



**US Army Corps
of Engineers**
Rock Island District



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

Archives Search Report

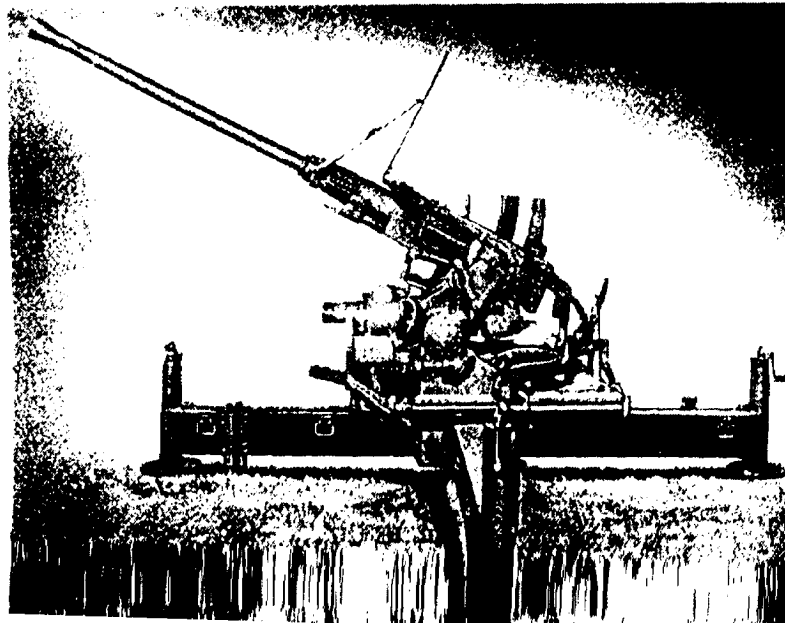
FINDINGS

for
the former

BORREGO MANEUVER AREA

BORREGO SPRINGS, CALIFORNIA
Project Number J09CA701101

JUNE 1997



DEFENSE ENVIRONMENTAL RESTORATION PROGRAM
for
FORMERLY USED DEFENSE SITES

FINDINGS

ORDNANCE AND EXPLOSIVE
ARCHIVES SEARCH REPORT
FOR

BORREGO MANEUVER AREA
BORREGO SPRINGS, CALIFORNIA
PROJECT NUMBER J09CA701101

JUNE 1997

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ORDNANCE AND EXPLOSIVE
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 FOR
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 BORREGO SPRINGS, CALIFORNIA
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ORDNANCE AND EXPLOSIVE
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FINDINGS

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ORDNANCE AND EXPLOSIVE
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FOR
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1. INTRODUCTION

a. Subject and Purpose

(1) This report presents the findings of an historical records search and site inspection for ordnance and explosive (OE) presence located at the former Borrego Maneuver Area. See plate 1 for general location map. The investigation was performed under the authority of the Defense Environmental Restoration Program for Formerly Used Defense Sites (DERP FUDS).

(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 by a thorough evaluation of historical records, interviews, and an on-site visual inspection.

b. Scope

(1) The investigation focused on approximately 400 square miles (256,000 acres) of land located near Borrego Springs, California. This land was obtained by the Department of the Army from the State of California by use permit around 1942 for use as a maneuver area for the Army Headquarters, Southern California Sector, Western Defense Command. The Borrego Maneuver Area was active from 1942 until 1944, with the primary documented user being the Army Anti-Aircraft Training Center (AARTC) at Camp Callan, California, from 1943 to 1944. The Marine Corps additionally utilized the maneuver area to train student drivers. The Borrego Maneuver Area was declared excess to the needs of the AARTC in 1944 and was further declared surplus in 1944, at which time the lands were returned to the State of California.

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

(3) For the purpose of this report, OE presence consists of live ammunition, live 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. Such ammunition/components are no longer under accountable record control of any DOD organization or activity.

(4) Expended small arms ammunition (caliber .50 or smaller) does not constitute an OE presence. OE further includes "explosive soil" which refers to any mixture in soil, sands, clays, etc., such that the mixture itself is explosive. Generally, 10 percent or more by weight of secondary explosives in a soil mixture is considered explosive soil.

2. PREVIOUS INVESTIGATIONS

a. 1994 Preliminary Assessment

(1) A Preliminary Assessment (PA) of the Borrego Maneuver area was conducted under the Defense Environmental Restoration Program, Formerly Used Defense Sites (DERP FUDS) by the U.S. Army Corps of Engineers, Los Angeles District (CESPL) on 6 July 1994 (site number J09CA701100). At that time, it was determined that the site was formerly used by the DOD for various military functions. Several OE projects, with a broad scope of OE delivery and usage, were classified in the Borrego Springs project, some lying within or near the Borrego Maneuver area, with the Borrego Maneuver Area being one of the areas identified and the subject of this report (see document E-1).

(2) The signed FDE concluded that the Borrego Maneuver Area site consisted of approximately 400 square miles (256,000 acres), was used from 1942 to 1944, and was eligible for restoration under the purview of DERP FUDS (see table 2-1 and document E-1).

Project Number	DERP Category	Present Phase	Comments	Location
J09CA701101	OE	SI	Ordnance & Explosives	Borrego Maneuver Area (see plates 1 & 2)
J09CA701102	OE	SI	Ordnance & Explosives	Camp Ensign
J09CA701104	OE	SI	Ordnance & Explosives	Borrego Hotel (Target and Emergency Landing Field,

Note: Site numbers J09CA701103 and J09CA701105 were omitted from assignment.

TABLE 2-1 (continued)				
DERP-FUDS PRELIMINARY ASSESSMENT PROJECT				
Project Number	DERP Category	Present Phase	Comments	Location
J09CA701106	OE	SI	Ordnance & Explosives	Benson Dry Lake
	HTRW	--	None Recommended	
	BD/DR	--	None Recommended	

b. Other Investigations

To the knowledge of the team, no other investigations pertinent to this site have been conducted or are being conducted at this time.

3. SITE DESCRIPTION

a. Existing Land Usage

(1) The former Borrego Maneuver Area is located in the vicinity of Borrego Springs, California. Total site acreage consisted of 400 square miles of a combination of barren desert, mountains, and badlands bearing negligible amounts of arid climate vegetation species, which was acquired by use permit from the State of California for use as a force-on-force maneuver area (see documents F-1 and G-1).

(2) Today, former project lands are owned predominately by the State of California for use as a State Park, with numerous additional parcels under state, federal and private ownership.

(3) Table 3-1 on the next page lists the current listed owners, acreages and OE areas that are appropriate to this project site.

**TABLE 3-1
CURRENT LAND USAGE**

AREA	FORMER USAGE	PRESENT OWNER	CURRENT USAGE	SIZE ACRES	COMMENTS
A-1	Mechanized Artillery Range Impact Area	California Parks Department	State Park	2,085.00	See plates 3 & 4
A-2	Mechanized Artillery Range Buffer Zone	California Parks Department	State Park	23,852.00	See plates 3 & 4
B	Borrego Mountain Auto Weapons Firing Range/ Rocket Experimental Test Area	California Parks Department	State Park	4,450.00	See plates 3 & 4
C	Santa Rosa Mountain Auto Weapons Firing Range	California Parks Department	State Park	5,985.00	See plates 3 & 4
D	All Other Lands	Multiple Owners	State Park/ Various	206,731.00	See plates 3 & 4
E-1	Naval Impact Areas	California Parks Department	State Park	3,112.00	See plates 3 & 4
E-2	Naval Buffer Zones	California Parks Department	State Park	9,785.00	See plates 3 & 4
TOTAL FDE ACRES:				256,000.00	

b. Climatic Data

(1) The former Borrego Maneuver Area is a parcel of desert land located in the eastern portion of San Diego County and the western portion of Imperial County. The project area is characterized by hot summers and mild winters. The average annual temperature is 72.6 degrees Fahrenheit (F). In the summer months (June through August), the daily average is 88.93 degrees F. The maximum high temperature recorded for the region is 120 degrees F. In the winter months (December through February), the average is 57.3 degrees F, with temperatures rarely falling below freezing.

(2) The average yearly rainfall is 6.83 inches, and occurs primarily during two seasons: winter, when Pacific frontal storms drop some moisture, and summer, when thunderstorms develop out of moist air coming north from the Gulf of California. Winter rains are usually gentle. Summer storms can be locally heavy and cause damaging flash floods. Occasionally, a tropical Pacific cyclone, known in Mexico as a chubasco, will strike the area and dump large amounts of rain in a short period of time. On the average, summer rains attributable to tropical Pacific storms reach Southern California once every two years.

(3) Westerly winds prevail in the project region except during the summer (June through August), when easterly winds equal or surpass the westerlies. Average wind speeds are light (2-4 meters/second) most of the year. During the spring, however, average wind speeds increase to a moderate 4-6 meters/second (see references B-6 and B-7).

c. Topography

(1) The former Borrego Maneuver Area is located predominately in the Borrego Valley with elevations ranging from 262 feet below sea level to 6,560 feet above sea level.

(2) The site is situated predominately on a fairly level, broad, and arid plain between Borrego Mountain and the Santa Rosa Mountains, with sections of both mountainous areas a portion of project lands. The vegetation of the area is sparse, with an array of a several arid climate plant species present (see reference B-5 and Plate 1).

d. Geology and Soils

(1) The Anza-Borrego Desert, in which the project area lies, is part of the Colorado Desert Biogeographical Province of southeast California. The Colorado Desert is a northern extension of the Sonora Desert of Arizona and northwestern Mexico.

(2) The Geology of the Anza-Borrego is diverse, displaying sandstone and silt creations of ancient lakes in much of the area, with flat valleys, jagged mountains, and narrow canyons also predominant features, the result of millions of years of faulting, water scouring, and erosion.

(3) The Anza-Borrego Desert, in the vicinity of project lands, is bisected by two large fault zones, the San Jacinto and the Elsinore. The San Jacinto runs from the Hemet area through the Borrego Valley, sending branches to the Salton Trough. The Elsinore zone runs from the Temecula south along County Road S-2.

(4) The largest earthquake to hit Anza-Borrego in historic times occurred on the Coyote Creek Fault, a branch of the San Jacinto, on 9 April 1968. It measured 6.4 on the Richter Scale with an epicenter near the Borrego Mountain. Damage to structures in Borrego Springs and Ocotillo Wells were minor.

(5) The predominant soil types of the project are identified as follows (see reference B-5):

(a) Rositas-Carrizo association: Somewhat excessively drained loamy coarse sands to very gravelly sands on alluvium fans; 0-9 percent slopes.

(b) Mecca-Indio association: Well drained sandy loams and silt loams on alluvial fans, subject to occasional flooding and deposition; 0 to 5 percent slopes.

(c) Crouch association, rocky: Well drained coarse sandy loams over weathered grandiorite; 9 to 75 percent slopes.

(d) Tollhouse-LaPosta-Rock land association, eroded: Excessively drained and somewhat excessively drained coarse sandy loams and loamy coarse sands over granitic rock, and areas of rock land; 9 to 65 percent slopes.

(e) Sheephead association, rocky: Well drained cobbly fine sandy loams over fractured mica schist; 9 to 65 percent slopes.

(f) Mottsville-Bull Trail association: Excessively drained to well drained loamy coarse sands and sandy loams on alluvial fans and in basins; 2 to 15 percent slopes.

(g) Mottsville-Calpine association: Excessively drained to well drained loamy coarse sands and coarse sandy loams on alluvial fans; 2 to 15 percent slopes.

(h) Rough broken land-Terrace escarpments-Sloping gullied land association: Steep and very steep dissected land, escarpments, and gullied land.

(i) Badland association: Dominantly barren eroded shales.

(j) Rock land association: Dominantly exposed bedrock and very large boulders.

e. Hydrology

(1) The Borrego Maneuver Area falls within the Borrego Valley Ground Water Basin which is an alluvium-filled valley underlain by crystalline bedrock.

(2) The valley fill is classified into three categories: upper, middle and lower aquifers. The upper aquifer ranges in thickness from 0 to 1000 feet, the middle aquifer from 0 to 700 feet, and the lower aquifer from 0 to 1,800 feet.

(3) Ground water levels vary considerably in the valley, ranging between about 18 feet and 305 feet from ground surface, depending upon elevation.

(4) The only surface body of water constantly present on project land is the Coyote Canyon stream (see reference B-8).

f. Natural Resources

(1) The subject site is in the general area of various state and federal endangered, threatened, and candidate species. Those species listed in Table 3-2 are known or believed to inhabit the site.

(2) For additional species in San Diego County that are considered Federal and State Candidate Category 1 and 2, interested parties should review document E-3. A species update should be acquired from the U. S. Fish and Wildlife Service, the California Natural Heritage Division, and the Anza-Borrego State Park prior to remediation (see documents E-6, E-7, and Appendix A).

g. Historical/Cultural Resources

Mr. Fred Jee of the Anza Borrego State Park has stated that numerous historical and archaeological/palaentological sites are located in or near project lands. These are in the form of village sites, tool construction sites, and sleeping circles (to name a few). In the event of remediation on the site, it is recommended that the California State Park Service be contacted for a current evaluation of site conditions and remediation guidelines. The phone number for this organization is (619) 767-5311 (see document I-6).

**TABLE 3-2
NATURAL/CULTURAL RESOURCES**

Resource Classification	Type	Comment
Wildlife	Least Bills Vireo	Endangered (Fed & State)
	Unarmored Threespine Stickleback	Endangered (Fed & State)
	Mohave Tui Chub	Endangered (Federal)
	Peninsular Bighorn	Proposed Endangered (Fed) Threatened (State)
	Flat-Tailed Horned Lizard	Proposed Threatened (Fed)
	Barefoot Banded Gecko	Threatened (State)
Historical		Numerous On/Near
Archeological		Numerous On/Near

4. HISTORICAL ORDNANCE PRESENCE

a. **Chronological Site Summary**

(1) Site Acquisition

(a) On 20 March 1942, Major General Wilson, the Army Commander of the Southern California Sector of the Western Defense Command, informed his command in Training Circular #23 that maneuver and firing rights had been secured in an area of the Borrego Desert covering 400 square miles (256,000 acres). Maneuver area acreage had been procured through use permit with the State of California with the maneuver area being known as the Borrego Maneuver Area (see documents F-1 and G-1).

(b) Maneuver area site boundaries were said to extend eastward to Highway 99 (now Highway 86), northward to the Riverside County line, westward to a north-south line extending through the Borrego Post Office, and southward to Highway 78. Excluded from military usage on the agreement document for site utilization were Indian lands in Township 9 south, Range 9 east, a Naval landing field (Benson's Dry Lake) north of Ocotillo, and an area adjacent to the western boundary on which houses, fences, and other improvements had been erected. Additionally, two other Navy procured parcels, not excluded by maneuver area documents, existed within maneuver area boundaries (see documents F-1 and G-1).

(2) Facility Construction and Use

(a) After the acceptance of Borrego Maneuver Area lands, the only Army related improvement known to be performed on the property was the oiling (black-topping) of Yaqui Pass road (see documents E-4, H-1 and H-2).

(b) Naval improvements included the development of target areas and related structures prior to the acquisition of and within the confines of the maneuver area. The Naval areas were known as Clarks Dry Lake and the Borrego (Military) Wash and contained bombing, strafing and rocket targets and rake stations. These areas, although falling within the confines of the Borrego Maneuver Area, have been identified and are being investigated as separate FUDS sites, currently in the PA phase of investigation (see documents E-4, F-7, and L-1).

(c) Army related activity within the Borrego Maneuver Area consisted of the following:

(1) In September 1943, the Camp Callan Anti-Aircraft Replacement Training Center of San Diego, California, secured the Borrego Maneuver Area for field training purposes. Anti-Aircraft Artillery firing was also conducted at this maneuver area, in addition to such firing as was conducted at the post reservation firing point in San Diego (see document E-2).

(2) When new AA replacement units at Camp Callan completed a basic training of 8 to 15 weeks duration, they were sent to the Borrego desert for a final two weeks of training in "dry run" and "live fire" training (see documents E-2, E-4, E-5, F-2, F-3, F-4, I-3, I-5, I-6, I-10, I-11, I-14, I-15, I-17, I-18, I-20, and I-21)

(a) In dry run training, the crew repeatedly set up a gun emplacement, tore it down, and moved to a new location (usually at night), where they would quickly and correctly conceal and protect it and make it once again combat ready. Batteries of large caliber guns also practiced training the gun on high flying aircraft detected by the aural locators which were aided at night by the searchlight crews. Batteries of small-caliber weapons also made dry runs by training their guns against low flying targets.

(b) "Live fire" antiaircraft firing ranges in the valley were said to have been north of Clark's Dry Lake and at the Borrego Mountain. Some of the Camp Callan training batteries made their dry runs in the Borrego Valley, then completed their field exercises by live firing at Camp Haan. Other training Batteries did both the dry runs and live firing in the valley. Although guns of up to 155mm were possibly transported to the property, only the smaller caliber weapons (.30 caliber to 90mm) fired live ammunition. Guns for larger ammunition were fired at Camp Haan. Historical and interview

evidence displays that small bore weapons fire (presumably .30 and .50 Caliber) was directed at trailer launched OQ2-A pilotless target planes (drones) which were launched and controlled in a east to west direction at the north face of the Borrego Mountains and the south face of the Santa Rosa Mountains (the latter being an area in the vicinity of the Navy Clark's Dry Lake Landing Field/Target). Additional small caliber AAA firing was said to have occurred at high altitude aircraft towed targets (socks) at the same locations. Historical, interview, and physical evidence uncovered suggests that Army AAA firing of 40mm ammunition occurred in the Borrego Maneuver Area with fire directed at the Navy Target area in the Borrego (Military) Wash. 90mm fire may have also occurred in this area. The suspected firing point is believed to be an area of desert east of the former Camp Ensign and north of Borrego Mountain.

(c) Firing activities were coordinated through the Joint Operations Center in San Diego to allow optimum/joint use of Army/Navy target areas by the requesting services and to preclude accidents occurring due to unknown airspace/land training usage.

(3) Bivouac areas used by Camp Callan Units included the Ensign Ranch and desert areas eastward (see documents E-4, H-1, H-2, I-15 and I-21).

(4) Additional military related maneuver activity which occurred in the former Borrego Maneuver Area is evidenced by a State Archaeologists discovery of observation posts at various locations, military artifacts and ration debris found nearby. Remnants of a floating dock were also discovered in the Borrego Wash, possibly the remnants of engineer activity. In addition, a local resident discovered that an abandoned family homestead near the Borrego Sink had been occupied by military troops (believed to have been a force-on-force exercise in the spring of 1942). The evidence remaining were vehicle and large weapon sized pits, piles of food tins, a sprung door on the dwelling, a destroyed fence, and a rifle hanging on a tree. This may have actually been related to Camp Callan activity which actually began in September 1943 (see documents E-3, E-4, and plate 2).

(d) Marine related activity within the Borrego Maneuver Area consisted of the following (see documents E-4, F-7, H-1, and H-2):

(1) The Marines established a Camp at the Ensign Ranch in Borrego Springs where trainees from San Diego billeted, known as Camp Ensign.

(2) Groups of Marine trainees rotated through the camp for periods of about a week during which they gained proficiency in driving military trucks at night. Although their practice course is not known, it is believed that they used the few gravel roads near the ranch and drove freely across the surrounding desert.

(3) A 1941 document describes the proposed use of Borrego Area Naval Ranges by Marine Antiaircraft Artillery Units. However, this use cannot be substantiated.

(e) Navy related activity within the Borrego Maneuver Area consisted of the following (see documents E-4, F-8, photos J-5 through J-18, and plates 2, 3, and 5):

(1) Replacement pilot and crew training in bombing, gunnery, and rocketry at the Naval Clark's Dry Lake and the Borrego (Military) Wash target area's. Personnel scoring and observation of ordnance related missions are evident by the presence of rake stations. Occasional maintenance and improvement of these emergency landing/target areas is also suspected.

(2) Navy pilots provided air monitoring support during the Army AA firing at pilotless target planes/drones. The pilot was responsible for chasing and shooting down any errant drone which escaped from its ground controller.

(f) Military related civilian activity included the following (see documents D-2, E-4, photo J-1, and plates 2,3, and 5):

(1) Rocket scientists from the California Institute of Technology (CALTECH), with help from training units from Camp Callan, tested experimental target rockets in an area north of Borrego Mountain. The testing was an experiment in the radio detection of hits on target rockets.

(2) The tests were conducted along the north face of Borrego Mountain. A .30 caliber machine gun emplacement with crew was positioned about 2 miles from the experimental rocket launch site, the CALTECH group was located about mid range, and the launch crew was positioned at the face of the mountain. Communications were established between the elements.

(3) The gun crew would be alerted of rocket loading. Upon ignition of the rockets the gun crew would be advised to "fire at will", the rockets would then be fired east to west along the north face of Borrego Mountain, CALTECH tracked the trajectory of the rockets with theodolite and electronically recorded hits. When the rocket landed the fins were recovered and the hits were compared with the electronic record. The rocket bodies were then left in place. 3.25 Inch Target Rockets

were found by the inspection team in an area north of the north face of Borrego mountain, with the forward (nose) sections facing in a westerly direction.

(3) Site Inactivation and Disposal

(a) On 29 May 1944, the Commanding General, Camp Callan, California, reported the Borrego Maneuver Area as excess to the needs of that command (see document F-5).

(b) On 13 July 1944, the Commanding General, Headquarters, Army ground Forces declared the Borrego Maneuver Area as surplus to the requirements of the Army Ground Forces (see document F-5).

(c) On 26 August 1944 the Commanding Officer, Headquarters, Camp Callan, based on a 24 August 1944 request for confirmation by the Corps of Engineers, San Diego Field Office, confirmed the following to be correct (see document F-5):

(1) That the Borrego Maneuver Area has been vacated and will not be used again.

(2) That all installations including warning signs have been removed from the property.

(3) That the entire area has been policed; and, to the best of their knowledge and belief, there exists no hazards such as unexploded shells or ammunition of any kind placed upon or left upon the premises by their command.

(d) Also on 26 August 1944 the Commanding Officer, Headquarters, Camp Callan, notified the Corps of Engineers, San Diego Field Office, that considerable Naval target practice on Borrego Maneuver Area lands has occurred since Army termination of activities, and the Navy should be further contacted prior to property release (see document F-5).

(e) On 22 September 1944, the War Department, Office of Pacific Division Engineer, requested information regarding Naval usage and contamination of Borrego Maneuver Area lands from the Commandant, 11th Naval District. Naval response to this request on 22 September and 7 October 1944 stated that target areas utilized/contaminated by the Navy within the Borrego Maneuver Area lands are owned or under the jurisdiction of the Navy (Clark's Dry Lake and Borrego Wash) and will continue to be used by the Navy Department. Also stipulated was the fact that the subject Army maneuver area was not required for Naval use (see document F-5).

(f) Although a permit termination document could not be found releasing the Borrego Maneuver Area back to the State of California, it is believed to have occurred following Naval response to the Division Engineer on 7 October 1944 (see document F-5).

(4) Post Range Disposal Activity and Use

The former Borrego Maneuver Area lands have consistently, since site closure, been under state, federal, and private ownership, with the predominant portion utilized by the State of California as state park land. Usage is expected to remain consistent in the future.

b. Ordnance Related Records Review

(1) Research efforts for the former Borrego Maneuver Area began with a thorough review of all reports, historical documents and reference materials gathered during the archives search. During this review, an effort was made to focus on areas of confirmed and/or potential OE presence.

(2) Several documents were found pertaining to the usage of the Borrego Maneuver Area. The following documents verify its establishment and operation:

(a) A training circular from the Headquarters Commander of the Southern California Sector of the Western Defense Command, dated 20 March 1942, announces the acquisition of a 400 square mile desert training area in San Diego and Imperial Counties. This area was acquired for maneuvering and firing and was titled the Borrego Maneuver Area (see document F-1).

(b) A Land Use Permit, dated 10 March 1942, between the War Department and the State of California, gave the United States, its troops, and their animals, vehicles and equipment, the right at any and all times during the state of emergency of that period, to enter, maneuver upon, pass over, fire, and bivouac or camp upon a series of land parcels which describes the former Borrego Maneuver Area lands (see document G-1).

(c) An Army Ground Forces Historical Study of the Antiaircraft Command and Center, 1946, established that a maneuver area for Camp Callan was established in the Borrego Desert in September 1943. AAA firing was said to have been conducted at this maneuver area, in addition to such firing as was conducted at the post reservation firing point in San Diego (see document E-2).

(d) A memorandum (with enclosures), initiated by the Commander of Camp Callan, dated 10 July through 7 October 1944, gives notification of the termination of use of the Borrego Maneuver Area by the Antiaircraft Replacement Training Center (AARTC). Additionally specified in the enclosures to this document are the following (see documents F-5):

(1) That the Borrego Maneuver Area has been vacated and abandoned and will not be used again by the AARTC.

(2) That all installations, including warning signs, have been removed from the property.

(3) That the entire area has been policed and that no hazards exist attributed to the usage of ordnance by the AARTC.

(4) That considerable target practice by the Navy occurred on Navy procured and controlled lands within the confines of the Borrego Maneuver Area. In addition, the Navy had no need for lands within the Borrego Maneuver Area, other than those procured for Navy use.

(5) That the Borrego Maneuver Area is declared "Excess" and "Surplus" to the requirements of the Army Ground Forces.

(e) A historical study of recent military operations in the Anza-Borrego Desert State Park (1941 to 1959), dated 31 October 1991, states the following (see document E-4):

(1) The Army acquired 400 square miles of the Anza Borrego State Park, an area about equal to the old Borrego State Park, for use as a maneuver area. The region, called the Borrego Maneuver Area, although having roads built and extensive logistical preparations made for it, was probably never used for its intended force-on-force exercises.

(2) Portions of the Borrego Maneuver Area were used extensively by antiaircraft gunnery units from Camp Callan at Torrey Pines. Following basic weapons training by antiaircraft soldiers, they were required to perform two weeks of field training prior to being assigned to a battery preparing for overseas combat duty. This training occasionally occurred in the Borrego Maneuver Area due to saturation of other training areas.

(3) Some of the training batteries from Camp Callan made dry-runs in the Borrego Maneuver Area, then completed their field exercises with live firing at the Camp Haan target ranges in the Mojave Desert. Dry-run training consisted of the repeated set up and tear down of gun emplacements, usually at night, with adequate cover and concealment the primary objective during setup. During dry-run training batteries of large-caliber guns practiced training the gun on high-flying aircraft detected

by aural locators and aided at night by searchlight crews. Batteries of small-caliber weapons also made dry runs by training their guns on low flying aircraft.

(4) Other training batteries from Camp Callan performed both dry-run and live fire training in the Borrego Valley. Live fire ranges were north of Clark's Dry Lake, at Borrego Mountain, and possibly in the Navy owned (but jointly used) Borrego (Military) Wash target area. Known targets included high altitude airplane-towed sock targets and unmanned OQ-2A radio-controlled target planes (drones). The AA target in the Military Wash target area is believed to have been a towed or self-propelled target on an extensive track. Drone firing occurred east to west along the face of the Santa Rosa or Borrego Mountains. The drones were kept sufficiently below the top of the mountains to ensure that the trainees, who were firing into the mountains, would not shoot over them.

(5) Rocket scientists from the California Institute of Technology (CALTECH), with help from a AAA training battalion and drone launching crew from Camp Callan, tested experimental target rockets in an area north of Borrego Mountain. The testing was an experiment in the radio detection of hits on specially developed 3.25" target rockets, utilizing a .30 caliber machine gun emplacement with crew which was positioned about 2 miles from the experimental rocket launch site. Upon ignition of the rockets the gun crew would be advised to "fire at will", the rockets would then be fired east to west along the north face of Borrego Mountain with CALTECH tracking the trajectory of the rockets with theodolite and electronically recording hits. When the rocket landed the fins were recovered and the hits were compared with the electronic record. The inert rocket bodies were then left in place.

(f) Several State Park Service Archeological Site Survey Records, 1986 through 1988, describe the remains of World War II era observation posts, a floating dock, and target/target related features within the former Borrego Maneuver Area. The target features are located at former Navy Target areas located within the maneuver area, Clarks Dry Lake and Borrego Wash (see document E-3).

(g) Newspaper articles, citing Borrego activities of World War II, dated 28 August 1971 and 23 November 1989, stated the following (see documents H-1 and H-2):

(1) That after Pearl Harbor, Borrego came alive with Army and Marine units.

(2) The Ensign Ranch was designated a Marine outpost to train San Diego Marine Corps recruits slated for the duty in Northern Africa (the Ensign Ranch bordered the Borrego maneuver Area on the west). The Marines learned to drive under desert conditions at night time without lights (black-out

conditions). The driver trainees came to the valley in groups of 100. Every Thursday, the drivers would be given a night-driving test. If they passed, they could return to San Diego and civilization.

(3) Army tank destroyer units rolled into the valley, presumably from New Mexico. The purpose of their visit was not mentioned and is not otherwise historically documented.

(4) Two Camp Callan antiaircraft units additionally trained in the desert each week, followed by clean-up squads upon their departure. One article also mentioned a searchlight crew presence and their activities at Camp Ensign.

(5) That P-38 planes were roaring and diving overhead on desert practice missions.

(6) That military service influence expedited the completion of Yaqui Pass road.

(7) That military personnel took over an unoccupied family (Laag) homestead in the Borrego Maneuver Area near the Borrego Sink. Evidence of military occupation was discovered by the family after military departure.

(8) That the Military (Borrego) Wash area, located within the Borrego Maneuver Area, contains shell clips, projectiles, the remains of two old bunkers, and a (supposed) railway like target system containing ammo crate or ration box debris.

(3) Several documents were discovered which verifies or suggests an ordnance or explosives (OE) usage/presence on the former Borrego Maneuver Area:

(a) An Explosive Ordnance Disposal Explosive Incident Report, dated 11 March 1994, reports the discovery and destruction of a 40mm MK1 high explosive incendiary projectile with tracer at the Palo Verde Wash of the Anza Borrego State Park. The park point of contact listed on the report, Ranger J. Meier, further described the location to be at the intersection of Palo Verde Wash and Short Wash (see documents D-1, D-5, E-5, I-11, and plate 5).

(b) An Army Ground Forces Historical Study of the Antiaircraft Command and Center, 1946, stated the following (see document E-2):

(1) That AAA firing was conducted in the Borrego Maneuver Area, in addition to such firing as was conducted at the Camp Callan post reservation firing point in San Diego.

(2) For carrying out the secondary mission of antiaircraft artillery, anti-mechanized artillery, the 90mm AA Gun, 40mm, and other automatic weapons of the AAA are capable of firing upon ground as well as air targets. To accomplish this mission/training, anti-mechanized ranges were built and utilized in all of the AAA training centers. At certain specified installations, targets mounted on power operated or winch drawn cars on a defilated track were utilized for this purpose. At other specified installations, targets built on sleds and towed by distant vehicles were used. Although not mentioned as one of the target locations in the historical document, a 1 mile long wooden track matching this description was found in the Naval Military Wash target area by the inspection team .

(3) That special training aids and devices were used for the training AAA troops. The OQ type target plane, said to have been utilized in the Borrego Maneuver Area by other source documents, was used as a target for automatic weapons fire (.30 and .50 caliber, and the 40mm automatic carriage which was standardized after termination of operations in Borrego) service practice. This was a small motor-operated plane which is put in flight by a catapult and controlled by radio from the ground.

(d) A historical study of recent military operations in the Anza-Borrego Desert State Park (1941 to 1959), dated 31 October 1991, stated the following (see document E-4):

(1) That only lighter Army antiaircraft weapons from Camp Callan (.30-caliber to 40mm) fired live ammunition in the valley during live fire training. Guns for larger ammunition (above 40mm) fired only at Camp Haan. 40mm fire is said to have occurred only at Borrego Mountain.

(2) That CALTECH conducted experiments at the north face of the Borrego Mountain utilizing 3.25" target practice rockets fired upon by Camp Callan .30 caliber machine guns. These target rockets consist of a motor, motor extension, nose, and three plywood fins. The only energetic materials contained within these rockets are rocket motor propellant (solvent-extruded double base powder), an electrical squib to ignite the propellant, and a pyrotechnic flare (some models). The maximum speed of these rockets is 425 miles per hour with a maximum range of 5000 feet.

(5) A few documents were located which suggested or confirmed a Navy or Marine target presence (with associated OE usage) within the boundaries of, but not associated with, the Borrego Maneuver Area:

(a) A San Diego Naval Air Station memorandum specifying Navy operating areas in the Borrego and Imperial valleys, dated 13 March 1941, show two Naval areas to be present and operational within the Borrego Maneuver Area site boundary, before the establishment of the Borrego Maneuver Area. These

sites were the Clarks Dry lake, leased by the Navy and containing an airfield and horizontal bombing target, and the Borrego Wash, leased by the Navy and containing a horizontal bombing target only (see document F-6)

(b) An 11th Naval District memorandum endorsement concerning Navy operating areas in the Borrego and Imperial valleys, dated 28 March 1941, recommends the acquisition of the Areas in the Borrego and Imperial valleys for use as an anti-aircraft and artillery range for Marine Corps Combat firing (see document F-7).

(c) An 11th Naval District circular letter concerning bombing targets in the Southern California Sector of the Western Sea Frontier, dated 24 August 1944, displays a target to exist at the Borrego Wash and Clarks Dry Lake sites. The Borrego Wash target consisted of concentric circles with an adjacent airplane silhouette and was designated for high altitude and dive bombing with "practice bombs and strafe". The Clarks Dry Lake target consisted of concentric circles with a simulated submarine and was designated for high altitude and dive bombing with "practice bombs and strafe" (see document F-8).

(d) A historical study of recent military operations in the Anza-Borrego Desert State Park (1941 to 1959), dated 31 October 1991, describes the establishment, activity, and remaining features of two Naval target areas (Clarks Dry Lake and Military Wash) located within, but not directly associated with, the former (Army) Borrego Maneuver Area (see document E-4).

(6) A couple of documents were located which suggest a joint Army/Navy ordnance usage on the Borrego Wash Naval Target Area:

(a) An 11th Naval District Joint Operations Center memorandum of the Western Defense Command-Western Sea Frontier, dated 1 September 1943, discusses the policy for joint use and control of Army/Navy land and sea training areas of the Army Southern California Sector, Western Defense Command, and the Navy Southern Sector, Western Sea Frontier (see document F-2).

(b) A Naval Air Control Center, Southern Sector, Western Sea Frontier memorandum and chart, dated 21 November 1943, discusses and provides an overlay grid for joint use coordination of sea and air training areas within the Southern Sector, Western Sea Frontier, with the Borrego Maneuver Area displayed to be a part of the "LL" section of training airspace (see document F-3).

(c) A Naval Air Control Center, Southern Sector, Western Sea Frontier memorandum, dated 3 June 1944, cites an installation, within the Borrego Area, which was defined as a danger area on 11 October 43 to be used by the AARTC, Camp Callan. This area was to be used for the firing of AA weapons, subject to Navy Jurisdiction over the areas and coordination

through the Joint Operations Center, San Diego. This area is believed to be the Naval Borrego Wash target area located within the Borrego Maneuver Area (see document F-4).

c. Interviews with Site Related Personnel

(1) Several persons were interviewed that were able to provide general OE related information of the Borrego Maneuver Area site.

(2) SGT Grayson has been a member of the San Diego County Sheriff's Department Arson/Explosives Unit for 20 years, and is the chairman of all Military/Civilian Explosive Ordnance Disposal (EOD) activity in the County. His organization is presumably notified of all ordnance/explosive incidents which occur/arise in San Diego County. His organization also supported Imperial County until three years ago. SGT Grayson is aware of ordnance activity in the Anza Borrego State Park (a portion of which the former Army Borrego Maneuver Area and a couple of other Navy targets were located, predominately on or originating from the Carrizo Impact area, and in the Chocolate Mountains (see document I-1).

(3) SFC Rodriguez, SSG Thompson, SSG Wilson, and SPC Knowles are all members of the 70th Ordnance Company (Explosive Ordnance Disposal) stationed at the Naval Sub Base in San Diego, California. They surveyed/reviewed all OE related incident reports, journals, and activity report files of their organization (dating from 1992 to present) to determine if an OE related incident response occurred to the Anza-Borrego Desert State Park area of San Diego County, specifically the former Borrego Maneuver Area, which is in their area of operations. Two incident (11 March 1994 and 29 December 1996) responses occurred which were within the former Borrego Maneuver Area boundary. One incident occurred in the Palo Verde Wash Area of the Desert State Park. The incident item discovered/destroyed was a 40MM MK1 WWII high explosive projectile. The second incident occurred in the Borrego (Military) Wash area. Incident items discovered and destroyed were two 5" high explosive rockets. This area is a separate former Naval Bombing Target located within (but not associated with) the former Army Borrego Manuever Area. All other incident responses involved response to the Carrizo Impact Area, which is part of the Anza-Borrego State Park but not associated with or near the aforementioned project area (see document I-2).

(4) Steve Sawyer has been an investigator with the Borrego Springs Fire Department Arson/Bomb Unit for 14 years, but has visited the Borrego Springs area for the past 19 years. His organization is normally called for assistance for all ordnance and explosive incidents in the Borrego Springs, Anza Borrego State Park, and Ocotillo Wells vicinity. Mr. Sawyer had knowledge of previous OE and range activity within the land area

comprising the former Borrego Maneuver Area. The areas which Mr. Sawyer cited were the Clarks Dry Lake and Borrego (Military) Wash areas, which were former Navy target areas within, but not associated with, the former Army maneuver area. Mr. Sawyer stated that two 5" high explosive rockets were found on 29 December 1996 in the Military Wash area and destroyed by Army Explosive Ordnance Disposal personnel. Other items commonly found in the Military Wash area are 3 pound MK23 practice bombs (devoid of spotting charges), 20mm projectiles, and .50 caliber bullets. MK 23 practice bombs have also been discovered in downtown Borrego Springs by a realtor and in the Fonts Point area (1) by paleontologists. Other military improvements found at Clarks Dry Lake and Military Wash target areas are "rake" (spotting) stations. Mr. Sawyer has also discovered practice rocket debris in the vicinity of Borrego Wash where it merges with San Felipe Wash. Mr. Sawyer hikes and explores the desert as a hobby. During the week of 2-7 March 1997, Mr. Sawyer and a friend hiked, explored, and searched the west butte of the north face of Borrego Mountain and a 2 square kilometer area around the Short Wash area which is north and in the expected firing fan of suspected Army AA firing into the Naval Borrego (Military) Wash target area. During this expedition, along with numerous previous expeditions, he did not discover any OE related areas or debris other than those previously stated. Mr. Sawyer is not aware of any incidents or accidents resulting from OE remaining in the area or of any form of CWM training or usage (see document I-3).

(5) Sheriff's Deputies Hahn and McKenna have been members of the San Diego County Rural Enforcement Division, Borrego Springs Office, for 6 and 17 years, respectively. Their area of operations include the Borrego Springs and Ocotillo Wells areas. Deputies Hahn and McKenna are aware of former range/OE activity on or near former Borrego Maneuver Area lands. Deputy Hahn is aware of a MK23 3 pound practice bomb discovery in the Naval Borrego (Military) Wash area around three years ago. He also believes that trees were fired upon by the military in the 5 Palms area of the park, which was also within the boundary of the former maneuver area. Deputy McKenna has only received two or three OE related calls since his employment in the area, all associated with the Carrizo Impact Area, which is within the current park boundaries, but substantially south of the former Borrego Maneuver Area lands. Neither individual is aware of any incidents or accidents resulting from OE remaining in the area or of any form of CWM training or usage in the area. The 5 Palms tree allegation was investigated by inspection team and park personnel and found to be some form of tree borer (insect) activity, not ordnance related (see documents I-4 and I-12)

(6) Nancy Ellis, a lifetime local resident of the, Borrego Springs area, is aware of 1940-1945 military activity within the former Naval Clarks Dry Lake Bombing Target and Emergency Landing Field, located within the former Borrego Maneuver Area. Ms. Ellis stated that planes dropped bombs from a

low altitude, bombing from east to west, at white round target circles. Planes also strafed the target area with small arms ammunition. She recalls seeing small practice bombs and .50 caliber ammunition in the area following range usage. Ms. Ellis recalled an incident in which their homestead, then located 1 mile north of the target area, was accidentally strafed with small arms ammunition causing her irate father to complain to military authorities. Ms. Ellis also recalls seeing what she believed were tank tracks in that area during that period, but never encountered tanks, troops or troop maneuvers, artillery pieces, or artillery ammunition in that area. Ms. Ellis, although selling a good portion of the family homestead land to the State Park, still retains and lives on a 40 acre parcel of land slightly west of Clarks Dry Lake (see document I-5).

(7) Fred Jee is the Supervising Park Ranger for the California Park Service at the Anza Borrego Desert State Park. He began employment as a Ranger in the Borrego Springs area for the park service in 1975. Mr. Jee is familiar with evidence of former military activity within the former Borrego Maneuver area, due to the fact that it is part of the State Park which he has patrolled a good portion of. Mr. Jee stated that there were former ranges/impact areas at the Clarks Dry Lake and Borrego (Military) Wash areas of the park. Ordnance items can still be found in these areas. The only other evidence of prior military use in the park consists of a fallen metallic platform located in Fault Wash, believed to have been an observation post for Military Wash. In addition, rake stations are present at both Clarks Dry Lake and the Military Wash areas. The only incident/accident, to Mr. Jee's knowledge, resulting from a remaining ordnance presence in the area occurred in 1959. Deaths occurred in the Carrizo Impact Area which is south and not related to the former maneuver area (see document I-6).

(8) Mark Jorgensen is a Park Ranger and Ecologist for the California Park Service at the Anza Borrego Desert State Park. He began employment as a Ranger in that area in 1972, but began playing in and exploring the area in 1963. Mr. Jorgensen is familiar with other past military activity in the area. Mr. Jorgensen remembers the discovery of what was believed to be 155mm shot rounds in 1969 around the Yaqui Pass. Also, a case of dynamite was discovered in the vicinity of Clarks Dry Lake around 1970. Mr. Jorgensen also stated that Chuck Gatti, an old Park Ranger now deceased, once told him that artillery emplacements were once present in the Borrego Sink area, with a firing destination believed to be northward towards Clarks Dry Lake. Mr. Gatti also stated that shrapnel could be found all over the badlands. Another oldtimer, Merle Beckman, once told Mr. Jorgensen that strafing occurred into the 1950's at the Military Wash Area. Footlockers were placed in line at that location for strafing fire. Mr. Jorgensen stated that he is not aware of any incidents/accidents resulting from ordnance remaining on or removed from the subject sites. Also, he has never heard rumor of CWM training or activities in the area (see document I-7).

(9) Kenneth Smith was a Park Ranger for the California Park Service at the Anza Borrego Desert State Park from 1978-91, and has knowledge of past military activity in the area. Mr. Smith remembers the discovery of what was believed to be a high explosive bomb in the 17 Palms area of the park at an unknown date. Also, military explosives were found in the vicinity of the Military Wash area at an unknown date. Mr. Smith is not aware of any incidents/accidents resulting from ordnance remaining on or removed from the subject site. In addition he has never heard rumor of CWM training or activities in the area. (see document I-8).

(10) Manford Knack has been an Archaeologist for the California Park Service, assigned to the Anza Borrego Desert State Park since 1972, and has knowledge of previous military activity in the former Borrego Maneuver area. Mr. Knack knows of the presence of ordnance in the Military Wash area. Mr. Knack has discovered military communications wire in the Yaqui pass area. Mr. Knack also has discovered evidence of former military activity in the Coyote Canyon, Rock House Canyon, and Font's Point areas, none of which was ordnance related (see document I-9).

(11) David Ragsdill has been a local resident for 6 years with an interest in military and Anza-Borrego Park history. In addition, Mr. Ragsdill is an engineer representing a company engaged in hot well boring activities in the area. Mr. Ragsdill knows of the presence of ordnance, rake stations, a concentric circle target, and plane crash debris in the Clarks Dry Lake area. Mr. Ragsdill stated that an old timer (Mr. Duvall) once told him that artillery fire occurred from Rams Hill towards Borrego Sink, that tanks maneuvered through Borrego, and that tank fire occurred from Camp Ensign eastward. Mr. Ragsdill also stated that he has heard that tanks maneuvered in the Little Clark's Lake area and in the foothill's of the Santa Rosa's. Mr. Ragsdill stated that he once located bomb fragments, buried vehicles, and a (shot-up) surface vehicle near Rock House Canyon Road. Mr. Ragsdill escorted the site inspection team to this area, but failed to re-locate the stated items. Mr. Ragsdill stated that he is not aware of any incidents or accidents resulting from ordnance remaining on or removed from the subject sites nor has he ever found evidence or heard rumor of CWM training or activity in the area (see document I-10).

(12) Jim Meiers has been a Ranger for the California Park Service since 1980, assigned to the Anza Borrego Desert State Park. Mr. Meiers current patrol area covers a good portion of the former maneuver area, where he often takes visitors on guided tours. Mr. Meiers knows of an ordnance presence in the Military Wash and Clarks Dry Lake area. Mr. Meiers has also discovered 40mm projectiles in the Palo Verde Wash areas and the 17 Palms area. The Palo Verde Wash 40mm was reported to authorities and destroyed by Army Explosive Ordnance disposal personnel on 11 March 1994. This was a 40mm high explosive round

and the actual location was at the intersection of Palo Verde Wash and Short Wash. The other 40mm projectile is located 1 to 1.5 miles west of the 17 Palms area. Mr. Meiers believes that he would be unable to pinpoint the exact location of the projectile for destruction. Mr. Meiers is not aware of any incidents or accidents resulting from ordnance remaining on or removed from the subject property nor has he ever found evidence or heard rumor of CWM training or activities (see document I-11).

(13) Bruce Tinknell is a retired Army Explosive Ordnance Disposal (EOD) Technician who had been stationed with the 70th Ordnance Detachment (EOD) (now 70th Ordnance Company) in San Diego from 1975-1987. The 70th's area of responsibility included the project area. Mr. Tinknell stated that he responded to an incident involving the discovery of three 100 pound photoflash bombs in the Military Wash portion of the former maneuver area. He could not recall the date of the incident, but he did recall that the bombs were destroyed. Mr. Tinknell responded to the Military Wash area on another unknown date after the discovery of a 5" rocket, believed to have been of the high explosive variety. Explosive disruption of this item revealed that it was a wax filled practice rocket. Mr. Tinknell stated that additional responses to the Anza Borrego region were numerous; items often appeared after rain moved through washes; but most of the responses were believed to have been attributed to operations in the Carrizo Impact area, south of the subject sites. Mr. Tinknell stated that he is not aware of any incidents or accidents resulting from ordnance remaining on or removed from the subject property nor has he ever found evidence or heard rumor of CWM training or activities (see document I-13).

(14) David Rock lived in the Borrego Springs area from the mid 1930's to late 1940's on property that his father homesteaded 1 mile north of Clarks Dry Lake. During the period of 1940-1944, the family did not actually live on the property but visited there most weekends. Mr. Rock stated that Navy Corsairs often bombed and strafed a concentric circle stone target on Clark's Dry Lake. The ordnance fired/dropped from these aircraft consisted of .30 and .50 caliber ammunition and 3 pound practice bombs containing a spotting charge resembling a 10 gauge shotgun shell. Mr. Rock stated that he could actually watch the ordnance activity from their property. The planes would sometimes come in from the southeast and dive bomb and strafe the targets from the east. Never did the bombs create a loud noise or earth shock, just a puff of spotting smoke. Sometimes, though, the planes would come in from the south and fire into the Santa Rosa's. One time the planes accidentally shot up their barn with small arm's fire. Mr. Rock stated that the practice bombs were only found in the target area, some intact and some broken, and were often removed as souvenirs. Mr. Rock stated that some of the bombs removed still had intact spotting charges. Although never removing any bombs himself, his cousin, now deceased, often removed them for his collection.

Also in his collection was a 155mm projectile (devoid of fuze) containing lead shot, the location discovered and it's present location are unknown. Mr. Rock stated that he is not aware of any incidents or accidents resulting from ordnance remaining on or removed from the subject sites nor has he ever observed or heard rumor of CWM training or activities in the area. Mr. Rock stated that the only other evidence of military operations in the park, that he discovered, were tank tracks in the vicinity of Clark's Dry Lake. Never did he actually see tank, artillery, or ground troop activity in the area. In addition, Mr. Rock clarified the families dislocation from the area from 1940-1944. He stated that it was family motivated, not government mandated, that's why they were able to return on weekends (see document I-14).

(15) Andy Yatsko was a soldier stationed at Camp Callan from 1942 until 1946, who participated in maneuvers in the Borrego Maneuver Area. Camp Callan was a station which used the Borrego Maneuver area periodically for desert operations and anti-aircraft weapons firing. Mr. Yatsko stated that he was a Chaplains Assistant, and on several occasions, was required to drive his assigned chaplain in a staff car to the Borrego Maneuver Area when a Battery/Battalion (consisting of approximately 1000 men) were engaged in desert training operations in preparation for overseas desert combat. Training units would go to the maneuver area during all seasons of the year, although he and his chaplain were not required to accompany each contingent of desert training troops. Each maneuver was seven to ten days in length. He would drive the staff car in a convoy, taking a full day to arrive to the maneuver area. Upon arrival, the headquarters assigned soldiers (including himself) would set up tents in Camp Ensign near the date palm trees. Sometimes in the winter, certain soldiers (to include himself) would sleep in foxholes at that location to stay warm. The AA field soldiers would set up camp east of Camp Ensign and North of Route 78, digging in and camouflaging their positions, guns, and equipment. The guns the AA troops brought and fired in the Borrego Maneuver area were of the .30 Cal, .50 Cal, 40mm, and 90mm varieties. Mr. Yatsko could not recall the actual location of the firing point(s), he did know, though, that the direction of fire was northeast, presumably towards the Santa Rosa Mountains. Targets fired upon included rocket targets, drone airplanes, and aircraft towed targets. Rocket targets were fired up a searchlight beam. Mr. Yatsko stated that no other ground maneuvers from other services or organizations occurred while Camp Callan soldiers were present in the area. Navy Corsairs, though, did bomb a position also northeast of their location while they were present. The planes would come in low overhead and horizontal or skip bomb with practice bombs, never did he hear a detonation after bomb impact. Mr. Yatsko stated that 155mm firing never occurred in the Borrego Maneuver area to his knowledge, 155mm fire only occurred at Camp Callan into the ocean. Mr. Yatsko stated that no ordnance clearance activity was ever conducted anywhere on the Borrego Maneuver area to the best

of his knowledge. Mr. Yatsko stated that CWM training was never conducted in the Borrego Maneuver Area to the best of his knowledge, strictly at Camp Callan in the gas chamber, with tear agent utilized. Mr. Yatsko stated that tanks were not present in the maneuver area while Camp Callan troops were training, although Camp Callan troops did bring some half-track vehicles. Mr. Yatsko has never heard of any incidents or accidents resulting from ordnance fire or as a result of ordnance remaining in the area after firing operations were concluded. Mr. Yatsko stated that, contrary to popular belief, General Patton and his troops never trained in the Borrego Maneuver Area, solely in the vast Mohave Desert Maneuver area (see document I-15).

(16) Homer Townsend was the Head Ranger for the Anza-Borrego Desert State Park from 1991 to 1996. In addition, he was the Chief Ranger for the Ocotillo State Off-Road Park, located east of the current Anza-Borrego Desert State Park and within the former project area, from 1983 until 1985. Mr. Townsend knew of a Naval ordnance presence in the Military Wash and Clarks Dry Lake areas of the former maneuver area. Mr. Townsend has also stated that Mr. Meiers, a Ranger of the Anza Borrego State Park, discovered a 40mm projectile in the Short Wash area north of Military Wash a few years ago. Mr. Townsend stated that he also heard rumor that artillery fire occurred over the badlands towards Clarks Dry Lake. Mr. Townsend stated that he is not aware of any incidents/accidents resulting from ordnance remaining on or removed from the subject sites nor has he found evidence of or heard rumor of CWM training or activities in the area (see document I-16).

(17) Bob Begole has been an Archaeologist for the California Park Service for a number of years, working in the Anza-Borrego Desert State Park, and is familiar with evidence of former military activity in the former Borrego Maneuver area. Mr. Begole found an observation post with ration cans in the Yaqui Pass area. Additionally found in this area was a telephone line extending towards Borrego Springs. Mr. Begole knows of a naval ordnance presence in the Military Wash and Clarks Dry Lake areas. Mr. Begole stated that he has extensively walked the Borrego Mountains, the Santa Rosa Mountains, and the majority of the former maneuver area acreage, never discovering any other military ordnance or artifacts. In conclusion, Mr. Begole stated that he is not aware of any incidents or accidents resulting from ordnance remaining on or removed from the subject property nor has he ever found evidence or heard rumor of CWM training or activities (see document I-17).

(18) Willard Henry has been a local resident since 1955 with an interest in military activity/artifacts. Mr. Henry knows of a Naval ordnance presence in the Military Wash and Clarks Dry Lake areas. Mr. Henry also located concrete foundation remains and a 500 gallon propane tank north of the Borrego Sink, an area he believes to have been associated with military activity (possibly from a former firing point, the propane tank no longer

remains). Mr. Henry stated that he has scoured a good portion of the former Borrego Maneuver area acreage in search of artifacts since 1955, but never has discovered any projectiles, other ordnance, or firing/impact areas in areas other than those previously mentioned. Mr. Henry is not aware of any incidents or accidents resulting from ordnance remaining on or removed from the subject sites nor has he ever found evidence or heard rumor of CWM training or activities in the area (see document I-18).

(19) Al McLeary has been a Ranger for the Ocotillo State Off Road Park for over 20 years, a position he filled following his Navy retirement. The Anza Borrego Desert State Park area north of Route 78 and the Ocotillo State Park were included as part of the former Borrego Maneuver Area. Mr. McLeary knows of a Naval ordnance presence in the Military Wash and Clarks Dry Lake area. Mr. McLeary is also aware of an extensive ordnance presence in the Carrizo Impact Area, which is south and not associated with the project site. Mr. McLeary is not aware of any incidents or accidents resulting from ordnance remaining on or removed from the subject site nor has he has found evidence of or heard rumor of CWM training or activities in the area (see document I-19).

(20) Sam Fortiner has been a local resident since 1947, but began visiting the Borrego Springs area around 1945/1946. Mr. Fortiner is familiar with evidence of previous military activity in the former Borrego Maneuver Area. Mr. Fortiner knows of a Naval ordnance presence in the Clarks Dry Lake area. Ordnance in the form of .50 caliber bullets and little smoke bombs were dropped/fired into Clark's Dry Lake by Navy Planes. Mr. Fortiner also located military slit trenches east of the churches located in Borrego near Warners Hot Spring. Mr. Fortiner stated that he never heard or found evidence of tank maneuvers occurring anywhere in the area. Mr. Fortiner stated that he had talked considerably to the locals of that time that would have had the most contact with military personnel (Tom Davis who had a house on Camp Ensign, Eddie Duvall of the General Store/Post Office, and Mr. Ensign who owned the Camp Ensign Property). Never had they discussed a knowledge of Antiaircraft Artillery fire in the area. In conclusion, Mr. Fortiner stated that he is not aware of any incidents or accidents resulting from ordnance remaining on or removed from the subject sites nor has he ever found evidence or heard rumor of CWM training or activities in the area (see document I-20).

(21) Denny Duvall has been a local resident all of his life, and was a young boy living in the area at the beginning of WWII. His father (now deceased) owned the Borrego Springs general store/post office during military activities in the area during that era, and he and his family lived across the street from his father's establishment. Mr. Duvall recalls seeing Half Tracks, Jeeps, 6 X 6 vehicles, and a small "Banning" Tank in the area during that period, never any larger tanks. In fact, he was given a ride in the Banning Tank. Mr. Duvall recalls that his

father had some ordnance on display in the store/home at that time. He had several 6-8 inch diameter projectiles, about 17 inches long, some were empty and some filled with steel shot/balls (believed to be 155mm shot rounds). He also had a couple of 3 pound practice bombs on display which had been cleaned and plated. The location where these ordnance items were recovered or their present location is unknown. All the projectiles were devoid of fuzes. Mr. Duvall stated that all the soldiers he encountered were Army soldiers who often ate breakfast cooked by his mom at the store. The soldiers camped in the former Borrego Maneuver Area, both north of Clark's Valley and east of the store in the Borrego Sink area, and were being familiarized in desert operations for future wartime service in Africa. Mr. Duvall knows of a Naval ordnance presence in the Clarks Dry Lake area. Mr. Duvall stated that he has explored a good portion of the Maneuver Area in the last few years and has not discovered any other evidence of military activity. He believes a good deal of ordnance remaining after the military usage period has been removed by a multitude of people who visit the park. Mr. Duvall stated that he is not aware of any incidents or accidents resulting from ordnance remaining on or removed from the subject site nor has he ever witnessed, found evidence, or heard rumor of CWM training or activities in the area (see document I-21).

5. SITE ELIGIBILITY

a. **Confirmed Formerly Used Defense Site**

(1) Former land usage of the Borrego Maneuver Area has been confirmed and summarized in the COE Findings and Determination of Eligibility (see document E-1). The Borrego Maneuver Area, located near Borrego Springs, California, was used primarily as a Antaircraft Artillery desert training area for the AARTC at Camp Callan.

(2) By 1944 all acreage that had been acquired by the Army through use permit was returned to the State of California. Today, no ownership of the former Borrego Maneuver Area remains with the Department of Defense (DOD).

b. **Potential Formerly Used Defense Sites**

Two sites were discussed in the INPR (Borrego Springs, Site Number J09CA701300), Clarks Dry Lake and the Borrego (Military) Wash, but do not appear to currently exist as OE projects although included in the FDE. During the site inspection for this site, both of these areas were additionally visited and were found to possess a slight/moderate OE presence, respectively. The Naval operated Borrego (Military) Wash area was also found to contain an additional Army associated contamination presence based on the findings of this investigation. Further inquiry revealed that both of these areas

are in the preliminary stages of separate investigations (INPR) and do not possess a signed FDE as of yet. Since these sights were inspected during this investigation, were found to contain an OE presence, and have been further analyzed/described later in this report, it would be prudent to include additional area acreage with report FDE acres and terminate any further investigative actions.

6. VISUAL SITE INSPECTION

a. **General Procedures and Safety**

(1) During the period of 24 to 30 January 1997, members of the Assessment Team, Mr. Nick Iaiennaro and Mr. Chris Churney, accompanied by the Borrego Springs Fire Department Bomb/Arson Investigator Steve Sawyer, visited the former Borrego Maneuver Area near Borrego Springs, California. The primary task of the team was to assess potential OE presence and usage of the site as a Naval horizontal/dive bombing target. 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 obtained by the team due to the willingness of state representatives to allow the team to visit the property. Representatives were 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 (reference B-4). Prior to the inspection, a briefing was conducted which stressed that OE should only be handled by military EOD personnel.

(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-1: Mechanized Artillery Range Impact Area**

(1) This area consists of approximately 2,085.00 acres of flat and sparsely vegetated desert land, which served as a portion of the firing fan of a Army Mechanized Artillery Practice Fire Range.

(2) The sparse vegetation found in this area exists predominately in the form of several plant types being Sweet Bush, Brittle Bush, Creosote Bush, Burrow Bush, Dyeweed, Pencil Cholla, Buckhorn, Krameria, Croton, and Ocotillo.

(3) A review of historical documents and interview information revealed the discovery of two 40mm high explosive projectiles in this area, with one of the two destroyed by Army Explosive Ordnance Disposal personnel. The projectile destroyed, identified as a 40mm MK1, is identical to the 40mm MK2 and may have been misidentified because the MK2 version would have been fired by the Army. The second projectile could not be located for disposal after initial discovery by park personnel and still remains (see documents D-1, D-5, E-5, I-11 and plates 3 and 5).

(4) No additional OE evidence was discovered in this area during the site inspection by the site inspection team, or later, by a member of the Borrego Fire Department (see document I-3).

(5) Historical documents, interviews, and physical evidence suggest that the AAARTC at Camp Callan jointly utilized the Borrego (Military) Wash Naval target area, adding a Anti-Mechanized Target Range to a Naval Bombing, Strafing, and Rocket target area, in order to fulfill the secondary mission training requirements of that organization. The Borrego Wash area, along with Clarks Dry Lake, were Naval target areas within an Army Maneuver Area, and are currently under preliminary investigation for separate DERP-FUDS projects. Therefore, the actual target area and firing point relevant to this area are being identified and described in this section, although not a part of this project or project area. The target area and firing point actually fall within the confines of Area E-1 (Naval Impact Areas, Borrego Wash) described later in this document (see documents E-1, E-2, E-4, F-2, F-3, F-4, F-6, F-8, I-6, and plates 2, 3, 4, and 5).

(6) A site examination by the inspection team revealed additional evidence remaining in the Borrego Wash area to further substantiate Army Antiaircraft Artillery firing activity relevant to this area as follows:

(a) A one mile long wooden track/bed, extending east to west, possibly used to propel or tow a simulated mechanized target (see photo J-5 and plate 2).

(b) A hill/berm north of the target area, approximately 30 to 40 feet high, extending the length of the track/bed, apparently present to stop projectiles which missed the moving targets (see plate 2).

(c) The remains of two Antiaircraft related expended 40mm MKII high explosive-tracer (shell destroying) projectile tracer and ignitor elements were discovered by the inspection team amidst Naval ordnance related OE debris in the Borrego Wash Area. In addition to 40mm projectiles fired at anti-mechanized targets, historical documentation also suggests

that 90mm projectiles may have been fired into this area, although surface evidence was not discovered (see document D-1, D-5, E-2, photo J-6, and plate 5).

c. Area A-2: Mechanized Artillery Range Buffer Zone

(1) This area consists of approximately 23,852.00 acres of flat and sparsely vegetated desert land, which served as a portion of the firing (safety) fan of the Army Mechanized Artillery Practice Fire Range.

(2) The sparse vegetation found in this area is consistent with the types found/identified in area A-1.

(3) No historical documentation was located to specify military construction or improvement in this area. No military construction or improvement was discovered in this area.

(4) No historical, interview, or physical evidence was discovered to substantiate an OE presence in this area (see plates 2 and 3).

d. Area B: Borrego Mountain Automatic Weapons Firing Range/Rocket Experimental Test Area

(1) This area consists of approximately 4,450.00 acres of predominately flat and sparsely vegetated desert land with a firing backdrop extending into the northern foothills and face of the Borrego Mountain.

(2) The sparse types of vegetation found in this area is consistent with the types found/identified in area A-1.

(3) No historical documentation was located to specify military construction or improvement in this area. No military construction or improvement was discovered in this area.

(4) The following historical, interview, and physical evidence was discovered to substantiate an OE usage/presence in this area:

(a) A historical study of recent military operations in the Anza-Borrego Desert State Park states that training batteries from the AARTC at Camp Callan used live fire ranges north of Clark's Dry Lake, at Borrego Mountain, and possibly in the Navy owned (but jointly used) Borrego (Military) Wash target area. Known targets included unmanned OQ-2A radio-controlled target planes (drones). Drone firing occurred east to west along the face of the Santa Rosa or Borrego Mountains. The drones were kept sufficiently below the top of the mountains to ensure that the trainees, who were firing into the mountains, would not shoot over them. This study also states that rocket scientists from the California Institute of Technology (CALTECH), with help from a AAA training battalion .30 caliber machine gun

and drone launching crew from Camp Callan, tested experimental target rockets in an area north of Borrego Mountain. Rockets tested were left in place after firing/testing (see documents D-2, D-3, D-4, and E-4).

(b) An Army Ground Forces Historical Study of the Antiaircraft Command and Center stated that the OQ type target plane was used as a target for automatic weapons (.30 and .50 caliber) service practice (see document D-4 and E-2). This was a small motor-operated plane which is put in flight by a catapult and controlled by radio from the ground. A general description of this form of target is located in document D-3, although the model illustrated is a later (similar) version.

(c) The site inspection team discovered an area north of the Borrego Mountain to contain a small impact area of 7 3.25 inch target rockets, the points of impact displaying a east to west firing pattern. The only energetic items contained within the 3.25" target practice rockets are the rocket motor propellant and sometimes a tracer element. The rockets found were devoid of energetic materials. The approximate maximum range for a 3.25 inch target rocket is 5,000 feet (see document D-2 and photo J-1) .

(5) A cursory examination of this area by site inspection team personnel revealed an OE presence to exist solely in the form of 3.25" target practice rocket debris as previously stated. Extensive examination of this area by local government employees and citizens has also revealed solely a 3.25 inch practice rocket presence in the area, the same area investigated by the inspection team (see document D-2, photo J-1, and plates 2, 3, and 5).

e. Area C: Santa Rosa Automatic Weapons Firing Range

(1) This area consists of approximately 5,985.00 acres of predominately flat and sparsely vegetated desert land with a firing backdrop extending into the southern foothills and face of the Santa Rosa Mountains.

(2) The sparse types of vegetation found in this area is consistent with the types found/identified in area A.

(3) No historical documentation was located to specify military construction or improvement in this area. No military construction or improvement was discovered in this area.

(4) The following historical, interview, and physical evidence was discovered to substantiate an OE usage/presence in this area:

(a) A historical study of recent military operations in the Anza-Borrego Desert State Park states that training batteries from the AARTC at Camp Callan used live fire ranges north of Clark's Dry Lake, at Borrego Mountain, and possibly in the Navy owned (but jointly used) Borrego (Military) Wash target area. Known targets included unmanned OQ-2A radio-controlled target planes (drones). Drone firing occurred east to west along the face of the Santa Rosa or Borrego Mountains. The drones were kept sufficiently below the top of the mountains to ensure that the trainees, who were firing into the mountains, would not shoot over them (see document D-2, D-3, D-4, and E-4).

(b) An Army Ground Forces Historical Study of the Antiaircraft Command and Center stated that the OQ type target plane was used as a target for automatic weapons (.30 and .50 caliber) service practice (see documents D-4 and E-2). This was a small motor-operated plane which is put in flight by a catapult and controlled by radio from the ground. A general description of this form of target is located in document D-3, although the model illustrated is a later (similar) version.

(5) The site inspection team was unable to locate any OE evidence in this area. Extensive examination of this area by local government employees and citizens has also failed to reveal a remaining OE presence (see documents I-3, I-5, I-6, I-10, I-11, I-14, I-17, I-18, I-20, I-21, photo J-2 and J-3, and plates 2, 3, and 5).

f. Area D: All Other Lands

(1) This area consists of approximately 206,731.00 acres of flat to mountainous sparsely vegetated desert land.

(2) The sparse types of vegetation found in this area are consistent with the types found/identified in area A.

(3) There is no historical evidence to suggest an OE presence in this area. Interview evidence cited solely the discovery of a singular MK 23 3 pound practice bomb in the Fonts Point area by paleontologists, the item was devoid of energetic materials. It is unknown if this item was actually mistakenly dropped at that location or removed from a former range area and left at that location (see documents D-5 and I-3).

(4) The inspection team found no evidence of an OE presence during a random sampling of this vast sub-site (see photo J-4, and plates 2 and 3).

g. Area E-1: Naval Impact Areas (within the Borrego Maneuver Area)

(1) This area, which includes the Clarks Dry Lake Target Area and Emergency Landing Field and the Borrego (Military Wash) Target areas, consists of approximately 8,390.00 acres of predominately flat and sparsely vegetated desert land.

(2) The sparse types of vegetation found in these areas are consistent with the types found/identified in area A-1.

(3) These areas are currently under preliminary investigation for separate DERP-FUDS projects, but are included for report purposes. This is attributed to the impact they have on this report due to their location within the Army maneuver area and to a joint Army-Navy usage of the Borrego Wash area.

(4) Naval target and a small amount of OE debris was found in the Clarks Dry Lake Target Area. Naval target or target related evidence/debris was found in the form of two rake stations and one concentric circle bombing target. The small amount of OE debris was found in the form of MK 15MOD3 and M38A2 100 pound practice bomb and spotting charge debris, MK 23 3 pound practice bomb and spotting charge debris, and .50 caliber bullets. All of the OE items discovered by the site inspection team, with the exception of one, were devoid of energetic material. One MK23 3 pound practice bomb containing a spotting charge with remaining (exposed) MK4 spotting charge residue (smokeless powder/red phosphorus) was discovered and later destroyed by local Explosive Ordnance Disposal personnel.

(5) A considerable amount of surface Naval target and OE evidence was discovered in the Borrego Wash area. Naval target or target related evidence/debris was found in the form of two rake stations, one concentric circle bombing target, and three vehicular strafing/rocket targets. OE debris was found in the form of 5" high explosive rocket fragments, 2.25" practice rockets and related debris, MK 15MOD3 and M38A2 100 pound practice bomb and spotting charge debris, MK 23 3 pound practice bomb debris, a substantial amount of 20MM M95 and M99 armor piercing and target practice projectiles, and a substantial amount of .50 caliber bullets. Also, as reported in Area A-1, residue of Army ordnance usage was discovered in this area in the form of two expended 40mm MKII high explosive-tracer (shell destroying) projectile tracer and ignitor elements. All of the OE items discovered by the site inspection team were devoid of energetic material, however, two 5" high explosive rockets were discovered and destroyed in this area in December 1996, 3 M46 Photoflash bombs were discovered and destroyed at an unknown date, and Dynamite (military explosives) were also said to have been discovered in this area (see documents D-2, D-4, D-5, I-7, E-8, I-8, I-12, plate and photos J-5 through J-18, and plates 2, 3, and 5).

h. Area E-2: Naval Buffer Zones (within the Borrego Maneuver Area)

(1) This area, which includes areas surrounding the Clarks Dry Lake Target Area and Emergency Landing Field and the Borrego (Military Wash) Target areas, consists of approximately 8,390.00 acres of predominately flat and sparsely vegetated desert land.

(2) The sparse types of vegetation found in these areas are consistent with the types found/identified in area A-1.

(3) Essentially, these areas depict ordnance error zones, areas of sufficient size to account for pilot error/target misses.

(4) No historical documentation was located to specify military construction or improvement in these areas, no form of construction or improvement was discovered in these areas, and no OE evidence was discovered in these areas (see plates 2 and 3).

7. EVALUATION OF ORDNANCE HAZARDS

a. General Procedures

(1) The site was evaluated to determine confirmed, potential, or uncontaminated ordnance presence.

(2) **Confirmed** ordnance 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. Additional field data is not needed to identify a confirmed site. 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/bomb 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, on-site workers, soldiers who served there, etc.) verifying that they have seen OE presence on the surface or subsurface since site closure.

(3) **Potential** ordnance presence is based on a lack of confirmed OE presence. Potential OE presence is inferred from records, present day site features, non-verifiable direct witness, or indirect witness. Additional field data is needed to confirm potential OE sites. Inference from historical records is based on no OE items located 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. Inference from present day site features would be the indication of possible OE presence from such obvious features as target circles, depressions, mounds/backstops, OB/OD areas/pits, etc. Indirect witness would be people who have stated that they have heard of OE presence on site (hear-say evidence).

(4) **Uncontaminated** ordnance sub-sites are based on 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-1: Mechanized Artillery Range Impact Area

(1) Area A-1 is a **confirmed** area of OE presence. Historical documents and interview information reveal that two 40mm high explosive projectiles were discovered in this area, which is down-range from the suspected firing point and target track for this area (Area E-1, Borrego Wash) and within the ranges firing fan. One of these 40mm projectiles was destroyed, another still remains, the exact location unknown. Historical evidence was also discovered which suggests a possible 90mm high explosive projectile usage/presence in this area (see Area E-1).

(2) The major hazard(s) expected in this area may be present in the form(s) of MKII 40mm and M71 90mm high explosive projectiles.

(3) All OE varieties may be found on the surface or subsurface. No other types of ordnance are believed to be present in this area, which is supported by historical documentation, interview information, and overall site inspection.

c. Area A-2: Mechanized Artillery Range Impact Area

(1) Area A-2 is a **potential** area of OE misses due to its proximity to Area A-1 and its location down range to the suspected firing point and target track for this area (located in Area E-1, Borrego Wash).

(2) The major hazard(s) expected in this area may be present in the form(s) OF MKII 40mm and M71 90mm high explosive projectiles.

(3) All OE varieties may be found on the surface (which escaped observation by the inspection team) or subsurface. No other types of ordnance are believed to be present in this area, which is supported by historical documentation, interview information, and overall site inspection.

d. Area B: Borrego Mountain Automatic Weapons Firing Range/Rocket Experimental Test Area

Area B is **uncontaminated**. The team performed a substantial surface sampling of this area revealing solely the presence of 7 impacted 3.25 inch practice rockets located in a tight impact pattern, obviously having achieved maximum flight range prior to impact. Although a practice rocket presence was discovered, these particular rockets were fired during a closely controlled CALTECH experimental rocket program. They are fired devoid of hazardous energetic materials other than propellant and occasional flare elements, which were found to have been consumed in all discovered rockets. No other historical, interview, or physical evidence could be found to substantiate remaining hazardous OE presence in this area.

e. Area C: Santa Rosa Automatic Weapons Firing Range

Area C is considered to be **uncontaminated**. The site inspection team performed a surface visual inspection of this area, to the greatest extent possible, without discovering any OE items. In addition, no other historical or interview evidence could be found to substantiate a remaining hazardous OE presence in this area.

f. Area D: All Other Lands

This area is considered to be **uncontaminated**. The site inspection team performed a surface visual inspection of this area, to the greatest extent possible, without discovering any items of OE. In addition, no other historical evidence could be found to substantiate a remaining hazardous OE presence in this area. An interview source did state, however that a singular MK23 3 pound practice bomb was discovered, devoid of spotting charge, in the Font's Point vicinity of this area by paleontologists. It was unknown if this item was accidentally dropped in this area or transported from a known impact area. In any case, it appears to be an isolated incident, not believed to warrant further area remediation consideration.

g. Area E-1: Naval Impact Areas (within the Borrego Maneuver Area)

(1) This area, consisting of the Clarks Dry Lake Target Area and Emergency Landing Field and the Borrego (Military Wash) Target area, are **confirmed** areas of OE presence.

(2) Found in the Naval (Military Wash) target area is a substantial amount of OE items attributed to former Naval usage, as well as a history of reports/incidents involving the destruction of remaining energetic items as follows:

(a) The site inspection team discovered 5" high explosive rocket fragments, 2.25" practice rockets and related debris, MK 15MOD3 and M38A2 100 pound practice bomb and spotting charge debris, MK 23 3 pound practice bomb debris, a substantial amount of 20mm M95 and M99 armor piercing and target practice projectiles, and a substantial amount of .50 caliber bullets. Also, as reported in Area A-1, residue of Army ordnance usage was discovered in this area in the form of two expended 40mm MKII high explosive-tracer (shell destroying) projectile tracer and ignitor elements. Army historical documents also suggest a possible 90mm high explosive projectile usage in this area. All of the OE items discovered by the inspection team were devoid of energetic material.

(b) Two 5" high explosive rockets and three 100lb photoflash bombs were discovered and destroyed in this area. Dynamite (military explosives) were also said to have been discovered in this area.

(3) Found in the Clark's Dry Lake Target Area was a small amount of OE items attributed to former Naval usage consisting of M38A2 100 pound practice bomb, MK 23 3 pound practice bomb debris, and .50 caliber bullets.

(4) The major hazard(s) expected in the Borrego Wash Target area may be present in the form(s) of 100 pound photoflash bombs, 5 inch high explosive rockets, MKII 40mm and M71 90mm high explosive projectiles, M1 3 pound black powder spotting charges which were incorporated in the M38A2 100 pound practice bombs, MK4 smokeless powder/stabilized red phosphorous spotting charges which were incorporated in the MK23 3 pound and MK15 MOD4 100 pound practice bombs, and MK7 1 pound black powder spotting charges which were incorporated in the MK15 MOD3 100 pound practice bombs.

(5) The major hazard(s) expected in the Clarks Dry Lake Target may be present in the form(s) of M1 3 pound black powder spotting charges which were incorporated in the M38A2 100 pound practice bombs, MK4 smokeless powder/stabilized red phosphorous

spotting charges which were incorporated in the MK23 3 pound and MK15 MOD4 100 pound practice bombs, and MK7 1 pound black powder spotting charges which were incorporated in the MK15 MOD3 100 pound practice bombs.

(6) All OE varieties may be found on the surface or subsurface. No other types of ordnance are believed to be present in this area, which is supported by historical documentation, interview information, and overall site inspection.

h. Area E-2: Naval Buffer Zones (within the Borrego Maneuver Area)

(1) This area, consisting of lands surrounding the Clark's Dry Lake and Borrego (Military) Wash target areas, is considered to be an area of **potential** OE presence.

(2) The inspection team found no physical, historical, or interview evidence to confirm a remaining OE presence in this area. However, due to its proximity to practice bombing ranges, gunnery ranges, an artillery target area (Borrego Wash only), and rocket target areas (Borrego Wash only) displaying a confirmed ordnance presence, this area should be considered potentially contaminated due to probable pilot or artillery mishap/error.

(3) The ordnance types expected to be encountered in this area are the same as the types described for Areas E-1 and A-1.

8. SITE ORDNANCE TECHNICAL DATA

a. **End Item Technical Data.**

(1) Table 8-1 is a listing of ammunition and explosive fillers for items with a confirmed use within the Borrego Maneuver Area.

(2) Technical data and drawings relative to the end items listed in table 8-1 can be found in Appendix D.

**TABLE 8-1
AMMUNITION USED AND EXPLOSIVE FILLER**

NOMENCLATURE	FILLER/WEIGHT	AUTHORIZED FUZE (S)
Bomb, 3 to 4.5-lb Practice, AN-MK5, MK23, MK43 Signal, AN-MK4	Zinc, Cast Iron, Lead Antimony Smokeless Powder/Red Phosphorus	N/A
Bomb, 100-lb Photoflash, AN-M46	Flash Powder, 25-lb	M111, M144, AN-M146, M155
Bomb, 100-lb Practice, MK15 MOD3 Spotting Charge, MK7	Sand/Water Filled Black Powder, 1-lb	N/A MK247 (Inert)
Bomb, 100-lb Practice, MK15 MOD4 Signal, AN-MK4	Sand/Water Filled Smokeless Powder/ Red Phosphorus	N/A
Bomb, 100-lb Practice, M38A2 Spotting Charge, M1	Sand Filled Black Powder, 3-lb	N/A
Projectile, 40mm High Explosive -Tracer (Shell Destroying), MKII Tracer and Igniter, Shell, No.12, MK1	TNT, .15-lb Black Powder, .005-lb Tracer Composition and Black Powder	M64A1
Projectile, 90mm High Explosive, M71	Comp B, 2.15-lb	M43
Rocket, 5.0-Inch High Explosive Warhead, Mk1 Mod 0 Motor, 3.25-inch Mk7	8.6-lbs TNT 8.5-lbs Ballistite	Mk148 Mod 0
Rocket, 2.25-Inch Practice, SCAR Motor Tracer	Inert 1.75-lbs Ballistite Tracer Composition	N/A N/A N/A
Rocket, 3.25-Inch Practice, M2 Motor Flare	Inert 3.2-lbs Double Base Powder Pyrotechnic Mixture	N/A N/A
Small Arms Ammo .30 Cal Ball, M2	Lead Antimony with Gilding Metal Jacket	N/A
.30 Cal Tracer, M1	Tracer Composition	N/A
Propellant	50 gr Single or Double Base Powder	N/A
.50 Cal Ball, M2	Lead Antimony with Gilding Metal Jacket	N/A
.50 Cal Tracer, M1	Tracer Composition	N/A
Propellant	250 gr Single or Double Base Powder	N/A

b. Chemical Data of Ordnance Fillers

Table 8-2 has been developed to provide information on the explosive/chemical compounds used in the OE items cited in table 8-1.

TABLE 8-2 CHEMICAL DATA OF ORDNANCE FILLERS		
Filler	Synonym(s)	Chemical Formula
Black Powder		
74% Potassium Nitrate	Saltpeter; Niter	KNO_3
11% Sulfur		S
16% Charcoal		C
Double-base Powder	Ballistite	
60% Nitrocellulose	Guncotton; Pyroxylin	$[C_6H_8O_5(NO_2)_3]_n$
39% Nitroglycerin		$CH_2NO_3CHNO_3$
0.75% Diphenylamine	Stabilizer DPA	$(C_6H_5)_2NH$
E. C. Blank Powder	(single-based compound)	
80.4% Nitrocellulose	Guncotton; Pyroxylin	$[C_6H_8O_5(NO_2)_3]_n$
8% Potassium Nitrate	Saltpeter	KNO_3
8% Barium Nitrate		$Ba(NO_3)_2$
3% Starch		
0.6% Diphenylamine	Stabilizer DPA	$(C_6H_5)_2NH$
Pyrotechnic Composition		
75.0% Barium Nitrate		$Ba(NO_3)_2$
4.5% Sulphur		S
18.5% Aluminum		Al
1.5% Castor Oil		
Red Phosphorus		P
TNT	2,4,6-trinitrotoluene; triton; trotyl; trilitite; trinol; tritolo	$CH_3C_6H_2(NO_2)_3$
Tracer Composition		
16% Polyvinyl Chloride		
26% Magnesium Powder		Mg
52% Strontium Nitrate		$Sr(NO_3)_2$

9. OTHER ENVIRONMENTAL HAZARDS

a. Hazardous, Toxic, and Radiological Waste

No information has been found to indicate that there are potential HTRW sites/sources.

b. Building Demolition/Debris Removal

There were no structures or debris of significant importance found during this site inspection to warrant any BD/DR projects.

ORDNANCE AND EXPLOSIVE
ARCHIVES SEARCH REPORT
FOR
BORREGO MANEUVER AREA
BORREGO SPRINGS, CALIFORNIA
PROJECT NUMBER J09CA701101

APPENDIX A

REFERENCE SOURCES

REFERENCE SOURCES

The following organizations and personnel are acknowledged for their support

Organization	Name	Telephone	Nature of Support
<u>GOVERNMENT SOURCES</u>			
FEDERAL AGENCIES			
DEPARTMENT OF DEFENSE			
(DLOD) Defense Library on Disk Pentagon Library, Room 1A518 Washington, DC 20301-6000	Computer Search	(703) 697-4658	No Information
(DDESB) Defense Explosive Safety Board USATCES, SIOAC-ESM Savanna, IL 61074-9639	Computer Search	(703) 325-8624	No Information
(DLSIE) Defense Logistic Studies Information Exchange US Army Logistics Management College, Ft. Lee, VA 23801	Computer Search	(804) 734-4007	No Information
(DTIC) Defense Technical Information Center Cameron Station Alexandria, VA 22304-6145	Computer Search	(202) 274-7633	No Information
Defense Mapping Agency Attn: PMSC 6001 McArthur Blvd Bethesda, MD 20816-5001	Mr. Jimmy Thompsen	(301) 227-2495	Topographical Maps
Center of Military History Attn: DAMH-RAS 1099 14th St. NW Washington, DC 20536	Contractor	(202) 504-5416	See Appendix B, Section II, Parts A & B

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 (continued)			
AIR FORCE			
DMACSC, Philadelphia Depot 581 Tabor Avenue Philadelphia, CA 19120-5095	Staff	(301) 227-2495	Aeronautical Charts
Air Force Historical Research Agency 600 Chennault Circle Maxwell AFB, Al 36112-6424	IRIS System	(205) 953-2439	No Information
USAF Environmental Technical Applications Center 151 Patton Avenue, Room 120 Ashville, North Carolina	Ms. Janet Wall	(704) 271-4404	Climatological Data
ARMY			
70th Ord Det (EOD) Navy Sub Base, P.O. Box 6376 San Diego, CA 92166-0376	SFC Rodriguez	(619) 553-8500	See Interview I-2
Army Ordnance Museum Attn: ATSL-DOS-M APG, MD 21005	Mr. Roger Godin	(410) 278-3602	Source of Old Ordnance and Navy Publications
Center of Military History ATTN: DAMH-RAS 1099 14 th Street, NW Washington, DC 20536	Contractor	(202) 761-5416	See Appendix B, Section II, Parts A & B

REFERENCE SOURCES

The following organizations and personnel are acknowledged for their support

Organization	Name	Telephone	Nature of Support
<u>GOVERNMENT SOURCES</u>			
FEDERAL AGENCIES			
DEPARTMENT OF DEFENSE (continued)			
ARMY (continued)			
IOC Historical Office AMSIO-EAH Building 390 Rock Island Arsenal Rock Island, IL 61299	Mr. Tom Slattery	(309) 794-1450	No Information
Rock Island Arsenal Museum Rock Island Arsenal Rock Island, IL 61299-6000	Ms. Kris Gayman Leinicke	(309) 794-3518	Technical Manuals
U.S Army Chemical School Fischer Library, Bldg. 1081 Ft. McClellan, AL 36205-5000	Mr. Dick Pastorett	(205) 848-4414	No Information
Army Technical Center for Explosives Safety Library ATTN: SIOAC-ESM Savanna, IL 61074-9639	Staff	(815) 273-8772	Reference Sources
U.S. Military History Institute Photo Archives Carlisle Barracks Carlisle, PA 17013	Mr. Mike Winey	(717) 245-3434	No Information
U.S. Military History Institute Branch Carlisle Barracks Carlisle, PA 17013	Mr. Richard Sommers	(717) 245-3601	No Information

REFERENCE SOURCES

The following organizations and personnel are acknowledged for their support

Organization	Name	Telephone	Nature of Support
<u>GOVERNMENT SOURCES</u>			
FEDERAL AGENCIES			
DEPARTMENT OF DEFENSE (continued)			
ARMY (continued)			
U.S. Military History Library Carlisle Barracks, Bldg. 22 Carlisle, PA 17013	Mr. Dennis Vetock Mr. John Sloanaker	(717) 245-3611	No Information
US Army Chemical and Biological Command Aberdeen Proving Grounds, MD 21010	Ms. Kathy Ciolfi	(410) 679-4430	No Information
Corps of Engineers, Los Angeles District Real Estate Division 911 Wilshire Blvd. Los Angeles, CA 90017-3401	Ms. Dolores Henderson	(213) 452-3164	Real Estate Information
Corps of Engineers, Los Angeles District 911 Wilshire Blvd. Los Angeles, CA 90017-3401	Ms. Trudy Knutson Ms. Deborah Castens Mr. Jeff Armentrout	(213) 452-3990 (213) 452-3719 (213) 452-3719	Site Information and Assistance
Corps of Engineers, San Diego Project Office 10845 Rancho Bernardo Road, Suite 204 Rancho Bernardo, CA 92127	Mr. James B. Walker	(619) 674-6769	OE Site Information

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The following organizations and personnel are acknowledged for their support

Organization	Name	Telephone	Nature of Support
<u>GOVERNMENT SOURCES</u>			
FEDERAL AGENCIES			
DEPARTMENT OF DEFENSE (continued)			
ARMY (continued)			
Hqs, Corps of Engineers Office of History 7701 Telegraph Road Alexandria, Va 22310-3865	Dr. Martin Gordon	(703) 355-3558	See Appendix B, Section II, Parts A & B
NAVY			
Naval Construction Bn. Attn: Code 10H-NAVFAC Historian Port Hueneme, CA 93043	Dr. Vincent Transano	(805) 982-5913	Historical Information
Marine Corps Historical Center, Bldg 58 Washington Navy Yard Washington, DC 20374	Contractor	(202) 433-3483	See Appendix B, Section II, Parts A & B
Naval Historical Center Technical Library Washington Navy Yard Washington, DC 20374	Mr. Mark Wertheiner	(202) 433-3607	Obsolete Naval Publications
Naval Historical Center Bldg 57 Washington Navy Yard Washington, DC 20374	Contractor	(202) 433-3171	See Appendix B, Section II, Parts A & B

REFERENCE SOURCES

The following organizations and personnel are acknowledged for their support

Organization	Name	Telephone	Nature of Support
<u>GOVERNMENT SOURCES</u>			
FEDERAL AGENCIES			
DEPARTMENT OF DEFENSE (continued)			
NAVY (continued)			
Naval Construction Bn. Center, Code 72 NAVFAC Engineering Service Center 1000 1023 rd Avenue Port Hueneme, CA 93403-4370	Ms. Josephine Walsh	(805) 982-9110	No Information
Naval Construction Battalion Center Code 1581B, Civil Engineer Spt. Ofc. 1000 1023 rd Avenue Port Hueneme, CA 93403-4370	Mr. Robert Brickey Mr. Cliff Ledderer	(805) 982-5593	Historical Information
MCRD Museum Building 26 San Diego, CA 92140	MAJ Bruce Norton (Ret)	(619) 524-6719	No Information
Miramar Naval Air Station Attn: Roger Hillhouse-RH187 45249 Miramar Way San Diego, CA 92145-5005	Mr. Roger Hillhouse	(619) 537-1102	No Information
NAS North Island Natural Resources Office San Diego, CA 92135	Mr. Andy Yatsko	(619) 545-1131	Referral
NAS North Island Staff Civil Engineer Office San Diego, CA 92135	Mr. Dave Brown	(619) 545-1111	No Information

REFERENCE SOURCES

The following organizations and personnel are acknowledged for their support

Organization	Name	Telephone	Nature of Support
<u>GOVERNMENT SOURCES</u>			
FEDERAL AGENCIES			
DEPARTMENT OF DEFENSE (continued)			
NAVY (continued)			
COMEODGRU One Coronado Island San Diego, CA 92155	LTCMDR Peterson	(619) 437-0715	No Information
Command Museum Marine Corps Air Station, El Toro Santa Ana, CA	Mr. Fabian Jiroux	(714) 726-4380	No Information
JEODU Marine Corps Air Station Yuma, AZ 85639	CPT Peterlick	(520) 341-2788	UXO Information
Naval Engineering Facilities Command Code 14B, Room 10N59 200 Stovall Street Alexandria, VA 22332-2300	Mr. Charlie Cox Mr. Jack Kane	(703) 325-7342	No Information
Naval Engineering Facilities Command Southwest Division 1220 Pacific Highway, Building 127 San Diego, CA 92132	Mr. Lowell Martin Mr. Daniel Huey	(619) 532-2991	Historical/Cultural Information

REFERENCE SOURCES

The following organizations and personnel are acknowledged for their support

Organization	Name	Telephone	Nature of Support
<u>GOVERNMENT SOURCES</u>			
FEDERAL AGENCIES			
DEPARTMENT OF DEFENSE (continued)			
NAVY (continued)			
Naval Engineering Facilities Command Southwest Division Environmental Ofc. 1220 Pacific Highway, Building 127 San Diego, CA 92132	Mr. Mike Gonzales	(619) 532-3178	Environmental Information and Referrals
Naval Engineering Facilities Command Southwest Division Cadastral Office 1220 Pacific Highway, Building 127 San Diego, CA 92132	Mr. Tom Phelps Ms. Chriss Maves	(619) 532-1169	Historical Maps
Naval Engineering Facilities Command Southwest Division Natural Resources Department 1220 Pacific Highway, Building 127 San Diego, CA 92132	Mr. Mike Stroud	(619) 532-2319	Aerial Photos and Referrals
Naval Engineering Facilities Command Southwest Division Natural Resources Department 1220 Pacific Highway, Building 127 San Diego, CA 92132	Mr. Bill Fisher	(619) 532-1488	Endangered Species Information
NAVEODTECHDIV Technical Library 2008 Stump Neck Road Indian Head, MD 20640-5070	Ms. Betty Arbogast Ms. Dawn Risko	(301) 743-6834	Obsolete Naval Publications

REFERENCE SOURCES

The following organizations and personnel are acknowledged for their support

Organization	Name	Telephone	Nature of Support
<u>GOVERNMENT SOURCES</u>			
FEDERAL AGENCIES			
DEPARTMENT OF DEFENSE (continued)			
NAVY (continued)			
Navy Directive and Records Management CODE CNO NO 9B35 Washington Navy Yard, Building 166 901 M street SE Washington, DC 20374	Lt. Gilbert	(202) 433-4194	No Information
Naval Air Station Library, North Island P.O. Box 357801 San Diego, CA 92135-7081	Ms. Sharon Nelson	(619) 545-8230	Historical Publications and Documents
DEPARTMENT OF COMMERCE			
NGS, Information Services N/NGS 12, SSMC#, Station 9244 1315 E-W Highway Silver Spring, MD 20920-3282	Ms. Joan Rikon	(301) 443-8601	No Information
NOAA National Climatic Data Center, Federal Bldg Asheville, NC 28801	Ms. Yolanda Goosch Mr. Sam McCowan	(704) 271-4272	Climatic Data
DEPARTMENT OF THE INTERIOR			
US Geological Survey EROS Data Center Sioux Falls, SD 57198	Ms. Janet Wall	(704) 271-4404	No Information

REFERENCE SOURCES

The following organizations and personnel are acknowledged for their support

Organization	Name	Telephone	Nature of Support
<u>GOVERNMENT SOURCES</u>			
FEDERAL AGENCIES			
DEPARTMENT OF THE INTERIOR (continued)			
US Geological Survey Branch of Distribution Box 25286, Bldg 810 Denver Federal Center Denver, Co. 80225	Customer Service	(303) 202-4700	Topographical Maps
US Geological Survey EROS Data Center Sioux Falls, SD 57198	Ms. Janet Wall	(704) 271-4404	No Information
US Geological Survey Earth Science Information Center (ESIC 1400 Independence Road Rolla, MO 65401	Customer Service	(573) 308-3500	Orthophoto Quads
US Geological Survey Reston, VA 22090	Mr. Dave Keys	(703) 648-5956	No Information
Bureau Of Land Management California Desert District 6221 Box Springs Boulevard Riverside, CA 92507-0714	Ms. Manuela Johnson	(909) 697-5220	Plat Maps
Bureau Of Land Management California Desert District 6221 Box Springs Boulevard Riverside, CA 92507-0714	Mr. John Key	(909) 697-5383	No Information

REFERENCE SOURCES

The following organizations and personnel are acknowledged for their support

Organization	Name	Telephone	Nature of Support
<u>GOVERNMENT SOURCES</u>			
FEDERAL AGENCIES			
DEPARTMENT OF THE INTERIOR (continued)			
Bureau Of Land Management El Centro Resource Area 1661 South 4 th Street El Centro, CA 92243	Mr. Larry Cafey	(619) 337-4425	No Information
Bureau Of Land Management Palm Springs Resource Center 63500 Garnet Avenue North Palm Springs, CA 92258-2000	Mr. Mike Mitchell	(619) 251-4800	No Information
U.S. Fish and Wildlife Service 2730 Loker Avenue West Carlsbad, CA 92008	Mr. John Hanlon	(619) 431-9440	Endangered Wildlife Species Listing
NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA)			
Library of Congress Washington, DC 20536	Contractor	(202) 707-5522	See Appendix B, Section II, Parts A & B
Smithsonian Institution Historical Research Division Washington, DC 20560	Contractor	(202) 357-3133	See Appendix B, Section II, Parts A & B
Archives I (Old Military) Pennsylvania Ave & 7th Washington, DC 20408	Contractor	(202) 501-5390	See Appendix B, Section II, Parts A & B

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The following organizations and personnel are acknowledged for their support

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<u>GOVERNMENT SOURCES</u>			
FEDERAL AGENCIES			
NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA) (continued)			
Archives II (Still Picture Branch) 8601 Adelphi Road College Park, Md 20740	Contractor	(301) 713-6660	See Appendix B, Section II, Parts A & B
Archives II (Textual Branch) 8601 Adelphi Road College Park, Md 20740	Contractor	(202) 501-5380	See Appendix B, Section II, Parts A & B
Suitland Branch (Civil/Military) 4205 Suitland Road Suitland, Md 20409	Contractor	(301) 763-7410	See Appendix B, Section II, Parts A & B
Federal Records Center-San Francisco 1000 Commodore Drive San Bruno, CA 94066	Ms. Barbara Beppler	(415) 876-9001	See Appendix B, Section III, Parts A & B
Federal Records Center-Los Angeles 24000 Avila Road Laguna Niguel, CA 92656	Mr. Greg Pearman	(714) 360-2626	See Appendix B, Section III, Parts A & B
Pacific Sierra Region 1000 Commodore Drive San Bruno, CA 94066	Ms. Lisa Miller	(415) 876-9009	See Appendix B, Section III, Parts A & B
Pacific Southwest Region 24000 Avila Road Laguna Niguel, CA 92656	Ms. Suzanne Dewberry	(714) 360-2641	See Appendix B, Section III, Parts A & B

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<u>GOVERNMENT SOURCES</u>			
FEDERAL AGENCIES			
NATIONAL ARCHIVES AND RECORDS ADMINISTRATION (NARA) (continued)			
Archives I (Modern Military) Pennsylvania Ave & 7th Washington, DC 20408	Contractor	(202) 501-5385	See Appendix B, Section II, Parts A & B
Archives I (Navy) Pennsylvania Ave & 7th Washington, DC 20408	Contractor	(202) 501-5671	See Appendix B, Section II, Parts A & B
Archives II (Cartographic/ Architectural) 8601 Adelphi Road College Park, Md 20740	Contractor	(301) 713-7040	See Appendix B, Section II, Parts A & B
Archives II (Civil Reference Branch) 8601 Adelphi Road College Park, Md 20740	Contractor	(301) 713-7250	See Appendix B, Section II, Parts A & B
Archives II (Motion Picture Branch) 8601 Adelphi Road College Park, Md 20740	Contractor	(202) 713-7060	See Appendix B, Section II, Parts A & B
National Personnel Records Center 9700 Page Avenue St. Louis, MO 63132	Mr. Bill Siebert Mr. Wilson Sullivan	(314) 538-4085	See Appendix B, Section III, Parts A & B

REFERENCE SOURCES

The following organizations and personnel are acknowledged for their support

Organization	Name	Telephone	Nature of Support
<u>GOVERNMENT SOURCES</u>			
FEDERAL AGENCIES			
DEPARTMENT OF AGRICULTURE			
Consolidated Farm Service Agency 45-691 Monroe, Suite 4 Indio, CA 92201	Mr. Remu Khilnani	(619) 347-3675	Aerial Photographs
	Mr. Teja Salman		
Aerial Photography Field Office P.O. Box 30010 2222 West 2300 South Salt Lake City, UT 84131	Ms. Sherrie Holyoak	(801) 975-3503	Aerial Photographs
Natural Resources Conservation Service 332 South Juniper, Suite 110 Escindido, CA 92025	Ms. Becky Watts	(619) 745-2061	Provided Soil Survey and Aerial Photographs
	Mr. Jason Jackson		
STATE/LOCAL			
Anza-Borrego Desert State Park 200 Palm Canyon Drive Borrego Springs, CA 92004	Mr. Fred Jee	(619) 767-5311	See Interview I-6
	Mr. Mark Jorgenson		See Interview I-7
	Mr. Manfred Knack		See Interview I-9
	Mr. Jim Meiers		See Interview I-11
California State Archives 1020 O Street Sacramento, CA 95814	Mr. Tony Hoffman	(916) 653-2246	No Information
California State Library 914 Capital Mall, Library and Courts Building Sacramento, CA 94237-0001	Mr. John Gonzales	(916) 654-0176	No Information

REFERENCE SOURCES

The following organizations and personnel are acknowledged for their support

Organization	Name	Telephone	Nature of Support
<u>GOVERNMENT SOURCES</u>			
STATE/LOCAL (continued)			
San Diego State University Special Collections 5300 Campanile Drive San Diego, CA 92182-0511	Mr. Bill Payne	(619) 594-6791	No Information
San Diego State University Government Documents/Maps Section 5300 Campanile Drive San Diego, CA 92182-0511	Mr. Bruce Harley	(619) 594-5832	No Information
San Diego State University Reference Branch 5300 Campanile Drive San Diego, CA 92182-0511	Ms. Karen Sharp	(619) 594-6724	Newspaper Articles
South Coastal Info Center (SHPO) Social Sciences Research Lab San Diego State University San Diego, CA 92182-0511	Ms. Jan Culbert	(619) 594-5682	Archaeological and Historical Site Information
University of California P.O. Box 19557 Irvine, CA 92110	Reference Desk	(714) 824-6836	No Information
University of California Government Documents Department P.O. Box 19557 Irvine, CA 92110	Mr. Jeff Schneidewind Ms. Kay Collins	(714) 824-7234	No Information

REFERENCE SOURCES

The following organizations and personnel are acknowledged for their support

Organization	Name	Telephone	Nature of Support
<u>GOVERNMENT SOURCES</u>			
STATE/LOCAL (continued)			
University of California Archives P.O. Box 19557 Irvine, CA 92110	Ms. Mary Ellen Goddard	(714) 824-7193	Referrals
Borrego Springs Fire Department 2324 Stirrup Road Borrego Springs, CA 92004	Investigator Steve Sawyer	(619) 767-5436	See Interview I-3
San Diego County Assessor 1600 Pacific Highway Room 203 San Diego, CA 92101	Mr. Steve Berggren Mr. Ron Graham	(619) 531-6468	Real Estate Information
San Diego County Library Borrego Springs Branch 652 Palm Canyon Drive Borrego Springs, CA 92004-0297	Ms.. Kathy Raske	(619) 767-5761	Site Information
San Diego County Planning and Land Use Department 5201 Ruffin Road, Suite D San Diego, CA 92101	Mr. Gary Stockton	(619) 694-3871	Aerial Photos/Historical Maps
San Diego County Recorder and Clerk 1600 Pacific Highway Room 260 San Diego, CA 92101	Records Information	(619) 237-0502	San Diego County Deeds

REFERENCE SOURCES

The following organizations and personnel are acknowledged for their support

Organization	Name	Telephone	Nature of Support
<u>GOVERNMENT SOURCES</u>			
STATE/LOCAL (continued)			
San Diego Public Library California Room 820 East Street San Diego, CA 92101-6478	Ms. Blair Odinis	(619) 236-5834	Newspaper Articles
San Diego Public Library 820 East Street San Diego, CA 92101-6478	Librarian	(619) 236-5820	Referrals
University of San Diego Helen K. and James Copley Library Alcala Park San Diego, California	Librarian	(619) 260-4799	No Information
San Diego County Sheriff's Dept. 5255 Mt. Etna Drive San Diego, CA 92117	SGT Conrad Grayson	(619) 467-4579	See Interview I-1
San Diego County Sheriff's Dept. Rural Enforcement Division 610 Palm Canyon Drive Borrego Springs, CA 92004	Deputy Charles Hahn Deputy Jim McKenna	(619) 767-5656	See Interview I-4 See Interview I-12
Ocotillo State Off Road Park 5172 Highway 78 Ocotillo Wells, CA 92004	Mr. Al McLeary	(619) 767-5391	See Interview I-19

REFERENCE SOURCES

The following organizations and personnel are acknowledged for their support

Organization	Name	Telephone	Nature of Support
NON-GOVERNMENT SOURCES			
NATIONAL			
Northern Illinois Library System (NILS) 4034 East State Street Rockford, Il 61108	Computer Search	(815) 229-0330	No Information
Council on America's Past 518 Why Worry Lane Phoenix, AZ 85021	Heliogram Publication	(800) 396-4693	No Information
On-line Computer Library Center 6565 Franz Road Dublin, OH 43017-3395	Computer Search	(800) 848-5873	No Information
Scientific & Technical Information Library 689 Discovery Drive Huntsville, Al 35806	Computer Search	(205) 922-9822	Geological Information
STATE/LOCAL			
Imperial Valley Historical Society Pioneers Museum 323 East Aten Road Imperial, CA 92251	Ms. Lynn Bogdan Mr. Steve Bogdan	(619) 352-1165	No Information
San Diego Historical Society Archives 1649 El Prado, Balboa Park San Diego, CA 92138	Ms. Sally West	(619) 232-6203	No Information

REFERENCE SOURCES

The following organizations and personnel are acknowledged for their support

Organization	Name	Telephone	Nature of Support
NON-GOVERNMENT SOURCES			
STATE/LOCAL (continued)			
San Diego County Farm Bureau 1670 East Valley Parkway Escondido, CA 92027	Mr. David Owen	(619) 745-3023	No Information
SITE RELATED PERSONNEL			
Longtime Local Resident 411 West D Street Brawley, CA 92227	Mr. Leon Lesicka	(619) 344-2793	No Information
Military Historian 6016 Stanton Avenue Highland, CA 92346	Mr. Bruce Rebenstorf	(909) 864-4302	No Information
Lifetime Local Resident 601 Anchor Drive Borrego Springs, CA 92004	Ms. Nancy Ellis	(619) 767-3010	See Interview I-5
Former Park Ranger P.O. Box 252 Borrego Springs, CA 92004	Mr. Kenneth Smith	(619) 767-3303	See Interview I-8
Local Resident P.O. Box 143 Borrego Springs, CA 92004	Mr. David Ragsdill	(619) 767-0304	See Interview I-10
Retired Explosive Ordnance Disposal Technician 8786 Betelgeufe Way San Diego, CA 92126	Mr. Bruce Tinknell	(619) 578-9901	See Interview I-13

REFERENCE SOURCES

The following organizations and personnel are acknowledged for their support

Organization	Name	Telephone	Nature of Support
<u>NON GOVERNMENT SOURCES</u>			
SITE RELATED PERSONNEL (continued)			
Former Area Resident 1317 North V Street Lampoc, CA 93436	Mr. David Rock	(805) 735-4864	See Interview I-14
WWII Veteran Route 1 Box 2990 Coquille, OR 97423	Mr. Andy Yatsko	(541) 347-9865	See Interview I-15
Former Head Park Ranger P.O. Box 1620 Borrego Springs, CA 92004	Mr. Homer Townsend	(619) 767-3986	See Interview I-16
Archaeologist 1010 Palm Canyon Drive P.O. Box 1306 Borrego Springs, CA 92004	Mr. Bob Begole	(619) 767-5070	See Interview I-17
Longtime Local Resident 769 Diamond Bay Road Borrego Springs, CA 92004	Mr. Willard Henry	(619) 767-5506	See Interview I-18
Lifetime Local Resident P.O. Box 67 Borrego Springs, CA 92004	Mr. Sam Fortiner	(619) 767-5539	See Interview I-20
Lifetime Local Resident 601 Anchor Drive Borrego Springs, CA 92004	Mr. Denny Duvall	(619) 767-3010	See Interview I-21

ORDNANCE AND EXPLOSIVE
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BORREGO SPRINGS, CALIFORNIA
PROJECT NUMBER J09CA701101

APPENDIX B

REFERENCES AND ABSTRACTS

BIBLIOGRAPHIES

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Part A: Positive Findings

Part B: Negative Findings

SECTION III: Regional National Archive Findings

Part A: Positive Findings

Part B: Negative Findings

APPENDIX B

SECTION I: BIBLIOGRAPHY

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- B-2. U.S. Army Corps of Engineers, Rock Island District, "Defense Environmental Restoration Program for Formerly Used Defense Sites, Ordnance and Explosive Waste, Archives Search Report Manual", Version 2.2, 17 April 1995.
- B-3. Department of the Army, Environmental Protection and Enhancement, AR 200-1, 23 April 1990.
- B-4. U.S. Army Corps of Engineers, Rock Island District, "Site Safety Plan for OEW Investigations, 15 June 1992", with Appendix A-171, 15 September 1996.
- B-5. Department of Agriculture, Soil Conservation Service, Soil Survey of San Diego County, California, August 1990.
- B-6. National Oceanic and Atmospheric Administration, "Local Climatological Data, San Diego, California", 1993.
- B-7. National Oceanic and Atmospheric Administration, "Climate of California", June 1982.
- B-8. State of California, Department of Water Resources, "Borrego Valley Water Management Plan", June 1994.
- B-9. California Department of Parks and Recreation, "Ocotillo Wells East Acquisition, Final Environmental Impact Report", July 1986.
- B-10. M.L. Shettle, JR., Naval Air Stations of WWII, Schaertel Publishing Co., 1995.
- B-11. Paolo E. Coletta, United States Navy and Marine Corps Bases, Domestic, Greenwood Press, 1985.
- B-12. Smithsonian Institution, Americas Pursuit of Precision Bombing, 1910-1945, 1995.
- B-13. War Department, Ammunition Inspection Guide, TM 9-1904, 2 March 1944 (D-1).
- B-14. Department of the Army, Ammunition for Guns, Howitzers, and Recoilless Rifles, TM 43-0001-28, 20 April 70 (D-1).

- B-15. U.S. Navy Bomb Disposal School, United States Bombs, Fuzes, Pyrotechnics, Rockets and Miscellaneous, 1 September 1945 (D-2 and D-5).
- B-16. Department of the Army, Use of Radio Controlled Airplane Targets, TM 20-300, May 1952 (D-3).
- B-17. War Department, Small Arms Ammunition, TM 9-1990, 23 May 1942 (D-4).
- B-18. Departments of the Army, Navy, and Air Force, Bombs and Bomb Components, TM 9-1325-200, April 1966 (D-5).
- B-19. Department of the Army, U.S. Explosive Ordnance, TM 60A-2-1-11 (OP 1664), 28 May 1947 (D-1, D-5).
- B-20. War Department, Trajectory and Time Curves for 40mm Shell, HE, MK.2, FT 40AA-A-3, September 1945.
- B-21. War Department, Trajectory and Fuze Setter Chart for 90mm Shell, HE, M71, FT 90AA-B-3, September 1943.
- B-22. U.S. Army Corps of Engineers Los Angeles District, "DERP-FUDS INPR (Site No. J09CA701100)", 6 July 1994 (E-1).
- B-23. Historical Report, Historical Section, Army Ground Forces, "The Antiaircraft Command and Center", 1946 (E-2).
- B-24. Reports, State of California, Department of Parks and Recreation, "Archeological Site Survey Record Reports for the Former Borrego Maneuver Area", August 1983 through September 1989 (E-3).
- B-25. Historical Report, F.L. Orrell for the Anza-Borrego Desert Natural History Association, "Recent Military Operations in the Anza-Borrego Desert State Park", 31 October 1991 (E-4).
- B-26. Report, 70th Ord Co (EOD), San Diego, CA, "Explosive Incident Report", 11 Mar 1994 (E-5).
- B-27. Report, State of California, Department of Fish and Game, "Federal and State Rare and Endangered Species in San Diego County", 2 July 1996 (E-6).
- B-28. Report, United States Department of the Interior, Fish and Wildlife Service, "Threatened, Endangered, or Proposed Species for the Borrego Maneuver Area and Camp Ensign, San Diego County, California, 18 December 1996 (E-7).
- B-29. Report, Borrego Springs Fire Protection District, Arson/Bomb Investigation Division, "Preliminary Investigation Report for Found Military Ordnance", 29 December 1996 (E-8).

- B-30. Training Circular, Commanding Officer, Headquarters Southern California Sector, 20 March 1942, subject: Borrego Maneuver Area (F-1).
- B-31. Memorandum, Joint Operations Center, Western Defense Command-Western Sea Frontier, 1 September 1943, subject: Control of Training Areas, Southern California Sector, Western Defense Command and Southern Sector, Western Sea Frontier, NARA, Pacific Southwest, RG 181, Box 50, Folder A5-1 (F-2).
- B-32. Memorandum (with endorsements), War Department, Army Service Forces, 10 July 1944, subject: Termination of Use of Borrego Valley Maneuver Area by the Antiaircraft Replacement Center, NARA, Pacific Southwest, RG 181, Box 248 (F-3).
- B-33. Memorandum, Naval Air Control Center, Southern Sector, Western Sea Frontier, 21 November 1943, subject: Over-land Operating Areas, Southern Sector, Western Sea Frontier, NARA, Pacific Southwest, RG 181, Box 50, Folder A5-1 (F-4).
- B-34. Memorandum, Officer in Charge, Naval Air Control Center, Southern Sector, Western Sea Frontier, 3 June 1944, subject: Installations, Borrego Area, Effecting Tactical and Training Operations, NARA, Pacific Southwest, RG 181, Box 7, Folder A5-1 (F-6).
- B-35. Memorandum, U.S. Naval Air Station, San Diego, California, 13 March 1941, subject: Navy Operating Areas in Borrego and Imperial Valleys, NARA, Pacific Southwest, RG 181, Box 38 (F-6)
- B-36. Memorandum, Commandant's Office, 11th Naval District, 28 March 1941, subject: Navy Operating Areas in Borrego and Imperial Valleys, NARA, Pacific Southwest, RG 181, Box 242, Folders 1952, 1953, and 1954 (F-7).
- B-37. Letter, Deputy Commander, 11th Naval District, San Diego, California, 24 August 1944, subject: Aircraft Southern California Sector, Western Sea Frontier, Circular Letter Number 20-44 (F-8).
- B-38. Form No. 280, War Department and the State of California, 10 March 1942, subject: Permission to use Land for the Borrego Maneuver Area (G-1).
- B-39. The Borrego Sun, "Activities of World War II Stir Borrego with Marine, Army Units Training Here", 28 August 1971 (H-1).
- B-40. The Borrego Sun, "Military Wash Bears Evidence of 1942 Maneuvers", 23 November 1989 (H-2).
- B-41. Periodical: Journal of the Council on America's Military Past, "Camp Callan, by Judy P. Schulman", May 1984 (H-3).

B-42. Map, 11th Naval District, "Location Map of Naval Reservations in San Diego, Imperial, and Portions of Orange and Riverside Counties, California", 30 June 1943 (L-1).

SECTION II
NATIONAL CAPITAL REGION ARCHIVES FINDINGS
PART A
POSITIVE FINDINGS

BORREGO SPRINGS MANUEVER AREA, CA

***NARA - ARCHIVES II - TEXTUAL BRANCH
COLLEGE PARK, MD***

RG 160 (Records of the Army Service Forces)

Entry 27: Mobilization Division, Command Installation Branch, Correspondence
File, 1942 - 1946

Box 48

Correspondence Relative to Declaration of Borrego Maneuver Area as
Excess to Needs of Army Ground Forces, Borrego Springs Maneuver
Area, July - August 1944

SECTION II
NATIONAL CAPITAL REGION ARCHIVES FINDINGS
PART B
NEGATIVE FINDINGS

BORREGO SPRINGS MANEUVER AREA, CA

***CENTER OF MILITARY HISTORY - HISTORICAL RESEARCH
BRANCH
WASHINGTON, DC***

Pertinent Collections

***LIBRARY OF CONGRESS - GEOGRAPHY AND MAP DIVISION
WASHINGTON, DC***

Pertinent Collections

***LIBRARY OF CONGRESS - STILL PHOTOS DIVISION
WASHINGTON, DC***

Pertinent Collections

***NARA - ARCHIVES I
WASHINGTON, DC***

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

Entry 391: Construction Completion Reports, 1917 - 1943

Entry 393: "Historical Record of Buildings" and "Record of Equipment and
Condition of Buildings" at Active Army Posts, 1905 - 1942

RG 92 (Records of the Office of the Quartermaster General)

Entry 1891: General Correspondence (Geographic File), 1905 - 1942

RG 175 (Records of the Chemical Warfare Service)

Entry 1: Central Correspondence File, 1918 - October 1942

Entry 4: Security and Confidential Central Correspondence Files, 1918 - October
1942

RG 153 (Records of the Office of the Judge Advocate General)
Reservations File, 1800 - 1950
Subseries I
Subseries II

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

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

RG 77 (Records of the Office of the Chief of Engineers)
Entry 1011: Security Classified Subject Files, 1940 - 1945
Entry 1013: General Correspondence with Districts, 1941 - 1945
Entry 1014: General Correspondence with Divisions, 1941 - 1945

RG 92 (Records of the Office of the Quartermaster General)
Entry 1892: General Correspondence (Geographic File), 1936 - 1954

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

RG 107 (Records of the Secretary of War)
Entry 102: Project Decimal File, 1943 - January 1946
Entry 155: Under Secretary of War, Special Assistant for Construction MJ
Madigan, Projects, 1940 - 1945
Entry 158: Under Secretary of War, Special Assistant for Construction MJ
Madigan, General Correspondence, 1940 - 1945

RG 111 (Records of the Office of the Chief Signal Officer)
Entry: Unclassified Central Decimal Files, 1941 - 1957

- RG 112 (Records of the Office of the Surgeon General)
Entry 31: Geographic Series, 1938 - 1941
Entry 32: Geographic Series (Formerly Security Classified), 1938 - 1941
- 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 160 (Records of the Army Service Forces)
Entry 25: Director of Plans and Operations, Liaison and Control Branch, Subject Files, 1942 - 1944
Entry 138: Readjustment Division, Central Decimal Files, 1943 - 1944
Entry 139: Readjustment Division, Central Decimal Files, 1943 - 1946
- RG 165 (Records of the War Department General and Special Staffs)
Entry 258: Installations Branch, Reports and Correspondence Relating to Construction, Utilization, and Disposal of Army Installations, 1944 - 1947
Entry 484D: Federal Works Agency Project Files, 1940 - 1946
Entry 484E: Security Classified Federal Works Agency Project Files, 1942 - 1945
- RG 168 (Records of the National Guard)
Entry 343: State Guard State File, 1941 - 1949
Entry 344: State Decimal File, 1941 - 1947
- RG 175 (Records of the Chemical Warfare Service)
Entry 2A: General Correspondence (Subject Series), 1942 - 1945
- RG 218 (Records of the U.S. Joint Chiefs of Staff)
Entry: Series, 1942 - 1959 (Geographic File)
- 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 319 (Records of the Army Staff)
Entry 47: Army Intelligence Project Decimal File, 1941 - 1945

RG 336 (Records of the Office of the Chief of Transportation)

Entry: Historical Program Files, 1940 - 1950

RG 337 (Records of Headquarters Army Ground Forces)

Entry 30: General Staff, G3 Section, Inspection Reports, 1942 - 1944

Entry 57: General Correspondence, 1940 - 1942

Entry 57A: Project Files, Western Defense Command, 1940 - 1943

RG 338 (Records of US Army Commands, 1942 -)

Entry: Camps, Posts, and Stations

RG 407 (Records of the Adjutant General's Office)

Entry: 1940 - 1947, Army - AG, Formerly Classified Project Decimal Files

Entry: 1940 - 1954, Army - AG, Unclassified Project Decimal Files

Entry 427: WW II Operations Reports, 1940 - 1948

***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

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

Pertinent Record Groups

***NATIONAL GEOGRAPHIC SOCIETY
WASHINGTON, DC***

Pertinent Collections

***SMITHSONIAN NATIONAL AIR AND SPACE MUSEUM
WASHINGTON, DC***

Pertinent Collections

***US ARMY CORPS OF ENGINEERS - OFFICE OF HISTORY
ALEXANDRIA, VA***

Pertinent Collections

***WASHINGTON NATIONAL RECORDS CENTER
SUITLAND, MD***

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

Accession A52-259

Accession A52-434

Accession A53-325

Accession A55-323

Accession A56-398

Accession 67A-4792

SECTION III
REGIONAL NATIONAL ARCHIVES FINDINGS
PART A
POSITIVE FINDINGS

BORREGO MANEUVER AREA

***NARA, PACIFIC SOUTHWEST REGION
LAGUNA NIGUEL, CA***

RG 181, Records of the Naval Districts and Shore Establishments,
Box #248 (N1-13), Memo, Termination of Use.

SECTION III
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PART B
NEGATIVE FINDINGS

BORREGO MANEUVER AREA

**NARA, FEDERAL RECORDS CENTER
LAGUNA NIGUEL, CA**

**NARA, PACIFIC SOUTHWEST REGION
LAGUNA NIGUEL, 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
All Entries
Nothing Found

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

RG 111, Records of the Office of the Chief Signal Officer
All Entries
Nothing Found

RG 121, Records of Public Buildings Service
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
All Entries
Nothing Found

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

RG 338, Records of US Army Commands
All Entries
Nothing Found

**NARA, NATIONAL PERSONNEL RECORDS CENTER
ST LOUIS, MO**

All Accessions
Nothing 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 18, Records of Army Air Forces
All Entries
Nothing Found

RG 30, Records of 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 of the Chief of Engineers
Accession 077-83-004
Boxes #5-9, 16-18;
San Francisco District, Cent Dec Files, 1949-57
Nothing of Value to this ASR

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

RG 111, Records of the Office of the Chief Signal Officer
All Entries
Nothing Found

RG 112, Records of the Surgeon General
All Entries
Nothing Found

RG 121, Records of Public Building Service
Accession 9NSS-121-85-008
Box #3, Real Property Disposal Project Files, 1950-57
Nothing of Value to this ASR

Accession 9NSS-121-85-008
Box #1, Real Property Disposal Project Files, 1950-57
Nothing of Value to this ASR

Accession 9NSS-121-85-007
Box #18, Real Property Disposal Project Files, 1947-57
Nothing of Value to this ASR

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

RG 175, Records of the Chemical Warfare Service
Accession (None)
Box #1 (570729), Chemical Procurement Districts, California
Nothing of Value to this ASR

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

Accession Regionalized
Box #28, Real Property Disposal Case Files, 1946-49
Nothing of Value to this ASR

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

RG 319, Records of the Army Staff
All Entries
Nothing Found

RG 338, Records of US Army Commands
All Entries
Nothing Found

RG 406, Records of the Federal Highway Administration
Accession 72A1388/129964
Boxes #7,10-12,14,17; Federal Aid Secondary System Route
Description
Nothing of Value to this ASR

RG 407, Records of Adjutant General's Office
All Entries
Nothing Found

ORDNANCE AND EXPLOSIVE
ARCHIVES SEARCH REPORT
FOR
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BORREGO SPRINGS, CALIFORNIA
PROJECT NUMBER J09CA701101

APPENDIX C

GLOSSARY

APPENDIX C

GLOSSARY

AA	Antiaircraft
AAA	Antiaircraft Artillery
AAARTC	Antiaircraft Artillery Training Center
ASR	Archives Search Report
BD/DR	Building Demolition/Debris Removal
CEHNC	Corps of Engineers, Huntsville Center
CENCR	Corps of Engineers, North Central, Rock Island
CESPL	Corps of Engineers, Los Angeles District
CWM	Chemical Warfare Material
DA	Department of the Army
DERP	Defense Environmental Restoration Program
DOD	Department of Defense
DOI	Department of Interior
EE/CA	Engineering Estimate and Cost Analysis
EPA	Environmental Protection Agency
EOD	Explosive Ordnance Disposal
FDE	Findings and Determination of Eligibility
FUDS	Formerly Used Defense Site(s)
GSA	General Services Administration
HTRW	Hazardous, Toxic and Radiological Waste
INPR	Inventory Project Report
IRA	Interim Removal Action
LT	Lieutenant
M	Model
MAJ	Major
MK/MOD	Mark/Model
MSGT	Master Sergeant
NARA	National Archives Records Administration
NAS	Naval Air Station
NOAA	National Oceanic and Atmospheric Administration
OE	Ordnance and Explosives
PA	Preliminary Assessment
PBR	Practice Bombing Range
PN	Project Number
RAC	Risk Assessment Code
RG	Record Group
SCS	Soil Conservation Service
SI	Site Inspection
SFC	Sergeant First Class
SGM	Sergeant Major
SGT	Sergeant
SPC	Specialist
SSG	Staff Sergeant
TCRA	Time Critical Removal Action
USACE	U.S. Army Corps of Engineers
USADACS	U.S. Army Defense Ammunition Center and School
USATCES	U.S. Army Technical Center for Explosives Safety
UXO	Unexploded Ordnance

WAA
WD

War Assets Administration
War Department

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APPENDIX D

TEXTS/MANUALS

APPENDIX D

TEXT/MANUALS

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D-1. Text/Illustration of Practice Bomb Types with Associated Spotting Charges (B-13 and B-14).

D-2. Text/Illustration of AA Projectiles and Ammunition for Aircraft Guns (B-15).

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BORREGO SPRINGS, CALIFORNIA
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APPENDIX D

TEXTS/MANUALS

APPENDIX D

TEXT/MANUALS

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D-1. Text/Illustration of AA Projectiles and Ammunition for Aircraft Guns (B-13 and B-14).

D-2. Text/Illustration of Rockets and Rocket Components (B-15).

D-3. Text/Illustration of Radio Controlled Airplane Targets (B-16).

D-4. Text/Illustration of Small Arms Ammunition (B-17).

D-5. Text/Illustration of Bombs and Bomb Components (B-15, B-18, and B-19).

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M1A2 antiaircraft gun (page 360). The main differences are in the cartridge case and propelling charge. The two projectiles are of similar construction, but the M80 is lighter in weight. This is accomplished by shortening the projectile. The M80 is 4.23 inches long and weighs 1.66 pounds, while the M74 is 4.84 inches long and weighs 1.92 pounds. The aircraft round also has a slightly greater radius of ogive (2.35 inches as compared to 2.205 inches). The Aircraft Round M80 may be distinguished as 37-mm ammunition by its size, and for the aircraft group by the length (5.69 inches) and flange of its cartridge case. The complete round is 9.34 inches long and weighs 2.25 pounds. The projectile is painted black with white stencil.

Packing of Ammunition for the 37-mm Aircraft Gun M4.
This ammunition is packed as follows:

The high-explosive and practice rounds are packed in two ways:

1. 1 round per fiber container, 40 containers (40 rounds) per wooden box.

2. 20 rounds per metal-lined wooden box.

The armor-piercing shot is packed 1 round per fiber container, 40 containers (40 rounds) per wooden box.

FURTHER REFERENCES: SNL R-1, Parts 1 and 2; SNL R-5, Parts 1 and 2; Ordnance Drawings; OS 9-20.

Chapter 4

Ammunition for 40-mm Gun M1

GENERAL.

Weapon. The GUN, automatic, 40-mm, M1, is intended for duties intermediate between those of the high-altitude guns of the 3-inch and 90-mm class and the 37-mm antiaircraft weapon. It is very effective against dive bombers and low-flying aerial targets. With the armor-piercing ammunition it may also be effectively used against armored ground targets. Its rate of fire is 120 rounds per minute which is accomplished by feeding the ammunition into the weapon by means of a 4-round changer clip. These rounds may be fired continuously in rapid fire or a single shot at a time.

This weapon is sometimes called the Bofors gun, since it was developed by the Bofors Company of Sweden. It was adopted by the British and then by the United States Ordnance in 1941. The 40-mm M1 or "Bofors" gun is easily recognized by the funnel-shaped flash hider screwed on the forward end of the tube, which protects the gun operators from temporary blinding by the flash.

AMMUNITION INSPECTION GUIDE

Class and Types. The 40-mm ammunition is of the fixed class and includes three types: high-explosive, practice, and armor-piercing.

Cartridge Cases.

CASE, cartridge, M25. The M25 Cartridge Case is "Standard" for ammunition of American design. This case is drawn from cartridge brass. It is 12.24 inches long and has a maximum weight of 1.94 pounds. An extracting groove is machined into the head of the case. The feeder mechanism of the M1 Gun requires that an annular groove be cut into the base. A tapered hole is machined through the head for press fitting the M23A2 Primer.

CASE, cartridge, M25B1. This case is "Substitute Standard" for 40-mm, American designed ammunition. Except for a few differences in the propelling charge cavity near the head, a thinner head, and being made of steel, it is the same as the M25 Brass Case. The differences in the head and material make the steel case approximately 0.25 pound lighter than the brass case.

CASE, cartridge, M22A1. The M22A1 is "Standard" for 40-mm ammunition of British design. It was developed from the Mk. I/L Cartridge Case which was redesigned to become the M22. The M22 Case was machined in the head to receive the British Percussion Primer, Mk. II/L/ which was assembled with threads into the cartridge case. The A1 modification of the M22 consisted of changing the head to seat the M23A2 American Primer. The M22A1 Cartridge Case differs only in very minor details from the M25.

CASE, cartridge, M22A1B1. This case is "Substitute Standard" for 40-mm ammunition of British design. It differs from the M22A1 Brass Case in that the material is steel and the head is thinner. It weighs about 0.25 pound less than the brass case.

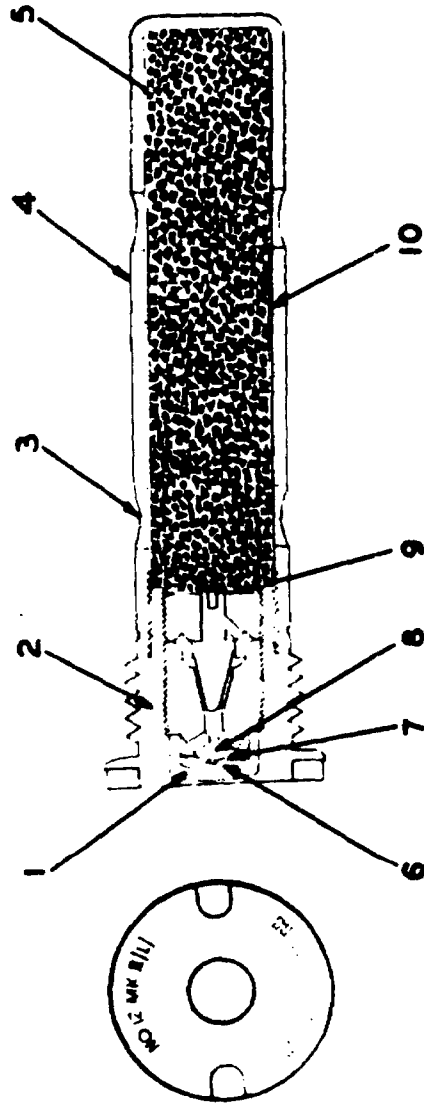
Primers.

PRIMER, percussion, 20-grain, M23A2. This primer is "Standard" for use in both American and British designed 40-mm ammunition. The primer and its development are described in the chapter dealing with 37-mm ammunition.

PRIMER, percussion, No. 12, Mk. II/L/. This primer may be found in some old rounds of British design. It is screwed and staked into the head of the old M22 or Mk. I/L/ Cartridge Case. The "L" in British nomenclature stands for land use. The Mk. II Primer consists of two parts, the head and the body.

The brass body contains the primer charge of 64 grains of black powder. It is in the shape of a tube closed at one end and tapped at the open end to receive the threads of the primer head. Several holes are drilled into the body to allow the flame from the primer charge to ignite the propellant. The primer charge is contained in a foiling-paper wrapping which lines the tube and prevents the powder from

ARTILLERY AMMUNITION



- | | |
|--------------------------------|--|
| 1. PERCUSSION CUP | 6. 1.2 GRAINS ⁶ 70 PRIMER MIXTURE |
| 2. PERCUSSION HEAD | 7. ONION SKIN PAPER |
| 3. FLASH HOLE | 8. ANVIL |
| 4. PRIMER BODY | 9. ONION SKIN PAPER |
| 5. 64 GRAINS ARMY BLACK POWDER | 10. FOILING PAPER WRAPPER |

RA PD 22328

Figure 142 — PRIMER, Percussion, No. 12, Mk. II/L/

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spilling out through the holes. The charge is sealed at the open end with a disc of onionskin paper.

The primer head has outside threads at the top for screwing into the cartridge case and at the bottom for threading into the body. The primer cup is press-fit into the head from the forward end so as to leave a portion of the cup exposed to the firing pin of the weapon. The primer cup contains a priming mixture weighing 1.2 grains sealed with a paper disc. The anvil is threaded into the head behind the primer cup. A beveled gas-check plug fits loosely into a cavity in the anvil. A plug with a flash vent machined into it, threads into the head behind the anvil.

The function is the same as for the American-type of percussion primer. The firing pin of the weapon indents the primer cup which crushes the primer composition against the anvil. The flame from the resulting explosion flashes through the vents and ignites the primer charge. The gas-check plug is pushed down by the gases from the primer composition and pushed up, closing the vent in the anvil, when the primer charge explodes.

CARTRIDGE, H.E.-T(SD), Mk. II.

General. This round was designed for use against aircraft but may also be used against other targets of opportunity. The nomenclature tells much of the story of the projectile since the "HE-T" indicates high-explosive filler with tracer and the "SD" refers to the tracer as shell-destroying. The complete round consists of a fuzed projectile complete with filler and tracer, a propelling charge, and a primed cartridge case.

Cartridge Cases. The M25 Brass Case is "Standard" for rounds of American design; the M25A1 Steel Case is "Substitute Standard." The M22A1 Brass Case is "Standard" with British rounds, the M22A1B1 Steel Case is "Substitute Standard."

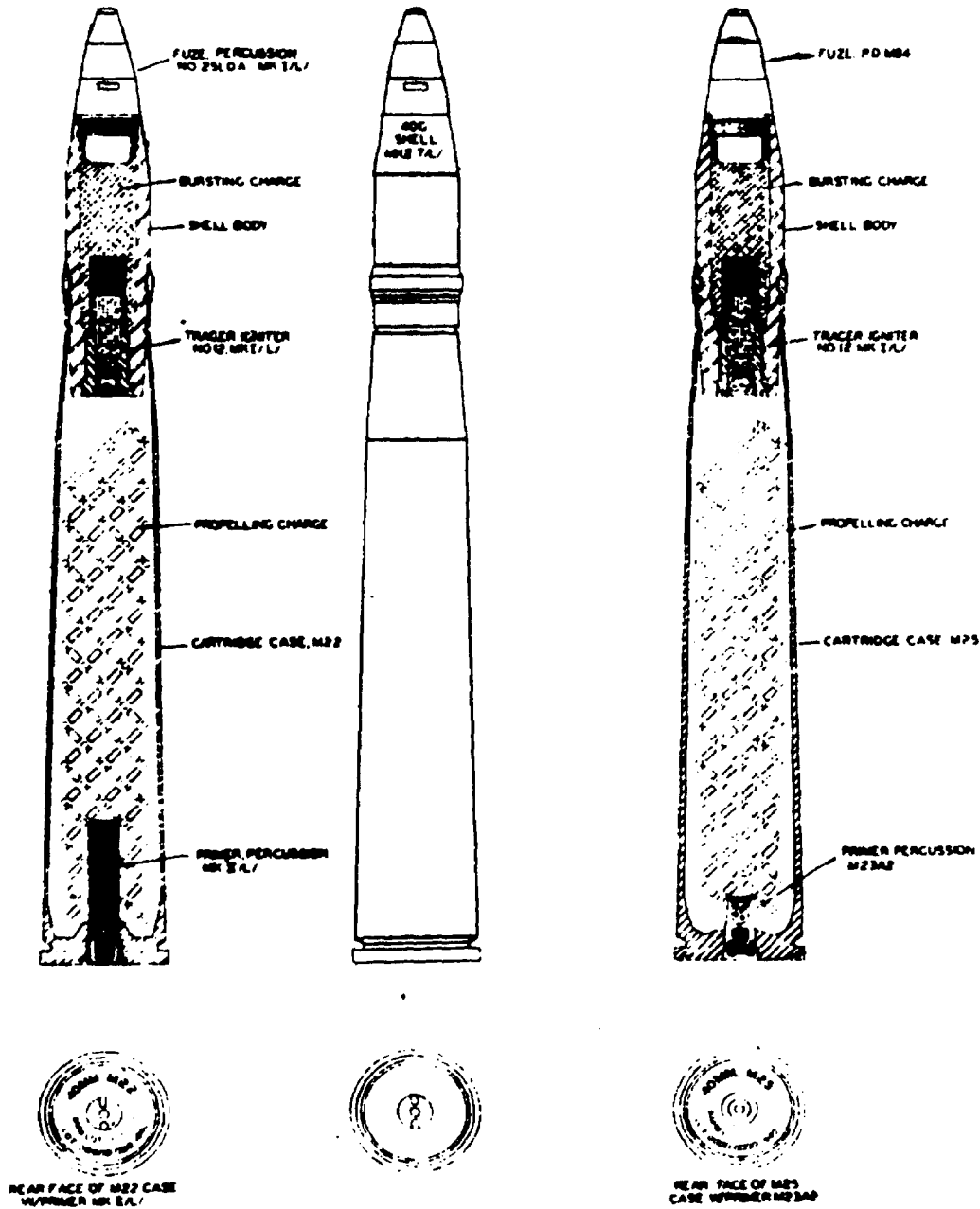
Propelling Charge. A muzzle velocity of 2,960 feet per second is imparted to the projectile by 10.4 ounces of FNH smokeless powder poured loosely into the cartridge case.

Primer. The M23A2, 20-grain, Percussion Primer is "Standard" for all 40-mm rounds. PRIMER, percussion, No. 12, Mk. II/L/, may be found in some old rounds of British design.

Projectile. The Mk. II High-explosive Projectile is made up of a metal parts assembly, a filler, a shell-destroying tracer, and a point-detonating fuze. The projectile, loaded and fuzed, is a little over 7 inches long, the length varying slightly for different fuzes.

Metal parts assembly. This assembly consists of the shell body and the rotating band. The body is completely hollow. The cavity at the

ARTILLERY AMMUNITION

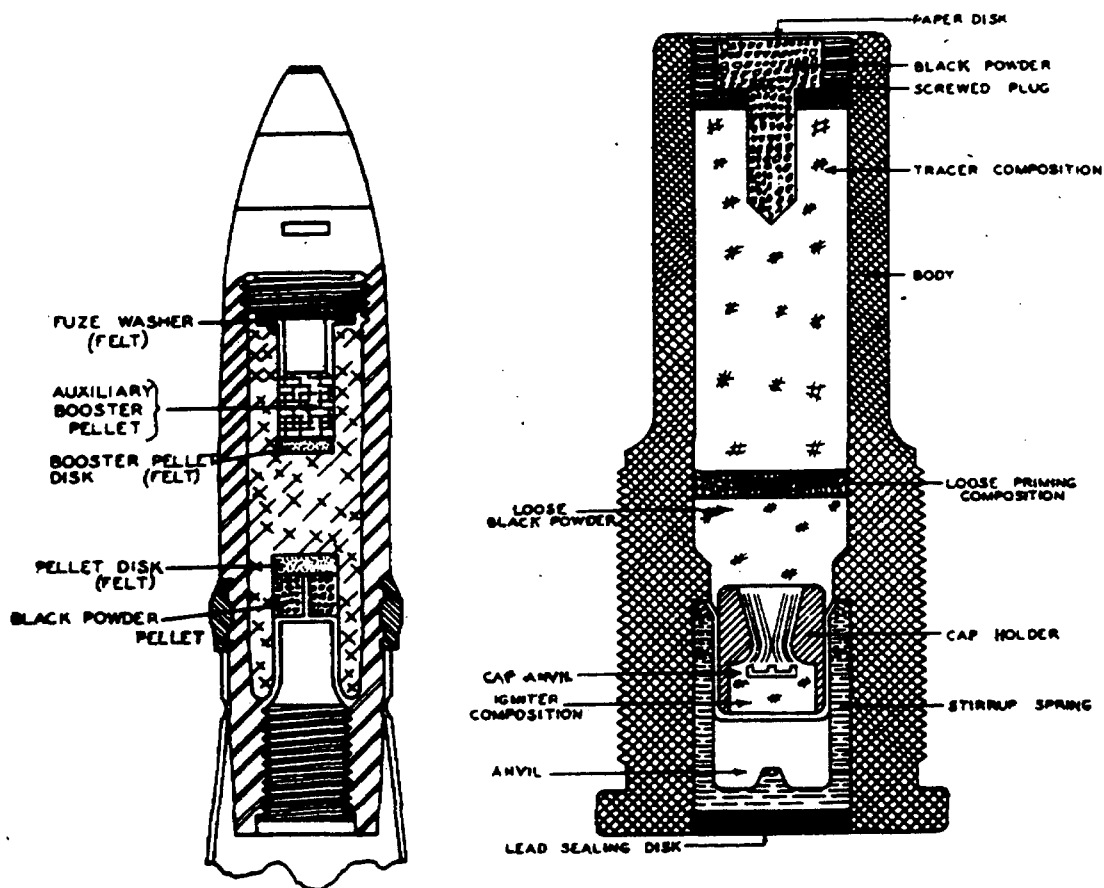


RA PD 22929

**Figure 143 — Alternate Assemblies of Cartridge, H.E.-T (SD)
40-mm, Mk. II, T/L/**

rear of the body is shaped and threaded to take the Tracer Igniter No. 12, Mk. 1/L/. The nose end of the filler cavity is threaded to take Point-detonating Fuzes No. 251, Mk. 27 or M64A1. A knurled or ribbed recess 0.642 inch wide is machined into the body 1.745 inches above the base to receive a copper rotating band. A canelure is cut into the shell about 0.5 inch behind the rotating band to receive the cartridge case crimps. The ogive of the projectile is tapered rather than curved. The taper is 7 degrees 15 minutes. The base is also cylindrically tapered to an angle of 7 degrees 45 minutes.

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Figure 144 — Tracer and Igniter, Shell No. 12, Mk. I/L/

Filler. The filler consists of 0.15 pound of TNT and 0.005 pound of black powder in the form of a pellet with a hole in the center. The filler of the American projectile is drilled out at the top to accommodate the booster of the fuze. This drilling leaves the fuze booster surrounded by TNT. The British filler is drilled deeper at the nose to accommodate an auxiliary booster pellet of tetryl. A cavity is also drilled into the TNT at the bottom leaving a surround. A felt disc fits into the top of this cavity. The black powder pellet is inserted behind this disc and is held in place by the tracer igniter assembly.

Tracer assembly. The proper nomenclature for the tracer assembly is "Tracer and Igniter, Shell, No. 12, Mk. I/L/ Internal," the British designation. The assembly is contained in a steel shell which threads into the base of the projectile so that only a paper disc separates the T-shaped relay igniter charge of loose black powder from the black powder pellet in the bursting charge. This relay igniter is surrounded by tracer composition which extends rearward to a layer of priming composition. Between the priming composition and the cap holder

ARTILLERY AMMUNITION

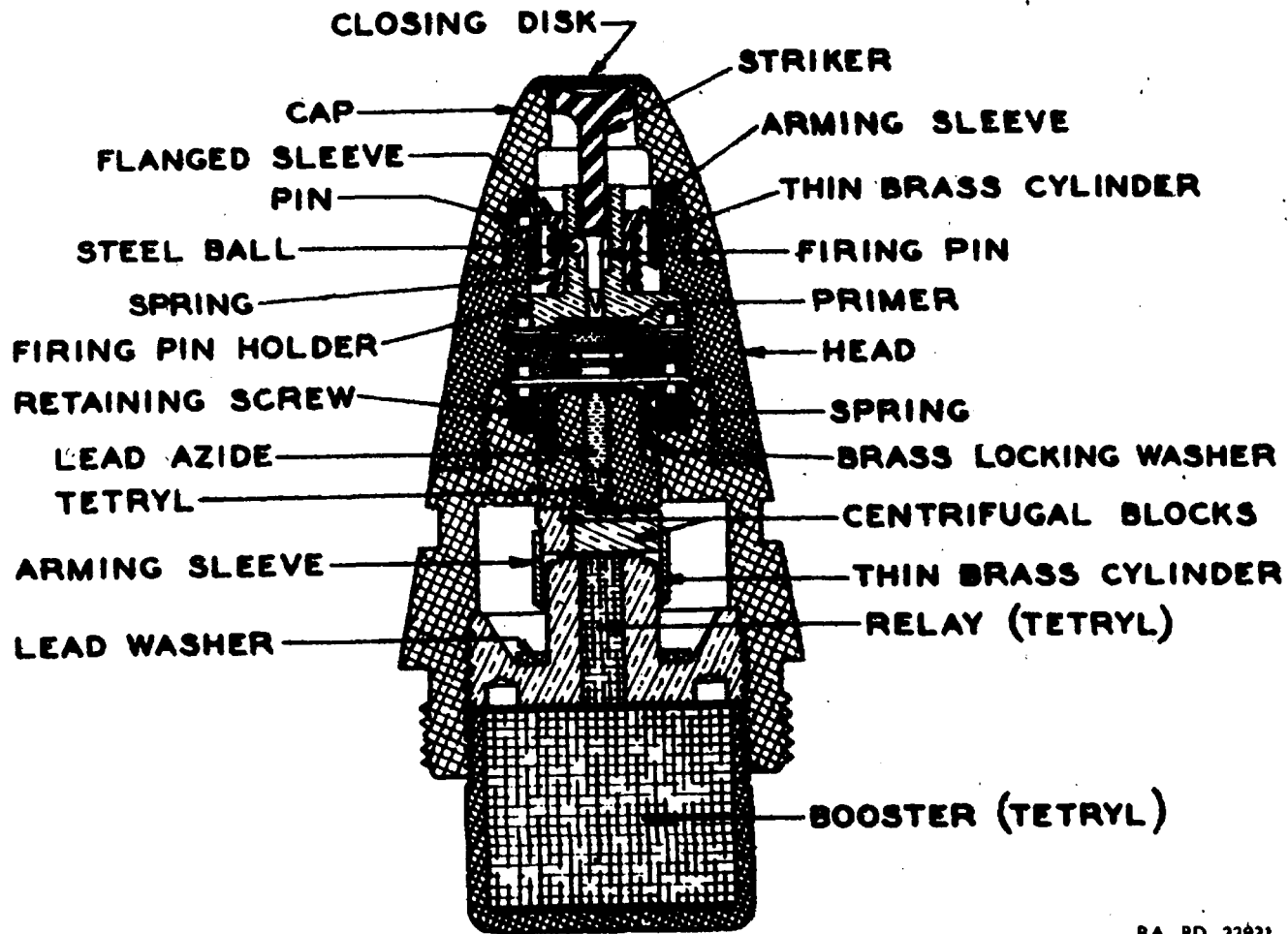
which fits inside a stirrup spring is loose black powder. The cap holder assembly includes a cap anvil which fits over a vent leading to the loose black powder and igniter composition placed between the anvil and the stirrup spring. The stirrup spring rests on the shoulders of a cylindrically shaped anvil which is closed at the bottom. A protrusion in the bottom of the anvil acts much the same as a firing pin. The tracer and igniter assembly is sealed at the base with a lead sealing disc.

The function of the tracer and igniter assembly begins when the projectile starts down the bore of the weapon. Set-back action causes the cap holder to move rearward and straighten out the stirrup spring which has retained it. The action carries the cap and stirrup spring onto the firing pin-like projection in the center of the anvil and crushes the igniting composition against the cap anvil. The flame from the resulting explosion fires the loose black powder which in turn ignites the priming composition. The back pressure from this loose black powder forces the mechanisms behind it out of the igniter body. The priming composition ignites the tracer composition. When the tracer composition has burned for approximately 7 seconds, it ignites the black powder relay igniter which carries the flame to the black powder pellet in the bursting charge and results in the destruction of the projectile.

There are three fuzes listed as standard for issue and manufacture for use with the Mk. II Projectile: the British FUZE, percussion, D.A., No. 251, Mk. I/L/, the Navy FUZE, P.D., Mk. 27, and the Army FUZE, P.D., M64A1.

FUZE, Percussion, D.A., No. 251, Mk, I/L/.

Description. The "D.A." in the nomenclature of this fuze is British for "direct action" which means about the same as the Army Ordnance term "superquick." The body of the fuze is made in three parts. The lower part is threaded on the outside for screwing into the nose of the Mk. II Projectile and is threaded on the inside to receive a relay assembly containing a charge of 2.3 grains of tetryl and a booster cup containing a tetryl pellet weighing 109.69 grains. A lead washer fits around the bottom of the protrusion on the relay holder. A thin brass cylinder fits over the upper end of the relay holder. Four tiny lugs at the top of this cylinder are bent over the rounded shoulder on the relay holder. Four tiny lugs at the bottom of the cylinder are bent out and up to retain a heavier brass arming sleeve. The arming sleeve is of sufficient length to protrude above the relay holder and retain two centrifugal blocks. These blocks form a positive separation between the relay charge and the detonating elements of the fuze making it boresafe. The detonator assembly fits in through the top of the lower part of the body and rests on the centrifugal blocks. The detonator charge consists of 0.93 grain of



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Figure 145 — FUZE, Percussion, D.A., No. 251, Mk. I/L/

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lead azide over 0.15 grain of tetryl. A brass washer in two parts fits around the detonator holder just above the shoulder. This washer is backed up by a spring which is compressed and held in place by a retaining screw. The lower portion of the body is threaded on the outside at the top so that the second body part, the head, may be screwed over it.

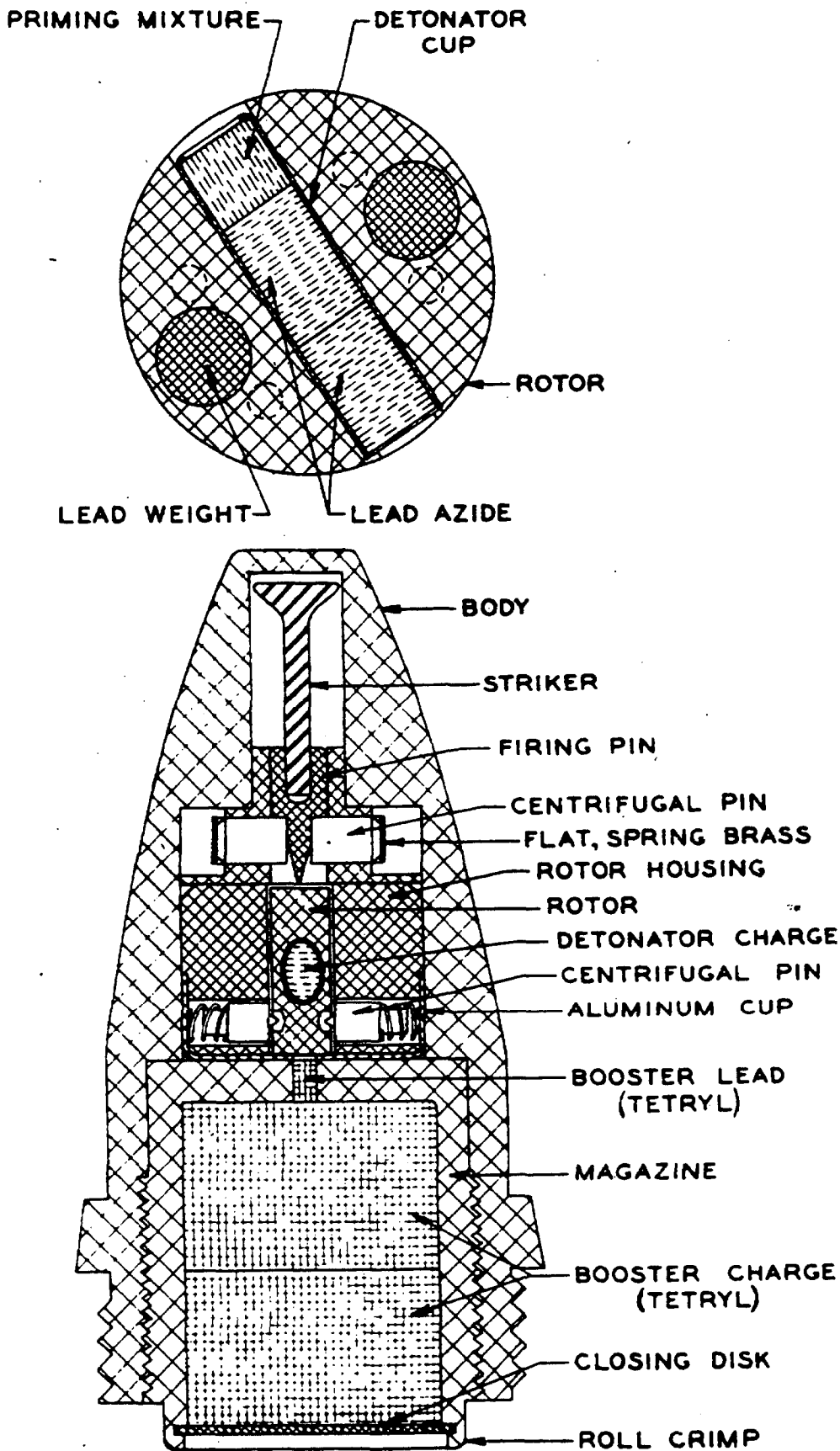
The head is threaded on the inside at the rear to receive the firing pin sleeve and the primer assembly. The primer holder screws into the head behind the firing pin sleeve. The primer charge of priming mixture weighs 1.9 grains and should be inserted into the primer holder so that the colored side is visible. A small hole in the firing pin holder seats a steel ball which engages the shoulder of the firing pin and keeps it from contacting the primer during shipment and handling. A sleeve, flanged at the top, fits around the firing pin holder and keeps the steel ball in place. A compressed spring fits around this sleeve and is held in place by the flange. A thin brass cylinder similar to that in the lower portion of the fuze has its upper lugs bent over the shoulder of the flange on the firing pin holder sleeve and keeps the spring from forcing it outward. The brass cylinder is in turn held down by an arming sleeve fitting into the lower lugs which are bent outward and upward. A small pin fitting into a slot in the arming sleeve insures proper movement. The arming sleeve cannot move outward because it engages a shoulder in the third portion of the body, the cap.

The cap is threaded on the inside at the bottom and screws over the head. It retains a nail-shaped, plastic firing pin striker. The lower end of the striker fits into the firing pin holder just over the firing pin. The cap is closed at the top with a thin metal disc.

Function. When the weapon is fired and the projectile starts down the bore of the weapon, set-back causes two actions to occur simultaneously. The arming sleeve around the centrifugal blocks and the relay assembly is forced rearward dragging the lugs of the thin brass cylinder off the shoulder of the relay assembly. The shock of this action is taken up by the lead washer which acts as a cushion. At the same time, the arming sleeve in the head of the fuze moves rearward and drags the lugs of the thin brass cylinder off the shoulders of the flange on the arming pin holder sleeve. As this flange is released, the spring forces the firing pin holder sleeve outward into the fuze cap. The steel ball then falls out of the firing pin holder and the firing pin moves inward and rests on the primer. Set-back action also causes the centrifugal blocks to be held more firmly in place.

As the projectile leaves the bore of the gun it has acquired a high rotational velocity. The resulting centrifugal force causes the centrifugal blocks, which are between the relay holder and the detonator holder, to move out into the recess in the lower body. When this

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Figure 146 — FUZE, P.D., Mk. 27 (Navy)

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occurs, the spring behind the detonator holder forces it rearward to close the space formerly occupied by the centrifugal blocks and bring the detonator charge immediately over the relay charge. The 2-sectioned washer around the detonator holder spreads into a recess in the lower body when the holder has moved sufficiently rearward. This locks the detonator firmly in place.

Impact with the target forces the thin metal disc and the nail-shaped firing pin striker inward. As the force is transmitted to the firing pin, it penetrates the primer. The resulting explosion functions the remainder of the explosive train consisting of the detonator charge of lead azide and tetryl, the relay of tetryl, the booster of tetryl, and finally the TNT bursting charge of the projectile.

FUZE, P.D., Mk. 27 (Navy).

Description. The body of the Mk. 27 Fuze is die-cast in one piece from aluminum-base alloy. It is threaded on the outside at the base to screw into the Mk. II or Mk. I High-explosive Projectiles and on the inside to receive a magazine or booster cup. The nose of the body is closed by leaving a thickness of 0.04 inch of the metal as a cover during casting.

A small cavity in the nose of the fuze seats a nail-shaped plastic firing pin striker. The lower part of the striker fits into the head of the firing pin which is cup-shaped. The firing pin holder is made in three diameters. The upper part with the smaller diameter fits into the striker cavity. The part of intermediate diameter is drilled transversely to seat two centrifugal pins which, in the unarmed position, prevent the firing pin from contacting the rotor detonator. A strip of spring brass is wrapped around this intermediate part and must be spread by the centrifugal pins before the firing pin is released. The part of largest diameter fits the larger cavity in the fuze and provides room for the centrifugal pins to spread.

The firing pin assembly is held in place by the rotor assembly which is fitted in behind it. The rotor housing is a solid cylinder of aluminum-base alloy. A rectangular cavity is cut into the center and goes completely through the length of the housing. The purpose of this cavity is to house the rotor. A hole is drilled completely through the housing at right angles to the rotor cavity. Centrifugal pins are inserted into this hole on either side of the rotor and are backed up by small springs. Small nipples on the end of the pins engage recesses in the rotor. The pins and springs are held in place by a thin aluminum cup which fits over the lower half of the housing. The aluminum cup has a flash hole in the center of the bottom.

The rotor is a flat circular disc with a hole drilled through its diameter to seat the detonator consisting of 0.03 gram of priming mixture over two pellets of lead azide, each weighing 0.054 gram.

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Two lead weights are pressed into the rotor at opposite ends of a diameter which is at right angles with the detonator cavity. Recesses are machined into the rotor on each side to receive the nipples of the centrifugal arming pins.

The magazine is cup-shaped with heavy walls and bottom. It screws into the fuze body behind the rotor assembly so that only a small part is left protruding at the rear. A hole is drilled through the bottom of the cup to seat a booster lead charge of 0.020 gram of tetryl. The booster charge is made up of 5.40 grams of tetryl divided into two equal pellets. The open end of the magazine is closed with a disc held in place by a 360-degree crimp.

Function. The function of the Mk. 27 Fuze begins as it leaves the bore of the weapon. Centrifugal force causes both sets of centrifugal pins to move against their springs. The firing pin, thus released, moves inward and rests on the rotor. The rotor, which is then also free to move, aligns its detonator with the firing pin because of the effect of centrifugal force upon the lead weights.

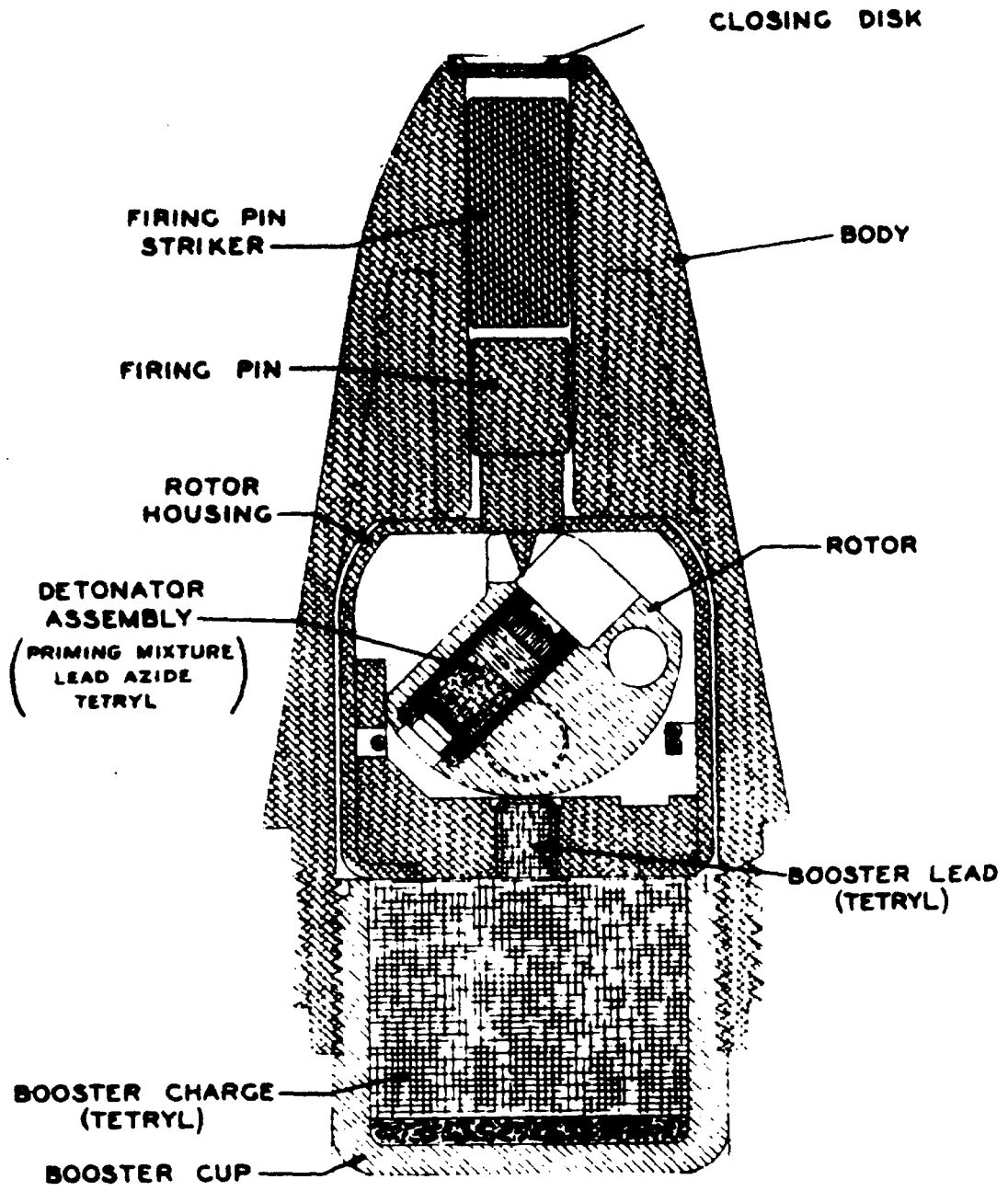
Impact with the target forces the firing pin into the priming composition. The resulting explosion initiates the remainder of the explosive train consisting of lead azide detonator, tetryl lead, booster of tetryl and the bursting charge of the Mk. II or Mk. I High-explosive Projectile.

FUZE, P.D. M64A1.

Description. The M64A1 Fuze body is a single piece, die-cast from an aluminum-base alloy. The body is threaded externally and internally at the base; the external threads screw into the nose of the Mk. II Projectile and the booster cup screws into the internal threads. A pellet of 112 grains of tetryl is contained in the booster.

The rotor assembly fits into a cavity ahead of the booster. The rotor housing, which is also a die-cast aluminum-base alloy is enclosed by a brass sleeve which fits snugly into the body cavity. The housing is in the shape of a solid cylindrical block with a rectangular cavity cut across its diameter to house the rotor. This cavity does not extend the full length of the block. Two holes are bored completely through the housing at right angles to the rectangular cavity. The upper hole is to seat two pins upon which the rotor pivots. These pins fit into circular recesses in the side of the rotor and are staked into place. The lower hole seats centrifugal pins on either side which also fits into circular recesses in the side of the rotor and hold it in position with the detonator out of line with the firing pin. A groove is cut around the circumference of the housing so that it passes through the centrifugal pinholes. A length of spring wire is wound around this groove and retains the centrifugal pins. Between 10,000 and 20,000 revolutions per minute are required for the centrifugal pins to

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Figure 147 — FUZE, P.D., M64A1
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spread this wire sufficiently to free the rotor. A hole is drilled through the bottom of the housing to the rotor cavity. A copper cup containing a booster lead charge of 1.67 grains of tetryl fits into this hole.

The brass rotor is centrifugally weighted and in the unarmed position holds its detonator of 0.72 grain of priming mixture, 2.39 grains of lead azide, and 1.08 grains of tetryl out of line with the firing pin. Since the detonator is thus physically separated from the booster charge, the fuze is regarded as boresafe. A notch is cut into the top of the rotor from the detonator cavity outward. The point of the firing pin rides this notch while the rotor is in the unarmed position.

The firing pin is made of aluminum alloy and fits into a small cavity in the nose of the fuze. A solid cylindrically shaped firing pin striker made of molded plastic fits into the cavity above the firing pin. The fuze body may be closed at the nose by leaving a thin thickness of the metal as a cover during casting, or by a closing disc.

A1 modifications. The M64A1 Fuze differs from the M64 in the following respects:

The firing pin striker in the M64 is nail-shaped. The M64A1 is a solid cylinder.

The firing pin of the M64 is hollowed out at the head to receive the end of the striker. The firing pin of the M64A1 has a head that contacts the full diameter of the striker.

In the M64 Fuzes, the rotor housing is contained directly in the fuze body. The base is threaded for screwing into the fuze body. The rotor housing for the M64A1 Fuze is contained in a brass sleeve which fits into the fuze body and the base is not threaded. It is held in place by the booster which is screwed in behind it.

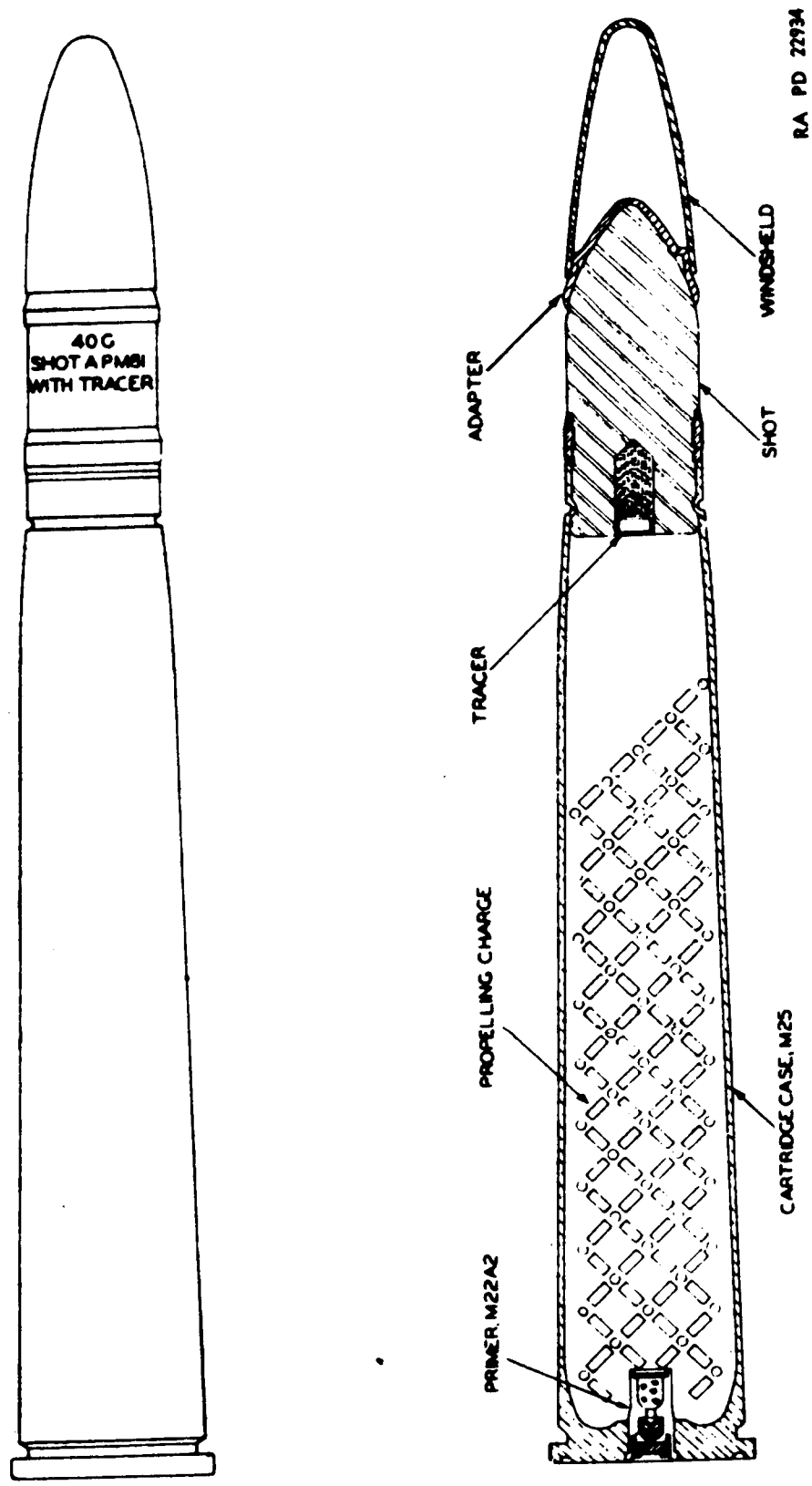
There are other details of manufacture which differ in the two fuzes, but the fundamental differences are those outlined above.

Function. The function of the fuze begins as rotational velocity is imparted to it. Centrifugal force causes the centrifugal pins to move outward, spread the spring wire and free the rotor. The rotor, being eccentrically weighted, rights itself and brings the detonator into position so that the firing pin rests on the detonator just above the priming mixture.

Impact with the target crushes the nose of the fuze and forces the firing pin striker and firing pin inward. When the firing pin penetrates the detonator, the priming mixture explodes and initiates the remainder of the explosive train consisting of the detonator of lead azide and tetryl, the booster lead charge of tetryl, the tetryl booster, and finally the TNT bursting charge of the Mk. II Projectile.

Identification. The complete round is approximately 17.64 inches long and weighs about 4.64 pounds. The length and weight vary

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Figure 148 — Cartridge, AP-T, 40-mm, M81

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slightly with the assembly of different fuzes. The No. 251, D.A., fuze may be recognized by the fact that its body is made up of three parts fitted together with threads. The M64A1 and Mk. 27 are similar in outward appearance but the nomenclature "Mk. 27" is stamped into the body of the Navy fuze. The Mk. 27 also has two notches cut into the body 180 degrees apart to fit a wrench. The Army projectile is painted olive drab and stenciled in yellow. The Navy system of painting is different.

CARTRIDGE, TP-T, T1.

This round was designed to simulate the 40-mm H.E. rounds for target practice. All components except the projectile and fuze are the same as those used in the service round. The projectile is inert except for a tracer in the base and is painted blue with white stencil to indicate practice use. The fuze used is the Dummy M69. This round is standard for issue only.

CARTRIDGE, AP-T, M81.

This complete round was designed for use against armored targets. It is peculiar as an armor-piercing projectile in that it has a windshield but no armor-piercing cap. The M81 is of American design and is standard for issue and manufacture.

Cartridge Cases. The M25 Case is "Standard"; the M25B1 Case is "Substitute Standard."

Propelling Charge. The propelling charge consists of 10.4 ounces of FNH powder held loosely in the cartridge case.

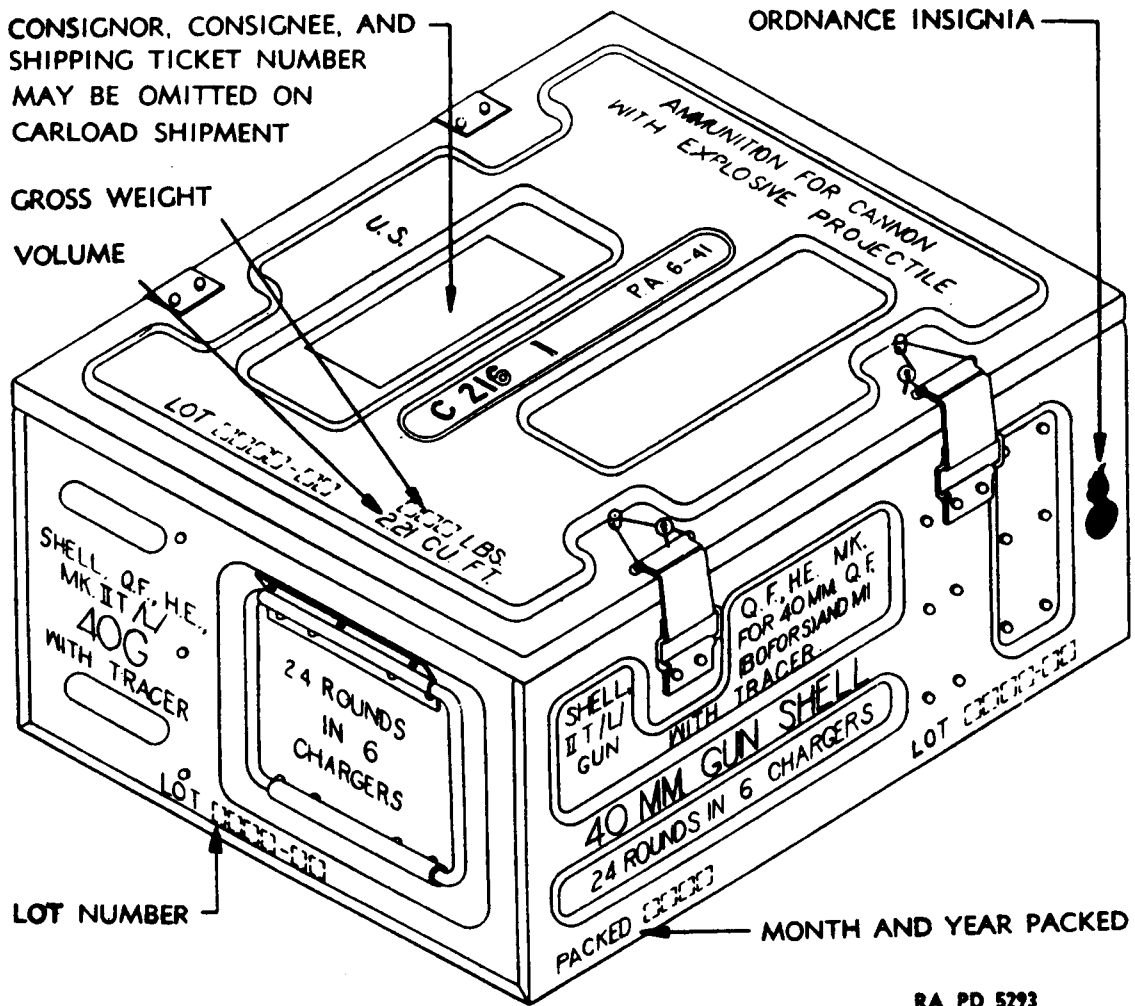
Primer. The M23A2, 20-grain, Percussion Primer is a standard component of the M81 Round. This primer is described in the chapter on 37-mm ammunition.

Projectile. The body of the projectile is machined from bar steel and is hardened to produce armor-piercing qualities. The ogive has a small radius and is continued to a point. A recess for a copper rotating band and a cannelure to receive the cartridge case crimps are machined into the body. The projectile is streamlined by the addition of a windshield which has a rounded nose. The windshield is soldered to a sheet metal adapter which is soldered and crimped to the nose of the body. A cavity is machined into the base of the body to receive the tracer assembly.

The tracer assembly is made up of tracer composition, igniting composition, and a clear celluloid cup. The cup is cemented and press-fit into the base of the projectile.

Identification. The complete round of the M81 Cartridge is 17.62 inches long and weighs 4.535 pounds. It is easily recognized by its

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Figure 149 — Metal Packing Box for 40-mm Ammunition

size and the windshield and windshield adapter. Since it is inert, it is painted black and stenciled in white.

CARTRIDGE, AP-T, M81A1.

Information on the A1 modification of the M81 is not available at this time. Both the M81 and M81A1 Rounds are listed as standard for issue and manufacture.

OTHER SERVICE ROUNDS.

Complete rounds listed in SNL P-5 which are not discussed above and on which no detailed information is available at this time, are as follows:

CARTRIDGE, H.E., Mk. I (Navy), w/FUZE, P.D. Mk. 27

CARTRIDGE, H.E., Mk. I, L & P

CARTRIDGE, H.E., Mk. II, L & P

The term "L & P" in the above nomenclature is an abbreviation for "loaded and plugged."

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PACKING.

CARTRIDGES, H.E.-T (SD), Mk. II; TP-T, T1; AP-T, M81 and AP-T, M81A1 may be packed either 1 round per fiber container, 24 containers (24 rounds) per box or 4 rounds per charger clip, 6 clips (24 rounds) per metal box. When CARTRIDGE, H.E.-T (SD), Mk. II, is fuzed with the Mk. 27 Navy Fuze, it may also be packed 4 rounds per charger clip, 4 clips (16 rounds) per metal box.

CARTRIDGES, H.E., Mk. I, L & P, and H.E., Mk. II, L & P, are packed 1 round per fiber container, 24 containers (24 rounds) per box.

CARTRIDGE, H.E., Mk. I (Navy), is packed 4 rounds per charger clip, 4 clips (16 rounds) per metal box.

FURTHER REFERENCES. OS 9-20; SNL P-5; SNL R-1; Ordnance Drawings.

Chapter 5

Ammunition for 57-mm Guns

GENERAL.

Weapons. The 57-mm Gun M1 is adapted from the British 2.24-inch (6-pounder) Gun Mk. III which has been successfully employed as an antitank weapon. The American gun differs in several respects from the British gun, but the same ammunition may be fired from either weapon. The gun is mounted on a split-trail carriage with rubber-tired wheels for high-speed transport, and is provided with armor-plate shields. The carriage is designed for 1-man control of elevating, traversing, and firing. The M1 Gun was known as the T2 Gun before standardization.

Class and Types. The 57-mm ammunition is of the fixed class. There are only two types of ammunition provided: the armor-piercing and the practice.

Cartridge Cases.

Case, cartridge, M23A2. This case, made of cartridge brass, is "Standard" for all rounds of 57-mm ammunition. The case is very long (17.40 in.), being approximately three-quarters the length of the complete round. It is provided with an extraction flange 0.20 inch thick. A primer seat to receive the M1B1A2 primer is machined into the head. The weight of the M23A2 Cartridge case is 3.9 pounds.

Case, cartridge, M23A2B1. As indicated by the B1 designation in the nomenclature, this case is made of steel. It is "Substitute Standard" for 57-mm ammunition. It differs from the M23A2 in that

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by cutting down a regular service cartridge case. The charge in each type is black powder, but each type uses a different weight charge. The standard for all purposes except firing salutes of international courtesy is a 6-ounce charge. A charge of 6.9 ounces, called a single pellet charge, is provided for use in lieu of the 6-ounce charge. A charge of 1 pound is provided for firing salutes of international courtesy, with a 13.8-ounce double pellet for use as an alternate.

Each round of blank ammunition is packed in an individual fiber container, and 10 rounds are packed in a wooden packing box.

In general, Blank Ammunition M10 for the 3-inch field gun is similar to the blank rounds discussed in connection with the 3-inch AA ammunition.

FURTHER REFERENCES: Complete Round Chart No. 5981; OS 9-20; OS 9-18; TR 1360-3A, 1370-A; OS 9-48.

Chapter 9

Ammunition for 90-mm Guns

GENERAL.

One of the most effective AA weapons used by the various arms today, is the 90-mm Gun M1. It is fired from a self-propelled mount as well as from the more common mobile mount. The self-propelled mount is used as a tank destroyer, and is moved about on half or full tracks by its own power. The mobile mount which can be used against tanks and aircraft is a towed carriage.

Types of ammunition provided for the 90-mm Gun M1 are:

- High-explosive
- Projectile, A.P.C.
- Shot, A.P.
- Practice
- Drill

Fuzes. All fuzes used with complete rounds of 90-mm ammunition have been previously discussed.

P.D., M48, and M48A1, selective, time and super quick—Fully discussed with 75-mm gun ammunition.

B.D., M68—Identical in all respects to the FUZE, B.D., M66A1, discussed with 75-mm gun ammunition, except for the fact that the body of the M68 is larger.

Mechanical Time M43 (all modifications)—Fully discussed in the chapter dealing with 3-inch AA ammunition.

Boosters. All boosters are of the M20-series (M20, M20A1, etc.).

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Cartridge Case. The case used on all 90-mm ammunition is the M19 or M19B1 (steel). This case is usually of drawn brass, and is about $23\frac{5}{8}$ inches long. The case has an extracting flange on the head which acts to stop the round when it is loaded into the weapon, and also to eject the case after firing. The metal near the mouth of the case is comparatively thin and soft, so that the pressure of the propelling charge gases expands it tightly against the walls of the chamber, thus preventing the leakage of any gases past the cartridge case.

Propelling Charge. The propellant charge for 90-mm ammunition consists of approximately 7 pounds of NH smokeless powder poured loosely in the cartridge case.

Primer. The primer used in all complete rounds is the M28-series of 300-grain percussion type of cannon primer.

SHELL, FIXED, PRACTICE, M58.

General. This complete round was originally developed as the High-explosive Round M58. Due to the thin body walls, prematures resulted. As a result, the filler was washed out and a substitute filler of sand and a black powder spotting charge was substituted. The round, thus, has been designated a practice round.

Projectile. The projectile is of steel construction. It is streamlined, with a boat-tail base. The fuze continues the exterior streamline of the projectile. The shell has a steel base plate welded to its base.

Components. A complete round of M58 Practice Ammunition consists of the following: An M58 Projectile with 2.11 pounds of inert filler and 0.56 pound black powder spotting charge in pellet form; an M20 Booster and an M43A2 Fuze; and an M19 Cartridge Case with a propellant charge of NH smokeless powder.

Guns. This complete round is fired from all models of the M1 Guns.

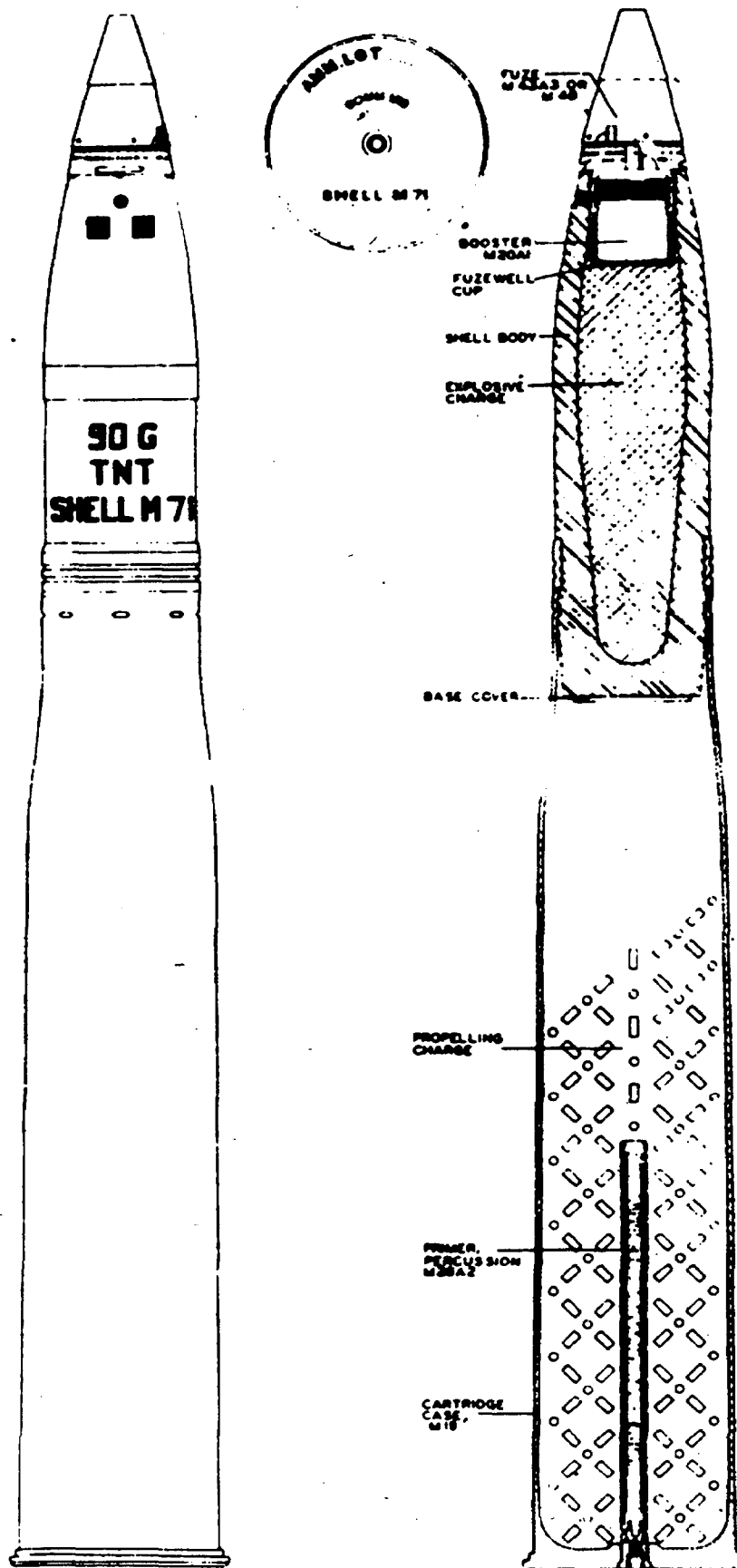
SHELL, FIXED, H.E., M71.

General. The M71 Shell was developed to replace the M58. The walls are made thicker to overcome the prematuring factor. In all other respects (outwardly) the shell is identical to the M58.

Projectile. The M71 Shell is streamlined, with a boat-tail base and a steel base plate. The fuze continues the streamline of the projectile. It is of forged steel construction.

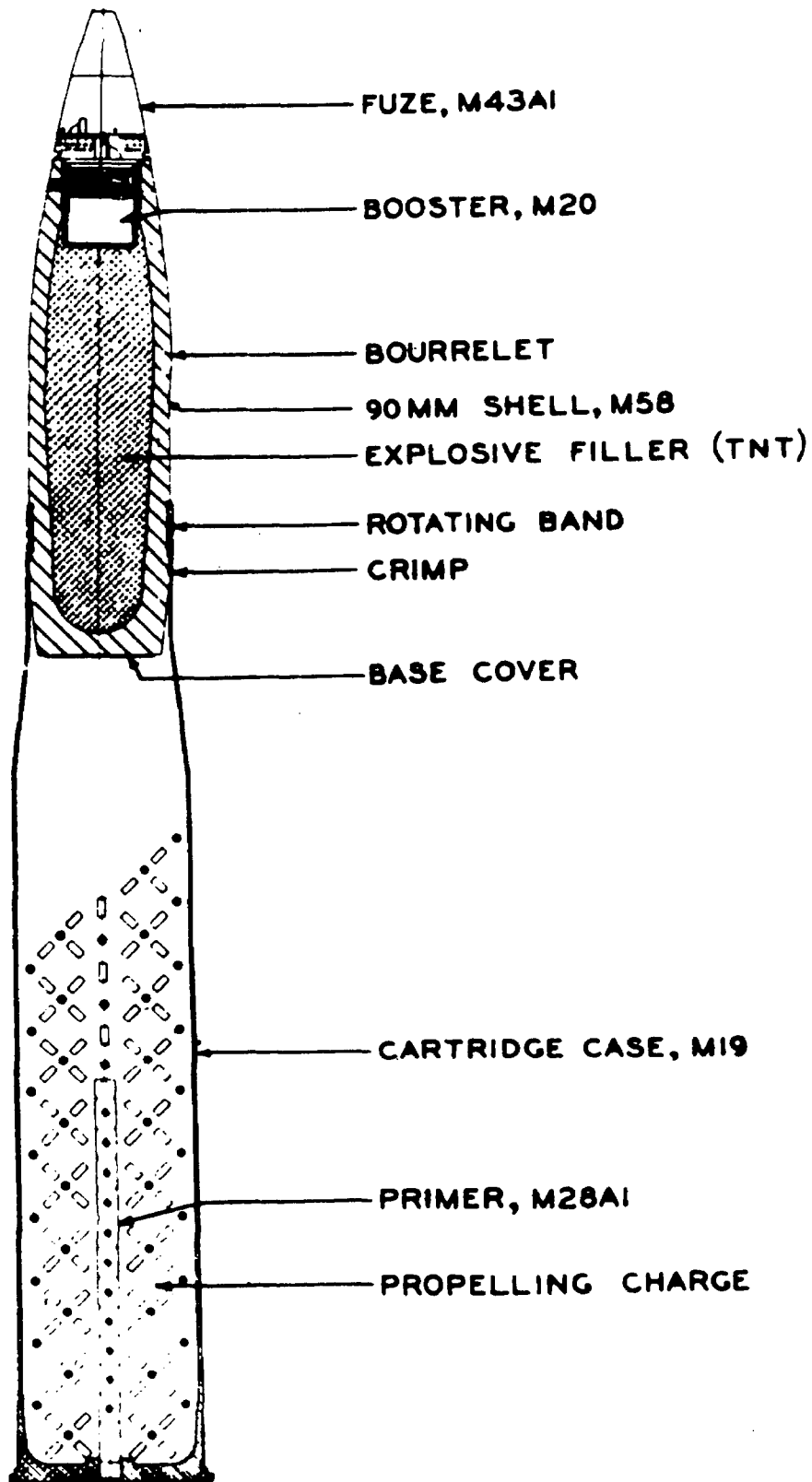
Components. The filler for this round is 2.04 pounds of cast TNT, which is detonated by the M20A1 Booster used in conjunction with the M43-series mechanical time fuze for AA work, and the P.D. M48 or M48A1 for firing against ground targets. The loaded and fuzed projectile is assembled to an M19 Cartridge Case containing approxi-

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Figure 184 — SHELL, H.E., 90-mm, M71

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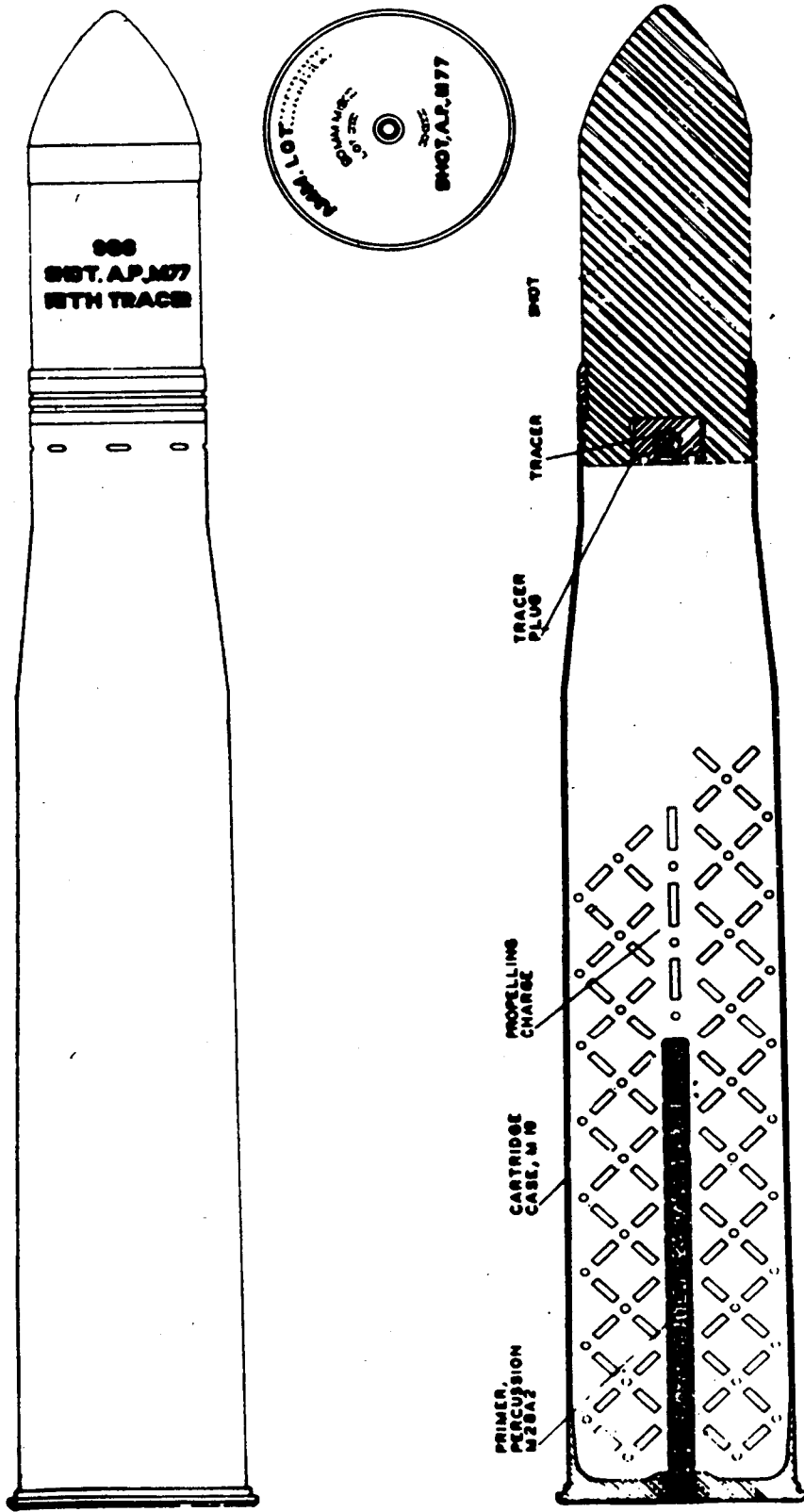


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Figure 185 — SHELL, H.E., 90-mm, M58

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Figure 186 — SHOT, A.P., 90-mm, M77

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mately 7 pounds of loose NH smokeless powder and an M28A1 or A2 Primer.

Gun. This round is fired from the 90-mm AA or AT Gun M1.

SHELL, FIXED, H.E., M58 (AMMANOL).

General. This round of ammunition was developed largely for testing purposes. It is identical in every way to the SHELL, H.E., M71, except for filler which consists of TNT, ammonium nitrate, and flaked aluminum. The aluminum gives a brilliant flash when the shell functions, and produces an incendiary effect against inflammable targets.

SHOT, FIXED, A.P., M77.

General. As the 90-mm Gun M1 can be used either against aircraft or tanks, the ammunition is adapted to both targets. The Shot M77 is provided for antitank use.

Projectile. The projectile consists of a heat-treated solid steel shot with no provision made for booster or fuze.

Components. The complete round consists of a SHOT, A.P., M77, firmly attached to an M19 Cartridge Case containing NH smokeless powder (approx. 7 lb) and an M28A1 or A2 Primer.

Gun. The 90-mm Gun M1 fires this round against tanks.

PROJECTILE, FIXED, A.P.C., M82.

General. This round is the more effective of the two armor-piercing rounds provided for the 90-mm gun when used against tanks.

Projectile. This round is the same as other A.P.C. rounds previously discussed, in that it has the heat-treated solid steel shot with an A.P. cap sweated on, and a false ogive or windshield screwed to this cap. Provisions are made for an explosive filler and base-detonating fuze.

Components. The complete round consists of the A.P.C. Projectile M82, with an explosive D filler and a B.D. Fuze M68. The M68 is similar to the B.D. M66, the only difference being in size. The M68 is larger than the M66. The fuze has a tracer composition in a boat-tail shaped portion that protrudes from the base of the projectile. The loaded and fuzed projectile is firmly crimped to the M19 Cartridge Case with its NH smokeless powder propellant and the M28A1 or A2 Primer.

Gun. This round is issued for firing in the M1 Gun when used against tanks.

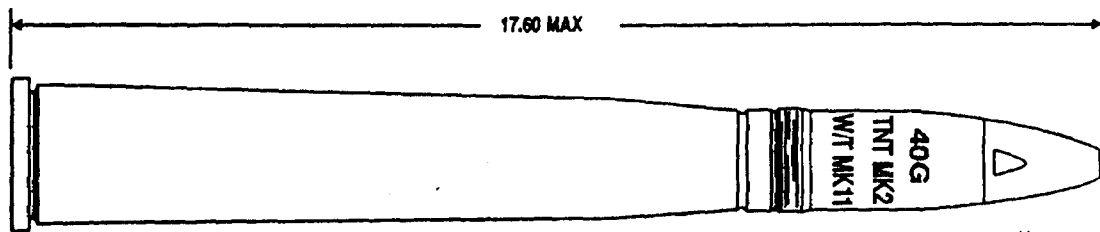
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COMPLETE ROUNDS FOR 90-MM GUNS

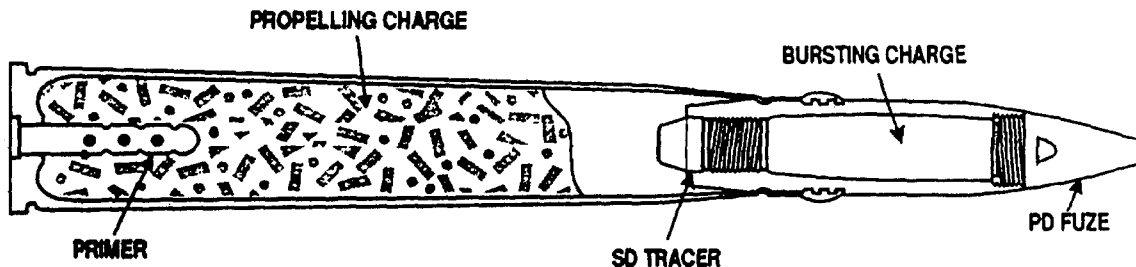
Complete Round	Status	Projectile	Filler	Fuze	Booster	Cartridge Case	Primer
Shell, Prac., M58	S	M58	Sand	Inert M43A2	Inert M20	M19	M28A1
Shell, H.E., M71	S&M	M71	TNT	M43A2 M48 M48A1	M20A1	M19	M28A1
Shell, H.E., M58	S	M71	Ammonal	M43	M20A1	M19	M28A1
Shot, A.P., M77	S&M	M77	M19	M28A1
Projectile, A.P.C., M82	S&M	M82	Exp. "D"	M68	M19	M28A1
Cartridge, Drill, M12	S&M	Cast Bronze	M44A2 Dummy	Cast Bronze	Inert

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CARTRIDGE, 40 MILLIMETER: HE-T, SD, MK11, MK2, MV2870 AND SD, M3 OR M3A1, MV2700



U
AR 199877



U
AR 199876

Type Classification:

STD OTCM 36841 dtd 1958 (MK2 only, CON MSR 11756003).

Use:

This cartridge is used in 40mm gun cannons for firing against materiel.

Description:

The thin-walled projectile contains a TNT bursting charge, a point-detonating fuze, and a self-destroying tracer. The projectile nose is internally threaded to receive the fuze. The boat-tailed base has a self-destroying tracer assembly threaded internally. The assembly, protruding approximately 0.6 inch from the base, contains an igniting charge, a tracer composition, and a relay igniting charge of black powder. The projectile is assembled with either a brass or steel cartridge case containing a percussion primer that is crimped to the projectile by means of a 360° crimp. This cartridge provides a muzzle velocity of 2,870 feet per second.

Functioning:

When the percussion primer is struck by the firing pin of the weapon, the black powder in the primer tube is ignited. Sparks from the black powder ignite the propellant, which, in turn, imparts velocity to the projectile and ignites the tracer. The high-explosive bursting charge is detonated by either the fuze functioning or the tracer relay igniting charge, depending upon whether contact with a target or the burning out of the tracer occurs first. The tracer composition burns with a visible trace for 8 to 10 seconds.

Difference Between Models:

The MV2700 is similar except the tracer is M3 or M3A1 and the projectile is loaded with tetryl.

Tabulated Data:

Complete round:	
Type.....	HE-T, SD
Weight.....	4.75 lb
Length.....	17.6 in.

Complete round (cont):

Cannon used with ----- M1 series, M2 series or MK1 (Navy)

Projectile:
 Body material ----- Steel
 Color:
 Army mfg ----- Olive drab w/yellow markings
 Navy mfg ----- Green w/white markings and green tip fuze

Filler and weight ----- TNT or Tetryl, 0.14 lb

Components:
 Cartridge case ----- M25, M25B1
 Propelling charge ----- M1 propellant, 0.72 lb
 Primer ----- M38, M38B2 or MK22
 Tracer ----- MK11, MK11 Mod 2, M3, M3A1-Red
 Bursting charge ----- Pressed TNT
 Fuze ----- PD-MK27 (M3 or M3A1) M27, M71 (MK11, MK11 Mod 2)

Performance:
 Maximum range ----- SD, MK2 (2870 fps): 4300 yd (tracer burn-out); SD, MK2 (2700 fps): 5700 yd (tracer burn-out)

Temperature limits:
 Firing:
 Lower limit ----- -40°F
 Upper limit ----- +125°F
 Storage:
 Lower limit ----- -80°F (for period not more an 3 days)

Upper limit ----- +160°F (for period not more than 4 hr/day)

*Packing (Navy) ----- 4 cartridges per charger clip; 4 clips (16 cartridges) per metal box

*Packing box (Navy):
 Weight ----- 110 lb
 Dimensions ----- 22 x 11-3/4 x 11-3/4 in.
 Cube ----- 1.7 cu ft

*Packing (Army) ----- 1 round per fiber container; 8 containers per wooden box

*Packing box (Army):
 Weight ----- 59 lb
 Dimensions ----- 21-11/15 x 12-9/16 x 7-31/32 in.
 Cube ----- 1.3 cu ft

* NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

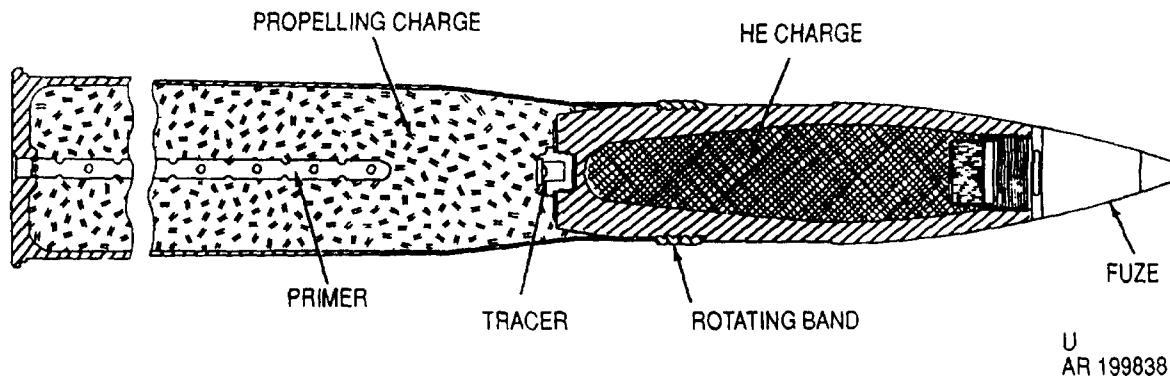
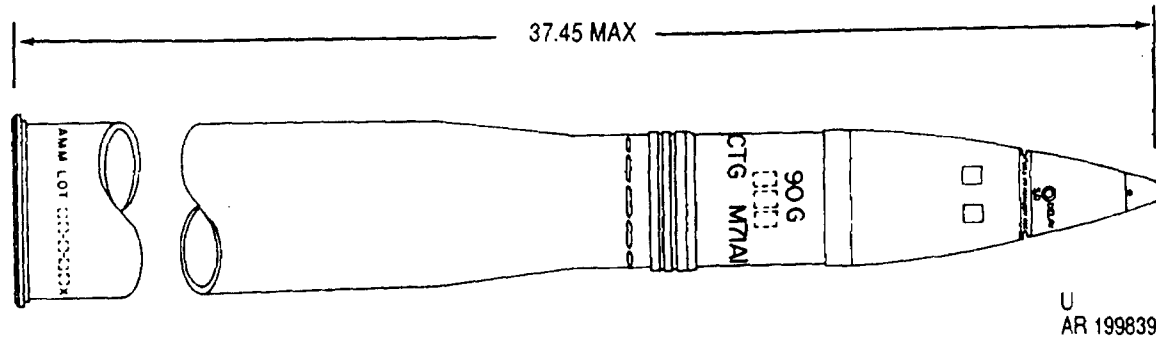
UNO serial number ----- 0321
 Quantity-distance class ----- (08) 1.2
 Storage compatibility group --- E
 DOT shipping class ----- A
 DOT designation ----- AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILES

DODAC ----- 1310-B562
 Drawing number ----- 75-1-166

References:

AMC-P 700-3-3
 SB 700-20
 TM 9-1300-251-20

CARTRIDGE, 90 MILLIMETER: HE-T, M71A1, AND HE, M71



Type Classification:

STD OTCM 37436 dtd 1960 (M71A1).
CON MSR 11756003 (M71).

Use:

This cartridge is used in 90mm guns against personnel and materiel, producing blast and fragmentation at the target.

Description:

The hollow steel forged projectile has a boat-tailed base and a streamlined ogive. Fuze cavity may be a normal or a deep cavity type. The projectile is loaded with 2.15 pounds (1.68 lb, deep cavity) of Composition B or TNT. A tracer is threaded into the projectile base (M71A1). A point-detonating fuze is assembled

to the projectile. Loaded projectile weights fall into one of three weight zones.

Functioning:

When the weapon is fired, the burning propellant ignites the tracer and creates gases which propel the projectile out of the gun tube. The tracer burns for a minimum of three seconds. Upon impact, the fuze functions on superquick or delay, as preset, and detonates the high-explosive filler producing blast and fragmentation.

Difference Between Models:

M71A1 has a tracer; M71 does not. M71A1 has M1 propellant resulting in lower velocity; M71 has M6 or M15 propellant.

Tabulated Data:

Complete round:

	<u>M71A1</u>	<u>M71</u>
Type-----	HE-T	HE
Weight-----	38.8-39.54 lb	41.19-41.93 lb
Length-----		37.46 in.
Cannon used with -----		M36, M41 or M54

Projectile:

Body material -----	Steel
Color -----	Olive drab w/yellow marking
Filler and weight -----	Comp B, 2.15 lb

Component:

Cartridge case-----	M19, M19B1
Propelling charge -----	M1, 5.33 lb (M71A1); M6 or M15, 7.31 lb (M71)
Primer-----	M28B2, M28A2
Tracer -----	XM10 (M71A1)
Fuze-----	PD, M51A5, M557; MTSQ, M520 Series, M564

Performance:

Maximum range-----	15,800 m (17,300 yd) (M71A1); 17,800 m (19,475 yd) (M71)
Muzzle velocity -----	730 mps (2400 fps) (M71A1); 823 mps (2700 fps) (M71)

Temperature limits:

Firing:	
Lower limit-----	-40°F
Upper limit-----	+125°F

Storage:

Lower limit----- -80°F (for period not more than 3 days)

Upper limit----- +160°F (for period not more than 4 hr/day)

*Packing----- 1 round per fiber container; 2 containers per wooden box

*Packing box:

Weight----- 132 lb
 Dimensions ----- 43-5/8 x 13 x 8-5/32 in.
 Cube ----- 2.69 cu ft

* NOTE: See DOD Consolidated Ammunition Catalog for complete packing data including NSN's.

Shipping and Storage Data:

UNO serial number -----	0321
Quantity-distance class -----	(12) 1.2
Storage compatibility group---	E
DOT shipping class -----	A
DOT designation-----	AMMUNITION FOR CANNON WITH EXPLOSIVE PROJECTILE
DODAC -----	1315-C280 (M71A1); 1315-C265 (M71); 1315-C266 (M71); 1315-C267 (M71)
Drawing number-----	8849017-1 (M71A1); 75-1-157 (M71)

References:

AMC-P 700-3-3
 SB 700-20
 TM 9-1300-251-20

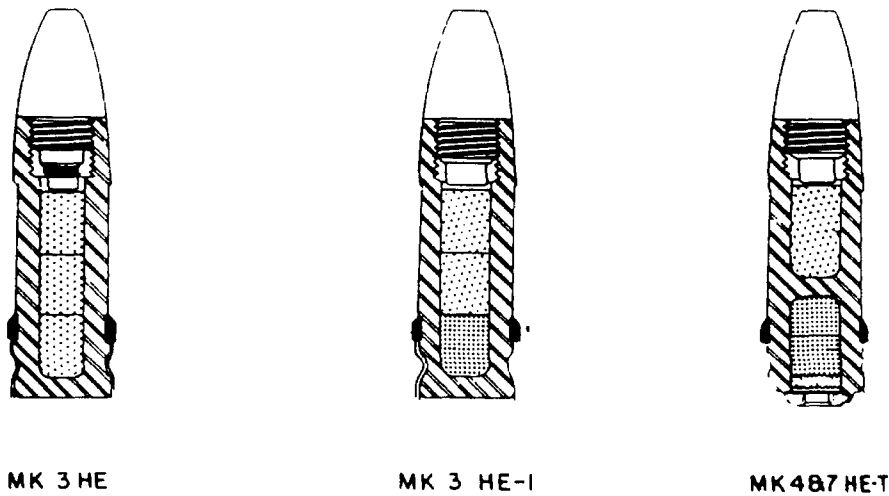
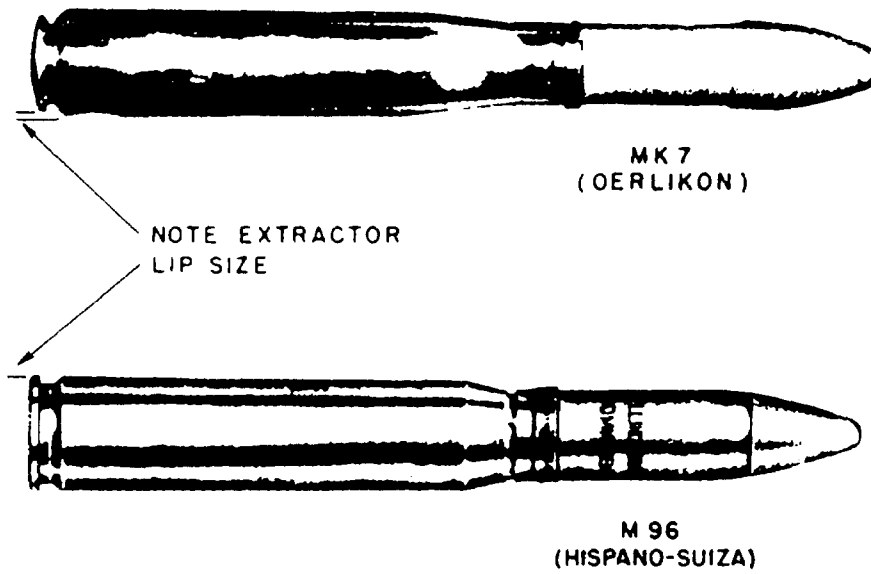


Figure 75 (Part 1). 20-mm Projectiles

This round is also issued B.L. & P., with an inert filler and a dummy nose cap.

Identification—marking and painting

Type	Color
H.E. (Tetryl)	White
H.E. (Pentolite)	Yellow
H.E.-I. (Tetryl)	Red
H.E.-I. (Pentolite)	Light pink

B.L. & P. Dark gray green
 The many modification numbers are to distinguish between products from different contracts.

20-mm A.A. H.E.-T. and B.L. & T. Mk 4
 Mods 1—28 and Mk 7

(May have Dark Ignition tracers.)
 Over-all length, inches 3.025

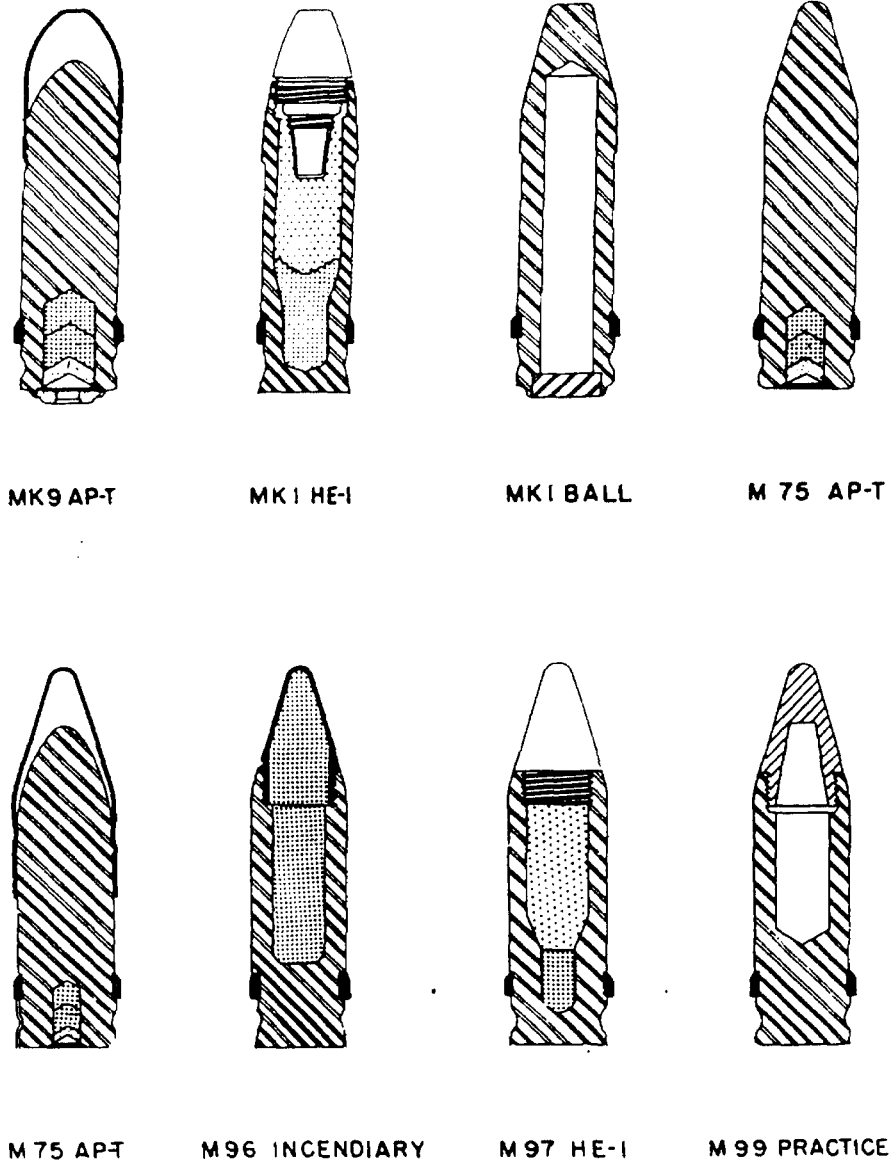


Figure 75 (Part 2). 20-mm Projectiles, continued

Without nose fuze 2.525
 Diameter of base, inch 0.74
 Distance base to band, inches 0.397
 Width of band, inch 0.16
 Diameter at bourrelet, inch 0.78
 Filling Tetryl or Pentolite
 Weight of filling, pounds
 H.E.: 0.01 lb.
 Tracer: 0.0173 lb.

Weight of loaded projectile, pound 0.2621
 Cartridge Case Mk 2
 Primer Mk 30
 Tracer Integral
 Fuzes
 Nose Projectile Mk 4—
 Mk 26 Mods 0 or 2
 Projectile Mk 7—
 Mk 26 Mods 0 or 1

Length of tracer cavity, inches 1.107
 Diameter of tracer cavity, inches 0.51
 To eliminate the blinding flash characteristic of standard 20-mm tracers fired at night, a special Dark Ignition tracer has been developed which does not light up until about 100 yards from the gun muzzle. Rounds are designated "H.E.-T.-D.I." Over-all burning time of this trace is four seconds; during the "dark" period there is a faint streaking in the projectile's path.

The Mk 4 and Mk 7 rounds are identical except for the dimensions of the tracer cavity, which is slightly greater in diameter and length in the Mk 4 than in the Mk 7. This somewhat reduces the tracer filling of the Mk 7.

The Mk 7 round is also issued B.L. & T. with an inert filler in the H.E. cavity and a dummy nose plug. The tracer cavity contains the standard tracer mixture.

The burster charge of the 20-mm is more sensitive than the usual projectile burster charge. Accordingly, greater caution should be observed in handling.

The tracer element in these projectiles is loaded in two increments. First increment is the tracer composition, which is pressed in the after compartment by hydraulic pressure; the second increment is the "starter" mixture, which is pressed in on top of the tracer composition and is more sensitive than the latter. When the projectile is fired, the heat from the propellant charge ignites the starter which, in turn, sets off the tracer composition.

Identification—marking and painting

TYPE	COLOR
*H.E.-T. (Tetryl)	Light gray
*H.E.-T. (Pentolite)	Blue
B.L. & T.	Dark gray green, with 1/4-inch yellow band

20-mm A.P.-T. Mk 9

Over-all length, inches	
With cap & windshield	3.051
Without cap & windshield	2.449

*When assembled with Dark Ignition tracers, a 1/4-inch bright red band will be painted around the projectile midway between the bourrelet and the rotating band.

Diameter of base, inch	0.742
Distance base to band, inch	0.315
Width of band, inch	0.154
Diameter at bourrelet, inch	0.784
Weight of loaded projectile, pound	0.2686
Cartridge Case	Mks 3 and 4
Primer	Mk 31
Tracer	Integral

20-mm A/C A.P.-T. M95 (New Series)

Over-all length, inches	
With cap & windshield	3.27
Without cap & windshield	2.40
Diameter of base, inch	0.76
Distance base to band, inch	0.39
Width of band, inch	0.203
Diameter at bourrelet, inch	0.78
Weight of loaded projectile, pound	0.29
Cartridge Case	M21A1
Primer	M36A1
Tracer	Integral

The tracer is red in color and burns for a period of about 2.25 seconds, equivalent to a range of about 1,400 yards. This round is superseding the A.P.-T. M75 round of the Old Series.

20-mm A/C Incendiary M96 (New Series)

Over-all length, inches	
With nose cap	3.245
Without nose cap	2.30
Diameter of base, inch	0.76
Distance base to band, inch	0.39
Width of band, inch	0.203
Diameter at bourrelet, inch	0.78
Filling	Incendiary Mixture
Weight of filling, pound	0.020
Weight of loaded projectile, pound	0.27
Cartridge Case	M21A1
Primer	M36A1

The incendiary mixture fills both the nose cap and the projectile body. No fuze is required, since the functioning is initiated by impact of the nose with the target.

20-mm A/C H.E.-I. M97 (New Series)

Over-all length, inches	
With nose fuze	3.28
Without nose fuze	2.44
Diameter of base, inch	0.76

Distance base to band, inch.....	0.39
Width of band, inch.....	0.203
Diameter at bourrelet, inch.....	0.78
Filling.....	Tetryl and Incendiary Mix
Weight of filling, pound.....	0.017
Weight of loaded projectile, pound.....	0.29
Cartridge Case.....	M21A1
Primer.....	M36A1
Fuzes.....	Nose—M75

This round is superseding the H.E.-I. Mk 1 round of the Old Series.

20-mm A/C Practice M99 (New Series)

Over-all length, inches	
With nose cap.....	3.27
Without nose cap.....	2.30
Diameter of base, inch.....	0.76
Distance base to band, inch.....	0.39
Width of band, inch.....	0.203
Diameter at bourrelet, inch.....	0.78
Filling.....	None
Weight of loaded projectile, pound.....	0.29
Cartridge Case ..	M21A1
Primer.....	M36A1

This round is superseding the Ball Mk 1 round of the Old Series.

20-mm A/C H.E.-I. Mk 1 (Old Series)

Over-all length, inches.....	3.22
Diameter of base, inch.....	0.770
Distance base to band, inch.....	0.50
Width of band, inch.....	0.203
Diameter at bourrelet, inch.....	0.784
Filling.....	Tetryl and Incendiary Mix
Weight of filling, pound.....	0.025
Weight of loaded projectile, pound.....	0.290
Cartridge Case.....	M21A1
Primer.....	M36
Fuzes.....	No. 253 Mk 1

This round is to be superseded by the H.E.-I. M97 round of the new ballistically matched

series. The H.E.-I. Mk 1 round is to be classified unserviceable by Naval activities as soon as replacement allowances or stocks of the M97 round are received.

20-mm A/C Ball Mk 1 (Old Series)

Over-all length, inches.....	3.31
Diameter of base, inch.....	0.770
Distance base to band, inch.....	0.50
Width of band, inch.....	0.203
Diameter at bourrelet, inch.....	0.784
Filling.....	None
Weight of loaded projectile, pound.....	0.28
Cartridge Case.....	M21A1
Primer.....	M36

This round is to be superseded by the practice round M99 of the new ballistically matched series. The Ball Mk 1 round is to be classified unserviceable by Naval activities as soon as replacement allowances or stocks of the M97 round are received.

20-mm A/C A.P.-T. M75 (Old Series)

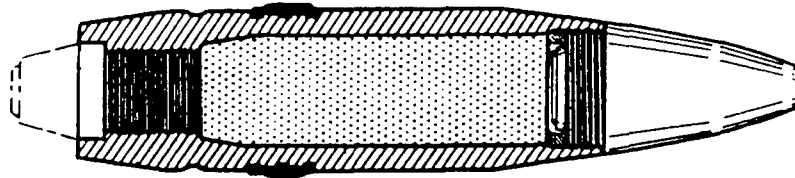
Over-all length, inches.....	3.25
Diameter of base, inch.....	0.770
Distance base to band, inch.....	0.5
Width of band, inch.....	0.203
Diameter at bourrelet, inch.....	0.784
Filling.....	None
Weight of loaded projectile, pound.....	0.370
Cartridge Case.....	M21A1
Primer.....	M36
Tracer.....	Integral

The tracer is red in color and burns for about four seconds, equivalent to a range of about 3,000 yards.

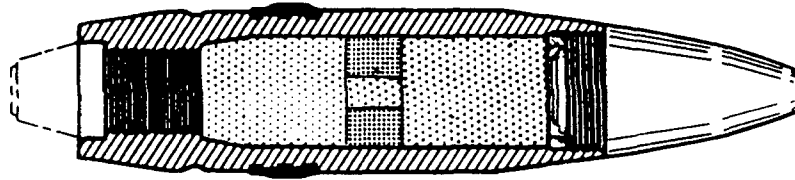
This round is to be superseded by the A.P.-T. M95 round of the new ballistically matched series. The A.P.-T. M75 round is to be classified unserviceable by Naval activities as soon as replacement allowances or stocks of the M95 round are received.

Part I — Chapter I — Section 12

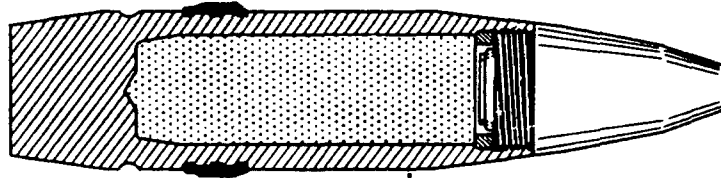
40-mm PROJECTILES



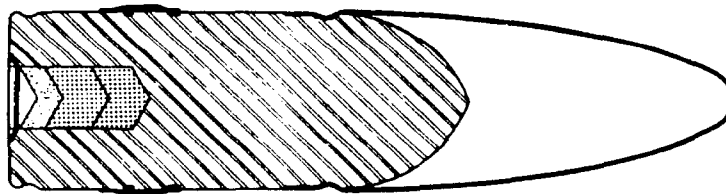
MK 2 HE



MK 2 HE-I



MK 3 HE & HE-I



M 81 A1

Figure 76. 40-mm Projectiles

40mm A.A. H.E.-I. (a) Mk 1 Mods 1—24 and (b) Mk 2 Mods 1—35

(May have "Dark" or "Dark Ignition" tracer.)

Over-all length, inches	
With nose fuze	7.1
Without nose fuze	5.2
Diameter of base, inches	1.3
Distance base to band, inches	(a) 1.675
	(b) 1.730
Width of band, inch	0.6
Diameter at bourrelet, inches	1.57
Filling . . . H.E.: Cast TNT	
H.E.-I.: Cast TNT and Incendiary	
Weight of filling, pound	(a) 0.148
	(b) 0.150
Weight of loaded projectile, pounds	1.985
Charge/weight ratio	5.0%
Cartridge Case	Mk 1, Mk 2, Mk 3

Primer	Mk 21 Mods 2 and 3; Mk 22 Mods 0 and 1
Tracer	Mk 10, Mk 11
Fuzes	Nose—Mk 27 Mods 0 and 1
	See Tracer Mk 11 for "Dark" and "Dark Ignition" developments.

The Mk 1 and the Mk 2 projectiles are both loaded H.E. in three increments. The Mk 2 may also be loaded H.E.-I. with the central increment an incendiary composition. The Mk 2 H.E.-I. round may be issued plugged instead of tracered. Both projectile bodies may be issued B.L. & P. or B.L. & T. for target practice or de-icing.

Tracer Mk 10 has been declared unserviceable and is being replaced by the Tracer Mk 11 in all assemblies.

The 24 Mods of Mk 1 and the 35 Mods of Mk 2 are merely bookkeeping designations.

Identification—Marking and Painting

TYPE	BODY	COLOR BAND	TIP	REMARKS
H.E.-P.	Green	Green	Green	Plug in tracer
H.E.-T./S.D.	Green	White	Green	
E./S.D.	Green	Black	Green	Non-luminous tracer
H.E.-I.-T./S.D.	Green	White	Red	
H.E.-I.-P.	Green	Red	Red	Plug in base
H.E.-I./S.D.	Green	Black	Red	Non-luminous tracer
H.E.-I.-T.	Green	White	Red	S.D. relay not loaded
	with black band			
B.L. & T.	Red	White	Red	Dummy fuze
B.L. & P.	Red	Red	Red	Dummy fuze and plug in base

40-mm Mk 3

Except for some minor differences in dimensions, the main difference between the Mk 3 projectile and the Mks 1 and 2 is that there is no hole in the base of the Mk 3 for a tracer or plug. This design was developed when the tactical need for non-trace ammunition arose; but with the appearance of "Dark" tracers, the Mk 3 projectile's original purpose was eliminated.

Diameter of base, inches	1.55
Distance base to band, inch	0.803
Width of band, inch	0.64
Diameter at bourrelet, inches	1.55
Weight of loaded projectile, pounds	1.96
Cartridge Case	Mk 1, Mk 2, Mk 3
Primer	Mk 21, Mk 22
Tracer	Integral
Fuzes	None

This projectile is an Army design manufactured for the Navy to Naval specifications.

The A.P. round has a plug in the tracer cavity; the A.P.-T. has a red tracer.

40-mm A.A. M81A1 A.P. and A.P.-T.

Over-all length, inches	6.19
-----------------------------------	------

The 2.25 sub-caliber rocket for aircraft use was developed for training purposes. Initially two types were designed to approximate the trajectory of both the 375 and 570 rockets; however, it is believed that only one rocket will be standardized for future use. The rocket with Motor Mk 11 and the body Mk 3 Mod 2 is the assembly which probably will be used in future training.

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

U. S. NAVY

2.25" ROCKET

SUB-CALIBER, AIRCRAFT

Motor	Body	Velocity	Approximates Trajectory of:
2725 Mk 10 or 11	2725 Mk 1 or 3 (1.6 lbs.)	1150 ft/sec	375 Rocket (3725 Motor)
2725 Mk 12 or 13	2725 Mk 1 or 3 (1.6 lbs.)	810 ft/sec	570 Rocket (3725 Motor)
2725 Mk 10 or 11	2725 Mk 2 (8.6 lbs.)	310 ft/sec	570 Rocket (3725 Motor)

The 2725 Motor Mark 10 and 11 are similar to each other as are the 2725 Motor Mark 12 and 13. The Motors Mark 10 and 11 differ from the Mark 12 and 13 in that the diameter of the nozzle on the latter are smaller and the weight of propellant of the Mark 10 and 11 is 1.75 lbs. as compared to the weight of 1.12 lbs. in the Mark 12 and 13.

The external dimensions of these rockets are the same. For recognition purposes, the 2725 motors Mark 10 and 11 are painted white with black fins while the Motors Mark 12 and 13 are grey with black fins.

MOTOR MK 11 AND BODY MK 2 MOD 3

Overall 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 aft end of the motor tube and are not removable as is the case with most service rockets.

The 2725 motor Mark 11 contains essentially the following parts:

- (1) Propellant. The propellant is an extruded cylindrical grain of ballistite weighing approximately 1-3/4 pounds. Inhibitor discs cemented to the ends of the grain control the burning area.
- (2) Igniter. A 14 gram black powder igniter in a plastic case is located at the forward end of the motor. This igniter is set off by an electrical squib.
- (3) Grid. The grid supports the propellant grain. During burning it prevents the grain from sliding rearward and clogging the nozzle opening.
- (4) Nozzle. The nozzle is a steel venturi through which the gases flow. It directs the gas jet in the desired direction and also provides for the expansion of the gases in the exit cone.
- (5) Nozzle Closure. The nozzle closure seals the rear end of the motor. It is crimped to the electrical pigtail, providing a moisture proof seal.
- (6) Pigtail. The electrical pigtail extends from the nozzle end and is the same design as that used in service rockets.

When the body is screwed to the motor in assembly, a luting compound (white or red lead) is used to effect a tight seal between the two parts.

LAUNCHERS

Rocket launcher Mark 6 is actually an adapter for accommodating the relatively short 2725 sub-caliber rocket to the Mark 5 Mod 1 zero length launcher. The rocket launcher Mark 6 is placed on the Mark 5 Mod 1 zero length launcher in the same manner as a standard service round would be installed.

The 2725 sub-caliber rocket is inserted in the rail slot of the Mark 6 launcher and is secured by a snear wire (#19 gauge soft copper) which is inserted through a latch arrangement.

Another type adapter known as the Mark 6 Mod 1 consists essentially of a rocket launcher Mark 6 with a special attachment for use on the Grumann type zero length launcher.

The sub-caliber 2725 Rocket will fit the rail type, 70 inch Rocket Launcher Mark 4 directly without the use of an adapter.

2"25 ROCKET (SUB-CALIBER, AIRCRAFT)

MOUNTED ON MK.6 TYPE ROCKET LAUNCHER

NOTE { THE MK.6 LAUNCHER IS FITTED TO MK.5,MOD.1
ZERO LENGTH LAUNCHER IN SAME MANNER AS
SERVICE ROUND.

MK.5,MOD.1 LAUNCHER

MK.6 LAUNCHER

20

U. S. NAVY

ROCKET TARGETS DRIFT SIGNAL ROCKETS

ROCKET TARGET: (RT)

As a target for anti-aircraft gunners, the rocket target is projected into the air with speeds and courses approximating those of an aircraft in flight and attack. It consists essentially of a rocket propulsive unit to which are attached large stabilizing fins, arranged for maximum visibility.

The rocket targets are referred to by their Mark number (old designation) or by their assembly number (new designation) as indicated below. They all consist of a simple rocket motor with three large fins which consist of wooden frames and light weight fibre board. The fins are 120 degrees apart, each attached by two lugs.

Designation	Approx. Initial	Approx. Range	Approx. Max. Elevation	3725 Motor	Fin	Flare
Mk Assembly No.	Velocity (m.p.h.)	(Q.A.45°) Ft.	(Q.A.45°) Ft.	Mark No.	Mark No.	Mk No.
1 3725 RT001	425			Mk 8	Mk 1	Flare
1 3725 RT002	425			Mk 8	Mk 1	None
2 3725 RT003	300			Mk 9	Mk 1	Flare
2 3725 RT004	300			Mk 9	Mk 1	None
3 3725 RT005	425	4500	1600	Mk 10 Mod 0	Mk 2 Mod 0	Mk 1 All Mods
3 3725 RT006	425	5000	1750	Mk 10 Mod 0	Mk 2 Mod 0	None
4 3725 RT007	300	3100	950	Mk 11 Mod 0	Mk 2 Mod 0	Mk 1 All Mods
4 3725 RT008	300	3400	1050	Mk 11 Mod 0	Mk 2 Mod 0	None

(a) The Mk 1 and 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. 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.

(b) The Mks 3 and 4 differ from Mks 1 and 2 in construction details: 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.

DRIFT SIGNAL ROCKETS:

Four 370 drift signal service rockets for retro-firing have been developed. All of these rockets use the 1725 motor and have a total weight of 4.5 to 4.8 pounds. The firing of the motor of the drift signal rocket initiates a delay train in the signal which initiates the flare some 10 to 20 seconds later. The motor separates from the signal during the free fall and the signal floats in water, burning for 10 to 15 minutes. They are launched from the aircraft launcher Mk 2.

Rockets, Signal, Night, Drift—Complete Round Assemblies

Complete rounds			Head				Motor						
Assembly Number	Num. Wt. Lbs.	Num. Val. Ft./Sec.	As-Mk.	Mod.	Assembly Dwg. No.	Size in.	Mk.	Type of Elec. Plug	Lead-in Assembly Dwg. No.	Case Mk.	Wt. Lbs.	Lettering	pre-firing Assn. Ltr. No.
PY001	4.8	300	5	1	344551	1.25	2	'EH	375036	4	.3	EMAB	
PY002	4.6	300	5	1	344551	1.25	3	'EH	388532	5	.14	EMAC	

'EH is abbreviation for Household Type of Electrical Connector.

OVERALL LENGTH 59 in.
DIAMETER 3.25 in.
WIDTH ACROSS FINS 24 in.
WEIGHT 37.5 lb.
PROPELLING CHARGE WEIGHT 3.2 lb.
IGNITER WEIGHT (black powder) 0.78 oz.

U. S. ARMY

3.25" TARGET ROCKET

M 2
M 2 A1 (flare)

USE:

High speed target for firing practice with automatic anti-aircraft weapons.

COMPONENTS:

The rocket consists of a motor, motor extension, nose, and three plywood fins. This rocket is very similar to the Navy TR, and is a direct copy of the British 3 inch U.P. projectile.

PROPELLANT:

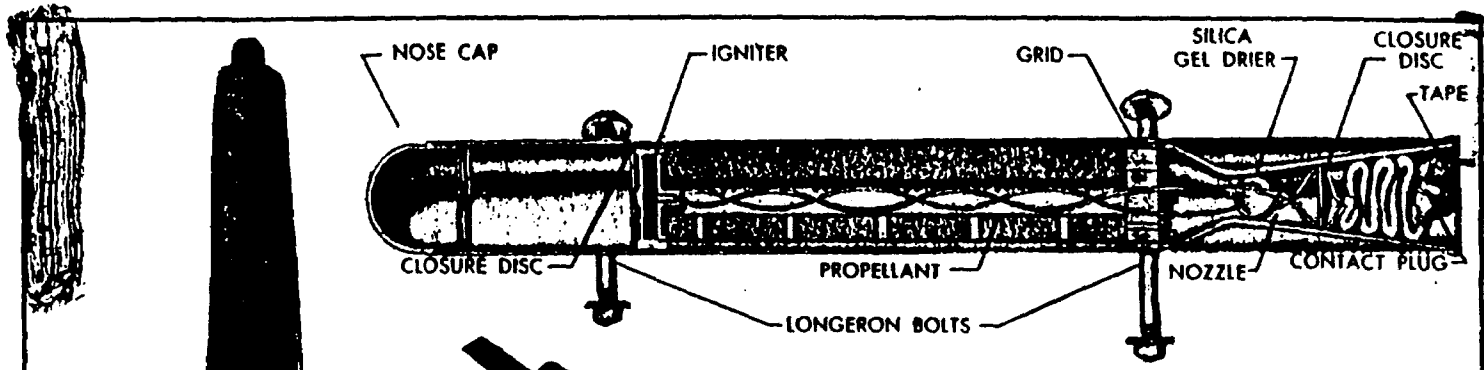
The propellant is a solvent-extruded double-base powder (40 percent nitro-cellulose), extruded into cylindrical grains 5" long and 7/8" in diameter, with a 5/16" axial hole. The propelling charge is ignited by an electric squib assembled within the rocket.

M 2A1, FLARE, MODIFICATION:

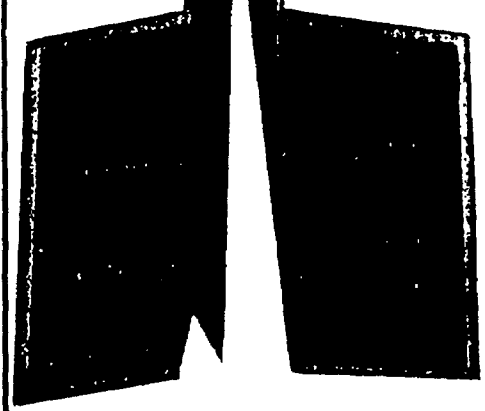
When a flare is added to the M 2 rocket for anti-aircraft target practice at night, the resulting projectile is designated as the rocket, target, anti-aircraft 3.25", M 2A1. The flare burns for 15 to 20 seconds from the beginning of flight.

LAUNCHER:

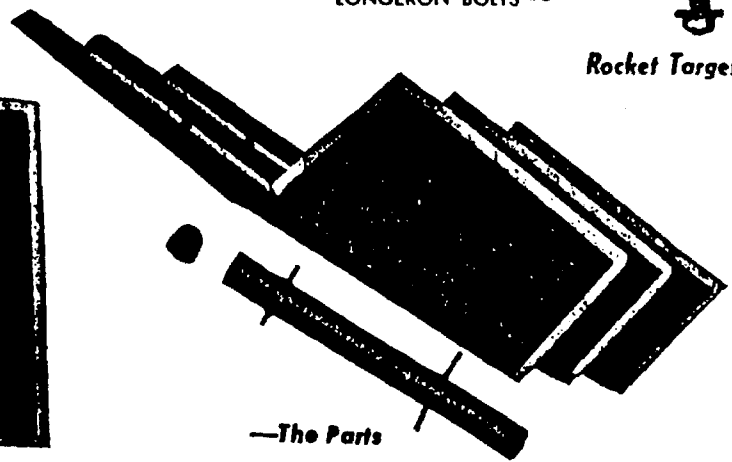
These rockets are launched from the Target Rocket Projector, M 1.



Rocket Target Motor and Flares.



Assembled Rocket Target



—The Parts



FLARE MARK 1 MOD. 1



FLARE MARK 1 MOD. O

OVERALL LENGTH 69"
 TOTAL WEIGHT 140 lbs.
 DIAMETER OF HEAD 5.0"
 LENGTH OF HEAD 20.3"
 WEIGHT OF HEAD 52 lbs.
 WALL THICKNESS
 MOTOR LENGTH 51.4"
 MOTOR DIAMETER 5.0"

RANGE
 FUSES: Mk 3-0 and Mk 6-0 Nose Fuze Mk 148
 Nose Fuze Mk 149
 Base Fuze Mk 157-0
 Base Fuze Mk 159-0
 Mk 6-1 (only) Base Fuze Mk 159-1
 Base Fuze Mk 164-0

U. S. NAVY

5.0" ROCKET 5.0" MOTOR

(unofficially designated as
 the K.V.A.R.)

ROCKET HEAD: The rocket heads used are the 5"0, Mk 6 Mods 0 and 1. The Mk 6 Mod 0 is filled with TNT and is equipped with a base fuze and a nose plug. When thus used, the head will have the penetration and fragmentation characteristics at comparable velocities of the 5"/38 AA Common projectile, of which it is a modified design. All 5"0 rocket heads Mk 6 Mods 0 and 1 are shipped with a base fuze installed and staked in place. No attempt shall be made to remove the base fuze from the head prior to the firing. A metal cup-shaped thread protector protects the external threads on the base of the head and on the base fuze. The Mk 6 Mod 1 is similar to the Mk 6 Mod 0 with a gas seal added to the bomb fuze seat. The 5"0 body Mk 5 Mod 0 is the initial CIT production which was adopted by BuOrd as the Mk 6 Mod 0. The two bodies are identical.

ROCKET MOTOR: The 5"0 Rocket Motor Mk 2 Mod 0 consists of a seamless steel tube with internal threads on both ends. Into the rear end is screwed the nozzle plate having 8 nozzles arranged in a circle, and a central blow-out nozzle. The central nozzle is closed by a disc of 0.024" thick copper, insulated against the heat of the motor by asbestos and hard fiber plugs. The thickness of the disc is such that it shears and blows out at a pressure of approximately 2400 lbs. per square inch, which is the normal maximum motor pressure when the propellant grain is at a temperature of 100° F. If the pressure rises above this, the disc and plug are ejected; this increases the usable temperature range of the rocket by about 40° F.

Seven of the eight nozzles are sealed individually by a light steel cup and sealing compound. The eighth nozzle accommodates the electric connector cable which is crimped into the steel nozzle closure. In shipment, a dome-shaped steel shipping cap fits into the sleeve of the fin assembly, acting as an auxiliary seal and at the same time serving to enclose and protect the electrical pig-tail in shipment.

Lugs for attaching the fins are mounted on the nozzle end of the motor. The fins are shipped with the motor and are attached when the round is assembled. The fins are held in place by spring-loaded latches within the fin itself. The fin lugs and rear suspension lugs are welded to the bands of the fin assembly, which is slipped over the nozzle end of the motor. The front lug band is strapped to the motor. The motor is shipped with lug attachments on the motor tube for use with aircraft launcher Mk 5 Mod 1. An extra rail type lug is provided in the shipping box to adapt the rocket for use on the aircraft launcher Mk 4.

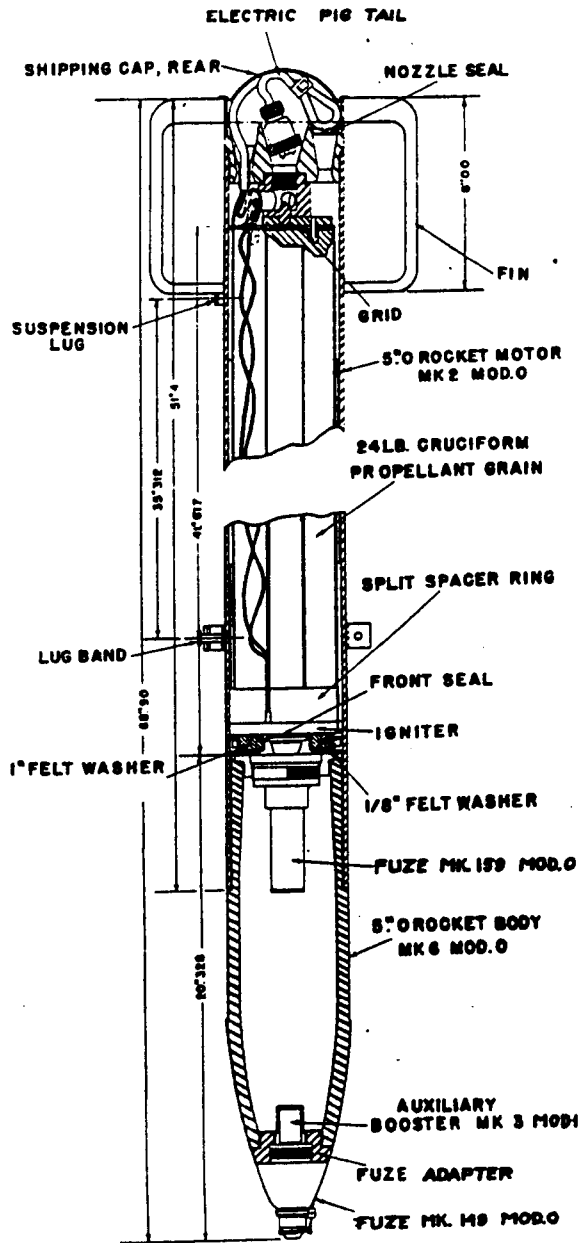
The front end of the motor is sealed by a steel diaphragm equipped with a blow-out disc in the center to allow easy passage of the motor gases to the pressure arming fuze in the base of the body. In shipment, a cylindrical metal thread protector extends into the motor the same depth as the body and seats on a felt rim glued to the diaphragm seal.

The propellant is a grain of cruciform shaped ballistite weighing 24 lbs. The grain is inhibited on the outer web surface and is supported by a spacer and steel grid at the nozzle end. The propellant is ignited by a metal case igniter containing 35 grams of black powder.

The 5"0 Mk 2 Mod 1 motor was never produced. The Mk 2 Mod 2 differs in that the tail fins are welded to a sleeve which slips over the base of the tube and is clamped in place. The fin assembly is complete and separate from the motor. The rear suspension lug for use with the Mk 5 Mod 1 launcher is on an independent band. The Mk 2 Mod 3, which will supersede the Mod 0 and 2, is similar to the Mod 2 except except the nozzle ring is of slightly different construction.

The 5"0 Mk 1 Mod 0 rocket motor (CIT Production) is the prototype of the Mk 2 Mod 0 (BuOrd issue). The two motors vary only in that the suspension lugs on the former are welded directly to the rocket motor.

REMARKS: 1. Using fuze Mk 159 Mod 0, this rocket will penetrate 3.75 ft. of reinforced concrete at normal incidence. At an angle of 30° obliquity, it should penetrate 2.75 ft. Fired from a plane traveling at 300 knots, fuzed with the Mk 149 Mod 0 fuze, serious damage will be caused to armor up to 1-5/8" in thickness. Using the Mk 159 Mod 0 fuze and a steel nose plug, this rocket will penetrate armor 1.0" thick before detonation.



**5.0 ROCKET
 (5.0 MOTOR)**

CHAPTER 5

TRAINING METHODS

Section I. GENERAL

150. General

a. The OQ-19D airplane target is used for training in anti-aircraft marksmanship with light anti-aircraft weapons. Anti-aircraft marksmanship training using the OQ-19D airplane target will follow training on other types of anti-aircraft targets except rocket targets.

b. The advantages of the target are—

- (1) It presents the appearance of an airplane.
- (2) It is more maneuverable than towed targets.
- (3) It is more flexible to use than towed targets.
- (4) It may be operated by the using arm.
- (5) There are no canned courses because the controller can vary the range, elevation, and direction of flight of the target.
- (6) It can operate in inclement weather that would ground air missions.
- (7) It can be used where air missions are not available.
- (8) It is relatively inexpensive to operate.

c. A disadvantage of the target is its one-third representative appearance ratio to a fighter-type airplane. The target's speed is approximately one-third that of a fighter-type airplane. The speed of the target is constant, so in order to simulate the speed of fighter-type aircraft for tracking purposes, courses may be flown at reduced ranges.

151. Safety Precautions

Normal safety precautions are prescribed in SR 385-310-1.

a. *Firing or Tracking Unit.*

- (1) The unit using radio-controlled airplane targets for firing or tracking missions will appoint a safety officer for the prevention of accidents.
- (2) The unit safety officer will see that no personnel are within the danger area of the type launching device used.
- (3) All firing must be controlled by suitable signals or commands. COMMENCE FIRING and CEASE FIRING must be given in such a manner as to be promptly and clearly understood by everyone engaged in firing. Assist-

ants and coaches must be trained to transmit the signals promptly.

- (4) At least two assistants to the safety officer (one at each end of the firing line) will be designated to assist the officer in charge of firing and the safety officer in carrying out all safety precautions. They will also act as observers for the purpose of notifying the safety officer and the controller when man-carrying aircraft approach the zone in which the target is flying. The controller will take any steps necessary to prevent an air collision.
- (5) The unit safety officer will brief the unit on the dangers of targets going out of control and crashing into the gun positions. He will warn all men to take cover in the event the target comes toward their position.
- (6) The unit safety officer should install radio or telephone communication from the controller to the control tower. The safety officer will have a siren, horn, or whistle that can be heard and understood by all and will set up a warning system to warn personnel when the target is out of control. When the controller loses control of the target, he should immediately relay the message TARGET OUT OF CONTROL to the control tower. The tower attendant will then use the warning device to warn all personnel, or will immediately call over the hot loop to all gun positions, TARGET OUT OF CONTROL, TAKE COVER.
- (7) TM 44-234 and local safety regulations, prepared by the commanding officer of the local installation or area, will be consulted and observed at all times.

b. Flying.

- (1) At no time will a controller operate a target over personnel or equipment.
- (2) The target detachment commander will observe all safety precautions prescribed in this manual, SR 385-310-1, TM 44-234, and local safety regulations.
- (3) The target detachment commander will check periodically with the area frequency coordinator to insure that no outside interference will cause the loss of control of targets.

c. Catapult Launching.

- (1) When choosing the launching site, a lane 100 feet to each side of the catapult and 100 yards long behind the catapult must be cleared so that the blast of the jet will not injure personnel or damage equipment (fig. 50).

- (2) When the target is placed on the launching car and the car is in firing position, the launcher chief will see that the car is properly pinned in position, making sure the shear washer is on properly and that a cotter key of the correct size is installed. He will then check the connection where the target is pinned to the launching car, taking the same precautions. This will prevent the target from running forward when the engine is started, causing the propeller to hit the starter and the personnel operating it.
- (3) When the jato unit is placed in the cradle under the launching car, it will not be plugged into the socket on the catapult until the rest of the target is properly checked and ready to be launched. At this time the man in charge of the detonator box will check it, making sure the plunger is pushed all the way down and the safety switch is in the SAFE position. He will then check the launching area to insure that all personnel and equipment are a safe distance from the catapult. When satisfied, he will signal the launcher chief who will plug the jato unit connection into the catapult and pull the lanyard on the catapult to the FIRE position.
- (4) When a number of jato units are taken to the range, they should be stored in a cool, dry place. Avoid direct heat or sun on the units. Return all unused jato units to the ammunition dump for storage.
- (5) In the event a jato unit should misfire, follow the steps listed in paragraph 75.

d. Rotary Launching.

- (1) A proper inspection should be made to insure that the rotary launching track is free of any obstacle (stones, excess sand, etc.) that would cause the launching car to leave the track.
- (2) A check of the bomb-shackle release mechanism should be made to insure proper operation. The ignition ground switch will be checked.
- (3) All vehicles and personnel should be cleared from the outer edge of the track to a safe minimum distance of 150 yards prior to launching (fig. 15).
- (4) All launching signals will be agreed upon by the launcher chief and the controller prior to the launching of a target. If, upon signal from the controller, the target does not release within one turn of the track, the motor will be turned off by pressing the ignition ground switch on the release control box, the equipment will be checked and the defect remedied.

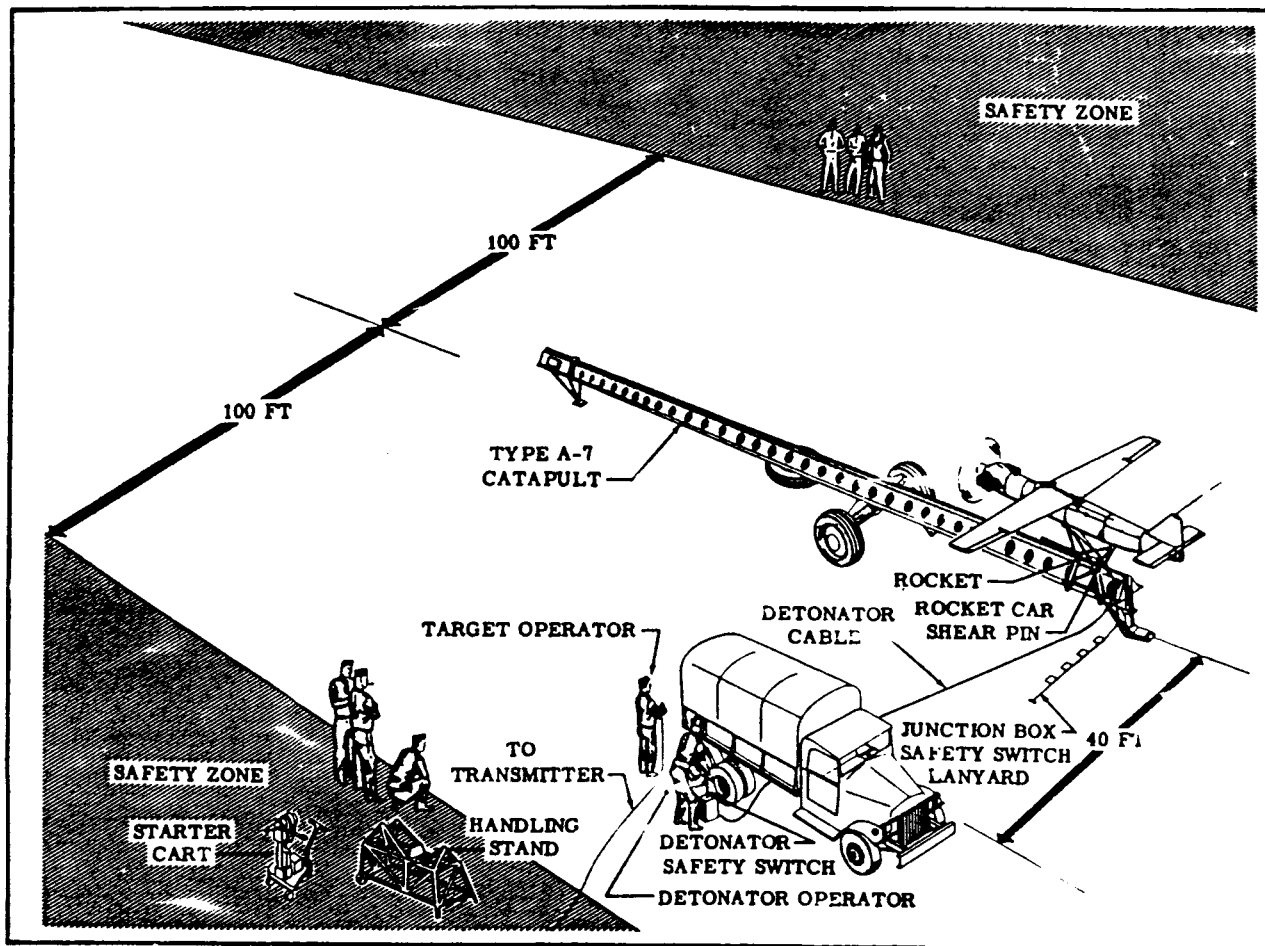


Figure 59. Catapult launching safety areas.

Section II. LIGHT ANTI-AIRCRAFT ARTILLERY AND MEDIUM AND HEAVY ANTI-AIRCRAFT ARTILLERY TRAINING

152. Light Antiaircraft Artillery

a. The OQ-19D radio-controlled airplane target is used in the training of light antiaircraft units. It is used for both radar tracking and firing practice.

b. Fire control methods and procedure for firing may be found in TM 44-234.

153. Courses

The controller will be directed by the officer in charge of the practice as to type of courses desired and their sequence. After preliminary training with the target, the machine gunners and fire units will not be given information as to the type of courses to be flown. The machine gunners and fire units will be trained to engage a target whenever it is in a safe field of fire regardless of the course. Information on the types of courses to be flown for the various types of light antiaircraft artillery weapons may be found in TM 44-234.

154. Medium and Heavy Antiaircraft Artillery

The OQ-19D target is given high altitude flight characteristics for gun firing by making the RPS-4B autopilot an integral part of the target. This combination becomes the OQ-19B target. Since the RPS-4B autopilot is only a substitute standard item, with development continuing, the OQ-19D target has not been included in this manual.

CHAPTER 2

AMMUNITION, CALIBER .30

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SECTION I

GENERAL

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41. Types.—*a.* The ammunition described in this chapter is designed for use in all standard rifles and machine guns of caliber .30. It includes cartridges of the following types: armor-piercing, ball, tracer, incendiary, blank, dummy, guard, and high-pressure test. (See figs. 17-20.)

b. Cartridges which differ in the type of cartridge case, such as subcaliber, caliber .30, and carbine, caliber .30, are described in chapter 5.

42. Identification.—*a.* In common with all other small-arms ammunition, caliber .30 cartridges are identified by the markings on the packing boxes and cartons and by the identification card. These included the type, caliber, model, manufacturer's symbol, and ammunition lot number. For further information see section III, chapter 1.

b. Physical differences in the cartridges are described in the sections on the several cartridges.

43. Grades and uses.—For information concerning grades and uses see paragraph 13 and OFSB No. 3-5.

44. Marking and packing.—*a. Marking.*—The markings on boxes and cartons and coloring on bullets are described in section IV, chapter 1.

b. Packing.—The following table of packing data includes packing for all standard caliber .30 cartridges. Further information will be found in section V, chapter 1.

Caliber .30 ¹	Cartridges per clip	Cartridges per carton	Cartridges per metallic link belt in carton	Cartridges per machine-gun belt	Clips per carton	Clips per bandoleer	Cartons per box	Bandoleers per box	Machine-gun belts per box	Total cartridges per box	Total weight—pounds
Armor-piercing, M2	—	20	—	—	—	—	75	—	—	1,500	108
Armor-piercing, M2 ²	—	—	100	—	—	—	12	—	—	1,200	107
Armor-piercing, M2 (tracer, M1) ³	—	—	{80-AP 20-trac}	—	—	—	12	—	—	1,200	107
Ball, M1	—	20	—	—	—	—	75	—	—	1,500	115
Ball, M1	5	—	—	—	4	—	75	—	—	1,500	117
Ball, M1	5	—	—	—	—	12	—	25	—	1,500	120
Ball, M1	5	—	—	—	—	12	—	20	—	1,200	100
Ball, M1	8	—	—	—	—	6	—	25	—	1,200	101
Ball, M1	—	—	—	250	—	—	—	—	5	1,250	101
Ball, M1 ³	—	—	100	—	—	—	12	—	—	1,200	108
Ball, M1 (tracer) ²	—	—	{80-ball 20-trac}	—	—	—	12	—	—	1,200	108
Ball, M1, national match.	5	—	—	—	4	—	75	—	—	1,500	117
Ball, M2	—	20	—	—	—	—	75	—	—	1,500	110
Ball, M2	5	—	—	—	4	—	75	—	—	1,500	116
Ball, M2	5	—	—	—	—	12	—	25	—	1,500	120
Ball, M2	5	—	—	—	—	12	—	20	—	1,500	98
Ball, M2	8	—	—	—	—	6	—	25	—	1,200	101
Ball, M2	—	—	—	250	—	—	—	—	5	1,250	96
Ball, M2 national match.	5	—	—	—	4	—	75	—	—	1,500	116
Ball, M2 ²	—	—	100	—	—	—	12	—	—	1,200	105
Ball, M2 (tracer) ²	—	—	{80-ball 20-trac}	—	—	—	12	—	—	1,200	105
Ball, M2 (armor-piercing, M2 and tracer, M1) ²	—	—	{40-ball 40-AP 20-trac}	—	—	—	12	—	—	1,200	106
Blank, M1909	—	20	—	—	—	—	100	—	—	2,000	90
Blank, M1909	5	—	—	—	4	—	100	—	—	2,000	90
Dummy, M2	5	—	—	—	4	—	75	—	—	1,500	99
Dummy, M1906—Corrugated.	5	—	—	—	—	—	91	—	—	1,820	116
Dummy, M1906—Corrugated.	5	—	—	—	—	—	91	—	—	1,820	116
Gallery practice, M1919	{20 10}	—	—	—	—	—	62	—	—	1,250	87
Guard, M1	20	—	—	—	—	—	84	—	—	1,680	110
Guard, M1906	5	—	—	—	4	—	82	—	—	1,640	106
High-pressure test, M1	—	20	—	—	—	—	75	—	—	1,500	116
Incendiary, M1	—	20	—	—	—	—	75	—	—	1,500	—
Tracer, M1 ⁴	—	20	—	—	—	—	75	—	—	1,500	110

¹ All rounds are packed in boxes 18¹/₈ by 9¹/₈ by 14¹/₈ inches which occupy 1.21 square feet and 1.49 cubic feet. ² Special packing for Army Air Forces. ³ See also ball, M2 (armor-piercing and tracer). ⁴ Bandoleer, M1906. ⁵ Bandoleer, M1. ⁶ See also armor-piercing, M2 (tracer); ball, M2 (tracer); ball, M2 (armor-piercing and tracer); ball, M1 (tracer).

D-4

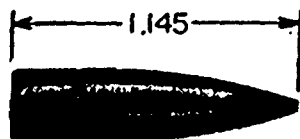
45. Component parts.—The following table lists the component parts of caliber .30 cartridges. For description of case, primer, and powder charge, see section II, chapter 1. Components which differ from the standard type are described in the section for the specific cartridge.

44

	Cartridge case	Propellent powder	Bullet			
			Jacket	Core	Point filler	Base filler
AP, M2	Brass	Smokeless	Gilding metal	Alloy steel	Lead shot	Gilding metal
Ball M1	Brass	Smokeless	Gilding metal	1 antimony		
Ball M1—Alt.	Brass	Smokeless	Gilding metal	1 antimony		Tracer composition.
Tracer, M1	Brass	Smokeless	Gilding metal		1 antimony (39 lead)	
Blank, M1909	Brass	EC Blank powder		Paper cup or wad		
Dummy, M2	Brass tinned	None	Gilding metal	1 antimony 39 lead		
Dummy, M1906	Brass	None	Cupro-nickel or gilding metal.			
Gallery practice, M1919.	Brass	DuPont No. 80 smokeless.		Lead		
Guard, M1	Brass	DuPont No. 80 smokeless.		Lead		
Guard, M1906	Brass	Bullseye smokeless	Cupro-nickel	1 antimony 39 lead		
High-pressure test, M1.	Brass tinned	IMR No. 25	Gilding metal	Lead		
Incendiary, M1	Brass	Smokeless	Gilding metal			

46. Component weights.—The following table gives the weights of all caliber .30 cartridges. The weights listed are the maximum limits permitted in manufacture.

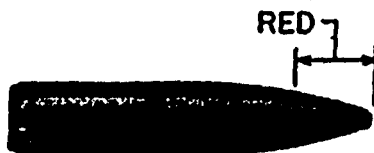
Component weights (in grains)	Weight of complete cartridge (approximate)	Weight of cartridge case	Weight of powder charge (approximate)	Weight of bullet	Weight of jacket	Weight of core	Weight of point filler	Weight of primer	Weight of base filler	Weight of tracer composition
AP, M2.....	414	200	53	168.5	65	84	12.15	5.594	19	
Ball, M1.....	420	200	50	174.5	62	112.5		5.594		
Ball, M1—Alt.....	420	200	50	174	60	114		5.594		
Ball, M2.....	396	200	50	152	54.5	97.5		5.594		
Ball, M2—Alt.....	396	200	50	152	52.5	99.5		5.594		
Blank, M1909.....	207	200	12					5.594		
Dummy, M2.....	341	200		152	54.5	97.5				
Dummy, M1906 (M1).....	363	200		174.5	62	112.5				
Dummy, M1906 (M2).....	341	200		152	54.5	97.5				
Dummy, M1906 (06).....	340	200		151	38.5	112.5				
Gallery practice, M1919.....	346	190	10.5	140				5.482		
Guard, M1.....	346	200	10.5	142				5.594		
Guard, M1906.....	354.5	190	9.1	150	38	112		5.482		
High-pressure test M1.....	{ 433.5 or 420.5	{ 213 or 200	52	174.5	62	112.5		5.594		
Tracer, M1.....	396	200	50	152.5	83	52.5		5.594		Ignition composition 17.
Incendiary M1.....		200	50					5.594		



BULLET, BALL, CAL. .30, M2



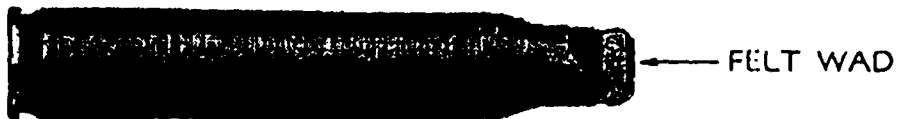
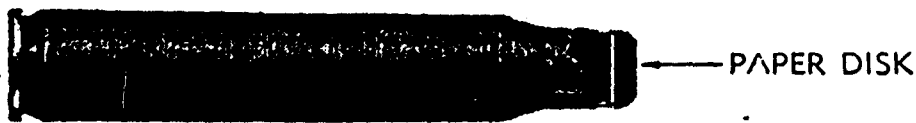
BULLET, ARMOR-PIERCING, CAL. .30, M2



BULLET, TRACER, CAL. .30, M1.

RA PD 4521

FIGURE 17.—Bullets, caliber .30.



RA PD 4524

FIGURE 18.—Blank cartridges—necks in section showing wads.

SECTION III

CARTRIDGE, BALL, CALIBER .30, M1

	Paragraph
Description	49
Exterior ballistics	50

49. Description.—*a. General.*—This cartridge (fig. 19) is a limited standard item of issue and is used in the same weapons and for the same purposes as the cartridge, ball, caliber .30, M2.

b. Visual identification.—This cartridge cannot be readily distinguished from the M2 ball cartridge of late manufacture except by weight and date.

c. Components.—The cartridge consists of a cartridge case, primer, propelling charge, and bullet. The complete assembly weighs approximately 420 grains.

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

(2) The bullet (fig. 17) consists of two parts, a lead alloy core, composed of 90 percent lead and 10 percent antimony, and a gilding metal jacket. An alternative bullet having a gilding metal jacket and a core composed of 97½ percent lead and 2½ percent antimony may also be used. The base of either bullet has a 1° taper, called a boat-tail. The over-all length of the M1 bullet is 1.262 inches, and that of the M1 alternative bullet, 1.265 inches. The mouth of the cartridge case is crimped into the knurled cannellure at assembly and a minimum pull of 45 pounds is required to remove the bullet from the case.

50. Exterior ballistics.—*a. Maximum range.*—5,500 yards (approximate).

b. Average maximum pressure.—48,000 pounds per square inch.

c. Velocity.—(1) At 78 feet, 2,600 feet per second.

(2) At 53 feet from muzzle, 2,620 feet per second.

(3) Muzzle, 2,647 feet per second.

d. Muzzle energy.—2,675 foot-pounds.

e. Accuracy.—Average of mean radii of all targets at 500 yards, not greater than 4.5 inches; at 600 yards, 5.5 inches, when fired from a Mann accuracy weapon. Dispersions obtained from firings under service condition at all ranges are published in firing tables for the weapons in which this ammunition is used.

f. Penetration.—Firings of caliber .30, M1, ball ammunition, into various materials resulted in the penetrations shown in the table below:

Material	Penetration in inches					
	200 yards		600 yards		1,600 yards ¹	
	Average	Maximum ²	Average	Maximum ²	Average	Maximum ²
1/4-inch armor plate ³ -----	0.1	-----	0	-----	0	-----
Gravel-----	7.0	8.0	4.5	5.0	4.1	5.5
Brick masonry ⁴ -----	4.3	6.5	2.2	3.6	1.5	1.9
Concrete-----	4.0	-----	1.0	-----	0.5	-----
Solid oak-----	13.8	18.0	12.0	13.6	2.1	3.8
Dry sand ⁵ -----	6.5	8.2	7.1	8.5	8.2	9.0
Moist sand ⁵ -----	7.3	9.2	9.6	11.2	8.7	9.5
Loam-----	24.1	24.5	24.0	25.0	22.7	26.2
Greasy clay-----	24.6	29.0	22.0	23.0	14.2	15.0
Loose earth-----	19.0	-----	15.8	-----	-----	-----

¹ Fired over 78-foot range with reduced charge to simulate remaining velocity at 1,600 yards.
² Maximum penetration for a single shot.
³ Penetration shown is average for single shots. A recent test showed that the first shot weakened the structure of the plate so that succeeding shots in the same place effected appreciable penetration.
⁴ Penetrations given in table are for single shots striking brick only. A bullet striking only mortar has penetrated 18.84 inches with a velocity corresponding to a range of 1,500 yards. A series of 6 shots, fired under these conditions at the same point, penetrated 6.72 inches of brick, and a seventh struck mortar, penetrating to 14.52 inches. A succession of 5 shots, with a charge to simulate 600 yards range, penetrated brick masonry to 9.36 inches.
⁵ Fired over 78-foot range with reduced charge to simulate remaining velocity at 600 yards.
⁶ Penetration at 600 yards is often greater than at 200 yards, due to the larger yaw of the bullet at 200 yards.
⁷ Average penetration at 400 yards.

g. Table of fire.

Range	Angle of elevation	Time of flight	Maximum ordinate	Angle of fall
Yards	Mils	Seconds	Yards	Mils
0	-----	-----	-----	-----
100	0.8	0.12	-----	0.8
200	1.6	.25	0.1	1.8
300	2.5	.39	.2	3.0
400	3.5	.54	.39	4.4
500	4.7	.70	.67	6.0
600	6.0	.88	1.03	8.1
700	7.5	1.07	1.52	10.6
800	9.1	1.27	2.15	13.7
900	10.9	1.50	3.00	17.5
1,000	12.9	1.75	4.1	22.0

Based on muzzle velocity of 2,600 feet per second.
 Data from FT 0.30-C-4.

SECTION IV

CARTRIDGE, BALL, CALIBER .30, M2

Description-----	51
Exterior ballistics-----	52

51. Description.—*a. General.*—This cartridge (figs. 1, 2, and 19) is a current standard item of issue and is used in machine guns and rifles against personnel and light matériel targets.

b. *Visual identification.*—Cartridges of recent manufacture cannot be readily distinguished from the M1 cartridges by visual inspection, although this can be done by weight and date. Cartridges manufactured prior to September 20, 1940, could be readily distinguished from the M1 cartridges by their tin-coated, gilding metal bullet jackets.

c. *Components.*—The cartridge consists of a cartridge case, primer, propelling charge, and bullet. The complete assembly weighs approximately 396 grains.

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

(2) The bullet (fig. 17) consists of two parts, a lead alloy core, composed of 90 percent lead and 10 percent antimony, and a gilding metal jacket. An alternative bullet having a gilding metal jacket, and a core composed of 97½ percent lead and 2½ percent antimony may also be used. The base of the bullet retains its cylindrical shape to the base line. The over-all length of the M2 bullet is 1.125 inches, and that of the M2 alternative bullet, 1.103 inches.

52. *Exterior ballistics.*—a. *Maximum range.*—Approximately 3,500 yards.

b. *Average maximum pressure.*—50,000 pounds per square inch.

c. *Velocity.*—(1) At 78 feet, 2,740 feet per second.

(2) At 53 feet, 2,755 feet per second.

(3) Muzzle, 2,805 feet per second.

d. *Accuracy.*—From accuracy rifle—average of mean radii of all targets at 500 yards not greater than 6.5 inches; at 600 yards not greater than 7.5 inches.

e. *Table of fire.*

Range	Angle of elevation	Time of flight	Maximum ordinate	Angle of fall
<i>Yards</i>	<i>Mils</i>	<i>Seconds</i>	<i>Yards</i>	<i>Mils</i>
100	0.7	0.12	0	1
200	1.5	.25	.1	2
300	2.4	.38	.2	3
400	3.4	.53	.4	4
500	4.6	.70	.6	6
600	6.0	.89	1.0	9
700	7.7	1.11	1.7	12
800	9.6	1.35	2.4	17
900	11.9	1.62	3.6	22
1,000	14.6	1.91	5.1	28

Based on muzzle velocity of 2,700 feet per second.
Data from FT 0.30-A-4.

SECTION V

CARTRIDGE, TRACER, CALIBER .30, M1

Description.....	Paragraph
Exterior ballistics.....	53 54

53. Description.—*a. General.*—This cartridge (fig. 19) is a standard item of issue and is used in both machine guns and rifles. It is intended for use with other ammunition to show the gunner, by its trace, the path of the bullets. While tracer cartridges were primarily intended for machine-gun use, there are cases wherein they can be advantageously used in rifles; for example, for signal and incendiary purposes, target designation, and range estimation.

b. Visual identification.—The cartridge is readily identified by its characteristic red bullet point, red indicating the color of the trace.

c. Components.—The cartridge consists of a cartridge case, primer, propelling charge, and bullet. The complete assembly weighs approximately 396 grains.

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

(2) The bullet (fig. 17) consists of three parts: a gilding metal jacket, a lead alloy slug, and a tracer composition. The over-all length of this bullet is 1.45 inches and point is painted red for a distance of approximately 5/16 inch. It has a square base which contains an inflammable substance which is ignited by the propelling charge when the cartridge is fired. The tracer composition burns with a bright red flame which enables the course of the bullet to be followed by the gunner. The mouth of the cartridge case is crimped into the knurled cannelure at assembly and a minimum pull of 45 pounds is required to remove the bullet from the case.

54. Exterior ballistics.—*a. Maximum range.*—(1) *Bullet.*—Approximately 3,450 yards.

(2) *Range of trace.*—Trace begins at a distance not greater than 125 yards from weapon and bullets continue tracing to 750 yards from weapon.

b. Average maximum pressure.—50,000 pounds per square inch.

c. Velocity.—(1) At 78 feet, 2,650 feet per second.

(2) At muzzle, 2,715 feet per second.

d. Accuracy.—Average of mean radii of all targets at 600 yards less than 15 inches.

e. Trajectory.—This ammunition is designed so that the bullet's trajectory will cross the trajectory of ball, M2, and AP, M2, ammunition of the same caliber at approximately 600 yards.

CHAPTER 4

AMMUNITION, CALIBER .50

	Paragraphs
SECTION I. General.....	78-83
II. Cartridge, armor-piercing, caliber .50, M2.....	84-85
III. Cartridge, ball, caliber .50, M2.....	86-87
IV. Cartridge, tracer, caliber .50, M1.....	88-89
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VI. Cartridge, dummy, caliber .50, M2.....	91
VII. Cartridge, dummy, caliber .50, M1.....	92
VIII. Cartridge, high-pressure test, caliber .50, M1.....	93
IX. Cartridge, incendiary, caliber .50, M1.....	94

SECTION I

GENERAL

	Paragraph
Types.....	78
Identification.....	79
Grades and uses.....	80
Packing and marking.....	81
Component parts.....	82
Component weights.....	83

78. **Types.**—The ammunition described in this chapter is designed for use in all caliber .50 machine guns. It includes cartridges of the following types: armor-piercing, ball, tracer, incendiary, blank, dummy, and high-pressure test.

79. **Identification.**—*a.* In common with all other small-arms ammunition, caliber .50 cartridges are identified by the marking on the packing boxes and cartons and the identification card. These include the type, caliber, model, manufacturer's symbol, and ammunition lot number. For further information see section III, chapter 1.

b. Physical differences in the cartridges are described in the sections on the several cartridges.

80. **Grades and uses.**—For information concerning grades and uses see paragraph 13 and OFSB No. 3-5.

81. **Packing and marking.**—*a. Marking.*—The markings on boxes and cartons are described in section IV, chapter 1.

b. Packing.—The following table of packing data includes packing for all standard caliber .50 cartridges. Further information will be found in section V, chapter 1.

Packing cartridges, caliber .50	Cartridges per carton	Cartons per box	Total rounds per box	Total weight of box, pounds	Cartridges per link belt packed in carton	Total rounds link belt assembled cartridges per box	Weight of box of assembled cartridges
AP M2	10	35	350	113			
AP M2 ¹					100	200	83
Ball M2	10	35	350	113			
Ball M2 ¹					100	200	83
Blank M1	10	45	450	81			
Dummy M1 or M2	10	35	350	99			
High-pressure test M1	10	30	300	108			
Tracer M1	10	35	350	111			
AP M2 (80) and tracer M1 (20)					100	200	83
Ball M2 (80) and tracer M1 (20)					100	200	83
AP M2 (40) and ball M2 (40) and tracer M1 (20)					100	200	81
Incendiary M1	10	35	350				

¹ Also packed 266 cartridges in link belts.

82. Component parts.—The following table lists component parts of caliber .50 cartridges. For description of the parts see section II, chapter 1. Components which differ from the standard type are described in the section on the specific cartridge.

	Cartridge case	Propellant powder	Bullet		
			Jacket	Filler	Core
AP M2	Brass	IMR 4814	Gilding metal.	Antimony lead.	Hard steel
Ball M2	Brass	IMR 4814	Gilding metal.	Antimony lead.	Soft steel.
Tracer M1	} Brass	IMR 4814	Gilding metal.	Point lead, rear tracer composition.	None.
Tracer M2					
Blank M1	Brass	IMR 4814	None	None	None.
Dummy M1	Tinned brass.	None.	Gilding metal.	Antimony lead.	Soft steel.
Dummy M2	Tinned brass.	None.	Tin coated gilding metal.	Antimony lead.	Soft steel.
High-pressure test M1.	Tinned brass.	IMR 4814	Gilding metal.	Forward slug antimony lead; rear antimony lead.	None.
Incendiary M1.	Brass	IMR 4814	Gilding metal.		

83. Component weights.—The following table gives the weights of the caliber .50 cartridges. The weights listed are the maximum limits permitted in the manufacture of these cartridges.

Component weights (in grains)	Weight of complete cartridge (approximate)	Weight of cartridge case	Weight of primer	Weight of propelling charge	Weight of bullet	Weight of core	Weight of jacket	Weight of filler
AP M2	1,837	850	19.06	250	718	410	253	56.5
AP M2 (alternate)	1,829				710	402		
Ball M2	1,830	850	19.06	250	711.5	402	253	56.5
Blank M1	889	850	19.06	43				
Dummy M1	1,620	850	16.9		753	405	266	82
Dummy M2	1,569	850				405	266	82
High-pressure test M1	2,110	850	19.06	240	1,002	487	263	
Tracer M1	1,789	850	19.06	240	681	252	263	
Incendiary M1		850	19.06			207	408	70

1 Front slug.
2 Rear slug.
3 Tracer composition.

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SECTION II

CARTRIDGE, ARMOR-PIERCING, CALIBER .50, M2

Description.....	84
Exterior ballistics.....	85

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 $\frac{1}{16}$ inch. The base has a 9° taper beginning .386 inch from the base. The mouth of the case is crimped into cannellure 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.

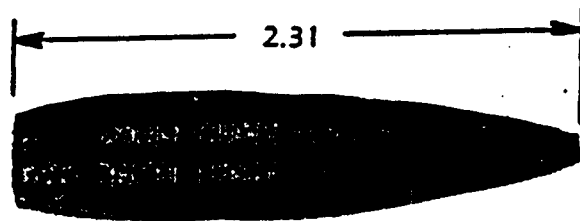
c. Velocity.—(1) At 78 feet, 2,900 feet per second.

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

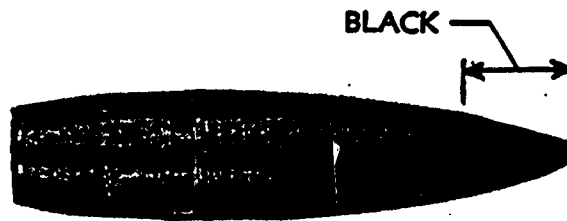
d. Accuracy.—At the time of acceptance, this ammunition will group within a mean radius not greater than 8.0 inches at 500 yards or 9.0 inches at 600 yards.

e. Table of fire.

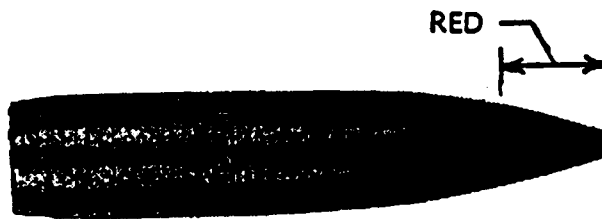
Range	Angle of elevation	Time of flight	Maximum ordinate	Angle of fall
Yards	Mils	Seconds	Yards	
0	0	0	0	0
200	1.2	.22	.1	1.4
400	2.7	.46	.3	3.3
600	4.3	.72	.7	5.2
800	6.1	1.00	1.4	7.4
1,000	8.2	1.32	2.4	10.5
1,200	10.7	1.69	3.9	15.4
1,400	13.7	2.10	6.0	22.0
1,600	17.3	2.56	8.9	30.5
1,800	21.5	3.07	12.7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



BULLET, BALL, CAL. .50. M2



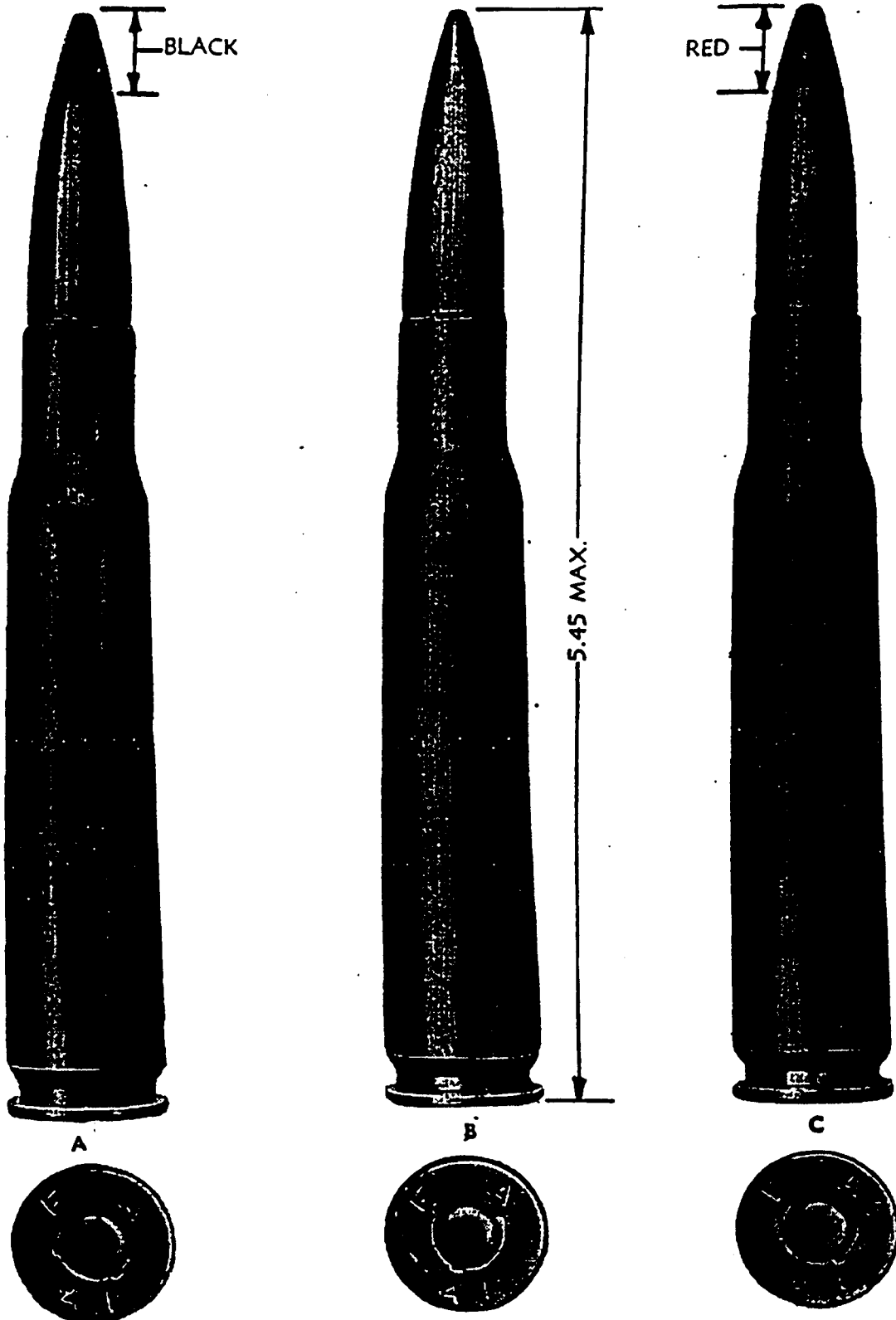
BULLET, ARMOR-PIERCING, CAL. .50. M2



BULLET, TRACER, CAL. .50. M1

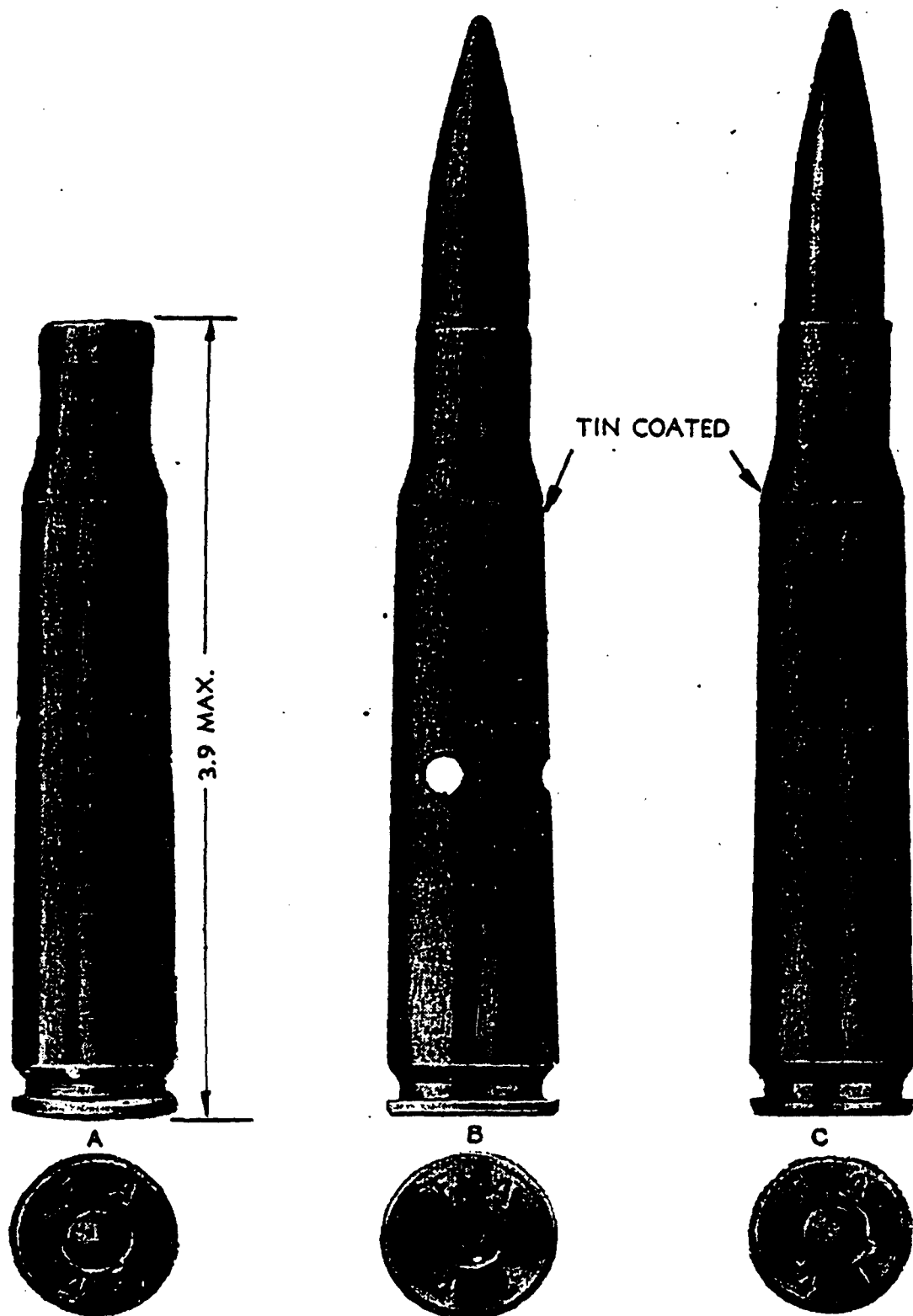
RA PD 4526

FIGURE 22.—Bullets, caliber .50.



RA PD 2117

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



RA PD 4530

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

SECTION III

CARTRIDGE, BALL, CALIBER .50, M2

Description-----	Paragraph 86
Exterior ballistics-----	87

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

Description-----	Paragraph 88
Exterior ballistics-----	89

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 cannellure 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

Description-----	Paragraph 90
------------------	-----------------

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.

(2) The case has a slight annular groove about $\frac{1}{4}$ inch from the mouth, which serves as the seat for the wad.

(3) The wad is a disk punched out of strawboard sheet, $\frac{1}{16}$ inch thick, and is lacquered on both sides before the blanking operation.

(4) The powder charge consists of 43 grains of E. C. blank powder or equivalent.

(5) The primer is described in paragraph 9. After loading, a heavy coat of lacquer is applied to the wad and the mouth is crimped.

SECTION VI

CARTRIDGE, DUMMY, CALIBER .50, M2

Description----- Paragraph 91

91. Description.—*a. General.*—This cartridge (fig. 24) is standard for use in all caliber .50 machine guns for training purposes. It may also be used for testing the mechanism of the gun.

b. Visual identification.—This cartridge is distinguished from live ammunition by the cartridge case, which is tin-coated, has three holes drilled in the side, and an empty primer pocket. It is distinguished from the cartridge, dummy, caliber .50, M1, by the bullet which is tin coated.

c. Components.—(1) This cartridge consists of cartridge case and bullet.

(2) The cartridge case is identical with service cases except, as noted above, it is tin-coated and has three holes drilled about the midpoint.

(3) The bullet consists of three parts, a tin-coated gilding-metal jacket, a soft steel core, and a point filler of hardened lead. The mouth of the case is crimped into the cannellure at assembly and a minimum pull of 100 pounds is required to extract the bullet from the case.

SECTION VII

CARTRIDGE, DUMMY, CALIBER .50, M1

Description----- Paragraph 92

92. Description.—*a. General.*—This cartridge is limited standard for the same purposes and weapons as the dummy M2.

b. Visual identification.—This cartridge may be distinguished from the M2 by the bullet, which is not coated, and the fact that it has a single hole drilled in the case 2 inches from the base.

c. Components.—Except as noted above, this cartridge is identical with the cartridge, dummy, caliber .50, M2, for which see paragraph 91.

SECTION VIII

CARTRIDGE, HIGH-PRESSURE TEST, CALIBER .50, M1

Description----- Paragraph
93

93. Description.—*a. General.*—The cartridge, high-pressure test, caliber .50, M1 (fig. 22), is used for proof-firing caliber .50 machine guns at the place of manufacture. The cartridge is loaded with a powder charge sufficient to develop a breech pressure averaging 62,500 pounds per square inch for any ten consecutive shots. Due to this excessive pressure and the danger involved in firing, the guns under test are fired from a fixed rest under a hood by means of a mechanical firing device. This cartridge should be fired only by authorized personnel.

b. Visual identification.—This cartridge is distinguished from other caliber .50 cartridges by the tinned cartridge case. Dummy cartridges, which also have tinned cases, have holes drilled through the case.

c. Components.—(1) The cartridge consists of a cartridge case, primer, propelling charge, and bullet. The entire assembly weighs 1,980 grains.

(2) The case is made of tinned cartridge brass; in other respects it is the same as the cases of other cartridges of this caliber.

(3) The primer is described in paragraph 9.

(4) The bullet consists of a gilding metal jacket and a core made up of 2 slugs, a front slug and a rear slug. 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.

SECTION IX

CARTRIDGE, INCENDIARY, CALIBER .50, M1

General----- Paragraph
94

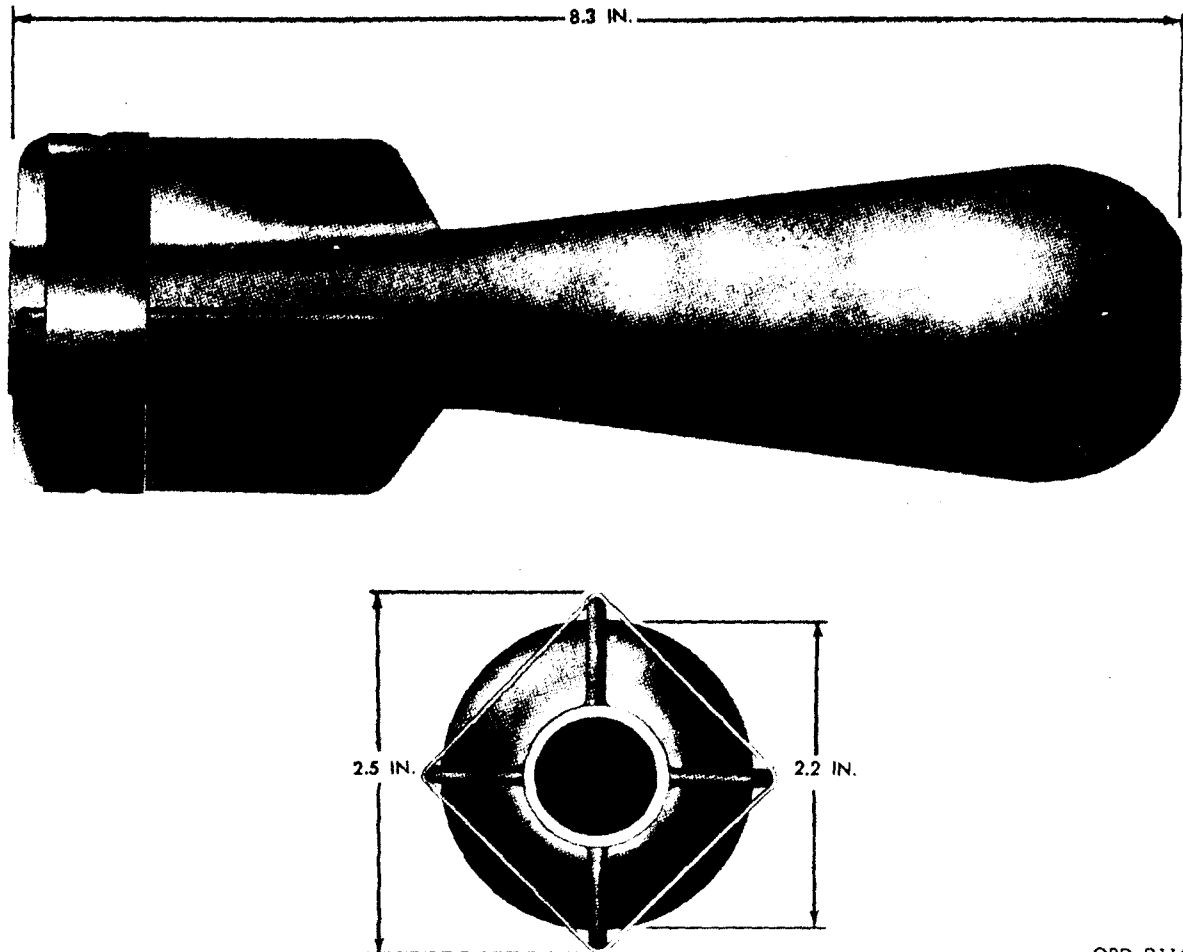
94. General.—This cartridge is a standard item of issue for use in caliber .50 machine guns. The cartridge resembles the cartridge, ball, caliber .50, M2, in outward appearance, but it may be identified by the light blue paint on the tip of the bullet. Other information about this ammunition is not available at this time.

Section IX. PRACTICE BOMBS

2-47. Practice Bombs

Practice bombs are used for target practice and the training of bombing crews, and are designed to simulate service bombs. Practice bombs have various methods of spotting their points of impact. One type provides a colored target on snow covered ranges. Others function so that the firing pin detonates a blank .38 caliber cartridge on impact, causing the signal to fire. The ex-

plosion of the signal produces a flash and a large puff of smoke, permitting observation of bombing accuracy. Under freezing conditions, practice bombs that are filled with water or with a mixture of water and sand, have antifreeze added to prevent bursting of the bomb case caused by freezing of the filler.

2-48. Bomb, Practice: Miniature, 3-Pound, MK5 Mods 2 and 3

ORD D1159

Figure 2-55. Bomb, practice: miniature, 3-pound, AN-MK 23, Mod 1.

2-73 / 2-74

D-5

Table 2-46. Bomb, Practice: Miniature, 3-lb, MK5 Mods 2 and 3;
 Bomb, Practice: Miniature, 3-lb, AN-MK23 Mod 1;
 Bomb, Practice: Miniature, 3-lb, MK43 Mod 1.

Mark Mod	MK 5 2 and 3	AN-MK 23 1	¹ MK 43 1
Length of Assembled Bomb (in.).....	8.3.....	8.3.....	8.3
Diameter of Body (in.).....	2.2.....	2.2.....	2.2
Fin Span (in.).....	2.5.....	2.5.....	2.5
Weight:			
Without Signal (lb).....	2.56.....	2.87.....	4.31
With MK4 Signal (lb).....	2.68.....	3.00.....	4.43
With MK5 Signal (lb).....	2.62.....	2.94.....	4.37
Firing-Pin Assembly.....	MK1 Mod 0..	MK1 Mod 0..	MK1 Mod 0
Signal.....	MK4 Mods..	MK4 Mods..	MK4 Mods
	or	or	or
	MK5 Mod 0..	MK5 Mod 0..	MK5 Mod 0

a. *Description.* Miniature practice bombs (MPB) MK5 Mods 2 and 3 (figs. 2-55 and 2-56, and table 2-46), the MPB AN-MK23 Mod 1, and MPB MK43 Mod 1 are similar in physical appearance, but differ basically in the metal used to cast the body. Bomb MK5 is manufactured from zinc alloy and weighs the least of the three bombs.

Bomb AN-MK23 is made of cast iron. Bomb MK43 is manufactured from cast lead and is 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.

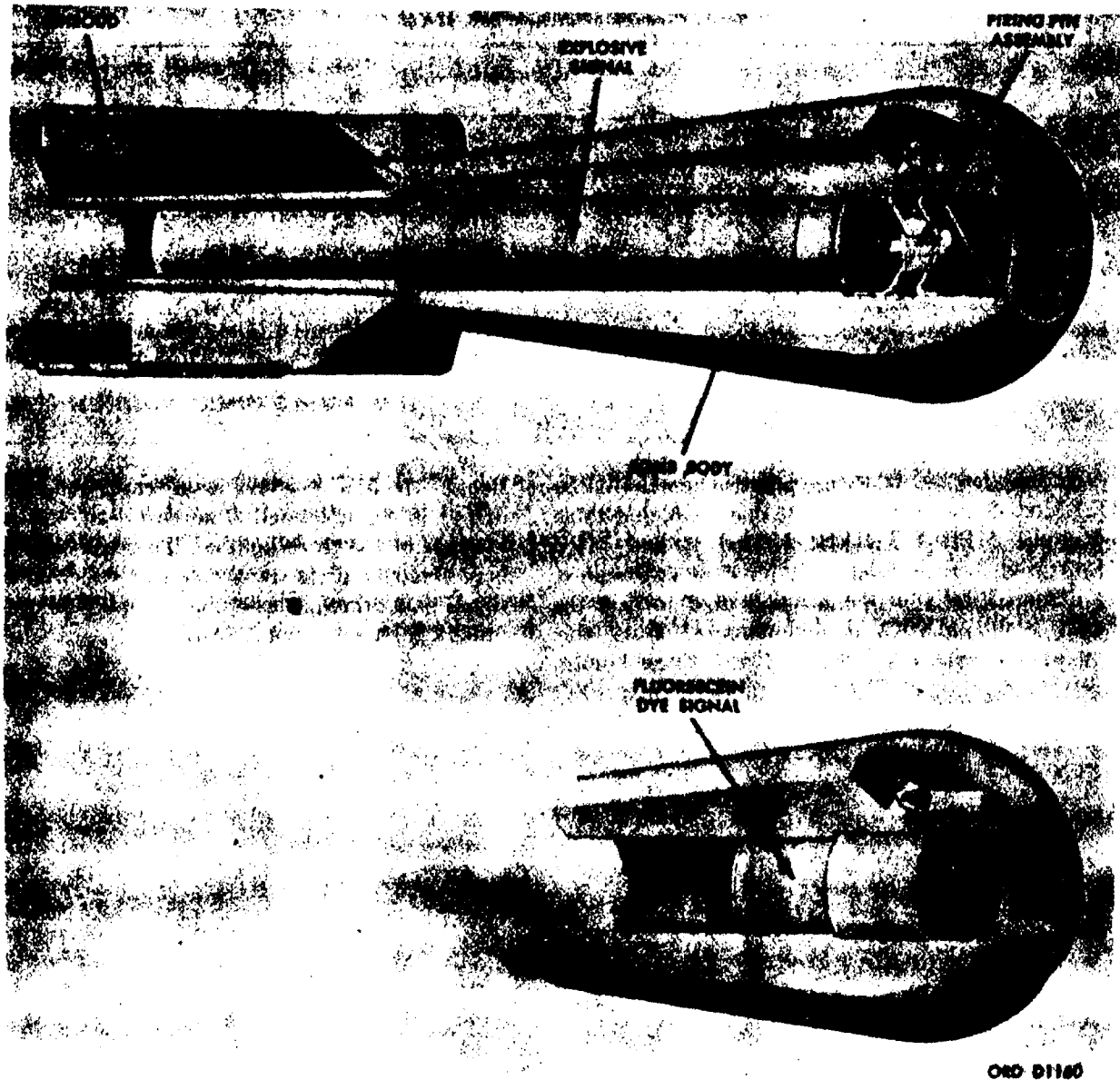


Figure 2-56. Bomb, practice: miniature, 3-pound, AN-MK23 Mod 1, cutaway view.

b. *Use.* Miniature practice bomb MK5 is used for bombing practice on armored-deck target boats. Bomb AN-MK23 is authorized for all bombing practice except that involving armored-deck target boats. MPB MK43 is used for low altitude, horizontal or dive bombing and on armored-deck target boats. Bombs MK5, AN-MK23, and MK43 are used with the MK4 signal. These bombs also are

used with the MK5 signal which contains a fluorescent dye and is actuated by impact on water. When the MK5 signal is installed, the firing pin assembly is not used. Special containers are utilized by aircraft to carry and release these bombs.

c. *Functioning.* The firing pin assembly fires the signal which expels a large puff of smoke rearward through the base of the bomb.

2-52. Bomb, Practice: 100-Pound, MK15 Mods 2, 3 and 4

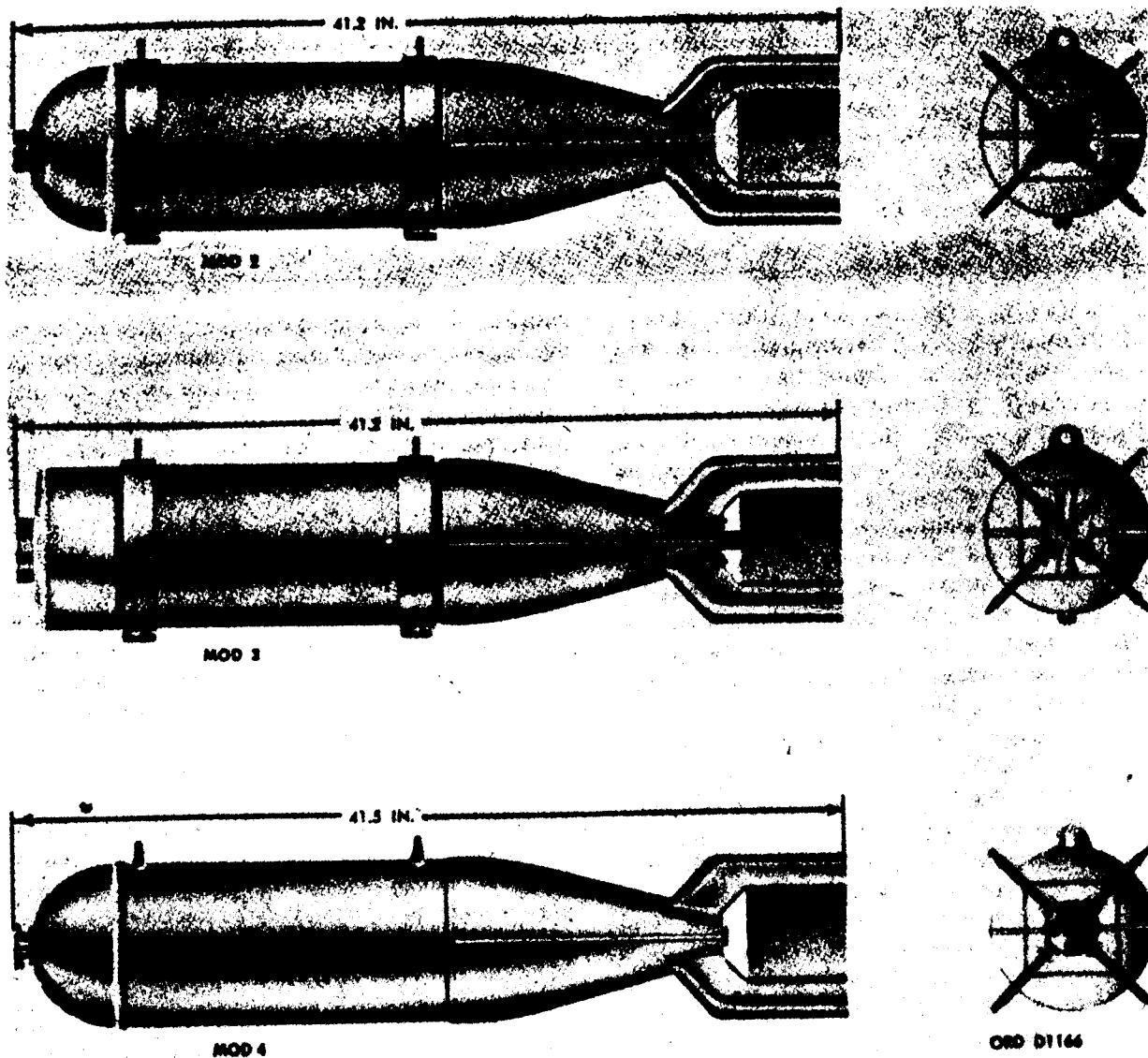
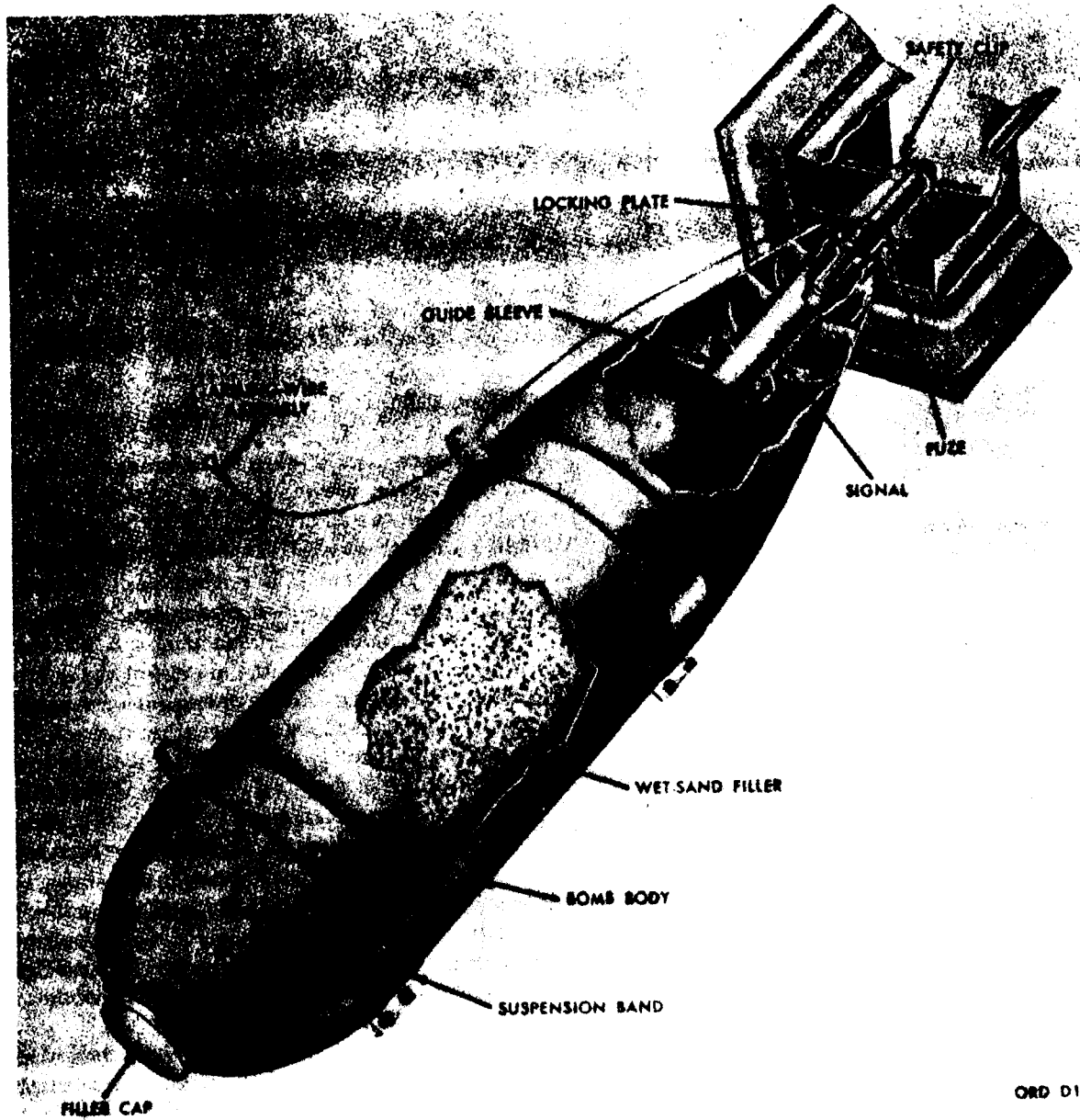


Figure 2-62. Bomb, practice: 100-pound, MK15 Mods 2, 3, and 4.

Table 2-50. Bomb, Practice: 100 Pound, MK15 Mods 2, 3, and 4

Mark	15	15	15
Mod	2	3	4
Length of Assembled Bomb (in.)	41.2	41.2	41.5
Diameter of Body (in.)	8.0	8.0	8.0
Fin Span (in.)	11.24	11.24	11.24
Weight of Assembled Bomb (lb):			
Loaded with Wet Sand	100.0	100.0	97.0
Loaded with Water	56.0	67.0	60.0



ORD D1167

Figure 2-63. Bomb, practice: 100-pound, MK15, Mods 2, 3 and 4, cutaway.

5-30. Signal, Practice Bomb: Mk4 Mods 3 and 4

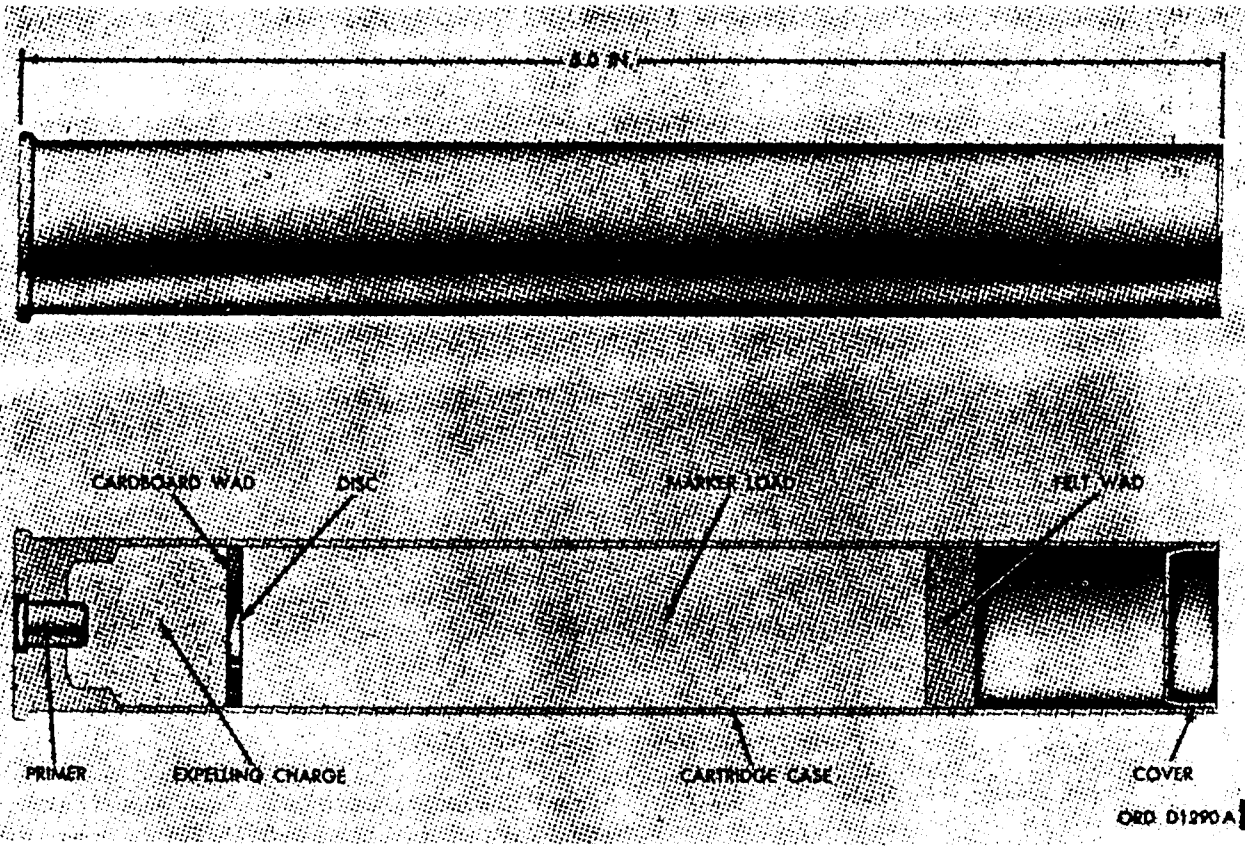


Figure 5-23. Signal, practice bomb: Mk4 Mods 3 and 4.

Table 5-24. Signal, Practice Bomb: Mk4 Mods 3 and 4

Mark	4	4
Mod	3	4
Length of Assembly (in.)	5.0	5.0
Diameter of Body (in.)	0.85	0.85
Weight of Assembly (lb)	0.16	0.16
Case Material	Aluminum	Aluminum
Expelling Charge	Smokeless Powder.	Smokeless Powder.
Marker Load	Stabilized Red Phosphorous.	Zinc Oxide

a. *Description.* Practice bomb signals Mk4 Mods 3 and 4 (fig. 5-23 and table 5-24) are essentially 10-gauge shotgun shells. They contain an expelling charge of smokeless powder and are primed with a commercial primer. A pyrotechnic or inert marker load is separated from the expelling charge by a disc and cardboard gun wad. The end of the shell is closed by felt gun wads which are cemented to the cover.

b. *Use.* The signals are used in either the min-

iature or the larger practice bombs. However, installed in the miniature practice bombs, the signals do not consistently produce a visible signal when dropped from an altitude of 10,000 feet or higher. Released from that height, the bomb enters the water or earth so quickly that the signal frequently does not have time to function.

c. *Functioning.* When the practice bomb in which the signal is installed strikes water or the earth, impact causes the firing pin in the nose of the bomb to impinge upon the primer of the signal. The primer ignites the expelling charge, forcing the marker load out through an opening in the bomb. The resulting flash and puff of white smoke permit observation of bombing accuracy.

d. *Differences Between Mods.* Signal Mk4 Mod 0 was the first of this type developed. Mods 1 and 2 were procured later for issue to activities limited by environment to performing practice bombing in the vicinity of flammable areas. These signals

contain inert materials which produce very little flash and are markedly inferior to the Mod 0. Signal MK4 Mod 3 is similar to the MK4 Mod 0 but differs in that the cartridge case of the MK4 Mod 3 is extruded aluminum instead of paper; a primer mixture with improved storage characteristics has been used, and a new pyrotechnic load

(which produces about the same flash, but with a superior smoke puff) has been incorporated. The MK4 Mod 4 signal is similar to the MK4 Mod 3 with the exception of an inert marker load of zinc oxide. In both Mods, the cover and cartridge case are cemented together; in Mod 3 the assembly also is staked in four equally-spaced places.

5-31, Signal, Practice Bomb: MK5 Mod 0

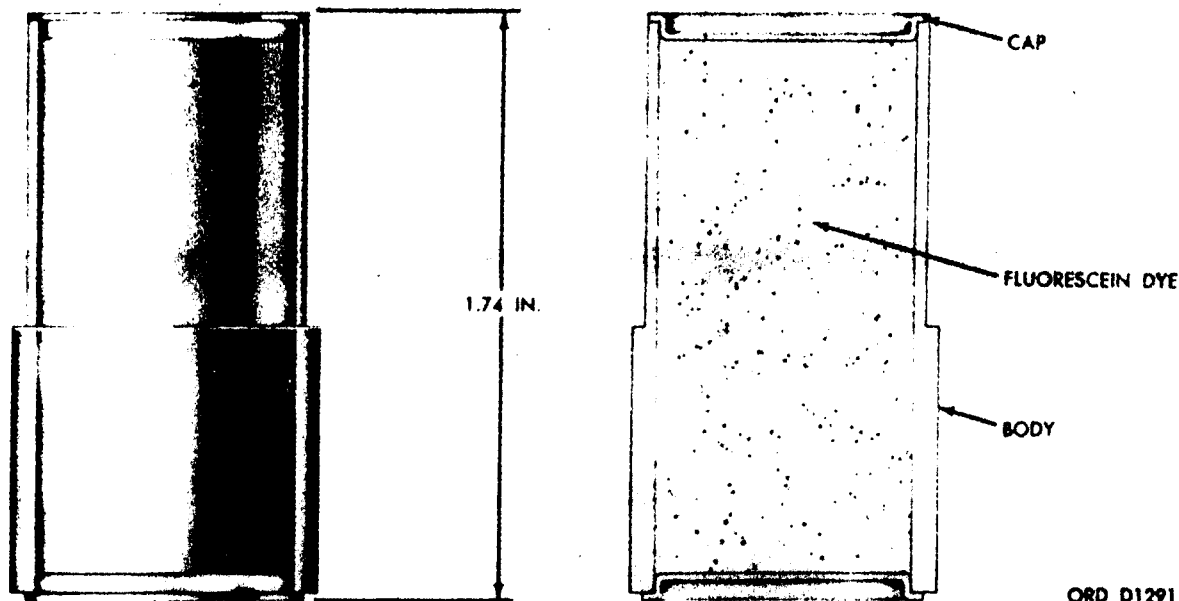


Figure 5-24. Signal, practice bomb: MK5 Mod 0.

Table 5-25. Signal, Practice Bomb: MK5 Mod 0

Mark.....	5
Mod.....	0
Length of Assembly (in.).....	1.74
Diameter of Body (in.).....	0.93
Weight (oz).....	0.5
Cylinder Material.....	Plastic
Dye Filler.....	Flourescein
Dye Color:	
Dry.....	Brick Red
Dissolved in Water.....	Bright Green

a. *Description.* Practice bomb signal MK5 Mod 0 (fig. 5-24 and table 5-25) is approximately the size of a 10-gauge shotgun shell. A shoulder, which increases the diameter of one end, serves to locate the signal in the bomb. The signal consists of a plastic cylinder containing 10 grams of fluorescein

dye, a highly-soluble salt, brick red in color, which turns bright green when dissolved in water.

b. *Use.* The signal, for use in dive-bombing practice, can be used in any miniature practice tice bomb in which signal MK4 can be used. It is dropped only on water targets during daylight. When a wind is blowing, the smoke from the MK4 signal often blows away before the pilot can get into position to view the results of his attack. The slick from the MK5 signal can be seen from an altitude of 15,000 feet.

c. *Functioning.* Upon impact, water enters the nose of the bomb, breaks the weak ends of the plastic container, and forces the dye out through the tail of the bomb.

5-32. Signal, Practice Bomb: MK6 Mod 0

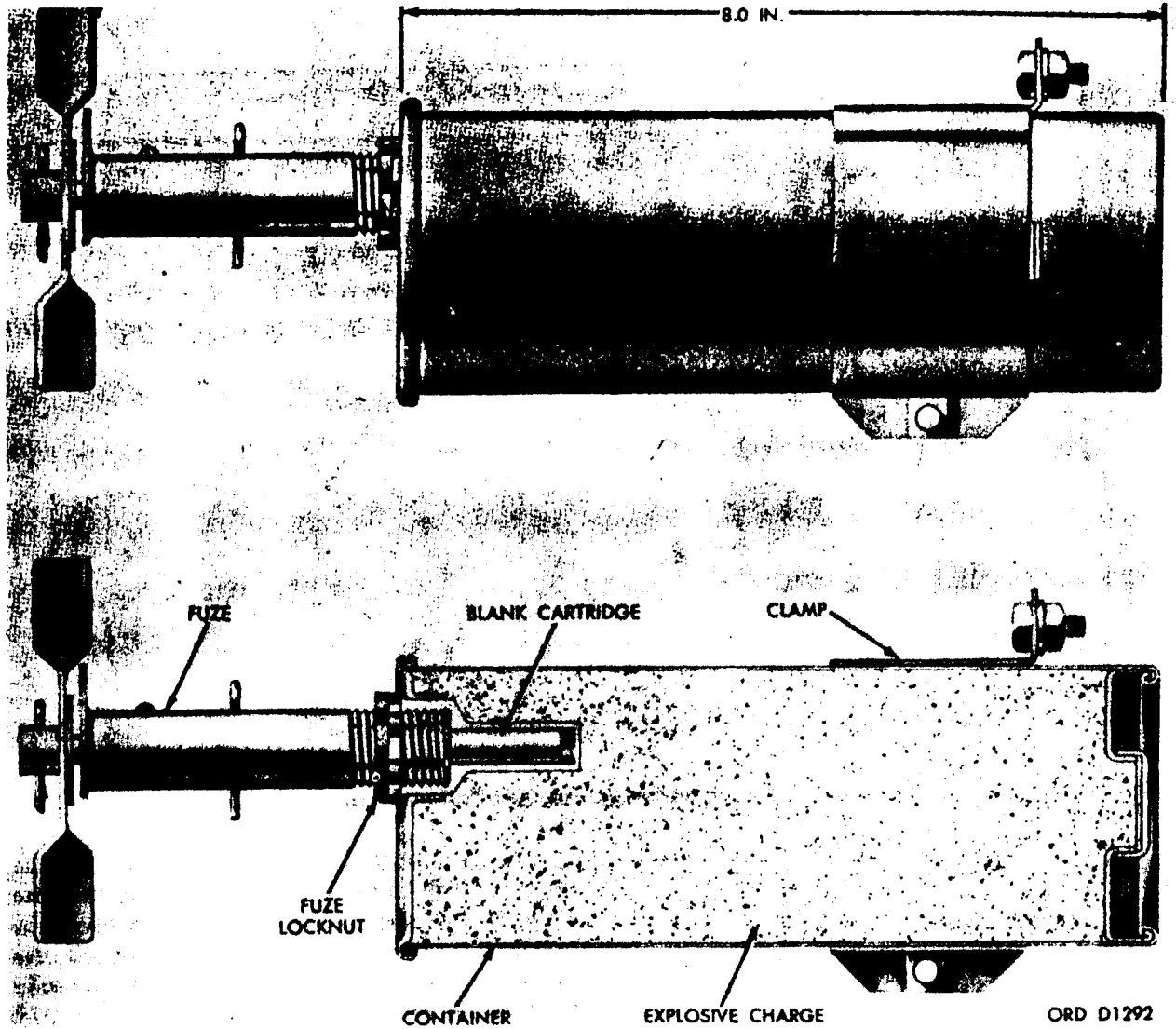


Figure 5-25. Signal, practice bomb, MK6 Mod 0 w/fuze.

Table 5-26. Signal, Practice Bomb: MK6 Mod 0

Mark.....	6
Mod.....	0
Length of Assembly (in.).....	8.0
Diameter of Body (in.).....	3.0
Weight of Assembled Signal (lb).....	3.7
Container Material.....	Steel
Explosive Charge.....	Black Powder
Weight (lb).....	2.0

a. Description. Practice bomb signal MK6 Mod 0 (fig. 5-25 and table 5-26) consists of a can of black powder fitted with inert fuze AN-MK247 Mod 0 and a blank .38-caliber cartridge used as a detonator.

Signal MK6 is used with practice bombs for observation of bombing accuracy.

b. Functioning. Upon release of the bomb from the aircraft, the arming wire is withdrawn, permitting the fuze arming vane to rotate and arm the signal. Upon impact, the firing pin in the fuze overcomes a creep spring and impinges upon the primer of the blank cartridge, which, in turn, ignites the black-powder charge. The resulting explosion produces a flash of light and a large puff of gray smoke.

c. Differences Between MK6 and MK7. Refer to paragraph 5-33.

5-33. Signal, Practice Bomb: MK7 Mod 0

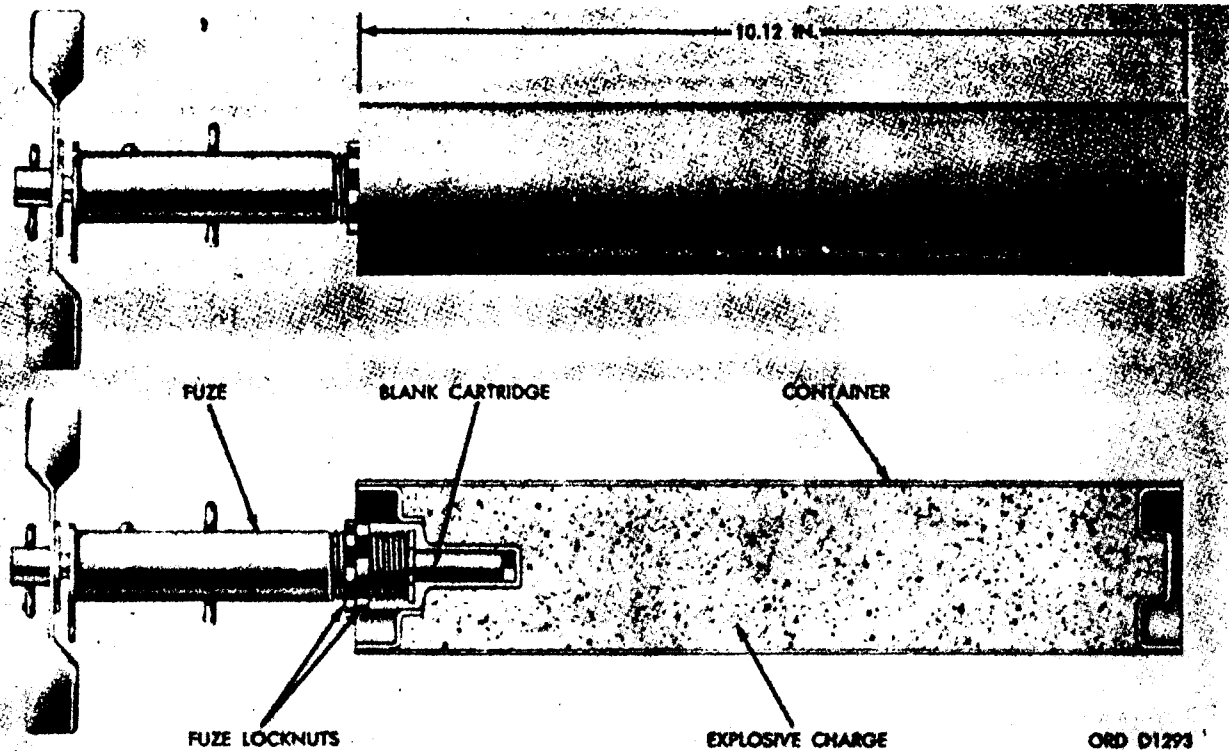


Figure 5-26. Signal, practice bomb: MK7 Mod 0 w/fuze.

Table 5-27. Signal, Practice Bomb: MK7 Mod 0

Mark.....	7
Mod.....	0
Length of Assembly (in.).....	10.12
Diameter of Body (in.).....	2.0
Weight of Assembled Signal (lb).....	2.5
Container Material.....	Steel
Explosive Charge.....	Black Powder
Weight (lb).....	1.0

a. *Description.* Practice bomb signal MK7 Mod 0 (fig. 5-26 and table 5-27) consists of a can of black powder fitted with inert fuze AN-MK247 Mod 0 and a blank .38-caliber cartridge which is used as a detonator. Signal MK7 is used with practice bombs for observation of bombing accuracy.

b. *Functioning.* Upon release of the bomb from the aircraft, the arming wire is withdrawn, per-

mitting the fuze arming vane to rotate and arm the signal. Upon impact, the firing pin in the fuze overcomes a creep spring and impinges upon the primer of the blank cartridge which, in turn, ignites the black-powder charge. The resulting explosion produces a flash of light and a large puff of gray smoke.

c. *Differences.* The MK7 is generally the same as the MK6 except that the fuze is mounted off-center in the MK6 and its black-powder filling weighs about 1 pound more.

5-34. Spotting Charges

Spotting charges function in the same manner and for the same purpose as the signal cartridges; however, they consist of relatively larger amounts of filler.

Part 6 — Chapter 19 — Section 2

ARMY PRACTICE BOMBS

3-pound AN-Mk 5 Mod 1

See Navy practice bombs.

20-pound M48

This is a dummy of the 20-pound Fragmentation Bomb AN-M41. It has a two-ounce black-powder charge and uses the Fuze M110 or AN-M110A1 in the nose. It is 21.8-inches long; weighs 19.7 pounds. It is issued in practice bomb clusters M2 and M2A1.

23-pound M71 and M71A1

These are parachute-type practice fragmentation bombs for clustering. They do not have a fuze or spotting charge, because of the presence of the parachute. The parachute assembly is the M3, modified from the M4 by removal of the suspension assembly, hand assembly, and pull wire container. M71 is 26.8 inches long; weighs 21 pounds. M71A1 differs by the addition of the shoulder to the bomb nose.

100-pound M38A2

Over-all length, inches.....	47.5
Diameter, inches.....	8.13
Weight, empty, pounds.....	15.7
Weight, sand-loaded and spotting charge, pounds.....	100

This bomb simulates a G.P. bomb of the same size. The spotting charge is assembled in a sleeve at the base of the bomb, within the fin box. Authorized spotting charges are M1A1, M3, and M4.

100-pound M75

Length, inches.....	47.0
Diameter, inches.....	8.0
Filler, hematite, pounds.....	72
Total weight, pounds.....	101.3

This bomb is designed to provide a target reference for practice bombing over snow-covered ranges. Resembling the chemical bomb of the same size, it consists of a light, sheet-metal case; a charge of red iron ore (hematite); a Burster M4; and a Fuze M108 in the nose.

100-pound M85

This model is a reinforced concrete design ordered to relieve a temporary shortage of the Practice Bomb M38A2 during the war.

Spotting Charges (Army)

M1A1

Over-all length, inches.....	11.18
Diameter, inches.....	3.43
Weight, pounds.....	4.25
Black-powder charge, pounds.....	3.0
Bomb used in.....	M38A2
Fuze.....	Integral inertia-type

This type of spotting charge fits in the after end of the 100-pound Practice Bomb M38A2. It produces a flash of flame and white smoke for observation of bombing accuracy. When assembled in the bomb, the can of the charge protrudes two to three inches out of the bomb body.

The fuze is an integral part of the spotting charge assembly. When the arming wire is pulled, the spring-loaded arming pin jumps out, leaving the inertia weight supported only by the combination firing pin and creep spring. On impact, the inertia weight drives this firing pin into the shotgun-type primer, which, in turn, ignites the black powder.

M3: The Spotting charge M3 has a 2¼-pound dark smoke filling and a black-powder igniter. It is ⅝ inch longer than the Spotting Charge M1A1, but otherwise is like it. The M3, with

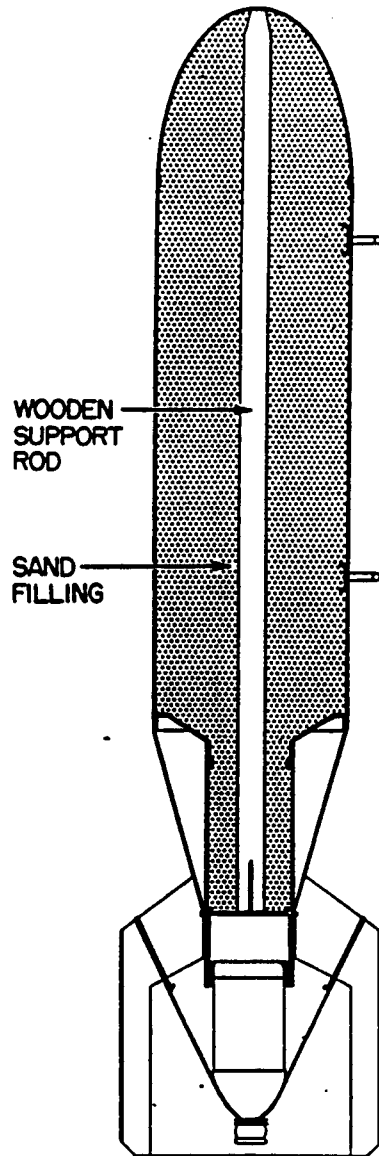


Figure 314. 100-pound Practice Bomb M38A2

its dark smoke filler, is well adapted for bombing practice over snow-covered terrain. The black-powder igniter charge contains approximately 425 grains. It is used in the Practice Bomb M38A2.

M5	
Over-all length, inches.....	7.37
Diameter, inches.....	2.95

Material	Glass
FS filler, fluid ounces.....	14.4

The Spotting Charge M5 consists of a glass bottle filled with FS smoke mixture. An ordinary bottle cap seals the mixture. The bottle is held to the Practice Bomb M38A2 by a wire twisted around the neck of the bottle and attached to the tail vanes. The charge assembly weighs 2.54 pounds.

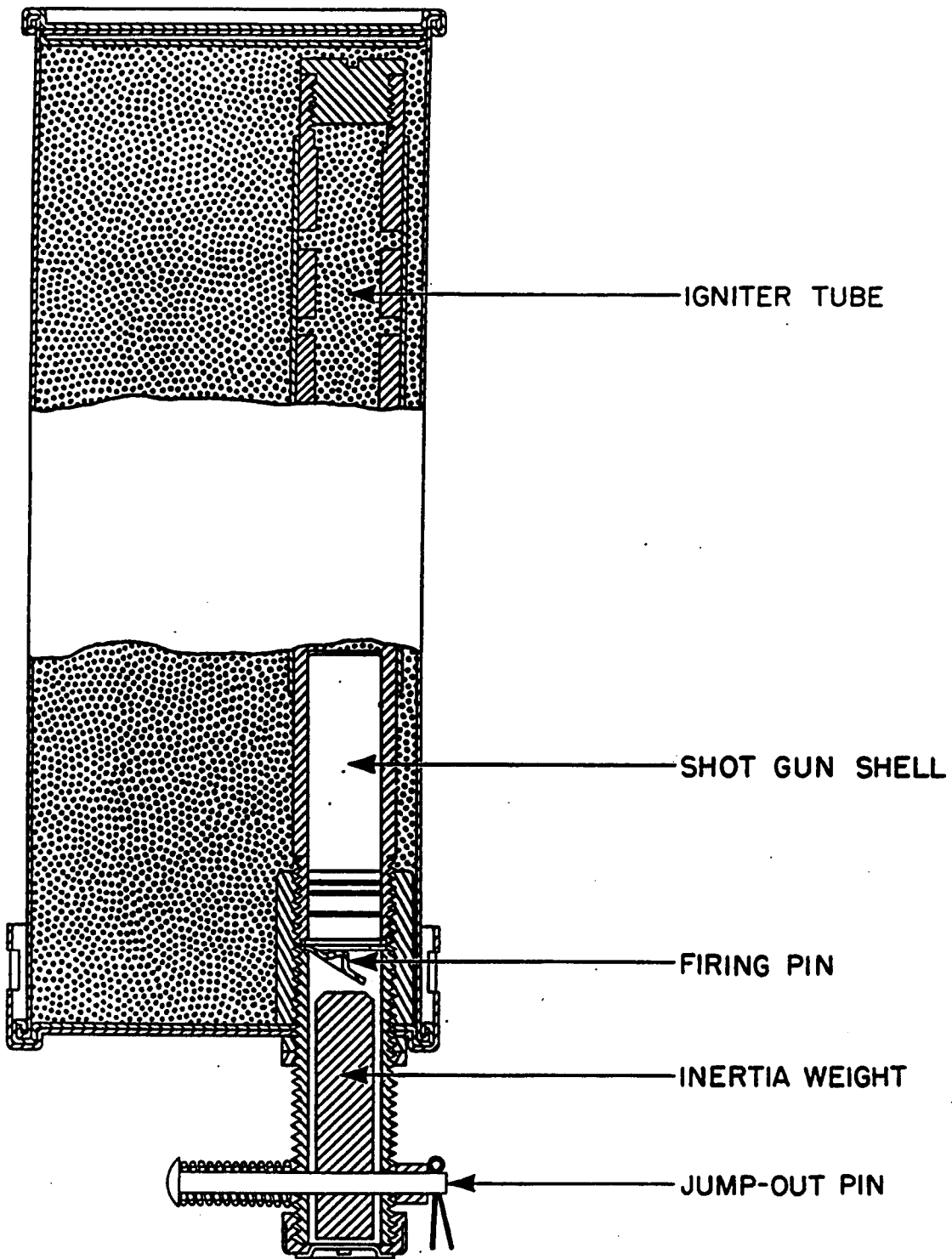


Figure 315. Spotting Charge M1A1

~~CONFIDENTIAL~~

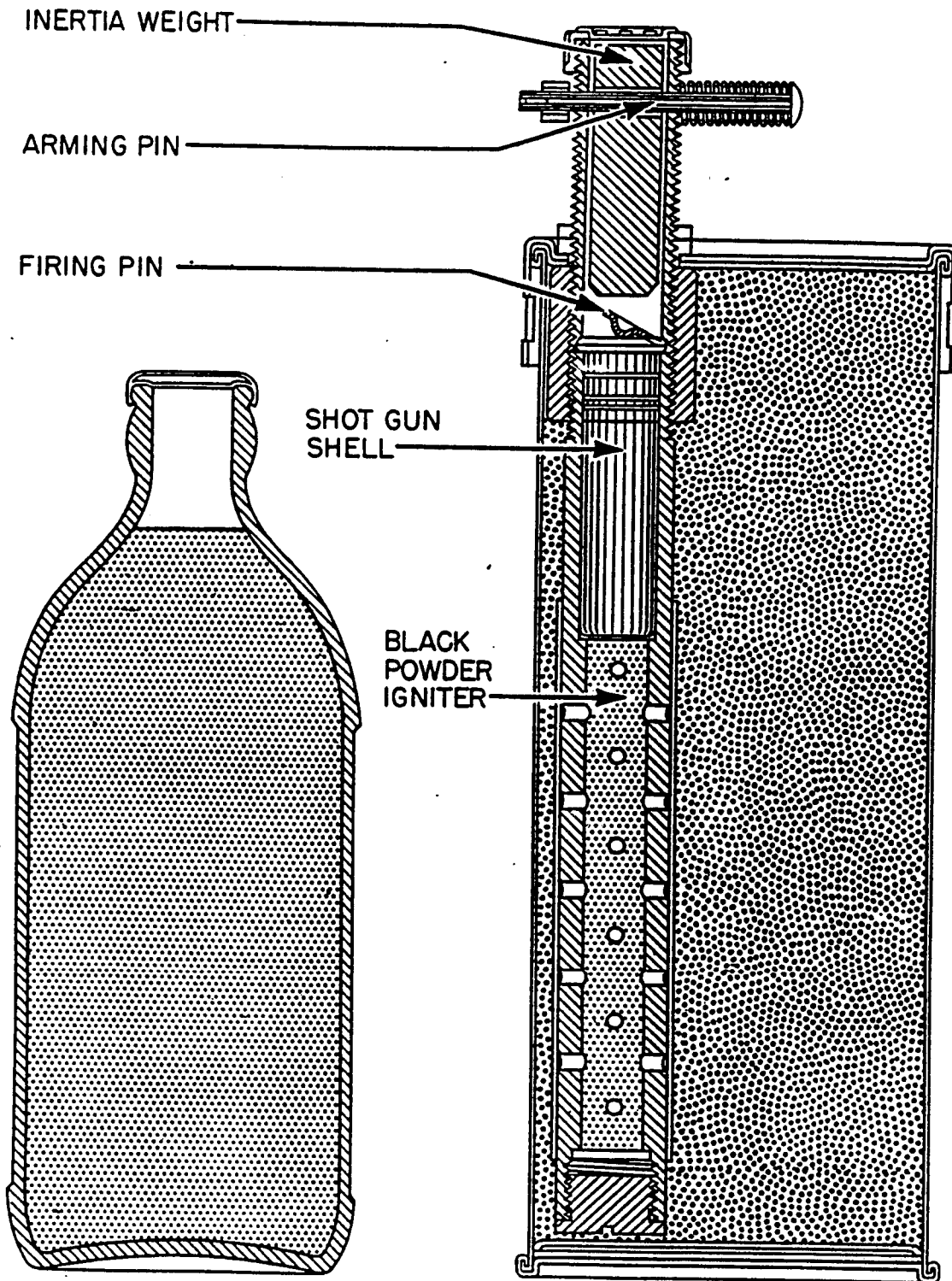
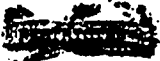
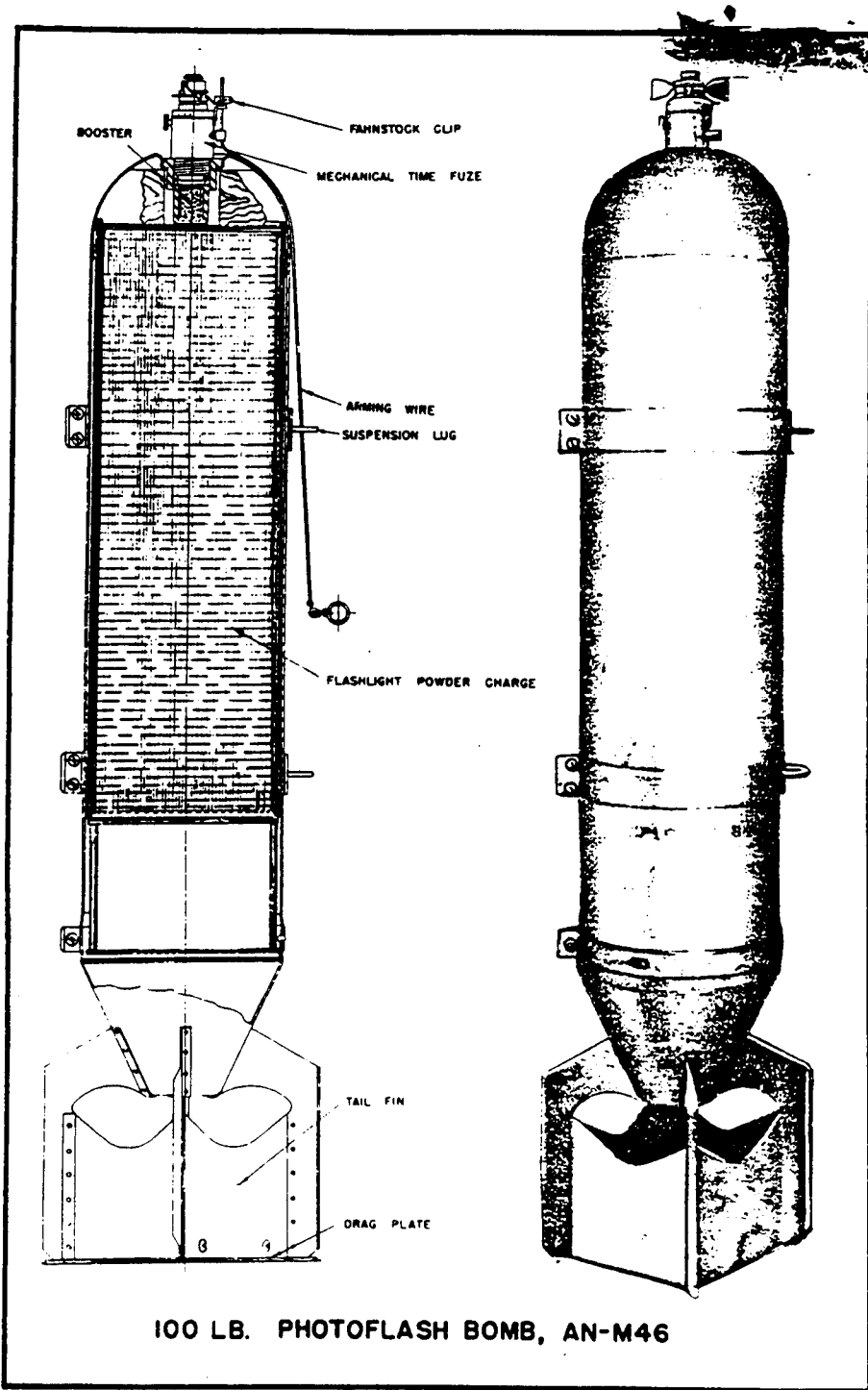


Figure 316. Spotting Charges M3 (right) and M5 (left)

 <p><u>Data:</u></p> <p>OVERALL LENGTH 48.4 in. DIAMETER OF BODY 8 in. WEIGHT 51.9 lbs. WEIGHT FLASH POWDER 25 lbs. BURNING TIME20 seconds PEAK INTENSITY 500,000,000 candlepower</p>	<p><u>ARMY - NAVY BOMB</u></p> <p>AN-M46</p> <p>PHOTOFLASH</p> <p>BOMB</p>
<p>USE:</p> <p>For night photography. (Developed so that planes engaged in night photography reconnaissance need not be limited to low altitudes.)</p>	
<p>FUZZING:</p> <p>M 111 A2, AN-M 146, M 155, M 144.</p>	
<p>DESCRIPTION:</p> <p>In appearance it resembles a conventional light case bomb. Uses an M 111A2 fuze in the nose, but it is issued unfuzed. It also has two suspension bands for rack and shackle suspension. Has box type tail with square drag plate closing off the tail vane assembly.</p>	
<p>RELEASING METHODS:</p> <p>This bomb can be dropped from any bomb rack or shackle except the Mk 35 rack.</p>	
<p>OPERATION:</p> <p>When the bomb is dropped the arming wire is pulled, starting the mechanical time fuze. When the time set on the fuze has elapsed, the flashlight powder is ignited by the fuze booster. The resulting flash of light lasts for about .20 sec. and has a peak intensity of approximately 500,000,000 candlepower.</p>	
<p>REMARKS:</p> <p>Because of the brilliance of the flash it is detrimental to the vision to watch the explosion of photoflash bombs. Extreme care should be exercised in handling these bombs, because the charge is very sensitive to friction, shock, and temperature. Bomb should not be jettisoned over friendly territory, as it may function on impact.</p>	



ORDNANCE AND EXPLOSIVE
ARCHIVES SEARCH REPORT
FOR
BORREGO MANEUVER AREA
BORREGO SPRINGS, CALIFORNIA
PROJECT NUMBER J09CA701101

APPENDIX E

REPORTS/STUDIES

APPENDIX E

REPORTS/STUDIES

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- E-4. Historical Report Describing WWII Military Operations in the Anza Borrego Desert State Park, 31 October 1991 (B-25).
- E-5. Explosive Ordnance Disposal Incident Report, 11 Mar 1994 (B-26).
- E-6. Report of Federal and State Rare and Endangered Species in San Diego County, 2 July 1996 (B-27).
- E-7. Report of Threatened, Endangered, or Proposed Species for the Borrego Maneuver Area and Camp, 18 December 1996 (B-28).
- E-8. Arson/Bomb Investigation Division Preliminary Investigation Report for Found Military Ordnance, 29 December 1996 (B-29).

**SITE SURVEY SUMMARY SHEET
FOR
DERP-FUDS SITE NO. J09CA701100**

**BORREGO SPRINGS
BORREGO SPRINGS, CALIFORNIA
6 JULY 1994**

SITE NAME: Borrego Springs, California (includes: Army - Borrego Maneuver Area, Navy - Benson Dry Lake, Navy - Borrego Hotel, Navy - Borrego Military Wash, Navy - Clark's Dry Lake, and Marines - Camp Ensign).

LOCATION: The majority of the site is located in the northern portion of Anza-Borrego Desert State Park. The Park is located in eastern San Diego County, west and southwest of the Salton Sea, California. The overall general area consists of desert terrain and dry lakes.

SITE HISTORY: The Borrego Springs site was a composite of several sub-sites within or immediately adjacent to the boundaries of the Anza-Borrego Desert State Park. Sub-sites that were formerly utilized by the Army, Navy or Marines include: Borrego Maneuver Area, Benson Dry Lake, Borrego Hotel, Borrego Military Wash, Clark's Dry Lake, and Camp Ensign. Each of these areas are discussed separately below.

Army - Borrego Maneuver Area The Borrego Maneuver area comprised of approximately 400 square miles of park land. The northern boundary extended to the Riverside County line, the eastern boundary was U.S. Highway 99, the southern boundary was State Highway 78, and the western boundary was a north-south line through Borrego P.O. The property was acquired by the Department of the Army through a Use Permit with the State of California dated 10 March 1942. This permit exempted three areas: portion of Township 9 South, Range 9 East, lying between U.S. Highway No. 99 and the Santa Rosa Mountains (this area is an Indian Reservation); Benson's Dry Lake lying north of Ocotillo (Naval landing field); and area adjacent to western boundary on which houses, fences and other improvements have been erected. It is not clear if private properties were also exempted. Records indicate the majority of the Maneuver area was returned to the State of California during the end of 1944.

The Department of the Army conducted extensive logistical preparations to build roads in the area but reportedly did not use the area as extensively as originally intended. Reported uses of the area by the Army included: force-on-force maneuvers (limited number of excursions) and anti-aircraft training for troops stationed at Camp Callan (San Diego, California). Historical references to the locations where Army training activities were conducted in the Borrego Maneuver area were vague. Areas used by the Army specifically identified in the documents include Coyote Canyon, the north face of Borrego Mountain, Borrego Military Wash, south of Borrego Sink, Yaqui Pass, Fish Creek Mountain, Carrizo Canyon, and Blair Valley.

According to Jim Walker, OEW expert with the Army Corps of Engineers, the Army Maneuver Area has relatively high potential for ordnance hazards. Based on the areas history and reports of recovered ordnance, possible ordnance in the area includes: medium/large caliber arms (armor piercing), 100-pound practice bombs, 2 to 6 inch rockets, and various small arms (0.22 to 0.50 caliber).

Navy - Borrego (Military) Wash (inside the boundary of the Army's Borrego Maneuver Area) - This area lies approximately three miles due north of the town of Ocotillo Wells and Benson Dry Lake. No records were found that indicated the size of the property or when the Department of the Navy acquired it. Nevertheless, this property was located within the Borrego Maneuver Area which was acquired from the State of California by the Department of the Army in 1942.

According to the Navy records this area was used for level bombing. This was confirmed by ordnance fragments from both 100- and 250-pound bombs. The Navy and/or Army also used this area for aircraft gunnery practice as evidenced by the heavy concentration of 20mm and 0.50-caliber projectiles and clips and 2.75-inch rockets. The collapsed remains of two rake stations are present at Military Wash, only the concrete-reinforced platforms remain.

North and east of the rake stations is feature on the desert floor which consist of an east-west lineament running for about one to two miles. This feature may possibly have been the site of railroad tracts along which a target was either pulled or was self-driven. A heavy concentration of ordnance was found along this lineament. A large metal structure (8 feet by 8 feet) was located in Fault Wash (about 0.5 miles south west of the first rake station) and appears to have been a target.

Mr James Walker, OEW expert with the Army Corps of Engineers, noted that while all of the ordnance observed on this site visit presented no immediate danger, there was a distinct possibility that there could be a definite hazard presented by live ordnance that was either unobserved or buried. A week after the site visit to the area, State Park Ranger, Mr. Homer Townsend reported that the Army's 70th Ordnance Detachment for Explosive Ordnance Disposal (EOD) was sent to the intersection of Palo Verde Wash Road and Short Wash Road (approximately 3.5 miles north of the Military Wash site) and disposed of a high explosive 40mm round (Appendix 3 of 3, Section 5). Additional inquiries concerning ordnance were made to the San Diego Sheriff's Department, Borrego Springs Fire Department, former Yuma EOD contacts at the Yuma Proving Ground, and to Marine Corps EOD at Camp Pendelton. The contacts indicated that numerous sightings of various ordnance have been found at the site. The predominant type of ordnance recalled to be found in the area includes: practice bombs, spent small arms (0.50 caliber and 20mm), and some unidentified high explosive rockets or bombs. This area, in particular, is considered to be a high risk area for remaining ordnance.

Navy - Clark's Dry Lake (inside the boundary of the Army's Borrego Maneuver Area) - Clark's Dry Lake consisted of 640 acres located in Section 5, T10S, R7E. This section comprises most of the southeastern corner of the dry lake. The property was acquired by the Department of the Navy through Declaration of Taking dated 25 October 1943. This property was declared surplus on 30 November 1955. Ownership of the property was transferred to Bart J. Comer, through a Deed of Trust, on 21 September 1956. The property was subsequently granted to the State of Maryland for use as a radar telescope site. During the late 1980s the property was transferred to the State of California to be incorporated into Anza-Borrego State Park.

The Navy referred to it's installation at Clark's Dry Lake as an outlying field or as an emergency landing field, although it's primary function was as a target for practice bombing. Navy records alternatively describe it as a level bombing target and as a dual-purpose level and dive bombing target. The field was the responsibility of the Naval Auxiliary Air Station (NAAS) at Salton Sea. The NAAS-Salton Sea reported through the Naval Air Station - San Diego to the 11th Naval District headquartered in San Diego, California.

The facility included a target, two dirt landing strips, a wind sock and two bomb-proof rake stations. The target was constructed of stones placed in concentric circles and a majority of it was still intact. The landing strips consisted of sections of the desert floor that were cleared of brush. No pavement was installed, and evidence of these landing strips was not found during the site visit. The rake stations consisted of a reinforced concrete slab, three-feet thick by twelve-feet square, resting on four reinforced concrete pillars. Remnants of the rake stations are still present, including the four pillar supports for each station.

According to Jim Walker, OEW expert with the Army Corps of Engineers, the most likely ordnance expected at this site would be practice bombs with spotting charges. Remnants of ordnance spotted during the site visit included corroded remains of 6-inch and 100-pound practice bombs and 20mm shells. One source quoted in Orrell's account reports (Appendix 3 of 3, Section 3) that the amount of ordnance around the target was quite abundant at one time but today the remaining ordnance is relatively small. Orrell reports that evidence of 2.75-inch training rockets were found but none were noted during the site visit.

Additional inquiries concerning ordnance were made to the Army's 70th EOD, Park Rangers, San Diego Sheriff's Department, San Diego Fire Department, the Borrego Springs Fire Department, Yuma Proving Ground, and the Marine Corps EOD at Camp Pendelton. No specific accounts of unexploded ordnance were identified, but access to this area was restricted to the general public until the last couple of years.

Navy - Benson Dry Lake (also known as Ocotillo Dry Lake) (just outside the southern boundary of the Army's Borrego Maneuver Area) - This area lies just outside the boundary of Anza-Borrego Desert State Park at the northeast corner of Highway 78 and Split Mountain Road. The property acquired consisted of four parcels totalling 353.11 acres. Two of the parcels, 160 acres (Marvin Ben Couch) and 85.21 acres (Elbert and Chesta Benson) were purchased by the Department of Defense (DOD) on 19 November 1940. The other two parcels, 80 acres (John Sheran et al) and 27.90 acres (Elaine L. Wright et al) were acquired through a Declaration of Taking (condemnation) on 20 March 1941.

The property was used by the Department of the Navy as a dive bombing target and an emergency landing field. Use of the property during World War II is documented. Post World War II use of the property is not clear from the documentation. The property was declared excess 20 December 1955. Disposal documents indicate that the property contained no improvements and was transferred to the County of San Diego on 17 August 1956. San Diego County currently owns the property and operates a small airport at the site.

While the real estate documents indicates that no improvements were constructed at the site, two remnants of stone-reinforced bunkers were observed on the small hills immediately east of the landing field. These structures provided excellent viewing areas of the landing field to the west and the Military Wash target area approximately 3 miles to the north. No other structures were noted during the site visit and no ordnance was found.

According to Jim Walker, OEW expert with the Army Corps of Engineers, the most likely ordnance expected at a former bombing target would be practice bombs with spotting charges. According to the Borrego Springs Fire Department a 20-pound practice bomb has been recovered from the area.

Navy - Borrego Hotel (also known as Halfhill Dry Lake) (Outside the boundary of the Army's Borrego Maneuver Area) - The area is located approximately 1.5 miles south on Split Mountain Road from the intersection of Highway 78 and Split Mountain Road. The subject property comprised of 160 acres that consist of the southeast 1/4 of Section 26 Township (T) 12 South (S) and Range (R) 8 East (E) was acquired from Elmo Rowland Livingston via Declaration of Taking, dated 10 July 1941. The property was declared excess and sold to Ray Formost on 6 September 1956. Currently, the property is owned by multiple private parties (only one owner shown).

This location was designated as a dive bombing target. In the general area was the former site of the "Little Miracle Hotel" (also referred to as the "Borrego Hotel"). The hotel was deserted in the 1930s. Today only the slab of the 14 room hotel exists. An abandoned water well lies west of the former hotel. No ordnance was found in the area and the only structure observed which could present a hazard was the exposed casing of the water

well extending about two to three feet above ground level. Date of the well is unknown. The slab of former hotel is now used extensively by campers as a level area for their trailers.

According to Jim Walker, OEW expert with the Army Corps of Engineers, the most likely ordnance expected at a dive bombing area would be practice bombs with spotting charges, medium caliber arms (20mm target practice and possibly high explosives), and small arms (0.50 caliber).

Marines - Camp Ensign (just outside the western boundary of the Army's Borrego Maneuver Area) - The Ensign Ranch, known as Camp Ensign, is situated in the western portion of Borrego Springs, California. The intersection of Palm Canyon Drive and Borrego Springs Road defines the northeast corner of the former Camp. In 1943 Marines established a formal base at the Ensign Ranch. No real estate documents were found that identified the amount of acreage the camp consisted of. The historical map indicates that the camp consisted of sections 4, 9, and 16 of T11S, R6E (estimated from maps to be 1920 acres).

Camp Ensign reportedly consisted of a tented area for trainees and an unoccupied dwelling for use as headquarters near the open area where the tents were set up. The facility was used to train large numbers of Marines as truck drivers who were to be readied for combat duty in short order. It is possible that the destination for these drivers after training made practice in desert driving essential.

The area once occupied by Camp Ensign is now a residential area containing residences and large open areas. No evidence of the former camp now exists. Real estate records indicate that the area of the former camp is owned by numerous (estimated over 200) private parties.

SITE VISIT: The site was visited 26 February 1994 and 26 March 1994 by Robert A. Davis, Jr. of Groundwater Technology, Inc., San Diego, California. Jim Walker, OEW expert with the Army Corps of Engineers was present during the site visit on 26 March 1994. Site conditions encountered are detailed in the Field Trip Summary Sheet dated 22 April 1994.

CATEGORY OF HAZARD: OEW

PROJECT DESCRIPTION:

a) OEW: Recommend the Mandatory Center of Expertise (MCX) for OEW at Huntsville Division make a determination regarding further investigation at this site.

AVAILABLE STUDIES AND REPORTS:

Pacific Sierra Region, National Archives San Bruno, California - Limited files and maps on Benson Dry Lake, Borrego Hotel and Clark's Dry Lake

SITE NO. J09CA7C1100

F.L. Orrell, recent Military Operations in the Anza-Borrego
Desert State Park, (a preliminary study of such activity from
1941 to 1959) 31 October, 1991 (Revised January 1992)

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

PROJECT SURVEY SUMMARY SHEET
FOR
DERP-FUDS OEW PROJECT NO. J09CA701101

BORREGO SPRINGS
BORREGO SPRINGS, CALIFORNIA
SITE NO. J09CA701100
6 JULY 1994

PROJECT DESCRIPTION: During World War II the Department of the Army, the Department of the Navy, and the Marines used sections of the Anza-Borrego Desert State Park and/or private property in the Borrego Springs area for military purposes. The area was used for multiple purposes which include: force-on-force maneuvers, anti-aircraft training, various kinds of bombing targets, emergency landing fields, and training camps.

The majority of the acreage acquired by the Department of Defense (DOD) entailed 400 square miles that constituted the Army's Maneuver Area. The Maneuver Area included acreage that the Navy used at Borrego Military Wash (acreage unknown) and Clark's Dry Lake (640 acres). Property acquired by the Navy included Benson Dry Lake (353.11 acres) and Borrego Hotel (160 acres). Finally, the Marines acquired an undetermined amount of property (calculated 1920 acres) known as Camp Ensign.

Army - Borrego Maneuver Area Limited information was available concerning the specific types of maneuvers conducted in the area. The references indicated that less maneuvers were conducted than originally planned. However, types of ordnance expected in the area includes: medium/large caliber arms (armor piercing), 100-pound practice bombs, 2 to 6 -inch rockets and various small arms (0.22 to 0.50 caliber). Sighted ordnance, at unidentified sites in the Borrego Springs area have included the above mentioned items along with military dynamite, high explosive rockets, and fragmentation that indicates the use of high explosive bombs. This area has the potential as being a high risk area for remaining ordnance. However, recovering any remaining ordnance is complicated since the location of the Army's activities in the historical documents is vague.

None of the historical records revealed what kinds of clearance activities were conducted in the area, if any. However, reported accounts and visual inspection of the property revealed that various types of ordnance has been found, including live rounds. Agencies and personnel contacted concerning ordnance in the area included Jim Walker, OEW expert with the Army Corps of Engineers;

SITE NO. J09CA701100

Anza-Borrego State Park Rangers; Army 70th Ordnance Detachment, Explosive Ordnance Disposal (EOD); San Diego Sheriff's Department; San Diego Fire Department; Borrego Springs Fire Department; Yuma Proving Ground; and the Marine Corps EOD at Camp Pendelton.

PROJECT ELIGIBILITY: The property was formerly owned and used by the DOD (Army, Navy and Marines). Any ordnance found could be the result of past DOD activity.

POLICY CONSIDERATIONS: No policy considerations are known to exist that would affect proposal of this project.

PROPOSED PROJECT: Recommend the Corps' Mandatory Center of Expertise (MCX) for OEW at the Huntsville Division make a determination if further action is required.

RAC FORM: Attached.

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

DEFENSE ENVIRONMENTAL RESTORATION PROGRAM
FORMERLY USED DEFENSE SITES
FINDINGS AND DETERMINATION OF ELIGIBILITY

BORREGO SPRINGS
BORREGO SPRINGS, CALIFORNIA
SITE NO. J09CA701100

FINDINGS OF FACT

1) During the early 1940s the Army, Navy, and Marines acquired authorization to use six locations in the vicinity of Borrego Springs as primarily bombing targets and/or landing fields. Not all the real estate information was available, but the research conducted indicates that the property was acquired as follows. The largest area of property acquired consisted of the Army's Borrego Maneuver Area. The Maneuver Area consisted of 400 square miles (calculated 256,000 acres) that were acquired from the State of California via a Use Permit dated 10 March 1942. This permit exempted three areas: portion of Township 9 South, Range 9 East, lying between U.S. Highway No. 99 and the Santa Rosa Mountains (this area is an Indian Reservation); Benson's Dry Lake lying north of Ocotillo (Naval landing field); and area adjacent to western boundary on which houses, fences and other improvements have been erected. It is not clear if private properties were also exempted. Two of the Navy's properties were located within the Army's property and included: Borrego Military Wash and Clark's Dry Lake. No records were found that indicated the size of Borrego Military Wash or when the Department of the Navy acquired it. Clark's Dry Lake consisting of 640 acres was acquired from private parties through a Declaration of Taking dated 25 October 1943. Two additional Navy areas included Benson Dry Lake (353.11 acres) and Borrego Hotel (160 acres) and were acquired from private parties. Benson Dry Lake consisted of four parcels. Two of the parcels, 160 acres (Marvin Ben Couch) and 85.21 acres (Elbert and Chesta Benson) were purchased by the Department of Defense (DOD) on 19 November 1940. The other two parcels, 80 acres (John Sheran et al) and 27.90 acres (Elaine L. Wright et al) were acquired through a Declaration of Taking (condemnation) on 20 March 1941. Borrego Hotel was acquired from Elmo Rowland Livingston via Declaration of Taking, dated 10 July 1941. Finally, the Marines acquired an undefined amount of acreage (calculated 1920 acres) in the town of Borrego Springs known as Camp Ensign.

2) The Department of the Army acquired 400 square miles for use in force-on-force maneuvers and anti-aircraft training for troops stationed in the San Diego area. However, records indicate that the Army's use of the area may have been less than originally planned for. Referenced improvements to the Maneuver Area primarily included roads. The Navy sites were predominantly used as various bombing targets and emergency landing strips. Emergency landing strips were installed by the Navy at Benson Dry Lake and Clark's Dry Lake. Expected and or observed military improvements at the bombing targets include: remains of rake stations, remains of mobil target tracks, and remains of targets. The Marine site was reportedly used as a tent camp for trainees

from the San Diego area. No references of permanent structures or improvements were found for Camp Ensign.

3) Documentation detailing the Department of Defense (DOD) disposal activities were not available for all the sites. The records found indicated that the majority of the properties were relinquished during the 1950s. The 400 square miles which constituted the Maneuver Area were predominantly relinquished back to the State of California. Currently, the State of California owns this property as part of the Anza-Borrego Desert State Park. The 640 acres which comprises Clark's Dry Lake was transferred to Bart J. Comer, through a Deed of Trust, on 21 September 1956. The property was subsequently granted to the State of Maryland for use as a radar telescope site. During the late 1980s the property was transferred to the State of California to be incorporated into Anza-Borrego State Park. The 353.11 acres which constituted Benson Dry Lake was relinquished to the County of San Diego for use as a municipal airport. Disposal documents for Benson Dry Lake indicate that the property contained no improvements and was transferred to the County of San Diego on 17 August 1956. The 160 acres which comprised the former Borrego Hotel was declared excess and sold to Ray Formost on 6 September 1956. The former site of Borrego Hotel is currently owned by multiple private parties but only one owner is identified on the records. Site specific real estate records were not available for Camp Ensign. However the real estate records indicate that the undefined amount of acreage (calculated 1920 acres) which constituted Camp Ensign were sold to private parties and have subsequently been subdivided and are owned by multiple private parties.

DETERMINATION

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

17 Jan 95

Date

for DE Pitt col
BRUCE K. SCOTT
Brigadier General, U.S. Army
Commanding

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purpose of gunners' instruction, antiaircraft artillery target practice, and completion of any subject in which time had been lost during the training program. MTP 4-1 was to be used only as a guide for the conduct of training. Training Directive No. 6 also gave Replacement Training Center commanders a working basis for conducting specialists schools, listing how many and what type specialists would be required, and also outlining the requirement rates for line battery personnel.

3. Phase III - 8 August 1943 to 2 September 1945.

- Based on a directive from Hq AGF, Hq AAC on 8 August 1943, published Training Directive No. 6 (1943 series) which directed that training at its RTCs be increased to a seventeen-week period.⁵⁰

- The four weeks additional training time was added for the purpose of including additional small unit training up to and including the battery, with at least two weeks of continuous field exercises. Shortly thereafter, to supplement Training Directive No. 6, separate detailed training programs for conduct of training in "line" and "school" batteries of Antiaircraft Replacement Training Centers were published by the AAC with the approval of Hq AGF. These programs contained a breakdown of each subject into periods of instruction, with appropriate references to War Department publications. The general scope of the program to be conducted at specialized schools was also indicated in detail. These two programs for "line" and "school" batteries, together with Training Directive No. 6, completely replaced MTP 4-1 and provided the basis for all instruction at Replacement Training Centers. The two programs were printed separately in book form by the AAC, distribution being prescribed on the basis of three for each Training Group and Training Battalion, and one for each "line" and "school" battery at Replacement Training Centers.

Fundamentally the training program at the Antiaircraft Replacement Training Centers did not change from August 1943 until the end of hostilities. There were several new training directives. On 13 June 1944, AAC issued Training Directive No. 1. Training Directive No. 1 rescinded Training Directive No. 6 of 8 August 1943, but this only effected procedure and not the subject matter.

On 30 September 1944, the AAC issued a complete training directive entitled "Training Program for Antiaircraft Replacement Training Center Line and School Batteries". This publication rescinded all previous training publications. The purpose of this publication was to be a guide for the training of enlisted replacements of gun, automatic weapons, automatic weapons (SP), and searchlight line batteries and enlisted replacements of school batteries at Antiaircraft Replacement Training Centers during a seventeen week period. The subjects covered were fundamentally the same as in all previous training directives, but this directive stressed realism in all training. The training program set-up in September 1944 remained in effect until after hostilities in Europe ceased.

Due to the cessation of hostilities in Europe and the redeployment of troops from Europe to the Pacific, it was necessary to revise somewhat the training in AAC. On 11 July 1945, the War Department issued MTP 44-2 which set up the complete program for all Antiaircraft Replacement Training Centers. This was supplemented by AGF TM No. 1, and finally by AAC TD No. 1, issued on 23 July 1945. TD No. 1 of the AAC took into consideration the special training of trainees under nineteen years of age. In April 1945, AAC was informed by AGF that all individuals in units who were under 19 years of age must complete a minimum of six months military training, as distinguished from military service prior to shipment overseas.⁵¹ Individual replacements under 19 years of age would not be shipped overseas until they had completed six months military training.⁵² After V-E Day, all replacements under 19 years of age who had completed

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On 1 June 1942, when two Coast Artillery (AA) regiments were activated thereat. The Sigsbee Engineer Command was also located at this camp. The AAATC, at Camp Edwards, was discontinued as of 15 July 1944.⁹

Camp Hulen is located approximately two miles west of Palacios, Texas, on Galveston Bay, approximately seventy miles from Houston. It was built in the latter part of 1940 and early 1941 as a Coast Artillery Unit Training Center. The AAATC at Camp Hulen was discontinued as of 10 December 1944.¹⁰

Fort Bliss is located approximately five miles northeast of El Paso, Texas. The proper name is an old one, having housed the troops of the First Cavalry Division since World War I, and being commonly known as a Cavalry Post. During 1941, additions were made to the post for Coast Artillery (AA) troops, and a separate Coast Artillery (AA) Training Center was established. With the discontinuance of Camp Callan in January 1944, the Replacement Training Center was transferred to Fort Bliss. At the same time the Officers Replacement Pool was also transferred to Fort Bliss.¹¹ In December 1944, the AAC was transferred from Richmond, Virginia to Fort Bliss, its present station. Also, in October 1944, the AAAS and AAAB were moved from Camp Davis to their present location at Fort Bliss, Texas. On 31 March 1945, the AAATC at Fort Bliss was discontinued.¹² Due to the termination of hostilities in Europe, it was necessary for the AAC to reopen two AAATCs. On 18 July 1945, the AAATC at Fort Bliss was again opened.¹²⁻¹ During the period, 18 July 1945 through 2 September 1945, the AAATC at Fort Bliss, Texas, was in the process of getting organized, this process had just been completed and training of the first redeployed units started when all hostilities ended.

Fort Sheridan, Illinois, is located approximately twenty-five miles north of Chicago, on Lake Michigan. For many years this post was used as a Coast Artillery Aircraft Artillery Training Camp, the Regular Army 61st Coast Artillery (AA) regiment being stationed there during peace time. At the time of activation of the AAC, one separate Coast Artillery (AA) automatic weapons battalion was stationed at this camp, and there was no headquarters establishment for supervision of AA training. Headquarters and headquarters battery for the AAATC were activated on 26 March 1943.¹³ This AAATC was disbanded on 1 November 1943.¹⁴

Camp Haan is located ten miles southeast of Riverside, California, and is adjacent to March Field, California. It was built in the early part of 1941 as a Coast Artillery Training Center. Antiaircraft Artillery firing is conducted at a firing point in the Mojave Desert located approximately one hundred and thirty-five miles north of Camp Haan. Originally known as the Mojave Desert Antiaircraft Artillery Firing Range, the designation of this sub-camp was changed to Camp Irwin on 4 December 1942, by War Department Orders.¹⁵ Camp Haan, California, was discontinued, effective on 31 January 1945.¹⁶

Appendix "D" to this history lists the number and types of Coast Artillery (AA) units undergoing training at each of the above training centers on activation of the AAC (9 March 1942). In considering the small number of Coast Artillery (AA) units stationed at the above training centers at the time of activation of the AAC, it should be remembered that with declaration of war by the United States, the demand for AA units was great, and the Coast Artillery Unit Training Centers had been stripped of personnel and even only partially trained AA units for immediate service in Defense Commands and overseas.

in securing sufficient land to warrant adequate safe firing, very few 90mm gun units were trained at Camp Hulen.²¹ At Fort Sheridan, firing with AAA weapons was conducted over Lake Michigan, the firing point being located on the post reservation.

At three of the AAATCs, firing with primary AAA weapons was conducted at aerial targets flying over land areas. At Camp Stewart, Georgia, sufficient additional land was obtained as a part of the reservation to permit all firing with AAA weapons to be conducted over land. The main firing point was located within the camp reservation, with a second firing range known as the Roding range being located approximately fifteen miles distant from the main firing range. At Fort Bliss, Texas, additional land in New Mexico was leased for firing with AAA weapons. The firing range was an area comprising approximately 650 square miles, with the nearest point about 20 miles distant. Originally, AAA firing was conducted from seven individual firing points all over the range. In the fall of 1942 the firing points were consolidated, all firing with 40mm and other automatic weapons being conducted at Hueco, New Mexico, from a firing line approximately 1-3/4 miles long. All firing with 90mm (and 120mm) guns was conducted at Orogrande, New Mexico, from a firing point approximately 3-1/2 miles in length. Hueco is located approximately twenty-five miles, and Orogrande approximately fifty miles, distant from Fort Bliss. As already mentioned, the Mojave Desert Anti-aircraft Artillery Firing Range, known since December 1942 as Camp Irwin, California, served as the AAA firing area for Camp Haan. Four separate firing points were located at Camp Irwin, which is approximately 135 miles from Camp Haan, firing being conducted over desert regions.

The increasing number of units undergoing training at each of the training centers made it mandatory that firing ranges be utilized to the utmost degree. Close schedules for firing were made and maintained insofar as practicable, consistent with weather conditions and availability of towing missions. To obtain maximum possible use of flying missions, procedures were established whereby units utilized tow-target flying missions for training in tracking while other units were conducting their firing practices.

2. Anti-Mechanized Ranges.

For carrying out the secondary mission of antiaircraft artillery, the 90mm AA gun, 40mm and other automatic weapons of the AAA are capable of firing upon ground as well as air targets. All firing units were required to become proficient in the use of their weapons against ground targets as well as air targets. Consequently, training for and firing at ground or surface targets received important consideration in the training of AAA units.²²

To accomplish this training, anti-mechanized ranges were built and utilized in all of the unit training centers. Usually these anti-mechanized ranges were constructed adjacent to normal firing ranges in such manner that necessary safety precautions could be observed. At Camp Hulen, Camp Stewart, Fort Bliss, and Camp Davis, targets mounted on power-operated or winch-drawn cars running on a defiladed track were utilized for this purpose. At Camp Irwin, Fort Fisher, and Fort Sheridan, targets built on sleds and towed by distant vehicles were used.

E. Maneuver Areas.

With the increase in training period for AAA units from 12 to 18 and eventually 26 weeks, and the increased emphasis on field exercise training, the need for additional maneuver areas for the use of AAA units became a matter of vital concern to Unit Training Center commanders. Owners of suitable land had to be contacted, and necessary permission for its use had to be obtained. Insofar as possible, areas adjacent to

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ing centers were used for this purpose, but in some cases available maneuver areas field exercises could be found only at considerable distances from the training centers concerned. The training center at Fort Sheridan had difficulty in securing factory areas due to the dense population around Chicago, and areas which were not particularly conducive to realistic field exercises training had to be selected and used. On the other hand, the vast desert regions adjacent to Fort Bliss, Texas, and Camp Irwin, California (sub-camp of Camp Haan), afforded ample opportunity for conduct of field exercises, the extent of which was unlimited. The wooded areas near Cape Cod, Massachusetts, adjacent to Camp Edwards, also proved excellent for field exercise training. Camp Stewart, Georgia, was blessed with considerable adjacent areas (approximately 600 square miles in the Government reservation) which would be utilized for this purpose. In this connection, Camp Stewart was in a far better position than Camp Davis, where maneuver facilities were relatively limited.

Searchlight defense areas were provided in each AAATC where searchlight battalions were being trained. These consisted of plots of ground at normal tactical distances which were made available to searchlight units for complete tactical occupation and defense of a normal searchlight defense.

Training Aids of a General Nature.

On activation of the AAC, small arms target ranges, bayonet courses, and obstacle courses for physical development were already available at the unit training centers. With the increase in the number of units undergoing training, however, additional ranges and courses of this type had to be constructed in proportion to the increase in training capacity of the respective training centers. Additional gas chambers as needed were also constructed. Sanitary demonstration areas were established, these consisted of designated areas in which troops constructed latrines, soakage pits, garbage pits, trenches, incinerators, grease traps and field showers for practice and demonstration purposes.

Mock-ups of cargo airplanes were constructed for the purpose of training troops in loading and unloading of airborne AAA units and the earlier air echelons of automatic weapons units in loading and unloading of lashing equipment. Mock-ups of railroad flat cars were also constructed at the unit training centers for use in training of personnel in loading AAA equipment and lashing.

In the early part of 1943 Infiltration Courses were constructed at all of the training centers. These infiltration courses provide an area of ground on which troops are held under barbed wire while being subjected to nearby explosions and overhead machine gun fire, for the purpose of psychological battle training.²³ Debarkation towers were also constructed at all training centers. The debarkation tower has a solid wall on one side against which a cargo net is suspended; climbing down the net with full load provides training for troops in debarking from ships as well as physical conditioning.²⁴

Training aids of a special nature used in training of AAA troops are covered in a separate chapter of that title.

Physical Conditioning of Troops.

During the early part of 1943, increasing stress was placed on the battle conditioning of troops, through a definite program of physical and psychological hardening of both officers and men.²⁵

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under TD No. 6 until June 1944, when a new TD was issued. This TD and subsequently TD No. 1 of 1945 made very little change in the organization of the school batteries.¹⁸

The majority of the training batteries were known as "line" units, their mission being to accomplish the full training of individuals as AA artillerymen during the prescribed training program,

D. Conduct of Training.

After completion of prescribed basic training, advanced training was conducted to prepare trainees for T/O requirements for Coast Artillery (AA) regiments, and the later basic AAA battalions. These requirements were officially listed as military Specialist Serial Numbers (SSN) and trainees were qualified during the training cycle to fill duties covered by these serial numbers. The troop basis for activation of various types of AAA units and the occurrence rate of each SSN appearing in T/O for gun, automatic weapons and searchlight units, governed the number of each SSN to be trained.¹⁹

Each training battery had assigned to it a fixed cadre of officers and enlisted men, whose function was to supervise and conduct the training of men assigned to the unit during a training cycle, under supervision of the battalion and group organization. In most instances the batteries within a battalion operated on the same training cycle, but in some cases, especially in school battalions or battalions having batteries of different types, training cycles were necessarily staggered by battery to insure a constant output of the various types of specialists.

Due to the intensive program necessary in training of combat loss replacements on the numerous types of AA weapons and equipment, it was essential that specialized supervision of instruction take place. To better accomplish this objective, in April 1943 Hq AAC directed that qualified officers in gunnery (for 90mm guns), automatic weapons, and searchlights, be placed on the replacement training center staff to supervise the technical phases of this training. These specialists served as technical assistants to the Replacement Training Center S-3 for the purpose of coordinating and facilitating the training of all batteries.²⁰ This in effect provided specialized training center inspection teams which kept constant check on the activities of the training batteries. These specialists were drawn from available officers in the AAAORP. Unfortunately, these officers were never assigned to the AARTC, but only placed on temporary duty. This method caused a very high turnover in officers. In September 1943, a specialist in Target Recognition training methods was added to the staff of each replacement training center commander.

■ Paralleling the trend in AAATCs during the early part of 1943, increasing stress was placed on battle conditioning of all trainees, through a definite program of physical and psychological hardening.²¹ The fullest possible use was made of obstacle and infiltration courses, and trainees were taken on hikes which started at 2 miles without packs and finally wound up with a 25 mile hike with full pack in a time limit of 8 hours. With inception of the seventeen-week training program, all training organizations were required to spend the last two weeks of the training cycle in the field occupying tactical positions and engaging in all tactical maneuvers except firing.²²

In general, the same training aids that were constructed in AAATCs, such as small arms target ranges, bayonet courses, obstacle courses, infiltration courses, debarkation towers, and gas chambers, were also used in Replacement Training Centers.²³

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E. Firing Points.

Firing points for firing the primary weapons of AAA armament were provided at all three replacement training centers. For Fort Eustis, the original firing point was at Grandview, Virginia, a distance of 23 miles from Fort Eustis, with firing being conducted over Chesapeake Bay. Commencing in May 1943, a new firing point was established at New Point Comfort, a distance of 53 miles from Fort Eustis, with firing conducted over Chesapeake Bay. For Camp Wallace, the firing point was originally located at Fort Crockett, Texas, 15 miles distant, with firing being conducted over the Gulf of Mexico. During June 1942, a new firing point came into use at East Beach, another portion of the Fort Crockett military reservation directly in front of Fort San Jacinto. In July 1943 an additional firing point was secured for Camp Wallace at West Beach, a location at the opposite end of Galveston Island from the East Beach firing point, approximately 20 miles from Camp Wallace and in the vicinity of the Aerial Gunnery Range used by the Army Air Forces stationed at the Galveston Army Air Base. The firing point for Camp Callan was located on the main reservation, with firing being conducted over the Pacific Ocean. In September 1943, a maneuver area for Camp Callan was secured in the Borego Desert, approximately 150 miles east of Camp Callan. AAA firing was also conducted at this maneuver area, in addition to such firing as was conducted at the post reservation firing point.

Anti-mechanized firing was also conducted at all three of these replacement training centers in accordance with prescribed training programs.²⁴

F. Officers' Replacement Pools.

Prior to activation of the AAC, Officer Replacement Pools for temporarily unassigned Coast Artillery officers were established at Fort Eustis and Camp Wallace.²⁵ These continued in operation upon creation of the AAC. To meet the considered need for a similar pool on the West Coast, a third pool for unassigned officers under the AAC was established at Camp Callan, California.²⁶ Commonly known throughout the AAC under the designation AAAORP, the pools at the three replacement training centers, along with one established for the AAAS at Camp Davis, N.C., and one for the Barrage Balloon School at Camp Tyson, Tennessee, for unassigned officers attending courses at those Service Schools, served as a means of caring for officers awaiting assignment. During 1943, the number of officers in the Officer Replacement Pools at the three Replacement Training Centers averaged approximately 300 at Fort Eustis, 250 at Camp Wallace, and 150 at Camp Callan.²⁷ As the Replacement Training Centers were consolidated, the AAAORPs also were consolidated. At the end of 1944 the only AAAORP in existence was stationed at Fort Bliss, Texas. In February 1945 the Officers Replacement Pool, assigned to the AARTC at Fort Bliss, was transferred to the AAS. It was hoped that under this set-up the officers could be given more complete refresher training. The AAAORP at the present date is with the AAAS.

Operation of these pools placed a heavy administrative burden on the AARTCs, as extra personnel for their operation was not allotted. Insofar as the constant in-and-out flow of these officers would permit, their services were utilized at Replacement Training Centers to assist in the training of enlisted trainees. Commencing the middle of 1943, officers assigned to replacement pools at the three Replacement Training Centers attended a three weeks school course covering AA equipment.

Commanding officers of the several antiaircraft replacement training centers, with the duration of their command, are as follows:

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Much of the AA equipment standardized subsequent to the activation of the AAC was originally proposed when the development of AAA materiel was still the responsibility of the Chief of Coast Artillery. There was no gap in continuation of these activities by the AAC, for when the latter was created, the pertinent files of the Office of the Chief of Coast Artillery were retained, and the key Coast Artillery officers then working with development of AA materiel were retained by General Green in this same work. For a full picture of the results of these continuing development activities, it will be necessary to mention the most important developments.⁴

B. Antiaircraft Artillery Weapons.

1. Guns.

a. 90mm Gun

When the AAC came into being, the 3" AA gun had already been officially superseded by the 90mm AA gun, M1 on Mount M1A1 standardized in May 1941. Evaluation of reports from combat theaters led to considerable experimentation, and a better mount was developed which was eventually standardized in May 1943 as the 90mm Gun Mount M-2. This is a two-bogie mount of increased stability which permits firing from the wheels if necessary; inclusion of a combination fuze-setter and rammer permits a higher rate of fire; the gun can be fired at a lower depression angle, and an armored shield is provided for protection of the gun crew.

For towing the 90mm M1A1 Gun Mount, a 6-ton 6x6 Truck, commonly known as a Prime Mover, had been provided. To insure more effective mobility, exhaustive tests with various tractors were conducted by the AAAB, resulting in adoption during 1943 of a high speed tractor to be used as a prime mover for the new 90mm Gun Mount M2. Standardization under nomenclature, "Tractor, High-Speed, 18-ton, M4", this 225-horsepower tractor is capable of a maximum speed of 35 miles per hour.

b. 120mm (4.7") Gun

The 120mm AA gun was developed as the result of experimentation which began prior to activation of the AAC. This gun on a mobile mount is designed for effective fire at considerably greater altitude than heretofore possible, and is known as the 120mm Gun Mount M1. The special prime mover developed and adopted for this gun was standardized in June 1943 under the nomenclature, "Tractor, High Speed, 38-Ton, M6".

2. Automatic Weapons.

a. 37mm and 40mm

In 1940 the 37mm gun mounted on a towed carriage suitable for firing against aerial targets had already been issued to AAA troops as a standard automatic weapon. This gun was mounted on the 37mm Gun Carriage M3. This mount was constantly improved, but with the adoption and issue of the 40mm automatic weapon, the 37mm gun as an automatic weapon gradually became AAA armament used only on self-propelled vehicles, except in overseas theaters such as the Southwest Pacific where considerable numbers of these weapons on the modified 37mm Gun Mount M3A1 continued to prove their worth. This M3A1 model, standardized in the early part of 1941, added power control to the M3 Mount.

Experimentation with the British 40mm Bofors AA gun, originally produced by the Swedish Bofors firm, led to its standardization in 1941 under American nomenclature, "40mm Gun M1 on Carriage M1". In May 1941, an American version of the original

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British model, with incorporation of some slight changes, was adopted and standardized under nomenclature, "40mm Gun Carriage M2". Subsequent continuing experimentation resulted in standardization in August 1943 of an M2A1 model, this modified mount providing an increased traversing ratio over that provided in the M2 version.

Another model standardized during the latter part of 1943 is the "40mm Gun Mount M5", which consists of an airborne 40mm gun mount of lighter construction and more compact design than the Carriage M2. For a fuller description of this mount, reference is made to the discussion of Air Transportable Automatic Weapons Battalions appearing in the Chapter on "Antiaircraft Artillery Combat Units".

b. Machine Guns.

In 1939, the few Coast Artillery (AA) regiments both in the United States and in overseas positions were equipped with caliber .30 and .50 machine guns on pedestal mounts that limited the guns to an elevation of only 67 degrees. The .50 caliber machine gun is now used with both single and multiple mounts that permits firing at 90 degree elevations. In spite of the fact that many considered the .50 AA machine gun too light a weapon against modern aircraft, it has proved its worth on every battlefield since the entry of the United States into World War II, and has exacted a heavy quota of aerial targets engaged. Under the latest T/O, all gun and searchlight battalions are provided with some of these .50 caliber machine guns for close-in defense. The self-propelled and mobile and semi-mobile automatic weapons battalions are equipped with them in large numbers.

In the single machine gun mount the latest type, adopted in 1942 on recommendation of the AAC, is the "Caliber, .50 Machine Gun Mount M3". This is a single gun mount for the caliber .50 machine gun, incorporating improvements in design which increase stability and facilitate smoother tracking in AA machine gun fire.

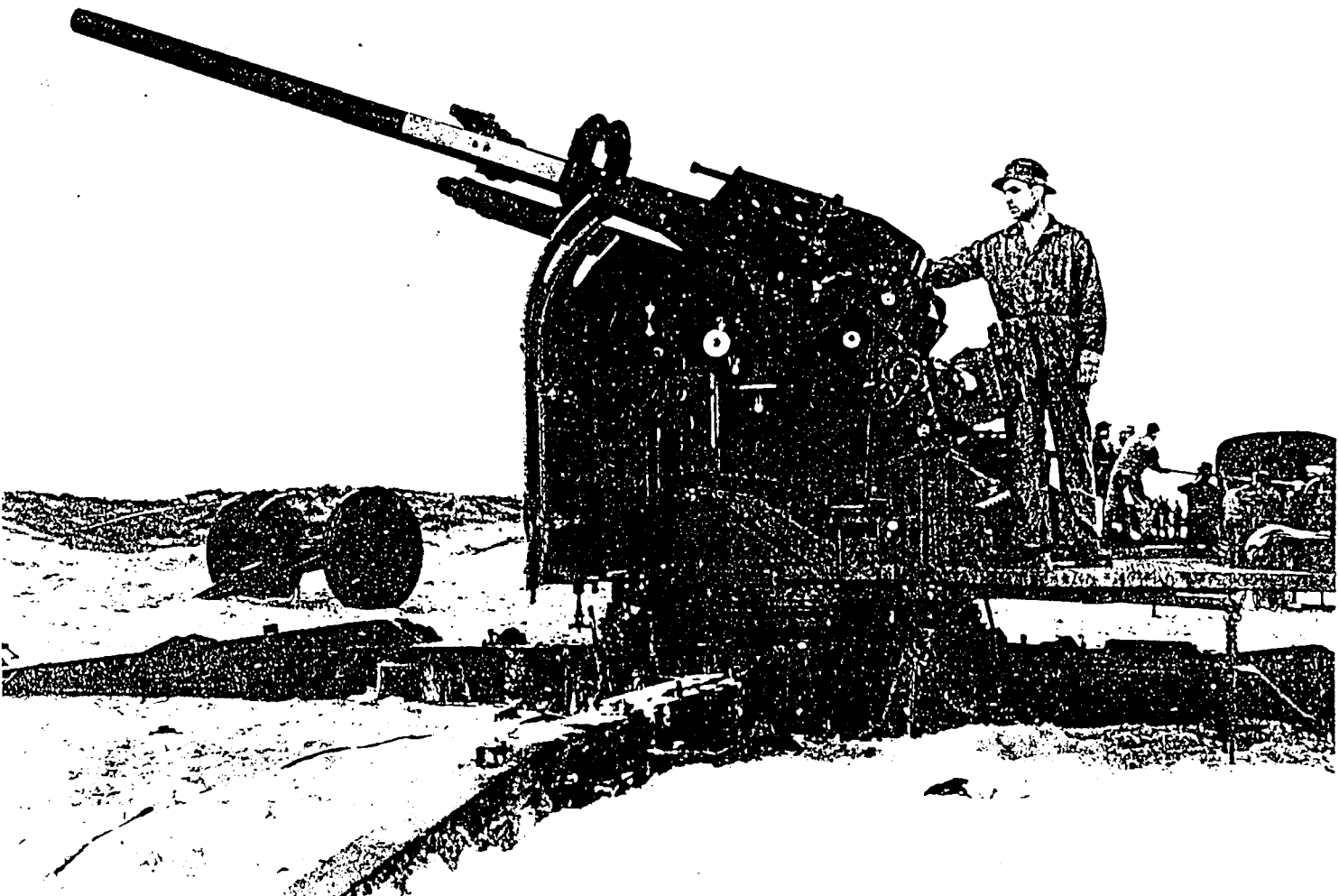
For protection of motor vehicle convoys enroute, "Truck Mount M32" was adopted. This is a single machine gun mount consisting of a large circular ring or rail mounted over a hole in a cab roof of a standard cargo truck, upon which is mounted a caliber .50 machine gun carried on a skate which is free to move on the rail in a 360° traverse.

In July 1944, caliber .50 Machine Gun Mount M63 was standardized. The .50 caliber Machine Gun Mount M63 is a lightweight ground mount for Caliber .50 Heavy Barrel Machine Gun M2. It is used as an alternate ground mount for the Caliber .50 Machine Gun normally mounted on vehicular mounts. This mount was also known as the Kochevar mount.

Under the impetus of experimentation carried on by the AAC, several types of multiple machine gun weapons have been developed and standardized. The multiple machine gun material standardized up to 2 September 1945 may be briefly described as follows:

Twin Caliber .50 Machine Gun Mount M33: A power driven, armored machine gun mount with a self-contained power unit, equipped with two (2) caliber .50 machine guns, heavy barrel, air-cooled; it is used primarily on self-propelled carriages of the M13 type.

Multiple Caliber .50 Machine Gun Mount M45: A power driven, armored machine gun mount with a self-contained power unit, similar to Mount M33, but of heavier construction, and equipped with four (4) caliber .50 machine guns, heavy barrel, air-cooled. This mount is used primarily on self-propelled carriages of the M16 type.



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90MM AA GUN (NON-STANDARD)

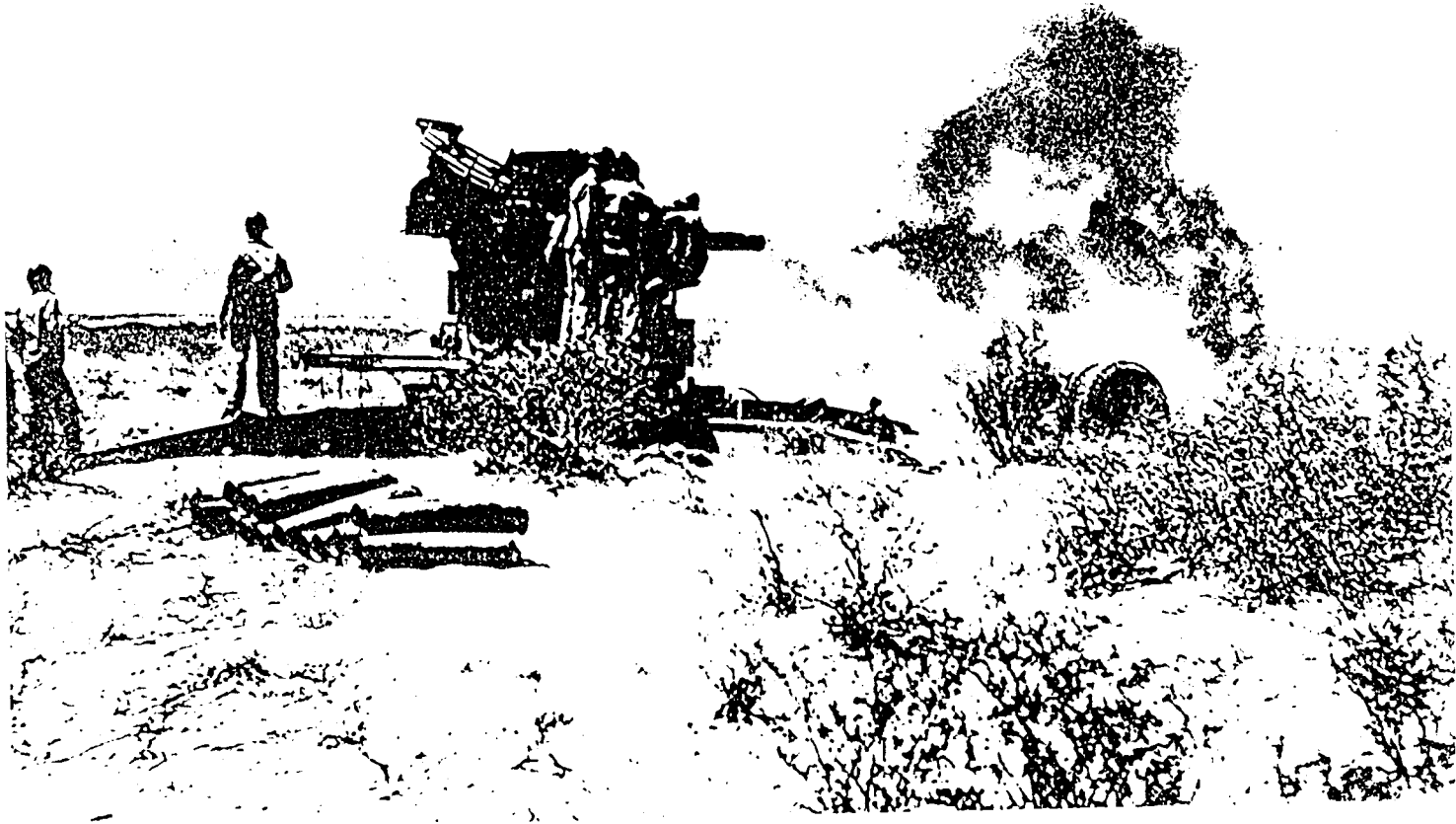
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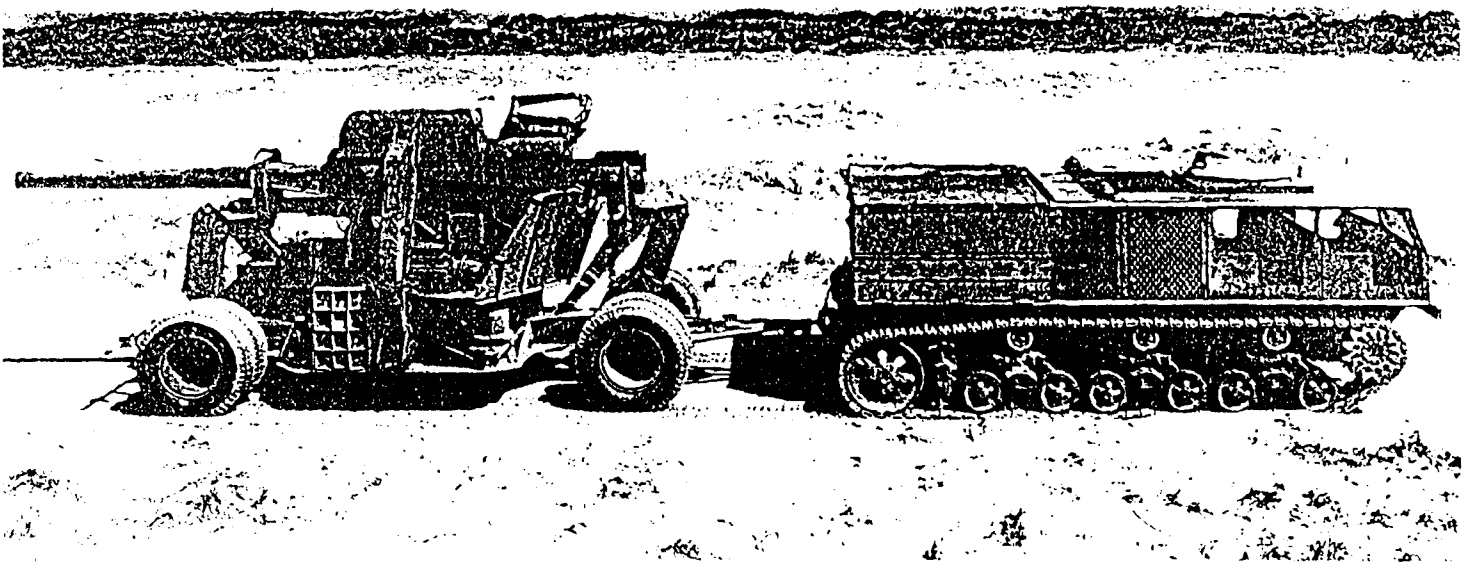
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120-MM AA GUN M1 ON MOUNT M1 FIRING AT A TERRESTRIAL TARGET

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GUN, 120MM, M1 ON MOUNT, GUN, AA, 120MM, M1, AND TRACTOR, HIGH SPEED, 38 TONS, M6

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Multiple Caliber .50 Machine Gun Carriage M51: The Multiple Caliber .50 Machine Gun Mount M45, described above, on Mount Trailer M16 (modified M7 Generator Trailer), designed to replace the single gun M2A1 and M3 caliber .50 AA machine gun mounts.

Multiple Caliber .50 Machine Gun Trailer Mount M55: This is a power-controlled turret carrying four coaxially mounted .50 caliber heavy barrel machine guns on a trailer mount capable of being transported by air; this mount is primarily for issue to Air-Transportable Automatic Weapons Battalions.

c. Self Propelled

The development of Self-Propelled Automatic Weapons Battalions has already been discussed in the Chapter entitled "Antiaircraft Combat Units", and reference is made to that chapter for the historical background leading up to the adoption of self-propelled carriages mounting AAA weapons. The carriages adopted for AAA Self-Propelled units fall into three main types:

Multiple Gun Motor Carriage M13: Half-track Personnel Carrier M3 mounting the Twin Caliber .50 Machine Gun Mount M33 discussed above. This carriage was standardized for AAA in September 1942. A similar substitute standard carriage, utilizes Half-Track Personnel Carrier M5 and is designated the M14.

Multiple Gun Motor Carriage M15: Standardized in November 1942, this carriage is Half-Track Personnel Carrier M3 mounting one 37mm gun and two coaxially mounted caliber .50 machine guns. A modified version of this carriage is known as the M15A1.

Multiple Gun Motor Carriage M16: Standardized in December 1942, this is the Half-Track Personnel Carrier M3 mounting one Multiple Caliber .50 Machine Gun Mount M45 (4 machine guns) discussed above. A similar substitute standard carriage utilizes Half-Track Personnel Carrier M5 and is designated the M17.

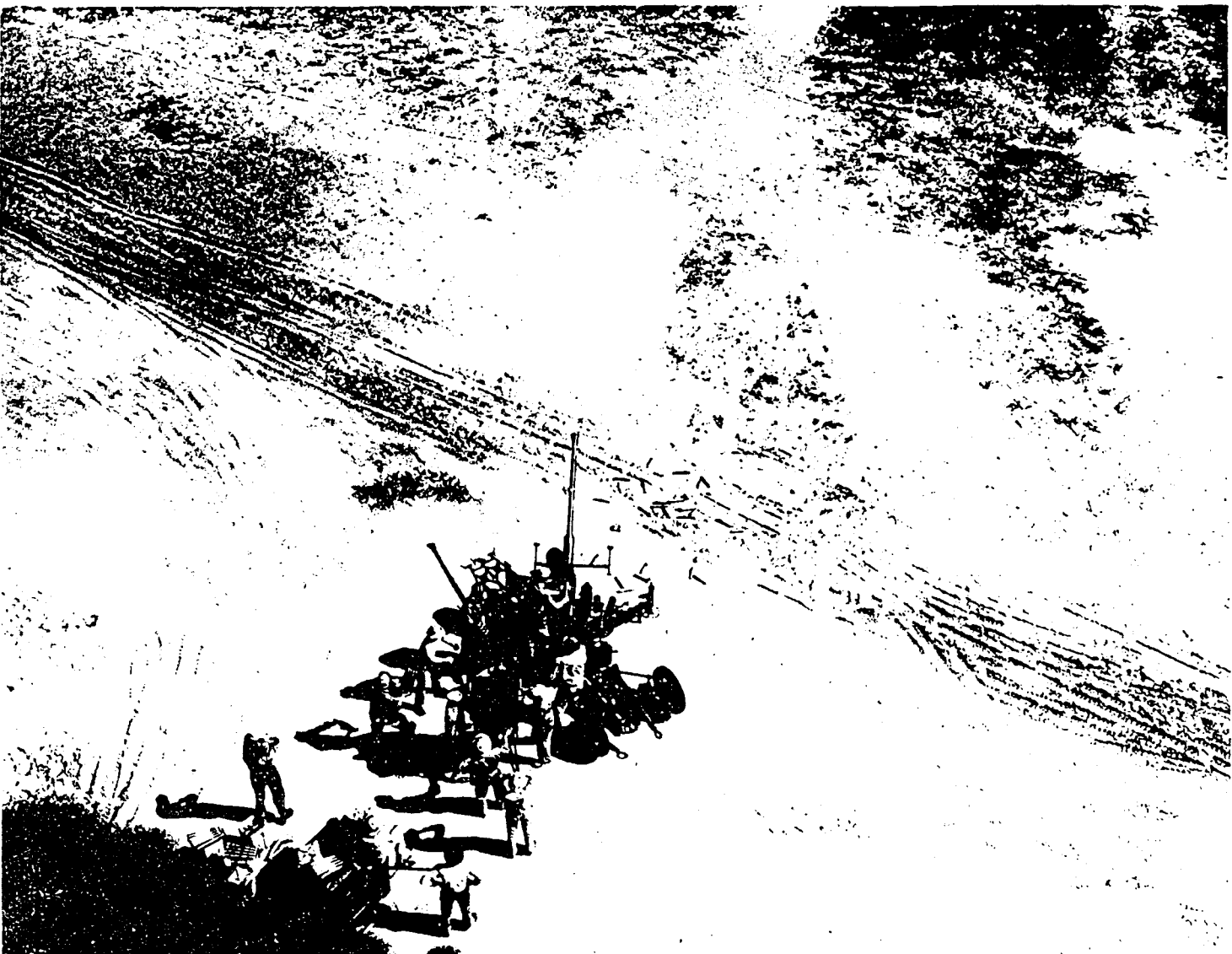
Twin 40mm Gun Motor Carriage M19: Standardized in June 1944, the M19 consists of an extended Light Tank M24 chassis mounting on M4 turret, which contains two 40mm Guns. The turret fire control is by means of a computing sight of the M7 type. The turret is driven in azimuth and the guns in elevation by two oil gear units of the M3 type.

3. Searchlights.

The standard sixty-inch searchlight used by the AAA was adopted and in use prior to activation of the AAC. Made by the General Electric and Sperry Gyroscope Companies, these searchlights generate a beam of 800 million candlepower. The effectiveness of these beams is such that under normal atmospheric conditions they can readily illuminate targets at a distance of from 8 to 10 miles.

For many years prior to the activation of the AAC, interested Coast Artillery officers experimented from time to time with the possibility of spreading the normal beam of the AA searchlight. Various modifications and additions to the standard light were experimented with. During the fall of 1942, the AAAS in collaboration with the AAAB conducted extensive experiments along these lines, modifying a standard searchlight so that the beam could be thrown out of focus by manipulation of a special hand-wheel. Extensive experimentation indicated that satisfactory results could be obtained by a simple modification of existing standard equipment. Although intensity of the beam and effective range was lessened with this focus change, the wider beam attained made it ideal for use against high speed targets flying at close range, and it was

RESTRICTED



GUN, AUTOMATIC, 40MM, M1 ON CARRIAGE, GUN, 40MM, M2A1 (AA)

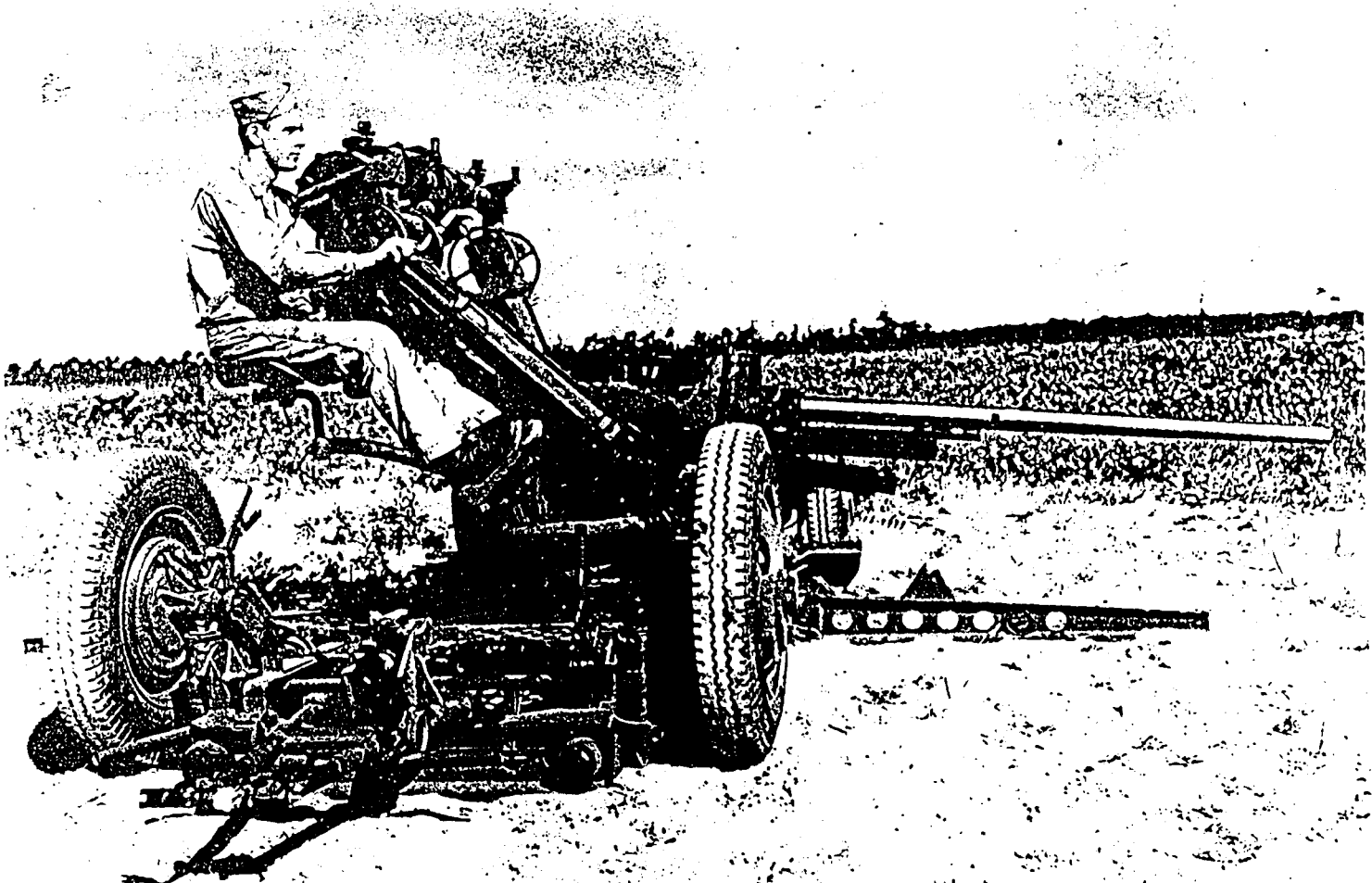
- 152 -

RESTRICTED

E-2

~~RESTRICTED~~

*reproduced meteorological
by Order, Sell
Army by, TAC 8/X-218*

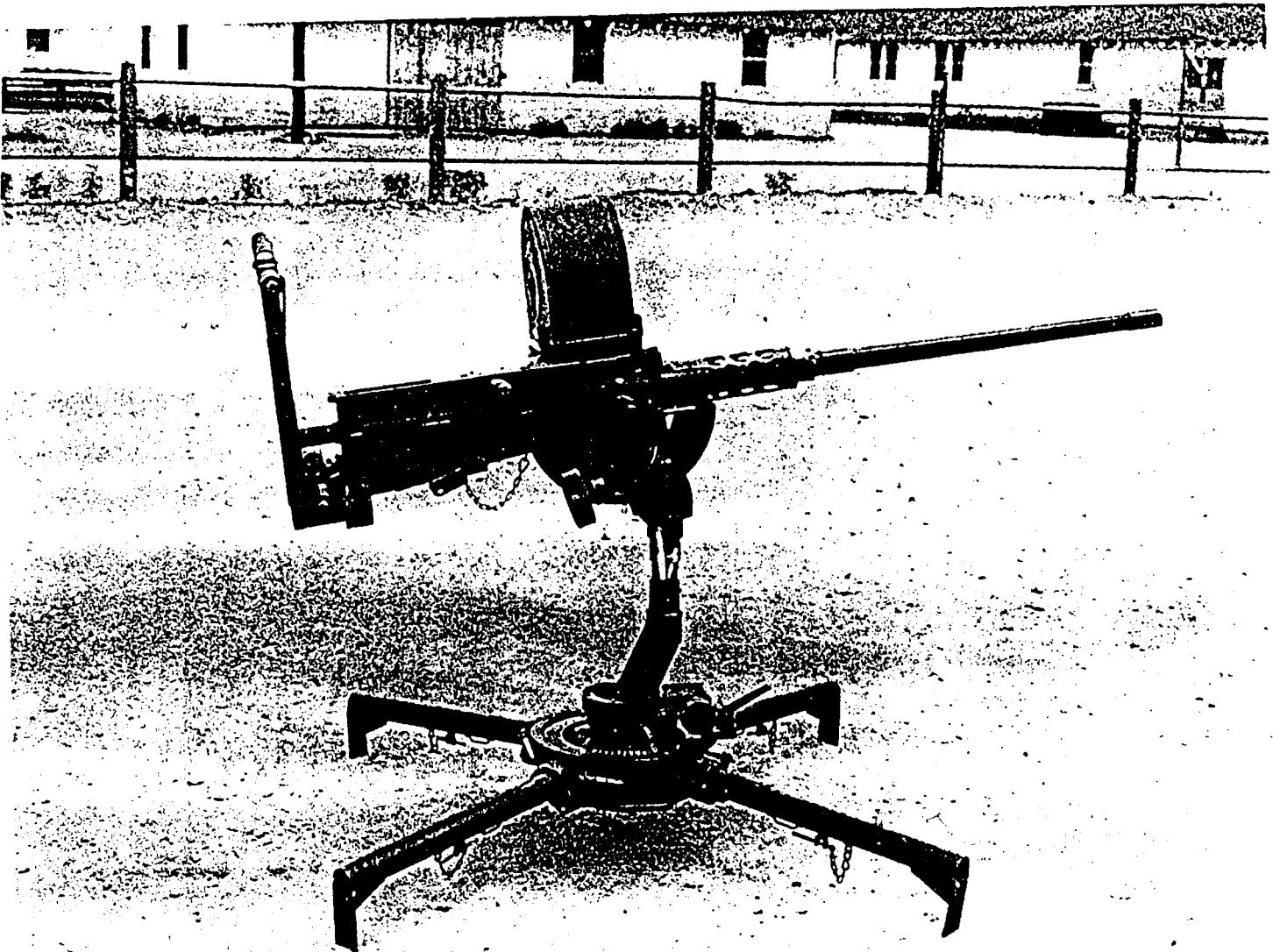


GUN, AUTOMATIC, 37MM, M1A2 ON CARRIAGE, GUN, 37MM, M3E1 (AA)

- 153 -

~~RESTRICTED~~

E-2



MOUNT, MACHINE GUN, CALIBER .50, AA, M63

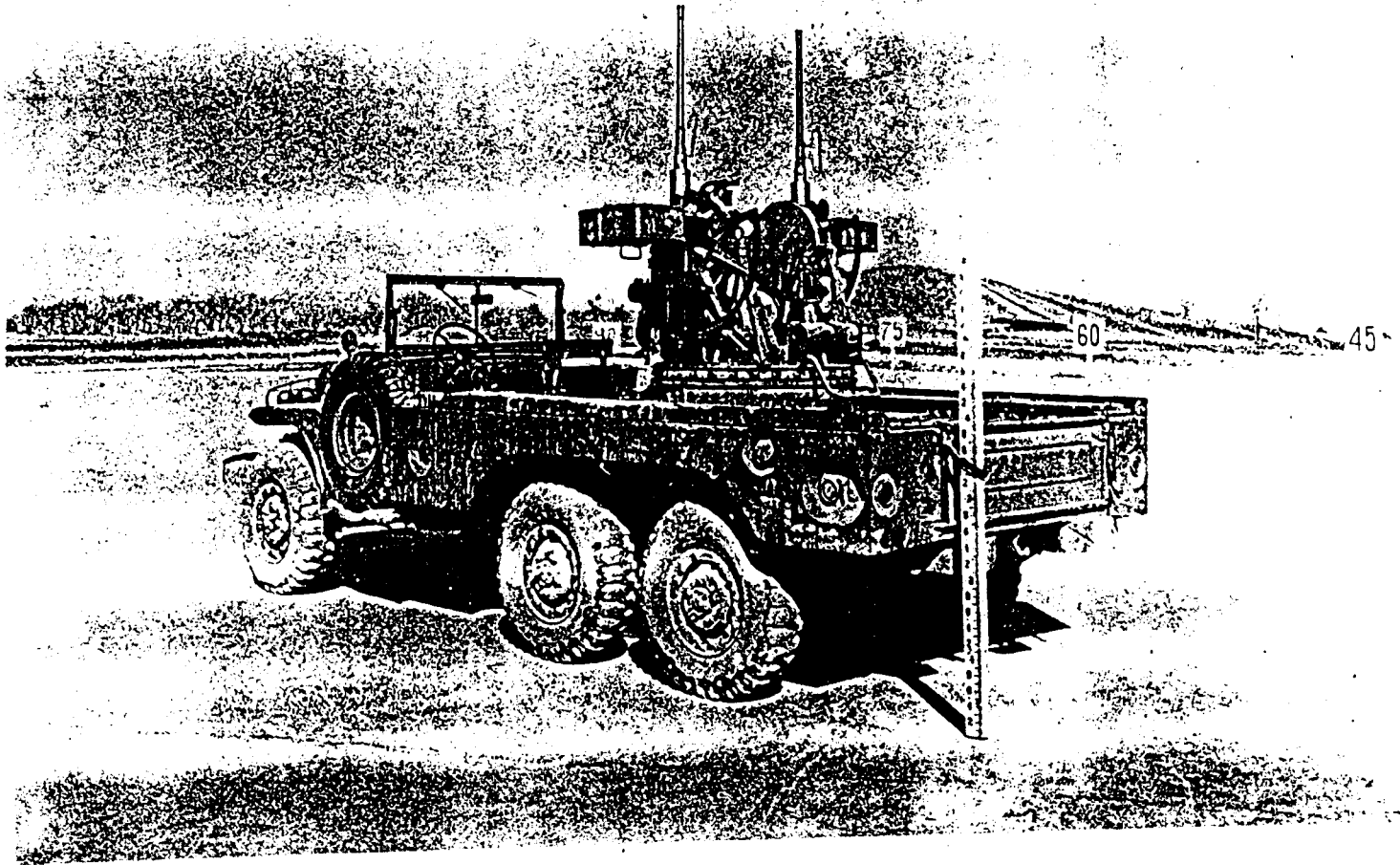
- 154 -

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E-2

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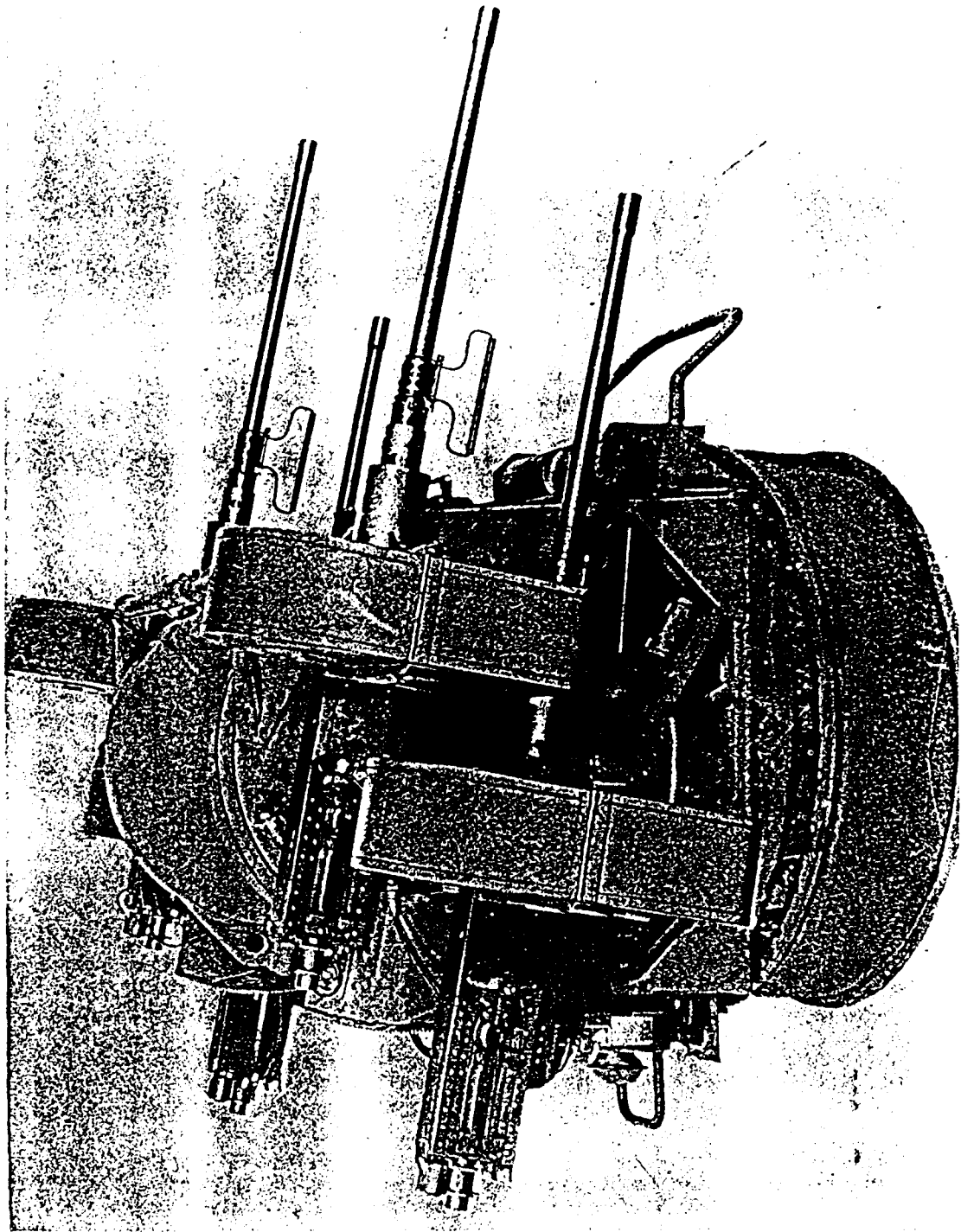
- 155 -
RESTRICTED



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77439 2-8-43 ABERDEEN PROVING GROUND ORDNANCE DEPT.
Project 6-2-27. 6 x 6 Fargo Truck with M33 Maxson Turret. Three-quarter left rear view.

RESTRICTED



MOUNT, MACHINE GUN, MULTIPLE CALIBER .50, M45

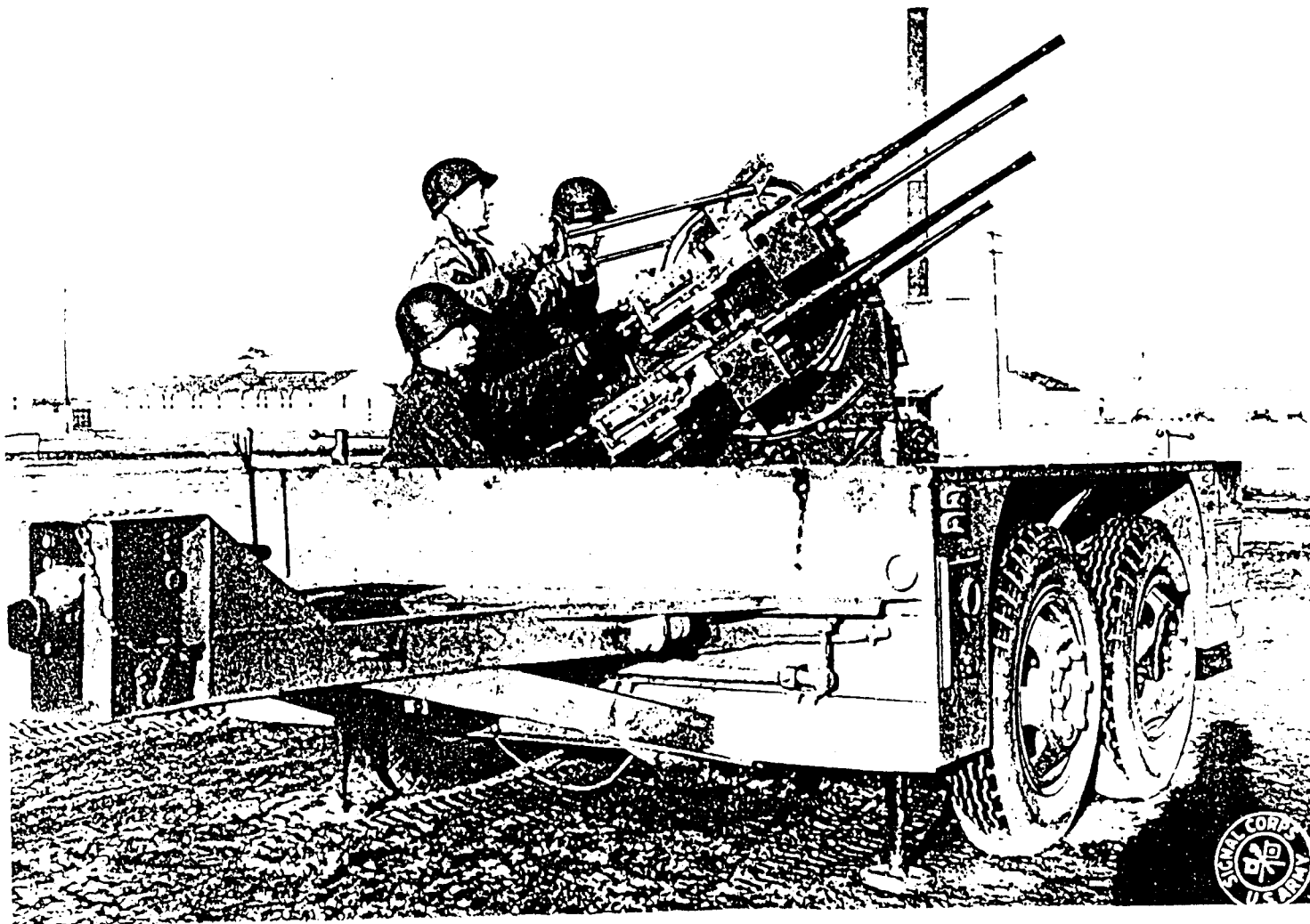
- 156 -

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E-2

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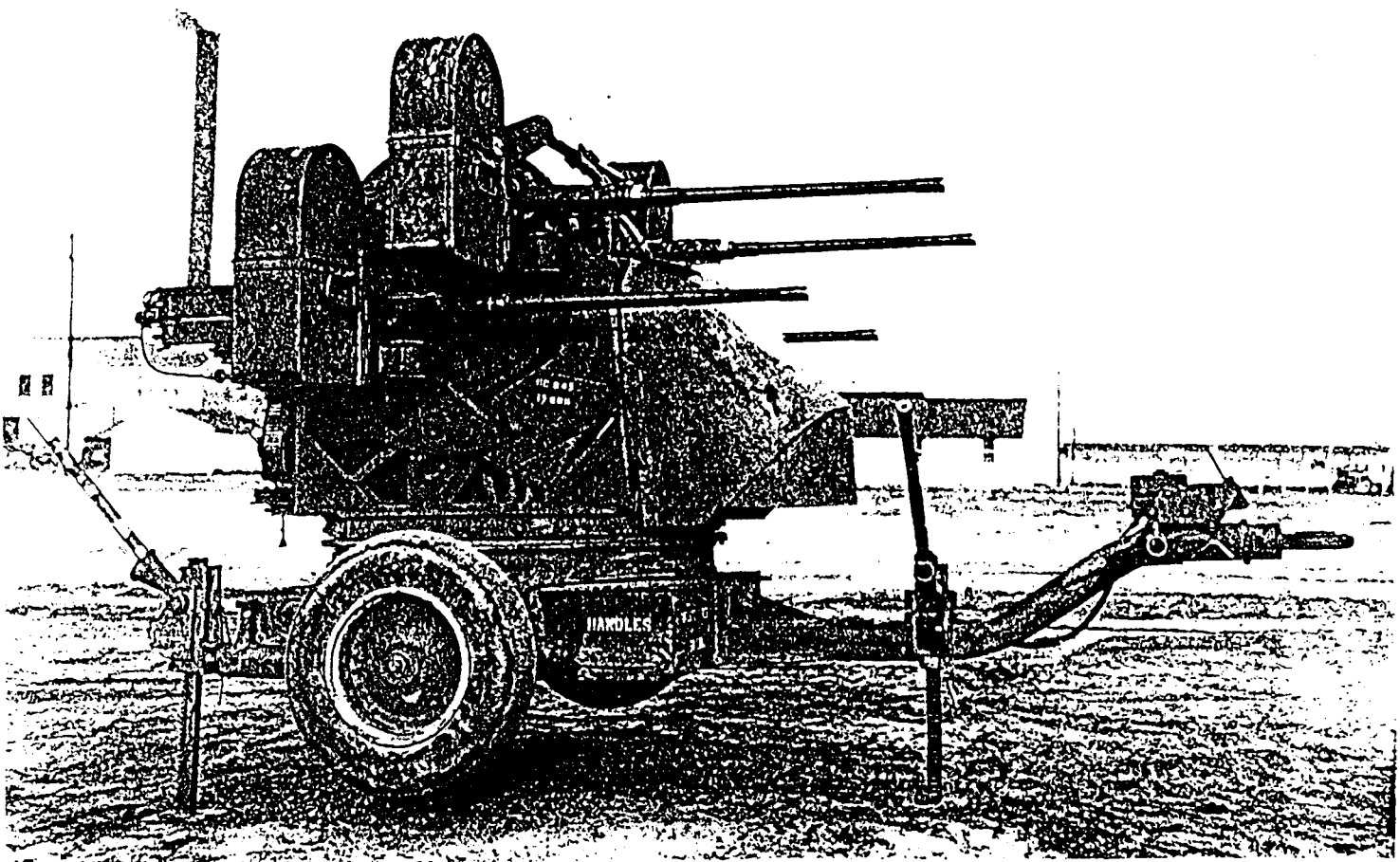
- 157 -



RESTRICTED

Multiple Caliber .50 Machine Gun Mount M 45 with Manual Control Device on
Multiple Machine Gun Carriage M51

RESTRICTED



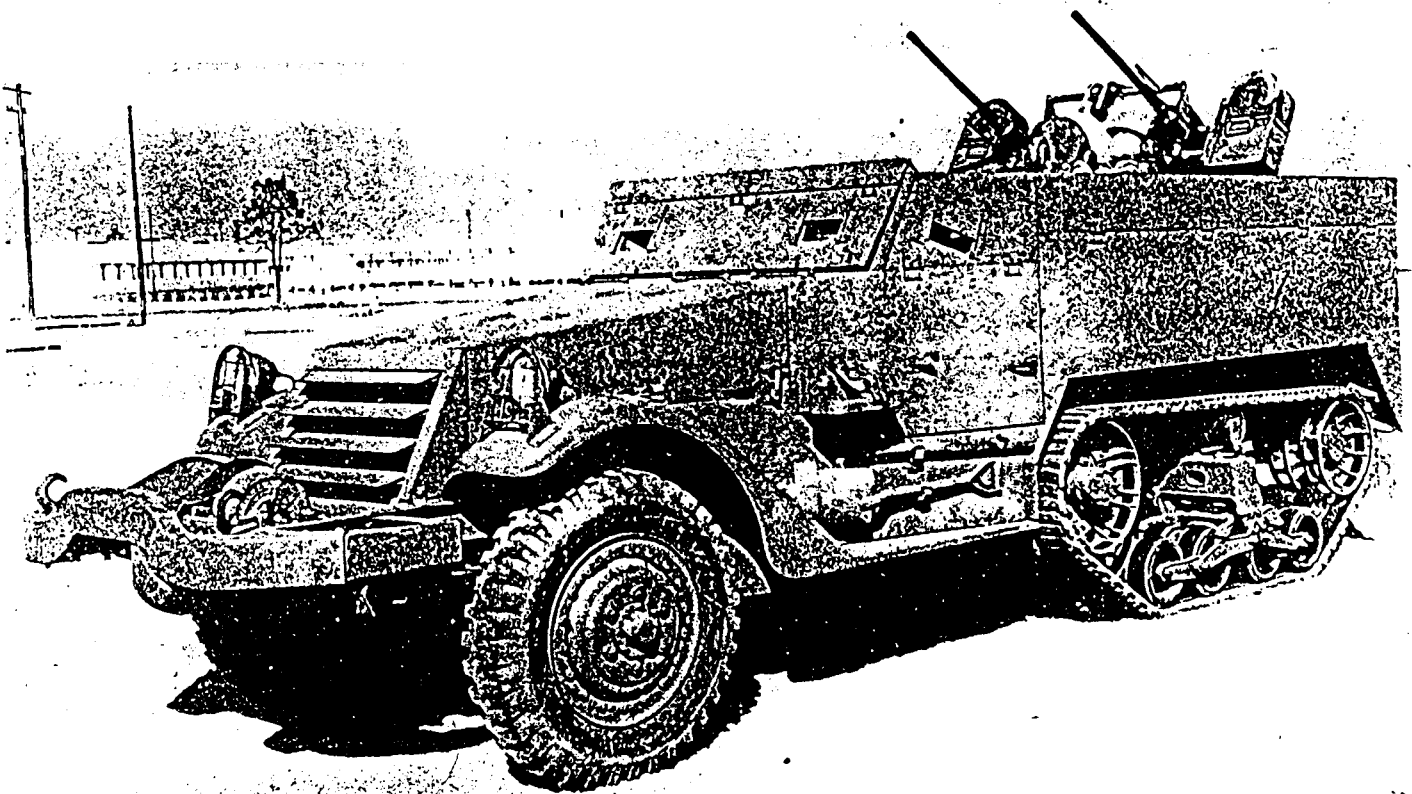
MOUNT, TRAILER, MULTIPLE CALIBER .50, MACHINE GUN, 1950

- 158 -

RESTRICTED

E-2

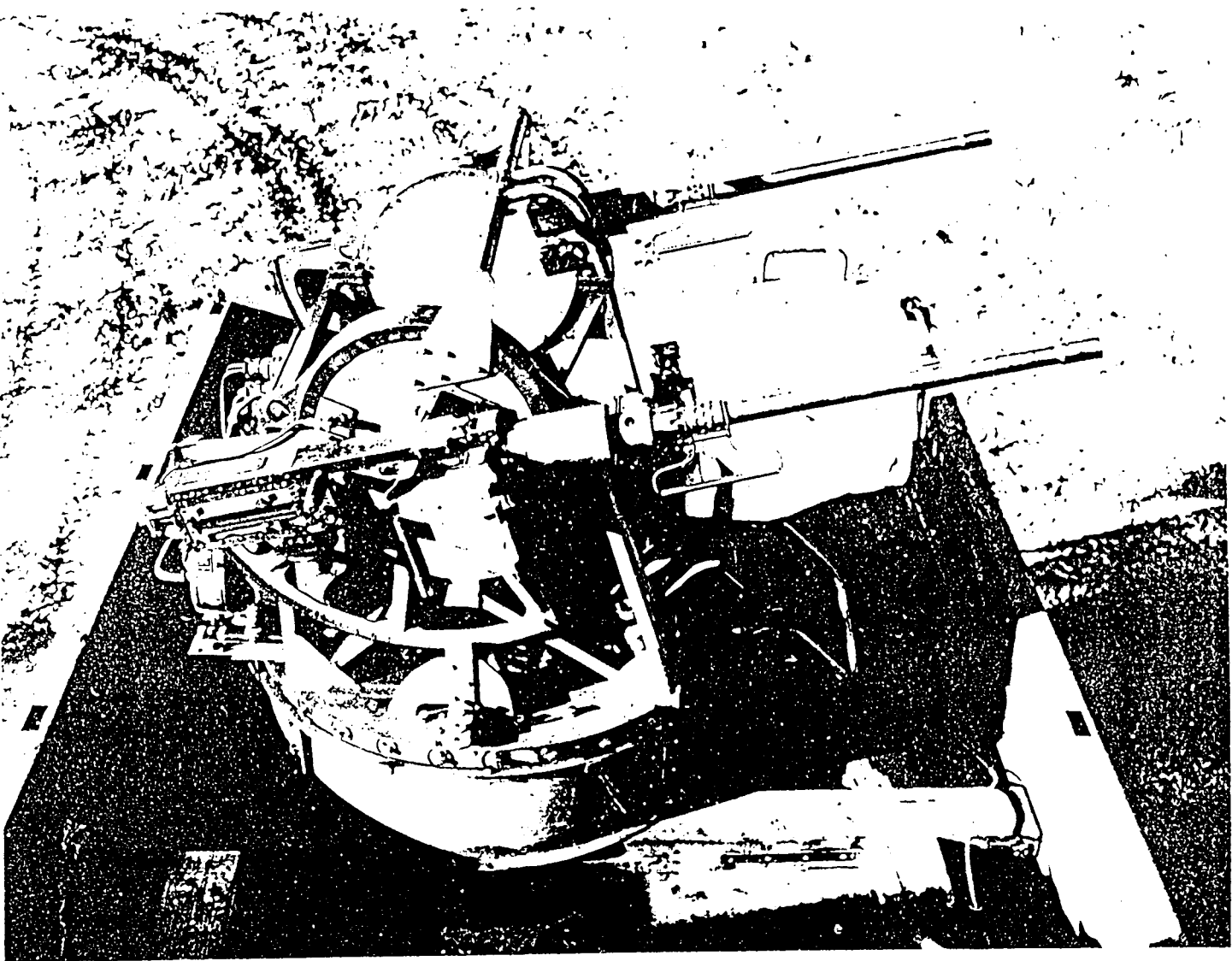
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ARRIAGE, MOTOR, MULTIPLE GUN, M3

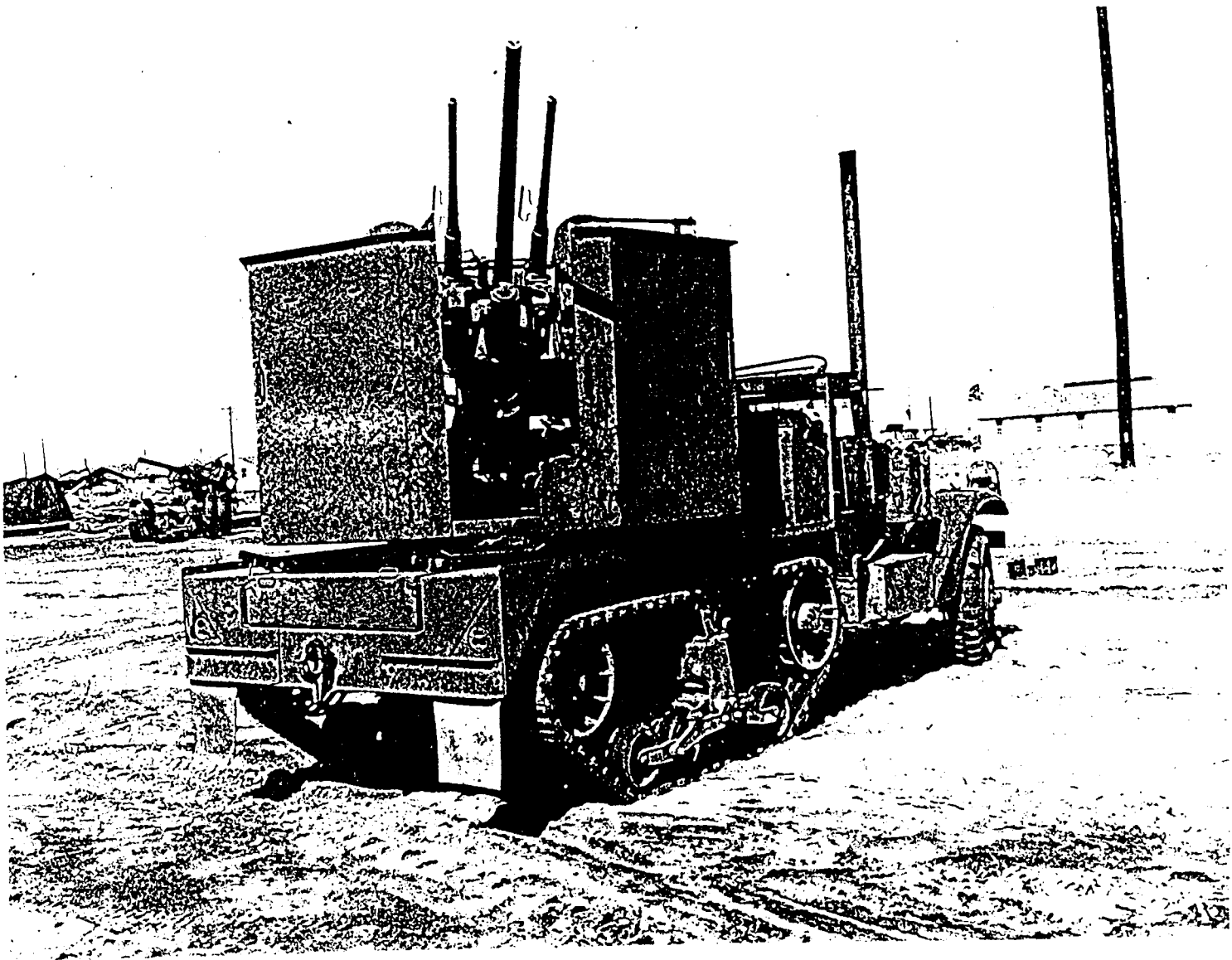
RESTRICTED

RESTRICTED



MOUNT, MACHINE GUN, MULTIPLE CALIBER .50, M3, MOUNTED ON TRUCK BED

RESTRICTED



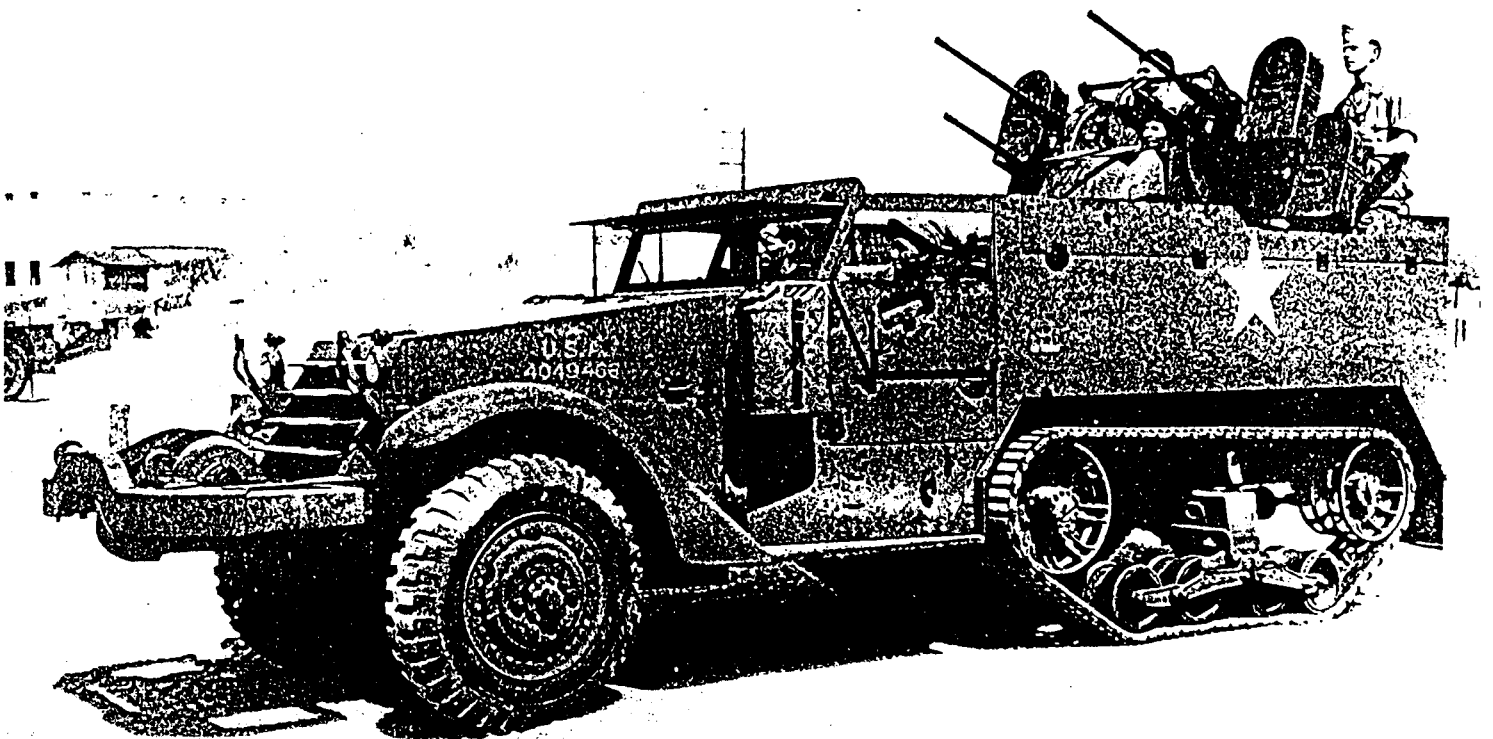
CARRIAGE, MOTOR, COMBINATION GUN, M25A1

- 161 -

RESTRICTED

E-2

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RESTRICTED

CARRIAGE, MOTOR, MULTIPLE GUN, M16

- 162 -

RESTRICTED

CHAPTER XVI

SPECIAL TRAINING AIDS AND DEVICES

Training of AAA troops in the effective use of their primary weapons and accompanying fire control instruments requires the utilization of special items of equipment. A history of the AAC would not be complete without brief mention of the more important of these training aids and devices. Most of these were developed and adopted after the AAC came into being, and they played an important part in the preparation training of AAA troops for combat duty.

A. For Service Firing Practice.

Airplanes assigned to Tow Target Squadrons at unit and replacement training centers are utilized to tow "sleeves" or "flags" as targets for gun and automatic weapons service practice. For practice in detection and tracking, airplanes are assigned to fly prescribed courses or free maneuver. To add more realism in the conduct of firing and practice in tracking, several special devices were adopted for use by AAA troops

The OQ Type Target Plane first became available about October 1942. Used as a target for automatic weapons service practice, it is a small motor-operated airplane which is put in flight by a catapult and controlled by radio from the ground.¹

The PQ Type Target Plane became available for the first time the latter part of 1942. Used as a target for 90mm gun units for tracking and firing practice, it is a small airplane (C det) which is usually put in flight by radio control on the ground and then controlled by radio while in the air from a "mother ship" flying in the vicinity.²

The AA Target Rocket M2 was developed to furnish advanced firing training for crews of AAA automatic weapons. Due to the lack of maneuverability and slow speed, the towed sleeve target could not represent the fleeting high-speed aerial targets encountered in battle and was therefore inadequate for the complete training of automatic weapons units. The rocket targets have a speed comparable to modern plane and represent ground-strafting planes or dive bombers. Released from a special projector, this rocket target, 3.25" in diameter, is projected through space by gas escaping from its body. First deliveries of this item to training centers began in April 1942, but it did not become available in adequate amounts until about December 1942.³

B. Synthetic Training Devices.

Various types of synthetic training devices were adopted and used by the AAC in its unit and replacement training centers. The more important of these devices are listed below with short appropriate comments.

Machine Gun Trainer M9: This synthetic training device simulates the appearance and performance of the caliber .50 AA machine gun on a single mount, and fires small pellets from a compressed air operated model machine gun at small model airplanes on wire. It is equipped with realistic sound effects and operates to scale, its primary purpose being to train AA machine gunners in the taking of initial "leads" and tracer control. It became available to AAA troops in May 1943.⁴

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At the height of the training of AAA units in October 1943, the AAA units were getting all the towing missions that they needed. As an example of the tow-target squadron assigned to cooperate with the AAA units the following is a list of Tow-Target Squadrons in existence in October 1943:10

	<u>Station</u>	<u>Tow-Trgt Squadron</u>	<u>Location</u>
AAATC:	Camp Edwards, Mass.	1st	Otis Field, Camp Edwards
	Camp Davis, N. C.	3rd	Air Field, Camp Davis
	Camp Stewart, Ga.	4th	Air Field, Camp Stewart
	Camp Hulen, Texas	5th	Air Field, Camp Hulen
	Fort Bliss, Texas	6th	Biggs Field, El Paso
	Camp Haan, Calif.	7th	March Field, Calif.
	Fort Sheridan, Ill.	9th	Chicago
AARTC:	Camp Callan, Calif.	7th	March Field, Calif.
	Camp Wallace, Texas	18th	Ellington Field, Houston
	Fort Eustis, Va.	10th	Langley Field, Virginia
	AAA School & Board	14th	Air Field, Camp Davis

From June 1942 through April 1943 the tow-target and tracking missions made available for the AAA units increased 450 percent. In September 1944 four AA training installations were scheduled for inactive status and a request was made to cut down the number of tow-target missions to correspond.11

The Tow-Target Squadrons were used in both missions for guns and automatic weapons firing. The A6A continues to be the standard target for automatic firing, and is also occasionally used for guns. In February 1945 there had been shipped several new type (plastic reinforced) flags which are being tested by the AAAB.12

The Tow-Target Squadrons also flew missions with the Radar Tow-Target. Much experimentation has been done with this type target but with not very good results. As of February 1945 the Langley target was in use, but it was contemplated adopting the Radar Tow-Target Mark 22 (Navy) type target if this could be supplied in sufficient quantity.13

C. Army Air Forces School of Applied Tactics.

In the early part of 1942, arrangements were effected under which AA searchlight battalions would be stationed at Orlando, Florida, to assist the Army Air Forces in giving instruction to fighter pilots in joint operations with AAA searchlights.14 In August 1942, two AAA searchlight battalions were located at Orlando, and plans were then being effected for establishment of an experimental searchlight belt for use principally in training day-fighters in searchlight-pursuit plane cooperation, but it was contemplated that these searchlight units could also be used to train key personnel from other searchlight units in this technique. The Fighter Command School (later called the Army Air Forces School of Applied Tactics) was being used to coordinate this training.15 Established by the AAF, this school had as one of its named purposes "the training of students from the AAF, the Signal Corps and the Coast Artillery Corps in the necessary teamwork required to the successful operation of air defense measures."16

Two representatives of the AAC visited this school in August 1942, and plans were discussed with the Commandant for utilization of the school facilities for training AAA personnel in the technique of AAA-AAF cooperation. After a survey of facilities

ARCHEOLOGICAL SITE SURVEY RECORD

- 1. Previous Site Designation SDI 2652 a & b-C 2. Temporary Field No. _____
- USGS Quad Borrego Sink 7 1/2' X 15' Year 1959
- 4. ~~UTM Coordinates~~ From SW corner of Quad: North 4 3/4°, East 5"
- 5. Twp. 12 S Range 6 E : center 1/4 of NW 1/4 of Sec. 10
- 6. Location About 2.2 miles NE on the Borrego Springs Road from Tamarisk Grove. Then climb .4 miles to east across mountains.
- 7. Contour 1900 8. Owner & Address California State Park
- 9. Prehistoric X Ethnographic _____ Historic X 10. Site Description Two rock constructed WWII observation posts. Also in the area mescal pits, San Dieguito and Southern Diegueno cleared circles.
- 11. Area 100 x 100 meters, 10,000 square meters. 12. Depth of Midden surface
- 13. Site Vegetation Creosote, ocotillo Surrounding Vegetation same
- 14. Location & Proximity of Water Small drainages
- 15. Site Soil Sand on rock Surrounding Soil same
- 16. Previous Excavation WWII command posts
- 17. ~~Special Notes~~ Note WWII location of telephone wire spool. Photo used on original site sheet.
- 18. Destruction Possibility Slight
- 19. Features In a nearby early man area is a stone chair which had been braced
- 20. ~~Series~~ on one side with two stones and in back with one stone. It has
- 21. ~~Artifacts~~ collapsed to the west. It faced 58° True which is the summer solstice point. To the rear is an old cleared dwelling circle. Adjacent is a very old rock outlined rock circle, perhaps San Dieguito I also
- 22. ~~Found Remains~~ SDII clearings and Southern Diegueno clearings probably used in conjunction with several mescal roasting pits.
- 23. Comments _____

- 1. Accession No. _____ 25. Sketch Map yes by Begole where attached
- 26. Date Recorded 2/6/86 27. Recorded By R Begole
- 28. Photo Roll No. _____ Frame No. _____ Film Type (s) B & W color Taken By Begole



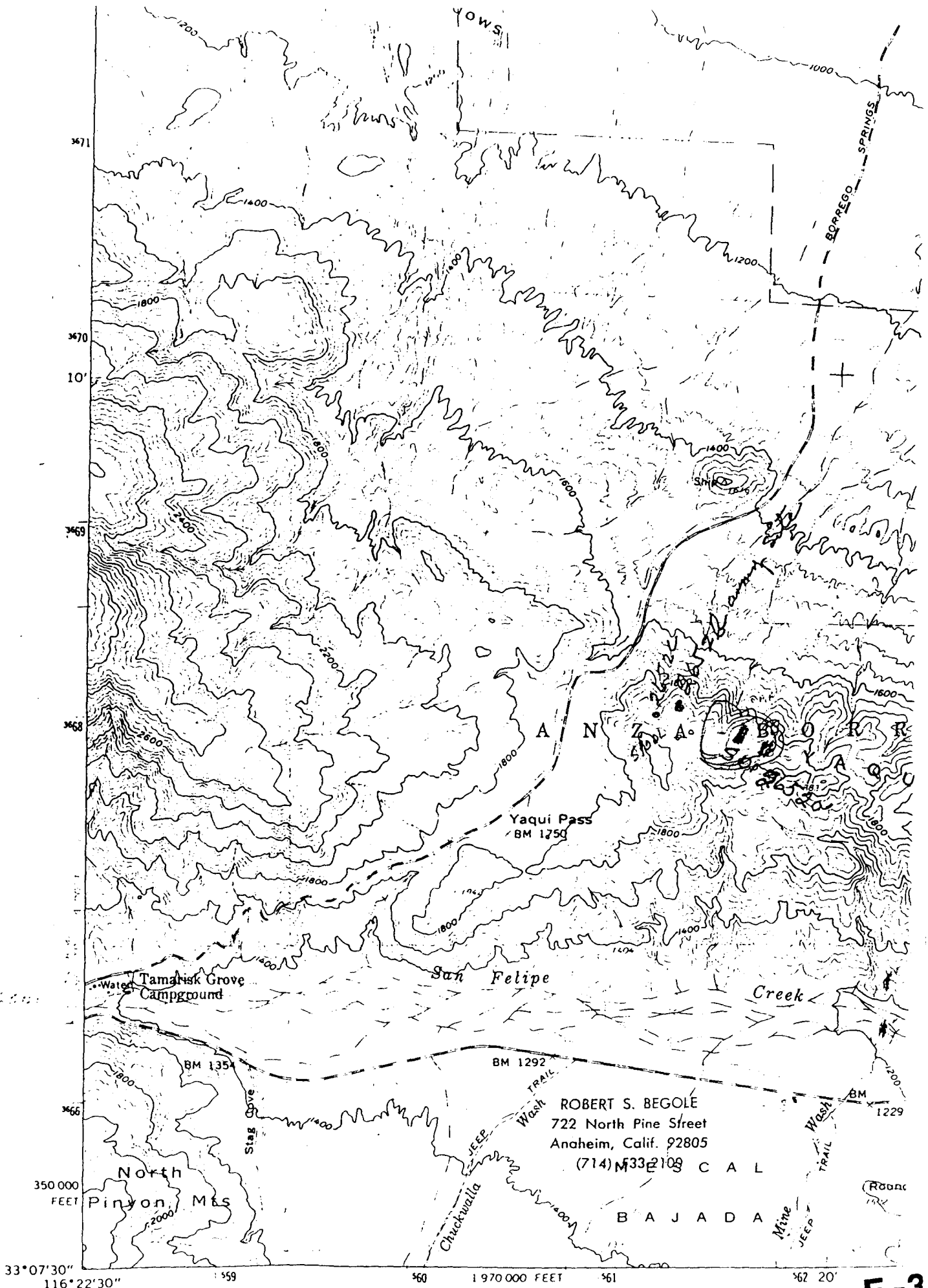
Caved in rock
walled observation
post. Telephone line
on right



Caved in rock
walled dwelling(?)
area. Ration cans
adjacent



Ration cans
plus Spam can.
These cans were also
found at SOI 4043
and SOI 8722



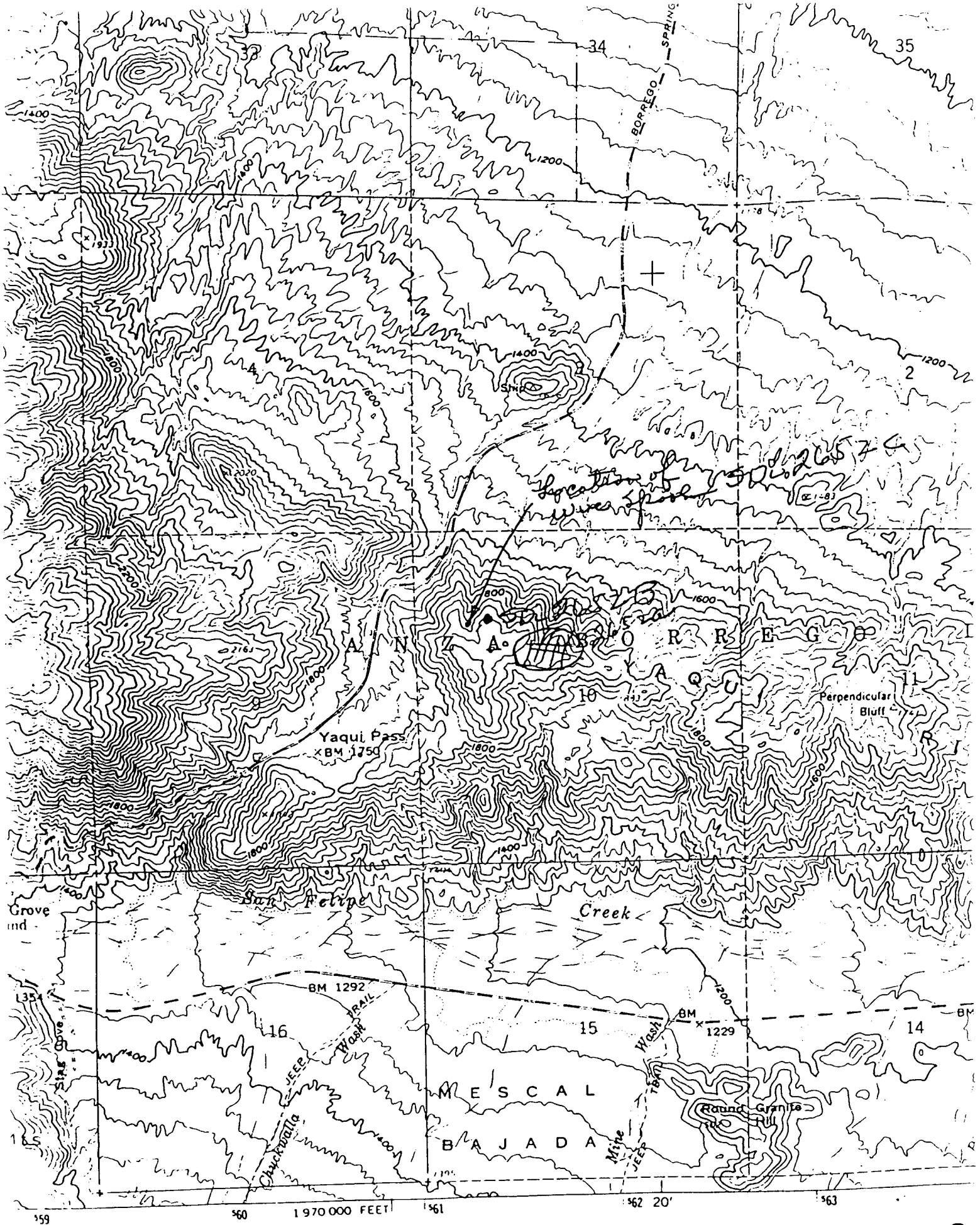
Mapped, edited, and published by the Geological Survey
 Produced by USGS, USC&GS, and USCE

PACIFIC COAST ARCHAEOLOGICAL SOCIETY, INC.

ARCHAEOLOGICAL SITE SURVEY RECORD

1. Site SD1 3652 2. Map Borrego Sink 7.5' 3. County San Diego
4. Twp. 12 S Range 6 E; SE 1/4 of NW 1/4 of Sec. 10
5. Location Approx 5.2 mi south on Borrego Springs Road to Tamarask Grove; then due east 1/4 mi " as the crow flies".
6. On contour elevation 1960
7. Previous designations for site none
8. Owner Calif State Park 9. Address --
10. Previous owners, dates --
11. Present tenant --
12. Attitude toward excavation none
13. Description of site An old WW II lookout station facing the Borrego Sink.
14. Area 500' x 500' 15. Depth -- 16. Height --
17. Vegetation ocotillo, mescal, bush 18. Nearest water none
19. Soil of site rock 20. Surrounding soil type rock
21. Previous excavation none
22. Cultivation none 23. Erosion slight
24. Buildings, roads, etc. Borrego Springs Road to west; Borrego Valley Road to NW.
25. Possibility of destruction none
26. House pits none
27. Other features Excavation of rock for commandpost and shelters.
28. Burials none
29. Artifacts Wire telephone line & many GI ration cans dated 8/42 & 12/42.
During WW II the artillery target practiced by firing into Clark Lake.
30. Remarks Do not believe that SD 3651 blinds had any connection with the army as no cans around them and construction of blinds appear much older.
31. Published references none
32. Accession No. _____ 33. Sketch map See attached
34. Date 11/18/74 35. Recorded by Begole 36. Photos no YES CP.
37. Informant none

ROBERT S. BEGOLE
 722 North Pine Street
 Anaheim, Calif. 92805
 (714) 533-2100



and published by the Geological Survey
 SOCS, and USCE
 photographs by photogrammetric methods.



ARCHEOLOGICAL SITE SURVEY RECORD

1. Previous Site Designation SDi 2. Temporary Field No. RSB-1
3. USGS Quad Borrego Sink 7½' X 15' Year 1959
4. ~~UTM~~ Coordinates From SW Quad corner North 3 7/16"; East 3 1/4"
5. Twp. 12 S Range 6 E ; NW ¼ of SE ¼ of Sec. 9
6. Location SE up mountain side from the Yaqui Pass road at the narrow area, just as road drops down to Tamarisk Grove
7. Contour 1880 8. Owner & Address Anza Borrego Desert State Park
9. Prehistoric Ethnographic Historic 10. Site Description Three World War Two rock outlined observation posts
11. Area 50 x 75 meters, 3750 square meters. 12. Depth of Midden surface
13. Site Vegetation Brittle bush, mescal Surrounding Vegetation Ocotillo, creosote
14. Location & Proximity of Water Tamarisk Grove
15. Site Soil rock on sand Surrounding Soil rock and sand
16. Previous Excavation Emplacements dug by WW 2 soldiers
17. Site Disturbance Yes
18. Destruction Possibility Slight
19. Features Three rock outlined shelters as observation posts
20. Burials None
21. Artifacts Numerous GI "K" ration cans, plus a few "C" rations, milk, spam cans. Also wooden shingles and strapping, probably used for fuel.
22. Faunal Remains _____
23. Comments Observation post with telephone line at SDi 2652. This site is similar to one at Elephant Tree in the Lower Borrego. SDi 9722
24. Accession No. _____ 25. Sketch Map Yes by Begole where attached
26. Date Recorded 8/1/83 27. Recorded By R. Begole
28. Photo Roll No. _____ Frame No. _____ Film Type (s) B&W Slides Taken By R. Begole

State of California - The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
ARCHEOLOGICAL SITE SURVEY RECORD

File No. 546

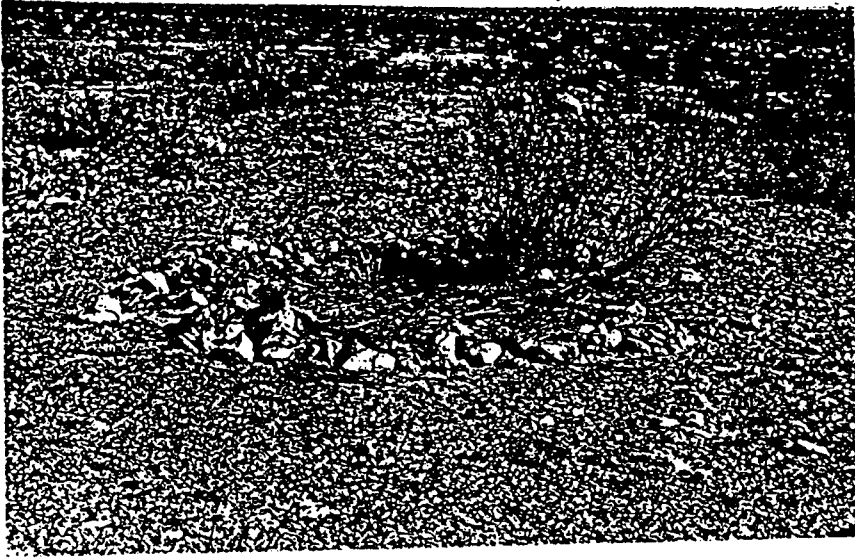
SITE No. SD1 4043

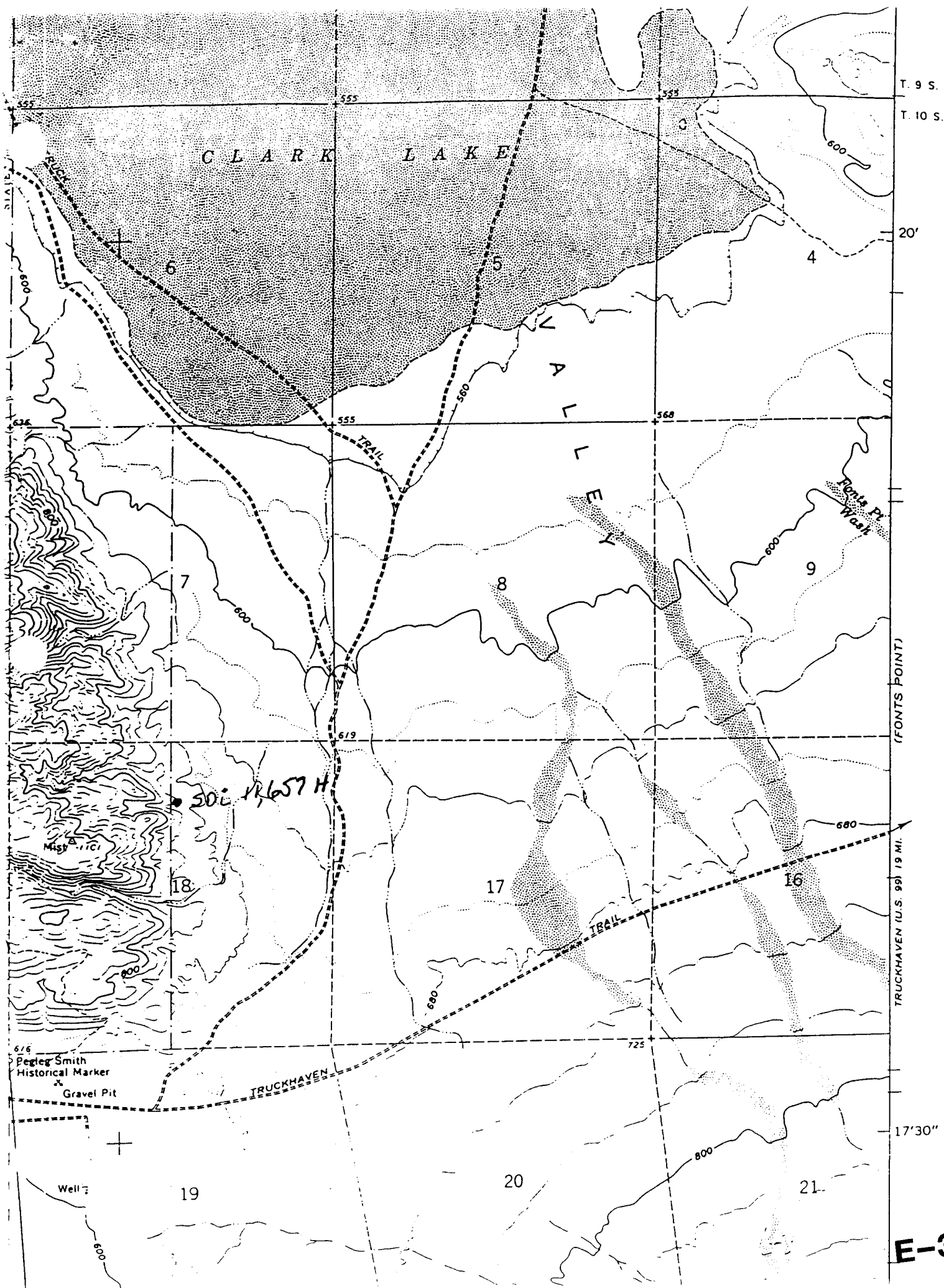
1. USGS Quad. Borrego Sink (1959) _____ (7½') _____ (15')
2. Latitude _____ N; Longitude _____ W
3. Coordinates _____
4. Twp. 12S Range 6E ; NW ¼ of SE ¼ of Sec. 9
5. Location On Yaqui Pass, on peak southwest of bench mark 1750, south of Borrego Springs road, just before coming down grade to Tamarisk Grove.
6. Contour 1880 ft.
7. Owner Anza-Borrego Desert State Park 8. Address Borrego Springs
9. Site Description Rock walls of probable aboriginal origin, mining pits and tin cans, rod propped up at south end of mountain.
10. Area _____ 11. Depth untested, not likely
12. Vegetation creosote, cholla, incense bush, barrel cactus, agave, ocotillo
13. Water Yaqui well, approximately 2¼ miles southwest, intermittent streams
14. Site Soil decomposed granite 15. Surrounding soil decomposed granite
16. Previous excavation none - mining pits
17. Destruction possibility _____
18. Features 3 rooms, 1 roasting pit near rooms; 1 mining pit in room, 2 near rooms, 1 on ridge above rooms with cairn, 2 small walled places like storage rooms,
19. ~~Burials~~ 1 small niche on in between level.
20. Artifacts none.
21. Remarks _____
22. Accession No. _____ 23. Sketch map no
24. Date 6/21/75 25. Recorded by K. Easland, S. Cupples 26. Photos yes

This site is probably
a U.S. Army WW2
observation post.
Cans are WW2
K, C rations plus
milk cans. Army
Junk in road below.
SDI 2652 to NE was
WW2 Command Post with
telephone wires going
down mtn. with
cans and old wooden shingles &
binding. Site same as
sites on mtn at Pegole
Elephant Tree.

ARCHEOLOGICAL SITE SURVEY RECORD

1. ~~Previous~~ Site Designation UTM 11566160/3685460 2. Temporary Field No. "C"
3. USGS Quad Clark Lake 7 1/2' X 15' Year 1959
4. UTM Coordinates From SE corner of Quad North 10 1/2" then West 5 7/8"
5. Twp. 10S Range 7E ; NE 1/4 of NW 1/4 of Sec. 18
6. Location East on Hwy S-22 from Borrego Springs to Rockhouse Cyn Road, then NE 1.25 miles, then walk West 0.45 miles to base of mountain.
7. Contour 760 8. Owner & Address Dale (as close as I can figure)
9. Prehistoric Ethnographic Historic X 10. Site Description A 90" stacked rock circle plugged with sand & pebbles. Inside floor filled with very old creosote bushes.
11. Area 20' x 20' meters, square meters. 12. Depth of Midden surface
13. Site Vegetation Ocotillo bush Surrounding Vegetation same
14. Location & Proximity of Water Washes or carried in
15. Site Soil Rock on sand Surrounding Soil same
16. Previous Excavation none
17. Site Disturbance none
18. Destruction Possibility slight
19. Features 90" rock circle with adjacent old jeep road
20. Burials none
21. Artifacts none noticed. Looked for old cans but none found yet. Cans could have indicated age of circle. See PCAS Quarterly below (page 6-7)
22. Faunal Remains none
23. Comments It looks af it if could have been a WWII observation post. See PCAS Quarterly Vol 25, No 3, July 1989, Pg 5-14.
24. Accession No. 25. Sketch Map yes by Begole where attached
26. Date Recorded 9/1989 27. Recorded By RS Begole
28. Photo Roll No. Frame No. Film Type (s) B&W Taken By RS Begole





ARCHEOLOGICAL SITE SURVEY RECORD

1. Previous Site Designation None 2. Temporary Field No. D
3. USGS Quad Borrego Mountain 7½' X 15' Year 1960
4. UTM Coordinates From NE corner of Quad South 9 3/8", west 3½"
5. Twp. 11 S Range 8 E ; SW ¼ of SW ¼ of Sec 21 (extended)
6. Location From Ocotillo Wells 2.9 miles north to junction of Military Road and Fault Wash. North on Fault Wash 1.05 & 1.1 mile to steel plates.
7. Contour 320 8. Owner & Address California State Parks & Recreation (?)
9. Prehistoric Ethnographic Historic X 10. Site Description Three steel sections that appear to have been from the type of floating docks used during WWII.
11. Area 30 x 500 meters, 15,000 square meters. 12. Depth of Midden surface
13. Site Vegetation small bush Surrounding Vegetation smoke trees & ocotillo
14. Location & Proximity of Water wash
15. Site Soil sand Surrounding Soil sand
16. Previous Excavation none
17. Site Disturbance slight except for flash floods
18. Destruction Possibility none
19. Features Three steel parts of floating docks
20. Burials none
21. Artifacts The steel docking has been rumored to have been used as targets during WWII. Supposedly pulled along a railroad track by a donkey engine. This engine was supposedly buried. The rumored use doesn't seem too
22. ~~Feature Remains~~ plausible as the steel is too heavy to pull. Also, there is telephone pole near one steel dock. Further investigation is underway.
23. Comments
24. Accession No. 25. Sketch Map attached by where
26. Date Recorded 4/1987 27. Recorded By RS Begole
28. Photo Roll No. Frame No. Film Type (s) B & W Taken By RS Begole
slides



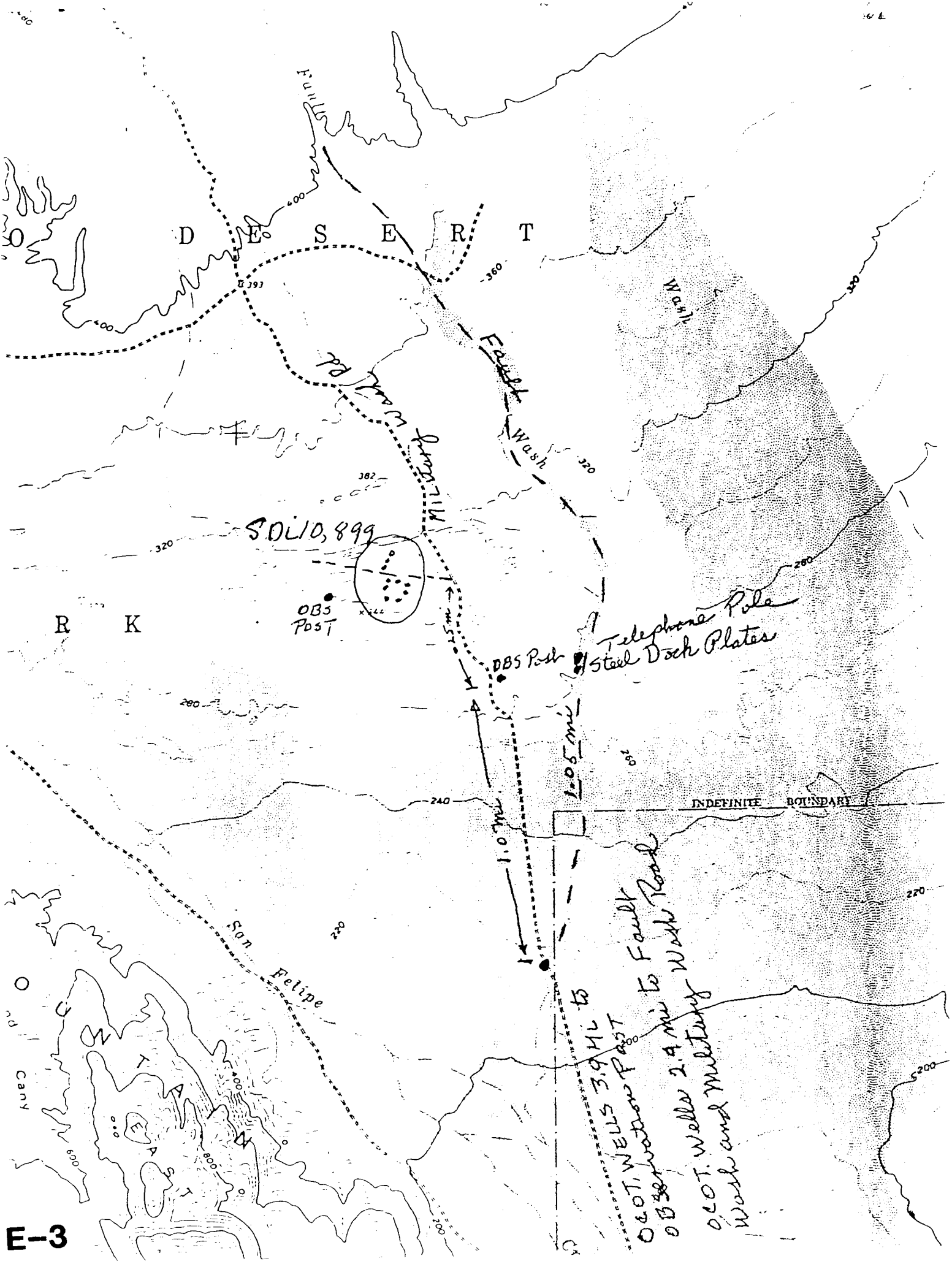
SD: 10,906

ARCHEOLOGICAL SITE SURVEY RECORD

- 1. Previous Site Designation None 2. Temporary Field No C
- 3. USGS Quad Borrego Mountain 7 1/2' X 15' Year 1960
- 4. UTM Coordinates From NE corner of Quad South 8 1/2"; West 4 1/2" to 6"
- 5. Twp. 11 S Range 8 E : NW 1/4 of SE 1/4 of Sec. 20 (extended)
- 6. Location From Ocotillo Wells north 4.15 miles on Military Raod, then west for 1/2 mile along side a nail covered road.
- 7. Contour 300' 8. Owner & Address California State Park & Recreation
- 9. Prehistoric Ethnographic Historic 10. Site Description A bulldozed road covered with nails on the east end and burned amunition boxes on the west end. To the south a large circle of rock cairns.
- 11. Area 1/2 mix 1/2 mimeters, square meters. 12. Depth of Midden surface
- 13. Site Vegetation small bushes Surrounding Vegetation ocotillo, creosote bush
- 14. Location & Proximity of Water washes
- 15. Site Soil sand & mud Surrounding Soil sand, mud, gravel
- 16. Previous Excavation none
- 17. Site Disturbance slight
- 18. Destruction Possibility The bulldozed road appears, on the east end, to have had
- 19. Features amunition boxes placed on it in squares of 10' to 12', then a space
- 20. ~~Barriers~~ of 10-12', the boxes were burned leaving the nails. To the south a
- 21. ~~Area~~ large rock cairn circle with bombed metal pieces suggesting flare holders. It appears that bulldozed mounds may cover military material, a common military practice when leaving an area. There are small pieces of
- 22. Faunal Remains frag bombs (daisy cutters), spent shells, shrapnel. To the west, two sizes of amunition boxes. To the north, a lot of shrapnel. To
- 23. Comments the east, shot up trucks.

- 24. Accession No. _____ 25. Sketch Map attached by _____ where _____
- 26. Date Recorded 4/1987 27. Recorded By RS Begole
- 28. Photo Roll No. _____ Frame No. _____ Film Type (s) B & W Taken By RS Begole
slides





ARCHEOLOGICAL SITE SURVEY RECORD

1. Previous Site Designation None 2. Temporary Field No. B
3. USGS Quad Borrego Mountain 7 1/2' X 15' Year 1960
4. UTM Coordinates From NE corner of Quad South 8 5/8"; West 5 7/16"
5. Twp. 11 S Range 8 E ; NE 1/4 of SW 1/4 of Sec 20 (extended)
6. Location From Ocotillo Wells north 2.9 miles to junction of Fault Wash & Military Road, north on Military road 4.15 miles, then west .5 mile
7. Contour 320 8. Owner & Address California State Park & Recreation
9. Prehistoric Ethnographic Historic X 10. Site Description Concrete rein-
forced with steel observation post used during WWII training maneuvers.
Probably partly destroyed when troops left.
11. Area 40 x 40 meters, 1600 square meters. 12. Depth of Midden surface
soil
13. Site ~~Vegetation~~ Sand and gravel Surrounding Vegetation same
14. Location & Proximity of Water Water trucked in for troops
15. Site ~~Soil~~ vegetation sparse, ocotillo Surrounding ~~Soil~~ vegetation ocotillo, creosote bush
16. Previous Excavation none
17. Site Disturbance slight
18. Destruction Possibility slight
19. Features Observation post where the military action could be observed.
20. Burials none
21. Artifacts A few frag bombs, shrapnel, wires and caps that looked to be
from demolition packs.
22. Faunal Remains This area was used by General George Patton's tank corps. Later
by the army's anti-aircraft batteries that came in every two weeks from
23. ~~Sites~~ Camp Callan, San Diego. Seemed also to be a target bomb area.

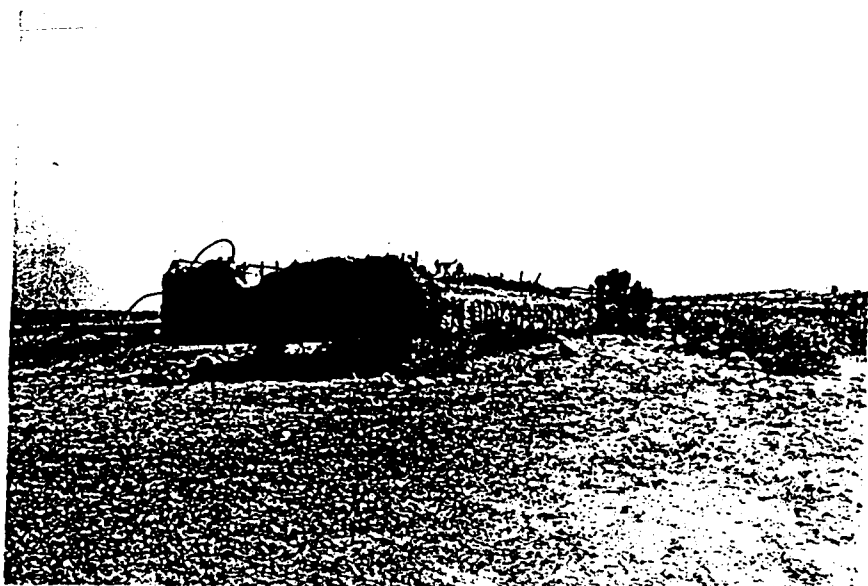
Accession No. 25. Sketch Map attached by where

26. Date Recorded 3/1987 27. Recorded By RS Begole

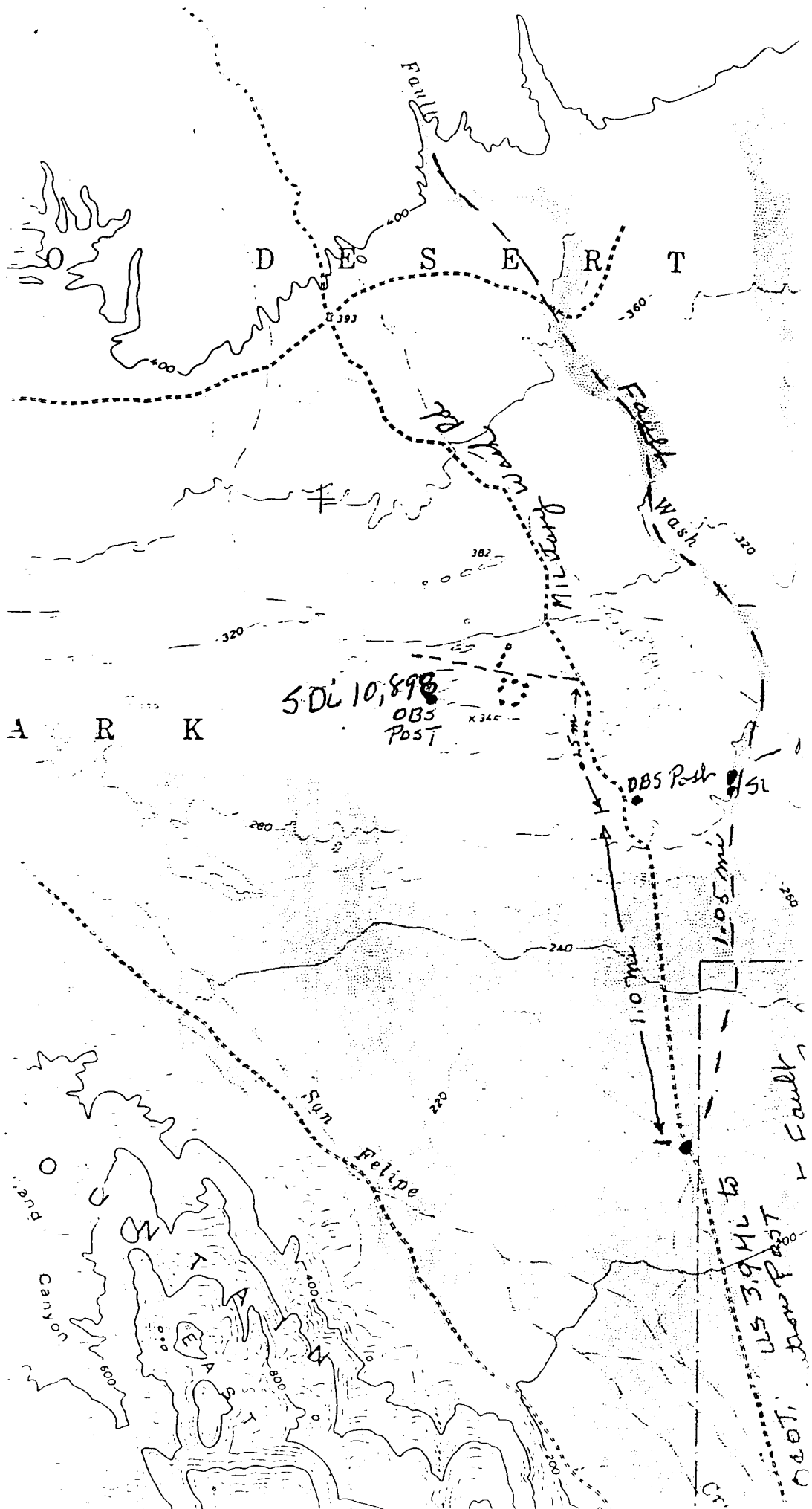
28. Photo Roll No. Frame No. Film Type (s) B & W
color Taken By RS Begole
slides



SDi 10,891

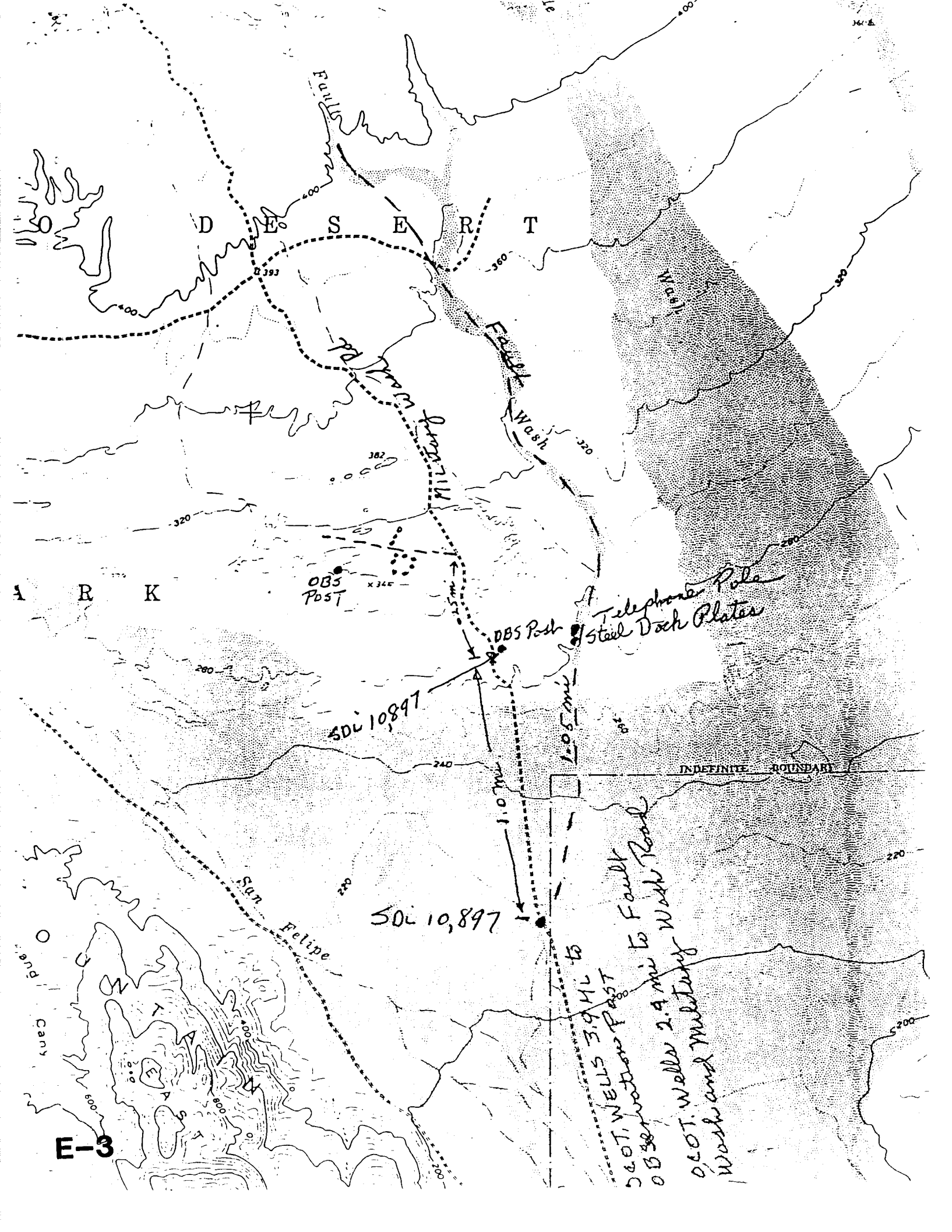


SDI
10,897



ARCHEOLOGICAL SITE SURVEY RECORD

1. Previous Site Designation None 2. Temporary Field No. A
- USGS Quad Borrego Mountain 7½' X 15' Year 1960
4. UTM Coordinates From NE corner of Quad, South 9 5/8"; West 4 1/8"
5. Twp. 11 S Range 8 E : SE ¼ of SE ¼ of Sec. 20 (extended)
6. Location From Ocotillo Wells 2.9 miles north to junction of Fault Wash and Military Road, then north ^{1.0 Mi} on Military Road to Observation Post.
7. Contour 280 8. Owner & Address California State Parks & Recreation
9. Prehistoric Ethnographic Historic 10. Site Description Concrete reinforced with steel, World War II observation post. Underpinnings were blown up probably when troops left the area.
11. Area 60 x 60 meters, 3600 square meters. 12. Depth of Midden surface
13. Site Vegetation very sparse Surrounding Vegetation Ocotillo, creosote bush
14. Location & Proximity of Water Nearby wash, but troops would have used water trucks.
15. Site Soil Sand & gravel Surrounding Soil same
16. Previous Excavation none
17. Site Disturbance Collectors have picked up spent shells
18. Destruction Possibility slight
19. Features Observation post where the military action of tanks, bombing &
20. ~~Features~~ artillery could have been observed.
21. Artifacts There is a lot of debris lying around 30mm & 50 mm shells, belt clips from shells, parts of small frag bombs, tail fins from larger bombs. This was the first area used by General George Patton's tank
22. ~~Artifacts~~ corps. Later the area was used by army's anti-aircraft batteries from Camp Callan, San Diego California
23. Comments _____
24. Accession No. _____ 25. Sketch Map attached by _____ where _____
26. Date Recorded 3/19/87 27. Recorded By R. S. Begole
28. Photo Roll No. _____ Frame No. _____ Film Type (s) B & W Taken By RS Begole
color slides



D E S E R T

A R K

Fault Wash

Sun Felipe

Cany

INDEFINITE BOUNDARY

1.0 mi

1.5 mi

2.4 mi

3.9 mi

SDI 10,897

DBS Post

Telephone Pole

Steel Deck Plates

OBSERVATION POST

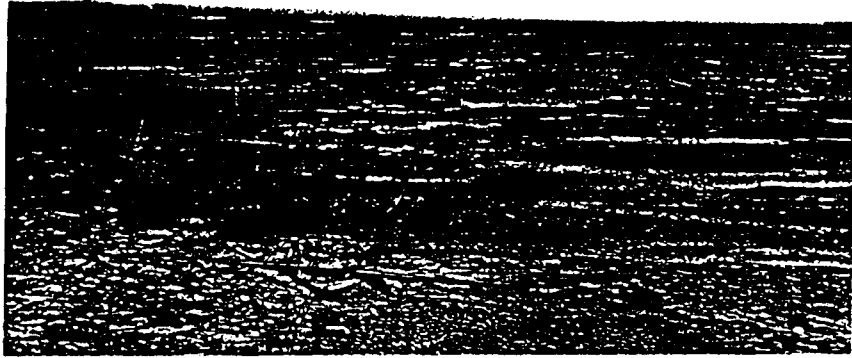
O.C.T. Wells 3.9 mi to Fault Wash and Military

O.C.T. Wells 2.4 mi to Fault Wash and Military

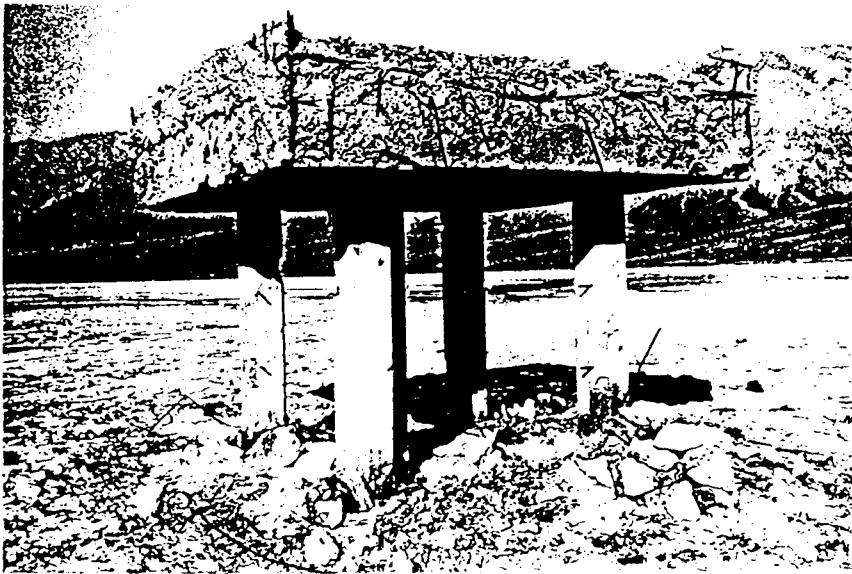
E-3

ARCHEOLOGICAL SITE SURVEY RECORD

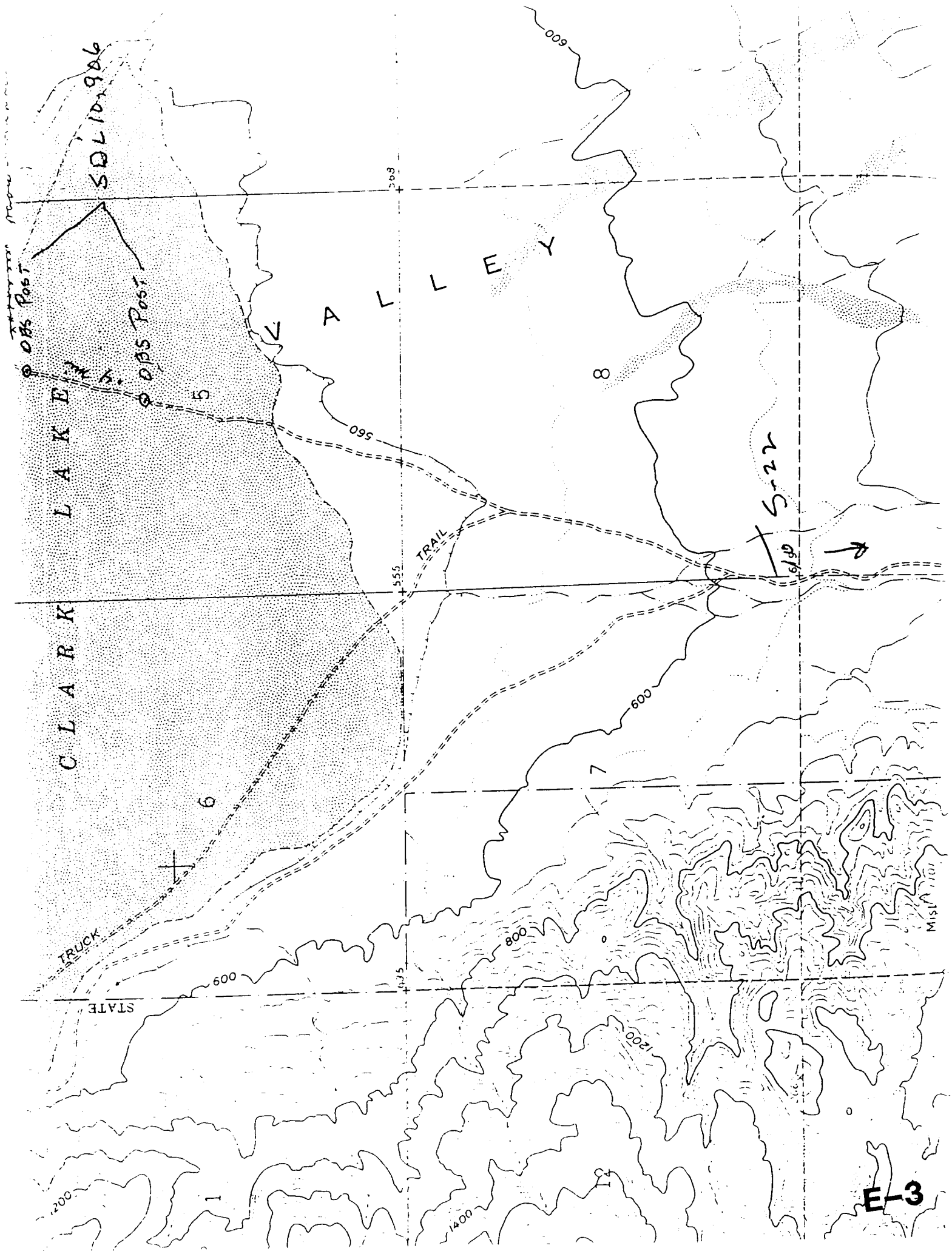
1. Previous Site Designation none 2. Temporary Field No. F
3. USGS Quad Clark Lake Quad 7 1/2' X 15' Year 1959
4. UTM Coordinates From NE corner of Quad: S 6 1/8", W 2 15/16", and S 7 1/8", W 3 3/16"
5. Twp. 10 S Range 7 E ; S West % of S East % of Sec. 32
S West % of N East
6. Location From S-22 north 1.5 miles to junction of Rockhouse Jeep road. Right on Clark Well Jeep road 1.65 to observation post; 0.4 miles to second observation post.
7. Contour 555 8. Owner & Address Sec 5 Calif. State; Sec 32 University of Maryland
9. Prehistoric Ethnographic Historic X 10. Site Descriptions Two reinforced concrete WWII observation posts used when training artillery was fired into Clark Lake.
11. Area 100 x 100 meters, square meters. 12. Depth of Midden surface
13. Site Vegetation none Surrounding Vegetation none
14. Location & Proximity of Water Clark Lake (when wet)
15. Site Soil mud on sand Surrounding Soil same
16. Previous Excavation none
17. Site Disturbance Appears to have been used for target practice.
18. Destruction Possibility Yes by vandalism.
19. Features Concrete steel inforced observation posts.
20. Burials
21. Artifacts Lying 100 yards to the northeast is an old abandoned radio antenna once used by the University of Maryland. for signal from The universe
22. Faunal Remains
23. Comments Observation post similar to SDi⁰⁸⁹⁷, and SDi⁰⁸⁴⁸, but still in standing position.
24. Accession No. 25. Sketch Map attached by RS Begole where
26. Date Recorded 1/10/88 27. Recorded By RS Begole
28. Photo Roll No. Frame No. Film Type (s) B & W Taken By RS Begole



SD: 10,906
old outer space
radio antenna



observation
Post



RECENT MILITARY OPERATIONS
IN THE
ANZA-BORREGO DESERT STATE PARK

(A PRELIMINARY STUDY OF SUCH ACTIVITY
FROM 1941 TO 1959)

FINAL REPORT

by

F. L. Orrell

October 31, 1991

Revised January, 1992

Submitted in fulfillment of the requirements of a
James L. Brainerd Memorial Grant
from the
Anza-Borrego Desert Natural History Association

RESULTS

The study explicated extensive use of the Park area by the military during and immediately following the Second World War. Major activities are summarized in the following.

The US Army.

The Southern California Sector of the Western Defense Command grabbed 400 square miles of the Park, an area about equal to the old Borrego State Park. The area included much privately-held land and conflicted with the Navy's access to a portion of Clark's Dry Lake and their operations involving Benson's Dry Lake.

The Army called the region the Borrego Maneuver Area. Although they made extensive logistical preparations and built roads, they probably never used it for the intended exercises. However, they used portions of it intensively for training antiaircraft gunnery units from Camp Callan at Torrey Pines. Some of these units practiced by firing at radio-controlled drone airplanes. They alternated firing between Coyote Canyon and the north face of Borrego Mountain. The Army may also have been active in Borrego Wash and, sporadically, elsewhere in the Park. While on temporary duty in the desert, some troops bivouacked at the Ensign ranch.

The US Navy.

Navy operations in the Borrego desert were the most extensive and the most destructive of those of any of the military services. All were part of the training of replacement pilots and crews for the air arm of the Pacific Fleet. Aviation training for the 11th Naval District at San Diego involved several locations in San Diego and Imperial Counties. These are listed in Table I on the following page. Those marked by an asterisk were located within today's Park. The others either bordered on the Park or were somewhat removed. However, each of the latter was involved in or influenced to a greater or lesser degree the Navy's activity at each of its locations within the Park. Each was under the jurisdiction of the Auxiliary Air Station at Salton Sea and/or the Naval Air Station at San Diego. Only those Navy facilities within the Park were studied in depth.

It was initially stated that the study would be restricted to the era of the Second World War. However, the most extensive and the most devastating activity was the Navy's use of the Carrizo Impact Area which occurred post-War. Incongruously, it was a peacetime activity following the Second World War and preceding the Korean War.

Table I

Naval Facilities In Or Affecting The Park

<u>Location</u>	<u>Activity</u>
Benson Dry Lake	Emergency Landing Field (ELF) level bombing target
Borrego Hotel	ELF; dive & horiz. bombing
— Borrego (Military) Wash	bombing and strafing
Carrizo Impact Area	live bombing and rocket firing at vehicular targets
— Clark's Dry Lake	ELF; level & dive bombing; strafing
Coyote Wells	N & S: ELF's and 1 target
El Centro	Auxiliary Air Station
Holtville	Auxiliary Air Station
Jacumba	ELF
Salton Sea	Aux. Air Stn., seaplane landing trng. in rocketry; skip bombing

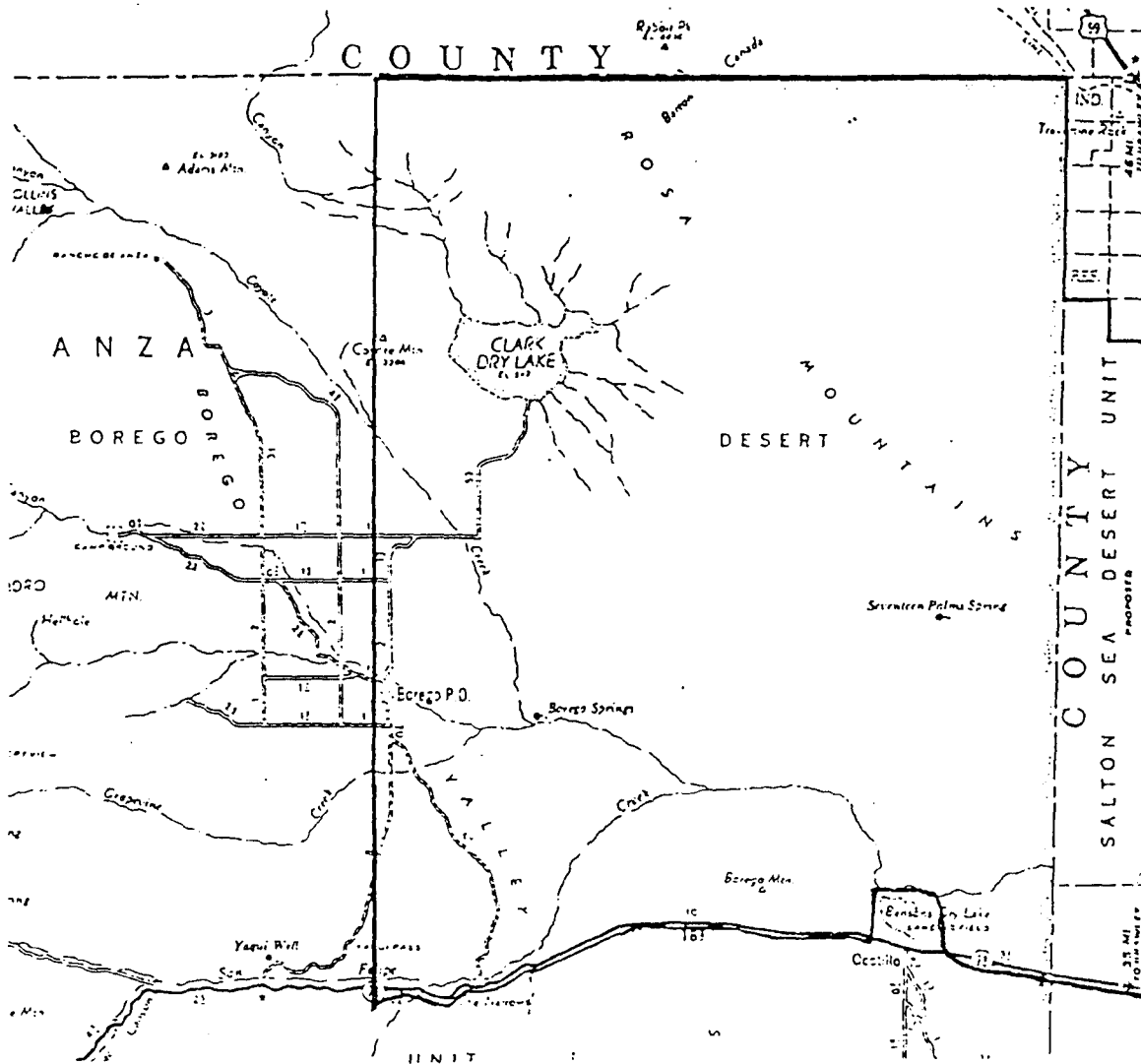
The Marine Corps.

The Marines established a camp at the Ensign ranch (unofficially, Camp Ensign) where trainees from San Diego (Camp Elliott or Camp Pendleton) billeted. Groups of trainees rotated through the camp for periods of about a week during which they gained proficiency in driving military trucks at night. Their practice course is not known, but it is believed they used the few gravel roads near the ranch and drove freely across the surrounding desert.

CalTech.

Rocket scientists from the California Institute of Technology, with help from training units from Camp Callan, tested experimental target rockets in an area north of Borrego Mountain. While the concept being evaluated did not prove feasible, the testing contributed to the advancement of rocketry, the second most significant weapon development of World War II.

THE BOREGO MANEUVER AREA



Credit: Southern California Automobile Club, 1942

Heavy lines mark three of four boundaries of BMA.
It extended on the east to Highway 99 (present 86)

THE BORREGO STATE PARK: The Army's Maneuver Area

Official Designation.

On March 20, 1942 Major General Wilson, Commander of the Southern California Sector of the Western Defense Command, announced to his command the conditions for use of 400 square miles of Park land which he designated the "Borrego Maneuver Area".

Location.

The Borrego Maneuver Area [BMA] comprised most of what was once the Borrego State Park, extending from the Riverside County boundary on the north to State Route 78 on the south. A north-south line drawn through the Old Borrego Post Office was the western boundary and the former U.S. Highway 99 was the eastern boundary (the present Route 86).

Regions within these boundaries which were specifically excluded by General Wilson (see Appendix II) were Benson's Dry Lake ("a Navy landing field"), the Torres-Martinez Indian Reservation, and "areas adjacent to the western boundaries on which....improvements have been erected." It is not clear whether he was careless in not including all private land or was implicitly condoning incursion on unimproved property.

Need.

As discussed previously, training, although always important to the military, was a major challenge from 1939 through 1945. The country could not be successfully defended nor battles won without adequate resources of men and materiel. But it was vital that the men use the materiel effectively and this required thorough training of officers and troops.

In 1939, the "trained" Army was a force of only 174,000 men (Larrabee 1987).¹³ It was not only the smallest army--it ranked 19th in the world, smaller than Portugal's--it was also the worst equipped of the major powers. By war's end the

Army numbered 8.25 million. Adequately training for combat or service more than eight million men in six years was a herculean task.

While basic training was transforming the raw recruit into a soldier, he was also being taught to be an effective member of a combat or service unit. This was accomplished through exercises wherein the unit, men and officers, learned to do its job effectively, whether operating independently or in support of other units.

In most of the exercises, the units performed unopposed; in some, they engaged in mock battles or force-on-force maneuvers. As the size of the unit in training increased from squad to platoon to company and up to army, so the complexity of unit action and the land area required for the exercises grew. It was in anticipation of such training needs that General Wilson requested access to Borrego Park.

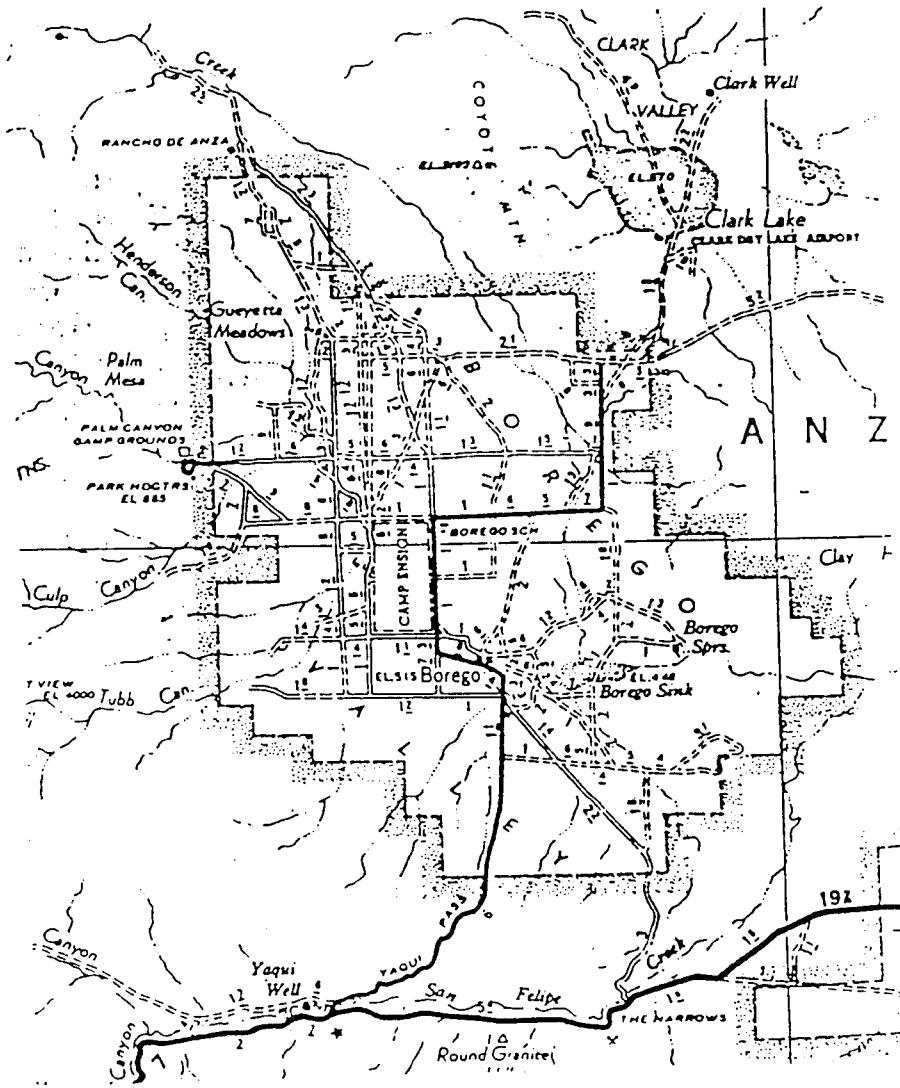
Area Preparation.

The only major physical change the Army made to the Valley was to improve the access road. It is possible this was done in preparation for maneuvers, but it is more probable that it was done in 1943 in support of the heavy traffic from Camp Callan for anti-aircraft training. Tom Davis believes an Engineer Construction Battalion attached to the 4th Army and the County Highway Department regraded Yaqui Pass Road and oiled or blacktopped it.

The map on the following page shows this improvement and should be compared with the earlier map in the section of the report for Clark's Dry Lake. It is reproduced from a special map prepared by the Southern California Automobile Club exclusively for military use.¹⁴ It was correct to November of 1943. Comparison of the two maps reveals interesting details.

1. Existence of the Navy's target and emergency landing field at Clark's Dry Lake is now noted as an "Airport."

2. Although the Park was, in effect, "closed for the duration," about a mile of road at the headquarters had been hard-topped (for military use of the camp ground?).



Credit: Southern California Automobile Club

Corrected to November 22, 1943
Special map for Armed Forces use only

3. Of the two southerly approaches to Borrego, Yaqui Pass and the Texas Dip, only Yaqui Pass was surfaced, which was the road most convenient for Army and Marine traffic from the west. Navy traffic, which approached from the east, could continue to use the dirt road into Borrego or drive 5.4 miles further on Route 78 to Yaqui Pass. This probably indicates semi-quantitatively the differences among the Services in volume of traffic into Borrego.

4. Note the formal recognition of Camp Ensign. Note also that the new hard surface road does not continue directly and diagonally northeast from the Borrego Post Office--the shortest route to its terminus. It detours west in order to pass and service Camp Ensign.

The following logistical arrangements were to have been made to support the Maneuver Area; probably none were implemented until antiaircraft batteries arrived in 1943:

Provision for unit containers of safe, potable water for men and animals (*N. B.*) at two disbursement places. When the Army began intensive use of the Valley in 1943, they found it easier to depend on the well and pump at the Ensign Ranch.

Food rations (field ration "A") were to be supplied daily from Camp Haan at Riverside. Field kitchens were located opposite the school on the northwest corner of the intersection of Borrego Valley Road and Palm Canyon Drive.

Gasoline and lubricants were to be furnished by the Shell Oil Company from Brawley and engine oil by the Texaco dealer in Brawley.

Communication between Headquarters of the Southern California Sector and the field operation in Borrego was to be over a radio channel maintained by the 54th Signal Battalion at Pomona, emergency telephone from Julian, and special messenger direct from Pasadena to Borrego Springs.

It was expected that each unit occupying the BMA would have Medical Corps personnel attached who would provide needed medical service.

Use--Maneuvers: the Laag Homestead.

In spite of the detailed preparation by the Army, there is no hard evidence at hand of a true force-on-force exercise having been held in the Borrego Maneuver Area. There are, however, rumors which insist there was a large detachment, some or all of which was armored, that took up an entrenched position in the Valley. It was defending against and awaiting an attacking force which never arrived. It is possible that these "defenders" were the Army unit located briefly on the Laag homestead.

One of the earliest homesteaders in the Valley was Albin A. Laag who migrated to California from Finland in 1906. He had a vineyard near Loma Linda but, in a familiar story, sought a microclimate that would ripen his grapes earlier and bring a better price. Someone suggested Borrego and, by 1914, he was developing a portion of Section 24 (Township 11 South, Range 6 East) a mile or two south of the Borrego Sink. By 1918 he had a well, a 20 by 20 adobe dwelling and five acres of grapes, so the Federal government granted him a patent on the land.

The vineyard was not a success, but the family retained the land for recreation. Late in the Fall of 1942, Albin's son, Arthur, (pers. com. 1990) visited the homestead and learned that the Army had recently commandeered, occupied, and abandoned the property. The dwelling had been used as a command post and large, tracked vehicles had been entrenched in several places.

Although Arthur did not see the vehicles, he found Army debris--a rifle hanging in a tree, small trash, and large piles of food tins. The Army's presence was further verified when, shortly after the War ended, the War Department volunteered to the Laags a check for damages to fences and the dwelling.

There is some local opinion that the attacking force for the ephemeral maneuver included cavalry. If so, the closest units in early 1942 were the 11th Cavalry at Camp Lockett at Campo. However, Colonel Fife, who was a staff officer for the 11th at the time, states (pers. com. 1991) that they never were near or north of Route 78. There is nothing in the records of the 11th to dispute the Colonel.

The tracked vehicles at the Laag homestead could have been either tanks or tank destroyers. There are reports of tanks operating in the Valley. Millard (pers. com. 1991) tells of talking in the Borrego desert with officers from tank units, but that would have been in 1943 or 1944, too late to correlate with the Laag units or a

1942 force-on-force maneuver. Surles most graphically states "Army tanks rumbled through the Valley relentlessly" and "streamed along Truckhaven Trail."¹⁵ However, Jack Frost (pers. com. 1986), who worked at the calcite mine in view of the Truckhaven Trail from 1942 to 1945, makes no mention of military traffic of any kind along the Trail, an impractical route, at best.

\ The only tank whose presence in the Valley it has been possible to verify is the one of World War I vintage shown at the Ensign Ranch on the following page. It is more likely that this is the one Millard saw towing targets in Military Wash than that it was engaged in force-on-force maneuvers.

* The more plausible accounting for the vehicle tracks on the Laag place is to attribute them to tank destroyers. Voigtlander stated that such units from New Mexico "rolled into the valley" during the War.¹⁶ In December of 1941 there were four battalions of tank destroyers attached to the Southern California Sector.¹⁷ One or more of these might have been Army Reserves or National Guard from New Mexico and could have participated in a limited exercise in the BMA in 1942 which involved the Laag homestead.

Use--Maneuvers: Summary.

Training Circular Number 1, dated January 14, 1943, describes the training requirements for units of the Southern California Sector. It states that "Training will be progressive, with emphasis on basic training of the individual, intensive small unit combat training, and coordinated employment of supporting arms and services in combined training."¹⁸

It was probably in anticipation of training units of battalion size and larger "to function in combat teams of combined arms" that permission to use Borrego State Park was sought and "obtained." Changes in training plans or directives occurred soon thereafter and, fortunately for the Park, the land was never used for large-scale, force-on-force maneuvers.

Chapter 7 of the History of the Western Defense Command confirms this by stating on page 92 that "in 1942 large training areas were acquired," listing places in La Mesa and Vista in San Diego County, but making no mention of Borrego Valley. However, the Army did make extensive use of the Borrego Maneuver Area for other training exercises which are described in the following sections.



Credit: V. DeMarais

World War I Tank "Lottie"
Being "inspected" at the Ensign Ranch

Use--Observation Posts.

Robert S. Begole, a local archaeologist, has intensively studied structural artifacts in the Borrego desert. His primary interest is in ones erected by native Americans. Recently he re-examined a number of these artifacts to distinguish between those of historic value and those of recent origin. He reported in 1989 that rock parapets in at least four locations were observation posts constructed by the Army. He found these north and south of Yaqui Road near the summit of the pass; near the peak of Fish Creek Mountain overlooking the Elephant Tree area; in Carizo Canyon; and in Blair Valley.

All the structures at these locations were made by stacking native rock into walls about two feet thick and 18 inches to 30 inches high. The shape of the structures ranged from horseshoe to oval to rectangle. One structure, at Fish Creek Mountain, had been framed with ocotillo stems and roofed with creosote bushes. At each location, except Blair Valley, Begole found caches or remnants of U.S. Army "C" and "K" rations. He also found a number of cleared circles and cooking pits. He concluded that each of these structures had been erected and occupied by Army troops.

The structures at Yaqui Pass, as described by Begole, appear more permanent than the others. Fire pits and fireplaces suggest provision for long-term self-sufficiency. The height of the enclosures, 30 inches to 42 inches, might imply that their occupants were to defend the approach to the Valley as well as report on traffic. The incomplete telephone lines discovered here by Begole indicate the occupants intended to support or coordinate with other forces. Laag believed that the Army unit on his father's property (see foregoing) was either an attacking force which had come up from the southwest over Yaqui Pass or was defending against one expected from that direction. It is proposed that the vehicles on the Laag homestead and the builders of Begole's structures at Yaqui Pass were involved in the same (aborted?) maneuver.

During the first two years of the War, it was feared that the United States was particularly exposed to attack and invasion from across the border with Mexico. Until Mexico joined the war against the Axis in mid-1942, that border seemed especially vulnerable. Accordingly, the Southern Land Frontier (a unit of the Western Defense Command) was formed to patrol and defend it. Responsibility for this was

first assigned in September of 1941 to the 11th Cavalry stationed at Camp Seeley, a few miles west of El Centro, The 11th was a mounted regiment equipped with trucks, motorcycles, scout cars, and its share of the 20,000 horses the expanding Army had purchased. (Beginning in 1939, the Army struggled to be ready for trouble, but one of General Marshall's most nettlesome problems was that many of his top commanders were preparing to re-fight the first World War.)

In December of 1941, the 11th abandoned the small, primitive quarters of Camp Seeley and moved to Camp Lockett at Campo. Lockett was about 50 miles west of El Centro and about the same distance from San Diego. This location put the regiment virtually astride the point at which the San Diego and Arizona Railroad re-entered the United States. Thus, it was conveniently located for guarding the border and the railroad's tunnels and bridges in Carrizo Gorge (Hines 1991). Of the tunnels, numbers 5 and 21 were situated within the Park, thus marking one more, albeit innocuous, military activity there.

The relocation of the 11th from Seeley to Lockett began with the transfer of a small group. According to Fife, the group's assignment was to find a route for the main body which was to move later. The path taken by the lead party went due west of Seeley to Carrizo Gorge, south down the Gorge, and along the railroad to Campo and Camp Lockett.

The most probable explanation for the origin of Begole's Army structures at Carrizo Canyon and Fish Creek Mountain is that they were built by the 11th Cavalry during their move to Camp Lockett. Although the site at Fish Creek Mountain seems north of the intended route, Begole's observation of worn paths there suggests use by the main body of the regiment. Also, the covered structures may well have been corrals for use by the main body.

As the country was at war when this relocation was effected, the troops probably did not bed down for the night without first posting guard and erecting protective enclosures. In which case, the structures at these two location were defenses, not observation posts.

Explanation of Begole's Blair Valley site must await more data. Its location does not relate to either the activity at the Laag site or the move of the 11th Cavalry. Moreover, no rations have been found there and the loose stone walls, while similar to those at the other sites, differ sufficiently to make them suspect as Army structures.

Begole also relates a conversation with Robert Crawford, "a pioneer rancher in the area," who told of a maneuver in Carrizo Canyon between a "new" mechanized unit and an "old fashioned" cavalry unit. It is known that elements of the 11th maneuvered in the Manzanita Indian Reservation in 1941 (Hines 1991), but not elsewhere. It is believed that Crawford's "maneuver" in Carrizo Canyon is a misinterpretation of a pause by troops of the 11th during relocation to Camp Lockett.

Use--Antiaircraft Training: General.

• After the Army went on the offensive in Africa and until the Allies established control of the skies over Europe, it assigned a high priority to training antiaircraft batteries and centralized this training at two locations in Southern California. Recruits selected for antiaircraft duty by western induction centers were sent to Camp Callan at La Jolla (adjacent to and south of Torrey Pines State Park) or to Camp Haan at Riverside.

According to Chris Marsh, President of the San Diego Military Heritage Society (pers. com. 1991), these men were assigned at Camp Callan to one of six Training Battalions (the 52nd through the 57th) and began their basic and specialist training. Specialist assignment was to a battery of either .30-caliber, .50-caliber, 20mm, 37mm, 40mm Bofors, 70mm, or 90mm antiaircraft guns; to a quad .50-caliber mounted on a half-track; or to a supporting unit which operated a searchlight, a range finder, or an aural direction locator.

Generally, the Army allotted eight weeks for the antiaircraft trainee to become proficient in the basics of the care and handling of his assigned weapon or equipment. This was followed by two weeks of field training. At the conclusion of field training, the recruit was transferred to a battery that was preparing for overseas combat duty. It appears that most of the Camp Callan trainees completed field training at La Jolla. However, when weather shut down coastal firing ranges or the ranges became saturated with gunfire from Callan and/or the Navy, the trainee was moved to either Borrego Valley or to Camp Haan's ranges in the Mojave desert.

‡ Units moving to Borrego for practice left Camp Callan in the morning, sometimes as early as two o'clock and usually on Saturday. They travelled in a convoy of 6x6 trucks, personnel carriers, and gun trucks. Their route took them through Julian, down Banner grade, along Route 78, past Scissors Crossing, and up over Yaqui Pass into Borrego.

When an unmanned target plane was included in the convoy, it was transported on a 60-foot trailer which also served as its launcher. Most of the curves on the Banner grade were too narrow and sharp to permit hauling the rig down the grade behind a truck. Consequently, the men were required to unhitch the trailer and jockey it around the curves by hand. None wished to repeat the experience.

Once the convoy reached Borrego Valley Road, it proceeded to the Ensign ranch and date grove where the men were billeted, probably to be close to the Ensign well and pump. It was a convenient supply of drinking water, the only one in the Valley equal to the needs of large numbers of troops.

Even the Ensign well did not slake all the thirsts. Former Staff Sergeant Arthur Proscovitz, Battery D, 57th Training Battalion, Camp Callan, was among a few fortunate soldiers who borrowed a jeep with which they stumbled onto the Navy installation at Salton Sea. In spite of inter-service rivalry, when the sailors learned where the soldiers were billeted, they treated them to showers (pers. com. 1991).

There were no tents for the Army at Ensign. The soldiers slept in shallow fox holes which they dug into the sand and covered with a poncho. This arrangement was primitive, but so much better than the open desert that at least one group showed its appreciation of Ensign's hospitality by digging irrigation ditches for him for two days. Happily, the Truman Congressional Committee investigating military/private sector wrong-doing never became aware of this.

Some Army units operating in the Valley set up field kitchens diagonally across from the grade school on Palm Canyon Drive. The antiaircraft training batteries may have been among them. In any event, the soldiers supplemented their rations with the dates which dropped from Ensign's palms. There were plenty of drops because pickers couldn't be hired during the wartime shortage of labor.

During certain months the desert winds blow fiercely. Tom Davis recalls that, when the winds had infiltrated the Army chow with sand, soldiers from the field kitchen at the school mounted motorcycles and rode to the Ensign ranch to gather dates and buy milk with which to wash them down.

For most of the men, this one- to two-week duty in the desert was a lonely assignment. A few, probably officers in the antiaircraft Headquarters Training Battalion, had family staying at the nearby Desert Lodge. Voigtlander reports that the very limited accommodations there were overtaxed by military wives (*Borrego Sun*

1971). For a short time young ladies from Julian augmented Borrego belles at dances held at the school house for the troops. The School Committee became concerned about liability or propriety or both and put an end to the dances, returning the trainees to uninterrupted social isolation.

Use--Antiaircraft Training: Desert Practice.

Field exercises for antiaircraft gun batteries were of two types: "dry runs" and "live firing." In dry runs the crew repeatedly set up a gun emplacement, tore it down, and moved it to a new location--usually at night--where they would quickly and correctly conceal and protect it and make it combat ready again. Batteries of large-caliber guns also practiced training the gun on high-flying aircraft detected by the aural locators which were aided at night by the searchlight crews. Batteries of small-caliber weapons also made dry runs by training their guns against low-flying planes.

Local newspaper accounts have these planes based in Yuma. However, it would seem to have been more efficient to have this service provided by the airplane towing detachment at March Field, Riverside, which group also serviced the Camp Haan ranges in the Mojave desert (Nelson 1941).

Apparently, gun emplacements for these dry runs were close to the Ensign ranch, as the low-flying planes frequently buzzed Ensign's cows. Often the cattle ripped their hides and udders while running through barbed wire fences in their fright--to the disgust of Davis who had to minister to them.

* Some of the training batteries at Camp Callan made their dry runs in the Borrego Valley, then completed their field exercises with live firing at the Camp Haan target ranges in the Mojave desert. Others of the training batteries did both the dry runs and live firing in the Valley. It appears that only the lighter weapons (.30-caliber to 40mm) fired live ammunition in the Valley. Guns for larger ammunition (above 40mm) fired only at Camp Haan.

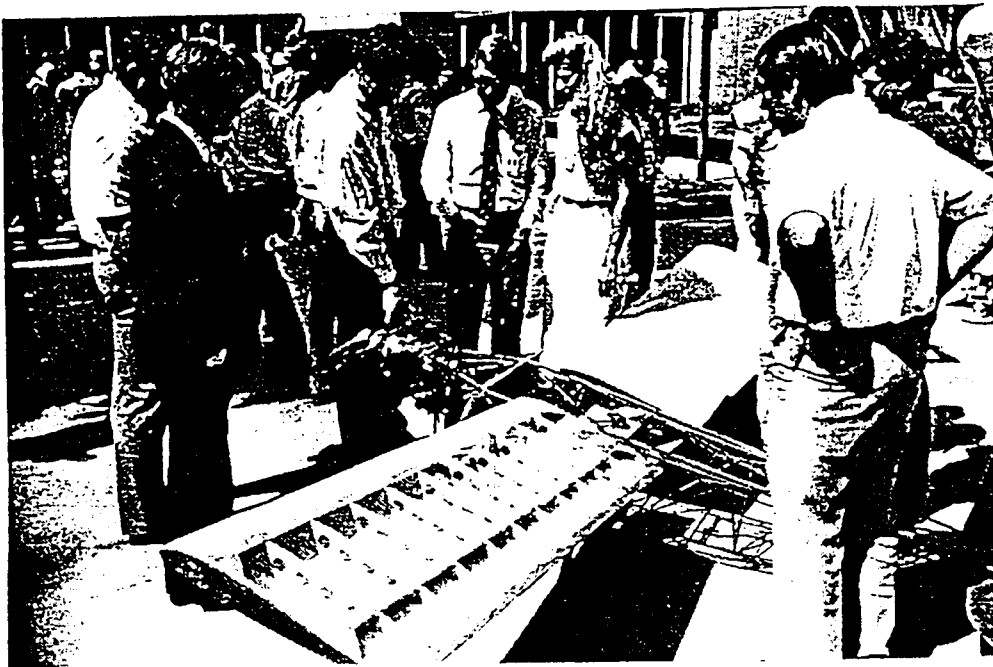
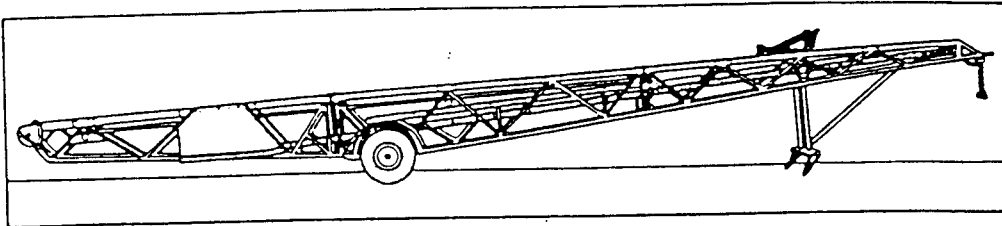
The antiaircraft firing ranges in the Valley were north of Clark's Dry Lake and at Borrego Mountain. Firing alternated between the two locations in coordination with Navy bombing and firing at Clark's and/or at Borrego Wash or Benson's Dry Lake. For example, when the Navy was using their target at Clark's Dry Lake, the Army would use Borrego Mountain, keeping the Navy inactive at Benson's Dry Lake and Borrego Wash. At the next Army firing practice the active locations might

be reversed. Millard insists that firing of 40mm weapons took place only at Borrego Mountain. Use of a particular firing range might have been dictated by both the Navy's needs and the antiaircraft weapon assigned to the training unit. e

* The high-altitude target was a sock towed behind an airplane. The low-altitude target for small-bore weapons (at Borrego Valley, at any rate) was an unmanned, radio-controlled plane called a drone. Former Lieutenant Harvey A. Millard was the Assistant Radio Plane Operator with the Headquarters of the 11th Antiaircraft Training Group at Camp Callan. From September of 1943 until May of 1944, he made bi-weekly trips to the Borrego desert to pilot a drone for antiaircraft gunnery practice. Many of the details of antiaircraft firing in the Valley were given by Millard in a lengthy interview on April 28, 1991.

The Army designation for the drone which saw service in the Valley in 1943 and 1944 was the OQ-2A. It was designed and developed by the Radioplane Company of Van Nuys, California. One of the founders of this company and the initial developer of American target planes was Reginald Leigh Denny, film star and model plane enthusiast. An assembler on the production line for Denny's drones was an attractive young woman named Norma Jean Dougherty. Captain Ronald Reagan, a friend of Denny's, sent Private David Conover to Radioplane to make publicity stills of America's women in war work. Later, after Conover persuaded Dougherty to become a model, she became better known as Marilyn Monroe (Botzum 1985).

The OQ-2A was a high-wing monoplane with a wing span of 12 feet, a length of about nine feet, and a weight of 108 pounds. It was powered by a 6.5 horsepower, two-cylinder engine which drove a pair of wooden, counter-rotating propellers. It had a maximum air speed of 85 miles per hour. There were no ailerons, directional control being provided by the horizontal stabilizer and the rudder. Directional response must have been somewhat sluggish, but, considering the size of the drone, probably simulated well the performance of a full-size plane.



Credit: Ira E. Chart, Northrup Corporation

Pilotless Target Plane

Upper: A-2 Catapult Launcher
(Similar to the A-1 Launcher/Trailer for the OO2-A)

Lower: OO2-A Radioplane Drone

The drone was launched from the combined trailer-catapult used to transport it over the roads. Rubber shock cords provided the energy for launching and acted like a slingshot. When airborne, the drone was controlled remotely by means of a radio transmitter on the ground and a receiver mounted in the drone. Although the plane was equipped with landing wheels and a tail skid, recovery was by means of a 24-foot parachute attached with four-point suspension. Loss of radio signal or the "Parachute" command from the control stick caused a trap door in the top of the fuselage to spring open, releasing the pilot chute and shutting off the engine. (Botzum 1985)

X The ground controller piloted the drone more or less east to west along the face of the Santa Rosa or Borrego Mountains. He kept it sufficiently below the top of the mountains to ensure that the trainees, who were firing into the mountains, would not shoot over them.

Both firing locations were approved aerial ranges with stipulated angles of fire, according to Millard. The Staff Training Officer coordinated their use with a central agency which warned other air operations of the firing times and location. Monitors were required at each live firing practice. They were responsible for observing the land and air space around the firing range, for fending off intruders, and for warning the antiaircraft group of an intrusion. It is possible that the phone lines running east opposite the northern Rake Station at Clark's Dry Lake were installed for the use of the monitors.

Some of the monitoring was on the ground, some in the air. Oddly, the Navy, not the Air Force, furnished the air monitoring. The pilot doing the air monitoring was also responsible for chasing and shooting down any errant drone which escaped from its ground controller.

At one practice session, a second Navy plane flew in to relieve the first monitor. As the second plane took up its station, the pilots lost sight of each other. The two planes collided in mid-air and crashed into Clark's Dry Lake. This collision was probably the source of the two wing tanks observed there by Begole and by some of the Rangers.

Use--Rocket Experiments.

We have already examined some of the effects on the Park of the effort to assemble a winning war machine by building a cadre of trained military people. Another aspect of building the machine was to devise and equip it with superior weapons. This, too, involved the Park, although to a minor degree.

The California Institute of Technology in Pasadena, was developing two new weapon systems each of which would have a profound effect on both the war effort and post-war society. Both were rocket programs. A team headed by the renowned Theodore von Karman with Frank Malina, and Clark Millikan was working on jet propulsion systems. One of these became the Jet-Assisted Take-Off or JATO system which reduced a plane's take-off distance and time. For example, when an attack bomber was equipped with a 2,000-pound thruster, the take-off distance under full load was reduced 32 percent. It could also be used to give a plane short-duration, super-performance at altitude (Bower 1943).

One of the earliest applications of JATO was to flying boats which the Navy used extensively for antisubmarine and other patrols. JATO did not impinge upon the Park, but it came close. Very early trials of a JATO affixed to a PBY flying boat were conducted at the Naval Auxiliary Air Station at Salton Sea. This program spawned the Aerojet-General Corporation and the Jet Propulsion Laboratory, a leader in space exploration and developer of ever-more-devastating missile systems.

The second CalTech rocket project was run by a team of chemists and physicists headed by Nobelist Charles Lauritsen which developed a series of highly successful aircraft ordnance rockets. They, too, conducted certain testing and evaluation of rockets at Salton Sea. One of their more unique studies, and the one that involved the Park, resulted when the Coast Artillery asked to have a target rocket developed. "Gunnery needed realistic targets that could approximate the speed and course of aircraft. Towed targets were too slow; remote control aircraft, too expensive" (Christman 1971).

The target rocket suffered from the same training limitations as the towed sock and the drone. Except for the rare one which destroyed the target, hits could not be determined until the target was examined later--if it were not destroyed on landing. Examination was long after firing ceased--a slow, complicated procedure which delayed scoring. It also prevented the gunner from making timely correction to his aiming.

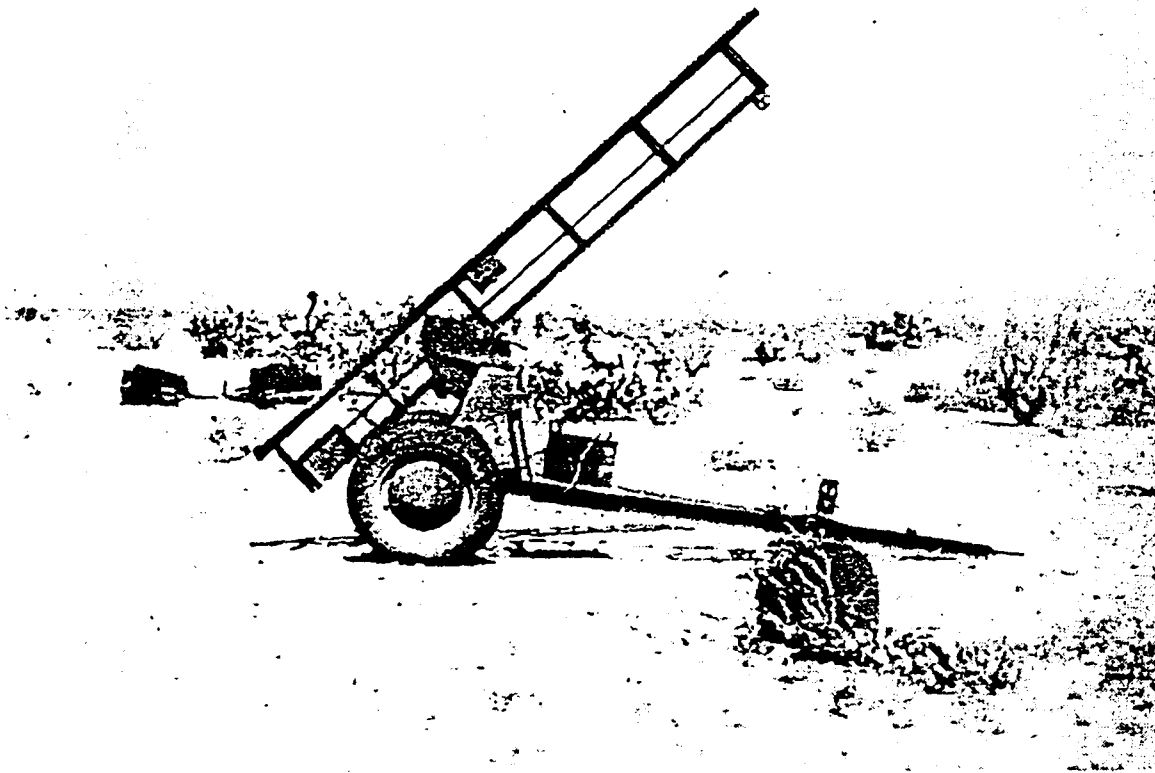
The CalTech group proposed a radio detection technique which would signal hits when they occurred. They attached wooden fins covered with aluminum foil to a rocket body. The foil was coated with a paint that would build and hold an electrostatic charge while the rocket was in flight. Penetration of a fin by a bullet or small-caliber projectile would produce an air-borne electronic signal.

For help in evaluating the concept, CalTech secured the participation of an anti-aircraft battery and of a drone launching crew from Camp Callan. Millard states the tests were performed in a flat area north of and adjacent to Borrego Mountain. The groups were spread along the flight path of the rockets. Lieutenant Millard and the launcher were at the upper end, the .30-caliber anti-aircraft gun at about mid-range, and the scientists about half way between them. The gun was faced so that it fired into the mountain.

The groups could communicate with each other via telephones over wires laid on the surface of the ground and spun from spools mounted at the rear of a jeep. When CalTech was ready for a shot, they alerted Millard by phone, telling him which missile they wanted. (One of the experimental variables was flight trajectory as a function of propellant load.)

When the rocket was loaded on the launcher and armed, Millard so advised the scientists and ordered the gun crew to "fire at will." The CalTech people monitored the flight electronically for hits and tracked the trajectory with a theodolite. After the rocket landed, the fins were recovered and compared for hits with the electronic record. The rocket bodies were abandoned where they landed, but there are no reports of their being found postwar by visitors or Rangers so, hopefully, some are still there. During the several days of the trials, all groups bivouacked at or in an old gold mine adit near the eastern end and in the northern face of Borrego Mountain.

Target rockets were used during the War, but there are no data to indicate that the CalTech electronic scoring technique was adopted. However, the trajectory data proved useful so the Park played a small role in the development of the most important (after the atom bomb) ordnance item developed during the War. The Navy alone spent 325 million dollars buying rockets (Christman 1971) and, until the last year of the war, every rocket fired by the Navy was made in Pasadena (Richman and Weiner 1967).



Credit: Harvey A. Millard

CalTech Rocket Launcher
At experiment site near Borrego Mountain

Use--Marines: Camp Ensign.

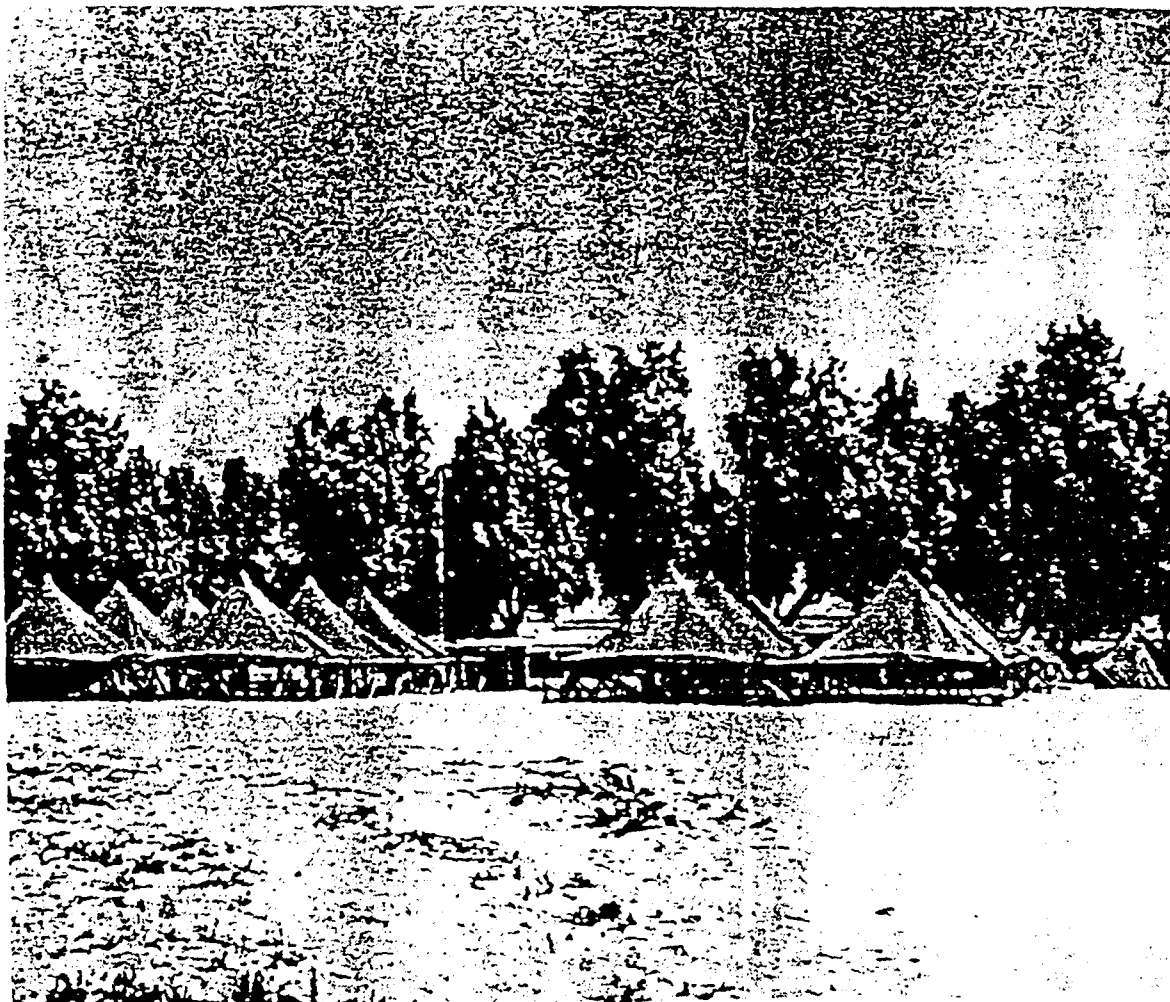
Sometime in 1943, the Marine training centers near San Diego (either Camp Pendleton or Camp Elliott) were answering a call for large numbers of truck drivers who were to be readied for combat duty in short order.

For reasons that are not clear in view of the enormous size of Camp Pendleton, one aspect of the training that could not be accommodated at Pendleton, was practice in night driving. It is possible that the destination for these drivers after training made practice in desert driving essential. In a second rare display of inter-service cooperation (the first was the Army-Navy sharing of Clark's Dry Lake), the Marines opted (and the Army, apparently, concurred) to conduct this phase of the training in the Borrego Maneuver Area and/or the Borrego Valley.

Unlike the Army, however, the Marines established a more formal base in the desert, erecting a tented area for the trainees on the Ensign Ranch. When the tents were in place and a flag pole erected, Lieutenant Colonel Joseph M. Swinerton, commanding officer of the Base Service Battalion hoisted the flag for the formal opening of the camp. Major Ralph L. Schiesswohl commanded the Motor Transport School and was also present at the dedication of Camp Ensign (Davis 1990). There was an unoccupied dwelling near the open area where the tents were set up which the School used as its headquarters.

Trainees were brought from the coast to Camp Ensign on Fridays. They went through a series of night driving training exercises, presumably running some sort of course across the open desert. According to Davis, if the trainee had demonstrated the required proficiency by Thursday night, he was allowed to return to the coast the next day. If the School operated during the summer months, a strong incentive to return to the coast within the first week is understandable.

As with the Army troops, the Marines appreciated the hospitality of the Ensigns and the Davises and elected to show it by installing a swimming pool. They had a small bulldozer (probably, for retrieving trucks stuck in the sand) with which they dug the excavation for the pool. On the day they intended to cement the excavation, they received orders to break camp. That ended the swimming pool, the hole for which the Ensigns later converted to a fish pond.



Credit: Borrego Sun

Camp Ensign

Marine Corps Driver Training School
at the Ensign Ranch

MILITARY WASH: U. S. Navy Bombing Target

Official Designation.

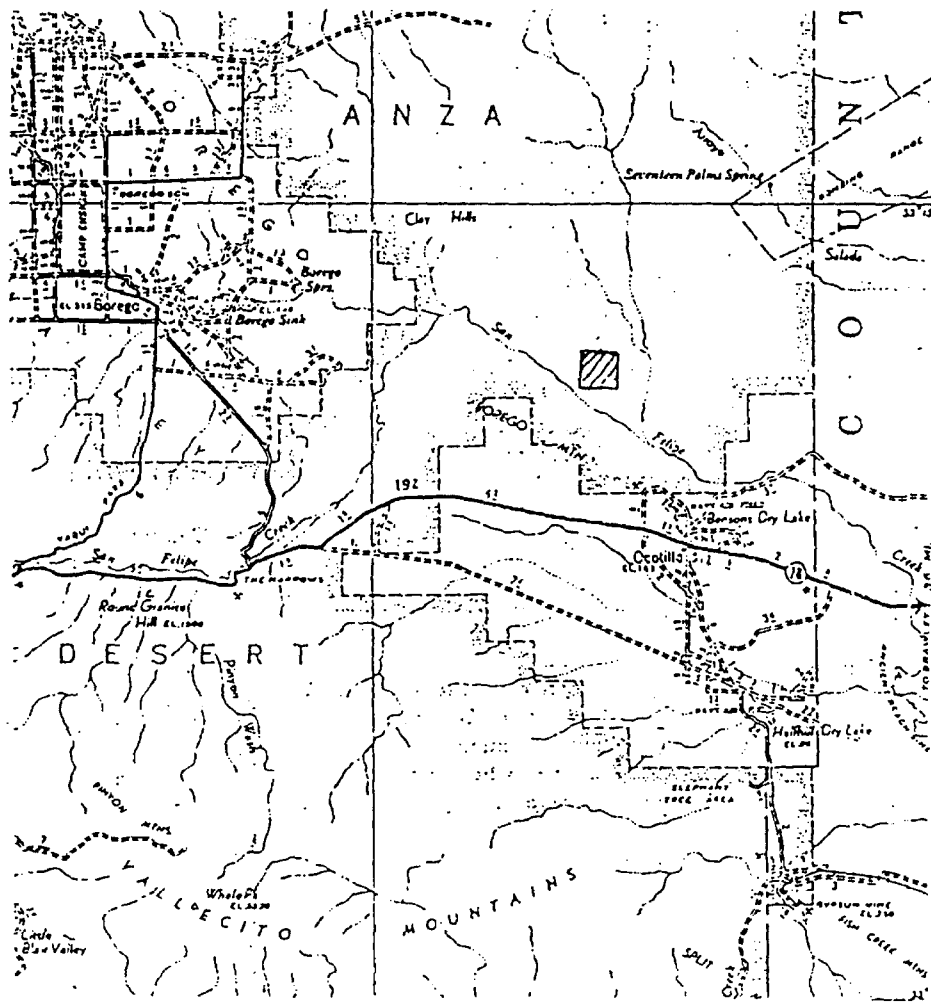
The only name the Navy gave to this facility was the undistinguished designation, "Bombing Target." Their references to the facility describe its function as for level bombing only,¹⁹ which limitation is consistent with the absence of emergency landing strips within the Section. The Navy usually demanded that an emergency landing field be adjacent to dive bombing targets.²⁰

Admiral Blakely, Commandant of the 11th Naval District, San Diego, gave as one reason for this, "Pull-outs from bombing dives extend a considerable distance from the target before the minimum altitude is reached. During this period of pull-out the pilot is always hazy and often 'blacked-out,' and, therefore, is unable to observe and be alert for other aircraft."²¹

* The Military Wash target area was an adjunct to the Navy's dive bombing target facilities at Ocotillo (Benson's) Dry Lake and is usually mentioned in only those Navy records pertaining to the Ocotillo target facility. As an adjunct to this latter facility, it was one of the ten land targets and five emergency landing fields manned and maintained by the Naval Auxiliary Air Station at Salton Sea.²²

Location.

Military Wash, or Borrego Wash, as the Navy called it, lies three miles almost due north of Ocotillo Wells and Benson's Dry Lake. It is near San Felipe Wash, Fault Wash, and the present Ocotillo Wells Vehicle Recreation Area. The target use area was to have been confined to Section 20, Township 11 South, Range 8 East, San Bernardino Meridian. The approximate location of the target area is shown on the Auto Club map on the following page. Note the Navy Air Fields at Benson's Dry Lake and at Halfhill Dry Lake (the Navy called it their Borrego Hotel location). Note also the bombing range at Seventeen Palm Spring and the Arroyo Salada. This was probably also a Navy area but has not been positively identified. It may not have been used as the author has no reports of military debris from that area.



Credit: Southern California Automobile Club
Corrected to November, 1943

Military Wash Target Area

Cross-hatched area is approximate target location

Description--As Installed.

Unfortunately, no detailed description of this target facility, textual or photographic, has been unearthed. As such items were highly standardized, it is safe to assume that the bombing target was the same size, design, and construction as the one at Clark's Dry Lake. Two Rake Stations, identical to the ones at Clark's, were located atop a low bluff or ridge. Ironically, their added elevation made tracking dive bombing easier here, where it was prohibited, than at Clark's which did permit it. The Navy provided other target facilities here which cannot yet be described authoritatively. Remaining debris encourages some speculation about their nature and function. The debris and the speculation are described in the next section.

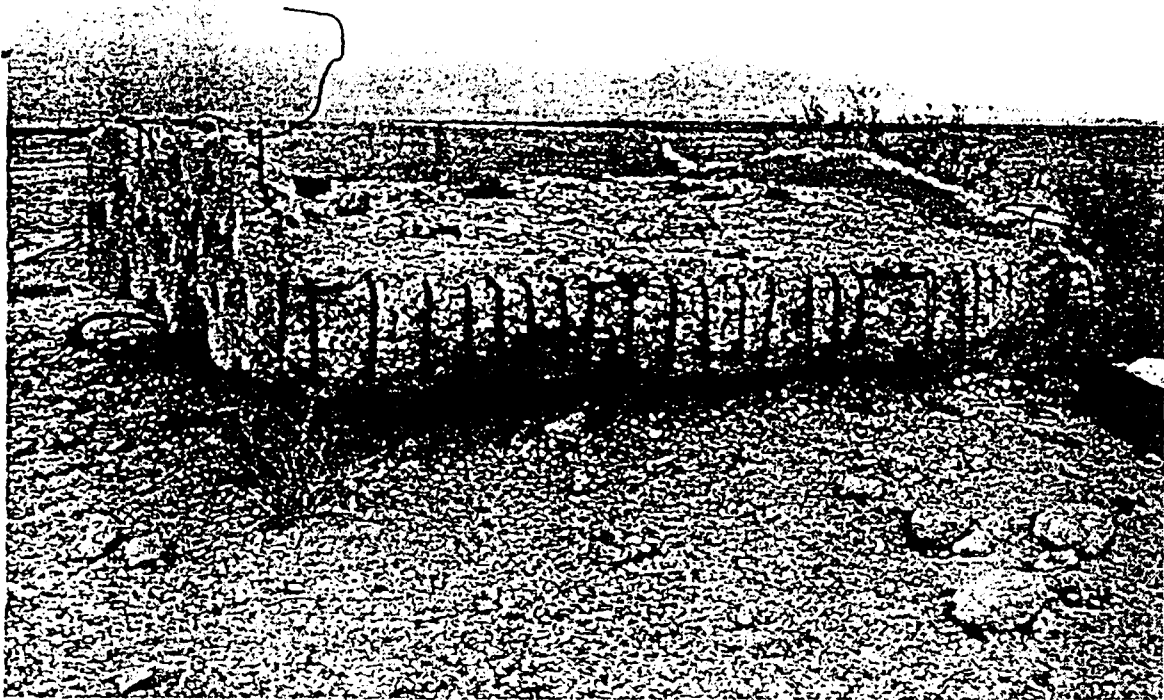
Description--Current.

If there were a fieldstone or rock bombing target comparable to the one at Clark's Dry Lake, it has been obliterated. As this location is not as convenient to a supply of rock as is Clark's at the foothills of the Santa Rosa Mountain, the target circles here may well have been non-durable markings of chalk or paint.

As with those at Clark's Dry Lake, little remains of the Rake Stations but the reinforced-concrete columns and bomb-proof roof. However, here the Stations have collapsed onto the ground. Because the roofs appear to have dropped directly in place on top of the buckled columns, without lateral movement, it appears that the Stations were destroyed by explosive demolition, leaving an outrageous eyesore.

The heavy concentration of .50-caliber bullets and clips in a small area not far from and within sight of the Rake Stations indicates the location of a target for practicing aircraft fixed gunnery. Nothing of the target remains. A hundred yards or more east of this spot are the remains of a truck or automobile whose styling suggests its vintage was late '30s. It was liberally punctured by bullets and a few practice rocket casings were found nearby. Whether this was an official target or a casual target of opportunity is not known.

Much further east in Fault Wash is another collection of military artifacts and debris. It is sufficiently distant from the Rake Stations to suggest that, again, the Navy was indifferent to Section boundaries. Portions of a tall, wooden, utility pole remain in place on one edge of the Wash. Its position suggests that there was a companion at the opposite edge and that some sort of target for airplane firing practice was suspended between them.



Credit: Author

Remains of Rake Station Roof
at Military Wash

Near the pole is a large steel box which the elements are slowly exposing after some deluge covered it with sand. The box is rectangular and of welded construction. It has been suggested that it was once a "portable," floating dock. Although it contains bullet holes, it does not appear to have been a Navy target. Its true function at this facility is unknown.

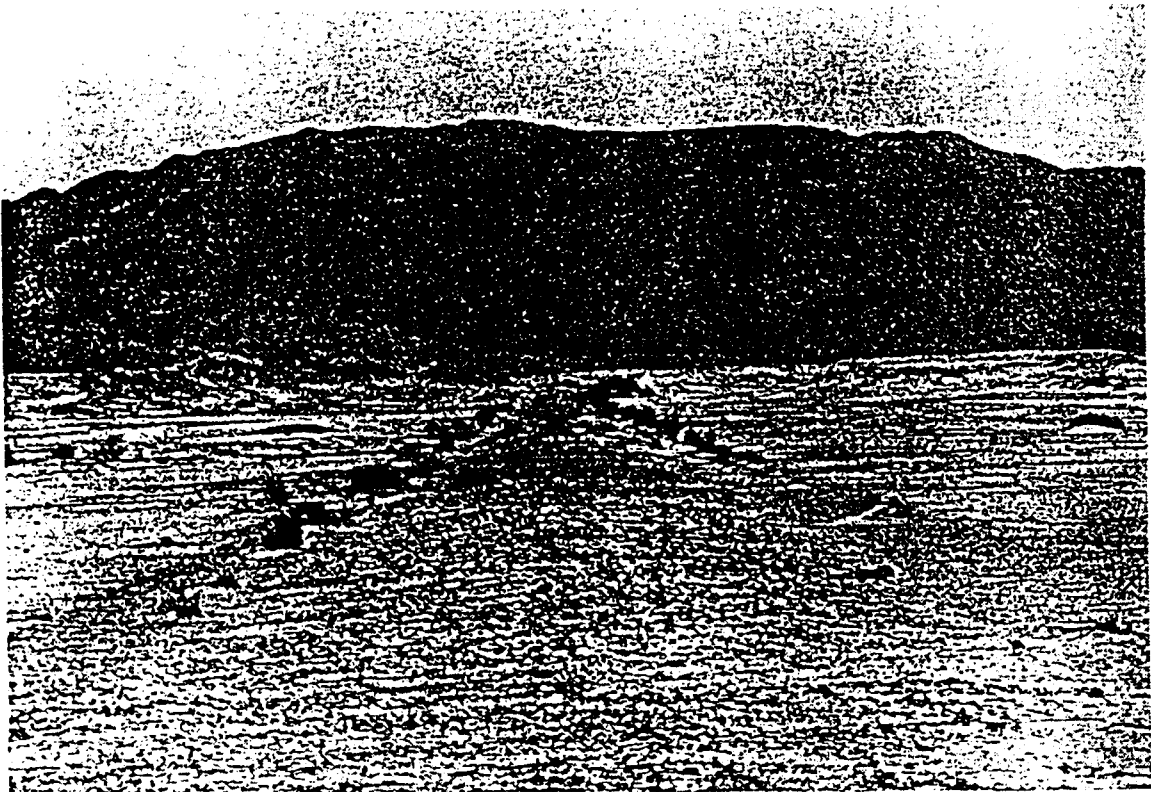
An interesting, anonymous note in the files of the Parks and Recreation District office in San Diego states that the Navy did not discontinue use of this target area until 1953 and that they decontaminated (removed ordnance debris) the area in June of that year. Strickler wrote a memo in 1961 in which he described the Navy's use of the area as "bombing and strafing." He further states, "We have continually found and have notified the Army for disposal of ordnance around [Military Wash], as well as other portions well within the Park." Amazingly, he expresses the opinion that the Carrizo Impact Area is as safe "or even safer" than Military Wash.

X The most intriguing military artifact in Borrego Wash is the debris which was the source of the long-standing speculation of a buried railroad train and tracks which once served as a target for aircraft gunnery.²³ Below the Rake Stations and opposite their northerly faces, there is a line of evenly-spaced marks on the desert floor that suggest railroad ties for tracks.

However, the distance between the marks is too short for tie spacing for standard-gauge rails. Furthermore, clusters of light box nails and residue of burned wooden boxes embedded below the surface of the ground point to some other origin for the marks. The perfect alignment of the marks over a distance of one to two miles suggests they were laid out with a transit. This and their regularity indicate the possibility they were associated with some sort of special-purpose target--possibly, a towed or a self-propelled target.

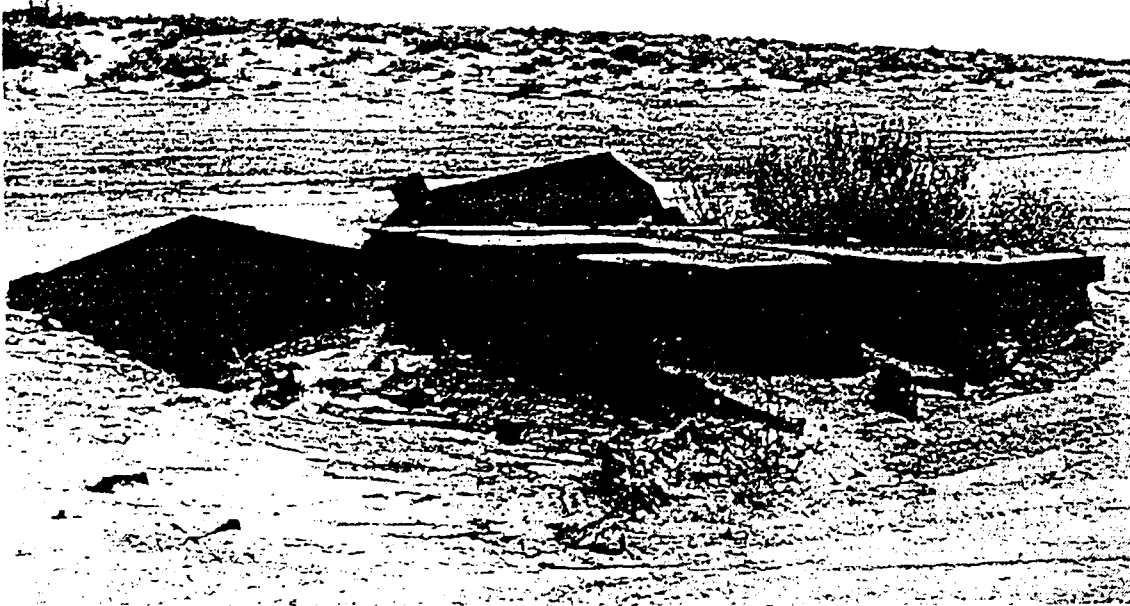
* It has been stated previously that Millard reported seeing "5-ton tanks" towing targets while he was in the Borrego desert with anti-aircraft training batteries from Camp Callan. As he frequented the area around Borrego Mountain and Ocotillo Wells, it is quite possible he saw them (or it) in Military Wash.

It should be noted that the Camp Haan/Mojave Anti-aircraft Artillery Range operated five anti-tank ranges as early as 1941 for practice firing of .50-caliber anti-aircraft machine guns by anti-aircraft batteries. The firing was at a fast-moving target sled towed at 25 to 35 miles per hour behind a truck (Nelson 1941). Anti-aircraft units at Fort Bliss, Texas, were using gravity-propelled, fast-moving targets mounted on mine car trucks in 1940 (McConnell 1941).



Credit: Author

Site of the "Railroad"



Credit: Author

Floating Dock Debris
at Fault Wash

It is quite possible, then, that some of the debris in Military Wash was associated with practice firing by antiaircraft battalions at targets representing moving armored vehicles. If this is correct, both the Army and the Navy were using the area. This is a plausible speculation inasmuch as they are known to have shared firing ranges and air space at Clark's Dry Lake and nearby Borrego Mountain.

Operation of the Facility.

Until the question raised in the foregoing of the possibility of joint Army-Navy use of the area and until more data can be obtained on the function of the major artifacts, the only detailed information available on operation pertains to the functions of the Rake Stations. This has been covered in the section of the report for Clark's Dry Lake.

A few general characteristics of the Navy's use and operation of facilities in Borrego Valley have emerged, though. In 1941, the Naval Air Station at San Diego contemplated having from 400 to 600 pilots and planes in training at one time.²⁴ With the advent of war, the number of capital ship aircraft carriers grew beyond the eleven forecast and large numbers of escort and "baby" carriers were added. The numbers of pilots and planes involved in training must have greatly exceeded their worst expectations.

In spite of the worsened training problem, the Navy attempted to hold to its concept of reserving the Valley facilities as standby units--to be used only when the weather prevented gunnery and bombing to seaward or at coastal targets. They preferred to conduct machine gun firing over water, but found firing over uninhabited (note the single criterion) areas an acceptable alternate.

Level or heavy bombing over water was preferred to land. Air over the desert was normally turbulent below 12,000 feet, but bombing above this altitude with the small, solid practice bombs was ineffective because of their inherent inaccuracy above 12,000 feet. Releasing solid and water-filled practice bombs below 9,000 feet in level bombing over desert targets increased theoretical accuracy, but the gain was offset by the increased difficulty in maintaining level flight at the time of aiming and release in the more turbulent air at the lower altitude.

Dive bombing was usually practiced over land targets, but, again, Operations Officers avoided the desert targets whenever possible, especially in the summer months. Repeated diving and pullouts in the hot desert air overheated the engines which curtailed practice and exacerbated equipment maintenance problems.

Apparently, the ever-growing training demands as the War progressed overcame aversion to desert targets and fields. Marine aviators were practicing from a field at El Centro by 1942 only to be displaced by Navy pilots before the end of the War. An auxiliary field and temporary base were established by the Navy at Holtville further east in Imperial County. In addition to the experimental work at Salton Sea already described, it was the site in 1944 for intensive training in rocket firing. Each of these expansions in training facilities were reflected in increased use of Borrego Valley target areas.

* The Navy's Access to Section 20.

Gaining access to a portion of Military Wash was part of a master plan for the 11th Naval District. The plan greatly increased the number of facilities available for training new and replacement squadrons in carrier landing, bombing, gunnery, and rocketry. However, the last was not foreseen in 1939 when the first Navy seaplane landed on Salton Sea and started the acquisition ball rolling. Recognizing the pending inevitable competition for air space along the coast, the Navy looked inland to San Diego and Imperial counties for expansion sites.

Why the Navy chose Section 20 in preference to more acreage adjacent to Benson's Dry Lake, for which they were also negotiating, is not clear. Also, why they preferred this section to one of those abutting it is not obvious. One or more of the neighboring sections might have been railroad property at that time. As they were then obtaining the Clark's Dry Lake target area from the Southern Pacific Railroad, it would seem efficient to have combined the two acquisitions.

In any event, the Navy chose Section 20, which was already Park land, and applied to the State Commission for Beaches and Parks for permission to use the area for "aircraft training purposes for a period of one year from November 3, 1941." The petition was acted upon at the Commission meeting of April 19 and 20, 1941 when it was unanimously approved without recorded discussion.²⁵ There is no indication from the Minutes that the Commissioners inquired about the nature of or the consequences of "aircraft training purposes." Perhaps the fact that they did not recognize the location of the Section as Borrego State Park, not Anza Desert Park, is indicative of a lack of concern for the Park's welfare.

The following observations are relevant:

- a. The Navy's application in early 1941 anticipated their use of the land by al-

most a year.

b. The permit was for only one year; yet there is no known record of a renewal even though the Navy used the land until the end of the War.

c. Military Wash lies within the Borrego Maneuver Area. Although Army use of Benson's Dry Lake was prohibited (by negotiation with the Navy?), the Army did have a weak but arguable right to Military Wash.

Within eight months of issuing the permit for Military Wash, the Commission had granted the military the use of 17 other State Park facilities. At its January 1 and 2, 1942 meeting, the Commission voted to explore the possibility of compensation for such use. Their explorations were not very remunerative. It is not even clear that the Commissioners recognized the military might not return Park property in as good condition as they obtained it.

Future Work.

1. Review the minutes of all the meetings of the Commission for State Parks and Beaches from 1941 through 1945 for clearer perception of considerations or motivations for freely turning over state parks to the military. Was the permit for Borrego Wash renewed annually? Was it ever a lease for rent monies? Did the Navy formally quit the Section? Was there discussion of cleanup and restoration? If so, with what outcome?

2. Consult more records of the 11th Naval District, Camp Callan, and Camp Haan to confirm or refute joint Army-Navy use of Military Wash. These same records will probably provide details for explaining the function and purpose of the "railway" and verify use of vehicular targets, suspended targets, and the "floating dock."

3. Prepare a map of the area which accurately positions the Rake Stations and other major artifacts. If Navy use extended beyond the boundaries of Section 20, look for permits from affected landowners.

4. Relate in more detail the Navy activity at Military Wash to that at Benson's Dry Lake and Salton Sea. Explain the need for this facility in addition to that at Clark's Dry Lake and the others in San Diego and Imperial Counties. Investigate the Navy acquisitions at Benson's Dry Lake. This may well contribute to understanding their perceived need for and access to Military Wash.

CLARK'S DRY LAKE: The U. S. Navy Bombing Target

Official Designation.

The Navy referred to its installation at Clark's Dry Lake as an Outlying Field or as an Emergency Landing Field, although its primary function was as a target for practice bombing. Navy records alternately describe it as a level bombing target and as a dual-purpose level and dive bombing target. The Field was the responsibility of the Naval Auxiliary Air Station at Salton Sea. NAAS-Salton Sea reported through Naval Air Station-San Diego to the 11th Naval District headquartered in San Diego.

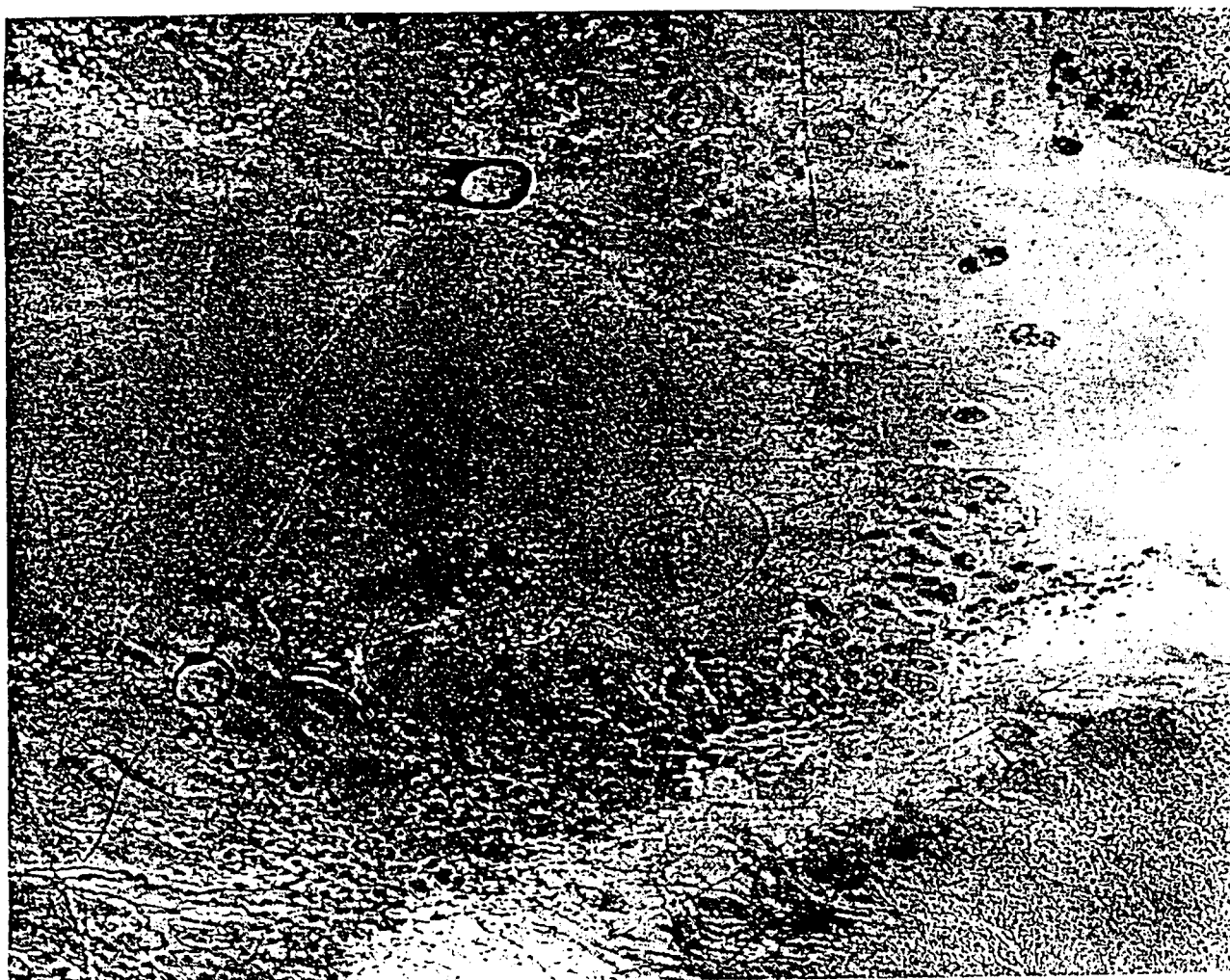
Location.

The target and attendant facilities were located east of Coyote Mountain and about two miles north of the present Salton Seaway, State Route S22. They were supposed to be confined within Section 5, Township 10 South, Range 7 East of the San Bernardino Base and Meridian. This section comprises most of the southeast quarter of the Lake. There is reason to suspect that the facilities strayed into adjoining sections.

Description--As Installed.

The facility included a target, two dirt landing strips, a wind sock, and two bomb-proof Rake Stations (see Appendix I). It may also have included a pair of telephone lines running to a plotting and communication center located on a knoll about a mile east of the target. Remnants of the phone lines still exist, but their origin and purpose have not been documented.

The target was constructed by carefully placing light-colored stones to form four concentric circles on the desert floor. The stones were probably gathered from the low slopes of the nearby Santa Rosa Mountains. The diameters of the circles were approximately 50 feet, 100 feet, 200 feet, and 500 feet. Each band of rocks marking a circle was about two feet wide. At the center of the circles there was a wooden pylon, high enough to be clearly visible from the Rake Stations. There may have been another wooden structure at the center. If so, it and/or the pylon served as a strafing target.



Credit: National Archives, Still Pictures Branch: 80-G-360509

Bombing Target

U.S. Navy Photograph taken March 23, 1944
Looking west at 4000 feet
(Note large number of vehicle tracks showing
extent of wartime traffic. Black circles surround
Rake Stations.)

In addition to the circles there are four straight lines lying outside the largest circle and marking the cardinal points of the compass. The marker for true north is an arrow (see Illustrations). There is also an arrowhead pointing southeast. All markers were about two feet wide and laid out with stones in the same manner as the circles.

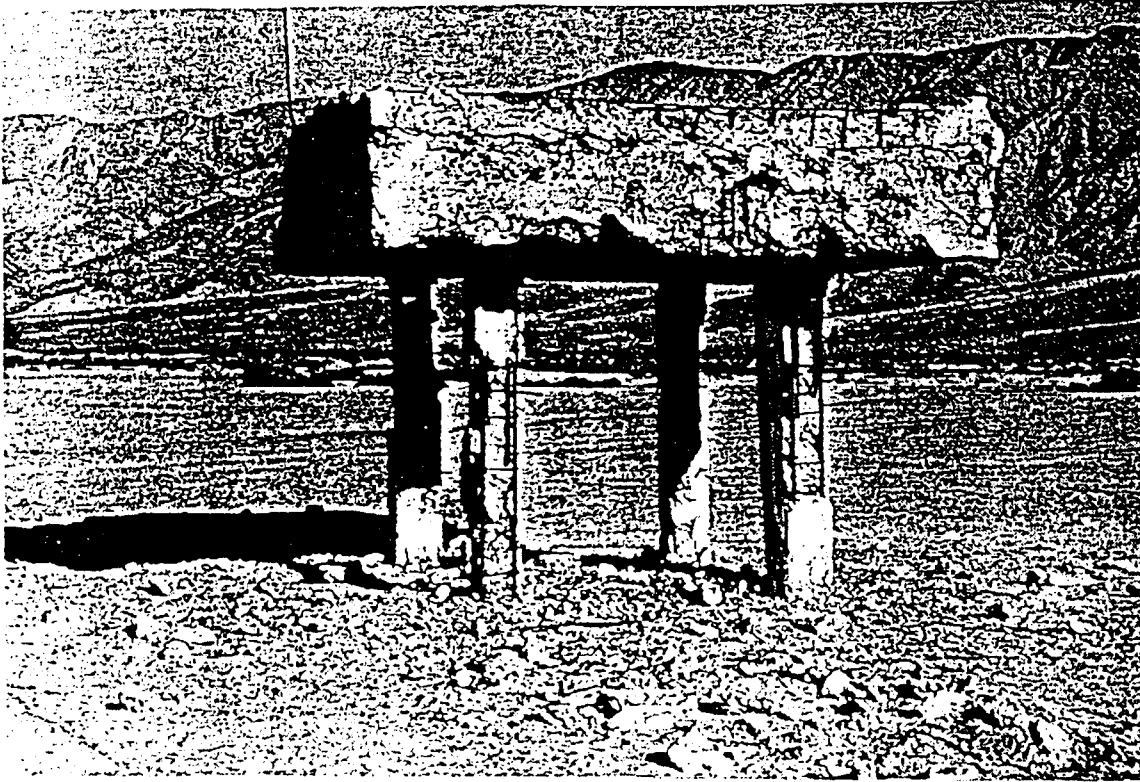
The southeast-pointing arrowhead may have indicated the run-in line to the target. This line would be the perpendicular bisector of a line between the centers of the two Rake Stations. An approach from the northwest, down Coyote Canyon, would give the dive bombers unobstructed "pullout and peeloff" from the dive.

The landing strips were simply portions of the desert floor without preparation other than removal of brush and creosote bush. It appears their location was indicated by right-angle corner markers placed at the ends of the strips. They were probably "policed" regularly by the personnel manning the Rake Stations to remove ordnance debris and to assure pilots of a safe landing surface.

According to the Navy records (see Appendix I) the strips were 500 feet wide and 4500 to 5000 feet long. If they were positioned as shown in the Navy sketch, then they extended well into Section 6 and their use constituted a trespass. (This possibility is attested to by one Navy document which claims two square miles for their use at this installation.⁶)

The Rake Stations consisted of a reinforced concrete slab, three feet thick by 12 feet square, resting on four reinforced concrete pillars. The top of the slab contained a rectangular cavity about one foot deep which was filled with rock to deflect or absorb hits before they struck the slab proper. Headroom beneath the slab was about seven feet. A 30-inch overhang of the slab prevented bombs or projectiles from diving planes reaching the interior.

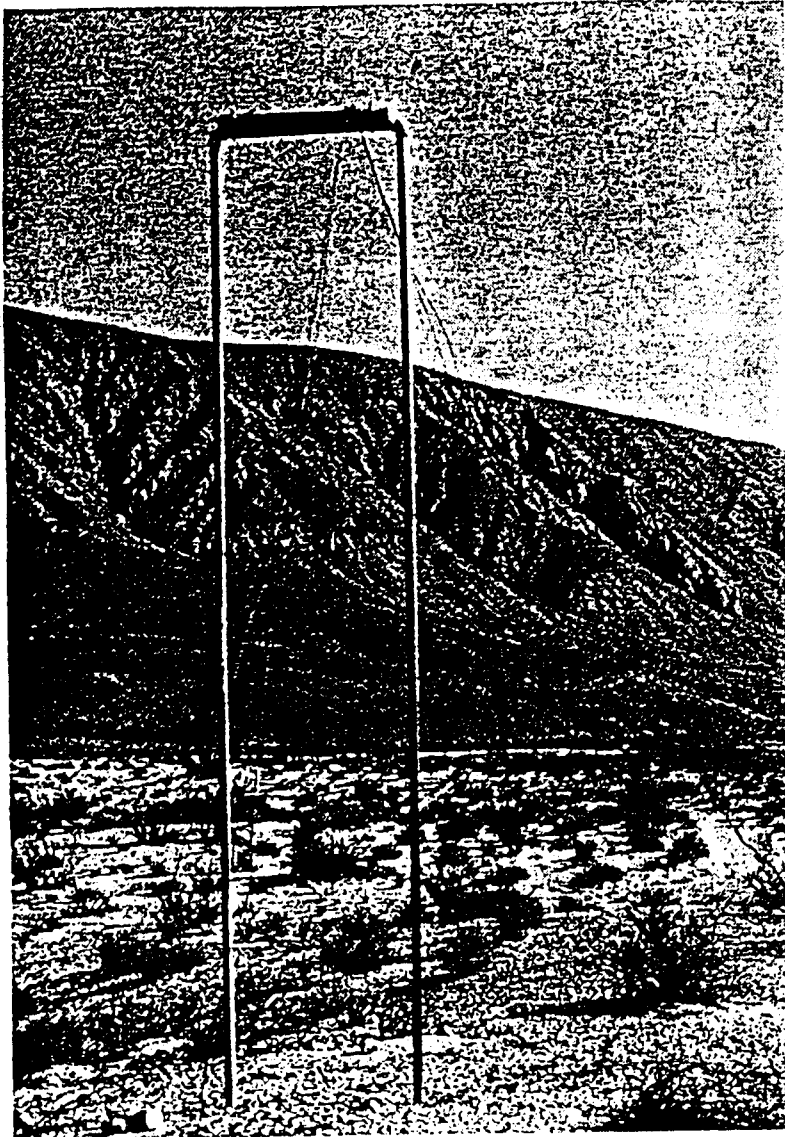
To shelter the occupants, the spaces between the pillars were filled with metal shields suspended from hooks which still remain in the centers of the outer edges of the overhanging roof,⁷ or with wood (Begole 1989, 12), or with rock and concrete.⁸ All vestiges of such protective fillers have disappeared from both Rake Stations. However, bolts embedded in the concrete columns and remnants of studs secured thereby suggest that the fillers were wood.



Credit: Author

Rake Station

One of two remaining at
Clark's Dry Lake



Credit: Author

Telephone Lines

Two Paired telephone lines and "pole"
Santa Rosa Mountain in background
About two miles east of northern Rake Station
at Clark's Dry Lake

Description--Current.

Considering that the facilities have been unattended and unprotected for over 50 years, there is a surprising proportion still identifiable. Although extensively vandalized, the columns and roofs of the Rake Stations remain. Whatever may have been used to enclose the sides is missing. Perhaps more remarkable is that after two hurricanes, repeated flooding, and years of heedless vehicular traffic, most of the target and rock markers are still visible although the author could locate only three of the four target rings. The pylon and strafing target, if any, have disappeared. Several of the unique poles from which the two pairs of telephone lines were strung still exist, some with the wires still in place.

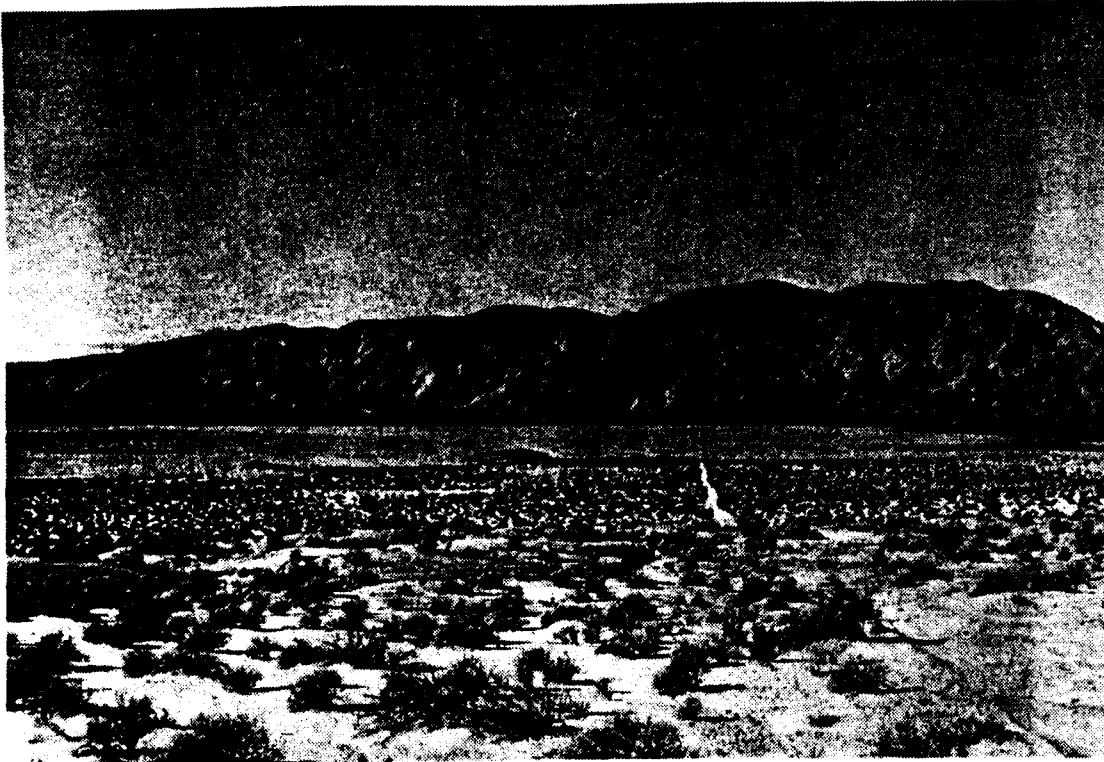
The amount of ordnance debris around the target area is relatively small, suggesting that the installation was only lightly used or that it has been thoroughly scavenged or both. (Begole stated in 1989 that the area once "was littered with debris," but "Today most has been collected..."). There are a very few remnants of 2.75" training rockets, probably fired there mistakenly or capriciously. (Such firing should have been at Salton Sea in 1944 or at the Carrizo Impact Area from 1946 to 1959.)

Only scattered fragments of 1½-pound, cast practice bombs remain, although it is said that the local Fire Department has a large collection of intact specimens.⁹ Pieces of a larger, sheet-metal, practice bomb can also be found, but only sparsely.

The most common debris are .30-caliber and .50-caliber armor-penetrating slugs and clips. None of these were tested but it is believed that they do not pose a chemical toxicity threat--from phosphorus or uranium, for example (Cavanaugh 1990). It is unlikely that the military traffic through this Section has been nearly as detrimental as the traffic for the radio telescope and by the public (see Photographs for early, military traffic across the Lake which may have been the start of the persistent damage to the floor of the Lake).

Operation of the Facility.

One side of each Rake Station faced the target. Observers manned the Stations to mark the locations of each bomb hit. They viewed the target area by sighting along a simple device called a "rake." This consisted of a horizontal bar which extended across the line of sight and contained a number of evenly-spaced, vertical pins. The center of the "rake" was aligned with the pylon in the bull's eye of the target.



Credit: Author

Route of the Telephone Lines

View west from the terminus of the telephone lines
Wires paralleled jeep trail (bottom, right of center)
which runs toward northern Rake Station.
Coyote Mountain and radio observatory building in distance.

Practice bombs were contrived to release a puff of smoke upon impact. The observer at each Rake Station reported to the plotter the number of the vertical pin which aligned most closely with the bomb burst.

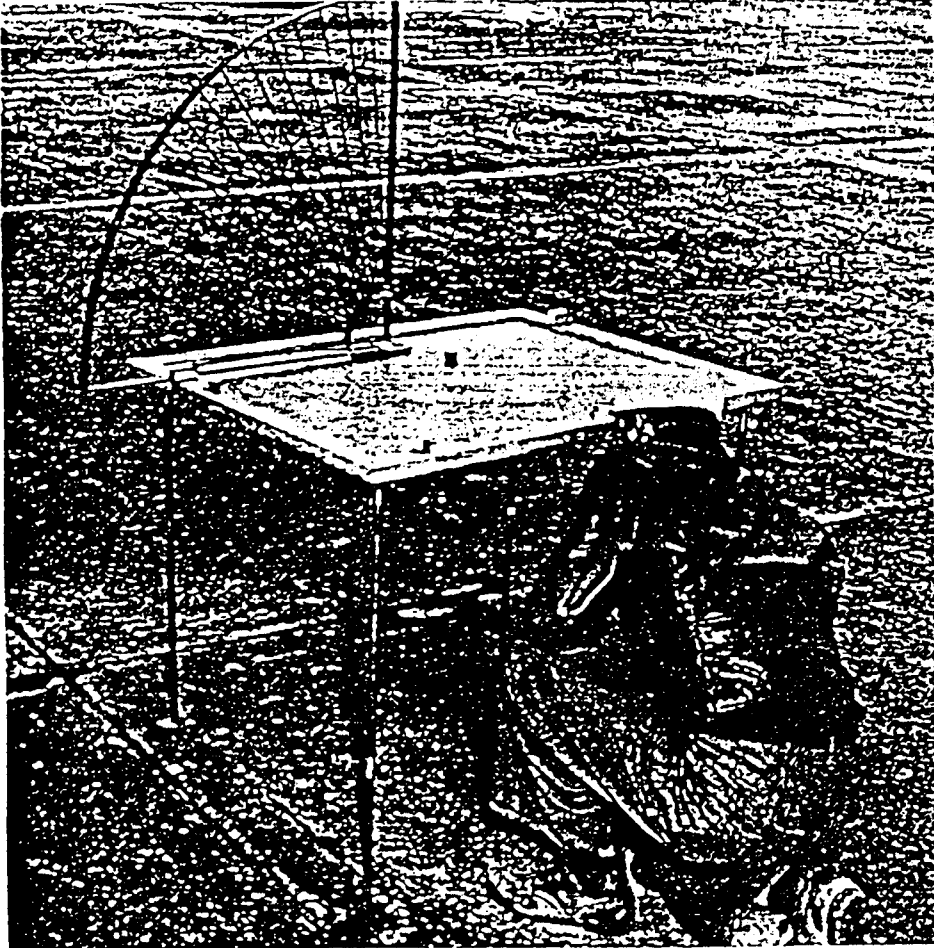
The plotter worked from a board which contained a scaled layout of the target and the two Rake Stations. On the board were two strings, each stretching across the board from the representation of a Rake Station toward the figure of the target. The target ends of the strings were movable and could be set so that the directions of the strings corresponded with the angles indicated by the pin numbers reported by the observers. The intersection of the two strings gave the clockwise orientation of the hit and its distance from the bull's eye. These data were recorded, if the pilot were bombing for score or qualification, and radioed to the pilot by a talker.

If the run were a dive-bombing run, the location of the hit, determined as described above, and the dive angle were obtained. This was measured by watching the plane's descent to the target through a "lyre" (see next page) and matching one of the wires with the angle of descent. Again, all the data were radioed to the pilot so that he could take any needed corrective action on subsequent bombing runs.

Whether the plotting board was located in one of the Rake Stations (there certainly was room for it) or on the knoll at the terminus of the easterly phone lines is not known. The personnel manning the Stations came from NAAS--Salton Sea; the pilots from training squadrons on North Island at San Diego.

The landing strips were intended primarily as a safety net in case of engine failure or pilot blackout during pullout after a dive bombing run. Also, it was not uncommon for a plane to be disabled by flying into ordnance from its own dive-bombing or strafing run. If the strips at Clark's Dry Lake were used, it was probably by planes ferrying personnel to and from Salton Sea.

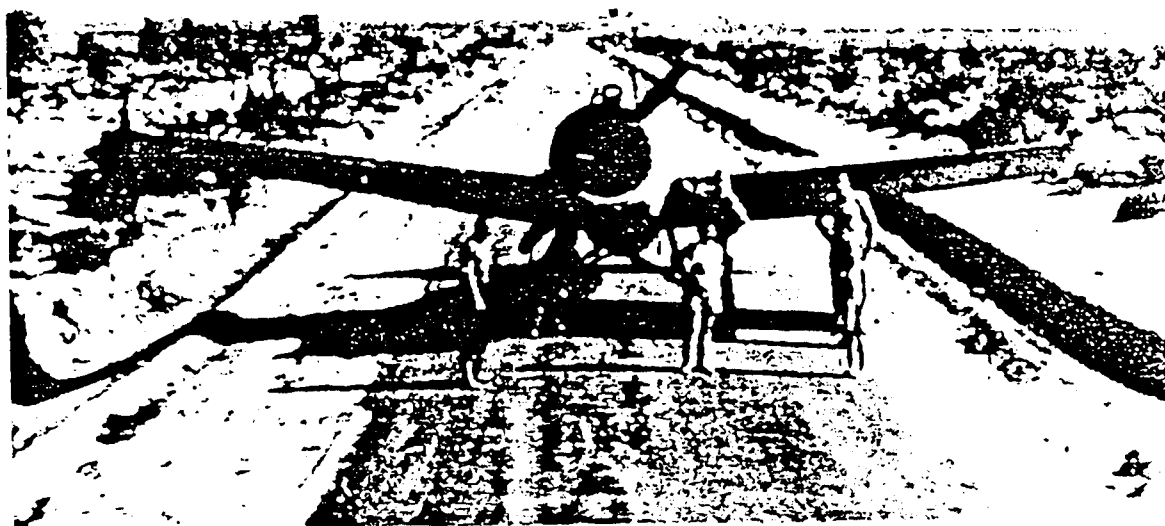
Although labelled an emergency landing field, it appears that the Navy did not intend for it to be used as such by its general air traffic and did not publicize its existence among its pilots. Lieutenant Fletcher, an instructor at North Island in 1945, experienced engine failure over the Borrego Valley. He made a hazardous landing on a narrow dirt or gravel road near the Ensign ranch unaware of the safer emergency strips a mile or two away at Clark's Dry Lake (Fletcher 1991). (See Appendices).



Credit: (Christman 1971)

Navy Plotting Harp

Early harp or lyre and plotting table
Used for determining airplane's dive angle
and locating "hits" with respect to target



Credit: V. DeMarais

Forced Landing

Navy Lt. Fletcher and friends inspect downed
Vought OS2U

The Navy apparently considered this facility a standby for like facilities along the coast, as they complained that there were several months during which Clark's Dry Lake field was closed because the rains made the landing strips unusable and the target too soggy.¹⁰ In any event, its use was restricted to inert bombing, not live bombing. However, even inert bombs usually contained a small, but dangerous, explosive charge to assist spotters in locating hits.

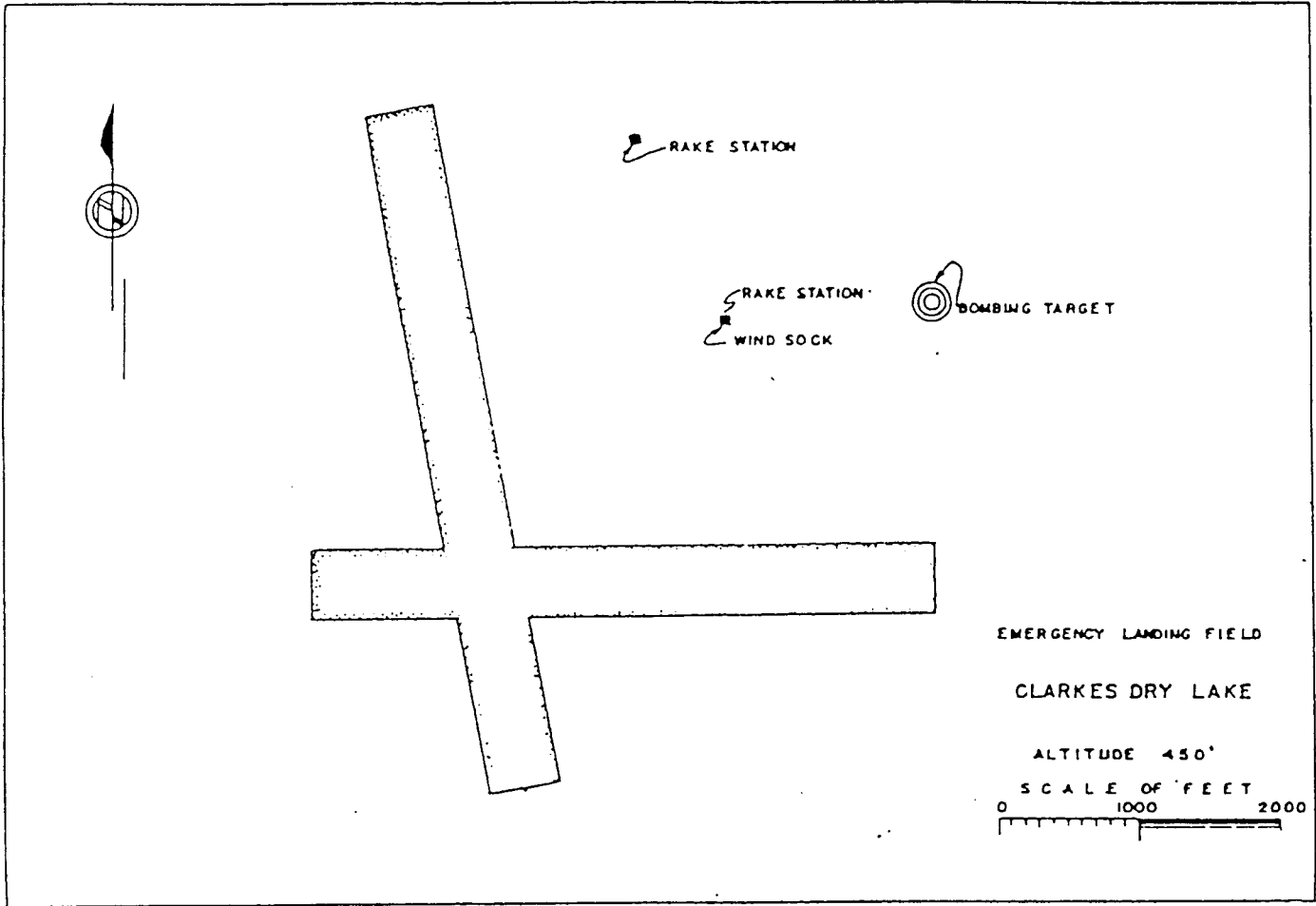
The Navy's Access to Section 5.

Section 5, the area which was supposed to contain the Navy's bomb target at Clark's Dry Lake, had been the property of the Southern Pacific Railroad or its assignee, Southern Pacific Land Company. The railroad acquired title to the section under a patent issued by the United States government in 1925.

To stimulate and encourage construction of transcontinental rail routes, Congress made generous grants of public land to the builders under Acts and Joint Resolutions of 1866, 1870, and 1905. The Acts awarded 10 alternate, odd-numbered sections on each side of the line for each mile of the line. Ownership of land as remote as Clark's Dry Lake by the Southern Pacific must have been associated with their acquisition of the San Diego and Arizona Railroad which ran through Carrizo Gorge.

On July 15, 1941, the U.S. Navy acquired Section 5 from the Railroad by condemnation at a cost of 75 cents per acre.¹¹ (If not "worthless" land, very close to it!) The Navy had been leasing this Section beginning in 1940 or earlier. The location of Clark's Dry Lake with respect to the fledgling community of Borrego Springs in 1941 is shown on the map, "Location of Clark's Dry Lake." Note there were then only two gravel roads (cross-hatched lines) serving the area, both running to Rancho de Anza. Note also that, although the Navy had been leasing this land previously and owned it from mid-year, their emergency landing field does not yet show on the map. This suggests the possibility that the target here at Clark's may have been the last of their desert ranges to be activated.

It should be noted that the adjoining sections were privately owned--most by homesteaders--during the War and were not rented or leased to the military. How and why the Navy disposed of Section 5 after the War has not been established. However, by 1976 it was owned by Peter Peckham of San Diego who was leasing it to the University of Maryland for their radio telescope work. When the University closed that research project, Peckham sold the section to the State of California. On February 26, 1979 it became part of the Park.¹²



Emergency Landing Field
Clark's Dry Lake

FIELD DESIGNATION	05169 (NAS San Diego)
TELEPHONE (Nearest)	Wood Desert Outpost, which connects through El Centro.
LOCATION	Latitude 33° 20' 24" N Longitude 116° 17' 48" W
ALTITUDE	450'
RUNWAYS	
Size & Bearing	29-7 5000' x 500' 31-13 5000' x 500'
Surface	Compact sandy silt and clay. Entire area usable.
Description	Field in good condition. Soft during wet weather, dries slowly but drains to the S side, leaving the N side usable.
LIGHTING	None.
BOMBING TARGET	E of field.
OBSTRUCTIONS	Mountains on E and W side of field.
ADDITIONAL FACILITIES	None.
REMARKS	Wind sock in NE portion of the field.
HIGHWAY ROUTE FROM NAS, SAN DIEGO	U.S. #80 to Descanso, U.S. #79 via Julian and Banner to Yaqui Wells, N 17 miles to State Highway Station, thence past Desert Lodge to Borego Store. Continue N-NE 10 miles to field.

EXPLOSIVE INCIDENT REPORT 1. UNIT NUMBER 70-084-94 2. CONTROL NUMBER UNUSUAL: ROUTINE: X

5. DATE TIME REPORTED: 111135MAR94 9. INCIDENT LOCATION: PALO VERDE WASH ANZA-BORREGO ST PARK BORREGO SPRINGS, CA 11. ITEM(S) REPORTED: RECOVERED ORDNACE

6. REPORTED BY: PARK RGR H. TOWNSEND

7. PHONE NUMBER: (619)767-5311 10. POINT OF CONTACT: RNGR J. MEIER

8. AGENCY/ORGANIZATION: CA ST PARK

12. PERSONNEL DISPATCHED: SFC HURTLE SGT(P) THOMPSON 13. DATE/TIME: A. DEPART 111200MAR94 B. ARRIVE 111515MAR94 C. COMPLETE 112100MAR94 14. TRAVEL DATA: A. AIR: (HOURS) B. VEH: (MILES) 15. HOURS: A: TRAVEL: B: INCID. 18

16. CONFIRMED IDENTIFICATION: 1 PROJO, US, 40MM(WWII), HEI-T, MK1 17. DISPOSITION: BIP

18. INCIDENT NARRATIVE:

DODIC/NOMENCLATURE	LOT #	QTY
M023/CHARGE, DEMO C-4	LOP91A020-001	1BLK
M130/CAP, BLASTING, ELEC		
M456/CORD, DETONATING		
M766/IGNITER, TIME, M60	SGK65A010-003	2EA
M670/FUSE, BLASTING TIME	EDM92E002-031	12FT
M131/CAP, BLASTING, M/E	DUP90H001-002	2EA

AUTHENTICATION

TEAM LEADER, NAME, RANK, SIGNATURE AND DATE
 DAVID L. HURTLE, SFC, USA *[Signature]* 11 Mar 94

COMMANDER, NAME, RANK, SIGNATURE AND DATE
 MARK K. ROMEO, CPT, OD, Commanding *[Signature]* 6 APR 94

7010 01/10/00

P. 1000

11/10/00 Sub P. 1000

San Diego, CA 92160-6376

619 53-8500

Listed Species in SAN DIEGO County

COMMON NAME	SCIENTIFIC NAME	FEDERAL STATUS	STATE STATUS
CALIFORNIA BROWN PELICAN	PELECANUS OCCIDENTALIS CALIFORNICUS (NESTING COLONY)	Endangered	Endangered
CALIFORNIA BLACK RAIL	LATERALLUS JAMAICENSIS COTURNICULUS	Sp of Concern (C2)	Threatened
LIGHT FOOTED CLAPPER RAIL	RALLUS LONGIROSTRIS LEVIPES	Endangered	Endangered
WESTERN SNOWY PLOVER	CHARADRIUS ALEXANDRINUS NIVOSUS	Threatened	None
CALIFORNIA LEAST TERN	STERNA ANTILLARUM BROWNI	Endangered	Endangered
WESTERN YELLOW BILLED CUCKOO	COCCYZUS AMERICANUS OCCIDENTALIS	None	Endangered
WILLOW FLYCATCHER	EMPIDONAX TRAILLII	None	Endangered
BANK SWALLOW	RIPARIA RIPARIA	None	Threatened
CALIFORNIA GNATCATCHER	POLIOPTILA CALIFORNICA	Threatened	None
LEAST BELLS VIREO	VIREO BELLII PUSILLUS	Endangered	Endangered
BELDINGS SAVANNAH SPARROW	PASSERCULUS SANDWICHENSIS BELDINGI	Sp of Concern (C2)	Endangered
DESERT PUFFISH	CYPRINODON MACULARIUS	Endangered	Endangered
TIDEWATER GOBY	EUCYCLOGOBIUS NEWBERRYI	Endangered	None
UNARMORED THREESPINE STICKLEBACK	GASTEROSTEUS ACULEATUS WILLIAMSONI	Endangered	Endangered
PACIFIC POCKET MOUSE	PEROGNATHUS LONGIMEMBRIS PACIFICUS	Endangered	None
STEPHENS KANGAROO RAT	DIPODOMYS STEPHENSI	Endangered	Threatened
PENINSULAR BIGHORN SHEEP	OVIS CANADENSIS CREMNOBATES	Proposed Endangered	Threatened
BAREFOOT BANDED GECKO	COLEONYX SWITAKI	Sp of Concern (C2)	Threatened
ARROYO SOUTHWESTERN TOAD	BUFO MICROSCAPHUS CALIFORNICUS	Endangered	None
RIVERSIDE FAIRY SHRIMP	STREPTOCEPHALUS WOOTTONI	Endangered	None
SAN DIEGO BUTTON-CELERY	ERYNGIUM ARISTULATUM VAR PARISHII	Endangered	Endangered
ENCINITAS BACCHARIS	BACCHARIS VANESSAE	Proposed Endangered	Endangered
OTAY TARPLANT	HEMIZONIA CONJUGENS	Proposed Endangered	Endangered
MOHAVE TARPLANT	HEMIZONIA MOHAVENSIS	Sp of Concern (C2*)	Endangered
LAGUNA MTS ASTER	MACHAERANTHERA ASTEROIDES VAR LAGUNENSIS	Sp of Concern (C2)	Rare
GANDER'S RAGWORT	SENECIO GANDERI	Sp of Concern (C2)	Rare
SLENDER-POD JEWELFLOWER	CAULANTHUS STENOCARPUS	Sp of Concern (C2)	Rare
GAMBEL'S WATERCRESS	RORIPPA GAMBELLII	Endangered	Threatened
CUYAMACA LAKE DOWNINGIA	DOWNINGIA CONCOLOR VAR BREVIOR	Proposed Endangered	Endangered
SHORT-LEAVED DUDLEYA	DUDLEYA BLOCHMANIAE SSP BREVIFOLIA	Proposed Endangered	Endangered
PEIRSON'S MILK-VETCH	ASTRAGALUS MAGDALENAE VAR PEIRSONII	Proposed Endangered	Endangered
COASTAL DUNES MILK-VETCH	ASTRAGALUS TENER VAR TITI	Proposed Endangered	Endangered
SAN DIEGO THORN MINT	ACANTHOMINTHA ILICIFOLIA	Proposed Endangered	Endangered
WILLOWY MONARDELLA	MONARDELLA LINOIDES SSP VIMINEA	Proposed Endangered	Endangered
SAN DIEGO MESA MINT	POGOGYNE ABRAMSII	Endangered	Endangered
OTAY MESA MINT	POGOGYNE NUDIUSCULA	Endangered	Endangered
PARISH'S MEADOWFOAM	LIMNANTHES GRACILIS SSP PARISHII	Proposed Threatened	Endangered
ORCUTT'S SPINEFLOWER	CHORIZANTHE ORCUTTIANA	Proposed Endangered	Endangered
CUYAMACA LARKSPUR	DELPHINIUM HESPERIUM SSP CUYAMACAE	Sp of Concern (C2)	Rare
SMALL-LEAVED ROSE	ROSA MINUTIFOLIA	Sp of Concern (C2)	Endangered
BORREGO BEDSTRAW	GALIUM ANGUSTIFOLIUM SSP BORREGOENSE	Sp of Concern (C2)	Rare
SALT MARSH BIRD'S-BEAK	CORDYLANTHUS MARITIMUS SSP MARITIMUS	Endangered	Endangered
MEXICAN FLANNELBUSH	FREMONTODENDRON MEXICANUM	Proposed Endangered	Rare
DEHESA NOLINA	NOLINA INTERRATA	Proposed Threatened	Endangered

THREAD-LEAVED BRODIAEA
DUNN'S MARIPOSA LILY
CALIFORNIA ORCUTT GRASS
Totals

BRODIAEA FILIFOLIA
CALOCHORTUS DUNNII
ORCUTTIA CALIFORNICA

Proposed Threatened	Endangered
Sp of Concern (C2)	Rare
Endangered	Endangered

20 Animals

27 Plants

Return to species by county.

rev:07/08/96



United States Department of the Interior

FISH AND WILDLIFE SERVICE

Ecological Services
Carlsbad Field Office
2730 Loker Avenue West
Carlsbad, California 92008

December 18, 1996

Mr. Mike Harper
Department of the Army
U.S. Army Defense Ammunition Center and School
Savanna, IL 61074-9639

Attn: Mr. Stephen Hadley

Re: Request for Threatened, Endangered, or Proposed Species for the Borrego Maneuver Area and Camp Ensign, San Diego County, California (1-6-97-SP-31)

Dear Mr. Harper:

The Fish and Wildlife Service (Service) has reviewed the information provided by your letter dated November 27, 1996, in an effort to assess the potential for federally listed threatened or endangered species at the referenced sites. The U.S. Army Technical Center for Explosives Safety is supporting the U.S. Army Corps of Engineers in assessing formerly used defense sites for potential ordnance and explosives contamination. To assist you in evaluating the potential for conflicts between threatened and/or endangered species and the proposed actions on the sites, we are providing one list (see enclosed) which contain species that occur in the general area of both sites. The enclosed lists partially fulfill the requirements of the Service under section 7 of the Endangered Species Act of 1973, as amended (Act). We recommend that you seek assistance from a biologist familiar with the project sites and with the listed species in assessing the potential for direct, indirect and cumulative impacts resulting from project implementation.

Section 7(a)(2) of the Act requires a Federal Agency, in consultation with, and with the assistance of the Service, to insure that any action it authorizes, funds, or carries out, is not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of critical habitat. To meet this requirement, Biological Assessments are required under section 7 of the Act if listed species or critical habitat may be present in the area affected by any major construction activity¹. Federal agencies have the responsibility to

¹ "Construction Activity" means any Federal action which significantly affects the quality of the human environment designed primarily to result in the building or erection of man-made structures such as dams, buildings, roads, pipelines, channels, and the like. This includes Federal actions such as permits, grants, licenses, or other forms of Federal authorizations or approvals which may result in construction.

prepare a Biological Assessment if the proposed action is a major construction activity that requires the preparation of an Environmental Impact Statement. If a Biological Assessment is not required, your agency still has the responsibility to review its proposed activities and determine whether the listed species will be affected. Moreover, "action" means all activities or programs of any kind authorized, funded, or carried out, in whole or in part, by Federal agencies. In addition, "action area" means all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action.

Section 7(d) of the Act prohibits Federal agencies and applicants from making any irreversible or irretrievable commitment of resources which has the effect of foreclosing the formulation or implementation of reasonable and prudent alternatives which would avoid jeopardizing the continued existence of listed species or resulting in the destruction of critical habitat. During the assessment or review process, you may engage in planning efforts, but may not make any irreversible commitment of resources. Such a commitment could constitute a violation of section 7(d) of the Act. If a listed species may be adversely affected, agencies should request, in writing through our office, formal consultation pursuant to section 7(a)(2) of the Act. Informal consultation should be used to exchange information and resolve conflicts with respect to listed species prior to a written request for formal consultation.

When the agency determines that its action is likely to jeopardize the continued existence of any proposed species or result in the destruction or adverse modification of proposed critical habitat, a Federal agency is required to initiate a conference with the Service. Conferences are informal discussions between the Service and the Federal agency, designed to identify and resolve potential conflicts between an action and proposed species or proposed critical habitat at an early point in the decision making process. The Service makes recommendations, if any, on ways to minimize or avoid adverse effects of the action. These recommendations are advisory because the jeopardy prohibition of section 7(a)(2) does not apply until the species is listed or the proposed critical habitat is designated, and the Federal agency determines whether or not formal consultation is required. The conference process fills the need to alert Federal agencies of possible steps that an agency might take at an early stage to adjust its actions to avoid jeopardizing a proposed species.

Species of concern are taxa which currently are afforded no federal status but are included for the purpose of notifying a project proponent in advance of possible proposals and listings which at some time in the future may have to be considered in your planning activities. If early evaluation of a project indicates that it is likely to adversely impact a species of concern, we recommend that the Federal agency seek technical assistance from this office in an effort to avoid or reduce impacts to such species.

At the end of the enclosed list, the Service has added the names of two reptiles and eight plants which currently are not federally listed or proposed for listing but represent species which are believed to be rare, declining, or otherwise at risk. The Service has special concerns about the sensitivity of these species and urges you to avoid or minimize impacts to

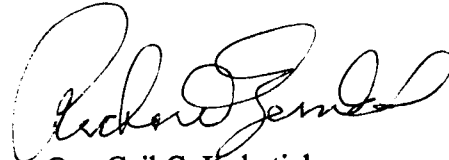
Mike Harper (1-6-97-SP-31)

3

them. Some of the activities which are currently known to threaten their survival include dust residue created by dirt roads, widening or increasing roads, farm equipment and vehicular traffic, foot traffic, fire, blight, grazing, and urban encroachment.

The Service appreciates close coordination with the Department of the Army and the U.S. Army Corps of Engineers during the preparation of the Environmental Assessment. Our goal would be to provide technical assistance that identifies specific features that could be incorporated into the project description to avoid adverse impacts to listed and other sensitive species. Should you have any questions regarding the species listed or your responsibilities under the Act, please contact Beverlee Mare'chal of my staff at (619) 431-9440.

Sincerely,



for Gail C. Kobetich
Field Supervisor

cc: John Hanlon (USFWS, Federal Projects)

1 Enclosure

E-7

Listed Endangered, Threatened, and Proposed Species that
 May Occur in the Jurisdiction of the Borrego Maneuver Area
 and Camp Ensign, San Diego, County, California.

(1-6-97-SP-31)

December 18, 1996

Common Name Status	Scientific Name	
<u>Birds</u>		
least Bell's vireo	<i>Vireo bellii pusillus</i>	E
<u>Fish</u>		
Mojave tui chub	<i>Gila bicolor mohavensis</i>	E
unarmored threespine stickleback	<i>Gasterosteus aculeatus williamsoni</i>	E
<u>Mammals</u>		
peninsular bighorn sheep PE	<i>Ovis canadensis cremnobates</i>	
<u>Reptiles</u>		
flat-tailed horned lizard	<i>Phrynosoma mcalli</i>	PT

E: Endangered
 T: Threatened
 PE: Proposed Endangered
 PT: Proposed Threatened

The following species are not federally listed or proposed for listing but do represent species which are believed to be rare, declining, or otherwise at risk. The Service has special concerns about the following sensitive species and offers our technical assistance in efforts to conserve them.

Common Name	Scientific Name	Status
Reptiles		
Barefoot banded gecko	<i>Coleonyx switaki</i>	None
San Diego horned lizard	<i>Phrynosoma coronatum blainvillei</i>	None
Plants		
Warner Springs lessingia	<i>Lessingia glandulifera</i> var. <i>tomentosa</i>	None
Orcutt's woody aster None	<i>Xylorhiza orcuttii</i>	
Gander's cryptantha	<i>Cryptantha ganderi</i>	None
Payson's jewelflower	<i>Caulanthus simulans</i>	None
Borrego Valley pepper-grass	<i>Lepidium flavum</i> var. <i>felipense</i>	None
Wiggin's cholla	<i>Opuntia wigginsii</i>	None
Thurber's pilostyles	<i>Pilostyles thurberi</i>	None
Borrego bedstraw	<i>Galium angustifolium</i> ssp. <i>borregoense</i>	None

**BORREGO SPRINGS FIRE PROTECTION DISTRICT
ARSON/BOMB INVESTIGATION DIVISION**

96-0964-1

PRELIMINARY INVESTIGATION REPORT

PHOTOS		OTHER AGENCY NAME AND CASE NO. J.S. ARMY 70th ORD CA D.P.R.
<input type="checkbox"/> YES	BY:	
<input checked="" type="checkbox"/> NO	<input type="checkbox"/> ABIU <input checked="" type="checkbox"/> LOCAL	

COLL SECTION		3 CRIME/INCIDENT Found Military Ordnance			4 PROPERTY CLASSIFICATION 11; Desert State Park			5 COUNTY San Diego	
DATE AND TIME OCCURRED—DAY UNK		7 DATE AND TIME REPORTED 12/29/96; 1110 hrs			8 LOCATION OF OCCURRENCE Military Wash, OWOHV				
VICTIM'S NAME—LAST, FIRST, MIDDLE (FIRM IF BUSINESS) State of California					10 RESIDENCE ADDRESS			11 RES. PHONE (619) 767-5391	
1 OCCUPATION		13 RACE—SEX	14 AGE	15 D.O.B.	16 BUSINESS ADDRESS (SCHOOL IF JUVENILE)			17 BUS. PHONE (619) 767-5391	
DOES FOR BOXES 20 AND 30		V-VICTIM	RP-REPORTING PARTY		DC-DISCOVERED CRIME	18 HOW REQUEST RECEIVED Telephone		DATE 12/29/96	TIME 1110 hrs
2 NAME—LAST, FIRST, MIDDLE DIMASSIMO, Rick #923		20 CODE R	21 RESIDENCE ADDRESS			22 RES. PHONE			
3 OCCUPATION State Park Ranger		24 RACE—SEX	25 AGE	26 D.O.B.	27 BUSINESS ADDRESS (SCHOOL IF JUVENILE) P.O. Box 360 Borrego Spgs 92004			28 BUS. PHONE (619) 767-5391	
4 NAME—LAST, FIRST, MIDDLE		30 CODE	31 RESIDENCE ADDRESS			32 RES. PHONE			
5 OCCUPATION		34 RACE—SEX	35 AGE	36 D.O.B.	37 BUSINESS ADDRESS (SCHOOL IF JUVENILE)			38 BUS. PHONE	

9 DESCRIBE CHARACTERISTICS OF PREMISES AND AREA WHERE OFFENSE OCCURRED OR POINT OF ORIGIN
Open desert recreation area that was used for military training during WW II.

0 DESCRIBE BRIEFLY HOW OFFENSE WAS COMMITTED OR MATERIAL IGNITED AND SOURCE
Found military ordnance (5" self-propelled rocket warhead) located by two juveniles & reported

to W.O.H.V. Park Rangers. Another found by third party later same day.

1 DAMAGE BRIEFLY EXTENT OF DAMAGE N/A		CONFIDENTIAL FOR LAW ENFORCEMENT USE ONLY NOT TO BE REPRODUCED
2 MOTIVE—FINANCIAL, THEFT OR OTHER REASON FOR OFFENSE N/A		
3 ESTIMATED LOSS VALUE AND/OR NUMBER OF INJURIES OR DEATHS N/A		
4 DESCRIBE WEATHER AND WIND CONDITIONS Temperature high 60's low 70's; clear and calm; RH 25-35%		
15 FIRE INSURANCE POLICY NO., AMOUNT, AND COMPANY N/A		
16 M.O.—OTHER DISTINCTIVE ACTION OF SUSPECT/S N/A		
17 VEHICLE USED—LICENSE NO., ID NO., YEAR, MAKE, MODEL, COLORS (OTHER IDENTIFYING CHARACTERISTICS) N/A		

18 SUSPECT NO. 1 (LAST, FIRST, MIDDLE)		49 RACE—SEX	50 AGE	51 HT.	52 WT.	53 HAIR	54 EYES	55 ID NO. OR D.O.B.	56 ARREST <input type="checkbox"/> YES <input type="checkbox"/> NO
57 ADDRESS, CLOTHING AND OTHER IDENTIFYING MARKS OR CHARACTERISTICS									
58 SUSPECT No. 2 (LAST, FIRST, MIDDLE)		59 RACE—SEX	60 AGE	61 HT.	62 WT.	63 HAIR	64 EYES	65 ID NO. OR D.O.B.	66 ARREST <input type="checkbox"/> YES <input type="checkbox"/> NO
57 ADDRESS, CLOTHING AND OTHER IDENTIFYING MARKS OR CHARACTERISTICS									68 CHECK IF MORE NAMES IN CONTINUATION <input type="checkbox"/>

REPORTING INVESTIGATOR S. SAWYER	DATE: 12/31/96	ASSIGNED BY:	DATE:	REVIEWED BY: <i>[Signature]</i>	TYPED BY: S.S. 12/31/96 1000
--	--------------------------	---------------------	--------------	---	--

COPIES TO—NAME AND AGENCY:

<input type="checkbox"/> D.A.:	<input type="checkbox"/> F.D.:
<input type="checkbox"/> P.D.:	<input type="checkbox"/> PROB.:
<input type="checkbox"/> S.O.:	<input type="checkbox"/> OTHER:

HER ION
 YES
 NO

E-8

INVESTIGATION NARRATIVE

CASE NUMBER: 96-0364-1

PAGE 1 OF 2

SUMMARY: Military ordnance found by two juveniles just west of Military Wash in the Anza-Borrego Desert State Park. They reported their find to the Ocotillo Wells Off-Hwy Vehicle (OHV) Park, disposed of by 70th Ordnance, U.S. Army.

INTRODUCTION: At about 1110 hrs. on 12-29-96, I received a phone call from Borrego Springs Fire Department Captain BAUMGARDNER advising I needed to telephone State Park Ranger Rick DIMASSIMO at the Ocotillo Wells OHV Park regarding found military ordnance. I phoned DIMASSIMO and after he described the ordnance, I advised him I would enroute to his location.

Upon arrival, the temperature was in the high 60's, clear and calm. There were about 5-6 off-highway vehicles in the area of Military Wash NE of the ordnance by about 600-800 meters. The ordnance was laying on top of the ground and appeared to be untouched.

NARRATIVE: After visual examination of the ordnance, I advised Park Ranger DIMASSIMO that it should not be disturbed in any way. He advised that he had contacted 70th Ordnance and was awaiting their phone call. I told DIMASSIMO that I would also contact 70th Ordnance first thing in the morning of 12-30-96. Based on the remote location of the ordnance and the fact that most visitors were leaving the park for the weekend, it was decided that the ordnance would remain untouched.

At about 0700 hrs. on 12-30-96, I telephoned 70th Ordnance, spoke to the clerk, gave him my name, phone number and purpose of the call. At about 0715 hrs., SSG OLAIRES 70th Ordnance returned my call. I described the ordnance to SSG. OLAIRES and he advised he would be enroute to the Borrego Springs Fire Department to meet so I could lead him to the ordnance. SSG OLAIRES arrived at the Borrego Springs Fire Department at 1025 hrs. At about 1050 hrs., we left Borrego Springs Fire Department enroute to the location of the ordnance. Park Ranger DIMASSIMO was advised by cell phone at about 1100 hrs. and said he'd meet us at the site.

Once on scene, SSG OLAIRES advised the ordnance was an armor piercing warhead from a 5-inch self-propelled rocket. Park Ranger DIMASSIMO arrived and advised that they had located another piece of ordnance similar except it had a "flat nose." We advised that once the first item had been rendered safe, the second item would be evaluated.


State Park photographed the ordnance with Polaroid, 35 mm and video. Non-essential personnel moved to a safe location while 70th Ordnance set up counter-charge. Once the counter-charge was in place, 70th Ordnance joined the others and fired the charge. It was then decided the ordnance contained HE. All equipment was secured and the Park lead us to the second item which was a duplicate of the first. It was counter-charged same as the first and fired. All equipment was secured. There were no injuries or equipment lost.

INVESTIGATION NARRATIVE


CASE NUMBER: 96-036A-1

PAGE 2 OF 2

CONCLUSION: There were two 5-inch self-propelled rocket warheads found, one in the Anza-Borrego Desert State Park and one in the Ocotillo Wells OHV Park. 70th Ordnance, U.S. Army, was advised and responded for explosive ordnance disposal operations. Both items were counter-charged and it was determined that both contained a quantity of HE. After both items were disposed, it was determined that there is a need for an Explosive Ordnance Recognition Course presentation to personnel from both State Parks. This Course will be arranged through 70th Ordnance and the Ocotillo Wells OHV Park for sometime in March 1997.


Steven L. Sawyer, #F601

December 31, 1996

Reviewed by: 
Charles J. Cariveau, Fire Chief

CONFIDENTIAL
FOR LAW ENFORCEMENT
USE ONLY
NOT TO BE REPRODUCED

UTM GRIDS - BORREGO MTN QUAD

#1 0578401
3673129

#2 0579326
3673122

E-8

CONTINUED:

ORDNANCE AND EXPLOSIVE
ARCHIVES SEARCH REPORT
FOR
BORREGO MANEUVER AREA
BORREGO SPRINGS, CALIFORNIA
PROJECT NUMBER J09CA701101

APPENDIX F

LETTERS/MEMORANDUMS/MISCELLANEOUS ITEMS

APPENDIX F

LETTERS/MEMORANDUMS/MISCELLANEOUS ITEMS

Table of Contents

- F-1. Training Circular Citing the Acquisition, Location, Operating Requirements, Training Requirements, and Logistical Requirements of the Borrego Maneuver Area, 20 March 1942 (B-30).
- F-2. Memorandum Governing Joint Army/Navy Usage and Control of Southern California Sector, Western Defense Command and Southern Sector, Western Sea Frontier Training Areas, 1 September 1943 (B-31).
- F-3. Memorandum (with endorsements) Citing the Termination of Use of the Borrego Valley Maneuver Area by the Camp Callan Antiaircraft Replacement Center (B-332).
- F-4. Memorandum with Chart Displaying Joint Army/Navy Overland Operating/Training Areas in the Southern Sector of the Western Sea Frontier, 21 November 1943 (B-33).
- F-5. Memorandum Displaying Camp Callans Usage of a Naval Target Area in the Borrego Valley for the Fire of AA Weapons, 3 June 1944 (B-34).
- F-6. Memorandum Citing Navy Operating Areas in the Borrego and Imperial Valleys, 13 March 1941 (B-35)
- F-7. Memorandum Citing the Potential Use of Naval Borrego and Imperial Valley Ranges for Marine AA Practice Firing (B-36).
- F-8. Circular Letter Concerning Naval Bombing Target Location and Operation in the Southern California Sector of the Western Sea Frontier, 24 August 1944 (B-37).

REC'D S-3 OFFICE

HEADQUARTERS SOUTHERN CALIFORNIA DISTRICT
Pasadena, California

5-3

MAR 25 1942

DIST. ALL TROOPS
Det.
10. COPIES 75-FA
H.E.S.

March 20, 1942

TRAINING CIRCULAR)
NO.....23)

BOREGO MANEUVER AREA

1. Maneuver and firing rights have been obtained covering approximately 200 square miles of desert land in San Diego and Imperial Counties. This area is bounded on the east by U. S. Highway No. 99, on the South by State Highway No. 78, on the west by a north-south line through Borrego P.O., on the north by the boundary line separating San Diego and Riverside Counties. There are certain exempted areas within the boundaries indicated above. These are as follows:

a. That portion of Township 9 South, Range 9 East, lying between U. S. Highway No. 99 and the Santa Rosa Mountains. This area is an Indian Reservation and will not be entered by U. S. Troops.

b. Benson's Dry Lake lying north of Ocotillo. This is a Naval landing field.

c. Area adjacent to western boundary on which houses, fences, and other improvements have been erected. All buildings, except those open for commercial purposes, and the area 100 yards in every direction therefrom, are "off limits" for military personnel.

2. Requests for use of above area will be submitted through channels to this Headquarters. Such requests will include the following:

a. Designation of units and name of senior officer who will be present.

b. Approximate number of officers and enlisted men.

c. Type of field operations contemplated.

d. Period of time use of area is desired.

3. Commanding officers of troop units will be held responsible for the following:

a. Orderly conduct of troops.

b. Non infringement on areas "OFF LIMITS".

c. Prevention of damage to private property.

d. Establishment of necessary range guards.

e. Observance of safety regulations as prescribed in Army Regulations.

f. Observance of standard Army practice in construction and use of latrines, kitchen sumps for liquids, police of camp sites, etc.

4. Water will be supplied as follows:

a. Men. To unit containers at two (2) DPs, at locations to be selected and announced. Water will be from potable sources and need not be treated by units, in the absence of further instructions.

b. Animals. At the same two DPs as in a above.

5. Rations and fuel will be supplied as follows:



A. The Quartermaster, Camp Haan will supply the "A" field ration daily by refrigerator truck. Rations will be transported to distributing point in the vicinity of Borogo Post Office where they will be transferred to unit Supply Officers. Unit Supply Officers will notify both the truck-head Officer where their rations are regularly drawn, and the Commissary Officer, Camp Haan at least four (4) days before movement to Borogo so that arrangements may be made. Authority is granted to purchase ice locally and coal invoices to the Quartermaster, Camp Haan.

b. Gasoline and lubricants other than engine oil: bulk delivery will be made by Brawley Depot, Shell Oil Company direct to unit bivouac upon request by unit.

Address: 511 South 9th St., Brawley.
Telephone: Brawley 431-W.

c. Engine Oils: Texaco dealer, Brawley.

Note: New contractors may be designated April 1, 1942.

d. Third and Fourth Echelon motor maintenance, Camp Haan.

6. Communication with this Headquarters will be provided as follows:

a. A radio channel will be operated between Borogo Headquarters and the 54th Signal Bn. at Pomona. Scheduled contacts will be made each day as follows: 6:15A - 8:15A - 10:15A - 12:15P - 2:00P - 5:00P - 7:00P - 9:30P. Messages will be relayed between this headquarters and the 54th Signal Bn. Station at Pomona by messenger or telephone.

b. Emergency communication from the Borogo Headquarters may be obtained by dispatching a motor messenger to Julian, California, from which point a collect call can be made to RY 1-6771 (Beaver).

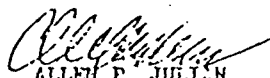
c. Special Messenger run will be made from this headquarters to Borogo headquarters, when needed.

7. Medical service will be provided by Medical Corps personnel attached to units using the maneuver area.

By command of Major General WILSON:

FRANK ROYSE,
Colonel, G.S.C.,
Chief of Staff.

OFFICIAL:


ALLEN P. JULIAN,
Major, A.G.D.,
Adjutant General.

DISTRIBUTION:

"B"

F-1

RESTRICTED

JOINT OPERATIONS CENTER
WESTERN DEFENSE COMMAND-WESTERN SEA FRONTIER
HEADQUARTERS ELEVENTH NAVAL DISTRICT
SAN DIEGO, CALIFORNIA

1 September 1943

Subject: Control of Training Areas, Southern California Sector,
Western Defense Command and Southern Sector, Western
Sea Frontier.

1. In accordance with paragraph 8 (c) 2 of "Proceedings Joint Conference, Western Defense Command and Western Sea Frontier" of May 25, 1943, the Joint Operations Center, Headquarters Building, Eleventh Naval District, San Diego, California, is the joint coordinating control for the establishment, allocation and use of the operating areas in the Southern California Sector, Western Defense Command and Fourth Army, and Southern Sector, Western Sea Frontier, under authority of the Commander, Western Sea Frontier and the Commanding General, Western Defense Command. D5-1/sc

2. In carrying out the required control, the following procedures will be followed:

a. A request for assignment of areas will contain a statement of the type of missions to be performed and the time of performance. Requests for area assignments will be made by the operating headquarters concerned directly to the Joint Operations Center.

b. In order to make maximum use of training areas only necessary assignments will be requested.

c. All requests for area assignments will be directed to the Joint Operations Center, Headquarters Building, Eleventh Naval District, San Diego, California.

(1) Requests for weekly assignments must be received by Joint Operations Center prior to 1200 on Friday of the preceding week.

(2) Special assignments during the week, other than the weekly assignments, must be received by Joint Operations Center, a minimum of 14 hours prior to the time the mission is due to commence.

(3) Cancellation of missions will be reported to Joint Operations Center at the earliest practicable time in order that other missions can be assigned to the area during the period that the area will not be used by the unit concerned.

*Comdt's Office rec'd 2 copies, -1-
retained one; sent Planning one.*

F-2

RESTRICTED

Subject: Control of Training Areas, Southern California Sector, Western
Defense Command and Southern Sector, Western Sea Frontier.

3. Procedures laid down in the "Proceedings" mentioned in paragraph
1, this letter are attached and made a part of instructions herewith.

D. W. BAGLEY

W. H. Lassing
W. H. LASSING
By direction

By command of Lieutenant General DeWITT:

James E. Pemberton
JAMES E. PEMBERTON
Major, Infantry

F. M. TRAPNELL

Max I. Black
MAX I. BLACK
By direction

BASIC INSTRUCTIONS

Governing the joint coordinating control for the establishment, Allocation and Use of Operating and Training Areas.

(Extracted from "Proceedings Joint Conference Western Defense Command and Western Sea Frontier of May 25, 1943)

Paragraph 6.

(a) Coordination of Allocation and Use of Areas. In order to coordinate the allocation and use of the subject areas, the following procedure will be observed: Army or Navy (including Marine Corps) air, ground or surface forces, groups or units desiring to conduct practice gunnery or other firing exercises within a prescribed area, not primarily or previously allocated to it, or training exercises which may cause interference with other operations (military, naval or civilian) conducted in the same or adjacent area, will submit request to JOC for allocation or assignment of the area(s) desired as follows:

(1) In the case of proposed aerial firing and bombing operations, allocation of areas and clearance for them shall be obtained by Army commanders concerned through the Commanding General, Fourth Air Force, San Francisco, or his sector representative, and by Navy commanders concerned through the Commanders, Air Task Groups, Western Sea Frontier, Northern Sector (Alameda) and Southern Sector (San Diego), as appropriate. These commanders will, after mutual agreement with the other service, obtain the allocation through Joint Operations Center, San Diego (for Southern Sector).

(2) In the case of proposed surface or ground practice and training operations, allocation of area(s) and clearance for same will be obtained by Army and Navy commanders concerned through the Joint Operations Center at San Diego.

(b) Use of Areas. The service having an assigned allocation and use of an area shall submit schedule of firing and changes there to, and make such area available, when not in use, to all elements of either service when a request for temporary use of the area is made through the proper channels and when the granting of such use will not interfere with the operations of the service having assigned rights.

(c) Establishment of Additional Areas or Changes to existing Areas. Whenever it is desired that changes in delineation of areas be made or additional areas be established for;

(1) practice or training activities which may involve a hazard to aircraft in flight,

(2) operations which may interfere with other authorized activities

(3) a prohibited flight area (from which all aircraft are prohibited under penalty of being fired upon),

preliminary clearances shall first be obtained from or reconciled with any other command concerned and a request then submitted via the chain of command to the Sector (District) Command or the Commanding General, Western Defense Command and Fourth Army or the Commander, Western Sea Frontier, as

appropriate, for joint concurrence (JOC), presentation to the Inter-departmental Air Traffic Control Board and final approval, (except when precluded by military or naval emergency in which event the appropriate JOC shall be notified immediately and the request submitted to the appropriate headquarters as soon as possible thereafter.

Paragraph 7.

In connection with the foregoing proposals the relations of the IATCB are briefed as follows: As set forth in the references, the Inter-departmental Air Traffic Control Board (IATCB) has authority to rule on the allocation and use (Army, Navy or civilian) of the navigable air space of the continental United States, including the area extending 200 miles seaward from the continental shores. This is to insure that no Army, Navy or civilian construction or activity which may constitute an unacceptable physical or operational interference with established airways or which may create conflicts in the use of the navigable air space or which may interfere with an adequate air defense of the United States, shall be engaged in without prior approval of the IATCB. This includes the use of Navigable air space, location of airfields and airways, construction of ground installations which constitute hazards in the vicinity of air fields, and the location of aerial, ground and surface gunnery, bombing, artillery and anti-aircraft practice and training areas on or over land or sea.

Paragraph 8

(c) The general operating methods be as follows:

(1) ***

(2) The Joint Operations Center, *** San Diego, will be the central joint coordinating agency for the establishment, allocation and use of the operating areas under the Commanding General, Western Defense Command and the Commander, Western Sea Frontier, or their Sector (District) Commanders. All matters which cannot be adjusted in the sector concerned will be submitted *** for presentation to the Commanding General, Western Defense Command and the Commander, Western Sea Frontier for joint action.

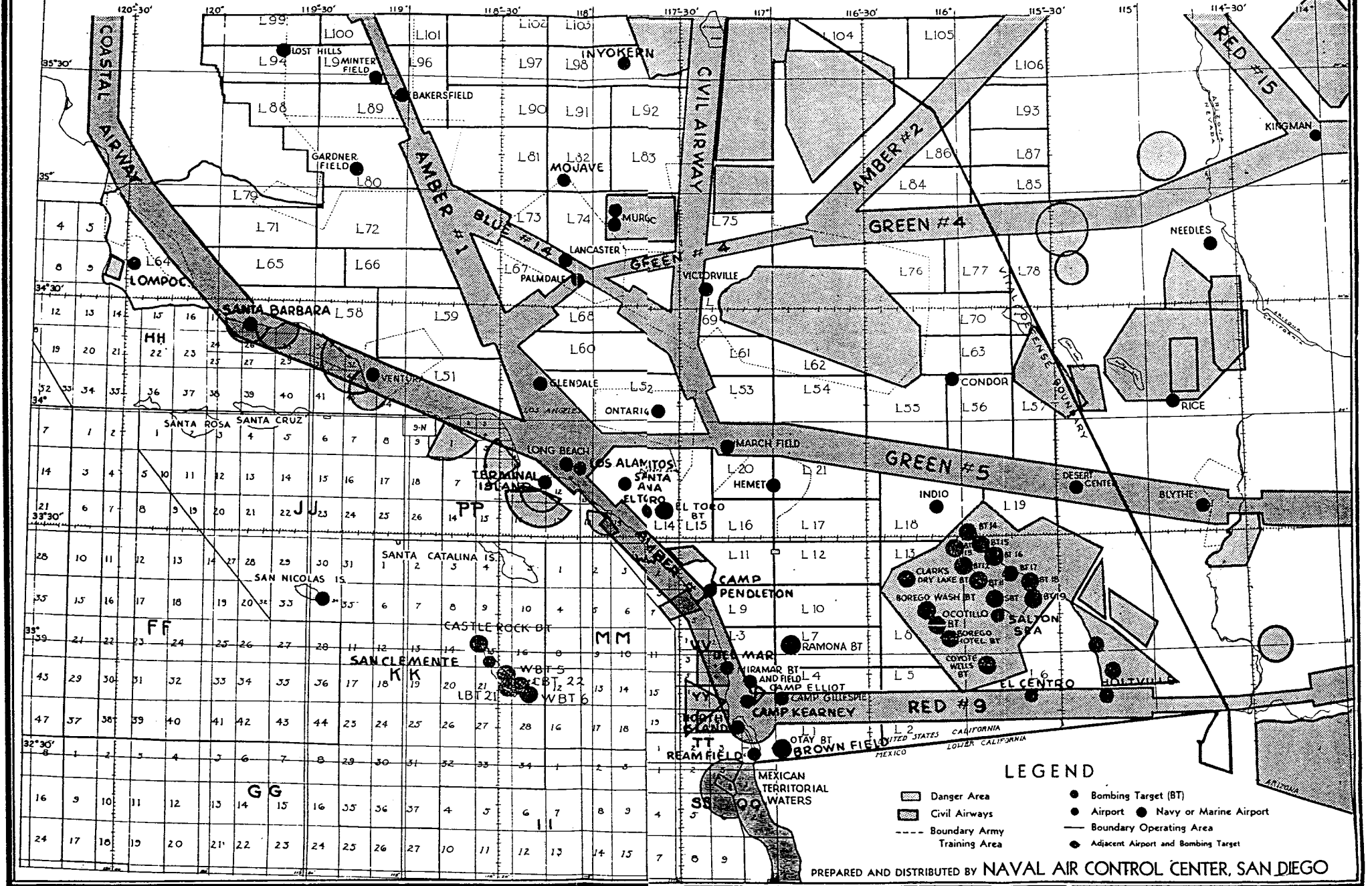
(3) Each area assigned or unassigned is basically under the military jurisdictional control of one service or branch thereof. In accordance with JAAN 1935, areas offshore of the Pacific Coastal Frontier come under the Western Sea Frontier and land areas under the Western Defense Command.

(4) *****

(5) Operations in certain areas must take into consideration the location of fixed harbor defenses, air bases, etc. Coordination after assignment must be assured by the assignee.

(6) Areas will be assigned for specific purposes or on an "until further notice" bases to the service requiring operational jurisdiction. Any service which has been assigned an area on an "until further notice" basis, will reaffirm their option on the area weekly. This will guarantee the use of the area for an extended period of time while assuring that the area will not be left idle when other use may be indicated.

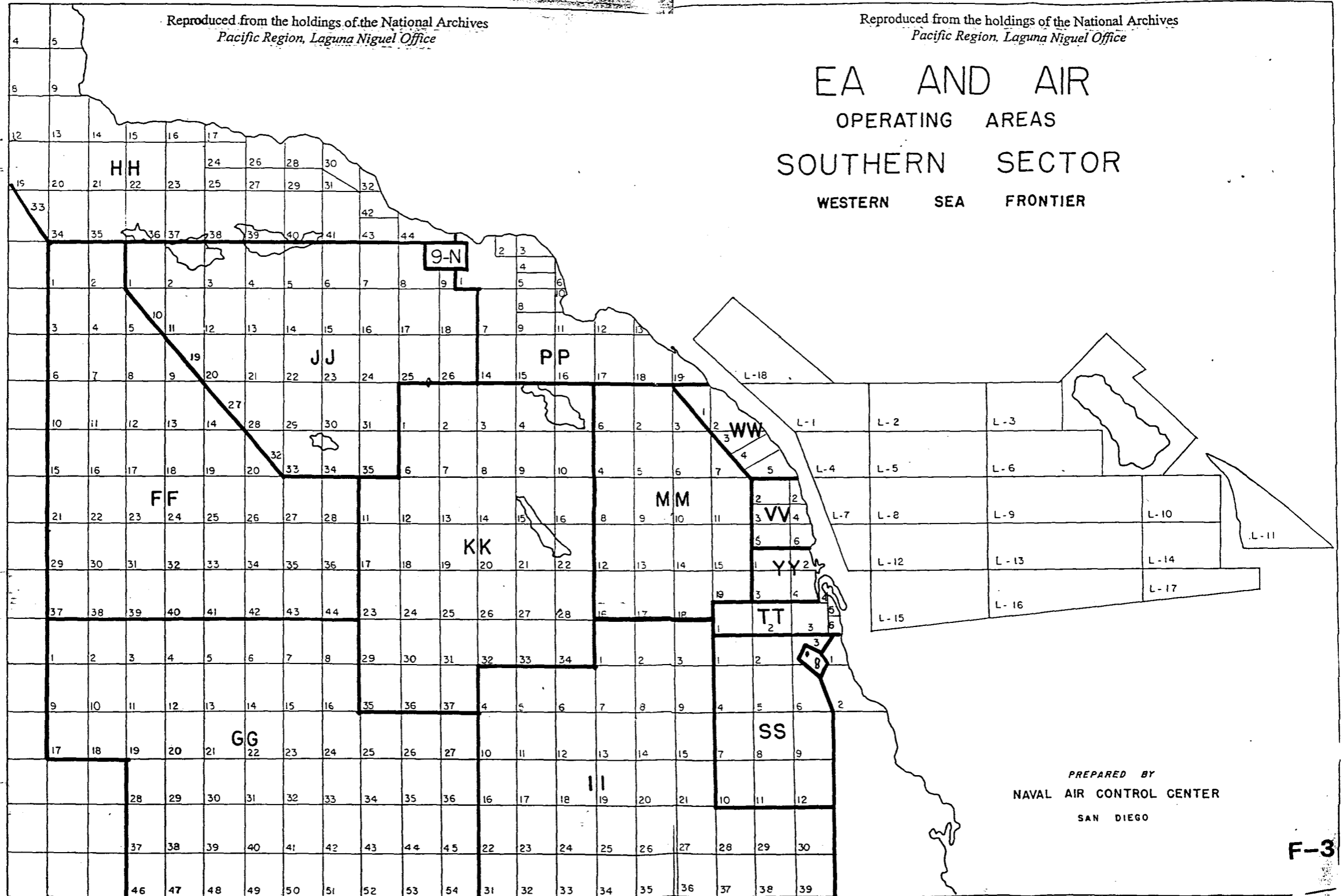
LAND AND SEA OPERATING AND DANGER AREAS SOUTHERN SECTOR WESTERN SEA FRONTIER



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Pacific Region, Laguna Niguel Office

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Pacific Region, Laguna Niguel Office

EA AND AIR OPERATING AREAS SOUTHERN SECTOR WESTERN SEA FRONTIER



PREPARED BY
NAVAL AIR CONTROL CENTER
SAN DIEGO

8. (c)
- (7) In the event the service having assigned jurisdiction is not using or contemplating the use of the assigned area it shall notify the Joint Operations Center thereof, in order that the area may be used by some other service during such period.
- (8) All firing areas will be made available to all elements of either service by the service having assignment of use when such relinquishment of use does not interfere with the operations of the service having assigned rights.
- (9) Should either service desire additional areas or reallocation of existing areas, requests will be made to JOC.
- (10) Any Army or Navy unit, prior to firing in an assigned area, will notify the *** JOC of the date, time and type of firing or submit a schedule in advance.
- (11) Responsibility for submitting firing notices lies with the service using the firing area. It includes notification via appropriate JOC to all interested commands of the service (Army or Navy) originating the notice and to one designated agency of the other service (Army or Navy) which will be responsible for notifying all interested commands of the service to which that agency belongs.
- (12) *****
- (13) *****
- (14) *****
- (15) *****
- (16) Firing notices will be originated in ample time to permit dissemination of information.

Pacific Region, Laguna Niguel Office

(Copy-Jn)

NAVAL AIR CONTROL CENTER
Southern Sector
Western Sea Frontier

5-1

A4-3(ws)

21 November 1943

From: Commander Max I. Black, U.S.N.
Navy Co-member, Sub-committee, Interdepartmental Air
Traffic Control Board, Los Angeles Area.

To : Sub-committee, Interdepartmental Air Traffic Control
Board, Los Angeles Area.

Subject: Over-land Operating Areas, Southern Sector, Western
Sea Frontier.

Enclosure: (A) Chart designating requested areas.

1. The Joint Operations Center, San Diego, is charged with the responsibility of allocation of operating air space to aviation units of the Army, Navy, Marine Corps and Coast Guard operating in the southern sectors of the Western Sea Frontier and the Western Defense Command. The air operating space is allocated on a weekly basis to units requesting such space, and every attempt is made to allocate the space requested to the unit desiring it. When a unit releases air space previously assigned, such air space is re-allocated to another unit, if possible, thereby assuring full use of all available air space.

2. Increasing training operations require that additional air space be allocated and, at the present time, the saturation point of space already delineated has been reached. The Love (land plane) operating areas at present delineated in the San Diego sector are now inadequate for all units, and it is believed that the gridding of the entire Southern Sector area is urgent at this time.

3. The suggested grid (enclosure (A) is superimposed on the joint Army-Navy grid and allows for the transmission of area assignments to operating units as unclassified material, since the joint Army-Navy grid designations are not used in such transmissions.

4. The proposed increase in Army, Navy and Marine air training in this area will eventually require the use of practically all of the air space in this area and, therefore, a coordinated use of all the air space is believed mandatory.

5. Under this system no unit would have exclusive rights to any air space but, for obvious reasons, certain air space would usually be re-assigned to units operating from certain fields on a continuing basis.

MAX I. BLACK

Comll Distribution:
Dist. Air Off.
Planning

(R)

F-3

NAVAL AIR CONTROL CENTER
SOUTHERN SECTOR
WESTERN SEA FRONTIER

IATCB/N20-10(en)
Serial AC-733

MEMORANDUM

3 June 1944

From: Officer-in-Charge.
To: Commandant, Eleventh Naval District.
Subj: Installations, Borego Area, Effecting Tactical and Training Operations.
Ref: (a) Hdqts. AA RTC ltr. 354 GNSRC-1 dated 29 May 1944.

1. IATCB minutes 252 dated 31 March 1943 assigned the danger area in question for Navy operations. Specifically this area contains bombing targets which are assigned on a weekly basis by the Joint Operations Center, San Diego to planes attached to ComFairWestCoast and MarFairWestCoast.
2. IATCB minutes 354-A dated 11 October 1943 defines a danger area within the aforementioned Navy danger area to be used by the AA RTC, Camp Callan to fire AA weapons, subject to Navy jurisdiction over the areas and coordination through JOC, San Diego, California.

Respectfully,


MAX I. BLACK

Pacific Region, Laguna Niguel Office

A5-1
(A7-Vr)
Serial W-1291

RESTRICTED

5 June 1944

To: Commanding General, Antiaircraft Replacement Training Center,
Camp Callan, San Diego, California.

Subj: Installations, Borego Area, Affecting Tactical and Training
Operations.

Ref: (a) Hdqts. AARTO ltr 354 QHSRC-1 dated 29 May 1944.

1. As requested, receipt of reference (a) is hereby acknowledged.
2. Commander, Fleet Air West Coast, and Marine Fleet Air West Coast, whose planes also use this area, have been furnished copies of reference (a).

G. M. RAVENSCROFT,
Assistant Commandant (Logistics)

7 June, 1944 - a.m.

Wm

Originating Officer check routing desired prior to signature by Commandant

INITIAL

Ch. of Staff

Asst. Ch. of Staff

Aide

Accounting

Air Officer

Chaplain

Comdt's Clerk

Communications

Disbursing

Dist. S.O.

Intelligence

Issuing

Legal

Medical

Operations

Patrol Comdr.

Ord. and Eng.

Personnel (Navy)

Personnel (Civilian)

Planning

P.D. (NTS)

Public Relations

P.W.O.

Security

Shore Patrol

Welfare & Recn.

ASSISTANT'S Initial Below

✓ *MR*

Mid-1 on Hdqts AARTC ltr 354 ONSMO-1
dated 29 May 1944

AS-1
(A7-Vr)
Serial # 1892

Originating Officer check routing desired prior to signature by Commandant

INITIAL

RESTRICTED

5 June 1944

Re: ComFair, West Coast
MarFair, West Coast

Subj: Installations, Borego Area, Affecting Tactical and Training Operations.

Ref: (a) CincMAGC memo Serial AG-723 dated 3 June 1944.

1. Forwarded for information, together with copy of reference (a), as enclosure (2).

G. M. RAVENSCROFT,
Assistant Commandant (Logistics),
11th Naval District

Encl: (NV)
2. Copy of ref (a)

CC: MAGC (Less enclosure).

6 June 1944 - p.m.
WR

Ch. of Staff	
Asst. Ch. of Staff	✓
Aide	
Accounting	
Adm. Officer	
Chaplain	
Comdt's. Clerk	
Communications	
Disbursing	
Dist. S.O.	
Intelligence	
Issuing	
Legal	
Medical	
Operations	
Patrol Comdr.	
Ord. and Eng.	
Personnel (Navy)	
Personnel (Civilian)	
Planning	WR
P.D.(NTS)	
Public Relations	
P.W.O.	
Security	
Shore Patrol	
Welfare & Recn.	

ASSISTANT'S Initial Below

✓ MR

F-4

WAR DEPARTMENT
ARMY SERVICE FORCES
OFFICE OF THE COMMANDING GENERAL
WASHINGTON

Handwritten initials and scribbles

SPMOC 601.53 (3 July 44)

10 JUL 1944

MEMORANDUM FOR THE COMMANDING GENERAL, ARMY GROUND FORCES:
(Attention: G-3 Division (Colonel Harding)).

Handwritten marks

Subject: Termination of Use of Borego Valley Maneuver Area by
the Antiaircraft Replacement Training Center.

The attached letter from Headquarters, Antiaircraft Replacement Training Center to the Commanding General, Camp Callan, California, file 601 GNSRC-1, subject as above, dated 29 May 1944, with four (4) indorsements and three (3) inclosures, reporting the Borego Valley Maneuver Area as excess to the needs of that command, is transferred in accordance with your verbal request. (Colonel Harding to Major Ball).

For the Commanding General:

LeR. LUTES,
Major General, G.S.C.,
Director of Plans and Operations,
A.S.F.

Handwritten signature of Charles F. Dissinger

CHARLES F. DISSINGER,
Colonel, General Staff Corps
Director, Mobilization Division
A.S.F.

Incl
Ltr, AARTC Cp Callan to
CG, Cp Callan, dtd
29 May 44, w/4 Inds &
3 Incls.



50/6930

354.2/122(10 Jul 44)GNGCT-54 1st Ind

HEADQUARTERS ARMY GROUND FORCES, Army War College, Washington 25, D. C.

13 Jul 1944

TO: Commanding General, Army Service Forces, Washington 25, D. C.
(Attention: Director, Plans and Operations).

Activities of ground troops within the Borego Valley Maneuver Area have ceased, and present plans of this headquarters do not anticipate reopening this area. The Borego Valley Maneuver Area is therefore declared surplus to requirements of Army Ground Forces.

For the COMMANDING GENERAL:



✓
1 Incl.
n/c

F-5

SFMOC
CCZ:rec
Ext:74145

A

SFMOC 601.53 (13 July 44)

MEMORANDUM FOR THE RECORD:

1. Basic ltr as noted in par 1. requests necessary action to terminate permits.
2. 1st Ind, Hq Camp Callan to USEO, San Diego, dtd 2 Jun 44, requests necessary action be taken.
3. 2nd Ind USEO, San Diego to Los Angeles RE Sub-Office PD Engr, 6 June 44 for action.
4. 3rd Ind Los Angeles Sub O to PD Engr 27 June 44, forwards correspondence.
5. 4th Ind PD Engr to CG, ASF, 3 July 44, for disposition as a Class II installation.
6. T/S SFMOC to CG, AGF 10 July 44, forwards correspondence as per request.
7. 1st Ind on T/S, CG, AGF to CG, ASF, 23 July 44, states subject maneuver area is excess to Ground Forces.
8. The following informally concur in this action:
 - ACoFS, G-3, WDGS ----- (Lt Col Hill)
 - ACoFS, G-4, WDGS ----- (Lt Col Fellenz)
9. The following foresee no further WD requirement and informally concur in disposal:
 - MTD ----- (Lt Col Spencer)
 - CG, AAF ----- (Lt Col Lyle)
10. The following are informed by copy of this memo:
 - ACoFS, G-3, WDGS
 - ACoFS, G-4, WDGS
 - L & L Div, O/CS
 - Dir of Supply, ASF
 - Deputy C/S for SvC's, ASF
 - CG, 9th SvC
 - CG, AAF (Attn: Air Installations Div, AC/AS, MM&D)
 - Readjustment Div, ASF
 - Demobilization Br., ASF
 - CG, AGF

SFMOO
COZ:rec
Ext:74146

SFMOO 601.63 (13 July 44)

MEMORANDUM FOR THE CHIEF OF ENGINEERS:

Subject: Termination of Use of Sorogo Valley Maneuver Area by the
Antiaircraft Replacement Training Center.

1. Reference is made to letter from Headquarters Antiaircraft Replacement Training Center, Camp Callan, California to the Commanding Officer, Camp Callan, file 601 OMSHC-1, subject as above, dated 29 May 1944, with four (4) indorsements and three (3) inclosures which declares the Sorogo Valley Maneuver Area, California, excess to the needs of the Antiaircraft Replacement Training Center.

2. The Commanding General, Army Ground Forces has no further requirement for the subject facilities and an informal survey indicates no other War Department requirement for this land.

3. It is desired that this maneuver area be processed in accordance with the provisions of paragraph 5 c, War Department Circular 8, 1944, and the correspondence is therefore transmitted for appropriate action.

4. It is desired that this Headquarters be informed of the action taken in this matter.

By Command of Lieutenant General COMBIVILLE:

W. A. BENT, JR.,
Brigadier General, G.S.C.,
Acting Director of Plans and Operations,
A.S.F.

Incl
Ltr, AAFTC Cp Callan to
CG, Cp Callan, dtd
29 May 44, w/4 Incls &
3 Incls.

[Handwritten signature]
AGF

SPAOE 601.53 (13 July 44)

190 vml
13 July 44

TERMINATION OF USE OF BOREGO VALLEY MANEUVER AREA BY THE ANTI-AIRCRAFT REPLACE*
MENT TRAINING CENTER.

Memo to the C/Engrs, file SPMOC 601.53 (13 July 44), subject as above,
This action forwards correspondence from Hq, AARTC, Cp Callan to C/Engrs for
appropriate action in disposing of the Borego Valley Maneuver Area Calif.,
in accordance with provisions of par 5 c, WD Cir 8, 1944.

MEMO
1 ~~to~~ to CG, AGF and 1st Ind thereto from CG, AGF w/drawn and file in CIB.

Major Zantzinger

21 July

D. O'Y

CG 601.53 SAN DIEGO, California, Borrego Valley Maneuver Area - SIELT
1st Ind.

Subject: Termination of Use of Borrego Valley Maneuver Area by the
Antiaircraft Replacement Training Center.

Office, C. of E., 9 August 1944.

To: The Division Engineer, Pacific Division, Corps of Engineers, U.S.A.,
251 California Street, SAN FRANCISCO, CALIFORNIA.

1. Reference is made to teletype from this office dated 8 August,
No. 1700. Instructions contained therein hereby confirmed.

2. The inclosed file is submitted for your information. One
copy of Tract Register has been withdrawn by this office.

By order of the Chief of Engineers:

JOHN J. O'BRIEN,
Colonel, Corps of Engineers,
Chief, Real Estate Division.

1 Incl. n/c
(except 1 copy Incl. #3
listed on 3rd Ind. r/d)

C C
C O
P P
Y

CE 601.53
SAN DIEGO, California,
Borego Valley Maneuver Area - SPELT

9 August 1944

MEMORANDUM FOR THE COMMANDING GENERAL, ARMY SERVICE FORCES
ATTENTION: Colonel H. W. Bolan, Mobilization Division.

SUBJECT: Termination of Use of Borego Valley Maneuver
Area by the Antiaircraft Replacement Training
Center.

1. Reference is made to Memorandum from your office dated 22 July 1944, file SPMOC 601.53 (13 July 44), Subject: Termination of Use of Borego Valley Maneuver Area by the Antiaircraft Replacement Training Center.

2. There are inclosed for your information copies of teletype, No. 1700, and 1st indorsement from this office to the Division Engineer, Pacific Division.

For the Chief of Engineers:

JOHN J. O'BRIEN,
Colonel, Corps of Engineers,
Chief, Real Estate Division.

2 Incls:
Incl. 1 - Teletype No. 1700.
Incl. 2 - 1st Ind. dtd. 9 Aug. 44
to Div. Engr.

C
O
P
Y

8 August 1944

CG 601.53 SAN DIEGO, Diego Valley Maneuver Area - SIELT
OCE, Real Estate Division, Disposal Branch, Operations Section, SPEIT
21st and Virginia Avenue, N. W., Washington, D. C.

THE DIVISION ENGINEER
PACIFIC DIVISION
CORPS OF ENGINEERS U. S. A.
THREE FIVE ONE CLAY STREET
SAN FRANCISCO CALIFORNIA

X

JJOIP

REURTHD REURTHDATED THUR JULY 20 BY 2001 TO CG AGF FILE SIX NAUGHT ONE
FOUR FIVE THREE SAN DIEGO CALIFORNIA DIEGO VALLEY MANEUVER AREA SUBJECT
TERMINATION OF USE OF DIEGO VALLEY MANEUVER AREA BY AARTIC COLON REQUEST
ACTION BE TAKEN TO CANCEL EXISTING PERMITS COVERING SAID AREA AND RESTORE
ELEMENTS IN ACCORDANCE WITH TERMS AND CONDITIONS OF EJECT SETTLEMENT IN LIEU
OF SUCH NEGOTIATION AND CORRESPONDENCE TO FOLLOW PER SIELT 1700

UNFILED

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F-5

Inc-1

CHIEF OF ENGINEERS

SFAOE 601.53 (9 Aug 44)

3/25 cas
11 Aug 1944

TERMINATION OF USE OF BOREGO VALLEY MANEUVER AREA BY THE ANTI-AIRCRAFT
REPLACEMENT TRAINING CENTER.

Memo from OC/E 9 Aug 44 informs CG, ASF that instructions have
been issued to terminate maneuver rights covering Borego Valley Maneuver
Area, California.

Correspondence filed in CIB.

Major Zantzinger 14 Aug 1943

2. There are enclosed for your information copies of teletype,
No. 1700, and 1st indorsement from this office to the Division Engineer,
Pacific Division.

By the Chief of Engineers:

John J. O'Brien
JOHN J. O'BRIEN,
Colonel, Corps of Engineers,
Chief, Real Estate Division.

2 Incls:

- Incl. 1 - Teletype No. 1700.
- Incl. 2 - 1st Ind. dtd. 9 Aug. 44
to Div. Engr.



F-5

601.53(San Diego Calif)
Borego Training Center

24 August 1944

Subject: Termination of Use of Borego Valley Manuever
Area by AANTC

TO: Commanding Officer,
Camp Callan,
San Diego, California.

Attention: Lt. Col. G. B. Appelman

1. Reference is made to basic letter directed to you by Headquarters Antiaircraft Replacement Training Center dated 29 May 1944, subject as above, File 601 GNSRC-1 and forwarded to this office by 1st indorsement dated 2 June 1944; and to telephone conversation of this date between Lt. Col. G. B. Appelman and Mr. Moulton.

2. It is the understanding of this office that:

(a) The Borego Valley Manuever Area has been vacated and abandoned and will not be used again by your command.

(b) All installations including warning signs, have been removed from the property.

(c) The entire area has been policed; and, to the best of your knowledge and belief, there exist no hazards such as unexploded shells or ammunition of any kind placed upon or left upon the premises by your command. In this connection this office is aware that another military agency (thought to be the U. S. Navy) has also used this property for manuevers.

(d) The Division Engineer can proceed with the cancellation of any and all permits, leases and/or licenses which have been obtained in connection with the use of this property insofar as your headquarters is now aware.

3. This office requests that this understanding be confirmed (or excepted) by indorsement hereto.

For the Division Engineer

F-5

/s/ Kenneth Moulton
KENNETH MOULTON
Manager
San Diego Field Office

601.53

Morego Training Center. 1st Inf. OBA/ra

Headquarters Camp Callan San Diego II, California

26, August 1944

To: Office of the Division Engineer, Real Estate
Division, P O Box 710, San Diego 12 Calif.

1. Paragraph, 2 is correct and approved.
2. Regarding s, para. 2 there has been considerable target practice, bombing by the Navy, since Camp Callan released the desert training area to your headquarters. For the protection of all concerned, from duds, etc. the Navy should be contacted before property is released.

/s/ C. B. Appelman
Lt. Col. Inf.
Commanding.

F-5

War Department
OFFICE OF THE DIVISION ENGINEER
Pacific Division
Real Estate Division
P. O. Box 710
San Diego 12, California

601,53 San Diego
Borego Training
Center

20 September 1944

Subject: Termination of Use- Borego Maneuver Area

TO: Commandant, 11th Naval District, San Diego, Calif.

Att. Captain R. R. Smith

1. Your attention is invited to copy of basis letter, 24 August 1944 and to copy of 1st Ind. thereto; Subject, Termination of Use of Borego Valley Maneuver Area by A.A.A.R.T.C.
2. Pursuant to conversation of 18 September 1944, Captain Smith, Mr. Robert Muench of your headquarters and Mr. Loomis, Mr. Moulton and the undersigned of this office it is requested that your headquarters advise this office as to whether or not the Navy used the Borego area, under Army permits, for practice bombing.
3. If the area under Army permits was used by the Navy for practice bombing it is requested that your headquarters advise this office that no hazards, such as unexploded shells or ammunition, exist.
4. As noted by 2nd Ind. enclosed, a clearance has been obtained from Camp Callan. However, before the present permits are cancelled by this office it is necessary that your headquarters furnish this office the clearance as requested herein.
5. Mr. Muench of your office has a map in his file of the subject area.

For the Division Engineer

/s/ G. N. Sheets
G. N. Sheets
Manager,
San Diego Field Office

End-1 on War Dept. Office of Div.
Engg., Pac. Div., Real Estate Div.,
San Diego ltr 601.53 San Diego,
Borego Training Center, dated 20
Sept. 1944.

NAC11/F41-10
(Serial No. P-15876)

22 SEP 1944

To: ComdrNAB, 11 ND.

Subj: Termination of use of the Borego Maneuver Area
by the Army.

1. Forwarded for necessary action and consultation with
ComFairWestCoast.

2. Map of this area set out in paragraph No. 5 of basic
letter is forwarded herewith as encl. 3. It is noted by
reference to location map of Bombing, Strafing and Skip
Targets, Salton Sea; Land Targets, Imperial and San Diego
Counties, that the Navy Department has four targets within
the outline area shown on the enclosed map, as well as the
Ocotillo Dry Lake Landing Field and Bombing Target.

A. K. FOGG,
Public Works Officer
11th Naval District.

By direction of the Commandant:

Encl.

3. (HW) Blackburn's Map of San Diego County, California.

F-5

Copy for Commandant's Office

MAC11/F41-10
(Serial No. P-13916)

Pl:Sh

7 - OCT 1944

To: War Department, Office of the Division Engineer,
Pacific Division, Real Estate Division, San Diego
Branch Office, P. O. Box 710, San Diego 12, Calif.

Subj: Termination of use of the Borego Maneuver Area
by the Army.

Ref: (a) Unltr 601.53 San Diego, Borego Training Center,
dated 20 Sept. 1944.

1. Ref. (a) requested certain information regarding the
Navy's use of the subject Borego Maneuver Area.

2. The Navy has never used the Borego Area under Army Per-
mits for practice bombing. The target sites which are be-
ing used by the Navy are either owned in fee by the United
States of America and are under the jurisdiction of the
Navy Department, or are on sites presently covered by Per-
mit to the Navy Department.

3. The subject area is not needed by any activities of
the Eleventh Naval District. However, the areas presently
used for bombing target sites referred to above will con-
tinue to be used.

G. M. RAVENSCROFT,
Assistant Commandant (Logistics)

F-5

Copy for Commandant's Office

MI-9 (TDO)
(950488)

U. S. NAVAL AIR STATION
SAN DIEGO, CALIFORNIA
March 13, 1941.

95-enc

MEMORANDUM

From: The Commanding Officer (District Air Officer).
To: Colonel S.L. Howard, USMC, 2nd Marine Brigade,
Marine Corps Base, San Diego, California.

Subject: Navy Operating Areas in Borego and Imperial Valleys.

Enclosure: (A) Chart showing present and proposed Navy air
operating areas in Borego and Imperial Valleys.

1. In compliance with a telephone request from Lieut.
Berger, enclosure (A) is forwarded herewith.

2. The Navy will require the proposed emergency machine
gun range east of the Salton Sea on account of the fact that the
present off-shore ranges are restricted by Army coastal firing
from Fort Rosecrans, Torrey Pines Mesa and Carlsbad and such Marine
firing as may take place in the above areas.

3. The status of the Borego Valley sites now being used
by the Navy is as follows:

Clarks Dry Lake	- Airfield and horizontal bombing target. Property leased by Navy.
Borego Wash	- Horizontal bombing target only. Property leased by Navy.
Cocotillo	- Landing field and dive bombing target. Property being purchased by Navy.
Borego Hotel Site	- Landing field and dive bombing target. Property leased by Navy.
Coyote Wells	- Landing field. Horizontal bombing target three (3) miles east. Proper- ty leased by Navy.
Jacumba	- Airfield only. Property leased by Navy.
Salton Sea	- Water bombing target and seaplane operating area.

R. L. JUNTNER.

F-6

COPY

COPY

COPY

NI-9X
KP102
NI-13
25-1

THIRD INDORSEMENT
Commandant's Office, Eleventh Naval District
San Diego, California

ND11/NI-9
(A7-Cb)
Serial W-191

March 28, 1941.

From: The Commandant.
To : The Commanding General, Marine Corps Base.
Subject: Navy Operating Areas in Borego and Imperial Valleys.
Reference: (a) Comdt. 11th NavDist 4th Indorsement KP-102/A1-1 (Serial P-2321) dated 3-27-41, to MGC, USMC, via BuY&D.

1. The Commandant in reference (a) has recommended the acquisition of the areas in Borego and Imperial Valleys for use as an anti-aircraft and artillery range for Marine Corps combat firing. A copy of the indorsement is being forwarded to you under separate cover. A copy indicating the Commandant's action is also being sent to the Commanding Officer, Naval Air Station, San Diego.

C. A. BLAKELY.

cc: CG, 2dMarDiv.
CO, NAS, San Diego.

*Copy made for: Comdt's files
PWC files.*

3-28-41 p.m.

cb

INITIAL	Originating officer check routing desired prior to signature by Commandant.
K	Ch. of Staff
cb	Aide
	Accounting and Disb.
	Chaplain
	Comdt's Clerk
	Communications
	Dist. S.O. OinC. NSD
	Intelligence
	Issuing
	Legal
	Material
	Medical
	Operations
	Personnel (Navy)
	Personnel (Reserve)
	Personnel (Civilian)
	P.D. (NTS)
	Pres., GCM
	P.W.O.
	Sr. Pat.
	War Plans

ASSISTANTS Initial Below

ACC/F41-10
A2-11(wt)
Serial: 98

AIRCRAFT
SOUTHERN CALIFORNIA SECTOR
WESTERN SEA FRONTIER

24 August, 1944

Eleventh Naval District
San Diego, California

AIRCRAFT SOUTHERN CALIFORNIA SECTOR, WESTERN SEA FRONTIER
CIRCULAR LETTER NUMBER 20-44

From: Commander Aircraft, Southern California Sector, Western
Sea Frontier.
To : AIRCRAFT, Southern California Sector, Western Sea Frontier.
Subj: Bombing Targets in Southern California Sector, Western Sea
Frontier.

1. Enclosure (1) contains the position and description of all bombing targets in the Southern California Sector of the Western Sea Frontier, together with a statement of the type of bombing runs permitted and the type of ordnance permitted.
2. Certain bombing targets listed in enclosure (1) are not in commission as yet. A notam will be issued when such targets are commissioned.
3. The targets listed in enclosure (1) shall be used solely by the units to whom they are assigned by Joint Operations Center, San Diego (Naval Air Control Center). The unit to whom the target is assigned, however, may permit another unit to use such target. When such permission is given, Air Control Center shall be advised by teletype.
4. Where areas, targets, and landing fields are assigned by Joint Operations Center, San Diego, to more than one unit, the senior naval aviator of the units assigned the same areas, targets and landing fields shall coordinate the schedules except in cases where the assignments specify the hours a unit is to use such area, target or landing field.
5. It is frequently necessary to conduct air and surface firing and other surface operations in the same areas. All units must exercise caution. Aerial gunnery above an overcast is not permitted.
6. No dummy runs are to be made on any target declared closed.
7. Water filled bombs over 100 pounds may not be used on water bombing targets or land skip bombing targets.
8. Units desiring to drop live bombs must notify Joint Operations Center, San Diego at least 24 hours in advance.
9. The following targets can be illuminated: Otay on request to Naval Auxiliary Air Station, Brown Field, all Salton Sea targets on request to

fm

ACC/F41-10

A2-11(wt)

Serial: 98

24 August, 1944

Subj: Bombing Targets in Southern California Sector, Western
Sea Frontier.

Naval Auxiliary Air Station Salton Sea and Holtville one (1) and two (2)
on request to Naval Auxiliary Air Station Holtville.

10. Squadrons must observe provisions of Fleet Air Detachment Circular
Letters 25-43 and 22-44.

By direction of ComAirSoCalSec, WSP

Enc-(1) Position & Description
of Bombing Targets.

Max L. Black
MAX L. BLACK
Deputy Commander

NAME	POSITION	DESCRIPTION	TYPE OF BOMBING RUN	TYPE OF ORDNANCE
WBT A	32-32-10 117-12-30	Radar-rigged Pyramid	Bombing runs must be conducted at an alt. not to exceed 700 ft. Actual releases at 200 feet.	Practice Bombs
WBT B	33-04-40 117-19-50	Radar Rigged Pyramid	Low level (see WBT A)	Practice bombs
Borego Hotel BT	33-05-30 116-06-06	Concentric Circles	High Altitude and Dive Bombing	Practice bombs and strafe
Borego Wash BT	33-11-45 116-09-15	Concentric circles with airplane silhouette adjacent to target for strafing only	High Altitude and Dive Bombing	Practice bombs and strafe
WBT C	33-26-00 117-41-30	Radar-rigged Pyramid	Low-level (see WBT A)	Practice bombs
Catalina BT	33-18-50 118-26-40	Concentric circles	Dive Bombing	Practice bombs
Clarks Dry Lake BT	33-20-24 116-16-48	Concentric circles simulated submarine	High Altitude and Dive Bombing	Practice bombs and strafe
Cortes Bank WBT	32-28-45 119-12-50	Radar-rigged	Low-level	Practice bombs
Coyote Wells BT	32-56-00 115-52-30	Circle - simulated Destroyer deck	High Altitude and Dive bombing	Practice bombs and strafe
WBT D	33-37-27 118-04-00	Radar-rigged Pyramid	Low-level (See WBT A)	Practice bombs
WBT E	34-01-00 118-36-00	Radar-rigged Pyramid	Low-level (see WBT A)	Practice bombs
East Borego BT	33-04-00 115-57-25	Circle	High Altitude and Dive Bombing	Practice bombs and strafe
Holtville BT 1	32-56-45 115-12-30	Concentric circles	Dive Bombing	Practice bombs and strafe
Holtville BT 2	33-01-30 115-18-30	Concentric circles	Low-level	Rocket
Holtville BT 3	33-09-00 115-22-05	Concentric circles	Dive Bombing	Practice bombs

ORDNANCE AND EXPLOSIVE
ARCHIVES SEARCH REPORT
FOR
BORREGO MANEUVER AREA
BORREGO SPRINGS, CALIFORNIA
PROJECT NUMBER J09CA701101

APPENDIX G

REAL ESTATE DOCUMENTS

APPENDIX G

Real Estate Documents

Table of Contents

G-1. Land Use Permit for the Borrego Maneuver Area (B-38).

(See PRE 12)

Form No. 280

WAR DEPARTMENT

PERMISSION TO USE LAND

C
O
P
Y

Sacramento, California
(Place)

3/10/42
(Date)

The undersigned hereby gives permission for the United States, its troops, and their animals, vehicles and equipment, at any and all times during the present emergency, to enter, maneuver upon, pass over, fire, and bivouac or camp upon the following described premises, and to use the improvements thereon and the water therein or thereon for drinking, cooking and cleaning purposes. The said premises are described as follows:

State-owned lands under jurisdiction of the Department of Finance located in Townships 9 South, Ranges 6, 7 and 8 East; 10 South, Ranges 6, 7, 8 and 9 East; 11 South, Ranges 6, 7, 8, 9 and 10 East (excluding areas east of U.S. Highway No. 99); 12 South, Ranges 6, 7, 8, 9 and 10 East (excluding all areas south of State Highway No. 78)

RECORD OF SURVEY

C
O
P
Y

Sacramento, California
(Place)

3/10/42
(Date)

This record is to be appended to and made a part of an agreement entered into between the United States and the party named herein.

1. OCCUPYING UNIT U.S. TROOPS NO. OF OFF. _____ NO. OF E. M. _____
2. DATE OF OCCUPANCY March 10, 1942, Intermittently thereafter
3. IDENTITY OF PROPERTY (Designation of Location) All State-owned lands located in Townships 9 South, Ranges 6,7, and 8 East; 10 South, Ranges 6,7, 8 and 9 East; 11 South, Ranges 6,7,8,9 and 10 East (excluding areas east of U.S. Highway No. 99); 12 South, Ranges 6,7,8,9 and 10 East (excluding all areas south of State Highway No. 78)
4. RESIDENT: None
5. OWNER OR AGENT; (a) Name:
(b) Address:

(c) Telephone Number:

TOTAL ACRES CONTRACTED FOR _____ OFF LIMITS None

LIVE STOCK CENSUS: None

CROPS (Including orchards): None

FENCING (Condition, Amount, and Type): None

BUILDINGS (Type, Condition, Utilities, etc.): None

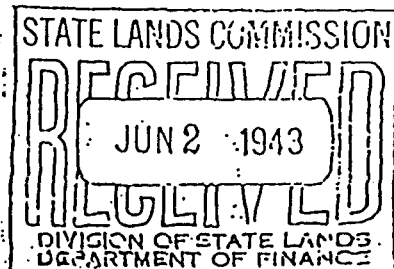
ADDITIONAL REMARKS: None

(Resident, Owner, or Agent)

(Name) C.C. Bank
Col. F.A., III Army Corps.

(Rank and Organization)

(Use reverse side if necessary, numbering entires according to above)



It is understood that any claim for damage arising out of the use of said property under this permit shall be in writing, under oath, and shall contain a detailed statement of the condition of the premises, enumerating the loss or damage alleged and the estimated amount. Such claim shall be filed in triplicate after the termination of the use herein granted, with the Rents and Claims Officer at Southern California Sector, San Bernardino, California, for adjustment or for settlement as provided by law and regulations.

State of California
George Killion, Director of Finance

By (original signed by George Killion)
(Owner or Lessee)

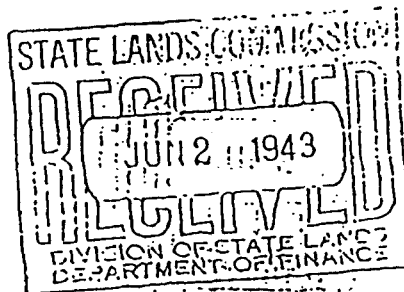
State of California
Sacramento, California

(Witness)

(Address)

(Attach Record of Survey AR 30-1415 (Par. 10))

Approved
Department of Finance
March 10, 1942



ORDNANCE AND EXPLOSIVE
ARCHIVES SEARCH REPORT
FOR
BORREGO MANEUVER AREA
BORREGO SPRINGS, CALIFORNIA
PROJECT NUMBER J09CA701101

APPENDIX H

NEWSPAPERS/JOURNALS

APPENDIX H

NEWSPAPERS/JOURNALS

Table of Contents

H-1. "Activities of World War II Stir Borrego with Marine, Army Units Training Here", 28 August 1971 (B-39).

H-2. "Military Wash Bears Evidence of 1942 Maneuvers", 23 November 1989 (B-40).

H-3. "Camp Callan, by Judy P. Schulman", May 1984 (B-41).

BORRERO SUN
August 28, 1971.

Activities Of World War II Stir Borrego With Marine, Army Units Training Here

Editor's Note: The lively history of present-day La Casa del Zorro, which includes the founding of Burks Ranch and The Desert Lodge, is recalled in this last article in a series by subscriber Noel Crickmer, who owned and operated the Lodge.

By LOIS von VOIGTLANDER

The Noel Crickmers planned to operate The Desert Lodge resort as a winter business and keep summers free for travel and recreation when they opened up in 1939.

But Dec. 7, 1941, changed many plans of many persons, including those of the Crickmers. Immediately after the attack on Pearl Harbor by the Japanese, the few employes at the Lodge left thinking there would be little business until after the war.

Suddenly, Borrego came alive with Army and Marine units. Service influence expedited the completion of Yaqui Road. The Ensign Ranch, where Borrego Springs Park is now, was designated a Marine outpost to train recruits, slated for duty in the northern deserts of Africa.

In Borrego they learned to drive under desert conditions at night-time without lights.

Army tank destroyer units from New Mexico rolled into the valley. The Lodge was swamped with soldiers, their families and mounds of luggage. Built to accommodate 18 guests at the most, the Lodge was trying to squeeze in from 30 to 40.

No one cared how crowded it became as long as families could be together a few more days or hours. One night Crickmer and a guest slept on kitchen chairs after giving up their beds to tired, bewildered military wives.

Rationing and the OPA (Office of Price Administration) came into being. The Crickmers were able to serve staggered meals for guests by using ration stamps on hand. Then the stamp allotment was cut

in half, necessitating drastic revisions.

Guests, who still came when they could, brought in cigarettes, candy and cokes for soldiers until the Lodge was able to obtain a special permit to purchase such items.

Kitchen help was hard to come by. Mrs. Crickmer baked fresh bread three times a day. The Desert Lodge's source of milk, cream and butter — Bessie, the cow — was indispensable. Sometimes the Ensign Ranch could help with dairy products. A friendly merchant in Westmorland assisted when possible and when Ranchita ranchers butchered, fresh beef was available.

With help from desert friends the Lodge subsisted.

Two units of anti-aircraft units from Camp Callam near La Jolla arrived in the desert to train each week. In between times, clean-up squads arrived. They brought their own lunches but found the amount of food inadequate. They, too, found their way to the Crickmers' doorstep. Guests sometimes brought in extra rations to help out.

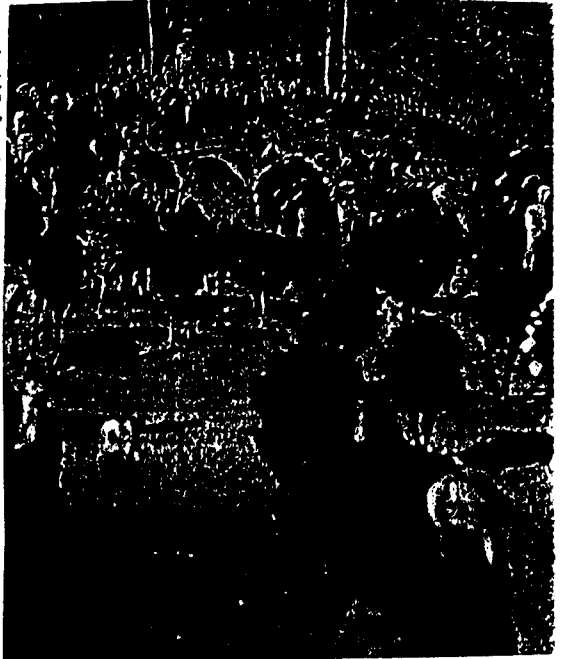
Executives from the aircraft industry arrived as did professional people hard pressed in a war-oriented society.

To conserve fuel, the Lodge owners closed down the lighting system at 10 p.m. Guests who wished to stay up later did so with good grace, merriment and with the help of candles and kerosene lamps.

Soon P-38 planes were roaring and diving overhead on desert practice missions. Two pilots who crashed over Clark Dry Lake never went home.

As the war continued, maintenance problems became acute. Nothing was ever thrown away, not even bailing wire. It was a long haul to the outside for food and supplies and only an "A" card for gas was made available for the Lodge.

Sometimes friends donated gas



THANKSGIVING ALL YEAR — A bumper crop of turkeys grown in Borrego Springs during the war years on the Roy Ensign Ranch. As many as 4,000 were fed at a time.

CONTINUED
NEXT PAGE

BORRERO SUN
August 28, 1971.

or coupons. One couple, the Walter Treptes, who came often to the Lodge, helped solve the transportation problem.

Mrs. Trepte, a volunteer Gray Lady, needed a larger car. She traded her sedan for the Crickmers' station wagon and tossed in a cement mixer with a five-horse power engine into the deal. The mixer was worth its weight in gold, because by using it as a gasoline requirement the Lodge was able to operate its vehicles with a narrow margin of safety.

Later, the cement mixer was used to help build two of Borrego's first motels.

As the war years drew to a close more visitors and realtors became interested in the valley. Some who had learned to enjoy the desert during the war returned.

There was talk of an agricultural future. Sam Fortiner had already begun to grow gladiolus.

The face and pace of Borrego began perceptively to change. Crickmers subdivided part of The Desert Lodge property and named the new section "Rancho Borrego."

In 1947, Di Giorgio Corp. moved in. Needing temporary housing for workers, it leased the Lodge for six months until its own buildings were completed.

"Residents began to note billowing clouds of desert dust that swirled as far as the Julian hills," Crickmer said.

Bulldozers were converting carpets of purple spring verbena beds into furrowed fields and sites for warehouses.

Regretfully, the Crickmers decided to sell the Lodge. The purchaser was A. A. Burnand Jr. Burnand family members managed the Lodge until it was purchased by James S. Copley in 1960 and it was renamed La Casa del Zorro.

Meanwhile, the Crickmers had purchased Tub Canyon Ranch from Fred Lanz. There they created a small guest accommodation.

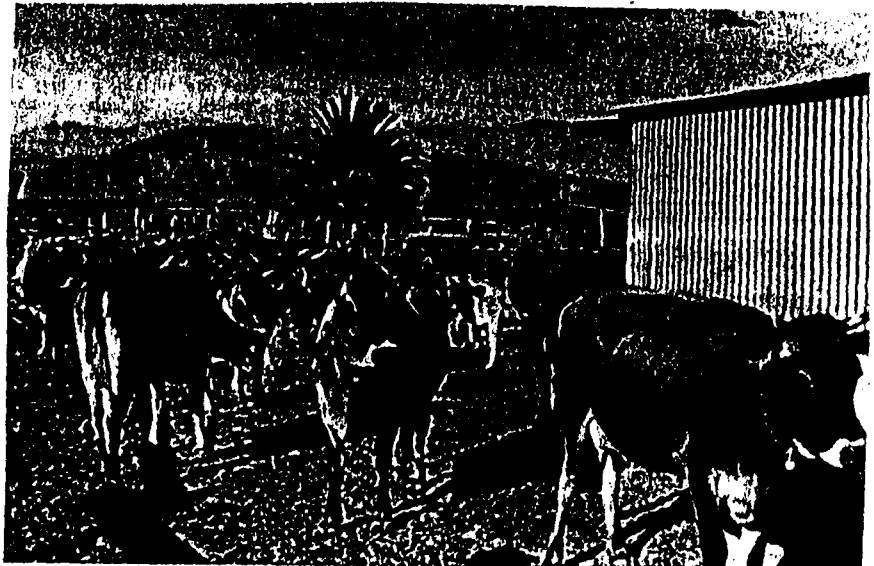
One morning shortly after the Crickmers had moved in, Crickmer recalls, someone drove into the yard from the Lodge requesting Crickmer to come and rescue them from Towser, the dog.

Towser, born on the property and guarding it for all his years, was not about to permit new owners access to the place, deed or no deed.

Looking over the lush grounds that enhance La Casa del Zorro today, Crickmer remarked, "We were often asked why we didn't try to grow more flowers around the place.

"Once we did try a lawn. The jack rabbits nibbled one side and the dogs cavorted on the other. We did have a vegetable garden and constructed a living Ocotillo fence which blossomed in spring. We believed the desert should remain unaltered, with the natural charm that is God given.

"And, even in those days," Crickmer continued, his face crinkling ruefully, "visitors from Palm Springs used to drive over and raid our desert for barrel cacti, especially the tall six foot ones."



LOCALLY SUPPLIED MILK - A herd of about 25 milk cows were kept on the Ensign Ranch at one time. Crops like cotton, milo,

alfalfa, and dates were also grown in the agriculture-rich valley, which is fed by a large, natural underground watering system.

PICTURES NEXT PAGE

H-1

1545

BORREGO SUN
August 28, 1971.

CAMP ENSIGN IN BORREGO - Marine and Army units trained in Borrego during World War II so they could get the feel of the desert before going to sandy beaches and terrain of North

Africa. Up to 2,000 underwent training here at the same time. The military activity helped put Borrego on the map, including the finishing of Yagui Pass Road.



MORE PICTURES NEXT PAGE
1546

H-1

BORREGO SUN
NOVEMBER 23, 1984

Military Wash bears evidence of 1942 maneuvers



Aptly named, Military Wash near Ocotillo Wells is a graveyard of old shell clips, projectiles and other reminders of war exercises conducted in the area 42 years ago. State Park Ranger YOM. Jeri Zimón points out remains of two old bunkers standing like huge globes of cement dropped from above on the desert landscape. Men were trained here for desert warfare to be waged in far away North Africa against German troops led by Field Marshal Rommel. Photo by Minnie Surles.

H-2

5091

BORREGO SUN
NOVEMBER 29, 1989

By Minnie Surles

In 1942 when military forces were training for desert warfare in what is now Anza-Borrego Desert State Park, Ranger Jeri Zemon was yet to be born.

However, this young Ranger can quickly guide you on the easiest and shortest route to Military Wash, near Ocotillo Wells, where evidence still remains some 47 years later, that extensive war exercises took place in this part of California's vast desert region.

I was on a civilian ride-along with Ranger Zemon and was anxious to see terrain that I had been through at an earlier date, when I had not appreciated what I was seeing. I didn't know the history of the area and I had not bothered to get out of our 4-wheel drive vehicle.

If you scout around on foot in Military Wash, shell clips and projectiles are still to be found. Remains of two old bunkers stand like huge globs of cement dropped from above on the landscape. Railroad tracks and ties believed to have been used here are no longer seen but what is clearly seen is the long narrow strip of land that was cleared of all vegetation for the tracks.

According to Ranger Fred Jee who once had Military Wash as part of his patrol area, the railway targets may have been stationary or they may have been rigged in a short piece of isolated track so that they might be moved back and forth presenting moving targets for the tanks.

An interesting bit of information, that Ranger Jee offers, is that still discernable in the area are straight lines of nails remaining from large stacks of wooden boxes left by the troops. It is not clear whether they were ration boxes or ammunition boxes, but in either case, the boxes have long since disappeared leaving a few pieces of wood and long lines of rusting nails in perfect formation where they had been placed.

The starkness of land must have made it seem like another planet to many of the fighting men for whom this was their first encounter with such bleak desert country.

Maneuvers were carried on through days as hot and dusty as the men had ever experienced and with nights so dark that only their vehicle lights guided them.

What a far cry this must have been from the peace and quiet that may be enjoyed (well, most of the time) in the desert now.

What was it that happened to cause the U.S. to frantically start training men for desert warfare? Quite simply it was the fact that just a month after the U.S. entered the war, German troops under the command of Field Marshal Rommel started pushing across North Africa toward Egypt, threatening the Suez Canal. British troops were unable to stop the assault. It was evident that U.S. troops would have to engage in a desert campaign.

There was no background for such an engagement in the history of U.S. warfare. General George S. Patton Jr., a relative unknown two-star general at that time, was designated to organize and command a Desert Training Area.

While the center grew to 11 camps and would train over a million men in seven armored divisions, none of Patton's camps was in the Borrego Valley region!

Marine planes from El Centro, Navy planes from Holtville and Army planes from Yuma continuously flew missions over this part of San Diego County.

Targets were floated on the Salton Sea for planes to destroy. The Carrizo Badlands, in the lower part of the park, were so heavily bombed by planes that to this day they remain out-of-bounds to the general public because of possible

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unexploded munitions.

Robert S. Begole, Anza-Borrego Desert State Park Natural History Association's volunteer archaeologist, is a man who has hiked this park, probably more than any person alive, searching for artifacts. It was Begole who donated to the park the Borrego Archaeology Research Center. The Center houses a variety of fascinating artifacts including military type debris from WWII.

"The Army with its mechanized units made the greatest impact on the landscape," Begole wrote in an article in a recent issue of the Pacific Coast Archaeological Society Quarterly. "The Navy during the war leased some 640 acres on the east side of Clark Dry Lake for use as an airfield and as a horizontal bombing target area."

The military also leased many acres around the old Borrego Hotel in the vicinity of Ocotillo Wells.

Lois von Vbiglander, who still lives in Borrego Springs, wrote about the war years in the valley in a 1971 article in the *Borrego Sun*. "Suddenly Borrego came alive with Army and Marine units and the service influence expedited the completion of Yaqui Pass Road." In the article she told of how the wives of the men in training coped with living at a "small desert resort," the forerunner of today's La Casa del Zorro Resort Hotel.

Army tanks rumbled through the valley relentlessly. The Ensign Ranch, which encompasses the area now known as Club Circle Resort, was designated a Marine outpost to train recruits slated for duty in the northern deserts of Africa.

One could not find any better informed residents on what it was like to live in Borrego Valley during WWII than Bernice and Tom Davis. Tom was employed by the Ensign Ranch and they lived there when it was being used by U.S. military troops in 1942.

The Davis family has an old map that shows in detail the buildings that were used by the military.

Tom and Bernice experienced first hand the excitement and confusion that the troops generated. Tom Davis recalls how the 29th Army Engineers ramped kitty-cornered from where the Elementary School is now.

"In those days not many of the roads in Borrego Valley were more than dirt lanes. The Army Engineers in conjunction with the county oiled most of the roads in the valley. Any surface dirt that was used probably came from the Ensign Ranch and our Number One Well furnished the water that was needed by the military," explained Davis.

Things did not always go smoothly while the ranch was hosting the troops. An Aircraft Searchlight Group was close by the Davis home. Davis recalls "When fox holes were dug in our date groves, we protested to the officer in charge and the digging stopped." The men were then directed to near-by hills to dig their fox holes but disaster awaited some of them.

Whoever was in charge of the men obviously knew little about what it takes to survive in arid desert lands. They were rationed out only a quart of water per man for a 24 hour shift. Fifty of the men had to be sent back to San Diego because they couldn't take it, according to Davis.

In 1943, Marines from San Diego set-up a Motor Transport Camp in Borrego Valley and surrounding areas. They had found a perfect place to practice "black-out" driving.

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The driver trainees came to the valley in groups of 100. Every Thursday the drivers were given a night-driving test. If they passed they could return to San Diego and civilization."

The house where the Davises lived on the Ensign Ranch, and where they still live today, was literally surrounded by Troop activities. During this time headquarters for one detachment was just a stone's throw from their front door and tent houses the troops lived in were close-by.

One time a bulldozer was brought in to make a swimming pool for the men. Before the pool could be cemented the outfit got their orders to leave. "Mr. Ensign decided that the ranch could use a fish pond so he just filled the excavation with water," Davis said.

The granary on the ranch was used for Saturday night dances for the service men. "Girls came down from Julian and a few local girls attended the dances," Bernice Davis remembers.

Whenever planes flew at tree top level over the ranch it was very annoying. The noise scared the cows so much that they frequently stampeded and cut their udders on the barbed wire fences.

Davis remembers when a plane out of the Clark Dry Lake area crashed and wasn't found for a period of time. The parents of one of the flyers rented pack horses from the ranch to search for the downed plane with no luck.

The commanding officer, who had been absent at the time the plane went down returned and from the air sighted the wrecked plane on the sloped of Rabbit Peak north of Borrego Valley. The two flyers did not survive the crash.

When you listen to Bernice and Tom Davis talk about when the Ensign Ranch was used for a training ground for Uncle Sam you know why they remember those days so vividly.

Loretta Laag, long time resident of Borrego, recalls the family's homestead land was taken over during the war by the military. (The now deserted homestead remains near a grove of Tamarisk trees, east of La Casa del Zorro Resort, near the Borrego Sink.)

Long after the troops had left their land Laag recalls that the family found all sorts of things that were left by the men in training.

Throughout the most desolate and remote parts of the desert tanks and jeeps streamed along the old Truckhaven Trail. Highway S-22 was not in existence yet. At times traffic became so congested that it was necessary to use Military Police to do nothing but direct the massive mess of military vehicles that roared up and down Truckhaven Trail to and from the Salton Sea.

From time to time men that once trained in this part of the desert return with their families to show them where they once were stationed in the middle of what General George S. Patton Jr. once described as ... "The Place God Forgot."

(If you are interested in learning more about Patton's role in training men for desert warfare be sure to visit the new General Patton Memorial Museum. It is located in Chiricaco Summit, CA — Interstate 10 east of Indio.)

4. *Muster Roll*. Company F, Second Regiment Texas Mounted Rifles. February 28, 1862.
5. *Letter*, dated July 30, 1861. Signed by Captain William Carroll Adams, at Fort Lancaster, Texas.
6. Post Return, *Fort Lancaster, Texas*, September, 1861.
7. Post Return, *Fort Inge, Texas*, September, 1861.
8. Post Returns, *Fort Lancaster, Texas*, September and October, 1861.
9. Post Return, *Fort Stockton, Texas*, September, 1861.
10. Post Returns, Fort Davis, September, 1861 and March, 1862.
11. Robert W. Frazer, *Forts of the West*, University of Oklahoma Press, Norman, Oklahoma, 1965, 152.
12. *Ibid.*, 153.
13. W. T. Mechling, acting assistant adjutant general, General Order 8. *War of the Rebellion: A Compilation of the Official Records of the Union and Confederate Armies*. Series One, Volume I, Government Printing Office, Washington, D.C., 1880, 574-575.
14. Post Return, *Fort Lancaster, Texas*, November, 1861. See also W. W. Heartsill, *Letter to R. W. Loughery*, written at Fort Lancaster, Texas, on December 29, 1861. He was not physically present with this group. Heartsill and several others had remained at Fort Clark until nearly a month later.
15. Post Return, *Fort Lancaster, Texas*, November, 1861.
16. Martin Hardwick Hall, *Sibley's New Mexico Campaign*, University of Texas Press, Austin, Texas, 1960, 45. See also Joe A. Gibson, *Forts and Treasure Trails of West Texas*, Educator Books, Inc., San Angelo, Texas, 1969, 98.
17. *Muster Roll*. Company F, Second Regiment Texas Mounted Rifles, February 28, 1862. See also W. W. Heartsill, *Journal*, December 28, 1861 entry.
18. Heartsill, *Journal*, December 25, 1861 entry.
19. Post Return, *Fort Davis, Texas*, March, 1862.
20. Post Return, *Fort Davis, Texas*, April, 1862.

THE AUTHOR

Gordon W. Geldard, late Air Force major of Las Cruces, New Mexico, commanded the Rio Grande Department of CAMP upon his death last year. He was interested in military history and archaeology of the Southwest.

ATTENTION, WRITERS!

A PERIODICAL Style Sheet has been drafted, defining the preferred style for articles submitted for consideration by this publication. Its guiding rules should be followed in the preparation of such material. A copy of the Style Sheet is free, but requests should be accompanied by a self-addressed, stamped, long white envelope, and may be directed to the editorial address of the journal. It is hoped that the Style Sheet will help standardize the written material appearing in the PERIODICAL.

Camp Callan—From Glory to a Memory

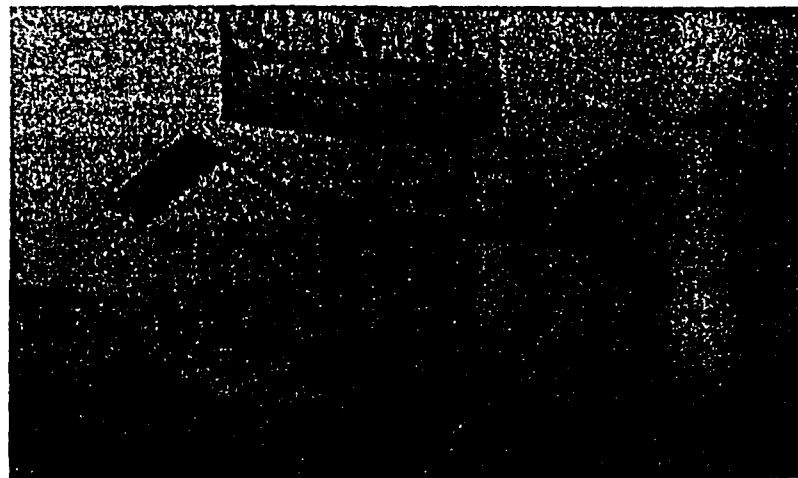
BY JUDY P. SCHULMAN

When one thinks of the military at San Diego, California it is usually the Navy that comes to mind. Less commonly known is the fact that San Diego has also had its share of Army installations. Over the years these have come to include an airfield, two camps, a cavalry unit, and a fort. It is about Camp Callan, lesser known Army installation, that this article is about.

Camp Callan was a World War II anti-aircraft artillery replacement training center. Located along U. S. Highway 101 some 15 miles north of downtown San Diego, it occupied a 3 by half mile rectangular area on Torrey Pines Mesa (named for the rare tree, *Pinus torreyana*, which grows only in that area and 175 miles to the north on Santa Rosa Island). The camp was named in honor of Major General Robert Callan (1874-1936), one of the most noted officers in coast artillery history. With 40 years of continuous service, he was a veteran of both the Spanish-American War and World War I.

Originally the camp functioned as a coast artillery training center with batteries assigned to both anti-aircraft and seacoast artillery training missions. It was established in response to the War Department's need to train the growing number of men that the draft would bring. Before 1940, basic training was

Main entrance, Camp Callan. Photo by Charles G. Ellington. Camp Callan about 1943. Courtesy Leslie J. Swope.



ft to individual units. The function of the training centers was to relieve these units for mobilization and combat. On November 22, 1940 the War Department announced plans to create the nucleus for new coast artillery units to be formed with men inducted under the Selective Service Program and assigned to the center on Torrey Pines Mesa. A month earlier, the San Diego City Council granted the military 710 acres of land for \$1 a year. Additional acreage was acquired from private sources. With the establishment of a campment site and gun firing positions, the purpose of the camp was to teach airmen how to fire long range weapons in the event the Japanese fleet tried to attack our west coast.

After heavy grading, construction was started in late November, 1940. Official occupation of the camp was marked by a flag-raising ceremony on January 15, 1941. The ceremony was attended by 20 officers and 120 soldiers, 111 members of the first unit of operations personnel. Colonel Francis P. Faraday, Camp Callan's first commanding general, spoke on the importance of the camp to the defense program. The camp originally had wide open spaces separated by occasional clusters of barracks buildings, camp roads that resembled cowpaths and unpaved battery areas that washed downhill with every rainstorm.

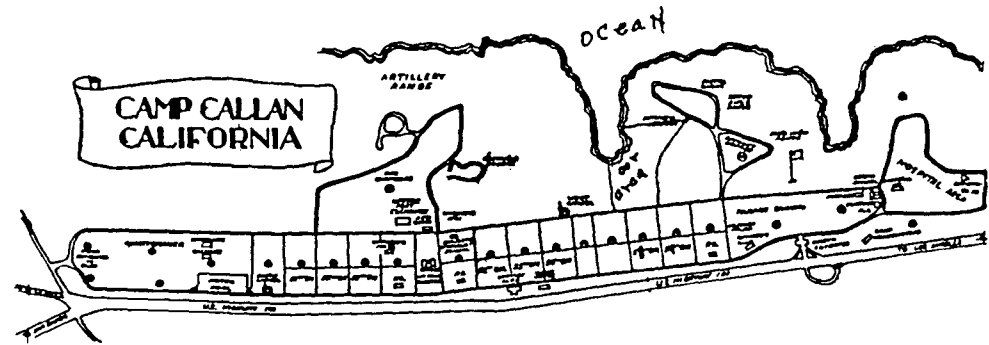
February 24, 1941 was the arrival of the camp's first large guns. Among these were nine French-made 155-mm guns that dated back to World War I. Between the last week of February and the end of March, some 5,000 trainees arrived by rail to a nearby reopened railroad station. These trainees came mainly from Forts Ord and MacArthur in California, Fort Sheridan in Illinois, Fort Missoula in Montana, and Fort Vancouver in Washington.

The first military review was held on April 2, 1941. Six thousand men passed in formation before Major General Joseph A. Green, chief of Coast Artillery. He congratulated the trainees on the progress they had managed to make in such a short time. As Camp Callan still had no band of its own a 100-piece Marine Corps band provided military music.

March, 1942 began a period of important change for Camp Callan. Whereas training emphasis had been on both anti-aircraft and seacoast artillery, the decision now was made to place full emphasis on anti-aircraft weapons, the need made evident by the terrible damage caused to England by the German Luftwaffe.

This change signalled what was to become a two-year period of peak activity for the camp. The camp had grown to some 297 buildings covering 23 blocks. About 15,000 men were now going through each 13-week training cycle and there was a variety of training facilities to meet their training needs: (1) operational, (2) training and (3) leisure time.

In addition to Headquarters buildings, there were offices to take care of the daily operational needs of running a training camp. These included the Quartermaster, Ordnance, a Motor Pool, Military Police and a Salvage Station. There was also a commissary, five post exchanges, ammunition magazines, warehouses, power plants, plotting rooms and observation



Camp Callan, looking north.

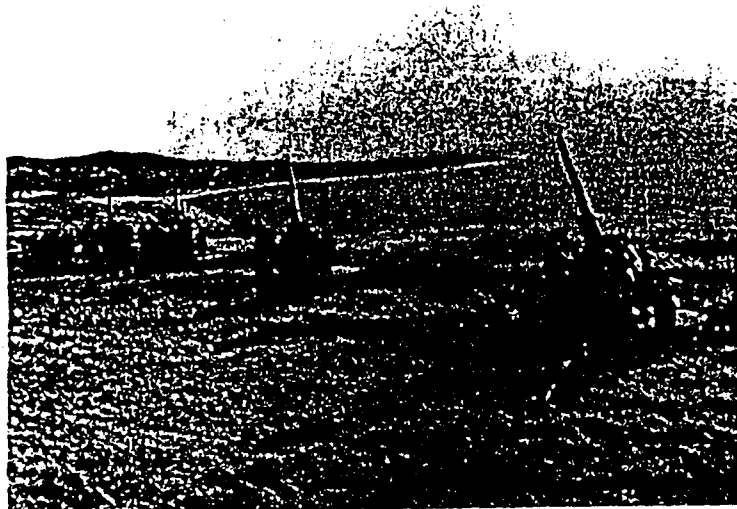
stations. The camp's water supply was stored in a 4.5 million gallon reservoir and a 100,000 gallon water tank.

The health of the men was overseen by a myriad of facilities in the hospital zone. In addition to more than 300 beds, there were laboratories, Red Cross stations, physical therapy units, a cafeteria, a post office, an auditorium, a cleaning shop and a dental clinic. These were all staffed by 50 doctors and 30 nurses. One of the nurses stationed at Camp Callan was of Polynesian royal heritage. She also was a 5th generation descendant of Fletcher Christian, the leader of the famed mutiny on the *Bounty* in the South Pacific in 1789.

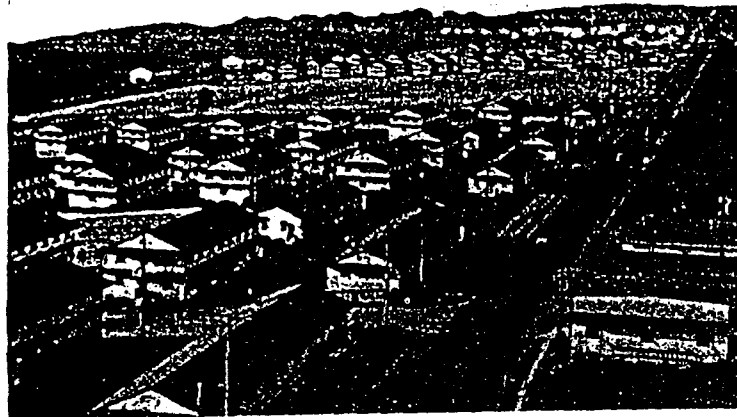
In order to ready soldiers for war, there also were other training facilities. General physical conditioning was accomplished by traditional obstacle layouts and Hell's Acres, a natural obstacle course in one of the canyons on camp property. Physical conditioning also involved overnight bivouacs to locations 50 miles away, desert marches and day hikes through such rugged terrains as the later Torrey Pines State Reserve.

For orientation of new recruits, each battalion held "county fairs." Unlike the traditional county fair, the Army version sought to teach various aspects of military life and consisted of exhibits and live demonstrations set up around a parade ground. Exhibits taught such things as the Articles of War, how to pitch a tent, how to make a bed and arrange a footlocker, how to pack field equipment, the identification of aircraft and the camouflaging of weapons.

Ranges existed for training with everything from hand-held guns to the larger anti-aircraft artillery. These included a 1,000-inch range and a 200-yard rifle range, a pistol range, an automatic weapons range, and a 3-inch anti-aircraft gun range. In addition, the men trained with guns of 155-mm, 90-mm, 75-mm, and 40-mm caliber. Other aspects of warfare also were taught. An infiltration course was used to teach trainees how to advance on enemy positions while under fire. "Little Tokyo," a mock Japanese village, was used



90mm guns with training crews.



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to teach about booby traps and land mines and training was provided in chemical warfare and camouflage techniques. An Enlisted Specialists School prepared qualified men for future work as cadres for new units, further study at advanced schools, or to serve as replacements for established units.

Leisure time facilities were not overlooked. There was a Camp Callan

Sketch Club and a Radio Hour broadcast from a local radio station. A 40-piece band played at reviews, infantry drills and presented special concerts. For those with a literary bent, there was a weekly newspaper called *The Range Finder* and an annual pictorial review called *The Callander* (originally *The Oozlefinch* when the camp was coast artillery). The athletic office organized teams for baseball, basketball, bowling, boxing and softball. Trainees could also participate in sporting events held at nearby country clubs, USOs, and YMCAs. Other facilities maintained high morale. There were three 357-seat chapels for Catholic, Jewish or Protestant services. A guest house was available for family members of the men to stay for a few days at a time. With its social hall, cafeteria, and library, the service club was utilized for musicales, art shows, letter writing, dances, classes, conferences and band concerts. The officers had their own recreational facilities in the officers' club.

The camp boasted a large, outdoor theatre and two indoor theatres. The 5,000-seat outdoor theatre provided the stage setting for such visiting performers as Bob Hope, Jack Benny, Buddy Hayes, Kay Kyser, Rudy Valee, Skitch Henderson, Marlene Dietrich and Carole Landis. The outdoor theatre was also used as a regulation boxing ring. The two indoor theatres provided entertainment with current movies, one of which, *Guadacanal Diary*, was watched with special interest by the men of Battery B of the 56th Battalion: they had participated in its filming. Their part was to depict the Army relieving tired Marines who had made the initial landing at Guadacanal weeks before. Starring William Bendix, Lloyd Nolan and Anthony Quinn, the actual filming took place at Camp Pendleton Marine Base near Oceanside, California.

All of the foregoing about Camp Callan are only impersonal statistics unless one takes into consideration the feelings of the men whose lives were briefly affected by this training center. Based on other accounts of Camp Callan and 17 interviews (both in person and by mail) with former trainees and officers, one finds that there was generally a very positive regard toward the camp. This is best exemplified by statements such as: (1) It was the West Point of California; (2) If one had to be anywhere during the war, Camp Callan was the place to be; (3) I almost cried when I left; (4) The discipline I received there helped me to become a success later on in life and (5) I enjoyed my training at Callan so much that I decided to make the Army my career.

During June, 1944 the training emphasis at Camp Callan was again to change. The anti-aircraft cadres were transferred to Fort Bliss, Texas and the camp became an important link in preparations for massive overseas amphibious assaults. The need for such training was to be short lived. By May 8, 1945 (VE Day) the war was over in Europe and by August 15, 1945, (VJ Day) the Japanese had surrendered.

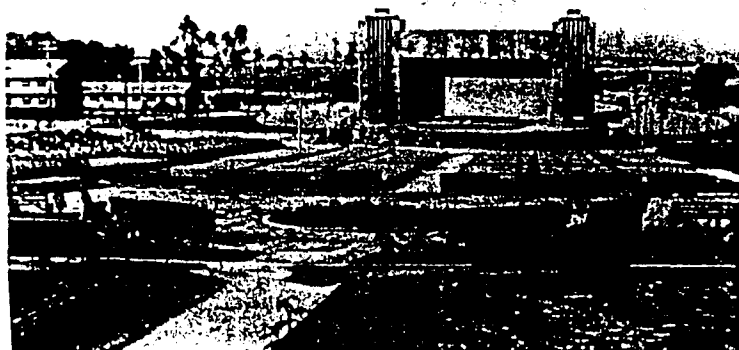
On November 1, 1945, Camp Callan was declared surplus. But its usefulness to the American people wasn't quite over yet, at least not at the local level. At the time Camp Callan closed, there was a serious shortage of lumber and building material in Southern California. In order to mitigate the problem for the many veterans who chose to stay in San Diego, the City Coun-

cil started negotiations with the War Department to acquire all the buildings and facilities of the Camp. The selling price was \$200,000. These items were then resold to veterans and other citizens at reasonable prices. From the 500 buildings that existed when Camp Callan closed, the following items were salvaged: (1) 15 million board feet of lumber that would become 1,500 new homes; (2) 50 small buildings that were hauled away intact to become dwellings; (3) enough building material to remodel or improve several thousand homes; (4) three chapels that were dismantled, moved and then rebuilt; (5) transformers, power poles, and transmission lines that were bought for reuse by a local utility company, and (6) toasters, dishwashers and other items sold to a local hospital. From all this, not only did the city recoup its \$200,000, but made a \$250,000 profit. Part of this money went to build the Veteran's War Memorial Building in San Diego's 1,074-acre Balboa Park.

Although the buildings had been demolished, portions of Camp Callan's roadways were kept intact. In the early 50s, the area played host to the Torrey Pines Road Race, sponsored by the California Sports Car Club and the San Diego Junior Chamber of Commerce.

By the 1980's what was once a proud and vital training camp is barely recognizable as such. Joggers run through it, students from the nearby university wander over the campsite on study breaks (I was one of those six years ago), pet owners walk their dogs through it and some teenage boys even use the side of one large foundation to practice skateboard tricks on. Few seem to realize what the area once was. All that now remains is a section of crumbling foundations and weed-filled parade grounds. The rest of what was once Camp Callan is now the site of variety of developments. These include a small, southern section of Torrey Pines State Reserve, a golf course, business and scientific research facilities, a glider port, part of a campus of the University of California at San Diego, and a residential area.

Camp Callan's fairly lush outdoor theatre; it presented entertainment by Hollywood's luminaries of the period. U.S. Army photograph.



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ORDNANCE AND EXPLOSIVE
ARCHIVES SEARCH REPORT
FOR
BORREGO MANEUVER AREA
BORREGO SPRINGS, CALIFORNIA
PROJECT NUMBER J09CA701101

APPENDIX I

INTERVIEWS

APPENDIX I

INTERVIEWS

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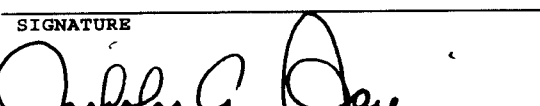
NAME OF PERSON CONTACTED SGT Conrad Grayson	ORGANIZATION San Diego County Sheriff's Dept. 5255 Mt. Etna Drive San Diego, CA 92117	TELEPHONE NO. (619) 467-4579
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SUBJECT OE on or Originating from The Former Borrego Hotel Site (Target Area and Emergency Landing Field) and Borrego Maneuver Area

SUMMARY At the above specified time and date, SGT Grayson, of the Arson/Explosives unit of the above specified organization, was interviewed concerning his knowledge of ordnance or explosives reported or discovered on the former Borrego Hotel Site (Bombing Target and Emergency Landing Field) and Former Borrego Manuever Area. SGT Grayson began the interview by stating that he has been with the Sheriff's Department Arson/Explosives Unit for 20 years, and is the chairman of all Military/Civilian Explosive Ordnance Disposal (EOD) activity in the County. His organization is notified of all ordnance/explosive incidents in San Diego County. His organization also supported Imperial County until three years ago. SGT Grayson was not aware of a range or an ordnance/explosives presence at the location of the former Borrego Hotel Site. SGT Grayson was aware of ordnance activity in the Anza Borrego State Park (a portion of which the former Maneuver Area was located) and in the Chocolate Mountains. SGT Grayson's organization specializes in the render safe of Improvised Explosive Devices (Pipe Bombs, etc.) and calls the 70th Ordnance Company (EOD) to respond to military ordnance calls in general, so he is not aware of the location of actual ranges/former ranges in that area. SGT Grayson is aware of the presence of a lot of 2.75 inch rockets in that region. SGT Grayson also stated that most of the military ordnance discovered in that region is the result of ordnance removed/pilfered from ranges in the Anza-Borrego Park and the Chocolate Mountains and left by the roadside. SGT Grayson suggested that the 70th EOD be contacted to determine ordnance types and range locations of

ACTION REQUIRED

None

NAME OF PERSON DOCUMENTING COVERSATION Nicholas A. Iaiennaro	ORGANIZATION CENCR-ED-DO	TELEPHONE NUMBER (309) 794-6056
SIGNATURE 	TITLE Health & Safety Specialist (UXO)	DATE 22 January 97

that region. SGT Grayson, in conclusion, stated that he is not aware of any incidents/accidents resulting from ordnance remaining on/removed from the subject sites.

CONVERSATION RECORD	TIME 1115	DATE 22 January 1997
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TYPE	<input checked="" type="checkbox"/> VISIT	<input type="checkbox"/> CONFERENCE	<input type="checkbox"/> TELEPHONE
			<input type="checkbox"/> INCOMING
			<input type="checkbox"/> OUTGOING

NAME OF PERSON CONTACTED SFC Rodriguez SSG Wilson SSG Thompson SPC Knowles	ORGANIZATION 70 th Ord Co (EOD) Navy Sub Base, P.O. Box 6376 San Diego, CA 92166	TELEPHONE NO. (619) 553-8500
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SUBJECT OE on or Originating from The Former Borrego Hotel Site (Target Area and Emergency Landing Field) and Borrego Maneuver Area

SUMMARY
At the above specified time and date, the above specified individuals were interviewed concerning their knowledge of ordnance or explosives reported or discovered on the former Borrego Hotel Site (Bombing Target and Emergency Landing Field) and former Borrego Maneuver Area. All incident reports, journals, and activity report files of the organization (dating from 1992 to present) were surveyed to determine incident response to the subject sites. Several incident responses occurred in the Anza-Borrego Desert State Park region. None of the incidents occurred at or near the former Borrego Hotel Site, nor was any of the interviewed parties aware of a former bombing target at that location. Two incidents (11 March 1994 and 29 December 1996) occurred near/in the former Maneuver Area. One Incident occurred in the Palo Verde Wash Area of the Desert State Park. The Incident item discovered/destroyed was aa 40MM MK1 WWII High Explosive Projectile. The second incident occurred in the Borrego (Military) Wash area. Incident items discovered and destroyed were two 5" High Explosive Rockets. This area is a separate former Naval Bombing Target located within (but not associated with) the former Army Borrego Maneuver Area. All other incident responses involved response to the Carrizo Impact Area, which is part of the Anza-Borrego State Park but not associated or near aforementioned project areas. The interviewed parties, in conclusion, stated that they are not
(continued on next page)

ACTION REQUIRED
None

NAME OF PERSON DOCUMENTING COVERSATION Nicholas A. Iaiennaro	ORGANIZATION CENCR-ED-DO	TELEPHONE NUMBER (309) 794-6056
SIGNATURE 	TITLE Health & Safety Specialist (UXO)	DATE 22 January 97

aware of any incidents/accidents resulting from ordnance remaining on/removed from the subject sites or other sites in the area. In addition they have not found evidence of or heard rumor of CWM training or activities in the area.

CONVERSATION RECORD	TIME 0700/0800	DATE 27 Jan/4 Mar 1997
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TYPE		
<input checked="" type="checkbox"/> VISIT	<input checked="" type="checkbox"/> CONFERENCE	<input checked="" type="checkbox"/> TELEPHONE
		<input type="checkbox"/> INCOMING
		<input checked="" type="checkbox"/> OUTGOING

NAME OF PERSON CONTACTED Investigator Steve Sawyer	ORGANIZATION Borrego Springs Fire Department 2324 Stirrup Road Borrego Springs, CA 92004	TELEPHONE NO. (619) 767-5436
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SUBJECT OE on or Originating from The Former Borrego Hotel Site (Target Area and Emergency Landing Field) and Borrego Maneuver Area

SUMMARY
 At the above specified time and date, Investigator Sawyer of the Arson/Bomb unit of the above specified organization, was interviewed concerning his knowledge of ordnance or explosives reported or discovered on the former Borrego Hotel Site (Bombing Target and Emergency Landing Field) and Former Borrego Maneuver Area. Investigator Sawyer began the interview by stating that he has been with the Borrego Springs Fire Department Arson/Bomb Unit for 14 years, but has visited the Borrego Springs area for the past 19 years. His organization is normally called for assistance for all ordnance/explosive incidents in the Borrego Springs/Park vicinity. Investigator Sawyer was not aware of a target area or an ordnance/explosives presence at the location of the former Borrego Hotel Site. Investigator Sawyer was aware of ordnance ranges/activity in the Anza Borrego State Park. Investigator Sawyer stated that there were former ranges/impact areas at the Clarks Dry Lake and Military Wash Area of the Park (these areas were Naval bombing/strafing ranges/targets located within, but not associated with, the former maneuver area). Two 5" high explosive rockets were discovered in/around the Military Wash area on 29 December 1996 and destroyed by the Army Explosive Ordnance Disposal personnel (70th Ord Co) at his request. Other items commonly found in the Military Wash area are 3 pound MK 23 practice
 (continued on separate page)

ACTION REQUIRED
None

NAME OF PERSON DOCUMENTING COVERSATION Nicholas A. Iaiennaro	ORGANIZATION CENCR-ED-DO	TELEPHONE NUMBER (309) 794-6056
SIGNATURE 	TITLE Health & Safety Specialist (UXO)	DATE 22 January 97

bombs devoid of spotting charges, .50 caliber bullets, and 20mm projectiles. MK 23 3 pound practice bombs have also been discovered (devoid of spotting charges) in town (Borrego Springs) by a local Realtor (Ted Townsend) and in the vicinity of Fonts Point (northeast, one practice bomb) by paleontologists. Other military improvements located at the former Clarks Dry Lake and Military Wash ranges are Rake Stations. Investigator Sawyer has also discovered what are believed to be inert target practice rockets in the vicinity of Borrego Wash around the area where it merges with San Felipe Wash. Investigator Sawyer also hikes and explores as a hobby. During the week of 2-7 March 1997, Investigator Sawyer hiked/explored the west butte of Borrego Mountain and the Short Wash area (to include an approximate 2 Kilometer area radius surrounding the Short Wash location) of the Anza Borrego State Park in an effort to determine if an ordnance problem existed which would present a hazard to park visitors . No OE items were discovered during the course of this expedition. In conclusion, Investigator Sawyer stated that he is not aware of any incidents/accidents resulting from ordnance remaining on or removed from the subject sites. In addition he has not found evidence of or heard rumor of CWM training or activities in the area.

CONVERSATION RECORD	TIME 0930	DATE 27 January 1997
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TYPE		
<input checked="" type="checkbox"/> VISIT	<input type="checkbox"/> CONFERENCE	<input type="checkbox"/> TELEPHONE
		<input type="checkbox"/> INCOMING
		<input type="checkbox"/> OUTGOING

NAME OF PERSON CONTACTED Deputy Charles K. Hahn	ORGANIZATION San Diego County Sheriff's Dept. Rural Enforcement Div. 610 Palm Canyon Drive Borrego Springs, CA 92004	TELEPHONE NO. (619) 767-5656
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SUBJECT OE on or Originating from The Former Borrego Hotel Site (Target Area and Emergency Landing Field) and Borrego Maneuver Area

SUMMARY
At the above specified time and date, Deputy Hahn, of the above specified organization, was interviewed concerning his knowledge of an ordnance or explosives presence reported or discovered on the former Borrego Hotel Site (Bombing Target and Emergency Landing Field) and Former Borrego Maneuver Area. Deputy Hahn began the interview by stating that he has been with the Sheriff's Department for 6 years working in the Borrego Springs/Ocotillo area. Deputy Hahn was not aware of a target area or an ordnance/explosives presence at the location of the former Borrego Hotel Site. The only ordnance related discovery that he is aware of associated with the former Borrego Maneuver Area was the discovery of a MK23 3 pound practice bomb in the military wash area 3-4 years ago. (this area was a Naval bombing/strafing range/target area located within, but not associated with, the former Army maneuver area). Deputy Hahn also believes that their are trees that were fired upon by the military in the Five Palms Spring area of the former maneuver area. In conclusion, Deputy Hahn stated that he is not aware of any incidents or accidents resulting from ordnance remaining on or removed from the subject sites. Also, he has not found evidence of or heard rumor of CWM training or activities in the area.

ACTION REQUIRED
None

NAME OF PERSON DOCUMENTING CONVERSATION Nicholas A. Iaiennaro	ORGANIZATION CENCR-ED-DO	TELEPHONE NUMBER (309) 794-6056
SIGNATURE 	TITLE Health & Safety Specialist (UXO)	DATE 22 January 97

CONVERSATION RECORD	TIME 0930	DATE 27 January 1997
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TYPE

VISIT CONFERENCE

TELEPHONE
INCOMING
OUTGOING


NAME OF PERSON CONTACTED Nancy Ellis	ORGANIZATION 601 Anchor Drive Borrego Springs, CA 92004	TELEPHONE NO. (619) 767-3010
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SUBJECT OE on or Originating from The Former Borrego Hotel Site (Target Area and Emergency Landing Field) and Borrego Maneuver Area

SUMMARY

At the above specified time and date, Ms. Ellis, a lifetime local resident of the Borrego Springs Area, was interviewed concerning her knowledge of an ordnance or explosives presence reported or discovered on the former Borrego Hotel Site (Bombing Target and Emergency Landing Field) and Former Borrego Maneuver Area. Ms. Ellis began the interview by stating that she was not aware of a target area or an ordnance/explosives presence at the location of the former Borrego Hotel Site. She was familiar, however, with military activity in the former Borrego Maneuver area from 1935-1948 when she lived in a homestead with her family 1 mile north of Clarks Dry Lake. She stated that the Clark's Dry Lake area was used for bombing and strafing activity from approximately 1940 until the end of the war in 1945 (this area was a Naval bombing/strafing range/target area located within, but not associated with, the former Army maneuver area). Ms. Ellis stated that planes dropped bombs at low altitude, bombing from east to west, at white rock round target circles. Also present in the area were rake (observation) stations. Planes also strafed the target area, with small arms ammunition. She recalls seeing small practice bombs and .50 caliber ammunition in the area following range usage. Ms. Ellis recalled an incident where her homestead was accidentally strafed by small arms ammunition. Her father lodged a serious complaint following the incident with local military authorities. Ms. Ellis also recalls seeing tank tracks in the vicinity of her old

ACTION REQUIRED
None

NAME OF PERSON DOCUMENTING COVERSATION Nicholas A. Iaiennaro	ORGANIZATION CENCR-ED-DO	TELEPHONE NUMBER (309) 794-6056
SIGNATURE 	TITLE Health & Safety Specialist (UXO)	DATE 27 January 97

homestead during that period, but never actually encountered tanks or troops maneuvering in the area. Ms. Ellis stated that she is not aware of any incidents/accidents resulting from ordnance remaining on or removed from the subject sites. In addition she has never observed or heard rumor of CWM training or activities in the area or artillery soldiers, guns, or positions in the area. In conclusion, Ms. Ellis stated that her brother, David Rock, may have additional knowledge of activities during that period. In addition, she stated that although selling a good portion of family acreage to the State for additional park land, she still owns a 40 acre parcel of land west of Clark's Dry Lake.

CONVERSATION RECORD	TIME 1045	DATE 27 January 1997
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TYPE

VISIT CONFERENCE

TELEPHONE
 INCOMING
 OUTGOING

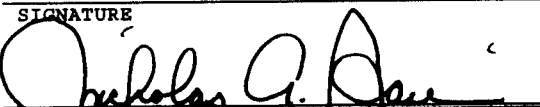
NAME OF PERSON CONTACTED Fred Jee	ORGANIZATION California Park Service Anza-Borrego State Park 200 Palm Canyon Dr. Borrego Springs, CA 92004	TELEPHONE NO. (619) 767-5311
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SUBJECT OE on or Originating from The Former Borrego Hotel Site (Target Area and Emergency Landing Field) and Borrego Maneuver Area

SUMMARY

At the above specified time and date, Mr. Jee was interviewed concerning his knowledge of an ordnance or explosives presence reported or discovered on the former Borrego Hotel Site (Bombing Target and Emergency Landing Field) and Former Borrego Maneuver Area. Mr. Jee began the interview by stating that he is the Supervising Park Ranger for the California Park Service at the Anza Borrego Desert State Park. He began employment as a Ranger in that area in 1975. Mr. Jee was not aware of a target area or an ordnance/explosives presence at the location of the former Borrego Hotel Site. He was familiar, however, with evidence of former military activity in the former Borrego Maneuver area, due to the fact that he has patrolled a good portion of that area. Mr. Jee stated that there were former ranges/impact areas at the Clarks Dry Lake and Military Wash Area of the Park (these areas were Naval bombing/strafing ranges/targets located within, but not associated with, the former Army Maneuver Area). Ordnance items can still be found in these areas. The only other evidence of prior military use in the park consists of a fallen metallic platform once supported by telephone poles (located in Fault Wash, believed to have been an observation post for Military Wash) and rake stations at the aforementioned Navy Clark's (continued in next page)

ACTION REQUIRED
None

NAME OF PERSON DOCUMENTING COVERSATION Nicholas A. Iaiennaro	ORGANIZATION CENCR-ED-DO	TELEPHONE NUMBER (309) 794-6056
SIGNATURE 	TITLE Health & Safety Specialist (UXO)	DATE 22 January 97

Dry Lake and Military Wash locations. Mr. Jee stated that the only incident/accident resulting from a remaining ordnance presence, to his knowledge, occurred in 1959 in the Carrizo Impact area (not associated with the Maneuver Area). Two individuals were apparently killed when trying to remove ordnance scrap from that area. Mr. Jee stated that park records for the period of military occupation of the area do not exist, they were destroyed long ago. A minimal park personnel presence existed during the military occupation period, so park records were probably few or non-existent for that period anyway. Mr. Jee stated that there are several Archeological/Palaentological sites located within the former maneuver area in the form of village sites, tool construction sites, and sleeping circles (to name a few). In conclusion, Mr. Jee has never heard rumor of CWM training or activities in the area.

CONVERSATION RECORD	TIME 1045	DATE 27 January 1997
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TYPE

VISIT CONFERENCE

TELEPHONE
 INCOMING
 OUTGOING

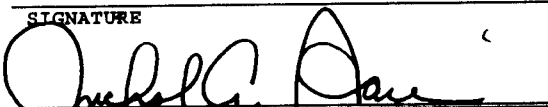
NAME OF PERSON CONTACTED Mark Jorgensen	ORGANIZATION California Park Service Anza-Borrego State Park 200 Palm Canyon Dr. Borrego Springs, CA 92004	TELEPHONE NO. (619) 767-5311
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SUBJECT OE on or Originating from The Former Borrego Hotel Site (Target Area and Emergency Landing Field) and Borrego Maneuver Area

SUMMARY

At the above specified time and date, Mr. Jorgensen was interviewed concerning his knowledge of an ordnance or explosives presence reported or discovered on the former Borrego Hotel Site (Bombing Target and Emergency Landing Field) and Former Borrego Maneuver Area. Mr. Jorgensen began the interview by stating that he is a Park Ranger and Ecologist for the California Park Service at the Anza-Borrego Desert State Park. He began employment as a Ranger in that area in 1972, but began playing in and exploring the area in 1963. Mr. Jorgensen was not aware of a target area or an ordnance/explosives presence at the location of the former Borrego Hotel Site. He was familiar, however, with evidence of former military activity in the former Borrego Maneuver area. Mr. Jorgensen remembers the discovery of what was believed to be 155MM shot rounds in 1969 around the Yaqui Pass. Also, a case of dynamite was discovered in the vicinity of Clark's Dry Lake around 1970. Mr. Jorgensen recalled the stories of an old Park Ranger, Chuck Gatti (deceased) who stated that artillery emplacements were once present in the Borrego Sink area with a firing destination northward believed to be towards Clark's Dry Lake. Mr. Gatti also had stated that schrapnel could be found all over the badlands. Mr. Jorgensen also stated that another oldtimer,
(continued on next page)

ACTION REQUIRED
None

NAME OF PERSON DOCUMENTING COVERSATION Nicholas A. Iaiennaro	ORGANIZATION CENCR-ED-DO	TELEPHONE NUMBER (309) 794-6056
SIGNATURE 	TITLE Health & Safety Specialist (UXO)	DATE 27 January 97

Merle Beckman, once told him that strafing occurred into the 1950's at the Military Wash Area. Footlockers were placed in line at that location for strafing fire (this area was a Naval bombing/strafing range/target area located within, but not associated with, the former Army maneuver area). Mr. Jorgensen stated that he is not aware of any incidents/accidents resulting from ordnance remaining on or removed from the subject sites. In addition he has never heard rumor of CWM training or activities in the area.

CONVERSATION RECORD	TIME 1200	DATE 30 January 1997
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TYPE

VISIT

CONFERENCE

TELEPHONE
INCOMING
OUTGOING

NAME OF PERSON CONTACTED Kenneth A. Smith	ORGANIZATION P.O Box 252 Borrego Springs, CA 92004	TELEPHONE NO. (619) 767-3303
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SUBJECT OE on or Originating from The Former Borrego Hotel Site (Target Area and Emergency Landing Field) and Borrego Maneuver Area

SUMMARY

At the above specified time and date, Mr. Smith was interviewed concerning his knowledge of an ordnance or explosives presence reported or discovered on the former Borrego Hotel Site (Bombing Target and Emergency Landing Field) and Former Borrego Maneuver Area. Mr. Smith began the interview by stating that he was a Park Ranger for the California Park Service at the Anza Borrego Desert State Park from 78-91. Mr. Smith was not aware of a target area or an ordnance/explosives presence at the location of the former Borrego Hotel Site. He was familiar, however, with evidence of former military activity in the former Borrego Maneuver area. Mr. Smith remembers the discovery of what was believed to be a High Explosive bomb in the 17 Palms area at an unknown date. Also, military explosives were found in the vicinity of the Military Wash area at an unknown date (this area was a Naval bombing/strafing range/target area located within, but not associated with, the former Army maneuver area). Mr. Smith stated that he is not aware of any incidents/accidents resulting from ordnance remaining on or removed from the subject sites. In addition he has never heard rumor of actual CWM training or activities in the area.

ACTION REQUIRED

None

NAME OF PERSON DOCUMENTING COVERSATION Nicholas A. Iaiennaro	ORGANIZATION CENCR-ED-DO	TELEPHONE NUMBER (309) 794-6056
SIGNATURE 	TITLE Health & Safety Specialist (UXO)	DATE 30 January 97

CONVERSATION RECORD	TIME 1126	DATE 30 January 1997
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TYPE

VISIT CONFERENCE

TELEPHONE
 INCOMING
 OUTGOING

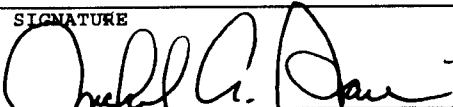
NAME OF PERSON CONTACTED Manford Knack	ORGANIZATION California Park Service Anza-Borrego State Park 200 Palm Canyon Dr. Borrego Springs, CA 92004	TELEPHONE NO. (619) 767-5311
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SUBJECT OE on or Originating from The Former Borrego Hotel Site (Target Area and Emergency Landing Field) and Borrego Maneuver Area

SUMMARY

At the above specified time and date, Mr. Knack was interviewed concerning his knowledge of an ordnance or explosives presence reported or discovered on the former Borrego Hotel Site (Bombing Target and Emergency Landing Field) and Former Borrego Maneuver Area. Mr. Knack began the interview by stating that he has been an Archaeologist for the California Park Service since 1972, assigned to the Anza Borrego Desert State Park. Mr. Knack was not aware of a target area or an ordnance/explosives presence at the location of the former Borrego Hotel Site. He was familiar, however, with evidence of former military activity in the former Borrego Maneuver area. Mr. Knack knows of the presence of ordnance in the Military Wash area (this area was a Naval bombing/strafing range/target area located within, but not associated with, the former Army Maneuver Area). Mr. Knack has discovered military communications wire in the Yaqui pass area. Mr. Knack also has discovered evidence of former military activity in the Coyote Canyon, Rock House Canyon, and Font's Point areas, none of which was ordnance related.

ACTION REQUIRED
None

NAME OF PERSON DOCUMENTING CONVERSATION Nicholas A. Iaiennaro	ORGANIZATION CENCR-ED-DO	TELEPHONE NUMBER (309) 794-6056
SIGNATURE 	TITLE Health & Safety Specialist (UXO)	DATE 30 January 97

CONVERSATION RECORD	TIME 1845/0900	DATE 27/30 Jan 1997
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TYPE

VISIT CONFERENCE


TELEPHONE
 INCOMING
 OUTGOING

NAME OF PERSON CONTACTED David Ragsdill	ORGANIZATION P.O. Box 143 Borrego Springs, CA 92004	TELEPHONE NO. (619) 767-0304
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SUBJECT OE on or Originating from The Former Borrego Hotel Site (Target Area and Emergency Landing Field) and Borrego Maneuver Area

SUMMARY At the above specified time and date, Mr. Ragsdill was interviewed concerning his knowledge of an ordnance or explosives presence reported or discovered on the former Borrego Hotel Site (Bombing Target and Emergency Landing Field) and Former Borrego Maneuver Area. Mr. Ragsdill began the interview by stating that he is has been a local resident for 6 years with an interest in military and Anza-Borrego Park history. In addition, Mr. Ragsdill is an Engineer representing a company engaged in hot well boring activities in the area. Mr. Ragsdill was not aware of a target area or an ordnance/explosives presence at the location of the former Borrego Hotel Site. He was familiar, however, with evidence of former military activity in the former Borrego Maneuver area. Mr. Ragsdill knows of the presence of ordnance, rake stations, a concentric circle target, and plane crash debris in the Clarks Dry Lake area (located within, but not associated with, the former Army maneuver area). Mr. Ragsdill stated that an old timer (Mr. Duvall) once told him that artillery fire occurred from Rams Hill towards Borrego Sink, that tanks maneuvered through Borrego, and that tank fire occurred from Camp Ensign eastward. Mr. Ragsdill also stated that he has heard that tanks maneuvered in the Little Clark's Lake area and in the foothill's of the Santa Rosa's. Mr. Ragsdill stated that he once located bomb fragments, buried vehicles, and a surface shot-up vehicle near Rock House Canyon Road. Mr. Ragsdill escorted the site inspection team to this area, but failed to re-locate the stated items. In conclusion, Mr. Ragsdill stated that he is not aware of any incidents or accidents
(continued on next page)

ACTION REQUIRED None

NAME OF PERSON DOCUMENTING COVERSATION Nicholas A. Iaiennaro	ORGANIZATION CENCR-ED-DO	TELEPHONE NUMBER (309) 794-6056
SIGNATURE 	TITLE Health & Safety Specialist (UXO)	DATE 30 January 97

resulting from ordnance remaining on or removed from the subject sites. In addition he has never heard rumor of actual CWM training or activities in the area.

CONVERSATION RECORD	TIME 1115	DATE 14 February 1997
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TYPE

VISIT CONFERENCE

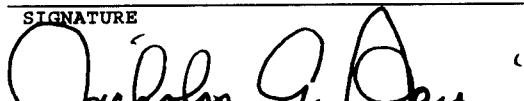
<input checked="" type="checkbox"/>	TELEPHONE
	INCOMING
<input checked="" type="checkbox"/>	OUTGOING

NAME OF PERSON CONTACTED Jim Meiers	ORGANIZATION California Park Service Anza-Borrego State Park 200 Palm Canyon Dr. Borrego Springs, CA 92004	TELEPHONE NO. (619) 767-5311
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SUBJECT OE on or Originating from The Former Borrego Hotel Site (Target Area and Emergency Landing Field) and Borrego Maneuver Area

SUMMARY At the above specified time and date, Mr. Meiers was interviewed concerning his knowledge of an ordnance or explosives presence reported or discovered on the former Borrego Hotel Site (Bombing Target and Emergency Landing Field) and Former Borrego Maneuver Area. Mr. Meiers began the interview by stating that he has been a Ranger for the California Park Service since 1980, assigned to the Anza Borrego Desert State Park. Mr. Meiers was not aware of a target area or an ordnance/explosives presence at the location of the former Borrego Hotel Site. He was familiar, however, with evidence of former military activity in the former Borrego Maneuver area. Mr. Meiers current patrol area covers a good portion of the former maneuver area, where he often takes visitors on guided tours. Mr. Meiers knows of an ordnance presence in the Military Wash and Clarks Dry Lake area (these areas were Naval bombing and strafing ranges/target areas located within, but not associated with, the former Army maneuver area). Mr. Meiers has also discovered 40mm projectiles in the Palo Verde Wash areas and the 17 Palms area. The Palo Verde Wash 40mm was reported to authorities and destroyed by Army Explosive Ordnance disposal personnel on 11 March 1994. This was a 40mm high explosive round and the actual location was at the

ACTION REQUIRED
None

NAME OF PERSON DOCUMENTING COVERSATION Nicholas A. Iaiennaro	ORGANIZATION CENCR-ED-DO	TELEPHONE NUMBER (309) 794-6056
SIGNATURE 	TITLE Health & Safety Specialist (UXO)	DATE 14 February 97

intersection of Palo Verde Wash and Short Wash. The other 40mm projectile is located 1 to 1.5 miles west of the 17 Palms area. Mr. Meiers believes that he would be unable to pinpoint the exact location of the projectile for destruction. In conclusion, Mr. Meiers stated that he is not aware of any incidents or accidents resulting from ordnance remaining on or removed from the subject property. Also, he has never heard rumor of CWM training or activities.

CONVERSATION RECORD	TIME 0800	DATE 13 February 1997
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TYPE

VISIT

CONFERENCE

<input checked="" type="checkbox"/>	TELEPHONE
	INCOMING
<input checked="" type="checkbox"/>	OUTGOING

NAME OF PERSON CONTACTED Bruce Tinknell	ORGANIZATION 8786 Betelgeufe Way San Diego, CA 92126	TELEPHONE NO. (619) 578-9901
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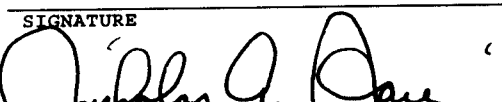
SUBJECT OE on or Originating from The Former Borrego Hotel Site (Target Area and Emergency Landing Field) and Borrego Maneuver Area

SUMMARY At the above specified time and date, Mr. Tinknell was interviewed concerning his knowledge of an ordnance or explosives presence reported or discovered on the former Borrego Hotel Site (Bombing Target and Emergency Landing Field) and Former Borrego Maneuver Area. Mr. Tinknell began the interview by stating that he is a retired Army Explosive Ordnance Disposal (EOD) Technician who had been stationed with the 70th Ord Det (EOD) in San Diego from 1975-1987. The 70th's area of responsibility included the project areas. Mr. Tinknell was not aware of a target area or an ordnance/explosives presence at the location of the former Borrego Hotel Site. He was familiar, however, with evidence of former ordnance activity in the former Borrego Maneuver area. Mr. Tinknell stated that he responded to an incident involving the discovery of three 100 pound photoflash bombs in the Military Wash portion of the maneuver area. He could not recall the date of the incident, but he did recall that the bombs were destroyed. Mr. Tinknell responded to the military wash area on another unknown date after the discovery of a 5" rocket, believed to have been of the high explosive variety. Explosive disruption of this item revealed that it was a wax filled practice rocket. Mr. Tinknell stated that additional responses to the Anza Borrego region were numerous, items often appeared after rain moved through washes, but most of the activity was believed to have been attributed to operations in the

(continued on next page)

ACTION REQUIRED

None

NAME OF PERSON DOCUMENTING COVERSATION Nicholas A. Iaiennaro	ORGANIZATION CENCR-ED-DO	TELEPHONE NUMBER (309) 794-6056
SIGNATURE 	TITLE Health & Safety Specialist (UXO)	DATE 13 February 97

Carrizo Impact area, south of the subject sites. In conclusion, Mr. Tinknell stated that he is not aware of any incidents or accidents resulting from ordnance remaining on or removed from the subject property. Also, he has never heard rumor of actual CWM training or activities in the area.

CONVERSATION RECORD	TIME 1030	DATE 17 February 1997
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TYPE

VISIT CONFERENCE

<input checked="" type="checkbox"/>	TELEPHONE
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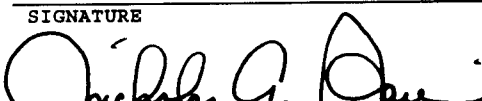
NAME OF PERSON CONTACTED Deputy Jim McKenna	ORGANIZATION San Diego County Sheriff's Dept. Rural Enforcement Division 610 Palm Canyon Dr. Borrego Springs, CA 92004	TELEPHONE NO. (619) 767-5656
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SUBJECT OE on or Originating from The Former Borrego Hotel Site (Target Area and Emergency Landing Field) and Borrego Maneuver Area

SUMMARY

At the above specified time and date, Deputy McKenna, of the above specified organization, was interviewed concerning his knowledge of an ordnance or explosives presence reported or discovered on the former Borrego Hotel Site (Bombing Target and Emergency Landing Field) and Former Borrego Maneuver Area. Deputy McKenna began the interview by stating that he has been with the Sheriff's Department for 17 years working in the Borrego Springs/Ocotillo area. Deputy McKenna stated that in his seventeen years in the area, he has only received 2-3 ordnance related calls which were associated with ordnance discovered in the Carrizo Impact area, located south of the subject sites. In conclusion, Deputy McKenna stated that he is not aware of any incidents/accidents resulting from ordnance remaining on or removed from the subject sites. In addition he has not found evidence of or heard rumor of CWM training or activities in the area.

ACTION REQUIRED
None

NAME OF PERSON DOCUMENTING COVERSATION Nicholas A. Iaiennaro	ORGANIZATION CENCR-ED-DO	TELEPHONE NUMBER (309) 794-6056
SIGNATURE 	TITLE Health & Safety Specialist (UXO)	DATE 17 February 97

CONVERSATION RECORD	TIME 1200	DATE 17 February 1997
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TYPE

VISIT

CONFERENCE

<input checked="" type="checkbox"/>	TELEPHONE
	INCOMING
<input checked="" type="checkbox"/>	OUTGOING

NAME OF PERSON CONTACTED David Rock	ORGANIZATION 1317 North V Street Lampoc, CA 93436	TELEPHONE NO. (805) 735-4864
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SUBJECT OE on or Originating from The Former Borrego Hotel Site (Target Area and Emergency Landing Field) and Borrego Maneuver Area

SUMMARY

At the above specified time and date, Mr. Rock was interviewed concerning his knowledge of an ordnance or explosives presence reported or discovered on the former Borrego Hotel Site (Bombing Target and Emergency Landing Field) and Former Borrego Maneuver Area. Mr. Rock began the interview by stating that he was not aware of a target area or an ordnance/explosives presence at the location of the former Borrego Hotel Site. He was familiar, however, with military activity in the former Borrego Maneuver area during WWII activity, where he lived in a homestead with his family 1 mile north of Clarks Dry Lake. Mr. Rock began the interview by stating that he lived in the Clark's Dry Lake area from the mid 1930's until the late 1940's on property that his father had homesteaded. During the period of 1940-1944, the family did not actually live on the property but visited there most weekends. Mr. Rock stated that Navy Corsairs often bombed and strafed a concentric circle stone target on Clark's Dry Lake (this area was a Naval bombing/strafing range/target area located within, but not associated with, the former Army maneuver area). The ordnance fired/dropped from these aircraft consisted of .30 and .50 caliber ammunition and 3 pound practice bombs containing a spotting charge resembling a 10 gauge shotgun shell. Mr. Rock stated that he could actually watch the ordnance activity from their property. The planes would sometimes come in from the southeast and dive bomb and
(continued on next page)

ACTION REQUIRED

None

NAME OF PERSON DOCUMENTING COVERSATION Nicholas A. Iaiennaro	ORGANIZATION CENCR-ED-DO	TELEPHONE NUMBER (309) 794-6056
SIGNATURE 	TITLE Health & Safety Specialist (UXO)	DATE 17 February 97

strafe the targets from the east. Never did the bombs create a loud noise or earth shock, just a puff of spotting smoke. Sometimes, though, the planes would come in from the south and fire into the Santa Rosa's. One time the planes accidentally shot up their barn with small arm's fire. Mr. Rock stated that the practice bombs were only found in the target area, some intact and some broken, and were often removed as souvenirs. Mr. Rock stated that some of the bombs removed still had intact spotting charges. Although never removing any bombs himself, his cousin, now deceased, often removed them for his collection. Also in his collection was a 155mm projectile (devoid of fuze) containing lead shot, the location discovered and it's present location unknown. Mr. Rock stated that he is not aware of any incidents or accidents resulting from ordnance remaining on or removed from the subject sites. In addition he has never observed or heard rumor of CWM training or activities in the area. In conclusion, Mr. Rock stated that the only other evidence of military operations in the park, that he discovered, were tank tracks in the vicinity of Clark's Dry Lake. Never did he actually see tank, artillery, or ground troop activity in the area. In addition, Mr. Rock clarified the families dislocation from the area from 1940-1944. He stated that it was family motivated, not government mandated, that's why they were able to return on weekends.

CONVERSATION RECORD	TIME 1030	DATE 14 February 1997
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TYPE

VISIT

CONFERENCE

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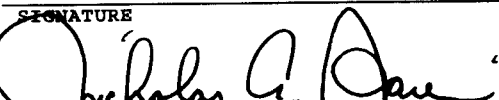
NAME OF PERSON CONTACTED Andrew Yatsko	ORGANIZATION Route 1 Box 2990 Coquille, OR 97423	TELEPHONE NO. (541) 347-9865
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SUBJECT OE on or Originating from The Former Borrego Maneuver Area

SUMMARY At the above specified time and date, Mr. Yatsko was interviewed concerning his knowledge of an ordnance or explosives presence on the former Borrego Maneuver Area. Mr. Yatsko began the interview by stating that he was drafted in the Army in 1942 and was released in 1946, serving almost his entire tour of duty at Camp Callan, San Diego, California. Camp Callan was a station which used the Borrego Maneuver area periodically for desert operations and anti-aircraft weapons firing. Upon entering the service Mr. Yatsko was sent to Camp Callan for basic training. While engaged in his initial training, Mr. Yatsko was injured, preventing him from certain duties, and was therefore appointed chaplain assistant duties, a position he held during his tour at Camp Callan. Mr. Yatsko began at Camp Callan shortly after its initial opening in 1942 and remained there until its closure in late 1945, at which time he was transferred to Camp Haan for a few months until he was released from duty. Mr. Yatsko stated that he, on several occasions, was required to drive his assigned chaplain in a staff car to the Borrego Maneuver when a Battery/Battalion consisting of approximately 1000 men were engaged in desert training operations in preparation for overseas desert combat. Training units would go to the maneuver area during all seasons of the year, although he and his chaplain were not required to accompany each contingent of desert training troops. Each maneuver was 7 to ten days in length. He would drive the staff car in a
(continued on next page)

ACTION REQUIRED

None

NAME OF PERSON DOCUMENTING CONVERSATION Nicholas A. Iaiennaro	ORGANIZATION CENCR-ED-DO	TELEPHONE NUMBER (309) 794-6056
SIGNATURE 	TITLE Health & Safety Specialist (UXO)	DATE 14 February 97

convoy, taking a full day to arrive to the maneuver area. Upon arrival, the Headquarters assigned soldiers (including himself) would set up tents in Camp Ensign near the date palm trees. Sometimes in the winter, certain soldiers (to include himself) would sleep in foxholes at that location to stay warmer, the nights got pretty cold. The Anti-Aircraft (AA) field soldiers would set up camp east of Camp Ensign and North of Route 78, digging in and camouflaging their positions, guns, and equipment. The guns the AA troops brought and fired in the Borrego Maneuver area were of the .50 Cal, 20MM, 40MM, and 90MM varieties. Mr. Yatsko could not recall the actual location of the firing point(s), he did know, though, that the direction of fire was Northeast, presumably towards the Santa Rosa Mountains. Targets fired upon included rocket target drones, drone airplanes, and aircraft towed targets. Rocket drone targets were fired up a searchlight beam. Mr. Yatsko stated that no other ground maneuvers from other services or organizations occurred while Camp Callan soldiers were present in the area. Navy Corsairs, though, did bomb a position also northeast of their location while they were present. The planes would come in low overhead and horizontal or skip bomb with practice bombs, never did he hear a detonation after bomb impact. Mr. Yatsko stated that 155MM firing never occurred in the Borrego Maneuver area to his knowledge, 155MM fire only occurred at Camp Callan into the ocean. Mr. Yatsko stated that no ordnance clearance activity was ever conducted anywhere on the Borrego Maneuver area to the best of his knowledge. Mr. Yatsko stated that Chemical Training was never conducted in the Borrego Maneuver Area to the best of his knowledge, strictly at Camp Callan in the gas chamber, with tear agent utilized. Mr. Yatsko stated that tanks were not present in the maneuver area while Camp Callan troops were training, although Camp Callan troops did bring some half-track vehicles. Mr. Yatsko stated that he never heard of any incidents or accidents resulting from ordnance fire or as a result of ordnance remaining in the area after firing operations were concluded. Mr. Yatsko stated that after VE day, special support/assault soldiers, British and Scotch Highlanders, assembled at Camp Callan to await and assist in a Japanese Assault. This assault never occurred due to the dropping of the atom bomb. These soldiers never trained in the Borrego Maneuver Area to the best of his knowledge. In conclusion, Mr. Yatsko stated that, contrary to popular belief, General Patton and his troops never trained in the Borrego Maneuver Area, solely in the vast Mohave Desert Maneuver area.

CONVERSATION RECORD	TIME 1115	DATE 14 February 1997
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TYPE

VISIT CONFERENCE

<input checked="" type="checkbox"/>	TELEPHONE
	INCOMING
<input checked="" type="checkbox"/>	OUTGOING

NAME OF PERSON CONTACTED Homer Townsend	ORGANIZATION	TELEPHONE NO. (619) 767-3986
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SUBJECT OE on or Originating from The Former Borrego Hotel Site (Target Area and Emergency Landing Field) and Borrego Maneuver Area

SUMMARY At the above specified time and date, Mr. Townsend was interviewed concerning his knowledge of an ordnance or explosives presence reported or discovered on the former Borrego Hotel Site (Bombing Target and Emergency Landing Field) and Former Borrego Maneuver Area. Mr. Townsend began the interview by stating that he was the Head Ranger for the Anza Borrego Desert State Park from 1991 to 1996. In addition, he was the Chief Ranger for the Ocotillo State Park from 1983 until 1985. The Anza Borrego Desert State Park area north of Route 78 and the Ocotillo State Park were included as part of the Borrego Maneuver Area. Mr. Townsend was not aware of a target area or an ordnance/explosives presence at the location of the former Borrego Hotel Site. He was familiar, however, with evidence of former military activity in the former Borrego Maneuver area. Mr. Townsend knew of an ordnance presence in the Military Wash and Clarks Dry Lake area (these areas were Naval bombing and strafing ranges/target areas located within, but not associated with, the former Army maneuver area). Mr. Townsend has also stated that Mr. Meiers, a Ranger of the Anza Borrego State Park, discovered a 40mm
(continued on next page)

ACTION REQUIRED
None

NAME OF PERSON DOCUMENTING COVERSATION Nicholas A. Iaiennaro	ORGANIZATION CENCR-ED-DO	TELEPHONE NUMBER (309) 794-6056
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SIGNATURE 	TITLE Health & Safety Specialist (UXO)	DATE 14 Feb 97
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projectile in the Short Wash north of Military Wash a few years ago. Mr. Townsend stated that he also heard rumor that artillery fire occurred over the badlands towards Clarks Dry Lake. In conclusion, Mr. Townsend stated that he is not aware of any incidents/accidents resulting from ordnance remaining on or removed from the subject sites. In addition he has not found evidence of or heard rumor of CWM training or activities in the area.

CONVERSATION RECORD	TIME 1115	DATE 14 February 1997
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TYPE

VISIT

CONFERENCE

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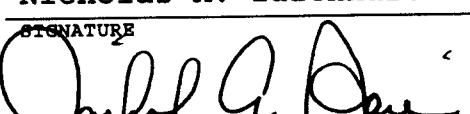
NAME OF PERSON CONTACTED Bob Begole	ORGANIZATION 1010 Palm Canyon Dr. P.O. Box 1306 Borrego Springs, CA 92004	TELEPHONE NO. (619) 767-5070
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SUBJECT OE on or Originating from The Former Borrego Hotel Site (Target Area and Emergency Landing Field) and Borrego Maneuver Area

SUMMARY At the above specified time and date, Mr. Begole was interviewed concerning his knowledge of an ordnance or explosives presence reported or discovered on the former Borrego Hotel Site (Bombing Target and Emergency Landing Field) and Former Borrego Maneuver Area. Mr. Begole began the interview by stating that he has been a Archaeologist for the California Park Service for a number of years, working in the Anza Borrego Desert State Park. Mr. Begole was not specifically aware of a target area or an ordnance/explosives presence at the location of the former Borrego Hotel Site. He was familiar, however, with evidence of former military activity in the former Borrego Maneuver area. Mr. Begole found an observation post with ration cans in the Yaqui Pass area. Additionally found in this area was a telephone line extending towards Borrego Springs. Mr. Begole knows of an ordnance presence in the Military Wash and Clarks Dry Lake area (these areas were Naval bombing and strafing ranges/target areas located within, but not associated with, the former Army maneuver area). Mr. Begole stated that he has walked the Borrego Mountains, the Santa Rosa Mountains, and the majority of the former maneuver area acreage, never discovering any other military ordnance or artifacts. In conclusion, Mr. Begole stated that he is not aware of any incidents or accidents resulting from ordnance remaining on or removed from the subject property. Also, he has never heard rumor of actual CWM training or activities.

ACTION REQUIRED

None

NAME OF PERSON DOCUMENTING COVERSATION Nicholas A. Iaiennaro	ORGANIZATION CENCR-ED-DO	TELEPHONE NUMBER (309) 794-6056
SIGNATURE 	TITLE Health & Safety Specialist (UXO)	DATE 14 February 97

CONVERSATION RECORD	TIME 1300	DATE 17 February 1997
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TYPE

VISIT

CONFERENCE

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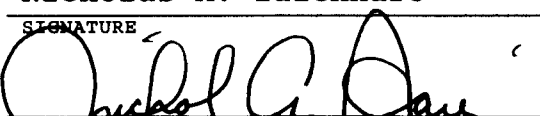
NAME OF PERSON CONTACTED Willard Henry	ORGANIZATION 769 Diamond Bay Rd. Borrego Springs, CA 92004	TELEPHONE NO. (619) 767-5506
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SUBJECT OE on or Originating from The Former Borrego Hotel Site (Target Area and Emergency Landing Field) and Borrego Maneuver Area

SUMMARY At the above specified time and date, Mr. Henry was interviewed concerning his knowledge of an ordnance or explosives presence reported or discovered on the former Borrego Hotel Site (Bombing Target and Emergency Landing Field) and Former Borrego Maneuver Area. Mr. Henry began the interview by stating that he is has been a local resident since 1955 with an interest in military activity/artifacts. Mr. Henry was not aware of a target area or an ordnance or explosives presence at the location of the former Borrego Hotel Site. He was familiar, however, with evidence of former military activity in the former Borrego Maneuver area. Mr. Henry knows of an ordnance presence in the Military Wash and Clarks Dry Lake area (these areas were Naval bombing and strafing ranges/target areas located within, but not associated with, the former Army maneuver area). Mr. Henry also located concrete foundation remains and a 500 gallon propane tank north of the Borrego Sink, an area he believes to have been associated with military activity (possibly from a former firing point, the propane tank no longer remains). Mr. Henry stated that he has scoured a good portion of the former Borrego Maneuver area acreage in search of artifacts since 1955, but never has discovered any projectiles, ordnance, or firing/impact areas other than those previously mentioned. In conclusion, Mr. Henry stated that he is not aware of any incidents or accidents resulting from ordnance remaining on or removed from the subject sites. In addition he has never heard rumor of actual CWM training or activities in the area.

ACTION REQUIRED

None

NAME OF PERSON DOCUMENTING COVERSATION Nicholas A. Iaiennaro	ORGANIZATION CENCR-ED-DO	TELEPHONE NUMBER (309) 794-6056
SIGNATURE 	TITLE Health & Safety Specialist (UXO)	DATE 17 February 97

CONVERSATION RECORD	TIME 1410	DATE 13 February 1997
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TYPE

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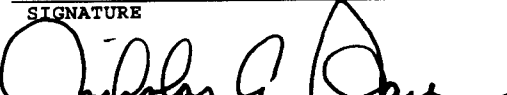
<input checked="" type="checkbox"/>	TELEPHONE
	INCOMING
<input checked="" type="checkbox"/>	OUTGOING

NAME OF PERSON CONTACTED Al McLeary	ORGANIZATION Ocotillo State Off Road Park 5172 Highway 78 Ocotillo Wells, CA 92004	TELEPHONE NO. (619) 767-5391
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SUBJECT OE on or Originating from The Former Borrego Hotel Site (Target Area and Emergency Landing Field) and Borrego Maneuver Area

SUMMARY At the above specified time and date, Mr. McLeary was interviewed concerning his knowledge of an ordnance or explosives presence reported or discovered on the former Borrego Hotel Site (Bombing Target and Emergency Landing Field) and Former Borrego Manuever Area. Mr. McLeary began the interview by stating that he has been a Ranger for the above specified organization for over 20 years, a position he filled following his Navy retirement. The Anza Borrego Desert State Park area north of Route 78 and the Ocotillo State Park were included as part of the Borrego Maneuver Area. Mr. McLeary was not aware of a target area or an ordnance/explosives presence at the location of the former Borrego Hotel Site. He was familiar, however, with evidence of former military activity in the former Borrego Maneuver area. Mr. McLeary knows of an ordnance presence in the Military Wash and Clarks Dry Lake area (these areas were Naval bombing and strafing ranges/target areas located within, but not associated with, the former Army maneuver area). Mr. McLeary is also aware of an extensive ordnance presence in the Carrizo Impact Area, which is south and not associated with the project sites. In conclusion, Mr. McLeary stated that he is not aware of any incidents or accidents resulting from ordnance remaining on or removed from the subject sites. In addition he has not found evidence of or heard rumor of CWM training or activities in the area .

ACTION REQUIRED
None

NAME OF PERSON DOCUMENTING COVERSAATION Nicholas A. Iaiennaro	ORGANIZATION CENCR-ED-DO	TELEPHONE NUMBER (309) 794-6056
SIGNATURE 	TITLE Health & Safety Specialist (UXO)	DATE 13 February 97

CONVERSATION RECORD	TIME 1030	DATE 19 February 1997
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TYPE

VISIT CONFERENCE

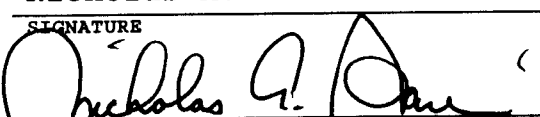
<input checked="" type="checkbox"/>	TELEPHONE
	INCOMING
<input checked="" type="checkbox"/>	OUTGOING

NAME OF PERSON CONTACTED Sam Fortiner	ORGANIZATION P.O. Box 67 Borrego Springs, CA 92004	TELEPHONE NO. (619) 767-5539
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SUBJECT OE on or Originating from The Former Borrego Hotel Site (Target Area and Emergency Landing Field) and Borrego Maneuver Area

SUMMARY At the above specified time and date, Mr. Fortiner was interviewed concerning his knowledge of an ordnance or explosives presence reported or discovered on the former Borrego Hotel Site (Bombing Target and Emergency Landing Field) and Former Borrego Maneuver Area. Mr. Fortiner began the interview by stating that he has been a local resident since 1947, but began visiting the area since 1945/1946. Mr. Fortiner was not aware of a target area or an ordnance or explosives presence at the location of the former Borrego Hotel Site. He was familiar, however, with evidence of former military activity in the former Borrego Maneuver area. Mr. Fortiner knows of an ordnance presence in the Clarks Dry Lake area (this area was a Naval bombing and strafing range/target area located within, but not associated with, the former Army maneuver area). Ordnance in the form of .50 caliber bullets and little smoke bombs were dropped/fired into Clark's Dry Lake by Navy Planes. Mr. Fortiner also located military slit trenches east of the churches located in Borrego near Warners Hot Spring. Mr. Fortiner stated that he never heard or found evidence of tank maneuvers occurring anywhere in the area. He did recall seeing a sign in the former Borrego Store/Post Office stating the price of hot and cold showers (25c/40c) with a statement concerning General Patton beneath it (stating (continued on next page)

ACTION REQUIRED
None

NAME OF PERSON DOCUMENTING COVERSATION Nicholas A. Iaiennaro	ORGANIZATION CENCR-ED-DO	TELEPHONE NUMBER (309) 794-6056
SIGNATURE 	TITLE Health & Safety Specialist (UXO)	DATE 19 February 97

something to the effect that General Patton had showered there). Mr. Fortiner stated that he had talked considerably to the locals of that time that would have had the most contact with military personnel (Tom Davis who had a house on Camp Ensign, Eddie Duvall of the General Store/Post Office, and Mr. Ensign who owned the Camp Ensign Property). Never had they discussed a knowledge of Anti-Aircraft Artillery fire in the area. In conclusion, Mr. Fortiner stated that he is not aware of any incidents or accidents resulting from ordnance remaining on or removed from the subject sites. In addition he has never heard rumor of actual CWM training or activities in the area.

CONVERSATION RECORD	TIME 1115	DATE 19 February 1997
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TYPE

VISIT

CONFERENCE

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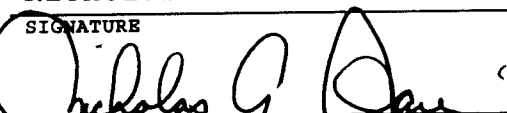
NAME OF PERSON CONTACTED Denny Duvall	ORGANIZATION 601 Anchor Drive Borrego Springs, CA 92004	TELEPHONE NO. 619) 767-3010
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SUBJECT OE on or Originating from The Former Borrego Hotel Site (Target Area and Emergency Landing Field) and Borrego Maneuver Area

SUMMARY At the above specified time and date, Mr. Duvall was interviewed concerning his knowledge of an ordnance or explosives presence reported or discovered on the former Borrego Hotel Site (Bombing Target and Emergency Landing Field) and Former Borrego Maneuver Area. Mr. Duvall began the interview by stating that he has been a local resident all of his life, and was a young boy living in the area at the beginning of WWII. His father (now deceased) owned the general store/post office during military activities in the area during that time frame, and he and his family lived across the street from his fathers establishment. Mr. Duvall recalls seeing Half Tracks, Jeeps, 6 X 6 vehicles, and a small Banning Tank in the area during that period, never any large tanks. In fact, he was given a ride in the Banning Tank. Mr. Duvall recalls that his father had some ordnance on display in the store/home at that time. He had several 6-8" inch diameter projectiles, about 17" long, some were empty and some filled with steel shot/balls (believed to be 155mm shot rounds). He also had a couple of 3 pound practice bombs on display which had been cleaned and plated. The location where these ordnance items were recovered or their present location is unknown. All the projectiles were devoid of fuzes. Mr. Duvall stated that all the soldiers he encountered were Army soldiers who often ate breakfast cooked by his mom at the store. The soldiers camped north of Clark's Valley and east of the store in the Borrego Sink
(continued on the next page)

ACTION REQUIRED

None

NAME OF PERSON DOCUMENTING COVERSATION Nicholas A. Iaiennaro	ORGANIZATION CENCR-ED-DO	TELEPHONE NUMBER (309) 794-6056
SIGNATURE 	TITLE Health & Safety Specialist (UXO)	DATE 17 February 97

area. The soldiers were being familiarized in desert operations for future wartime service in Africa. Mr. Duvall was not aware of a target area or an ordnance or explosives presence at the location of the former Borrego Hotel Site. He was familiar, however, with evidence of former ordnance activity in the former Borrego Maneuver area. Mr. Duvall knows of an ordnance presence in the Clarks Dry Lake area (this area was a Naval bombing and strafing range/target area located within, but not associated with, the former Army maneuver area). Mr. Duvall stated that he has explored a good portion of the Maneuver Area in the last few years and has not discovered any other evidence of military activity. He believes a good deal of ordnance remaining after the military usage period has been removed by a multitude of people who visit the park. Mr. Duvall stated that he is not aware of any incidents or accidents resulting from ordnance remaining on or removed from the subject sites. In addition he has never witnessed or heard rumor of actual CWM training or activities in the area.

ORDNANCE AND EXPLOSIVE
ARCHIVES SEARCH REPORT
FOR
BORREGO MANEUVER AREA
BORREGO SPRINGS, CALIFORNIA
PROJECT NUMBER J09CA701101

APPENDIX J

PRESENT SITE PHOTOGRAPHS

APPENDIX J
PRESENT SITE PHOTOGRAPHS

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- J-1. Area B: Looking North to South at One of Several 3.25 Inch Target Rockets.
- J-2. Area C: Looking Southeast to Northwest from Clarks Dry Lake Towards the South Face of the Santa Rosa Mountains.
- J-3. Area C: Looking Southwest to Northeast from Clarks Dry Lake Towards the South Face of the Santa Rosa Mountains.
- J-4. Area D: Looking Southeast to Northwest at the 17 Palms (Badlands) Area of the Mechanized Target Area Firing Fan.
- J-5. Area E-1 (Borrego Wash): Looking Southwest to Northeast Towards 1 Mile Long Suspected Towed Target Track.
- J-6. Area E-1 (Borrego Wash): Two MK2 40MM Projectile Tracer and Igniter Elements.
- J-7. Area E-1 (Borrego Wash): One of Two Collapsed Rake Stations.
- J-8. Area E-1 (Borrego Wash): 2.25 Practice Rocket Debris (SCAR).
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- J-11. Area E-1 (Borrego Wash): Remains of One of Three Vehicular Targets.
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- J-13. Area E-1 (Borrego Wash): Assorted M75 20MM Armor Piercing-Tracer Projectiles, M99 20MM Target Practice Projectiles, and .50 Caliber Bullets.
- J-14. Area E-1 (Clarks Dry Lake): One of Two Erect Rake Stations.
- J-15. Area E-1 (Clarks Dry Lake): .50 Caliber Bullets (One Split).

J-16. Area E-1 (Clarks Dry Lake): MK 23 3 Pound Practice Bomb Debris.

J-17. Area E-1 (Clarks Dry Lake): MK15 100 Pound Practice Bomb Debris.

J-18. Area E-1 (Clarks Dry Lake): Looking East Towards Concentric Circle Bombing Target Rings (Rock).



J-1. Area B: Looking North to South at One of Several
3.25 Inch Target Rockets.



J-2. Area C: Looking Southeast to Northwest from Clarks
Dry Lake Towards the South Face of the Santa Rosa Mountains.



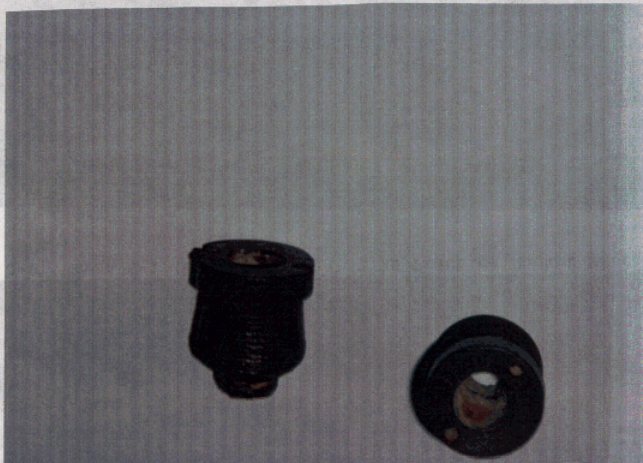
J-3. Area C: Looking Southwest to Northeast from Clarks Dry Lake Towards the South Face of the Santa Rosa Mountains.



J-4. Area D: Looking Southeast to Northwest at the 17 Palm (Badlands) Area.



J-5. Area E-1 (Borrego Wash): Looking Southwest to Northeast Towards the 1 Mile Long Suspected Towed Target Track.



J-6. Area E-1 (Borrego Wash): Two MK2 40MM Projectile Tracer and Igniter Elements.



J-7. Area E-1 (Borrego Wash): One of Two Collapsed Rake Stations.



J-8. Area E-1 (Borrego Wash): 2.25 Practice Rocket Debris (SCAR).



J-9. Area E-1 (Borrego Wash): MK 23 3 Pound Practice Bomb Fragments.



J-10. Area E-1 (Borrego Wash): Outer Bomb Target Ring.



J-11. Area E-1 (Borrego Wash): Remains of One of Three Vehicular Targets.



J-12. Area E-1 (Borrego Wash): Fragment of 5" High Explosive Aircraft Rocket.



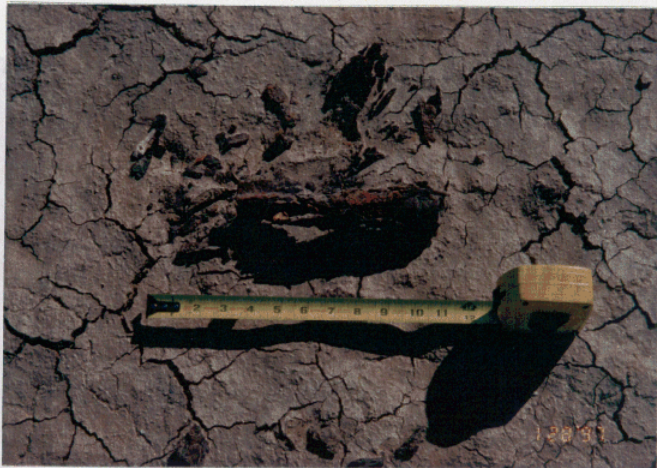
J-13. Area E-1 (Borrego Wash): Assorted M75 20MM Armor Piercing-Tracer Projectiles, M99 20MM Target Practice Projectiles, and .50 Caliber Bullets.



J-14. Area E-1 (Clarks Dry Lake): One of Two Erect Rake Stations.



J-15. Area E-1 (Clarks Dry Lake): .50 Caliber Bullets
(One Split).



J-16. Area E-1 (Clarks Dry Lake): MK 23 3 Pound Practice
Bomb Debris.



J-17. Area E-1 (Clarks Dry Lake): MK15 100 Pound Practice
Bomb Debris.



J-18. Area E-1 (Clarks Dry Lake): Looking East Towards
Concentric Circle Bombing Target Rings (Rock)

ORDNANCE AND EXPLOSIVE
ARCHIVES SEARCH REPORT
FOR
BORREGO MANEUVER AREA
BORREGO SPRINGS, CALIFORNIA
PROJECT NUMBER J09CA701101

APPENDIX K

HISTORICAL PHOTOGRAPHS

(Not Used)

ORDNANCE AND EXPLOSIVE
ARCHIVES SEARCH REPORT
FOR
BORREGO MANEUVER AREA
BORREGO SPRINGS, CALIFORNIA
PROJECT NUMBER J09CA701101

APPENDIX L

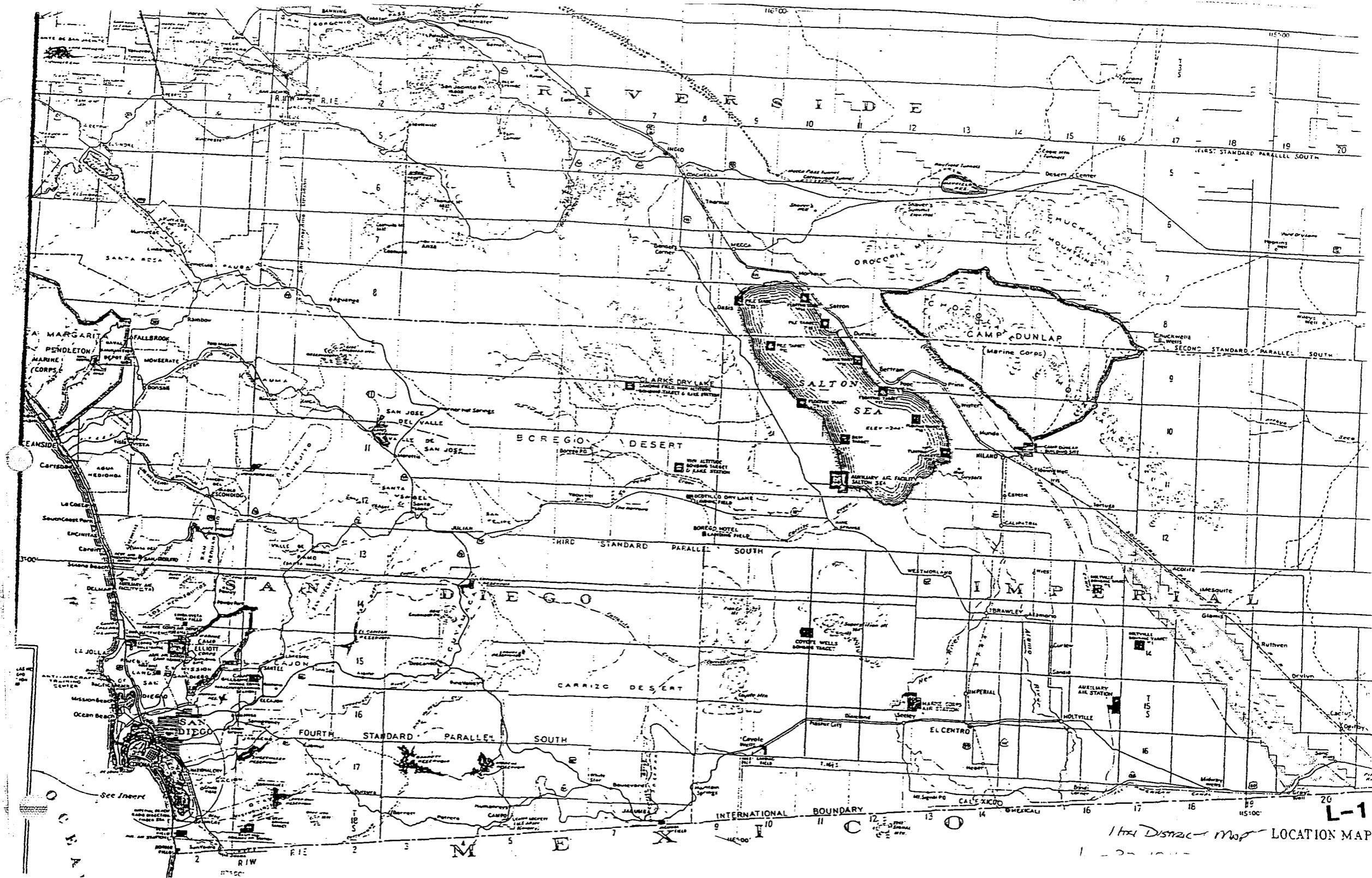
REFERENCE MAPS/DRAWINGS

APPENDIX L

REFERENCE MAPS/DRAWINGS

Table of Contents

L-1. Location Map of Naval Reservations in San Diego, Imperial, and Portions of Orange and Riverside Counties, California, 30 June 1943 (B-36).



L-1

1:250,000
1-2-1945
LOCATION MAP

ORDNANCE AND EXPLOSIVE
ARCHIVES SEARCH REPORT
FOR
BORREGO MANEUVER AREA
BORREGO SPRINGS, CALIFORNIA
PROJECT NUMBER J09CA701101

APPENDIX M

ARCHIVES SEARCH REPORT CORRESPONDENCE

(Not Used)

ORDNANCE AND EXPLOSIVE
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FOR
BORREGO MANEUVER AREA
BORREGO SPRINGS, CALIFORNIA
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APPENDIX N

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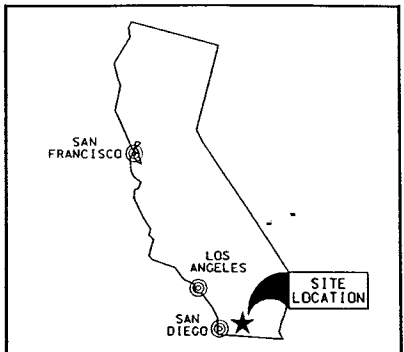
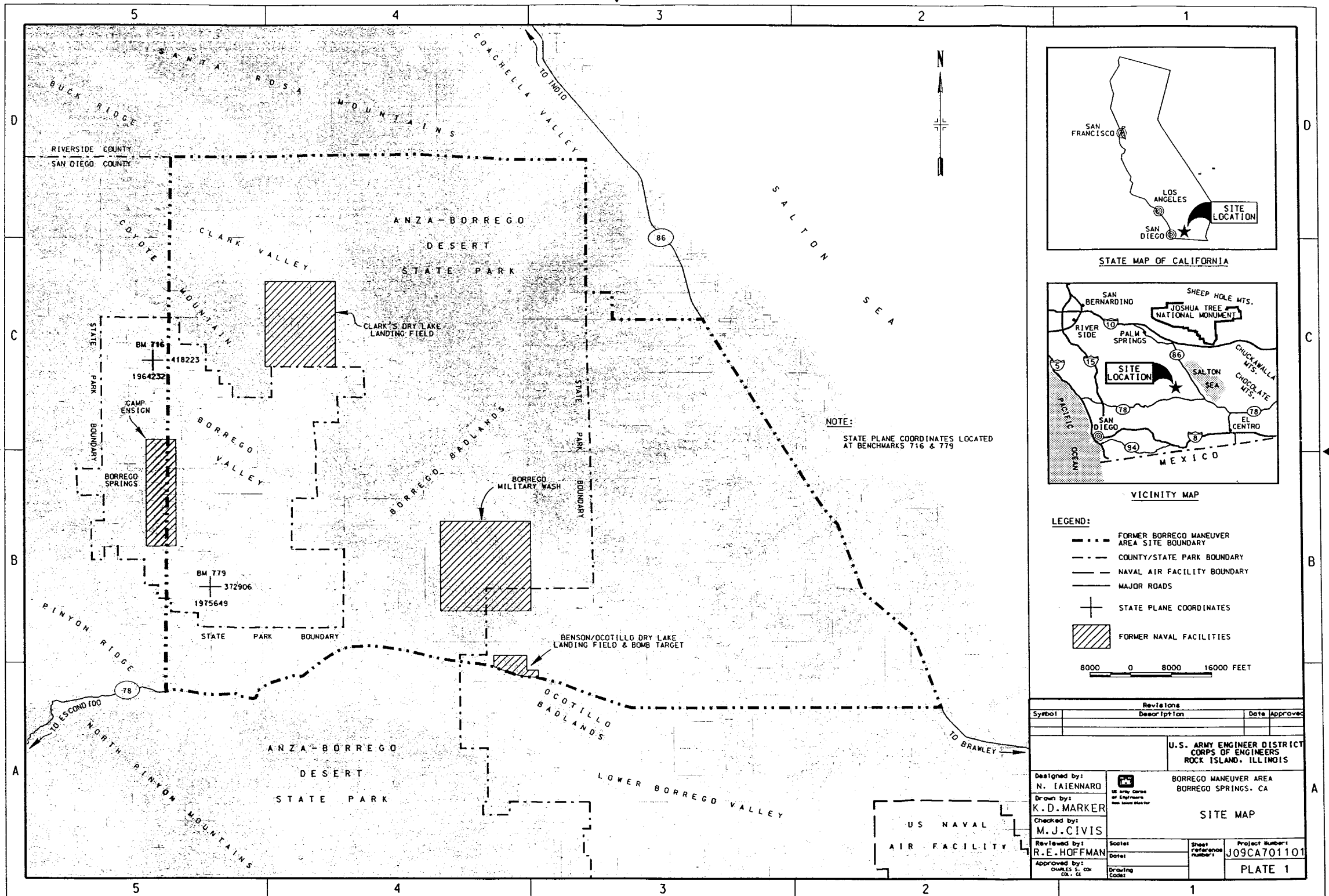
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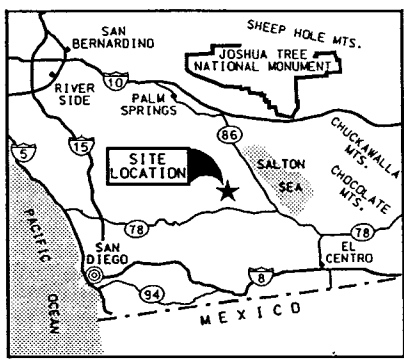
I - Final Report
 II - Findings Report
 III - Routed Final Report

ORDNANCE AND EXPLOSIVE
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BORREGO MANEUVER AREA
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PROJECT NUMBER J09CA701101

REPORT PLATES

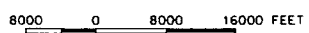


STATE MAP OF CALIFORNIA



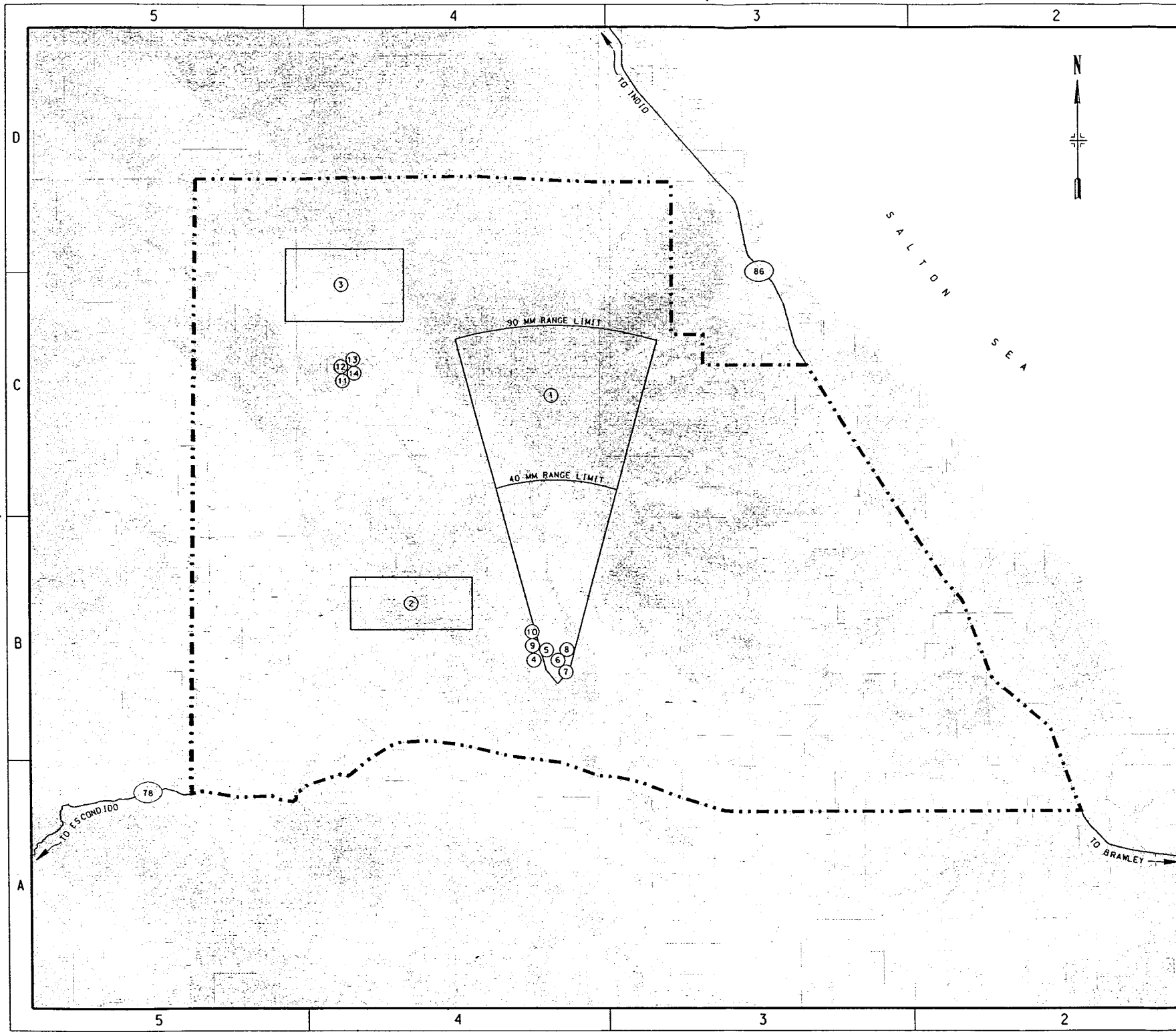
VICINITY MAP

- LEGEND:**
- FORMER BORREGO MANEUVER AREA SITE BOUNDARY
 - - - COUNTY/STATE PARK BOUNDARY
 - NAVAL AIR FACILITY BOUNDARY
 - MAJOR ROADS
 - + STATE PLANE COORDINATES
 - ▨ FORMER NAVAL FACILITIES



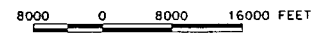
NOTE:
STATE PLANE COORDINATES LOCATED AT BENCHMARKS 716 & 779

Revisions		Date Approved	
Symbol	Description		
U.S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS ROCK ISLAND, ILLINOIS			
Designed by: N. LAIENNARD		BORREGO MANEUVER AREA BORREGO SPRINGS, CA	
Drawn by: K.D. MARKER			
Checked by: M.J. CIVIS			
Reviewed by: R.E. HOFFMAN		Scale:	Sheet Reference Number:
Approved by: CHARLES S. COX COL. CC		Date:	Project Number: J09CA701101
Drawing Code:			PLATE 1

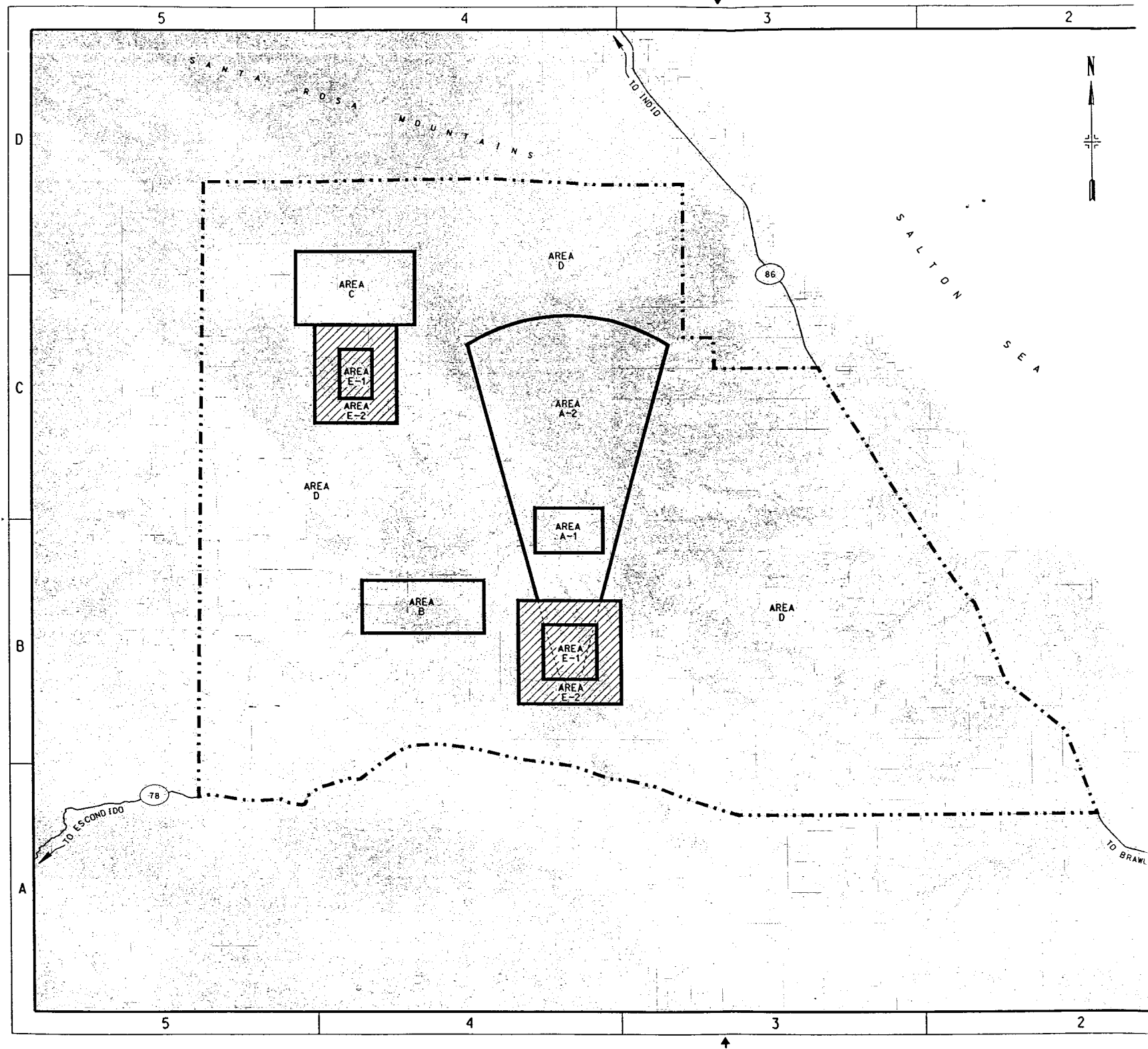


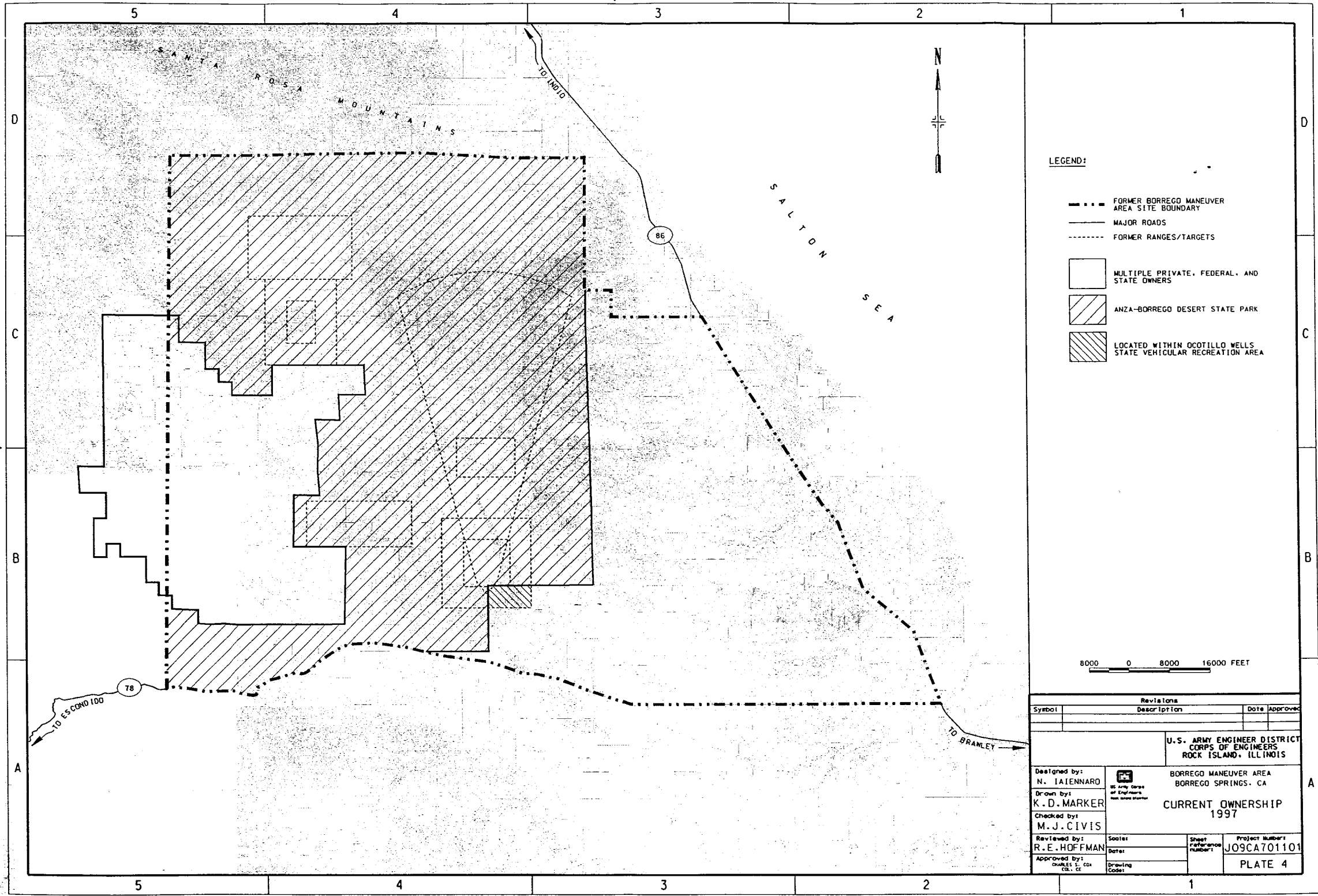
RANGE SUMMARY	
LOCATION	DESCRIPTION
1	MECHANIZED ARTILLERY PRACTICE FIRE RANGE
2	AUTOMATIC WEAPONS FIRING RANGE/ROCKET EXPERIMENTAL TEST AREA
3	AUTOMATIC WEAPONS FIRING RANGE
4	RAKE STATION
5	TARGET CENTER (MILITARY WASH)
6	RAKE STATION
7	VEHICULAR TARGETS
8	OBSERVATION PLATFORM
9	MILE LONG WOODEN TRACK
10	TARGET BERM
11	RAKE STATION
12	DIRECTION ARROW
13	RAKE STATION
14	TARGET CENTER (CLARKS DRY LAKE)

LEGEND:
 - - - - - BORREGO MANEUVER AREA SITE BOUNDARY
 ——— MAJOR ROADS



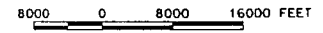
Revisions		Date		Approved	
Symbol	Description				
U.S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS ROCK ISLAND, ILLINOIS					
Designed by: N. LAIENARO		BORREGO MANEUVER AREA BORREGO SPRINGS, CA RANGE LAYOUT CIRCA 1942			
Drawn by: K. D. MARKER					
Checked by: M. J. CIVIS		Scale:		Sheet Performance Number:	
Reviewed by: R. E. HOFFMAN		Date:		Project Number: J09CAT01101	
Approved by: CHARLES S. COE COL., CG.		Drawing Codes:		PLATE 2	



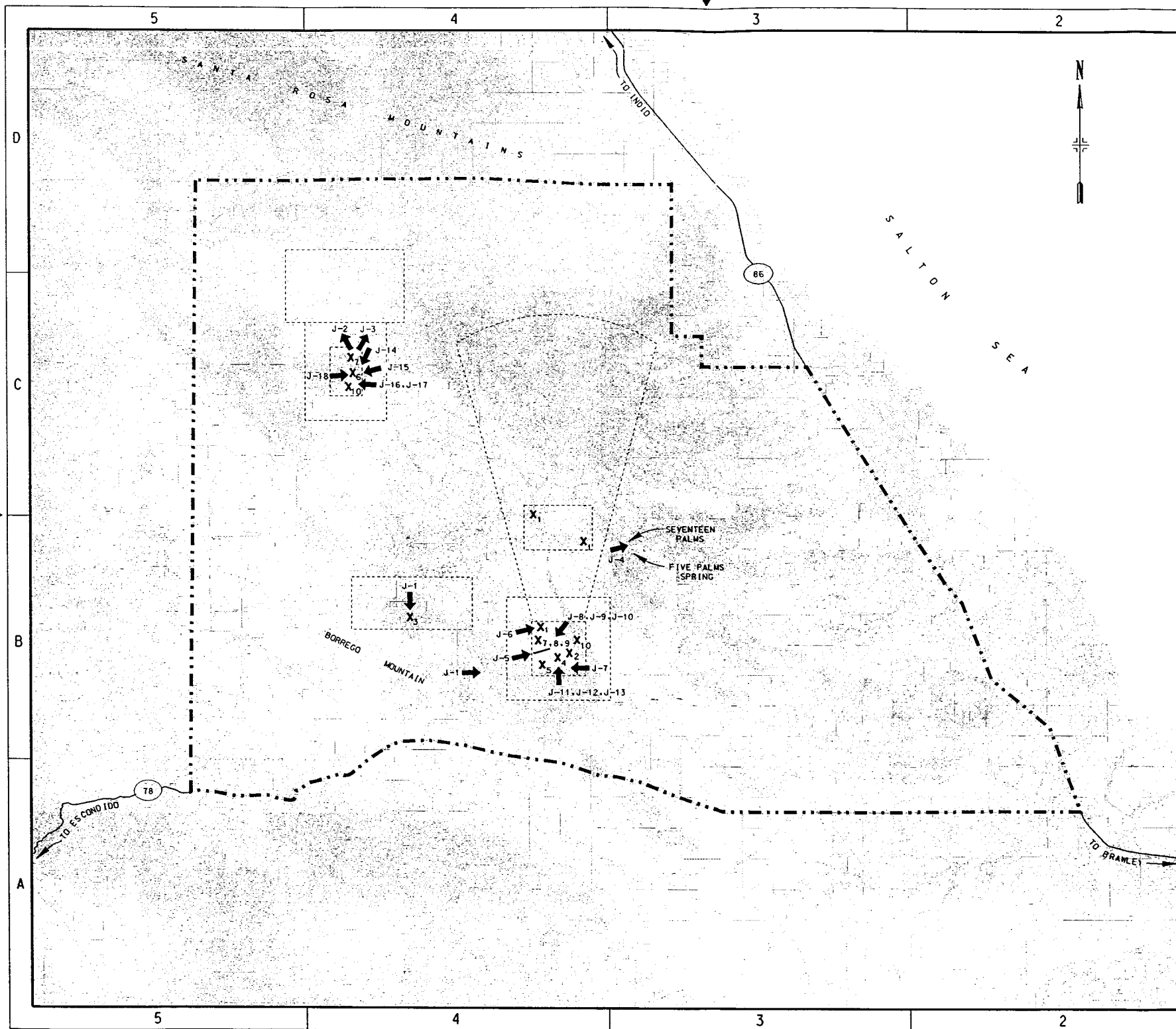


LEGEND:

- FORMER BORREGO MANEUVER AREA SITE BOUNDARY
- MAJOR ROADS
- - - - FORMER RANGES/TARGETS
- MULTIPLE PRIVATE, FEDERAL, AND STATE OWNERS
- ▨ ANZA-BORREGO DESERT STATE PARK
- ▩ LOCATED WITHIN OCOTILLO WELLS STATE VEHICULAR RECREATION AREA



Revisions		Date	Approved
Symbol	Description		
U.S. ARMY ENGINEER DISTRICT CORPS OF ENGINEERS ROCK ISLAND, ILLINOIS			
Designed by: N. IAIENNARO	 BORREGO MANEUVER AREA BORREGO SPRINGS, CA	CURRENT OWNERSHIP 1997	
Drawn by: K. D. MARKER			
Checked by: M. J. CIVIS	Project Number: JO9CA701101		
Reviewed by: R. E. HOFFMAN	Scale: Date:	Sheet Reference Number:	PLATE 4
Approved by: DUKES S. COX CDL, CE	Drawing Code:		



OE SUMMARY	
LOCATION	DESCRIPTION
X ₁	MK 11 40 MM HIGH EXPLOSIVE-TRACER PROJECTILE OR PROJECTILE RESIDUE
X ₂	2.25 INCH PRACTICE ROCKET
X ₃	3.25 INCH PRACTICE/TARGET ROCKET
X ₄	5 INCH HIGH EXPLOSIVE ROCKET OR ROCKET RESIDUE
X ₅	MK 15 MOD 3 100 POUND PRACTICE BOMB/SPOTTING CHARGE DEBRIS
X ₆	M38A2 100 POUND PRACTICE BOMB/SPOTTING CHARGE DEBRIS
X ₇	MK23 3 POUND PRACTICE BOMB/SPOTTING CHARGE DEBRIS
X ₈	M58 20 MM TARGET PRACTICE PROJECTILE
X ₉	M95 20 MM ARMOR PIERCING PROJECTILE
X ₁₀	.50 CALIBER AMMUNITION

LEGEND:

--- --	BORREGO MANEUVER AREA SITE BOUNDARY
— — — —	MAJOR ROADS
.....	FORMER RANGES/TARGETS
→	PHOTO LOCATIONS
X	OE LOCATIONS

Revisions		Date	Approved
Symbol	Description		
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Drawn by: K.D. MARKER		PHOTO/OE LOCATIONS	
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Reviewed by: R.E. HOFFMAN		Scale:	Sheet reference number:
Approved by: DAVID S. COE COL, LT		Date:	Project Number: J09CA701101
Drawing Code:		PLATE 5	