnance and Explosives

Archives Search Report

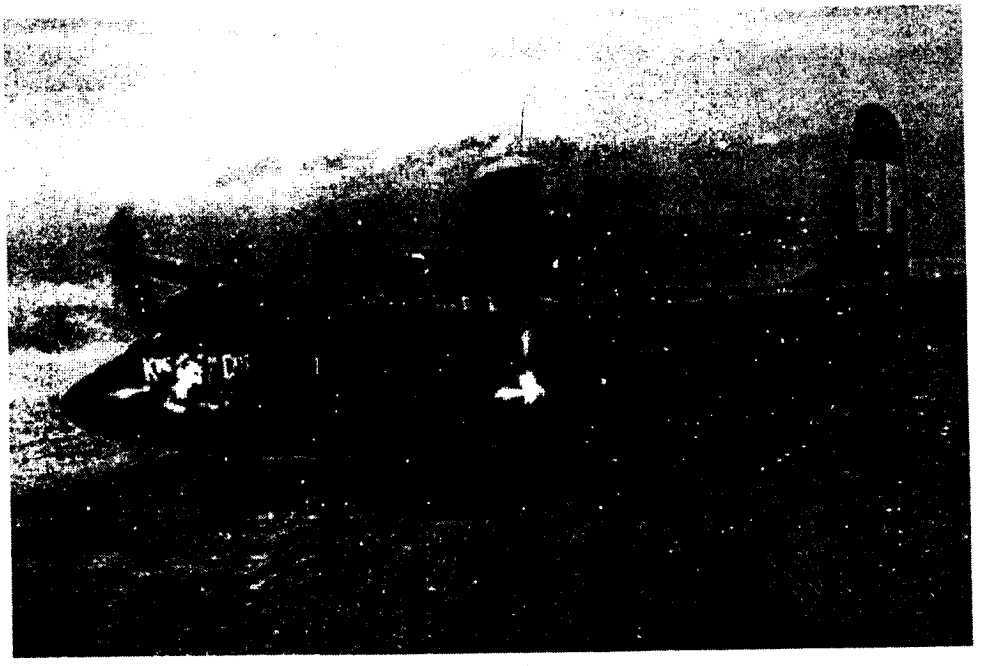
FINDINGS

for
the former

HOLTVILLE ROCKET TARGET 1R (#94)

IMPERIAL COUNTY, CALIFORNIA
Project Number J09CA017201

April 1998



DEFENSE ENVIRONMENTAL RESTORATION PROGRAM
for
FORMERLY USED DEFENSE SITES

CONCLUSIONS AND RECOMMENDATIONS

ORDNANCE AND EXPLOSIVES ARCHIVES SEARCH REPORT FOR THE FORMER HOLTVILLE ROCKET TARGET 1R (#94) IMPERIAL COUNTY, CALIFORNIA PROJECT NUMBER J09CA017101

April 1998

Prepared For

U.S. Army Corps of Engineers
Engineering and Support Center
ATTN: CEHNC-OE
Huntsville, Alabama 35807-4301

Prepared By
U.S. Army Corps of Engineers
Rock Island District
ATTN: CEMVR-ED-DO
P.O. Box 2004
Rock Island, Illinois 61204-2004

and

U.S. Army Defense Ammunition Center
ATTN: SIOAC-ES
Savanna, Illinois 61074-9639

DEFENSE ENVIRONMENTAL RESTORATION PROGRAM
for
FORMERLY USED DEFENSE SITES

FINDINGS

ORDNANCE AND EXPLOSIVES ARCHIVES SEARCH REPORT FOR THE FORMER HOLTVILLE ROCKET TARGET 1R (#94) IMPERIAL COUNTY, CALIFORNIA PROJECT NUMBER J09CA017201

ACKNOWLEDGMENT
The following persons provided support as indicated.

Function	Name	Title	Organization	Telephone
On-site assessment	George Williams*	Q.A. Spec., Ammunition (QASAS)	CEMVR-ED-DO	(309) 794-6027
	Nickolas Heleg-Greza	UXO Safety Specialist	CEMVR-ED-DO	(309) 794-6052
Engineering Support	Robert Hoffman	Environmental Engineer	CEMVR-ED-DO	(309) 794-6080
Technical Records Search	Larry Dauphin	Q.A. Spec., Ammunition (QASAS)	SIOAC-ESL	(815) 273-8867
Geographic District Support	Trudy Knutson	Civil Engr.	CESPL-ED-MI	(213) 452-3990
Industrial Hygiene	Bob Platt	Hygienist	MCXP-RIA	(309) 782-0806
Division Support.	Wayne Galloway	UXO Safety Specialist	CEHNC-OE-EM	(205) 895-1582
CADD Support	Thomas Geerlings	Technician	CEMVR-ED-DO	(309) 794-6072

*Team Leader

ORDNANCE AND EXPLOSIVES
ARCHIVES SEARCH REPORT
FOR
THE FORMER
HOLTVILLE ROCKET TARGET 1R (#94)
IMPERIAL COUNTY, CALIFORNIA
PROJECT NUMBER J09CA017201

FINDINGS

TABLE OF CONTENTS

APPENDICES

TABLES

Page

REPORT PLATES

ORDNANCE AND EXPLOSIVES ARCHIVES SEARCH REPORT FOR THE FORMER HOLTVILLE ROCKET TARGET 1R (#94) IMPERIAL COUNTY, CALIFORNIA PROJECT NUMBER J09CA017201

1. INTRODUCTION

a. Subject and Purpose

(1) This report presents the findings of an historical records search and site inspection for ordnance and explosives (OE) presence located at the former Holtville Rocket Target 1R (#94), Imperial County, California. The investigation was performed under the authority of the Defense Environmental Restoration Program for Formerly Used Defense Sites (DERP-FUDS) (see Plate 1).

(2) The purpose of this investigation was to characterize the site for potential OE presence, to include conventional ammunition and chemical warfare material (CWM). This was achieved through evaluation of all historical records available, interviews, and the on-site inspection results.

b. Scope

(1) The investigation focused on 1,080 acres (640 acres described in the Findings of Determination and Eligibility and 440 acres of potential FUDS) of Federal land reserved for Navy use as a low altitude rocket range by units stationed at the naval air stations in the Holtville - El Centro area between May 1945 and May 1958 (see paragraph 2a(3) and Plates 1, 2 and 3).

(2) This report presents the site history, site description, real estate ownership information, and confirmed ordnance presence based on available records, interviews, and site inspection. It further provides a complete evaluation of all information to assess potential OE presence where actual ordnance presence has not been confirmed.

(3) For the purpose of this report, OE presence consists of live ammunition, ammunition components, CWM or

explosives which have been lost, abandoned, discarded, buried, fired, or thrown from demolition pits or burning pads. These items were either manufactured, purchased, stored, used, and/or disposed of by the War Department/Department of Defense.

(4) **Expended** small arms ammunition (caliber .50 or smaller) is **not** considered OE presence. OE further includes "explosive soil" which refers to any mixture of explosives and native soil. Generally, 10 per cent or more by weight of secondary explosives in a soil mixture is considered explosive soil.

2. PREVIOUS INVESTIGATIONS

a. 1993 DERP-FUDS Preliminary Assessment

(1) The preliminary assessment (PA) of former Holtville Rocket Target 1R (#94) was conducted on April 30, 1993 under the DERP-FUDS by the Corps of Engineers, Los Angeles District, Site Number J09CA017200 (see Document E-1).

(2) The Findings and Determination of Eligibility (FDE), dated 10 July 1995, concluded that the former Holtville Rocket Target 1R (#94) was built and utilized by the War Department for use as a U.S Navy low altitude practice rocket range. This classified the site as a Formerly Used Defense Site, falling within the purview of the Defense Environmental Restoration Program (see Document E-2).

(3) The FDE describes Holtville Rocket Target 1R (#94) as consisting of the entire Section 24 of Township 14 South and Range 16 East and the southerly 30 feet of Section 23 east of the High Line Canal. However, the FDE must be amended to include 238 acres surrounding Section 24, so as to include additional land with OE presence (see Plate 3).

(4) Due to the manner in which the site was utilized, the PA recommended that an Ordnance and Explosives (OE) investigation be performed to evaluate the possibility that an OE presence remains in the area. Table 2-1, on the next page, represents an overview of that preliminary assessment phase. DERP-FUDS Project Number J09CA017201 is the principal subject of this report.

(5) The PA refers to several types of OE discoveries by Science Applications International Corporation, San Diego, California, the contractor which accomplished the site survey. Among the ordnance types that were said to have been identified were practice bombs, blasting caps, a complete 20mm cartridge,

mortar shells, an illumination shell. However, the 2-inch shell also mentioned in the PA is not of a caliber issued to U.S. forces past or present and could possibly be the result of a misidentification by the investigating team. The BDU-48/B Practice Bomb which was found by the PA team and shown in the attachment to the PA (see Document E-1) was likely the result of military post-site-closure use of the site.

b. Other Previous Investigations

No other previous investigations pertaining to this site were found.

Table 2-1
DERP-FUDS SITE PROJECTS

Project Number	Project Category	Present Phase	Comments	Location
J09CA017201	OE	SI	Potential ordnance presence (practice bombs, blasting caps, 20mm cartridge, mortar shells, illumination shell, 2-inch shell, expended small arms ammunition components)	Entire site
	HTRW	--	None Recommended	
	CON/HTRW	--	None Recommended	
	BD/DR	--	None Recommended	

3. SITE DESCRIPTION

a. Existing Land Usage

(1) The former Holtville Rocket Target 1R (#94) is located 8 miles north-northeast of Holtville, California, 3/4 mile east of the High Line Canal. It may be reached by taking U.S. Route 8 from San Diego, exiting at the Orchard Road exit east of El Centro and heading north to Holtville. Once in Holtville, take state route 115 north to Boyd Road. Head east on Boyd Road to the intersection of Whitlock Road. Head north on Whitlock, a gravel road, for approximately 2/3 mile. The entrance to the site is via a dirt road to the right, passing

between gravel pits operated by the Granite Construction Company (see Plate 1, Plate 4 and Photo J-1).

(2) Today, this property is owned by the Federal Government and managed by the Bureau of Land Management (BLM) (see Plate 4). Approximately half of the site is part of a larger area restricted from public use by the BLM, due to a need to protect the local wildlife (see Plate 5).

(3) The area is isolated, with the nearest permanent residences located on farmland slightly over one mile to southwest of the site boundary.

(4) An ownership map of the properties within Holtville Rocket Target 1R (#94) is provided within this report (see Plate 4). Table 3-1 shows how this land is currently utilized.

TABLE 3-1
CURRENT LAND USAGE

AREA	FORMER USAGE	PRESENT OWNER	PRESENT USAGE	SIZE/ ACRES	COMMENTS
A	Target Area	Federal Government	Public Land	265	see Plates 3, 4 and 5
B	Observation Post/Target Area	Federal Government	Public Land	1	see Plates 3, 4 and 5
C	Buffer Zone 1	Federal Government	Public Land	238*	see Plates 3, 4 and 5
D	Buffer Zone 2	Federal Government	Public Land	157	see Plate 3, 4 and 5
E	All Remaining Land	Federal Government	Public Land	217	see Plates 3, 4 and 5

* Not currently qualified by FDE Total Acreage = 878

b. Climatic Data

(1) Material in paragraphs (2) through (4) was extracted from Soil Survey of Imperial County, California, Imperial Valley Area, October 1981 (Reference B-7).

(2) The climate of the area encompassing the former Holtville Rocket Target 1R (#94) is arid, with hot summers and mild winters. Sunshine averages more than 8 hours per day, even in winter.

(3) The average January air temperature as recorded in Imperial, approximately 16 miles to the west of the site, is about 54 degree Fahrenheit. The average July air temperature is about 92 degrees. The average annual air temperature is about 73 degrees. The lowest minimum temperature recorded was 16 degrees on 22 January 1937. The highest temperature, 119 degrees, occurred on 4 dates: 14 and 16 July 1936; 25 July 1943; and 25 June 1970.

(4) Average annual precipitation at Imperial is about 2.8 inches. Precipitation distribution in Imperial Valley is uneven, but probably averages less than 3 inches. June is the driest month, usually having no precipitation. The highest rainfall for one day was recorded on 6 September 1939, when 4.08 inches was measured. September 1939 was the wettest month with 7.06 inches, and 1939 was the wettest year, with 8.52 inches. The only general snowfall of record fell on 12 December 1932, with 2.5 inches recorded at Imperial and 4 inches reported in the southeast part of Imperial Valley.

(5) Prevailing winds are westerly in winter and spring. On windy days, velocities of 15 to 20 miles per hour are common, and some gusts exceed 30 miles per hour. Breezes in the hot summer months usually have velocities below 15 miles per hour and tend to come from the southeast, bringing in humid air from the Gulf of California.

(6) The average annual relative humidity is 29 percent in the Imperial Area. The most humid period is late summer through winter. The average monthly relative humidity reaches a maximum of 40 percent in August and a minimum of 24 percent in March and April.

c. Topography

The terrain of the site is level desert, with the exception of sand dunes in the north and east (see Plate 4 and Photo J-2).

d. Geology and Soils

(1) Material in paragraphs (2) and (3) was extracted from Soil Survey of Imperial County, California, Imperial Valley Area, October 1981 (Reference B-7).

(2) The site lies within the Imperial Valley, a great basin that is part of the northern extension of the giant geologic trough occupied by the Gulf of California. The basin is bounded on the east by the Chocolate and Cargo Muchacho Mountains and on the west by the Coyote and Fish Creek

Mountains. The Imperial Valley is separated from the Gulf of California by the ridge of the Colorado River delta, which is about 30 feet above sea level at its lowest point.

(3) The soils of the former bomb target consist largely of Rositas fine sands, varing in slope between 0 and 9 percent and Rositas loamy fine sand varying in slope between 0 and 2 percent. Other minor soils include Rositas silt loam, Carsitas gravelly sand and Indo-Vint complex.

(a) Rositas fine sands are very deep, somewhat excessively drained. Their surface layers are typically stratified, pink and reddish yellow sand ranging in depth between 27 and 60 inches. The underlying pink or brown sands are 60 or more inches deep, and range from fine to coarse. These soils are very permeable. The 300 foot diameter target area and the observation post lie within a region of this soil type.

(b) Rositas silt loam is very deep, somewhat excessively drained, nearly level soil. The surface layer is pink silt loam about 12 inches thick. The underlying material is reddish yellow fine sand to a depth of 60 inches. In some places the surface layer is sand, clay loam, sandy clay loam, or fine sandy loam. A few small areas of this soil have 1 to 5 percent soft masses of lime.

(c) Carsitas gravelly sand (0 to 5 percent slopes) is very deep, excessively drained soil formed in mixed alluvial materials weathered from granite and metamorphic rocks. Typically, the surface layer of this soil is pink gravelly sand about 10 inches thick. Underlying this is stratified very pale brown sand, coarse sand, gravelly sand, and gravelly coarse sand to a depth of 68 inches. Permeability is rapid, and available water capacity is low or very low. Surface runoff is slow.

(d) Indo-Vint complex are nearly level soils found on flood plains and alluvial basin floors. They average about 35 percent Indo loam and 30 percent Vint loamy fine sand. The remaining 35 percent are comprised of Rositas, Meloland, and Holtville soils; soils that are highly stratified with sand to silt loam textures; narrow areas with slopes of 2 to 5 percent; and areas that have hummocky or dune topography. The Indo soil is very deep and well drained. The surface layer is typically pinkish gray loam about 12 inches thick. The underlying material is stratified very pale brown and pink light silt loam and loamy very fine sand to a depth of 60 inches or more. The layers below the surface layer have brown stains on the faces of cracks to a depth of about 44 inches.

Permeability of this soil is moderate, and available water capacity is high to very high. Surface runoff is slow. The Vint soil is very deep and well drained. It is typically stratified light brown and pink loamy fine sand to a depth of 60 inches. Several thin lenses of silt loam are at a depth between 10 to 40 inches. Permeability of Vint soil is moderately rapid, and available water capacity is moderate. Surface runoff is slow.

e. Hydrology

There are no rivers or streams, active or dry, cutting through the site. Rainwater flows quickly into the groundwater without a tendency to collect on the surface.

f. Natural Resources

(1) When queried concerning the site, the U.S. Department of the Interior Fish and Wildlife Service identified one reptile species as "Proposed Threatened" and one plant species considered a "Species of Concern". These are listed in Table 3-2, on the next page. This listing does not preclude the possible presence of other species, plant or animal, protected by Federal or state laws.

(2) Due to a lack of information specific to this site, a survey of the local flora and fauna must be conducted in order to determine the actual presence of threatened or endangered species. Remediation efforts should be closely coordinated with state and Federal authorities.

g. Historical/Cultural Resources

The Bureau of Land Management has indicated that to the best of their knowledge there are no archeological or historical structures known to exist within the site of the former Holtville Target 1R (#94). However, project managers should coordinate proposed remediation actions with the SHPO in order to assure compliance with Federal laws governing such matters.

Table 3-2 Natural and Cultural Resources		
Resource	Type	Comments
Animals	**Reptiles** Phrynosoma mcallii	Also known as the flat tailed horned lizard. Proposed Threatened
Plants	Palafoxia arida var. gigantea	Species of Concern Also known as the giant Spanish needle
Cultural	None Known	Coordinate intrusive activities with SHPO
Historical	None Known	Coordinate intrusive activities with SHPO
Archaeological	None Known	Coordinate intrusive activities with SHPO

4. HISTORICAL ORDNANCE PRESENCE

a. Chronological Site Summary

(1) The land comprising the Holtville Rocket Target 1R (#94) was acquired for use under permit from the Department of The Interior, Bureau of Land Management, in May of 1945 (see Document G-5). It was likely used by nearby Naval Auxiliary Air Station, Holtville, approximately 4.5 miles to the south and possibly by Marine Corps Air Station (a Naval Air Station beginning in May 1946), El Centro, 24 miles to the west.

(2) No known improvements were made to the site, with the exceptions of concentric circles laid out to form the rocket target bull's eye, a few miles of temporary roads and an observation post exterior to the west boundary (boundary identified in the FDE) (see Document K-1).

(3) Although abandoned in 1953, control of the property was not returned to the Bureau of Land Management until 1958 (see paragraph 4b(4)) when another site was subsequently established with the name Target #94 (see paragraph 4b(6)). However, there is reason to believe that some of the ordnance presence on the site is due to unofficial latter day use (see paragraphs 4c(4) and 5c(3)).

b. Ordnance Related Records Review

(1) Few records directly relating to Holtville Rocket Target 1R could be found in the course of conducting the search of historical archives. Pertinent documents include several aerial photographs of the site covering the condition of the site between the period of 1949 to 1965. Other records include real estate documents describing the site boundaries and position of a single target. No records could be found concerning the ammunition types fired on the site.

(2) A letter from the Public Works Office of the 11th Naval District, dated 24 May 1945, was the earliest correspondence found in the archives search referencing acquisition of site. It identifies Holtville Rocket Target #1R as consisting of 640 acres in Section 24 in Township 14, South, Range 16, East. It also identifies a prior request to acquire the southerly 30 feet of Section 23 of the same township and range for use as an access road to the site. Supporting this document is a Navy Property Administration Division report entitled Status of Department of The Interior Lands Under Jurisdiction of The Navy Department, dated April 1950, which verifies this as the legal description of Target 94. Moreover, this document confirms that the site was still active in 1950. (see Documents G-1 and G-2).

(3) A document identified as the Compilation of Naval Air Targets, Gunnery and Bombing Areas, circa 1947-1948, reveals the purpose of Target #94 (rocket firing), the coordinates of the center of the target circles (latitude 32° 55'10"N and longitude 115°16'15"W) (see Document G-3).

(4) A letter from the 11th Naval District to the Bureau of Land Management, dated 24 January 1958 identifies the location of Holtville Rocket Target 1R (#94) and that its land was reserved under Public Land Order No. 279. Furthermore, it states that the Navy's need for the land had ceased after August 1953 (see Document G-4). An attachment to this letter, a statement from the 70th EOD Detachment, dated 14 September 1953, indicates that an ordnance clearance was accomplished at the site between 24 and 29 August 1953. It should be noted that this document fails to indicate whether subsurface clearance was accomplished (see Document G-6).

(5) A Department of Agriculture aerial photograph of the site dating to 1949 shows the distinctive pattern of two concentric circles of 150 feet and 300 feet in diameter. However, subsequent Department of Agriculture photographs taken in 1953, 1959, and 1965 show progressive deterioration to the

point that the circles cannot be distinguished. The asphalt roadway also shows evidence of serious deterioration after 1949 (see photographs K-1, K-2, K-3 and K-4). These conditions imply that the target area was not being maintained and may have been abandoned sometime between 1950 and 1953. Ultimately, Public Land Order #1620, issued in 1958, directed that control of the site revert to the Bureau of Land Management (see Document G-5).

(6) During the course of reviewing various documents referring to the Holtville area targets, some confusion arose as to the Navy's application of target numbers. It was noted for example, that the Target #94 identified in general data sheet 6 of 8 of the Master Shore Station Development Plan, Part II, Section 1, dated 31 December 1957 is not the same target referenced in documents from earlier years (see Document G-7). The location coordinates are clearly different, with the new target residing south and east of the old. This is supported by an enclosure to a 2 July 1951 letter from the District Public Works Officer, 11th Naval District, referencing Target No. 94 as being located in Township 15, South, Range 17, East, Section 2 (see Document G-8). This situation was also noted for Target Numbers 68, 95 and others. It became obvious that target numbers of abandoned sites were subsequently assigned to their successors. This should be considered when researching other targets in the El Centro area.

(7) A Bureau of Land Management map entitled Imperial Valley South, Desert Access Guide #22, dated 1989, identifies more than ten square miles of land to the northeast as a Navy live bombing area (see Document L-1). Its proximity suggests an explanation for the presence of modern ordnance within the site (see paragraph 6c(1)). Ordnance intended for the active range may have been inadvertently dropped on Holtville Rocket Target 1R (#94). This map also demarcates, by cross hatching, the part of the site off limits to the public due to environmental conservation considerations.

(8) A complete list of sources utilized to verify the presence of OE at Holtville Rocket Target 1R (#94) is included in Appendix A, Reference Sources and includes the following:

(a) National Archives
(b) Regional Archives
(c) The Military History Institute
(d) US Army Center of Military History
(e) Explosive Ordnance Disposal Units (EOD)
(f) Local Police Department
(g) County Court House
(h) Local Historical Society

(i) Local Libraries
(j) Local Residents

c. Interviews with Site Related Personnel.

(1) Prior to conducting the on-site inspection of Holtville Rocket Target 1R (#94), the site assessment team met with Mr. Timothy Finger, a wildlife specialist with the Bureau of Land Management field office in El Centro. The team briefed Mr. Finger on the intent of its visit. Mr. Finger offered the team useful advice and the assistance of towing service, in the event the team became stranded in the desert.

(2) Mr. Christopher Kenney is the pit supervisor for Granite Construction Company of El Centro, California. He has worked in this capacity for four years. Granite Construction Company operates a gravel pit near the western boundary of Section 24. Mr. Kenney was interviewed upon the chance that buried ordnance may have been unearthed in this area in the course of normal pit operations. Mr. Kenney stated that although some small arms ammunition links and rocket igniter plugs were found while digging, no ordnance had been encountered (see Document I-1).

(3) Mr. Jerry Kear is a supervisor with the Public Works Department of Naval Air Facility, El Centro. It was hoped that his office could provide information concerning the layout of Holtville Rocket Target 1R and the time span of its use. Although this information was not available, Mr Kear did provide insight into the Navy's facility numbering system. He stated that it was the practice to re-issue facility identification numbers of buildings and other structures that had been destroyed (see Document I-2). This explained the confusion the site assessment team encountered when reviewing documents referring to targets in the Holtville area (see Document I-2).

(4) Ms. Lynda Kastoll is a realty specialist with the El Centro BLM District office. The team had hoped to obtain a copy of the use permit authorizing the Navy to set up the range and any other information relating to Navy use of this area. Unfortunately, the use permit was unavailable. However, Ms. Kastoll did provide valuable insight into military use of BLM properties. She stated that the BLM has had problems with military units conducting operations in areas not authorized for their use. This is a possible explanation for the Preliminary Assessment team encountering post-site-closure era ordnance in 1993 (see Document I-3).

(5) Mr. Bruce Tinknell is a retired member of the 70th EOD Unit, which has operated in southern California for many years. Mr. Tinknell spent the twelve years between 1975 and 1987 with this unit. Although he could recall no requests for assistance involving Holtville Target 1R (#94), he vaguely remembered an ordnance accident in that area. He also recalled that his unit destroyed a pod of 2.75-inch rockets on BLM property near Holtville. However, he could provide no details on that matter (see Document I-4).

5. SITE ELIGIBILITY

a. Confirmed Formerly Used Defense Site

Former land usage by the Navy was previously confirmed for 640 acres of the former bombing range, as described in Section 4 of this report.

b. Potential Formerly Used Defense Sites

An additional 238 acres bordering the original site's eastern and southern boundaries must be considered a **potential formerly used defense site** (see Table 5-1). This property is exterior to the site boundary described in the INPR and has an OE presence or potential OE presence (see Plate 3).

Table 5-1
Potential FUDS/Additional Acreage Associated with Project Site

AREA	FORMER USAGE	PRESENT OWNER	SIZE/ ACRES	COMMENTS
B	Observation Post/Target Area	Bureau of Land Management	1	see Plates 3 and 4
C	Buffer Zone 1	Bureau of Land Management	238	see Plates 3 and 4

6. VISUAL SITE INSPECTION

a. General Procedures and Safety.

(1) During the periods of 15 through 21 January 1996, members of the Assessment Team traveled to the former Holtville Rocket Target 1R (#94), Imperial County, California. The primary task of the team was to assess the presence of, or

potential presence of OE. The site inspection was limited to non-intrusive methods; i.e. subsurface sampling was not authorized nor performed.

(2) Real estate rights-of-entry were not required as the site is public land under control of the Bureau of Land Management. BLM was briefed on the non-intrusive nature of the inspection and the safety measures used by the inspection team.

(3) A site safety plan was developed and utilized by the assessment team to assure safety from injury during the site inspection of the area. Prior to the inspection, a briefing was conducted which stressed that OE should only be handled by military EOD personnel (Reference B-2).

(4) Prior to the site visit, a thorough review of all available reports, historical documents, texts, and technical ordnance reference materials gathered during the historical records search was made to ensure awareness of potential ordnance types and associated hazards.

b. Area A: Target Area

(1) The terrain in this area is flat, with occasional brush dotting the landscape. The assessment team had no trouble negotiating the area and viewing surface debris.

(2) The target was marked with two concentric circles of unknown construction. These rings are not visible today, but are revealed in historical photographs referred to in section 4 of this report (see Photo K-1). Moreover, the target's center coordinates were available from historical documents. This evidence, utilized in conjunction with a global positioning satellite receiver, was invaluable in guiding the assessment team within the site.

(3) The target center is littered with a large concentration of metal parts from 20mm target practice projectiles, 2.25-inch sub-caliber practice rockets (SCARS), 100-lb M38 and Mk 15 practice bombs and 3-lb Mk 23 series miniature practice bombs. A large number of caliber .50 projectiles were also found. A fragment of a high explosive bomb was also discovered by the assessment team (see Plate 4 for location). The team noted the metal parts from a 2.75-inch rocket motor with unburned propellant nearby (see Plate 4 for location). The presence of practice bomb debris extends out to the edge of the southern boundary of this area. There was no evidence of bomb craters that would indicate the use of high explosive ordnance, though wind erosion would likely have filled these in over the 40 years since site closure (see

Photos J-3 through J-13 and Plate 4). The boundaries for this area were roughly estimated and are based upon presence of bomb, rocket and 20mm ordnance around the target circles.

e. Area B: Observation Post/Target Area

(1) This area, east of the target, consisting mainly of dunes. Although dotted with bushes, the assessment team had little trouble negotiating this area with their vehicle or observing the terrain. Clusters of burrows undermine the soil in certain parts, however. These were carefully avoided, so as to avoid getting stuck.

(2) An observation point (OP) utilized by range personnel was situated on the top of a dune within this area (see Plate 2). The assessment team noted high concentration of OE debris, mainly. consisting of 2.25-inch SCARS and 100-lb practice bomb pieces, near the site of the OP. The assessment team inferred that the observation post was also used as a target area (see Photo J-14 and K-1 and Plates 3 and 4). The boundaries for this area were roughly estimated and are based upon presence of bomb, rocket and 20mm ordnance around the observation post.

d. Area C: Buffer Zone 1

(1) This area is mixture of flat terrain in the south and dunes in the north.

(2) Many rocket motor igniter wires for 2.25-inch practice rockets and links and cartridge cases for small arms ammunition were encountered in Section 25, just south of the Section 24 boundary. This suggests that sorties approached the target from the south. The fact that the links and igniter wires were found off-range is explained by the fact that this is where the aircraft weapons were fired. The igniter wires were expelled rearward from the rocket motor and the links were thrust out of the ejection ports. The boundaries for this area were roughly estimated and are based upon the near presence of practice bomb debris in Area A and the probable dispersion of rockets fired upon the observation post.

e. Area D: Buffer Zone 2

(1) The terrain in this area is flat, with occasional brush dotting the landscape. The assessment team had no trouble negotiating the area and viewing surface debris.

(2) The assessment team found only rocket motor and igniter wires in this area. Judging by the concentration of small arms ammunition links and igniter wiring harnesses along the western approach to the target, most runs on the target appear to have come from this direction. The boundaries of this area are based upon the probable dispersion of rockets and 20mm ammunition fired at, and practice bombs dropped into the target circles.

e. Area E: All Remaining Land

(1) This area is a mixture of level terrain and dunes. Traversing the dunes in this area is more difficult than in the rest of the site, as they have greater slopes.

(2) No OE was found in this area. It lies sufficiently beyond the target areas such that none would be expected to be encountered.

7. EVALUATION OF ORDNANCE HAZARDS

a. General Procedures

(1) The site was evaluated to determine the extent of confirmed, potential, or absence of ordnance. Confirmed ordnance and explosives (OE) presence is based on verifiable historical record evidence or direct witness of OE items (with explosive components and/or inert debris/fragments) since site closure. Verifiable historical record evidence is based on OE items actually seen on site since site closure and authenticated by: historical records (Archive Records, Preliminary Assessment Reports, Site Investigation Reports), local fire departments and law enforcement agencies/bombs squads, military Explosive Ordnance Disposal (EOD) Units, newspaper articles, photographs, or maps. Direct witness of OE items consists of the site inspection team(s) and other credible witnesses as determined by the ASR Research Team Leader (landowners, workers on-site, soldiers who served there, etc.) verifying that they have seen OE presence on the surface or subsurface since site closure.

(2) Potential ordnance presence is based on a lack of confirmed ordnance presence. Potential ordnance contamination is inferred from records or indirect witness. Inference from historical records is based on no OE items actually seen on site since site closure and would include documentation (records, aerial photographs, maps) indicating possible OE presence derived from common practice in production, storage, use, or disposal at that time and from records indicating known

OE usage. Potential ordnance presence could also be based upon indirect witness or from present day site features. Additional field data is needed to confirm potential ordnance sub-sites.

(3) Uncontaminated ordnance sub-sites are based upon a lack of confirmed or potential ordnance evidence. There is no reasonable evidence, either direct or inferred, to suggest present day ordnance presence. Additional field data is not needed to assess uncontaminated ordnance sub-sites.

b. Area A: Target Area

Not withstanding the statement of decontamination discussed in paragraph 4b(5) of the report, this is a sub-site with an **OE presence**. This target was evidently intensively fired upon with 2.25-inch rockets over the period that it was in use. It was also and the extensive presence of practice ordnance debris indicates that live ordnance may yet be present. Moreover, a fragment of the high explosive bomb was found within this area. The presence of the 2.75-inch rocket motor found in this area is most likely an isolated case and associated with a three tube rocket launcher that Mr. Bruce Tinknell referred to in paragraph 4c(5) of this report.

c. Area B: Observation Post/Target Area

Not withstanding the statement of decontamination discussed in paragraph 4b(5) of the report, this is a sub-site with an **OE presence**. The assessment team's discovery of practice ordnance debris within this area indicates that additional live ordnance may be present here.

d. Area C: Buffer Zone 1

This area is a **potential** OE sub-site. Although no OE was noted here by the assessment team, the possibility exists that sub-surface ordnance may be present. This possibility cannot be excluded since there is no historical evidence that the EOD team accomplished more than a surface clearance at the site. It is most likely that this ammunition consists mainly of practice bomb debris and expended 2.25-inch SCARS, as these were the items found within Area B.

e. Area D: Buffer Zone 2

This area is a **potential** OE sub-site. Although no OE was noted here by the assessment team, the possibility of an OE presence cannot be excluded since there is no historical evidence that the EOD team accomplished more than a surface

clearance at the site. It is most likely that this ammunition consists mainly of practice bomb debris inert 20mm projectiles and expended 2.25-inch SCARS, as these were the items found within Area A.

8. SITE ORDNANCE TECHNICAL DATA

a. End Item Technical Data

Table 8-1 has been developed to establish a list of potential ordnance items and their explosive/chemical fillers that could exist at sub-surface levels within the former bomb target site. No documentation exists specifically describing weapons and ammunition utilized on this range. The items in this table include those which may reasonably be expected to exist, based upon the usage scenario attributed to the site and ordnance or ordnance components observed during the site inspection (see Documents D-1 through D-8).

Table 8-1
Ammunition and Explosive/Chemical Filler Potentially Found on Holtville Rocket Target Range 1R (#94)

Item	Model	Material of Components	Fuze
Bomb, 4.5-lb Practice	AN-Mk 43	Lead alloy body	Percussion primer
w/Signal Cartridge	AN-Mk 4	10 gm zinc oxide 3 gm smokeless powder Titanium Tetrachloride	Integral w/signal
			None
Bomb, 3-lb Practice	AN-Mk 23	Cast iron body	Percussion primer
w/Signal Cartridge	AN-Mk 4	10 gm zinc oxide 3 gm smokeless powder Titanium Tetrachloride	Integral w/signal
			None
Bomb, 3-lb Practice	AN-Mk 5 Mod 1	Zinc body	Percussion primer
w/Signal Cartridge	AN-Mk 4	10 gm zinc oxide 3 gm smokeless powder Titanium Tetrachloride	Integral w/signal
			None
Bomb, Practice, 100 lb w/Mk 4 Signal	Mk 15	Inert filler (sand or water) Smokeless Powder expulsion charge Red Phosphorous (stabilized) marker	None

Table 8-1 (Cont.)
Ammunition and Explosive/Chemical Filler Potentially Found on Holtville Rocket Target Range 1R (#94)

Item	Model	Material of Components	Fuze
Bomb, Practice, 100 lb w/spotting charge M1A1 w/28 gage blank shotgun shell	M38A2	Inert (sand or water filled) or optional 3 lbs black powder	Optional base initiated fuze is used with black powder charge.
Bomb, High Explosive 100-lb	AN-M30 series	51-lbs Amatol or 53-lbs TNT	AN-M103 series Nose AN-M100 series Tail
Rocket, Sub-caliber Aircraft, 2.25-inch		1.12 to 1.75-lbs of Ballistite propellant	None
Cartridge, 20mm, Target Practice	M99	FNH Powder, Type II, .066-lbs	None
Cartridge, 20mm, AP-T	M75	FNH Powder, Type II, .066-lbs Tracer Composition, 42 grains	None
Cartridge, Caliber .50 AP	M2	Smokeless Powder, 235 grains	None
Cartridge, Caliber .50 Ball	M2	Smokeless Powder, 235 grains	None
Cartridge, Caliber .50 Tracer	M1	Smokeless Powder, 240 grains Tracer Composition	None

b. Chemical Data

Table 8-2,on the next page provides a list of the chemical data for the fillers. Drawings of the items may be found in Appendix D.

Table 8-2
Chemical Data of Ordnance Fillers

Filler	Synonym(s)	Chemical Formula
Zinc Oxide		ZnO
Smokeless Powder (mixture)	Cellulose Nitrate	$[C_6H_8O_5(NO_2)_3]_n$
Nitrocellulose	DNT	$CH_3C_6H_3(NO_2)_2$
Dinitrotoluene	gelling agent	$C_6H_4(CO_2C_4H_9)_2$
Dibutylphthalate	DPA	$(C_6H_5)_2NH$
Diphenylamine		
Titanium Tetrachloride		$TiCl_4$
Red Phosphorous		P
Black Powder		KNO_3, C, S (mixture)

Table 8-2 Chemical Data of Ordnance Fillers		
Filler	Synonym(s)	Chemical Formula
Ballistite	Double-base Powder	
60% Nitrocellulose		$[C_6H_8O_5(No_2)_3]$
39% Nitroglycerin		$CH_2NO_3CHNO_3CH_2NO_3$
0.75% Diphenylamine		$(C_6H_5)_2NH$
TNT	Trinitrotoluene	$(CH_3)C_6H_2(NO_2)_3$
Tracer Composition		
Various Combinations		
Strontium Nitrate		$SrNO_2$
Polyvinyl Chloride	PVC	$CH_2=CHCl$
Strontium Peroxide		SrO_2
Amatol		
Ammonium Nitrate		NH_3NO_4
TNT		$(CH_3)C_6H_2(NO_2)_3$

9. Other Environmental Hazards

a. Hazardous, Toxic, and Radiological Waste

The OE team did not observe any potential HTRW sites at the former Holtville Rocket Target 1R (#94).

b. Building Demolition/Debris Removal

The OE team did not observe any structures or residual materials, which indicate a potential requirement for initiating BD/DR projects.

ORDNANCE AND EXPLOSIVES
ARCHIVES SEARCH REPORT
FOR
THE FORMER
HOLTVILLE ROCKET TARGET 1R (#94)
IMPERIAL COUNTY, CALIFORNIA
PROJECT NUMBER J09CA017201

APPENDIX A

REFERENCE SOURCES

APPENDIX A

REFERENCE SOURCES

The following organizations and personnel are acknowledged for their support

ORGANIZATION	NAME	TELEPHONE	NATURE OF SUPPORT
GOVERNMENT SOURCES			
FEDERAL AGENCIES			
DEPARTMENT OF DEFENSE			
Defense Library on Disk Pentagon Rm 1A518 Washington, DC 20310-6080	Computer Search (DLOD)	(703) 697-4658	No Information
Defense Technical Information Center 8725 John J. Kingman Road, Suite 0944 Ft. Belvoir, VA 22060-6218	Computer Search	(703) 767-8274 DSN (427)	No Information
Department of Defense Explosive Safety Board (DDESB) Accident Safety Board 2461 Eisenhower Avenue Alexandria, VA 22331	Computer Search	(815) 273-8730	No Information s
ARMY			
52nd Ordnance Group Fort Gillem, GA 30050-5000	Staff	(404) 363-5978 DSN (797) Fax 363-3338	Negative Report
70th Ordnance Detachment-EOD Navy Sub Base, PO Box 6376 San Diego, CA 92166-0376	Sgt Thompson Capt Fiske	(619)553-8500 DSN (553) Fax 553-8095	Negative Report
Center of Military History Attn: DSMH-RAS 1099 14th St. N.W. Washington, DC 20005-3402	Staff	(202) 761-5416 DSN (763)	See Appendix B, Section II, Parts A and B.

REFERENCE SOURCES

The following organizations and personnel are acknowledged for their support

GOVERNMENT SOURCES (cont.)

FEDERAL AGENCIES (Cont.)

DEPARTMENT OF DEFENSE (Cont.)

ARMY (cont.)

ORGANIZATION	NAME	TELEPHONE	NATURE OF SUPPORT
Defense Logistics Studies Information Exchange (DLSIE) US Army Logistics Management College Ft.Lee, VA 23801	Computer Search	(804) 734-4007	No Information
Defense Mapping Agency Customer Support Center, Philadelphia Depot 5801 Tabor Ave. Philadelphia, CA 19120-5095	Staff	(800) 826-0342 (301) 227-2495	Areonautical charts.
Industrial Operations Command Historical Office AMSIO-EAH Bldg 390 Rock Island Arsenal Rock Island, IL 61299	Tom Slattery	(309) 794-1450 DSN (793)	No Information
Rock Island Arsenal Museum Rock Island Arsenal Rock Island, IL 61299	Chris Leinicke	(309) 794-3518	Technical manuals
U.S. Army Technical Center For Explosives Safety Library Attn: SIOAC-ESM Savanna, IL 61074	Staff	(815) 273-8772 DSN (585)	Reference sources.

REFERENCE SOURCES

The following organizations and personnel are acknowledged for their support

ORGANIZATION	NAME	TELEPHONE	NATURE OF SUPPORT
GOVERNMENT SOURCES (cont.)			
FEDERAL AGENCIES (Cont.)			
DEPARTMENT OF DEFENSE (Cont.)			
ARMY (Cont.)			
U.S. Military History Institute Archives Branch Carlisle Barracks Carlisle, PA 17013	Richard Sommers	(717) 245-3601 DSN (242)	No Information
U.S. Military History Institute Library Carlisle Barracks, Building 22 Carlisle, PA 17013-5008	John Slonaker Dennis Vetock	(717) 245-3611 DSN (242) FAX DSN 242-4370	No Information
U.S. Military History Institute Photographic Archives Carlisle Barracks Carlisle, PA 17013	Mike Winey	(717) 245-3434 DSN (242).	No Inforamation
US Army Chemical & Biological Defense Command Aberdeen Proving Ground, MD 21010-5423	Kathleen Ciolfi	(410) 679-4430 DSN (584)	No Information
USACE, Los Angeles District Real Estate Division 911 Wilshire Boulevard Los Angeles, CA 90017-3401	Delores Henderson	(213) 452-3164	Real Estate Information

REFERENCE SOURCES

The following organizations and personnel are acknowledged for their support

ORGANIZATION	NAME	TELEPHONE	NATURE OF SUPPORT
GOVERNMENT SOURCES			
FEDERAL AGENCIES (Cont.)			
DEPARTMENT OF DEFENSE (Cont.)			
ARMY (Cont.)			
US Army Corps of Engineers, Los Angeles District 911 Wilshire Boulevard Los Angeles, CA 90017-3401	Deborah Castens Jeff Armentrout	(213) 452-3719/3720	Information pertinent to preliminary assessment
US Army Corps of Engineers, Office of History 7701 Telegraph Road Alexandria, VA 22310-3865	Contractor Dr. Martin Gordon	(703) 355-3558	See Appendix B, Section II, Parts A and B.
AIR FORCE			
Air Force Historical Research Agency 600 Chennault Circle Maxwell AFB, AL 36112-6424	Thomas Dean	(205) 953-6884	(IRIS) On-line computer search. No information found on this site.
USAF Environmental Technical Applications Center 151 Patton Ave, Rm 120 Ashville, NC 28801	Janet Wall	(704) 271-4404	Local climatological data (LCD)
MARINES			
Commander, Explosive Ordnance Group 1 Coronado Island San Diego, CA 92155	Gunner Gary Burns Lieutenant Commander Peterson	(619) 437-0715/0723 DSN (577)	Negative Report

REFERENCE SOURCES

The following organizations and personnel are acknowledged for their support

ORGANIZATION	NAME	TELEPHONE	NATURE OF SUPPORT
GOVERNMENT SOURCES			
FEDERAL AGENCIES (Cont.)			
DEPARTMENT OF DEFENSE (Cont.)			
MARINES (Cont.)			
Command Museum Marine Corps Air Station, El Toro Santa Ana, CA	Fabian Jiroux	(714) 726-4380	No Information
Joint Explosive Ordnance Disposal Unit Marine Corps Air Station Yuma, AZ 85639	CPT Peterlick	(520) 341-2788/2303 DSN (951) Fax 341-2112	Negative Report
Marine Corps Historical Center Building 58 Washington Navy Yard Washington, DC 20374	Contractor	(202) 433-3483	See Appendix B, Section II, Parts A and B.
Marine Corps Reserve Depot Museum Building 26 San Diego, CA 92140	Major Bruce Norton (Ret)	(619) 524-6719	Referral
NAVY			
Miramar Naval Air Station Attn: Roger Hillhouse-RH187 45249 Miramar Way San Diego, CA 92145-5005	Roger Hillhouse	(619) 537-1102 DSN (577)	No Information
Naval Air Station, North Island Natural Resources Office San Diego, CA 92135	Andy Yatsko	(619) 545-1131	Referral

REFERENCE SOURCES

The following organizations and personnel are acknowledged for their support

ORGANIZATION	NAME	TELEPHONE	NATURE OF SUPPORT
GOVERNMENT SOURCES			
FEDERAL AGENCIES (Cont.)			
DEPARTMENT OF DEFENSE (Cont.)			
NAVY (Cont.)			
Naval Air Station, North Island Staff Civil Engineer Office San Diego, CA 92135	Dave Brown	(619) 545-1111/1113 DSN (735)	No Information
Naval Air Facility, El Centro Public Works Department, Bldg. 504 El Centro, CA 92243	John Crow	(619) 339-8532 DSN (958)	Referral
Naval Air Facility, El Centro Base Security El Centro CA 92243	NCOIC	(619) 339-2524 DSN (958)	Referral
Naval Air Facility, El Centro Code 34, Bldg. 139 El Centro, CA 92243	Carl David	(619) 339-2665/2601 DSN 958-8665/8601	Referral
Naval Air Facility, El Centro Public Works Department, Bldg. 504 El Centro, CA 92243	Jerry Kear	(619) 339-2224/2205 DSN 958-8224/8205	See Interview I-2
Naval Air Facility, El Centro Naval Air General Library El Centro, CA 92243-5001	Alma Foley	619-339-2470 DSN 958-8470	No Information

REFERENCE SOURCES

The following organizations and personnel are acknowledged for their support

ORGANIZATION	NAME	TELEPHONE	NATURE OF SUPPORT
GOVERNMENT SOURCES			
FEDERAL AGENCIES (Cont.)			
DEPARTMENT OF DEFENSE (Cont.)			
NAVY (Cont.)			
Naval Air Station Library, North Island PO Box 357081 San Diego, CA 92135-7081	Sharon Nelson	(619) 545-8230 Fax 545-8036	No Information
Naval Construction Battalion Center Code 1581B, Civil Engineering Support Office Building 20, 1023rd Avenue Port Hueneme, CA 93043-4301	Bob Brickey Cliff Ledderer	(805) 982-5593 DSN (551)	No Information
Naval Construction Battalion Center Naval Facilities Engineering Service Center Code 72, Technical Information Center 1100 1023rd Avenue Port Hueneme, CA 93043-4370	Josephine Walsh	(805) 982-9110 DSN (551)	No Information
Naval Construction Battalion. Center Code 10H, Naval Facilities Historian 621 Pleasant Valley Road Port Hueneme, CA 93043-4300	Dr. Vincent Transano Carol Marsh	(805) 982-5913 DSN (551)	No Information

REFERENCE SOURCES

The following organizations and personnel are acknowledged for their support

ORGANIZATION	NAME	TELEPHONE	NATURE OF SUPPORT
GOVERNMENT SOURCES			
FEDERAL AGENCIES (Cont.)			
DEPARTMENT OF DEFENSE (Cont.)			
NAVY (Cont.)			
Naval Facility Engineering Command, SW Division 1220 Pacific Hwy, Bldg 127 San Diego, CA 92132	Lowell Martin Daniel Huey	(619) 532-2991 DSN (522)	Referral
Naval Facility Engineering Command, SW Division 1220 Pacific Hwy. Bldg 131 San Diego, CA 92132	Mike Gonzales	(619) 532-3178 DSN (522)	No Information
Naval Facility Engineering Command, SW Division 1220 Pacific Hwy, Bldg 127 San Diego, CA 92132	Tom Phelps Chriss Maves	(619) 532-1169/3769 DSN (522) Fax 522-1135	No Information
Naval Facility Engineering Command, South West Division 1220 Pacific Hwy, Bldg 127 San Diego, CA 92132	Mike Stroud	(619) 532-2319 DSN (522)	No Information
Naval Facility Engineering Command, South West Division 1220 Pacific Highway, Bldg 127 San Diego, CA 92132	Bill Fisher	(619) 532-1488 DSN (522)	No Information

REFERENCE SOURCES

The following organizations and personnel are acknowledged for their support

ORGANIZATION	NAME	TELEPHONE	NATURE OF SUPPORT
GOVERNMENT SOURCES			
FEDERAL AGENCIES (Cont.)			
DEPARTMENT OF DEFENSE (Cont.)			
NAVY (Cont.)			
Naval Explosives Ordnance Detachment Technical Division Technical Library 2008 Stump Neck Road Indian Head, MD 20640-5070	Betty Arboghast Dawn Risko	(301) 743-6834	No Information
Navy Historical Center Building 57 Washington Naval Yard Washington, DC 20374	Contractor	(202) 433-3171	See Appendix B, Section II, Parts A and B.
Navy Historical Center Technical Library Washington Navy Yard Washington, DC 20374	Mark Wertheiner Curator	(202) 433-3607	No Information
U.S. Naval Facilities Engineering Command Code 14B, Room 10N59 200 Stovall Street Alexandria, VA 22332-2300	Charlie Cox Jack Kane	(703) 325-7342 DSN (221) Fax 325-2839 (703) 428-0436	No Information
U.S. Navy Directive and Records Management Code CNO NO9B35 Washington Navy Yard, Bldg 166 901 M Street SE Washington, DC 20374	LT Gilbert Records Officer	(202) 433-4194 Fax 433-7520 DSN (288)	No Information

REFERENCE SOURCES

The following organizations and personnel are acknowledged for their support

ORGANIZATION	NAME	TELEPHONE	NATURE OF SUPPORT
GOVERNMENT SOURCES			
FEDERAL AGENCIES (Cont.)			
NATIONAL ARCHIVES RECORDS ADMINISTRATION			
NARA, Federal Records Center- San Francisco 1000 Commodore Drive San Bruno, CA 94066	Barbara Bepler	(415) 876- 9001/9006 Fax 876-0920	See Appendix B, Section III, Parts A and B.
NARA, Federal Records Center-Los Angeles 24000 Avila Road Laguna Niguel, CA 92656	Greg Pearman	(714) 360-2626 Fax 643-4500	See Appendix B, Section III, Parts A and B.
NARA, Pacific Sierra Region 1000 Commodore Drive San Bruno, CA 94066	Lisa Miller	(415) 876-9009 Fax 876-9233	See Appendix B, Section III, Parts A and B.
NARA, Pacific Southwest Region 24000 Avila Road Laguna Niguel, CA 92656	Suzanne Dewberry	(714) 360-2641	See Appendix B, Section III, Parts A and B.
National Archives Archives II (Cartographic/Architectural) Branch 8601 Adelphi Rd College Pk, MD 20740	Staff	(301) 713-7040	See Appendix B, Section II, Parts A and B.

REFERENCE SOURCES

The following organizations and personnel are acknowledged for their support

ORGANIZATION	NAME	TELEPHONE	NATURE OF SUPPORT
GOVERNMENT SOURCES			
FEDERAL AGENCIES (Cont.)			
NATIONAL ARCHIVES RECORDS ADMINISTRATION (Cont.)			
National Archives Archives I (Modern Military) Pennsylvania and 7th Avenue Washington, DC 20408	Staff	(202) 501-5385	See Appendix B, Section II, Parts A and B.
National Archives Archives II (Civil Reference Branch) 8601 Adelphi Rd College Park, MD 20740	Staff	(301) 713-7250	See Appendix B, Section II, Parts A and B.
National Archives Archives II (Still Picture Branch) 8601 Adelphi Road College Park, MD 20740	Staff	(301) 713-6660	See Appendix B, Section II, Parts A and B.
National Archives Archives II (Motion Picture Branch) 8601 Adelphi Road College Park, MD 20740	Staff	(301) 713-7060	See Appendix B, Section II, Parts A and B.
National Archives Archives II (Textual Branch) 8601 Adelphi Road College Park, MD 20740	Staff	(301) 713-7250	See Appendix B, Section II, Parts A and B.
National Archives Archives I (Navy) Pennsylvania and 7th Avenue Washington, DC 20408	Staff	(202) 501-5671	See Appendix B, Section II, Parts A and B.

REFERENCE SOURCES

The following organizations and personnel are acknowledged for their support

ORGANIZATION	NAME	TELEPHONE	NATURE OF SUPPORT
GOVERNMENT SOURCES			
FEDERAL AGENCIES (Cont.)			
NATIONAL ARCHIVES RECORDS ADMINISTRATION (Cont.)			
National Archives Archives I (Old Military) Pennsylvania Ave. and 7th Avenue Washington, DC 20408	Staff	(202) 501-5390	See Appendix B, Section II, Parts A and B.
National Archives, Suitland Branch 4205 Suitland Road (Civil And Military) Suitland, MD 20409	Staff	(301) 457-7190	See Appendix B, Section II, Parts A and B.
National Personnel Records Center 9700 Page Ave. St Louis, MO 63132	Bill Siebert Wilson Sullivan	(314) 538-4085	See Appendix B, Section III, Parts A and B.
Library Of Congress Washington, DC 20540	Staff	(202) 707-5522	See Appendix B, Section II, Parts A and B.
Smithsonian Institution Historical Research Division Washington, DC 20540	Dan Hagedorn Tim Cronan	(202) 357-3133	See Appendix B, Section II, Parts A and B.
DEPARTMENT OF AGRICULTURE			
Consolidated Farm Service Agency 380 North 8th St. Suite 15 El Centro, CA 92243	Sandra Cruz	(619) 352-3531	No Information

REFERENCE SOURCES

The following organizations and personnel are acknowledged for their support

ORGANIZATION	NAME	TELEPHONE	NATURE OF SUPPORT
GOVERNMENT SOURCES			
FEDERAL AGENCIES (Cont.)			
DEPARTMENT OF AGRICULTURE (Cont.)			
USDA Aerial Photography Field Office P.O. Box 30010 2222 West 2300 South Salt Lake City, UT 84130-0010	Sherrie Holyoak	(801) 975-3503	No Information
USDA, Natural Resources Conservation Service 2151 Adams Avenue El Centro, CA 92243	Steve Cameron	(619) 352-7886 Fax 339-9896	Aerial Photo
DEPARTMENT OF COMMERCE			
National Oceanographic and Atmospheric Administration National Climatic Data Center Federal Bldg Ashville, NC 28801	Yolanda Goosch Sam McCowan	(704) 271-4272	Local climatological data reports
National Geodetic Survey Information Services N/NGS 12, SSMC#, Station 9244 1315 E-W Highway Silver Spring, MD 20920-3282	Joan Rikon	(301) 443-8601 Fax 713-4172	No Information
DEPARTMENT OF INTERIOR			
Bureau Of Land Management California Desert District 6221 Box Springs Boulevard Riverside, CA 92507-0714	Manuela Johnson	(909) 697-5220 Fax 697-5299	No Information

REFERENCE SOURCES

The following organizations and personnel are acknowledged for their support

ORGANIZATION	NAME	TELEPHONE	NATURE OF SUPPORT
GOVERNMENT SOURCES			
FEDERAL AGENCIES (Cont.)			
DEPARTMENT OF INTERIOR (Cont.)			
Bureau Of Land Management California Desert District 6221 Box Springs Boulevard Riverside, CA 92507-0714	John Key	(909) 697-5383 Fax 697-5299	Referrals
Bureau Of Land Management El Centro Resource Area 1661 South 4th Street El Centro, CA 92243	Linda Kastoll Jim Talent Tim Finger Robert Bower	(619) 337-4400	Maps Logistical support See Interview I-3 (Linda Kastoll)
Bureau Of Land Management El Centro Resource Area 1661 South 4th Street El Centro, CA 92243	Larry Cafey	(619) 337-4425	No Information
Department of Interior U.S. Geological Survey Earth Resource Observation Systems Data Center Sioux Falls, SD 57198	Staff	(605) 594-6151 Fax 594-6589	No Information
Department of Interior Geological Survey Reston, VA 22092	Dave Keys	(703) 648-5956 Fax 648-5548	No Information
U.S. Geological Survey, Earth Science Information Center Box 25046, Bldg. 810 Denver Federal Center Denver, CO 80225	Paula Erickson Steve Reiter	(303) 202-4200 Fax 202-4188	No Information

REFERENCE SOURCES

The following organizations and personnel are acknowledged for their support

ORGANIZATION	NAME	TELEPHONE	NATURE OF SUPPORT
GOVERNMENT SOURCES			
FEDERAL AGENCIES (Cont.)			
DEPARTMENT OF INTERIOR (Cont.)			
U.S. Fish And Wildlife Service 2730 Loker Ave. West Carlsbad, CA 92008	John Hanlon	(619) 431-9440	Information on endangered species
U.S. Geological Survey Earth Science Information Center (ESIC) 1400 Independence Road Rolla, MO 65401	Staff	(573) 308-3500 Fax 308-3615	No Information
US Geological Survey Branch of Distribution Box 25286, Bldg 810 Denver Federal Center Denver, CO 80225	Staff	(303) 203-4700 Fax 203-4693	Source of topographical maps
STATE AGENCIES			
Anza-Borrego Desert State Park 200 Palm Canyon Drive Borrego Springs, CA 92004	Fred Jee	(619) 767-5311 FAX 767-3427	No Information
California State Archives 1020 O St. Sacramento, CA 95814	Tony Hoffmann	(916) 653-2246	No Information
California State Library 914 Capital Mall, Library And Courts Building Sacramento, CA 94237-0001	John Gonzales	(916) 654-0176 Fax 654-8777	No Information

REFERENCE SOURCES

The following organizations and personnel are acknowledged for their support

ORGANIZATION	NAME	TELEPHONE	NATURE OF SUPPORT
GOVERNMENT SOURCES			
STATE AGENCIES (Cont.)			
San Diego State University Special Collections 5300 Campanile Drive San Diego, CA 92182-0511	Bill Payne	(619) 594-6791	Referrals
San Diego State University Government Documents/Maps Section 5300 Campaline Drive San Diego, CA 92182-0511	Bruce Harley	(619) 594-5832	Referrals
San Diego State University Reference Branch 5300 Campanile Drive San Diego, CA 92182-0511	Karen Sharp	(619) 594-6724	No Information
SHPO, Southeast Information Center Imperial Valley College Desert Museum PO Box 430 Ocotilla, CA 92259	Roy Wilcox	(619) 358-7016	No Information
University Of California PO Box 19557 Irvine, CA 92110	Reference Desk	(714) 824-6836	No Information
University Of California Government Documents Department PO Box 19557 Irvine, CA 92110	Jeffrey Schneidewind Kay Collins	(714) 824-7234	No Information
University of California Archives PO Box 19557 Irvine, CA 92713	Mary Ellen Goddard	(714) 824-7193	Referrals

REFERENCE SOURCES

The following organizations and personnel are acknowledged for their support

ORGANIZATION	NAME	TELEPHONE	NATURE OF SUPPORT
GOVERNMENT SOURCES			
COUNTY AGENCIES			
Imperial County Fire Department Bomb Unit 2514 Labrucherie Avenue Imperial, CA 92251	Brad Garrison	(619) 355-1191 352-5222	No Information
Imperial County Recorder Room 206 940 Main St. El Centro, CA 92243	Maxine Hatch	(619) 339-4272	No Information
Imperial County Sheriff 328 Applestill Road El Centro, CA 92243	Sgt Garcia Sgt Hall	(619) 339- 6300/6324	Referrals
Imperial County Tax Assessor 940 Main St. 1st Floor El Centro, CA 92243	Roger Murphy	(619) 339-4244	Plat map
Imperial Valley Free Library Holtville Branch P.O. Box 755 Holtville, CA 92250	Reference Librarian	(619) 356-2385	Referrals
Imperial Valley Free Library 1331 South Clark Road El Centro, CA 92423-2282	Mrs. Horn	(619) 337-4565	Referrals
San Diego County Sheriff Criminal Investigation Unit-Bomb Squad 5255 Mt Etna Drive San Diego, CA 92117	Sgt Conrad Grayson	(619) 467- 4579/4660 Fax 467-4570	No Information

REFERENCE SOURCES

The following organizations and personnel are acknowledged for their support

ORGANIZATION	NAME	TELEPHONE	NATURE OF SUPPORT
	GOVERNMENT SOURCES		
COUNTY AGENCIES (Cont.)			
Imperial Valley College Library 380 East Ira Aten Rd. Imperial, CA 92251	Thomas Welch	(619) 355-6382	No Information
Council On America's Past 518 Why Worry Lane Phoenix, AZ 85021	Heliogram Publication	(800) 396-4693	No Information
CITY AGENCIES			
Imperial Public Library 200 West Ninth St. Imperial, CA 92251-0038	Gregorio Ponce	(619) 355-1332	No Information
Brawley Public Library 400 Main St. Brawley, CA 92227-2491	Diana Magana	(619) 344-1891	No Information
El Centro Public Library 539 State St. El Centro, CA 9 2243-2973	Joan Horn	(619) 337-4565	Referrals
PUBLIC UTILITIES			
Imperial Valley Irrigation District 1251 West Evan Hughes El Centro, CA 92243	Jerry David	(619) 337-1400	No Information
Imperial Valley Irrigation District 333 East Barioi Avenue Imperial, CA 92251	Randy Gray	(619) 339-9239	No Information

REFERENCE SOURCES

The following organizations and personnel are acknowledged for their support

ORGANIZATION	NAME	TELEPHONE	NATURE OF SUPPORT
NON GOVERNMENT SOURCES			
PUBLIC UTILITIES (Cont.)			
Imperial Valley Irrigation District 333 East Barioi Avenue, Building J1 Imperial, CA 92251	Sherry O'Malley Paul Peschel	(619) 339-9282/9256	Aerial Photographs
NATIONAL AGENCIES			
Knight-Ridder Information Inc. 2440 El Camino Real Mountain View, CA 94040	Computer Search	(800) 334-2564	No Information
Northern Illinois Library System 4034 East State St. Rockford, IL 61108	Computer Search (NILS)	(815) 229-0330	No Information
Online Computer Library Center 6565 Frantz Road Dublin, OH 43017-3395	Computer Search (OCLC)	(800) 848-5878	No Information
Sirsi Corporation Scientific and Technical Information Library 689 Discovery Dr Huntsville, AL 35806	Computer Search (STILAS)	(205) 922-9820	No Information
CMS Incorporated Tampa FL 33634-5001	Joe Mares	(813)882-0148	No Information
El Centro Chamber Of Commerce El Centro, CA 92244	Receptionist	(619) 352-3681	No Information

REFERENCE SOURCES

The following organizations and personnel are acknowledged for their support

ORGANIZATION	NAME	TELEPHONE	NATURE OF SUPPORT
NON GOVERNMENT SOURCES			
NATIONAL AGENCIES (Cont.)			
Heritage Press 102 West 6th Avenue Escondido, CA 92025	Meredith Vezina	(619) 735-9313 Fax 432-9043	No Information
Imperial Valley College Desert Museum PO Box 430 Ocotilla, CA 92259	Jay Von Werlhof	(619) 358-7016	No Information
Imperial Valley Historical Society Pioneers Museum 323 East Aten Road Imperial, CA 92251	Lynn Bogdan	(619) 352-1165 HOME (619) 356-4006 Fax 356-2216	No Information
San Diego Historical Society Archives 1649 El Prado, Balboa Park San Diego, CA 92138	Sally West	(619) 232-6203 Fax 232-6297	No Information
LOCAL RESIDENTS			
Bruce Tinknell 8786 Betelgeufe Way San Diego, CA 92126	Retired EOD	(619) 578-9901	See Interview I-4
Leon Lesicka 411 West D Street Brawley, CA 92227	Longtime Local Resident	(619) 344-2793/7073	No Information
Boston, Michael R Imperial County Airport 1099 Airport Rd Imperial, CA 92251	Former Commander, NAS, El Centro	(619) 337-1727	No Information

REFERENCE SOURCES

The following organizations and personnel are acknowledged for their support

ORGANIZATION	NAME	TELEPHONE	NATURE OF SUPPORT
NON GOVERNMENT SOURCES			
LOCAL RESIDENTS			
Steve Bogdan 1254 Zenos Road Holtville, CA 92250	Local Historian	(619) 356-4006	No Information
Tom Rolf 1262 Smoke Tree Drive El Centro, CA 92243	Retired Range Officer	(619) 352-7213	Referrals
Bruce Rebenstorf 6016 Stanton Avenue Highland, CA 92346	Military Historian	(909) 864-4302	No Information

ORDNANCE AND EXPLOSIVES
ARCHIVES SEARCH REPORT
FOR
THE FORMER
HOLTVILLE ROCKET TARGET 1R (#94)
IMPERIAL COUNTY, CALIFORNIA
PROJECT NUMBER J09CA017201

APPENDIX B

REFERENCES AND ABSTRACTS

APPENDIX B

REFERENCES AND ABSTRACTS

Table of Contents

SECTION I

BIBLIOGRAPHY

B-1 Management Plan for Ordnance and Explosive Waste (OEW) Mandatory Center of Expertise (MCX) and Design Center, CEHND 1105-3-9, U.S. Army Corps of Engineers, Huntsville Division, November 1994.

B-2 DERP-FUDS Inventory Project Report (INPR) for Site No. J09CA017200, Holtville Rocket Target 1R, U.S. Army Corps of Engineers, Los Angeles District, 22 September 1993, (Documents E-1, E-2 and E-3).

B-3. Defense Environmental Restoration Program for Formerly Used Defense Sites, Ordnance and Explosive Waste, Archives Search Report Instructions, Version 2.2, U.S. Army Corps of Engineers, Rock Island District, 17 April 1995.

B-4 Site Safety Plan for OE Investigations, 25 June 1992 w/Appendix A-177, 24 January 1997, U.S. Army Corps of Engineers, Rock Island District.

B-5 AR 200-1, Environmental Protection and Enhancement, Department of the Army, 23 April 1990.

B-6 Map, Imperial Valley, South, Desert Access Guide #22, November 1989, California District, U.S. Department of The Interior (Document L-1) (Department of Interior).

B-7 Soil Survey of Imperial County, California, Imperial Valley Area, October, 1981, USDA Natural Resources Conservation Service.

B-8. Letter, Executive Assistant, Public Works Office, 11th Naval District to the Bureau of Docks, 24 May 1945, subject: Bombing Targets for Activities, NABs 11ND-Acquisition of Land For (Document G-1) (NARA, Pacific Southwest Region)

B-9 Report, Status of Department of The Interior Lands Under Jurisdiction of The Navy Department, April 1950, Property Administration Division, Navy Department (Document G-2) (NARA, Archives II, Textual Branch, RG-71, Entry 1001, Box 119)

B-10 Report, Compilation of Naval Air Targets, Gunnery and Bombing Areas, circa 1947/1948, Navy Department, Office of Chief of Naval Operations (Document G-3) (RG-127, Entry 18A, Box 1983)

B-11 Letter, 11th Naval District, to Los Angeles Land Office, Bureau of Land Management, Los Angeles, California, dated 24 January, 1958, transmittal letter referencing decontamination of targets, nos. 94 and 95 (Document G-4) (NARA, Pacific Southwest Region, RG-49, Box 1975)

B-12 Federal Register No. 106, Vol. 23, 29 May 1958 (Document G-5) (NARA, Pacific Southwest Region, RG-49, Box 1975)

B-13 Letter, Chief of Staff, 11th Naval District to Commander, Naval Air Bases, 11th and 12th Naval Districts, referencing decontamination of targets nos. 94 and 95 (Document G-6) (NARA, Pacific Southwest Region, RG-49, Box 1975)

B-14 Master Shore Station Development Plan, El Centro Naval Air Station, dated 31 December 1957, El Centro Naval Air Station Public Works (Document G-7) (El Centro Naval Air Station Public Works)

B-15 Letter from the District Public Works Officer, 11th Naval District to the Chief of Civil Engineers, 2 July 1951, subject: Special Device Target No. 94, Imperial County, California; Renewal of Permit to Use, w/enclosure (Document G-8) (NARA, Archives II, Textual Branch, RG-72, Entry 1001, Box 185)

B-16 Aircraft Bombs, OP 1280, 17 Feb 1945, Bureau of Ordnance (Document D-1)

B-17 Aircraft Bombs, Fuzes and Associated Components, OP 2216, 1 Aug 1960, Bureau of Naval Weapons (Document D-2)

B-18 Science In WWII, Rockets, Guns and Targets, 1948, Atlantic Monthly Press, Little, Brown and Company (Document D-3)

B-19 Bombs For Aircraft, TM 9-1980, June 1942, War Department (Document D-4)

B-20 Artillery Ammunition, TM 9-1901, 29 June 1944, War Department (Document D-5)

B-21 Small Arms Ammunition, TM 9-1990, 23 May 1942, War Department (Document D-6)

B-22 U.S. Explosive Ordnance, OP 1664, 28 May 1947, Bureau of Ordnance (Vol. 1) (Document D-7)

B-23 Rocket Ammunition, 3.5" and 5.0" Aircraft Rockets (3.25" Motor), OP 1157, 23 March 1945, Bureau of Ordnance (Document D-10)

B-24 Photograph, Holtville Rocket Target 1R (#94), 17 February 1949, Department of Agriculture (Document K-1) (Imperial Valley Irrigation District, Imperial, CA)

B-25 Photograph, Holtville Rocket Target 1R (#94), 7 April 1953 Department of Agriculture (Document K-2) (Imperial Valley Irrigation District, Imperial, CA)

B-26 Photograph Holtville Rocket Target 1R (#94), 2 June 1959 Department of Agriculture (Document K-3) (Imperial Valley Irrigation District, Imperial, CA)

B-27 Photograph Holtville Rocket Target 1R (#94), 31 July 1965 Department of Agriculture (Document K-4) (USDA, Natural Resources Conservation Service, El Centro, CA)

B-28 Airborne Weapons Assembly Manual, NAVAIR 11-140-5, 1 July 1988, Naval Air Systems Command (Document D-9)

B-29 Rockets, TM 9-1950, July 1950, Department of the Army, (Document D-8)

SECTION II
NATIONAL CAPITAL REGION ARCHIVES FINDINGS
PART A
POSITIVE FINDINGS

HOLTVILLE ROCKET TARGET 1R (#94), CA

MARINE CORPS HISTORICAL CENTER
WASHINGTON, DC

Posts & Stations - California

Short History and Chronology, 1942 - 1945: Marine Corps Air Station, El Centro, CA

NARA - ARCHIVES I
WASHINGTON, DC

RG 80 (General Records of the Department of the Navy, 1798-1947)

Entry: General Correspondence, 1926 - 1942
Box 801
Administration of Naval Air Station Ordnance Activities, Chiefs, Bureaus of Aeronautics and Ordnance, to Commanding Officers, United States Naval Air Stations, 10 January 1942

NARA - ARCHIVES II - TEXTUAL BRANCH
COLLEGE PARK, MD

RG 71 (Records of the Bureau of Yards and Docks)

Entry 1001: Naval Property Case Files, 1941 - 1958
Box 119
Report Relative to Status of Department of the Interior Lands Under the Jurisdiction of the Navy Department, Holtville Rocket Target 1R (#94), April 1950

RG 72 (Records of the Bureau of Aeronautics)

Entry 1001: "Unclassified" General Correspondence, 1948 - 1959
Box 185

Correspondence Relative to Real Estate Acquisition in Connection with Holtville Rocket Target 1R (#94), 2 - 25 July 1957

Entry 1001: "Unclassified" General Correspondence, 1948 - 1959
Box 188

Public Works Repair and Maintenance List in Connection with Proposed New Construction, Including Project Description, Photographs, and Sketches, Holtville Rocket Target 1R (#94), 15 March 1955

Entry 1001: "Unclassified" General Correspondence, 1948 - 1959
Box 188

Public Works Repair and Maintenance List in Connection with Installation of Commercial Power, Holtville Rocket Target 1R (#94), 15 March 1955

Entry 1001: "Unclassified" General Correspondence, 1948 - 1959
Box 201

Memorandum and Project Description Relative to Real Estate Acquisition in Connection with Establishment of Safety Clearance Area for Ammunition Stowage, Including Description of Ordnance Facilities, at El Centro Naval Auxiliary Air Station, Holtville Rocket Target 1R (#94), 23 January 1957

Entry 1001: "Unclassified" General Correspondence, 1948 - 1959
Box 201

Mission Statement, El Centro Auxiliary Naval Air Station, Holtville Rocket Target 1R (#94), FY 1958

Entry 1001: "Unclassified" General Correspondence, 1948 - 1959
Box 202

Justification Data Relative to Real Estate Acquisition in Connection with Targets for Military Test and Training Complex, El Centro Auxiliary Naval Air Station, Holtville Rocket Target 1R (#94), May 1957

Entry 1001: "Unclassified" General Correspondence, 1948 - 1959
Box 206

Correspondence Relative to Proposed New Construction, Holtville Rocket Target 1R (#94), 21 March - 24 October 1955

RG 74 (Records of the Bureau of Ordnance)

Entry 1002A: Construction and Procurement Subject Files, 1945
Box 1079

Memorandum Relative to Request for Authority to Dispose of Obsolete, Unserviceable, and/or Excess Ammunition, El Centro Marine Corps Air Station, Holtville Rocket Target 1R (#94), 4 - 22 October 1945

Entry 1002B: Construction and Procurement Subject Files, 1946
Box 193

Memorandum Relative to West Coast Marine Air Unit Assignments, Holtville Rocket Target 1R (#94), 1 February 1946

Entry 1002B: Construction and Procurement Subject Files, 1946
Box 193

Report, Aircraft Ammunition on Hand, El Centro Marine Corps Air Station, Holtville Rocket Target 1R (#94), 5 March 1946

Entry 1002B: Construction and Procurement Subject Files, 1946
Box 193

Telegram Relative to Urgent Aviation Ordnance Material and Equipment Requirements, El Centro Marine Corps Air Station, Holtville Rocket Target 1R (#94), 21 March 1946

Entry 1002B: Construction and Procurement Subject Files, 1946
Box 193

Memorandum Relative to Ammunition Stowage, El Centro Marine Corps Air Station, Holtville Rocket Target 1R (#94), 19 April 1946

Entry 1002C: Construction and Procurement Subject Files, 1947
Box 130

Monthly Report Relative to Aviation Ammunition on Hand, El Centro Marine Corps Air Station, Holtville Rocket Target 1R (#94), 1947

Entry 1002C: Construction and Procurement Subject Files, 1947
Box 130

Memorandum and Table Relative to Marine Corps Air Station, Miramar Ammunition Levels, El Centro marine Corps Air Station, Holtville Rocket Target 1R (#94), 21 March 1947

Entry 1002C: Construction and Procurement Subject Files, 1947
Box 130

Report, Stowage, Distribution of, and Available Space for Ammunition, Explosives, and Inert Ordnance Material, Miramar Marine Corps Air Station, Holtville Rocket target 1R (#94), 30 June 1947

RG 77 (Records of the Office of the Chief of Engineers)

Entry 1011: Security Classified Subject File, 1940 - 1945
Box 480

Preliminary Engineering Study, Heavy Bombardment Airfield, Holtville, CA, Containing Details Relative to Climate, Topography and Other Site-Related Factors, Holtville Rocket Target 1R (#94), November 1942

Entry 1011: Security Classified Subject File, 1940 - 1945
Box 480

Correspondence Relative to Proposed Holtville, CA Site for Heavy Bombardment Field, Holtville Rocket Target 1R (#94), November - December 1942

RG 80 (General Records of the Department of the Navy, 1798 - 1947)

Entry: General Correspondence, 1926 - 1942

Administration of Naval Air Ordnance Activities, Chiefs, Bureaus of Aeronautics and Ordnance, to Commanding Officers, United States Naval Air Stations, 10 January 1942

RG 127 (Records of the United States Marine Corps)

Entry 18A: Office of the Commandant, General Correspondence, January 1939 - June 1950
Box 1983

Compilation of Naval Air Targets, Gunnery, and Bombing Areas, Post-WW II, Holtville Rocket Target 1R (#94)

NARA - ARCHIVES II - STILL PICTURES BRANCH COLLEGE PARK, MD

RG 80G

Four Aerial Photographs, Pinpoint Views, Marine Corps Air Station, El Centro, CA, 28 July 1943

Aerial Photograph, El Centro Marine Corps Air Station, 25 August 1943

Four Aerial Views, Oblique, Buildings, Holtville AAS, 24 CM, 20 November 1943

Five Aerial Views, Oblique, Buildings, Holtville, CA, Altitude 1,000', Focal Length 24 CM, 23 March 1944

Aerial Photograph, Marine Corps Air Station, El Centro, CA, 29 March 1944

Aerial Photograph, Marine Corps Air Station, El Centro, 25 June 1944

Aerial Photograph, Marine Corps Air Station, El Centro, CA, 14 July 1944

Aerial Photograph, Marine Corps Air Station, El Centro, CA, 18 September 1944

Twenty-two Aerial Photographs, Marine Corps Air Station, El Centro, CA, 30 January 1945

Two Aerial Photographs, Marine Corps Air Station, El Centro, CA, 23 April 1945

Aerial Photograph, Marine Corps Air Station, El Centro, CA, 11 June 1945

NAVAL HISTORICAL CENTER - NAVY DEPARTMENT LIBRARY WASHINGTON, DC

US Naval Administration

WW II, Commandant, 11th Naval District
Vol. 118
Brief History, Marine Corps Air Station, El Centro

NAVAL HISTORICAL CENTER - OPERATIONAL ARCHIVES WASHINGTON, DC

Aviation History File

Air/Ground Establishments
History, US Naval Air Station, El Centro, 1 May 1946 to 1 July 1946

SECTION II
NATIONAL CAPITAL REGION ARCHIVES FINDINGS
PART B
NEGATIVE FINDINGS

HOLTVILLE ROCKET TARGET 1R (#94), CA

LIBRARY OF CONGRESS - GEOGRAPHY AND MAP DIVISION WASHINGTON, DC

Pertinent Collections

LIBRARY OF CONGRESS - STILL PHOTOS DIVISION WASHNIGTON, DC

Pertinent Collections

NARA - ARCHIVES II - TEXTUAL BRANCH COLLEGE PARK, MD

RG 16 (Records of the Department of Agriculture)
Entry 17: General Correspondence of the Office of the Secretary of Agriculture, 1906 - 1975

RG 30 (Records of the Bureau of Public Roads)
Entry 54: Highway Traffic Advisory Committee to the War Department, 1941 - 1945

RG 38 (Records of the Chief of Naval Operations)
Entry: General Correspondence, July 1944 - June 1946

RG 48 (Records of the Office of the Secretary of the Interior)
Entry 749B:Central Classified Files, 1939 - 1953

RG 52 (Records of the Bureau of Medicine and Surgery)
Entry: Subject Files, 1941 - 1953

RG 57 (Records of US Geological Survey)
Entry 27: Correspondence and Related Records, 1906 - 1948

RG 72 (Records of the Bureau of Aeronautics)
Entry 1021: Records Relating to Inactive Air Stations

RG 74 (Records of the Bureau of Ordnance)
Entry 1001: General Correspondence, 1907 - 1946

RG 80 (General Records of the Department of the Navy, 1798 - 1947)
Entry 1318: General Correspondence, 1941 - 1945

RG 96 (Records of the Farmers Home Administration)
Entry 3: Correspondence Relating to Participation in the Defense Program, 1940 - 1942

RG 115 (Records of the Bureau of Reclamation)
Entry 7: General Administrative and Program Files, 1919 - 1945

RG 121 (Records of the Public Buildings Service)
Entry 13: Records Concerning Federal Real Estate Inventory, 1936 - 1940

RG 165 (Records of the War Department General and Special Staffs)
Entry 484D: Federal Works Agency Project Files, 1940 - 1946
Entry 484E: Security Classified Federal Works Agency Project Files, 1942 - 1945

RG 218 (Records of the U.S. Joint Chiefs of Staff)
Entry: Series, 1942 - 1959 (Geographic File)

RG 250 (Records of the Office of War Mobilization and Reconversion)
Entry 46: Surplus Property Disposal Records

RG 269 (Records of the General Services Administration)
Entry 5: Real property Disposal Case Files Transferred from the Farm Credit Administration, 1945 - 1953

RG 270 (Records of the War Assets Administration)
Entry 3: Office of Information, Subject Files, 1946 - 1959

RG 291 (Records of the Federal Property Resources Service)
Entry 5: Real Property Disposal Case Files, 1962

RG 428 (Records of the Department of the Navy, 1947-)
Entry 4: Records of the Secretary of the Navy, General Records, Formerly Security Classified DCNO 05 (Air) Chronological Files, January 1949 - June 1950

NARA - ARCHIVES II - CARTOGRAPHIC BRANCH
COLLEGE PARK, MD

Pertinent Record Groups

NARA - ARCHIVES II - MOTION PICTURE, SOUND AND VIDEO BRANCH
COLLEGE PARK, MD

Pertinent Record Groups

NATIONAL GEOGRAPHIC SOCIETY
WASHINGTON, DC

Pertinent Collections

NAVAL HISTORICAL YARDS - NAVAL AVIATION HISTORY OFFICE
WASHINGTON, DC

Pertinent Collections

SMITHSONIAN NATIONAL AIR AND SPACE MUSEUM
WASHINGTON, DC

Pertinent Collections

SECTION III

REGIONAL NATIONAL ARCHIVES FINDINGS

PART A

POSITIVE FINDINGS

HOLTVILLE ROCKET TARGET 1R (#94), CA

SECTION III
REGIONAL NATIONAL ARCHIVES FINDINGS
PART A
POSITIVE FINDINGS

HOLTVILLE ROCKET TARGET 1R (#94)
AKA
HOLTVILLE TARGET #1-R
TARGET NO. 94

NARA, PACIFIC SIERRA REGION
SAN BRUNO, CA

RG 291, Records of the Federal Property Resources Service
Accession #9NSS-291-94-001
Box #11
Map of Auxiliary Air Station, Holtville, CA, June 30, 1945
Market Data Map, Imperial County, December 1966
Paper, Inspection Report, Region 9, October 31, 1966

NARA, FEDERAL RECORDS CENTER
LAGUNA NIGUEL, CA

RG 77, Records of the Office the Chief of Engineers
Accession #077-96-0134
Box #9
Memo, Subj: Bombing Targets for Activities NABs 11ND - Acquisition of Land for, 24 May 1995
Memo, Subj: Land and Water Targets - Numbering of, 23 April 1945
Memo, Subj: Bombing Targets in Southern Sector, Western Sea Frontier, 24 August 1944
Paper, Listing of Bombing Targets

NARA, PACIFIC SOUTHWEST REGION
LAGUNA NIGUEL, CA

RG 49, Records of the Bureau of Land Management
Box #1975
Paper, Federal Register No. 106, Vol 23, May 29, 1958
Memo, Subj: Proposed Order of Revocation, Mar 27, 1958

Memo, To Los Angeles Land Office, Re: Public Land Order No. 279 dated May 22, 1945, Jan 24, 1958
Memo, Subj: Decontamination of Former Navy Target Areas, 14 Sept, 1953
Paper, Bureau of Land Management - Case No. 0156909, 3/27/58

RG 181, Records of the Naval Districts and Shore Establishments
Box #38
Report, 11th Naval District, Re: 15,000 Plane Program, October 11, 1941

Box #200
Paper, Listing of Bombing Targets
Memo, Subj: Bombing Targets for Activities NABs 11ND - Acquisition of Land for, 24 May 1995
Memo, Subj: Land and Water Targets - Numbering of, 23 April 1945

Box #248
Memo, Subj: NAC, San Diego, Calif. - Lease With Mabel J. Dray, in Connection With Acquisition of Land in Imperial County, Calif. for Bombing Target Site (Holtville Target No. 1), 24 Nov 1943

Box #420
Map, Aviation Shore Facilities United States Navy, March 15, 1943

Box #421
Memo, Subj: NAAS, Holtville - Acquisition of Land for Targets and Access Roads to Targets for Aircraft Rocket Training Program, 6 Sep, 1944

Map Drawer 101-3
Map, Army, Navy, and Military Facilities Southern California Area
Map, N.A.S. San Diego, Calif, Status of Targets, June 30, 1950

RG 270, Records of the War Assets Administration
Box #64
Paper, Real Property Classification, Holtville Auxiliary Air Station N-Calif-178, 5 June, 1946

SECTION III
REGIONAL NATIONAL ARCHIVES FINDINGS
PART B
NEGATIVE FINDINGS

HOLTVILLE ROCKET TARGET 1R (#94)
AKA
HOLTVILLE TARGET #1-R
TARGET NO. 94

NARA, FEDERAL RECORDS CENTER
LAGUNA NIGUEL, CA

RG 77, Records of the Office the Chief of Engineers
All Entries
Nothing Found

NARA, PACIFIC SOUTHWEST REGION
LAGUNA NIGUEL, CA

RG 30, Records of the Bureau of Public Roads
All Entries
Nothing Found

RG 71, Records of the Bureau of Yards and Docks
All Entries
Nothing Found

RG 77, Records of the Office the Chief of Engineers
All Entries
Nothing Found

RG 92, Records of the Quartermaster General
All Entries
Nothing Found

RG 156, Records of the Chief of Ordnance
All Entries
Nothing Found

RG 219, Records of the Office of Defense Transportation
All Entries
Nothing Found

RG 269, General Records of the General Services Administration
All Entries
Nothing Found

RG 270, Records of the War Assets Administration
Box #63
Nothing of Value to This ASR Found

RG 336, Records of the Office of the Chief of Transportation
All Entries
Nothing Found

NARA, NATIONAL PERSONNEL RECORDS CENTER ST LOUIS, MO

Accession #052-55A5164
Box #06-31-50-3-5
Nothing of Value to This ASR Found

NARA, FEDERAL RECORDS CENTER SAN BRUNO, CA

RG 77, Records of the Office the Chief of Engineers
Accession #077-76L1483
Boxes #115-130,132-134,136-148
Nothing of Value to This ASR Found

RG 121, Records of the Public Building Service
Accession #121-77-0003
Boxes #1,3-8,10-17,1a-5a
Nothing Of Value to This ASR Found

RG 269, General Records of the General Services Administration
All Entries
Nothing Found

RG 291, Records of the Federal Property Resources Service
All Entries
Nothing Found

NARA, PACIFIC SIERRA REGION
SAN BRUNO, CA

RG 30, Records of the Bureau of Public Roads
All Entries
Nothing Found

RG 49, Records of the Bureau of Land Management
All Entries
Nothing Found

RG 77, Records of the Office the Chief of Engineers
Accession #077-83-004
Boxes #5-9,16-18
Nothing of Value to This ASR Found

RG 92, Records of the Office of the Quartermaster General
All Entries
Nothing Found

RG 121, Records of the Public Buildings Service
Accession #9NSS-121-85-008
Box #26
Nothing of Value to This ASR Found

RG 127, Records of the U.S. Marine Corps
All Entries
Nothing Found

RG 156, Records of the Office of the Chief of Ordnance
All Entries
Nothing Found

RG 175, Records of the Chemical Warfare Service
Box #1
Nothing of Value to This ASR Found

RG 181, Records of the Naval Districts and Shore Establishments
All Entries
Nothing Found

RG 211, Records of the War Manpower Commission
All Entries
Nothing Found

RG 219, Records of the Office of Defense Transportation
All Entries
Nothing Found

RG 269, General Records of the General Services Administration
All Entries
Nothing Found

RG 270, Records of the War Assets Administration
All Entries
Nothing Found

RG 291, Records of the Federal Property Resources Service
Accession #9NSS-291-93-002
Box #20
Nothing of Value to This ASR Found

Accession #9NSS-291-94-001
Box #12
Nothing of Value to This ASR Found

RG 313, Records of the Naval Operating Forces
All Entries
Nothing Found

RG 406, Records of the Federal Highway Administration
Accession #72A1388
Boxes #7,10-12,14,17
Nothing of Value to This ASR Found

ORDNANCE AND EXPLOSIVES
ARCHIVES SEARCH REPORT
FOR
THE FORMER
HOLTVILLE ROCKET TARGET 1R (#94)
IMPERIAL COUNTY, CALIFORNIA
PROJECT NUMBER J09CA017201

APPENDIX C

GLOSSARY

APPENDIX C

GLOSSARY

AN-	Army - Navy, Jointly developed item
AP	Armor Piercing
APC	Armor Piercing, Capped
BD/DR	Building Demolition/Debris Removal
BDU	Bomb Dummy Unit
BLM	Bureau of Land Management
BuDocks	Bureau of Docks, United States Navy
CE	Chief of Engineers
CEHNC	U.S. Army Corps of Engineers, Huntsville Center
CEHND	U.S. Army Engineer Division, Huntsville
CENCR	U.S. Army Corps of Engineers, Rock Island District
CESPD	U.S. Army Corps of Engineers, South Pacific Division
CESPL	U.S. Army Corps of Engineers, Los Angeles District
COE	Corps of Engineers
CON/HTRW	Containerized/Hazardous, Toxic and Radioactive Waste
CWM	Chemical Warfare Material
DA	Department of the Army
DERP	Defense Environmental Restoration Program
DOD	Department of Defense
EOD	Explosive Ordnance Disposal
EE/CA	Engineering Evaluation/Cost Analysis
EPA	Environmental Protection Agency
ESI	Expanded Site Investigation
EXO	Explosive Ordnance
FDE	Findings and Determination of Eligibility
FUDS	Formerly Used Defense Site
GSA	General Services Administration
HE	High Explosive
HQUSACE	Headquarters, United States Army Corps of Engineers
HTRW	Hazardous, Toxic and Radioactive Waste
HTW	Hazardous and Toxic Waste
HVAR	High Velocity Aircraft Rocket
INPR	Inventory Project Report
MCAS	Marine Corps Air Station
Mk	Mark, Navy terminology for model
mm or MM	Millimeter
NAAS	Naval Auxiliary Air Station
NAB	Naval Air Base
NARA	National Archives Records Agency
NAS	Naval Air Station
O.C.E.	Office of the Corps of Engineers

OE	Ordnance and Explosives
OEW	Ordnance and Explosives Waste
OP	Ordnance Publication
OP	Observation Post
PA	Preliminary Assessment
PN	Project Number
PD	Point Detonating
QASAS	Quality Assurance Specialist (Ammunition Surveillance)
RAC	Risk Assessment Code
SAIC	Science Applications International Corporation
SCAR	Subcaliber Aircraft Rocket
SHPO	State Historical Preservation Office
SR	State Route
TM	Technical Manual
TNT	Trinitrotoluene
TO	Technical Order
DNT	Dinitrotoluene
USA	United States Army
USACE	United States Army Corps of Engineers
USADAC	United States Army Defense Center
USADACS	United States Army Defense Center and School
USAEDH	United States Army Engineer Division, Huntsville
USATCES	United States Army Technical Center for Explosives Safety
USDA	United States Department of Agriculture
UXO	Unexploded Ordnance
WAA	War Assets Administration
WD	War Department
WW2	World War II
11ND	11th Naval District

ORDNANCE AND EXPLOSIVES
ARCHIVES SEARCH REPORT
FOR
THE FORMER
HOLTVILLE ROCKET TARGET 1R (#94)
IMPERIAL COUNTY, CALIFORNIA
PROJECT NUMBER J09CA017201

APPENDIX D

TEXTS/MANUALS

APPENDIX D

TEXTS/MANUALS

Table of Contents

lugs having pulled through between the hooks and the frame of the shackle. As a temporary correction, these bombs should have their laminated suspension lugs (nominal thickness 1/8 in.) spread with a cold chisel to a width of approximately 5/16 in. before suspending them from a bomb shackle of the Mk 3, Mk 4, or Mk 5 series. Later, lots of these bombs have thicker lugs (5/16 in. thick), and the above modification will only be necessary until the older lots are expended.

THE 500-POUND PRACTICE BOMB MK 21

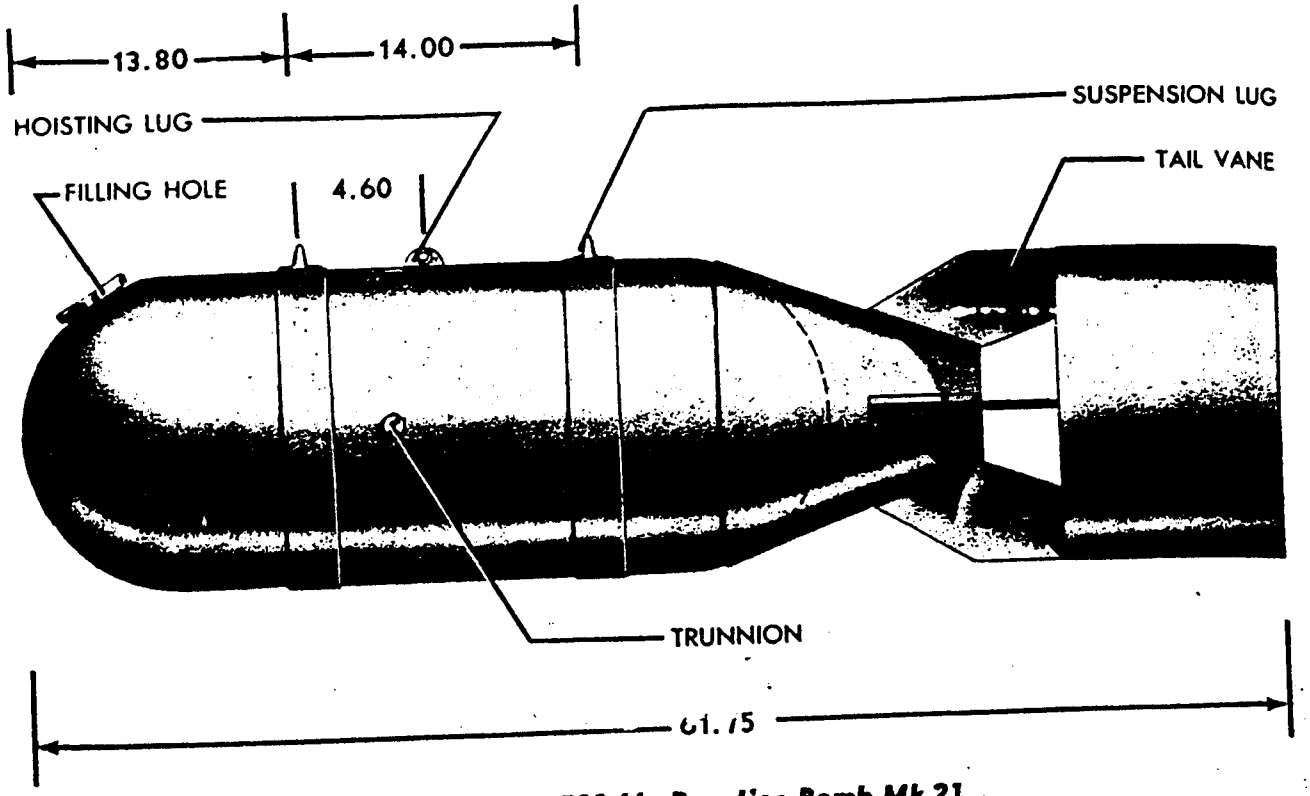


Figure 153.—500-Lb. Practice Bomb Mk 21

The 500-pound Practice Bomb Mk 21 has the following characteristics:

Weight—empty .....58 lb.
Weight—water-filled .....273 lb.
Weight—wet-sand-filled (maximum) .....500 lb.
Capacity .....25.8 gallons (5960 cu. in.)
Overall length .....61.75 in.
Body diameter—maximum 15 in.
Fin dimension—maximum 15 in.
Material .....Welded sheet metal
Ballistic coefficient .....2.2 (Dropping weight of 500 lb.)

Auxiliary Equipment

Water or wet sand to be inserted at loading base.

Under freezing conditions anti-freeze to be added.

THE 100-POUND PRACTICE BOMB MK 15 MOD 2

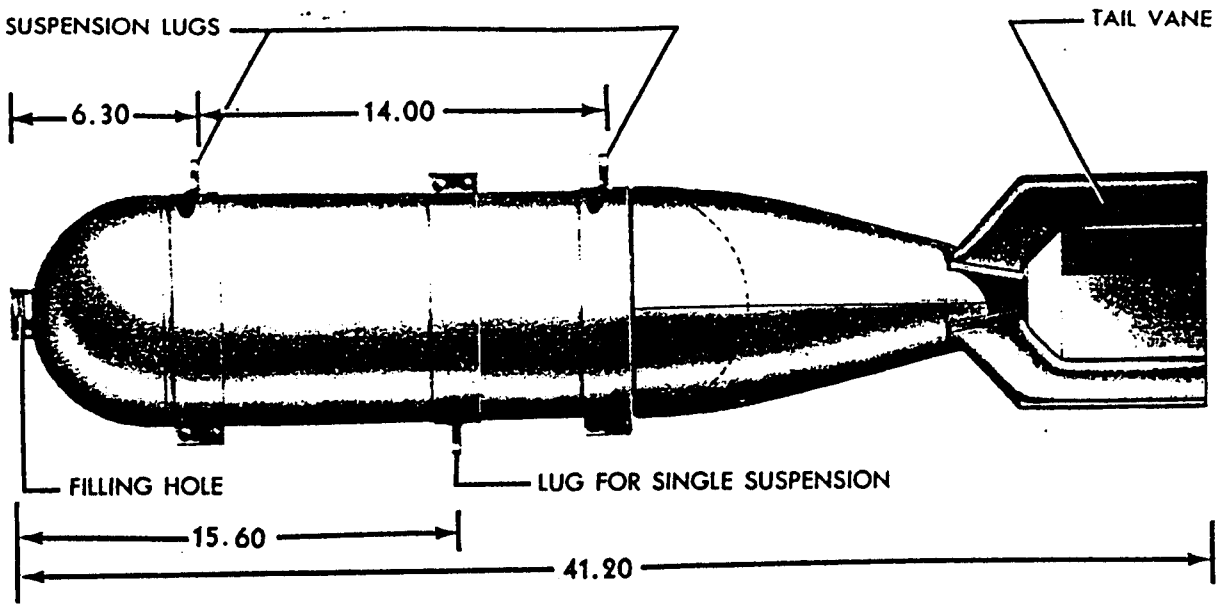


Figure 152.—100-Lb. Practice Bomb Mk 15 Mod 2

The 100-pound Practice Bomb Mk 15 Mod 2 has the following characteristics:

Weight—empty	17 lb.
Weight—water-filled	56 lb.
Weight—wet-sand-filled	95 lb.
Capacity	4.6 gallons (1072 cu. in.)
Overall length	41.2 in.
Body diameter—maximum	8.0 in.
Fin dimension—maximum	11.2 in.
Material—body and tail	Welded sheet metal
Ballistic coefficient	0.8 (Dropping weight 56 lb.)

Auxiliary Equipment

Water or wet sand to be inserted at loading base.

Under icing conditions anti-freeze to be added.

Use

This bomb is used for all types of bombing practice and may be used against armored-deck target boats. When this bomb is used against armored-deck target boats having 20-pound STS (½-inch) deck armor, it must be water-filled and released at altitudes not greater than 7000 feet.

Suspension

Two suspension bands are provided for suspending the bomb from any two-hook types of racks or shackles. By removing one suspension band and loosening and moving the other band to the center of gravity, the bomb may be suspended from any single-hook bomb racks or shackles. Because of the comparatively light weight of this bomb when filled only with water, positive release from double-hook bomb racks may not be attained unless the racks are in excellent operating condition.

Note: Practice bombs in some of the earlier lots in the Mk 15 series have been accidentally released from bomb shackles of the Mk 3 type as a result of the suspension

3-LB MINIATURE PRACTICE BOMB Mk 5 Mods 2 and 3
3-LB MINIATURE PRACTICE BOMB AN–Mk 23 Mod 1
4.5-LB MINIATURE PRACTICE BOMB Mk 43 Mod 1

Mark	Mk 5	AN–Mk 23	Mk 43.
Mod	2 and 3	1	1.
General Arrangement	452859	452860	452858.
List of Drawings	Sk 165595	Sk 165597	Sk 165596.
Length of Assembled Bomb (in.)	8.25	8.25	8.25.
Diameter (in.)	2.18	2.18	2.18.
Fin Span (In.)	2.5	2.5	2.5.
Weight:			
Without Signal (lb)	2.56	2.87	4.31.
With Mk 4-Type Signal (lb)	2.68	3.00	4.43.
With Mk 5-Type Signal (lb)	2.62	2.94	4.37.
Firing-Pin Assembly	Mk 1 Mod 0	Mk 1 Mod 0	Mk 1 Mod 0
Signal	Mk 4 Mods or Mk 5 Mod 0.	Mk 4 Mods or Mk 5 Mod 0.	Mk 4 Mods or Mk 5 Mod 0.

General Description

The 3-lb MPB Mk 5 Mods 2 and 3, the 3-lb MPB AN–Mk 23 Mod 1, and the 4.5-lb MPB Mk 43 Mod 1 are similar in physical appearance and differ basically in the metal used to cast the body.

Bomb Mk 5, now obsolescent, is manufactured from zinc alloy and weighs the least of the three bombs. Bomb AN–Mk 23 is made of cast iron. Bomb Mk 43, now obsolete, was manufactured from cast lead and was the heaviest of the three bombs.

The cast body has a bore throughout its transverse axis which houses a signal and firing-pin assembly.

Four fins are cast integrally with the bomb body. A rectangular sheet-metal shroud attached to the fins is used to stabilize the bomb in flight. Two crimps, 180 degrees apart, anchor the shroud to the fin blades.

The firing-pin assembly consists of two shallow metal cups, separated by a spacer which houses the firing pin. A cotter pin through the nose of the bomb body and two recesses in the lip of the forward cup lock the firing-pin assembly and signal in place.

Painting and Marking

Identification data is cast integrally on the body of the bomb during manufacture, and the bomb has no color marking other than that of the cast metal.

Use

The 3-lb MP Bomb Mk 5 is used for bombing practices on armored-deck target boats. The Bomb AN–Mk 23 is authorized for all bombing practices except those involving armored-deck target boats. The 4.5-lb MP Bomb Mk 43 was used for low-altitude, horizontal or dive bombing and on armored-deck target boats. The Bombs Mk 5, AN–Mk 23, and Mk 43 are used with the Mk 4-type signal, which expels a large puff of smoke rearward through the bore of the bomb when detonated by action of the firing pin. They also are used with the Mk 5 type signal, which contains a fluorescein dye and is actuated by a water inertia load on the firing pin. When the Mk 5 type signal is installed, the firing-pin assembly is not used. Special containers are utilized by aircraft to carry and release these bombs.

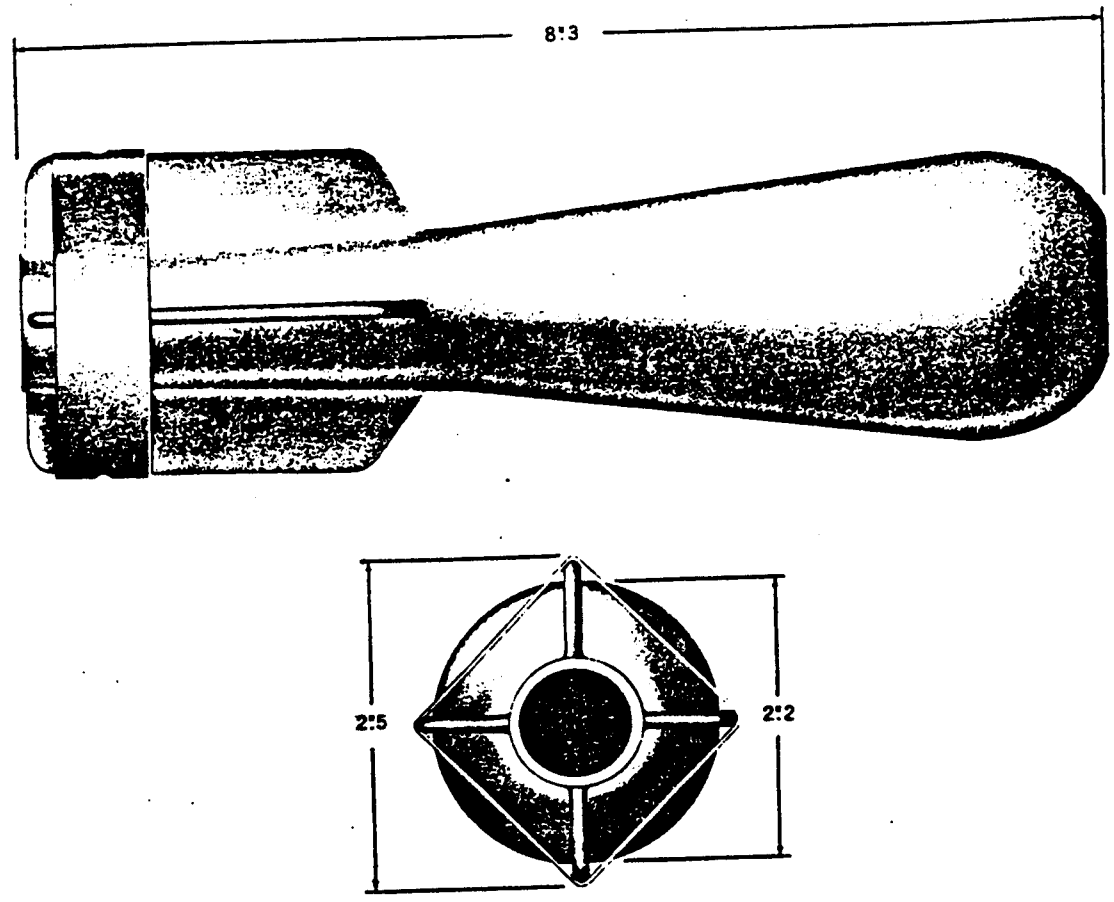


Figure 11–1.—3-lb Miniature Practice Bomb AN–Mk 23 Mod 1, Exterior View.

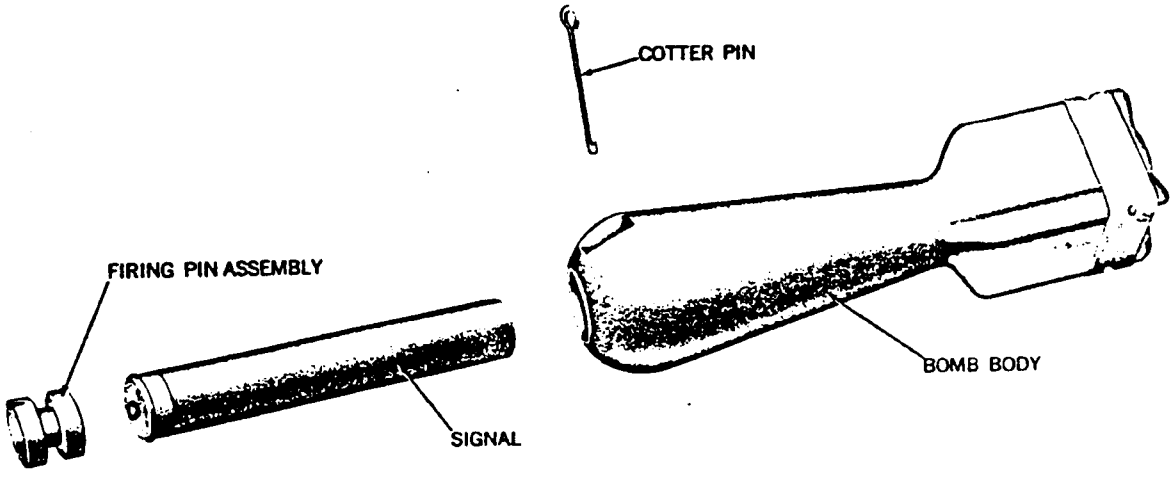


Figure 11–2.—3-lb Miniature Practice Bomb AN–Mk 23 Mod 1, Exploded View.

Assembly With the Mk 4 Type Signal

CAUTION: Signals and bombs are not to be unpacked in advance of requirements. If unpacked and not used, return them to their original packings.

1. Remove the bomb and the signal from their packings.

2. Remove the cotter pin and the firing-pin assembly from the nose of the bomb. The firing-pin assembly should fit loosely in the bomb and not bind when being removed.

3. Check the bore through the center of the bomb; it must be clean, smooth, and not damaged in any way.

4. Inspect the firing-pin assembly for

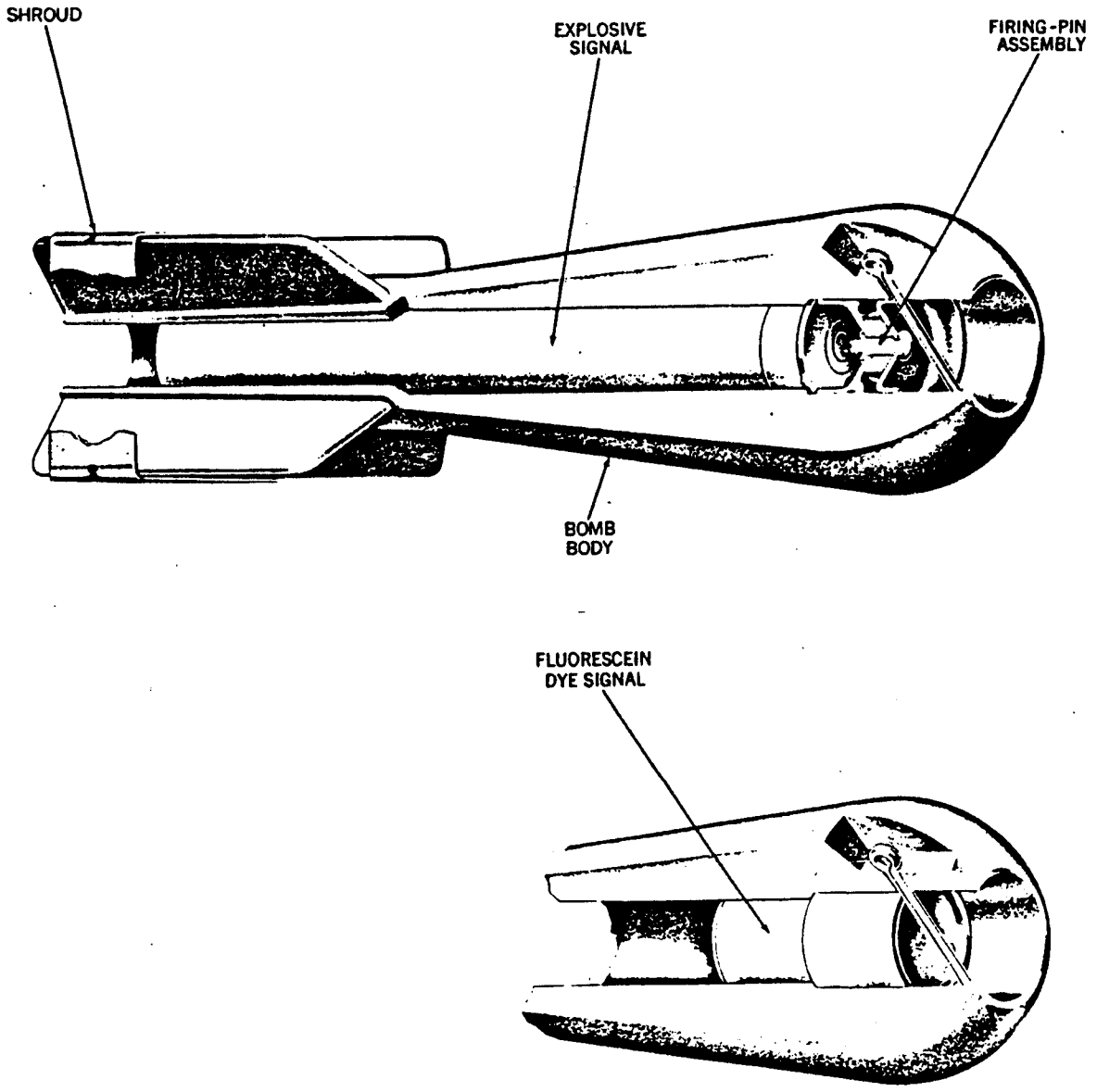


Figure 11–3.—3-lb Miniature Practice Bomb AN–Mk 23 Mod 1, Cutaway View and Detail Showing Signal Mk 5 Mod 0 Installed.

damage. Be sure the firing-pin cup is not deformed and that the firing-pin point is below the lip of its cup.

5. Place the bomb in a vertical position, nose end up.

6. Check that the signal is not swollen or deformed in any way. The primer must be flush or slightly below the base of the cartridge. Do not use a signal cartridge that is deformed in any way.

7. Insert the signal into the bomb, primer end up, and let it fall gently into place; do not force it. The base flange of the signal cartridge must rest on the bomb bore shoulder.

8. Insert the firing-pin assembly carefully with the firing-pin end toward the signal. The assembly must drop into place under its own weight.

> CAUTION: Do not apply pressure to force the firing-pin assembly into the bomb. The assembly may collapse and fire the signal.

9. Rotate the firing-pin assembly so that the two notches in the lip line up with the two pin holes in the bomb nose. Do not apply pressure to the firing pin during this operation.

10. Insert the cotter pin through the nose holes and the recesses in the firing-pin assembly.

11. Spread the ends of the cotter pin with a screwdriver sufficiently to retain the pin in the bomb. Do not bend the ends of the cotter pin at a right angle to the axis of the cotter pin or strike the ends to bend them into position.

> CAUTION: Be extremely careful when handling practice bombs loaded with signals. Jarring or dropping the bomb may detonate the signal. Do not, under any circumstances, point either end of the signal toward other personnel. Loaders must not place their bodies in line with the nose or tail ends of the bombs.

Disassembly

To disassemble the complete bomb, the previous steps should be carried out in reverse order and the components restored to their original condition.

Assembly With the Mk 5 Type Signal

1. Prepare the bomb in accordance with steps 1 through 6 of the assembly instructions for the Mk 4 type signal.

2. Insert the signal with the small end toward the tail of the bomb.

3. Secure the signal in the bomb by replacing the cotter pin.

4. Spread the ends of the cotter pin sufficiently to lock it in place.

5. Retain the discarded firing-pin assemblies as spares or return them to the nearest supply point.

signers and would constitute a very powerful addition to aircraft armament.

The official name of the rocket was the 5-inch HVAR. But during its development it was nicknamed Holy Moses. This nickname, which was applied by Conway Snyder of the projectile design group, passed into general use as an appropriate tribute to the power of the rocket.

Some of the characteristics of Holy Moses have already been mentioned. The others are worth listing: Over-all length, 72 inches; total weight, 140 pounds. The velocity (at 70° F.) is 1375 feet per second; so the designers got better than the 1175 feet per second of the 3.5-inch AR. Eventually two models were produced; one with a base fuze and a semi-armor-piercing head; the other, with both base and nose fuzes. Since enemy shipping would be among the probable targets for Holy Moses in Service use, a sphere-ogive head was developed (following the general pattern of the sphere-ogive head for the 3.5-inch AR), to give the round a longer, flatter underwater trajectory and hence a better chance of holing the hull.

Launchers were no problem. Both rail and zero-length launchers were as suitable for Holy Moses as for the previous aircraft rockets. By the time Holy Moses went into Service use, however, the zero-length launchers, because of their lower drag, were superseding the rails, and the types of aircraft which would be armed with HVAR were equipped with zero launchers.

By the spring of 1944, the California Institute was involved in interim production of Holy Moses. The Production Section was turning out 150 to 200 rounds daily, and had undertaken a commitment to produce 35,000 rounds by October 1944. Ultimately, when Bureau of Ordnance production reached sufficient volume Holy Moses would probably have almost completely replaced the 5-inch aircraft rocket as a Service round; but as late as March 1945 production was still limited, and distribution of rounds was under allocation by the Joint Chiefs of Staff since the AAF had put in bids for them.

Holy Moses first went into combat use in July 1944, under dramatic circumstances which will be detailed later.

Subcaliber Aircraft Rockets

The interval between the experimental development of the first aircraft rockets by the California Institute group and the introduction of those rockets into Service use was a relatively short one. The result was that the rockets were being fired against the enemy and larger and larger requirements for them were developing before the Bureau of Ordnance could secure any considerable volume of production from its contractors. And as aircraft rockets demonstrated their usefulness, the Navy kept expanding its program for training pilots to use them. Adequate training, of course,

could not be done without the firing of rockets. All this combined to create an acute shortage of ammunition.

Anticipating some such difficulty, and thinking also in general terms of the advantages of economizing on propellant, the Institute group (with Bureau of Ordnance co-operation) began, quite early in the aircraft-rocket development program, to design a subcaliber round which could be used, instead of the full-size ammunition, for pilot training.

These subcaliber aircraft rockets (commonly known as SCAR's) were designed with a 2.25-inch motor carrying a 3-ridge tubular propellant grain of solventless-extruded ballistite, similar to the grain already developed for the 4.5-inch barrage rocket. In general external form and aerodynamical characteristics, the SCAR's matched the full-size rockets. By varying the amount of propellant, one SCAR had a trajectory approximating that of the 3.5-inch AR and the 5-inch HVAR (this was the so-called fast SCAR) and another to match that of the 5-inch AR (the slow SCAR). As experience in pilot training accumulated, however, it became clear that if adequate sighting tables were available, this range of velocities was not necessary. Interim pilot production of SCAR's by the Institute — a total of 100,000 rounds, completed in June 1944 — included both velocities, but the Bureau of Ordnance production, which was reported to be scheduled at the rate of 500,000 rounds per month,[4] was concentrated, after January 1945, on the fast SCAR. So that pilots in land training could more easily spot ground impacts, the Bureau incorporated into its production rounds a modified head which emitted a smoke puff upon hitting the ground.

Launchers presented no particular problem with the SCAR. With the lug-band button suspension, they could be launched from the slotted rails in the same fashion as the full-size rockets. For the zero-length launchers, it was necessary to develop an adapter rail. This was a shorter slotted rail which could be attached to the posts of the zero-length installations, and from which the SCAR could be fired, just as from the standard, full-size rail.

Tiny Tim

Development of the aircraft rockets already described gave Navy aircraft a much greater striking power than they had had before. For area bombardment and the destruction of heavy structures, aircraft rockets could not compete with bombs or heavy artillery fire, but for small targets such as submarines, shipping, antiaircraft gun positions, ammunition and oil storage dumps, tanks, and locomotives, they enabled pilots to make hits with the equivalent of 5-inch shells. This fire power and accuracy, plus the comparative ease with which rockets could be mounted on and

[4]Bureau of Ordnance production of SCAR's reached the impressive total of 5,000,000 rounds.

(3) Fill bomb body completely with sand to within approximately ¼ inch below the shoulder of the head. This requires approximately 80 pounds of sand. No water will be added to the sand.

(4) Assemble head cover by means of a wooden rammer. The head cover is a snug fit to the head so that when assembled sand will be prevented from working back into the sleeve.

(5) Insert the charge, spotting, assembly, M1A1, practice bomb, 100-pound, M38A2, into the sleeve with the fuze and arming pin in the positions shown in figure 62. When so assembled, the slots in the cover of the charge engage in raised portions of the sleeve, thus preventing any longitudinal movement or rotation of the charge. See that the split end of the cotter pin points toward the nose of the bomb.

(6) Thread the arming wire through the rear suspension lug and through the inner of the two holes in the arming pin. This hole, normally concealed, is exposed by a slight pressure on the head of the arming pin.

(7) Adjust arming wire to protrude from 2 to 3 inches beyond the arming pin. No safety clip will be used and the cotter pin will remain in its place until the bomb is installed in the plane.

NOTE.—After the bomb is installed in the bomb rack, the cotter pin will be withdrawn from the arming pin in accordance with instructions on tag. When removing the cotter pin, care will be exercised not to disturb the adjustment of the arming wire.

SECTION XI

DRILL BOMBS

88. Drill bombs.—*a.* These bombs are provided for training and practice in assembling, fuzing, and handling operations. They are fitted with adapters to take inert fuzes of standard models. The following drill bombs are of the same size, shape, and weight as the corresponding service bombs:

100-pound, M30.
300-pound, M31.
500-pound, M43.
600-pound, M32.
1,000-pound, M44.
1,100-pound, M33.
2,000-pound, M34.

These bombs contain no explosive and are painted black or olive drab with black bands and appropriately marked to distinguished them from explosive bombs.

ance with instructions on the tag attached thereto. When removing the cotter pin, care will be exercised not to disturb the adjustment of the arming wire. Should it be necessary to disassemble the complete round into its components, the above steps will be carried out in the reverse order and the components restored to their original condition and packings.

87. Bomb, practice, 100-pound, M38A2 (drg. 82-0-23).—*a. General.*—This bomb, with principal data and marking, is shown as a complete round assembly in figure 62. When loaded the assembled bomb weighs approximately 100 pounds. For the complete round assembly, the following components are required:

Bomb, practice, 100-pound, M38A2, less spotting charge.
Charge, spotting, assembly, M1A1, practice bomb, 100-pound, M38A2.
Wire, arming, assembly, piece mark 82-3-234W.

These components are shown as received with packing material removed in figure 63. Packing and marking of the packing boxes are shown in figure 64.

b. Description.—The sheet metal bomb body is designed for sand loading to weight at point of use. The box type fin is welded to the body. As shipped, a sleeve cover is fitted over the end of the spotting charge receiver (sleeve). Within is a metal disk which is placed in the bottom of the receiver after the bomb has been sand-loaded. The disk is provided to prevent the sand filler from working out into the spotting charge receiver. The spotting charge is a composite assembly consisting of a fuze, primer and igniting charge, and spotting charge. The fuze is of the arming pin type fitted to, and extending through, the end of the spotting charge container. The primer and igniting charge are in the form of a blank loaded 28-gage shotgun shell, fitted to the inner end of the fuze. The spotting charge, 3 pounds of black powder, is assembled loosely in the container. The complete assembly is moisture resistant and will not be disassembled under any circumstances. There are two eyelets in the small end of the arming pin. A small, freely fitting sleeve is assembled over the end of the arming pin, which is held in place by a cotter pin in the outer of the two holes. This sleeve makes the cotter pin more accessible and provides for proper arming wire resistance. It is therefore important that this sleeve is always in place and that it is a loose fit on the arming pin. The inner hole, through which the arming wire is threaded, is exposed by a slight pressure on the head of the arming pin.

c. Assembly and disassembly (fuzing and unfuzing).—(1) Remove sleeve cover from sleeve (loading tube).

(2) Remove head cover from sleeve. The head cover is assembled loosely in the sleeve during shipment.

its components, the above steps will be carried out in the reverse order and the components restored to their original condition and packings.

86. Bomb, practice, 20-pound, M48 (drg. 82-C-44).—*a. General.*—This practice bomb is essentially the same as the M45 described above except that it is fitted with an arming vane impact type fuze. It weighs approximately 20.5 pounds. For the complete round assembly, the following components are required:

Bomb, practice, 20-pound, M48, unfuzed, without spotting charge assembly.
Charge, spotting, assembly, practice bomb, 20-pound, M45 or M48 (black powder).
Fuze, bomb, M110 (nose).
Wire, arming, assembly, piece mark 82-3-234H.

b. Description.—A hole in the side of the bomb, covered by a sheet metal disk, is provided for the escape of the smoke for practice charge.

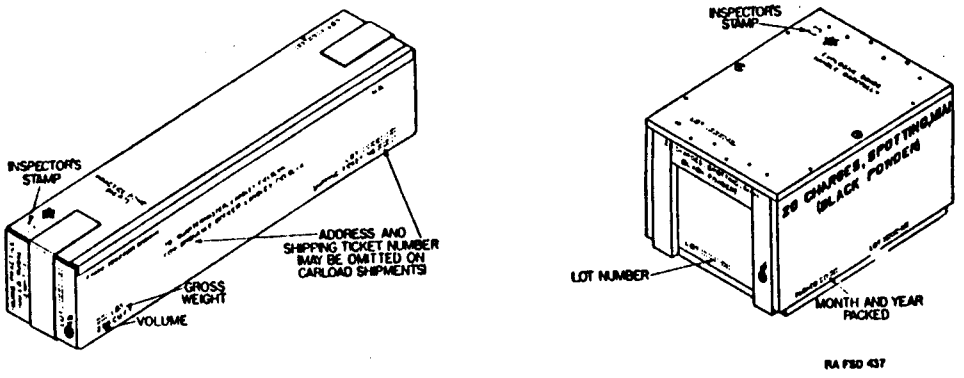


FIGURE 64.—Packing and marking of packing boxes for bomb, practice, 100-pound, M38A2.

The suspension lug on the side of the bomb body is provided for horizontal suspension, while the suspension lug at the tail is provided for vertical suspension. Principal dimensions are shown in figure 60.

c. Assembly and disassembly (fuzing and unfuzing).—The prior examination of components prescribed in paragraph 18 is to insure that all components at the bomb fuzing point are serviceable. The complete round is assembled as follows: After removing the nose closing plug, insert the practice charge and assemble the fuze as prescribed in paragraph 30. The bomb is now an assembled complete round, ready for installation in the bomb rack.

NOTE.—If the bomb is assembled for installation in a horizontal rack, the arming wire must be shortened. For assembly for horizontal suspension, cut the wire to such length that when the swivel loop is placed approximately 2½ inches to the rear of the suspension lug on the side of the bomb, the free end of the wire will protrude from 2 to 3 inches beyond the arming pin. After the bomb is installed in the bomb rack, the cotter pin is withdrawn from the fuze in accord-

These components are shown as received with packing material removed in figure 61.

b. Description.—A hole in the side of the bomb, covered by a sheet metal disk, is provided for the escape of the smoke for practice charge. The suspension lug on the side of the bomb body is provided for horizontal suspension, while the suspension lug at the tail is provided for vertical suspension. Principal dimensions are shown in figure 60.

c. Assembly and disassembly (fuzing and unfuzing).—The prior examination of components prescribed in paragraph 18 is to insure

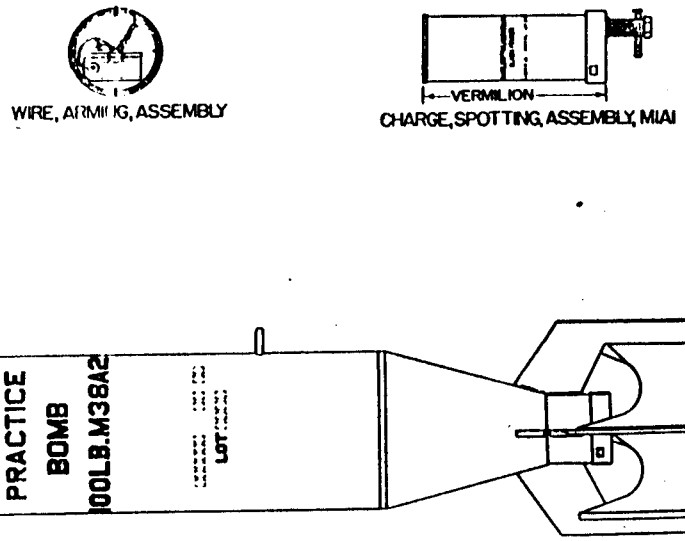


FIGURE 63.—Components required for complete round No. 543, bomb, practice, 100-pound, M38A2.

that all components at the bomb fuzing point are serviceable. The complete round is assembled as follows: After removing the nose closing plug, insert the practice charge and assemble the fuze as prescribed in paragraph 27. The bomb is now an assembled complete round, ready for installation in the bomb rack.

NOTE.—If the bomb is assembled for installation in a horizontal rack, the arming wire must be shortened. For assembly for horizontal suspension, cut the wire to such length that when the swivel loop is placed approximately 2½ inches to the rear of the suspension lug on the side of the bomb, the free end of the wire will protrude from 2 to 3 inches beyond the arming pin. After the bomb is installed in the bomb rack, the cotter pin is withdrawn from the fuze in accordance with instructions on the tag attached thereto. When removing the cotter pin, care will be exercised not to disturb the adjustment of the arming wire. Should it be necessary to disassemble the complete round into

Charge, spotting, assembly, practice bomb, 20-pound, M45 or M48 (black powder).
Fuze, bomb, mechanical time, M107 (nose).
Wire, arming, assembly, piece mark 82-3-234G.

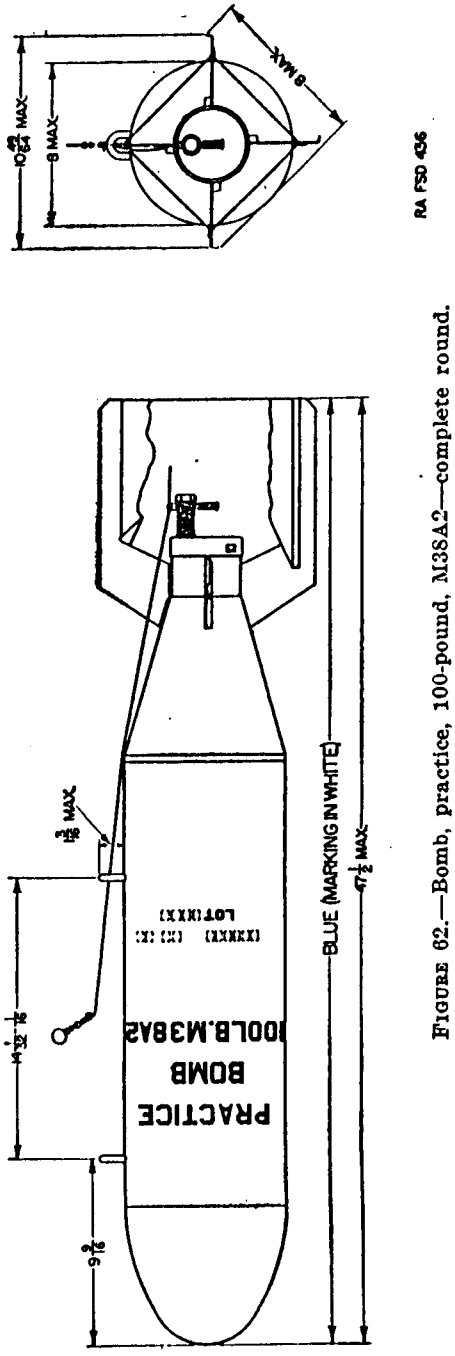


FIGURE 62.—Bomb, practice, 100-pound, M38A2—complete round.

D-4

charge. With delay action approximtely 0.5 cubic yard of earth is displaced per pound of explosive.

41. **Bomb, general purpose, 100-pound, AN–M30.**—*a. General.*—This bomb was formerly designated bomb, demolition, 100-pound, M30, which is shown as a complete round assembly in figure

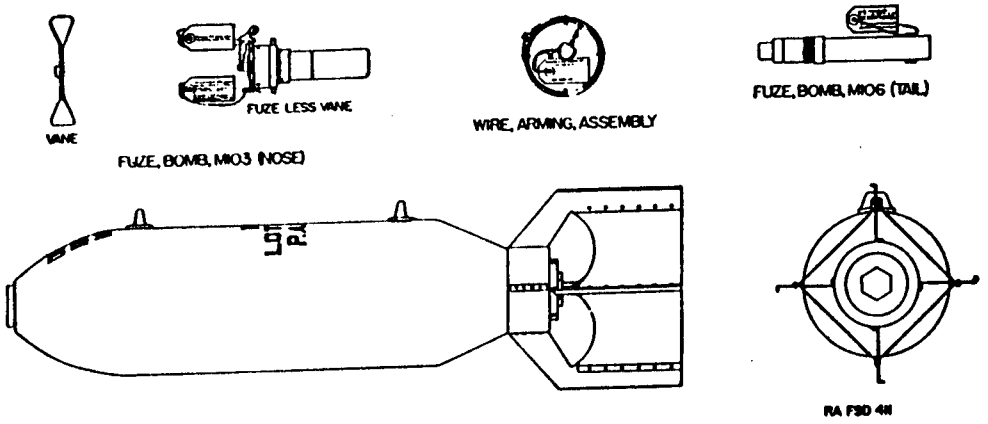


FIGURE 18.—Components required for complete round No. 480, bomb, demolition, 100-pound, M30.

17. It weighs approximately 107 pounds and is intended for destructive effect against such targets as railway equipment and trackage, small buildings, ammunition dumps, airplanes on the ground, hangars, etc. For components required for assemblies for special

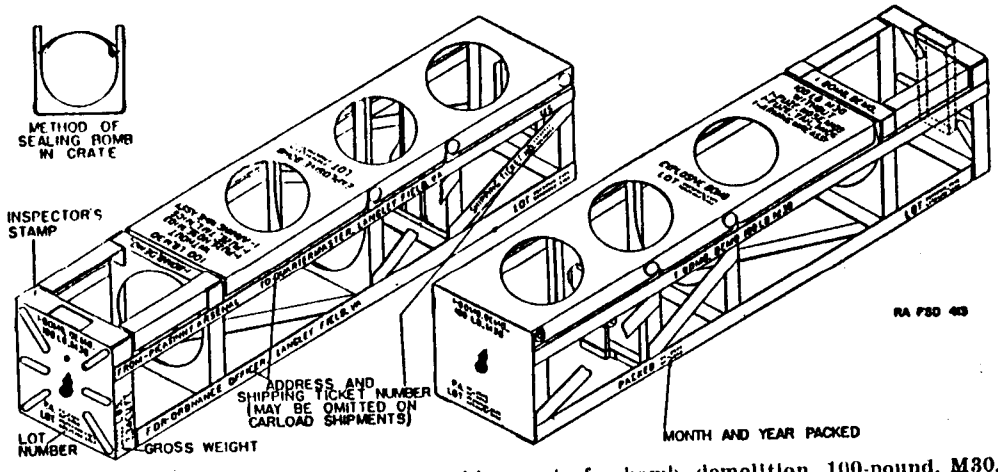


FIGURE 19.—Packing and marking of packing crate for bomb, demolition, 100-pound, M30.

purposes, see paragraph 40. For the standard complete round assembly, the following components are required:

Bomb, general purpose, 100-pound, AN–M30, unfuzed.
Fuze, bomb, AN–M103 (nose).
Fuze, bomb, AN–M100A1 (tail), or fuze, bomb, M106 (tail).

Wire, arming, assembly, piece mark 82–3–234U (with fuzes AN–M103 and M106), or 82–3–234 X A (with fuzes AN–M103 and AN–M100A1).

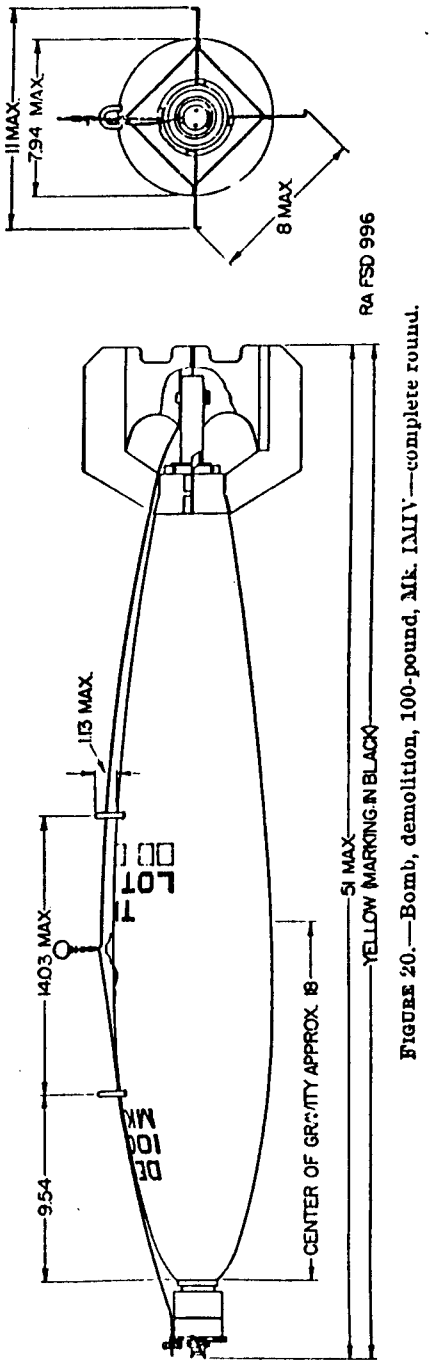


FIGURE 20.—Bomb, demolition, 100-pound, Mk. I AN—complete round.

Components for the standard assembly are shown as received but with packing material removed in figure 18. Packing and marking of the packing crate are shown in figure 19.

delay action is used to produce a mining effect or where it is desired that the bomb explode after it has penetrated the target. Long

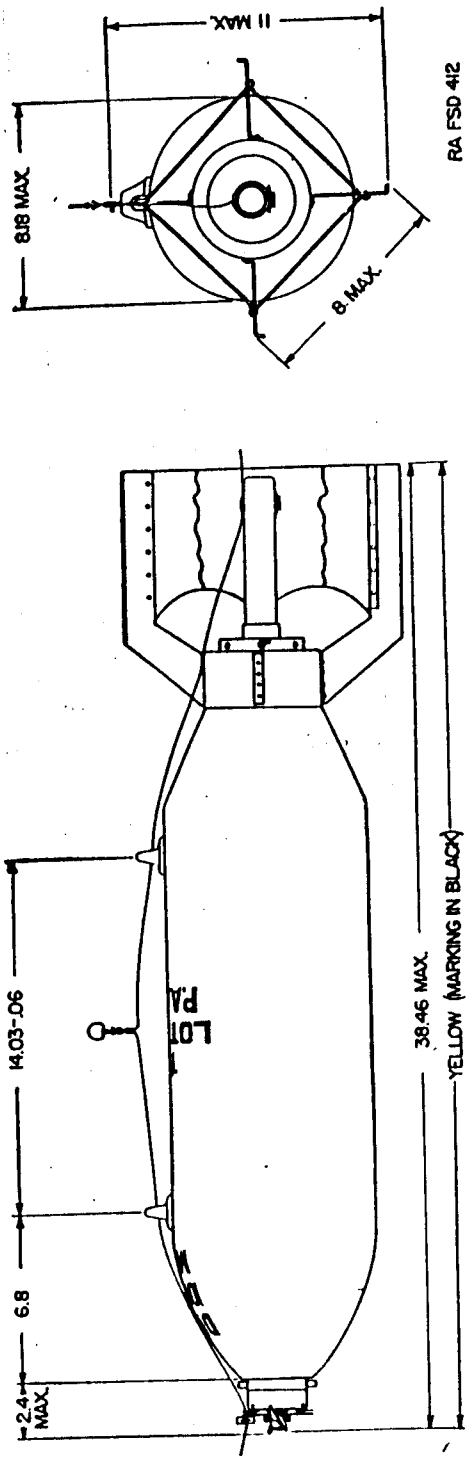


FIGURE 17.—Bomb, demolition, 100-pound, M30—complete round.

delay action, 45 seconds or more, is used for special purposes. With instantaneous action the blast effect varies approximately inversely as the square of the distance and directly as the weight of the

D-4

b. Description.—This bomb (fig. 17) is a cylindrical type bomb having a box type fin. It contains approximately 57 pounds of high explosive and is adapted for both a nose and a tail fuze. To keep the fuze cavities free of foreign matter, closing plugs are fitted to the adapter openings. Principal dimensions are shown in figure 17.

c. Assembly and disassembly (fuzing and unfuzing).—The prior examination of components prescribed in paragraph 18 is for the purpose of insuring that all components at the bomb fuzing point are serviceable. For assemblies for special purposes, see paragraph 40. The standard complete round is assembled as follows:

(1) *Tail fuze.*—After removing the tail closing plug, assemble tail fuze as prescribed in paragraph 38. Tighten fin lock nut if necessary.

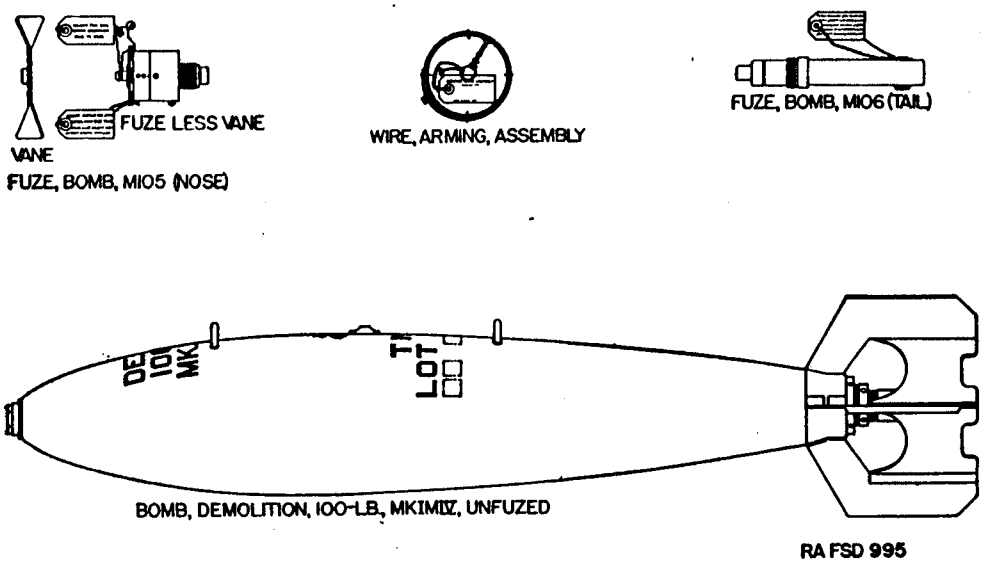


FIGURE 21.—Components required for complete round No. 482, bomb, demolition, 100-pound Mk. IMIV.

(2) *Nose fuze.*—After removing the nose closing plug, assemble nose fuze as prescribed in paragraph 24. The bomb is now an assembled complete round ready for installation in the bomb rack.

NOTE.—After the bomb has been installed in the bomb rack, the cotter pins are to be removed from the fuzes in accordance with instructions on the tags attached thereto. Should it be necessary to disassemble the complete round into its components, the above steps will be carried out in the reverse order and the components restored to their original condition and packings.

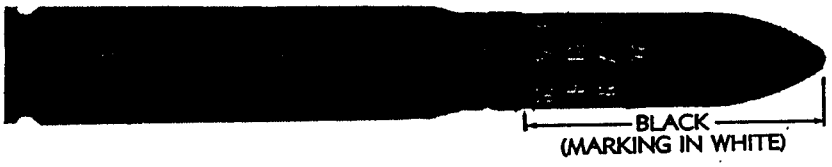
42. Bomb, demolition, 110-pound, Mk. IMIV (drg. 82-0-30).—*a. General.*—This bomb, with principal data and marking is shown as a complete round assembly in figure 20. It weighs approximately 122 pounds and is intended for destructive effect against such targets as railway equipment and trackage, small buildings, ammunition

D-4

21. CARTRIDGE, HE-I, MK. I, W/FUZE, P. D., 253 MK. II-III, 20-MM GUNS, M1, AN-M2, M3, AND BR. H.S./A/ (fig. 24), is for use against aircraft and light materiel targets, functioning with both explosive and incendiary effect. The explosive filler is tetryl and the incendiary mixture is located in the base of the shell. After the shell penetrates the target, the high-explosive filler is detonated, the shell is shattered, and the incendiary composition is ignited. Its fuze is an instantaneous percussion fuze of the impact type. The thickness of the base is only 0.15 inch and a base cover is present for additional protection.

DATA

Weight of complete round	0.57 lb	Width of rotating band	0.203 in.
Length of complete round	7.19 in.	Type of base	Square
Length of fuzed projectile	3.22 in.	Radius of ogive	3.27 cal.
Length of cartridge case	4.34 in.	Muzzle velocity	2,800 ft per sec
Maximum range	5,100 yd		



RA PD 80695

Figure 25 — CARTRIDGE, AP-T, M75, 20-mm Guns, M1, AN-M2, M3, and Br. H.S./A/

22. CARTRIDGE, AP-T, M75, 20-MM GUNS, M1, AN-M2, M3, AND BR. H.S./A/ (fig. 25), is for use against armored targets. The projectile is a solid steel shot, turned from cold-drawn steel bar stock. The base of the projectile contains a red tracer composition which is sealed in by means of a metal closing cup. When ignited, the tracer burns for about 4 seconds, equivalent to a range of about 3,000 yards.

DATA

Weight of complete round	0.639 lb	Radius of ogive	2.39 cal.
Length of complete round	7.22 in.	Muzzle velocity	2,615 ft per sec
Length of projectile	3.25 in.	Maximum range	6,300 yd
Length of cartridge case	4.34 in.	Penetration (in. at 0-deg obliquity of face-hardened plate at 1,000 yd)	0.6
Width of rotating band	0.203 in.		
Type of base	Square		

percussion fuze of the impact type. The thickness of the base is approximately 0.2 inch, and a base cover is welded thereon for additional protection. This cartridge differs basically from the HE-I cartridge, described in paragraph 21, by having a pointed fuze.

RA PD 65137

Figure 29 — CARTRIDGE, HE-I, T23 (M97), w/FUZE, P.D., T71E4 (M75), 20-mm Guns, M1, AN-M2, M3, and Br. H.S./A/

DATA

Weight of complete round	0.57 lb	Width of rotating band	0.203 in.
Length of complete round	7.22 in.	Type of base	Square
Length of fuzed projectile	3.28 in.	Radius of ogive	2.54 cal.
Length of cartridge case	4.34 in.	Muzzle velocity	2,800 ft per sec
Maximum range	5,750 yd		

RA PD 65136

Figure 30 — CARTRIDGE, Practice, T24 (M99), 20-mm Guns, M1, AN-M2, M3, and Br. H.S./A/

27. CARTRIDGE, PRACTICE, T24 (M99), 20-MM GUNS, M1, AN-M2, M3, AND BR. H.S./A/ (fig. 30), is for practice firing. The projectile is similar in shape and ballistic properties to the T18 (M96) Incendiary Projectile but is hollow and contains no explosive. The nose consists of a zinc die casting as in the T18 (M96) Incendiary but its weight is adjusted to give the projectile a weight of 2,000 grains (0.29 lb). The projectile body is made of cold-drawn steel.

DATA

Weight of complete round	0.57 lb	Width of rotating band	0.203 in.
Length of complete round	7.22 in.	Type of base	Square
Length of projectile	3.27 in.	Radius of ogive	2.54 cal.
Length of cartridge case	4.34 in.	Muzzle velocity	2,800 ft per sec
Maximum range	5,750 yd		

TECHNICAL MANUAL
No. 9–1990

WAR DEPARTMENT,
WASHINGTON, May 23, 1942.

SMALL-ARMS AMMUNITION

*This manual supersedes TR 1350–A, May 18, 1934, including C 1, January 2, 1935; C 2, January 2, 1936; C 3, January 3, 1938; C 4, January 3, 1939; and C 5, October 20, 1939.

SECTION II

CARTRIDGE, ARMOR-PIERCING, CALIBER .50, M2

84. Description.—*a. General.*—This cartridge (fig. 22) is a current standard item of issue for all caliber .50 machine guns. It is designed for use against armored aircraft, armored vehicles, concrete shelters, and similar bullet-resisting targets.

b. Visual identification.—This cartridge may be identified by the blackened tip of the bullet.

c. Components.—(1) The cartridge consists of a cartridge case, primer, propelling charge, and bullet. The complete assembly weighs 1,800 grains.

(2) The cartridge case, primer, and propelling charge are described in section II, chapter 1.

(3) The bullet (fig. 21) consists of three parts—a gilding metal jacket, a hardened steel core, and a point filler of an antimony-lead alloy. The over-all length of the bullet is 2.29 inches and the point is blackened for approximately 9/16 inch. The base has a 9° taper beginning .386 inch from the base. The mouth of the case is crimped into cannelure at assembly and a minimum pull of 100 pounds is required to extract the bullet from the case.

85. Exterior ballistics.—*a. Maximum range.*—Approximately 7,200 yards.

b. Maximum pressure.—52,000 pounds per square inch.

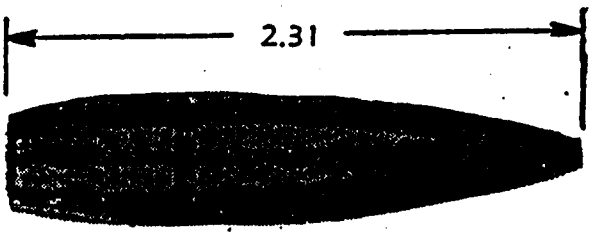
c. Velocity.—(1) At 78 feet, 2,900 feet per second.

(2) Muzzle, 2,935 feet per second.

d. Accuracy.—At the time of acceptance, this ammunition will group within a mean radius not greater than 8.0 inches at 500 yards or 9.0 inches at 600 yards.

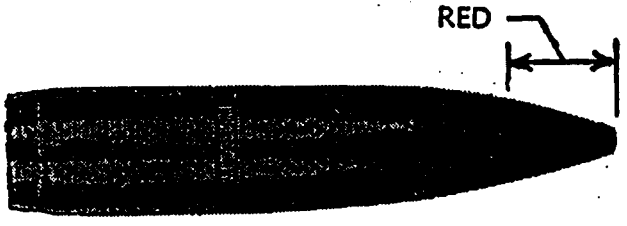
e. Table of fire.

Range	Angle of elevation	Time of flight	Maximum ordinate	Angle of fall
Yards	*Mils*	*Seconds*	*Yards*	
0	0	0	0	0
200	1.2	.22	.1	1.4
400	2.7	.46	.3	3.3
600	4.3	.72	.7	5.2
800	6.1	1.00	1.4	7.4
1,000	8.2	1.32	2.4	10.5
1,200	10.7	1.69	3.9	15.4
1,400	13.7	2.10	6.0	22.0
1,600	17.3	2.56	8.9	30.5
1,800	21.5	3.07	12.7	40.6
2,000	26.3	3.61	17.5	52.3



BULLET, BALL, CAL. .50, M2

BULLET, ARMOR-PIERCING, CAL. .50, M2



BULLET, TRACER, CAL. .50, M1

RA PD 4526

FIGURE 22.—Bullets, caliber .50.

D-6

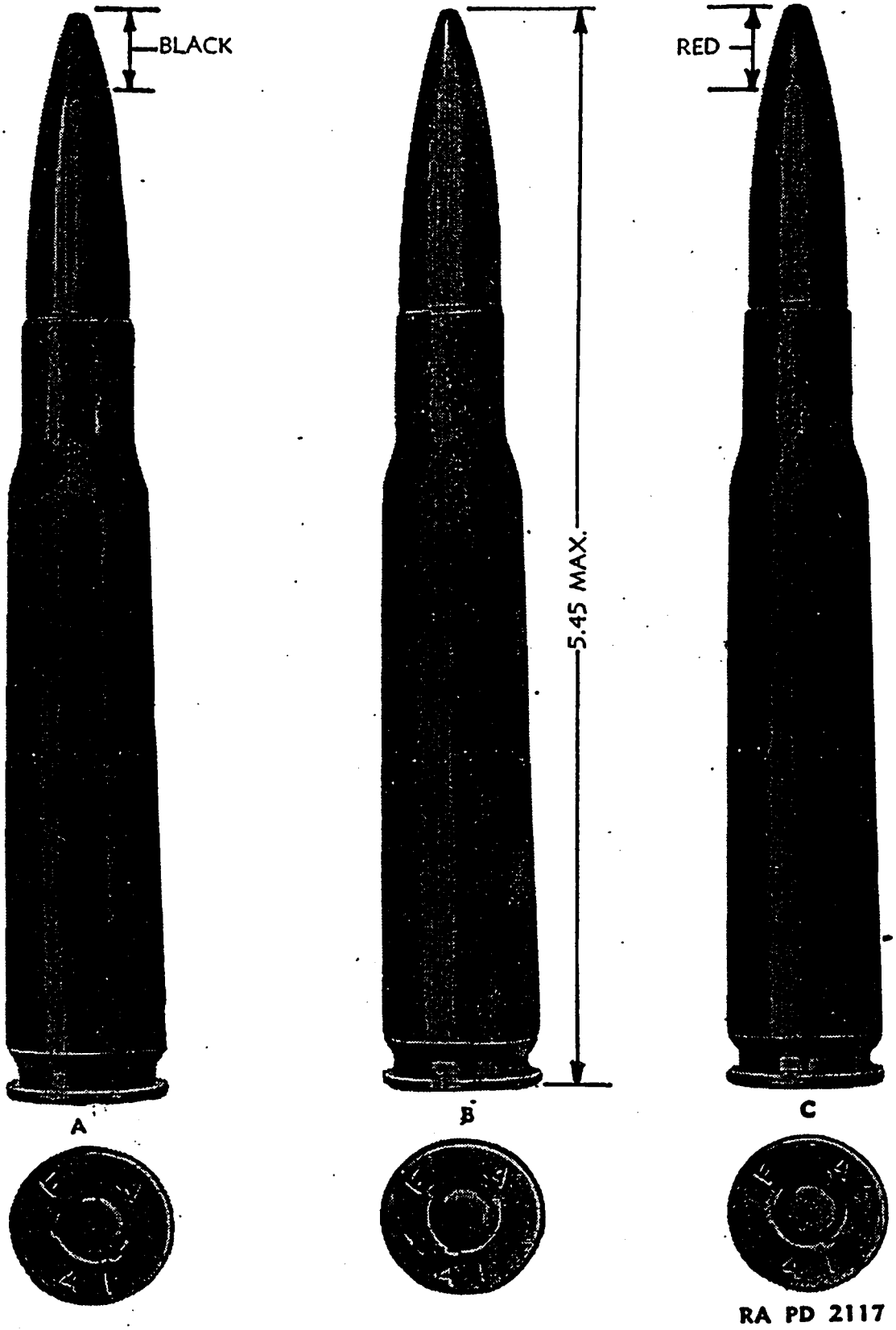


FIGURE 23.—Armor-piercing, ball, and tracer cartridges, caliber .50.

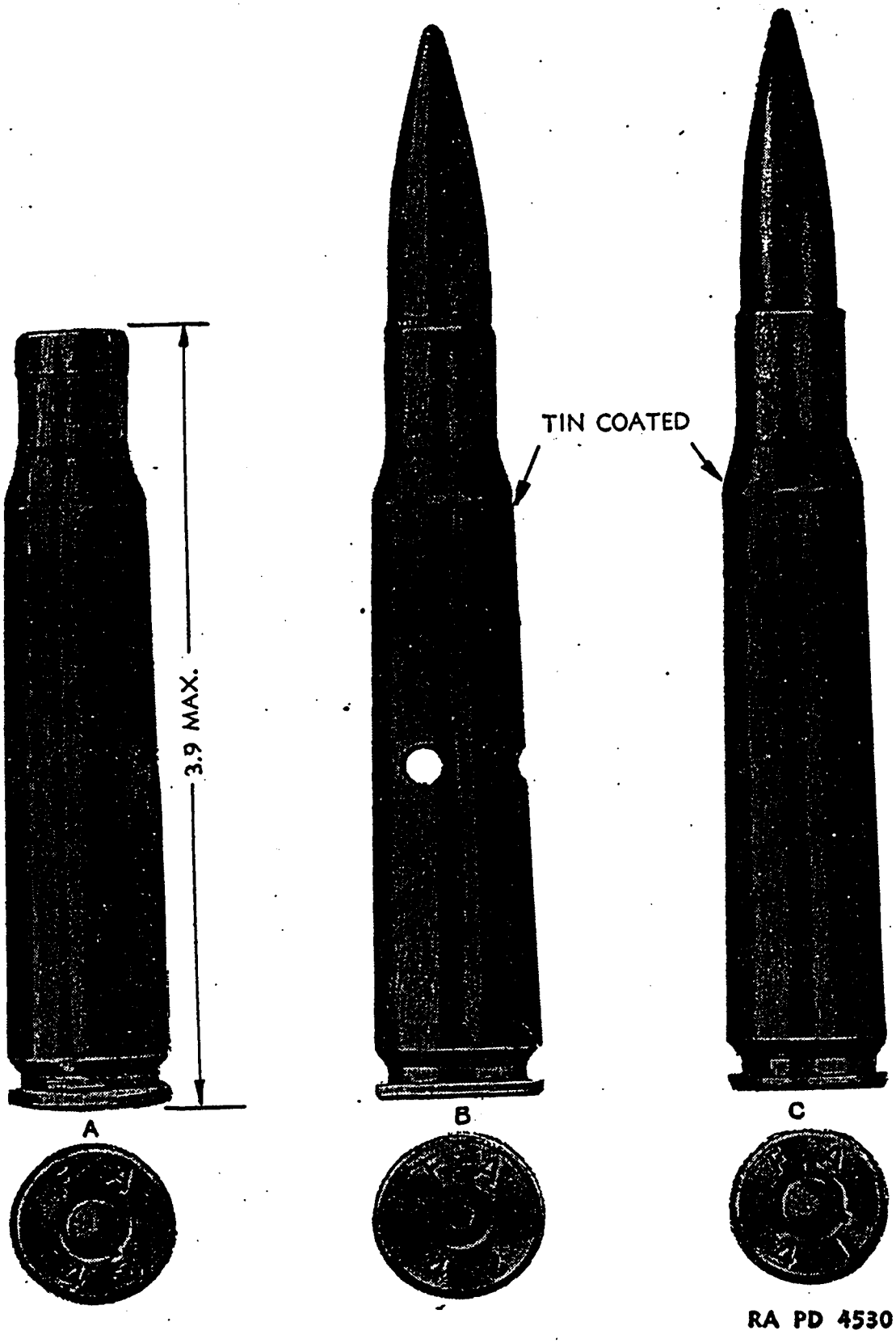


FIGURE 24.—Blank, dummy, and high-pressure test cartridges, caliber .50.

SECTION III

CARTRIDGE, BALL, CALIBER .50, M2

86. Description.—*a. General.*—This cartridge (fig. 23) is a standard cartridge for caliber .50 machine guns.

b. Visual identification.—This cartridge does not have any identification markings and the tip of the bullet is not painted.

c. Components.—(1) The cartridge consists of cartridge case, primer, propelling charge, and bullet. The complete assembly weighs 1,800 grains.

(2) The cartridge case, primer, and propelling charge are described in section II, chapter 1.

(3) The bullet (fig. 22) consists of three parts: a gilding metal jacket, a soft steel core, and a point filler of antimony-lead alloy. The over-all length of the bullet is 2.29 inches. The base has a 9° taper beginning at a point .386 inch from the base. The mouth of the case is crimped into the cannelure at assembly and a minimum pull of 100 pounds is required to extract the bullet from the case.

87. Exterior ballistics.—*a. Maximum range.*—Approximately 7,200 yards.

b. Maximum pressure.—52,000 pounds per square inch.

c. Velocity.—(1) At 78 feet, 2,900 feet per second.

(2) Muzzle, 2,935 feet per second.

d. Accuracy.—At the time of acceptance, this ammunition will group within a mean radii not greater than 8.0 inches at 500 yards, or 9.0 inches at 600 yards, when fired from an accuracy rifle held in a V-block.

e. Trajectory.—The trajectory of this ammunition is the same as the trajectory of the cartridge, armor-piercing, caliber .50, M2.

SECTION IV

CARTRIDGE, TRACER, CALIBER .50, M1

88. Description.—*a. General.*—This cartridge (fig. 23) is standard for observation of fire in all caliber .50 machine guns. It may also serve as an incendiary against balloons and other readily inflammable targets. Care must be exercised in the use of this cartridge to guard against its igniting dry vegetation on the range.

b. Visual identification.—This cartridge may be identified by the point of the bullet, which is painted red to indicate the color of the trace.

c. Components.—(1) The cartridge consists of cartridge case, primer, propelling charge, and bullet. The complete assembly weighs 1,760 grains.

(2) The cartridge case, primer, and propelling charge are described in section II, chapter 1.

(3) The bullet (fig. 22) consists of three parts—a gilding metal jacket, a hardened lead slug which fills the forward end of the jacket, and tracer and igniter compositions which fill the balance. Unlike the bullets for armor-piercing and ball cartridges, this bullet is cylindrical to the base which is open to permit the propelling charge to ignite the tracer composition. The over-all length of the bullet is 2.4 inches. The mouth of the case is crimped into the cannelure at assembly and a minimum pull of 100 pounds is required to extract the bullet from the case.

89. Exterior ballistics.—*a. Maximum range.*—(1) *Bullet.*—3,500 yards.

(2) *Trace.*—The trace begins at a distance not greater than 250 feet from the weapon; the range of the trace is about 1,600 yards.

b. Maximum pressure.—52,000 pounds per square inch.

c. Velocity.—(1) At 78 feet, 2,830 feet per second.

(2) Muzzle, 2,865 feet per second.

d. Accuracy.—At the time of acceptance, this ammunition will group within a mean radii not greater than 20 inches at 600 yards.

e. Trajectory.—The trajectory of this ammunition approximates that of the caliber .50 ball and armor-piercing M2 ammunition at ranges near 1,000 yards.

SECTION V

CARTRIDGE, BLANK, CALIBER .50, M1

90. Description.—*a. General.*—The cartridge, blank, caliber .50, M1 (fig. 24) is standard item of issue designed for use in caliber .50 machine gun with a blank firing attachment in order to operate the weapon for training purposes.

b. Visual identification.—This cartridge is identified by the absence of the bullet.

c. Components.—(1) This cartridge consists of case, wad, primer, and propelling charge.

NAVY ROCKETS

2.25-INCH ASSEMBLIES

Motor	Head	Velocity	Approximate Trajectory of
2.25″ Mk 10 or 11	2.25″ Mk 1 or 3 (1.6 lb.)	1150 ft./sec.	3.5″ Rocket (3.25″ Motor)
2.25″ Mk 12 or 13	2.25″ Mk 1 or 3 (1.6 lb.)	810 ft./sec.	5.0″ Rocket (3.25″ Motor)
2.25″ Mk 10 or 11	2.25″ Mk 2 (8.6 lb.)	810 ft./sec.	5.0″ Rocket (3.25″ Motor)

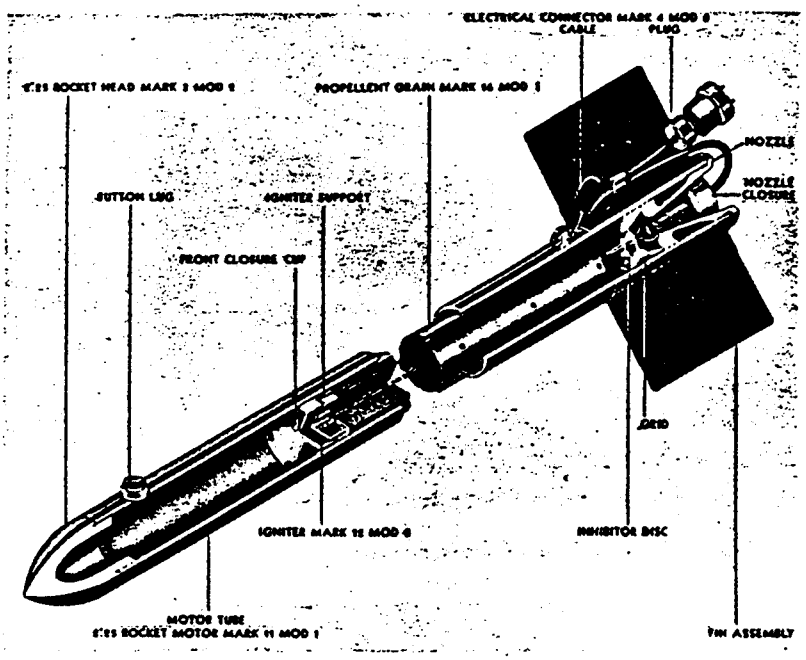


Figure 124. 2.25-inch A.R., Practice

2.25-inch A.R. Practice

General: The 2.25-inch sub-caliber rocket for aircraft was developed for training purposes. Initially, two types were designed to approximate the trajectory of the 3.5-inch and 5.0-inch rockets; however, only the Motor Mk 11 and the Head Mk 3 Mod 2 will be used in future training.

The Mk 1, a California Institute of Technology production, was issued until adopted and issued by Bureau of Ordnance as the Mk 3 Mod 2. The Mk 2, a California Institute of Technology production, was designed as a slow sub-caliber rocket. The complete assembly for the latter is no longer available.

The 2.25-inch Motors Mk 10 and Mk 11 are similar to each other, as are the 2.25-inch Motors Mk 12 and Mk 13. The Motors Mk 10 and Mk 11 differ from the Mk 12 and Mk 13 in that the diameter of the nozzle on the latter is smaller and the weight of the propellant of the Mk 10 and Mk 11 is 1.75 pounds, as compared to the weight of 1.12 pounds in the Mk 12 and Mk 13.

The external dimensions of these rockets are the same. For recognition purposes, the 2.25-inch motors Mk 10 and Mk 11 are painted white with black fins, while the Motors Mk 12 and Mk 13 are grey with black fins.

Motor Mk 11 and Head Mk 3 Mod 2: Over-all length of the rocket is 29 inches. Two button-type lugs are provided on the motor tube, spaced approximately 19 inches apart. Four fins are welded to the after end of the motor tube. The propellant is a cylindrical grain of ballistite weighing approximately 1-¾ pounds.

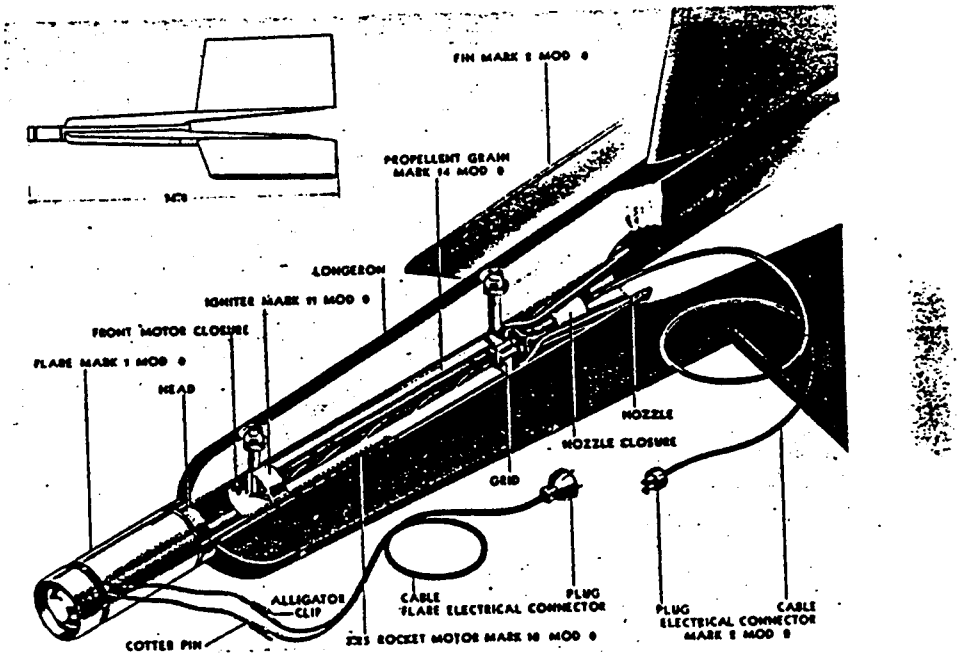


Figure 125. 3.25-inch Target Rocket

3.25-inch Targets

General: As a target for antiaircraft gunners, the rocket is projected with speeds approximating those of an aircraft. It consists of a rocket propulsive unit to which are attached large stabilizing fins, for maximum visibility. Rocket targets are referred to by their assembly number as indicated in the accompanying table. They all consist of a simple rocket motor with three large fins prepared from wooden frames and light-weight fiber board. The fins are 120 degrees apart, each attached by two lugs.

The 3.25-inch Rocket Targets Mk 1 and Mk 2 consist of a motor 36 inches long, to which fins 18 inches by 34 inches are attached. An electrical connection is made by a standard 110-volt plug. The 3.25-inch Target Rocket Mk 1 is standardized at 425 m.p.h. and the Mk 2 at 300 m.p.h. On some models, a screamer is put over the nose end.

The Mks 3 and 4 differ from Mks 1 and 2 in that the motor is heavier and the fins are held on by threaded studs instead of lugs. The ballistics are similar; Mk 3 is like Mk 1, and Mk 4 is like Mk 2.

CHAPTER 3

AIRCRAFT TYPE ROCKETS

Section I. 2.25-INCH, 3.5-INCH, 5.0-INCH, AND 11.75-INCH ROCKETS

63. General

Several Navy type rockets are used by the United States Air Force for forward-firing from aircraft rocket launchers of the post type (zero length), the rail type, the drop type, or the retractable jettisoning type. Ignition is by electric squib or cap through wires and standard plug. The following rockets of similar construction are included in this category. Should it be desirable to check the continuity of their electrical circuits, use continuity circuit tester (par. 14).

2.25-inch rocket (fig. 55)
3.5-inch rocket (fig. 56)
5.0-inch rocket (fig. 57)
5.0-inch high-velocity rocket (figs. 58, 65, 66, and 67)
11.75-inch rocket (figs. 68 and 69)

Note. The components comprising the complete rounds shown in table I are described below. Table II gives physical and ballistic data.

64. 2.25-Inch Rockets

The 2.25-inch forward-firing subcaliber aircraft rockets (SCAR) (fig. 55) are used as practice ammunition in place of the 3.5-inch and 5.0-inch forward-firing aircraft rockets. Their trajectories are intended to be identical with those of the service ammunition for aircraft firing at 70° F., at 20° dive angle, 265 mph, and 1,000-yard range. The rocket consists of a motor approximately 29 inches long with four 3- by 5-inch fins welded in place on the motor body. Two lug buttons are attached to the motor body to engage Mk 6 adapters on the Mk 5 launchers. The 2.25-inch rocket Mk 1 Mod O, using a 1.6-pound head, is used as practice ammunition for the 3.5-inch aircraft rocket or the 5.0-inch high-velocity aircraft rocket. The 2.25-inch rocket Mk 2 Mod O (now obsolescent) used an 8.6-pound head and was used as practice ammunition for the 5.0-inch aircraft rocket. The 2.25-inch rocket Mk 2 Mod 1, using a 1.6-pound head and a motor

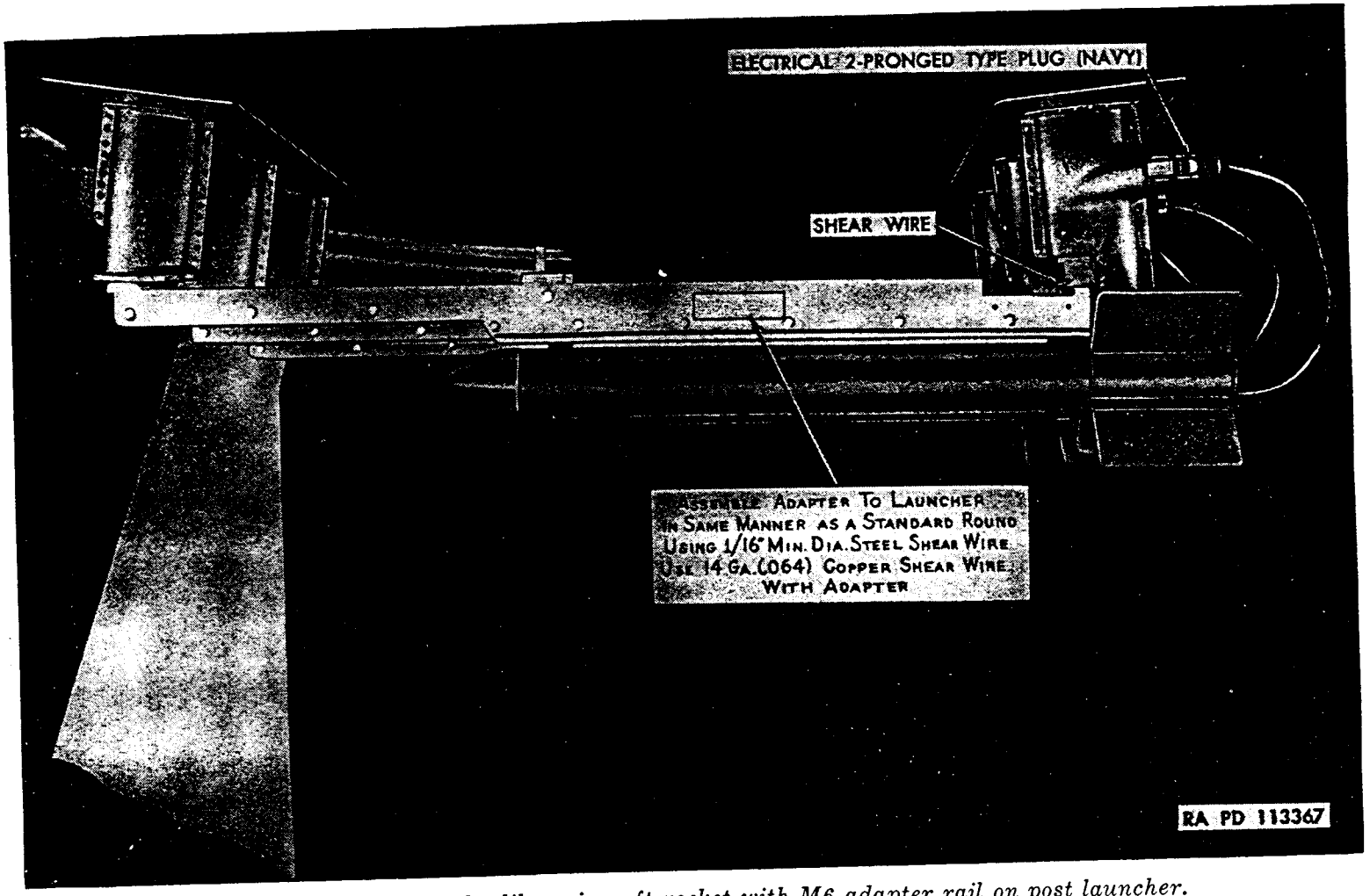


Figure 55. 2.25-inch subcaliber aircraft rocket with M6 adapter rail on post launcher.

with less thrust than that employed with the 2.25-inch rocket Mk 2 Mod 0, is used as practice ammunition for the 5.0-inch aircraft rocket.

65. 3.5-INCH ROCKETS

a. GENERAL. The 3.5-inch aircraft rockets (AR) (tables I and II) are fin-stabilized using the 3.25-inch motor Mk 7 modifications as the propulsive unit (fig. 56). Rockets equipped with a 3.5-inch solid steel head are used against light armored vehicles and for penetrating submarines and other lightly armored vessels.

b. HEAD. The Mk 8 Mod 1 head, which is used in the service round, is a 20-pound solid steel shot, 11.75 inches long, having a double ogive giving it the effect of an ogive of several calibers radius. The head Mk 8 Mod 1, when fired at angles of 20° or less, has a lethal underwater range of 120 feet. Since the Mk 1 (Mods) or Mk 2 (Mods) heads, used on some rounds, have a shorter ogive radius, thus giving them a more blunt appearance, the lethal underwater range of such rounds is only 60 feet; these heads are capable of penetrating 1.5 inches of mild steel at normal incidence. The smoke shell with FS (sulfurtrioxide-chlorsulfonic acid) filler uses the head Mk 6 Mod 0 and the drill (dummy) round uses the head Mk 2 Mod 0. The fuze used in the smoke rocket is the nose fuze Mk 155 Mod 0 (par. 75). The armor-piercing and drill (dummy) round has no fuze.

c. MOTOR. The 3.5-inch rocket uses the motor Mk 7 Mod 0, which consists of a steel tube, 3.25 inch outside diameter, containing a single cruciform inhibited propellent grain supported internally on a grid. The inhibitors, sometimes called deterrents, are of plastic material. They consist of longitudinal strips cemented to the edges of the grain and shaped washers cemented to the front and rear ends of the grain. They control the burning area of the grain, and consequently, the pressure developed in the motor. At the front end of the grain is a black powder igniter and electric squib contained in a plastic case. An electrical connector from the squib terminates in a plug similar to that shown in figure 59. At the rear is the nozzle, which is sealed with a moistureproof closure. The fin assembly, which is reversible, is a metal sleeve with four equally spaced rectangular fins. The sleeve slides over the rear end of the motor and is secured by screwing it onto the tail ring. Front and rear shipping caps are provided to protect the motor during shipment and storage.

d. PREPARATION FOR FIRING AND SAFETY PRECAUTIONS. See paragraphs 71 and 72.

PHYSICAL CHARACTERISTICS:	Mk 76	MK 106 Mod 5	BDU-33D/B	BDU-45/B	BDU-48/B
Weight:	25.0 lb.	5.0 lb.	25.0 lb.	500 lb.	10 lb.
Dimensions:					
Length:	24.64 in.	21.00 in.	23.19 in.	61.38 in.	22.12 in.
Diameter:	4 in.	3.88 in.	4.0 in.	10.75 in.	3.857 in.
SUSPENSION PROVISIONS:	Single lug	Single lug	Single lug	14.0 in.	Single lug

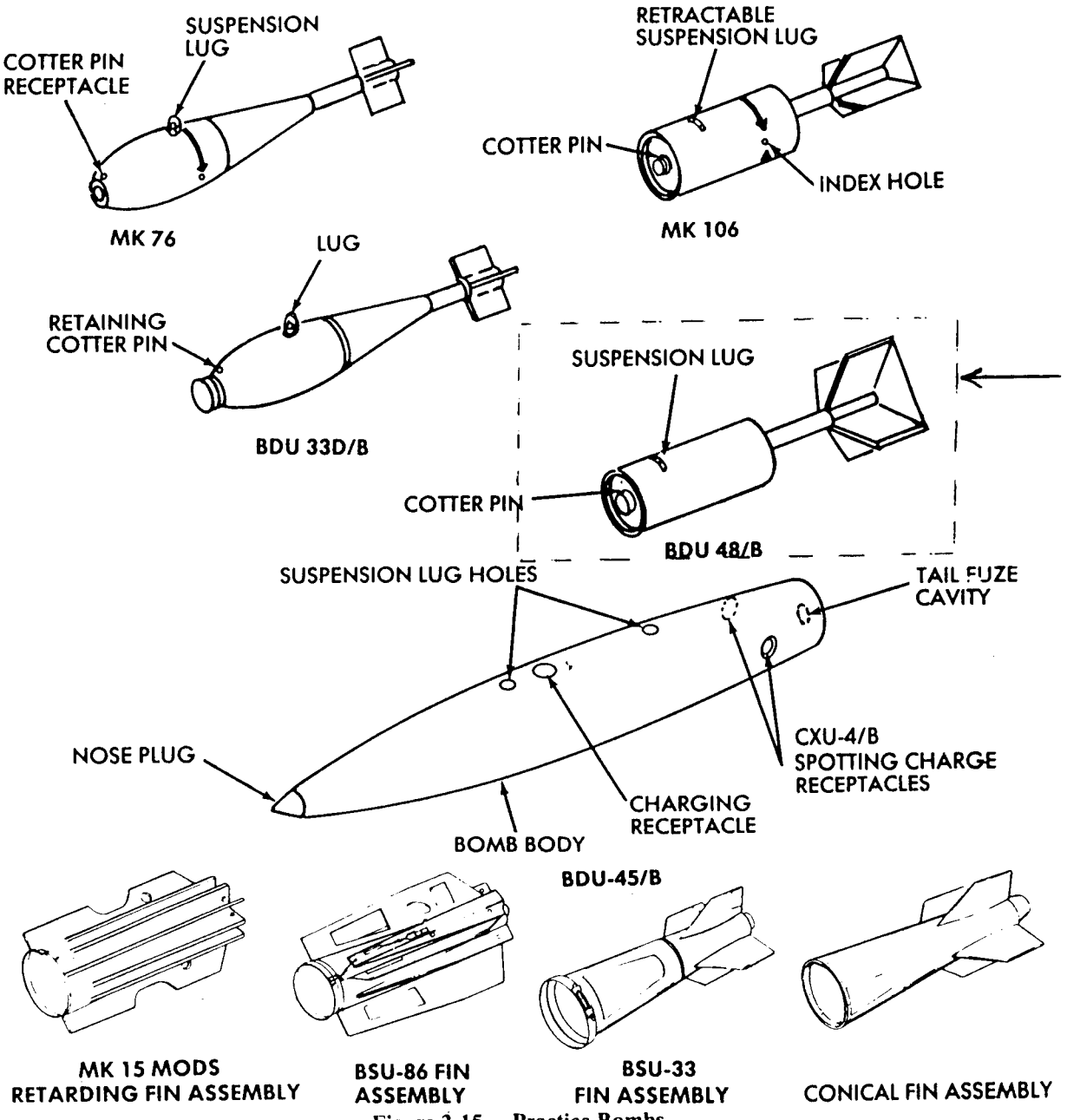


Figure 2-15. Practice Bombs

2-27. MK 76 PRACTICE BOMB. The MK 76 practice bomb is a teardrop-shaped bomb that has a cast metal body and is centrally bored. The fin assembly consists of four fin blades attached to the bomb inner cylinder. The inner cylinder extends to the forward end of the bomb. A firing pin assembly and signal (spotting charge) are retained in the forward end of the bomb inner cylinder with a cotter pin. A single lug is threaded into the bomb body for suspension.

2-28. MK 106 PRACTICE BOMB. The MK 106 practice bomb has a cylinder-shaped body. The box-type fin assembly consists of four fin blades attached to the bomb inner cylinder. The inner cylinder extends through the nose of the bomb. A firing pin assembly and signal (spotting charge) must be installed in the forward end of the bomb inner cylinder. The suspension lug is integral to the bomb body surface.

2-29. BDU-33D/B PRACTICE BOMB. The BDU-33D/B practice bomb has a teardrop-shaped cast metal body that is centrally bored. The tail tube fits into the end of the bore. The conical afterbody covers the tail tube and is crimped to the body. The fin assembly is welded to the tail tube. The bomb is designed for impact firing. The firing pin assembly consists of a firing pin, a collar and a safety block. The firing pin and collar are held in the proper relationship to each other by a shear pin. The safety block, held on the firing pin head by a safety (cotter) pin, prevents the firing pin from moving aft and firing the signal (spotting charge) during ground handling operations. The firing pin assembly is retained in the bomb nose by a retaining cotter pin through the bomb body and the hole in the assembly. The hole diameter in the assembly is larger than the cotter pin diameter to allow the aft movement of the firing pin. When the safety block is removed the collar of the assembly will rest against the rim of the signal (spotting charge) but the firing pin will be held away from the signal (spotting charge) primer by the shear pin. Upon impact, the shear pin holding the firing pin and collar is sheared which allows the firing pin to move aft and fire the signal (spotting charge).

2-30. BDU-48/B PRACTICE BOMB. The BDU-48/B practice bomb is designed to simulate high drag configured MK 80 series LDGP bombs and DSTs. It is similar in appearance and construction to the MK 106 Mod 5 practice bomb. Its additional weight provides for a more stable release, better trajectory and improved impact pattern on target. It is comprised of a bomb body assembly with a bore tube for installation of a signal (spotting charge), a firing pin and spring loaded retractable suspension lug. Impact initiates a signal (spotting charge) which expels smoke/flame from the bore tube for impact marking.

2-31. BDU-45/B PRACTICE BOMB. The BDU-45/B practice bomb was designed to simulate MK 82 LDGP bombs in low/high drag configurations. It is identical to the MK 82 LDGP with the exception of an inert filler and provisions for spotting charges for target impact spotting/fuze functioning indications.

2-32. WEAPONS SUPPORT/HANDLING EQUIPMENT/SPECIAL TOOLS.

2-33. GMU-74/E SWAY BRACE GAUGE (figure 2-16). The GMU-74/E sway brace gauge is used to check the preset dimensions of the lower inboard sway braces on multiple and triple ejector racks. The gauge may be used to check lug height adjustment in weapons/launchers.

2-34. GMU-72/E GAUGE BAR ASSEMBLY (figure 2-17). The GMU-72/E gauge bar assembly is of aluminum construction and consists of inner and outer arms, inner and outer tubes, a slide, hinges and quick release pins. Gauge bar assembly GMU-72/E can be extended or retracted by means of a sliding inner tube. The inner and outer tubes have end fittings that fit over bomb lugs to set up proper load spacing required for F-14 aircraft weapon rail or multiple ejector rack application.

2-35. MER/TER HOOKS RELEASE TOOL (figure 2-18). The MER/TER hooks release tool is used to open the self-latching hooks of the individual ejector units on the MER/TER/BRU-41/42. The release tool is inserted into the manual release lever to open the hooks.

2-36. MK 49 MOD 1 WEAPON CARRIER (figure 2-19). The MK 49 Mod 1 weapon carrier is a welded, steelplate carrier provided with four hoisting points and two attaching studs. A fixed stud is at the "B" end of the strongback. The stud at the "A" end pivots and is locked in place with a quick-release pin. The studs fit weapons with suspension lugs spaced 14 inches apart.

with its speed. Since the sight is fixed to the aircraft while the rocket heads into the lines of flight, errors can arise from deviations in aircraft speed from the value for which the sight setting is made.

f. **Aircraft Dive Angle.** In general, deviations in dive angle from that for which the sight is set produce only negligible striking errors. Small vertical errors arise with changes in dive angle because of small changes in rocket trajectory and small changes in aircraft attitude.

g. **Temperature.** Trajectories are dependent on propellent temperature because the burning time of the rocket decreases with increasing temperature, and, therefore, the trajectory drop at a given distance becomes smaller as the temperature increases.

h. **Vertical and Lateral Errors.** The errors arising from faulty estimation of wind, range, etc., are summarized in the table below. With firing conditions of a 20° Dive Angle, 70° Temperature and 750 yard Range, the errors (expressed in mils) arising from faulty estimation of these factors, using Aircraft Rocket Launcher Mark 4 Mod 0, are summarized below:

Vertical Errors	3.5-inch AR				5.0-inch AR			
Aircraft Speed	200	225	250	275	200	225	250	275
Ammunition Dispersion	5	4	3	2	6	5	4	3
Aiming	3	3	3	3	3	3	3	3
Wind (10 ft./sec.)	3	3	3	3	4	4	4	4
Range (10%)	2	2	2	2	3	3	3	3
Temperature (10°F.)	2	2	2	2	2	2	2	2
Aircraft Speed (10%)	7	6	6	5	9	8	7	6

Lateral Errors	3.5-inch AR				5.0-inch AR			
Ammunition Dispersion	5	4	3	2	6	4	3	2
Aiming	2	2	2	2	2	2	2	2
Wind (10 ft./sec.)	8	8	8	8	11	11	11	11

Obviously some of these errors will be positive and others negative. By taking the square root of the sum of the squares of the errors listed above, the total mean error to be expected under the given conditions will be found to be approximately as follows:

	3.5-inch AR				5.0-inch AR			
Aircraft Speed	200	225	250	275	200	225	250	275
Vertical Errors	10	9	8	7	12	11	10	9
Lateral Errors	10	9	9	8	13	12	12	11

25. Underwater Trajectories

a. Of the Rocket Heads described in this pamphlet only the 3.5-inch solid heads are designed to have desirable underwater trajectory characteristics. They were designed primarily for use as antisubmarine weapons and the underwater trajectory is therefore of some significance. In the early stages of development of solid heads considerable stress was laid upon their lethal range.

It is now generally agreed, however, that complete penetration of a submarine with consequent possible damage to equipment is much more desirable than mere penetration of the hull. An impact velocity of the order of 1000 ft./sec. is necessary to accomplish complete penetration. A steep glide on the approach contributes to greater accuracy in aiming and stability of the rocket in flight.

b. **The 3.5-inch Head Mark 2 (or Mark 1) Mod 0.** This head has a single ogive nose. Its path underwater is theoretically an arc of a circle. If the underwater travel is not too great to reduce the velocity to the value where gravitational forces become appreciable, the rocket will emerge. At entry angles greater than 20° less than one-half of the rockets emerge. The length of underwater travel at which the head Mark 2 Mod 0 will still have a velocity (600 ft./sec.) sufficient for it to penetrate a submarine hull is approximately 70 feet (lethal range).

c. **The 3.5-inch Head Mark 8 Mod 0.** This head was developed in experiments to increase underwater travel. It has a double ogive head which results in less nose lift and greatly increases the radius of curvature of the underwater trajectory. At the same time, the velocity is not decreased to 600 ft./sec. until the length of the underwater travel has reached about 135 feet.

ORDNANCE AND EXPLOSIVES
ARCHIVES SEARCH REPORT
FOR
THE FORMER
HOLTVILLE ROCKET TARGET 1R (#94)
IMPERIAL COUNTY, CALIFORNIA
PROJECT NUMBER J09CA017201

APPENDIX E

REPORTS/STUDIES

APPENDIX E

REPORTS/STUDIES

Table of Contents

SITE SURVEY SUMMARY SHEET
FOR
DERP-FUDS SITE NO. J09CA017200
HOLTVILLE ROCKET TARGET 1R (#94)
16 September 1993

SITE NAME: HOLTVILLE ROCKET TARGET 1R (#94), also known as Holtville Target #1-R, and Target No. 94.

LOCATION: The Holtville Rocket Target 1R (#94) site is located in Imperial County, California, approximately 0.75 miles east of the Highline Canal Levee.

SITE HISTORY: In 1945, the Eleventh Naval District acquired 640 acres of land for Holtville Rocket Target 1R (#94), a low level rocket target, from the Bureau of Land Management (BLM). An access road for this site may also have been acquired from BLM. The target was located in undeveloped desert. No information was found concerning the disposal of this site. Permits and leases for other Imperial County target sites were discontinued in approximately 1946 (see J09CA103800); however, as indicated below, ordnance observed during the site survey may likely date from a later period. Currently, the target site and access road are under the jurisdiction of BLM and have remained vacant desert land. During the on-site survey, the following evidence of former bombing and strafing activity was observed: one practice bomb multiple 50-caliber clips, casings, and spent shells; multiple blasting caps and fuses7 multiple 20- millimeter casings and spent shells; multiple 30-caliber spent shells; one 20-millimeter live shell; multiple practice bomb/mortar shells; an illumination shell; and two 2-inch shells. Certain of this ordnance material (e.g., the practice bomb) may likely date from a period subsequent to the mid-1940s. Various metal debris and munitions clips were found across the northern 2/3 of the site. Jeep tires (of unknown origin) were also found near the center of the site.

SITE VISIT: The site was visited on April 30, 1993, by Hunter Butler and Sandra Rehfeldt of Science Applications International Corporation, San Diego, California.

CATEGORY OF HAZARDS : OEW

PROJECT DESCRIPTION: Recommend the MCX for OEW at Huntsville Division make a determination concerning further investigation.

AVAILABLE STUDIES AND REPORTS : Historical information on 11th Naval District bomb targets was obtained from the National Archives office in Laguna Niguel, California. Land acquisition and ownership records were obtained from the Bureau of Land Management, El Centro, California, and the Imperial County Assessor's Office, El Centro California.

DISTRICT POC: Jatin Desai, Los Angeles District, (213) 894-6266

PHOTO NO. 4 - Practice Bomb, Southwest Corner of Site. View South.

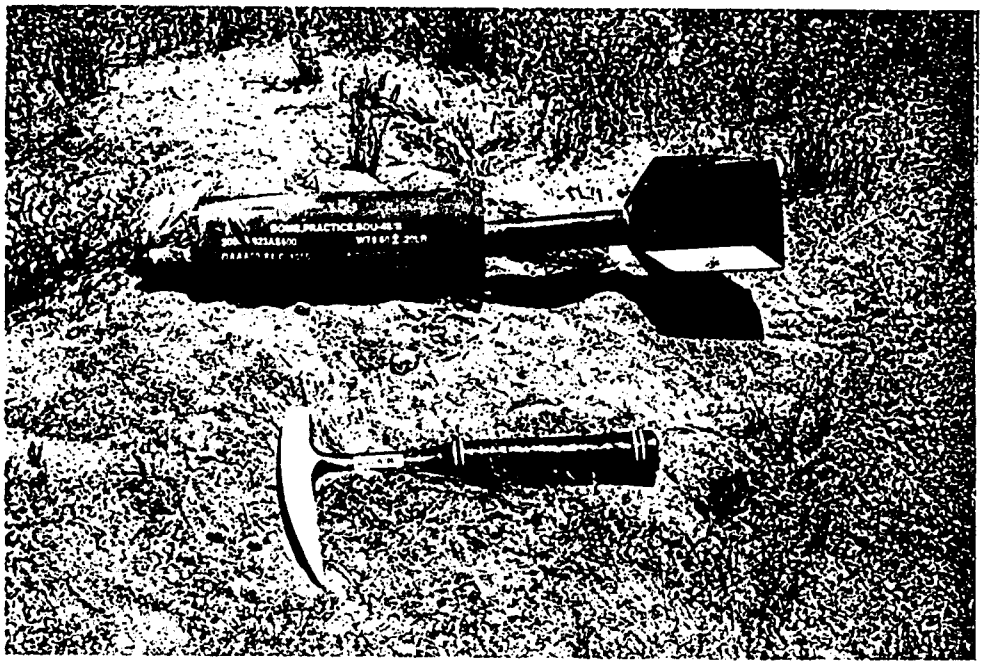


PHOTO NO. 5 - Practice Bomb (Detail). Southwest Corner of Site.

DEFENSE ENVIRONMENTAL RESTORATION PROGRAM
FORMERLY USED DEHEHSE SITES
FINDINGS AND DETERMIWATION OF ELIGIBILITY

HOLTVILLE ROCKET TARGET 1R (#94)
IMPERIAL COUNTY, CALIFORNIA
SITE NO. J09CA017200

FINDINGS OF FACT

1. The Eleventh Naval District acquired a 640-acre section of land (Section 24, Township 14 South, Range 16 East) from the Department of Interior, Bureau of Land Management (BLM) in approximately 1945. The available information also suggests that a portion (the southerly 30 feet of that portion lying easterly of the East High Line Canal) of the adjacent Section 23, may also have been acquired from BLM to provide access to Section 24. No further information was available concerning acquisition of this property.

2. The Navy used this site as a low-level rocket target. The target was described as "concentric circles."

3. No specific information was found concerning the disposal of this site. It is possible that, as with other Imperial County target sites used during the mid-1940s, Navy use was discontinued in approximately 1946 (see J09CA103800); however, ordnance observed during the site survey may likely date from a later period. Both locations (Section 23 and the access acreage) are presently under the jurisdiction of BLM and are vacant desert land.

DETERMINATION

Based on the foregoing Findings of Fact, this site has been determined to be formerly used by the Department of Defense. It is therefore eligible for the Defense Environmental Restoration Program - Formerly Used Defense Sites, established under 10 USC 2701, et seq.

10 JUL 1995

Date

BRUCE K. SCOTT
Brigadier General, U.S. Army
Commanding

PROJECT SUMMARY SHEET
FOR
DERP-FUDS OEW PROJECT NO. J09CA017201
HOLTVILLE TARGET 1R (#94)
SITE NO. J09CA017200

PROJECT DESCRIPTION: During the mid-1940s (and possibly later), thiS site was used by the Eleventh Naval District as a low level rocket target. The site is located in undeveloped desert, approximately 0.75 miles from East Highline Canal Levee. Ordnance observed on site during the survey include: multiple blasting caps and fuses; multiple 50-caliber belt clips and casings; multiple 20-millimeter casings; multiple 30-caliber, 50-caliber and 20-millimeter spent shells; one practice bomb; one 20-millimeter live shell; multiple practice bomb/mortar shells; one illumination shell; and two 2-inch shells.These items were not concentrated in certain locations, but rather, were distributed across the site. The presence and condition of any ordnance below the surface of the desert sand on site is not known. The site is subject to weather conditions (localized rainfall, high winds, etc.) that may have concealed ordnance.

PROJECT ELIGIBILITY: This site was formerly used by the Eleventh Naval District.

POLICY COWSIDERhTION: No policy considerations prevent the proposal of this project.

PROPOSED PROJECT : Recommend the Corps Mandatory Center of Expertise (MCX) for OEW at Huntsville Division make a determination concerning further investigation.

RAC FORM: Attached.

DISTRICT POC: Request CEHND inform Mr. Jatin Desai at (213) 894-6266 when a determination is made regarding project status.

ORDNANCE AND EXPLOSIVES
ARCHIVES SEARCH REPORT
FOR
THE FORMER
HOLTVILLE ROCKET TARGET 1R (#94)
IMPERIAL COUNTY, CALIFORNIA
PROJECT NUMBER J09CA017201

APPENDIX F

LETTERS/MEMORANDUMS/MISCELLANEOUS

(Not Used)

ORDNANCE AND EXPLOSIVES
ARCHIVES SEARCH REPORT
FOR
THE FORMER
HOLTVILLE ROCKET TARGET 1R (#94)
IMPERIAL COUNTY, CALIFORNIA
PROJECT NUMBER J09CA017201

APPENDIX G

REAL ESTATE DOCUMENTS

APPENDIX G

REAL ESTATE DOCUMENTS

Table of Contents

Pacific Southwest Region

ND11/N2   FL:Mo
(Serial No. P-18978)
24 MAY 1945

AIR MAIL

To: BuDocks
Attn: F-5-3

Subj: Bombing Targets for activities NABs 11ND - Acquisition of land for

Refs: (a) Com11 ltr to BuDocks NAS11(Holtville), Serial No. P-15588 dtd 6 Sept 1944
(b) Urltr to Com11 ND11/N1-13, X5-90-40, F-5-3/RAS:mr dtd 31 Mar 1945
(c) Com11 ltr to BuDocks NAS11/F41-10, Serial No. P-18502 dtd 19 April 1945
(d) Urltr to Com11 ND11/N1-13, T5-7-6W, F-5-3/RAS:mr dtd 12 May 1945
(e) Com11 ltr to BuDocks NAS11(Holtville) Serial No. P-18972 dtd 19 May 1945

1. Ref. (a) requested the acquisition of Sec. 24 in T. 14 S., R. 16 E., S.B.B.&M., Imperial County, California, for use as Rocket Target, which Target has been designated Holtville Rocket Target #1-R. This letter also requested the acquisition of the following described property:

> The Southerly 30' of that portion of Sec. 23, T. 14 S., R. 16 E., S.B.B.&M., lying Easterly of the East High Line Canal, Imperial County, California.

This property was acquired for use as an Access Road to Holtville Rocket Target #1-R. In the same letter, acquisition of the property described as:

> Westerly 30' of the SW¼ of Sec. 15 and the Westerly 30' of Sec. 22, T. 13 S., R. 16 E., S.B.B.&M., Imperial County, California, except the Southerly 873' of said Westerly 30' of Sec. 22;

was requested. Use of this property was desired for access to Holtville Bombing Target #2.

2. By Ref. (b) BuDocks advised that consent for the use of the aforedescribed lands had been procured and requested that maps showing the location of Access Road to the Targets on these lands be forwarded to the Bureau in triplicate.

Copy for Commandant's Office

G-1

74

741-6

NB1/N2
(Serial No. P-16978)
AIR MAIL
24 MAY 1945

Subject: Bombing Targets for activities NABs 11ND - Acquisition of land for

- -

Ref. (a) advised that the maps forwarded by Ref. (c) did not show location of the Access Roads as requested in Ref. (b) and again requested that a map of the Access Road to "Target Site #1" be furnished in triplicate.

3. Search of the files of this office does not indicate that request for acquisition of lands to be used as an Access Road for Holtville Target Site #1, has, at any time, been made, and it does not appear that such access is required. It is believed that Target Site #1 referred to in Ref. (d) is in fact Holtville Target Site #1-R. Ref. (e) forwarded to the Bureau in triplicate, a map showing Access Road to Holtville Target Site #1-R, drawn in red, and Access Road to Holtville Bombing Target #2, designated by dotted lines. It is believed that this map will provide all information requested by Ref. (b) and (d), respectively.

By direction of the Commandant:

R. FOWLER
Executive Assistant
Public Works Officer,
Eleventh Naval District

Copy for Commandant's Office

910

G-1

FACILITY (a)	LOCATION (b)	LEGAL DESCRIPTION (c)	AUTHORITY FOR USE (d)	PRESENT STATUS (e)
TARGET No. 68	HOLTVILLE, IMPERIAL COUNTY	SE¼ of Sec. 8 Twp 14 S. Rge 17 E. S½ of Sec. 9 Twp 14 S. Rge 17 E. NE¼ of Sec 17 Twp 14 S. Rge 17 E. Containing 480 Ac. Dept of Int.	Pursuant to two (2) ltrs to Sec Nav from SecInt. dtd June 24 1943 and May 24 1944.	ACTIVE
TARGET No.94 . ROCKET No 1.	HOLTVILLE, IMPERIAL COUNTY.	Sec. 24 Twp 14 S. Rge 16 E. Containing 640 Ac. Dept of Int. ACCESS ROAD; 30' in width. Accrossed portions of Sec. 23 Twp 14 S. Rge 16 E, and Sec,s 15 & 22 Twp 13 S. Rge 16 E.	SecNav ltr to SecInt. dtd Sept. 23 1944 and, Public Land Order No. 279 dtd May 22 1949.	ACTIVE
TARGET No. 95. ROCKET No. 2.	HOLTVILLE, IMPERIAL COUNTY.	SE¼ of Sec. 9 Twp 13 S. Rge 16 E. S½ of Sec 8 Twp 13 S. Rge 16 E. N½ of Sec. 15 Twp 13 S. Rge 16 E. Containing 480 Ac. Dept of Int.	Pursuant to two (2) ltrs to SecNav from SecInt dtd June 24 1943 and May 23 1944.	ACTIVE
TARGET No.s 103 and 103A.	EL CENTRO, IMPERIAL COUNTY.	S½ of Sec. 12 Twp 15 S. Rge 10 E. Sec 13 Twp 15 S. Rge 10 E. E½ of NW¼ Sec 24 Twp 15 S. Rge 10 E. NE¼ of Sec 24 Twp 15 S. Rge 10 E. and S½ of NE¼ of Sec 7 Twp 15 S. Rge 11 E. N½ of Sec 8 Twp 15 S. Rge 11 E. NW¼ of Sec 17 Twp 15 S. Rge 11 E. N½ of Sec 18 Twp 15 S. Rge 11 E. SW¼ of Sec 18 Twp 15 S. Rge 11 E. Containing 2800 Ac. more or less Dept of Interior Lands.	Pursuant to SecNav ltr to SecInt. dtd July 14 1945 and July 16 1945, and subsequent correspondence including ltr from SecInt to SecNav dtd Nov 25 1949.	ACTIVE
NAS SALTON SEA AIRPLANE BASE	SALTON SEA, IMPERIAL COUNTY	All Sec. 20 Twp 11 S. Rge 11 E. N½ of Sec 28 Twp 11 S. Rge 11 E. SW¼ of Sec. 28 Twp 11 S. Rge 11 E. Containing 720 Ac. more or less Dept of Interior Lands	EXECUTIVE ORDER No 9337 of Apr 24 1943, and to Sec. 3 of ACT of June 17 1902, 32 Stat 383 (USC title 43 sec 416). , and PUBLIC LAND ORDER No. 141 dtd Sept 18 1942	TRANSFERED by Navy Dept The Manhatten Project.

11th NAVAL DISTRICT -- POSTWAR GUNNERY AND TARGET AREA REQUIREMENTS (CONTD)

NAME	NO.	LATITUDE	LONGITUDE	DESCRIPTION	USE	REMARKS	SUPPORTING ACTIVITY	OWNERSHIP STATUS	LEASE NO.	EXPIRATION DATE
Octillo Dry Lake	66	33°09'06"N	116°08'10"W	Concentric circles 50'-100' and 200' radii.	Horizontal, glide or dive bombing.		NAS El Centro	USN owned.		
Holtville	68	32°56'45"N	115°12'30"W	Concentric circles 50'-100' and 200' radii.	Dive bombing and strafing.		NAS El Centro	48OAC USN owned, 8OAC - leased State of Calif. Permit.	NOy(R)-34196	Permit - 30 June 1948
Holtville	94	32°55'10"N	115°16'15"W	2 Concentric circles 75'-150'	Rocket firing.		NAS El Centro	Use permits.		
Holtville	95	33°01'36"N	115°18'48"W	2 Concentric circles 75'-150'.	Rocket firing.		NAS El Centro	Use Permits.		
Trabuco	102	33°38'11"N	117°36'20"W	2 Concentric circles 75'-150'.	Rocket firing.		MCAS El Toro	Lease	NOy(R)-37241	30 June 1948
Coyote Wells	103	32°53'05"N	115°52'12"W	2 Concentric circles 75'-150'.	Tiny Tim Rocket firing.		NAS El Centro	Permit for U.S. Dept. of Interior.		
Coyote Wells	103A	32°51'10"N	115°54'32"W	2 Concentric circles 75'-150'.	Tiny Tim Rocket firing.		NAS El Centro	NE¼ Sec.13 SE¼ Lease not executed. Rev. Permit.		
Lake Hodges	106	33°00'49"N	117°08'48"W	2 Concentric circles 75'-150'.	SCAR Rockets Only.		MCAS Miramar	Lease	NOy(R)-35957	30 June 1948
Trabuco	108	33°37'00"N	117°37'00"W	2 Concentric circles 75'-150'.	Rocket firing.		MCAS El Toro	Lease	NOy(R)-37241	30 June 1948
Chocolate Mt. Gunnery Range, also known as Dunlap Gunnery Range.		33°31'00"N 33°33'00"N 33°00'00"N 33°08'00"N	115°45'00"W 115°35'00"W 115°04'00"W 114°56'00"W	Air to Air Gunnery Range.	Aerial Gunnery.		NAS El Centro	Taken over under the 2nd war powers act. misc. permits and leases. 358,248 acres-US gov. owned. 10,100 acres-State of Calif. permit, 2,500 acres - leased.		30 June 1948
San Clemente Impact Area (S.Clem.Is.)		All of that portion of S.Clem.Is. southeast of 32°52'40" 32°54'40"	 118°30'30" 118°28'00"	Air support Gunnery.	A.. support.			Navy owned.		

6-4

0156909

IN REPLY REFER TO:

Ser 835/DE-210

JAN 24 1958

Los Angeles Land Office
Bureau of Land Management
Bartlett Building
215 West 7th Street
Los Angeles 14, California

Attention: Mr. Paul Witmer, Manager

Gentlemen:

Reference is made to Public Land Order No. 279 dated May 22, 1945, which reserved for the use of the Department of the Navy in connection with the U.S. Naval Auxiliary Air Station, El Centro, California, 640 acres of land comprising Section 24, Township 14 South, Range 16 East, SBM.

This area was used for military purposes and identified by the Navy as Target 94. The jurisdiction granted by the Order ceased at the expiration of the six-month period following the termination of the unlimited national emergency declared by Proclamation No. 2487 of May 27, 1941 (55 Stat. 1647). At that time, jurisdiction over the land was revested in the Department of the Interior; however, the Order required that the land continue to remain withdrawn from appropriation as provided by the Order until otherwise ordered by the Secretary of the Interior.

On January 17, 1958, Mr. R. C. Phillips, whose address is 4654 Sunnyside Drive, Riverside, California, called at this office in connection with a sodium prospecting permit application which he had filed in the above-described area, and is identified by your office as LA 0150699. Mr. Phillips stated that due to the restriction created by the final sentence in Public Land Order 279, your office has been unable to process his permit application. In order that your office may take such steps as may be necessary or desirable to make the land in question once again subject to all forms of appropriation under the public land laws, including the mining and mineral leasing laws, there is enclosed for your information, copy of a letter dated September 14, 1953, from the Commandant, Eleventh Naval District, to the Commander, Naval Air Bases, Eleventh and Twelfth Naval Districts,

G-4

Ser 835/DE-210

which shows that certain targets, one of which is Target 94, have been searched and cleared of all contaminating explosive ordnance. This work was performed in August 1953 after the Navy's need for the land ceased.

Very truly yours,

R. G. Muench
Director, Real Estate Division
By direction of the
District Public Works Officer

Encl:
(1) COMELEVEN ltr ser 794/45 of 14 Sep 1953, in dup.

0154.1

TITLE 43—PUBLIC LANDS: INTERIOR

Chapter I—Bureau of Land Management, Department of the Interior

Appendix—Public Land Orders

[Public Land Order 1640]

[2009042]

CALIFORNIA

REVOKING PUBLIC LAND ORDER NO. 279 OF MAY 22, 1945

By virtue of the authority vested in the President and pursuant to Executive Order No. 10355 of May 26, 1952, it is ordered as follows:

Public Land Order No. 279 of May 22, 1945, withdrawing the following-described public lands for use of the Department of the Navy in connection with the Naval Auxiliary Air Station, is hereby revoked:

SAN BERNARDINO MERIDIAN

T. 14 S., R. 16 E.
Sec. 24.

The area described contains 640 acres. The lands are withdrawn in the first form for reclamation purposes. They will be open to application and offers under the mineral leasing laws beginning at 10:00 a. m., on June 27, 1958.

ROGER ERNST,
Assistant Secretary of the Interior.

MAY 22, 1958

[F. R. Doc. 58-4006; Filed May 28, 1958, 8:45 a. m.]

Copy furnished:
Small Tract Unit
Lands Div.
So. Field Group
Information Unit
Case record file

G-5

COPY

COMMANDANT'S OFFICE
ELEVENTH NAVAL DISTRICT
SAN DIEGO 30, CALIFORNIA

45
A16
Ser 794/45

14 Sept. 1953

From: Commandant, Eleventh Naval District
To: Commander, Naval Air Bases, Eleventh and Twelfth Naval Distric

Subj: Decontamination of former Navy Target areas

Ref: (a) Com NAB 11/12 ltr RWD:kg El Centro/J29 ser 218-80 of 25 Jun 1953

1. The decontamination requested in reference (a) has been commenced, and will be prosecuted to the extent that disposal personnel are avai able.

2. A report has been received from Second Lieutenant William E. DeLo Ordnance Corps, U.S. Army, in command of the 70th Explosive Ordnance Explosive Squad, that targets Nos. 94 and 95 (old), near Holtville, a described in reference (a) have been searched and are cleared of all contaminating explosive ordnance. This clearance was conducted from 24 to 29 August 1953.

/s/ J. F. GOODWIN
Chief of Staff

275779

G-6

FOR OFFICIAL USE ONLY

TARGET 59 (Continued)

ltitude limits:	Surface to unlimited
Hours of usage:	Twenty-four hours d
Lighting:	None
Type exercises:	Dive, glide and low
Type ordnance:	Water filled, minia
Flight pattern:	Runs from east to w
Call sign:	None.
Frequency:	None.
Landing facility:	Former NAF Holtville
Remarks:	In using this target Pacific Railroad.
	NAAS El Centro tower
Established by:	ACC/ASP Mtg. No. 23 New effective altitu is surface to 20,00

several buildings for use as a Tuberculosis solated location there is no commercial use ny lighting equipment has been removed. The T unsupervised landings. The Navy has ce, non-reimbursable, claim free basis. te slabs) are used by the Navy for carrier

ted on 6' pyramids with red numbers

, 10 miles along east shore of Salton Sea.

TARGET 94

(A) Description:	Strafing, one target panels placed on re
Location:	North Elect. Target:
	South Elect. Target:
	Banner Target: Lat.
Altitude:	90 feet.
Altitude limits:	Surface to unlimite
Hours of usage:	Twenty-four hours d
Lighting:	Fixed flares only.
Type exercises:	Strafing.
Type ordnance:	Machine gun ammunit
Flight pattern:	Runs from west to e
Call sign:	DESERT RAT.
Frequency:	271.4 mcs.
Landing facility:	Former NAF Holtville
Remarks:	In using these targe Impact Area. A grou targets, control tower All flights must rem event that radio co strip laid out in t tion is to be used possibility of aircr
Established by:	ACC/ASP Mtg. No. 10 171 of 26 Oct 1950, New effective altitu 40,000 feet.

to NAAS El Centro tower. The Northern Observe caution in use of course. Target course.

ng exercises.

NW to latitude N 33°-20'-07" longitude line.

markers.

eye 20' diameter.

PARACHUTE DROP TEST AREA (SIGNAL MT.)

(A) Four (4) square mile area with soft sa soft sand surface, this area is prefere and angle calibration. s and shapes.

TARGET 95

(A) Description:	Concentric circles
Location:	Lat. 33° -02'C28.858 miles.
Altitude:	90 feet.
Altitude limits:	Surface to unlimiteon (target not manned) will report entering
Hours of usage:	Twenty-four hours d
Lighting:	Fixed flares only. 08 of 4 Mar 1948, amended by Mtg. No. 171 of
Type exercises:	Dive, glide and lowed by Mtg. No. 265 of 29 Jan 1952. angle calibration. No. 536, Case No. 10194 is surface to
Type ordnance:	Water filled, minia
Flight pattern:	Runs from north to
Call sign:	STORM DOOR.
Frequency:	265.8 mcs.
Landing facility:	Former NAF Holtvill W.; thence to Lat. 32°-51'-30" N., Long.
Remarks:	In using this targe 15°-04'-00.00" W.; thence to Lat. 32°-57'-30" not requiring rake ", Long. 115°-09'-50.00" W.; thence to to NAAS El Centro t
Established by:	ACC/ASP Mtg. No. 10 No. 171 of 26 Oct 1 Jan 1952. New effective altit to 40,000 feet.

ct to the Sand Hills Impact Area and other

tion of special target.

HOLTVILLE CARRIER LANDING FIELD the Mapala target.

(A) One 200 foot wide by 4000 foot long la layers over existing native sand with pressure when new (1944). Surface in This strip has not been used since 194 landings of planes using nearby target

U. S. NAVAL AUXILIARY AIR STATI
EL CENTRO, CALIFORNIA

MASTER SHORE STATION DEVELOPMENT PLA
PART II SECTION 1
GENERAL DATA SHEET
Sheet 5 of 8

CONDITIONS AS OF 31 DECEMBER 1957

TARGET 59 (Continued)

Altitude limits: Surface to unlimited.
Hours of usage: Twenty-four hours daily.
Lighting: None
Type exercises: Dive, glide and low level bombing, rocket firing and strafing.
Type ordnance: Water filled, miniature bombs, MK-76 SCAR and HVAR rockets and machine gun ammunition.
Flight pattern: Runs from east to west, perpendicular to the railroad, left hand traffic.
Call sign: None.
Frequency: None.
Landing facility: Former NAF Holtville (emergency only), bearing 262° mag., 16 miles.
Remarks: In using this target caution should be exercised with respect to the Mapala area and the Southern Pacific Railroad. Flights using this target will report entering and departing the target to NAAS El Centro tower.
Established by: ACC/ASP Mtg. No. 23k of 15 May 1951, amended by Mtg. No. 265 of 29 Jan 1952.
New effective altitude and time of use as recommended by the ACC/ASP Mtg. No. 536, Case No. 10194 is surface to 20,000 feet - sunrise to sunset.

TARGET 56

(A) Description: Strafing, one target (16 x 30 ft) banner placed on target and two remote targets (16 x 30 ft.) panels placed on remote scoring targets.
Location: North Elect. Target: Lat. 32°-52'-28.65" N., Long. 115°-10'-23.04" W.
South Elect. Target: Lat. 32°-52'-14.47" N., Long. 115°-10'-23.69" W.
Banner Target: Lat. 32°-52'-29.00" N., Long. 115°-10'-31.25" W.
Altitude: 90 feet.
Altitude limits: Surface to unlimited.
Hours of usage: Twenty-four hours daily.
Lighting: Fixed flares only.
Type exercises: Strafing.
Type ordnance: Machine gun ammunition. (Tracer or incendiary ammunition cannot be fired on these targets).
Flight pattern: Runs from west to east, right or left hand traffic.
Call sign: DESERT MAT.
Frequency: 271.4 mcs.
Landing facility: Former NAF Holtville (emergency only), bearing 237° mag., 5 miles.
Remarks: In using these targets caution should be exercised with respect to target 68 and the Sand Hills Impact Area. A ground crew, housed near the targets, control the air-ground crew, housed near the targets, control the aircraft during actual firing runs and only one target can be used at a time. All flights must make a dummy run on the target assigned before commencing firing runs. In the event that radio contact is not made, the leader must check to see if the target is open. A red strip laid out in the target area indicates the target is closed. No tracer or incendiary ammunition is to be used at any time. All pilots should be cautioned to pull out high enough to avoid possibility of aircraft being struck by ricocheted bullets.
Established by: ACC/ASP Mtg. No. 10k of 19 Feb 1948, amended by Mtg. No. 106 of 4 Mar 1948, amended by Mtg. No. 171 of 26 Oct 1950, amended by Mtg. No. 23k of 15 May 1951, amended by Mtg. No. 265 of 29 Jan 1952.
New effective altitude as recommended by the ACC/ASP Mtg. No. 536, Case No. 10194 is surface to 40,000 feet.

PARACHUTE DROP TEST AREA (SIGNAL MT.)

(A) Four (4) square mile area with soft sand surface for use by Department of Defense Parachute Test Facility. Due to soft sand surface, this area is preferred for live jumps.

TARGET 55

(A) Description: Concentric circles 75', 150' and 300' having a solid bull's eye 20' diameter.
Location: Lat. 33° -02'-28.85" N, Long. 115°-17'-2.00" W.
Altitude: 90 feet.
Altitude limits: Surface to unlimited.
Hours of usage: Twenty-four hours daily.
Lighting: Fixed flares only.
Type exercises: Dive, glide and low level bombing, rocket firing, angle calibration, high dive prop loft and angle calibration.
Type ordnance: Water filled, miniature bombs, MK-76, SCAR and HVAR rockets and shapes.
Flight pattern: Runs from north to south, right or left hand traffic.
Call sign: STOKEN LOOK.
Frequency: 265.8 mcs.
Landing facility: Former NAF Holtville (emergency only), bearing 173° mag., 12 miles.
Remarks: In using this target caution should be exercised with respect to targets in the area. Flights not requiring rake information (target not manned) will report entering and departing the target to NAAS El Centro tower.
Established by: ACC/ASP Mtg. No. 10k of 29 Feb 1948, amended by Mtg. No. 108 of 4 Mar 1948, amended by Mtg. No. 171 of 26 Oct 1950, amended by Mtg. No. 23k of 15 May 1951, amended by Mtg. No. 265 of 29 Jan 1952.
New effective altitude as recommended by the ACC/ASP Mtg. No. 536, Case No. 10194 is surface to 40,000 feet.

HOLTVILLE CARRIER LANDING FIELD

(A) One 200 foot wide by 4000 foot long landing strip bearing 58.8° 45' F (T). Construction consists of asphalt built up layers over existing native sand with approximately 16,000 pound wheel bearing capacity at an estimated 60 PSI tire pressure when new (1944). Surface in poor condition (1957) and requires a complete overlay if use is contemplated. This strip has not been used since 1945 for carrier landing practice. Its principle value today is for emergency landings of planes using nearby targets.

FORMER NAVAL AUXILIARY AIR STATION, HOLTVILLE

(A) In 1945 the County of Imperial purchased this station and has since converted several buildings for use as a Tuberculosis Sanitarium and have razed the remaining buildings, hangars, etc. Due to the isolated location there is no commercial use for the airfield and no maintenance has occurred since the Navy vacated. Runway lighting equipment has been removed. The runways are of concrete which has buckled and broken until no longer usable for unsupervised landings. The Navy has permission under lease No. NOy(R) 47904 to use the runways on a non-maintenance, non-reimbursable, claim free basis. Occasionally, short sections of the runways (between broken and buckled concrete slabs) are used by the Navy for carrier landing practice.

SALTON SEA SPEED COURSE

(A) Description: Speed course 10 nautical miles marked by white squares mounted on 6' pyramids with red numbers numbered 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10.
Location: Starting at Lat. 33°-20'-30.00" N., Long. 115°-30'-00.00" W., 10 miles along east shore of Salton Sea. Bearing N. 42°-30' W (T) (317°-30').
Altitude: -235 feet below sea level.
Altitude limits: Surface to 700 feet.
Hours of usage: Daylight hours only.
Lighting: None.
Type exercises: Air speed calibration.
Type ordnance: None.
Flight pattern: VFR below 700 feet.
Call sign: None.
Frequency: None.
Landing Facility: NAAS El Centro, bearing 155° mag., 32 miles.
Remarks: Flights will report entering and departing the speed course to NAAS El Centro tower. The Northern portion of speed course lies within Civil Airway Red 65. Observe caution in use of course. Target 57 is approximately 3½ miles WNW of southern end of speed course.
Established by: Notification of CAA.

AERIAL TYE LAYING RANGE

(A) Description: Water surface along East shore of Salton Sea for Mine Laying exercises.
Location: Starting at latitude N 33°-19'-09" Longitude W 115°-39'-39" NW to latitude N 33°-20'-07" longitude W 115°-40'-49". Range extends 1/2 mile each side of center line.
Altitude: -211 ft.
Type Exercise: New Target, not yet established.
Landing facility: Calipatria bearing degrees magnetic approximately miles.
NAAS El Centro bearing degrees magnetic approximately miles.
Rake Facility: Yes. Consists of 3 Rake shacks and 2 Radar Riged Course Markers.
Remarks: Abandoned.
Established by: Inactive.

TARGET 66

(A) Description: Concentric circles 75', 150' and 300' having a solid bull's eye 20' diameter.
Location: Lat. 32°-56'-30.50" N., Long. 115°-13'-39.16" W.
Altitude: 90 feet.
Altitude limits: Surface to unlimited.
Hours of usage: Twenty-four hours daily.
Lighting: Fixed flares only.
Type exercises: Dive, glide and low level bombing, rocket firing, high dive and angle calibration.
Type ordnance: Water filled, miniature bombs, MK-76, SCAR and HVAR rockets and shapes.
Flight pattern: Runs from west to east, right or left hand traffic.
Call sign: BUZZARD.
Frequency: 264.2 mcs.
Landing facility: Former NAF Holtville (emergency only), bearing 198° mag., 8 miles.
Remarks: In using this target caution should be exercised with respect to the Sand Hills Impact Area and other targets in the area. Flights not requiring rake information (target not manned) will report entering and departing the target to NAAS El Centro tower.
Established by: ACC/ASP Mtg. No. 10k of 19 Feb 1948, amended by Mtg. No. 108 of 4 Mar 1948, amended by Mtg. No. 171 of 26 Oct 1950, amended by Mtg. No. 265 of 29 Jan 1952.
New effective altitude as recommended by the ACC/ASP Mtg. No. 536, Case No. 10194 is surface to 40,000 feet.

SAND HILLS IMPACT AREA

(A) Location: Beginning at Lat. 32°-56'-30.00" N., Long. 115°-03'050.00" W; thence to Lat. 32°-51'-30" N., Long. 114°-55'-00.00" W.; thence to Lat. 32°-51'-30" N., Long. 115°-06'-00.00" W.; thence to Lat. 32°-57'-30" N., Long. 115°-09'-50.00" W.; thence to Lat. 32°-56'-30" N., Long. 115°-09'-50.00" W.; thence to beginning.
Altitude: Varies from 350 feet to 1000 ft.
Altitude limits: Surface to unlimited.
Hours of usage: Twenty-four hours daily.
Lighting: None.
Type exercise: Unrestricted. Strafing and Mapala targets in this area.
Type ordnance: Unrestricted, commensurate with type exercises and designation of special target.
Flight pattern: None. See chart for flight pattern while on target 69 and the Mapala target.

Note No. 1
All Facility Requirements listed herein are shown as:
(A) Existing

U. S. NAVAL AUXILIARY AIR STATION
EL CENTRO, CALIFORNIA

MASTER SHORE STATION DEVELOPMENT PLAN
PART II SECTION 1
GENERAL DATA SHEET
Sheet 5 of 8

CONDITIONS AS OF 31 DECEMBER 1957

DISTRICT PUBLIC WORKS OFFICE
ELEVENTH NAVAL DISTRICT
SAN DIEGO 32, CALIFORNIA

IN REPLY REFER TO:
Ser 10461/DE-210

JUL 2 1951

From: District Public Works Officer
To: Chief of Civil Engineers

Subj: Special Device Target No. 94, Imperial County, California; renewal of permit to use

Encl: (1) Draft of permit, in dup.

1. Bureau of Reclamation permit covering the use of subject target area expired by its terms on 11 March 1956. This target area is essential to the training program of the U. S. Naval Auxiliary Air Station, El Centro, California. Accordingly, the Bureau of Reclamation was requested to issue a new and superseding permit for an additional period of five years, beginning 12 March 1956.

2. Enclosure (1), prepared at the request of this office, is forwarded, recommending approval and execution on behalf of the Department of the Navy, after which it is requested that it be returned for obtaining execution on behalf of the Bureau of Reclamation.

J. W. FROHATH
By direction

Copy to:
BUAER
COMNAB 11
CO NAAS El Centro

20723456

G-8

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

ALL-AMERICAN CANAL PROJECT

1. THIS LICENSE, entered into this 12th day of March, 1956, by and between the United States Department of the Interior, represented by the Bureau of Reclamation, hereinafter referred to as the "United States", and the United States Department of the Navy, represented by the Chief, Bureau of Yards and Docks, acting under the direction of the Secretary of the Navy, hereinafter referred to as the "Navy";

WITNESSETH:

2. United States hereby licenses and permits Navy to use for Target Range purposes the following described lands now withdrawn for reclamation purposes:

California,
San Bernardino Meridian,

T. 15 S., R. 17 E.
Sec. 2.

3. This license shall expire five (5) years from the date hereof or at any time prior thereto after one (1) year's written notice that such lands, in the opinion of the contracting officer for the United States, are required for reclamation purposes.

4. The Navy shall retain title to the improvements constructed hereunder and all costs and expenses incurred in connection with the construction, maintenance, operation and repair of said

improvements shall be borne by the Navy. Upon the expiration of the term of this license, the Navy within a reasonable length of time thereafter, at its own cost, shall remove the said improvements and restore the United States land as nearly as practicable to its original condition.

IN WITNESS WHEREOF, the United States has caused the foregoing instrument to be executed as of the date first appearing above.

DEPARTMENT OF THE INTERIOR,

By _____
Regional Director, Region 3,
Bureau of Reclamation

DEPARTMENT OF THE NAVY,

By _____
By Direction of the Chief of the Bureau of YARDS and DOCKS, acting under the direction of the Secretary of the Navy

G-6

ORDNANCE AND EXPLOSIVES
ARCHIVES SEARCH REPORT
FOR
THE FORMER
HOLTVILLE ROCKET TARGET 1R (#94)
IMPERIAL COUNTY, CALIFORNIA
PROJECT NUMBER J09CA017201

APPENDIX H

NEWSPAPERS/JOURNALS
(Not Used)

ORDNANCE AND EXPLOSIVES
ARCHIVES SEARCH REPORT
FOR
THE FORMER
HOLTVILLE ROCKET TARGET 1R (#94)
IMPERIAL COUNTY, CALIFORNIA
PROJECT NUMBER J09CA017201

APPENDIX I

INTERVIEWS

APPENDIX I

INTERVIEWS

Table of Contents

CONVERSATION RECORD	TIME 1320	DATE 12 February 1997

TYPE

[ ] VISIT [ ] CONFERENCE [x] TELEPHONE [ ] INCOMING [x] OUTGOING

NAME OF PERSON(S) CONTACTED OR IN CONTACT WITH YOU Christopher Kenney	ORGANIZATION Granite Construction Co.	TELEPHONE NO: 619 337-3030

SUBJECT Ordnance Contamination on Property Which Granite Owns Mineral Rights

SUMMARY

Mr. Kenney is the gravel pit supervisor responsible for property abutting Holtville Rocket Target 1R (#94). He was contacted in reference to the possibility that off-range land along the west border of the site was inadvertently contaminated as the result of errant ammunition from aircraft firing on the target.

Mr. Kenney stated that in the four years that he has been in charge of gravel mining operations, his crew has encountered small arms ammunition links and rocket igniter connectors, but never encountered ordnance itself.

ACTION REQUIRED

ACTION TAKEN

NAME OF PERSON DOCUMENTING CONVERSATION GEORGE R. WILLIAMS	ORGANIZATION CENCR-ED-DO	TELEPHONE NUMBER 309 794-6027
SIGNATURE George R. Williams	TITLE QASAS	DATE 12 February 1997

CONVERSATION RECORD	TIME	DATE
	Morning	17 January 1997

TYPE

[x] VISIT [ ] CONFERENCE [ ] TELEPHONE [ ] INCOMING [ ] OUTGOING

NAME OF PERSON(S) CONTACTED OR IN CONTACT WITH YOU	ORGANIZATION	TELEPHONE NO:
Mr. Jerry Kear	El Centro, Naval Air Facility	(619) 339-2224

SUBJECT Design of Holtville Rocket Target 1R (#94)

SUMMARY

Mr. Jerry Kear is a supervisor with the Public Works Department of Naval Air Facility, El Centro.

It had been hoped that his office could provide information concerning the layout of Holtville Rocket Target 1R and the time period of its use. Although this information was not available in his files, Mr. Kear did provide insight into the Navy's facility numbering system. When asked concerning the apparent assignment of the same target number to different ranges, he stated that it was the practice to re-issue facility identification numbers of buildings and other structures that had been destroyed.

ACTION REQUIRED

ACTION TAKEN

NAME OF PERSON DOCUMENTING CONVERSATION	ORGANIZATION	TELEPHONE NUMBER
GEORGE R. WILLIAMS	CENCR-ED-DO	309 794-6027
SIGNATURE George R Williams	TITLE QASAS	DATE 17 January 1997

CONVERSATION RECORD	TIME Morning	DATE 19 January 1997

TYPE

[x] VISIT [ ] CONFERENCE [ ] TELEPHONE [ ] INCOMING [ ] OUTGOING

NAME OF PERSON(S) CONTACTED OR IN CONTACT WITH YOU Lynda Kastoll	ORGANIZATION Bureau of Land Management.	TELEPHONE NO: 619 337-4400

SUBJECT Information Concerning Land Use Permits Between The BLM and The Navy and Other Records Relating to Holtville Rocket Target 1R (#94)

SUMMARY

Ms. Lynda Kastoll is a realty specialist with the El Centro BLM District office.

The team had hoped to obtain a copy of the use permit authorizing the Navy to set up the range and any other information relating to Navy use of this area. Unfortunately, the use permit was unavailable. However, Ms. Kastoll did provide valuable insight into military use of BLM properties. She stated that the BLM has had problems with military units conducting operations in areas not authorized for their use. She said that due to the many units passing through El Centro NAS for training, it was not possible to identify which where at fault. This made BLM complaints to the Commanding Officer, El Centro, fruitless.

ACTION REQUIRED

ACTION TAKEN

NAME OF PERSON DOCUMENTING CONVERSATION GEORGE R. WILLIAMS	ORGANIZATION CENCR-ED-DO	TELEPHONE NUMBER 309 794-6027
SIGNATURE George R Williams	TITLE QASAS	DATE 12 February 1997

CONVERSATION RECORD	TIME Evening	DATE 21 January 1997

TYPE

[ ] VISIT [ ] CONFERENCE [x] TELEPHONE

[ ] INCOMING

[x] OUTGOING

NAME OF PERSON(S) CONTACTED OR IN CONTACT WITH YOU Mr. Bruce Tinknell	ORGANIZATION Private Citizen	TELEPHONE NO: (619) 578-9901

SUBJECT Holtville Rocket Target 1R (#94)

SUMMARY

Mr. Tinknell is a retired member of Army EOD. He spent twelve of his eighteen years of EOD experience with the 70th EOD in California. The 70th Explosive Ordnance Detachment is responsible for responding to calls for assistance in the Holtville, as well as other parts of California.

Although he was familiar with requests for assistance from authorities in the Carrizon, Brown Field and Anza Borrego areas, he could recall little concerning the Holtville Rocket Target 1R (#94). He did recall an accident near Holtville relating to ordnance, but could provide no specifics. He also recalled an occasion when his unit disposed of a rocket on BLM land in the Holtville area, but couldn't provide any details concerning that matter.

ACTION REQUIRED

ACTION TAKEN

NAME OF PERSON DOCUMENTING CONVERSATION GEORGE R. WILLIAMS	ORGANIZATION CENCR-ED-DO	TELEPHONE NUMBER 309 794-6027
SIGNATURE George R Williams	TITLE QASAS	DATE 20 January 1997

ORDNANCE AND EXPLOSIVES
ARCHIVES SEARCH REPORT
FOR
THE FORMER
HOLTVILLE ROCKET TARGET 1R (#94)
IMPERIAL COUNTY, CALIFORNIA
PROJECT NUMBER J09CA017201

APPENDIX J

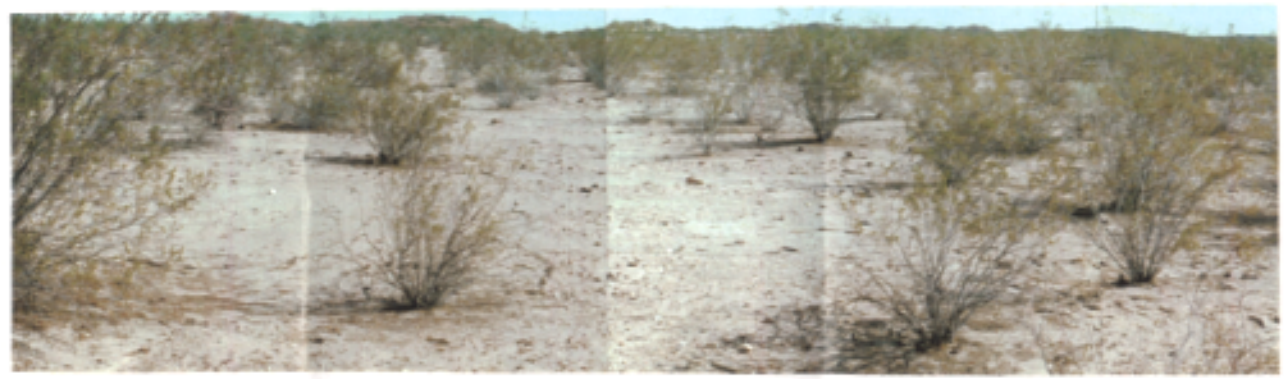
PRESENT DAY PHOTOGRAPHS

APPENDIX J

PRESENT DAY PHOTOGRAPHS

Table of Contents

J-1 Eastward view of target service road off Whitlock Road which serves as an entrance to Rocket Target IR (#94).



J-2 View towards dunes situated in eastern half of site.

J-3 View of approximate location of target center, from east.

J-4 View of 2.25-inch Practice Rocket found near target center.

J-5 Fragments of 2.25-inch Practice Rocket found near target center.

J-6 Sheet metal body of a 100-lb practice bomb found near target center.

J-7 20mm projectile from M99 Practice Cartridge, found near target center.

J-8 20mm projectile from M95 Armor Piercing, Tracer Cartridge, found near target center.

J-9 Bomb fin for 100-lb bomb, found near target center.

J-10 3-lb Practice Bombs, MK-Mk23, found near target center.

J-11 Fragment of 2.25-inch Rocket Motor found near target center.

J-12 Collection of closures for 2.25-inch rocket motors found near target center.

J-13 General view of the target area from the center looking towards the west.

J-14 Practice bomb debris found near observation post.

ORDNANCE AND EXPLOSIVES ARCHIVES SEARCH REPORT FOR THE FORMER HOLTVILLE ROCKET TARGET 1R (#94) IMPERIAL COUNTY, CALIFORNIA PROJECT NUMBER J09CA017201

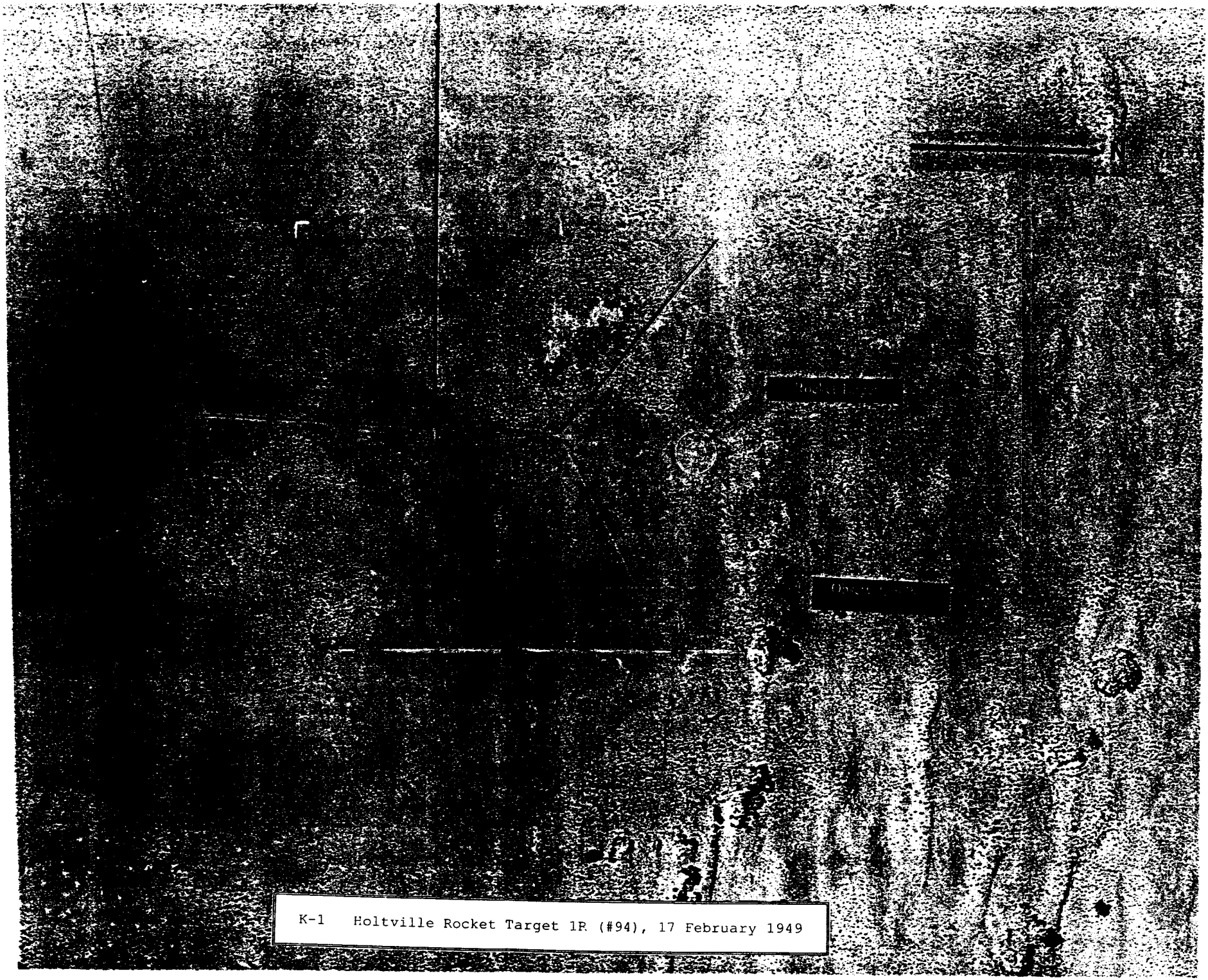
APPENDIX K

HISTORICAL PHOTOGRAPHS

APPENDIX K

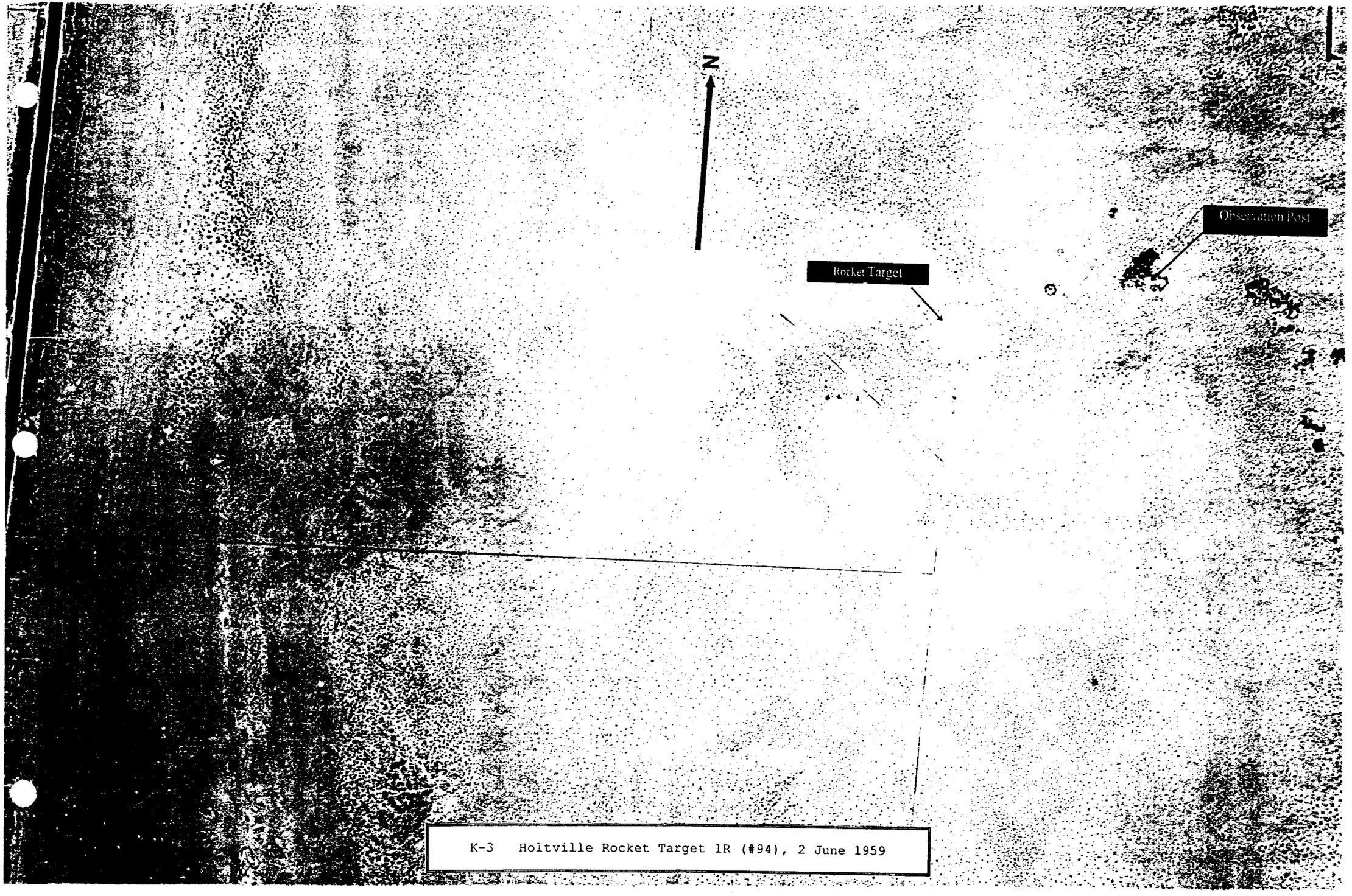
HISTORICAL PHOTOGRAPHS

Table of Contents



K-1 Holtville Rocket Target 1R (#94), 17 February 1949

K-2 Holtville Rocket Target 1R (#94), 7 April 1953



K-3 Holtville Rocket Target 1R (#94), 2 June 1959

K-4 Holtville Rocket Target 1R (#94 , 31 July 1965

ORDNANCE AND EXPLOSIVES
ARCHIVES SEARCH REPORT
FOR
THE FORMER
HOLTVILLE ROCKET TARGET 1R (#94)
IMPERIAL COUNTY, CALIFORNIA
PROJECT NUMBER J09CA017201

APPENDIX L

HISTORICAL MAPS/DRAWINGS

APPENDIX L

HISTORICAL MAPS/DRAWINGS

Table of Contents

L-1 Extract from Imperial Valley, South, Desert Access Guide #22

ORDNANCE AND EXPLOSIVES
ARCHIVES SEARCH REPORT
FOR
THE FORMER
HOLTVILLE ROCKET TARGET 1R (#94)
IMPERIAL COUNTY, CALIFORNIA
PROJECT NUMBER J09CA017201

APPENDIX M

ARCHIVES SEARCH REPORT CORRESPONDENCE

(Not Used)

ORDNANCE AND EXPLOSIVES
ARCHIVES SEARCH REPORT
FOR
THE FORMER
HOLTVILLE ROCKET TARGET 1R (#94)
IMPERIAL COUNTY, CALIFORNIA
PROJECT NUMBER J09CA017201

APPENDIX N

REPORT DISTRIBUTION LIST

APPENDIX N

REPORT DISTRIBUTION LIST

	No Copies		
	I	II	III
Commander, U.S. Army Corps of Engineers Engineering and Support Center, Huntsville ATTN: CEHNC-ED-SY (Mardis) P.O. Box 1600 Huntsville, AL 35807-4301	2		
Director, U.S. Army Defense Ammunition Center ATTN: SIOAC-ES Savanna, Illinois 61074-9639	3		
Commander, U.S. Army Corps of Engineers Los Angeles District P.O. Box 2711 ATTN: CESPL-ED-MI (Bobhossian) Los Angeles, CA 90053-2325	1		
Commander, U.S. Army Corps of Engineers Los Angeles District ATTN: CESPL-PM-M (Knutson) 911 Wilshire Blvd. Los Angeles, CA 90017	1		
Commander, U.S Army Corps of Engineers Los Angeles District CESPL-CO-SS 10845 Rancho Bernardo Road 2nd Floor Suite, Suite 200, Room 204 Rancho Bernardo, CA 92127	1		

I - Final Report
II - Findings Report
III - Routed Final Report

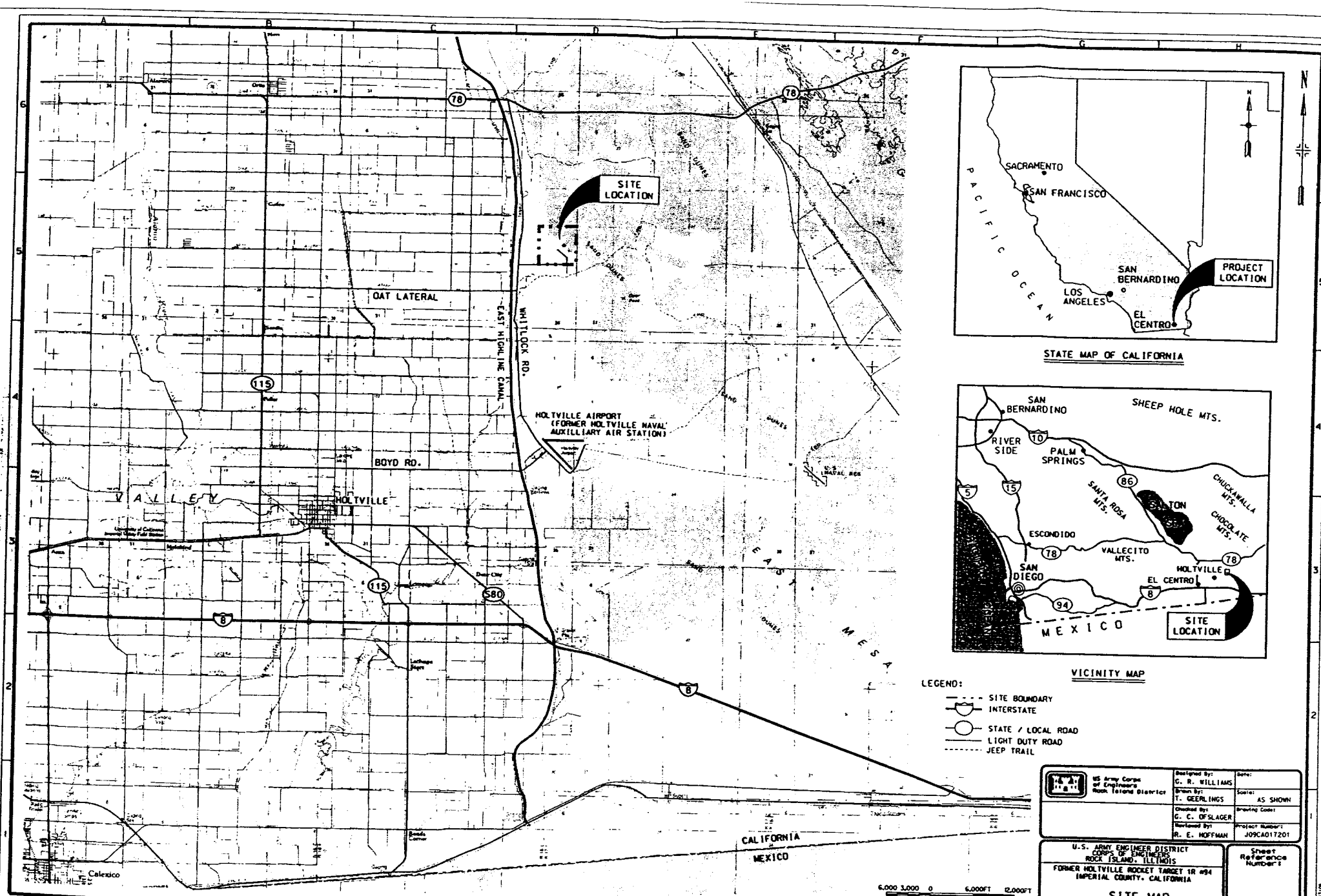
Commander, U.S. Army Engineer District,
Rock Island
P.O. Box 1600
Rock Island, IL 61201

	No. Copies		
	I	II	III
CENCR-ED			-1
-ED-D			-1
-ED-DO	3		

I - Final Report
II - Findings Report
III - Routed Final Report

ORDNANCE AND EXPLOSIVES
ARCHIVES SEARCH REPORT
FOR
THE FORMER
HOLTVILLE ROCKET TARGET 1R (#94)
IMPERIAL COUNTY, CALIFORNIA
PROJECT NUMBER J09CA017201

REPORT PLATES



STATE MAP OF CALIFORNIA

VICINITY MAP

LEGEND:
- SITE BOUNDARY
- INTERSTATE
- STATE / LOCAL ROAD
- LIGHT DUTY ROAD
- JEEP TRAIL

US Army Corps of Engineers Rock Island District	Designed By: G. R. WILLIAMS	Date:
	Drawn By: T. GEERLINGS	Scale: AS SHOWN
	Checked By: G. C. OFSLAGER	Drawing Code:
	Reviewed By: R. E. HOFFMAN	Project Number: J09CA017201

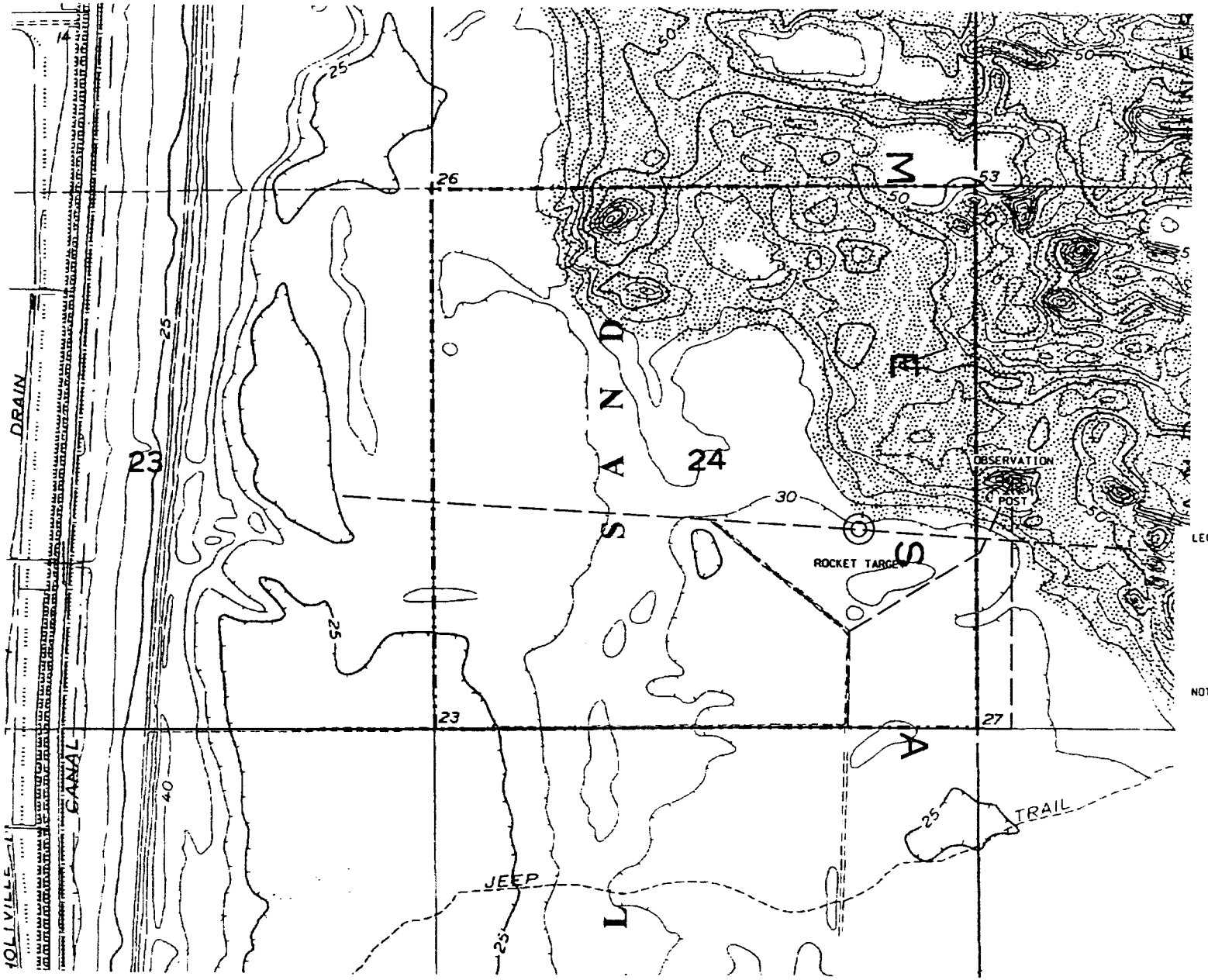
U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ROCK ISLAND, ILLINOIS

FORMER HOLTVILLE ROCKET TARGET 1R #94
IMPERIAL COUNTY, CALIFORNIA

SITE MAP

Sheet Reference Number: 1

Sheet 1 of 5



LEGEND:

- SITE BOUNDARY
- OBSERVATION POST
- ROCKET TARGET
- TEMPORARY ASPHALT ROAD
- DIRT ROAD

NOTES:

1. THE SITE BOUNDARIES WERE ESTABLISHED IN ACCORDANCE WITH DOCUMENT C-1 OF THE FINDINGS.
2. THE LOCATION OF TARGET IS BASED UPON A 1949 AERIAL PHOTOGRAPH (DOCUMENT K-1).
3. THE LOCATION OF THE OBSERVATION POST WAS CONFIRMED DURING THE SITE INSPECTION PHASE.

US Army Corps of Engineers Rock Island District	Designed By: G. R. WILLIAMS	Date:
	Drawn By: T. GEERLINGS	Scale: AS SHOWN
	Checked By: G. C. OFSLAGER	Drawing Code:
	Reviewed By: R. E. HOFFMAN	Project Number: J09CA017201

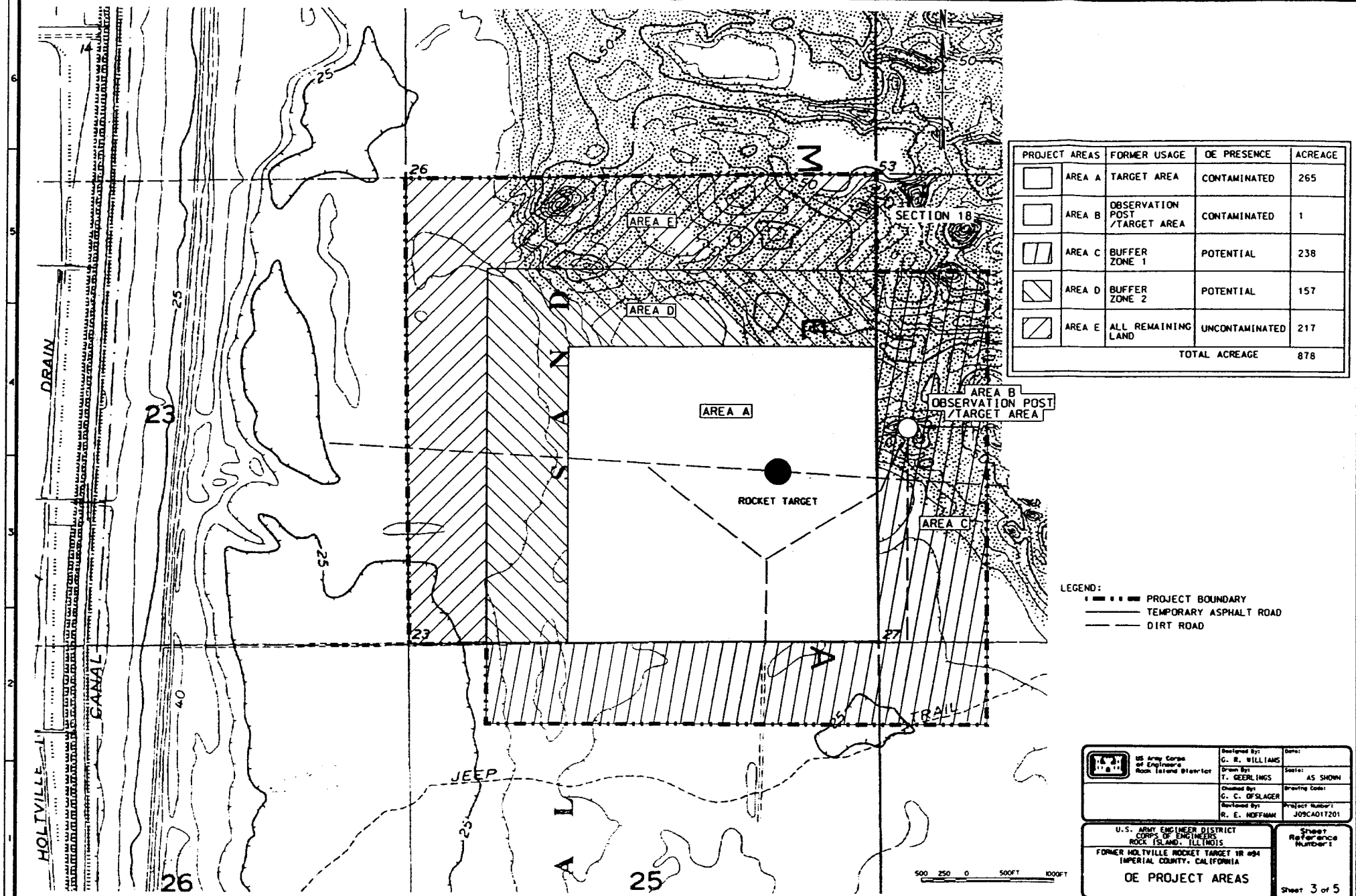
U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ROCK ISLAND, ILLINOIS

FORMER HOLTVILLE ROCKET TARGET 1R #94
IMPERIAL COUNTY, CALIFORNIA

FACILITY LAYOUT
CIRCA MAY, 1945

Sheet Reference Number

Sheet 2 of 5



PROJECT AREAS		FORMER USAGE	OE PRESENCE	ACREAGE
	AREA A	TARGET AREA	CONTAMINATED	265
	AREA B	OBSERVATION POST /TARGET AREA	CONTAMINATED	1
	AREA C	BUFFER ZONE 1	POTENTIAL	238
	AREA D	BUFFER ZONE 2	POTENTIAL	157
	AREA E	ALL REMAINING LAND	UNCONTAMINATED	217
			TOTAL ACREAGE	878

US Army Corps of Engineers Rock Island District

Designed By: G. R. WILLIAMS	Date:
Drawn By: T. GEERLINGS	Scale: AS SHOWN
Checked By: G. C. OFSLAGER	Drawing Code:
Approved By: R. E. HOFFMAN	Project Number: J09CA017201

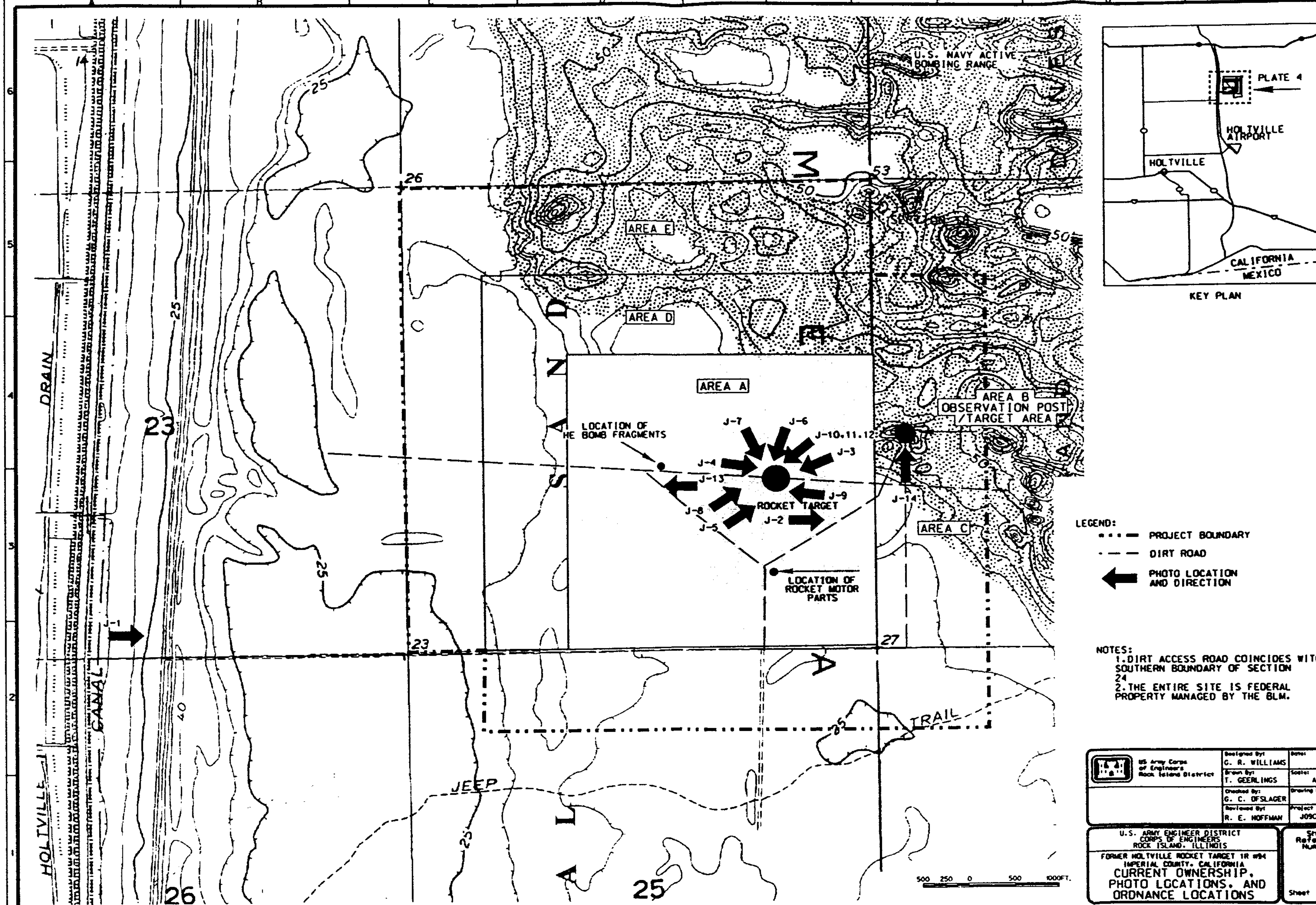
U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ROCK ISLAND, ILLINOIS

FORMER HOLTVILLE ROCKET TARGET 1R #94
IMPERIAL COUNTY, CALIFORNIA

OE PROJECT AREAS

Sheet Reference Number

Sheet 3 of 5



LEGEND:

- PROJECT BOUNDARY
- DIRT ROAD
- PHOTO LOCATION AND DIRECTION

NOTES:
1. DIRT ACCESS ROAD COINCIDES WITH SOUTHERN BOUNDARY OF SECTION 24
2. THE ENTIRE SITE IS FEDERAL PROPERTY MANAGED BY THE BLM.

US Army Corps of Engineers Rock Island District

Designed By: G. R. WILLIAMS	Date:
Drawn By: T. GEERLINGS	Scale: AS SHOWN
Checked By: G. C. OFSLAGER	Drawing Code:
Reviewed By: R. E. HOFFMAN	Project Number: J09CA017201

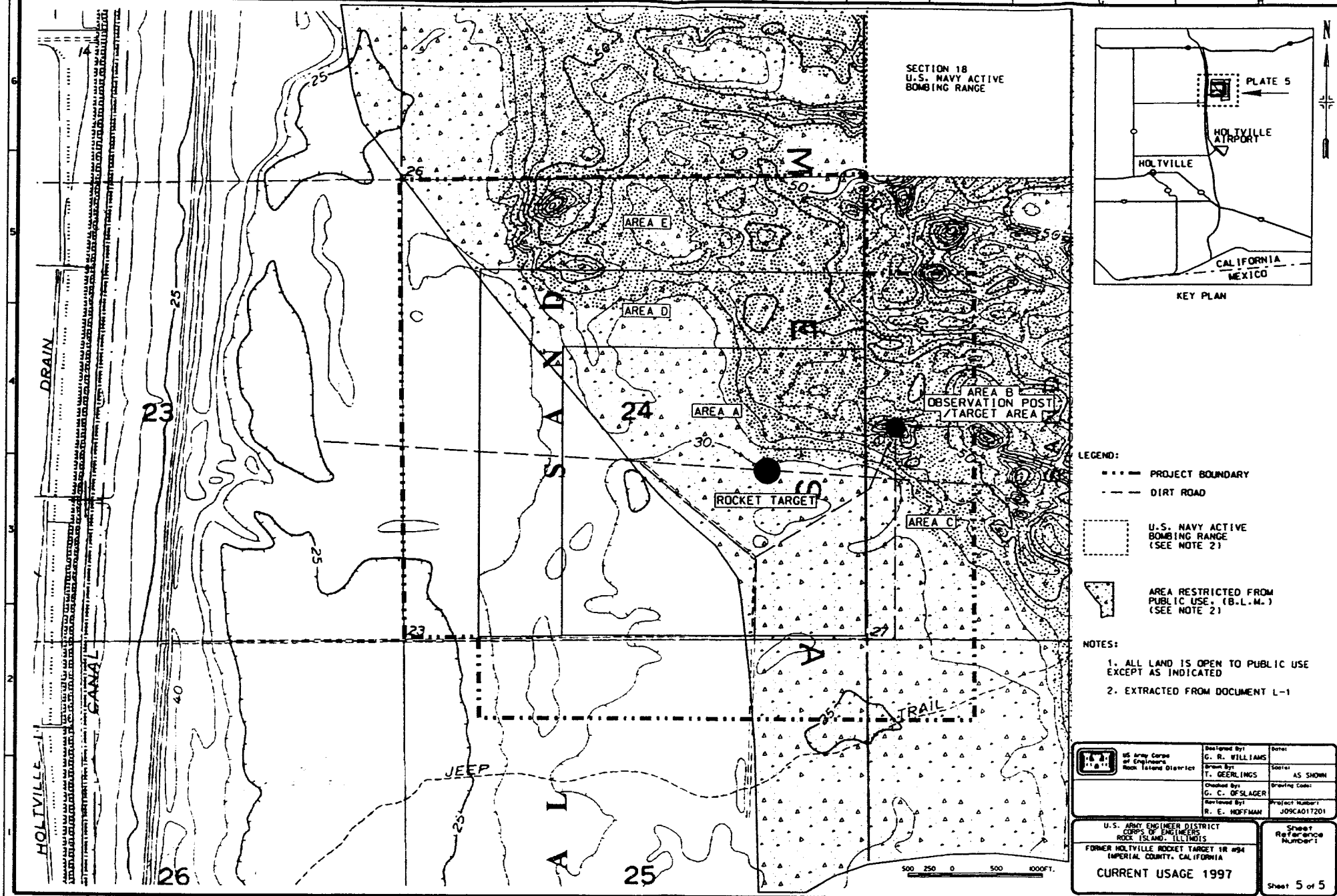
U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ROCK ISLAND, ILLINOIS

FORMER HOLTVILLE ROCKET TARGET 1R #94
IMPERIAL COUNTY, CALIFORNIA

CURRENT OWNERSHIP, PHOTO LOCATIONS, AND ORDNANCE LOCATIONS

Sheet Reference Number:

Sheet 4 of 5



US Army Corps of Engineers Rock Island District

Designed By: G. R. WILLIAMS	Date:
Drawn By: T. GEERLINGS	Scale: AS SHOWN
Checked By: G. C. OFSLAGER	Drawing Code:
Reviewed By: R. E. HOFFMAN	Project Number: J09CA017201

U.S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
ROCK ISLAND, ILLINOIS

FORMER HOLTVILLE ROCKET TARGET 1R #94
IMPERIAL COUNTY, CALIFORNIA

CURRENT USAGE 1997

Sheet Reference Number:

Sheet 5 of 5