US Army Corps of Engineers
HUNTSVILLE ENGINEERING AND SUPPORT CENTER

FINAL

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

ARCHIVE SEARCH REPORT

FINDINGS

Bodega Bay Gunnery Range

Bodega Bay, CA
Project Number – J09CA729001

September 2002

Prepared by
US Army Corps of Engineers
ST. LOUIS DISTRICT

ARCHIVE SEARCH REPORT
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1 INTRODUCTION

1.1 AUTHORITY

In 1986, Congress established the Defense Environmental Restoration Program (DERP) at 10 United State Code (USC) 2701 et seq. This program directed the Secretary of Defense to "carry out a program of environmental restoration at facilities under the jurisdiction of the Secretary."

In March 1990, the Environmental Protection Agency (EPA) issued a revised National Contingency Plan (NCP). Under 40 Code of Federal Regulations (CFR) 300.120, EPA designated the Department of Defense (DoD) to be the removal response authority for incidents involving DoD military weapons and munitions under the jurisdiction, custody and control of DoD.

Since the beginning of this program, the U.S. Army Corps of Engineers acts as the agency responsible for environmental restoration at Formerly Used Defense Sites (FUDS). Beginning in 1990, the U.S. Army Engineering and Support Center, Huntsville (USAESCH) serves as the Center of Expertise (CX) and Design Center for Ordnance and Explosives. In cooperation with the USAESCH, the U.S. Army Corps of Engineers, St. Louis District, prepares Archives Search Reports (ASR) in support of environmental restoration at active DoD installations, Formerly Used Defense Sites (FUDS) and installation transitions under Base Realignment and Closure (BRAC) recommendations.

1.2 SUBJECT

Bodega Bay Gunnery Range (BBGR) consisted of 605 acres near Bodega Bay, CA located in Sonoma County. The Army built BBGR as one of three subordinate range activities associated with Santa Rosa Army Air Field (AAF) of the 4th Air Force approximately 20 miles to the northwest. By 21 February 1944, the Army had use of the site and developed at least six ranges, primarily air to ground strafing ranges and at least one bomb target. Ordnance and explosive (OE) and chemical warfare material (CWM) related features of the former target area included range use with small arms and various types of practice bombs. Following the end of the war, the 4th Air Force declared Santa Rosa AAF surplus in November 1945. However, this range wasn't declared surplus until 29 August 1946, with the leases being canceled by the following March. Plate 1 in the report plates section shows the general location of the site.

1.3 PURPOSE

The ASR compiles information obtained through historical research at various archives and records holding facilities, interviews with persons associated with Bodega Bay Gunnery Range and an inspection of the site. The search directs efforts towards determining possible use or disposal of OE and CWM on the former military

establishment. The research places particular emphasis on establishing the types, quantities and areas of use and disposal. This process obtains information for use in developing recommendations for further action at the former Bodega Bay Gunnery Range.

1.4 SCOPE

This investigation focuses on potential OE and/or CWM contamination remaining on the former Bodega Bay Gunnery Range. The DERP-FUDS project number is J09CA729001. This report presents the following:

- A brief history of Bodega Bay Gunnery Range
- Description and characteristics of the immediate surrounding area
- A review of related site investigations
- An aerial photography and map analysis of the site
- Real estate information, past and present
- Findings of the site inspection
- Description of the OE and/or CWM identified with the site

These factors represent the basis for the evaluation of potential OE and CWM contamination and associated risks at Bodega Bay Gunnery Range.

2 PREVIOUS SITE INVESTIGATIONS

2.1 CORPS OF ENGINEERS DOCUMENTS

The Sacramento District of the Corps of Engineers prepared the following investigations in support of the DERP for FUDS:

> *Inventory Project Report Bodega Head Gunnery Range, Sonoma County, CA, FUDS Site No. J09CA7290,* May 1999.[1]

The Inventory Project Report (INPR) assigned a Risk Assessment Code (RAC) of 2 for the OE/CWM portion of this site. See Appendix D-1 for this report. The INPR identified only OE/CWM as a potential hazard at the former Bodega Bay Gunnery Range.

2.2 OTHER REPORTS

The archive search did not locate any additional environmental investigations or reports concerning Bodega Bay Gunnery Range.

3 SITE DESCRIPTION

3.1 LAND USE

3.1.1 Location

Bodega Bay Gunnery Range consisted of 605 acres in Sonoma County in CA (see Plate 1). This site lies between the Pacific Ocean on the west and Bodega Bay on the east. It is approximately one mile west of the community of Bodega Bay, which lies about 50 miles northwest of San Francisco, CA.

3.1.2 Prior Site Use

Prior to the Army's operation of Bodega Bay Gunnery Range, predominate use of the land was for agricultural purposes (e.g. livestock grazing).

3.1.3 Present Site Use

The majority of the former Bodega Bay Gunnery Range is part of the Sonoma Coast State Beach, Russian River/Mendocino District, California State Parks system and the Bodega Marine Laboratory under the University of California-Davis. Portions also appear to be owned by private residences.

3.2 CLIMATIC DATA

The nearest source of long-record climatological data and weather narrative that best represents the **Bodega Bay** site is the National Oceanic Atmospheric Administration (NOAA) station located at the San Francisco Airport approximately 60 miles to the southeast (see Table 3.2.1). Additional climatological data from the weather station in Graton, CA, located approximately 12 miles northeast, is provided in Table 3.2.2.[2]

Table 3.2 1 - Climatological Data For San Francisco, CA

Month	Temperature		Precipitation	Wind	
	Average Minimum (°F)	Average Maximum (°F)	Average (Inches)	Average Speed Miles/Hour	Average Direction
January	42	56	4.2	8	SE
February	52	59	3.2	11	WNW
March	53	61	3.0	12	WNW
April	56	64	1.3	13	WNW
May	58	66	0.3	14	WNW
June	61	70	0.1	14	WNW
July	63	71	T	13	WNW

Table 3.2 1 - Climatological Data For San Francisco, CA					
Month	**Temperature**		**Precipitation**	**Wind**	
	Average Minimum (°F)	**Average Maximum (°F)**	**Average (Inches)**	**Average Speed Miles/Hour**	**Average Direction**
August	63	72	T	12	WNW
September	64	73	0.2	11	NWNW
October	61	70	1.0	11	WNW
November	55	63	2.3	10	WNW
December	50	56	3.5	9	WNW
Average	57	65	19.3	12	WNW

Table 3.2.2 - Climatological Data For Graton, CA					
Month	**Temperature**		**Precipitation**	**Wind**	
	Average Minimum (°F)	**Average Maximum (°F)**	**Average (Inches)**	**Average Speed Miles/Hour**	**Average Direction**
January	36	56	9.48	-	-
February	38	61	7.12	-	-
March	39	64	5.54	-	-
April	40	69	2.57	-	-
May	44	75	0.89	-	-
June	47	80	0.29	-	-
July	48	83	0.06	-	-
August	48	84	0.16	-	-
September	47	82	0.48	-	-
October	44	76	2.23	-	-
November	39	65	5.65	-	-
December	36	56	7.24	-	-
Average	42	71	41.71	-	-

The region around San Francisco enjoys a marine-type climate characterized by mild and moderately wet winters and by dry, cool summers. Winter rains, occurring from November through March, account for over 80 percent of the annual rainfall. Measurable precipitation occurs on an average of 10 days per month during the winter period. However, there are frequent dry periods lasting well over a week as well. Severe winter storms with gale force winds and heavy rains occur only occasionally. Thunderstorms average two a year and may occur in any month. The maximum 24-hour rainfall was measured at 5.6 inches and occurred during the month of January. The maximum snowfall was recorded at only 2 inches and occurred during the month of January.

The daily and annual range in temperature is small. A few frosty mornings occur during the winter, but the temperature seldom drops below freezing. Winter temperatures generally rise to the high 50's in the early afternoon. The lowest recorded temperature was measured at 24 degrees and occurred during the month of December.

The summer weather is dominated by a cool sea breeze resulting in an average summer wind speed of nearly 15 mph. Winds are generally light in the early morning but normally reach 20 to 25 mph in the afternoon. Wind gusts of up to 68 mph have been observed.

Sea fog is another persistent feature of the summer weather. This high fog occasionally produces drizzle or mist and usually disappears during the late afternoon. Despite the overcast mornings, summer days are sunny. On average, a total of only 14 days during the four months from June through September are classified as cloudy.

Daytime temperatures are held down both by the overcast mornings and the strengthening sea breezes in the afternoon. During the summer months, occasional hot spells lasting a few days are experienced without the usual high fog and sea breeze. The maximum recorded temperature of 106 degrees was measured during the month of June.

3.3 GEOLOGY AND SOILS

3.3.1 Geology and Physiology

Bodega Bay is situated on the Coast Range's physiographic province of California, which is characterized by northwest-trending mountains and valleys. Geomorphic features of the local areas vary from beaches on the Pacific Ocean at the northwestern edge of the site, to tidal flats in the southeastern section near Bodega Harbor, to more rugged terrain at the southwestern tip of the peninsula, and to the east of the site where elevations quickly reach over 500 feet.

The sand dunes, which cover the northern half of the site, represent the surface level contact of the San Andreas Fault Zone. This zone is where the California continental plate and the Pacific Ocean plate meet. The San Andreas Fault is a right-lateral fault. The movement along this fault line brings the eastern plate south and the western plate north.

The oldest rocks exposed in Sonoma County occur at Bodega Head, directly on this site west of the San Andreas Fault. The granitic rocks found here represent the core of an ancient landmass that once stretched southward and included what is now the Point Reyes Peninsula, the Farallon Islands, and the granitic mountains of Santa Cruz and Monterey Counties. These intrusive rocks were formed at great depths when they crystallized during the early part of the Jurassic Period. Subsequent uplift brought them to the surface, and erosion has reduced them to the isolated remnants seen today.

East of the San Andreas Fault are found somewhat contemporaneous marine sediments, which were formed as geosynclinal deposits in an oceanic environment during the Jurassic Period. These deposits, which together comprise the Franciscan Formation and the Great Valley Sequence, are formed of sediments derived from an area located west of the present shoreline. The area, which received these sediments, was of broad extent and was slowly subsiding.

During the 50 million years that the sediments were being deposited, they were intruded with basic and ultrabasic rocks in the form of dikes, sills, and pillow lava flows. Most of these subsequently have been completely serpentinized. During the Cretaceous Period, deposition was halted and was followed by a brief period of uplift. During this uplift, coarse conglomeritic detritus was deposited in certain areas, while in others, sand and clay continued to mantle the sea bottom. In a few areas, notably along what is now the present seacoast, basaltic flows poured out from localized volcanic centers.

In the early part of the Tertiary Period, marine deposition again was the rule. Paleocene and Eocene sediments, ranging from sand to clay, were deposited in areas to the west and east of the San Andreas Fault. During Miocene time, the sea invaded the area, and shales and sands of the Neroly and related formations were deposited. Also in Miocene time, there were several periods of transgression and regression of the sea as the land surface oscillated above and below sea level. Toward the close of the Miocene Epoch, crustal compressional forces began forming the Coast Ranges.

Beginning in the early part of the Pliocene Epoch, a volcanic sequence was deposited in the south-central part of the county. After a subsequent period of erosion, deposition began anew, forming the sediments, which now constitute the Petaluma Formation. The depositional environment of the Petaluma Formation consisted of shallow to brackish water embayments, which had been eroded into the landscape formed from the Jura-Cretaceous and later rocks. Following deposition of the Petaluma beds, a period of orogeny occurred, which tilted, folded, and uplifted these beds while still young. This caused a widespread period of vigorous erosion, during which much of the then-soft Petaluma sediments were stripped off. By that time, much of eastern Sonoma County was above sea level, and here and there were lakes filled with water, which supported large communities of diatoms. At about this same time, movement began along the Tolay Fault, which caused a displacement of several thousand feet of formerly adjacent sediments.

During the latter part of the Pliocene Epoch, volcanic activity broke out in the eastern part of the county. Vents spewed out vast amounts of tuff-breccia, lava, ash, and cinders, all of which now constitute the Sonoma Volcanics. Meanwhile, to the west, in a shallow marine environment, sands and clays were being deposited to form the Merced Formation. This latter formation was deposited in an embayment that covered the central part of the county as far north as Healdsburg. At the close of the Sonoma volcanic

episode, reworked volcanic detritus began to be deposited under lagoonal and deltaic conditions; these sediments are now the Glen Ellen Formation. Sediments in the lower part of the Glen Ellen Formation were deposited contemporaneously with those of the Merced Formation as shown by the interfingering of these two formations.[3]

3.3.2 Soil

The soils of the Bodega Bay site can be easily divided into two categories; the sand dunes in the north and the sandy soils on the remnants of Bodega Head in the south. The dune land consists of loose, shifting sand. In an effort to control the mass movement of the sand, dune grass has been planted on the Bodega peninsula. This land is mostly used for recreation.

The other sites soils consist mainly of well-drained, coarse, silty, clayey sands that are underlain at a depth of 36 to 60 inches by granodiorite and weathered, decomposed, granitic material. These soils are on uplands. The elevation ranges from 100 to 300 feet. In a typical profile, the soil is very dark, grayish-brown and dark-brown with medium acid, coarse, silty, clayey sand about 47 inches thick. Below this is weathered granodiorite.[4]

3.4 HYDROLOGY

3.4.1 Surface Water

Bodega Bay is located along the South Salmon Creek Beach area and the Doran Beach area of the Pacific Ocean at Bodega Bay. The site is within the California subtropical fruit, truck and specialty crop land resource area of the Pacific Mountain Region of the western United States. This area is within the arid region of the United States, which makes it vulnerable chiefly to droughts of several years in duration. Warm dry soils with a mean annual soil temperature of higher than approximately 47 degrees F predominate the area where the site is located. The United States Geological Survey (USGS) estimates the average runoff for this area at about 20 inches. The average depth of frost penetration is about 3 inches with an extreme frost penetration of about 5 inches.

The prevalent concentration of dissolved minerals in the surface water is about 100 to 350 parts per million (ppm). The prevalent chemicals in the river water are Calcium magnesium bicarbonate; total dissolved solids more than 120 ppm. This data is provided by the USGS and is based on chemical analysis of water in streams during periods of low flow, when the water is derived chiefly from ground water.

The site is located within the Bodega Bay Watershed, consisting of 202 square miles. The overall health of the watershed is indicated by an Index Watershed Indicator (IWI). At Bodega Bay, the IWI is 3. A watershed rating of 3 has a less serious water quality problem with a low vulnerability to stressors such as pollutant loadings.

The elevation of the site area ranges between a high of about 285 feet National Geodetic Vertical Datum (NGVD) to a low of about 20 feet NGVD. The southern portion of the site area is somewhat hilly while the remaining area is flat and consists mostly of sand dunes and tidal flats. The site lies within the San Andreas Rift Zone. The surface water flows directly into the Pacific Ocean and Bodega Bay.

There are no major streams within the site area. The closest stream to the study site is Salmon Creek, but is outside the watershed. Salmon Creek empties into the Pacific Ocean about 1 mile north of the site. The USGS maintained a stream gage on Salmon Creek at Bodega Bay, California between the years 1963-1983. The highest recorded flow was measured at 7400 cubic feet per second (cfs) on January 4, 1982. The gage height for this event is not available. High flows near the mouth of Salmon Creek could back up into the low areas of the site area and cause some flooding. Flooding could also occur from localized heavy rainfall and from high tide from the Pacific Ocean.

The closest tidal gage for this site is located at Point Reyes, Drake Bay, CA. Tidal datum at Point Reyes are based on a 16 year length of series. Elevations of the tidal datum table below are referred to Mean Lower Low Water (MLLW), in feet.[5]

Table 3.4.1. - Tidal Datums Point Reyes, Drake Bay, CA	
Highest Observed High Water Level (12/03/1983)	8.67
Mean Higher High Water (MHHW)	5.77
Mean High Water (MHW)	5.11
Mean Tide Level (MTL)	3.15
National Geodetic Vertical Datum-1929 (NGVD)	2.85
Mean Low Water (MLW)	1.18
Mean Lower Low Water (MLLW)	0.00
Lowest Observed Water Level (01/19/1988)	2.48

3.4.2 Ground Water

Nearly all of the geologic formations in Sonoma County would yield some quantity of water to wells. Well yields range from 1,000 gallons per minute (gpm) in wells completed in coarse-grained Holocene deposits, to less than 1 gpm in wells in the Jura-Cretaceous and Tertiary marine sediments. In general, the Jura-Cretaceous and Tertiary marine sediments, along with the granitic rocks and serpentine, yield less than 5 gpm. Mineral constituents, such as chloride, iron, manganese, and boron may be present in sufficient amounts to make ground water unusable.

In contrast, the Pliocene to Holocene materials are the principal water producers in the county; the water derived from these materials usually is of good to excellent quality, although some water quality problems also may be present.

Large quantities of ground water are withdrawn from the permeable strata of the Quaternary and Tertiary sediments. Although the Quaternary alluvium sand stringers yield large quantities of ground water in some wells the major sources of ground water in this area are from the sediments of the Laguna and Mehrten Formations. [6]

3.5 ECOLOGY

The U.S. Fish and Wildlife Service (USFWS) have indicated that the following Federally listed threatened or endangered species, or those proposed to be listed as such may occur in Sonoma County:

Guadalupe fur seal, *Arctocephalus townsen,* threatened; Steller (northern) sea-lion, *Eumetopiasjubatu,* threatened; marbled murrelet, *Brachyramphus marmoratus,* threatened; marbled murrelet, *Brachyramphus marmoratus,* threatened; western snowy plover, *Charadrius alexandrinus nivosus,* threatened; bald eagle, *Haliaeetus leucocephalus,* threatened; northern spotted owl, *Strix occidentalis caurin,* threatened; loggerhead turtle, *Caretta caretta,* threatened; green turtle, *Chelonia mydas (incl. agassizi),* threatened; olive (Pacific) ridley sea turtle, *Lepidochelys olivacea,* threatened; California red-legged frog, *Rana aurora draytonii,* threatened; delta smelt, *Hypomesus transpacificus,* threatened; coho salmon - central CA coast, *Oncorhynchus kisutch,* threatened; Central California Coastal steelhead, *Oncorhynchus mykiss,* threatened; Northern California steelhead, *Oncorhynchus mykiss,* threatened; Central Valley spring-run chinook salmon, *Oncorhynchus tshawytscha,* threatened; So. OR/CA coastal chinook salmon, *Oncorhynchus tshawytscha,* threatened; Sacramento splittail, *Pogonichthys macrolepidotus,* threatened; coho salmon - central CA coast, *Oncorhynchus kisutch,* threatened; Central Valley spring-run chinook, *Oncorhynchus tshawytscha,* threatened; sei whale, *Balaenoptera borealis,* endangered; blue whale, *Balaenoptera musculus,* endangered; finback (fin) whale, *Balaenoptera physalus,* endangered; right whale, *Eubalaena glacialis,* endangered; humpback whale, *Megaptera novaeangliae,* endangered; sperm whale, *Physeter catodon (macrocephalus),* endangered; salt marsh harvest mouse, *Reithrodontomys raviventris,* endangered; California brown pelican, *Pelecanus occidentalis californicus,* endangered; California clapper rail, *Rallus longirostris obsoletus,* endangered; leatherback turtle, *Dermochelys coriacea,* endangered; tidewater goby, *Eucyclogobius newberryi,* endangered; winter-run chinook salmon, *Oncorhynchus tshawytscha,* endangered; winter-run chinook salmon, *Oncorhynchus tshawytscha,* endangered; Behren's silverspot butterfly, *Speyeria zerene behrensii,* endangered; Myrtle's silverspot butterfly, *Speyeria zerene myrtleae,* endangered; California freshwater shrimp, *Syncaris pacifica,* endangered; Sonoma alopecurus, *Alopecurus aequalis var. sonomensis,* endangered; Clara Hunt's milk-vetch, *Astragalus clarianus,* endangered; Baker's stickyseed, *Blennosperma baked,* endangered; white sedge, *Carex albida,* endangered; Vine Hill clarkia, *Clarkia imbricata,* endangered; Pennell's bird's-beak, *Cordylanthus tenuis ssp. capillaris,* endangered; yellow larkspur, *Delphinium luteum,* endangered; Burke's goldfields, *Lasthenia burkei,* endangered; Pitkin Marsh lily, *Lilium pardalinum ssp. pitkinense,* endangered; Sebastopol meadowfoam,

Limnanthes vinculans, endangered; clover lupine [Tidestrom's lupine], *Lupinus tidestromii,* endangered; many-flowered navarretia, *Navarretia leucocephala ssp. plieantha,* endangered; Kenwood Marsh checkermallow, *Sidalcea oregana ssp. valida,* endangered; showy Indian clover, *Trifolium amoenum,* endangered; Sonoma spineflower, *Chorizanthe valida,* endangered; soft bird's-beak, *Cordylanthus mollis ssp. mollis,* endangered; Baker's larkspur, *Delphinium bakeri,* endangered; Hickman's potentilla (cinquefoil), *Potentilla hickmanii,* endangered; short-tailed albatross, *Diomedea albatrus,* proposed endangered; white abalone, *Haliotes sorenseni,* proposed endangered.

The USFWS indicated the following canditate species, species of concern, and critical habitats may also occur in Sonoma County:

California tiger salamander, *Ambystoma californiense,* candidate; Central Valley fall/late fall-run chinook salmon, *Oncorhynchus tshawytscha,* candidate; black abalone, *Haliotes cracherodii,* candidate; California red tree vole, *Arborimus pomo,* species of concern; Pacific western big-eared bat, *Corynorhinus (Plecotus) townsendii townsendii,* species of concern; greater western mastiff-bat, *Eumops perotis califomicus,* species of concern; long-eared myotis bat, *Myotis evotis,* species of concern; fringed myotis bat, *Myotis thysanodes,* species of concern; long-legged myotis bat, *Myotis volans,* species of concern; Yuma myotis bat, *Myotis yumanensis,* species of concern; Suisun ornate shrew, *Sorex omatus sinuosus,* species of concern; grasshopper sparrow, *Ammodramus savannarum,* species of concern; Bell's sage sparrow, *Amphispiza belli belli,* species of concern; short-eared owl, *Asio flammeus,* species of concern; western burrowing owl, *Athene cunicularia hypugea,* species of concern; American bittern, *Botaurus lentiginosus,* species of concern; ferruginous hawk, *Buteo regalis,* species of concern; Vaux's swift, *Chaetura vauxi,* species of concern; lark sparrow, *Chondestes grammacus,* species of concern; olive-sided flycatcher, *Contopus cooperi,* species of concern; hermit warbler, *Dendroica occidentalis,* species of concern; white-tailed (black shouldered) kite, *Elanus leucurus,* species of concern; Pacific-slope flycatcher, *Empidonax difficilis,* species of concern; common loon, *Gavia immer,* species of concern; saltmarsh common yellowthroat, *Geothlypis trichas sinuosa,* species of concern; Harlequin duck, *Histrionicus histrionicus,* species of concern; loggerhead shrike, *Lanius ludovicianus,* species of concern; San Pablo song sparrow, *Melospiza melodia samuelis,* species of concern; long-billed curlew, *Numenius americanus,* species of concern; rufous hummingbird, *Selasphorus rufus,* species of concern; Allen's hummingbird, *Selasphorus sasin,* species of concern; red-breasted sapsucker, *Sphyrapicus ruber,* species of concern; Xantus' murrelet, *Synthliboramphus hypoleucus,* species of concern; Bewick's wren, *Thryomanes bewickii,* species of concern; California thrasher, *Toxostoma redivivum,* species of concern; northwestern pond turtle, *Clemmys marmorata marmorata,* species of concern; California horned lizard, *Phrynosoma coronaturn frontale,* species of concern; Northern red-legged frog, *Rana aurora aurora,* species of concern; foothill yellow-legged frog, *Rana boylii,* species of concern; western spadefoot toad, *Scaphiopus hammondii,* species of concern; green sturgeon, *Acipenser medirostris,* species of concern; Russian River tule perch, *Hysterocarpus traski pomo,* species of concern;

Pacific lamprey, *Lampetra tridentata,* species of concern; Gualala roach, *Lavinia symmetricus parvipinnis,* species of concern; longfin smelt, *Spirinchus thaleichthys,* species of concern; Sonoma arctic skipper, *Carterocephalus palaernon ssp,* species of concern; sandy beach tiger beetle, *Cicindela hirticollis gravida,* species of concern; globose dune beetle, *Coelus globosus,* species of concern; brownish dubiraphian riffle beetle, *Dubiraphia brunnescens,* species of concern; Ricksecker's water scavenger beetle, *Hydrochara rickseckeri,* species of concern; Leech's skyline diving beetle, *Hydroporus leechi,* species of concern; bumblebee scarab beetle, *Lichnanthe ursina,* species of concern; northcoast sand-verbena, *Abronia umbellata ssp. breviflora,* species of concern; Blasdale's bentgrass, *Agrostis blasdalei var. blasdalei,* species of concern; Baker's manzanita, *Arctostaphylos bakeri ssp. bakeri,* species of concern; Vine Hill manzanita, *Arctostaphylos densiflora,* species of concern; reedgrass, *Calamagrostis crassiglumis,* species of concern; The Cedars globe-lily, *Calochortus raichei,* species of concern; Mt. Saint Helena morning-glory, *Calystegia collina ssp. oxyphylia,* species of concern; swamp harebell, *Campanula califomica,* species of concern; Rincon Ridge ceanothus, *Ceanothus confusus,* species of concern; Calistoga ceanothus, *Ceanothus divergens,* species of concern; Vine Hill ceanothus, *Ceanothus foliosus var. vineatus,* species of concern; Sonoma ceanothus, *Ceanothus sonomensis,* species of concern; San Francisco Bay spineflower, *Chorizanthe cuspidata var cuspidata,* species of concern; northcoast bird's-beak, *Cordylanthus maritimus ssp. palustris,* species of concern; Mendocino cypress, *Cupressus goveniana ssp. pigmaea,* species of concern; supple daisy, *Efigeron supplex,* species of concern; Snow Mountain buckwheat, *Eriogonum nervulosum,* species of concern; San Francisco wallflower, *Erysimum franciscanum,* species of concern; fragrant fritillary, *Fritillaria filiacea,* species of concern; seaside tarweed, *Hemizonia multicaulis ssp. multicaulis,* species of concern; Tiburon tarweed, *Hemizonia multicaulis ssp. vemalis,* species of concern; two-carpeled dwarf-flax, *Hesperolinon bicarpellatum,* species of concern; coast lily, *Lilium maritimum,* species of concern; Gairdner's yampah, *Perideridia gairdneri ssp. gairdneri,* species of concern; northcoast semaphore grass, *Pleuropogon hooverianus,* species of concern; Marin knotweed, *Polygonum marinense,* species of concern; California beaked-rush, *Rhynchospora calffibmica,* species of concern; Marin checkermallow, *Sidalcea hickmanii ssp. viridis,* species of concern; Contact (Socrates) Mine jewelflower, *Streptanthus brachiatus ssp. brachiatus,* species of concern; Freed's jewelflower, *Streptanthus brachiatus ssp. hoffmanii,* species of concern; secund jewelflower, *Streptanthus glandulosus var. hoffmanii,* species of concern; Three Peaks jewelflower, *Streptanthus morrisonii ssp. elatus,* species of concern; Dorr's Cabin jewelflower, *Streptanthus morrisonii ssp. hirtiflorus,* species of concern; Kruckeberg's jewelflower, *Streptanthus morrisonii ssp. kruckebergii,* species of concern; Morrison's jewelflower, *Streptanthus morrisonii ssp. morrisonii,* species of concern; alkali milk-vetch, *Astragalus tener var. tener,* species of concern; legenere, *Legenere limosa,* species of concern; Petaluma popcornflower, *Plagiobothrys mollis var. vestitus,* species of concern; Crystal Springs lessingia, *Lessingia arachnoidea,* species of concern.

The USFWS also mentioned the following State of California listed species may occur in Sonoma County:

Little willow flycatcher, *Empidonax traillii brewsteri,* state listed; black rail, *Laterallusjamaicensis cotumiculus,* state listed.[7]

The State of California did not provide information for this site. If a project does occur at this site, the state should be consulted for the presence of any state listed species in the area.

Federally endangered and threatened species are protected by Federal law and must be considered prior to project development. If the action agency determines that listed species or critical habitat may be adversely affected by a federally funded, permitted, or authorized activity, the action agency must request formal consultation with the USFWS. If the action agency determines that the planned action may jeopardize a proposed species or destroy or adversely modify proposed critical habitat, the action agency must enter into a section 7 conference with the USFWS. Candidate species are those for which there is sufficient information to support a proposal for listing. Although candidate species have no legal protection under the Act, the USFWS recommends that they be considered in the planning process in the event that they become listed or proposed for listing prior to project completion.

No additional information on the occurrence of rare or endangered species or natural communities is known at this time. This does not mean that other State or Federally listed species may not be present within the areas of interest. An on site inspection by appropriate state and federal personnel may be necessary to verify the presence, absence or location of listed species, or natural communities if remedial action is recommended as part of the final ASR.

3.6 DEMOGRAPHICS

3.6.1 Centers of Activity

The Bodega Bay Gunnery Range site is located near the city of Bodega Bay in Sonoma County, California.[8]

3.6.2 Business and Industry Profile

The number of business establishments in Sonoma County, California can be broken down by type as follows: manufacturing 6.5%; trade 26.4%; services and financial 46.8%; and other 19.1%. Of the people in the county employed by businesses, approximately 1.2% are unclassified. Foregoing percentages are at mid-March 1997.

3.6.3 Population density

City/County	Area (Sq. Mi.)	Population	Population Density (Per Sq. Mi.)
Bodega Bay	7.9	1,127	141.8
Sonoma	1,576.2	388,222	246.3

3.6.4 Types of Housing

Housing in Bodega Bay is composed of both single family and multi-family dwellings. The median value of 299 specified owner-occupied housing units is $355,100.

3.6.5 New Development in the Area

New development in the area is both commercial and residential.

3.6.6 Typical Cross Sections of the Population

Bodega Bay	Percentages
White	94.0
Black	0.0
American Indian, Eskimo or Aleut	0.1
Asian or Pacific Islander	1.9
Other	4.0
Hispanic origin	6.6
Population under the age of 18	13.1
Population over the age of 65	17.8

Median age is 45.1

4 SITE HISTORY

4.1 HISTORICAL SITE SUMMARY

4.1.1 General Site History

The Army built the **Bodega Bay Gunnery Range** (BBGR) as one of three subordinate range activities associated with Santa Rosa Army Air Field (AAF) approximately 20 miles to the northwest. The other two subordinate ranges were Tubbs Island Air to Ground Gunnery Range and Drake's Bay Air to Ground Gunnery Range.

Although a gunnery tow target existed over the water off the coast of Bodega Head by 1941, it appears that it was not until 1943 that the Army Air Forces identified a requirement for a **ground range at Bodega** Head on the west side of the small bay. The Army Air Force identified **Bodega Head** as the location for a dive bombing range needed in the San Francisco area in July 1943. By November, the Army Air Force determined that "an air-to-ground gunnery range and dive and skip bombing range will be required…a suitable site has been found in the vicinity of Bodega Bay…". The Interdepartmental Air Traffic Control Board (IATCB) approved the 4th Air Force's request for an Air to Ground Gunnery Range at Bodega Bay on 9 December 1943.[9]

By 21 February 1944, the Army had a permit of entry and was completing acquisition on two tracts of land totaling 605 acres. Construction of the BBGR, also referred to as the **Bodega Bay Air to Ground Gunnery Range** (BBAGGR) was to begin immediately thereafter. Although aligned with Santa Rosa AAF, other Army air fields in the area, such as Chico AAF, had use of this range.[10]

The research found no specific details concerning the layout for the ranges at Bodega. By the end of 1944, there were six ranges at Bodega Head, including a ground strafing range and one designated as "X-5" used for overcast firing. The dive and skip bombing missions were reportedly performed at Tubbs Island and Drakes Bay ranges, though at

least one bomb target appears to have been constructed at BBAGGR. By June 1945, Tubb's Island had been modified to accommodate rocket firing (2.25-inch SCAR) following the Continental Air Forces cancellation of the wavier on rocket firing for the 4th Air Force. There is no indication that BBAGGR was also modified for this purpose.[11]

Following the end of the war, the 4th Air Force declared Santa Rosa AAF surplus on 26 November 1945, but desired retention of BBGR[i] along with the ranges at Tubb's Island and Drake's Bay. The Continental Air Forces requested that BBGR be declared surplus the following February, but it wasn't until 29 August 1946 that the Air Corps did so. The Army canceled the two leases for BBGR by the end of March 1947 and subsequently the land was returned to private ownership.[12]

In January 1948, the 12th Naval District, headquartered at Naval Air Station Alameda, considered using portions of the Bodega Bay site as a bombing target and took several photographs of the site. A couple of the images show tall telephone pole like posts in the ground a few hundred feet inland from the high water mark of the coastline. The purpose of the poles was believed to be in conjunction with the gunnery targets, but this is only supposition. Neither these photographs nor the aerial photo analysis could confirm the locations, types or number of targets at BBGR.[13]

4.1.2 Summary of Ordnance and Explosives Activities

An investigation of historical records did not specifically indicate the types and quantities of ordnance used on site by the 4th Air Force while active. A post use inspection in February 1947 by the Corps of Engineers found the remains of two vertical gunnery targets and one bombing target "on a sandy beach, some 200-300 feet above the high tide mark". The types of OE debris found at the time included .30 and .50 caliber ammunition, M38A2 100-pound and MK V 3-pound practice bombs. Furthermore, they found debris from two M38A2 100-pound practice bombs that still contained unexploded black powder spotting charges. Assumably the miniature practice bombs included the MK 23 (iron) and MK43 (lead-antimony) versions in addition to the zinc alloy MK5. The ASR site visit confirmed the presence of OE debris from .50 caliber ammunition and MK 23 practice bombs.[14]

The use of high explosive (HE) bombs, rockets or pyrotechnics on the site was not supported by any uncovered evidence. None of the reviewed historical documents indicate these items were used on this site.

[i] Documentation subsequent to this date refers to the site as **Bodega Bay Gunnery Range**, as opposed to the wordier Bodega Bay Air to Ground Gunnery Range.

4.1.3 Summary of Chemical Warfare Material Activities

The archive search uncovered no specific documentation relating to CWM at Bodega Bay Gunnery Range. However, pilots from the Santa Rosa AAF did perform Chemical Spray Missions beginning on 13 March 1945 (i.e. 4 hours per pilot trainee). The location of the Santa Rosa AAF spray missions was not documented and it is possible that it occurred at BBGR. The archive search did not locate primary source documents indicating the fill for these spray missions but previous investigations by the Corps of Engineers found that it would have included FS (e.g. screening smoke) or CNB (e.g. tear gas). Practice spray missions of the time also typically used molasses residuum in simulated H (mustard)[15].

4.1.4 Certificates of Clearance

With the declaration of surplus for Bodega Bay Gunnery Range in August 1946, the real estate disposal branch of the Corps of Engineers requested a certified report noting that the site was decontaminated, and/or neutralized. The 4th Air Force responded that this could not be accomplished since it was an over water target. This assessment proved erroneous, as in February 1947 a representative from the Corps of Engineers inspected the site and found OE debris from .30 and .50 caliber ammunition, M38A2 100-pound and MKV 3-pound practice bombs. Furthermore, they found parts of two M38A2 "still contained unexploded black powder spotting charges". The archive search did not reveal any subsequent certificates of ordnance clearance, decontamination or dedudding associated with BBGR.[16]

4.2 REVIEW OF HISTORICAL RECORDS

Appendix A contains full references of all in text citations along with the location of the copied document. The research team searched at the following locations for records relating to OE and CWM activities at Bodega Bay Gunnery Range. At these repositories the research team used finding aids and records managers to assist in locating documents relevant to the research topic. The ASR team also accumulated complementary documents reviewed on Bodega Bay Gunnery Range but not specifically used. These complementary documents are stored with the original ASR documents. Appendix H lists additional repositories and personnel contacted which reported no pertinent information.

4.2.1 National Archives at College Park, Textual Records

8601 Adelphi Road
College Park, MD 20740
POC: Rich Boylan
301-713-6800

Record Group 18 (Records of the Army Air Forces)

Entry 1A, Air Adjutant General Mail and Records Division Classified Records
Confidential and Secret Decimal Correspondence File, 1945
Box 558, Decimal 660-686

Entry 1C, Air Adjutant General Mail and Records Division Classified Records
Bulky Confidential and Secret Decimal Correspondence File, 1945
Boxes 673-674

Entry 1D, Air Adjutant General Mail and Records Division Classified Records
Decimal Confidential and Secret Decimal Correspondence File, 1946-1947
Box 672

Entry 1F, Air Adjutant General Mail and Records Division Classified Records
Bulky Confidential and Secret Decimal Correspondence File, 1945-48
Box 772

Entry 1G, Air Adjutant General Mail and Records Division Classified Records
Confidential and Secret Decimal Correspondence File, 1945-1948
Boxes 839-840

Entry 1I, Air Adjutant General Mail and Records Division Classified Records
Bulky Confidential and Secret Decimal Correspondence File, 1945-1948
Box 866

Entry 2A, Air Adjutant General Mail and Records Division Classified Records
Decimal File Unclassified Correspondence, 1944-1946
Boxes 2256-2257, 2275-2281, 2308

Entry 2C, Air Adjutant General Mail and Records Division Classified Records
Decimal File Unclassified Correspondence, 1947
Boxes 2797-2798

Entry 2E, Air Adjutant General Mail and Records Division Classified Records
Decimal File Unclassified Correspondence, 1948
Boxes 3191-3192

Entry 292A, Air Adjutant General Mail and Records Division Classified Records
Central Decimal File Unclassified Correspondence, 1942-1944
Boxes 1473, 1514, 1641-1642

Entry 294A, Air Adjutant General Mail and Records Division Classified Records
Central Decimal File Unclassified Correspondence, 1942-1944
Boxes 789-798

Entry 294B, Air Adjutant General Mail and Records Division Classified Records Bulky Central Decimal File Unclassified Correspondence, 1942-1944
Boxes 1446-1452

Record Group 48 (Records of the Office of the Secretary of the Interior)
Entry 749B, Central Classified Files 1937-52
Boxes 3220-3221 (2-68)

Record Group 71 (Records of the Bureau of Yards and Docks)
Entry 18, Location of Naval Activities, October 1944 & June 1945
Box 1

Entry 24 (former Acc 3305) Unprocessed Naval Property Case Files, 1940's
Boxes 16, 21, 33-34

Entry 74A, Misc. Records, Plans Charts of Harbors Naval Bases and Airfields, 1938-54
Boxes 1-6

Entry 1008, Correspondence Relating to Inter-Federal Agency Transfer of Facilities to and From Navy Department, 1944-46
Box 1

Entry 1016, Navy Land Acquisition Report of the Real Estate Division 1 July 1940-31 Dec. 1943
Boxes 1 - 4

Entry 1017, Land Purchase Progress Reports 1942-45
Box 1, Land Purchase Progress Reports 1942 - 1945

Entry 1019, Misc. Reports and other Records Regarding Land Investigations
Boxes 1-4

Entry 1030, Report of Army Facilities Acquired in 1944
Box 1

Entry 1037, Lease Files, 1941-47
Boxes 1, 4-5, 8, 10 & 12

Record Group 72 (Records of the Bureau of Aeronautics)
Entry 62B, General Correspondence, 1943-45
Boxes 1-5, 91, 883-884, 2437, 2808-2814, 2817-2819, 2834-2836, 2858, 2864-2865, 3065-3071, 3075, 3388-3389, 3414-3415, 3461-3462

Entry 171, Histories of BuAer, 1941 – 1947
Boxes 1 - 6

Record Group 77 (Records of the Office of the Chief of Engineers)
Entry 391B, Construction Completion Reports, 1917-43
Box 73, William Northern – Oakland Airport

Entry 433 Project and Geographic Files (Old Accession 77-52A-0259)
Box 11

Entry 435, Geographic and Project Files (Former 77-53A-0325) Construction Files from 1949-50
Boxes 12 & 31

Entry 1011, Security Classified Subject Files 1941-45 (Geographic File)
Boxes 41-45, 453

Entry 1021, Records Relating to Inactive Air Stations (Real Estate Files) 1943-1959
Boxes 2-3

Entry 1023, General Correspondence Relating to Airfields and Related Facilities, 1940-45
Boxes 16-58, Decimals 600 through 686

Record Group 107 (Records of the Office of the Secretary of War)
Entry 102, General Correspondence Files, Stimpson, Aviation Fields and Bombing Ranges
Boxes 126, 128, 131 and 132

Entry 211, Establishment of Airfields and Air Bases, 1940-1945
Boxes 203-204

Record Group 127 (Records of the Marine Corps)
Entry 18A, Office of the Commandant, General Correspondence 1939 – 1950
Boxes 210-211

Entry 1011, World War II Subject File
Boxes 4, 30-31, 42

Record Group 159 (Records of the Office of the Inspector General)
Entry 26D, General Correspondence, 1939-47
Boxes 460-461

Record Group 175 (Records of the Office of the Chemical Warfare Service)
Entry 2, Index Briefs
Boxes containing Hamilton

Record Group 237 (Records of the Federal Aviation Administration)
Entry 37, Minutes of the IATCB, 1941-46
Boxes 1-4

Record Group 341 (Records of Headquarters U.S. Air Force (Air Staff)
Entry 494, Correspondence Relating to Real Estate Facilities, 1948-1955
Boxes 17, 32, 71-72, 94, 140-141, 212-214, 305-306

Record Group 407 (Records of the Adjutant General's Office 1917-)
Entry 363A, Project Decimal File, 1940-45
Boxes 4047 & 4369

4.2.2 National Archives at College Park, Cartographic & Architectural Branch

8601 Adelphi Road
College Park, MD 20740
POC: Henry Gwiazda, RG 71
301-713-7040
POC: Sam Welch

The research team consulted the *Catalogue of Nautical Charts, July 1946* to locate the charts of interest to this investigation.

Record Group 23 (Records of the U.S. Coast and Geodetic Survey); filed under Record Group 370 (Records of the National Oceanic and Atmospheric Administration
Entry Nautical Charts
Folder Chart 5603, Bodega and Tomales Bays
Folder Chart 5502 San Francisco to Point Arena
Folder Chart 5702

Record Group 23 (Records of the U.S. Coast and Geodetic Survey); filed under Record Group 370 (Records of the National Oceanic and Atmospheric Administration
Entry Sectional Aeronautical Charts – Sacramento
Folders 1 and 2

The research team reviewed the Military Posts Finding Aids, identifying the following items:

Record Group 77 (Records of the Office of the Chief of Engineers)
File No. 6754 Hamilton Field, CA

4.2.3 National Archives at College Park, Still Pictures Branch
8601 Adelphi Road
College Park, MD 20740
POC: Reference Desk
301-713-6795

Record Group 111 (Records of the Office of the Chief Signal Officer)
File Card index with 4 categories:
1941-54

4.2.4 National Archives and Records Administration –Pacific Region San Bruno
1000 Commodore Dr.
San Bruno, CA 94066-2350
POC: Kathy O'Connor
650-876-9009

The research team reviewed the finding aids for the following:

Record Group 49 (Records of the Bureau of Land Management)
Record Group 121 (Records of the Public Building Service)
Record Group 181 (Records of the Naval Districts and Shore Establishments)
Record Group 269 (General Records of the General Services Administration)
Record Group 270 (Records of the War Assets Administration)
Record Group 291 (Records of the Federal Property Resource Service)

They reviewed the following entries:

Record Group 121 (Records of the Public Building Service)
Entry Real Property Disposal Project Files, 1950-1957
Box 10

Record Group 181 (Records of the Naval Districts and Shore Establishments)
Entry 12th Naval District - Public Works Office, Airbase Real Estate Acquisition Files, 1942-58 [Accession NN373-91 (181-61-0096)]
Boxes 1-12
Entry 12th Naval District - Public Works Office, Real Property Records, 1952-60 [Accession NN373-91 (181-61-0096)]
Boxes 1-12
Entry 12th Naval District - Public Works Office, Naval Air Bases [Accession 181-60-64]
Rolls 1-7

4.2.5 National Personnel Records Center Military Personnel Records (NPRC, MPR) 9700 Page Avenue St. Louis, MO 63132-5100 POC: John Daly, Archivist 314-538-4107

Record Group 342 (Records of United States Air Force Commands, Activities, and Organizations)

Accession 342-49H6037, Air Training Command Randolph Installation Development
Boxes 6, 10, 24 &37-39
Accession 342-50A4003, Flight Training Command Western
Box 8
Accession 342-50F4003, Flight Training Command Western
Boxes 20-21, 26 & 28
Accession 342-51B3003, 566th Air Bomb Group Vetinspec
Box 1
Accession 342-52B3007, Wright Patterson General Correspondence
Box 9
Accession 342-53F5038, Air Material Area Sacramento Installation Development
Box 6
Accession 342-53F6017, Air Defense Command Ent Installation Development
Boxes 3 & 6
Accession 342-53A6039, Castle AFB Installation Development
Boxes 1-2
Accession 342-54G4045, Air Material Command W-Patterson Installation Development
Box 3
Accession 342-54H4046, Air Material Command Wright Patterson Property
Box 1
Accession 342-54-7023, 4th Air Force Hamilton General Correspondence
Boxes 1-7
Accession 342-55F6041, Air R&D Command General Correspondence
Box 2
Accession 342-57A015, Technical Training
Box 1
Accession 342-57C3001, 4th Air Force Organization And Planning
Boxes 6 & 10
Accession 342-57D3001, 4th Air Force General Correspondence
Boxes 4 & 5
Accession 342-57H3001, 4th Air Force Installation Development
Boxes 1-23
Accession 342-57I3001, 4th Air Force Installation Development
Box 1

Accession 342-57J3001, 4th Air Force General Correspondence
Box 1
Accession 342-57K3001, 4th Air Force General Correspondence
Box 1
Accession 342-57M3001, 4th Air Force Installation Development
Box 1
Accession 342-57Q3001, 4th Air Force General Correspondence
Box 1
Accession 342-57S3001, 4th Air Force Installation Development
Box 1
Accession 342-58F6143, Rome Airfield Plt Rec
Boxes 1, 5, 8, 9 & 13
Accession 342-59O3352, Air Material Command W-P General Correspondence
Box 18
Accession 342-76A0020
Box 1
Accession 342-76B0020
Box 1
Accession 342-76A0021
Boxes 1-2

4.2.6 Federal Records Center–Pacific Region San Bruno

1000 Commodore Dr.
San Bruno, CA 94066-2350
POC: Richard Boyden
650-876-9084

The research team reviewed the 01 listings for Record Group 77 (Records of the Chief of Engineers) but found no information for review.

4.2.7 U.S. Air Force Historical Research Agency

USAFHRA\HO
600 Chennault Circle
Maxwell AFB, AL 36112-6424
POC: Archie Difante
334-953-2447

U.S. Army Air Corps Records
284.04-19, Hamilton Air Force Base, CA, July – December, 1947
Microfilm Roll A4171, 452.01 4th Fighter Command
Microfilm Roll B2555 - B2558, 284.04 Hamilton Army Airfield, CA

U.S. Army Corps of Engineer Records
Box 02023530 - 02023561 Gunter, AL - Hamilton Army Airfield, CA

Box 02023562 - 02023595 Hamilton Army Airfield, CA
Box 02023596 - 02023630 Hamilton Army Airfield, CA
Box 02023631 - 02023650 Hamilton Army Airfield, CA
Box 02023651 - 02023667 Hamilton Army Airfield, CA
Box 02023668 - 02023672 Hamilton Army Airfield, CA
Box 02023674 - 02023696 Hamilton Army Airfield, CA

4.2.8 U.S. Army Corps of Engineers - Sacramento District
Real Estate Division
1325 J St., 13th Floor
Sacramento, CA 95814-2922
POC: Lucille (Lucy) Ono, Cadastral Section
916-557-5312

The research team reviewed the final audit files in Cadastral Section's secure area and on microfiche for the subject sites, finding no information on this specific project.

4.2.9 U.S. Army Corps of Engineers - Sacramento District
Information Management Division, Records Management
1325 J St., 9th Floor
Sacramento, CA 95814-2922
POC: Pam Ammo
916-557-7079

The research team reviewed the Record Locator SF 135s for the Sacramento District's temporary Records Holding Area (currently Capital Records Management, formerly Bryte Yard Records Holding Area):

Real Estate Division Management and Disposal Branch
Real Estate Division Acquisition Branch
Real Estate Division Planning and Control Branch

Based on these lists they reviewed the following boxes (RE microfiche boxes 48064 and 72901 were ignored since duplicates were reviewed at the RE Cadastral Section):

Capital Records Mgmt Box
Box 67999
Folder Bodega Bay Gunnery Range

4.2.10 U.S. Army Corps of Engineers - Sacramento District
Engineering Division, Geotechnical and Surveys Branch
1325 J St., 11th Floor
Sacramento, CA 95814-2922
POC: Julie Dickinson
916-557-7151

The research team reviewed the index cards for military survey books and aerial photographs in the Survey Section File Room (1101) but found no pertinent information relating to the subject sites.

4.2.11 U.S. Army Corps of Engineers - Sacramento District
Engineering Division, DERP-FUDS
1325 J St., 12th Floor
Sacramento, CA 95814-2922
POC: Gerald Vincent, Program Manager
916-557-7452
POC: James P. McAlister
916-557-7401

The research team reviewed the INPRs for the following sites to see how they related to the subject sites:

J09CA7288	San Pablo Bay NWR
J09CA7289	Point Reyes NWR (Drake's Bay)
J09CA7290	Bodega Head Range

4.2.12 U.S. Army Corps of Engineers - Sacramento District
Engineering Division, Military Design Branch
Engineering, Technology and Specification Section
CADD Management and Archives Unit
1325 J St., 10th Floor
Sacramento, CA 95814-2922
POC: Raymond Dennis
916-557-7244

The research team visited the Engineering Division's Map Files room. Sacramento is the military Design District for California, Utah, Nevada and Arizona (LA District has retained the Construction mission since the late 1960's). Sacramento had the Design mission for Washington, Oregon, Idaho and Montana before it was transferred to Seattle. Old LA District design files have been archived on 105mm film, while Sacramento District files are on 35mm film aperture cards. The research team reviewed notebooks on:

Installation Names: Each installation has been given a unique three-digit number. Drawings are created in sequential order. They have a database of all the drawings they created. We received a print out.

FRC (Military-DAs and Topos)

Transfers (Sacramento to Various Military Agencies #1 and #2)

Note: The following three repositories were consulted for aerial imagery of the site. Yellow shading indicates that historical imagery was actually acquired for use in aerial photography interpretation and analysis.

4.2.13 National Archives at College Park, Cartographic & Architectural Branch

8601 Adelphi Road
College Park, MD 20740
POC: Henry Gwiazda, RG 71
301-713-7040

The research team also consulted *Aerial Photographs in the National Archives-Special List 25*, dated 1990, for available imagery from:

Record Group 57 (Records of the U.S. Geological Survey)
Record Group 95 (Records of the U.S. Forest Service)
Record Group 114 (Records of the Soil Conservation Service)
Record Group 145 (Records of the Agriculture Stabilization and Conservation Service)

Using the indexes, the following imagery was available for acquisition:

Date	RG	Scale	Old Can	New Can	IM/NUS#	Frames	Frame Quantity
6 Oct 47	95	1:20,000	3843			CDF2-8-161	1
4 Aug 53	145	1:20,000		ON36633	10280751	CSH-9K-79 to 82	4

The research team also consulted the aerial photo coverage overlays in Record Group 373 (Records of the U.S. Defense Intelligence Agency) for imagery at 1:40,000 scale or better covering the area. They pulled the index sheets for N38 W123.

Date	RG	Scale	Old Can	New Can	IM/NUS#	Frames	Frame Quantity
12 Dec 42	373 Box 550	1:26,000	2A-55	ON008693	10185037	525 to 528	4

4.2.14 U.S. Department of Agriculture - Aerial Photography Field Office

2222 W 2300 S
Salt Lake City, Utah 84119-2020
POC: Sharon McGiff
801-975-3503

CEMVS-ED-S tasked a Contractor to perform an initial search of available imagery for Sonoma County, CA. The imagery which covered the site includes:

Year	Program	Scale	Film Type	Frames	Comments	Frame Quantity
1961	NRCS	1:20,000	B/W	CSH-4BB-1 to 5, 4BB-66 & 67		7
1987	NAPP1	1:40,000	CIR	520-53, 54, 96 to 99		6
1993	NAPP2	1:40,000	B/W	6364-105 to 108, 6362-233 & 234		6
1998	NAPP3	1:40,000	B/W	10534-16 & 17	11 September 1998	2
1998	NAPP3	1:40,000	B/W	10537-39 to 42	7 September 1998	4

4.2.15 U.S. Geological Survey - EROS Data Center
Sioux Falls, South Dakota 57198
POC: Kimberly Kringen
605-594-6151 ext. 2075

CEMVS-ED-S tasked a Contractor to perform an initial search of available imagery for Bodega and located coverage during the following times:

Year	Scale	Entity ID	Film Type	Frames	Frame Quantity
2/11/71	1:24,000	ARDC1VCUM0041081 0	B/W		

ACO Date	Project Name	Roll	Frame #	Flight Line	Station	Film Type	Frame Quantity
9/11/98	NAPPW	10534	16	1231W	460	B/W	1
9/11/98	NAPPW	10534	17	1231W	459	B/W	1
9/7/98	NAPPW	10537	40	1231E	460	B/W	1
9/7/98	NAPPW	10537	41	1231E	459	B/W	1

4.3 SUMMARY OF INTERVIEWS

The archive search team conducted telephone and personal interviews to assist in the collection of information for this report. Appendix H lists interviewees and copies of

pertinent individual conversation records. The team attempted to locate persons with first hand knowledge of Bodega Bay Gunnery Range. The interviews primarily reported finds of OE debris found in the past confirming the use of the site as a strafing and practice bombing target. Contact with local law enforcement hazardous device squads and military Explosive Ordnance Disposal (EOD) units resulted in negative incident reports of OE or CWM in this area.

4.4 AIR PHOTO INTERPRETATION AND MAP ANALYSIS

4.4.1 Map Analysis

The ASR team did not locate a site-specific layout plan for Bodega Bay Gunnery Range or any map delineating the real estate boundaries spatially. The ASR team mapped the site boundaries using current Sonoma County Tax Assessor maps and the tract descriptions. While mapping the tract boundaries, two errors became apparent. On the 230-acre tract, the distance from point "B53" is 32.90 chains (i.e., 2,171.40 feet) as opposed to the stated 39.90 chains, based on the stated and shown distance on the Assessor map. A second error appears on the 375-acre tract. The stated direction of "north 47 ½ degrees west" from point "B54" should probably be north 31 3/4 degrees east, to match the survey line of the assessor map along the coast. The other points followed the tract lines shown on the map. The calculated area approximated the stated values.[17]

4.4.2 Air Photo Interpretation

Government and contractor personnel conducted an aerial photography database search (included in section 4.2). The aerial photography retrieved covered Bodega Bay Gunnery Range prior to and following military use. The imagery acquired is in photographic print format. The analyst performed the interpretation using the following source materials:

PHOTO DATE	APPROX. SCALE
12 December 1942	1:26,000
6 October 1947	1:20,000
4 August 1953	1:20,000
7 September 1998	1:40,000

The analyst delineated imagery containing important areas on hard copy plots and digitized it using Computer-Aided Drafting and Design (CADD) software. The digitized features overlay scanned aerial photography, resulting in the final plots. The analysis involved using stereo viewing of photography, which allows more accurate identifications than monoscopic interpretations. The resolution and scale of the imagery limited the identification of features discussed in this study. The analyst used the word "probable" when discussing features for which identification is reasonably accurate. The analyst used the term "possible" when identification was not positive, but the object/area matched known features/locations on other sources. Analysis of the aerial photographs

referenced the site maps discussed in sections 4.4.1 above. The boldfaced numbers in parentheses referenced in the sub-paragraphs below refer to the feature descriptions on the annotated aerial photography plates.

Imagery was acquired before and within a few years after the Army's use of the site. The 1942 imagery shows the condition of the site 14 months before the Army acquired the property. The site is undeveloped except for a few homes on the east side of Bodega Head, which were not included in the two tracts that the Army leased. The northern portion of the site is dominated by dunes, beginning at the edge of high tide and continuing across the head. The southern end is higher and cliffs mark the coast line.

Unfortunately, the later imagery of 1947 and 1953 doesn't show much more, and there is no discernable evidence of the targets or the Army's use remaining. The single 1947 photograph comes about two years after the Army was actively using the property and only covers the northern portion of the site. According to a 1947 report at least a couple of the targets sat "on a sandy beach, some 200-300 feet above the high tide mark". There is no distinguishable feature that appears related to strafing and bombing visible.

The 1953 imagery covers the entire site, with stereo pairs, but does not add any clues as to the target locations. The dunes remain in the same location as in 1942 and 1947 but are perhaps more vegetated. The later imagery was reviewed for additional evidence of the military's use of the site, though no features of any significance beyond those described above were noted.

5 REAL ESTATE

5.1 CONFIRMED DOD OWNERSHIP

The former Bodega Bay Gunnery Range consisted of a total stated area of 605 acres. It consisted of 2 tracts, 230 and 375 acres, respectively. By 21 February 1944, the Army had a permit of entry and was completing acquisition on the two tracts of land. Following the surplus of the of property in August 1946, the Army canceled the leases for the 375 acre parcel (i.e. W04-193 eng 6156) on 31 March 1947 and for the 230 acre parcel (W04-193 eng 3203) on 28 February 1947. These real estate figures concur with the acreage numbers stated in the INPR (Appendix D-1).[18]

5.2 POTENTIAL DOD OWNERSHIP

Based on available information (e.g. historical documents, aerial photos, interviews, etc.), the archive search did not identify any additional areas of undocumented military ownership associated with Bodega Bay Gunnery Range. However, when range safety fans or OE potential range cells are drawn for this site, they extend beyond the acquired FUDS boundaries and potentially represent land use by the DoD. The archive search did not find direct evidence of OE hazards on the real estate contained within these fans beyond the FUDS boundary. The DoD accepts responsibility for remediation of OE hazards resulting from their activities. If DoD OE hazards exist on real estate never acquired, they are generally eligible for cleanup under the Defense Environmental Restoration Program.

5.3 SIGNIFICANT PAST OWNERSHIP OTHER THAN DOD

This investigation did not reveal any significant past ownership of Bodega Bay Gunnery Range with relationship to OE or CWM.

5.4 PRESENT OWNERSHIP

Records reviewed indicate that the majority of the former Bodega Bay Gunnery Range is part of the Sonoma Coast State Beach, Russian River/Mendocino District, California State Parks and the Bodega Marine Laboratory under the University of California-Davis. Portions are owned by private residences as well.

6 SITE INSPECTION

6.1 GENERAL PROCEDURES AND SCOPE

An ASR site inspection is limited in scope to a visual, non-intrusive inspection of the areas suspected of having an OE or CWM hazard potential. This potential is based on an analysis of the collected information. Prior to the inspection, the Archive Search team determines the areas of the site to investigate. The team follows a site safety and health plan (SSHP) prohibiting digging or handling of potential OE and CWM. The SSHP defines standard operating procedures to ensure safety and prevent accidents. Appendix L-1 contains a copy of the SSHP. The inspection team consisted of the following St. Louis District Corps of Engineers personnel: Randal Curtis, Alix Borrok, and George Sloan. They performed the site survey on the morning of Tuesday, 28 August 2001. Subsection 6.2 contains a synopsis of the site inspection and Appendix L-2 contains a detailed account. Appendix I includes current site photographs.

6.2 SITE INSPECTION SYNOPSIS

The ASR site visit team met with Peter Connors (707-875-2020) at the main offices of the Bodega Marine Laboratory under the University of California-Davis. Mr. Connors is the Reserve Manger and has been at the labs at the Bodega Marine Reserve (BMR) since 1971. The BMR occupies approximately the southern half of the former range, with the northern portion being primarily a part of the Sonoma Coast State Beach, Russian River/Mendocino District of the California State Parks system.

The team held a short meeting reviewing the aerial imagery, the general history of the site, and the types of OE related items expected to be found at this location. Among the items discussed was how the ASR team could not identify the location of any of the strafing targets or the bombing target based on analysis of the aerial imagery. Mr. Connors described having found lots of rusted metal fragments in the dunes just north of the labs, but only a few pieces of any noteworthy size or that were complete. He confirmed the use of iron AN-MK23 miniature practice bombs by showing the team a complete but highly corroded example of one he had found in the past. He also showed the team about a dozen brass cartridge cases and a projectile from expended .50 caliber machine gun rounds that he has found in the sand dunes over the years. The casings all had WWII era manufacturing dates and locations on the head stamps. He does not remember ever seeing remnants matching the OE data sheet depictions of practice rockets.

Mr. Connors also produced a series of original Naval photographic prints from January 1948 for the "Proposed bombing site Bodega Bay...". He was able to identify the specific location where most of them were taken as they included distinct rock outcrops or other elements of Bodega Head (e.g. Mussel Point, Horseshoe Crab, etc.). He was less certain as to the exact location of the images of the sand dunes to the north of the lab

buildings, which appear to lie primarily on the Sonoma Coast State Beach. Two of the images show tall telephone pole like posts in the ground a few hundred feet in land from the high water mark of the coastline. They were interior to a fence line that was a couple of hundred feet inland from the coastline. The purpose of the poles was believed to be in conjunction with the gunnery targets but this is only supposition. A third 1948 photograph was labeled "shells buried by sand" but it did not clearly show any OE debris and it was impossible to determine its location. Mr. Connors made copies of the three images for the ASR team and then accompanied the team to the area in the dunes where most of the rusted fragments could be found.

As the team walked to the dunes, Mr. Connors reported that dune grass was planted in several areas beginning in the 1920's, though the planting program did not come into full swing until the 1950's. This has resulted in the dunes remaining fairly stable in the region over time. Entering a dune basin with sparse vegetation, the team began finding small, highly corroded, bits of metal that were not easily identifiable as OE debris. A few larger pieces had portions of curves allowing them to be recognized as bits of .50 caliber machine gun links, but only fragments were found. As the team continued NW along the devegetated basin, the metal fragments found were thicker and more fragments were found together in areas of less than a foot square. Examination of the fragments indicated that these were the extremely deteriorated remains of iron AN-MK23 miniature practice bombs. The ASR team used a GPS to establish the location of the approximate center of

the bomb fragments as the target center, though no other feature helped confirm this.[ii] Mr. Connors parted company with the team at this point.

The site visit team continued their traverse of the site heading northeast, crossing over the strands of wire fence line marking the boundary of BMR with the Sonoma Coast State Beach. Contemporary textual documents describe the strafing target locations as being "on a sandy beach, some 200-300 feet above the high tide mark", which is the area that the site visit team attempted to follow. The State Park established a horse trail paralleling the coastline roughly in this vicinity. The team avoided the well-traveled trail but paralleled it on either side, hopeful of finding evidence of the targets or less likely the projectiles. Continuing for roughly a mile and a quarter northeast of the bomb target, the team found no clear evidence of the Army's use of the site. They found a few weathered boards and barbed wire at one spot but the source was unknown. Piles of partially burnt wood at other locations suggests that much of the fence line depicted in the 1948 Naval imagery as well as other target material has long since been consumed by beach bon fires. The team returned by following a roughly parallel traverse a few hundred feet further landward, but as before, did not locate any OE debris until within a few hundred feet of the bomb target. They traveled up and down a few of the devegetated dune basins that were perpendicular to the main traverse and appeared similar in appearance to the bomb target basin. This also proved ineffective in locating OE debris.

Prior to departing the FUDS, the team drove south to the Bodega Head portion of the FUDS. Bodega Head sits on the Californian crustal plate (the dunes are on the point where the San Andreas Fault meets the Pacific Ocean). There was no evidence that a target was located on this portion of the FUDS based on interviews with Sonoma Coast State Beach personnel, textual descriptions of the targets or aerial imagery analysis. A traverse was not performed.

Range Feature Locations Acquired with GPS (Garmin Etrex Legend)		
Latitude	**Longitude**	**Feature**
N38° 19.254'	W123° 04.269'	Bodega Bombing Target Approximate Center Site Visit

[ii] Coordinates were taken with a Garmin Etrex Legend (Global Positioning System) receiver using mapping datum WGS 1984.

7 EVALUATION OF ORDNANCE POTENTIAL

7.1 CONVENTIONAL ORDNANCE CONTAMINATION

The archive search uncovered evidence that the Army utilized conventional ordnance at Bodega Bay Gunnery Range (BBGR). The types of ordnance and explosives associated with the site included small arms and practice bombs. This information was gathered from documentation, maps, aerial photography analysis and interviews. None of the reviewed information indicated any other ordnance related operations at BBGR.

The ASR team did not find an overt indication of a current ordnance and explosive hazard at BBGR. Research discovered no historical records indicating ordnance disposal on site. Interviews did not disclose any incidents of ordnance or explosive hazards found in the past. Aerial photography analysis did not locate any distinct signs of the targets or of on-site burial. Additionally, the site inspection did not uncover evidence of ordnance or explosive hazards.

7.2 CHEMICAL WARFARE MATERIAL CONTAMINATION

The archive search uncovered no evidence of chemical warfare materials storage or disposal at Bodega Bay Gunnery Range however, the 4th Air Force potentially used the site for spray missions. It is known that pilots from Santa Rosa Army Air Field (AAF) performed 4 hours of chemical spray missions per trainee, though the location was not determined. BBGR as one of the three range activities associated with Santa Rosa AAF was potentially used for this training. The types of material used during this training were not specifically determined but would typically include the use of screening smoke (e.g. FS), CNB (e.g. tear gas) and/or molasses residuum to simulate H (mustard). The archive search uncovered no evidence to indicate that toxic/lethal chemical agents were ever used at BBGR. The site inspection did not uncover any evidence of CWM hazards.

8 TECHNICAL DATA OF ORDNANCE AND EXPLOSIVES

8.1 POTENTIAL OE AND CWM ITEMS

The archive search identified the following ordnance items associated with Bodega Bay Gunnery Range. The team compiled this list from maps, documentation, the site visit and EOD incident reports.

Small Arms
- Caliber .30
- Caliber .50

Bomb, Practice
- Bomb, Practice, Miniature
- Bomb, Practice, M38A2
- Bomb, Practice, Mk 15

The archive search did not uncover specific evidence of CWM with the former Bodega Bay Gunnery Range, however it was possibly used in conjunction with chemical spray missions. The CWM materials typically associated with spray missions include smoke (e.g. FS and FM), tear gas (e.g. CNB), and simulated Mustard (e.g. molasses residuum). No evidence of was found that more lethal CWM agents were ever used on site.

8.2 DESCRIPTION OF CONVENTIONAL ORDNANCE

The following sections in Appendix C contain Ordnance Technical Data Sheets of typical examples[iii] of OE items identified with Bodega Bay Gunnery Range:

Page No.	Ordnance Technical Data Sheets[19]
C-2	Miniature Practice Bombs AN-Mk 5 Mod 1, AN-Mk 23, AN-Mk 43, and Mk 19
C-3	Bomb, Practice, 100-lbs, Mk 15 Mod 3
C-4	Bomb, Practice, 100 pound, M38A2
C-5	Spotting Charges, M1A1, M3, M5
C-6	Small-Arms Ammunition

8.3 DESCRIPTION OF CHEMICAL WARFARE MATERIALS

The typical examples of CWM items identified with Army Air Field practice spray missions from World War II include:

iii These are general descriptions and may not include all the specific variations of a particular ammunition item. This list is compiled from documentation found on the site and may not be comprehensive.

Tear Gas (CNB)

CNB consists of 10% (by weight) Agent CN (Chloroacetopheno), 45% Carbon Tetrachloride, and 45% Benzene. CNB was adopted as a standard liquid lacrimator (tear agent) in 1920 and was used until replaced by agent CNS.

Mustard simulants

The standard simulant for mustard agent is MR (molasses residuum). This is a mixture of 25% molasses residuum and 75% water. Molasses residuum is the residue from the production of molasses.

Smokes

The standard liquid smokes used in spray missions are FM and FS. The standard smoke, FM (Titanium Tetrachloride) was replaced by FS (Sulfur Trioxide) primarily due to the lesser cost of FS.

9 EVALUATION OF OTHER SITE INFORMATION

The archive search did not reveal any additional areas of potential environmental concern associated with the military use of Bodega Bay Gunnery Range.

APPENDIX A

REFERENCES

The following list of references only represents the items cited in preparation of this report, and does not illustrate all the documents reviewed or copied for the backup files (see Records Review section 4.2 for further details). Source listings for locating each underlined reference are noted and printed portions are included in this ASR. Furthermore, underlined references are hyperlinked to scanned images of the backup documents on the digital version of this report. References that are not underlined are generally available and not reproduced for this report.

Section 2.0 PREVIOUS SITE INVESTIGATIONS

[1] Corps of Engineers – Sacramento

1999 *Inventory Project Report Bodega Bay Gunnery Range, Sonoma County, CA, FUDS Site No. J09CA7290,* May 1999.

Appendix D-1

[2] Section 3.2 CLIMATIC DATA

Federal Climate Complex Asheville, NC.

1996 *International Station Meteorological Climate Summary, Version 4.0 CD ROM*, September 1996. Jointly produced by: Department of the Navy - Fleet Numerical Meteorology and Oceanography Detachment, National Oceanic and Atmospheric Administration- National Climate Center and the U.S. Air Force Environmental Technical Application Center (USAFETAC) OL-A.

National Oceanic and Atmospheric Administration National Ocean Service (NOS)

2001 Center for Operational Oceanographic Products and Services (CO-OPS) website information downloaded http://www.co-ops.nos.noaa.gov/ June 2001.

[3] Section 3.3.1 GEOLOGY

California State Department of Water Resources

1975 *Evaluation of Ground Water Resources: Sonoma County.* Bulletin 118-4, 177 p., 2 maps.

[4] Section 3.3.2 SOILS

Miller, Vernon C.

1972 *Soil Survey of Sonoma County, California.* US Department of Agriculture, Soil Conservation Service, in cooperation with the University of California Agricultural Experiment Station.

[5] Section 3.4.1 SURFACE WATER HYDROLOGY

Environmental Protection Agency (EPA)

2001 Data downloaded from http://cfoub1.epa.gov/sirf/locate/index.cfm in July 2001.

National Oceanic and Atmospheric Administration National Ocean Service (NOS)

2001 Center for Operational Oceanographic Products and Services (CO-OPS) website information downloaded http://www.co-ops.nos.noaa.gov/ June 2001.

U.S. Geological Survey

1972 *Bodega Head, Quadrangle, California - Sonoma County, 7.5 Minute Series (topographic)*, dated 1972.

U.S. Geological Survey

2001 Data downloaded from http://water.usgs.gov/nws in July 2001

[6] Section 3.4.2 GROUND WATER HYDROLOGY

California State Department of Water Resources

1975 *Evaluation of Ground Water Resources: Sonoma County.* Bulletin 118-4, 177 p., 2 maps.

[7] Section 3.5 ECOLOGY

U.S. Fish and Wildlife Service (USFWS) Sacramento, CA

2001 Official correspondence, dated 17 April 2001 (Correspondence Reference # 1-1-01-SP-1738)

[8] Section 3.6 DEMOGRAPHICS

U.S. Department of Commerce - Bureau of the Census

1990 *Census of Population and Housing*, Bodega Bay, California

1990 *Census of Population and Housing*, Sonoma County, California

1994 *County and City Data Book, Land Area and Population*, Sonoma County, California

1994 *County and City Data Book, Land Area and Population*, Bodega Bay, California

1997 *County Business Patterns*, Sonoma County, California

[9] Section 4.1 HISTORICAL SITE SUMMARY (cited references only)

Chief of the Air Corps, War Department

1941 *Letter regarding bombing and gunnery ranges being used by the Army Air Corps adjacent to shore lines,* 27 February 1941. RAG 342, Acc. 342-49H-6037, Box 38, Folder: 684 October 1941 NPRC (MPR), St. Louis, MO.

Appendix E-9

Army Air Forces, Headquarters

1943 *Memo: Status and Requirements of Bombing and Gunnery Ranges,* 13 July 1943. RAG 342, Acc. 342-57H-3001, Box 6, Folder: 684 1943 NPRC (MPR), St. Louis, MO.

Appendix E-6

Army Air Forces, Headquarters

1943 *Memo: Status and Requirements of Bombing and Gunnery Ranges,* 26 November 1943. RAG 342, Acc. 342-57H-3001, Box 6, Folder: 684 1943 NPRC (MPR), St. Louis, MO.

Appendix E-7

Interdepartmental Air Traffic Control Board (IATCB)

1943 *IATCB Meeting No. 384,* 9 December 1943. RAG 237, Entry 37, Box 2, Folder: 376-400, NARA-College Park, MD.

Appendix E-12

[10] 4th Air Force, Headquarters

1944 *Memo: Bodega Bay Air-to-Ground Gunnery Range,* 21 February 1944. RAG 342, Acc. 342-57H-3001, Box 14, Folder: 684 General Series 26 & 28, NPRC (MPR), St. Louis, MO.

Appendix E-1

4th Air Force, Headquarters

1944 *Memo: Status and Requirements of Bombing and Gunnery Ranges,* 13 June 1944. RAG 342, Acc. 342-57H-3001, Box 6, Folder: 684 1943 NPRC (MPR), St. Louis, MO.

Appendix E-2

[11] Santa Rosa Army Air Field

c.1945 History of the Santa Rosa Army Air Field, Santa Rosa California, 1 April 1944 to 31 December 1944, circa January 1945, Microfilm reel B2512, File 288.44-1v.2 Santa Rosa AAF, CA Apr-Dec 1944. Air Force Historical Research Agency, Maxwell AFB, AL.

Appendix E-13

Corps of Engineers, South Pacific Division
1947 *Memo: Neutralization of Unexploded Ammunition and Duds,* 13 March 1947. RAG 342, Acc. 342-57H-3001, Box 1, Folder: 684, NPRC (MPR), St. Louis, MO.
Appendix E-10

Santa Rosa Army Air Field
c.1945 History of the Santa Rosa Army Air Field, Santa Rosa California, 1 June 1945 to 30 June 1945, circa July 1945, Microfilm reel B2513, File 288.44-3 Santa Rosa AAF, CA June 1945. Air Force Historical Research Agency, Maxwell AFB, AL.
Appendix E-15

[12] 4th Air Force, Headquarters
1945 *Memo: Change of Status, Santa Rosa Army Air Field, Santa Rosa, California,* 26 November 1945. RAG 342, Acc. 342-57H-3001, Box 22, Folder: 686 Santa Rosa, NPRC (MPR), St. Louis, MO.
Appendix E-3

Army Air Forces, Headquarters
1946 *Letter regarding surplusing Santa Rosa Army Air Field and four auxiliary facilities,* 1 March 1946. RAG 18, Entry 2A, Box 2256, Folder: Building and Grounds, California R-2, 1946, NARA-College Park, MD.
Appendix E-8

4th Air Force, Headquarters
1946 *Memo: Bodega Bay Air-to-Ground Gunnery Range,* 29 August 1946. RAG 342, Acc. 342-57H-3001, Box 22, Folder: 602, Disposition of Real Property, NPRC (MPR), St. Louis, MO.
Appendix E-4

Corps of Engineers, South Pacific Division
1948 *Real Property Management and Disposal Report: Bodega Bay Air to Ground Gunnery Range*, 15 August 1948. Information Management Division, Records Management, Capital Records Mgmt Box 67999, Folder 1502-07 Bodega Bay Air To Gunnery Range, CA, U.S. Army Corps of Engineers - Sacramento District, CA
Appendix E-11

[13] 12th Naval District, Naval Station Alameda
1948 Photograph NA 27 L2943 "Proposed bombing site Bodega Bay proposed target site in center foreground", 13 January 1948, files of Peter Connors, Bodega Marine Reserve, Reserve Manger.
Appendix J-1

12th Naval District, Naval Station Alameda
1948 Photograph NA 27 L2942 "Proposed bombing site Bodega Bay, Shoreline looking north toward state park", 13 January 1948, files of Peter Connors, Bodega Marine Reserve, Reserve Manger.
Appendix J-2

12th Naval District, Naval Station Alameda
1948 Photograph NA 27 L2949 "Proposed bombing site Bodega Bay, Shells buried by sand", 13 January 1948, files of Peter Connors, Bodega Marine Reserve, Reserve Manger.
Appendix J-3

[14] Corps of Engineers, South Pacific Division
1947 *Memo: Neutralization of Unexploded Ammunition and Duds,* 13 March 1947. RAG 342, Acc. 342-57H-3001, Box 1, Folder: 684, NPRC (MPR), St. Louis, MO.
Appendix E-10

[15] Santa Rosa Army Air Field
c.1945 History of the Santa Rosa Army Air Field, Santa Rosa California, 1 January 1945 to 31 March 1945, circa April 1945, Microfilm reel B2573, File 288.44-2 Santa Rosa AAF Jan-Mar 1945. Air Force Historical Research Agency, Maxwell AFB, AL.
Appendix E-14

[15] Corps of Engineers – Sacramento
1999 *Inventory Project Report Bodega Bay Gunnery Range, Sonoma County, CA, FUDS Site No. J09CA7290,* May 1999
Appendix D-1

[16] Corps of Engineers, South Pacific Division
1947 *Memo: Neutralization of Unexploded Ammunition and Duds,* 13 March 1947. RAG 342, Acc. 342-57H-3001, Box 1, Folder: 684, NPRC (MPR), St. Louis, MO.
Appendix E-10

4th Air Force, Headquarters
1946 *Ltr Div Engr. Pac Divn, San Francisco, file PSDRM 684 (Bodega Bay Gunnery Range,): dtd30 Aug 46, Subject: Neutralization of Unexploded Ammunition and Duds,* 10 October 1946. RAG 342, Acc. 342-57H-3001, Box 23, Folder: 684, NPRC (MPR), St. Louis, MO.
Appendix E-5

[17] Section 4.4 AIR PHOTO INTERPRETATION AND MAP ANALYSIS
4th Air Force, Headquarters
1944 *Memo: Bodega Bay Air-to-Ground Gunnery Range,* 21 February 1944. RAG 342, Acc. 342-57H-3001, Box 14, Folder: 684 General Series 26 & 28, NPRC (MPR), St. Louis, MO.
Appendix E-1

Sonoma County Tax Assessor
1974 Assessor's Map Bk 100 Pg. 01, Sonoma County, Calif, 28 February 1974.
Appendix E-16

Sonoma County Tax Assessor
1984 Assessor's Map Bk 100 Pg. 02, Sonoma County, Calif, 21 February 1984.
Appendix E-17

U.S. Geological Survey
1972 *Bodega Head, Quadrangle, California - Sonoma County, 7.5 Minute Series (topographic),* dated 1972.

[18] Section 5.0 REAL ESTATE
4th Air Force, Headquarters
1944 *Memo: Bodega Bay Air-to-Ground Gunnery Range,* 21 February 1944. RAG 342, Acc. 342-57H-3001, Box 14, Folder: 684 General Series 26 & 28, NPRC (MPR), St. Louis, MO.
Appendix E-1

Corps of Engineers, South Pacific Division
1948 *Real Property Management and Disposal Report: Bodega Bay Air to Ground Gunnery Range,* 15 August 1948. Information Management Division, Records Management, Capital Records Mgmt Box 67999, Folder 1502-07 Bodega Bay Air To Gunnery Range, CA, U.S. Army Corps of Engineers - Sacramento District, CA
Appendix E-11

[19] Section 8.0 TECHNICAL DATA OF ORDNANCE AND EXPLOSIVES
References for Individual Ordnance Data Sheets contained in Appendix C are noted at the bottom of each sheet.

APPENDIX B

ABBREVIATIONS, ACRONYMS, AND BREVITY CODES

ABBREVIATIONS, ACRONYMS AND BREVITY CODES

The following list contains abbreviations, acronyms and brevity codes within this ASR, as well as typical others.

AAF*	Army Air Field
AA	Anti-Aircraft
ACGIH	American Conference of Governmental Industrial Hygienist
AEC	Army Environmental Center
AFB	Air Force Base
ACGIH	American Conference of Governmental Industrial Hygienist
ANSI	American National Standards Institute
AP	Armor Piercing
APDS	Armor Piercing Discarding Sabot
APERS	Anti-Personnel
AP-T	Armor Piercing-Tracer
ASR	Archive Search Report
AT	Anti-Tank
BBAGGR	Bodega Bay Air-to-Ground Gunnery Range
BBGR	Bodega Bay Gunnery Range
BD	Base Detonating
BD/DR	Building Demolition/Debris Removal
BLM	Bureau of Land Management
BRAC	Base Realignment and Closure
CADD	Computer-Aided Drafting and Design
CAIS	Chemical Agent Identification Set
cal	Caliber
CBDCOM	Chemical and Biological Defense Command
CE	Corps of Engineers
CEHNC	Corps of Engineers, Huntsville Engineering and Support Center
CEMVS	Corps of Engineers, Mississippi Valley-St. Louis District
CEMVK	Corps of Engineers, Mississippi Valley-Vicksburg District
CEP	Circular Error of Probability
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
CFS	Cubic Feet Per Second
COE	Chief of Engineers
ctg	Cartridge
CWM	Chemical Warfare Materials
CWS*	Chemical Warfare Service
CX	Center of Expertise
DA	Department of the Army
DEET	Diethyltoluamide

DERP	Defense Environmental Restoration Program
DoD	Department of Defense
DOI	Department of Interior
EE/CA	Engineering Evaluation/Cost Analysis
EIS	Environmental Impact Statement
EM	Engineer Manual
EOD	Explosive Ordnance Disposal
EPA	Environmental Protection Agency
ETL	Engineering Technical Letter
FGDC	Federal Geographic Data Committee
FM	Field Manual
FS	Feasibility Study
FUDS	Formerly Used Defense Sites
GIS	Geographic Information System
GPM	Gallons Per Minute
GPS	Global Positioning System
GSA	General Services Administration
HAZWOPER	Hazardous Waste Operations
HBX	high blast explosives; mixtures of RDX, TNT and aluminum
HE	High Explosive
HEAT	High Explosive Anti-Tank
HEI	High Explosive Incendiary
HEP	High Explosive Plastic
HMX	cyclotetramethylenetetranitramine (a type of high explosive)
HTRW	Hazardous Toxic and Radioactive Waste
HTW	Hazardous and Toxic Waste
IAS	Initial Assessment Study
IATCB	Interdepartmental Air Traffic Control Board
INPR	Inventory Project Report
IRP	Installation Restoration Program
IWI	Index Watershed Indicator
LD	Lyme Disease
MCX	Mandatory Center of Expertise
MHW	Mean High Water
MHHW	Mean Higher High Water
MLLM	Mean Lower Low Water
MLW	Mean Low Water
MT	Mechanical Time
MTL	Mean Tide Level
MTSQ	Mechanical Time Super Quick
NARA	National Archives and Records Administration
NAVSEA	Naval Sea Systems Command
NAS*	Naval Air Station
NCP	National Contingency Plan

n.d.	No Date
NEW	Net Explosive Weight
NGVD	National Geographic Vertical Datum
NIMA	National Imagery and Mapping Agency
NIOSH	National Institute for Safety and Health
NMAS	National Map Accuracy Standards
NPL	National Priorities List
NOAA	National Oceanic and Atmospheric Administration
NOFA	No Further Action
NPRC	National Personnel Records Center
NRC	National Records Center
NWS	National Weather Service
OCE	Office Chief of Engineers
OE	Ordnance and Explosives
OP	Ordnance Pamphlet
OSHA	Occupational Safety and Health Administration
PA	Preliminary Assessment
PD	Point Detonating
PE	Professional Engineer
PETN	pentaerythritol tetranitrate (a type of high explosive)
PIBD	Point Initiating, Base Detonating
PM	Project Manager
PPE	Personal Protective Equipment
PPM	Parts Per Million
QASAS	Quality Assurance Specialist, Ammunition Surveillance
RAC	Risk Assessment Code
RDX	cyclotrimethylenetrinitramine; also known as cyclonite or hexogen (a type of high explosive)
RG	Record Group
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
SARA	Superfund Amendments and Reauthorization Act
SEP	Spherical Error of Probability
SOP	Standing Operating Procedures
SPB*	Surplus Property Board
SSHO	Site Safety and Health Officer
SSHP	Site Safety and Health Plan
TCRA	Time Critical Removal Action
TEU	United States Army Technical Escort Unit
TM	Technical Manual
TNT	Trinitrotoluene
TP	Target Practice
USACE	U.S. Army Corps of Engineers
USADACS	U.S. Army Defense Ammunition Center and School

USAFHRA	U.S. Air Force Historical Research Agency
USATCES	U.S. Army Technical Center for Explosive Safety
USATHMA	U.S. Army Toxic and Hazardous Materials Agency
USC	United States Code
USCG	Untied States Coast Guard
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UXO	Unexploded Ordnance
WAA*	War Assets Administration
WAGE	Wide Area GPS Enhancemen
WGS	World Geodetic System
WNRC	Washington National Records Center

* designates an historic acronym

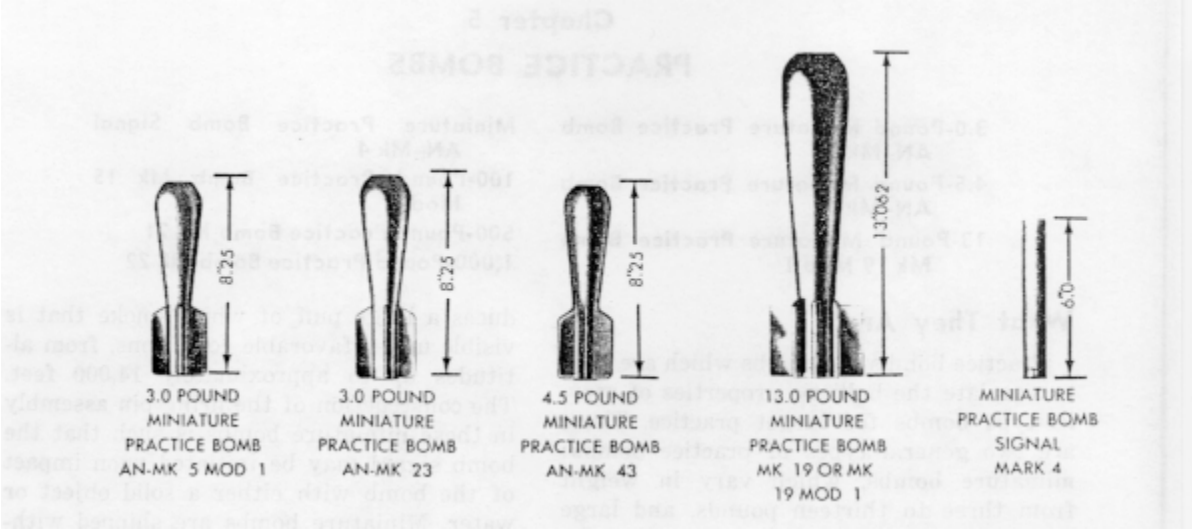
APPENDIX C

TEXT / MANUALS

TEXT / MANUALS

All Ordnance Technical Data Sheets Prepared by U.S. Army Corps of Engineers St. Louis District, Ordnance and Technical Services Branch-Engineering Division

MINIATURE PRACTICE BOMBS
AN-Mk 5 Mod 1, AN-Mk 23, AN-Mk 43, and Mk 19

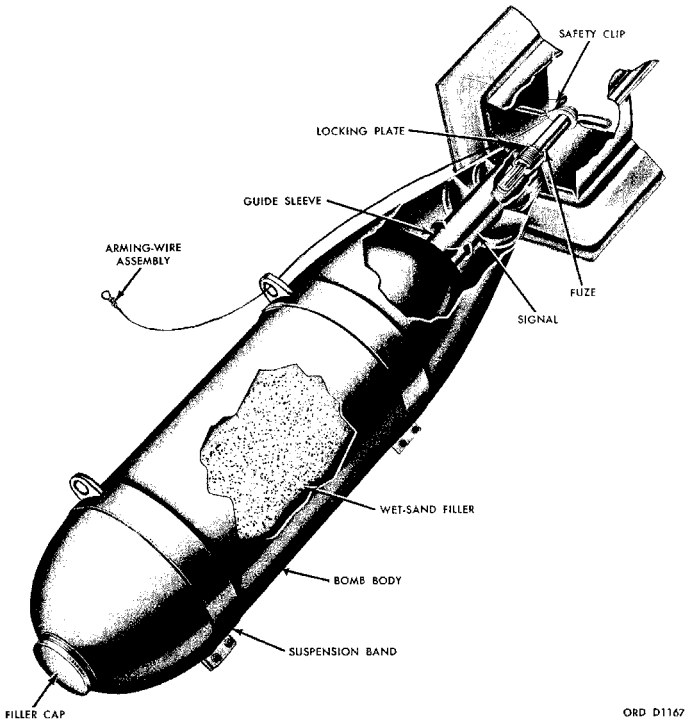


Description. These bombs are used for low-altitude horizontal, or dive-bombing practice. The four bombs are similar in physical appearance, but differ basically in the metal used to cast the body. Bombs are used with the AN-Mk 4 practice bomb signal that is a blank 10-gauge shotgun shell (extended length). Signals contain a black powder expelling charge and a red phosphorous pyrotechnic mixture. These bombs also are used with the MK5 signal that contains a fluorescein dye and is actuated by impact on water. When the Mk5 signal is installed, the firing pin assembly is not used.

	Mk 5	**Mk 23**	**Mk 43**	**Mk 19**
Over-all length inches	8.25 inches	8.25 inches	8.25 inches	13.062
Body Diameter inches	2.18 inches	2.18 inches	2.18 inches	2.62
Fin Dimension inches	2.5 inches		2.5 inches	3.67
Weight	2 lb. 11 oz. $\pm$ 1 oz	3 lb. $\pm$ 2 oz	4 lb. 7 oz. $\pm$ 2 oz.	13 lb $\pm$ 3 oz
Body Material	Zinc Alloy	Cast Iron	Lead-antimony antimony	Lead
Signal	AN-Mk 4, Black powder/pyrotechnic charge; Mk 5, Fluorescein dye			

Reference: OP 1280, *Aircraft Bombs*, February 1945; TM 9-1325-200, *Bombs and Bomb Components*, April 1966

BOMB, PRACTICE, 100-LBS, Mk 15 Mod 3

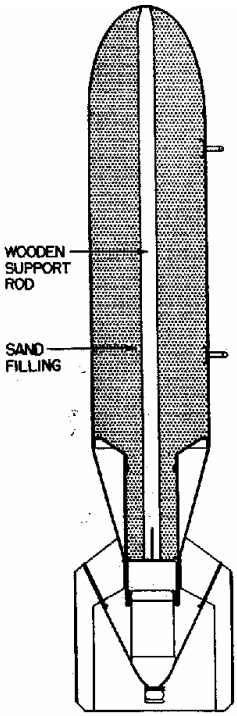


Description. The Mk 15 Mod 3 Practice Bomb is a light-cased, cylindrical body with a threaded filling hole in its rounded nose. A box fin assembly consisting of four metal vanes attached to a cone is welded to the aft end of the body. The bomb has two metal suspension band assemblies (each consisting of a circular clamp, a suspension lug, and two cap screws) for tightening the band to the bomb. The bomb is used with the practice bomb signal, Mk7 Mod 0 and inert fuze Mk 247 Mod 0 both of which are secured to the aft of the bomb. Upon impact of the bomb with the target, the signal is detonated, producing a flash and a large puff of smoke. The bomb is filled with wet sand and when fully assembled weighs approximately 100 pounds

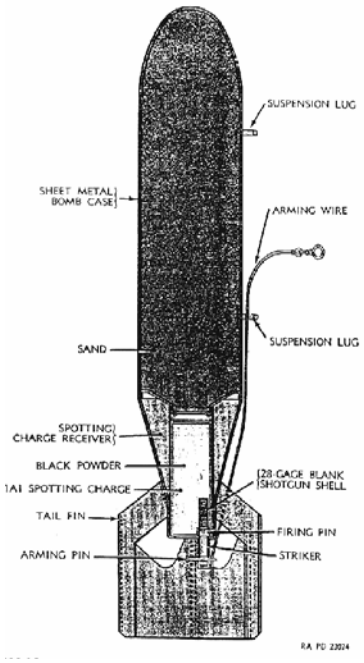
Length of assembled bomb .....41.2 inches
Diameter .....8.0 inches
Fin Span.....11.24 inches
Weight, assembled .....100 pounds
Filler.....Sand, Wet sand, or water
Signal .....Mk 7 Mod 0
Color .....Black

References: TM 9-1325-200, *Bombs and Bomb Components*, April 1966; NAVSEA OP 1664 Volume 2, *U.S. Explosive Ordnance*, February 1954

BOMB, PRACTICE, 100 POUND, M38A2



with M5 spotting charge



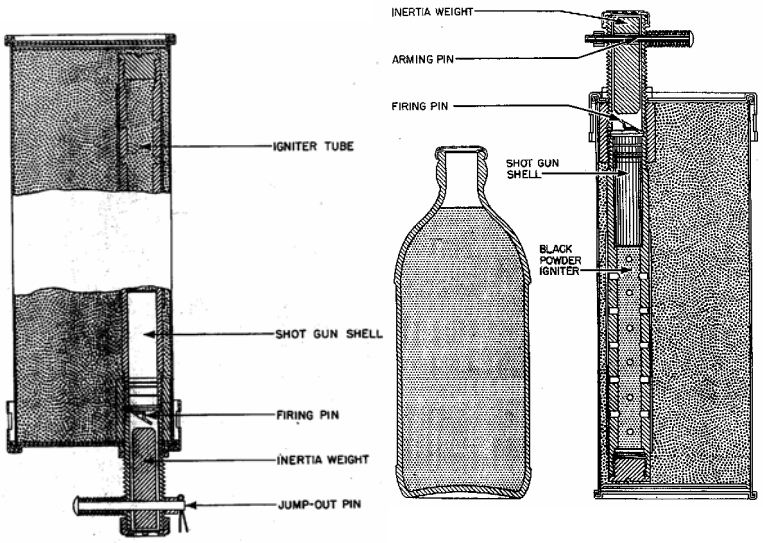
with M1A1 spotting charge

Description. This bomb simulates a General Purpose bomb of the same size. It is constructed of light sheet metal, approximately 22-gage, formed by rolling a rectangular sheet of metal into the form of a cylinder approximately 8 inches in diameter, and spot-welding the seam. The rounded nose is pressed from the same metal, as is the tail, which is formed in the shape of a cone. The tail portion ends in box type fins, which is welded to the cone. Inside of the smaller end of the conical tail section is welded the spotting charge receiver. The spotting charge is assembled in a sleeve at the base of the bomb, within the fin box. Authorized spotting charges are the M1A1, M3, and M5. When using the M5 spotting charge a wooden support rod is installed in the bomb. Two suspension lugs are bolted to the bomb body during fabrication. The Suspension Band M1 is provided for single suspension. The band is a separate component. The over-all length of the bomb body is 472 inches. When empty, the bomb body weighs approximately 14 pounds. When completely loaded with sand and spotting charge, the weight of the bomb is approximately 100 pounds.

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

Reference: TM 9-1904, *Ammunition Inspection Guide*, March 1944; NAVSEA OP 1664 Volume 2, *U.S. Explosive Ordnance*, February 1954; *Complete Round Chart #5981*, October 1944

SPOTTING CHARGES, M1A1, M3, M5



M1A1 M5 M3

M1A1 Spotting Charge. 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. It is made from a large tin can, 11.18-inches long, 3.43-inches diameter, weighing 4.25-pounds. At the top of the can is a cover, which has a hole in it for the insertion of a 28-gage blank shotgun shell and firing mechanism. Upon impact, the inertia weight drives the firing pin into the shotgun-type primer, igniting the 3-pounds of black powder.

M3 Spotting Charge. The spotting charge has a 2 1/3-pound dark smoke filling and a black-powder igniter. It is 5/8 of an inch longer than the Spotting Charge M1A1, but otherwise similar. The M3, with 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 M38A2 Practice bomb.

M5 Spotting Charge. The spotting charge 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.

Reference: TM 9-1904, *Ammunition Inspection Guide*, March 1944; NAVSEA OP 1664 Volume 2, *U.S. Explosive Ordnance*, February 1954

SMALL-ARMS AMMUNITION

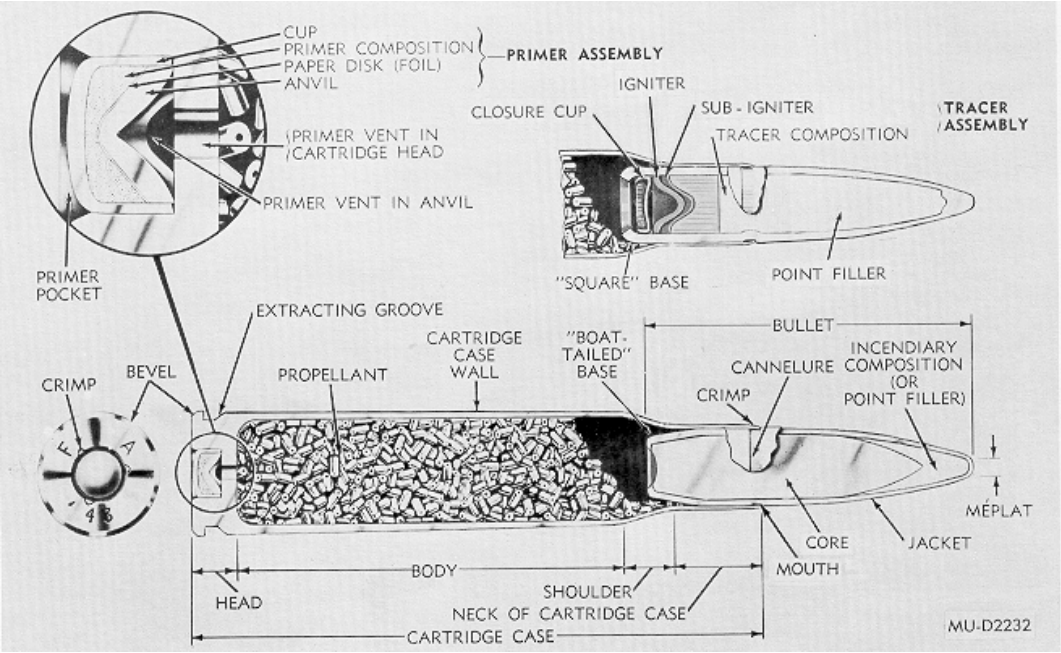


Figure 1. Typical cartridge (sectional)

General. Small-arms ammunition, as used herein, describes a cartridge or families of cartridges intended for use in various types of hand-held or mounted weapons through 30 millimeter. Within a caliber designation, these weapons may include one or more of the following: rifles (except recoilless), carbines, pistols, revolvers, machineguns and shotguns. For purposes of this publication, small-arms ammunition may be grouped as cartridges intended primarily for combat or training purposes (API, HEI, tracer or ball); for training purposes only (blank or dummy); or for special purposes (rifle grenade or spotter-tracer). Refer to TM 9-1306-200 for more detailed information on small-arms ammunition.

Cartridges. In general, a small-arms cartridge is identified as an assembly of a cartridge case, primer, a quantity of propellant within the cartridge case, and a bullet or projectile. Blank and rifle grenade cartridges are sealed with paper closure disks in lieu of bullets. Dummy cartridges are composed of a cartridge case and a bullet. Some dummy cartridges contain inert granular materials to simulate the weight and balance of live cartridges. A typical cartridge and the terminology of its components are shown in figure 1.

Case. Although steel, aluminum, zinc and plastic materials have been used experimentally, brass, a composition of 70 percent copper and 30 percent zinc, is the most commonly used material for cartridge cases. Steel, as well as brass, is an approved material for caliber .45 cartridge cases. Brass, paper and plastic are used for 12 gage shotshell bodies. Aluminum is used for military-type .410 gage shotshell bodies. Configurations of cartridges and bullets are illustrated in figures 2 through 11.

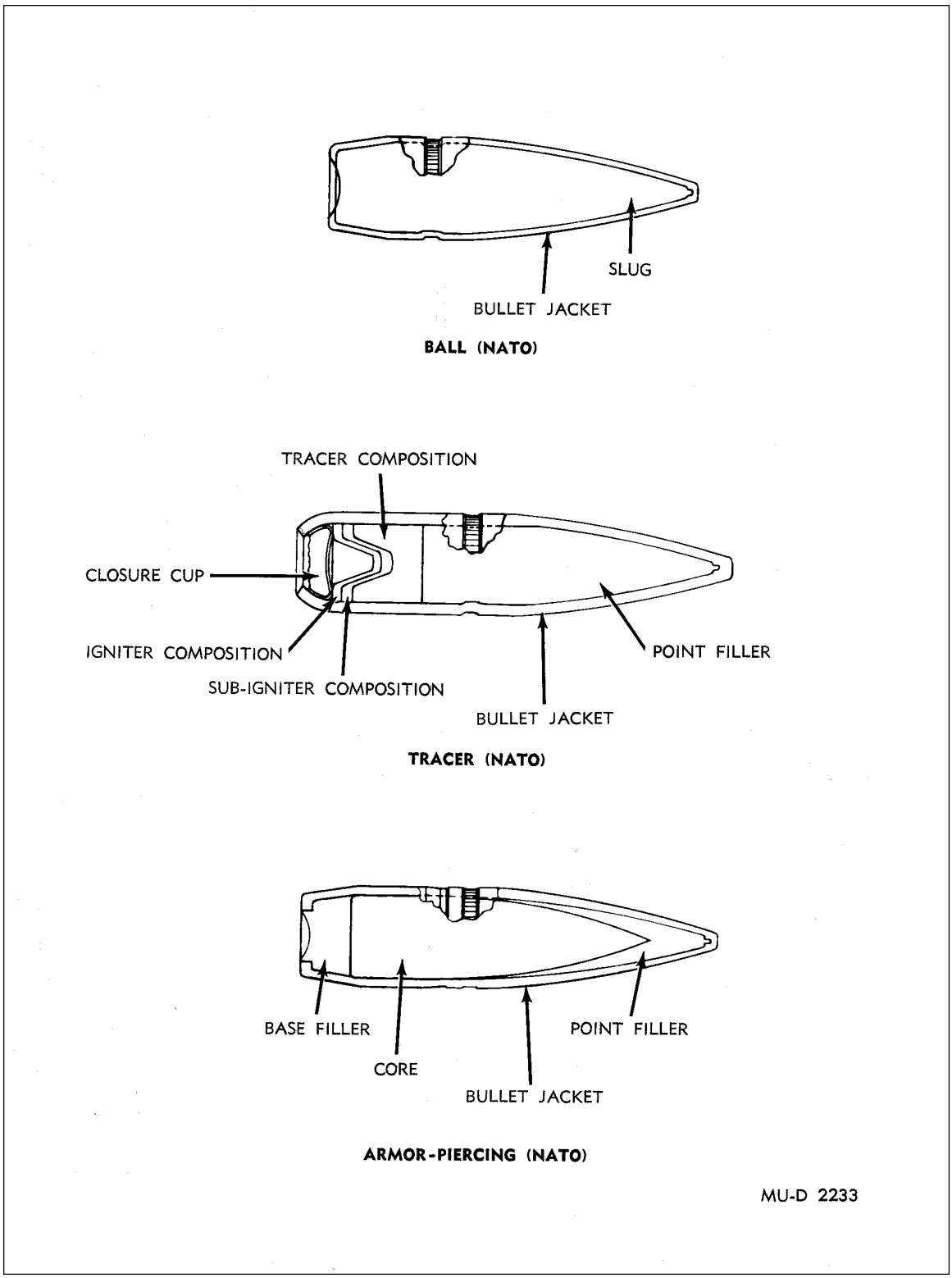


Figure 2. 7.62 mm bullets (sectional)

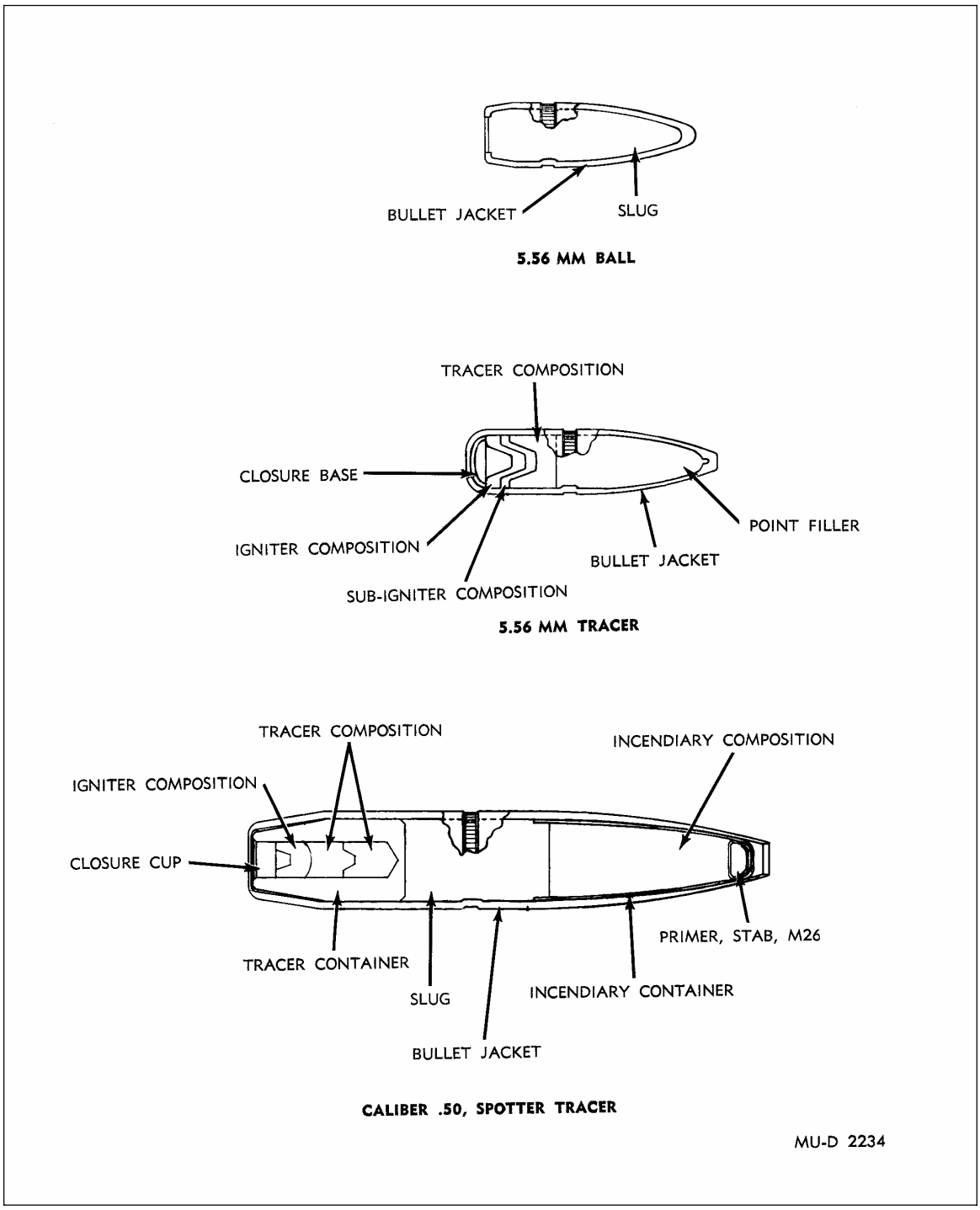


Figure 3. 5.56mm and caliber .50 spotter tracer bullets (sectioned)

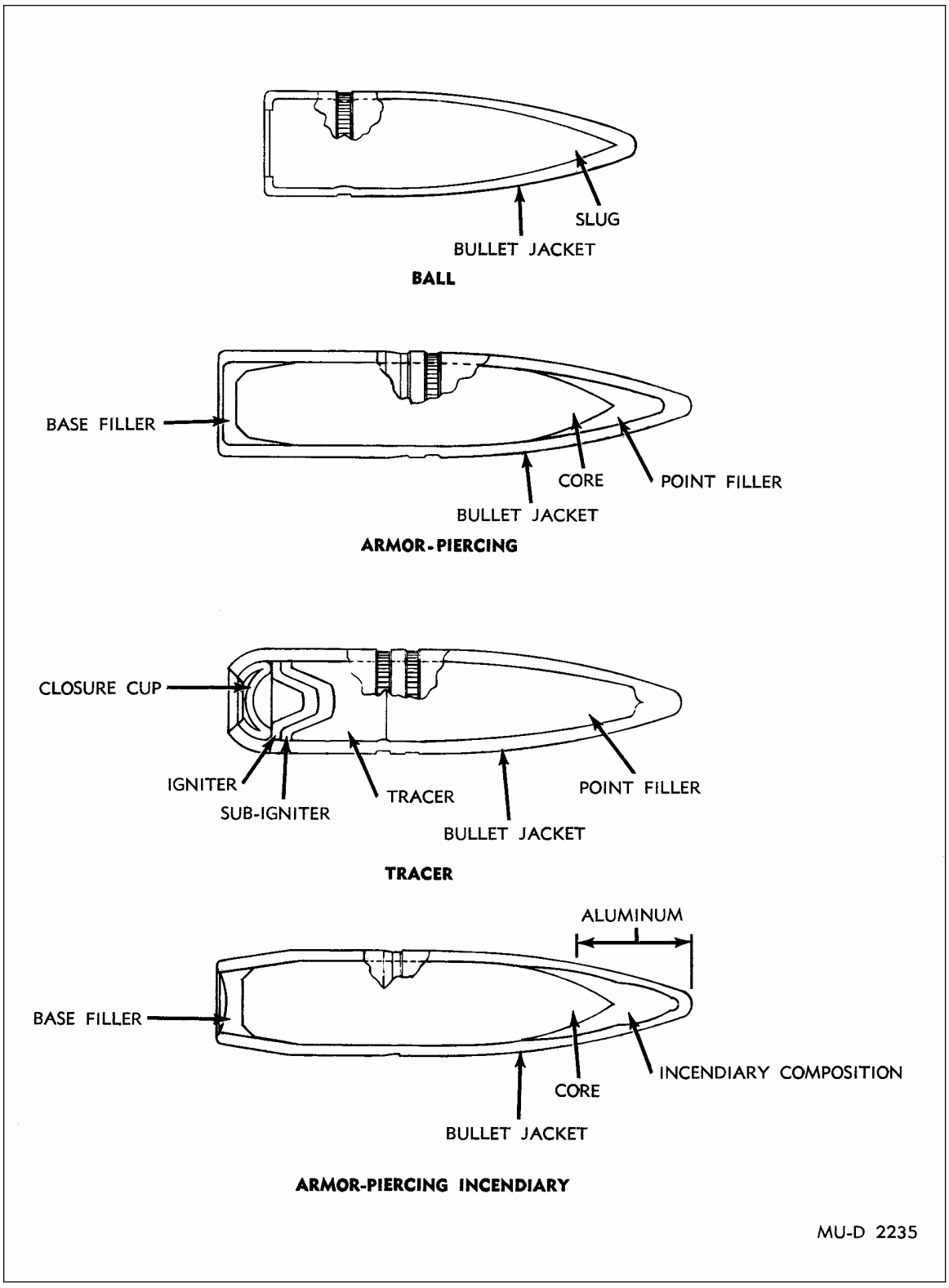


Figure 4. Caliber .30 bullets (sectional)

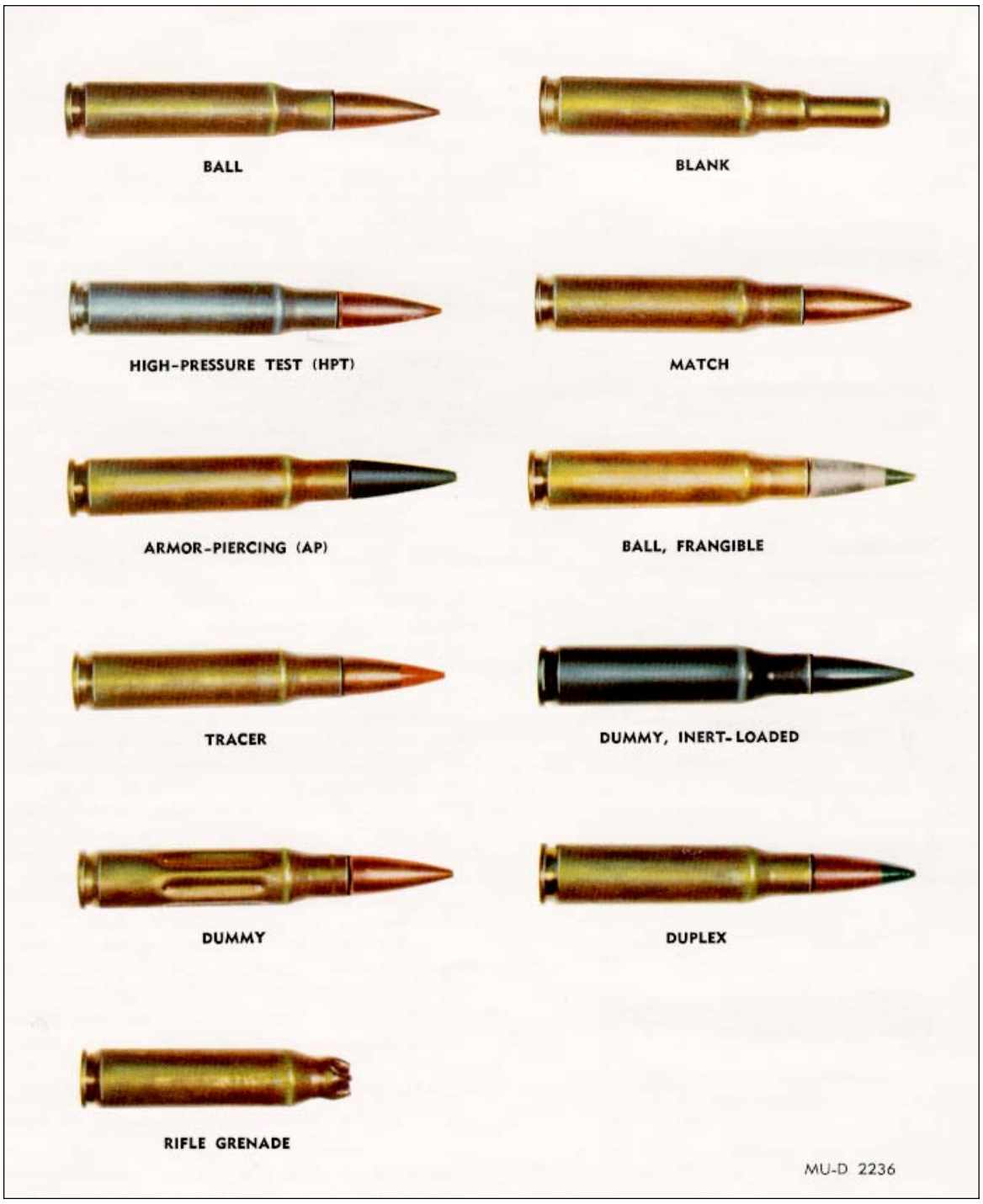


Figure 5. 7.62mm cartridges

Figure 6. 5.56mm cartridges

Propellant. Cartridges are loaded with varying weights of propellant. This is to impart sufficient velocity (within safe pressures) to the projectile to obtain the required ballistic performance. These propellants are either of the single-base (nitrocellulose) or double-base (nitrocellulose and nitroglycerine) type. The propellant grain configuration may be cylindrical with a single, lengthwise perforation, spheroid (ball) or flake. Most propellants are coated with a deterrent (to assist in controlling the rate of combustion) and with a final coating of graphite (to facilitate flow of propellant and eliminate static electricity in loading cartridges).

Primer. Small-arms cartridges contain either a percussion or electric primer. The percussion primer consists of a brass or gilding metal cup that contains a pellet of sensitive explosive material secured by a paper disk and a brass anvil. The electric primer consists of an electrode button in contact with the priming composition, a primer cup assembly and insulator. A blow from the firing pin of the weapon on the center of the percussion primer cup base compresses the primer composition between the cup and the anvil. This causes the composition to explode. The function of the electric primer is accomplished by a firing pin with electrical potential, which contacts the electrode button. This allows current to flow through the energy-sensitive priming composition to the grounded primer cup and cartridge case, exploding the priming composition. Holes or vents in the anvil or closure cup allow the flame to pass through the primer vent in the cartridge case and ignite the propellant. Rimfire ammunition, such as the caliber .22 cartridge, does not contain a primer assembly. Instead, the primer composition is spun into the rim of the cartridge case and the propellant is in intimate contact with the composition. On firing, the firing pin strikes the rim of the cartridge case, compressing the primer composition and initiating its explosion.

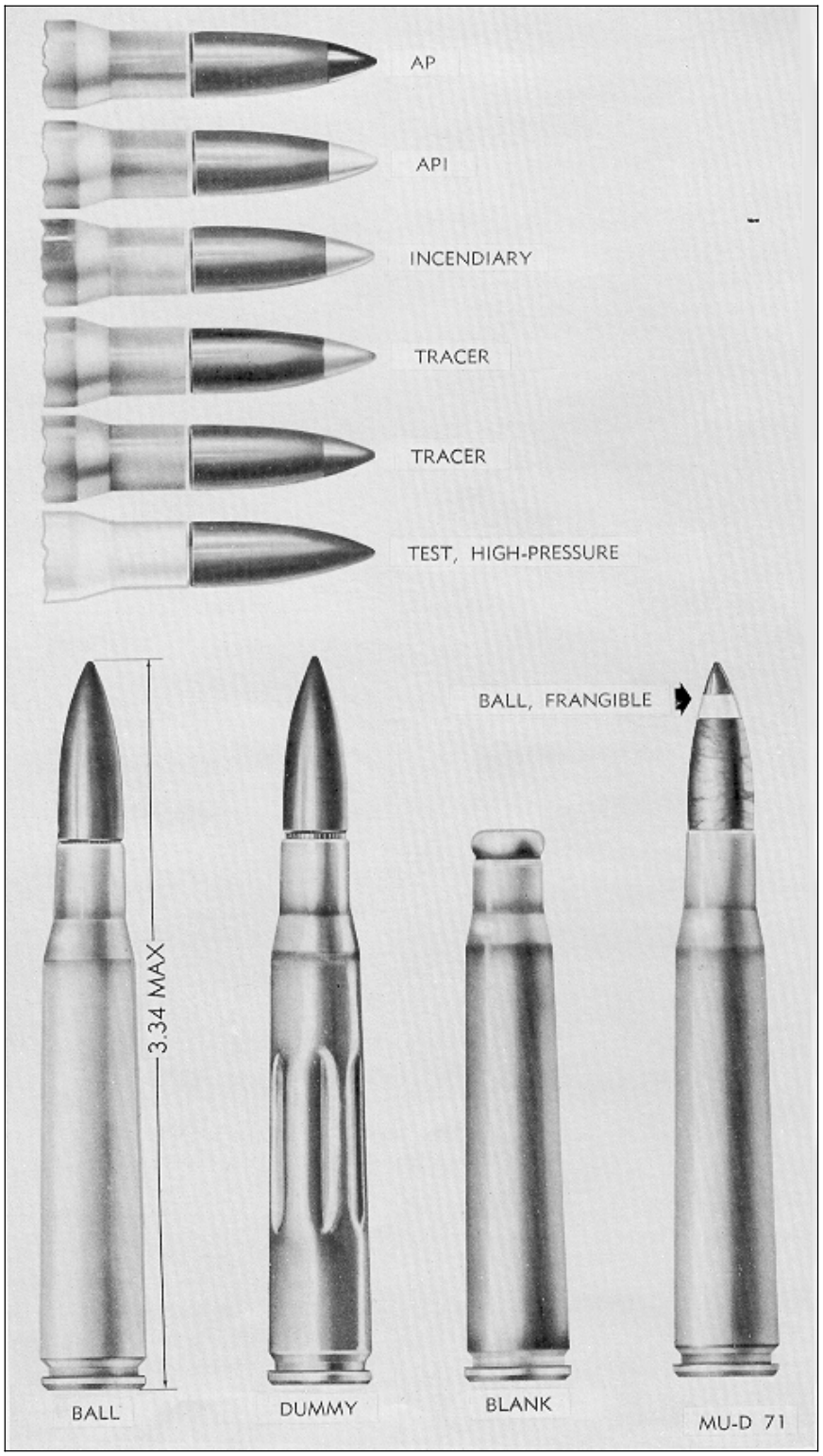


Figure 7. Caliber .30 cartridges

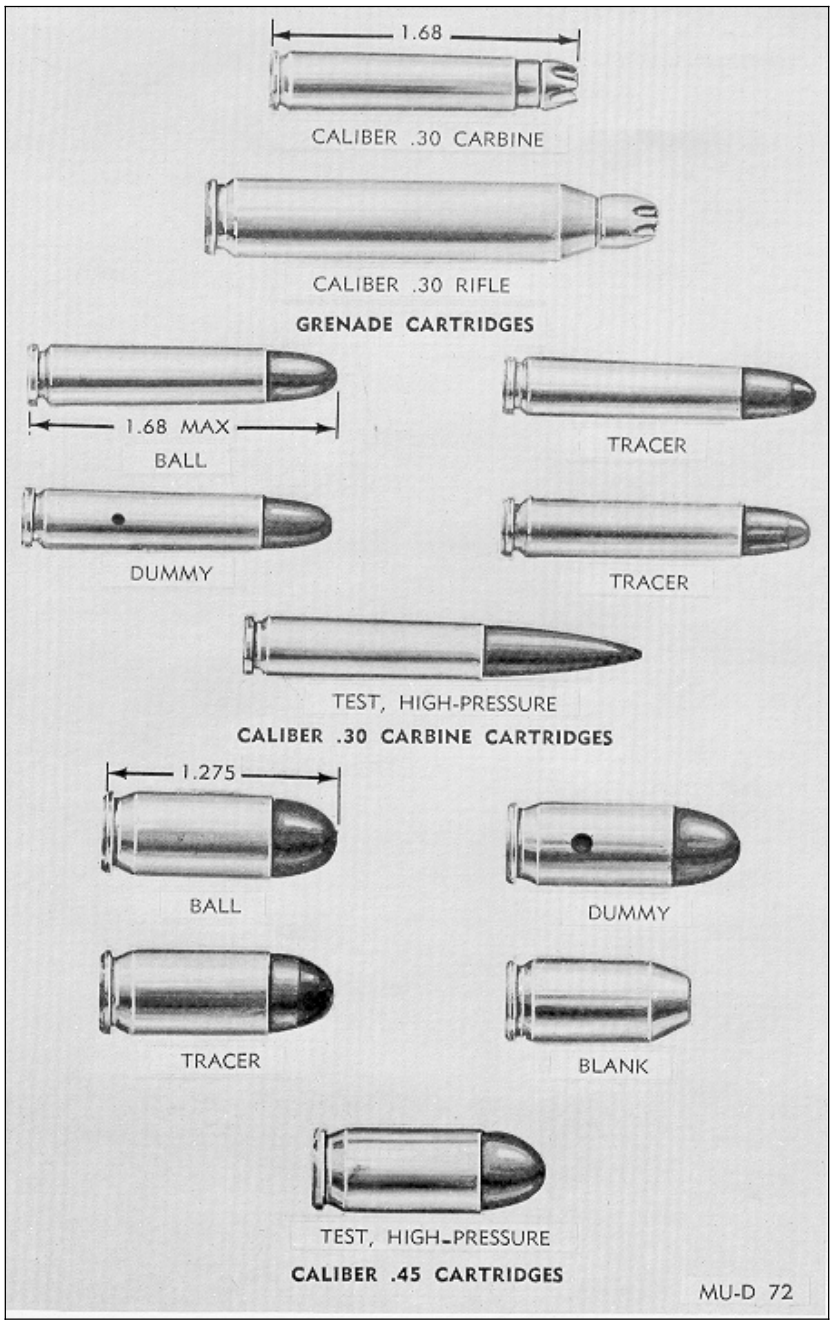


Figure 8. Caliber .30 carbine and caliber .45 cartridges

Bullet. With few exceptions, bullets through caliber .50 are assemblies of a jacket and a lead or steel core. They may contain other components or chemicals which provide the terminal ballistic characteristics of the bullet type. The bullet jacket may be either gliding metal, gliding-metal clad steel, or copper plated steel. Caliber .30 and 7.62mm frangible bullets are molded of powdered lead and a friable plastic which pulverizes into dust upon impact with the target. The pellets used in the shotgun shells are spheres of lead alloys varying from 0.08 inch to 0.33 inch in diameter.

Figure 9. Caliber .50 cartridges

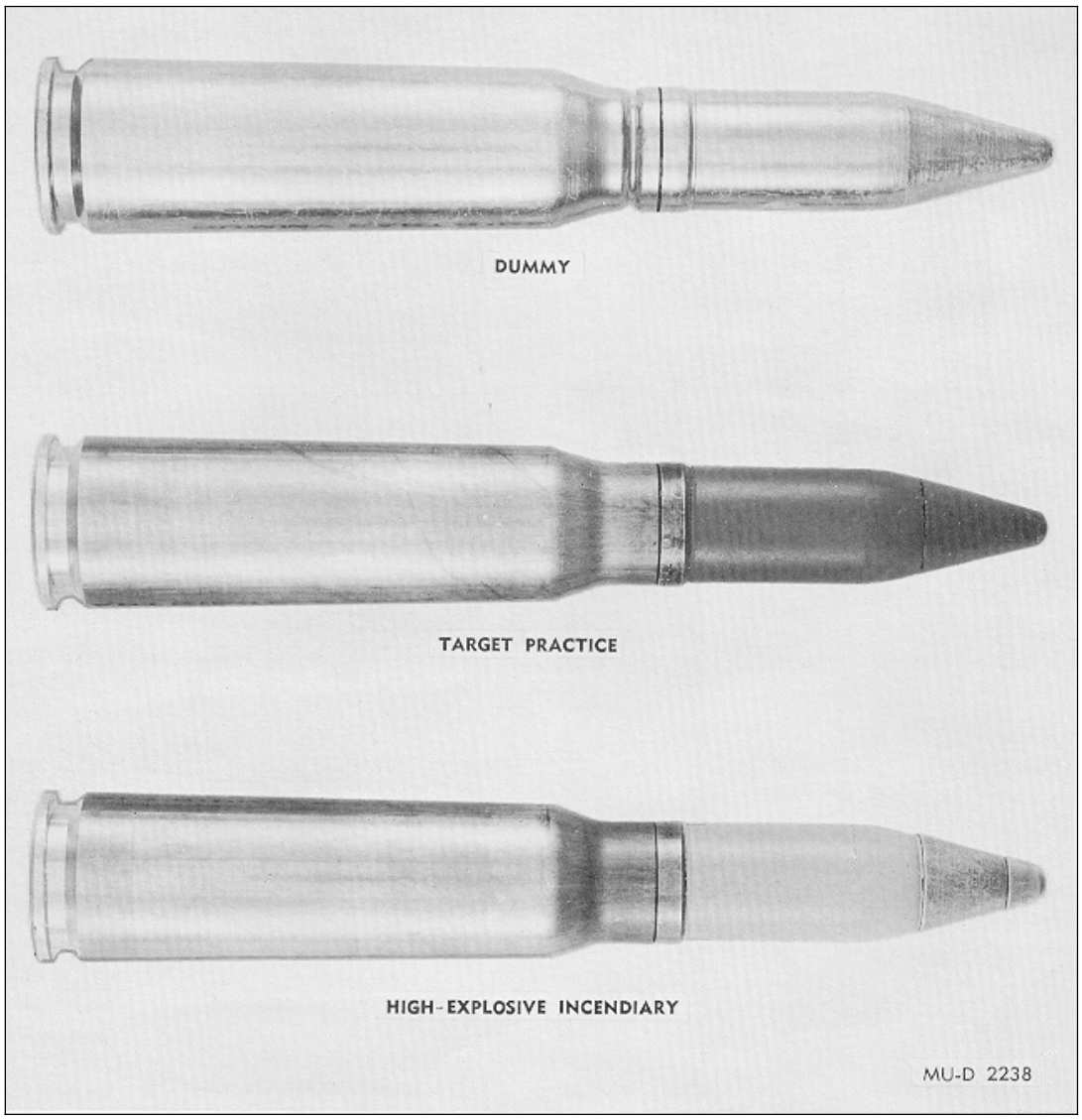


Figure 10. 20mm cartridges

Ball Cartridge. The ball cartridge is intended for use in rifles, carbines, pistols, revolvers and/or machineguns against personnel and unarmored targets. The bullet, as designed for general purpose combat and training requirements, normally consists of a metal jacket and a lead slug. Caliber .50 ball bullet and 7.62-mm, Ball M59 bullet contain soft steel cores.

Tracer Cartridge. By means of a trail of flame and smoke, the tracer cartridge is intended to permit visible observation of the bullet's in-flight path or trajectory and the point of impact. It is used primarily to observe the line of fire. It may also be used to pinpoint enemy targets to ignite flammable materials and for signaling purposes. The tracer element consists of a compressed, flammable, pyrotechnic composition in the base of the bullet. This composition is ignited by the propellant when the cartridge is fired. In flight, the bullet emits a bright flame which is visible to the gunner. Trace burnout occurs at a range between 400 and 1,600 yards, depending upon the caliber of ammunition.

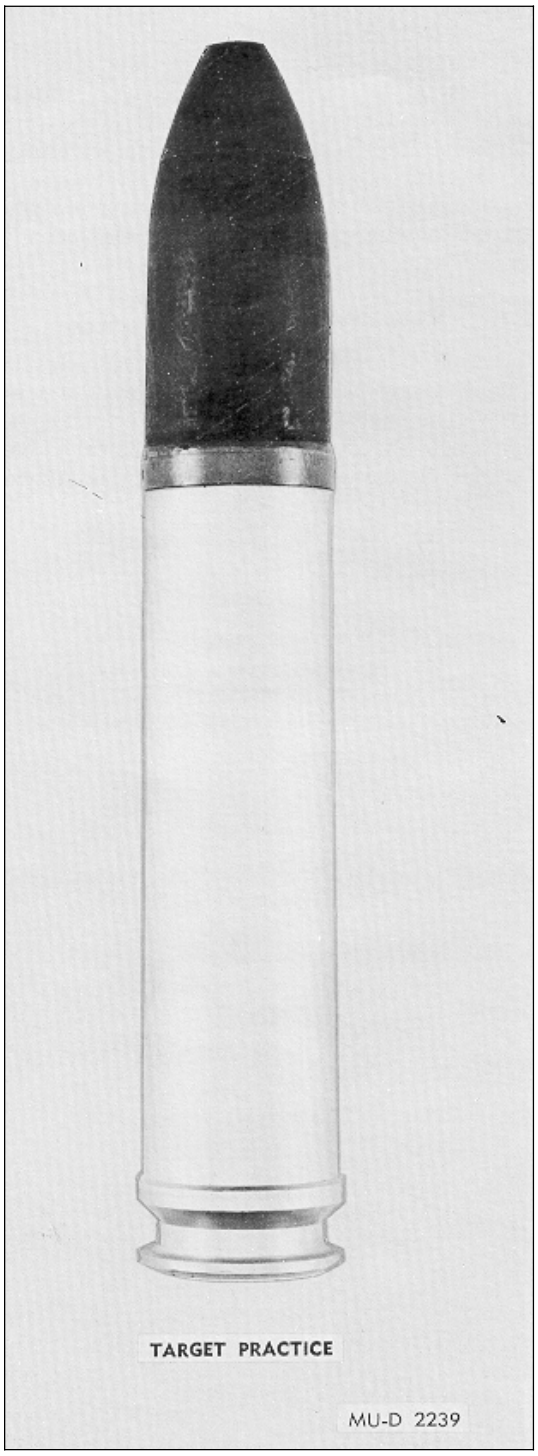


Figure 11. Typical 30mm projectile

Match Cartridge. The match cartridge is used in National and International Match Shooting competitions. The bullet consists of a gliding-metal jacket over a lead slug. The cartridges are identified on the head face with the designation NM (National Match) or Match.

Armor-Piercing Cartridges. The armor-piercing cartridge is intended for use in machine-guns or rifles against personnel and light armored and unarmored targets, concrete shelters, and similar bullet-resisting targets. The bullet consists of a metal jacket and a hardened steel-alloy core. In addition, it may have a base filler and/or a point filler of lead.

Armor-Piercing-Incendiary Cartridge. The armor-piercing-incendiary cartridge is used in rifles or machineguns as a single combination cartridge in lieu of separate armor-piercing and incendiary cartridges. The bullet is similar to the armor-piercing bullet, except that the point filler is incendiary mixture instead of lead. Upon impact with the target, the incendiary mixture burst into flame and ignites flammable material.

Armor-Piercing-Incendiary Tracer Cartridge. The bullet of the armor-piercing- incendiary-tracer cartridge combines the features of the armor-piercing, incendiary, and tracer bullets and may be used to replace those cartridges. The bullet consists of a hard steel core with compressed pyrotechnic mixture in the cavity in the base of the core. The core is covered by a gilding-metal jacket with incendiary mixture between the core point and jacket. This cartridge is for use in caliber .50 weapons only.

Duplex Cartridge. The duplex cartridge contains two special ball type bullets in tandem. The front bullet is positioned partially in the case neck, similarly to a standard ball bullet. The rear bullet, positioned completely within the case, is held in position by a compressed propellant charge. The base of the rear bullet is angled so that in flight, it follows a path slightly dispersed from that of the front bullet.

Spotter-Tracer Cartridge. The spotter-tracer cartridge is intended for use in coaxially mounted caliber .50 spotting rifles. The bullet trajectory closely approximates that of 106mm projectiles. Thus, this cartridge serves as a fire control device to verify weapon sight settings before firing 106mm weapons. The bullet contains an impact detonator and incendiary composition which identify the point of impact by flash and smoke.

Blank Cartridge. The blank cartridge is distinguished by absence of a bullet. It is used for simulated fire, in training maneuvers, and for saluting purposes. It is fired in rifles and machineguns equipped with blank firing attachments.

Grenade Cartridge. The grenade cartridge is used to propel rifle grenades and ground signals from launchers attached to rifles or carbines. All rifle grenade cartridges are distinguished by the rose petal (rosette crimp) closure of the case mouth.

Frangible Cartridge. The caliber .30 frangible cartridge, designed for aerial target training purposes, is also used in rifles and machineguns for target shooting. Caliber .30 and 7.62mm frangible cartridges are used in tank machineguns, firing single shot, for training in tank gunnery. At its normal velocity, the bullet, which is composed of powdered lead and friable plastic, will completely disintegrate upon striking a 3/16-inch aluminum alloy plate at 100 yards from the muzzle of the gun. These cartridges are not to be used on any but well ventilated indoor ranges to preclude buildup of toxic bullet dust. Inhalation of bullet dust may be injurious to health.

Incendiary Cartridge. The incendiary cartridge was designed for aircraft and ground weapon use to ignite combustible targets (e.g., vehicular and aircraft fuel tanks). The bullet contains a compressed incendiary mixture which ignites upon impact with the target. The incendiary cartridge has been superseded by the API and APIT cartridges because of their improved terminal ballistic effects.

Target-Practice Cartridge. The 20mm target-practice cartridge is the conventional steel shell with steel nose plug. It is used primarily for training purposes. This is not a combat cartridge; hence, no fuze is used in the assembly.

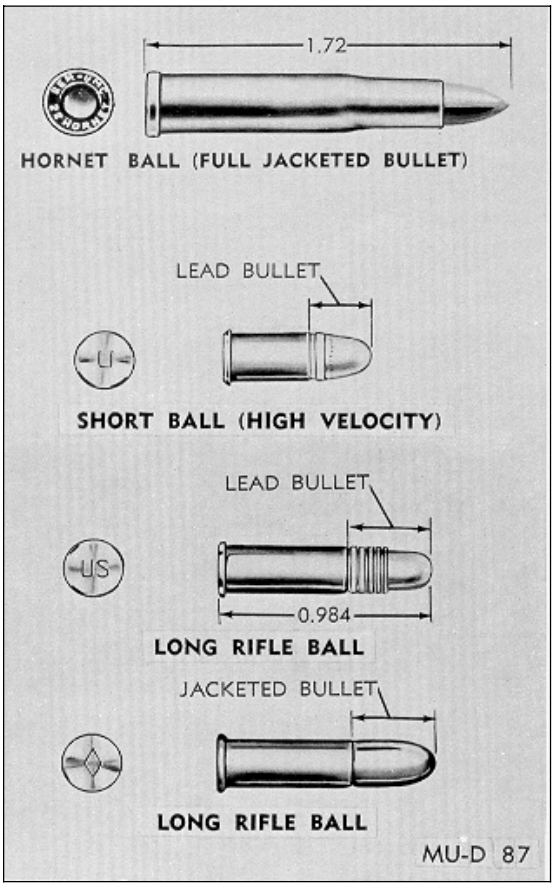


Figure 12. Caliber .22 cartridges

Special Purpose Cartridge

Cartridges of various calibers. (figures. 11 through 14), which consist of different types of projectiles and bullets, are used for training and special purposes. They include the following:

(1) Caliber .22 long rifle and caliber .38 and .45 wad-cutter cartridge for target shooting.

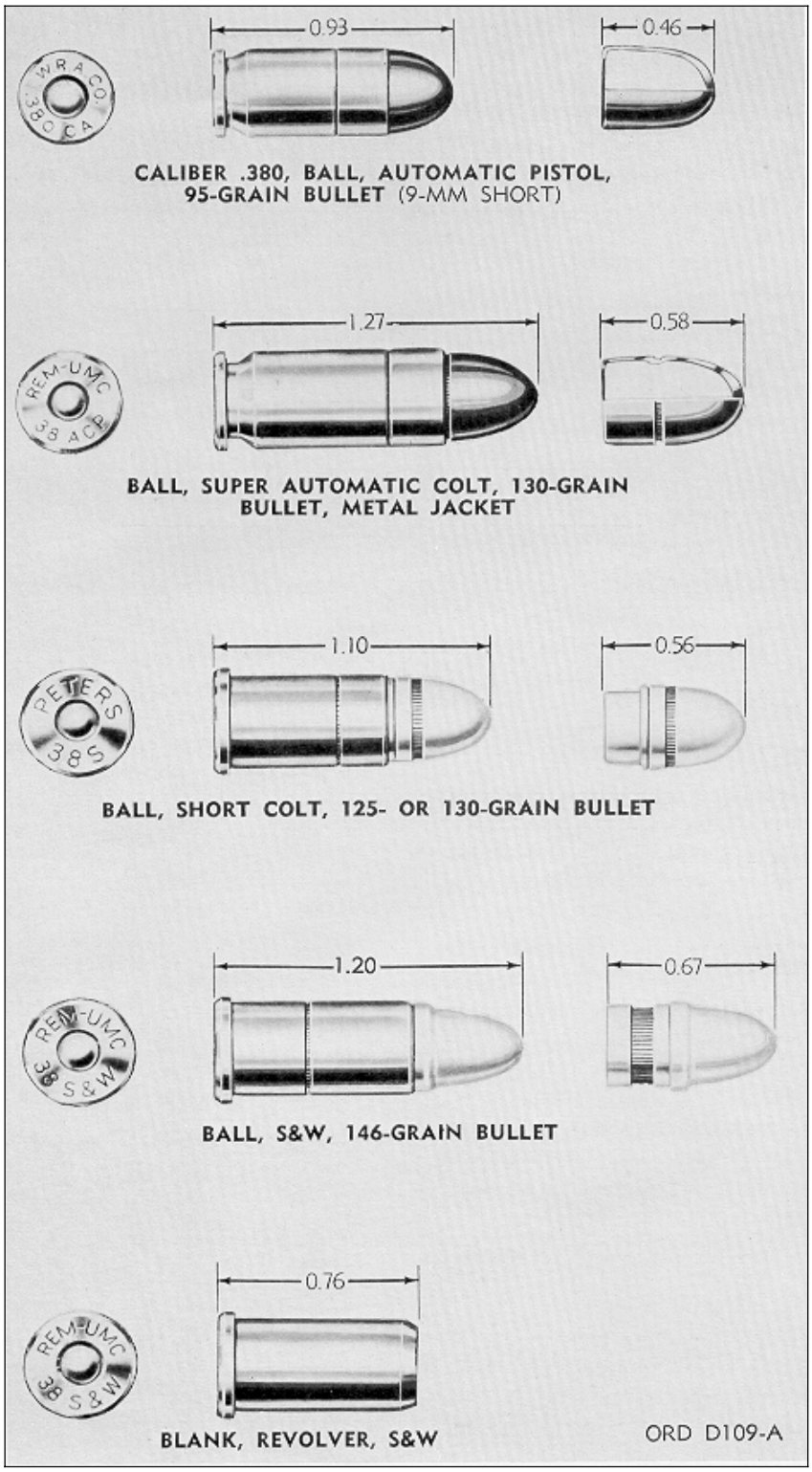


Figure 13. Caliber .38 cartridges

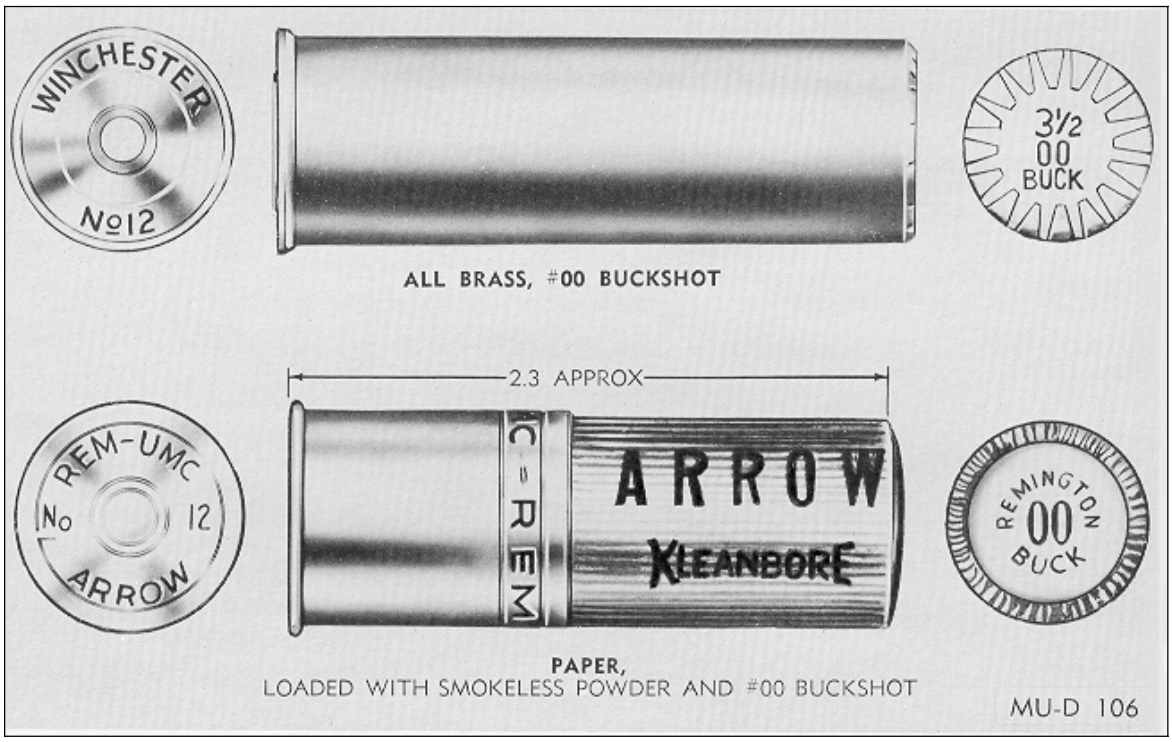


Figure 14. 12 gage shotgun shells

(2) Caliber .45 blank cartridges fired in exercises to condition dogs to gun fire.

(3) Caliber .22 hornet and .410 shotgun cartridges for firing in Air Force combination (survival) weapons for hunting purposes.

(4) Caliber.45 line-throwing cartridges for firing in caliber .45 line-throwing rifles. The Navy uses these for throwing lines from ship-to-ship. The Army Signal Corps uses these for projecting signal wires over elevated terrain.

(5) Shotshells containing the designated shot sizes as required for the following:

12 gage #00 Buck for guard duty
12 gage #4 Buck for guerrilla purposes.
12 gage #6, 7½ and 8 shot for clay target shooting for training purposes.
.410 gage #7 shot for caliber .22/.410 survival weapons maintained by aircraft

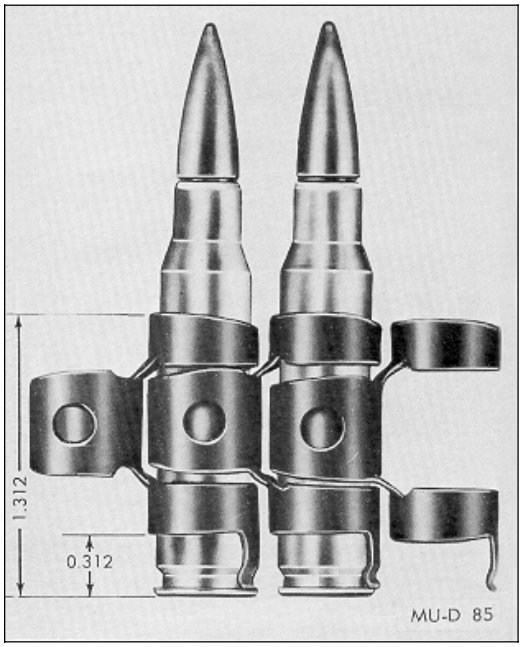


Figure 15. Linked 7.62-mm cartridges

Special purpose cartridges These also include the following types of military cartridges:

(1) Dummy. The dummy cartridge is used for practice in loading weapons and simulated firing to detect flinching of personnel when firing weapons. It consists of a cartridge case and a ball bullet. Cartridge identification is by means of holes through the side of the case or longitudinal corrugations in the case and by the empty primer pocket.

(2) Dummy inert-loaded. This cartridge consists of a cartridge case, a ball bullet and inert granular material in the case simulating the weight and balance of a live cartridge. The exterior of the cartridge is identified by a black chemical finish and by the absence of a primer. This cartridge is used by installations for testing weapon function, linkage and feed chutes.

(3) High-pressure test. High-pressure test ammunition is specially loaded to produce pressures substantially in excess of the maximum average or individual pressures of the corresponding service cartridge. This cartridge is not for field issue. It is used only by armorers and weapons mechanics for proof firing of weapons (rifles, pistols, machine guns) at place of manufacture, test and repair. Because of excessive pressures developed by this type of ammunition, and the potential danger involved in firing, proofing of weapons is conducted only by authorized personnel from fixed and shielded rests by means of a lanyard or other remote control methods.

1.1.1 Metallic Links and Clip

Metallic links. (figures. 15 and 16) are used with caliber .30, caliber .50, 5.56mm, 7.62mm and 20mm cartridges in machine guns. The links are made of steel, surface treated for rust prevention. They are used to assemble cartridges into linked belts of 100 to 750 cartridges per belt. The links must meet specific test and dimension requirements to assure satisfactory ammunition feed and functioning in the machine gun under all training and combat service conditions.

Different configurations of cartridge clips. These permit unitized packages of ammunition. This facilitates transfer of cartridges to appropriate magazines for caliber .30, 7.62mm and 5.56mm rifles. The caliber .30 eight-round clip feeds eight cartridges as a unit into the receiver of the rifle. The caliber .45 clip feeds three cartridges as a unit into the revolver cylinder. Five-round and eight-round clips are used with caliber .30 cartridges; five-round clips with 7.62mm cartridges; ten- round clips with caliber .30 carbine and 5.56-mm cartridges; and three-round clips with caliber .45 cartridges.

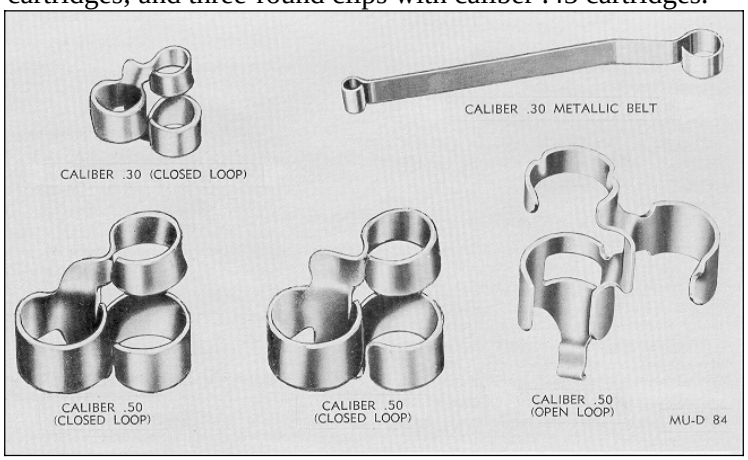


Figure 16. Links for caliber .30 and caliber .50 ammunition

Identification Markings. Each outer shipping container and all inner containers are fully marked to identify the ammunition. Wire- bound boxes are marked in black and ammunition boxes are painted olive drab, with markings in yellow. When linked ammunition is functionally packed, component lot numbers are replaced by a functional lot number. Typical packing and identification markings are illustrated in figures 17 through 19.

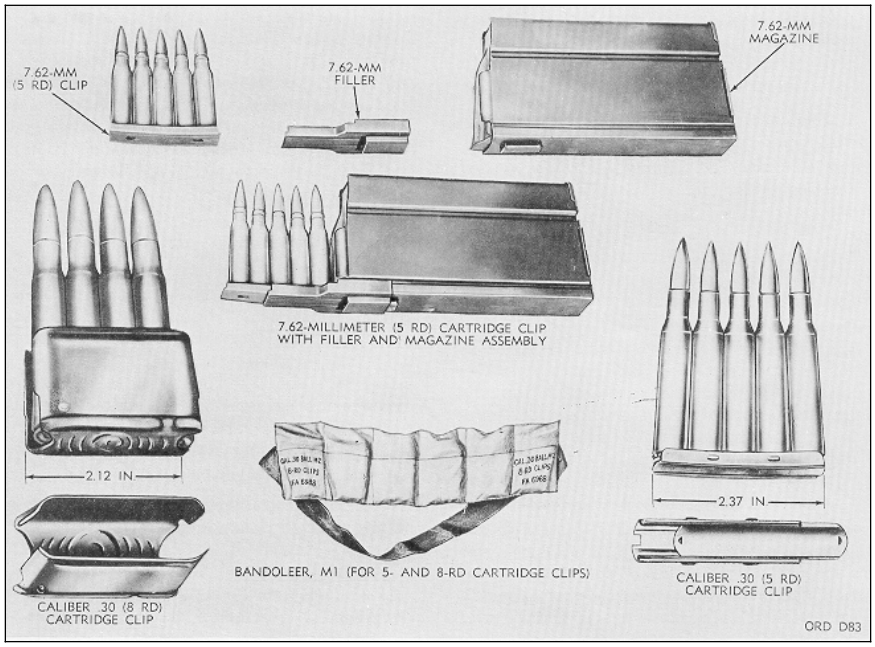


Figure 17. Cartridges, links, belt, cartons, bandoleers and ammunition box

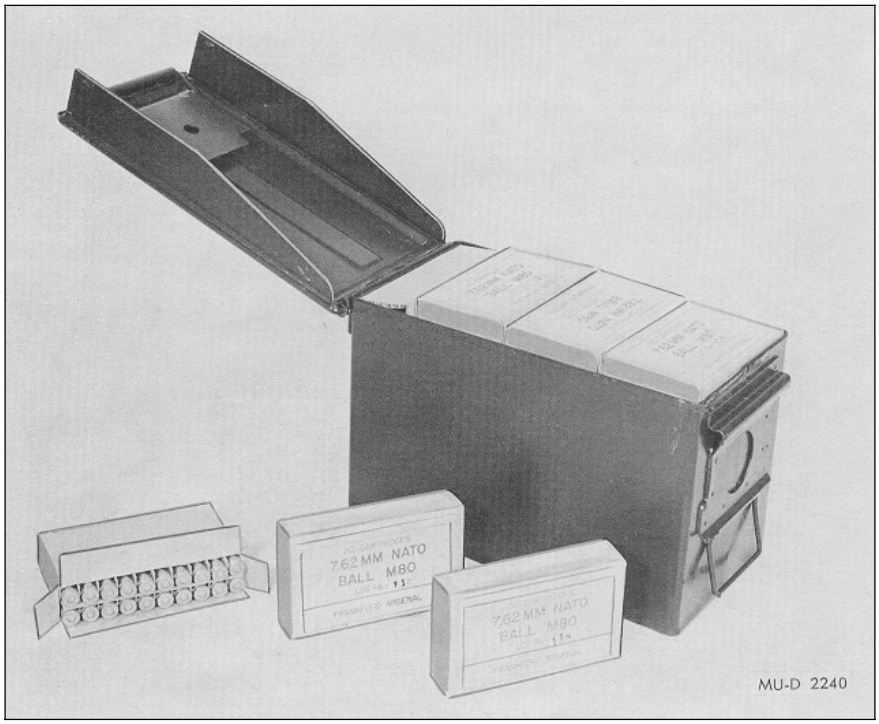


Figure 18. Cartridges, link belt, cartons, bandoleers and ammunition box

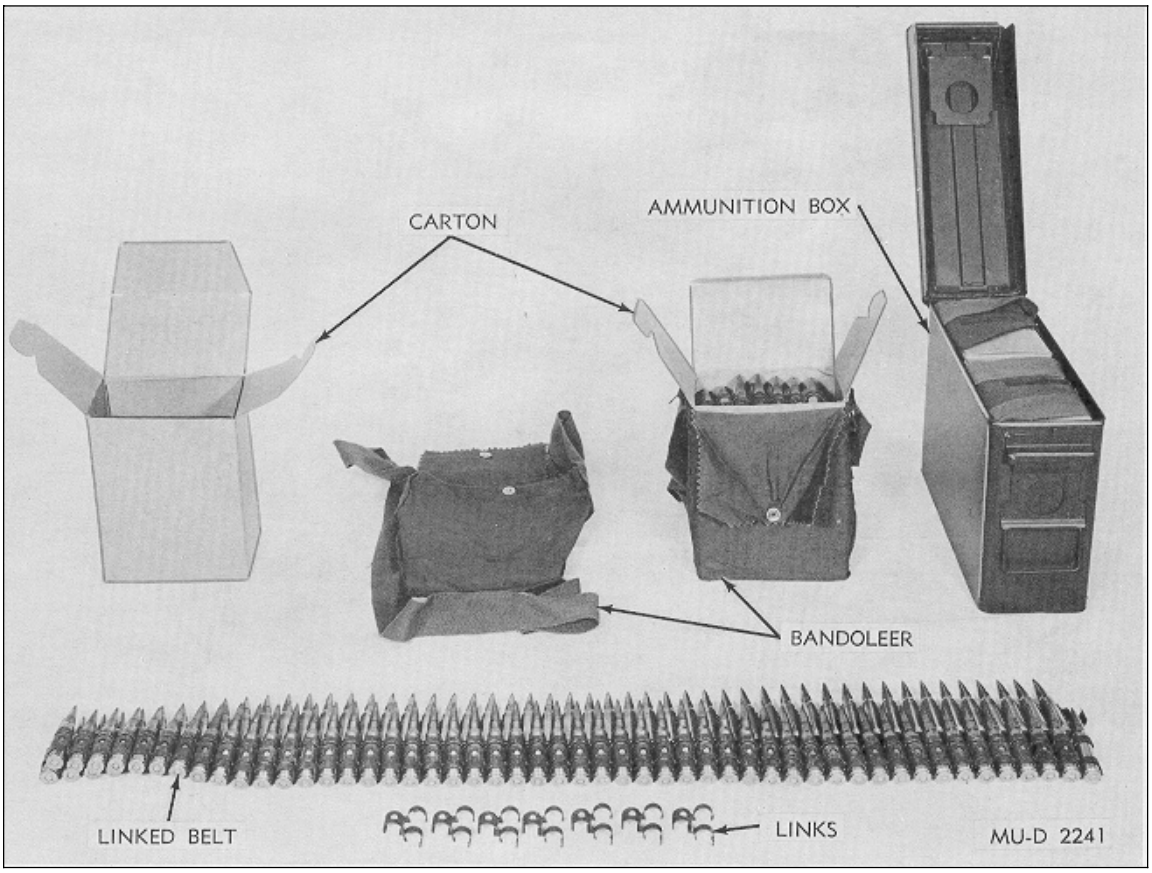


Figure 19. Cartridges, link belt, cartons, bandoleers and ammunition box

Care, Handling and Preservation

Small-arms ammunition is comparatively safe to handle. It is packed to withstand transportation, handling and storage conditions normally encountered in the field. However, consideration should be given to general handling precautions pertaining to ammunition and explosives.

Reference: This data is a reprint of Chapter 3, TM 9-1300-200, *Ammunition General,* October 1969

APPENDIX D

REPORTS / STUDIES

Section No. Report / Study

D-1 Corps of Engineers – Sacramento
1999 Inventory Project Report (INPR) for project no.J09CA7290, *Bodega Bay Gunnery Range*, Bodega Bay, California, dated May 1999.

DEPARTMENT OF THE ARMY
SOUTH PACIFIC DIVISION, CORPS OF ENGINEERS
333 Market Street, Room 923
San Francisco, California 94105-2195

REPLY TO
ATTENTION OF:

27 SEP 1999

CESPD-PM-R

MEMORANDUM FOR

Commander, U.S. Army Corps of Engineers, 20 Massachusetts Avenue, N. W., Washington, DC 20314-1000

Commander, U.S. Army Engineering Center, Huntsville, P.O. Box 1600, Huntsville, Alabama 35807-4301

SUBJECT: Defense Environmental Restoration Program For Formerly Used Defense Sites (DERP-FUDS), Inventory Project Report (INPR) for Bodega Head Range, Marin County, California, Site No. J09CA7290.

1. References:

a. Memorandum CEMP-RF, 17 Jan 1997, subject: Defense Environmental Restoration Program for Formerly Used Defense Sites (DERP-FUDS) - Delegation of Preliminary Assessment of Eligibility /Inventory Project Report (PAE/INPR), Project Approvals to Division Commanders.

b. DERP-FUDS Program Manual, U. S. Army Corps of Engineers, Directorate of Military Programs, Division of Environmental Restoration, Washington, D.C., July 96.

c. Memorandum CEMP-RF, 16 Oct 96, subject: Defense Environmental Restoration Program for Formerly Used Defense Sites (DERP-FUDS) - Preliminary Assessment Funding.

2. The enclosed INPR for Bodega Head Range is approved by SPD in accordance with Ref 1a, 1b, and 1c. The INPR is being forwarded to you for your information and appropriate action. The site has been determined to be a formerly used defense site and is eligible for DERP-FUDS. The proposed OE project is also eligible.

CESPD-PM-R

SUBJECT: Defense Environmental Restoration Program For Formerly Used Defense Sites (DERP-FUDS), Inventory Project Report (INPR) for Bodega Head Range, Marin County, California, Site No. J09CA7290.

3. This memorandum authorizes the OE (J09CA729001) project. The OE project is referred to Huntsville Army Engineering Center as recommended in the INPR.

Encl

PETER T. MADSEN
COL(P),EN
Commanding

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, SACRAMENTO
CORPS OF ENGINEERS
1325 J STREET
SACRAMENTO, CALIFORNIA 95814-2922

REPLY TO
ATTENTION OF

CESPK-PM-H (200-1c) 10 September 1999

MEMORANDUM FOR Commander, South Pacific Division,
ATTN: CESPD-PM-R (Vincent Del Greco)

SUBJECT: Inventory Project Report for the Former Defense Property at the Bodega Head Range, Marin County, California, Property No. J09CA729000

1. The enclosed Inventory Project Report (INPR) addresses our current evaluation of the subject property. This report was prepared following discussions with the State of California, which requested an additional investigation. The investigation found that an OE Project was needed. The enclosed report supersedes any previously submitted report of the property.

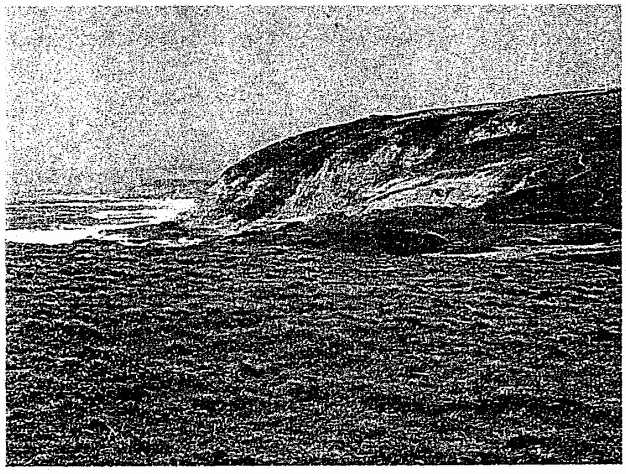
2. I recommend that you approve the proposed OE Project and provide a copy of the report to the Huntsville Design Center for their records.

FOR THE COMMANDER:

Encl

MARK C. CHARLTON
Chief, Programs and Project
Management Division

INVENTORY PROJECT REPORT
BOMBING TARGET CALIFORNIA
BODEGA HEAD GUNNERY RANGE
SONOMA COUNTY, CALIFORNIA



FUDS Site No. J09CA7290

Prepared For:
USAED, Sacramento
DERP-FUDS Program

Prepared By:

U. S. Army Corps
of Engineers
Environmental Design Section
Sacramento District

May 1999

DEFENSE ENVIRONMENTAL RESTORATION PROGRAM
FORMERLY USED DEFENSE SITES

FINDINGS AND DETERMINATION OF ELIGIBILITY
BODEGA HEAD RANGE
SONOMA COUNTY, CALIFORNIA
SITE NO. JO9CA7290

FINDINGS OF FACT

1. From the 1800's until 1957 the Stroh-Campbell family owned Campbell Cove and the southern end of Bodega Head, and the Rose Gaffney family owned the rest of Bodega Head and a stretch of the sand dune peninsula that connects it to the mainland. Bodega Head is currently part of the Sonoma Coast State Beach and Bodega Head is located on the Pacific Coast, in Sonoma County, California, approximately 65 miles north of San Francisco. The property is surrounded by the Pacific Ocean on the west, and on the east by Bodega Bay and Bodega Harbor. No indication has been found of Department of Defense (DoD) ownership interest in the property; however, historical information indicates that DoD used the site.

2. TechLaw Inc., a firm hired by the U.S. Army Corps of Engineers (USACE) to research various Formerly Used Defense Sites (FUDS), located several memoranda dated in late 1945 and early 1946 between Headquarters, Fourth Air Force, in San Francisco, California and the Commanding General, Continental Air Forces, at Bolling Field, Washington D.C., indicating that the Bodega Bay Gunnery Range was an auxiliary facility to Santa Rosa Army Airfield (SRAAF) during WWII and that the gunnery range at the Bodega Bay location was desired for possible use by aircraft from Hamilton Field, Marin County, CA, for post-war operations. According to Mr. Harrison Rued, a representative from the Redwood Empire Aviation Historical Society, the U.S. Army used Bodega Head as a small bombing range for smoke bombs from 1944 to 1945. A mid-air collision near Bodega Point was recorded on January 25, 1944, involving two planes from the 444th Fighter Squadron at SRAAF. It was reported to have occurred while the planes were in an aerial gunnery pattern over the Pacific near Bodega Point. In another incident, a SB2C crashed into a hilltop after flying through a cloud at Bodega Bay on July 14, 1944. The crash occurred during regular training maneuvers with three other SB2C's. Although the reports of these incidents do not specify the type or the location of the training that took place, they do support the U.S. Army's use of the area at Bodega Head. A 1993 USACE report, prepared by the

DEFENSE ENVIRONMENTAL RESTORATION PROGRAM
FORMERLY USED DEFENSE SITES

FINDINGS AND DETERMINATION OF ELIGIBILITY
BODEGA HEAD RANGE
SONOMA COUNTY, CALIFORNIA
SITE NO. JO9CA7290

FINDINGS OF FACT

Huntsville Design Center regarding operations at the former Santa Rosa Army Airfield, indicated that aerial chemical spray training was conducted at Bodega Head. Those training missions used airplane smoke tanks filled with FS (a screening smoke made with sulfur trioxide-chlorosulfonic acid solution) or CNB (a tear gas agent consisting of chloroacetophenone in benzene and carbon tetrachloride). Additionally, the History of the SRAAF, January 1, 1945 through March 31, 1945, reported that a "Sight Burst Panel" was erected at Bodega Head to aid in assessment of Gun Camera Film.

3. On January 3, 1946, a request was made in a memorandum between Headquarters, Fourth Air Force, and the Commanding General, Continental Air Forces for additional information for "justification of transfer of ... Bodega Bay Gunnery Range from SRAAF to Hamilton Field." A memo dated February 14, 1946, indicated that Bodega Bay Gunnery Range should be declared surplus. On March 1, 1946, SRAAF and its auxiliary facilities, including Bodega Bay Gunnery Range, were declared surplus, and the leases for an unspecified acreage of land were canceled and the land was returned to its original owners, the Stroh-Campbell family and the Rose Gaffney family.

DETERMINATION

Based on the forgoing findings of fact, the site has been determined to be formerly used by the DoD. Therefore this site is eligible for the Defense Environmental Restoration Program for Formerly Used Defense Sites established under 10 U.S.C. 2701 *et Seq.*

27 Sep 99
Date

for Peter T. Madsen
Colonel (P), US Army
Commanding

SITE SURVEY SUMMARY SHEET
FOR
DERP-FUDS SITE NO. J09CA7290
BODEGA HEAD GUNNERY RANGE

SITE NAMES:

The following is a list of names used for the site: the Bodega Head Gunnery Range, the Bodega Bay Gunnery Range, the Bodega Bay Bombing Range, the Bodega Head Range, Bodega Head, the Bodega Headlands, Bodega Point, and the Sonoma Coast State Beach. Since the exact location of the Department of Defense (DoD) activities is unknown, the location of those activities will be described as occurring at the Bodega Head Gunnery Range.

LOCATION:

The property is located in Sonoma County, California, approximately 65 miles north of San Francisco, along the Pacific Coast. See Figure 1 for the location of Bodega Head. Bodega Head is currently part of the Sonoma Coast State Beach and is surrounded by the Pacific Ocean on the west, and Bodega Bay and Bodega Harbor on the east. See Figure 2 for the layout of Bodega Head and the neighboring properties.

SITE HISTORY:

Ownership

Figure 3 is a composite of the two Sonoma County Assessor Maps (100-010 and 100-020) that depict Bodega Head and adjacent properties. Assessor parcel numbers (APNs) are assigned to each property, and consist of the book and page of the map and the individual parcel number (e.g., 100-010-009). Parcel numbers are circled on the map and appear as one or two digit numbers (e.g., 7 for 007, 14 for 014). For the remainder of this report, the properties at and adjacent to Bodega Head will be referred to by their individual one or two digit Parcel number. The property that has been determined to be Bodega Head, and the most probable location of the Bodega Head Gunnery Range, consists of Parcel 7.

From the 1800s until 1957, the Bodega Headlands were owned by two families. The Stroh-Campbell family owned Campbell Cove and the southern end of the head. The Rose Gaffney

family owned the rest of the head, along with a stretch of sand dune peninsula that connects it to the mainland (Kelleher, pg 260-261). In October of 1958, the Pacific Gas and Electric Company (PG&E) filed a suit in Sonoma County Superior Court to acquire the southernmost portion of the 400-acre Rose Gaffney property for the purpose of building an atomic reactor at Horseshoe Cove. The company eventually decided to build the reactor at Campbell Cove instead, and thus began pursuing the 160-acre Stroh-Campbell property (Kelleher, pg 262). The deed conveying the Campbell property (majority of Parcel 7) to PG&E was filed by the end of 1959. The southernmost portion of the Rose Gaffney property (northern one-third of Parcel 7) was also conveyed to PG&E by Deed of Condemnation (Kelleher, pg 263).

PG&E executed a Corporation Grant Deed on November 26, 1973 that conveyed all of Parcel 7 to the State of California after abandoning all plans of building the atomic reactor power plant (Sonoma County Clerk, 1973). Two other portions of the former Rose Gaffney property, specifically Parcels 8 and 10, were acquired by the Regents of the University of California by Final Order of Condemnation on December 3, 1962 (Sonoma County Clerk, 1962). It is unclear if Parcel 9 was also acquired in the condemnation. On October 26, 1962, Parcel 4 was obtained by the State of California as a result of Final Order of Condemnation to expand the Sonoma Coast State Beach. The State then acquired Parcel 13 as a result of Final Order of Condemnation on October 28, 1963 to again expand the Sonoma Coast State Beach (Sonoma County Clerk, 1963). Previously, Parcels 19, 32, and 33 had been obtained by the State of California for State Beach purposes by deed on November 7, 1934 (Sonoma County Clerk, 1934).

Department of Defense Operations

Several communications occurred in late 1945 and early 1946 between the Headquarters Fourth Air Force, in San Francisco, California, and the Commanding General, Continental Air Forces, at Bolling Field, Washington, D.C. Those communications indicate that the Bodega Head Gunnery Range was an auxiliary facility to Santa Rosa Army Air Field (SRAAF) during World War II, and was desired for possible use by aircraft from Hamilton Field for postwar operations (AAF, 1946). Although the Bodega Head Gunnery Range is listed as a training site, no specific location is provided in the documentation.

According to Mr. Harrison Rued, Redwood Empire Aviation Historical Society, the Army used Bodega Head as a small bombing range for smoke bombs from 1944 to 1945. He also stated that the Navy dive-bombed at the mouth of the Russian River, approximately 15-20 miles north of Bodega Head. Documentation supporting this statement suggests that aerial gunnery missions were flown from SRAAF to six ranges near the mouth of the Russian River at Bodega Head (History of SRAAF, 4/44 to 12/44).

After the Japanese bombing of Pearl Harbor, troops were dispersed throughout the Pacific Coast. In January of 1942, Troop C of the 107th Cavalry was detailed to Coast Watch at Bodega Bay (LeBaron, pg 289, 1993). Glenice Carpenter, Bodega Bay Historical Society, stated that the Army occupied a ranch house at Bodega Head when the war broke out. According to Ms. Carpenter, the Army kept tanks, vehicles, and other equipment at a "CCC" camp a few miles east of Freestone, California and they drove the tanks out to the dunes at Bodega Head for maneuvers and target practice (Cal/EPA, 1998).

As the war progressed, battle-fatigued aircraft were returned to the states to be used for pilot training, and accidents occurred frequently. A mid-air collision near Bodega Head was recorded on January 25, 1944, involving two planes from the 444th Fighter Squadron SRAAF. It was reported that the collision occurred while the planes were in an aerial gunnery pattern over the Pacific in the area of Bodega Head (Historical Diary, 1/25/44-1/27/44). On July 14, 1944, an SB2C crashed at Bodega Bay. The newspaper headline read "Dive-Bomber Hits Coast Hilltop in Training Maneuvers". The story indicated that four planes were involved in training maneuvers and one of them hit the hilltop after flying through a cloud. There may have been a second crash of a Navy plane near Bodega Head during July (Lebaron, 1993). Although the reports of these incidents are not specific as to the type or location of the training that was taking place, they do provide some insight into the Army's use of the area around Bodega Head.

A 1993 United States Army Corps of Engineers (USACE) report, prepared by the Huntsville Design Center regarding operations at the former Santa Rosa Army Airfield, indicates that Bodega Head was an area where aerial spraying training was conducted. As part of the chemical warfare training conducted at SRAAF, pilots were trained in aerial chemical procedures. These involved spray missions using airplane smoke tanks filled with FS (a screening smoke made with a sulfur

trioxide-chlorosulfonic acid solution) or CNB (a tear gas agent consisting of chloroacetophenone in benzene and carbon tetrachloride). One-hundred fifty hours of chemical training was required for each pilot, and each trainee was required to fly four chemical spray missions (USACE, 1993).

According to a *History of the Santa Rosa Army Airfield*, a "Sight Burst Panel was erected at the Bodega Head Gunnery Range to aid in assessment of Gun Camera film" (History of SRAAF, 1/45-3/45). Inferring from several descriptions given by military personnel, a Sight Burst Panel is thought to be a large panel, usually made of fiberglass, that is propped up on one end so that when viewed in profile it intersects the ground at some vertical angle. When the guns of an aircraft are fired at the panel, they punch holes through the thin material. A camera was mounted on the wing of the firing aircraft, adjacent to the guns, and recorded the number and location of the shots that hit the panel.

Site Deactivation and Current Uses

On January 3, 1946, a request was made in a memorandum between Headquarters Fourth Air Force, and the Commanding General, Continental Air Forces, for additional information on the "justification of transfer of ... Bodega Head Gunnery Range from Santa Rosa Army Air Field...to Hamilton Field..." (AAF, 1946). A memo dated February 14, 1946, indicates that it was determined that Bodega Head Gunnery Range should be declared surplus (CAF, 2/14/46). However, by March 1, 1946, SRAAF and its auxiliary facilities, including the Bodega Head Gunnery Range, were all declared surplus.

The National Archives in Washington, D.C. contains documentation that in the late 1950s the Sonoma County Tidelands, Harbor, and Beach Commission submitted a request to the Twelfth U.S. Coast Guard District for the transfer of the Coast Guard Station at Point Reyes, California to Bodega Bay. A letter sent in December, 1958 outlines the need for a Coast Guard Station at Bodega Bay based upon the increase of commercial crabbing and salmon fishing and a plan to institute recreational boating. The letter indicates that a hearing was held on December 11, 1958 regarding the request (Sonoma County Tidelands, 12/4/58). A letter sent in February of 1959 indicates that an additional hearing was held on February 12, 1959 in the matter of a Coast Guard Station at Bodega Bay, and it was determined that a lifeboat station was required at Bodega Bay

(12th Coast Guard Dist., 2/11/59). There is currently a U.S. Coast Guard Station located on the north side of Doran Beach in Bodega Harbor (see Figure 2).

The Regents of the University of California used land obtained from Rose Gaffney in the early 1960s to construct the Bodega Marine Life Refuge and U.C. Marine Life Laboratory at Bodega Bay (Sonoma County Clerk, 12/10/62). The Marine Laboratory and Marine Refuge are still in operation at Bodega Head.

California State Parks designated the land that was obtained in the mid 1970s from Rose Gaffney, PG&E, and others for recreational use and preservation through the state parks system and state beaches (see Figure 3). The majority of the property at Bodega Head and surrounding Bodega Bay is currently used for these purposes as part of the Sonoma Coast State Beach.

Previous record searches of former military target areas have provided general information regarding extensive bombing and strafing training in Northern California. While previous record searches have provided scant evidence of OE, development has encroached on these former target areas, and occasionally ordnance has been found. The State of California has often expressed safety concerns over these former targets.

SITE VISITS:

Two site visits were conducted at the site. The first occurred on April 7, 1998 when Techlaw Inc. was contracted by the USACE to compose a Preliminary Assessment Report (PAR) for the site. The second visit occurred on April 29, 1999 when USACE representatives visited the site.

Techlaw Inc.

Steven Clonts and Gene Barber of TechLaw conducted a site visit of Bodega Head on April 7, 1998. The purpose of that visit was to make observations about the current condition of the site and to identify any features that might relate to the operations of the Department of Defense (DoD).

As a result of the minimal information concerning the description and location of DoD activities at Bodega Head, TechLaw personnel could only make observations concerning the

current conditions of the surrounding area. The Village of Bodega Bay, located on the east side of the bay, is a small town with several stores and restaurants, a marina, and houses located on the surrounding hillside. Doran Beach is used primarily for recreational purposes and a number of motor homes were observed along the beach and parking areas. Because it was early spring and the weather conditions were still cold, there was very little activity in Bodega Bay other than a few windsurfers and people walking along the beach. Bodega Harbor contains several small marinas and a small fishing fleet. Looking south from the headlands a large series of rocks is visible several hundred yards off shore at the southern edge of the inlet between the bay and the ocean. That rock island may have been an ideal location for the placement of targets. No evidence of former targets was visible.

The top of the headlands were covered with grass and wildflowers but no observations were made of former structures or development. TechLaw did observe two large poles (approximately 12 inches diameter) embedded in the ground and protruding approximately 10 inches above ground surface. These poles had holes bored through them and looked as though they may have been used to secure guy wires for a tower or antenna. However, a third pole could not be located.

As a result of the site visit that TechLaw conducted at Bodega Head and its surrounding areas, several conclusions were developed. One conclusion was that Bodega Head is widely used by the public for recreational purposes. Another was that the trails on the headlands are open to the public when in good repair and weather permitting. Finally, it was concluded that all of the gunnery and bombing targets referenced in this report have been removed. No additional, significant observations were made during the site visit and no evidence was located indicating that the DoD had maintained a presence in this area.

Environmental Design Section (EDS)

The site visit for the USACE was conducted on April 28th, 1999, by Ms. Tracie Billington and Mr. Scott Duren of the USACE, Mr. David Price from the Dept. of Toxic Substances Control (DTSC), and Mr. Clinton Huckins, USACE Unexploded Ordnance (UXO) Safety Specialist from Fort Ord, Monterrey.

During the site visits several large pieces of concrete about 2-3 feet in diameter, each with wooden 2x4s imbedded in them, were observed at Bodega Head. There was also a pile of rocks that had been strengthened by concrete poured into the vacant spaces. It is believed that the material is some type of construction debris, but probably not part of a bombing target. A random visual and geophysical survey of the area was performed by Mr. Huckins using a Schonstedt Model GA-52Cx fluxgate magnetometer. Several ferrous anomalies were found in the area, but thought to be part of the construction debris. There were no visible remnants of any DoD activity at the site.

Several photographs were taken during the site visit. One photo was taken from the head, looking north up the coast (Photo 1), and another was taken of the construction debris (Photo 2). A handheld Global Positioning System (GPS) instrument was used to provide the coordinates for the site, which were 38° 25' 36" North and 123° 06' 52" West, at an elevation of 106 ft +/- 54 ft.

CATEGORY OF HAZARD: OE

PROJECT DESCRIPTION: An OE Site Investigation (Archive Records Search) is recommended.

AVAILABLE STUDIES AND REPORTS:

1. TechLaw, Inc., Preliminary Assessment Report, Bodega Head, Sonoma County, California. Prepared for the US Army Corps of Engineers, Sacramento District, under Contract No. DACW05-95-D-0004, Task Order No. 0009, dated July 31, 1998.

PA POC: Mr. William Mullery, CESPK-ED-EB, U.S. Army Corps of Engineers, Sacramento District, (916) 557-6944.

PROJECT SUMMARY SHEET FOR
DERP-FUDS HTRW PROJECT NO. J09CA729001
BODEGA HEAD GUNNERY RANGE
SITE NO. J09CA7290

PROJECT DESCRIPTION: Conduct an OE Site Investigation (Archive Record Search) to determine locations and descriptions of DoD activities at the site.

PROJECT ELIGIBILITY: Documents located describe DoD use of Bodega Head for target and/or bombing practice during WWII.

POLICY CONSIDERATIONS: The State of California has expressed its concern for public safety regarding former Defense targets. The public is encroaching on the former target areas and the State is not convinced that effective safety precautions were taken in restoring the former targets to public use.

PROPOSED PROJECT: Conduct an OE Site Investigation (Archive Records Search).

RAC Form: Attached. (See Appendix B)

DISTRICT POC: Mr. William Mullery, CESPK-ED-EB, U.S. Army Corps of Engineers, Sacramento District, (916) 557-6944.

Appendix A:
Photographs and Figures

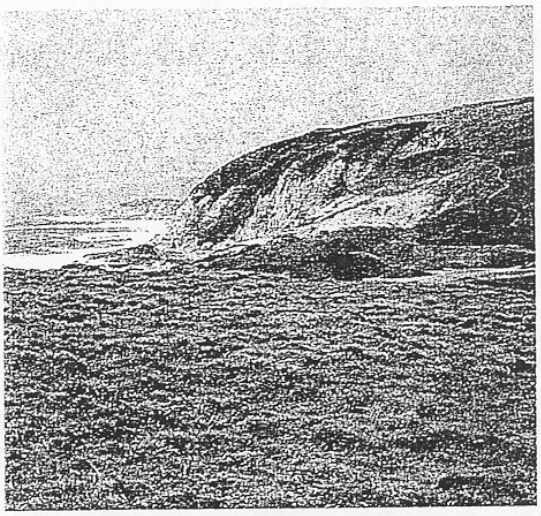


Photo 1: View to the North West from Bodega Head

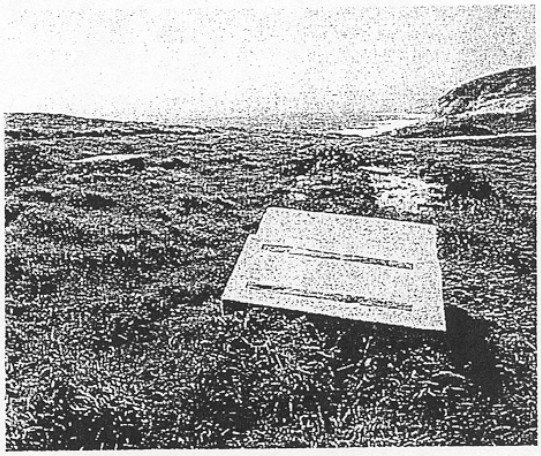
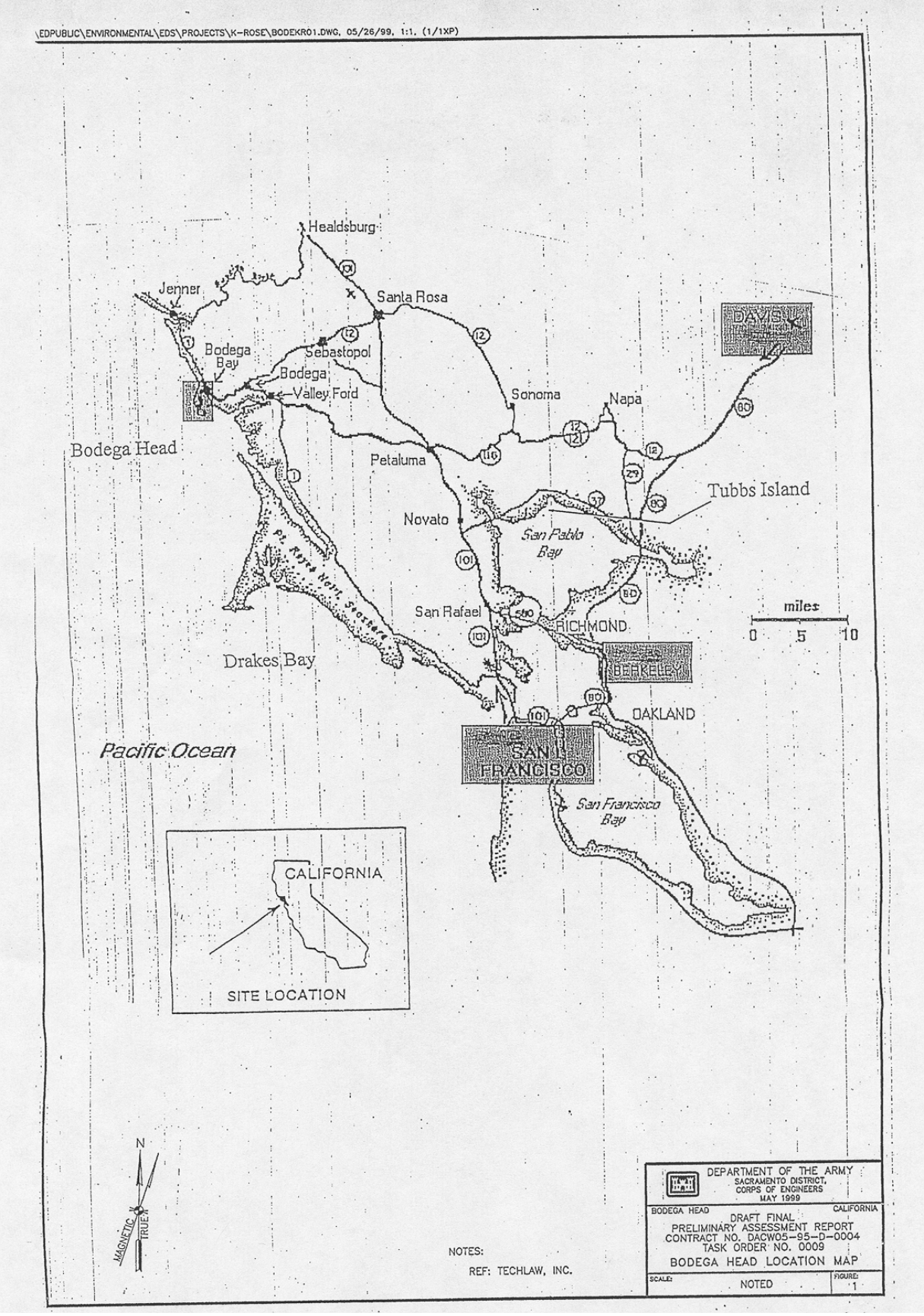


Photo 2: Concrete construction debris on top of a hill at Bodega Head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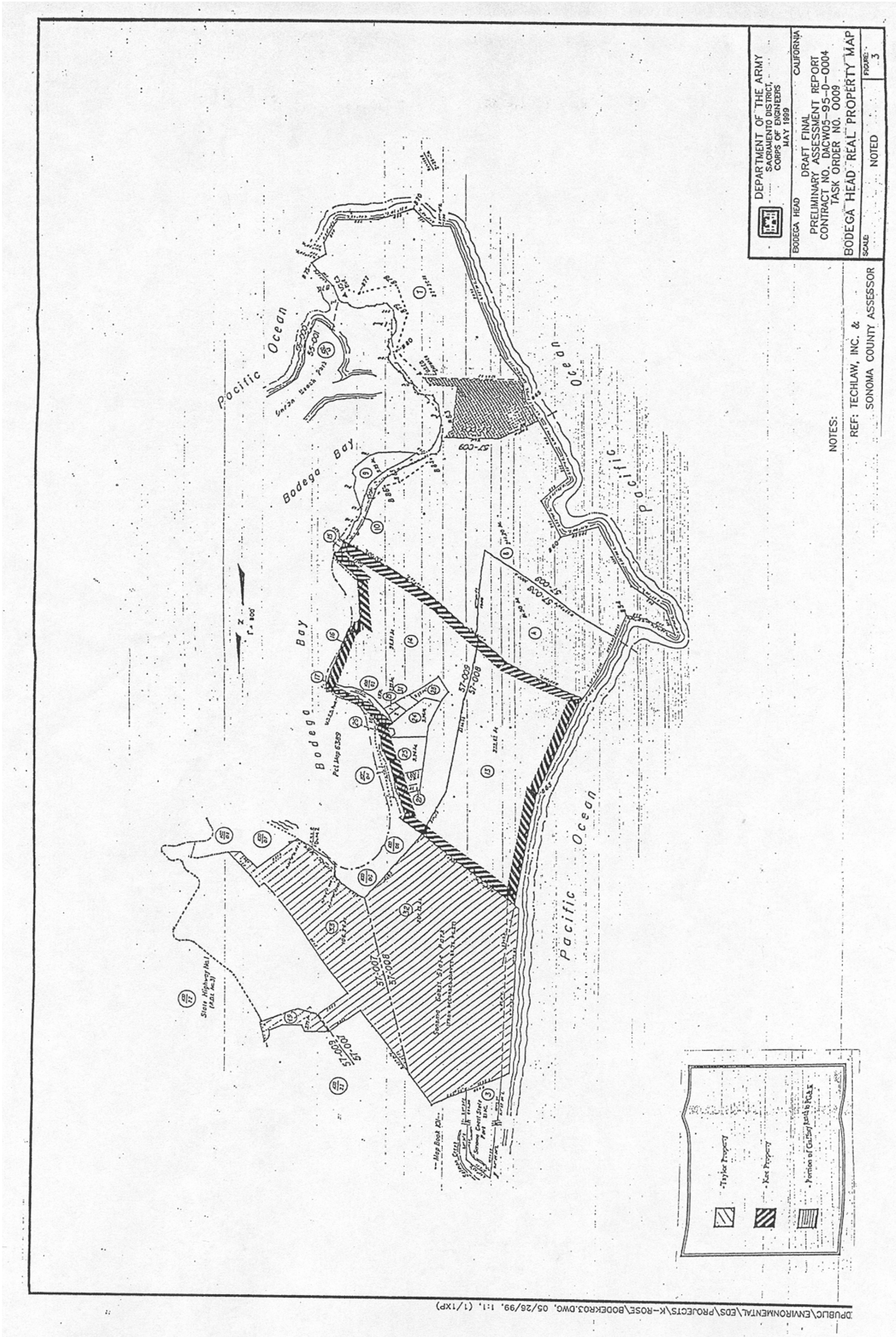
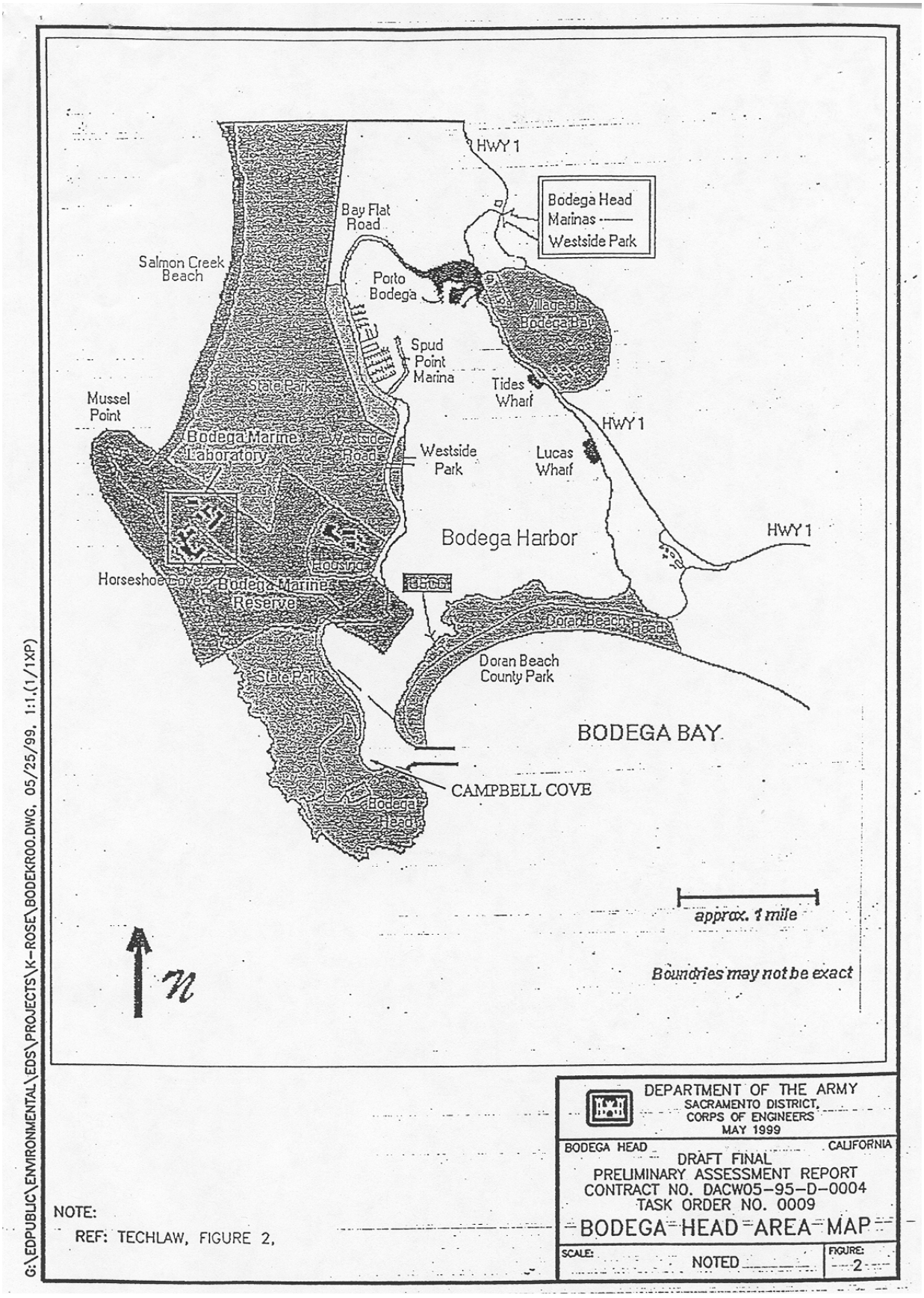
Healdsburg
Jenner
Santa Rosa
Sebastopol
Bodega Bay
Bodega
Valley Ford
Sonoma
Napa
DAVIS
Bodega Head
Petaluma
Tubbs Island
Novato
San Pablo Bay
Pt. Reyes Natl. Seashore
San Rafael
RICHMOND
BERKELEY
OAKLAND
Drakes Bay
Pacific Ocean
SAN FRANCISCO
San Francisco Bay
miles
0 5 10
CALIFORNIA
SITE LOCATION
N
MAGNETIC
TRUE
NOTES:
REF: TECHLAW, INC.
DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT,
CORPS OF ENGINEERS
MAY 1999
BODEGA HEAD
CALIFORNIA
DRAFT FINAL
PRELIMINARY ASSESSMENT REPORT
CONTRACT NO. DACW05-95-D-0004
TASK ORDER NO. 0009
BODEGA HEAD LOCATION MAP
SCALE: NOTED
FIGURE: 1


Pacific Ocean
Bodega Bay
Bodega Bay
Pacific Ocean
Pacific Ocean
State Highway No. 1
Sonoma Coast State Park
57-009
57-007
57-008
55-001
-Taylor Property
- Kee Property
- Portion of Gaffney
DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT,
CORPS OF ENGINEERS
MAY 1999
BODEGA HEAD
CALIFORNIA
DRAFT FINAL
PRELIMINARY ASSESSMENT REPORT
CONTRACT NO. DACW05-95-D-0004
TASK ORDER NO. 0009
BODEGA HEAD REAL PROPERTY MAP
SCALE:
NOTED
FIGURE:
3
NOTES:
REF: TECHLAW, INC. &
SONOMA COUNTY ASSESSOR
DPUBLIC\ENVIRONMENTAL\EDS\PROJECTS\K-ROSE\BODEKR03.DWG, 05/26/99, 1:1, (1/1XP)


HWY 1
Bodega Head
Marinas
Westside Park
Bay Flat Road
Salmon Creek Beach
Porto Bodega
Village of Bodega Bay
Spud Point Marina
Tides Wharf
State Park
Mussel Point
Bodega Marine Laboratory
Westside Road
Westside Park
Lucas Wharf
HWY 1
Bodega Harbor
HWY 1
Horseshoe Cove
Bodega Marine Reserve
Doran Beach Road
Doran Beach County Park
State Park
BODEGA BAY
CAMPBELL COVE
Bodega Head
approx. 1 mile
Boundries may not be exact
N
G:\EDPUBLIC\ENVIRONMENTAL\EDS\PROJECTS\K-ROSE\BODEKROO.DWG, 05/25/99, 1:1.(1/1XP)
NOTE:
REF: TECHLAW, FIGURE 2,
DEPARTMENT OF THE ARMY
SACRAMENTO DISTRICT,
CORPS OF ENGINEERS
MAY 1999
BODEGA HEAD
CALIFORNIA
DRAFT FINAL
PRELIMINARY ASSESSMENT REPORT
CONTRACT NO. DACW05-95-D-0004
TASK ORDER NO. 0009
BODEGA HEAD AREA MAP
SCALE: NOTED
FIGURE: 2

Appendix B:
RAC Form
(Risk Assessment Procedures for Ordnance and Explosives (OE) Sites)

APPENDIX B
RISK ASSESSMENT PROCEDURES FOR
ORDNANCE AND EXPLOSIVES (OE) SITES

Site Name: **Bodega Head Range**
Site Location: Bodega Head, Sonoma County, California
DERP Project #: **J09CA7290**
Date Completed: May 25, 1999

Rater's Name: Scott Duren
Phone No.: (916) 557-7633
Organization: United States Army Corps of Engineers
Score: **2**

OE RISK ASSESSMENT:

This risk assessment procedure was developed in accordance with MIL-STD 882C and AR 385-10. The Risk Assessment Code (RAC) score will be used by the U.S. Army Engineering and Support Center, Huntsville (USAESCH) , Ordnance and Explosives Team (CEHNC-OE) to prioritize the remedial action(s) at Formerly Used Defense Sites (FUDS). The risk assessment should be based upon the best available information resulting from records searches, reports of Explosive Ordnance Disposal (EOD) Detachment actions, field observations, interviews, and measurements. This information is used to assess the risk involved based on the potential OE hazards identified at the site. The risk assessment is composed of two factors, hazard severity and hazard probability. Personnel involved in visits to potential OE sites should view the CEHNC-OE videotape entitled "A Life Threatening Encounter: OEW."

Part I. Hazard Severity. Hazard severity categories are defined to provide a qualitative measure of the worst credible event resulting from personnel exposure to various types and quantities of unexploded ordnance.

TYPE OF ORDNANCE: (Circle all values that apply)

A. Conventional Ordnance and Ammunition	VALUE
Medium/large caliber (20mm and larger)	(10)
Bombs, explosive	10
Grenades, hand or rifle, explosive	10
Landmine, explosive	10
Rockets, guided missiles, explosive	10
Detonators, blasting caps, fuzes, boosters, bursters	6
Bombs, practice (w/spotting charges)	(6)
Grenades, practice (w/spotting charges)	4
Landmine, practice (w/spotting charges)	4
Small Arms, Complete Round (.22 cal - .50 cal)	1
Small Arms, Expended	0
Practice ordnance (w/o spotting charges)	0
Conventional Ordnance and Ammunition (largest single value)	**10**

What evidence do you have regarding conventional unexploded ordnance?

An archive search has revealed that a practice dive bombing target existed at Bodega Head, and that a Sight Burst Panel was also present. Practice bombs with spotting charges would have been dropped at the dive bombing target, while medium to high caliber wing guns would have been fired from aircraft at the Sight Burst Panel.

B. Pyrotechnics (For munitions not described above.)

	VALUE
Munition (Container) Containing White Phosphorus (WP) or other pyrophoric material (i.e., spontaneously flammable)	10
Munition containing a flame or incendiary material (i.e.,Napalm, Triethylaluminum metal incendiaries)	6
Flares, signals, simulators, screening smokes (other than WP)	(4)
Pyrotechnics (Select the largest single value)	4

What evidence do you have regarding pyrotechnics?

A 1993 USACE report indicated that aerial spraying training was conducted at Bodega Head. Several missions where believed to have been flown using airplane smoke tanks filled with FS, a screening smoke made with a sulfur trioxide-chlorosulfonic acid solution.

C. Bulk High Explosives (HE) (Not an integral part of conventional ordnance; uncontainerized.)

	VALUE
Primary or Initiating Explosives (Lead Styphnate, Lead Azide Nitroglycerin, Mercury Azide, Mercury Fulminate, Tetracene, etc.)	10
Demolition Charges	10
Secondary Explosives (PETN, Compositions A, B, C, Tetryl, TNT, RDX, HMX, HBX, Black Powder, etc.)	8
Military Dynamite	6
Less Sensitive Explosives (Ammonium Nitrate, Explosive D, etc.)	3
High Explosives (Select the largest single value)	0

What evidence do you have regarding bulk explosives?

None.

D. Bulk Propellants (Not an integral part of rockets, guided missiles, or other conventional ordnance; uncontainerized)

	VALUE
Solid or Liquid Propellants	6
Propellants (Total)	**0**

What evidence do you have regarding bulk propellants?
None.

E. Chemical Warfare Material (CWM) and Radiological Weapons

	VALUE
Toxic Chemical Agents (Choking, Nerve, Blood, Blister)	25
War Gas Identification Sets	20
Radiological	15
Riot Control Agents (Vomiting, Tear)	(5)
Chemical and Radiological (Select the largest single value)	**5**

What evidence do you have of chemical or radiological?
A 1993 USACE report indicates that Bodega Head was used for aerial spraying training missions. Some of those missions were believed to have been flown using airplane smoke tanks filled with CNB, a tear gas agent consisting of chloroacetophenone in benzene and carbon tetrachloride.

TOTAL HAZARD SEVERITY VALUE **19**
(Sum of Largest Values for A through E--Maximum of 61).
Apply this value to Table 1 to determine Hazard Severity Category.

TABLE 1
HAZARD SEVERITY *

Description	Category	Hazard Severity Value
CATASTROPHIC	I	21 and/or greater
CRITICAL	**II**	**10 to 20**
MARGINAL	III	5 to 9
NEGLIGIBLE	IV	1 to 4
**NONE	V	0

* Apply Hazard Severity Category to Table 3.

** If Hazard Severity Value is 0, you do not need to complete Part II of this form. Proceed to Part III and use a RAC Score of 5 to determine your appropriate action.

Part II. Hazard Probability. The probability that a hazard has been, or will be, created due to the presence and other rated factors of unexploded ordnance or explosive materials on a formerly used Department of Defense (DoD) site.

AREA, EXTENT, ACCESSIBILITY OF OE HAZARD
(Circle all values that apply)

A. Locations of OE Hazards	VALUE
On the surface	5
Within Tanks, Pipes, Vessels or other confined areas.	4
Inside walls, ceilings, or other building/structure.	3
Subsurface	(2)
Location (Select the single largest value)	2

What evidence do you have regarding location of OE?

None. No OE items have been found at the site. It is possible that any practice bombs and munitions could have been buried beneath the ground surface by the force of impact with the ground.

B. Distance to the nearest inhabited location/ structure likely to be at risk from OE hazard (roads, parks, playgrounds, building, etc.)

	VALUE
Less than 1,250 feet	(5)
1250 feet to 0.5 miles	4
0.5 miles to 1.0 mile	3
1.0 mile to 2.0 miles	2
Over 2 miles	1
Distance (Select the single largest value)	5

What are the nearest inhabited structures/buildings?

A road leads out to Bodega Head, and is traveled by recreational hikers and sightseers visiting the area. The Bodega Marine Laboratory also exists approximately one and one-half miles north of Bodega Head.

C. Number(s) of building(s) within a 2 mile radius measured from the OE hazard area, not the installation boundary.

	VALUE
26 and over	5
16 to 25	4
11 to 15	(3)
6 to 10	2
1 to 5	1
0	0
Number of Buildings (Select the single largest value)	3

Narrative: The Bodega Marine Laboratory and its associated housing lies within a two mile radius of the head, and there are several buildings that make up the lab area and the housing area.

D. Types of Buildings (within a 2 mile radius)

	VALUE
Educational, Child Care, Residential, Hospitals, Hotels, Commercial, Shopping Centers	(5)
Industrial, Warehouse, etc.	4
Agricultural, Forestry, etc.	3
Detention, Correctional	2
No Buildings	0
Types of Buildings (Select the largest single value)	5

Describe types of buildings in the area: There are some residential, and some research buildings within the area.

E. Accessibility to site refers to access by humans to ordnance and explosives. Use the following guidance:

	VALUE
No barrier nor security system	(5)
Barrier is incomplete (e.g., in disrepair or does not completely surround the site). Barrier is intended to deny egress from the site, as for a barbed wire fence for grazing.	4
A barrier, (any kind of fence in good repair) but no separate means to control entry. Barrier is intended to deny access to the site.	3
Security guard, but no barrier	2
Isolated site	1
A 24-hour surveillance system (e.g., television monitoring or surveillance by guards or facility personnel) which continuously monitors and controls entry onto the facility; or An artificial or natural barrier (e.g., a fence combined with a cliff), which completely surrounds the facility; and a means to control entry, at all times, through the gates or other entrances to the facility (e.g., an attendant, television monitors, locked entrances, or controlled roadway access to the facility).	0
Accessibility (Select the single largest value)	5

Describe the site accessibility:

No barriers or fences exist around the site, and hiking trails provide access to most of Bodega Head.

F. Site Dynamics - This deals with the site conditions that are subject to change in the future, but may be stable at the present. Examples would be excessive soil erosion on beaches or streams, increasing land development that could reduce distances from the site to inhabited areas or otherwise increase accessibility.

	VALUE
Expected	(5)
None Anticipated	0
Site Dynamics (Select largest value)	5

Describe the site dynamics:

Bodega Head is part of the Sonoma Coast State Park system, so any development in the near future is unlikely, however the constant force of winds and waves are continuously changing the geography of the coastline.

TOTAL HAZARD PROBABILITY VALUE 25

(Sum of Largest Values for A through F--Maximum of 30)
Apply this value to Hazard Probability Table 2 to determine Hazard Probability Level

TABLE 2

HAZARD PROBABILITY *

Description	Level	Hazard Probability Value
FREQUENT	A	27 or greater
PROBABLE	**B**	**21 to 26**
OCCASIONAL	C	15 to 20
REMOTE	D	8 to 14
IMPROBABLE	E	less than 8

* Apply Hazard Probability Level to Table 3.

Part III. Risk Assessment. The risk assessment value for this site is determined using the following Table. Enter the results of the Hazard Probability and Hazard Severity values.

Table 3

Probability Level	Frequent A	**Probable B**	Occasional C	Remote D	Improbable E
Severity Category					
Catastrophic I	1	1	2	3	4
Critical II	1	(2)	3	4	5
Marginal III	2	3	4	4	5
Negligible IV	3	4	4	5	5

RISK ASSESSMENT CODE (RAC)

RAC 1	Expedite INPR, recommending further action by CEHNC - Immediately call CEHNC-OE-S -- Commercial 205-895-1582/1598.
RAC 2	**High priority on completion of INPR - Recommend further action by CEHNC**
RAC 3	Complete INPR - Recommend further action by CEHNC.
RAC 4	Complete INPR - Recommend further action by CEHNC.
RAC 5	Usually indicates that no further action (NOFA) is necessary. Submit NOFA and RAC to CEHNC.

Part IV. Narrative. Summarize the documented evidence that supports this risk assessment. If no documented evidence was available, explain all the assumptions that you made.

All of the evidence that supports the risk assessment was found through extensive archive searches by TechLaw Inc., who were contracted by the USACE to write a Preliminary Assessment of the Bodega Head. The references found by TechLaw are listed in the Available Studies and Reports section of the attached Inventory Project Report.

APPENDIX E

LETTERS / MEMORANDUMS/ MISCELLANEOUS ITEMS

Section No. Letter / Memorandums / Miscellaneous Items

E-1 4th Air Force, Headquarters
1944 *Memo: Bodega Bay Air-to-Ground Gunnery Range,* 21 February 1944. RAG 342, Acc. 342-57H-3001, Box 14, Folder: 684 General Series 26 & 28, NPRC (MPR), St. Louis, MO.

E-2 4th Air Force, Headquarters
1944 *Memo: Status and Requirements of Bombing and Gunnery Ranges,* 13 June 1944. RAG 342, Acc. 342-57H-3001, Box 6, Folder: 684 1943 NPRC (MPR), St. Louis, MO.

E-3 4th Air Force, Headquarters
1945 *Memo: Change of Status, Santa Rosa Army Air Field, Santa Rosa, California,* 26 November 1945. RAG 342, Acc. 342-57H-3001, Box 22, Folder: 686 Santa Rosa, NPRC (MPR), St. Louis, MO.

E-4 4th Air Force, Headquarters
1946 *Memo: Bodega Bay Air-to-Ground Gunnery Range,* 29 August 1946. RAG 342, Acc. 342-57H-3001, Box 22, Folder: 602, Disposition of Real Property, NPRC (MPR), St. Louis, MO.

E-5 4th Air Force, Headquarters
1946 *Ltr Div Engr. Pac Divn, San Francisco, file PSDRM 684 (Bodega Bay Gunnery Range,): dtd30 Aug 46, Subject: Neutralization of Unexploded Ammunition and Duds,* 10 October 1946. RAG 342, Acc. 342-57H-3001, Box 23, Folder: 684, NPRC (MPR), St. Louis, MO.

E-6 Army Air Forces, Headquarters
1943 *Memo: Status and Requirements of Bombing and Gunnery Ranges,* 13 July 1943. RAG 342, Acc. 342-57H-3001, Box 6, Folder: 684 1943 NPRC (MPR), St. Louis, MO.

E-7 Army Air Forces, Headquarters
1943 *Memo: Status and Requirements of Bombing and Gunnery Ranges,* 26 November 1943. RAG 342, Acc. 342-57H-3001, Box 6, Folder: 684 1943 NPRC (MPR), St. Louis, MO.

E-8 Army Air Forces, Headquarters
1946 *Letter regarding surplusing Santa Rosa Army Air Field and four auxiliary facilities,* 1 March 1946. RAG 18, Entry 2A, Box 2256, Folder: Building and Grounds, California R-2, 1946, NARA-College Park, MD.

E-9 Chief of the Air Corps, War Department
1941 *Letter regarding bombing and gunnery ranges being used by the Army Air Corps adjacent to shore lines,* 27 February 1941. RAG 342, Acc. 342-49H-6037, Box 38, Folder: 684 October 1941 NPRC (MPR), St. Louis, MO.

E-10 Corps of Engineers, South Pacific Division
1947 *Memo: Neutralization of Unexploded Ammunition and Duds,* 13 March 1947. RAG 342, Acc. 342-57H-3001, Box 1, Folder: 684, NPRC (MPR), St. Louis, MO.

E-11 Corps of Engineers, South Pacific Division
1948 *Real Property Management and Disposal Report: Bodega Bay Air to Ground Gunnery Range*, 15 August 1948. Information Management Division, Records Management, Capital Records Mgmt Box 67999, Folder 1502-07 Bodega Bay Air To Gunnery Range, CA, U.S. Army Corps of Engineers - Sacramento District, CA

E-12 Interdepartmental Air Traffic Control Board (IATCB)
1943 *IATCB Meeting No. 384,* 9 December 1943. RAG 237, Entry 37, Box 2, Folder: 376-400, NARA-College Park, MD.

E-13 Santa Rosa Army Air Field
c.1945 History of the Santa Rosa Army Air Field, Santa Rosa California, 1 April 1944 to 31 December 1944, circa January 1945, Microfilm reel B2512, File 288.44-1v.2 Santa Rosa AAF, CA Apr-Dec 1944. Air Force Historical Research Agency, Maxwell AFB, AL.

E-14 Santa Rosa Army Air Field
c.1945 History of the Santa Rosa Army Air Field, Santa Rosa California, 1 January 1945 to 31 March 1945, circa April 1945, Microfilm reel B2573, File 288.44-2 Santa Rosa AAF Jan-Mar 1945. Air Force Historical Research Agency, Maxwell AFB, AL.

E-15 Santa Rosa Army Air Field
c.1945 History of the Santa Rosa Army Air Field, Santa Rosa California, 1 June 1945 to 30 June 1945, circa July 1945, Microfilm reel B2513, File 288.44-3 Santa Rosa AAF, CA June 1945. Air Force Historical Research Agency, Maxwell AFB, AL.

E-16 Sonoma County Tax Assessor
1974 Assessor's Map Bk 100 Pg. 01, Sonoma County, Calif, 28 February 1974.

E-17 Sonoma County Tax Assessor
1984 Assessor's Map Bk 100 Pg. 02, Sonoma County, Calif, 21 February 1984.

APPENDIX E-1

4th Air Force, Headquarters, 1944

Memo: Bodega Bay Air-to-Ground Gunnery Range, 21 February 1944

684 Gen.

4AFAT-17 — J. C.

21 FEB 1944

SUBJECT: Bodega Bay Air-to-Ground Gunnery Range.

TO: Commanding General, Northern California Sector, Presidio of San Francisco, California.

1. In compliance with request of your Headquarters, the following information is forwarded:

a. Possession of approximately 605 acres of Bodega Head Rancho, Sonoma County, California, has been made available to the Fourth Air Force for the purpose of air-to-ground gunnery for fighter type airplanes.

b. This property is now under direct acquisition by the Division Engineer, San Francisco, and a permit of entry has been issued.

c. Inclosed is property lay-out showing the two (2) tracts of land associated with this range.

For the Commanding General:

MAILED 21 FEB 1944 HEADQUARTERS 4th AIR FORCE

L. L. JUDGE
Colonel, AGD
Adjutant General

1 Incl.
Property Lay-Out

COORD
CG
CS
ASST. C S
A-1
A-2
A-3
A-4
A G
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ENGR
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FIN
BFO
Q M
CWS
CHAP
AER
PROV
COMDT
4 SCU
CO SQ
FILE

RECORD COPY

684 Gen. /26

4AFAT-17 D.C.

20 FEB 1944

SUBJECT: Bodega Bay Air-to-Ground Gunnery Range.

TO: Commanding Officer, Army Air Base, Hamilton Field, Calif.
ATTENTION: Base S-3, Officer.

1. Possession of two (2) tracts of land in Sonoma County, California, is available to the government for use by units under your jurisdiction.

2. Property in Tract #1 is described as follows:

Portion of the Bodega Rancho, to find the point of beginning commence at the west edge of the Bodega Bay at the foot of the bluff at a point between said Bay and the ocean at a post marked "B 94" and being the 94th station of the U. S. Survey of the Bodega Rancho as per field notes of the patent thereof; thence north 15½ degrees west 25 chains; thence north 22 degrees west 8.25 chains to a point which is the true point of beginning; thence north 49½ degrees west 16.17 chains; thence north 55 degrees west 23 chains; thence south 8 degrees west 33.68 chains to a post marked "B 53" which marks the 53rd station of said Bodega Rancho; thence south 21-3/4 degrees west 39.90 chains to the northwest corner of a 407.85 acres parcel of land now or formerly owned by Rose Gaffney; thence south 63½ degress east 25.67 chains; thence south 47½ degrees east 24 chains thence north 6 degrees west 32 chains; thence northeast on a direct line to the point of beginning, containing 230 acres, more or less.

3. Property in Tract #2 is described as follows:

Beginning at post "B 54" in the final survey of the Bodega Rancho as per patent thereof, said stake standing in the west side of the peninsula known as the Bodega Heads; thence north 47½ degrees east 30.90 chains to the southwest corner of a 379 acres parcel of land now or formerly owned by Robert T. Kee; thence south 63½ degrees east 25.67 chains; thence south 47½ degrees east 24 chains; thence southeasterly on a direct line to a post marked "B 86" in the final survey of the Bodega Rancho; thence south 71 degrees west 4 chains; thence south 46½ degrees west 11 chains;

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ENGR	(2)
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26 A

RECORD 1- COPY

(4AF ltr to CO, AAB, Hamilton, file 684 Gen., subj: Bodega Bay Air-to-Ground Gunnery Range, dated .)

thence south 28½ degrees west 12 chains; thence south 12 chains; thence south 88-3/4 degrees east 7.45 chains; thence south 38 degrees east 3.70 chains; thence west 27.17 chains to the ocean; thence following up the coast with the meanderings thereof to the point of beginning; containing 375 acres, more or less.

4. It is directed that your Headquarters begin construction immediately on this air-to-ground gunnery range.

By command of Major General LYND:

L. E. JUDGE
Colonel, AGD
Adjutant General

A-3

COORD
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1 Incl.
Real Estate Lay-Out.

MAILED
20 FEB 1944
HEADQUARTERS
4th AIR FORCE

RECORD COPY

BASIC: Ltr. Hdq. 4AF, HF, file 684 Gen./26, 20 Feb 1944, subj: "Bodega Bay Air-to-Ground Gunnery Range".

684. 1st Ind. 21 MAR 1944 (F)
AIR BASE HEADQUARTERS, Hamilton Field, California,

TO: Commanding General, Headquarters Fourth Air Force, 180 New Montgomery Street, San Francisco 6, California.

1. In compliance with Paragraph 4, basic communication, inclosed herewith is Cost Estimate and Engineering Analysis on OCE Form 105, prepared by the San Francisco District Engineer, for an Air-to-Ground Gunnery Range to be located at Bodega Bay.

2. It is requested that this construction be expedited so that the tactical units in this Air Base Area can effectively accomplish their training mission.

GEORGE F. KINZIE,
Colonel, Air Corps,
Commanding.

2 Incls:
#1 - n/c
#2 - OCE Form 105

- 3 -

APPENDIX E-2

4th Air Force, Headquarters, 1944

Memo: Status and Requirements of Bombing and Gunnery Ranges, 13 June 1944

4AFTC-T2

A-3

684/W/18 X 321

13 JUN 1944

SUBJECT: Status and Requirements of Bombing and Gunnery Ranges. (Clearance Number, AAF MD SP 8)

TO : Commanding General, Army Air Forces, Washington 25, D. C. Attention: Building and Grounds Section Office, Assistant Chief of the Air Staff, M & D.

1. Reference is made to letter your headquarters, AFDRB (2A-7/9), dated 26 May 1944, subject as above.

2. The following listed ranges are now available and are being used extensively by this Air Force.

a. Tonopah Army Air Field, Tonopah, Nevada.

(1) This station supports a B-24 heavy bombardment RTU training.

(2) The bombing and gunnery range lies within an area bounded by 37°55'N, 115°53'W, 37°55'N, 117°03'30"W, 37°33'N, 117°03'30"W, 37°33'N and 115°55'W.

(3) This area includes three (3) high altitude demolition targets and seven (7) high altitude practice targets, one (1) air-to-ground pursuit curve gunnery range, and four (4) air-to-air gunnery flight lines.

(4) All these targets and ranges are used to the greatest possible degree both day and night, depending on training requirements.

b. Muroc Army Air Field, Muroc, California.

(1) This field is supporting a B-24 heavy bombardment RTU training program.

(2) The bombing and gunnery range is confined to the boundaries of the Muroc Reservation 34°59'N, 117°58'W, 34°59'N, 117°55'W, 34°49'N, 117°55'W, 34°49'N and 117°58'W with the exception of the air-to-air gunnery range known as the Saline Valley containing two (2) flight lines with the following coordinates:

W/18

RECORD COPY

BASIC: Ltr, 684, dtd 9 Juen 44, Sub: "Status and Requirements of B & G Ranges.

over-land range to meet training directives.

A-3

HEADQUARTERS COORDINATION

f. Metropolitan Airport, Van Nuys, California.

(1) This base supports third phase P-38 RTU training and the ranges available are shared concurrently with Ontario Army Air Field, Ontario, California.

g. Santa Rosa Army Air Field, Santa Rosa, California.

(1) This station supports third phase RTU P-38 training.

(2) Ranges available to this field are as follows:

Air-to-Ground	Latitude	Longitude	Size	Distance from Base
Tubbs Island	38°08'N	122°25'W	2 X 3 Mi	30 Mi
Bodega Head	38°20'N	123°05'W	1 X 3/4 Mi	15 Mi
Drakes Bay	38°01'N	122°54'W	½ X ½ Mi	30 Mi

Air-to-Air

The only available air-to-air gunnery ranges are adjacent over-water ranges.

h. Chico Army Air Field, Chico, California.

(1) This base supports first and second phase fighter RTU training utilizing P-39 and P-63 type aircraft.

(2) Ranges available to this field include air-to-air, over-water ranges which are 150 miles from the base necessitating landing and refueling at an alternate airport. Air-to-Ground gunnery Requirements are met on ranges assigned to Santa Rosa Army Air Field, Santa Rosa, California.

Air-to-Ground (Located on Camp Beale Reservation, Use permit subject approval Camp Beale) 2 X 5

i. Portland Army Air Base, Portland, Oregon.

(1) This station is a P-39, P-63 RTU training station.

(2) Ranges available to this field:

- 4 -

W/18

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APPENDIX E-3

4th Air Force, Headquarters, 1945

Memo: Change of Status, Santa Rosa Army Air Field, Santa Rosa, California,
26 November 1945

~~RESTRICTED~~

HEADQUARTERS COORDINATION

CG
AIDE
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A-1
PERS
C PERS
PS
PA
A-2
C. INT
CID
A-3
OPNS
BTR
BMB
TNG
A-4
MAINT
SUPP
LOG
TRAN
MARN
A-5
RQMTS
REDPL
MAN
ANLS
A-6
TNG
S/M
WIRE
ELEC
OPNS
SECOR
AG
C/C
HIST
AAA
B&F
CHAP
CWS
ENGR
FIN
HQ&HQ COMDT
INSP
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PRO
QM
SCO
SURG
ATSCLO

26 NOV 1945 4AFCE-9

686 Santa Rosa/3

SUBJECT: Change of Status, Santa Rosa Army Air Field, Santa Rosa, California

TO : Commanding General, Continental Air Forces, Bolling Field, 20, D. C.

1. Reference is made to TWX A1844-2406 from Continental Air Forces to Fourth Air Force, received 24 October 1945. In accordance with WD Circular 89, dated 20 March 1945, Santa Rosa Army Air Field, less appurtenant ranges, is reported as being not required by Fourth Air Force for postwar operations.

2. Data pertaining to the field as required by WD Circular 89, dated 20 March 1945, and AAF Regulation 85-3, dated 12 May 1945, are as follows:

a. Santa Rosa Army Air Field.

b. Located approximately 7 miles northwest of Santa Rosa, Sonoma County, California.

c. The field consists of 1317.37 acres of land, held as follows:

(1) 826.46 acres – Government owned at a reported cost of $184,134.

(2) 337.34 acres – held under 2 leases, W866-eng-4532 with Supplemental Agreement thereto, and W866-eng-5249 with Supplemental Agreement thereto, at a total annual rental of $29.38.

(3) 153.57 acres – under an avigation easement.

d. A list of constructed facilities is inclosed.

e. Facilities are reported to be in good condition for Theatre of Operations type construction.

f. The field has been used for OCTU Fighter Training.

g. There are 4 auxiliary facilities used in connection with

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HEADQUARTERS COORDINATION
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C INT
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A-3
OPNS
FTR
BMB
TNG
A-4
MAINT
SUPL
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MARN
ROMTS
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ELEC
OPNS
SECOR
AG
C/C
HIST
AAA
B&F
CHAP
CWS
ENGR
FIN
HQCOMDT
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ATSCO

Ltr to CAF, Subject: Change of Status, Santa Rosa Army Air Field, Santa Rosa, California, File 686, continued.

this field. They are Tubbs Island Gunnery Range, Drakes Bay Gunnery Range, Bodega Bay Gunnery Range, and the Medical Aid Station in the City of Santa Rosa. This Headquarters desires to retain the 3 ranges for possible use by aircraft operating from Hamilton Field. The Medical Aid Station will be declared excess directly to the Division Engineer.

h. Date available - 30 November 1945.

i. Records of this Headquarters disclose no contractual commitments affecting the disposal of this field.

j. No services are currently being rendered any other Federal Agencies.

k. Recommended for surplus status.

3. In accordance with AAF Letter 85-44, dated 29 October 1945, a request for the rescission of IATCH clearances has been made. A copy of the request is inclosed.

FOR THE COMMANDING GENERAL:

FRANCIS A. DUNPHY,
Lt. Col. A.G.D.,
Asst. Adjutant General.

2 Incls:
Incl 1 - List of Constructed Facilities
Incl 2 - Cy Ltr this Hq Thru CAF to AAF "Request for Rescission of Clearance, Santa Rosa AAF".

cc: CO Santa Rosa Army Air Field
Div Engr., San Francisco

MAILED 26 NOV 1945 HEADQUARTERS 4th AIR FORCE

-2-

RECORD COPY

APPENDIX E-4

4th Air Force, Headquarters, 1946

Memo: Bodega Bay Air-to-Ground Gunnery Range, 29 August 1946

HEADQUARTERS COORDINATION
CG
AIDE
CS
DCS
C/C
A-1
M PERS
C PERS
PS
NG
RRS
MAN
A-2
C INT.
CID
HIST
A-3
OPERATNG
FLY'G TNG
GND TNG
OPR
ACFT ACC
DEFENSE
MAINT
SUPL
LOG
TRAN
CWS
ENGR
ORD
QM
A-5
FP
M&D
A-6
TNG
S/M
WIRE
SIGC
OPNS & SRC
CONTR GPS
AG
B&F
CHAP
FIN
HQ COMDT
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PRO
SCO
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ATSCLO
RCTG

AAFU-4

602/61

7321

29 AUG 1946

SUBJECT: Bodega Bay Air-to-Ground Gunnery Range

TO : Commanding General, Air Defense Command, Mitchel Field, New York

In accordance with Par. 11, Sect. IV, AAF Regulation 85-3, dated 12 May 1945, the following information is given.

a. Name - Bodega Bay Air-to-Ground Gunnery Range.
b. Located two miles South-West of Bodega Bay, Sonoma County, California.
c. Government leased land.

WDL-193-Eng-6156	$750.00/year
WDL-193-Eng-3203	460.00/year
	$1210.00

Term of each lease is duration plus six months.

d. No construction within the last 90 days.
e. The present condition of this property is good.
f. Used as an air-to-ground gunnery range.
g. Installation no longer needed effective this date.
h. There are no auxiliary facilities.
i. There are no contractual commitments affecting disposition.
j. There are no services currently being rendered and no obligations of, or to, any other AAF, Army, or Navy installations or Federal Agencies.
k. Recommended for surplus status.

FOR THE COMMANDING GENERAL:

R. R. HAILE
Major, Air Corps
Acting Asst. Adjutant General

MAIL ROOM 29 AUG 1946 4th AIR FORCE

RECORD COPY

61

APPENDIX E-5

4th Air Force, Headquarters, 1946

Ltr Div Engr. Pac Divn, San Francisco, file PSDRM 684 (Bodega Bay Gunnery Range,): dtd30 Aug 46, Subject: Neutralization of Unexploded Ammunition and Duds,
10 October 1946

BASIC: Ltr Div Engr, Pac Div, San Francisco, file PSDRM 684 (Bodega Bay Gunnery Range,) dtd 30 Aug 46, Subject: "Neutralization of Unexploded Ammunition and Duds"

684 Gen/25 (30 Aug 46) 3rd Ind 4AFU-3

HEADQUARTERS FOURTH AIR FORCE, Hamilton Field, California 10 OCT 1946

TO: Division Engineer, South Pacific Division, 351 California St., San Francisco 19, California

Due to the inaccessibility, size, nature, and location of the range and the type of ammunition used, it is impracticable to decontaminate or neutralize the area. However, the Bodega Bay Gunnery Range may be considered neutralized if properly posted in accordance with WD Circular 195, 29 June 1946, as there is no means of neutralizing a large area containing small arms ammunition.

FOR THE COMMANDING GENERAL:

R. R. HAILE
Major, Air Corps
Acting Asst. Adjutant General

Incl listed but not rec'd

COORDINATIO
CG
AIDE
CS
DCS
C/C
A-1
M PERS
C PERS
PS
NG
RES
MAN
A-2
C INT
CID
HIST
A-3
OPR & TNG
FLY'G TNG
GND TNG
OPR
ACFT ACC
DEFENSE
MARN
A-4
MAINT
SUPL
LOG
TRAN
CWS
ENGR
ORD
QM
A-5
FP
M&D
A-6
TNG
S/M
WIRE
ELEC
CENS & SEC
CONTR GPS
B&F
CHAP
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RCTG

MAILED
10 Oct 1946
HEADQUARTERS
4th AIR FORCE

RECORD COPY

C O P Y

BASIC: Ltr Div Engr, Pac Divn, San Francisco, file PSDRM 684 (Bodega Bay Gunnery Range), dtd 30 Aug 46, Subject: "Neutralization of Unexploded Ammunition and Duds"

684 Gen/25 (20 Aug 46) 1st Ind 4AFU-2

HEADQUARTERS FOURTH AIR FORCE, Hamilton Field, California

TO: Commanding Officer, Hamilton Field, California

1. For preparation of report requested in basic communication.

2. It is requested that the report be transmitted to this Headquarters not later than 13 September 1946.

BY COMMAND OF MAJOR GENERAL HALE:

/s/t/ R. R. Haile
Major, Air Corps
Actg Asst. Adjutant General

1 Incl:
n/c

40 684

2nd Ind

AIR BASE HEADQUARTERS, Hamilton Field, California 8 OCT 1946

TO: Commanding General, Fourth Air Force, Hamilton Field, California

Information has been received from Lt. Col. Daugherty, A-3 Section, Headquarters Fourth Air Force, that Bodega Bay Gunnery Range is an overwater target. Therefore, decontamination and/or neutralization cannot be accomplished by this station.

FOR THE COMMANDING OFFICER:

JAMES I. EILERS
CWO, USA
Asst. Adjutant

1 Incl:
n/c

A-4E

25

HEADQUARTERS COORDINATION

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BASIC: Ltr Div Engr, Pac Divn, San Francisco, file PSDEM 68, (Bodega Bay Gunnery Range), dtd 30 Aug 46, Subject: "Neutralization of Unexploded Ammunition and Duds"

68, Gen/25 (30 Aug 46) 1st Ind 4AFU-2

HEADQUARTERS FOURTH AIR FORCE, Hamilton Field, California

TO: Commanding Officer, Hamilton Field, California

4 SEP 1946

1. For preparation of report requested in basic communication.

2. It is requested that the report be transmitted to this Headquarters not later than 13 September 1946.

BY COMMAND OF MAJOR GENERAL HALE:

R. R. HAILE
Major, Air Corps
Acting Asst Adjutant General

1 Incl:
n/c

116

RECORD COPY

25

Army Service Forces
Corps of Engr
Office of the Div Engr
San Fran

PSDRM 684 (Bodega Bay
Gunnery Range)

30 August 1946

SEP 3 1946
HQ, 4th AIR FORCE

Neutralization of Unexploded Ammunition and Duds

Commanding General
Fourth Air Force
Hamilton Field, California

1. In compliance with procedure outlined in Cir 195, WD, 29 June 1945, it is requested that the information listed on the attached questionaire be completed and forwarded to this office on the installation known as "Bodega Bay Gunnery Range".

2. The itemized report prepared and certified by the responsible officer should state that all areas involved have been decontaminated and/or neutralized, or the extent to which such action has been taken.

3. Should your records reveal that the area used as a gunnery range contains only small arms ammunition and decontamination is deemed unnecessary, a letter from your office to that effect would suffice in lieu of a certified report.

FOR THE DIVISION ENGINEER:

1 Incl
Questionaire (in dup)

WILLIAM H. CUPPLES
Chief, Management & Disposal Branch
Real Estate Division

APPENDIX E-6

Army Air Forces, Headquarters, 1943

Memo: Status and Requirements of Bombing and Gunnery Ranges, 13 July 1943

FILE

AFDBS(26-2)

HEADQUARTERS OF THE ARMY AIR FORCES
WASHINGTON

1 3 JUL 1943

SUBJECT: Status and Requirements of Bombing and Gunnery Ranges

TO : Commanding General, Fourth Air Force, 180 New Montgomery Street, San Francisco, California.

1. In the past 2-1/2 years, over 12,000,000 acres of land have been acquired for the use of the Army Air Forces. It is apparent that at least 2,000,000 more acres will be required in the future. The extent of land acquisition for the Army Air Forces is attracting the interest of the Members of Congress and it appears that it will probably be necessary in the near future for this Headquarters to justify to the Truman Investigating Committee this land acquisition.

2. It is necessary that this Headquarters have a definite statement covering each range now under its jurisdiction, those proposed for future acquisition, and any ranges which might now be abandoned and returned to their owners.

3. It is therefore desired that a report be submitted to this Headquarters immediately, giving the following information.

a. A list of all bombing, air-to-ground and air-to-air ranges, giving latitude and longitude. This list must show the base to which each range is assigned.

b. The total approximate acreage of each range.

c. The type of use being made of the range, which will include the type of training and airplanes used on the range.

d. The percentage of use being made of each range.

e. A definite justification for the continued use of the range, explaining why two or more bases cannot use the same ranges, or share them with other activities.

f. A statement indicating what ranges are not being used and can be abandoned, and also whether it is anticipated that any of the ranges can be abandoned at some definite time in the future.

18

Letter to CG, AAF, San Francisco, California.

SUBJECT: Status and Requirements of Bombing and Gunnery Ranges.

4. It is desired that this report be transmitted promptly, but care should be exercised to see that the report is complete in view of the fact that at some time in the future it may be necessary to substantiate these reports to representatives of this Headquarters.

5. For your information, the Assistant Secretary of War for Air has directed that a field inspection of all ranges be made. Arrangements for this investigation will be announced in the near future.

6. In order to provide a uniform report, it is requested that the inclosed form be followed.

For the Commanding General, Army Air Forces:

J. C. SHIVELY, COL., A.C.
Buildings and Grounds Section
Office, Ass't Chief Air Staff, M.M.D.

1 Incl.
Report Form.

#3

18

IMMEDIATE ACTION

(BASIC: Imm. Act ltr Hq AAF to CG, 4AF, subj: "Status and Requirements of Bombing and Gunnery Ranges," 13 July 43.)

684 Gen/18 (7-13-43) 1st Ind. 4AFAT-S-sca

HEADQUARTERS FOURTH AIR FORCE, 180 New Montgomery Street, San Francisco (6) California. 26 JUL 1943

TO: Commanding General, Army Air Forces, Washington (25) D. C.

1. Information is hereby submitted relative to the use of bombing and gunnery ranges in the Fourth Air Force.

2. The following listed ranges are now available and being used extensively by this Air Force:

a. Muroc Bombing and Gunnery Range.

(1) There are four (4) air-to-ground gunnery ranges which are used to the maximum by P-38 fighter units in this area. An average of 200 aircraft and 500 pilots are stationed in this area with this gunnery range the only air-to-ground range available for their training. Muroc Bombing and Gunnery Range is the primary training center for all new P-38 pilots of the Fourth Air Force. It is expected that this training program will be increased rather than decreased in the future.

(2) There are seven (7) high altitude targets and two (2) low altitude targets. Four (4) of these targets have been used to the maximum in the past by fighter aircraft stationed at Muroc and bombardment stationed at March Field and Palmdale. Due to the location of the remaining targets in this area, it is not considered consistent with safety rules to use them very extensively. With the recent assignment of 40 more heavy bombers at March Field, it is expected that the facilities at Muroc will be overtaxed necessitating the use to some extent of the Tonopah Bombing and Gunnery Range which is over 500 miles away

b. Tonopah Bombing and Gunnery Range.

(1) There are two (2) air-to-ground gunnery ranges which are used to the fullest extent by P-39 fighter units stationed at Tonopah Bombing and Gunnery Range, and it is also used as a range for units stationed in the San Francisco area, and Portland area. An average of 125 pilots and 90 P-39's are stationed at Tonopah for ground gunnery.

(2) Four (4) high altitude bombing targets are available and being used extensively by the Fourth Air Force although not to full capacity. However, with the increase in aircraft assignment to this Air Force, this range will be used much more extensively in the near future. Aircraft of the Second Air Force may use this range, and would use it more if it weren't for the time and space factors between Second Air Force bases and this range. Camping facilities are very limited and at this time are filled almost to capacity by the fighter units of the Fourth Air Force stationed here.

-3-

IMMEDIATE ACTION

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IMMEDIATE ACTION

(BASIC: Imm. Act ltr AAF to CO, 4AF, subj: "Status and Requirements of Bombing and Gunnery Ranges," 13 July 43)

1st Ind. (cont'd)

(3) This is the only range available to the Fourth Air Force for year-round air-to-air gunnery and which is the governing factor for such a large area of land at Tonopah. Air-to-air gunnery ranges are available along the coast but are very undependable due to weather. Winter storms and summer coastal fog often make these over-water ranges unusable for weeks at a time. Therefore, it is of utmost importance that a range be available to units of this Air Force on the eastern side of the Sierra Nevada's for air-to-ground and air-to-air gunnery. The air-to-air ranges are not being used to capacity for the reasons as stated in (2) above.

c. Madera Bombing Range.

(1) A high and low altitude bombing target is available on this range.

(2) This range is being used to capacity by B-25 bombardment units stationed at Hamner Field.

(3) An average of 140 pilots and 41 aircraft use this range to a maximum advantage.

d. Tubbs Island Gunnery Range.

(1) This range is located at the north end of San Francisco Bay.

(2) This range is used by P-39 units based at Hamilton Field, Santa Rosa, Russell City, Oakland and Mills Field.

(3) The capacity of this range is extremely limited necessitating the use of Tonopah for a large portion of air-to-ground gunnery of P-39's in this area. There is an average of 260 pilots and 53 aircraft stationed in the San Francisco area.

3. Additional ranges which will be required by this Air Force.

a. Two (2) dive bombing ranges, each approximately one (1) mile square, will be required in the Los Angeles Area. The growing use of fighter aircraft for skip and dive bombing has made it imperative that some facility be made available in this area for practice in this method of bombing. Steps are being taken to locate these ranges on land of little or no agricultural value. These ranges will be used by units stationed at Van Nuys, Glendale, Santa Ana, Lomita, and San Diego.

b. Two (2) dive-bombing ranges with same requirements as above are needed in the San Francisco area. One (1) will be located on the coast near Bodega Head (Lat 38° 18' Long 123° 05') and the other, on the Tubbs Island range. These ranges are now in the process of acquisition and will be used by all bases in the San Francisco area.

-4-

IMMEDIATE ACTION

(BASF): Hqrs. Act ltr Hq AAF to CG, 4AF, subj: "Status and Requirements of Bombing and Gunnery Ranges," 13 July 43)

1st Ind. (cont'd)

c. An air-to-ground gunnery range will be required in the near vicinity of the Portland Army Air Base for units stationed at this Base and at Salem, Oregon. Such a range will require approximately 1,000 acres. It is very essential that gunnery ranges be located not further than 50 miles from any base, due to the limited range of fighter aircraft. A suitable site in the burnt-over lands of Mt. Hood National Forest has been located and acquisition of this territory is being processed. A high and low altitude bombing range will be needed within 50 miles of this base in order that training may effectively be accomplished. An average of 135 pilots with 35 P-39's and 10 B-25's are stationed in this area . The nearest present range is the Boardman Range approximately 170 miles east of Portland. This range being on the other side of the Sierra Nevada's is extremely hard and hazardous to reach during inclement weather that prevails in this territory a great deal of the time.

d. A base to accomodate one (1) fighter group is being constructed at Ellensburg, Washington, and will be completed in August. Air-to-ground gunnery ranges will be required for the use of this field which is designed for the use of all P-38 units in the Seattle Area. This area has considerably better weather than the Seattle area and will be used primarily for gunnery training. An area approximately eight (8) miles square will be required for this range as it is planned to construct ground strafing dummy targets as well as an air-to-ground range. Investigation is being made of the Yakima Field Artillery Range with the hopes that some portion of this range may be made available for this purpose. This range would be used by all units in the Seattle Area. An average of 160 pilots and 33 aircraft are stationed in this area. This range could also be used by aircraft stationed in the Portland Area during periods of bad weather.

4. Neds Rock, located in Grays Harbor, Washington, is now in the process of acquisition and will be used as a dive and skip bombing target. This rock is of no agricultural value.

5. Attention is invited to letter, this Headquarters, file 684, subject: "Acquisition of Bombing and Gunnery Ranges," dated 4 June 1943, with accompanying inclosures.

6. Aircraft manufacturers in the Los Angeles area use both Muroc and Tonopah ranges for work in connection with testing experimental aircraft and weapons.

7. There are no ranges under the jurisdiction of the Fourth Air Force that are not being used to the greater proportion of their capacity. It is not expected that any of the ranges mentioned will be abandoned at any time in the future, but that their use will be progressively increased.

For the Commanding General:

D. R. PATRICK,
Lt. Col. A. G. D,
Adjutant General

5 Incls:
1 Incl. n/c
4 Incls. added.
~~#2 - Range Data - Muroc B-4 Range~~ -5-
~~#3 - Range Data - Tonopah B-4 Range~~
#4 - Range Data - Madera Bombing Range
#5 - Range Data - Tubbs Island Gunnery Range

RANGE DATA

1. Name of field: Muroc Bombing and Gunnery Range

2. Type of training from this field: Fighter, bomber and experimental

3. Types of planes using ranges:

   a. Precision Bombing Ranges B-17, B-24 and experimental airplanes

   b. Air-to-Ground Ranges B-29

   c. Air-to-air Ranges None

4. Ranges available to this field:

	Latitude & Longitude	Approx. Area	Miles From Field	Average Daily Hours of Use Daylight	Dark
a. Precision Bombing.	34° 54' 117° 52'	168,960 acres	Adjacent	Conducted 24 hrs Per Day	
b. Air-to-Ground	" "	"	"	During all Daylight Hours	
c. Air-to-Air:	None				

5. Can any of these ranges be shared by another command? No If so, indicate on separate sheet which ones and to what extent.

6. Can any ranges be abandoned? No If so, indicate whether immediately or at some definite time in the future.

Incl #2

RANGE DATA

1. Name of field: Tonopah Bombing and Gunnery Range

2. Type of training from this field: Fighter, Bomber and experimental

3. Types of planes using ranges:

   a. Precision Bombing Ranges B-17, B-24; and experimental; B-25

   b. Air-to-Ground Ranges B-17, B-24; and experimental; P-39

   c. Air-to-Air Ranges P-39, P-38, B-17, B-24; and experimental ; B-25

4. Ranges available to this field:

	Latitude & Longitude	Approx. Area	Miles From Field	Average Daily Hours of Use Daylight	Dark
a. Precision Bombing.	38° 15' 117° 10'	3,075,840 acres	12	8 hrs	4 hrs
b. Air-to-Ground	" "	"	"	During all daylight hours.	
c. Air-to-Air:	" "	"	"	Durin all daylight hours	

5. Can any of these ranges be shared by another command? Yes If so, indicate on separate sheet which ones and to what extent.

6. Can any ranges be abandoned? No If so, indicate whether immediately or at some definite time in the future.

Inc #3

RANGE DATA

1. Name of field: Madera Bombing Range

2. Type of training from this field: Bomber

3. Types of planes using ranges:

   a. Precision Bombing Ranges B-25

   b. Air-to-Ground Ranges None

   c. Air-to-Air Ranges None

4. Ranges available to this field:

	Latitude & Longitude	Approx. Area	Miles From Field	Average Daily Hours of Use: Daylight	Dark
a. Precision Bombing.	38° 57' 120° 05'	3,240 acres	12	During all daylight hours and average of 3 hours at night	
b. Air-to-Ground	None				
c. Air-to-Air:	None				

5. Can any of these ranges be shared by another command? No If so, indicate on separate sheet which ones and to what extent.

6. Can any ranges be abandoned? No If so, indicate whether immediately or at some definite time in the future.

Inc #4.

COPY

RANGE DATA

1. Name of field: Tubbs Island Gunnery Range

2. Type of training from this field: Fighter

3. Types of planes using ranges:

   a. Precision Bombing Ranges

   b. Air-to-Ground Ranges P-39

   c. Air-to-Air Ranges

4. Ranges available to this field:

	Latitude & Longitude	Approx. Area	Miles from Field	Average Daily Hours of Use Daylight	Dark
a. Precision Bombing:					
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b. Air-to-Ground:					
1.	Lat. 38° 8' Long 122° 55'	318 Acres	10 mi	During all daylight hours	
2.					
3.					
4.					
c. Air-to-Air:					
1.					
2.					
3.					
4.					

5. Can any of these ranges be shared by another command? No If so, indicate on separate sheet which ones and to what extent.

6. Can any ranges be abandoned? No If so, indicate whether immediately or at some definite time in the future.

Sheet 5

APPENDIX E-7

Army Air Forces, Headquarters, 1943

Memo: Status and Requirements of Bombing and Gunnery Ranges, 26 November 1943

COPY

AIR MAIL

AFDBS 2A-2/2

WAR DEPARTMENT
HEADQUARTERS OF THE ARMY AIR FORCES
WASHINGTON

684/68

26 November 1943

SUBJECT: Status and Requirements of Bombing and Gunnery Ranges.

TO: Commanding General, Fourth Air Force, 180 New Montgomery Street, San Francisco, California.

1. Reference is made to letter from this Headquarters, 13 July 1943, subject as above, That letter called for a detailed report on the bombing and gunnery ranges assigned to your command.

2. Since the report was transmitted, there have been numerous changes in both training programs and in assignment of the Army Air Forces fields from one command to another which has resulted in making the report obsolete.

3. It is necessary that a new report be transmitted without delay. The report will be in accordance with the inclosed form. It will be noted that the first six (6) questions are substantially the same as those forwarded with the letter referred to above.

4. It is necessary that each question be answered fully and accurately. Full consideration must be given to the possibility of the release of any ranges which are not necessary. Thought should also be given to possible reduction in area of ranges under your jurisdiction.

5. If any of the ranges can be used concurrently by other commands, it is requested that the information be submitted in sufficient detail in order that this Headquarters can advise the other commands.

6. It is requested that this report be forwarded so as to be received in this Headquarters on or before 15 December 1943.

By command of General ARNOLD:

/s/ JOHN M. LYLE, Lt.Col., A.C.,
Bldgs & Grounds Section,
Const. Branch, AC/AS, MMD.

1 Incl.
Range data Report Form
(in dup)

60-D

BASIC: Ltr act ltr Hq AAF, subj: Status and Requirements of Bombing and Gunnery Ranges, dated 26 Nov 43.

Engr 684 (26 Nov 43) 1st Ind. 4AFAT-17
HEADQUARTERS FOURTH AIR FORCE, 180 New Montgomery Street, San Francisco, 6, California. 12 DEC 1943

TO: Commanding General, Army Air Forces, Washington, 25, D.C.

1. Information is hereby submitted relative to the use of bombing and gunnery ranges in the Fourth Air Force.

2. The following listed ranges are now available and being used extensively by this Air Force:

a. Army Air Field, Tonopah, Nevada.

(1) This field is supporting both heavy bombardment and fighter OTU and RTU training composed of B-24 and P-38 type aircraft.

(2) The bombing and gunnery range lies within an area bounded by 37° 53' N, 115° 53' W; 37° 33' N, 117° 03' 30" W; 37° 53' N, 117° 03' 30" W; 37° 33' N, 115° 53' W.

(3) This area contains three (3) high altitude demolition targets and seven (7) high altitude practice targets, one (1) air-to-ground gunnery range, and four (4) flight lines for air-to-air gunnery.

(4) All these targets and ranges are used to the greatest possible degree both day and night, depending on training requirements.

b. Army Air Field, Muroc, California.

(1) This field is supporting OTU and RTU heavy bombardment training utilizing B-24 type aircraft.

(2) The bombing and gunnery range is confined to the boundaries of 34° 49' N, 117° 32' W; 34° 56' N, 117° 32' W.

(3) This area contains six (6) high altitude bombing targets, one (1) air-to-ground gunnery range for use of P-38 fighter units based in the Los Angeles Area, and two (2) flight lines which have been made available by coordination and mutual agreement with the Navy and Camp Haan authorities. These flight lines are not assigned to the Fourth Air Force and are used only on a temporary basis. Air-to-air ranges are available along the coast but cannot be used for

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BASIC: Ltr act ltr Hq AAF, subj: Status and Requirements of Bombing and Gunnery Ranges, dated 26 Nov 43.

Engr 684 (26 Nov 43) 1st Ind. (cont.) 4AFAT-17

at a time during the winter months due to inclement weather. Therefore, it is of utmost importance that a range be available to units of this Air Force on the eastern side of the Sierra Nevada Mountains for air-to-air gunnery.

c. Army Air Base, March Field, California.

(1) This field is supporting the RTU, OTU heavy bombardment training program utilizing B-24 type aircraft.

(2) At the present time this base is utilizing the target facilities of Army Air Field, Muroc, California, in conjunction with the present training program at Muroc. Besides the problematical use of overwater ranges, one (1) flight line is available in the Muroc Area for this gunnery.

d. Army Air Base, Hammer Field, Fresno, California.

(1) This field is supporting the RTU and OTU heavy bombardment training, utilizing B-24 type aircraft.

(2) This field is utilizing the facilities of the Hunter Liggett Military Reservation which includes three (3) high altitude precision targets; one (1) air-to-ground gunnery range. The location of these ranges is as follows:

#1— 35° 49' 35" N, 120° 56' 12" W
#2— 35° 52' 00" N, 120° 58' 55" W
#3— 35° 55' 30" N, 121° 05' 30" W
#4— 35° 56' N, 121° 08' W

(3) The Madera Bombing Range is available to this base and is comprised of one (1) high altitude precision target and two (2) low altitude targets, located at 36° 59' N 119° 59' W. Air-to-air gunnery is conducted in the offshore areas depending on the weather.

e. Ranges available for air-to-ground gunnery and dive and skip bombing for fighter units under the Fourth Air Force.

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RECORD COPY

BASIC: Ltr act ltr Hq AAF, subj: Status and Requirements of Bombing and Gunnery Ranges, dated 26 Nov 43.

Engr 654 (26 Nov 43) 1st Ind. (cont.) 4AFAT-17

(1) Tubbs Island Gunnery Range.

(a) This range is located at the north end of San Francisco Bay.

(b) This range is used by P-39 units stationed at Hamilton Field, Santa Rosa, Hayward, Sacramento, Redding, Oroville, Marysville and Concord.

(c) The capacity of this range is extremely limited, necessitating the use of Tonopah for a large portion of air-to-ground gunnery for P-39's in this area.

(2) Drake's Bay Dive and Skip Bombing Range.

(a) This range is restricted to dive and skip bombing practice exclusively, and is located in the vicinity of 38° 01' 55" N, 122° 54' 05" W.

(b) Fighter units of the San Francisco Area have access to this range.

(3) Muroc Air-to-Ground Range.

(a) A portion of the Muroc Area is being used for the completion of gunnery requirements by fighters based in the Los Angeles Area. This range is used by P-38 type aircraft, and therefore will be used continuously by our units.

(4) Mt. Hood National Forest Range.

(a) This range is located at 45° 28' N, 121° 45' W.

(b) This range is an air-to-ground gunnery type used by P-39 fighter units based in the Portland Area.

(5) Ned's Rock Dive and Skip Bombing Target.

(a) This target is located in Gray's Harbor, Washington, and is a dive and skip bombing target exclusively.

(b) Target is used by P-39 fighter units based in the area.

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BASIC: Inm sct ltr Hq AAF, subj: Status and Requirements of Bombing and Gunnery Ranges, dated 26 Nov 43.

Engr 684 (26 Nov 43) 1st Ind. (cont.) 4APAT-17

3. Additional ranges which will be required by this Air Force are as follows:

a. Two (2) flight lines, each approximately thirty (30) miles long and ten (10) miles wide, to facilitate completion of the air-to-air gunnery requirements of heavy bombardment. A suitable site east of the Sierra Nevada Mountains has been found in the proximity of 36° 45' N, 117° 35' W. This land comes under the jurisdiction of the National Park Service, Regional Director, Grazing Service, and the General Land Office, San Francisco branch. These agencies have been contacted and their approval for withdrawal of the land from public use has been granted. This Headquarters is awaiting final approval from the Department of Interior on this proje

b. An air-to-ground gunnery range will be required in the near vicinity of Army Air Field, Santa Maria, California, for units stationed at this base. Due to the limited range of fighter aircraft, it is very essential that gunnery ranges be located no further than fifty (50) miles away from any base. A suitable site has been found in the vicinity of Soda Lake, 35° 15' N, 119° 46' W, and acquisition of this territory is being processed.

c. An air-to-ground gunnery range, and dive and skip bombing range will be required in the vicinity of San Francisco for the P-39 fighter aircraft based in this area. A suitable site has been found in the vicinity of Bodega Bay (38° 26' N, 123° 02' W), and acquisition is being processed by the Chief of Engineers.

d. This Air Force desires to obtain the area located twenty-five (25) miles southeast of Ellensburg, Washington. This area, previously under construction by the Second Air Force and recently abandoned by them, is ideal for an air-to-ground gunnery range. This construction project was cancelled by teletype, Office of Division Engineer, Salt Lake City, dated 23 October 1943. This land is under government lease and lies within the training area designated for the Second Air Force. The location of this land is as follows:

North-south boundary to the West - 119° 55'
" " " " " East - 119° 45'
East-west " " " North - 46° 56'
" " " " " South - 46° 50.2'

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RECORD COPY

BASIC: Ltr act ltr Hq AAF, subj: Status and Requirements of Bombing and Gunnery Ranges, dated 26 Nov 43.

Engr 684 (26 Nov 43) 1st Ind. (cont.) 4AFAT-17 - F.C.

4. There are no ranges under the jurisdiction of the Fourth Air Force that are not being used to the greater proportion of their capacity. It is not expected that any of the ranges mentioned will be abandoned at any time in the future, but their use will be progressively increased.

For the Commanding General:

DEAN B. McNEALY,
Captain, A.G.D.,
Asst. Adjutant Ge.

1 Incl. n/c

MAILED
13 DEC 1943
HEADQUARTERS
4th AIR FORCE

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APPENDIX E-8

Army Air Forces, Headquarters, 1946

Letter regarding surplusing Santa Rosa Army Air Field and four auxiliary facilities, 1 March 1946

~~RESTRICTED~~

CAF 686 (26 Nov 45) 3d Ind 14 FEB 1946 A4C4B
HEADQUARTERS CONTINENTAL AIR FORCES, Bolling Field 20, D. C.

TO: Commanding General, Army Air Forces, Washington 25, D. C.

1. It is requested that Tubbs Island and Bodega Bay Gunnery Ranges be declared surplus. It is further requested that Drakes Bay Gunnery Range be retained for use of Hamilton Field.

2. If headquarters, Fourth Air Force, does not move to Hamilton Field, a tactical fighter group probably will be stationed there, which will necessitate use of Drakes Bay Gunnery Range. This range is an over-water range, but does not restrict water navigation.

FOR THE COMMANDING GENERAL:

1 Incl
n/c

M. COMAROW
2nd Lt. Air Corps
Actg Asst Adj Gen

cc: CG 4AF

AFDIN-2A/7 4th Ind

Hq, AAF, Washington 25, D. C. 1 MAR 1946

TO: Commanding General, Continental Air Forces, Bolling Field, Washington 20, D. C.

1. Action has been taken to declare Santa Rosa Army Air Field and the four (4) auxiliary facilities surplus.

2. If it is still desired that Drakes Bay Gunnery Range be retained, this headquarters will, upon request of your headquarters, initiate action with the Interdepartmental Air Traffic Control Board to reestablish the danger area.

BY COMMAND OF GENERAL SPAATZ:

Leo J. Erler

1 Incl
n/c

LEO J. ERLER, Col., A. C.
Deputy Chief, Air Installations Division
Assistant Chief of Air Staff-4

~~RESTRICTED~~

DIN (3)

6 MAR 1946

CAF 686 (26 Nov 45) 5th Ind A4C4A
HEADQUARTERS CONTINENTAL AIR FORCES, Bolling Field 20, D. C.

TO: Commanding General, Army Air Forces, Washington 25, D. C.

It is requested that your headquarters initiate action with the Interdepartmental Air Traffic Control Board to re-establish the danger area for Drakes Bay Gunnery Range.

FOR THE COMMANDING GENERAL:

Melvin V. Young

MELVIN V. YOUNG
Capt., AC
Actg Asst Adj Gen

a-4

1 Incl
n/c

cc: CG 4AF

Subject: Change of Status, Santa Rosa Army Air Field, Santa Rosa, California

AFDIN-2B/3 6th Ind. 19 APR 1946

Hq AAF, Washington 25, D. C.

To: Commanding General, Air Defense Command, Mitchel Field, New York

Forwarded for your comments and recommendations.

BY COMMAND OF GENERAL SPAATZ:

Leo J. Erler.

LEO J. ERLER, Col., A. C.
Deputy Chief, Air Installations Division
Assistant Chief of Air Staff-4

1 Incl n/c

6245

RESTRICTED

APPENDIX E-9

Chief of the Air Corps, War Department, 1941

Letter regarding bombing and gunnery ranges being used by the Army Air Corps adjacent to shore lines,
27 February 1941

COPY

WAR DEPARTMENT
Office of the Chief of the Air Corps
Washington

February 27, 1941

Mr. John H. Baker
Executive Director
National Audubon Society
1006 Fifth Avenue
New York, New York

Dear Sir:

With further reference to your letter of February 3rd addressed to the Chief of Aid Corps, the following is a list of the bombing and gunnery ranges being used by the Army Air Corps adjacent to shore lines.

a. Hamilton Field, California Area:

(1) Bombing water target SAN PABLO BAY on a radius of approximately 3800 feet from the boat house and 2800 feet from the pump house. Slicks within thi area and within aerial gunnery areas.

(2) Gunnery tow target.

No. 1 POINT ARENA to STUARTS POINT
No. 2 STUARTS POINT to BODEGA HEAD
No. 3 BODEGA HEAD to POINT REYES
No. 4 POINT MONTEREY to PIDGEON POINT

b. Fort Douglas, Utah Areas:

(1) Bombing.

(a) Point in Great Salt Lake between Antelope Island and the shore 305° true from the Salt Lake City Airport.
(b) Bird Island (Small island south of Corrington Island).
(c) Salt bed at 41° 5' N 113° W.
(d) Salt bed at 41° 10' N 113° W.

(2) Aerial Gunnery

(a) West Side of Great Salt Lake, South of the Southern Pacific Tracks.
(b) West side of Great Salt Lake, North of the Southern Pacific tracks.

6. March Field, California Area.

(1) Bombing.

(a) Muroc bombing Range.
(b) Slicks on aerial gunnery ranges.

(2) Gunnery shore line from SANTA MONICA to GUADALUPE.

(a) 34° 2' N 118° 36' W to 34° 2' N 118° 56' W
(b) 34° 2' N 118° 56' W to 34° 11' N 119° 15' W
(c) 34° 11' N 119° 15' W to 34° 22' N 119° 29' W
(d) 34° 26' N 119° 58' W to 34° 27' N 120° 19' W
(e) 34° 27' N 120° 19' W to 34° 35' N 120° 39' W
(f) 34° 35' N 120° 39' W to 34° 55' N 120° 39' W

d. Langley Field, Virginia.

(1) The ranges are shown on the photostat copy of peninsula area of the Sectional Aeronautical Chart, marked Inclosure No. 1.

e. Selfridge Field, Michigan.

(1) An aerial gunnery range in upper Lake Huron, off shore, from Au Sable Point to Harrisville. Selfridge Field is requesting the District Engineer to extend the southern limit to Tawas Beach and the Northern limit to Ossineke.

(2) An aerial gunnery range (during the period that lake traffic is suspended for ice condition) in lower Lake Huron, offshore, from Lakeport to Harbor Beach.

(3) Ground gunnery ranges are located in the western part of the airdrome at Camp Skeel and the northwest part of Collins Airport at Alpena, Michigan.

(4) Selfridge has requested the District Engineer to close an area in Saginaw Bay near Sebewaing, Michigan, for ground gunnery targets.

f. Mitchel Field, New York:

(1) The aerial gunnery range is off-shore south of Long Island, adjacent to and extending the length of Fire Island. This area has been used for bombing slicks during the time that bombardment units were stationed at Mitchel.

g. MacDill Field, Florida:

(1) Practice Bombing Range on MacDill Field Reservation 2.7 miles WSW of main building area of MacDill Field.

(2) Aerial Gunnery Range off West Coast of Florida, area approximately 40 miles E-W and 60 miles N-S, west of line joining Anclote Key Lighthouse and lighthouse off Cedar Keys.

(3) Temporary Demolition Bombing Area - slicks and other floating targets located in Gulf of Mexico 40 miles or more west of Egmont Key Lighthouse. (West of Miami Section).

(4) Practice Bombing Range, 21st Reconnaissance Squadron - partially submerged wreck 4 miles WSW of lighthouse east of Key Largo. (Miami Section).

(5) Practice Bombing Range, 21st Reconnaissance Squadron - Land targets in Eagle Key Area (Miami Section).

(6) Aerial Gunnery Range, 21st Reconnaissance Squadron - Area roughly 20 miles E-W and 2 miles N-S off East Coast of Florida and North Miami Beach outside of shipping lane. (Miami Section).

h. Savannah, Georgia:

(1) Aerial Gunnery Range three miles off shore and parallel to shore line of Hilton Head Island, South Carolina. Range known as Hilton Head Island Gunnery range.

(2) High Altitude Bombing Range located as southeastern tip of Parris Island, South Carolina, known as Parris Island Bombing Range.

i. The tactical units based at McChord Field, Washington, has been conducti their bombing practice at Hamilton Field and their Aerial Gunnery on the March Field water targets basing at Santa Barbara. McChord Field is preparing to use the follow ing water targets when weather permits. All are on the shore line north of the Columbia River as indicated:

(a) CAPE SHOAL WATER to POINT CHEHALIS
(b) POINT BROWN to COPALIS BEACH
(c) COPALIS Rk to POINT GRENVILLE

Very truly yours,

/s/ Davenport Johnson
Brigadier General, Air Corps
Asst. Chief of the Air Corps.

APPENDIX E-10

Corps of Engineers, South Pacific Division, 1947

Memo: Neutralization of Unexploded Ammunition and Duds, 13 March 1947

Corps Engr.
South Pac Div
351 Calif St
S.F. 19, Calif

PRSEN-D 602 (Bodega Bay Gunnery Range)

13 March 1947

HQ, 4th AIR FORCE
MAR 17 1947

6841/9

Subject: Neutralization of Unexploded Ammunition and Duds

To: Commanding General
Fourth Air Force
Hamilton Field, California

1. Your attention is invited to the information contained in copies of attached 2nd and 3rd Indorsements, wherein it is stated that the Bodega Bay Gunnery Range is an overwater target and contains only small arms ammunition.

2. On 20 February 1947, a representative of this office inspected the Bodega Bay Gunnery Range and located one bombing target, which is nearly demolished, and two vertical gunnery targets. These targets are on a sandy beach, some 200 feet to 300 feet above the high tide mark. The range showed evidence of having been used for gunnery and bombing practice, using 30 and 50 caliber ammunition, M38A2, 100 pound, and M47V, 5 pound, practice bombs. Parts of two M38A2 practice bombs found still contained unexploded black powder spotting charges.

3. It was learned from several residents of Bodega Bay that this area is easily accessible at low tide and is frequented by them for clam digging and surf fishing. One lady reported she had been in the area with her two small sons just two days prior to the inspection.

4. Serious damage may result from unexploded black powder and duds through use of this area.

5. This office would appreciate your comments or advice on the action which can be taken by your headquarters in this matter.

FOR THE DIVISION ENGINEER:

2 Incls
1. Cy 2nd Ind dtd 8 Oct 46
2. Cy 3rd Ind dtd 15 Oct 46

F. E. FALKNER
Colonel, Corps of Engineers
Acting Executive Officer

99

APPENDIX E-11

Corps of Engineers, South Pacific Division, 1948

Real Property Management and Disposal Report: Bodega Bay Air to Ground Gunnery Range, 15 August 1948

AUDITED REPORTS SECTION

FINAL REPORT

REAL PROPERTY MANAGEMENT AND DISPOSAL REPORT

DATE OF REPORT: 15 August 1948

REPORTS CONTROL SYMBOL ENGKL-12(P-1)

TO: CHIEF OF ENGINEERS
ATTENTION: ENGLH
WASHINGTON 25, D.C.

FROM (DIVISION): South Pacific

PART I (Formerly known as Bodega Bay Gunnery Range) Santa Rosa AAF

INSTALLATION	LOCATION
Bodega Bay Air to Ground Gunnery Range	2 Miles SW of Bodega Bay

MILITARY: [X] COMMAND [ ] INDUSTRIAL
CIVIL: [ ] FLOOD CONTROL [ ] RIVERS AND HARBORS

COUNTY	STATE
Sonoma	California

ACREAGE OF ENTIRE INSTALLATION	W.D. OWNED	PUBLIC LAND	LEASED	LESSER INT	LAST USING SERVICE
			605		4th Air Force

PART II

	DATE	CLASSIFICATION	E OR P	WAR DEPT. OWNED (Acres) (1)	PUBLIC LANDS (ACRES) (2)	LEASED (ACRES) (3)	LESSER INT (ACRES) (4)	NATURE OF FACILITIES	COST TO GOVT. (DOLLARS)	CUSTODY BY C.E. (DATE)
A.	1/6/47	Surplus	E			605		Gun. Rge	None	1/10/47
B.										
C.										
D.										
E.										
F.										

PART III

TEMPORARY USE GRANTS

REF.	IN PROCESS			GRANTED			PURPOSE
	No.	Acres	Consideration ($)	No.	Acres	Consideration ($)	

DECLARATION TO WAR ASSETS ADMINISTRATION (GIVE DATES)

REF.	FORM 1000 REQUESTED	FORM 1005 TO O.C.E.	DECLARED TO WAA	LTR OF ACCEPT.	CUSTODY ASSUMED

TRANSFER OR RETRANSFER TO OTHER GOVERNMENT AGENCIES

REF.	DATE AUTHORIZED	RECEIVING AGENCY	DATE OF LETTER FROM WAR DEPT.	RESTORATION OR REHAB. DISP. COMPLETED (DATE)	DATE CUSTODY ASSUMED

LEASE CANCELLATIONS

REF.	IN PROCESS OF DISPOSAL			CANCELLED		
	No.	Acres	Rental (Dollars)	No.	Acres	Rental (Dollars)
A3				2	605	1210. per

OTHER WAR DEPARTMENT DISPOSALS

REF.	DATE AUTHORIZED	DATE NEGOTIATIONS INITIATED	DATE OFFER ACCEPTED	CONSIDERATION (DOLLARS)	DATE COMPLETED OR CUSTODY ASSUMED

SIGNATURE: J. D. Duncan J. D. DUNCAN

TITLE: Acting Chief, Real Estate Division

ADDRESS: Oakland Army Base, Oakland 14, Calif

ENG FORM 838
1 DEC 46

INSTRUCTIONS

ALL NUMBERS WILL BE ROUNDED TO THE NEAREST DOLLAR OR ACRE IN PREPARING THIS REPORT

a. REPORTS WILL BE PREPARED MONTHLY AS OF THE 15TH DAY OF EACH MONTH.

b. REPORTS WILL BE PREPARED IN QUADRUPLICATE FOR THE FOLLOWING DISTRIBUTION: Forward original and one copy in sufficient time to reach the Office, Chief of Engineers on or before the 22nd day of the month in which the report is prepared. One copy forwarded to the Division Office and one copy retained in the preparing office.

c. WHEN REQUIRED: Reports will be required commencing with the month in which the installation or any portion thereof is classified as Standby, Inactive or Surplus and continued until surplus property is disposed of by transfer, sale, termination of lease, or otherwise; but if another portion of the installation is classified at a later date and the report resumed, all previous actions will be reflected; where the installation or portion thereof is classified Inactive or Standby, the report may be suspended when the granting of temporary use of facilities made available for such purposes shall have been completed or definite information shall have been received that temporary use of facilities at installations or portions thereof in standby or inactive status cannot be granted.

d. PART I will identify the installation as to name, location and type, set forth the entire acreage either acquired or being acquired, and name the last using service. The acreage will be divided to show War Department owned, Public Lands (Public Domain and Lands transferred from other Government Agencies), Leased, and Lesser Interests. If an installation is part industrial and part Command the acreages of these parts similarly broken down will be reflected in "Remarks". State, county, or municipally owned lands will not be shown as Public Lands.

e. PART II will reflect information as to areas which have been classified "Standby", "Inactive" or "Surplus". A separate line will be used for each report of classification, but subsequent withdrawals or adjustments affecting a classified area will be reflected by net figures and an explanation under "Remarks". The date will be that on which the Appropriate Authority approved the classification. A symbol P or E will be used to denote whether "Classified Area" is a portion of or the entire installation. The acreage will be divided as explained in PART I above but will cover only the actual area or areas classified. The nature or use of the area will be reflected under "Nature of Facilities", i.e. Housing Area, Warehouse Area, Modification Center #2, POW Camp, etc. and if the installation is comprised of both command and industrial portions the symbol I (Industrial) or C (Command) will be used to indicate to which portion the area belongs. The cost of both land and construction will be shown under "Cost to Government". If the Corps of Engineers assumed custody the data will be shown, otherwise "ND" will be entered in the last column.

f. PART III will reflect management or disposal actions taken in connection with areas classified under PART II. The reference column will indicate the area by referring to the line on which it is listed under PART II (A, B, C, etc.) and the appropriate column (1), (2), (3), or (4). No areas or portions of areas which required separate classification reports will be combined in a single line under PART III however. It may be necessary to use several lines under PART III to reflect separate actions taken in connection with an area listed on a single line under PART II. The latter occurrence will be explained under "Remarks" and if necessary a further division of acreage recited.

1. TEMPORARY USE GRANTS will be reported by cumulative figures showing the number of instruments, acres involved, and annual considerations. When right of entry has been given but a formal instrument not executed and delivered it will be reported "in process", with appropriate footnote under "Remarks" including date right of entry granted. After delivery of the instrument it will be reported "granted". "Purpose" will reflect type of interest (Te for Lease, LI for Licenses) And the proposed use of the area, such as agriculture, industrial, etc. Elaboration where necessary will be indicated under "Remarks".

2. DECLARATIONS TO WAR ASSETS ADMINISTRATION. The dates of the following will be recorded: Letter from OCE requesting WAA Form 1005, Letter transmitting WAA Form 1005 to OCE, the declaration to WAA, the letter of acceptability from WAA, and the assumption of custody by the disposal Agency. The symbol or abbreviation of the disposal agency will also be shown under "Custody Assumed".

3. TRANSFER OR RETRANSFER TO OTHER GOVERNMENT AGENCIES. Entries in the second, third, and fourth columns will be made from information or informational copies of documents received from OCE being required only to complete Division and lower echelon records. The date restoration or building disposal (if required) is completed will be shown, otherwise the entry "None" will be made. The last column will reflect the date of written acceptance either from a field or departmental level with appropriate notation in "Remarks".

4. LEASE CANCELLATIONS will show the total number of leases, acreage and annual rental "In Process of Disposal" and "Cancelled" for each "area" of Classification.

5. OTHER WAR DEPARTMENT DISPOSALS mainly involving EPF contracts, easements, licenses, etc. will be recorded under this section of report using entries most nearly applicable to the circumstances and making entries under "Remarks" to explain unusual disposal actions.

REMARKS

PART II

REF	AUTHORITY	LEASED	COST TO GOVT
A3	3rd Ind OCE dtd 12/12/46 Ref: 601.53 Santa Rosa AAF,Calif,ENGLT	605 acres	None

PART III
Lease Cancellations

Ref	Lease No.	Area	Rental	Effective date of Release	Delegated Authority
A3	WO4-193 eng 6156	375 acres	$750. p.a.	3/31/47	D.E.
A3	WO4-193 eng 3203	230 "	460. p.a.	2/28/47	D.E.

APPENDIX E-12

Interdepartmental Air Traffic Control Board (IATCB), 1943

IATCB Meeting No. 384, 9 December 1943

APPENDIX E-12

Interdepartmental Air Traffic Control Board (IATCB), 1943

IATCB Meeting No. 384, 9 December 1943

~~RESTRICTED~~

JAM/pm

INTERDEPARTMENTAL
AIR TRAFFIC CONTROL BOARD
ROOM 1021, ARMY AIR FORCES ANNEX NO. 1
GRAVELLY POINT, WASHINGTON, D. C.

DEC 17 10 11 AM '43

Meeting No. 384 — 9 December 1943

Place: [illegible] Army Air Forces Annex No. 1

FIFTH REGION
CIVIL AERONAUTICS ADMINISTRATION
KANSAS CITY, MISSOURI

Time: 1:00 P.M. to 5:00 P.M.

Members Present:

Earl F. Ward, Dept. of Comm., Presiding
J. S. Marriott, Colonel, A.C.
L. B. Nivling, Lieutenant Commander, USNR
David B. Postle, CAB

Secretary: J. B. Hartranft, Jr., Major, A. C.

SUBJECTS:

TOTAL PAGES

CA-4766,AF

~~RESTRICTED~~

g No. 384 9 December 1943

. BODEGA BAY, CALIFORNIA - AIR TO GROUND GUNNERY RANGE

Discussion:

The Secretary of the Board presented findings and recommendations of Los Angeles Subcommittee on a request from Headquarters, Fourth Air Force, for approval of an Air to Ground Gunnery Range in the vicinity of BODEGA BAY, CALIFORNIA.

Findings:

1. Following findings and recommendations of Los Angeles Subcommittee on this request are taken from minutes of their Meeting No. 16 held on 23 November 1943

"Findings:

"1. The proposed Air to Ground Gunnery Range is described as follows:

"Beginning at a point
Lat. 38° 23' 50" N, Long. 123° 07' 40" W, thence SE'ly to
Lat. 38° 20' 15" N, Long. 123° 04' 00" W, thence SE'ly to
Lat. 38° 20' 05" N, Long. 123° 03' 55" W, thence S'ly along
the W'ly side of BODEGA BAY to
Lat. 38° 19' 00" N, Long. 123° 03' 25" W, thence NW'ly to
Lat. 38° 19' 10" N, Long. 123° 04' 28" W, thence NW'ly and E'ly
along the coast to
Lat. 38° 19' 20" N, Long. 123° 04' 28" W, thence SW'ly to
Lat. 38° 18' 35" N, Long. 123° 10' 10" W, thence W'ly and NE'ly
along an arc of a circle to the point of beginning.

"2. With the exception of a small area on BODEGA HEAD the proposed Air to Ground Gunnery Range is within an already established off-shore Danger Area.

"3. The proposed Danger Area is not within the confines of a Civil Airway.

"Recommendations:

"1. That Air to Ground Gunnery Operations by the Fourth Air Force be approved in the area described in Findings No. 1.

"2. That the portion of the area on BODEGA HEAD be established as a Danger Area and published in Weekly Notice to Airmen and shown on Aeronautical Charts."

2. Area described in finding 1 above lies within Joint Operational Area approved in Meeting No. 375 for use by the Army and Navy.

RECOMMENDATIONS:

1. That the following described area in the vicinity of BODEGA BAY, CALIF., be approved for Air to Ground Gunnery Operations of Fourth Air Force:

Beginning at Latitude 38° 23' 50", Longitude 123° 07' 40"; thence Southeasterly to Latitude 38° 20' 15", Longitude 123° 04' 00"; thence Southeasterly to Latitude 38° 20' 05", Longitude 123° 03' 55"; thence Southeasterly along the Westerly side of BODEGA BAY to Latitude 38° 19' 00", Longitude 123° 03' 25"; thence Northwesterly to Latitude 38° 19' 10", Longitude 123° 04' 28"; thence Northwesterly and Easterly along the coast to Latitude 38° 19' 20", Longitude 123° 04' 28"; thence Southwesterly to Latitude 38° 18' 35", Longitude 123° 10' 10"; thence Northwesterly and Northeasterly along an arc of a circle to the point of beginning.

CA-4766,AF

Meeting No. 384 9 December 1943

2. That portion of the area over BODEGA HEAD, CALIFORNIA be designated a Danger Area, published in notices to airmen and shown on aeronautical charts.

3. That Fourth Air Force Air to Ground Gunnery Operations in the area described in recommendation 1 above be coordinated through the Joint Operations Center, San Francisco, California (Sacramento)

* * * * * * * * *

5. MEMORANDUM FOR THE RECORD:

RAPID CITY, SOUTH DAKOTA - PUBLICATION OF ESTABLISHED DANGER AREA

1. Office, Chief of Engineers has advised that action has been initiated to acquire property for Precision Bombing Range approved in Meeting No. 367 for Army Airfield, Rapid City, South Dakota.

2. The Danger Area established in Meeting No. 367 over Rapid City Precision Bombing Range should now be published in notices to airmen and shown on aeronautical charts.

* * * * * * * * *

6. DEFERRED CASES:

A. NEWTON, KANSAS - WIRT FIELD - DESIGNATED LANDING AREA

Case 1287, report of Chicago Subcommittee on CAA request for approval of Wirt Field, Newton, Kansas as a "Designated Landing Area" was referred to the Chicago Subcommittee for information as to the nature and extent of activity to be conducted from this field and for further coordination with Naval Air Station, Hutchinson, Kansas and the Naval Air Primary Training Command.

* * * * * * * * *

B. OLATHE, KANSAS - OLATHE AIRPORT - DESIGNATED LANDING AREA

Case 1288, report of Chicago Subcommittee on CAA request for approval of Olathe Airport, Olathe, Kansas as a "Designated Landing Area" was referred to the Chicago Subcommittee for information as to the nature and extent of activity to be conducted from this field and for further coordination with Naval Air Station, Olathe, Kansas and the Naval Air Primary Training Command.

* * * * * * * * *

C. CHICAGO, ILLINOIS - ANTIAIRCRAFT FIRING AREA FOR GREAT LAKES ANTIAIRCRAFT TRAINING CENTER

Case 1290, report of Chicago Subcommittee on a request from Great Lakes Antiaircraft Training Center, Chicago, Illinois, for approval of an Antiaircraft Firing Area in Lake Michigan was referred to Chicago Subcommittee for recommendations on the following alternate proposals for avoiding conflict between amber airway #3 and the antiaircraft firing operations:

1. That Amber Airway No. 3 between Milwaukee and Chicago be designated as at present except that the East boundary be the shoreline of Lake Michigan.

2. That the South leg of the Milwaukee Radio Range be rerichted to intersect the Northwest leg of the Chicago Radio Range between Fox Lake and the Mt. Prospect Fan Marker on the Northwest leg of the Chicago Radio Range.

CL-4766,AF

APPENDIX E-13

Santa Rosa Army Air Field, c. 1945

History of the Santa Rosa Army Air Field, Santa Rosa California, 1 April 1944 to 31 December 1944, circa January 1945

THIS PAGE IS UNCLASSIFIED

RESTRICTED

HISTORY

OF THE

SANTA ROSA ARMY AIR FIELD

Santa Rosa, California

1 April 1944 to 31 December 1944

Prepared during the period 1 January 1945 to 15 April 1945 in compliance with AR 345-105, AAF Regulation 20-8, and Directives of the Fourth Air Force.

FORMER DESIGNATIONS

Santa Rosa Army Airdrome

PRESENT ASSIGNMENT

To Fourth Air Force

UNITS ASSIGNED OR ATTACHED

434th Army Air Forces Base Unit (CCTS-Ftr) (Assigned)
Detachment, 68th Army Air Forces Base Unit (Weather Personnel)
Detachment, 1811st Army Airways Communications System Squadron
738th Army Air Forces Band (Attached, 23 May 1944 to 30 November 1944)

COMPILED BY:

WILLIAM E. POLACK, JR.,
2nd Lt., Air Corps,
Historical Officer.

APPROVED:

JOHN W. WILLIAMS,
Colonel, Air Corps,
Commanding.

RESTRICTED

1658

test card the instructor can transfix airspeed, manifold pressure gauge and tackometer.[1]

Each operations section has installed control mock-up boards which consist of propeller control, throttle, mixture and fuel selectors. This has been a great help to the flying instructors during their operating instruction lectures.[2]

For aerial gunnery missions flown from the field, six ranges, all located near the mouth of Russian River at Bodega Head, are available for use.[3] One of these ranges, designated as X-5, is utilized for overcast firing. Dive and skip bombing missions are accomplished at either the Tubbs Island or Drakes Bay range.[4] Ground gunnery and dive-bombing missions are accomplished at the Tubbs Island range. A ground strafing range is located at Bodega Head.[5]

Base Operations

Capt. Wilbur S. Hattendorf has performed the duties of Base Operations' Officer during the entire period covered by this installment of the history. Assisting Captain Hattendorf in the supervision of the section were 1st Lt. Carl T.Huneycutt, from 1 April to 20 October 1944, and 2nd Lt. Robert P. Roberson, from 20 October to 31 December 1944.[6]

---

1. Interview with Capt. Judson Hallock, Supv. of Flying Th..., by Hist. O., SRAAF on 17 Jan. 1945.
2. Ibid.
3. Ibid.
4. Ibid.
5. Ibid.
6. Historical Report from Base Operations Officer for period 1 Apr. 1944 - 30 Nov. 1944.

APPENDIX E-14

Santa Rosa Army Air Field, c. 1945

History of the Santa Rosa Army Air Field, Santa Rosa California, 1 January 1945 to 31 March 1945, circa April 1945

THIS PAGE IS UNCLASSIFIED

~~CONFIDENTIAL~~ declassified EO 11652

HISTORY OF THE

SANTA ROSA ARMY AIR FIELD

Santa Rosa, California

1 January 1945 to 31 March 1945.

Prepared in April 1945 in compliance with AR 345-105, AAF Regulation 20-8, and Directives of the Fourth Air Force.

FORMER DESIGNATIONS

Santa Rosa Army Airdrome

PRESENT ASSIGNMENT

To Fourth Air Force

UNITS ASSIGNED OR ATTACHED

434th Army Air Forces Base Unit

Detachment, 68th Army Air Forces Base Unit (Weather Personnel)

Detachment, 101st Army Airways Communications Systems Squadron

COMPILED BY

TERRY L. HITCHETT,
2nd. Lt., Air Corps,
Historical Officer.

APPROVED:

JOHN M. WELTMAN,
Colonel, Air Corps,
Commanding.

~~CONFIDENTIAL~~

CHAPTER III

MAJOR ACTIVITIES OF SANTA ROSA ARMY AIR FIELD

FLYING TRAINING

Flying Training ranks first among major activities at the field. The section is responsible for replacement fighter pilot training in accordance with Fourth Air Force Memorandum 50-8. The average directive time per trainee, at the beginning of 1945, was 30.8 hours.[1]

The current class of trainees began work on 3 December 1944. At the time the class reported for duty, the trainees had had an average of fifteen hours single engine fighter time. Bad flying weather haunted and hindered the work. At the close of January the class was twenty-eight hours behind schedule because of unfavorable flying weather conditions. Twenty-three full days out of the fifty-nine days since the class reported had been claimed by "Old Man Bad Weather". This presented a new problem and required formulation of a set check-out procedure, rated very satisfactory by Lt. Col. Mark Shipman, Director of Operations, 318th Wing.[2]

A notable achievement of the Flying Training Section was the construction of a P-38 pre-flight trainer. Christened "Chained Lightning", the project consists of a Class 26 P-38L-1, mounted on six concrete piers in a flying attitude and requiring normal operating procedure in regard to engine, wheels and flaps. The central booth is placed in position off the left wing tip, and therein is mounted a complete instrument panel. By the use

1. Report of Director of Flying Training to Historical Officer, SRAAF, dtd Jan 45.
2. Report of Director of Flying Training to Historical Officer, SRAAF, dtd Jan 45.

THIS PAGE IS UNCLASSIFIED

~~CONFIDENTIAL~~

History of the Santa Rosa Army Air Field, 1 Jan 45 - 31 Mar 45

of extended lines from the aircraft instrument, duplicate readings regarding engine instruments can be had at this central board. Through the use of a vacuum motor such as is found in an instrument test card, the instructor can transfix air speed, the manifold pressure guage and tackometer.[1]

Pilots' lounges, received attention in the matter of redecoration. Business men's organizations in neighboring communities provided the means of accomplishing this work. White Section and Red Section lounges were "re-touched" in January and Blue Section was finished in February.[2]

Each flying section installed a control mock-up board, consisting of propellor control, throttle, mixture and fuel selectors. These proved great help to the instructors during operating instruction lectures.[3]

A few changes, made in the Flying Training Program by Fourth Air Force were inaugurated in March. Outstanding among these was the increase in the requirements for Aerial Gunnery - Medium and the decrease in Aerial Gunnery-High. High altitude gunnery was decreased by eleven hours and five missions and medium altitude gunnery was increased correspondingly. Transition was increased to eight hours; Fighter Instruments to ten hours; and Navigation to four hours.[4]

By the end of March the class of trainee pilots had flown a total of 14067:30 hours.[5]

Accidents declined each week during January, February and March, reaching the low of three accidents in P-38's for March.[6]

1. Report of Dir. of Flying Training to Hist. O.,SRAAF, Jan 1945.
2. Report of Dir. of Flying Training to Hist. O., Jan-Feb-Mar 1945.
3. Ibid. January 1945.
4. Ibid. March 1945.
5. Ibid. March 1945.
6. Ibid. March 1945.

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History of the Santa Rosa Army Air Field, 1 Jan 45 - 31 Mar 45.

the last Navy Fighter was found just southeast of Ukiah.[1]

In the crash near Fillsbury on 23 March, which resulted in the deaths of Captain Armstrong and Lieutenant James Wooldridge, Civilian Air Patrol Officers, the Base Rescue Personnel received excellent cooperation and assistance from the Sheriff at Lakeport, the Forestry Service, the Fish and Game Department, and several other civilians.[2] The assistance and cooperation rendered by the civilians in reaching and recovering the personnel involved in the crash was greatly appreciated.

GUNNERY

Gunnery Section is responsible for the coordination, standardization, and improvement of gunnery training for all trainee pilots in training at Santa Rosa Army Air Field. To accomplish its purpose the section has inaugurated several new ideas during the first three months of 1945:[3]

(1) Flight instructors have been sent to Air Force Gunnery Schools as often as possible;
(2) Coordination between gunnery officers of each Section has been accomplished by weekly meetings for discussion and solution of pressing problems, expression of new ideas, and consideration and adoption of recommendations.
(3) Two dive bomb targets were constructed at Tubbs Island Gunnery Range to facilitate accurate scoring of dive bombing.
(4) A Sight-Burst Panel was erected at Bodega Head to aid in Assessment of Gun Camera film.
(5) Visits to other installations for observation of methods and practice.
(6) Provision of a copy of "434 Gunnery And Bombing Guide" for each trainee in training to be studied in conjunction with Ground School Classes.
(7) A new system of marking targets to eliminate the confusion in determining the ownership of aerial targets after they were dropped.
(8) An Standard Operating Procedure for Gunnery Training Aids.
(9) Operational control over Gunnery Training Aids vested in the Staff Gunnery Officer.
(10) A Chart recording the hits in per cent in the Gun-Air Instructor.
(11) A new column on the film Assessment Chart showing the date film

1. Report of Base Operations to Hist.O.,SRAAF, Mar 45.
2. Ibid.
3. Report of Dir. of Operations for Gunnery to Hist.O. Jan,Feb,Mar.1945.

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was exposed.

(12) A Standard Operating Procedure for handling the Film Magazines to eliminate keeping of magazines in the personnel lockers.

In January 1945, Sergeant Walsh of the Base Light Armament Section designed and installed an ammunition booster, .50 cal. set-up, for the P-38 type aircraft. Tested under many conditions and found to give excellent service for the two top guns, this ammunition booster attracted the attention of Fourth Air Force.[1]

During February, the class of trainees progressed rapidly in gunnery. Early in the month they reached an average of thirty to thirty-five flying hours in the P-38. This gave the Gunnery Section its signal to load the guns and determine the ability of the trainees with actual firing. They were eager to begin firing and there were good reports on their initial work. Ten per cent of the trainees were found not yet ready for firing and these men were given additional camera work until they reached the standards set by the section. At the end of February, the trainees had flown more than one thousand gun camera missions. They had fired 163,675 rounds of aerial gunnery and 34,494 rounds of ground gunnery; and they had dropped 1,397 dive bombs and 1,757 skip bombs.[2]

In February, repairs were completed at Tubbs Island Ground Gunnery and Bombing Range, including sixteen hundred tons of sand placed around the gunnery targets to prevent richocheting bullets. One skip bomb target and two dive bomb targets were constructed and the range houses renovated.[3]

1. Report of Director of Operations for Gunnery to Hist. O., Jan 1945.
2. Ibid - February 1945.
3. Ibid - February 1945.

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History of the Santa Rosa Army Air Field, 1 Jan 45 - 31 Mar 45

By the end of March the trainees had completed approximately three-fourths of their gunnery and bombing training.[1] The record follows:

Rounds Expended Aerial Gunnery	251031.
Per Cent Hits Aerial Gunnery	8.7 %
Rounds Expended Ground Gunnery	78782.
Per Cent Hits Ground Gunnery	14.91 %
Bombs Expended Dive Bombing	1960.
Per Cent Hits Dive Bombing	47.3 %
Bombs Expended Skip Bombing	2485.
Per Cent Hits Skip Bombing	54.0 %

CHEMICAL WARFARE

The ever present possibility of the use of chemicals in the war has kept the Chemical Warfare Section functioning at Santa Rosa Army Air Field. In January, the section conducted the first two weeks of the Ground Training Program in the Post Theatre, accomplishing 4780 man-hours of training in Chemical Agents, First Aid for Gas Casualties, Gas Mask Drill Demonstration with the light weight gas mask, Incendiary and Smoke Demonstration, and Review. At the completion of the training examination was given to 950 enlisted men.[2]

On 23 January 1945, Second Lieutenant Chales J. Fabis was assigned to the Base Chemical Section as Assistant Base Chemical Officer, being transferred from Army Air Base, Paine Field, Washington.[3]

1. Report of Director of Operations for Gunnery to Historical Officer, March 1945.
2. Report of Base Chemical Officer to Historical Officer, 31 Jan 45.
3. S. O. No. 18, Par. 6, Hq SRAAF, dtd 23 Jan 45.

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History of the Santa Rosa Army Air Field, 1 Jan 45 - 31 Mar 45.

Eight enlisted men of the section took on-the-job training in Chemical Airplane Smoke Tank filling operations preparatory for work in spray missions to be flown by trainee pilots with airplane smoke tanks, M-10 filled with FS or CNB.

Sergeant Richard M. Wolfram, chemical warfare technician, joined the section from Army Air Base, Tonapah, Nevada, on 30 January 1945.[1]

During February, the section trained nine enlisted men - three from each squadron - as gas non-commissioned officers, each man completing the forty-four hour course and each being detailed as Gas Non-Commissioned Officers of their respective squadrons in accordance with Army Air Force Regulation 50-25.[2]

Major Thomas F. Pierce, Chemical Warfare Service, Assistant Chemical Officer from Headquarters Fourth Air Force, inspected the section in February and reported everything in satisfactory condition.[3]

In March the Base Chemical Office was moved from the General Supply Office into a separate office in Building T-722.

Sway Braces, in preparation for Chemical Spray Operations, were attached to the P-38 aircraft in Blue Section and Chemical Spray missions started on 13 March 1945. During March, trainee pilots completed their four hour Ground Training in Offensive Chemical Warfare.[4]

The gas chamber excercise required by Fourth Air Force Memorandum 50-2 was given to 1276 personnel in March.[5]

1. Report of Base Chemical Officer to Historical Officer, 31 Jan 45.
2. Ibid - February 1945.
3. Ibid.
4. Ibid - March 1945.
5. Ibid.

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APPENDIX E-15

Santa Rosa Army Air Field, c. 1945

History of the Santa Rosa Army Air Field, Santa Rosa California, 1 June 1945 to 30 June 1945, circa July 1945

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HISTORY OF THE

SANTA ROSA ARMY AIR FIELD

Santa Rosa, California

1 June 1945 to 30 June 1945

Prepared in July 1945 in compliance with AR 345-105, AAF Regulation 20-8, and Directives of the Fourth Air Force.

FORMER DESIGNATIONS

Santa Rosa Army Airdrome

PRESENT ASSIGNMENT

To Fourth Air Force

UNITS ASSIGNED OR ATTACHED

434th Army Air Forces Base Unit

Detachment, 68th Army Air Forces Base Unit (Weather Personnel)
Detachment, 101st Army Airways Communications Systems Squadron
Detachment, 3210th Engineer (Fire Fighting) Co. (Provisional)

COMPILED BY:

KENNETH L. SAYLES,
1st Lt., Air Corps,
Historical Officer.

APPROVED:

JOHN W. WELTMAN,
Colonel, Air Corps,
Commanding.

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History of the Santa Rosa Army Air Field, 1 Jun 45 - 30 Jun 45

NAME	ARRIVING FROM	STATION	DATE
Maj. J. R. Brown	Bakersfield	Bakersfield	26 Jun 45
Maj. C. E. Ford	Bakersfield	Bakersfield	26 Jun 45
Maj. R. H. Lynn	Hamilton	San Rafael	26 Jun 45
Maj. R. T. Barber	Bakersfield	Bakersfield	26 Jun 45
Maj. R. L. Pett	Bakersfield	Chico	26 Jun 45
Maj. W. T. Daly	Oakland	Oakland	21 Jun 45
Col. C. J. Anderson	Mather Fld.	Mather Fld.	19 Jun 45

GUNNERY

During June the trainee pilots completed their aerial bombing and gunnery requirements, in a most satisfactory manner. During this period the following record was established:[1]

Rds expended Aerial Gunnery	413775
% Hits Aerial Gunnery	9.92
Rds expended Ground Gunnery	135683
% Hits Ground Gunnery	16.63
Bombs expended Dive Bombing	3134
% Hits Dive Bombing	47.6
Bombs expended Skip Bombing	3010
% Hits Skip Bombing	53.4

This shows an overall increase in percentage of hits in Aerial and Ground Gunnery and Skip and Dive Bombing as compared with the month of May.

Continental Air Forces cancelled the waiver on rockets granted by Fourth Air Force, thereby making it necessary to

1. Report of Base Gunnery O. to Hist. O., SRAAF, June 1945.

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History of the Santa Rosa Army Air Field, 1 Jun 45 - 30 Jun 45

give all trainees additional training in rocket firing. They will have to fire from 24 to 32 2.25" SCAR before being committed to an overseas shipment. Plans are under way to train the instructors in rocket firing and the use of Wing Lines. They will be given a series of Ground School lectures covering Wing Lines, Rocket Armament, and Rocket Theory and will then fire a minimum of 20 rockets before instructing the trainees.

The dive-bomb target at Tubbs Island has been modified so as to accomodate Rocket Firing. The proposed Scoring Tower has not yet been erected, but it will be in the very near future.

Capt. James R. Gant left for Pinellas Army Air Field the latter part of this month for a ten day supervisory visit of the III Air Force Gunnery School.[1]

Captain Vogelsburg was appointed Gunnery Officer in Red Section in lieu of Lieutenant Goldstein.

Although all trainees have completed their minimum gunnery requirements they will continue firing and bombing in order to improve their efficiency until such time as they are committed.

Fourth Air Force Gunnery School at Daggett, California, has been lengthened from twenty-one to thirty days with a minimum of forty hours flying time to complete the course.[2]

1. S.O. No. 138, par. 1, Hq. SRAAF, dated 27 June 1945.
2. Report of Base Gunnery O. to Hist. O., SRAAF, June 1945.

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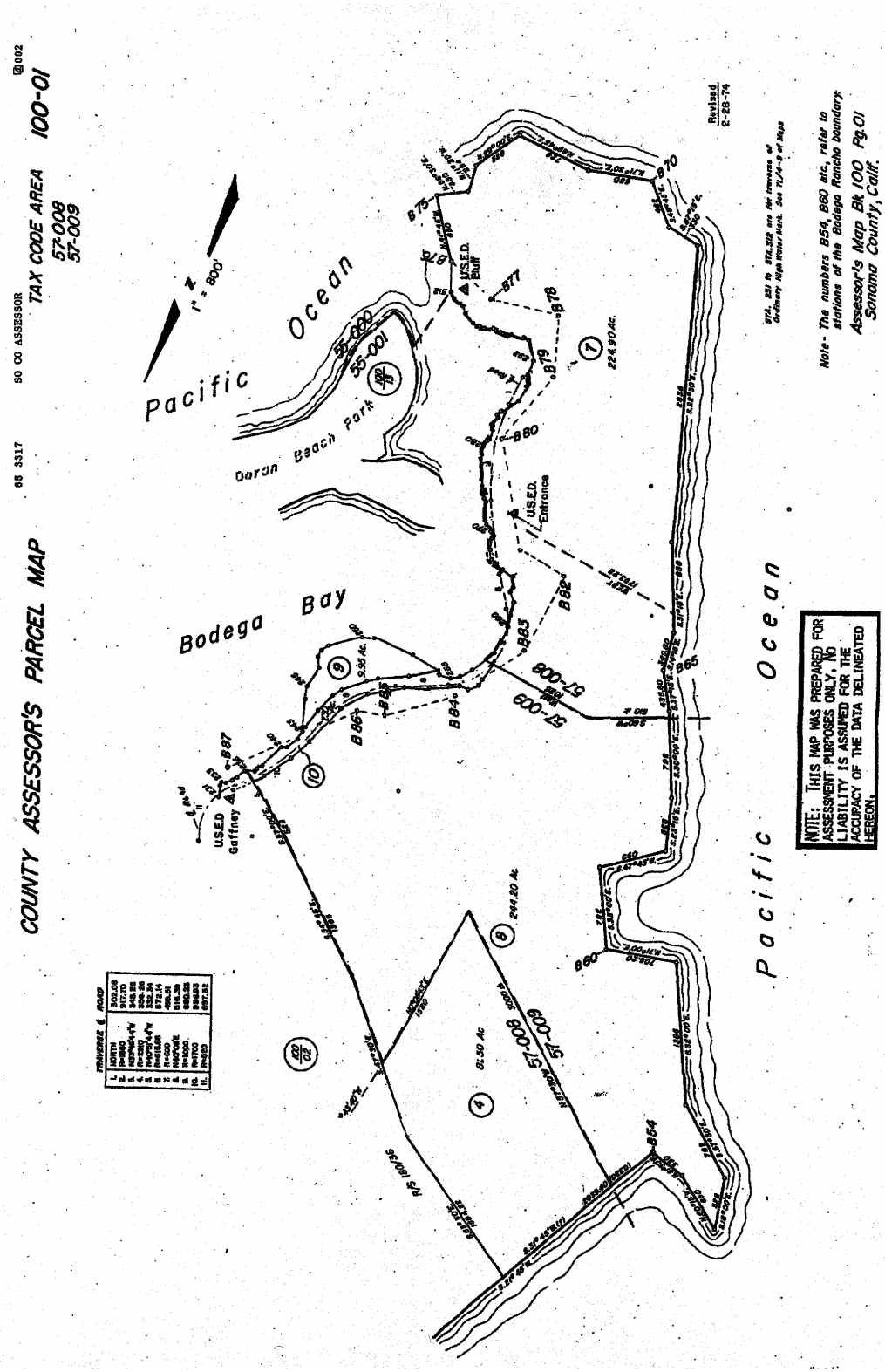
APPENDIX E-16

Sonoma County Tax Assessor, 1974

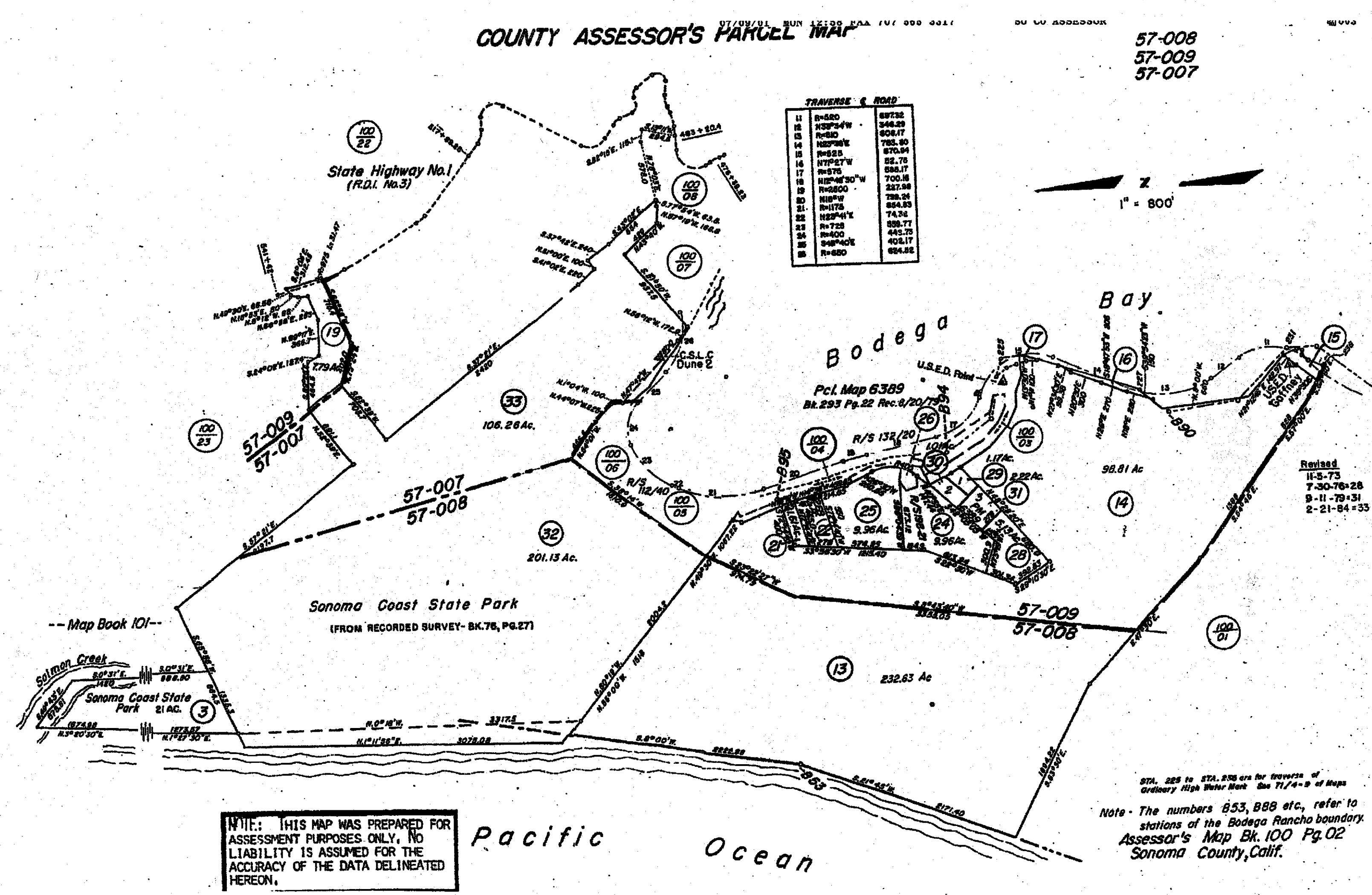
Assessor's Map Bk 100 Pg. 01, Sonoma County, Calif, 28 February 1974


COUNTY ASSESSOR'S PARCEL MAP
65 3317
SO CO ASSESSOR
TAX CODE AREA 100-01
57-008
57-009
1" = 800'
Pacific Ocean
Doran Beach Park
55-001
55-000
Bodega Bay
U.S.E.D. Bluff
U.S.E.D. Entrance
U.S.E.D. Gaffney
57-800
600-57
224.90 Ac.
244.80 Ac.
61.50 Ac.
9.39 Ac.
Revised 2-28-74
Note - The numbers B54, B60 etc., refer to stations on the Bodega Rancho boundary.
Assessor's Map Bk 100 Pg. 01
Sonoma County, Calif.
NOTE: THIS MAP WAS PREPARED FOR ASSESSMENT PURPOSES ONLY. NO LIABILITY IS ASSUMED FOR THE ACCURACY OF THE DATA DELINEATED HEREON.

APPENDIX E-17

Sonoma County Tax Assessor, 1984

Assessor's Map Bk 100 Pg. 02, Sonoma County, Calif, 21 February 1984


COUNTY ASSESSOR'S PARCEL MAP
57-008
57-009
57-007
State Highway No.1
(R.D.I. No.3)
TRAVERSE ℄ ROAD
1" = 800'
Bodega Bay
Pcl. Map 6389
Bk.293 Pg.22 Rec.8/20/79
U.S.E.D. Point
C.S.L.C. Dune 2
106.26 Ac.
201.13 Ac.
98.81 Ac
232.63 Ac
7.79 Ac.
1.17 Ac.
2.22 Ac.
9.96 Ac.
Revised
11-5-73
7-30-76=28
9-11-79=31
2-21-84=33
--Map Book 101--
Salmon Creek
Sonoma Coast State Park 21 AC.
Sonoma Coast State Park
(FROM RECORDED SURVEY- BK.76, PG.27)
Pacific Ocean
NOTE: THIS MAP WAS PREPARED FOR ASSESSMENT PURPOSES ONLY. NO LIABILITY IS ASSUMED FOR THE ACCURACY OF THE DATA DELINEATED HEREON.
Note - The numbers 853, 888 etc., refer to stations of the Bodega Rancho boundary.
Assessor's Map Bk. 100 Pg. 02
Sonoma County, Calif.

APPENDIX F

REAL ESTATE DOCUMENTS

NOT USED
(Citations included in Appendix E and K)

APPENDIX G

NEWSPAPER / JOURNALS

NOT USED

APPENDIX H

INTERVIEWS / POINTS OF CONTACT (POC)

INTERVIEWS/ POINTS OF CONTACT (POC)

The archive search team contacted the following individuals in preparation of this ASR. Conversation with these people yielded information of three general sorts:

- background data contained in written documents
- negative information (i.e. no pertinent knowledge of the site)
- coordination of efforts for various interested parties

While valuable, conversations with these individuals did not yield information cited in this report and hence Telephone Conversation Records have not been included. (See additional Points of Contact under section 4.2 Records Review):

Individual	Telephone Number	Position
Sgt Walker	650 603 8301/8302	787th Ordnance Co (EOD) Moffitt Field
Peter Connors	707-875-2020	Bodega Marine Reserve, Reserve Manger pgconnors@ucdavis.edu
Brit Horn	707-875-3627	Lifeguard, Sonoma Coast State Beach, Russian River/Mendocino District, California State Parks
Rich Lawton	707-875-3907	Ranger Supervisor; Sonoma Coast State Beach, Russian River/Mendocino District, California State Parks Mr. Lawton has found 3 brass .50 cal casings and 2 projectiles near Bodega
Breck Parkman	707-938-9548, ext 19	Senior State Archeologist, Silverado District –Sonoma
Susan Alverez	831-386-2520	Hunter-Liggett Base Archeologist

U.S. ARMY CORPS OF ENGINEERS POINT OF CONTACTS (POC)

The following individuals prepared the Archive Search Report or are involved in the process:

U.S. Army Corps of Engineers
St. Louis District
Engineering Division - Ordnance and Technical Services Branch (CEMVS-ED-P)
1222 Spruce Street
St. Louis, MO 63103-2833

Individual	**Telephone Number**	**Position**
Alix Borrok	314-331-8043	ED-P, Historian
Bryan Colegate	314-331-8744	ED-S, CADD Specialist

Individual	Telephone Number	Position
Randal Curtis	**314-331-8786**	**ED-P, Civil Engineer/ASR Project Manager**
Michael Dace	314-331-8036	ED-P, Chief of Ordnance and Technical Service Branch
Ida Morris	314-331-8040	ED-P, Project Assistant
George Sloan	314-331-8796	ED-P, Historian and Safety Specialist

U.S. Army Engineering and Support Center Huntsville
Center of Expertise and Design Center of Ordnance and Explosives
CEHNC-ED-SY-O
P. O. Box 1600
Huntsville, AL 35807-4301

Individual	Telephone Number	Position
Danny Mardis	256-895-1797	ASR Project Manager

U. S. Army Corps of Engineers
SACRAMENTO
Program Management Branch
CESPK-PM-H
1325 J St., 12th Floor
Sacramento, CA 95814-2922

Individual	Telephone Number	Position
Gerald (Jerry) Vincent	916-557-7452	DERP FUDS Program Manager

APPENDIX I

PRESENT SITE PHOTOGRAPHS

TABLE OF CONTENTS

Photo #1 – Bodega Bay Gunnery Range – 28 August 2001
AN-MK 23 iron Miniature Practice Bomb – rust encrusted OE debris collected by Peter Connors, Reserve Manger of Bodega Marine Reserve.

Photo #2 - Bodega Bay Gunnery Range – 28 August 2001
Bodega Bombing Target - Approximate center of target based on concentration of debris found; at N38 ^{o} 19.254', W123^{o} 04.269' looking SE at vegetation free area of sand dunes.

Photo #3 Bodega Bay Gunnery Range – 28 August 2001
Bodega Bombing Target – collected OE debris, small pieces of very rusted iron from bodies of AN-MK 23 miniature practice bombs (right side of photo) and .50 caliber machine gun links (left side of photo).

Photo #4 Bodega Bay Gunnery Range – 28 August 2001
Bodega Bombing Target – insitu OE debris, small pieces of very rusted iron from body of AN-MK 23 miniature practice bomb.

Photo #5 Bodega Bay Gunnery Range – 28 August 2001
Bodega Strafing Ranges Area – Looking SW across vegetated sand dunes where historical site photos and textual descriptions indicate targets were located; Bodega Head/California Plate in distance.

Photo #6 Bodega Bay Gunnery Range – 28 August 2001
Bodega Strafing Ranges Area – Looking NE across vegetated sand dunes where historical site photos and textual descriptions indicate targets were located; American Plate in distance.

Photo #7 Bodega Bay Gunnery Range 28 August 2001
Bodega Strafing Ranges Area – barbed wire and wood fence posts from unclear origin.

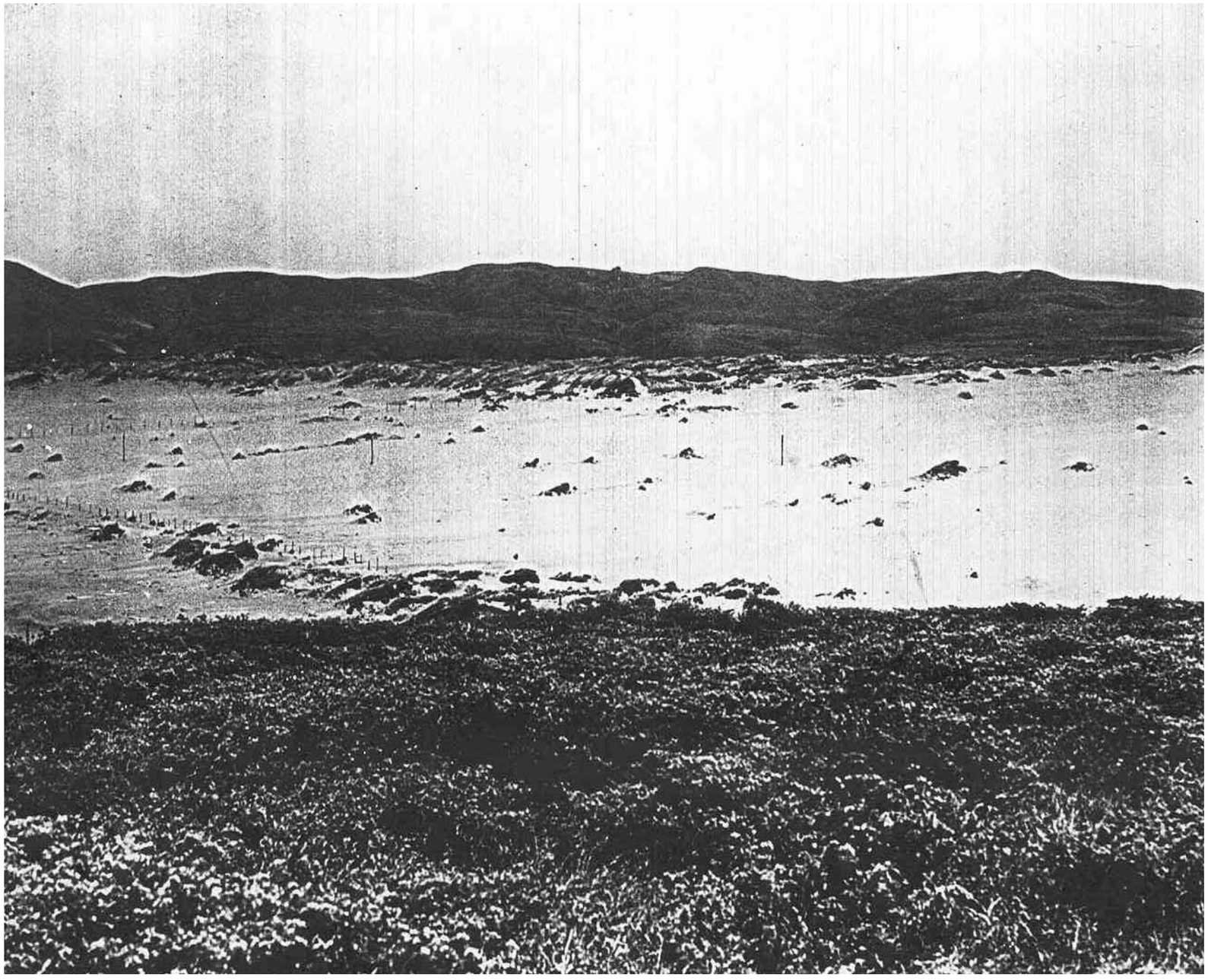
Photo #8 Bodega Bay Gunnery Range – 28 August 2001
Bodega Strafing Ranges Area – typical vegetation on sand dunes where historical site photos and textual descriptions indicate targets were located.

Photo #9 Bodega Bay Gunnery Range – 28 August 2001
Bodega Bombing Target – OE debris, very rusted iron from body of AN-MK 23 miniature practice bomb.

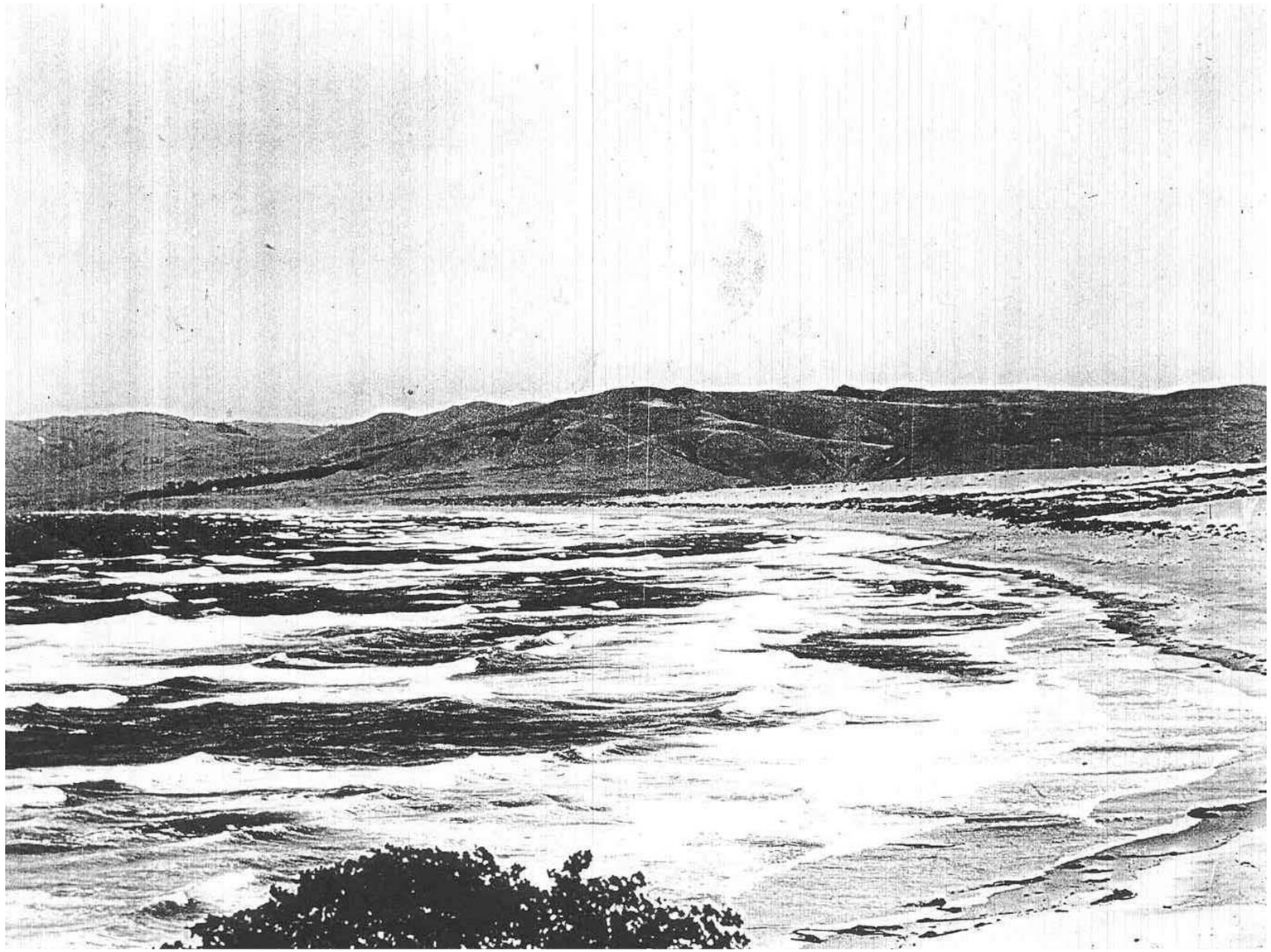
APPENDIX J
HISTORICAL PHOTOGRAPHS

Section No.	Historical Picture
J-1	12th Naval District, Naval Station Alameda 1948 Photograph NA 27 L2943 "Proposed bombing site Bodega Bay proposed target site in center foreground", 13 January 1948, files of Peter Connors, Bodega Marine Reserve, Reserve Manger.
J-2	12th Naval District, Naval Station Alameda 1948 Photograph NA 27 L2942 "Proposed bombing site Bodega Bay, Shoreline looking north toward state park", 13 January 1948, files of Peter Connors, Bodega Marine Reserve, Reserve Manger.
J-3	12th Naval District, Naval Station Alameda 1948 Photograph NA 27 L2949 "Proposed bombing site Bodega Bay, Shells buried by sand", 13 January 1948, files of Peter Connors, Bodega Marine Reserve, Reserve Manger.

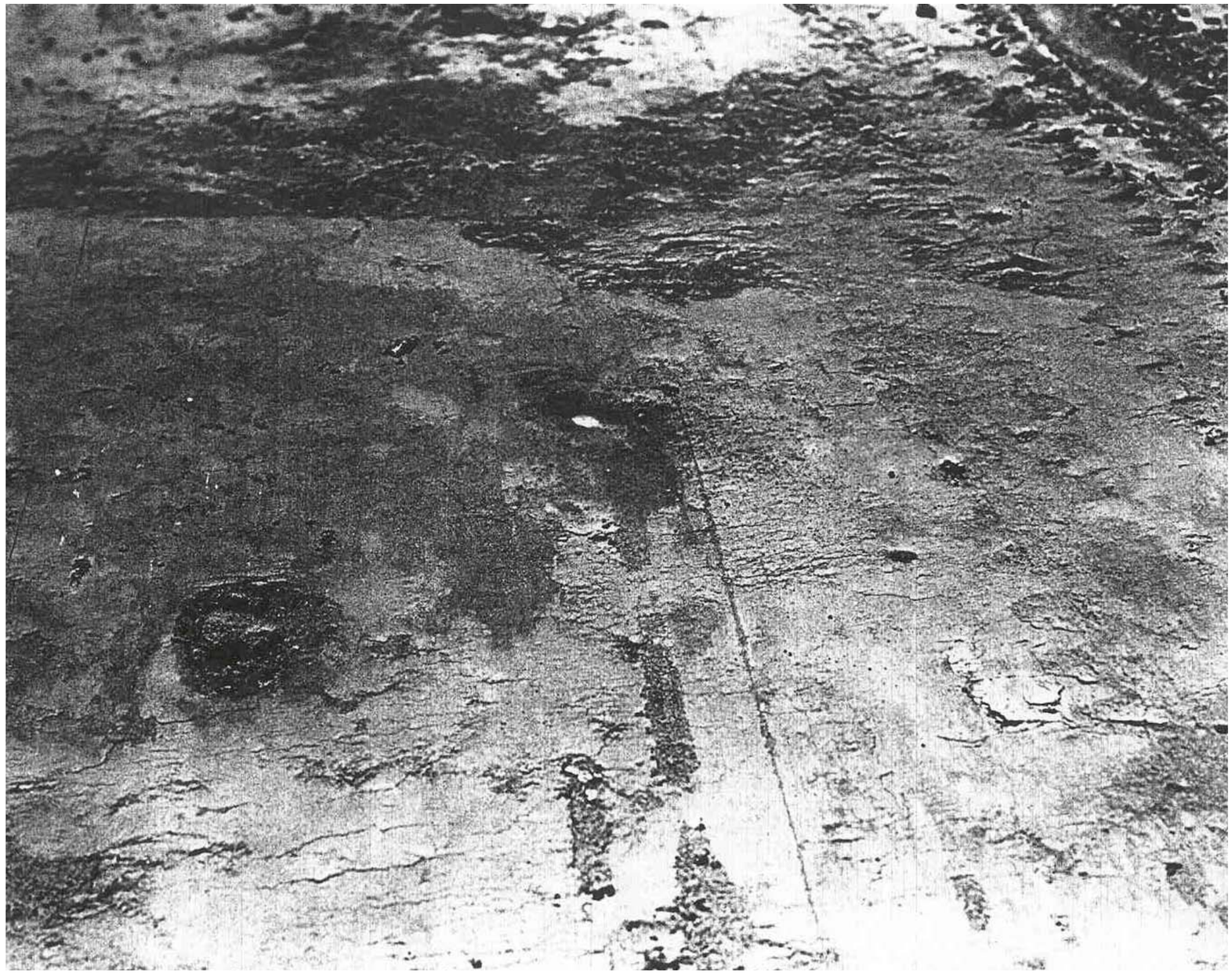
12th Naval District, Naval Station Alameda, 1948
Photograph NA 27 L2943 "Proposed bombing site Bodega Bay proposed target site in center foreground",



12th Naval District, Naval Station Alameda, 1948
Photograph NA 27 L2949 "Proposed bombing site Bodega Bay, Shells buried by sand",



12th Naval District, Naval Station Alameda, 1948
Photograph NA 27 L2949 "Proposed bombing site Bodega Bay, Shells buried by sand",



APPENDIX K

HISTORICAL MAPS / DRAWINGS

NOT USED

APPENDIX L

SITE SAFETY AND HEALTH PLAN / SITE INSPECTION REPORT

SITE SAFETY AND HEALTH PLAN / SITE INSPECTION REPORT

Section No.	Plan / Report
L-1	Site Safety and Health Plan – Bodega Bay Gunnery Range
L-2	Site Inspection Report – Bodega Bay Gunnery Range

APPENDIX L-1

Site Safety and Health Plan - Bodega Bay Gunnery Range

SITE SAFETY AND HEALTH PLAN (SSHP)
Bodega Bay Gunnery Range
Bodega Bay, CA
SITE # 01

The purpose of this site visit is to reconnoiter, document, and photograph areas on Bodega Bay Gunnery Range, Bodega Bay, California suspected to be contaminated with unexploded ordnance and/or toxic chemical munitions.

PREPARED BY:	George Sloan
OFFICE	USACE, CEMVS-ED-P
ADDRESS	1222 Spruce St. St. Louis, MO
PHONE	314-331-8796
DATE PREPARED	13 August 2001

REVIEWED/APPROVED BY: Sandy Sloan
SSHO

NOTE: This SSHP is to be used only for non-intrusive site visits and must be approved by safety prior to the start of the field visit. All team members must read and comply with the SSHP, and attend the safety briefings. The Site Safety and Health Officer (SSHO) shall ensure that the Safety Briefing Checklist and the SSHP acceptance form (Appendix C) are filled out prior to the start of the site visit.

A. SITE DESCRIPTION AND PREVIOUS INVESTIGATIONS

1. Site Description

a. Size: 605 acres

b. Present Usage (check all that apply)

[ ] Military	[X] Recreational	[ ] Other (specify)
[X] Residential	[X] Commercial	
[ ] Natural Area	[ ] Industrial	
[ ] Agricultural	[ ] Landfill	

[X] Secured	[ ] Active	[ ] Unknown
[X] Unsecured	[ ] Inactive	

2. Past Uses: The Army used the former Bodega Bay Gunnery Range as a practice-bombing target and aerial gunnery range from 1942-46.

3. Surrounding Population (check all that apply)

[X] Rural	[X] Residential	[ ] Other (specify)
[X] Urban	[ ] Industrial	
[X] Commercial		

4. Ordnance/Explosives (OE) Potential: practice bombs.

B. DESCRIPTION OF ON-SITE ACTIVITIES (check all that apply)

[X] Walk-through	[ ] Drive-through	[ ] Other (specify)
[ ] On-Path	[X] On-road	
[ ] Off-Path	[ ] Off-road	

C. SITE PERSONNEL AND RESPONSIBILITIES

1. Responsibilities

a. Project Manager The Corps of Engineers Project Manager (PM) is overall responsible for the site visit. He will assign a Team Leader, (in most situations this will be the PM). The PM will ensure that the SSHP is completed along with coordinating and executing the site visit.

b. Site Safety and Health Officer The SSHO is designated to conduct safety, enforce the SSHP, conduct safety briefings and ensure that the team leader can safely fulfill his objectives. The SSHO will maintain the safety gear

and monitor on-site operations. The SSHO is responsible for identifying, marking and reporting any unexploded ordnance and explosives.

2. Team Members

Name	Position	Address	Phone
Randal Curtis	PM	CEMVS-ED-P	314-331-8786
George Sloan	SSHO	CEMVS-ED-P	314-331-8796
Alex Borrok	Historian	CEMVS-ED-P	314-331-8043

D. OVERALL HAZARD EVALUATION (check one)

[ ] High [ ] Moderate [X] Low [ ] Unknown

This assessment was developed using the Site Investigation Hazard Analysis and Risk Assessment Code Matrix.

E. GENERAL PRECAUTIONS Prior to the on-site visit, all team members are required to read this SSHP and sign the form acknowledging that they have read and will comply with it. In addition, the SSHO shall hold a brief tailgate meeting in which site specific topics regarding the day's activities will be discussed. If unanticipated hazardous conditions arise, team members are to stop work, leave the immediate area and notify the SSHO. The buddy system will be enforced at all times.

F. STANDARD OPERATION SAFETY PROCEDURES, ENGINEERING CONTROLS AND WORK PRACTICES

1. Site Rules/Prohibitions At any sign of unanticipated hazardous conditions, stop tasks, leave the immediate area and notify the SSHO. Smoking, eating and drinking allowed in designated areas only.

2. Material Handling Procedures Do not handle.

3. Drum Handling Procedures Do not handle.

4. Confined Space Entry An area identified as a Permit Required Confined space will not be entered. All confined spaces shall be considered permit required confined spaces until the pre-entry procedures demonstrate otherwise. Confined spaces may be entered without a written permit or attendant provided the space is determined not to be a permit required confined space as specified in 29 CFR 1910.146.

5. Electrical Protection Overhead power lines, downed electrical wires and buried cables pose a danger of shock and electrocution. In addition, buildings may

contain exposed wiring that may hold a potential load. Workers should avoid contact with any and all exposed wire and cables

6. Spill Containment N/A

7. Excavation Safety Do not enter trenches/excavations.

8. Illumination Site visits will be conducted during daylight hours only.

9. Sanitation Use existing sanitary facilities.

10. Buddy System Individuals will maintain constant contact with other personnel at all times. No one will work alone at any time during the site visit.

11. Engineering Controls N/A

12. Insects Wearing light colored clothing and tucking in the pant legs can reduce contact. In severely infested area it may be necessary to tape all openings. Apply repellents to both clothing and bare skin. Diethyltoluamide (DEET) is an active ingredient in many repellents, which are effective against ticks and other insects. Repellents containing DEET can be applied on exposed areas of skin and clothing. However, repellents containing permethrin should be used on only clothing. For more information on insect bites, refer to Appendix B.

13. Poisonous Vegetation Recognition and avoidance is the best protection. Cover all exposed skin. If it is known or suspected that an individual has been exposed, wash the effected area with soapy water.

14. Inclement Weather When there are warnings or indications of impending severe weather (heavy rains, strong winds, lightning, tornadoes, etc.), weather conditions shall be monitored and appropriate precautions taken to protect personnel and property from the effects of the severe weather.

15. Hot Weather In hot environments, cool drinking water shall be made available and workers shall be encouraged to frequently drink small amounts, e.g., one cup every 15 - 20 minutes; the water shall be kept reasonably cool. In those situations where heat stress may impact worker safety and health, work regimens shall be established. Environmental monitoring of the Wet Bulb Globe Temperature Index shall be conducted and workloads and work regimens categorized as specified in the American Conference of Governmental Industrial Hygienist (ACGIH) publication "Threshold Limit Values and Biological Exposure Indices". For more information on Heat Stress refer to Appendix A of this SSHP.

16. Cold Weather Cold injury (frostbite and hypothermia) and impaired ability to work are dangers at low temperatures and when the wind-chill factor is low. To

guard against them; wear appropriate clothing; have warm shelter readily available; carefully schedule work and rest periods, and monitor workers' physical conditions.

17. Off-Road Driving Ensure all emergency equipment is available with the vehicle i.e. tire changing equipment. Drivers shall familiarize themselves with the procedures for engaging four-wheel drive systems before the need for added traction arises. Vehicles will not be driven into an environment that is unknown, such as deep water, or an unstable surface. Vehicles will not be driven into a suspected ordnance impact area.

18. Ordnance

a. General Information

(1) The cardinal principle to be observed involving explosives, ammunition, severe fire hazards or toxic materials is to limit the exposure to a minimum number of personnel, for the minimum amount of time, to a minimum amount of hazardous material consistent with a safe and efficient operation.

(2) The age or condition of an ordnance item does not decrease the effectiveness. Ordnance that has been exposed to the elements for extended periods of time may become more sensitive to shock, movement, and friction, because the stability agent in the explosives may be degraded.

(3) When chemical agents may be present, further precautions are necessary. If the munition has green markings leave the area immediately, since it may contain a chemical filler.

(4) Consider ordnance that has been exposed to fire as extremely hazardous. Chemical and physical changes may have occurred to the contents, which render it more sensitive than it was in its original state.

b. On-Site Instructions

(1) DO NOT TOUCH or MOVE any ordnance items regardless of the markings or apparent condition.

(2) DO NOT conduct a site visit during an electrical storm or an approaching electrical storm. If a storm approaches during the site visit leave the site immediately and seek shelter.

(3) DO NOT use a radio or cellular phone in the vicinity of a suspect ordnance item.

(4) DO NOT walk across an area where the ground cannot be seen.

(5) DO NOT drive a vehicle into a suspected OE area; use clearly marked lanes.

(6) DO NOT carry matches, cigarettes, lighters or other flame producing devices into an OE site.

(7) DO NOT rely on color code for positive identification of ordnance items or their contents.

(8) Approach ordnance items from the side; avoid approaching from the front or rear.

(9) Always assume ordnance items contain a live charge until it can be determined otherwise.

(10) Dead vegetation and animals may indicate potential chemical contamination. If a suspect area is encountered, personnel should leave the immediate area and evaluate the situation before continuing the site visit.

c. Specific Action Upon Locating Ordnance

(1) DO NOT touch, move or jar any ordnance item, regardless of its apparent condition.

(2) DO NOT be misled by markings on the ordnance item stating "practice", "dummy" or "inert". Practice munitions may contain an explosive charge used for spotting the point of impact. The item may also be mislabeled.

(3) DO NOT roll the item over or scrape the item to read the markings.

(4) The location of any ordnance items found during site investigations should be clearly marked so it can be easily located and avoided.

(5) Reporting will be conducted in accordance with CELMS-PM-M, Standard Operating procedure for Reporting Ordnance and Unexploded Ordnance (UXO), dated 19 January 1995.

19. Other (specify)

G. SITE CONTROL AND COMMUNICATIONS

1. Site Map Any maps will be maintained by the PM or Safety Officer.

2. Site Work Zones N/A

3. Buddy System Individuals will maintain constant contact with other personnel at all times. No one will work alone at any time during the site visit.

4. Communications

a. On-Site Verbal communications will be used among team members.

b. Off-Site Communications shall be established on every site. Communications may be established by using a cellular, public or private phone, which may be readily accessible. (specify below)

[X] Cellular phone

[X] Public/private phone

[ ] Other

c. Emergency Signals In the case of small groups, a verbal signal for emergencies will suffice. An emergency signal for large groups (i.e. air horn, whistle) should be incorporated at the discretion of the SSHO. (specify below)

[X] Verbal

[X] Nonverbal - whistle

H. EMERGENCY RESPONSE Team members are to be alert to the dangers associated with the site at all times. If an unanticipated hazardous condition arises, stop work, evacuate the immediate area and notify the SSHO. A First Aid Kit and emergency eyewash (if applicable) will be located in the field vehicle. If qualified persons (i.e. fire department, medical facility or physician) are not accessible within five minutes of the site, at least two team members shall be qualified to administer first aid and CPR.

1. Emergency/Important Telephone Numbers

Sonoma County Sheriff.....707-869-2411
3d Ordnance Bn (EOD) Ft. Lewis 253-967-1972/3090
787th Ordnance Co (EOD) Moffitt Field.....650 603 8301/8302
Huntsville Safety Office.....(205) 895-1598/1596
Huntsville Safety (after hours).....(205) 895-1180
St Louis Corps of Engineers .....(314) 331-8036

2. Hospital/Medical Facility Information

Name: Santa Rosa Memorial Hospital
Address: 1165 Montgomery Dr, Santa Rosa, CA
Phone: 707-546-3210

Distance to hospital: approximately 28 miles

Route to Hospital: refer to the site map included with this SSHP.

I. MONITORING EQUIPMENT AND PROCEDURES

1. Exposure Monitoring For non-intrusive on-site activities such as site visits, air monitoring is typically not required. However, if the site situation dictates the need for monitoring, complete the following information on a separate page and attach the page to the SSHP.

a. Monitoring Equipment To Be Utilized N/A

b. Equipment Calibration Results N/A

c. Action Levels N/A

2. Heat/ Cold Stress Monitoring

a. Heat Stress monitoring criteria published in Chapter 8 of the NIOSH/OSHA/USCG/EPA "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities" shall be followed.

b. Cold Stress monitoring shall be conducted in accordance with the most current published American Conference of Governmental Industrial Hygienists (ACGIH) cold stress standard.

J. PERSONAL PROTECTIVE EQUIPMENT Typically, for non-intrusive site visits, Level D is required. If a higher level of protection is to be used initially or as contingency, a brief discussion will be attached. At a minimum personnel shall wear clothing suitable for the weather and work condition. The minimum for fieldwork shall

be short sleeve shirt, long trousers, and leather or other protective work shoes or boots. If a higher level of protection is to be used initially or as contingency, a brief discussion will be attached.

1. **Footwear** Footwear providing protection against puncture shall meet the applicable requirements as stated in EM 385-1-1, paragraph 05.A.08. All activities which personnel are potentially exposed to foot hazards will be identified and documented in a hazard analysis. As an exception to wearing steel-toed boots, GSA-approved protective-soled boots are authorized.

2. **Hand Protection** Persons involved in activities, which subject the hands to injury (e.g., cuts, abrasions, punctures, burns, etc.), shall use leather gloves.

3. **Head Protection** Hardhats shall be worn when personnel are subject to potential head injury. The identification and analysis of head hazards will be documented in a hazard analysis.

4. **Eye Protection** Personnel will wear eye protection when activities present potential injuries to the eyes. All eye protection equipment shall meet the requirements as stated in EM 385-1-1, paragraph 05.B.

K. DECONTAMINATION PROCEDURES Decontamination procedures are not anticipated for this site investigation. Team members are cautioned not to walk, kneel or sit on any surface with potential leaks, spills or contamination.

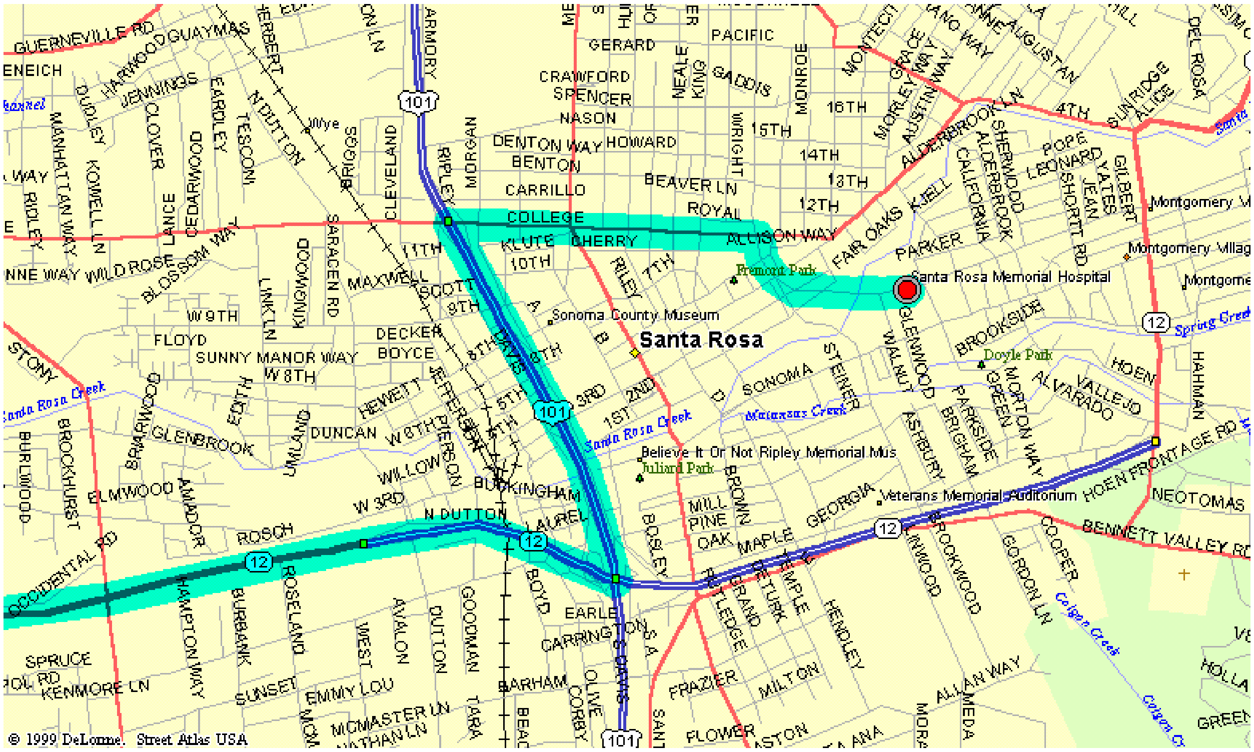
L. TRAINING All site personnel shall have completed the training required by Engineer Manual (EM) 385-1-1 and Title 29, Code of Federal Regulations (29 CFR, Part 1910.120 (e)). The U.S. Army Corps of Engineer (USACE) Project Manager shall ensure, and the SSHO shall verify, that all on-site personnel have completed appropriate training. Additionally, the SSHO shall inform personnel before entering of any potential site-specific hazards and procedures.

M. MEDICAL SURVEILLANCE PROGRAM The USACE Project Manager shall ensure, and the SSHO shall verify, that all on-site personnel meet the requirements of 29 CFR 1910.120. This includes enrollment in a Medical Surveillance Program, and complying with the standards of ANSI Z-88.2, as appropriate, depending on the personnel protective equipment (PPE) and site-specific tasks.

	HAZWOPER		MEDICAL
NAME	DATE	PROVIDER	DATE
Randal Curtis	20 Nov. 00	Corps of Engineers	11 Aug 99
George Sloan	10 Oct. 00	Corps of Engineers	June 2001
Alex Borrok	4 Jun 01	Corps of Engineers	14 Jun 01

N. LOGS, REPORTS AND RECORD KEEPING Site logs are maintained by the Project Manager and SSHO. This is to include historical data, personnel authorized to visit the site, all records, standard operating procedures, air monitoring logs and the SSHP.

O. GENERAL The number of personnel visiting the site shall be a limited to a minimum of two, maximum of eight. The more personnel on-site, the greater potential there is for an accident. The SSHO may modify this SSHP if site conditions warrant it and without risking the safety and health of the team members. This modification will be coordinated with the team members. The SSHO shall notify Corps of Engineers Safety Office in Huntsville, AL. of the change as the situation allows.


Santa Rosa
Santa Rosa Memorial Hospital
Sonoma County Museum
Fremont Park
Doyle Park
Juilliard Park
Believe It Or Not Ripley Memorial Mus
Veterans Memorial Auditorium
Montgomery Village
Santa Rosa Creek
Matanzas Creek
Spring Creek
Colgan Creek
GUERNEVILLE RD
COLLEGE
CHERRY
ALLISON WAY
FAIR OAKS
PARKER
BROOKSIDE
SONOMA
GEORGIA
MAPLE
HOEN FRONTAGE RD
BENNETT VALLEY RD
NEOTOMAS
OCCIDENTAL RD
ROSCH
N DUTTON
STONY
101
12
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APPENDIX A

HEAT- RELATED INJURIES

Once the signals of a heat-related illness begin to appear, the victim's condition can quickly get worse. A heat related illness could result in death. If you see any of the signals of sudden illness, and the victim has been exposed to extremes of heat, suspect a heat-related illness.

People at risk for heat-related illness include those who work or exercise outdoors, elderly people, young children, and people with health problems. Also at risk are those who have had a heat-related illness in the past, those with medical conditions that cause poor blood circulation, and those who take medications to get rid of water from the body (diuretics).

People usually try to get out of extreme heat before they begin to feel ill. However, some people do not or can not. Those that work outdoors often keep working even after they begin to feel ill. Many times, they might not even recognize that they are in danger of becoming ill.

Heat cramps, heat exhaustion, and heat stroke are conditions caused by overexposure to heat. You can help prevent heat-stress emergencies by recognizing and properly treating symptoms. Below is a quick reference guide to heat-related emergencies:

HEAT CRAMPS Heat cramps are the least severe, and often are the first signals that the body is having trouble with the heat. *Symptoms* include: muscle twitching; painful spasms in the legs, arms or abdomen.

WHAT TO DO:

Have the individual rest in a cool place.
Give cool water or a commercial sports drink.
Lightly stretch the muscle and gently massage the area.

HEAT EXHAUSTION Heat exhaustion is a more severe condition than heat cramps. *Symptoms* include: cool, moist, pale, or flushed skin, headache, nausea, dizziness, weakness, and exhaustion.

HEAT STROKE Heat stroke is the least common but most severe heat emergency. It most often occurs when people ignore the signals of heat exhaustion. Heat stroke develops when the body systems are overwhelmed by heat and begin to stop functioning. **Heat stroke is a serious medical emergency.** *Symptoms* include: red, hot, dry skin; changes in consciousness; rapid, weak pulse; and rapid, shallow breathing.

WHAT TO DO: When you recognize a heat-related illness in its early stages, you can usually reverse it.

Get the victim out of the heat.
Loosen any tight clothing and apply cool, wet cloths, such as towels or sheets.
If the victim is conscious, give cool water to drink. Do not let the conscious victim drink too quickly. Give about 1 glass (4 ounces) of water every 15 minutes.
Let the victim rest in a comfortable position, and watch carefully for changes in his or her condition. The victim should not resume normal activities the same day.
Refusing water, vomiting, and changes in consciousness mean that the victim's condition is getting worse. Call for an ambulance immediately if you have not already done so.
If the victim vomits, stop giving fluids and position them on their side.
Watch for signals of breathing problems.
Keep the victim lying down and continue to cool the body any way you can. If you have ice packs or cold packs, place them on each of the victim's wrists and ankles, on the groin, in each armpit, and on the neck to cool the large blood vessels.

APPENDIX B

BITES AND STINGS

Scorpions, Bees and Spiders

Bee stings are painful, but rarely fatal. Some people however, have a severe allergic reaction to an insect sting. This allergic reaction may result in a breathing emergency. If an insect stings someone, remove the stinger. Scrape it away with from the skin with your fingernail or plastic card, such as a credit card, or use tweezers. If you use the tweezers, grasp the stinger, not the venom sac. Wash the site with soap and water. Cover it to keep it clean. Apply a cold pack to the area to reduce the pain and swelling. Watch the victim for signals of an allergic reaction.

Scorpions live in dry regions of the southwestern United States and Mexico. They live under rocks, logs, and the bark of certain trees and are most active at night. Only a few species of scorpions have a sting that can cause death.

There are only two spiders in the United States whose bite can make you seriously sick or be fatal. These are the black widow spider and the brown recluse. The black widow is black with a reddish hourglass shape on the underside of its body. The brown recluse is light brown with a darker brown, violin-shaped marking on the top of its body. Both spiders prefer dark, out of the way places. Often, the victim will not know that he or she has been bitten until he or she starts to feel ill or notices a bite mark or swelling.

Symptoms: include nausea and vomiting, difficulty breathing or swallowing, sweating and salivating much more than normal, severe pain in the sting or bite area, a mark indicating a possible bite or sting, and swelling of the area.

First Aid: if someone has been stung by a scorpion or bitten by a spider he or she thinks is a black widow or brown recluse, wash the wound, apply a cold pack to the site, and get medical help immediately.

Reptiles

Venomous snakes exist in all parts of the continental United States. The pit viper family represents the greatest hazard in the field. This group includes the rattlesnakes and moccasins (copperhead and cottonmouth). Consider wearing snake chaps in areas of known infestation. Walking in grasses and shrubs that prevent seeing exactly where you are stepping, should be avoided. Extreme caution should be exercised in areas where alligators are present, particularly during the nesting season. Consulting a local resident or authority, such as a fish and wildlife or park ranger, is prudent before entering such areas.

First Aid: Often, a venomous snake will strike without injecting any venom into the wound. This is known as a dry bite. In any event, whenever bitten by a snake, especially if positive identification cannot be made, medical help should be sought immediately. Reassure and keep the victim calm. Keep limbs below the level of the heart. Clean the bite area, and get the person to a medical facility. Do not make incisions or suck the poison with the mouth. If medical help is many hours away, place a constricting band between the wound and the heart (it should be at least two inches wide and be able to slip a finger underneath).

Ticks - Lyme Disease

Transmission:

Lyme Disease (LD) is most commonly transmitted by a tick bite (usually painless). The tick vectors include Ixodes scapularis (Deer Tick), Ixodes dammini (Deer tick), Amblyomme americanum (Lone Star Tick) and Ixodes pacificus. Ixodes dammini was thought to be the only species responsible for transmission until it was shown to be the same as Ixodes scapularis in 1993. The ticks prefer to live in wooded areas, low growing grassland, seashores and yards. Depending on the location, anywhere from less than 1% to more than 90% of the ticks are infected with spirochetes.

The Deer tick has a 2-year life cycle and must feed 3 times. In the larvae stage, it is tan, the size of a pinhead and feeds on small animals like the mouse where it can pick up the spirochete. During the nymph stage the tick is the size of a poppy seed, beige or partially transparent and feeds on larger animals such as cats, dogs and humans. The adult ticks are black and/or reddish and feed on cattle, deer, dogs and humans. The Lone Star tick is gray with a white dot. April through October is considered the "tick season" even though Lyme disease is a year round problem. Ticks are very active in the spring and early summer.

Location:

Cases of Lyme disease have been reported in virtually every state, although the Northeastern, Great Lakes, and Pacific Northwest areas are particularly endemic.

Symptoms:

Lyme disease is called the "Great Imitator" because it can mimic many other diseases, which makes diagnosis difficult. A rash can appear several days after infection, or not at all. It can last a few hours or up to several weeks. The rash can be very small or very large (up to twelve inches across). A "bulls-eye" rash is the hallmark of LD. It is a round ring with central clearing. Unfortunately, this is not the only rash associated with Lyme. Various other rashes associated with LD have been reported. One bite can cause multiple rashes. The rash can mimic such skin problems as hives, eczema, sunburn, poison ivy, flea bites, etc. The rash can itch or feel hot or may not be felt at all. The rash can

disappear and return several weeks later. For those with dark skin the rash will look like a bruise. If you notice a rash, take a picture of it. Some physicians require evidence of a rash before prescribing treatment.

Early Symptoms: Several days or weeks after a bite from an infected tick, a patient usually experiences "flu-like" symptoms such as aches and pains in their muscles and joints, low-grade fever, and/or fatigue.

Other Possible Symptoms -- No organ is spared:

- Jaw -- pain, difficulty chewing
- Bladder -- frequent or painful urination, repeated "urinary tract infection"
- Lung -- respiratory infection, cough, asthma, pneumonia
- Ear -- pain, hearing loss, ringing, sensitivity to noise
- Eyes -- pain due to inflammation, sensitivity to light, scleritis drooping of eyelid, conjunctivitis, blurring or double vision
- Throat -- sore throat, swollen glands, cough, hoarseness, difficulty swallowing
- Neurological -- headaches, facial paralysis, seizures, meningitis, stiff neck, burning, tingling, or prickling sensations, loss of reflexes, loss of coordination, MS like syndrome
- Stomach --pain, diarrhea, nausea, vomiting, abdominal cramps, and anorexia
- Heart -- weakness, dizziness, irregular heartbeat, myocarditis, pericarditis, palpitations, heart block, enlarged heart, fainting inflammation of muscle or membrane, shortness of breath, chest pain
- Joint -- arthralgias or arthritis, muscle inflammation and pain
- Other Organs -- liver infection, elevated liver enzymes, enlarged spleen, swollen testicles, irregular or ceased menses
- Neuropsychiatric -- mood swings, irritability, poor concentration, cognitive loss, memory loss, loss of appetite, mental deterioration, depression, disorientation, sleep disturbance
- Pregnancy -- miscarriage, premature birth, birth defects, stillbirth
- Skin -- single or multiple rash, hives

The above is a list of possible symptoms. They can occur in any combination. You may have one or several symptoms but not everyone will experience every symptom. Lyme affects each host in a different way. Having one or many of these symptoms does not indicate that you have Lyme disease. Diagnosis for Lyme is a clinical one and must be made by a physician experienced in recognizing LD. Serological testing is not reliable.

Lyme Disease Prevention:

- Dress properly, wear long-sleeved shirts that button at the wrist, long pants tucked into socks, and closed shoes. Choose light-colored fabric so you can spot and brush of ticks.

- Apply approved tick repellant and use only as directed. Products that contain DEET are tick repellents. They do not kill the tick and are not 100% effective in discouraging a tick

from feeding on you. Products like Permanone contain premethrin and are known to kill ticks. However, they are not to be sprayed on the skin. Permanone can be sprayed on clothing. Once it is dry it is assumed to be safe. Ticks are anti-gravitational. They are generally seeking the highest point. If they get on your body below the clothes line, one hopes they will travel up and die once they come in contact with treated clothing.

- Always do regular tick checks when outdoors.

- Shower after all outdoor activities are over for the day. If the tick is still wandering it may wash off. Check all body parts that bend. Run fingers gently over skin. If there is a tick and it is attached, it will feel like the last piece of scab left before a cut completely heals. Remove ticks promptly and properly from yourself.

Proper Tick Removal:

Using fine-tipped tweezers, grasp tick close to the skin. Apply gentle, steady straight upward pressure to remove. Disinfect the bite site. Do not squeeze the body, apply Vaseline, use a burnt match, or clean with alcohol while the tick is attached. Any of these actions could cause transmission of the bacteria. Save the tick for testing. Put it in a vial or zip lock bag with a blade of grass. Contact your doctor for further instructions.

The best defense against LD is education. Know your facts.

APPENDIX C

SSHP ACCEPTANCE FORM

ABBREVIATED SITE SAFETY AND HEALTH PLAN

FOR

Bodega Bay Gunnery Range

Bodega Bay, California

I have read and agree to abide by the contents of the Site Safety and Health Plan.

NAME	OFFICE	SIGNATURE	DATE
Randal Curtis	CEMVS-ED-P	Randal S Curtis	21 Aug 01
George Sloan	CEMVS-ED-P	G. T Sloan	21 Aug 01
Alex Borrok	CEMVS-ED-P	Alex Borrok	21 Aug. 01

SITE SURVEY SAFETY BRIEFING

(Check subjects discussed)

Date 28 Nov 01

GENERAL INFORMATION

- ✓ Purpose of Visit
- ✓ Identify Key Site Personnel

SITE SPECIFIC INFORMATION

- ✓ Site Description/Past Use
- ✓ Results of Previous studies
- ✓ Potential Site Hazards
- ✓ OE Safety Procedures
- ✓ Site SOP
- ✓ Site Control and Communications
- ✓ Emergency Response
  - (✓) Location of First aid Kit
  - (✓) Emergency Phone Numbers
  - (✓) Map to Facility
- ✓ PPE
- ✓ Weather Precautions
  - (✓) Cold/Heat
  - (✓) Severe Weather

Safety Briefing Attendance

All team members and any accompanying personnel will be briefed and sign this form.

NAME (Print)	ORGANIZATION	SIGNATURE
Randal S. Curtis	USACE-CEMVS-ED-P	Randal S Curtis
George Sloan	USACE-CEMVS-ED-P	George F Sloan
Alex Borrok	USACE-CEMVS-ED-P	Alex Borrok

APPENDIX L-2

Site Inspection Report - Bodega Bay Gunnery Range

CEMVS-ED-P 6 September 2001

MEMORANDUM FOR RECORD

SUBJECT: ASR Site Inspection: Bodega Bay Gunnery Range - California

1. Personnel from the St. Louis District Corps of Engineers traveled to California to perform a site survey of the former Bodega Bay Gunnery Range. The Ordnance and Explosive (OE) and Chemical Warfare Materials (CWM) Archive Search Report (ASR) program requires a site inspection. The ASR program supports the Defense Environmental Restoration Program (DERP) at Formerly Used Defense Sites (FUDS).

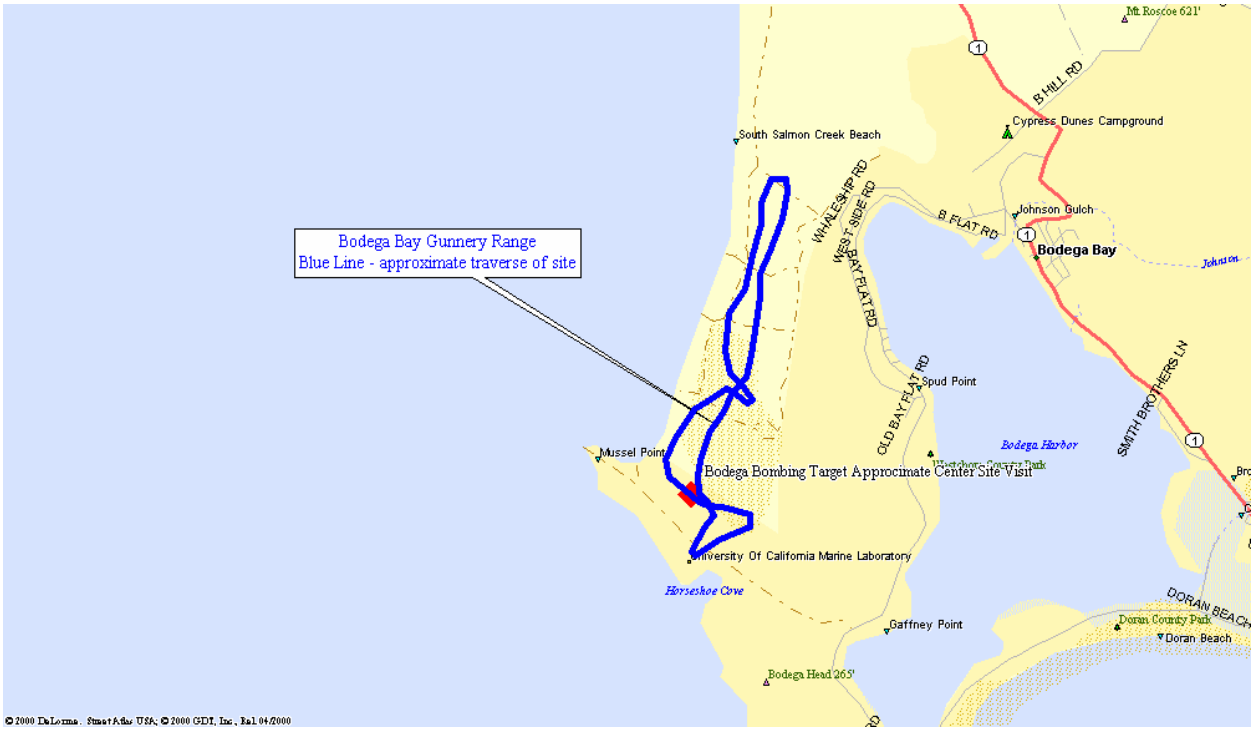
2. The ASR site inspection characterized OE and CWM potential based on a visual examination at the former Bodega Bay Gunnery Range. Landowners granted verbal permission for right-of-entry prior to the site inspection. The site inspection included only visual and non-intrusive methods of inspection. The team followed a site safety and health plan (SSHP) prohibiting digging or handling of potential OE/CWM. The inspection team consisted of the following personnel: Alix Borrok, Randal Curtis and George Sloan.

3. The team traveled to Bodega Bay, California to begin a site inspection of the Bodega Bay Gunnery Range on the morning of Tuesday, 28 August 2001. They met with Peter Connors (707-875-2020) at main offices of the Bodega Marine Laboratory under the University of California-Davis. Mr. Connors is the Reserve Manger and has been at the labs at the Bodega Marine Reserve (BMR) since 1971. The BMR occupies approximately the southern half of the former range, with the northern portion being primarily part of the Sonoma Coast State Beach, of Russian River/Mendocino District of the California State Parks system.

4. The team held a short meeting reviewing the aerial imagery, the general history of this site, and the types of OE related items expected to be found at this location. Among the items discussed was how the ASR team could not identify the location of any of the strafing targets or the bombing target based on analysis of the aerial imagery. Mr. Connors described having found lots of rusted metal fragments in the dunes just north of the labs but only a few pieces of any size or that were complete. He confirmed the use of iron AN-MK23 miniature practice bombs by showing the team a complete but highly corroded example of one he found in the past. He also showed the team about a dozen brass cartridge cases from expended .50 caliber machine gun rounds and a single projectile from the same, that he has found in the sand dunes over the years. The casings all had WWII era manufacturing dates and locations on the head stamps. He does not

remember ever seeing remnants matching the OE data sheet depictions of practice rockets.

5. Mr. Connors also produced a series of original Naval photographic prints from January 1948 for the "Proposed bombing site Bodega Bay…". He was able to identify the specific location where most of them were taken as they included distinct rock outcrops or other elements of Bodega Head (e.g. Mussel Point, Horseshoe Crab, etc.). He was less certain of the exact location of the images of the sand dunes to the north of the lab buildings, which appear to lie primarily on the Sonoma Coast State Beach. Two of the images show tall telephone pole like posts in the ground a few hundred feet in land from the high water mark of the coastline. They were interior to a fence line that was a couple of hundred feet in land from the coastline. The purpose of the poles was believed to be in conjunction with the gunnery targets but this is only supposition. A third 1948 photograph was labeled "shells buried by sand" but it did not clearly show any OE debris and it was impossible to determine its location. Mr. Connors made copies of the three images for the ASR team and then accompanied the team to the area in the dunes where most of the rusted fragments could be found.



6. As the team walked to the dunes, Mr. Connors reported that dune grass was planted in several areas beginning in the 1920's, though the planting program did no come into full swing until the 1950's. This has resulted in the dunes remaining fairly stable in the region over time. Entering a dune basin with sparse vegetation, the team began finding small, highly corroded, bits of metal that were not easily identifiable as being OE debris. A few larger pieces had portions of curves allowing them to be recognized as bits of .50 caliber machine gun links, though only fragments were found. As the team continued

NW along the devegetated basin the metal fragments found were thicker and more fragments were found together in areas of less than a foot square. Examination of the fragments indicated that these were the very deteriorated remains of iron AN-MK23 miniature practice bombs. The ASR team used a GPS to establish the location of the approximate center of the bomb fragments as the target center, though no other feature helped confirm this.[1] Mr. Connors parted company with the team at this point.

7. The site visit team continued their traverse of the site heading northeast, crossing over the strands of wire fence line marking the boundary of BMR with the Sonoma Coast State Beach. Contemporary textual documents describe the strafing target locations as being "on a sandy beach, some 200-300 feet above the high tide mark", which is the area that the site visit team attempted to follow. The State Park established a horse trail paralleling the coastline roughly in this vicinity. The team avoided the well-traveled trail but paralleled it on either side, hopeful of finding evidence of the targets or less likely the projectiles. Continuing for roughly a mile and a quarter northeast of the bomb target, the team found no clear evidence of the Army's use of the site. They found a few weathered boards and barbed wire at one spot but the source was unknown. Piles of partially burnt wood at other locations suggests that much of the fence line depicted in the 1948 Naval imagery as well as other target material has long since been consumed by beach bon fires. The team returned by following a roughly parallel traverse a few hundred feet further landward, but as before, did not locate any OE debris until within a few hundred feet of the bomb target. They traveled up and down a few of the devegetated dune basins that were perpendicular to the main traverse and appeared similar in appearance to the bomb target basin but this also proved ineffective in locating OE debris.

8. Prior to departing the FUDS, the team drove south to the Bodega Head portion of the FUDS. Bodega Head sits on the Californian crustal plate (the dunes are on the point where the San Andreas Fault meet the Pacific Ocean). There was no evidence that a target was located on this portion of the FUDS based on interviews with Sonoma Coast State Beach personnel, textual descriptions of the targets or aerial imagery analysis. A traverse was not performed.

Range Feature Locations Acquired with GPS (Garmin Etrex Legend)		
Latitude	**Longitude**	**Feature**
N38 ° 19.254'	W123° 04.269'	Bodega Bombing Target Approximate Center Site Visit

[1] Coordinates were taken with a Garmin Etrex Legend (Global Positioning System) receiver using mapping datum WGS 1984.

RANDAL S. CURTIS, P.E.
Project Manager/Civil Engineer

GEORGE SLOAN
Safety and Occupational Health Specialist

ALIX BORROK
Project Historian

APPENDIX M

REPORT DISTRIBUTION LIST

Addressee	No. Copies
Commander, U.S. Army Engineering and Support Center Huntsville, ATTN: CEHNC-ED-SY-O (D. MARDIS) P.O. Box 1600 Huntsville, Alabama 35807-4301	2
Commander, U.S. Army Engineer District, Sacramento ATTN: CESPK-PM-H, Gerald Vincent 1325 J Street Sacramento, California 95814-2922	1
Project Manager Chemical Demilitarization, Non-Stockpile ATTN: SFAE-CD-NM, Bldg E 4585 Aberdeen Proving Ground, Maryland 21010-5401	1
Commander, U.S. Army Soldier, Biological, and Chemical Command ATTN: AMSSB-CIH, Bldg. E 5027 Aberdeen Proving Ground, Maryland 21010-5424	1
Defense Ammunition Center ATTN: SMAAC-ESM 1C Tree Road, Bldg. 35 McAlester, Oklahoma 74501-9053	1

PLATES

REPORT PLATES

1 **Bodega Bay Gunnery Range** - Vicinity Map

Thematic Computer-Aided Design and Drafting (CADD) map files completed in association with this Archives Search Report are based on historic cartographic, aerial and site visit data collected during this investigation. The thematic maps were created using Intergraph's Microstation.

The thematic maps were created by scanning and warping selected historic data to reference points collected from non-stable selected base maps such as U.S. Geological Survey (USGS) 7.5 minute, quadrangle sheets or National Imaging and Mapping Agency (NIMA) maps. The horizontal scale and horizontal datum of the base maps is generally known. In this case the datum used was 1927 North Atlantic Datum/World Geodetic System (WGS) 1984. Attempts have been made to rectify the data to the referenced base maps. However, distortions in scale and contortions of the features are present. These distortions are a result of inaccuracies in the source data, as well as the processes of scanning and rectifying the data. Much of the data on the maps lack sufficient information to support a determination of accuracy.

Many of the historic maps used were hand-drawn or built on locations that were inaccurate by modern standards. In general, historic map inaccuracies are unknown and not quantifiable. The unknown inaccuracies may then be magnified by the georeferencing process. Therefore, thematic maps generated from historic maps and drawings will have accuracy no greater than the least accurate source.

The historical aerial photography has been semi-rectified (georeferenced) to the base map; however, the photos have not been corrected for photogrammetric displacements such as those due to topography or the altitude of the aircraft at the time of imaging. They are not orthorectified images. Locations of features noted on aerial photography are not exact due to the rectifying of both the image and the base map.

The horizontal and vertical locations of selected features noted in the ASR and located on the thematic maps have been established utilizing Global Positioning System (GPS) technology. These coordinates were acquired using the Federal Version PLGR96+ GPS receiver. Features located utilizing GPS techniques are so noted in the ASR. The PLGR+96 uses the Precise Positioning Service (16 m SEP) and Wide Area GPS Enhancement (WAGE) 4 m CEP.

The lineage and source of the historic data used to generate the thematic maps is unknown. The majority of Federal Geographic Data Committee (FGDC) Metadata fields are therefore unknown. A metadata file that gives all available pertinent information has been provided with this product. The statements above are inclusive of all available information regarding the historic data sources and the thematic maps generated. The

thematic maps are not original digital mapping data; are scanned and warped data with selected unique feature annotation. The intended purpose of the mapping data is for photo-interpretation and not design. The vector data and associated symbology is unique to the intended purpose. The majority of the digitized features are not part of the current Tri-Service CADD Standards list of features and associated line types and symbology (ie. range fans, pits, disturbed land). The mapping data produced does comply with applicable Tri-Service Standards.

LEGEND

BODEGA BAY GUNNERY RANGE

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U.S. ARMY CORPS OF ENGINEERS
ST. LOUIS DISTRICT

BODEGA BAY GUNNERY RANGE
SONOMA COUNTY, CALIFORNIA
DERP-FUDS* J09CA729001

VICINITY MAP

PROJ. DATE 2000	DATE OF MAP 1996	PLATE NO. 1