US Army Corps
of Engineers®
Rock Island District

FINAL

DEFENSE ENVIRONMENTAL
RESTORATION PROGRAM

FOR

FORMERLY USED DEFENSE SITES
ORDNANCE AND EXPLOSIVES
ARCHIVES SEARCH REPORT

FOR

INDIAN ROCKS
AIR-TO-GROUND GUNNERY RANGE
BELLEAIR BEACH, FLORIDA
PROJECT NUMBER I04FL033701

14 JUNE 1994

DEPARTMENT OF THE ARMY
ROCK ISLAND DISTRICT, CORPS OF ENGINEERS
CLOCK TOWER BUILDING - P.O. BOX 2004
ROCK ISLAND, ILLINOIS 61204-2004

REPLY TO
ATTENTION OF

http://www.mvr.usace.army.mil

CEMVR-EC-DO

15 September 2009

MEMORANDUM FOR RECORD

SUBJECT: Missing Technical Advisory Group (TAG) Package for Indian Rocks Air-To-Ground Gunnery Range, Project Number I04FL033701

1. Project records present at the U.S. Army Corps of Engineers, Rock Island and Jacksonville Districts and Huntsville Center, were reviewed to locate the TAG package for the subject project ASR. However, the TAG package was not located.

2. The subject project Archives Search Report has been finalized without the TAG package based on a memorandum from Rock Island District dated 14 June 1994 transmitting final copies of the report. The original risk assessment (RAC) form in the report has been used as the final RAC, and the date of the final report, 14 June 1994, is the date of the Rock Island District memorandum transmitting the initial final report.

3. If the TAG package is located after the subject report has been finalized, the report will be revised to reflect the content of the TAG package.

Christopher J. Churney
Chief, Ordnance and Explosives Section
Rock Island District
U.S. Army Corps of Engineers

DEPARTMENT OF THE ARMY
ROCK ISLAND DISTRICT, CORPS OF ENGINEERS
CLOCK TOWER BUILDING – P.O. BOX 2004
ROCK ISLAND, ILLINOIS 61204-2004

REPLY TO ATTENTION OF:

CENCR-ED-DN

14 June 1994

MEMORANDUM FOR Commander, U.S. Army Engineer Division,
Huntsville, ATTN: CEHND-PM-OT (Britton)
P.O. Box 1600, Huntsville, AL 35807-4301

SUBJECT: OEW Archives Search Report for the Former Indian Rocks Air-To-Ground Gunnery Range, Belleair Shores, Florida, Project Number I04FL033701

1. This memorandum transmits 15 copies of the Final subject report.

2. Minor editing/changes have been made to the Draft Report prior to its finalization.

3. The POC for this office is Mr. Dan E. DeWease, CENCR-ED-DN, telephone (309) 794-5808.

FOR THE COMMANDER:

ORIGINAL SIGNED BY
GARY LOSS

Encl (15 cys)

RQBERT W. KELLEY, P.E.
Chief, Engineering Division

CF (w/encl):

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DISCLAIMER

The purpose of this archives search report is to present the findings of research undertaken for this specific Formerly Used Defense Site (FUDS) property. All of the factual information found during the research is included in this "Findings" volume. Reference may be made in this volume to a separate "Conclusions and Recommendations" volume. In some instances, the Conclusions and Recommendations volume contained recommendations of individuals performing the analysis that may contain inferences or conjecture not supported in subsequent reviews. Because these statements are not always factual in nature, the US Army Corps of Engineers has determined the Conclusions and Recommendations volumes, where they exist, do not necessarily represent the opinion of the USACE and are not available for public release. The Risk Assessment Code (RAC) form that was contained in the Conclusions and Recommendations volume has been inserted in a separate Appendix of this finalized report.

DEFENSE ENVIRONMENTAL RESTORATION PROGRAM
for
FORMERLY USED DEFENSE SITES

ORDNANCE AND EXPLOSIVES ARCHIVES SEARCH REPORT
For
INDIAN ROCKS
AIR-TO-GROUND GUNNERY RANGE
BELLEAIR BEACH, FLORIDA
PROJECT NUMBER I04FL033701

14 JUNE 1994

Prepared For
U.S. Army Corps of Engineers
Engineering and Support Center, Huntsville
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Huntsville, Alabama 35807-4301

Prepared By

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ORDNANCE AND EXPLOSIVE
ARCHIVES SEARCH REPORT
FOR
INDIAN ROCKS AIR-TO-GROUND GUNNERY RANGE
BELLEAIR BEACH, FLORIDA
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ACKNOWLEDGEMENT

The following persons provided support as indicated

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ORDNANCE AND EXPLOSIVES
ARCHIVES SEARCH REPORT
FOR
INDIAN ROCKS AIR-TO-GROUND GUNNERY RANGE
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INDIAN ROCKS AIR-TO-GROUND GUNNERY RANGE
BELLEAIR BEACH, FLORIDA
PROJECT NUMBER I04FL033701

1. INTRODUCTION

a. Subject and Purpose

(1) This report presents the findings of an historical records search and site inspection for the presence of ordnance and explosive waste (OEW) at the Former Indian Rocks Air-to-Ground Gunnery Range, located on the present day site of Belleair Beach and Belleair Shores in Pinellas County, Florida. The investigation was performed under the authority of the Defense Environmental Restoration Program for Formerly Used Defense Sites (DERP FUDS).

(2) The purpose of this investigation was to characterize the site for confirmed and/or potential OEW contamination, to include chemical warfare materiel (CWM) and conventional munitions.

b. Scope

(1) The investigation initially focused on the 180.30 acres of land that was leased by the War Department during World War II as an air-to-ground gunnery range for aircraft and an anti-aircraft gunnery range for air defense personnel. Information discovered during the course of the investigation resulted in the expansion of the scope to include adjacent areas of potential use/contamination.

(2) This report presents the site history, site description, real estate ownership information, and confirmed ordnance presence (prior to and after site closure), based upon available records, interviews, and the site inspection. It further provides a complete evaluation of all information to assess actual and potential present day ordnance contamination.

2. PREVIOUS INVESTIGATIONS

a. 1992 Preliminary Assessment

(1) In 1992 a preliminary assessment of the Former Indian Rocks Air-to-Ground Gunnery Range was conducted under DERP FUDS by the U.S. Army Corps of Engineers, Jacksonville District (CESAJ). At that time, the Findings and Determination of Eligibility (FDE), dated September 9, 1992, concluded that 180.30 acres of land at Belleair Beach and Belleair Shores, Florida (Pinellas County), had been formerly leased and used by the War Department (DOD) as the Indian Rocks Air-to-Ground Gunnery Range (see document E-1).

(2) The investigation concluded that there was an eligible category under DERP FUDS, see document E-2 and TABLE 2-1. Due to the fact that the land had been used by the U.S. Army as a gunnery range, an OEW project was recommended - DERP FUDS OEW Project Number I04FL033701, the principle subject of this report.

b. Other Investigations

No other relevant investigations were discovered during this archives search report (ASR) records search.

TABLE 2-1
DERP-FUDS PRELIMINARY ASSESSMENT PROJECTS

Project Number	DERP Category	Present Phase	Comments	Location
I04FL033701	OEW	SI	Ordnance or explosive contamination	Entire 180.30 acres (see Plate 1)
-	HTRW	-	None	-
-	BD/DR	-	None	-

3. SITE DESCRIPTION

a. Existing Land Usage

(1) The former Indian Rocks Air-to-Ground Gunnery Range consisted of two parcels of land on Sand Key, a barrier island located off the western coast of Florida in the vicinity of Tampa Bay. The larger parcel comprised 177.8 acres in what is now Belleair Beach, two miles southeast of Clearwater and three miles north of the city of Indian Rocks Beach. The smaller parcel comprised 2.5 acres in what is now Belleair Shores, approximately one half mile south of the larger site (see document L-2 and Plate 1).

(2) The northern border of the larger site is the current northern city limit of Belleair Beach and the southern city limit of Clearwater. The southern border of the larger site is approximately midway between 19th and 20th streets in Belleair Beach. The eastern border is defined by the Intracoastal Waterway and the western border by the Gulf of Mexico. In total, this site comprised the whole of Section 30 Township 29 South, between Sections 19 and 31, and was approximately 4400 feet long from north to south, and 1000 feet to 1200 feet wide from east to west. The land area is currently privately owned and is utilized for hotels, multifamily condominiums, and single family residences (see photos J-8, J-13, K-4, and K-5).

(3) The eastern border of the smaller site is Gulf Boulevard and the western border is the Gulf of Mexico. The northern border of the smaller site begins at a small city park on the western side of Gulf Boulevard across from 6th street in Belleair Shores. The southern border of the smaller site is across from 4th street. This site was approximately 500 feet long from north to south, and 250 feet wide from east to west. The addresses of the five privately owned, single family residences that comprise this site are 420, 440, 500, 520 and 540 Gulf Boulevard (see photos J-17, J-18, J-19, and K-6).

(4) For the purposes of this report, the larger, 177.8 acre site, the Indian Rocks Air-to-Ground Gunnery Range, will be hereafter referred to as "Area A", and the smaller, 2.5 acre site, the Indian Rocks Anti-Aircraft Gunnery Range, will be referred to as "Area B" (see Plate 6).

(5) TABLE 3-1 represents the current land usage of Areas A and B depicted on Plates 1, 3 and 4.

TABLE 3-1
LAND USAGE

FORMER USAGE	PRESENT OWNER	PRESENT USAGE	SIZE/ ACRES	COMMENTS
Area A: Gunnery Impact Range	Private (150+ owners)	Residential, Condominiums, Hotels	177.8	See Plate 3
Area B: Anti-Aircraft Gunnery Range	Private (5 owners)	Single Family Residences	2.5	See Plate 4
			180.30	TOTAL

(6) The Gulf beaches bordering this site are very narrow or nonexistent and, consequently, are not very popular for recreational activities such as swimming or sunbathing. The Intracoastal Waterway shoreline has no beach and consists of private property to the waterline with numerous private boat docks.

(7) There is only a small local fishing industry in the area immediately off the Gulf Coast of Sand Key; the principal catch is mullet (see document I-14).

(8) The gunnery impact range consists of flat, open, sandy beach subdivided into numerous small lots upon which are built hotels, condominiums, and single family residences, rather uniformly distributed (see documents K-4, K-5 and Plate 3). Several small city parks are also located within this area. There is one major north-south traffic artery, Gulf Boulevard, and numerous, short, east-west streets. While some individual properties may have fences or walls, access to virtually any or all of the former site is uncontrolled, except for normal ownership and trespassing considerations. The beach itself can be reached by the public via a number of city parks that allow access.

(9) The anti-aircraft gunnery range consists of flat, open, sandy beach subdivided into five single family residential properties, two of which consist of double lots (see document K-6 and Plate 4). There are no streets on this site. While some individual properties may have fences or walls, access to virtually any or all of the former site is uncontrolled, except for normal ownership and trespassing considerations. The beach itself can be reached by the public via a number of city parks that allow access.

b. Climatic Data

(1) The area has long humid summers and mild winters. Annual rainfall is about 55 inches, of which 60 percent falls from June through September; the rest is more or less evenly distributed throughout the remainder of the year. Temperatures are moderated by the waters of the Gulf of Mexico and Tampa Bay. (For a monthly breakdown of temperature and precipitation, see document E-6.)

(2) Air temperatures range from mean monthly values of 60°F in January to 82°F in August. Summer temperatures vary little from day to day, and seldom reach 95°F. Periodic invasions of cold, dry air from the north cause considerable daily variation in temperature in winter. A temperature of 32°F occurs on an average of 5 to 10 days every year. Temperatures drop to 28°F or lower about three times every year.

(3) Water temperaturs are mild. Water on the open shelf to the northwest of the area ranges from 65°F in winter to 100°F in the summer. Fluctuations of a few degrees may occur in a short period of time in coastal waters as storm systems pass over the area.

(4) In summer, rain falls mainly in afternoon and evening thundershowers. Sometimes as much as 2 or 3 inches fall within 2 hours. Thunderstorms may be very intense along the Florida coast with an average occurrence of 91 days per year. Rainfall in autumn, winter, and spring usually is not as intense as in summer. Day-long rains are rare in summer. When they occur, they are almost associated with a tropical storm. A 24-hour rainfall in excess of 8 inches can be expected one year in ten on the average. Extended periods of dry weather occur in any season, but are most common in spring and fall. Hail falls occasionally in thundershowers, but the hailstones usually are small and seldom cause much damage. It rarely snows in the area.

(5) Prevailing winds are from the south in March and from the north and east the rest of the year. Windspeeds are usually 10 to 15 miles per hour in the afternoon and 5 to 10 miles per hour at night.

(6) Tropical storms affect the area from early in June through mid-November. The probability that wind speeds of hurricane force, 74 miles per hour or more, will occur in the area in any given year is about 1 in 20. Heavy rainfall during tropical storms may cause considerable flood damage.

(7) The combination of a broad, gently sloping continental shelf and the limitations on fetch result in a low wave energy level reaching the Pinellas County barrier coast. Even offshore values show that during October-April 65% of wave heights are less than 1 meter and during May-August nearly 90% of the waves are in this range. Estimated mean wave height for the Pinellas County coast is 20-25 cm. A 1976 field study gave wave heights of 6-30 cm with periods of 2-4 seconds during most of the year with frontal systems generating waves averaging 50-60 cm with periods of 5 seconds.

(8) The Pinellas County coast is subjected to a mixed tidal system with semi-diurnal cycles of unequal heights during most of the lunar month. Mean neap range is 60 cm and mean spring range is 90 cm on the open Gulf coast (REF B-5, B-6 and B-7).

c. Topography

The area is characterized by flat, featureless terrain, barely above sea level.

d. Geology and Soils

(1) Regional Geology/Soils

(a) The two major geologic formations in Pinellas County are the Hawthorn Formation of the lower Miocene and Caloosahatchee Marl of the lower Pliocene. The border between these formations extends across the peninsula north of the Cross Bayou Canal through Safety Harbor and Oldsmar. Soils north of this line are underlain by the Hawthorn Formation.

1 Caloosahatchee Marl is of marine origin. It consists of sand, sandy clay, and marl and is from 2 to 85 percent shell. The maximum thickness of this formation is about 50 feet.

2 Hawthorn Formation consists of interbedded sand, clay, marl, limestone, lenses of fuller's earth, and land-pebble phosphate.

(b) During the Pleistocene these formations were covered with marine deposits that formed the following four terraces: Pamlico, Talbot, Penholoway, and Wicomico. These terraces were covered by a mantle of sand that ranges from 2 to 35 feet in thickness.

(c) With few exceptions, individual soils are not confined to a particular geologic formation or marine terrace. For example, Pinellas soils that formed in fresh-water alkaline deposits on upland terraces are very similar to Pinellas soils that formed in alkaline sediments of Caloosahatchee Marl. Though variations in characteristics of the parent material are apparent in the field, they do not affect soil classification (REF B-5).

(2) Site Specific Geology/Soils

(a) Characteristics of coastal barrier islands - the geologic history of northern Pinellas County indicates that Miocene limestones served as the foundation upon which the present barrier system developed. A shallow limestone platform which slopes gradually gulfward under the present coastal zone was exposed was exposed and eroded then at least partially covered by the Pleistocene clay and sand during high stands of sea level. Remnants of these strata were preserved during the low stand of sea level. As sea level rose during the Holocene, this platform first became intertidal and supported an extensive mangrove community. Continued increase in sea level inundated the platform and permitted development of the present barrier island system and its associated wide shallow bay adjacent to the mainland coast (REF B-6).

(b) Sand Key is long, narrow and rather straight. It was developed as a spit formed by sediment that was eroded from the headland at Indian Rocks Beach and transported northward. It is primarily "coastal beach" composed of St. Lucie fine sand, shell substratum. Much of the land along the eastern shore of the intracoastal waterway is classified as "made land" and was created after the site was used as a gunnery range. The

180.30 acres comprising the former Indian Rocks Air-to-Ground Gunnery Range consists of the four distinct varieties of soil or land types listed below (see Document L-3):

(c) Coastal Beaches

1 "Coastal beaches" consist of narrow strips of tide-washed sand bordering islands and parts of the mainland. Most areas are covered during storms and daily at high tide. These beaches range from a few feet to as much as 500 feet in width. Long stretches are practically without vegetation, but sparse salt-tolerant grasses and other plants grow in places. Depth to the water table varies with the tide.

2 The beach sand has been deposited, mixed, and reworked by waves. It is firm or compact when moist and loose when dry. This sand is light gray to white and consists mainly of fine quartz particles in which there are varying quantities of medium to coarse shell fragments. The sand contains a few fine, rounded, weakly cemented very dark gray to very dark brown particles.

(d) Made Land - in coastal areas it has been built up to provide desirable locations for residential development (see document L-4 for an illustration of how the shoreline was changed from 1943 to 1981).

1 "Made land" consists of mixed sand, clay, hard rock, shells, and shell fragments that have been transported, reworked, and leveled by earth-moving equipment. Many areas consist of material that has been dredged from the bay and used to fill diked areas. Coarser sludge materials are deposited near the outlet of discharge pipes and finer materials settle in more distant positions. Rocks 1/2-inch to 12 inches in diameter are common. Numerous silicified oyster shells and some animal fossils occur in these materials.

2 "Made land" is underlain at a depth of 2 to 8 feet by various kinds of materials. In some areas it is underlain by the sandy bay bottom, and in others by Tidal swamp that has layers of fibrous peat 20 inches or less thick. Some of the material transported by truck has been deposited over solid rubble consisting of chunks of concrete, discarded appliances, and broken asphalt.

(e) Type Sand

1 St. Lucie fine sand, shell substratum - nearly level soil on low ridges on barrier islands in the western part of Pinellas County. In most places the surface layer is very dark gray fine sand about 3 inches thick. Below this is light-

gray loose fine sand about 34 inches thick. The next layer is very pale brown, loose, fine sand that extends to a depth of 40 inches or more. This is underlain by layers of mixed light-gray or white sand, seashells, and shell fragments (see photo J-20).

2 Palm Beach sand - nearly level, well-drained sand mixed with shells and fine shell fragments. It consists mainly of material dredged from shallow water to fill dikes. This material has been reworked and leveled. Many areas contain lumps of clay and rock fragments. In most places the material has been deposited only recently and no soil development has occurred. This soil is used mainly for waterfront homesites (REF B-5).

e. Hydrology

(1) There is no flowing surface water within either of the two areas that comprise the former Indian Rocks Air-to-Ground Gunnery Range.

(2) The water table is very near the land surface and the depth to water table varies with the tide. The water table is at a depth of 40 to 60 inches for 6 months or more in most years. It is within 40 inches for less than 60 days. The Floridian aquifer underlies these sites and consists of a thick sequence of carbonate rocks (limestone and dolomite) (REF B-7).

f. Natural Resources

(1) Although there are numerous animals on the "Official Lists of Endangered and Potentially Endangered Fauna and Flora in Florida," published by the Florida Game and Fresh Water Fish Commission, the small size (180.30 acres) of the former Indian Rocks Air-to-Ground Gunnery Range makes it an unlikely refuge for threatened species. Furthermore, since virtually every available parcel of land within these sites has been developed, there is no natural barrier island habitat remaining in this area. Neither is there designated shelter for endangered species in the immediately adjacent offshore area (REF B-8).

(2) Although the Tampa Bay estuary contains many protected areas for seagrasses, mangroves, salt marshes, mud flats, oyster bars, and submerged aquatic preserves, none of these have been identified in the vicinity of the former Indian Rocks Air-to-Ground Gunnery Range. Furthermore, since virtually every available parcel of land within these sites has been developed, there is little natural plant life remaining in this area. The predominant vegetation is residential lawns, decorative shrubbery, and artificially located palm trees (REF B-9).

g. Historical/Cultural Resources

According to Mrs. Ralph Finke, Indian Rocks Area Historical Society, there are no specific archaeological or paleontological or historic sites known to exist on the former Indian Rocks Air-to-Ground Gunnery Range (see document I-14).

4. HISTORICAL ORDNANCE PRESENCE

a. Chronological Site Summary

(1) When the United States entered the Second World War in December 1941, the northern half of Sand Key was simply a wind-swept, desolate barrier island off the Gulf coast of Florida. Pictures from that period show a barren, uninhabited stretch of sand, bisected by a single, unimproved road, Gulf Boulevard (see photos K-1 and K-3).

(2) As the U.S. mobilized for the war, the entire state of Florida, to include the Tampa Bay region, became a center of military construction activity. Florida's mild climate made it ideal for pilot training and air bases sprang up around the state. Quickly joining the already operational MacDill Field in Tampa were Drew, Henderson, and Pinellas Army Airfields. As these bases were being constructed and outfitted, the search began for suitable bombing and gunnery ranges within the vicinity upon which young aviators could hone their skills (see document F-1). Florida in 1940 was home to only 2 million residents and, consequently, there was an abundance of available, undeveloped land upon which to conduct training for war. One such parcel was the area about 3.5 miles north of the Indian Rocks Beach community on Sand Key.

(3) At some point during this period, negotiations commenced with the owner of said property and a lease between the War Department and the lessor was eventually agreed upon for the 177.8 acres that was designated as the Indian Rocks Air-to-Ground Gunnery Range (for a further description of this real estate transaction, see paragraph 5a(2) below). Upon execution of the lease, this range was assigned to the 3rd Army Air Forces, III Fighter Command, stationed at Pinellas Army Airfield (see document E-3).

(4) Most likely at the coincident time, a lease was being negotiated between the same parties for a smaller tract of beach to be used as an anti-aircraft gunnery range. This agreement covered a 2.5 acre site that was designated as the Indian Rocks Anti-Aircraft Gunnery Range (for a further description of this real estate transaction, see paragraph 5a(2) below). Upon execution of this lease, the range was assigned to Drew Field (see document E-3).

(5) The military first occupied the Air-to-Ground Gunnery Range on 7 May 1943 and used it for several years as a target/impact area for machine gun and rocket fire and small practice bombs.

(6) On 7 January 1947, the lease for the Air-to-Ground Gunnery Range was canceled and on 25 January 1947, the lease for the Anti-Aircraft Gunnery Range was canceled (see document L-1). From that time onward, these sites and the surrounding properties were subdivided numerous times until the current state of real estate affairs was reached. The 177.8 acre site has well over 150 separate parcels of land which are occupied by hotels, condominiums, and single family residences. The 2.5 acre site now consists of five single family residences. During this period, two townships were incorporated to govern the land between the Indian Rocks Beach community and the city of Clearwater. The northern town was given the name Belleair Beach, about half of which is the former Air-to-Ground Gunnery Range. The southern town took the name Belleair Shores and contains the former Anti-Aircraft Gunnery Range.

b. Review of Ordnance Related Records

(1) No contemporary official records were located that identified the type of ordnance employed at this site. As established previously, the Air-to-Ground Gunnery Range was assigned to Pinellas Army Airfield (AAFld) which was home to the 304th and 337th Fighter Squadrons, as well as one of the few aircraft gunnery schools in existence at that time. Table 4-1 lists the warplanes these squadrons flew, as well as the weapons/ordnance with which they were armed when they trained upon this air-to-ground gunnery range (REF: B-10 and B-11; see documents D-2 and E-5).

TABLE 4-1
PINELLAS AAFLD WARPLANES

Warplane Type	Armament
P-39 Airacobra (all types)	.50 inch machine guns .30 inch machine guns Small practice bombs
P-40 Warhawk Tomahawk Kittyhawk	.30 inch machine guns .303 inch machine guns .50 inch machine guns 4.5-inch rockets Small practice bombs
P-51 Mustang (all types)	.303 inch machine guns .50 inch machine guns 5.0-inch rockets Small practice bombs

(2) From site closure to 1972, no written record could be located that noted the discovery of OEW at this location. However, newspaper articles describing post-1972 OEW discoveries often made reference to ordnance items washing up on shore during this period (see documents H-2b, H-2h, H-2q, H-2z, and H-2ad).

(3) On 13 June 1972, a small rocket was found about 40 feet offshore at Belleair Beach. Air Force explosives experts identified it as a dud World War II naval barrage rocket (see document H-1).

(4) In July 1975, the discovery of a "barnacle-encrusted bomb" off shore triggered a summer-long search for ordnance involving both Army and Navy EOD teams. These "bombs" were initially described as being "about 32-inches long and 17-inches in circumference" and weighing about "30 pounds." As the cleanup operation progressed, numerous newspaper articles made reference to "bombs," "shells," "mines," and "rockets" that had been "fired," "dropped," or "dumped" in the area during World War II training operations (see documents H-2a through H-2ad). The following represents a summary of the summer's events as described in official documents and newspaper accounts:

(a) On 30 July 1975, the mayor of Belleair Beach sent a formal request to the 547th Ordnance Detachment requesting their assistance in clearing the beach area of "all explosive or simulated explosive devices" (see document F-2).

(b) A joint Army-Navy EOD team responded to the mayor's request and conducted a search of the beach and immediate area off shore.

(c) On 15 September 1975, the mayor of Belleair Beach sent correspondence to the Secretaries of the Army and Navy commending the military personnel participating in this operation. The mayor noted that "132 items of ordnance were recovered and detonated, 21.6 miles of swimming were done and 21,000 square yards of underwater landscape were explored" (see documents F-3 and F-4).

(d) Though no official EOD record could be located concerning this exercise, interviews with EOD personnel at the time were reported in the local newspapers. These interviews indicated the following:

1 That these "bombs" were 2.25-inch and 4.5-inch aircraft rockets.

2 That many of the rockets were found offshore in the vicinity of the Serena Del Sol condominiums, 2900 Gulf Boulevard.

3 That the initial EOD sweep in early August located 14 rockets, all of which contained high explosive, none of which were fused.

4 That a more thorough sweep by EOD at the end of August located at least another 76 rockets which were detonated at the nearby Avon Park Bombing Range, Florida.

(5) In June 1977, rockets again began appearing off the shores of Belleair Beach (see document F-5). This discovery resulted in requests for assistance from the mayor to the Secretary of the Navy and the Commanding Officer of Naval Air Station (NAS), Cecil Field, Florida (see documents F-6 and F-7). Replies to the mayor from the Deputy Chief of Naval Operations (Surface Warfare) and the Acting Commander of NAS, Cecil Field (see documents F-8 and F-10), as well as message traffic (see document F-9), indicate that such help would be forthcoming. However, no official record could be located that reveals the results of such assistance or the number of rockets found, other than the three "4.2 rockets" mentioned in the mayor's original request.

(6) In June 1980, two youths diving in the Gulf behind the condominiums at 2900 Gulf Boulevard found a "bomb" in about eight feet of water roughly ten yards from shore. Shortly thereafter, two more "bombs" were found in the vicinity (see document H-3a). A Navy EOD team was called in and a newspaper reported that they found eight more "war relics" in about five feet of water roughly 50 yards from the shore (see document H-3b).

(7) In May 1986, a snorkeler off Belleair Beach dragged in a World War II "practice bomb" and told police that he had seen three to five more in the area (see document H-4a). This incident prompted another request for assistance from the Mayor to the commander of the 66th Ordnance Detachment (EOD), Patrick Air Force Base, Cape Canaveral, Florida (see document F-11). Shortly thereafter, a naval EOD team arrived and began a sweep of the area (see document H-4b). Following this operation, the Navy Officer in Charge of the EOD Detachment sent a trip report to the Belleair Police Department that "thirteen items and pieces were recovered" (see document F-12). The mayor then followed up with a request to the commanding officer, NAS Cecil Field, for another visit to "grid search and sweep the area" (see document F-13). Belleair Beach departmental correspondence dated July 10, 1986, indicates that a subsequent visit was made by Navy EOD and that some additional ordnance had been found (see document F-14).

(8) On 29 January 1993, a practice bomb was unearthed during a road-widening construction project on Gulf Boulevard. It is possible that additional such items were also located during this project, but this incident is the only one on record at the supporting area EOD detachment (see document I-11).

(9) Continuing interest in the possibility of OEW incidents was shown by a 6 May 1993 article in the St. Petersburg Times which has served to remind the public of the OEW dangers that remain within the state of Florida; the Belleair Beach site received prominent play (see document H-5).

c. Interviews with Site Related Personnel

(1) The following represents summaries of interviews with personnel who trained upon this gunnery range when it was active or had knowledge of how it was used during that period of time (for greater detail, please refer to the full transcripts of the interviews located in Appendix I):

(a) Brigadier General (Ret) James H. Howard was a World War II fighter pilot who once commanded Pinellas AAFld. He flew P-40s and P-51s against the Indian Rocks Air-to-Ground Gunnery Range, but only recalls strafing this site with machine gun fire, not with rockets or bombs. He mentioned that the planes would use the Biltmore Hotel in Belleair as a guide and bank toward the range just south of the hotel, fly westward across the Intracoastal Waterway, and fire at targets on shore (see document I-1).

(b) Mr. Garland V. Fory was a World War II fighter pilot stationed at Pinellas AAFld as a gunnery instructor. He recalls firing 5.0-inch High Velocity Aircraft Rockets (HVAR) and .50 inch machine guns at this range. He did not remember launching 4.5-inch rockets at this site, though he does not discount that possibility. He stated that pilots also dropped numerous practice bombs which he described as "little blue training bombs with smoke charges." He was quite certain that no high explosive bombs or 20mm cannon were employed against this gunnery range. As far as he knew, the rockets were fuzed and set to detonate on impact, thereby allowing the spotters to score the results. All targets for all types of firing and practice bombing were located on land, but he does recall that rockets would occasionally miss their target by enough distance to land in the water immediately off the Gulf shore. He confirmed that the warplanes always flew and fired from east to west - they NEVER fired towards the east (see document I-2).

(c) Mr. Norman Starks was a World War II fighter pilot stationed at Pinellas AAFld as a gunnery instructor and was a colleague of Messrs. Fory and Pursley. He also recalls firing .50 inch machine guns and aircraft rockets at this range, but could not remember the exact size of the rockets. He too dropped small practice bombs on this site and confirmed that none of the planes mounted 20mm cannon, thereby eliminating the possibility of those rounds being found at this location. As far as he knew, the rockets were fuzed and set to detonate on impact and recalls an incident in which a rocket he fired blew a crater in what was then an unimproved Gulf Boulevard. He confirmed that the warplanes always flew and fired from east to west - they never fired toward the east (see document I-3).

(d) Major (Ret) Walter Pursley was a World War II fighter pilot who commanded Pinellas AAFld immediately prior to BG Howard. Though he never flew against this site he did confirm that, to his knowledge, Pinellas AAFld was the only field that used this range. He could recall only machine guns being fired, not rockets (see document I-4).

(e) Mr. Ansley Watson was a World War II fighter pilot who was once stationed at Pinellas AAFld. He flew a P-51 Mustang and recalls strafing the Indian Rocks Air-to-Ground Gunnery Range with his .50 inch machine guns. He does not recollect any bombing or rocket launching at this site (see document I-5).

(f) Mr. Willie O'Donnel was a former World War II fighter pilot who also flew against this gunnery range. He too remembers .50 inch as being the largest ammunition fired (see document I-6).

(g) Mr. "Cappy" (Otto) Bie was a young boy when the range was in use and he recalls P-40 warplanes mounting six .50 inch machine guns firing at a bed sheet attached to a frame of 2x4s. He indicated that he never saw any rockets fired or bombs dropped. He also remembers a .50 inch gun emplacement at the site in Belleair Shores which would fire at balloons floating at the water's edge, thereby resulting in numerous spent rounds falling into the Gulf (see document I-7).

(h) Mrs. Hazel Geissler also lived nearby when the range was in use and she recalls that "bombers" from MacDill and fighters from Orlando would shoot at a 10-12 foot high sand barricade (see document I-8).

(i) Mr. Bob Harris, Curator of Collections, Heritage Park, said that Belleair Beach was a "bombing area" during World War II and that small bombs were dropped and .50 inch machine guns were fired there (see document I-9).

(2) The following represents summaries of interviews with personnel who are familiar with or aware of OEW contamination on the site after its deactivation (for greater detail, please refer to the full transcripts of the interviews located in Appendix I):

(a) Mrs. Hazel Geissler resided in the first area of development at Belleair Beach after the government canceled the lease, and she remembers ordnance washing up on shore on a weekly basis, even though she thought the site had been combed for OEW prior to the commencement of private development. She said the items were about 32 inches long with a flange at the end and that someone would come around occasionally to detonate them. After the initial influx of ordnance, she said there would be recurrences at two year intervals. Following storms, the items would wash up on the Gulf-side beaches (see document I-8).

(b) The officer-in-charge of the Naval EOD team that responded to the 1975 OEW cleanup operation, CWO3 (Ret) Henry (Bud) S. Thrift, Jr., confirmed much of what was reported in the newspapers at that time, with special note made of the following (see document I-10):

1 That only 4.5-inch rockets were discovered;

2 That many of the rockets were likely fuzed;

3 That due to electronic search equipment malfunction, the underwater sweep was conducted completely by sight; and,

4 That Army EOD destroyed all rockets found and indicated that many had live high explosive (HE) warheads.

(c) Mr. Buell Vann, Director of Public Works for Belleair Beach, indicated that a number of practice bombs have been discovered on land by road construction and telephone crews, but that the majority of ordnance is found offshore in the Gulf. He knew of no ordnance being found on the eastern side of the key in the Intracoastal Waterway. He described these items as "4.5-inch rockets with fins and blunt noses that could be screwed out, about 1 foot long." When shown a picture of the Army 4.5-inch rockets in use during World War II, he indicated that they resemble the items he has seen (see document I-12).

(d) One of the homeowners on the former Indian Rocks Anti-Aircraft Gunnery Range site, Mr. Lee Hanna, mentioned his discovery of spent .30 and .50 inch bullets while walking along the beach. He reports no other encounters with OEW and says his neighbors have never mentioned ordnance being found on their properties. As a city official and 22 year resident of Belleair Shores, he stated that discovered ordnance has never been an issue brought before city government. Finally, he and two of his neighbors have had pools dug in their yards and no ordnance was unearthed during these excavations (see document I-13).

5. SITE ELIGIBILITY

a. Confirmed Formerly Used Defense Sites

(1) Former land lease and usage by the War Department was previously confirmed for the entire site during the preliminary assessment phase of DERP FUDS conducted by USACE, Jacksonville District and described in paragraph 2a. It was noted that the terms and conditions of the lease and termination notice, or if there were any restorations required, are unknown as copies of those instruments could not be located. Disposal information was taken from the real estate map (see document L-2).

(2) Further research by the site investigation team confirmed the lack of real estate documents concerning this lease and its termination. Local real estate transactions are officially recorded in the Pinellas County Courthouse, Court Street, Clearwater, Florida. However, interviews with staff members in the recorder's office revealed that the recording of leases is not required and, therefore, is not always done. A perusal of the "Grantor Index" for the period of 1935 to 1946 reveals no record of a lease between the U.S. Government and the landowner for the Indian Rocks Gunnery Range site.

(a) One of only two official documents located concerning this lease is the aforementioned real estate map which notes two leases between the War Department and a "Arnold S. Kirkeby, et ux." Lease Number W09-026 ENG 159 was for 177.8 acres under the name of "AIR TO GROUND GUNNERY RANGE" and Lease Number W2287 ENG 15861 was for 2.5 acres under the name of "ANTI-AIRCRAFT GUNNERY RANGE" (see document L-2).

(b) The other official document located is a "Leased Property Inspection Report" completed by the Corps of Engineers, South Atlantic Division, on 6 March 1945 which notes the lessor as being "Kirkeby Hotels, Inc." This report indicates the annual rental for the property was $2,499.96 and the site was first occupied by the military on May 7, 1943 (see document E-4).

(c) Additional study of the Grantor Index discloses numerous real estate transactions during the 1940s by "Arnold S. and Carlotta Kirkeby of Cook County, Illinois," involving Belleair Beach land. It is therefore likely to conclude that the land comprising the former Indian Rocks Gunnery Range sites was leased to the War Department by this Arnold S. Kirkeby individual in some form or the other.

b. Potential Formerly Used Defense Sites

(1) All information obtained during the archives search, site visit, and personal interview has verified, as much as necessary, the accuracy of the overall scope and boundaries of the 180.30 acre lease. However, additional consideration should be given to those two areas that have proven to be contaminated with OEW due to their proximity to the ranges themselves; specifically, the two underwater areas adjoining the Gulf shore side of Area A and Area B (see Plate 6).

(2) A good approximation of the size of these two areas would be based upon the danger areas delineated in the 1944 sectional aeronautical chart (see document L-1) and superimposed over the current map of the area (see Plate 2). For the purposes of this report, the underwater area adjoining the western edge of the former Indian Rocks Air-to-Ground Gunnery Range (Area A), will be hereafter referred to as "Area C" and comprises approximately 277 acres. The underwater area adjoining the

former Indian Rocks Anti-Aircraft Gunnery Range (Area B), will be referred to as "Area D" and comprises approximately 8884 acres. The remainder of the circular danger area defined by the 1944 sectional aeronautical chart will be referred to as "Area E" and comprises approximately 1595 acres.

TABLE 5-1
POTENTIAL FUDS

FORMER USAGE	PRESENT OWNER	PRESENT USAGE	SIZE/ ACRES	COMMENTS
Area C: Gunnery Impact Range (underwater)	None (within U.S territorial waters)	Swimming, Boating, Diving	277	See Plate 6
Area D: Anti-Aircraft Gunnery Range Impact Area	None (within U.S. territorial waters)	Swimming, Boating, Diving	8884	See Plate 6
Area E: None, area bordering impact Area	Land: many owners Water: none	Residential, Condos, Hotels Swimming, Boating, Diving	1595	See Plate 6
			10756	TOTAL

(3) No other information was obtained to indicate that any other additional acreage/sites were used as a part of, or in conjunction with, the former Indian Rocks Gunnery Range.

6. VISUAL SITE INSPECTION

a. General Procedures and Safety

(1) During the period 6-14 December 1993, members of the Assessment Team traveled to the former Indian Rocks Gunnery Range in Pinellas County, Belleair Beach, Florida. The primary task of the Assessment Team was to assess OEW presence/potential due to the usage of the area as an air-to-ground gunnery range. This inspection was limited to nonintrusive methods; i.e., subsurface sampling was not authorized or performed.

(2) Real estate rights of entry were not obtained by inspection personnel due to the accessibility of most of the property by way of city parks, roads, or public beaches. Private property rights were respected at all times by the inspection team and access to such was deemed not necessary to mission accomplishment.

(3) A site safety plan was developed and utilized by the assessment team to assure safety from injury during the site inspection. A preinspection briefing was conducted which stressed that OEW should not be handled (REF. B-4).

(4) Prior to the on-site visit, a thorough review of all available reports, historical documents, and available reference material gathered during the records search was made to ensure awareness of the types and uses of the ordnance most likely to be encountered at this site.

(5) Site visits occurred on two days.

(a) The initial visit took place on 8 December 1993, and began at the Belleair Beach Police Department and City Hall. The assessment team met with Mr. Buell Vann, Director of Public Works, who provided anecdotal evidence of OEW discovered during his tenure with the city, as well as copies of their plat maps. Following this session, which lasted about two hours, the assessment team conducted an unescorted site visit, as described below.

(b) The second visit took place on Sunday morning, 11 December 1993, and virtually retraced the steps taken during the initial visit described above. The primary purpose of this visit was to take additional photographs to better illustrate the archive search report (see Plate 5 for photograph locations).

b. Area A: Air-to-Ground Gunnery Range Impact Area

(1) The inspection team entered the beach area through the Morgan Drive city park which is located at the approximate north-south midpoint of the old site. Even during a low tide period, there is virtually no beach between the surf and the sea wall north of this park (see photos J-1 thru J-4). This lack of beach made it difficult to actually walk that section of the site and the team restricted itself to the taking of photographs. (During the second site visit, the team walked the seawall as far north as the Serena Del Sol Condominiums located at 2900 Gulf Boulevard [see photo J-5]). The team thereupon walked southward along the beach until they reached the 19th Street city park which is located at the southern boundary of the old site (see photos (see photos J-6 and J-7).

(2) The inspection team drove northward the length of Gulf Boulevard with several detours down side streets to take photographs (see photos J-9, J-10, and J-20).

(3) At the northernmost city limits of Belleair Beach, which coincide with the northern boundary of the site, the inspection team again entered the beach area. As before, there was no beach area between the surf and sea wall, and the team restricted itself to the taking of photographs (see photos J-11 and J-12). No OEW was observed by the inspection team in this area.

c. Area B: Anti-Aircraft Gunnery Range Gun Emplacement Area

The inspection team entered the beach area through the 6th Street city park which is located at the northern boundary of the old site (see photos J-14 and J-15). The team walked southward along the beach to 420 Gulf Boulevard which approximates the southern boundary of the old site (see photo J-16). No OEW was observed by the inspection team in this area.

d. Area C: Air-to-Ground Gunnery Range Underwater Impact Area

The inspection team viewed this offshore coastal area from the beach. No OEW was observed by the inspection team in this area.

e. Area D: Anti-Aircraft Gunnery Range Impact Area

The inspection team viewed this offshore coastal area from the beach. No OEW was observed by the inspection team in this area.

f. Area E: 1944 Aeronautical Chart Danger Area

The inspection team drove through the land area on Gulf Boulevard and viewed the Intracoastal Waterway portion from the adjoining land and the Belleair Beach Causeway. No OEW was observed by the inspection team in this area.

7. EVALUATION OF ORDNANCE HAZARDS

a. General Procedures

(1) Each area was evaluated to determine confirmed, potential, or uncontaminated ordnance presence. Confirmed ordnance contamination is based upon verifiable historical evidence or direct witness of ordnance items since site closure. Verifiable historical record evidence consists of ordnance items located on site and documented by local bomb squads, Army Explosive Ordnance Disposal (EOD) Teams, newspaper articles, correspondence, and any other findings. Direct witness of ordnance items consists of the inspection team directly locating ordnance items by visual inspection. Additional field data is not needed to identify OEW presence at a confirmed site.

(2) Potential ordnance contamination is based upon a lack of confirmed ordnance presence since site closure. Potential ordnance contamination is inferred from records. Inference from historical records would include common practice in production, storage, usage, or disposal, at that time, which could have allowed present day ordnance contamination. Potential ordnance contamination could also be based on indirect witness or from present day site features. Additional field data is needed to confirm potential ordnance areas.

(3) Uncontaminated ordnance areas are based on a lack of confirmed or potential **energetic** ordnance contamination. There is no reasonable evidence, either direct or inferred, to suggest present day energetic ordnance contamination. Additional field data is not needed to assess uncontaminated ordnance areas.

b. Area A: Air-to-Ground Gunnery Range Impact Area

(1) Area A should be considered a confirmed ordnance area based upon its use when it was active and evidence of residual OEW contamination since it was closed.

(2) Historical documents and interviews with individuals who trained at this site confirm that ordnance was employed at this location during the period within which it was active. It is likely that the some or all the following ammunition was used during training at this range: .30 inch and .50 inch machine gun bullets; 3 and 4.5 pound practice bombs; and 2.25-inch, 4.5-inch, and 5.0-inch aircraft rockets.

(3) Newspaper accounts and interviews with individuals knowledgeable of the area confirm OEW contamination since site closure. It appears that the majority of ammunition discovered on this site since closure has been the practice bombs.

(a) The most likely potential OEW hazard would be from the practice bombs dropped on this site. However, the shell bodies of these practice bombs were inert and designed to be rugged enough to allow for reuse. The only explosive component was an AN-Mk.4 Signal Cartridge consisting of a long 10-gauge blank shotgun shell containing an ejection charge and a pyrotechnic charge which would burn above water after impact, forming a large puff of white smoke (see document D-1c). It is highly unlikely that an open-end device of this sort, if not activated when initially dropped, would be still active after 50 years of burial in wet sand. Therefore, the hazard from these practice bombs should be considered minimal. Furthermore, this area has been totally developed and there are few, if any, lots left upon which to build, thereby also minimizing the possibilities of a chance encounter with a buried object.

(b) The following information cited previously is likely accurate concerning this area:

1 That this area was used for its intended purpose during World War II. Interviews with pilots stationed at its controlling fighter base and historical documentation tend to support the premise that it was an air-to-ground gunnery range used to train young fighter pilots. Testimony from contemporary site-related personnel points toward .50 inch machine gun rounds, aircraft rockets, and practice bombs as the predominant ordnance employed upon this gunnery range. Though the exact length of time this site was active could not be determined, it is safe to assume that it was at least two years. The amount of ammunition fired at this location could not be quantified, but was likely great for the short period of time it was open for business.

2 That no documentation could be located concerning a pre-site closure sweep for unexploded ordnance, although standard practice would dictate that such an operation be conducted prior to the return of a gunnery range to the public domain. The testimony of Mrs. Geissler, who moved onsite shortly after the lease was canceled by the War Department, indicates that such a search was accomplished, but to what degree of effectiveness cannot be ascertained.

3 That extensive anecdotal evidence and some official documentation exists concerning residual OEW contamination at this location after the lease was canceled in January 1947. While the vast majority of this contamination has occurred offshore and consists of aircraft rockets, onshore contamination seems to consist mainly of practice bombs containing smoke charges. Many spent .30 and .50 inch rounds have also been encountered since site closure (see Plate 5).

(c) The following information is likely inaccurate concerning this area or cannot be verified:

1 That the aircraft rockets were "de-fused to prepare them for use in mock attacks in support of practice beachhead landings during World War II," as stated in an August 1975 press release from the Mayor of Belleair Beach. Testimony from the Naval EOD team officer-in-charge of the 1975 cleanup operation and the pilots who fired the rockets indicate that these items were fuzed to detontate upon impact.

2 That this Air-to-Ground Gunnery Range was possibly used by Navy ships as a gunnery range as speculated in the Site Survey Summary Sheet prepared during the Preliminary Assessment phase of the DERP FUDS process. Considering the rudimentary nature of rockets in use during World War II, it appears unlikely that the Navy would be authorized to launch a rocket assault against an Army Air Force Gunnery Range separated from a populated shoreline by one mile of Intracoastal Waterway. The danger of a "hot" rocket motor propelling the warhead past the intended target area and coming to rest in downtown Belleair Bluffs would seem too great to allow such an exercise to occur.

c. Area B: Anti-Aircraft Gunnery Range Gun Emplacement Area

(1) Area B should be considered an uncontaminated ordnance area based upon its use when it was active and the lack of evidence of residual OEW contamination since it was closed. This site was more likely an anti-aircraft gun emplacement than an air-to-ground gunnery range, as indicated by:

(a) Mr. Bie's comment in paragraph 4c(1)(g);

(b) The notation on the real estate map, as described in paragraph 5a(2)(a);

(c) Its assignation as such to Drew Field, as described in paragraph 4a(4);

(d) The caption accompanying a 1946 photograph of Belleair Shore (see photo K-2);

(e) The distinctive firing fan delineated on the 1944 Restricted Area Aeronautical Chart (see document L-1); and,

(f) Its 2.5 acre size which is too small to be used as a target or impact range.

(2) As a gun emplacement, it is likely that the only residual OEW present would be spent bullets, since whatever ammunition was brought to the site was probably fired or returned to the point of issue. An interview with one of the homeowners on this old site, Mr. Lee Hanna, reveals his discovery of spent .30 and .50 inch bullets while walking along the beach. He reports no other encounters with OEW and says his neighbors have never mentioned ordnance being found on their properties. As a city official and 22 year resident of Belleair Shores, he stated that discovered ordnance has never been an issue brought before city government. Finally, he and two of his neighbors have had pools dug in their yards and no ordnance was unearthed during these excavations (see document I-13).

(3) No documentation could be located concerning a pre-site closure sweep for unexploded ordnance, though it is doubtful that it would be necessary since this site was not used as a target range or impact area. More likely would be a site inspection for unexpended ammunition prior to cancellation of the lease in January 1947.

d. Area C: Air-to-Ground Gunnery Range Underwater Impact Area

(1) Area C should be considered a confirmed ordnance area based upon its proximity to the air-to-ground gunnery range impact area (Area A) when it was active and evidence of residual OEW contamination since the range was closed.

(2) The size of Area C was based upon the probability of rocket overshoot distance, fifty years of wave and tidal action, size of the original target area on land, and size of previous EOD sweeps, plus some additional expansion in the interests of safety.

(3) Interviews with individuals who trained at the range confirm that some ordnance overshot the targets and landed in the Gulf. It is likely that the some or all the following ammunition fell into this underwater area: .30 inch and .50 inch machine gun bullets; 3 and 4.5 pound practice bombs; and 2.25-inch, 4.5-inch, and 5.0-inch aircraft rockets.

(4) Newspaper accounts and interviews with individuals knowledgeable of the area confirm OEW contamination since site closure. The preponderance of evidence indicating post-site closure OEW contamination is anecdotal in nature and appears mainly as newspaper accounts. Discovery of OEW contamination runs in periodic cycles and may be a function of Gulf storm and wave patterns that disturb the seabed sufficiently to uncover old ordnance and propel it ashore. The majority, if not the totality, of ammunition discovered in this area since the range was closed has been 4.5-inch aircraft rockets.

(5) Therefore, the primary potential OEW hazard is the aircraft rocket with a live HE warhead, such as have been discovered on numerous occasions since the range was deactivated and returned to the private sector. However, the overwhelming majority, if not the totality, of rockets found have been located underwater and, thereby, constitute a minimal hazard to residents living onshore. Insofar as the existence of an underwater hazard is concerned, the following must be considered:

(a) That the targets for these rockets were positioned on land and those rockets that struck water were not aimed there on purpose. Therefore, the quantity of rockets underwater should be a small percentage of the total number fired. Considering the number found by EOD to date, in addition to the unsubstantiated claims of "hundreds" more being found by swimmers since the range closed, it seems likely that most of the mistargeted rockets may have been located.

(b) That the relatively small underwater section from which virtually every rocket has come has been searched by EOD on at least four occasions in 1975, 1977, 1980, and 1986. Several, if not all, of these sweeps were carefully performed utilizing both sophisticated electronic detection equipment and the practiced eye of experienced EOD professionals. It is likely that all of the easily located rockets have been found and any that remain will be difficult to detect and remove.

(c) That no record could be located of any rockets being found since 1986.

e. Area D: Anti-Aircraft Gunnery Range Impact Area

(1) Area D should be considered a confirmed ordnance area based upon its use when it was active and evidence of residual OEW contamination since the anti-aircraft gunnery range was closed. The spent bullets being fired at offshore targets would have fallen within this landing area. While the size(s) and type(s) of gun(s) emplaced here could not be confirmed through official records, its proximity to civilization would seem to discourage any caliber larger than .50 inch and that speculation is supported by Mr. Bie's testimony (see document I-7) and the caption under a historical photograph of Belleair Shores (see photo K-2).

(2) As an impact area for an anti-aircraft gunnery range, it is likely that the only residual OEW present would be spent bullets. Some anecdotal evidence and no official documentation exists concerning residual OEW presence at this location after the lease was canceled in January 1947. This presence consists exclusively of spent .30 and .50 inch bullets washing up onshore (see Plate 5). An interview with one of the homeowners on this old site, Mr. Lee Hanna, reveals his discovery of spent .30 and .50 inch bullets while walking along the beach.

(3) As to what type(s) of anti-aircraft (AA) gun (and therefore what type[s] of ammunition was used) was emplaced upon this range, the evidence points toward .30 inch and .50 inch machine guns based upon Mr. Bie's testimony and the spent ordnance washed up on shore. While the 40mm Bofors gun, the 37mm M1, and the 90mm M1 were the standard field army AA guns of this period, there is no evidence to indicate that shells of these sizes were ever fired from the gun emplacement into this underwater impact area.

(4) No documentation could be located concerning a pre-site closure sweep for unexploded ordnance, though it is doubtful that it would have been necessary since the only ordnance likely to be found would have been the spent bullets.

f. Area E: 1944 Aeronautical Chart Danger Area

(1) Area E should be considered an uncontaminated ordnance area based upon its use when the gunnery range was active and the lack of evidence of residual OEW contamination since it was closed.

(2) While the circular "invisible hazard - danger area" defined in the 1944 Aeronautical Chart (see document L-1) may be used as a guide for site investigators, it should by no means be considered to define an ordnance impact area in its entirety. The only portions of this circle that have shown evidence of post-site closure OEW contamination are the two areas discussed above: Area A and Area C. No incidents of OEW contamination in the remainder of this area (Area E) have ever been reported and this area should be considered uncontaminated with ordnance.

8. SITE ORDNANCE TECHNICAL DATA

a. End Item Technical Data

(1) No comprehensive list of ammunition fired into the former Indian Rocks Air-to-Ground Gunnery Range could be located. However, it is logical to assume that, as a small gunnery range attached to an Army Airfield harboring nothing but fighter planes, the bulk of expended ordnance, if not the entirety, would be machine gun ammunition, aircraft rockets, and small practice bombs. No evidence exists that chemical warfare materiel (CWM) was ever used at this site.

(2) TABLE 8-1 has been developed to establish a list of those ordnance items most likely to be encountered at this site, either at the surface or below, or underwater. This table has been developed based upon a review of official records, interviews, post site closure OEW discoveries, the armament mounted by the warplanes that pilots flew when they trained upon this range, and the typical military utilization of air-to-ground gunnery ranges and anti-aircraft gunnery ranges. Exact model numbers and munition types have been included or assumed whenever permitted by available source material and are speculative.

(3) Technical data and drawings relative to the end items and component parts listed in TABLE 8-1 can be found in Appendix D.

b. Chemical Data of Ordnance Fillers

TABLE 8-2 lists the explosive/chemical fillers of those ordnance items identified in TABLE 8-1.

TABLE 8-1
AMMUNITION USED AND EXPLOSIVE/CHEMICAL FILLER

NOMENCLATURE	MODEL/TYPE	FILLER/WEIGHT
Small Arms Ammo	M2 Ball	Lead Antimony
.30 Cal	M2 AP	Tungsten Chrome Steel
with gilding	M1 Tracer	Tracer
metal jacket	T10 Tracer	Composition
	M1 Incend	Incendiary Composition
Propellant		Single or Double-base (DB) powder
Small Arms Ammo	M2 Ball	Soft Steel
.50 Cal	M2 AP	Tungsten Chrome Steel
with gilding	M1 Tracer	Tracer
metal jacket	M10 Tracer	Composition
	M17 Tracer	Tracer
	M21 Tracer	Composition
	M1 Incend	Incendiary
	M23 Incend	Mixture
Propellant		Single or Double-base (DB) powder
Bomb, Practice, 3 lb	AN-Mk.5 Mod 1	Inert (zinc)
w/signal	AN-Mk 4	10 gm zinc oxide 3 gm black powder 3 gm smokeless powder Titanium Tetrachloride
Bomb, Practice, 3 lb	AN-Mk 23	Inert (cast iron)
w/signal	AN-Mk 4	10 gm zinc oxide 3 gm black powder 3 gm smokeless powder Titanium Tetrachloride
Bomb, Practice, 4.5 lb	An-Mk 43	Inert (lead)
w/signal	AN-Mk 4	10 gm zinc oxide 3 gm black powder 3 gm smokeless powder Titanium Tetrachloride
Rocket, Practice	2.25" SCAR	Inert warhead (machined steel, cast iron or zinc)
Motor, Rocket		
Igniter		14 gm black powder
Propellant		1.75 lb ballistite

TABLE 8-1
AMMUNITION USED AND EXPLOSIVE/CHEMICAL FILLER (Con't)

NOMENCLATURE	MODEL/TYPE	FILLER/WEIGHT
Rocket, H.E.	M8	4.3# Cast TNT
4.5-inch	M8A1	4.5# Cast TNT
	M8A2	4.3# Cast TNT
Fuze, P.D.	M4A2	
Primer, SQ		
Primer, Delay		
Delay Charge		
Relay Charge		
Detonator		
Booster		
Auxiliary Booster	M1A1	0.8# TNT
		0.2# tetryl ring
Motor, Rocket		
Igniter		Black powder charge
Propellant		30 sticks (4.65#) DB powder
Rocket, H.E.	T22	4.3# Cast TNT
4.5-inch		
Fuze, P.D.	M4A2	
Primer, SQ		
Primer, Delay		
Delay Charge		
Relay Charge		
Detonator		
Booster		
Auxiliary Booster	M1A1	0.8# TNT
		0.2# tetryl ring
Motor, Rocket		
Igniter		Black powder charge
Propellant		30 sticks (4.65#) DB powder
Rocket, H.E.	M16	5.2# Cast TNT
4.5-inch		
Fuze, P.D.	M81	
Fuze, P.D.	M48A2	
Detonator		
Superquick		Lead azide
Delay		Compressed black powder pellet
Relay		Lead azide pellet
Booster	M24	
Detonator		Tetryl
Booster lead		Tetryl
Booster charge		Tetryl pellet
Motor, Rocket		
Igniter		Black powder charge
Propellant		4.75# DB powder

TABLE 8-1
AMMUNITION USED AND EXPLOSIVE/CHEMICAL FILLER (Con't)

NOMENCLATURE	MODEL/TYPE	FILLER/WEIGHT
Rocket, Practice	T46	Inert
4.5-inch		
Fuze, Dummy	M6	
Motor, Rocket		
Igniter		Black powder charge
Propellant		4.75# DB powder
Rocket, Beach-barrage	Mk3	6.4# TNT
4.5-inch, H.E.		
Fuze, Nose (Air)	Mk137	
Detonator		
Lead-in Cup		Tetryl
Booster		Tetryl
Motor, Rocket	2.25" Mk9	
Igniter		Black powder charge
Propellant grain		1.4# Mk 1
Rocket, H.E.	5" HVAR	7.5# Cast TNT
Nose Fuze, AIR-SQ	Mk149	
Detonator		
Lead-in		Tetryl
Booster		Tetryl
Base Fuze, PIR	Mk159	
Detonator		
Lead-in		Tetryl
Booster		Tetryl
Motor, Rocket		
Igniter		Black powder charge
Propellant grain		24.8 lb ballistite
Rocket, Practice	5" HVAR	Inert warhead
Motor, Rocket		
Igniter		55 gm black powder
Propellant		24.8 lb ballistite

TABLE 8-2
CHEMICAL DATA OF ORDNANCE FILLERS

FILLER	SYNONYM(S)	CHEMICAL FORMULA
Antimony Sulfide		Sb_2S_3
Ballistite	(see DB powder)	
Barium Nitrate		$Ba(NO_3)_2$
Black Powder		
74% Potassium Nitrate	Saltpeter; Niter	KNO_3
11% Sulfur		S
16% Charcoal		C
Charcoal		C
Dibutylphthalate	gelling agent	$C_6H_4(CO_2C_4H_9)_2$
Dinitrotoluene	DNT	$C_6H_3CH_3(NO_2)_2$
Diphenylamine	stabilizer DPA	$(C_6H_5)_2NH$
Double-base (DB) Powder	Ballistite	
60% Nitrocellulose	Guncotton; Pyroxylin	$[C_6H_8O_5(NO_2)_3]_n$
39% Nitroglycerin		$CH_2NO_3CHNO_3CH_2NO_3$
0.75% Diphenylamine	stabilizer DPA	$(C_6H_5)_2NH$
E.C. Blank Powder	(single-base compound powder)	
80.4% nitrocellulose	Guncotton; Pyroxylin;	$[C_6H_8O_5(NO_2)_3]_n$
8.0% potassium nitrate	Saltpeter;	KNO_3
8.0% barium nitrate		$Ba(NO_3)_2$
3.0% starch		
0.6% diphenylamine	stabilizer DPA	$(C_6H_5)_2NH$
FNH Powder, Type II		
Nitrocellulose	Guncotton; Pyroxylin;	$[C_6H_8O_5(NO_2)_3]_n$
Dibutylphthalate	gelling agent	$C_6H_4(CO_2C_4H_9)_2$
Dinitrotoluene	DNT	$C_6H_3CH_3(NO_2)_2$
Diphenylamine	stabilizer DPA	$(C_6H_5)_2NH$
Guncotton	(see nitrocellulose)	
13% nitrogen		N_2
Igniter Compositions *		
I-136 & I-136A		
10% Calcium Resinate		
90% Strontium Peroxide		SrO_2

* Most frequently used chemical compositions and their major ingredients

TABLE 8-2
CHEMICAL DATA OF ORDNANCE FILLERS (Con't)

FILLER	SYNONYM(S)	CHEMICAL FORMULA
I-194		
94% Igniter Composition I-136		
6% Magnesium Powder		Mg
I-276		
84% Barium Peroxide		BaO_2
16% Magnesium Powder		Mg
I-280		
85% Igniter Composition I-136A		
15% Magnesium Powder		Mg
I-508		
79% Barium Peroxide		BaO_2
14% Magnesium Powder		Mg
Incendiary Compositions *		
IM-11		
50% Barium Nitrate		$Ba(NO_3)_2$
50% Magnesium Aluminum Alloy		Mg & Al
IM-23		
50% Potassium Perchlorate		$KClO_4$
50% Magnesium Aluminum Alloy		Mg & Al
IM-28		
40% Barium Nitrate		$Ba(NO_3)_2$
50% Magnesium Aluminum Alloy		Mg & Al
10% Potassium Perchlorate		$KClO_4$
IM-68		
24% Barium Nitrate		$Ba(NO_3)_2$
50% Magnesium Aluminum Alloy		Mg & Al
25% Ammonium Nitrate		NH_4NO_3
IM-69		
40% Barium Nitrate		$Ba(NO_3)_2$
50% Magnesium Aluminum Alloy		Mg & Al
10% Iron Oxide, Ferric		Fe_2O_3
IM-136		
49% Potassium Perchlorate		$KClO_4$
49% Magnesium Aluminum Alloy		Mg & Al
IM-142		
48% Barium Nitrate		$Ba(NO_3)_2$
46% Magnesium Aluminum Alloy		Mg & Al
IM-144		
50% Barium Nitrate		$Ba(NO_3)_2$
50% Red Phosphorus		P
IM-162		
25% Incendiary Composition IM-23		
75% Zirconium		Zr
IM-163		
50% Incendiary Composition IM-23		
50% Zirconium		Zr
Incendiary Mixture	(see incendiary compositions)	
Lead Azide	Azide	$Pb(N_3)_2$

* Most frequently used chemical compositions and their major ingredients

TABLE 8-2

CHEMICAL DATA OF ORDNANCE FILLERS (Con't)

FILLER	SYNONYM(S)	CHEMICAL FORMULA
Nitrocellulose	Guncotton; Pyroxylin; Nitrocotton; Cellulose Nitrate	$[C_6H_8O_5(NO_2)_3]_n$
Nitroglycerin		$CH_2NO_3CHNO_3CH_2NO_3$
Potassium Chlorate		$KClO_3$
Potassium Nitrate	Saltpeter; Niter	KNO_3
Primer Composition		
FA-90A (for percussion primers)		
25% Lead Thiocyanate		$Pb(SCN)_2$
12% Antimony Sulfide		Sb_2S_3
10% PETN		$C(CH_2ONO_2)_4$
53% Potassium Chlorate		$KClO_3$
FA-70		
25% Lead Thiocyanate		$Pb(SCN)_2$
17% Antimony Sulfide		Sb_2S_3
5% TNT	2,4,6-trinitrotoluene	$CH_3C_6H_2(NO_2)_3$
53% Potassium Chlorate		$KClO_3$
Primer Mixture *		
Mercury Fulminate	Mercuric Cyanate	$Hg(CNO)_2$
Potassium Chlorate		$KClO_3$
Antimony Sulfide		Sb_2S_3
Red Phosphorus		P
Smokeless Powder	(see nitrocellulose)	
Flashless-nonhygroscopic (FNH)		
Nonhygroscopic (NH)		
Sodium Nitrate		$NaNO_3$
Sodium Oxalate		$Na_2C_2O_4$
Sulfur		S
Tetryl	Trinitrophenyl-methylnitramine	$(NO_2)_3C_6H_2N(NO_2)CH_3$
TNT	2,4,6-trinitrotoluene; triton; trotyl; trilite; trinol; tritolo	$CH_3C_6H_2(NO_2)_3$

* Most frequently used chemical compositions and their major ingredients

TABLE 8-2

CHEMICAL DATA OF ORDNANCE FILLERS (Con't)

FILLER	SYNONYM(S)	CHEMICAL FORMULA
Tracer Compositions *		
R-256		
8.3% Calcium Resinate		
26.7% Strontium Peroxide		SrO_2
26.7% Magnesium Powder		Mg
33.3% Strontium Nitrate		$Sr(NO_3)_2$
R-284		
17% Polyvinyl Chloride		
28% Magnesium Powder		Mg
55% Strontium Nitrate		$Sr(NO_3)_2$
R-321		
16% Polyvinyl Chloride		
26% Magnesium Powder		Mg
52% Strontium Nitrate		$Sr(NO_3)_2$

* Most frequently used chemical compositions and their major ingredients

9. OTHER ENVIRONMENTAL HAZARDS

a. Hazardous, Toxic, and Radiological Waste (HTRW)

(1) Though document E-4 indicates that the Army constructed buildings, a water pumping station, and an electric generator on this site, no visible evidence of these structures exists today. Neither is there any evidence of HTRW contamination as a result of their construction, use, or removal. There were no "closed storage or office" buildings constructed on this site.

(2) Document E-3 indicates that "hutments" sufficient to house 21 enlisted men were erected on the Air-to-Ground Gunnery Range site. Considering the temporary nature of such structures, it is unlikely that any HTRW contamination resulted from their construction, use, or removal.

b. Building Demolition/Debris Removal (BD/DR)

Though document E-4 indicates that the Army constructed buildings, a water pumping station, and an electric generator on this site, no visible evidence of these structures exists today.

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APPENDIX A

REFERENCE SOURCES

REFERENCE SOURCES

The following organizations and personnel are acknowledged for their support

Organizations	Name	Telephone	Nature of Support
	GOVERNMENT SOURCES		
FEDERAL AGENCIES			
Department of Defense			
Defense Technical Information Center Cameron Station Alexandria, VA 22304	Computer	(800) 225-3842	Automated Search
Army			
U.S. Army Military History Institute Carlisle, PA 17013-5008	Mr. John J. Slonaker Chief, Historical Reference Branch	(717) 245-3611	References
U.S. Army Armament Munitions and Chemical Command Rock Island Arsenal Rock Island, IL	Dr. Herb LePore Historian	(309) 782-1276	Referrals
52nd Ordnance Group, EOD Fort Gillem, GA 30050-5000	Major Perez	(404) 363-3324	Referrals
66th Ordnance Detachment, EOD Cape Canaveral AFS, FL	SGT Campbell	(407) 853-9951	Interview (see document I- 11)
U.S. Army Corps of Engineers, Jacksonville District P.O. Box 4970 Jacksonville, FL 32232-0019	Mr. Russ Jones P.E.	(904) 232-2168	Site Support, Real Estate, Documents

REFERENCE SOURCES (continued)

Organizations	Name	Telephone	Nature of Support
FEDERAL AGENCIES (continued)			
Department of Defense (continued)			
Army (continued)			
U.S. Army Corps of Engineers, Huntsville Division ATTN: CEHND-ED-SY Huntsville, AL 35807-4301	Mr. Doug Rhodes	(205) 955-5857	Verbal Info and Clarification
U.S. Army Corps of Engineers Office of History 7701 Telegraph Road Alexandria, VA 22310-3865	Mr. Martin Gordon Ph.D.	(703) 355-3558	No info available
U.S. Army Defense Ammunition Center and School ATTN: SMCAC-ASL Savanna, IL 61074-9639	Mr. Tom Wick Instructor (retired Naval EOD officer)	(815) 273-8916	Referrals
Air Force			
AFHRA/ISR 600 Chennault Circle Maxwell AFB, AL 36112-6424	Mr. B. Spink	(205) 953-5342	References
Gunter AFB (AFHRA Annex) Historical Research Dept.	Mr. Dick Gamma	(205) 953-5342	Historical Records
MacDill AFB Historical Research Office Library/Public Affairs Tampa, FL	MSG Gaston Ms. Jean Phillips	(813) 968-3607 (813) 968-2680	Referral Research
Air Force Museum Wright Patterson AFB Dayton, OH	Mr. Worman	(513) 255-3286	No info available

REFERENCE SOURCES (continued)

Organizations	Name	Telephone	Nature of Support
FEDERAL AGENCIES (continued)			
Department of Defense (continued)			
Navy			
U.S. Navy COMEODGRU Two Little Creek, VA	CDR Dave Jardott XO	(804) 422-8468 ext *322	Referrals
Department of Agriculture			
Soil Conservation Service Hillsborough & Pinellas Counties 5118 N. 56th St., #250 Tampa, FL 33610	Staff	(813) 621-8824	Soil Survey of Pinellas County
General Services Administration			
National Archives Suitland Reference Branch 8601 Adelphi Road College Park, MD 20740-6001	Ms. Becky Collier	(301) 713-6660	No info available
National Archives Cartographic & Architectural Branch 8601 Adelphi Road College Park, MD 20740-6001	Mr. Robert Richardson	(301) 713-6630	No info available
National Archives Military Reference Branch Washington, DC	Mr. Ken Schlessinger	(202) 501-5400	Referrals
Southeast Regional Archives 1557 St. Joseph Ave. East Point, GA 30344	Mr. Charlie Reeves	(404) 763-7477	References

REFERENCE SOURCES (continued)

Organizations	Name	Telephone	Nature of Support
STATE AGENCIES			
Florida Department of Natural Resources	Records Mgt Bureau	(904) 488-9380	Referrals
Tallahassee, FL	Mr. Eric Shaw	(904) 488-6221	Referrals
Florida Division of State Lands	Mr. Joe Knetsche Historian	(813) 488-2427	Research
Division of Historical Resources	Staff	(813) 488-1480	Referrals
State Archives	Ms. Jody Norman	(904) 487-2073	Articles, Photos
State Library	Staff	(904) 487-2651	Newspaper Article
LOCAL AGENCIES			
Pinellas County Courthouse	Mr. Jim Smith	(813) 464-4290	Aerial Photos
Clearwater Office	Property Appraiser		
315 Court Street	Staff		Grantor's Index
Clearwater, FL 34616			
County Historian	Mr. Tony Pizzo	(813) 251-3591	No info available
Hillsborough County Aviation Authority	Mr. Paul McAlester	(813) 870-8700	No info available
Hillsborough County Courthouse	County Clerk	(813) 276-8100	Referrals
Sheriff's Office	Sgt. Lance Connors	(813) 247-8097	Technical Info
Hillsborough County	Bomb Squad		
2008 8th Ave	Sgt. Duncan	(813) 247-8107	Referrals
Ybor City, FL			

REFERENCE SOURCES (continued)

Organizations	Name	Telephone	Nature of Support
Local Agencies (con't)			
Tampa City Hall Tampa, FL	Staff	(813) 223-8251	No Info Available
City of Belleair Beach 444 Causeway Boulevard Belleair Beach, FL 34635	Mr. Buell Vann Public Works Director	(813) 595-4646	Plat maps, Interview (see document I-12)
	NON-GOVERNMENT SOURCES		
NATIONAL			
DIALOG Information Services, Inc. 3460 Hillview Avenue Palo Alto, CA 94304	Computer		Automated Search
STATE			
University of Florida Gainesville, FL	Mr. Butler Mr. Mel Willis	(904) 392-4919 (904) 392-2825	Referrals Aerial Maps
University of Tampa Library Tampa, FL	Ms. Jeannie Vince	(813) 253-6231	Books, Newspaper Articles
University of South Florida 4202 East Fowler Ave. Tampa, FL	Mr. Paul Camp	(813) 974-2731/ 2729	Maps, Charts
Florida State University Tallahassee, FL	Mr. Bert Altman	(904) 644-5211	Newspaper Articles
Florida Aviation Historical Society P.O. Box 127 Indian Rocks Beach, FL 34635	Dr. Warren J. Brown News Editor	(813) 595-4090	Referrals, Books, References

REFERENCE SOURCES (continued)

Organizations	Name	Telephone	Nature of Support
STATE (con't)			
Florida Military Aviation Museum Fairchild Drive St. Petersburg, FL	Mr. Hank Marois Curator	(813) 447-1469	Referrals
LOCAL			
Tampa-Hillsborough Library 900 N. Ashley Tampa, FL 33602	Mr. Joseph Hipp Mr. Jim Sutton	(813) 273-3652	Books, Referrals Books
Heritage Park 11909 125th St. No. Largo, FL 34644	Mr. Bob Harris Curator Mr. Ken Ford Director	(813) 582-2123	References, Interview (see document I-9)
St. Petersburg Public Library 3745 Ninth Ave. N. St. Petersburg, FL	Ms. Elizabeth Gresh	(813) 893-7724	Books, Newspaper Articles
Tampa Tribune 202 South Parker Ave. P.O. Box 191 Tampa, FL	Mr. Leland Hawes Local Historian Mr. Ned Rochford Tribune Library	(813) 259-7827 (813) 272-7665	Referrals Referrals
St. Petersburg Historical Museum St. Petersburg, FL	Mr. Bob Wiltse	(813) 894-1052	No info available

REFERENCE SOURCES (continued)

Organizations	Name	Telephone	Nature of Support
LOCAL (continued)			
St. Petersburg Historical Society Library 335 2nd Ave, NE St. Petersburg, FL	Staff	(813) 341-4732	Referral
Chamber of Commerce Tampa, FL	Staff	(813) 228-7777	No Info Available
Clearwater Public Library System Clearwater, FL	Mr. Jim Davis	(813) 462-6800	Referral
St. Petersburg Times St. Petersburg, FL	Staff	(800) 333-7505	Newspaper Article
Indian Rocks Area Historical Society 1507 Bay Palm Blvd. Indian Rocks Beach, FL	Mrs. Ralph Finke President	(813) 595-5827	Interview (see document I-14), book on Indian Rocks Beach
Indian Rocks Beach Public Library Indian Rocks Beach, FL	Staff	(813) 596-1822	Referral
Largo Library Largo, FL	Staff	(813) 584-3330	No Info Available
Gulf Beaches Chamber of Commerce Indian Rocks Beach, FL	Staff	(813) 595-4575	No Info Available

REFERENCE SOURCES (continued)

Name/Position	Address	Telephone	Nature of Support
INDIVIDUALS			
Bartelsen, John Naval EOD Historian	Virginia Beach, FL	(804) 499-9043	Referrals
Bie, "Cappy" Otto	513 20th Ave Indian Rocks Beach, FL	(813) 596-5025	Interview (see document I-7)
Dunn, Hampton Historian, Author	c/o Tampa Tribune Tampa, FL	(813) 935-7786	Referrals
Fory, Garland V. Former Army fighter pilot, gunnery instructor at Pinellas AAFld	2879 Bullard Drive St. Petersburg, FL	(813) 573-2411	Interview (see document I-2)
Geissler, Hazel	115 6th Street Belleair Beach, FL	(813) 595-2846	Interview (see document I-8)
Hanna, Lee City Commissioner and Former Mayor	440 Gulf Boulevard Belleair Shores, FL	(813) 595-7247	Interview (see document I-13)
Howard, James H. Retired Army Air Forces General, Former Commander Pinellas AAFld	155 Bluffview Drive Belleair Bluffs, FL	(813) 581-4796	Interview (see document I-1)
King, Don Military Collector	205 Redwood Avenue Temple Terrace, FL 33617	(813) 988-8565	Maps, Historical Documents
O'Donnel, Willie Former Army Fighter Pilot	6531 Dartmouth Ave, N. St. Petersburg, FL 33710	(813) 345-2755	Interview (see document I-6)

REFERENCE SOURCES (continued)			
Name/Position	Address	Telephone	Nature of Support
Individuals (con't)			
Pursley, Walter Retired Army Air Forces Major, Former Commander Pinellas AAFld	St. Petersburg, FL	(813) 525-5447	Interview (see document I-4)
Starks, Norman Former Army Fighter Pilot, Gunnery Instructor at Pinellas AAFld	444 San Antonio Ave #100 Palo Alto, CA	(415) 858-2883	Interview (see document I-3)
Thrift, Henry S. Retired CWO3 Naval EOD Officer	Lake Wales, FL	(813) 696-3204	Interview (see document I-10)
Watson, Ansley Former Army Fighter Pilot	Tampa, FL	(813) 258-3261	Interview (see document I-5)

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BELLEAIR BEACH, FLORIDA
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APPENDIX B

REFERENCE AND ABSTRACTS

APPENDIX B

REFERENCES AND ABSTRACTS

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

B-2 U.S. Army Corps of Engineers, Huntsville Division, "Management Plan for Ordnance and Explosive Waste (OEW) Mandatory Center of Expertise (MCX) and Design Center," CEHND 1105-3-9, 10 August 1992

B-3 U.S. Army Corps of Engineers, Rock Island District, "Defense Environmental Restoration Program for Formerly Used Defense Sites, Ordnance and Explosive Waste, Archives Search Report Manual," Version 2.1, 28 February 1994

B-4 U.S. Army Corps of Engineers, Rock Island District, Site Safety Plan for OEW Investigations (Appendix A-19, only), 25 June 1992

B-5 U.S. Department of Agriculture, Soil Survey of Pinellas County, Florida, September 1979

B-6 Davis, Richard A., Jr., Coastal Zone Atlas: Northern Pinellas County, Florida. Tampa, FL: Department of Geology, University of South Florida, September 1982

B-7 Florida Cooperative Extension Service, University of Florida, "Florida's Hydrologic Cycle," date unknown

B-8 Florida Game and Fresh Water Fish Commission, Official Lists of Endangered and Potentially Endangered Fauna and Flora in Florida, 1 April 1991

B-9 Florida Department of Natural Resources, Florida Marine Research Institute, "Boater's Guide to Tampa Bay," April 1993

B-10 Brown, Warren J. Florida's Aviation History: The First One Hundred Years. 2nd ed. Largo, Fl.: Aero-Medical Consultants, Inc., 1994

B-11 The Illustrated Encyclopedia of 20th Century Weapons and Warfare. Ed. Bernard Fitzsimons. 24 vols. New York: Columbia House, 1971-77

B-12 Excerpts from: TM 9-1900, Ammunition, General, June 1945; TM 9-1901, Artillery Ammunition, 29 June 1944; TM 9-1904, Ammunition Inspection Guide, 2 March 1944; TM 9-1950, Rockets, 9 July 1945; TM 9-1980, Bombs for Aircraft, 15 November 1944; OP 1187, 2.25" Subcaliber Aircraft Rockets, February 1945; and OP 1239, 5" Rockets, Description Instruction for Use, 29 March 1954 (D-1)

B-12a .30 inch SAA (D-1a)

B-12b .50 inch SAA (D-1b)

B-12c Bombs, Aircraft Practice (D-1c)

B-12d Rocket, Practice, 2.25" SCAR (D-1d)

B-12e Rockets, 4.5-inch (D-1e)

B-12f Rockets, 5-inch HVAR (D-1f)

B-13 Green, Constance McLaughlin, Harry C. Thomson, and Peter C. Roots. The Ordnance Department: Planning Munitions for War. Washington, D.C.: Office of the Chief of Military History, Department of the Army, 1955 (D-2)

B-14 Memorandum, U.S. Army Corps of Engineers, Jacksonville District, CESAJ-PD-EE, 29 Jul 92, subject: DERP-FUDS Inventory Project Report (INPR) for Site No. I04FL033700, Air To Ground Gunnery Range, Indian Rocks, Florida (with 3 enclosures) (E-1 & 2)

B-14a Site Survey Summary Sheet (E-1)

B-14b Findings and Determination of Eligibility (E-1)

B-14c Project Summary Sheet (E-2)

B-15 Report. "Owned, Sponsored and Leased Facilities, 31 December 1945." Reports Control Symbol: AMD-1, prepared by Office of the Chief of Engineers. (E-3)

B-16 "Leased Property Inspection Report." Prepared by Corps of Engineers, Office of the Division Engineer, South Atlantic Division, 6 March 1945 (with accompanying letter of distribution) (E-4)

B-17 Report. "Second Report of the Commanding General of the Army Air Forces to the Secretary of War." Prepared by General H. H. Arnold, February 27, 1945, page 77 (E-5)

B-18 Average Annual Temperature and Precipitation Table for St. Petersburg. Extracted from U.S. Department of Agriculture, Soil Survey of Pinellas County, Florida, September 1979, page 62 (E-6)

B-19 Letter. A letter from Major General Muir S. Fairchild, Director of Military Requirements, to the Commanding General of the Third Air Force, Tampa, FL, subject: Promotion and Facilitation of Aerial Machine Gun Practice Firing and Bombing Practice; September 29, 1942 (F-1)

B-20 Letter. A request from the Mayor of the City of Belleair Beach to the Commander of the 547th Ordnance Detachment, Fort Gillam (sic), GA, to clear the beach area of "all explosives or simulated explosive devices," July 30, 1975.(F-2)

B-21 Letter. A thank you from the Mayor of the City of Belleair Beach to the Secretary of the Army for the recently completed ordnance cleanup, September 15, 1975. (F-3)

B-22 Letter. A thank you from the Mayor of the City of Belleair Beach to the Secretary of the Navy for the recently completed ordnance cleanup, September 15, 1975. (F-4)

B-23 Telephone Conversation Record. A handwritten note from the Belleair Beach Chief of Police to the Mayor describing a conversation with a sergeant from the 66th Ordnance Detachment (EOD), Patrick AFB, concerning the discovery of two WW II rockets, June 20, 1977. (F-5)

B-24 Letter. A request from the Mayor of the City of Belleair Beach to the Secretary of the Navy, to send someone to evaluate whether a full scale search is again necessary due to the recent discovery of three more rockets, June 28, 1977. (F-6)

B-25 Letter. Notification from the Mayor of the City of Belleair Beach to the Commanding Officer of NAS Cecil Field of the probable assignment of his organization to an ordnance cleanup, July 5, 1977. (F-7)

B-26 Letter. A response from the Deputy Chief of Naval Operations (Surface Warfare) to the Mayor of the City of Belleair Beach concerning the Mayor's request for assistance from the Navy, 1 August 1977. (F-8)

B-27 Message, CNO, Washington, DC, 011705Z Aug 77, subject: SURVEY OF BELLEAIR BEACH, FL FOR SUBMERGED UNEXPLODED ORDNANCE (UXO). (F-9)

B-28 Letter. A response from the acting Commanding Officer of NAS Cecil Field to the Mayor of the City of Belleair Beach concerning the Mayor's letter, 3 August 1977. (F-10)

B-29 Letter. A request from the Belleair Beach Chief of Police to the Commanding Officer of the 66th Ordnance Detachment (EOD), Patrick AFB, for EOD assistance, May 20 1986. (F-11)

B-30 Letter. A trip report from the commander of a naval EOD team to the Belleair Beach Police Department describing their recent visit to search for unexploded ordnance, 29 May 1986. (F-12)

B-31 Letter. A thank you from the Mayor of City of Belleair Beach to the Commanding Officer of NAS Cecil Field for the recent visit of the naval EOD team, June 26, 1986. (F-13)

B-32 Note. Local departmental correspondence from the Belleair Beach Chief of Police to the Belleair Beach Mayor, subject: Search for and Removal of any U.S. Ordnance From the Waters Off Belleair Beach By U.S. Navy Explosive Group Personnel, July 10, 1986. (F-14)

B-33 Newspaper article concerning the specific discovery/ recovery of ordnance onsite in 1972 (H-1)

Article. "'Dud' World War II Rocket is Recovered." St. Petersburg Times, 13 June 1972, p. 2B.

B-34 Newspaper articles concerning the specific discovery/ recovery of ordnance onsite in 1975 (H-2)

B-34a Article. "Bomb found offshore at Belleair Beach." St. Petersburg Times, 24 July 1975, p. 2B. (H-2a)

B-34b Article. "Leftovers Of War May Ignite Cleanup." Newspaper Unknown, 30 July 1975, p. unknown. (H-2b)

B-34c Article. "Minesweepers asked to remove World War II bombs from Gulf." St. Petersburg Times, 31 July 1975, p. 4b. (H-2c)

B-34d Article. "Bombs Away!." Pinellas Times, 31 July 1975, p. unknown. (H-2d)

B-34e Article. "Bomb Removal Requested." Clearwater Sun, 1 August 1975, p. unknown. (H-2e)

B-34f Article. "Be Wary of Bombs." Clearwater Sun, 1 August 1975, p. unknown. (H-2f)

B-34g Article. "Army, Navy to make bomb survey at beach." Pinellas Times, August 1975 (exact day unknown), p. unknown. (H-2g)

B-34h Article. "Belleair Beach Seeks Help in Beach Cleanup." Clearwater Sun, 8 August 1975, p. unknown. (H-2h)

B-34i Article. "Hunting Bombs: Beach city's officials worry over new fad." Pinellas Times, 6 August 1975, p. unknown. (H-2i)

B-34j Article. "Beach strollers hunt for bombs, worry Belleair Beach officials." St. Petersburg Times, 6 August 1975, p. 3b. (H-2j)

B-34k Press Release. "Beach Sweep." From Belleair Beach Mayor's Office, 7 August 1975. (H-2k)

B-34l Article. "Bomb war fizzles." Pinellas Times, 13 August 1975, p. unknown. (H-2l)

B-34m Picture. Caption Title: "Flipped Out." Clearwater Sun, 14 August 1975, p. 1a. (H-2m)

B-34n Article. "Bomb Experts Hit The Beach." Clearwater Sun, 14 August 1975, p. 1b. (H-2n)

B-34o Article. "Battle of bombs begins at beach." Pinellas Times, 14 August 1975, p. 1. (H-2o)

B-34p Press Release. From Belleair Beach Mayor's Office, 22 August 1975. (H-2p)

B-34q Article. "Relics From Beach May Be Explosive." Clearwater Sun, 23 August 1975, p. 1a. (H-2q)

B-34r Article. "Explosives in Belleair Beach bombs." St. Petersburg Times, 23 August 1975, p. 2b. (H-2r)

B-34s Article. "Family's bomb souvenir a live one." St. Petersburg Times, 24 August 1975, p. 11b. (H-2s)

B-34t Editorial. "Please Collect Shells Instead." Clearwater Sun, 25 August 1975, p. 8a. (H-2t)

B-34u Article. "Bomb sweep to begin Friday." Pinellas Times, 28 August 1975, p. unknown. (H-2u)

B-34v Article. "Gulf floor combed for explosives." St. Petersburg Times, 30 August 1975, p. 2B. (H-2v)

B-34w Article. "Bomb Cleanup Netting Cache." Clearwater Sun, 3 September 1975, p. unknown. (H-2w)

B-34x Article. "Army to Explode Bombs." Newspaper Unknown, 6 September 1975, p. unknown. (H-2x)

B-34y Picture. Caption: "On dry land, the barnacle-encrusted World War II rockets 'really stink'." St. Petersburg Times, 7 September 1975, p. unknown. (H-2y)

B-34z Article. "A legacy of World War II harvested." St. Petersburg Times, 10 September 1975, p. 1D. (H-2z)

B-34aa Article. "Bombs on Beach 'Dangerous'." Tampa Tribune, 1975 (exact date unknown), p. unknown. (H-2aa)

B-34ab Article. "Hunting bombs is hard, stinky work, but the pros like it." Pinellas Times, 1975 (exact date unknown), p. 1A. (H-2ab)

B-34ac Article. "Beach bombs: a real danger." Pinellas Times, 1975 (exact date unknown), p. unknown. (H-2ac)

B-34ad Article. "Police Explode Bomb." Clearwater Sun, 1975 (exact date unknown), p. 1A. (H-2ad)

B-35 Newspaper articles concerning the specific discovery/ recovery of ordnance onsite in 1980

B-35a Article. "Divers in gulf find bombs from World War II." St. Petersburg Times, 9 June 1980, p. 1B. (H-3a)

B-35b Article. "Divers find more bombs off Belleair Beach." St. Petersburg Times, 12 June 1980, p. 6B. (H-3b)

B-36 Newspaper articles concerning the specific discovery/ recovery of ordnance onsite in 1986

B-36a Article. "Practice bomb found off Belleair Beach." St. Petersburg Times, 17 May 1986, p. 1B. (H-4a)

B-36b Article. "Naval frogmen surface at Belleair Beach." Belleair Bee, 29 May 1986, p. 1. (H-4b)

B-37 Article. "Lethal Legacy." St. Petersburg Times, 3 May 1993, p. 1B. (H-5)

B-38 Personal Interviews conducted by the SI Team (Appendix I)

B-39 Present-day Photographs taken by the SI Team, 6-14 December 1993 (Appendix J)

B-40 View of Gulf Boulevard, photo taken in 1932 in the vicinity of Indian Rocks Beach; from the book, INDIAN ROCKS: A PICTORIAL HISTORY, compiled by the Indian Rocks Area Historical Society, published by Great Outdoors Publishing Company, St. Petersburg, FL, 1980, pg. 70 (K-1)

B-41 View of what is now Belleair Shore, photo taken in 1946; from the book, INDIAN ROCKS: A PICTORIAL HISTORY, compiled by the Indian Rocks Area Historical Society, published by Great Outdoors Publishing Company, St. Petersburg, FL, 1980, pg. 70 (K-2)

B-42 Aerial Photograph of Northern Sand Key (what is now Belleair Beach and Belleair Shores) taken on April 2, 1942 (K-3)

B-43 Aerial Photograph of Sand Key taken February 3, 1993 which shows Belleair Beach from northern city limits to 25th Street - covers approximately the northern half of the former Indian Rocks Air-to-Ground Gunnery Range Impact Area (K-4)

B-44 Aerial Photograph of Sand Key taken February 3, 1993 which shows Belleair Beach from Harrison Avenue to 16th Street - covers approximately the southern half of the former Indian Rocks Air-to-Ground Gunnery Range Impact Area (K-5)

B-45 Aerial Photograph of Sand Key taken February 3, 1993 which shows Belleair Shores from Belleair Beach Causeway to Indian Rocks Beach Township - covers the entire former Indian Rocks Anti-Aircraft Gunnery Range Gun Emplacement Site (K-6)

B-46 Sectional Area Chart for Miami (N-8) showing Restricted Areas. Compiled and printed by the U.S. Coast Guard and Geodetic Survey, July 13, 1944. (L-1)

B-47 Real Estate Map for the Indian Rocks Air-to-Ground Gunnery Range and Anti-Aircraft Gunnery Range. Prepared by the War Department, Office of the Chief of Engineers, Construction Division; approved 31 July 1944. (L-2)

B-48 Soil Map extracted from U.S. Department of Agriculture, Soil Survey of Pinellas County, Florida, September 1979. (L-3)

B-49 Shoreline Change Map of Northern Sand Key. Extracted from Coastal Zone Atlas: Northern Pinellas County, Florida. Davis, Richard A., Jr., Tampa, FL: Department of Geology, University of South Florida, September 1982, page 13. (L-4)

B-50 Plat Map of Belleair Beach, Florida (L-5)

ORDNANCE AND EXPLOSIVES
ARCHIVES SEARCH REPORT
FOR
INDIAN ROCKS AIR-TO-GROUND GUNNERY RANGE
BELLEAIR BEACH, FLORIDA
PROJECT NUMBER I04FL033701

APPENDIX C

GLOSSARY

APPENDIX C

GLOSSARY

AA	Anti-Aircraft
AAF	Army Air Forces
AAFld	Army Air Field
AP	Armor-Piercing
AR	Aircraft Rocket
ASR	Archives Search Report
BD/DR	Building Demolition/Debris Removal
CAL	Caliber
CEHND	Corps of Engineers, Huntsville Division
CENCD	Corps of Engineers, North Central Division
CENCR	Corps of Engineers, North Central Division, Rock Island District
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CESAD	Corps of Engineers, South Atlantic Division
CESAJ	Corps of Engineers, South Atlantic Division, Jacksonville District
CWM	Chemical Warfare Materiel
DA	Department of Army
D.B.	Double Base
DERA	Defense Environmental Restoration Account
DERP	Defense Environmental Restoration Program
DOD	Department of Defense
EE/CA	Engineering Evaluation/Cost Analysis
EOD	Explosive Ordnance Disposal
EPA	Environmental Protection Agency
FDE	Findings and Determination of Eligibility
FNH	Flashless Nonhygroscopic
FS	Feasibility Study
FUDS	Formerly Used Defense Site(s)
gr	Grain
HE	High Explosive
HTRW	Hazardous, Toxic and Radiological Waste
HTW	Hazardous and Toxic Waste
HVAR	High Velocity Aircraft Rocket
I	Incendiary
INPR	Inventory Project Report
IRA	Interim Remedial Action
IRP	Installation Restoration Program
M	Model Number
MG	Machine Gun
Mk	Mark
mm	Millimeter
MT	Mechanical Time
NH	Nonhygroscopic
OEW	Ordnance and Explosive Waste

PA	Preliminary Assessment
P.D.	Point Detonating
PIR	Pressure-arming, impact-operating rocket fuze
PN	Project Number
RA	Remedial Action
RAC	Risk Assessment Code
RD	Remedial Design
RD/RA	Remedial Design/Remedial Action
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
SAA	Small Arms Ammunition
SARA	Superfund Amendments and Reauthorization Act
SCAR	Subcaliber Aircraft Rocket
SI	Site Investigation or Site Inspection
SQ	Superquick
T	Tracer
TSQ	Time Superquick
USA	U.S. Army
USACE	U.S. Army Corps of Engineers
USADACS	U.S. Army Defense Ammunition Center and School
USAEDH	U.S. Army Engineer Division, Huntsville
USATCES	U.S. Army Technical Center for Explosives Safety
UXO	Unexploded Ordnance
WAA	War Assets Administration
WD	War Department
#	Pounds (lbs.)

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APPENDIX D

TEXTS/MANUALS

APPENDIX D

TEXTS / MANUALS

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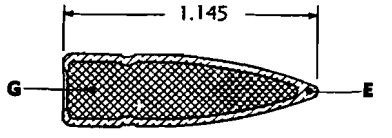
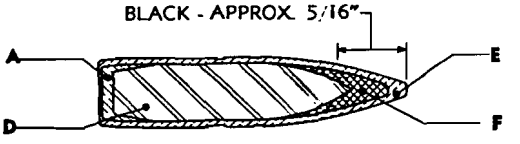
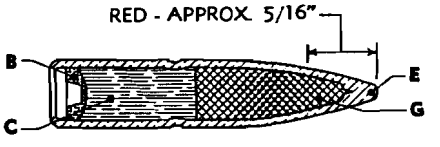
F — POINT FILLER-LEAD "T" SHOT
G — SLUG-LEAD WITH ANTIMONY
H — BODY PLUG-LEAD SHOT
I — INCENDIARY COMPOSITION
J — STEEL BODY



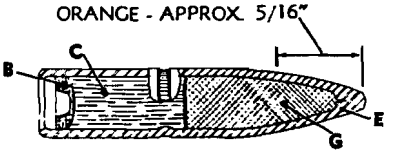
CAL. .30 BALL BULLET, M2



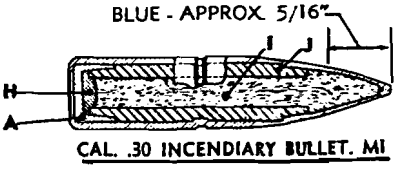
CAL. .30 ARMOR-PIERCING BULLET, M2



CAL. .30 TRACER BULLET, M1



CAL. .30 TRACER BULLET, T10



CAL. .30 INCENDIARY BULLET, M1

RA PD 4511C

Figure 27 — Caliber .30 Bullets — Cross Section

D–1a

CARTRIDGE, Ball, Cal. .30, M1906.

General. While the cal. .30, M1, and cal. 30, M2, Ball Ammunition have superseded the M1906 as standard items, the description of the latter is of value, in view of the stock of M1906 Ammunition that remains on hand.

Visual identification. This cartridge may be distinguished from the M1 and M2 Ball Rounds by the color of the jacket of the bullet, which is cupronickel and has a silvery appearance. Also, the numerals on the head of the cartridge case run from "21" downward.

Components. The cartridge consists of a cartridge case, primer, propelling charge, and bullet. The complete assembly weighs approximately 395 grains.

The bullet is pointed, having a square or cylindrical base, and the length of the bullet is approximately 1.085 inches. It has a jacket of cupronickel with a lead core hardened with antimony (97½ percent lead and 2½ percent antimony). The bullet is secured in the neck of the cartridge case by crimping the mouth into a cannelure on the bullet. The pull required to extract the bullet from the case is 75 pounds (minimum bullet pull).

External ballistics, maximum range (approx.) ..... 3,450 yd
Average maximum pressure ..... 52,000 lb per sq in.
Velocity:
- At 78 ft ..... 2,640 ft per sec
- At 53 ft ..... 2,660 ft per sec
- At muzzle ..... 2,700 ft per sec

Muzzle energy ..... 2,429 ft-lb

CARTRIDGE, Ball, Cal. .30, M1.

General. This cartridge is a limited standard item of issue and is used in the same weapons and for the same purposes as the CARTRIDGE, ball, cal. .30, M2.

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

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

The bullet consists of two parts, a lead alloy core, composed of 90 percent lead and 10 percent antimony, and a gilding metal jacket. An alternative bullet having a gilding metal jacket and a core composed of 97½ percent lead and 2½ percent antimony may also be used. The base of either bullet has a 9-degree taper, called a boattail. The over-all length of the M1 Bullet is 1.32 inches, and that of the M1 Alternative Bullet, 1.265 inches. The mouth of the cartridge case is crimped into the knurled cannelure at assembly and a minimum pull of 45 pounds is required to remove the bullet from the case.

External ballistics, maximum range (approx.) ..... 5,500 yd
Average maximum pressure ..... 48,000 lb per sq in.
Velocity:
- At 78 ft ..... 2,600 ft per sec
- At 53 ft ..... 2,620 ft per sec
- At muzzle ..... 2,647 ft per sec

Muzzle energy ..... 2,675 ft-lb

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

CARTRIDGE, Ball, Cal. .30, M2.

General. This cartridge is a current standard item of issue and is used in machine guns and rifles against personnel and light materiel targets.

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

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

The bullet consists of two parts, a lead alloy core, composed of 90 percent lead and 10 percent antimony, and a gilding metal jacket. An alternative bullet having a gilding metal jacket, and a core composed of 97½ percent lead and 2½ percent antimony may also be used. The base of the bullet retains its cylindrical shape to the base line. The over-all length of the M2 Bullet is 1.125 inches, and that of the M2 Alternative Bullet is 1.103 inches. A minimum pull of 45 pounds is required to remove the bullet from the case.

External ballistics, maximum range (approx.) ..... 3,500 yd
Average maximum pressure ..... 50,000 lb per sq in.
Velocity:
- At 78 ft ..... 2,740 ft per sec
- At 53 ft ..... 2,755 ft per sec
- At muzzle ..... 2,805 ft per sec

Accuracy (from accuracy rifle). Average of mean radii of all targets of 500 yards not greater than 6.5 inches; at 600 yards not greater than 7.5 inches.

D-1a

AMMUNITION INSPECTION GUIDE

CARTRIDGE, Armor-piercing, Cal. .30, M2.

General. This cartridge is a current standard item of issue and is fired from machine guns and rifles. It is designed for use against armored aircraft, armored vehicles, concrete shelters, and similar bullet-resisting targets.

Visual identification. This cartridge may be identified by the additional cannelure and the blackened tip of the bullet.

Components. The cartridge consists of a cartridge case, primer, propelling charge, and bullet. The complete assembly weighs approximately 414 grains.

The bullet consists of four parts: a gilding metal jacket, a tungsten chrome steel core, a lead "T"-shot point filler, and a gilding metal base filler. The over-all length of this bullet is 1.370 inches and its point is blackened for a distance of approximately $^{9}/_{32}$ inch. The base of the bullet is cylindrical down to the base line where it has a slightly beveled edge. The mouth of the case is crimped into the cut cannelure at assembly, and a minimum pull of 45 pounds is required to remove the bullet from the case.

External ballistics, maximum range (approx.).....3,500 yd
Average maximum pressure.....50,000 lb per sq in.
Velocity:
At 78 ft.....2,715 ft per sec
At 53 ft.....2,730 ft per sec
At muzzle .....2,775 ft per sec

Accuracy. Average of mean radii of all targets at 500 yards, not greater than 9.0 inches; at 600 yards not greater than 10.0 inches.

CARTRIDGE, Tracer, Cal. .30, M1.

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

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

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

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

Exterior ballistics, maximum range (approx.).....3,450 yd
Range of trace.....trace begins at a distance not greater than 125 yd from the weapon, and bullets continue tracing to 750 yd from the weapon
Average maximum pressure.....50,000 lb per sq in.
Velocity:
At 78 ft.....2,650 ft per sec
At muzzle .....2,715 ft per sec

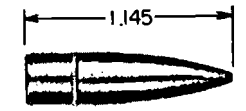
Accuracy. Average of mean radii of all targets at 600 yards less than 15 inches.

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

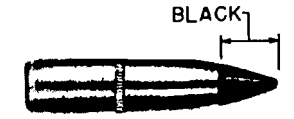
CARTRIDGE, Incendiary, Cal. .30, M1.

General. This cartridge is a standard item of issue for machine guns.

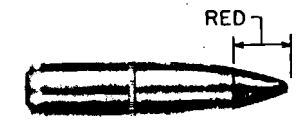
SMALL ARMS AND TRENCH WARFARE



BULLET, BALL, CAL. .30, M2



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



BULLET, TRACER, CAL. .30, M1

RA PD 4521

Figure 78a — Bullets, Cal. .30

AMMUNITION INSPECTION GUIDE

A-BASE FILLER-GILDING METAL
B-COMPOSITION, IGNITER
C-COMPOSITION, TRACER
D-CORE-TUNGSTEN CHROME STEEL
E-JACKET-GILDING METAL
F-POINT FILLER-LEAD "T" SHOT
G-SLUG-LEAD WITH ANTIMONY

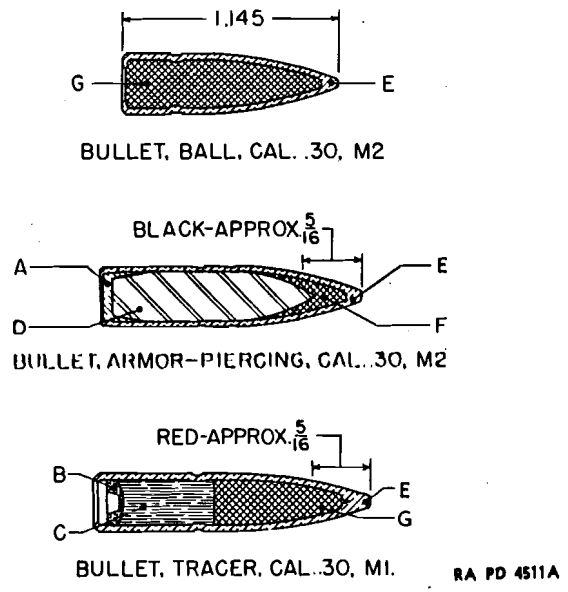


Figure 78b — Bullets, Cal. .30 — Sectioned

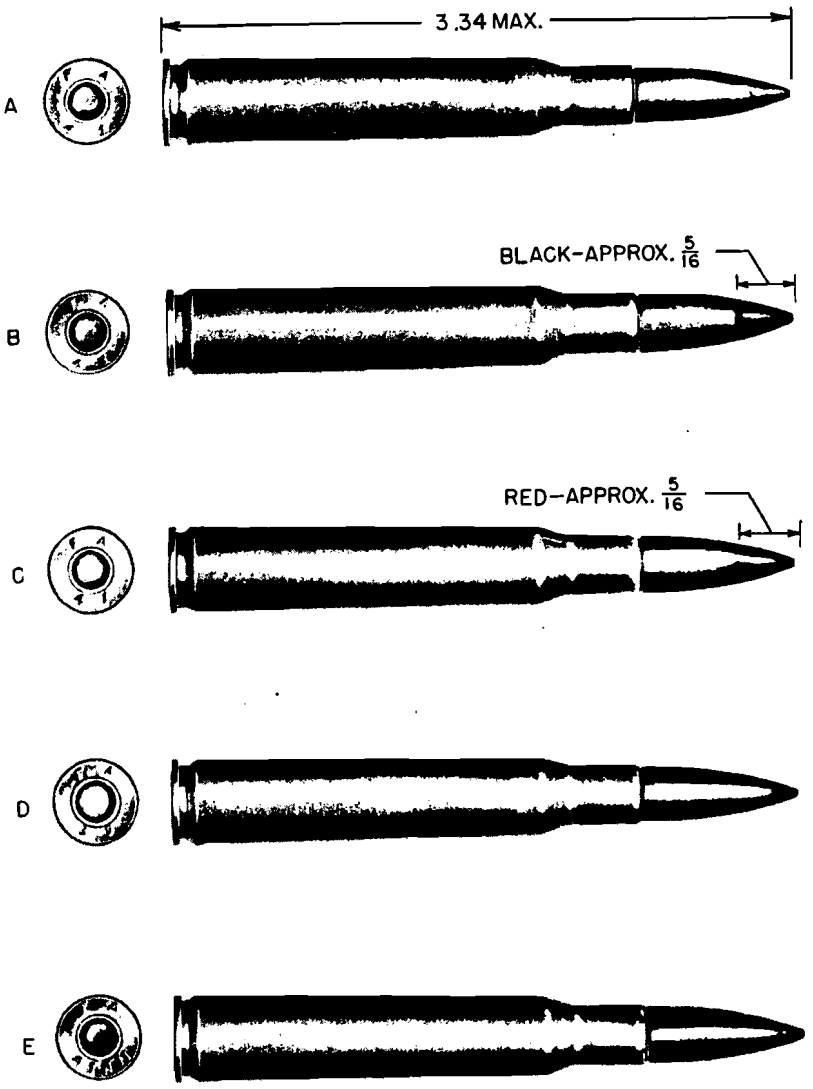
Visual identification. The cartridge resembles the CARTRIDGE, ball, cal. .30, M2, in outward appearance, but it may be identified by the light blue paint on the tip of the bullet.

Components. The cartridge consists of a cartridge case, primer, propelling charge, and bullet.

The bullet consists of four parts: a gilding metal jacket, a hollow steel cylindrical core, an incendiary composition, and a lead base filler. The mouth of the cartridge case is crimped into the knurled cannelure at assembly and a minimum pull of 45 pounds is required to remove the bullet from the case.

CARTRIDGE, Rifle Grenade, Cal. .30, M3.

General. This cartridge is used in cal. .30 Rifles, M1, M1903, M1903A1, and M1917, for discharging antitank rifle grenades. This



A-CARTRIDGE, ARMOR-PIERCING, CAL. .30, M2
B-CARTRIDGE, BALL, CAL. .30, M2
C-CARTRIDGE, TRACER, CAL. .30, M1
D-CARTRIDGE, BALL, CAL. .30, M1
E-CARTRIDGE, BALL, CAL. .30, M2, NATIONAL MATCH
RA PD 4522

Figure 79a — Cartridges, Cal. .30

A — COMPOSITION, IGNITER
B — COMPOSITION, SUB-IGNITER
C — COMPOSITION, TRACER
D — CORE-STEEL
E — CORE-TUNGSTEN CHROME STEEL
F — JACKET-GILDING METAL
G — POINT FILLER-LEAD WITH ANTIMONY
H — SLUG, LEAD WITH ANTIMONY
I — JACKET-GILDING METAL CLAD STEEL
J — INCENDIARY MIXTURE
K — STEEL BODY

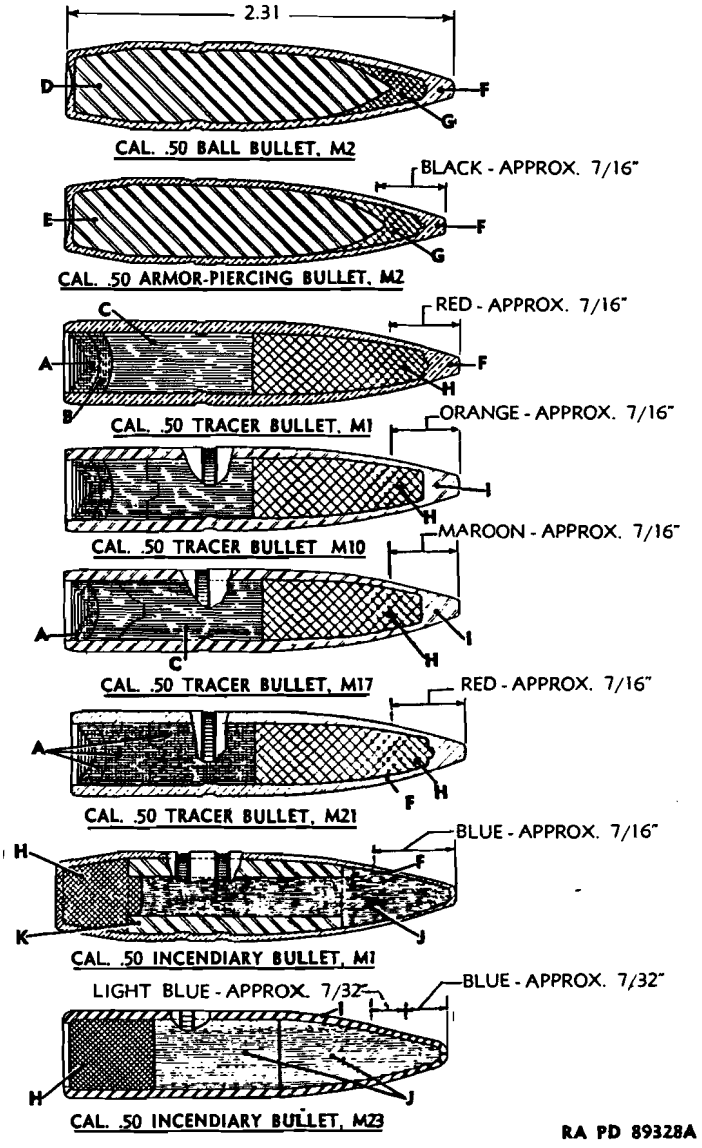


Figure 28 — Caliber .50 Bullets — Cross Section

CARTRIDGE, Ball, Cal. .50, M2.

General. This cartridge is a standard cartridge for all cal. .50 machine guns.

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

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

The bullet consists of three parts; a gilding metal jacket, a soft steel core, and a point filler of lead hardened with antimony. The over-all length of the bullet is 2.29 inches. The base has a 9-degree taper, beginning at a point 0.386 inch from the base. The mouth of the case is crimped into the cannelure at assembly and a minimum pull of 100 pounds is required to extract the bullet from the case.

Exterior ballistics, maximum range (approx.) ..... 7,200 yd

Velocity:

At 78 ft ..... 2,900 ft per sec

At muzzle ..... 2,935 ft per sec

Maximum pressure ..... 52,000 lb per sq in.

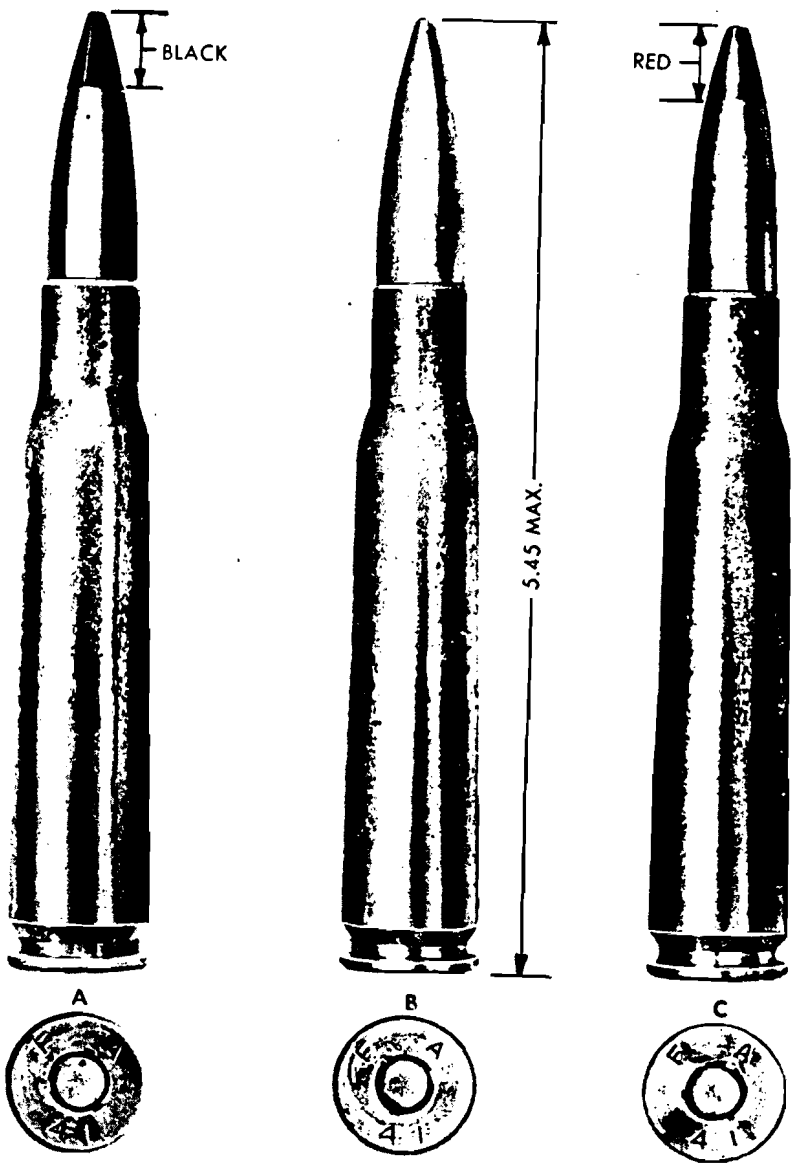
Accuracy. At the time of acceptance, this ammunition will group within mean radii not greater than 8.0 inches at 500 yards, or 9.0 inches at 600 yards, when fired from an accuracy rifle held in a V-block.

CARTRIDGE, Armor-piercing, Cal. .50, M2.

General. This cartridge is a current standard item of issue for all cal. .50 machine guns. It is designed for use against armored aircraft, armored vehicles, concrete shelters, and similar bullet-resisting targets.

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

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



A—CARTRIDGE, ARMOR-PIERCING CAL. .50, M2

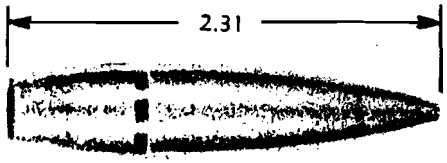
B—CARTRIDGE, BALL, CAL. .50, M2

C—CARTRIDGE, TRACER, CAL. .50, M1

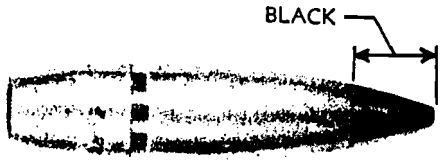
RA PD 2117

Figure 83 — Cartridges, Cal. .50

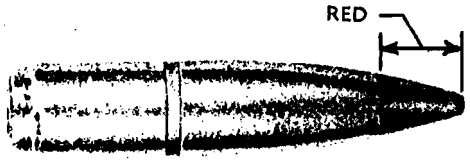
AMMUNITION INSPECTION GUIDE



BULLET, BALL, CAL. .50, M2



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



BULLET, TRACER, CAL. .50, M1

RA PD 4526

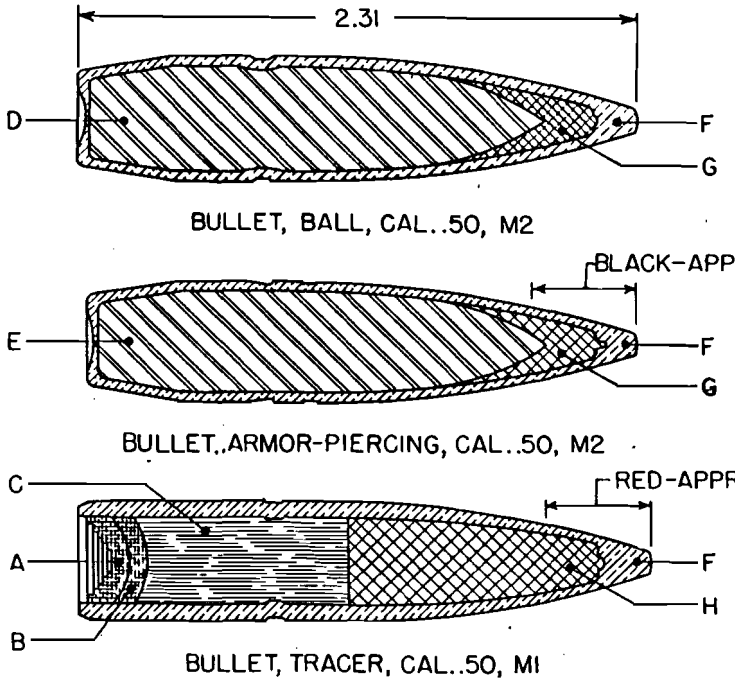
Figure 82a — Bullets, Cal. .50

The bullet consists of three parts: a gilding metal jacket; a tungsten-chrome steel core; and a point filler of lead hardened with antimony. The over-all length of the bullet is 2.29 inches and the point is blackened for approximately $\frac{9}{16}$ inch. The base has a 9-degree taper beginning 0.386 inch from the base. The mouth of the case is crimped into the cannelure at assembly, and a minimum pull of 100 pounds is required to extract the bullet from the case.

Exterior ballistics, maximum range (approx.) . . . . . 7,200 yd
Maximum pressure . . . . . 52,000 lb per sq in.
Velocity:
At 78 ft . . . . . 2,900 ft per sec
At muzzle . . . . . 2,935 ft per sec

SMALL ARMS AND TRENCH WARFARE

A-COMPOSITION, IGNITER
B-COMPOSITION, SUB-IGNITER
C-COMPOSITION, TRACER
D-CORE-STEEL
E-CORE-TUNGSTEN CHROME STEEL
F-JACKET-GILDING METAL
G-POINT FILLER-LEAD WITH ANTIMONY
H-SLUG-LEAD WITH ANTIMONY



RA PD 4512

Figure 82b — Bullets, Cal. .50 — Sectioned

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

CARTRIDGE, Tracer, Cal. .50, M1.

General. The cartridge is standard for observation of fire in all cal. .50 machine guns. It may also serve as an incendiary against balloons and other readily inflammable targets. Care must be exercised in the use of this cartridge to guard against its igniting dry vegetation on the range.

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

Components. The cartridge consists of cartridge case, primer, propelling charge, and bullet. The complete assembly weighs approximately 1,760 grains.

The bullet consists of five parts: a gilding metal jacket; a hardened lead slug which fills the forward end of the jacket; a tracer composition which fills the central portion; an igniter; and subigniter composition, which fills the rear portion. Unlike the bullets for armor-piercing and ball cartridges, this bullet is cylindrical to the base. The base is open to permit the propelling charge to ignite the tracer composition. The over-all length of the bullet is 2.4 inches. The mouth of the case is crimped into the cannelure at assembly, and a minimum pull of 100 pounds is required to extract the bullet from the case.

Exterior ballistics, maximum range:

Bullet ..... 3,500 yd

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

Maximum pressure ..... 52,000 lb per sq in.

Velocity:

At 78 ft..... 2,830 ft per sec

At muzzle ..... 2,865 ft per sec

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

CARTRIDGE, Incendiary, Cal. .50, M1.

General. This cartridge is a standard item of issue for use in cal. .50 machine guns.

Visual identification. The cartridge resembles the CARTRIDGE, ball, cal. .50, M2, in outward appearance, but it may be identified by the light-blue paint on the tip of the bullet.

Components. The cartridge consists of a cartridge case, primer, propelling charge, and bullet.

The bullet consists of four parts: a gilding metal jacket; a hollow steel cylindrical core; an incendiary composition; and a lead base filler. The mouth of the cartridge case is crimped into the knurled cannelure at assembly, and a minimum pull of 100 pounds is required to remove the bullet from the case.

Exterior ballistics—This information is not available at this time.

CARTRIDGE, Blank, Cal. .50, M1.

General. The CARTRIDGE, blank, cal. .50, M1, is a standard item of issue designed for use in cal. .50 machine guns with a blank firing attachment in order to operate the weapon for training purposes.

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

Components. This cartridge consists of a cartridge case, primer, propelling charge, and wad.

The case has a slight annular groove about ¼ inch from the mouth, which serves as a seat for the wad.

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

The powder charge consists of 43 grains of E. C. Blank Fire Powder. After loading, a heavy coat of lacquer is applied to the wad and the mouth is crimped.

CARTRIDGE, Dummy, Cal. .50, M2.

General. This cartridge is standard for use in all cal. .50 machine guns for training purposes. It may also be used for testing the mechanism of the gun.

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

Components. This cartridge consists of a cartridge case, and a bullet.

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

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

BOMB, PRACTICE, 3-POUND, AN-MK. 5 MOD. 1.

General. This bomb is designed to give practice in low-altitude bombardment. It is particularly used for dive bombing practice on water or land. The bomb is rugged enough to allow for reuse after it has been dropped.

Body Description. The bomb body is streamlined or tear drop in shape, having a blunt nose and a tapered tail. It is made in one piece zinc alloy casting. An axial hole somewhat wider at the nose portion, extends through the bomb and is approximately 0.9 inch in diameter. A tail fin which consists of four blades is part of the body. There is no suspension lug on the bomb body. At the nose, a firing mechanism and blank shotgun shell is assembled to provide for a puff of white smoke. The entire length of the bomb body is about 8 inches. The total weight of the bomb body is approximately 2.7 pounds.

Firing Mechanism and Spotting Charge. The firing device consists of two shallow cups separated by a spacer. The firing pin extends through the bottom of one cup. The firing mechanism is held in place at the nose by a cotter pin which passes through holes in the bomb body above the firing pin and thereby prevents it from falling out through the nose and by a shoulder produced by the axial hole becoming smaller in diameter to prevent it from dropping out through the tail of the bomb body.

The Signal Cartridge AN-Mk. 4 consists of a long 10-gage blank shotgun shell 5.75 inches long containing an ejection charge and a pyrotechnic charge which burns above water after impact, forming a large puff of white smoke. To assemble the cartridge, it is only necessary to remove the cotter pin and firing pin assembly. The cartridge is then inserted. It is held by the flange on the brass base of the cartridge coming in contact with the shoulder of the bomb body. The firing pin assembly, having the firing pin directly above the primer of the cartridge, is replaced. The cotter pin is next inserted through holes in the nose of the bomb body to prevent the entire assembly from dropping out. No arming wire is used.

Function. The bomb is dropped, and on impact, the firing pin strikes the primer of the cartridge. The flame produced ignites the black powder which in turn expels a puff of white smoke through the tail of the bomb body to indicate the point of impact. The bomb body is reusable.

Packing. The bomb body and signal cartridge are shipped separately. The bomb bodies are shipped with the firing mechanism assembled to the bomb, 25 per crate. The signals are packed in a paper carton, 20 per carton, 20 cartons are packed per wooden box.

Complete Round Components. A complete round consists of the following components:
BOMB, practice, 3-pound, AN-Mk. 5 Mod. 1
BOMB, signal, practice, AN-Mk. 4

Comparison to Other Models. The AN-Mk. 5 Mod. 1 can be compared to a number of other miniature practice bombs as follows:

AN-Mk. 5. This bomb has a firing mechanism which is less sensitive.

M36. This bomb is the same as the AN-Mk. 5. It is made of a one piece die casting. It utilizes the M4 and M5 Blank 10-gage Shotgun Shell. The M4 has more powder and is used for high altitudes.

AN-Mk. 23. This bomb is 3 pounds in weight, made of cast iron.

AN-Mk. 43. This bomb is 4 pounds in weight, made of lead, and suited for glide and dive bombing. It conserves zinc.

FURTHER REFERENCES: Ordnance Drawings; TM 9-1980, Bombs for Aircraft; TM 3-330, Incendiary Bombs; OS 9-18, Ammunition, General; Ordnance Pamphlet No. 878; Ordnance Pamphlet No. 736; TM 9-1900, Ammunition in General; Pamphlet No. 2, Chemical Warfare; The Ordnance Sergeant; Complete Round Chart No. 5981; O.O. 7224, Ordnance Safety Manual; OS 9-49, Aircraft Depth Bomb Mk. XVII.

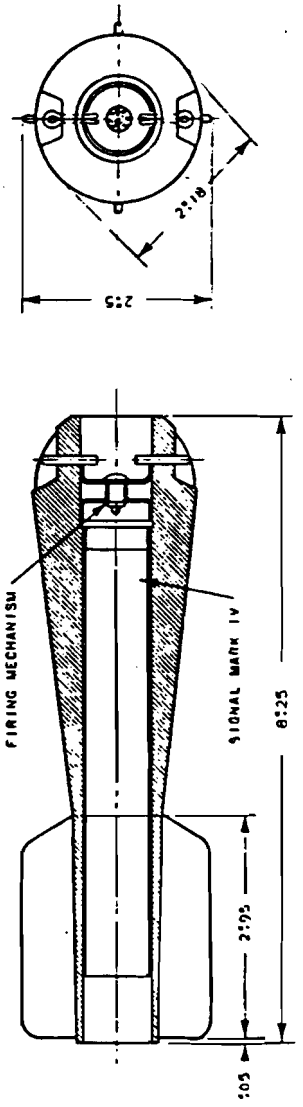


Figure 277 — Practice Bomb Mk. V (Miniature—Navy)

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

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

General Description

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

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

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

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

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

Painting and Marking

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

Use

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

Assembly With the Mk 4 Type Signal

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

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

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

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

4. Inspect the firing-pin assembly for

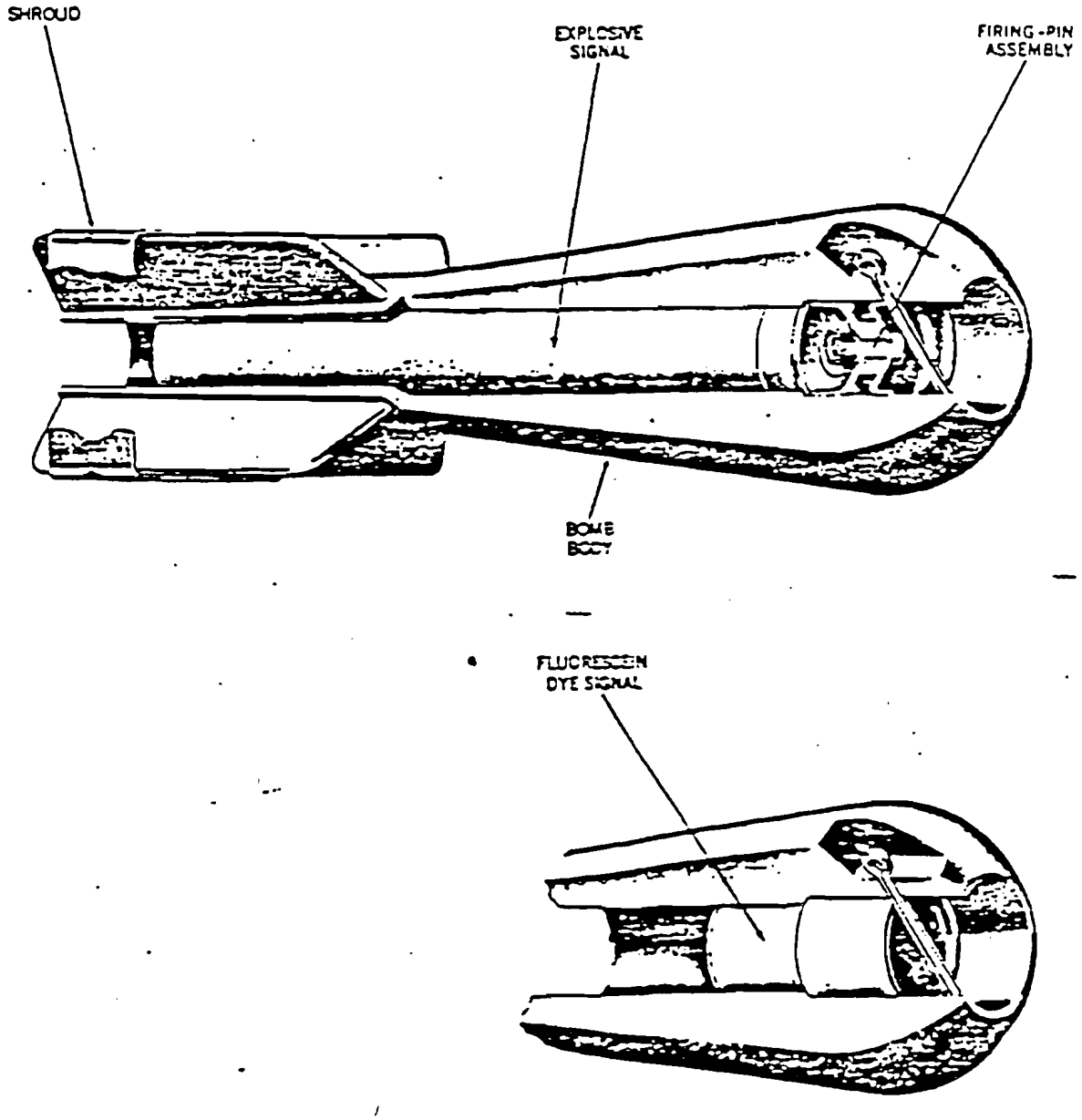


Figure 11-3.—3-lb Miniature Practice Bomb AN-Mk 23 Mod 1, Cutaway View and Detail Showing Signal Mk 5 Mod 0 Installed.

PAINTING AND MARKING

11. **STANDARD NOMENCLATURE** of bombs is the official designation, as: (BOMB, SAP, 500 lb. AN-M58A1). This information with filler and lot number is stenciled on the bomb.

PAINTING AND MARKING: BOMBS

BOMB	BODY	BANDS	MARKING (letters and figs.)
HIGH EXPLOSIVE: (G.P., Demo., AP., SAP., Frag*)			
Filled with TNT or Amatol	Olive Drab	Nose: One 1″ yellow Tail: One 1″ yellow	Black
Filled with Comp B	Olive Drab	Nose: Two 1″ yellow Tail: Two 1″ yellow	Black "Comp B" stenciled on one nose band and one tail band.
PRACTICE	Light Blue	None	White
DRILL	Olive Drab	Nose: One 1″ black Tail: One 1″ black	Black: Drill (inert)
CHEMICAL			
Nonpersistent gas	Blue-Gray	1 Green, nose, tail, and center	Green
Persistent gas	Blue-Gray	2 Green, nose, tail, and center	Green
Irritant smoke (vomiting gas)	Blue-Gray	1 Red, nose, tail, and center	Red
Screening Smoke	Blue-Gray	1 Yellow, nose, tail and center	Yellow
Incendiary	Olive Drab	1 Purple, nose, tail, and center	Purple

* Small fragmentation bombs: nose and tail painted yellow (no bands), Body—olive drab.

MARKING: FUZES

Fuzes are stenciled or stamped with type and model, lot number, number and length of delay.

PAINTING AND MARKING: PRIMER DETONATORS
(See fig. 42)

Head painted:
- All black—0.1 Sec. delay
- ½ black—0.05 Sec. delay
- ¼ black—0.025 Sec. delay
- ⅛ black—0.01 Sec. delay
- All white—Nondelay

Chapter 10

SUBCALIBER ROCKETS

Purpose

The purpose of subcaliber rockets is to train personnel in the technique of rocket firing. Considerable training and practice is required by aircraft pilots to reduce the overall dispersion of rockets fired to the inherent dispersion of the rockets themselves.

Description

General. 2.25 Subcaliber Aircraft Rockets, figure 17, are high-velocity, fin-stabilized, self-propelled missiles with inert heads. They are made up of two major components, a head and a motor. A complete description of the round is given in OP 1187.

Subcaliber Rocket Head. The head is a metal cone threaded at the rear for assembly to the motor. It is hollowed out to attain the proper weight for the desired ballistic characteristics.

Subcaliber Rocket Motor. The motor consists of a metal tube threaded at the front for attaching the rocket head. The tube contains a cylindrical grain of ballistite for a propellant. The propellant is ignited by an electrically fired igniter charge of black powder. The rocket is propelled by the propellant gases escaping through venturi-type nozzles at the rear of the motor tube.

OP 1187

INTRODUCTION

WHAT THEY ARE

The 2.25-inch Subcaliber Aircraft Rockets described in this pamphlet are subcaliber, high velocity, fin stabilized rockets with inert heads.

THEIR PURPOSE

The 2.25-inch Subcaliber Aircraft Rocket is used as a training round in place of the service aircraft rockets.

Only one of the two types of subcaliber rockets is necessary for this purpose since the essential elements in rocket training embody; first, teaching the pilot to put the center of impact of the training round onto the target by adjusting his attack conditions to those originally laid out, and, second, to attempt, by proper flying, to reduce the overall dispersion to the inherent dispersion of the training round.

The assembly sheet on page 3 lists the various combinations of components now in service.

WHERE THEY ARE USED

These rockets are for use in conducting training and refresher courses in forward firing from aircraft.

WEIGHTS AND DIMENSIONS

The weights and dimensions of the various complete rounds, of their individual components, and of the rounds packed in shipping containers are given in the chart of Physical Characteristics of 2.25-inch Subcaliber Aircraft Rockets on page 3.

DESCRIPTION

GENERAL DESCRIPTION

2.25-inch Aircraft Rockets are composed of two major components, the head and the motor.

The Head is of machined steel, diecast zinc or cast iron. It is threaded at the rear for assembly to the motor and is hollowed out to give the head the correct weight to produce proper ballistic characteristics when the rocket is fired.

The Motor consists of the following parts:

1. TUBE. The tube is a seamless, or electrically welded, steel tube which contains the propelling charge and the igniter. It is the combustion chamber for the propellant.

2. MOTOR SHIPPING CAP. This cap protects the threads on the front end of the motor and also acts as an additional moisture seal for the front end of the motor. It must be removed before assembly of motor and head.

3. FRONT CLOSURE DISC. This disc acts as a seal, keeping out moisture and dirt from the front end of the motor. It also serves to retain the igniter and the grain in place in the motor.

4. IGNITER. The igniter is a plastic case containing 14 grams of FFFG black powder and an electric squib. Leads, connected to the squib, pass through the central hole in the propellant grain and extend through the nozzle, where they are connected to the electrical connector cable.

5. PROPELLANT. The Propellant is an extruded cylindrical grain of ballistite. Inhibitor discs, cemented to the ends of the grain, control the burning area and, hence, the pressure developed.

6. GRID. The grid supports the powder grain. During burning, it prevents the powder grain from sliding rearward and clogging the nozzle opening.

7. NOZZLE. The nozzle is a steel venturi through which the gases flow. It directs the gas jet in the desired direction and also provides for the expansion of the gases in the exit cone.

8. NOZZLE CLOSURE. The nozzle closure seals the rear end of the motor. It is crimped to the electrical connector cable, providing a moisture proof seal.

D-1d

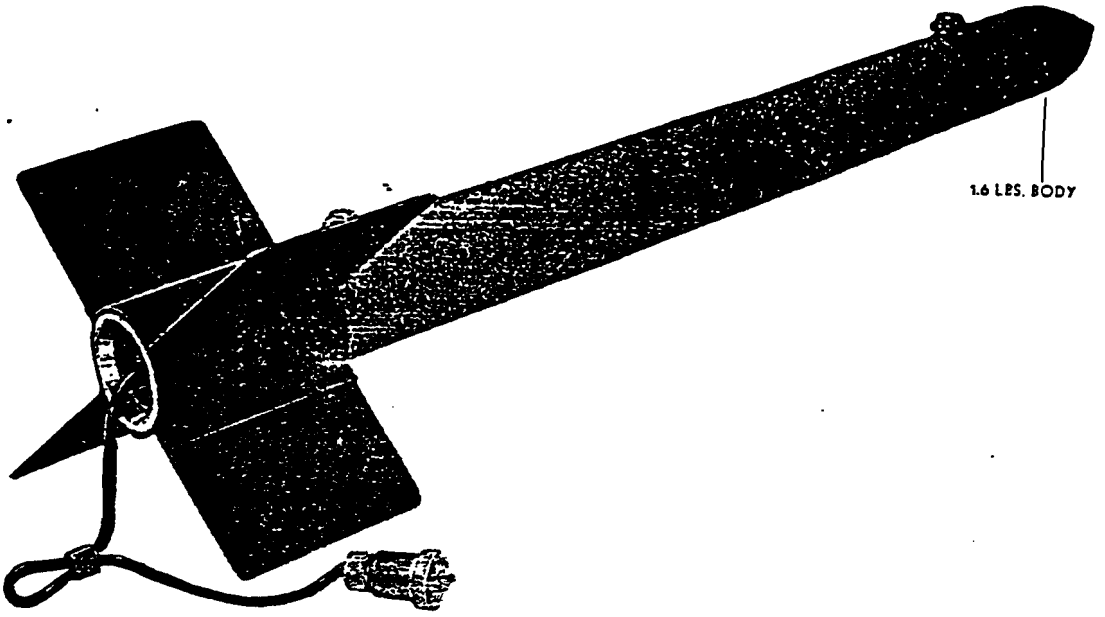


Figure 1.—2.25-inch Subcaliber Aircraft Rockets

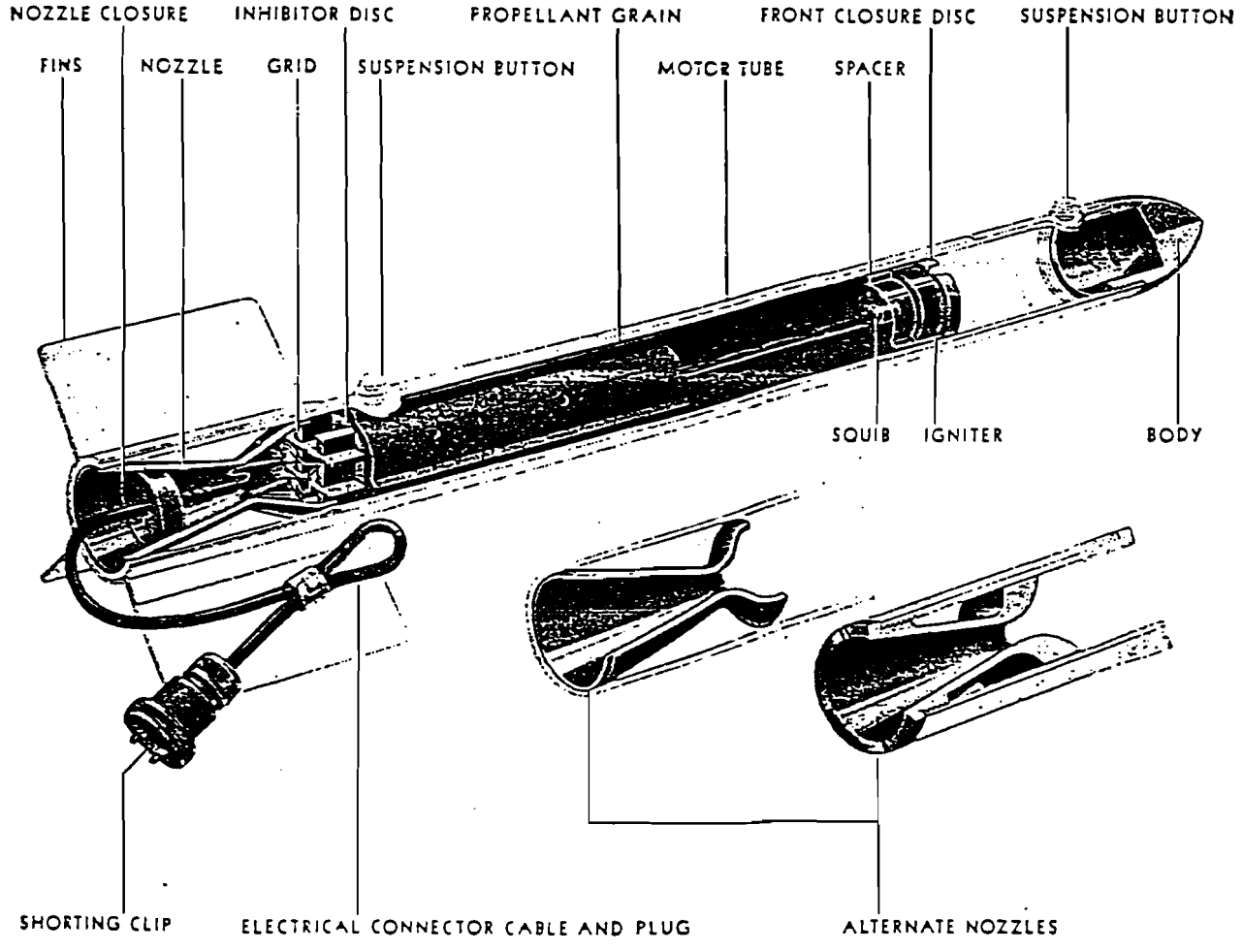


Figure 2—Descriptive View of Rocket

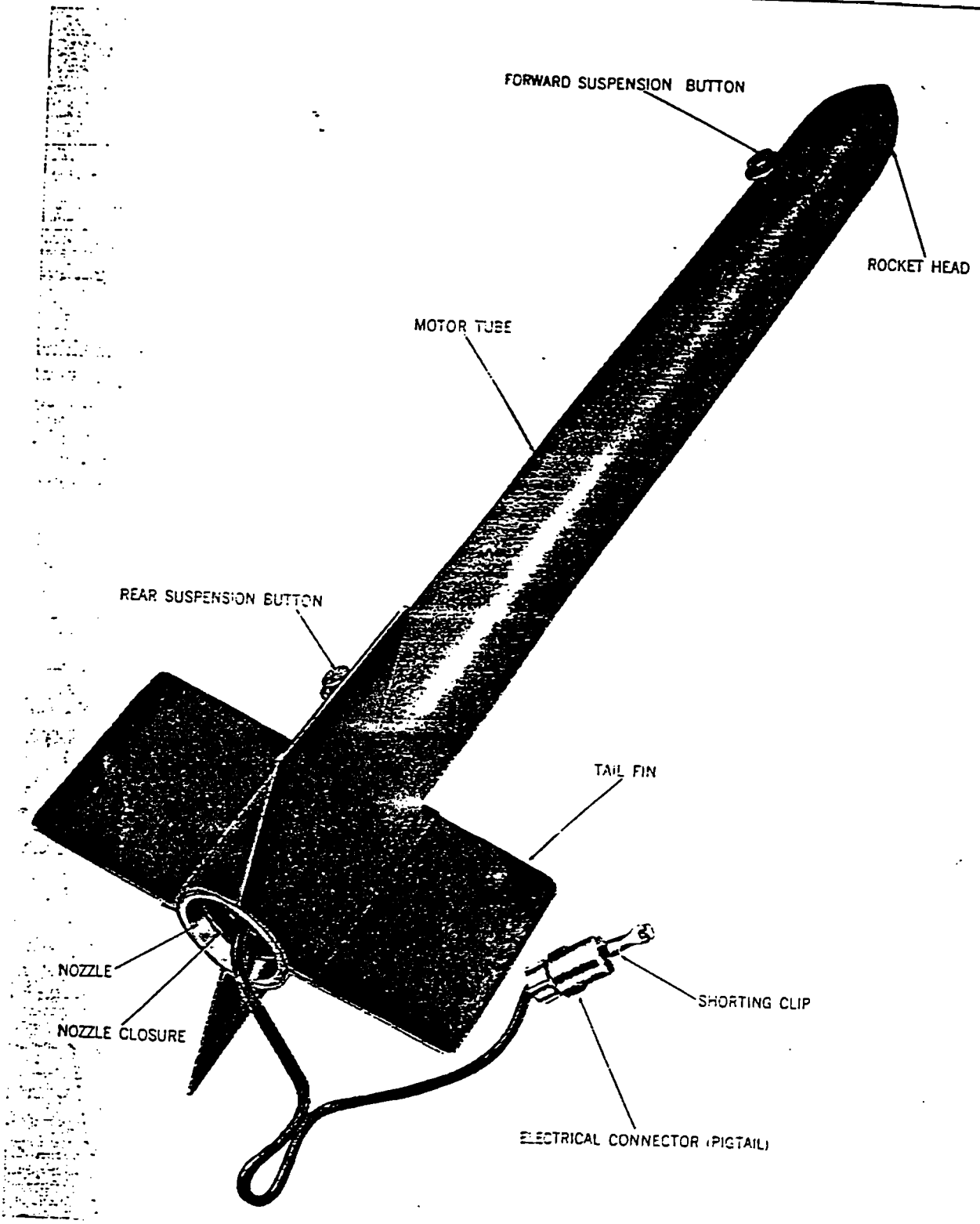


Figure 17—2.25 Subcaliber Aircraft.

Section II. 2.25-INCH ROCKETS

9. General

a. General Discussion. The 2.25-inch, fin-stabilized, subcaliber aircraft rocket (fig. 35) is a Navy type used by the United States Air Force for forward-firing from an aircraft rocket launcher. The rocket is used as practice ammunition in place of the 5.0-inch rocket HVAR which it simulates ballistically. The 2.25-inch rocket is fired from the 5.0-inch rocket launcher Mk 5 adapted for this use by adapter Mk 6. Two lug buttons attached to the motor body of the rocket engage the adapter. Electrical energy to fire the rocket is derived from the electrical system of the aircraft. The rocket consists of an inert head and a motor.

b. Head. The head Mk 3 Mod 2 and other Mods are hollow and threaded externally at the rear to receive the motor.

c. Motor. The motor Mk 11 Mod 0 or 1, Mk 15 Mod 0, or Mk 16 Mod 5 is internally threaded to engage the head. It consists of the motor tube, front closing disk, igniter, propellant, grid, nozzle, nozzle closure electrical cable and igniter plug, suspension buttons and fin assembly. The motor contains the igniter, propellant and grid to position the propellant. Assembled to the motor tube are the nozzle, fin assembly and suspension buttons.

(1) *Fin assembly.* The fin assembly, which is welded to the rear end of the motor, is a sleeve with four equally spaced rectangular fins extending radially.

(2) *Propellant.* The propellant is a single grain Mk 16 Mod 0 or 1 of ballistite. See chapter 4 for detailed information.

(3) *Igniter.* The igniter Mk 112 and Mods is a plastic case containing 14 grams of FFFG black powder and an electric squib. Two lead wires from the squib extend from the igniter passing through the perforation in the propellent grain to the nozzle where they are connected to the electrical cable.

(4) *Igniter plug.* The igniter plug used with motors Mk 11 Mod 0 or 1 and Mk 15 Mod 0 is a Navy type (two-pronged). The igniter plug used with motor Mk 16 and Mods is an Army type (phone-jack).

d. Identification. The rocket is identified by the two suspension buttons on the motor (fig. 35). Painting and marking for identification are in accordance with the scheme prescribed in TM 9–1900.

e. Packing. The rockets are packed as complete rockets (assembled or unassembled), either eight rockets to a wooden box, four rockets to a metal box, or two metal boxes containing four rockets overpacked in a wooden box. Packing and shipping data appear in SM 9–5–1340.

f. Preparation for Firing.

(1) *Assembled rockets.*

(*a*) Remove from packing and inspect for serviceability.

60. Rocket, Practice, 2.25-Inch: Mk 1 Mod 0 SCAR

The rocket is stored and issued assembled. It consists of the 2.25-inch rocket head Mk 3 Mods 0, 2, 3 and the 2.25-inch rocket motor Mk 11 Mod 0 or 1. This motor has 18.50-inch spacing of suspension buttons. Table III lists the complete round nomenclature, used by the Navy, and data. The rocket has the Navy-type igniter plug as shown in figure 5.

61. Rocket, Practice, 2.25-Inch: Mk 4 Mod 0 SCAR

The rocket is stored and issued assembled or unassembled—motor and head in the same packing container. It consists of the 2.25-inch rocket head Mk 3 Mods 0, 2, 3, and 2.25-inch rocket motor Mk 15 Mods 0 or 2. This motor has 6.0-inch spacing of suspension buttons. Table III lists the complete round nomenclature, used by the Navy, and data. The rocket has the Army-type igniter plug.

62. Rocket, Practice, 2.25-Inch: Mk 6 Mod 0 SCAR

The rocket is similar to that described in paragraph 61. It differs chiefly in having 2.25-inch motor Mk 16 Mods 4, 5, and 6 and 18.50-

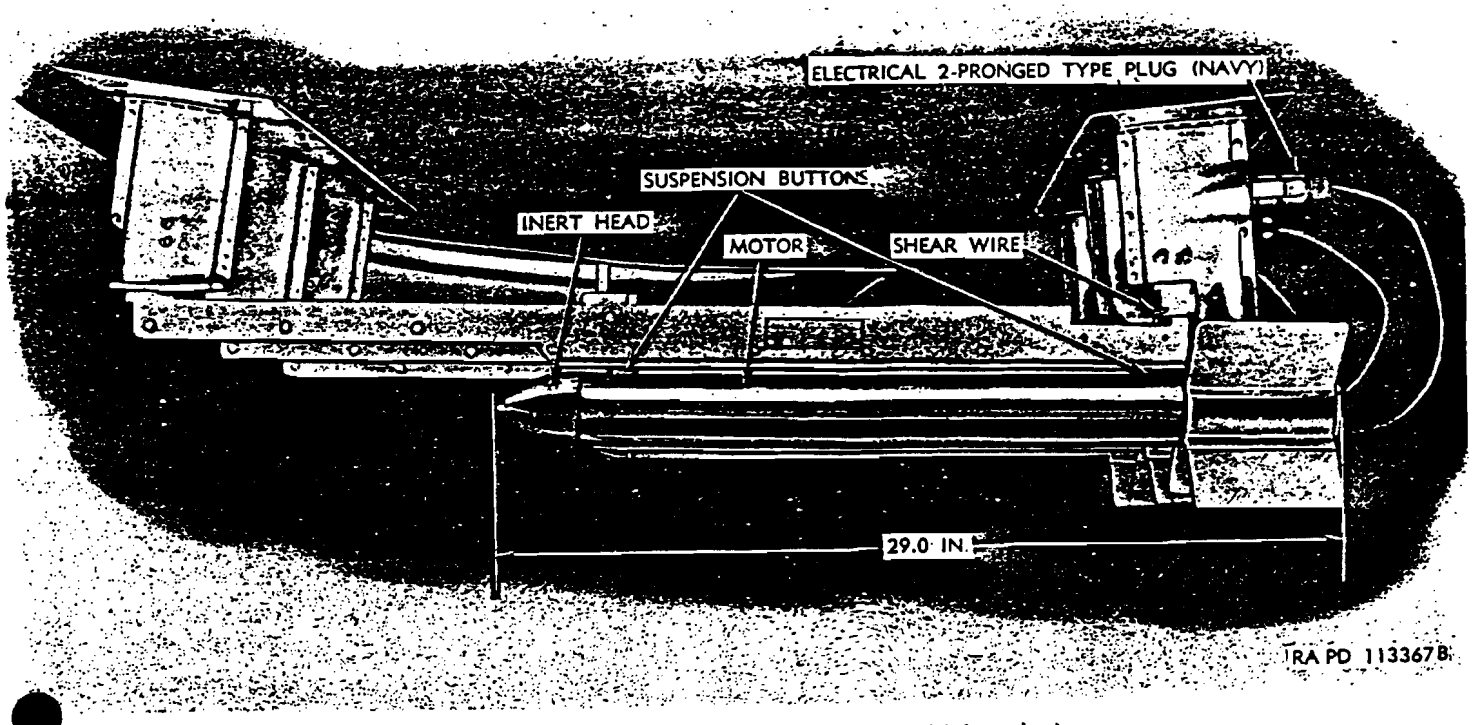


Figure 35. Rocket, practice, 2.25-inch: SCAR (with launcher).

Table II. Components Comprising Complete Rounds of Aircraft Type Rockets and Related Data

Head			Motor			Fuze		Velocity (fps)	Use
Diameter (in.)	Mark and Mods	Filler	Diameter (in.)	Mark and Mods	Propellant grain	Nose	Base		
2.25	Mk 3 Mod 2 Mod 3	Zinc Mal. Iron	2.25	Mod 0 Mk 11 Mod 1	Mod 0 Mk 16 Mod 1	None	None	1,130	Target practice (subcaliber for 5.0-inch rocket)
2.25	Mod 0 Mk 3 Mod 2 Mod 3	Steel Zinc Mal. Iron	2.25	Mk 15 Mod 0 Mod 2	Mk 16 Mod 1	None	None	1,130	Target practice (subcaliber for 5.0-inch rocket)
2.25	Mod 0 Mk 3 Mod 2 Mod 3	Steel Zinc Mal. Iron	2.25	Mod 4 Mk 16 Mod 5 Mod 6	Mk 16 Mod 1	None	None	1,130	

Table III. Physical and Ballistic Data for Aircraft Type Rockets

Size of rocket	2.25-inch		
Army Complete Round Nomenclature.	ROCKET, PRACTICE 2.25-INCH: SCAR.	ROCKET, PRACTICE 2.25-INCH: SCAR.	ROCKET, PRACTICE 2.25-INCH: SCAR.
Navy Complete Round Nomenclature.	2.25-inch Rocket Mk 1 Mod 0 (aircraft practice).	2.25-inch Rocket Mk 4 Mod 0 (aircraft practice).	2.25-inch Rocket Mk 6 Mod 0.
HEAD—Mark and Mod	Mk 3 Mods	Mk 3 Mods	Mk 3 Mods
Length (in.)	3.75	3.75	3.75
Diameter (in.)	2.25	2.25	2.25
Weight (lb)	1.60	1.60	1.60
Type of filler	solid	solid	solid
Motor—Mark and Mod	Mk 11 Mod 0 or 1	Mk 15 Mod 0 or 2	Mk 16 Mod 4, 5, or 6
Length (in.)	26.20	26.20	26.20
Diameter (in.)	2.25	2.25	2.25
Weight (lb)	10.40	10.40	10.40
Model of propellant	Mk 16 Mod 1	Mk 16 Mod 1	Mk 16 Mod 1
Weight of propellant (lb)	1.75	1.75	1.75
FUZE—type, Mark and Mod	None	None	None
ROCKET (assembled)			
Length (in.)	29.20	29.20	29.20
Weight (lb)	12.00	12.00	12.00
Velocity (max) (fps)	11.30	11.30	
Temperature limits (° F.)	20 to 110	20 to 110	20 to 110
Burning time (static) (sec)	0.79 to 0.37	0.79 to 0.37	0.79 to 0.37
Burning time (effective) (sec)	0.64 to 0.10	0.64 to 0.10	0.64 to 0.10
Burn-out point (ft from launcher)	440 to 230	140 to 230	440 to 230

PHYSICAL CHARACTERISTICS OF 2.25 SUBCALIBER AIRCRAFT ROCKETS

MAJOR COMPONENTS OF THE ROCKETS

Head					Motor									
					Designation		Propellant		Grain	Igniter				
Mark	Mod	Material	Length In.	Weight Lbs.	Mark	Mod	Mark	Mod	Weight Lbs.	Mark	Mod	Length In.	Weight Lbs.
1	0	Steel	3.75	1.6	10	0	16	0	1.75	12	2	26.0	10.25
1	1	Zinc	3.75	1.6	10	1	16	1	1.75	12	2	26.0	10.25
2	0	Steel	8.75	8.6	11	all	16	1	1.75	12	0	26.0	10.25
3	0	Steel	3.75	1.6	12	0	17	0	1.12	13	1	26.0	9.6
3	1	Zinc	3.75	1.6	13	all	17	0	1.12	13	0	26.0	9.6
3	2	Zinc	3.75	1.6	11	all	16	1	1.75	12	2	26.0	10.25
3	3	Cast Iron	3.75	1.6	11	all	16	1	1.75	12	2	26.0	10.25

ASSEMBLY SHEET

Complete Round Designation	Weight Lbs.	Length In.	Motor		Head		Subcaliber Designed For:
			Mark	Mod	Mark	Mod	
2.25 TA001	11.85	29	10	0	1, 3	all	3.5-inch Aircraft Rocket
2.25 TA002	11.85	29	10	1	1, 3	all	3.5-inch Aircraft Rocket
2.25 TA003	18.85	34	10	0	2	0	5.0-inch Aircraft Rocket
2.25 TA004	18.85	34	10	1	2	0	5.0-inch Aircraft Rocket
2.25 TA005	11.85	29	11	all	1, 3	all	3.5-inch Aircraft Rocket
2.25 TA006	18.85	34	11	all	2	0	5.0-inch Aircraft Rocket
2.25 TA007	11.2	29	12	0	1, 3	all	5.0-inch Aircraft Rocket
2.25 TA008	11.2	29	13	all	1, 3	all	5.0-inch Aircraft Rocket

SHIPPING AND STOWING WEIGHTS AND DIMENSIONS

Designation		No. Rockets Per Box	Box Size				Weight When Packed
Mark	Mod		Length (in.)	Width (in.)	Height (in.)	Cu. Feet	
1	0	4	29.03	11.22	11.87	2.24	68
2	0	4	29.03	11.22	11.87	2.24	80
3	0	8	30.1	17	12	3.56	126.8

Section V

4.5-INCH ROCKETS

28. TYPES.

a. There are four general types of 4.5-inch rockets which may be distinguished by the type of stabilization.

(1) FOLDING FIN. This type has a circle of fins pivoted on a ring. Prior to firing, the fin blades are folded into the constriction of the motor forming the nozzle. Set-back due to firing, causes the fins to open to a 12-inch spread. This type is represented by the rockets of the M8 series and rockets T22 and T46 (fig. 26).

(2) CIRCULAR FIN (SHROUDS). This type has a fixed shrouded fin of caliber diameter. It is represented by the Navy-type beach-barrage rocket (fig. 27).

(3) FIXED FIN. This type has a large, fixed, four-vane fin, and is equipped with lug bands for firing from the zero-length rail aircraft launcher. The folding-fin type may be converted to this type by means of kit T23 (fig. 28).

(4) SPIN STABILIZED. This type does not use fins, but uses rotation of the rocket for stabilizing flight (fig. 26).

29. FOLDING-FIN TYPE.

a. General. This type of rocket is cylindrical except for the ogival nose and nozzle constriction at the tail. It is issued as unfuzed complete rounds. There is a corresponding practice round for each service model, the only difference being that the shell of the practice round is loaded with inert filler and uses a dummy fuze.

b. Head. The rocket head consists of a shell body and a burster tube (fig. 7). The shell body is approximately 1.6 calibers in length, and has an ogive of 2 calibers radius. The burster tube extends about 15 inches from the base of the shell body into the motor. In addition to increasing the explosive capacity of the head, the burster tube has the advantage of using the motor as an additional source of fragments. The head contains a fuze well which is closed in storage and transit by a plug screwed into the nose of the shell and held by a set screw. The bursting charge consists of 4.3 pounds of cast TNT.

c. Fuze. The standard impact fuze for the service rocket is the point-detonating rocket fuze M4A2 with auxiliary booster M1A1 (par. 47). The standard fuze for the practice rocket is the dummy rocket fuze M6 (par. 48).

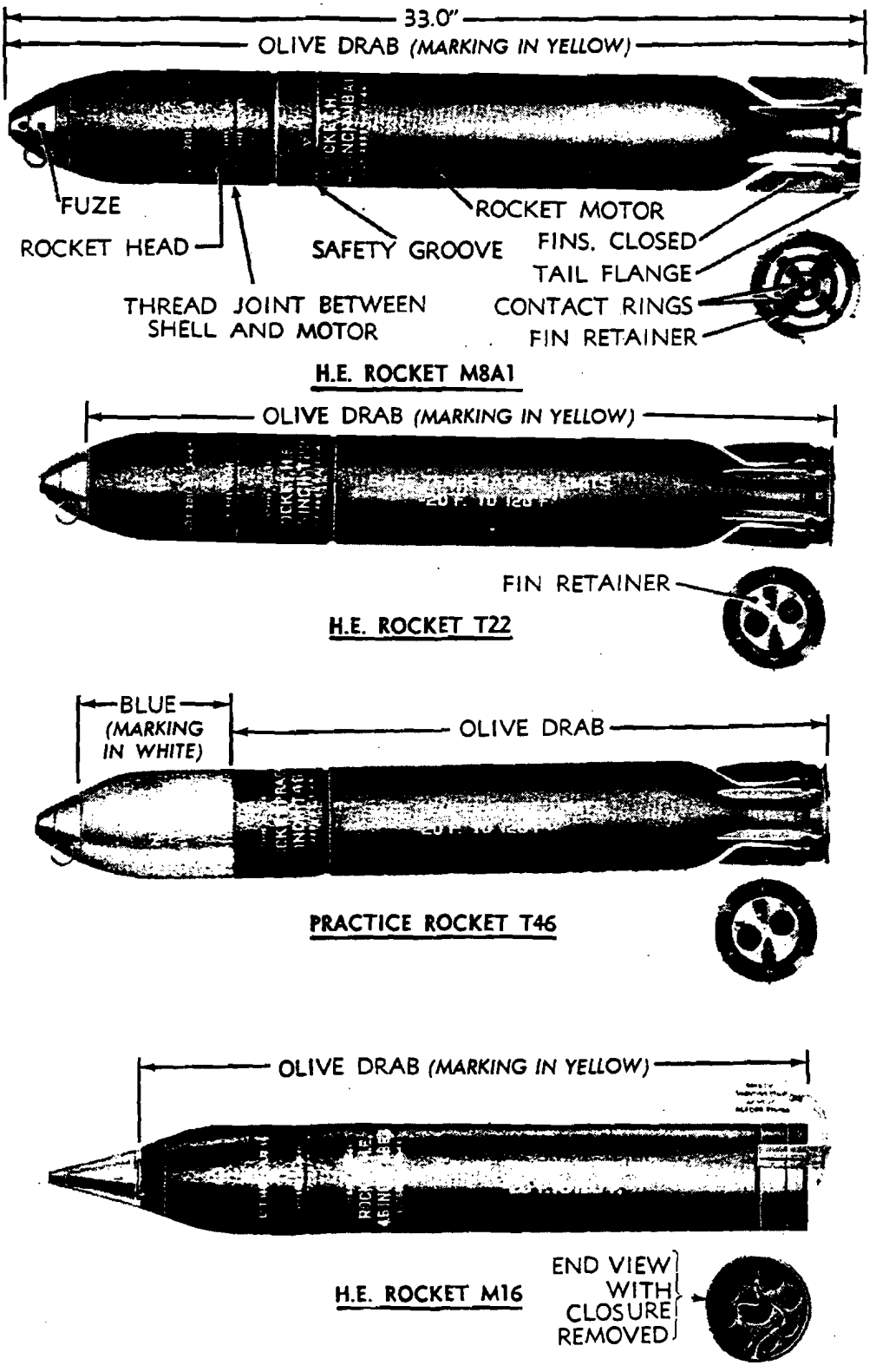


Figure 26 — 4.5-inch Army Rockets

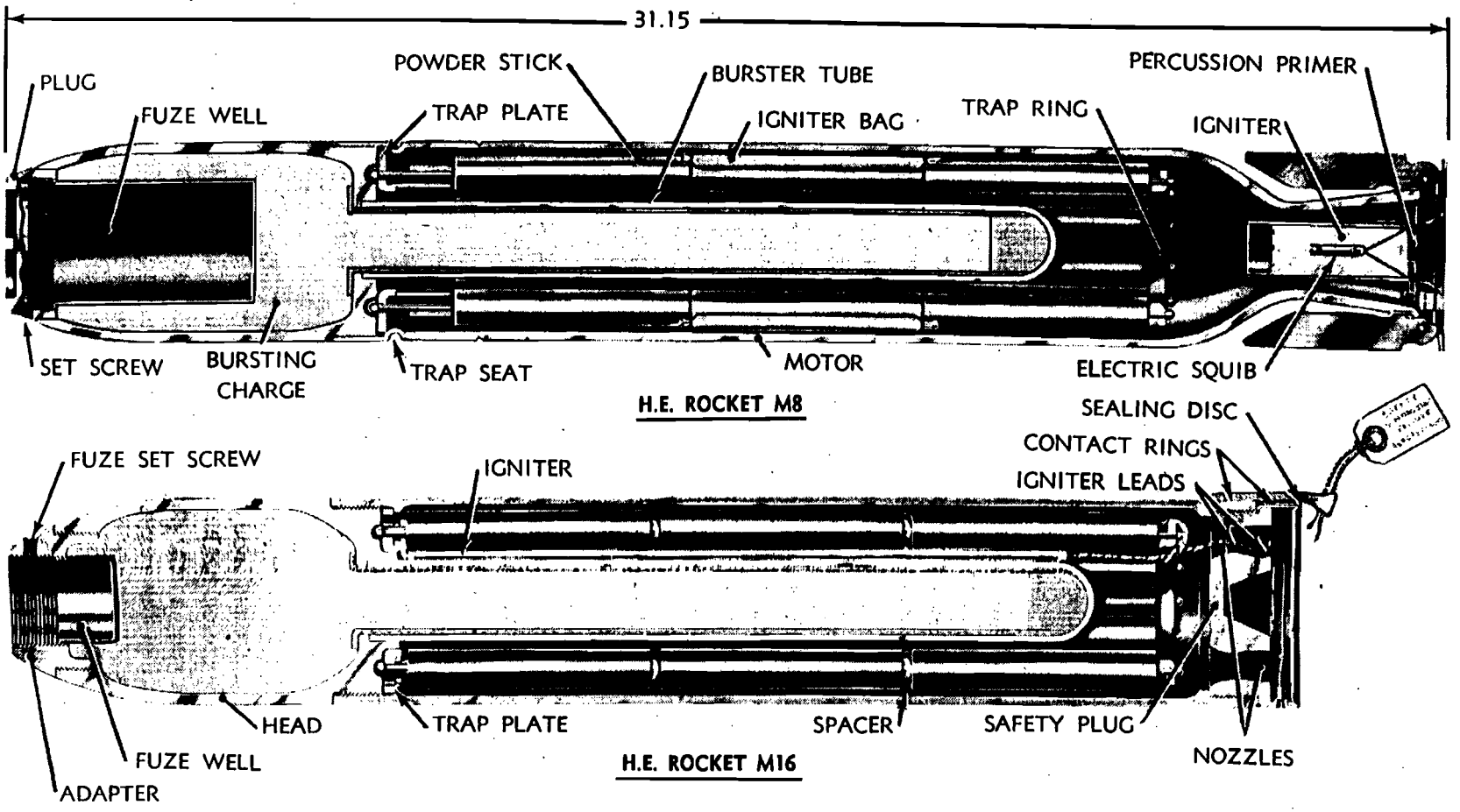


Figure 7 — Sections of Unfuzed Rockets M8 and M16

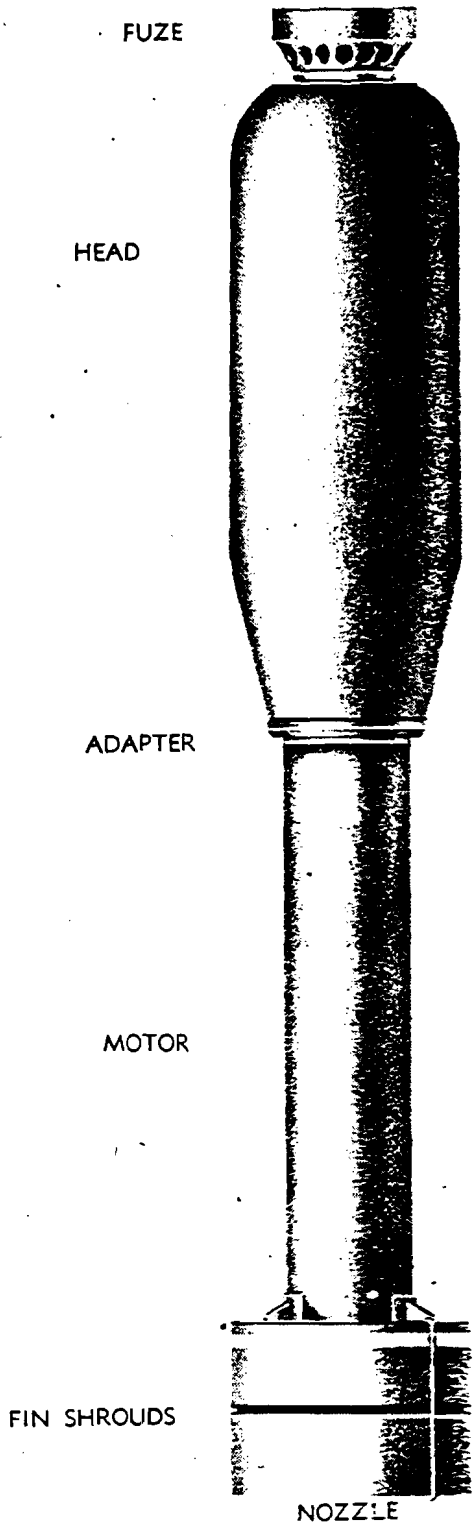


Figure 27 — 4.5-inch Beach Barrage Rocket

d. Motor. The basic components of the motor are the motor tube, the propellant, the propellent support, and the igniter. The motor tube is of steel and is constricted near the tail end to form a nozzle. The forward end is threaded for assembly to the rocket head, and the rear end is adapted for attachment of the fin assembly. The fin assembly consists of a fin ring holding a circle of six fins which are held folded into the constriction of the motor tube by a fin retainer. When the rocket leaves the launcher, the fins are opened by set-back to a 12-inch spread. A safety groove is formed in the motor tube to permit it to separate at a definite point, should an excessive pressure be generated within the motor body on firing. Such occurrences are very rare, but can be expected if the rocket is fired when its temperature is above that given as its safe operating temperature, or if the nozzle should become blocked. When separations occur, the shell and the propellent charge will travel forward with low velocity and have a range of from 100 to 1,000 yards. The motor body will be blown backward from the launcher tube for some distance.

e. Propellant. The propelling charge consists of 30 sticks of double-base powder mounted on the wires of a cage-like support. This consists of ten wires attached to a base ring and an annular plate which is slotted to receive the top ends of the wires. The plate rests on a seat formed by a shoulder in the forward end of the motor tube. The weight of powder used varies with each lot. Since the burning rate of smokeless powder varies with the initial temperature, the weight of each charge is adjusted so that, when fired within the temperature range specified for the rocket, excessive and dangerous pressures will not be produced.

f. Igniter. The igniter (figs. 7 and 8) consists essentially of a charge of black powder and an electric squib. In earlier models, the squib and black powder are contained in a plastic cup which is cemented in the nozzle opening. The leads of the squib are connected to a contact disk and a contact ring on the base of the cup. In combination igniters, a percussion primer is assembled in the base. In later models, the igniter is assembled in a long plastic tube attached to the support plate with the igniter wires leading to a contact plate in the nozzle. This plate has, in addition to the contact rings, a cable and plug for electrical connection. When this igniter is used in the launchers equipped with spring contact arms, the plug wires should be cut close to the contact rings.

g. Preparation for use. After removing the packings, the rocket is ready for use except for installation of the fuze (par. 47).

h. Data.

	HE M8 and Pract. M9	HE M8A1 and Pract. M9A1	HE M8A2 and Pract. M9A2	HE T22 and Pract. T46
Length, unfuzed	31.1 in.	31.5 in.	30.5 in.	30.5 in.
Weight	38.1 lb	38.8 lb	38.2 lb	40 lb
Range (max)	4,000 yd	4,000 yd	4,600 yd	4,600 yd
Dispersion	15 mils	15 mils	15 mils	12 mils
Velocity (max)	850 ft per sec	840 ft per sec	850 ft per sec	865 ft per sec
Temperature limits	+20 to +90* deg F	−10 to +105 deg F	−10 to +105 deg F	−20 to +120 deg F
Burning time	0.3 to 0.12 sec	0.3 to 0.13 sec	0.3 to 0.13 sec	0.36 to 0.10 sec
Burn-out point (feet from launcher)	70 to 80 ft	70 to 80 ft	70 to 80 ft	70 to 80 ft
Head, length	7.5 in.	7.5 in.	7.4 in.	7.4 in.
Head, weight	15.25 lb.	16.1 lb	16.1 lb	16 lb
Head, weight of filler	4.3 lb	4.5 lb	4.3 lb	4.3 lb
Propellant, weight	4.65 lb	4.65 lb	4.65 lb	4.75 lb

i. **Precautions.** In this type of rocket, the fins open to a spread of 12 inches as soon as the rocket leaves the launcher, and care should be exercised to see that there is sufficient clearance.

30. 4.5-INCH HE ROCKET M8 AND PRACTICE ROCKET M9.

a. **Description.** The original model of the 4.5-inch rocket has a comparatively light shell and motor. As a consequence, safe temperature ranges are narrow, and it is necessary to change the propelling charge to provide for full coverage of the temperature range. As issued, the charge is adjusted for firing at temperatures between 20° F and 90° F. The charge may be modified as described below for firing at temperatures between 50° F and 130° F. The temperature at the time of firing governs the selection of the charge. Under no circumstances should a rocket be fired at a temperature outside the range for which the charge is adjusted.

b. **Adjustment of propelling charge.** The propelling charge may be adjusted for high temperatures as follows:

(1) Unscrew the head from the motor, using two strap wrenches.

(2) Place the rocket on its tail on a clean level surface, and lift the head out of the motor.

(3) Lift the propellant and support out of the body. Be careful not to rub the igniter bags against the wall of the body.

(4) Remove tape holding wires in place in the plate.

(5) Push wires outward and remove the three silver-painted sticks of powder.

(6) Return wires to slots, and replace tape to hold wires in place.

*For full charge; reduced charge +50 deg F to +130 deg F (par. 30).

(7) Lower assembly into the motor body. Be careful that the powder bags are on the outside of the powder sticks, and that they are not damaged by rubbing against the body when the assembly is lowered into place.

(8) Replace the head in the rocket motor, using the strap wrenches to insure a tight joint.

(9) Mark the rocket to indicate the change in the charge. If rocket is repacked, mark packings as well.

(10) If there is a probability that the low-temperature charge will need to be restored, mark the rocket and the removed sticks so that the same three sticks may be returned to that rocket. It is mandatory that the same sticks be replaced because the weight of the stick varies with each powder lot and is adjusted for each rocket.

31. 4.5-INCH HE ROCKET M8A1 AND PRACTICE ROCKET M9A1. These rockets have a strengthened motor tube and may be fired at temperatures between −10° F and +105° F. No modification of the propelling charge is necessary.

32. 4.5-INCH HE ROCKET M8A2 AND PRACTICE ROCKET M9A2. These rockets in addition to the heavier motor body, have a smaller, heavier-walled shell. Its temperature limits are the same, −10° F to +105° F, and its velocity is slightly higher than the rockets M8A1 and M9A1.

33. 4.5-INCH HE ROCKET M8A3 AND PRACTICE ROCKET M9A3. All fins of these rockets have a slight bur or crimp to insure a tight fit in the fin ring when the fins open. Temperature ranges and other features are otherwise the same as for the rockets M8A2 and M9A2.

34. 4.5-INCH HE ROCKET T22 AND PRACTICE ROCKET T46. These rockets retain the heavier shell of the rockets M8A2 and M9A2. The motor tube is further strengthened and the fin assembly is modified. The igniter is assembled in a tube attached to the trap and extending the length of the propelling charge. Its temperature limits are −20° F to +120° F.

35. CIRCULAR-FIN (SHROUD) TYPE.

a. **General.** This type rocket (figs. 5 and 27) is commonly called the beach-barrage rocket. It consists of a streamlined head, motor and fin assembly, and nose fuze, all issued separately. Head and fin assembly are full caliber but the motor is of smaller diameter.

b. **Head.** The head is cylindrical with a hemispherical nose and tapered rear. There is a fuze well opening in the nose, and an adapter for attachment of the motor at the tapered end. Both are

protected by shipping plugs in storage and transit. An auxiliary booster is shipped in the fuze well of the high-explosive round.

c. Motor. The motor is a steel tube 2.25 inches outside diameter and 15 inches long. It contains an electric igniter, a propelling charge consisting of a single large grain, a grid-like support and a bag of drying agent. Both ends of the motor are sealed by waterproof fiber disks. The forward end of the motor is threaded for assembly to the adapter in the head; the rear end carries two fin shrouds which serve as flight stabilizers and as electrical contacts for the igniter. A shortening clip connects the two shrouds to protect against accidental ignition. This clip must be removed when the rocket is loaded into the launcher.

d. Fuze. The standard fuze for the high-explosive round is the rocket nose fuze Mk137 (par. 51). Fuze Mk145 (0.02-sec delay) may also be used. The standard fuze for the smoke rocket is the rocket nose fuze Mk154 which is the same as the fuze Mk137 with a long burster replacing the booster in the base of the fuze.

e. Preparation for use. Prior to use, it is necessary to assemble the round as follows:

(1) Unpack components and inspect for serviceability (par. 12).

(2) Remove shipping plug from adapter and protection *cap* from motor tube. Leave the closing *disk* in place.

(3) Screw motor into adapter and tighten with strap wrench. Be sure at least 1 inch of threads is engaged.

(4) Remove shipping plug from fuze well. Make sure that booster is in place for high-explosive rocket or that burster well is clear for smoke rocket.

(5) Inspect fuze and screw into place. Tighten with fuze wrench.

(6) Remove fuze safety wire and shroud shorting clip when loading the rocket into the launcher.

(7) If rocket is returned to storage, reverse the above steps.

f. Data.

	High Explosive	Smoke
Model, shell	4.5", Mk3	4.5", Mk7
Model, motor	2.25", Mk9	2.25", Mk9
Model, fuze	{Mk137 (SQ) / Mk145 (0.02-sec delay)	Mk 154
Complete round with fuze, length	30 in.	37 in.
Complete round, weight	29 lb	29 lb
Range (max)	1,130 yd	1,130 yd
Dispersion	37 mils	37 mils
Velocity (max)	360 ft per sec	360 ft per sec
Temperature limits	+10 to +120 deg F	+10 to +120 deg F
Burning time	0.30 sec	0.30 sec
Head, length	16 in.	23 in.
Head, weight	20 lb	20 lb
Head, filler type	TNT	FS
Head, weight of filler	6.4 lb	12.1 lb
Propellant grain	Mk 1	Mk1
Propellant, grain	1.4 lb	1.4 lb

37. SPIN TYPE.

a. General. The spin-type rocket (figs. 7 and 26) is cylindrical throughout except for the ogival nose and a groove near the base. A contact ring assembly is crimped to the nozzle plate on the base of the rocket. The rocket is issued as an unfuzed round.

b. Head. The rocket head is the same as that for the folding-fin type (par. 29) except that the fuze seat is designed for smaller artillery-type fuzes.

c. Fuzes. The fuze authorized for use with the spin-type rocket is the point-detonating fuze M81. This fuze consists of the fuze M48A2 (SQ-0.05-sec delay) assembled with the booster M24. The alternate fuze approved is the fuze M48A2 (SQ-0.05-sec delay) assembled with the booster M21A1. No other type of booster can be used. The fuze and booster for this round will be staked together and shipped as a unit. However, if such units are not available, components of fuze and booster as stated above may be assembled in the field.

d. Motor. The motor tube (fig. 7) is a cylindrical steel tube threaded at one end for assembly to the shell, and at the other for assembly of the nozzle plate. It contains the propelling charge and the igniter. The nozzle plate is a thick steel plug pierced by eight nozzles arranged in a circle and a central vent which is normally closed by a blow-out plug. The nozzles are inclined at an angle to impart rotation as well as driving thrust. The plug in the central vent is designed to blow out when motor pressures exceed a predetermined limit. The closing cap consists of a metal collar crimped to the nozzle plate and a plastic disk cemented in place. An insulated contact ring is assembled on the collar and a safety shorting strip connects the contact ring and nozzle plate.

e. Propellant. The propelling charge is similar to that for the folding-fin type rocket described in paragraph 29.

f. Igniter. The igniter consists of a charge of black powder and an electric squib assembled in a long flat plastic tube which is hung from the support plate beside the propellent sticks. The lead wires are tied to the trap ring and pass through one of the nozzles. One wire is grounded to the nozzle plate; the other is connected to the contact ring on the closing cap.

g. Preparation for use. The spin-type rocket is prepared for use as follows:

(1) Remove from packings and inspect for serviceability. If the closing cap or closing disk is loose, it may be replaced if it can be determined that no moisture or other foreign material has entered the motor.

(2) Remove nose plug and assemble fuze. Tighten with fuze wrench. Some models may have a set screw in the fuze adapter. In this case the set screw should be loosened to remove the nose plug and tightened after assembly of the fuze.

(3) Set fuze for desired action (par. 49).

(4) Remove safety shorting strip when loading the rocket into the launcher.

(5) If the rocket is returned to storage, reverse the above steps, returning the rocket to its original condition and packings.

h. Data.

	HE, M16, M20 and Pract. M17, M21
Length, unfuzed	27.75 in.
Weight	42.5 lb
Range (max)	5,200 yd
Dispersion	9 mils
Velocity (max)	890 ft per sec
Temperature limits	–20 to +130 deg F
Burning time	0.36 to 0.10 sec
Burn-out point, feet from launcher	80 ft
Head, length	9.4 in.
Head, weight	17 lb
Head, weight of filler	5.2 lb
Propellant, weight	4.75 lb
Fuze (HE)	M81, SQ-0.05-sec delay
Fuze (practice)	M73, dummy

i. Models.

(1) The standard high-explosive and practice rounds described above are designated respectively:

ROCKET, HE, 4.5", M16
ROCKET, practice, 4.5", M17

NOTE: *Rockets M16 and M17 were formerly designated T38E and T39E3, respectively.*

(2) Modifications, for use with expandable launchers (par. 11), which differ in that the igniter wires are not connected to the contact rings but are brought through the closing disk and connected to spools of wire, are designated:

ROCKET, HE, 4.5", M20
ROCKET, practice, 4.5", M21

NOTE: *Rockets M20 and M21 were formerly designated T38E7 and T39E7, respectively.*

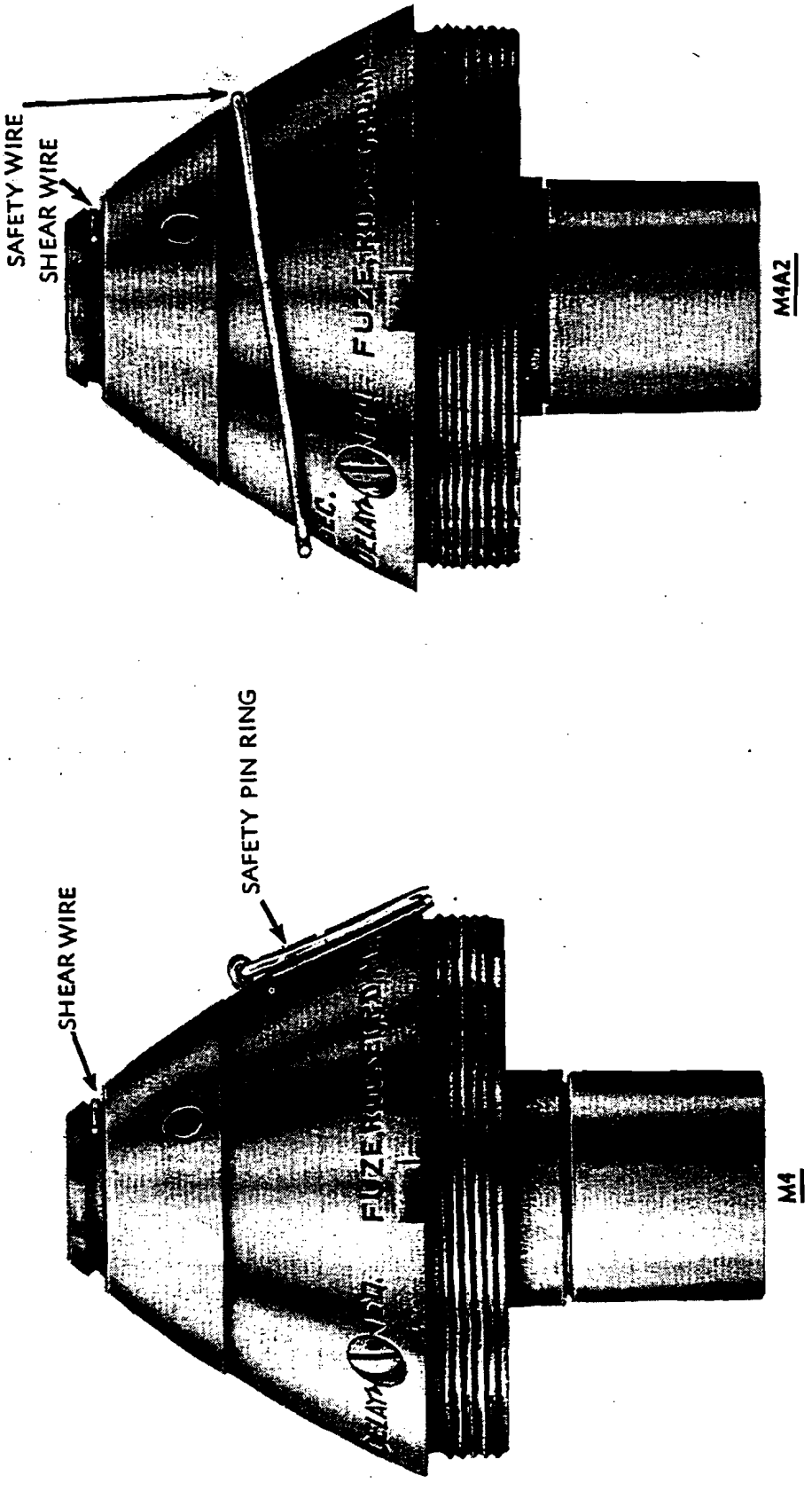
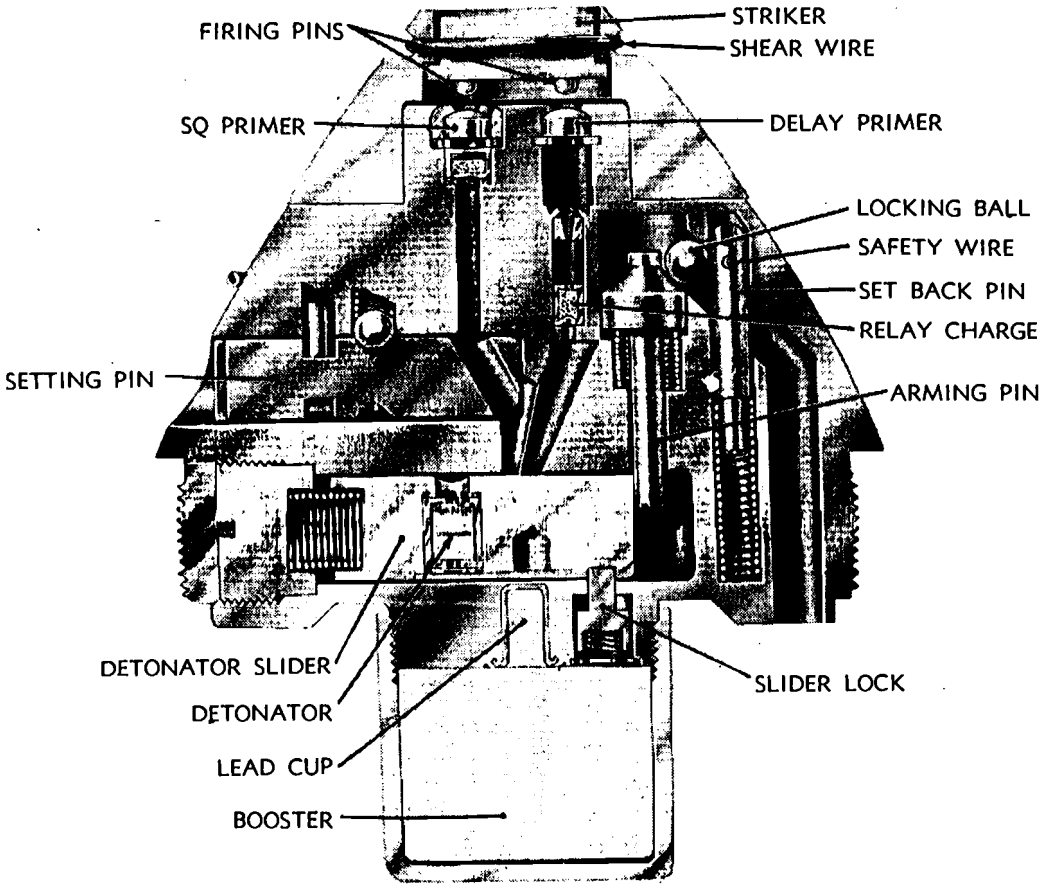


Figure 38 – PD Fuzes M4 and M4A2

D–1e



RA PD 95667

Figure 39 — PD Fuze M4A2 — Schematic Section

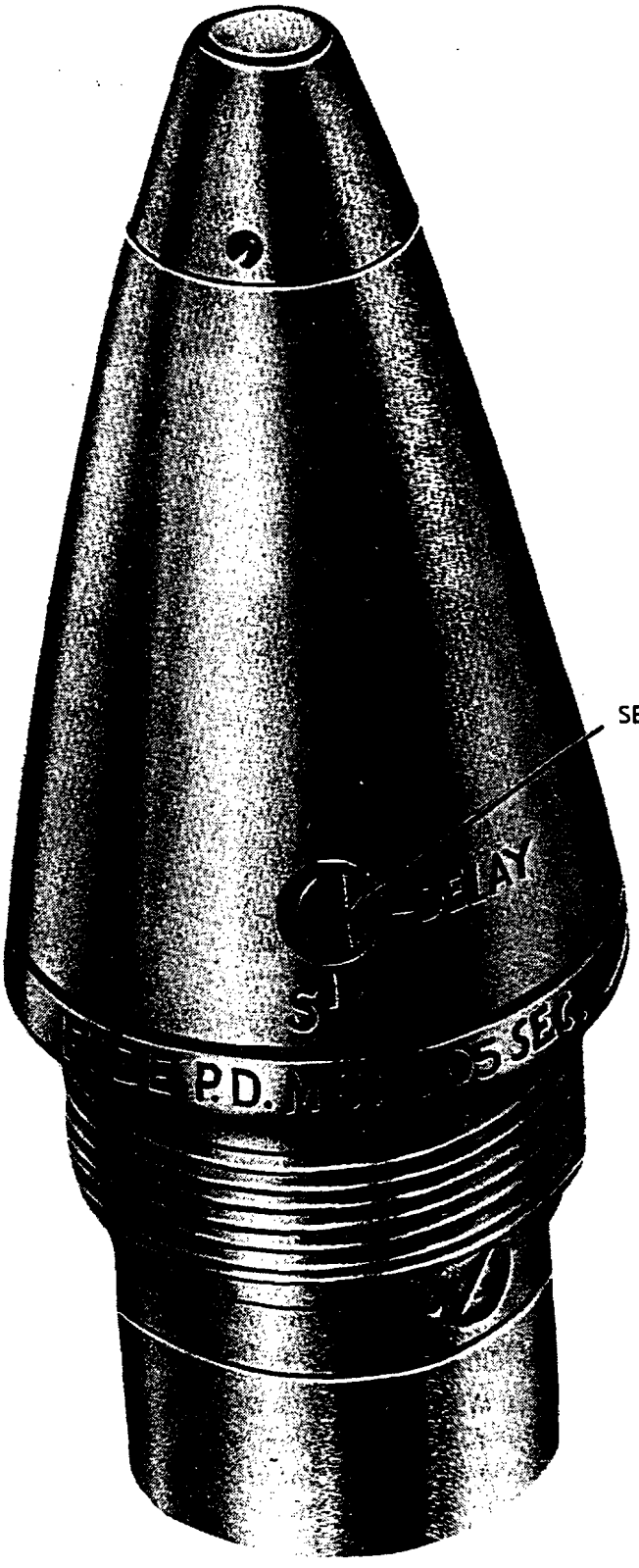


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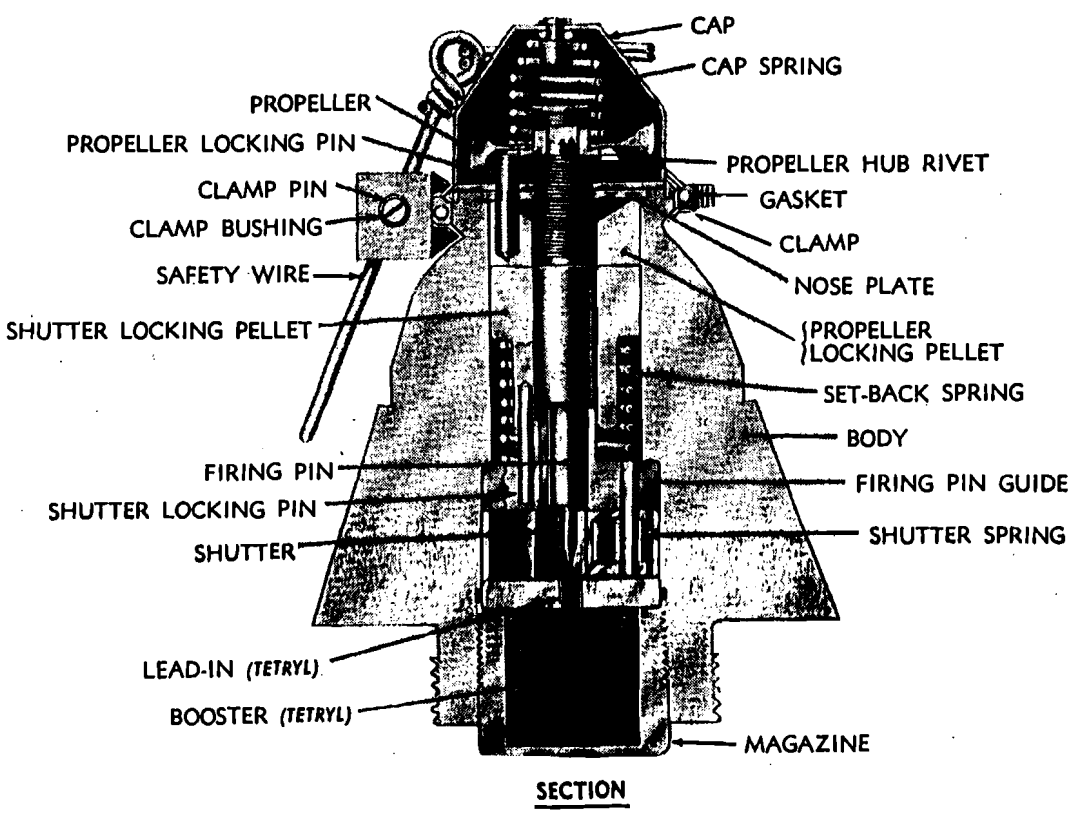
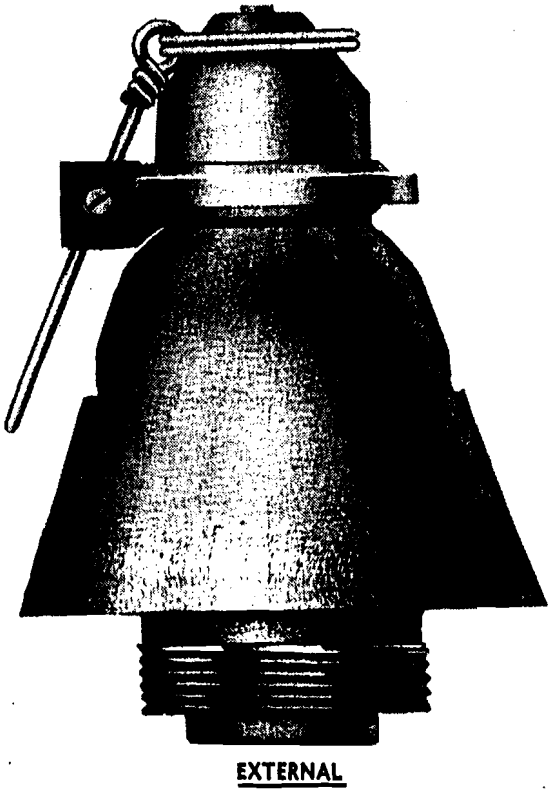
Figure 41 — PD Fuze M81





RA PD 95656

Figure 46 — Nose Rocket Fuze Mk149

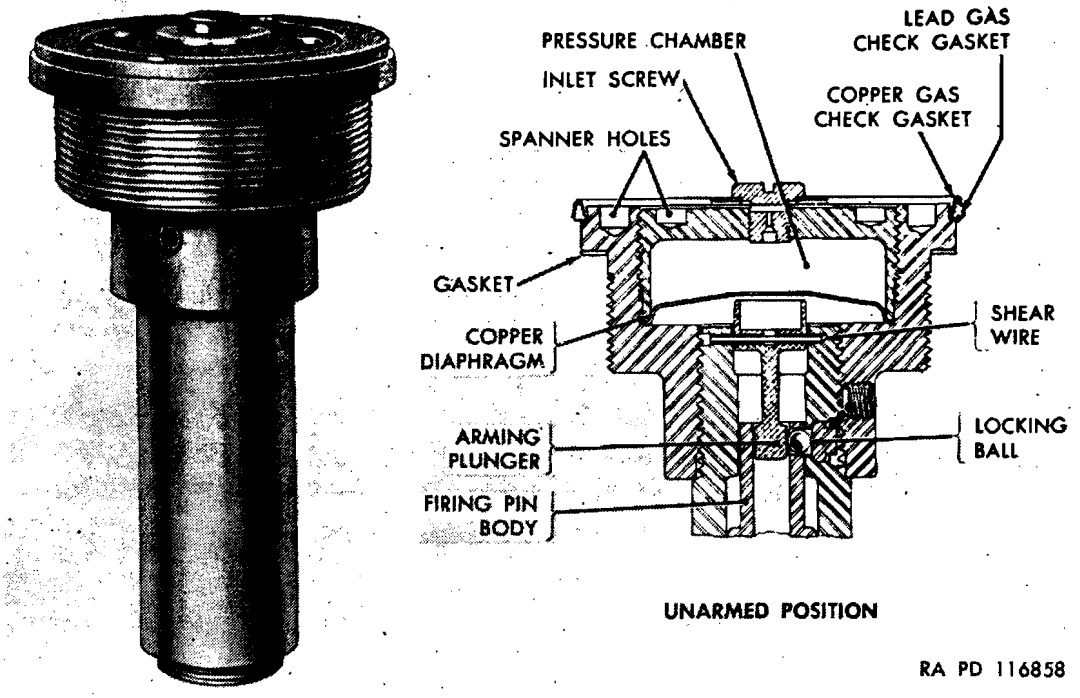


Figure 71. Fuze, rocket, base, MK 159 Mod 1—exterior view and section showing gas check gaskets.

Section VI

5-INCH ROCKETS

39. DESCRIPTION.

a. General. The 5-inch rocket is designed for firing from aircraft rocket launchers of the post type (zero-length). Included in this category, because of similarity in use and construction, are: (1) high-velocity aircraft rocket, 5″0 HVAR; (2) aircraft rocket, 5″0 AR; (3) 3.5-inch aircraft rocket, 3″5 AR; and (4) 2.25-inch subcaliber rocket, 2″25 SCAR.

b. Head. The 5-inch rocket head is an adaptation of an antiaircraft artillery shell. It is designed for both nose fuze and base fuze although either may be replaced by a steel plug. The HVAR head is threaded externally at the base for assembly of the 5-inch motor; the AR head has an adapter threaded internally for assembly of the 3.5-inch motor. The same 3.5-inch motor is used with a solid head to make up the 3.5-inch AR rocket. The 2.25-inch subcaliber rocket head is solid, for target practice, and is adapted for a 2.25-inch motor.

c. Motor. All motors for aircraft rockets are similar in construction except for size. They are threaded forward for attachment of the head and have nozzle and fin assembly to the rear. Front and rear openings are protected by waterproof disks. The igniter is assembled in a flat container in the front end of the motor. The propellant consists of a single grain. The igniter lead wires pass through the length of the motor and out through the nozzle and closing disk, and are connected to a plug.

d. Fuzes. Base fuzes assembled to the 5-inch rocket head are of the pressure-arming, impact-operating type (PIR) (par. 53). Nose fuzes for the 5-inch heads are of the vane (propeller)-arming, impact-operating type (par. 51), some of which require the use of an arming wire similar to bomb fuzes. The arming mechanism is similar to that of a bomb shackle. The rocket can be fired with the nose fuze armed or safe, thus making selection between superquick action of nose fuze and delay action of base fuze possible at the time of firing.

e. Data.

	5″.0 HVAR	5″.0 AR	3″.5 AR	2″.25 SCAR
Length	68.9 in.	65.8 in.	54.7 in.	29.2 in.
Weight	134 lb	85.5 lb	54.7 lb	11.9 lb
Range (maximum effective)	4,000 yd	2,000 yd	4,000 yd	2,000 yd
Velocity (max)	1,350 ft per sec	760 ft per sec	1,150 ft per sec	1,170 ft per sec
Temperature limits	0 to +120 deg F	0 to +120 deg F	0 to +120 deg F	0 to +120 deg F
Burning time	1.4 to 0.9 sec	1.5 to 0.61 sec	1.5 to 0.61 sec	0.91 to 0.38 sec
Burn-out point (static firing) (feet from launcher)	575 to 950 ft	230 to 530 ft	350 to 800 ft	230 to 480 ft
Head, length	16.73 in.	18.3 in.	10.35 in.	3.7 in.
Head, diameter	5 in.	5 in.	3.5 in.	2.25 in.
Head, weight	45.5 lb	48 lb	20 lb	1.6 lb
Head, weight of filler	7.5 lb	8 lb	—	—
Motor, diameter	5 in.	3.25 in.	3.25 in.	2.25 in.
Motor, length	51.4 in.	46 in.	46 in.	26 in.
Motor, propellant, weight	24.8 lb	8.5 lb	8.5 lb	1.75 lb
Nose fuze, model	Mk149	Mk149	Mk149	None
Nose fuze, type	AIR-SQ	AIR-SQ	AIR-SQ	—
Base fuze, model	Mk159	Mk159	None	None
Base fuze, type	PIR-0.015-sec delay	PIR-0.015-sec delay	—	—

40. MODELS.

a. Differences in various models are described below:

(1) 5″.0 HVAR. The 5″.0 rocket heads Mk5 and Mods and Mk6 and Mods are essentially the same except for details of the base fuze assembly. The 5″.0 rocket motors differ principally in the fin assembly; Mk1 and Mk2 Mod0 had fins welded to the motor; Mk2 Mod2 had fins attached to a sleeve which is assembled to the motor as issued; and Mk2 Mod3 has fins issued separately.

(2) 5″.0 AR. The 5″.0 rocket head Mk1 can be distinguished from the HVAR by the internally threaded motor adapter. The various modifications of the 3″.5 rocket motor Mk7 are in details of nozzle construction.

(3) 3″.5 AR. The 3″.5 rocket head has been manufactured in TNT-, FS-, WP-, and special-loaded models. However, the only types currently issued through Army ordnance channels are the solid shot Mk2 and Mk8.

(4) 2″.25 SCAR. The subcaliber rocket is supplied in two types to match trajectories of the 5″.0 HVAR and 5″.0 AR, respectively. This was formerly accomplished by providing a light and a heavy head. At present the weight of the head is kept constant and the motor varied. The 2″.25 rocket head Mk1 and Mods or Mk3 and Mods is used with 2″.25 rocket motor Mk10 and Mods (fast motor) to match the trajectory of the HVAR; and with the 2″.25 rocket motor Mk12 (slow motor) to simulate the AR.

Chapter 1

DESCRIPTION

Introduction

The 5"0 Rocket (5"0 Motor, Fin Stabilized) is a self-propelled missile designed for shipboard launching or for forward firing from aircraft. The rockets consist of two parts: the head which is essentially a fuzed projectile and the motor which propels the projectile. Various mods of heads and motors are used in different 5"0 rocket assemblies. Approximate weights of these assemblies range from 130 pounds to 150 pounds, and they are approximately 69 inches to 85 inches long. Figures 1 and 2 show the assembly arrangement.

Rockets and associated equipments that are used by carrier based aircraft are of primary concern in the instructions given in this book.

Rocket Motors

The 5"0 Rocket (5"0 Motor, Fin Stabilized) may have either a 5"0 Rocket Motor Mk 2 all Mods or a 5"0 Rocket Motor Mk 10 all Mods. These rocket motors are similar in construction except that the Mk 2 Mods have a two-prong type electrical connector while the Mk 10 Mods require the jack plug type. Both types of rocket motors are pipelike assemblies with venturi-tube exhausts for burning the cruciform-type propellant grain. The rocket is propelled by the exhaust gases from the burning propellant.

The principal components of a typical 5-inch rocket motor, listed below, are shown in figure 2.

Nozzle plate	Suspension lugs
Front closure disc	Propellant
Fin assembly	

Nozzle Plate. The nozzle plate, screwed into the rear of the motor tube, has eight nozzles arranged in a circle, each sealed by a light steel cup and sealing compound, and a central blowout nozzle. The central nozzle is sealed by a copper disc 0.024 inch thick, insulated against motor heat by asbestos and hard fiber plugs. The thickness of the disc is such that it shears and blows out at an approximate motor pressure of 2400 p. s. i. One of the eight periphery nozzles accommodates the electrical connector cable. During shipment, a dome-shaped steel shipping cap fits into the nozzle ring of the nozzle assembly to protect the nozzle plate and the electrical cable and plug assembly.

Front Closure Disc. The front end of the motor is sealed by a front closure disc. This disc has a smaller blowout disc in its center to allow passage of motor gases to the pressure-armed base fuze in the rocket head. A felt pad and felt washers are glued to the inside of the front closure disc to support the propellant grain and to allow for its thermal expansion. During shipment, a motor thread protector extends into the motor the same depth as the head, and seats on a felt washer. The center of the thread protector is a light metal cup that will blow out and render the motor nonpropulsive in the event of an accidental ignition before assembly.

Fin Assembly. The fin assembly consists of four stabilizing fins welded to a cylindrical sleeve. The sleeve is slipped onto the nozzle end of the motor and clamped between the rear suspension lug band and the nozzle ring attached to the nozzle. To prevent rotation of the fins, the sleeve interlocks with projections on the rear suspension lug band.

Suspension Lugs mounted on bands for attachment to the rocket motor are provided to suspend the rocket from the rails or T-slots of the rocket launchers. The motor is arranged so that the bands may be mounted at various positions for the different launchers. The 5"0 Rocket Motor Mk 10 Mod 5 has six, the Mk 2 Mod 4 and the Mk 10 Mod 4 have four, and the Mk 2 Mod 3 has two lug band locating holes. See NAVORD OMI 2-50 for proper positioning of bands for use on various launchers.

Propellant. The propellant is a cruciform-shaped grain of ballistite weighing 24 pounds. It is ignited by a metal case igniter containing 55 grams of black powder.

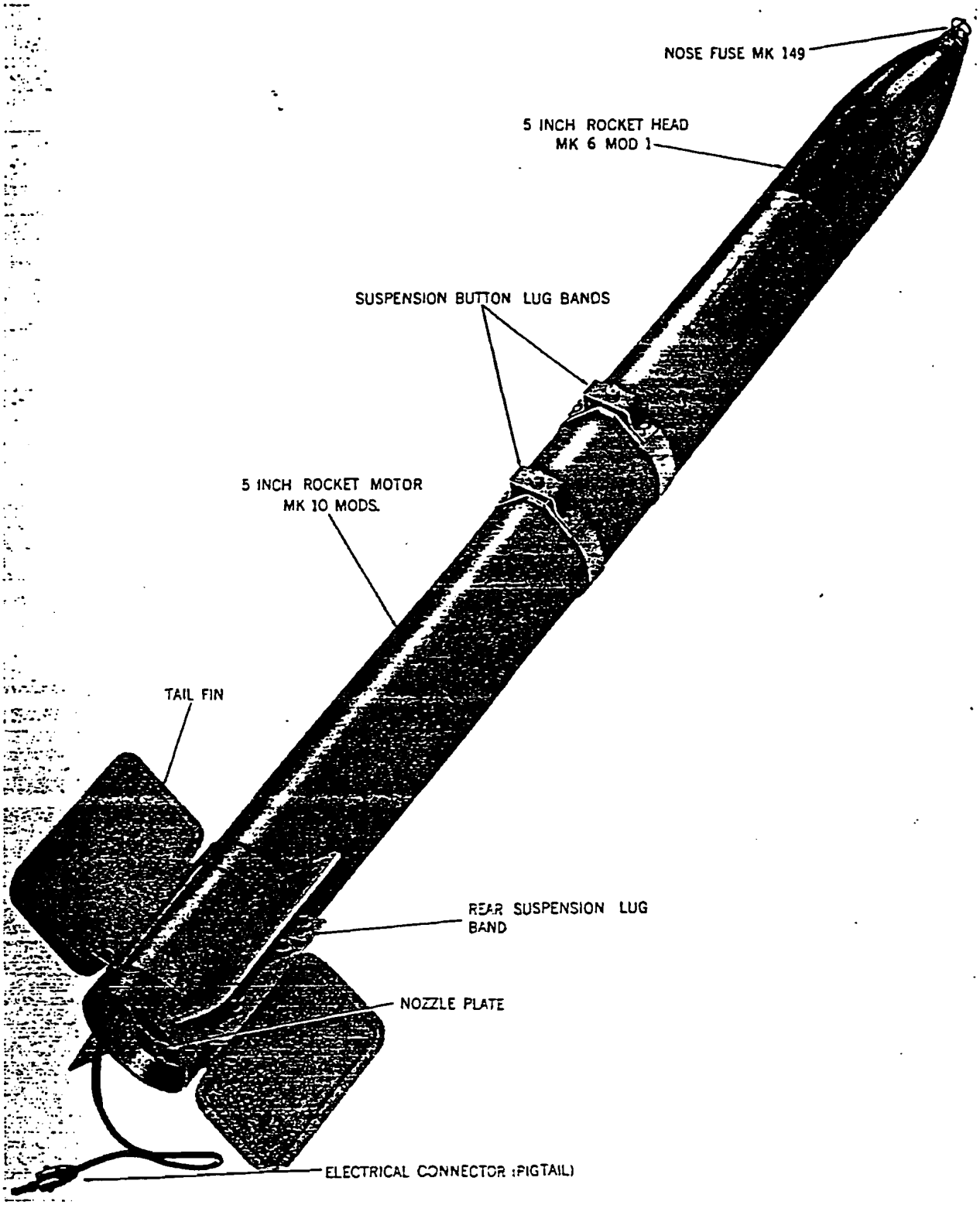


Figure 1—5"/0 High-Velocity Aircraft Rocket.

72. 5.0-Inch High-Explosive Rocket Heads (HVAR)

a. General Discussion. Listed below are the various HVAR heads which are assembled with 5.0-inch rocket motors to form HVAR complete rounds. Complete round data and nomenclature are given in tables II and III. The TNT loaded heads Mk 6 and Mods are shipped with permanently installed base fuze Mk 159 Mod 1 or Mk 164 and Mods and a shipping cap which is replaced by nose fuze Mk 149. The head Mk 6 Mod 4 is specially deep cavitized to receive a VT fuze. The head Mk 25 Mod 1 is a shaped charge type (having an internal copper cone) loaded with composition B. As shipped, the head Mk 25 Mod 1 has a nose shipping plug, which is replaced by nose fuze Mk 149, and a shipping cap to protect the base threads.

HEAD, HIGH-EXPLOSIVE, 5.0-INCH ROCKET: HVAR, Mk 6 Mods 0, 1, 2, and 3 TNT loaded, w/fuze, rocket base AN–Mk 159 (Mk 159 Mod 1) or AN–Mk 164 (Mk 164) and Mods installed

HEAD, HIGH-EXPLOSIVE, 5.0-INCH ROCKET: HVAR, Mk 6 Mod 4, TNT loaded, adapted for fuze, VT, M403, w/fuze, rocket, base AN–Mk 159 (Mk 159 Mod 1) and Mods or AN–Mk 164 (Mk 164) and Mods installed

HEAD, HIGH-EXPLOSIVE, 5.0-INCH ROCKET: HVAR, Mk 25 Mod 1 COMP B loaded, unfuzed

HEAD, INERT, 5.0-INCH ROCKET: Mk 6 and Mods.

b. Fuze. The 5.0-inch HVAR head Mk 6 Mods is permanently fuzed with base fuze Mk 159 Mod 1 or Mk 164 and Mods. The head Mk 6 and Mods and Mk 25 Mod 1 receive nose fuze Mk 149 Mod 0 or 1 after removal of the nose shipping cap. Head Mk 6 Mod 4 receives VT fuze M403 or M403E2 (Mk 172 Mod 2).

c. Identification. Painting and marking for identification are in accordance with the scheme prescribed in TM 9–1900.

d. Packing. The 5.0-inch HVAR head Mk 6 and Mods is packed two per wooden box or 48 per pallet (except Mk 6 Mod 4). The head Mk 25 Mod is packed one per wooden box with two lug bands, with or without arming wire. Nose and VT fuzes are packed 20 per wooden box. VT fuzes are packed one per metal can, nine cans per wooden box. Packing and shipping data appear in SM 9–5–1340.

73. 5.0-Inch Rocket Motors

Listed below are various similar 5.0-inch rocket motors which are assembled with 5.0-inch HVAR heads to form complete rockets as indicated in tables II and III. The motor Mk 10 differs from the motor Mk 2 principally in having an Army igniter plug instead of a Navy (bayonet-type) plug. The 5.0-inch motor is externally threaded at the forward end to engage the head. It consists of the motor tube, front closure disk, igniter, propellant, nozzle plate, suspension lugs and fin assembly. The motor contains the igniter, propellant and grid to position the propellant. Assembled to the motor tube are the nozzle, fin assembly and suspension lugs.

MOTOR, 5.0-INCH ROCKET: Mk 2 Mod 3.

MOTOR, 5.0-INCH ROCKET: Mk 2 Mod 3 (w/bayonet-type connector plug).

MOTOR, 5.0-INCH ROCKET: Mk 10 Mods 4 and 5.

MOTOR, 5.0-INCH ROCKET: Mk 10 Mods 4 and 5 (w/electrical connector Mk 11 Mod 5 or M3).

MOTOR, 5.0-INCH ROCKET: Mk 10 Mod 7 (w/o fin).

MOTOR, 5.0-INCH ROCKET, EMPTY: Mk 2 Mod 3.

MOTOR, 5.0-INCH ROCKET, INERT: Mk 2 Mod 3.

a. Fin Assembly. The fin assembly, which is clamped to the rear end of the motor, is a sleeve with four equally spaced rectangular fins extending radially.

b. Propellant. The propellant is a single grain Mk 18 Mod 0 of ballistite. Refer to chapter 4.

c. Igniter. The igniter is a metal can containing 55 grains of black powder and an electric squib. Two lead wires from the squib extend from the igniter passing through the perforation in the pro-

pellent grain to the nozzle where they are connected to the electrical cable and igniter plug (connector).

d. Identification. The motor is identified by the two suspension lugs (fig. 37). Painting and marking for identification are in accordance with the scheme for Navy rockets prescribed in TM 9–1900.

e. Packing. Inert or propellant loaded motors are packed (with or without fins) one per wooden box. Empty motors are packed three per wooden box. Packing and shipping data appear in SM 9–5–1340.

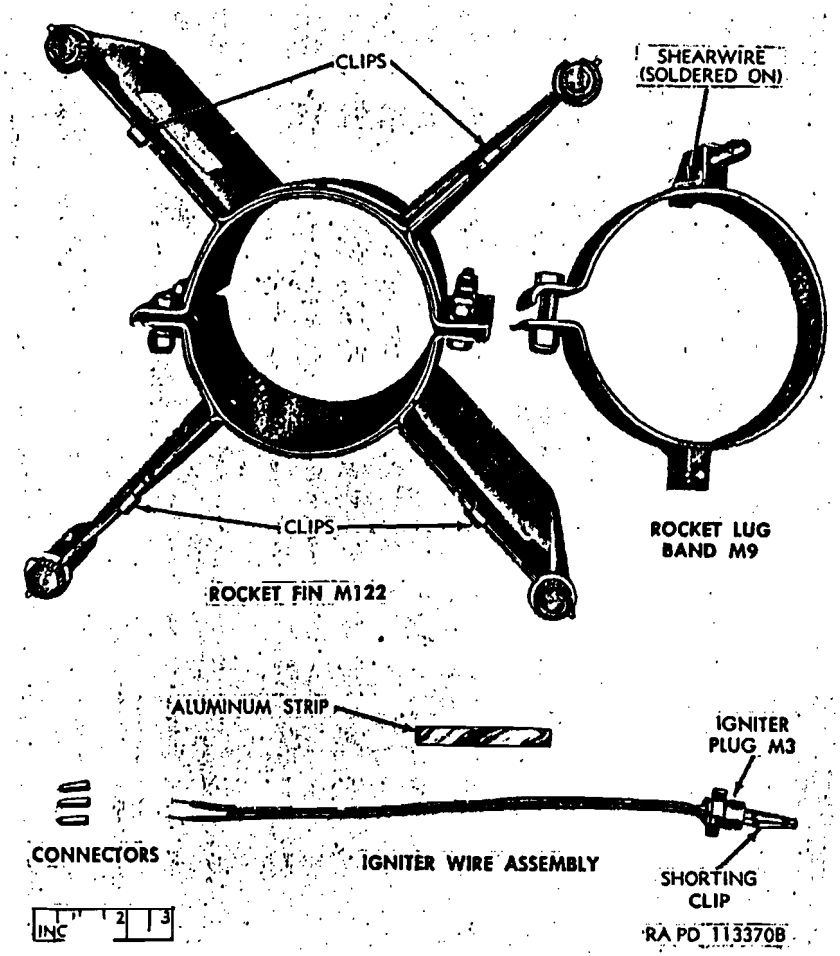


Figure 38. Fin assembly kit, 5.0-inch rocket: M34 (T38) for 5.0-inch high-velocity aircraft rocket (Navy)

Table II. Components Comprising Complete Rounds of Aircraft Type Rockets and Related Data—Continued

Head			Motor			Fuze			Velocity (fps)	Use
Mark and Mods	Filler	Diameter (in.)	Mark and Mods	Propellant grain	Nose	Base				
Mk 6 Mods	TNT	5.0	Mk 10 Mods	Mk 18 Mod 0	Mk 149 Mod 0 or 1	Mk 164 Mod 0	1,325	Service		
Mk 6 Mod 4	TNT	5.0	Mk 10 Mods	Mk 18 Mod 0	Mk 149 Mod 0	Mk 164 Mod 0	1,325	Service		
Mk 6 Mods	Plaster	5.0	Mk 10 Mods	Mk 18 Mod 0	None	None	1,325	Practice		
Mk 6 Mods	Plaster	5.0	Mk 2 Mod 3	None	None	None	None	Drill		
Mk 25 Mod 1	COMP B	5.0	Mk 10 Mods	Mk 18 Mod 0	Mk 149 Mod 0	None	1,325	Service (armor piercing)		

Rockets

More than a year before any model of cannon for ground strafing was approved, the drawbacks of mounting heavy guns in aircraft were recognized. This knowledge intensified the search for other types of powerful air armament. Accurate bomb sights would increase the effectiveness of bombs, and airborne homing torpedoes better the percentage of hits in antisubmarine warfare. But neither of these was the direct responsibility of Army Ordnance, although work of the Ballistic Research Laboratory at Aberdeen in compiling a complete set of ballistic tables for use with the Norden bomb sight contributed greatly to more effective bombing. Rockets, on the other hand, were the immediate concern of the Ordnance Department, as well as of the Navy Bureau of Ordnance and the Air Corps. If accurate rockets could be launched from aircraft, the problem of strafing might be largely solved. In December 1940 the Ordnance Department requested NDRC's assistance in developing a 4.5-inch rocket primarily for use in aircraft. The fruits of British research on rocketry, in 1940 far in advance of American and promptly put at the disposal of the United States, greatly expedited progress on adaptation of this ancient weapon to conditions of modern warfare.

British research before 1942 had been directed at developing rockets for antiaircraft and plane-to-plane fire, but in the United States the Army's attention early centered upon other phases. The bazooka was the first Army device to use a rocket in combat. Yet an Ordnance officer had fired an experimental 4.5-inch aircraft rocket before anyone had seriously considered the application of rocket propulsion to an infantry weapon. This 4.5-inch rocket, though originally designed for either ground or plane-to-plane use, was in actuality employed in the latter capacity in China, and then only experimentally. For strafing, however, it came to be a valuable weapon, adding to the fears of "the American harassment" repeatedly expressed by German ground troops.

To produce dependable, powerful rockets involved solving innumerable new engineering and ballistic problems. Motor tubes strong enough to withstand the high pressures of the propellent powders must be as light as possible, particularly for aircraft rockets. Propellants must create pressure high enough to attain the desired range but must be safe to handle, easily manufactured, and of composition to burn readily at a wide range of temperatures. Getting suitable even-burning powder was, in fact, the biggest poser of all. Nozzles to reduce the rate of flow of propelling gases must not raise internal pressures to the point of bursting the tubes. Traps and cages, by which to suspend the propellant sticks in the motor tubes, must be so designed as to retain the powder in the tubes until the sticks were completely burned, but without permitting the traps to interfere with the even, quick burning of the powder and without adding excessive over-all weight or reducing the rockets' pay load. A safe reliable ignition system was essential. Some means of stabilizing the rocket in flight and fuzes that would function properly with low-velocity projectiles must be devised.

Despite these obvious difficulties, development of a 4.5-inch rocket for air use initially proceeded with deceptive rapidity. Tentative military characteristics were agreed upon in the summer of 1941 after Ordnance ammunition experts had had opportunity to study samples of British

rockets. That fall, Maj. Leslie A. Skinner, the only Ordnance officer to work on rocketry during the 1930's, successfully made a few 4.5-inch rockets, using old fire-extinguisher cylinders as casings. This caliber appeared to be the smallest that could contain a reasonable-size burster tube and warhead and enough propelling charge to give about 1,000 feet-per-second velocity. Fired at Aberdeen in December 1941 these rockets, for all their crudity, were stable in flight and performed fairly well. They weighed about 33 pounds apiece and carried 3.8 pounds of explosive. Redesign for production began at once. Before the war was over, considerable criticism was directed at the Army and Navy for developing two separate rockets for essentially the same purpose but with a difference of half an inch in diameter. The sheer chance of having old fire extinguisher tubes available had determined the size of the Army models.[7]

By April 1942 both the Ordnance Department and the laboratory staff at Wright Field dared hope that a usable aircraft rocket was about ready. Aberdeen firings from the ground had indicated reasonably satisfactory accuracy of the redesigned 4.5-inch model and the probability of no damage to the plane structure. Fins that unfolded after the projectile left the tube gave adequate stability in flight.[8] Wright Field designed a mount for a launching tube under the wing of a P–40, while plans got under way for installation of projectors in the bomb bay of an A–20A plane to permit reloading while the plane was in flight. The chief of the Experimental Engineering Section at Wright Field, considering the rocket project vital, urged the Commanding General, Materiel Command, AAF, to inform the Chief of Ordnance of its importance. "In view," he wrote, "of the rapid progress which h[as] been made and the information availab[le] on its employment abroad, particularly b[y] the Russian Air Forces, it is suggested tha[t] the military characteristics for such [a] weapon be reviewed."[9] The Ordnanc[e] Department needed no prodding. Confi[-] dence in the 4.5-inch model ran so high that the Ordnance Committee had already recommended standardization and limited procurement of some 3,500.[10]

Six weeks later belief still endured that the difficulties so far encountered could be overcome quickly "if vigorously prosecuted."[11] Better ammunition, namely propellent powder of uniform thickness or "web" having neither internal fissures nor external cracks to interfere with even burning, was a problem the Ordnance Department hoped to have answered by midsummer. Maj. Gen. Millard F. Harmon, Chief of Air Staff, on 10 June set 1 October as the goal for having rockets available for the AAF in TORCH, the invasion of North Africa. Delivery of 15,000 for testing to

[7] (1) OCM 17047, Jul 41. (2) R&D Serv, Rocket Development, PSP 20, pp. 1–2, 14, OHF. (3) R&D Serv, Rockets, Development, Production and Performance, 1940–1945, Project Paper 20, pp. 8–9, OHF. See also testimony of Robert Patterson at *Hearings* on H Res 465, 26 Apr 44, p. 82.

[8] Historical Office, Air Materiel Command, Wright Field, Ohio, Aircraft Rockets, 1945, and attchd memo, Col Clyde H. Morgan, Ord Off, Wright Field, for Chief of Experimental Engr Sec, Wright Field, 3 Apr 42, sub: Installation of Rocket Gun in P-40 Airplane. Unless otherwise noted, with the exception of references to OCM's, copies of all documents hereafter cited on aircraft rockets are contained in blueprint copy form in this Wright Field compilation, on file in Hq USAF, Office of DCofS for Development.

[9] Memo, Col Carroll, Chief Experimental Engr Sec, AAF Materiel Command, for CG, Materiel Command, AAF, 25 Apr 42, sub: Rocket Development for Aircraft Armament.

[10] OCM 18187, 24 Apr 42.

[11] Memo rpt, Experimental Engr Sec, AAF Materiel Command, 8 Jun 42, sub: The Four and One-Half Inch Aircraft Rocket.

begin in August was requested. On 6 July a 4.5-inch rocket was successfully fired from a P–40E plane in flight without injury to the plane, a performance that fortified faith in the future of aircraft rockets.[12] Procurement then was raised to 600,000. But there the project bogged down because of the powder bottleneck. General Barnes wrote that the first 15,000 rockets could not be shipped until further experimentation and tests established the safety of the propellant and the rocket tubes. That moment arrived only seven months later, in March 1943. Overoptimism earlier, plus premature notices of prospective availability of rockets for the combat zones, made the unavoidable delays hard to explain to men who failed to comprehend the magnitude of the task.[13] Even Dr. Bush, Chairman of the Office of Scientific Research and Development, protested the slowness of progress. Maj. Gen. G. E. Stratemeyer, Chief of Air Staff, assured Dr. Bush in January 1943:

> Realizing the many problems confronting the development section of the Ordnance Department, we have no criticism of that Department for not having had everything connected with this program available and in order "for a long time." Personally, I feel that splendid progress has been made by the different groups concerned with various phases of this program, considering the complexity of the problems, dealing as it does with new propellants, new fuzes and new types of launching equipment.[14]

How to obtain suitable propellant was the first question, and the second was how to hold multiple small grains in the rocket motor. The Ordnance Department's answer to these problems fortunately could be one and the same for aircraft rockets and ground-launched rockets.[15] The plan to develop a single type of 4.5-inch rocket for Air Forces and Ground Forces alike permitted the Ordnance Department to dedicate far greater resources in technical talent and testing facilities, and, later, in production and inspection, than would have been possible otherwise. Most problems were common to the two applications.[16] The differentiation of aircraft rockets from ground rockets was to be solely in the fuze. To develop the best kind suited to air use required extensive experimentation. For some types proximity fuzes were to be tried, for others impact fuzes. When in June 1943 impact-fuzed high-explosive rockets were test fired at Eglin Field against water targets, observers reported functioning satisfactory and the splash pattern of fragments effective. Proximity fuzes, on the contrary, when tested both then and at intervals later, gave many duds and some prematures. Consequently VT fuzes were not employed.[17] Their use-

[12] (1) Memo, Gen Harmon, Chief of Air Staff, for CG Materiel Command, 10 Jun 42, sub: Rocket Projectiles. (2) Memo rpt Experimental Engr Sec, AAF Materiel Command, 15 Jul 42, sub: Air Firing of 4½ Inch Rocket from P-40E Airplane—AAF No. 41-25008.

[13] (1) Memo, Col John T. Murtha, Jr., Chief of Armament Sec, AAF Materiel Command, for CofOrd, 24 Aug 42, sub: Rocket, 4½" and 2.36" for Test by the Army Air Forces, and 1st Ind, Col Scott B. Ritchie, Deputy Chief of Tech Div, 9 Sep 42. (2) Memo for record, Col William H. Joiner, ACofS AAF, 10 Sep 42, sub: Rocket Program-Conference at Pentagon . . . 9 Sep 42.

[14] (1) Ltr, Dr. Bush to Lt Gen Henry H. Arnold, 8 Jan 43. (2) Ltr, Gen Stratemeyer to Dr. Bush, 29 Jan 43.

[15] See above, Ch. XII.

[16] OCM 19022, 13 Aug 42. The Ordnance Committee at this meeting recommended one designation, M8, for both air and ground 4.5-inch rockets. In April 1943 AGF established a requirement for 11,000,000 of these.

[17] (1) Memo, Col Carroll for CG Materiel Command, AAF, 26 Oct 42, sub: General Status Information. (2) Memo, Brig Gen Benjamin W. Chidlaw, ACofS AAF, for Gen Arnold, 3 Jan 43, sub: Current Status of Rocket Projectile Div. (3) Comment 2, Gen Chidlaw for ACAS Materiel, Maintenance and Dis-

fulness would have been chiefly for air-to-air combat, and by mid-1944, with enemy air power on the wane, the Air Forces had largely discarded plans for special new air-to-air weapons. Some work on influence fuzes for rockets continued down to V-J Day, but it was aimed at a long-term development rather than at one for immediate use.[18]

Projectors were still another feature of aircraft rocket installation that proved to be troublesome. In March 1943, after successful ground tests at Aberdeen, the Ordnance Department dispatched two experimental launchers to Wright Field. These were admittedly too heavy but were to be followed by aluminum alloy tube models, which would be very much lighter. They were designed for mounting in bomb bays to permit reloading while in flight. Though the models of this design were never air-tested, one sample of a redesigned lighter-weight automatic launcher was eventually shipped to Burma, where firing established the soundness of its principle of operation. After the war this launcher supplied the basis of an extensive development project.[19] But in World War II, after mid-1943, the "rocket gun" gradually dropped out of sight in planning, for at that point the Air Forces turned attention to jettisonable three-tube steel or plastic clusters to be mounted under the wings of aircraft.[20] Such a device precluded the possibility of reloading in flight, but omission of a reloading feature permitted more rapid completion of safely usable launchers. The three-tube plastic clusters, in fact, appeared to be sufficiently satisfactory to warrant an initial Ordnance procurement order of 5,000, and in October 1943 the AAF asked for 10,000 more. Soon after delivery of the first 5,000 in December, the AAF pushed its requirements for 1944 to nearly 200,000, far more than could be manufactured with the limited supply of plastic. Since magnesium-alloy tubes met all essential requirements, they were manufactured in considerable numbers to supplement the plastic. Though the combat theatres used some of both types of launcher, thousands were stored in the United States by the spring of 1945, literally an unwanted, obsolescent commodity.

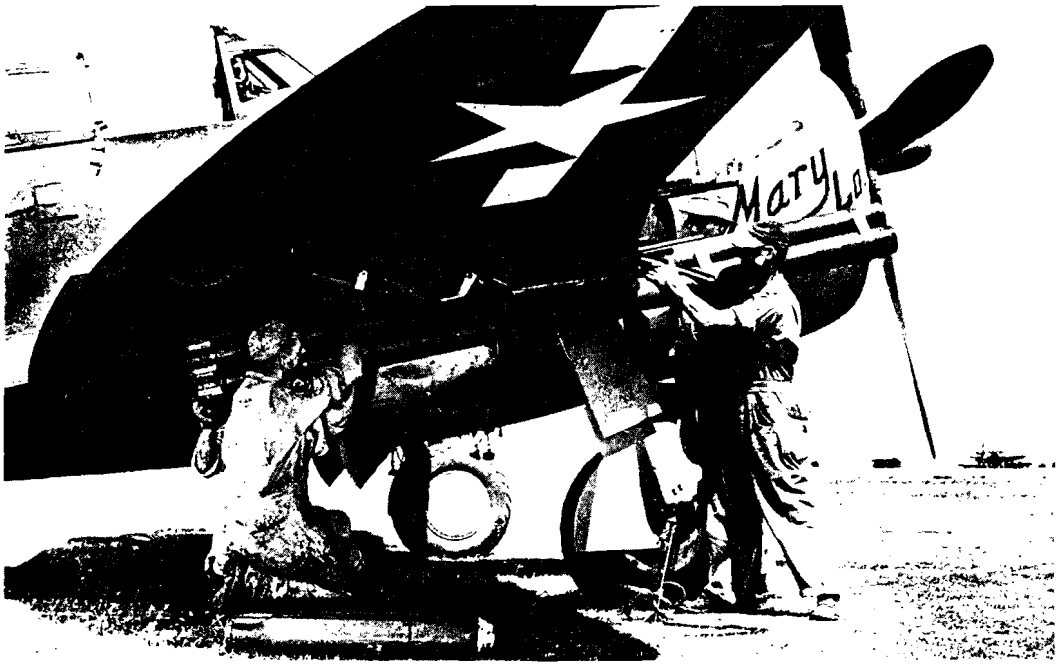
This accumulation of large stocks was due partly to the unexpectedly long life of tube launchers in service, and partly to the small number jettisoned in action. But the principal reason was the lack of proper aircraft mountings for the clusters. The Navy "zero rails," short simple posts beneath the wings from which the rocket could be suspended and launched without using tubes at all, were proving perfectly satisfactory. The speed of the aircraft gave sufficient directional stability to fixed-fin rockets to make needless any guide rail. Easy to manufacture and install, the zero rails had the further advantage of creating less drag

tribution Div, 26 May 43, sub: Rockets. (4) Comment 3, Gen Coupland for same, 22 Jun 43, sub: Aircraft Rockets. (5) Col Joiner, memo rpt for record, 7 Jun 43, sub: Trip to Eglin Field in Connection with 4.5" Rockets.

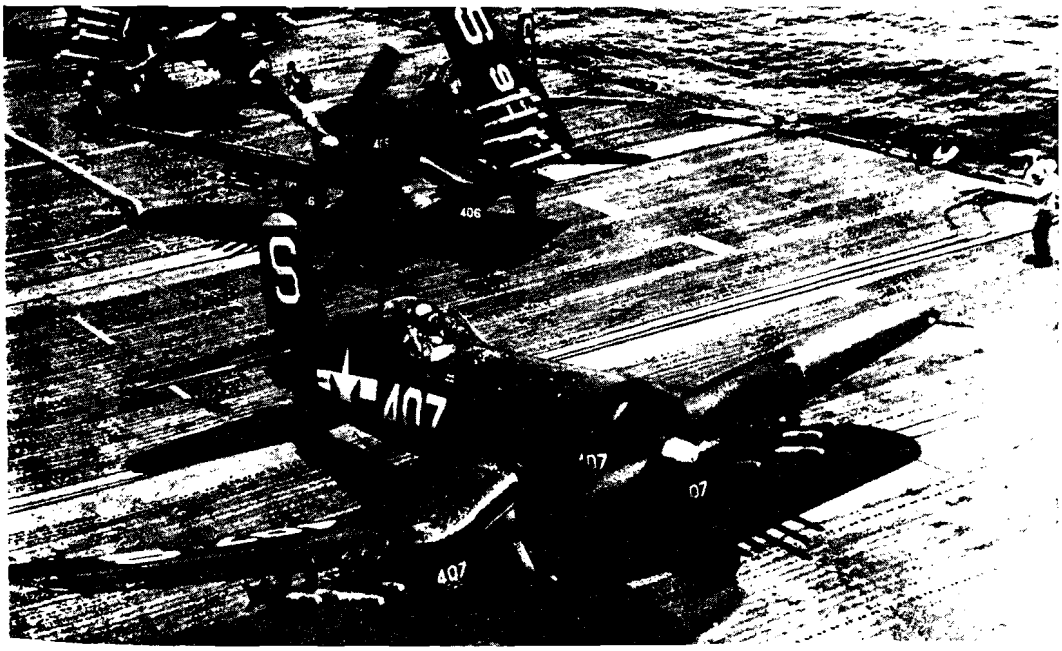
[18] Memo, Col James F. Phillips, CG Materiel Command, AAF, for Brig Gen Edward M. Powers, Deputy ACAS Materiel and Services Div, 7 Jun 45, sub: Rockets.

[19] (1) *Ibid.* (2) Interv with Dr. Colin Hudson, 11 Sep 51. (3) Air Technical Serv Command, Instructions to Procurement Div, 2 Apr 45, sub: Cancellation of Procurement for 4½" Rocket Launchers.

[20] (1) Memo, Col Quinn, OD, for CG Materiel Command, AAF, 17 Mar 43, sub: 4½" Rocket Projectors T4 and T2. (2) Memo, Gen Chidlaw for Director Military Requirements, 18 Mar 43, sub: 4½" Rockets. (3) Memo, Gen Chidlaw for CofOrd, 17 Apr 43, sub: Procurement of 4.5" Rocket Launcher Clusters. (4) ATSC, memo rpt, 27 Nov 44, sub: Closeout of Expenditure Order 552-452 (Development of a Rocket Gun).



AIRCRAFT ROCKET INSTALLATIONS. *Typical installations on Air Forces and Navy aircraft.*



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than tube launchers. By the time mounts were available for the latter, the Army Air Forces had adopted both the zero rails and the Navy 5-inch rockets. Still, because of the large quantities of 4.5-inch rockets available, commonsense dictated using them. Installation of adapters, which include a large fixed fin, a bayonet type of igniter, and lugs, permitted firing the smaller rocket from the zero-length launcher designed for the 5-inch. Used with these adapters the 4.5-inch, the Ninth Air Force reported, then compared favorably in accuracy with the 5-inch and were an acceptable substitute until the 5-inch were in larger supply.[21]

The AAF switch from the Army 4.5-inch rocket to the Navy 5-inch high-velocity aircraft rocket, HVAR, nicknamed "Holy Moses," grew out of delay in Air Forces procurement of mounts, impatience over the slowness of Ordnance developments, and discovery in the summer of 1944 that some HVAR's were immediately obtainable. Six months earlier Maj. Gen. Barney M. Giles, Chief of the Army Air Staff, had written the commanding general of the Army Service Forces listing the shortcomings of Army Ordnance rocket development. Stating that the 4.5-inch types were inaccurate, subject to fuze trouble, limited by extremes of temperature, and lacking in adequate velocity, Giles concluded:

> The Ordnance Department personnel have repeatedly stated that they were working on these difficulties, and that before winter the Air Forces would have another improved rocket. To date no recent improvement in the rockets that are being furnished to the Army Air Forces has been noted; in fact present tests underway at the Proving Ground on a current lot of ammunition indicate less satisfactory operation than previous lots tested at that station.
>
> 7. The experience of the Navy and of our Allies establishes the rocket as a weapon of prime and possibly decisive important [sic]. . . .
>
> 8. It is requested, therefore, that the Ordnance Department redouble its efforts to furnish the Army Air Forces a rocket suitable for combat use.[22]

Up to the fall of 1943, the 4.5-inch rocket, it is true, had had a checkered career. The mass production begun the preceding spring had been halted in June when service tests showed that motor tubes and some other components failed to function properly in extreme temperatures. Reducing the propellent charge in rockets already manufactured, though shortening effective range, made them safe to use at high temperatures, while strengthening the motor tube and redesigning the warhead partly corrected the weakness of the new rockets. Later, a slight modification of the fin blade produced a model labeled the M8A3.[23] But some months before General Giles aired his concern, the Ordnance Department itself had taken steps to "redouble its efforts" to speed rocket work. A separate Rocket Development Branch, created within Research and Development Service in September, expanded rapidly from a staff of 2 officers and 13 civilians to 15 officers and 31 civilians. Larger sums of money allotted to rocket projects enabled the chief of the branch, the gifted

[21] (1) Memo, Col Donald B. Diehl, Chairman Armament Sec, Materials Div, for CG Materiel Command, Wright Field, 31 Jul 44, sub: Aircraft Rockets. (2) Memo rpt, 21 Feb 45, sub: Monorail Type Rocket Launchers. (3) Memo, Maj J. K. Sun, Assistant Ord and Chemical Off, Hq Eighth AF, for Ord and Armament Off Eighth AF Div, 30 May 45, sub: Aircraft Rockets. (4) Rockets, Development, Production and Performance, 1940–1945, Project Paper 20, pp. 20–21, OHF.

[22] Memo, Gen Giles for CG ASF, 18 Dec 43, sub: Aircraft Rockets, 4.5-inch.

[23] (1) Rocket Development, June 1945, pp. 17–19, OHF. (2) OCM 20555, 27 May 43; 22778, 3 Feb 44

TABLE 12—COMPARISON OF 5-INCH AND 4.5-INCH ROCKETS

	5" HVAR Rocket	4.5" M8 Type Rocket
Total weight	140 pounds	40 pounds.
Maximum velocity	1,300 feet per second	865 feet per second.
Weight of high explosive	7.8 pounds	5.1 pounds (M8A3). 4.3 pounds (T22).
Maximum accurate range	1,000 yards	800 yards.
Approximate penetration of Class A armor	1.75 inches	1 inch.
Good reinforced concrete	3 feet	1 foot.
Operating temperature range	0° F to 120° F	−10° F to 105° F (M8A3). −20° F to 120° F (T22).
Weight of plane mounting installation	15 pounds (16 mounts)	196 pounds (with 2 cluster launchers).

Source: Memo, Lt Col J. W. Gruitch for C. W. Bunch, Office of Commitments and Requirements Div, 15 Aug 44, sub: Comparison of 4.5" Type and 5" HVAR Rockets, Hq USAF file, Office of DCofS for Development.

Col. Gervais W. Trichel, to intensify and widen the program and to establish closer ties with research groups of the Navy, NDRC, and AAF units at Wright Field and Eglin Field. As the AAF also enlarged its research and testing staff and opened Muroc and the Dover Air Bases, Army aircraft rocket developments moved more rapidly.[24]

Dissatisfaction with the first modifications of the M8 rockets revealed the necessity of designing motor tubes strong enough to withstand an internal pressure of 10,000 pounds per square inch. Experimentation proved that heat-treated alloy-steel seamless tubing gave the desired strength and extended the rockets' temperature range from −20° to 120° F.[25] The Ordnance Technical Committee designated this high-strength rocket the T22.[26] By August 1944 a comparison of these new types of 4.5-inch with the Navy HVAR 5-inch rockets showed that the latter was by no means superior in every respect. (*Table 12, above.*) While the HVAR thus carried about 50 percent more high explosive, had considerably greater muzzle velocity, and was equipped with both a nose and a base fuze, the 4.5-inch was so designed that it could be fired from an automatic launcher and could be launched in other directions than in the line of flight of the plane. The fact that the HVAR had an excellent underwater trajectory, which the 4.5-inch lacked, constituted no particular advantage of HVAR for Army Air Forces use inasmuch as the AAF had ceased to participate in sea search and antisubmarine warfare in July 1943, and Wright Field investigation of rocket launching devices for vertical bombing of submarines had faded out thereafter.[27] Moreover, a comparison tabulated after zero rails and adapters for the 4.5-inch rocket had come into use

[24] (1) 1st Ind, Gen Styer, CofS ASF, for CG AAF, 23 Dec 43. (2) Ltr, Col Joiner to Col Diehl, 5 Nov 43. (3) Ltr, Col Joiner to Col Bogert, Wright Field, 10 Nov 43. (4) Tech Div Memo No. 22, 23 Sep 43, OCO. (5) Ord Department Organization Chart, 48, 1 Jun 44, OHF.

[25] See above, Ch XII.

[26] See discussion in Craven and Cate, eds., *AAF II*, pp. 321–43.

[27] Air Tech Serv Command, memo rpt, 6 Dec 44, sub: Retractable 7.2" Antisubmarine Launchers.

might have made the lesser weight of the 40-pound rocket a more obvious asset. And finally, because the AAF employed rockets only for strafing, the 4.5-inch had an eminently desirable distinctive feature: its design enabled the pilot to fire both rockets and machine guns simultaneously by merely harmonizing with the gun sight.

Meanwhile, the existence of rather extensive facilities able to produce the thin-webbed wet-extruded powder grains used in Army 4.5-inch rockets, coupled with the relatively limited sources of supply for the thick-webbed dry-extruded powders needed for the 5-inch, pointed to the wisdom of designing a rocket at least nearly equalling HVAR in power, yet employing a solvent type of propellent powder. Early in 1944 the Ordnance Department requested NDRC to undertake the project, and by October experimental lots of the "H" 4.5-inch rocket were ready for test. Mounted on zero rails on P–47's and B–25's, these first "super 4.5-inch" rockets performed well. Damage to the planes was slight and easily preventable, and dispersion of fire was not excessive. Though the "H" rocket carried a 39-pound payload, HVAR a 48-pound, and though velocity of the former at long range was considerably lower than that of the 5-inch, the new rocket with its faster-burning propellant got up more speed quickly and, over short ranges, attained higher velocities. For many kinds of mission a weapon possessing these characteristics would be better than HVAR. A thousand of the "H" 4.5-inch rockets were accordingly made for further testing, but no production order followed, because as the tactical situation in the spring of 1945 altered, the probability shrank that any need would arise for this type of short-range rocket.[28]

Aircraft rockets played a smaller part in AAF combat than in naval air forces engagements, just as operations over Europe were different in character from those over the Pacific areas. Nevertheless, the knowledge gained in World War II about rocket design and performance was quite as valuable to the Army as to the Navy. An Army Air Forces officer prophetically summarized the importance of the Ordnance and AAF rocket developments when he wrote in 1943:

> In view of the potentialities of rockets as a new aircraft munition, . . . we should go after them hard, although I have never felt nor suggested that any of our "new weapons" would very strongly influence the outcome of the present war. My own view is that new weapons of one war become of real usefulness during the war after that in which they are introduced, and that we shall have to slug out this war for the most part with the guns, bombs and other munitions which we had or had in sight when we entered it.[29]

[28] (1) ATSC memo rpt, 18 Nov 44, sub: Preliminary Rpt on Launching of 4.5" Rockets from AAF Aircraft. (2) Interv with Dr. Hudson 20 Sep 51.

[29] Ltr, Col Joiner to Col Diehl, 5 Nov 43.

ORDNANCE AND EXPLOSIVES
ARCHIVES SEARCH REPORT
FOR
INDIAN ROCKS AIR-TO-GROUND GUNNERY RANGE
BELLEAIR BEACH, FLORIDA
PROJECT NUMBER I04FL033701

APPENDIX E

REPORTS/STUDIES

APPENDIX E

REPORTS / STUDIES

Table of Contents

SITE SURVEY SUMMARY SHEET
FOR
DERP-FUDS SITE NO. I04FL033700
AIR TO GROUND GUNNERY RANGE, INDIAN ROCKS, FL
17 JULY 1992

SITE NAME: Air To Ground Gunnery Range, Indian Rocks.

LOCATION: The site is comprised of two areas in Pinellas County, Florida. The 177.8 acre area is in Belleair Beach, two miles southeast of Clearwater and three miles north of Indian Rocks Beach. The 2.5 acre site is located approximately a half mile south of the larger area and is located in Belleair Shores. See the attached site location map.

SITE HISTORY: During the early 1940's, the U.S. acquired two tracts of land (177.8 acres and 2.5 acres) for the Army Air Force. The site was used by the Army Air Force and perhaps Navy ships as a gunnery range. There is also evidence that the site was used as an antiaircraft practice gunnery range. In 1947, the two areas were disposed of by lease cancellation. The north area is currently privately owned and utilized for hotels and multifamily condominiums. The south area is privately owned and utilized for single family residences.

SITE VISIT:

A site visit was conducted at the 2.5 acre area by Russ Jones, CESAJ-PD-EE, on 14 January 1992. He talked to two of the five homeowners who currently reside there. There was no evidence of hazardous/toxic waste, abandoned storage tanks, ordnance/explosive waste, or unsafe structures/debris.

A site visit was conducted at the 177.8 acre area by Russ Jones, CESAJ-PD-EE, on 11 June 1992. He met with Chief Frank Anderson of the Belleair Beach Police Department. There was no evidence of hazardous/toxic waste, abandoned storage tanks, or unsafe structures/debris. The city of Belleair Beach has had problems with rockets washing up onshore or being carried onshore by swimmers since 1975.

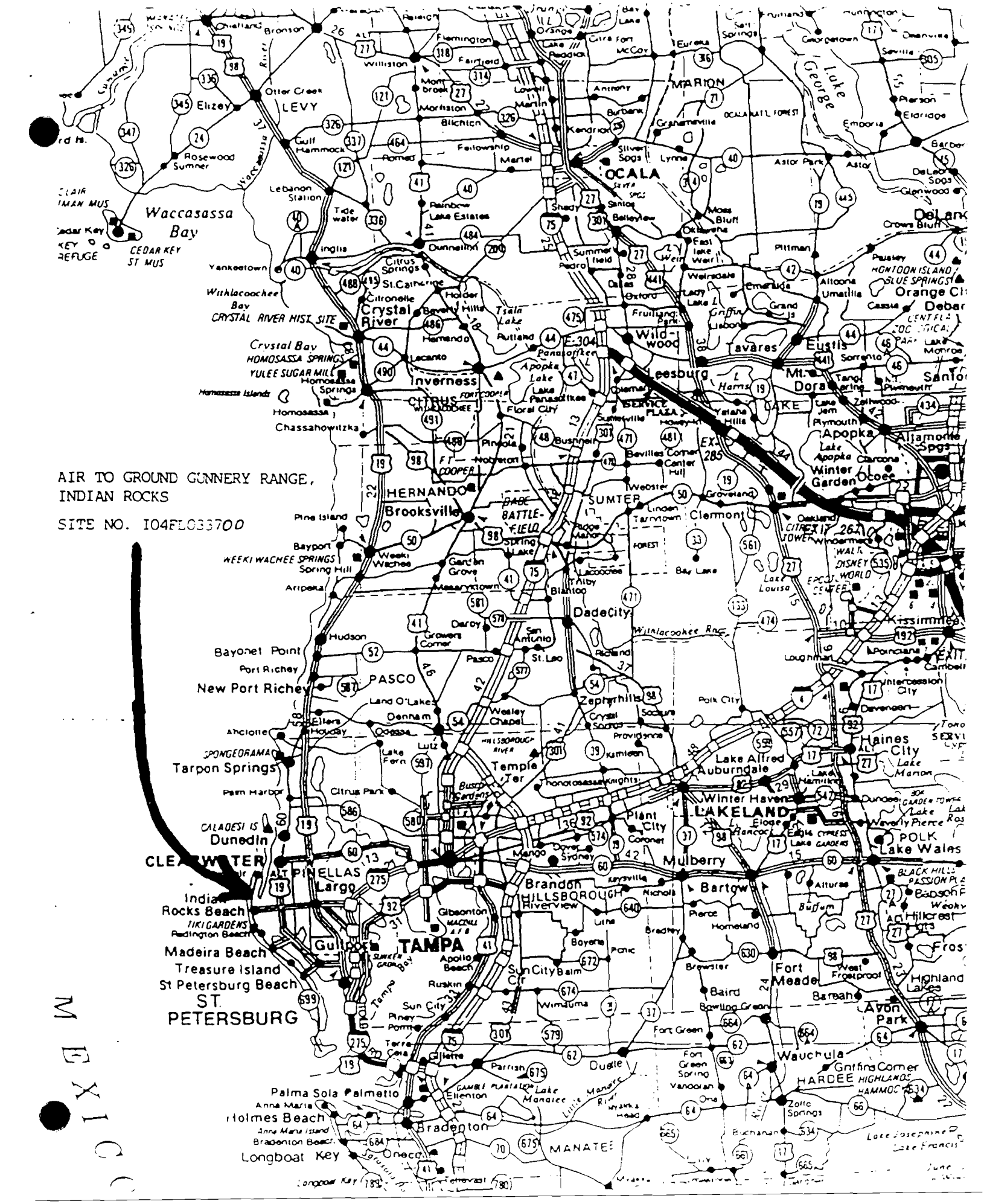
Site POC: Frank P. Anderson, Chief of Police
Belleair Beach Police Department
444 Causeway Boulevard
Belleair Beach, Florida 34635
813-595-4652

CATEGORY OF HAZARD: OEW.

PROJECT DESCRIPTION: CEHND should make a determination of the need for an investigation at the former gunnery range beyond the scope of the Preliminary Assessment.

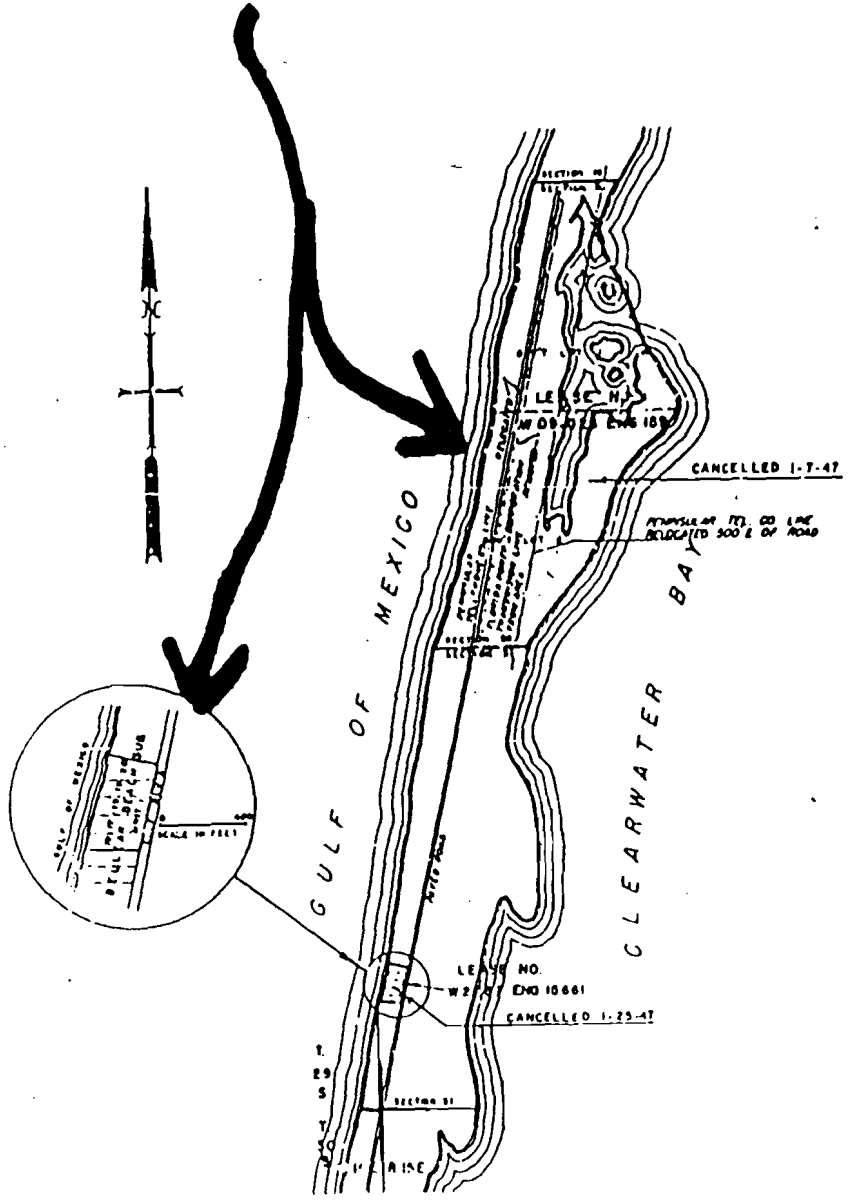
AVAILABLE STUDIES AND REPORTS: Several items of correspondence related to the ordnance problems at Belleair Beach are attached.

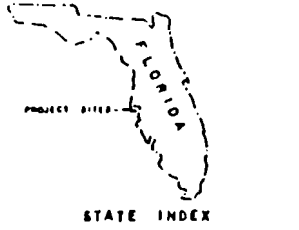
DISTRICT POC: Russ Jones, CESAJ-PD-EE, 904-232-2168.


AIR TO GROUND GUNNERY RANGE,
INDIAN ROCKS
SITE NO. I04FL033700
Waccasassa Bay
CEDAR KEY
CRYSTAL RIVER HIST. SITE
Crystal River
Inverness
CITRUS
HERNANDO
Brooksville
SUMTER
Wildwood
Leesburg
Tavares
Eustis
Mt. Dora
Apopka
Winter Garden
Ocoee
Clermont
OCALA
MARION
LEVY
Chassahowitzka
Homosassa
Crystal Bay
Yankeetown
Dade City
PASCO
New Port Richey
Port Richey
Hudson
Bayonet Point
Tarpon Springs
Dunedin
CLEARWATER
PINELLAS
Largo
India Rocks Beach
Madeira Beach
Treasure Island
St Petersburg Beach
ST. PETERSBURG
TAMPA
Gulfport
Brandon
HILLSBORO
Riverview
Temple Ter
Zephyrhills
Plant City
Mulberry
Lakeland
Winter Haven
Lake Alfred
Auburndale
Haines City
Kissimmee
Bartow
Fort Meade
Wauchula
Palma Sola
Palmetto
Holmes Beach
Bradenton
MANATEE
Longboat Key
Sarasota
Lake Manatee
Lake Tarpon
Lake George
Lake Louisa
Lake Josephine
Lake Francis
Withlacoochee River
Hillsborough River
Tampa Bay
Gulf of Mexico

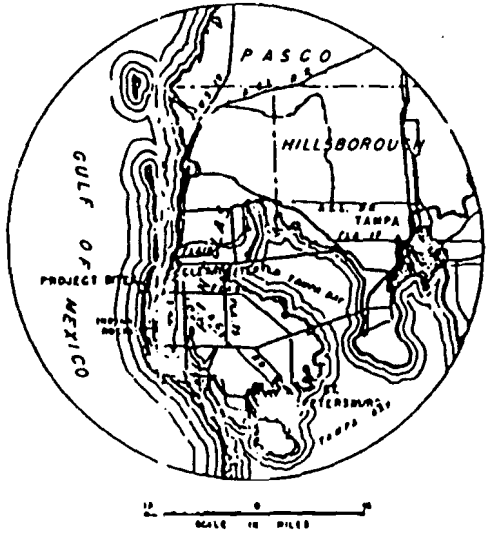
AIR TO GROUND GUNNERY RANGE, INDIAN ROCKS

SITE NO. I04FL033700





STATE INDEX



VICINITY MAP

TRACT NO.	LEASE NO.	VENDOR	ACRES LEASED
		AIR TO GROUND GUNNERY RANGE	
(NONE)	W09-026 ENG 139	ARNOLD S. KINNEBY, ET UX	177.8
		ANTI-AIRCRAFT GUNNERY RANGE	
(NONE)	W32-7 ENG 10661	ARNOLD S. KINNEBY, ET UX	2.5

DIRECTIVE DATA

FINAL

STATE . . FLORIDA

COUNTY . PINELLAS

DIVISION . SOUTH

SERVICE COMMAND

USING AGENCY . AF

. . 2 . . MILES . SE

. . 3 . . MILES . N

— TRANSPORT

. . . . . S A L

. . . . . 17, 99, 1

— LAN

ACRES OWNED BY

ACRES LEASED BY

ACRES LEASED FR

ACRES TRANSFERR

ACRES DONATED T

ACRES ACQUIRED

— DIS

ACRES SOLD. . . .

ACRES TERMINATE

ACRES EXCHANGED

ACRES OTHERWISE

— LI

RESERVATION LINE

STATE OR PROVINCE

COUNTY LINE

CIVIL DISTRICT PREC

LAND-GRANT LINE

CITY, VILLAGE, OR BO

CEMETERY, SMALL PAR

TOWNSHIP LINE

SECTION LINE

AVIGATION EASEMENT

FEE SIMPLE

SCALE

WAR D
CONSTR

REA
AIR TO GROU
ANTI-AIRCRAF
INDIAN
MILITAR

RECOMMENDED

APPROVED

COMPILED

DEFENSE ENVIRONMENTAL RESTORATION PROGRAM
FORMERLY USED DEFENSE SITES
FINDINGS AND DETERMINATION OF ELIGIBILITY

AIR TO GROUND GUNNERY RANGE, INDIAN ROCKS, FL

SITE NO. I04FL033700

FINDINGS OF FACT

1. During the early 1940's, the United States acquired from two private individuals by lease, two separated tracts of land, 2.5 acres and 177.8 acres, a total of 180.30 acres in leasehold, for a gunnery range. The site was developed and named the Air To Ground Gunnery Range, Indian Rocks, Florida. The site was located two miles southeast of Clearwater and three miles north of Indian Rocks, in Pinellas County, Florida.

2. The site was used by the Army Air Force for the purpose of a gunnery range. No information could be located pertaining to any improvements being constructed by the War Department. Therefore, it is unknown whether or not there were any improvements constructed on the site.

3. The entire site consisting of 180.30 acres in leasehold was disposed of by lease cancellation; 177.8 acres canceled on 7 January 1947 and 2.5 acres canceled on 25 January 1947. The terms and conditions of the lease and termination notices or if there were any restorations required are unknown as copies of those instruments could not be located. Disposal information was taken from the real estate map. The south tract (2.5 acres) is privately owned and currently utilized for single family residences. The north tract (177.8 acres) is privately owned and currently utilized for hotels and multifamily condominiums.

DETERMINATION

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

9 Sep 92
DATE

James H. Simms
JAMES H. SIMMS
Colonel, EN
Commanding

PROJECT SUMMARY SHEET
FOR
DERP-FUDS OEW PROJECT NO. I04FL033701
AIR TO GROUND GUNNERY RANGE, INDIAN ROCKS, FL
SITE NO. I04FL033700
17 JULY 1992

PROJECT DESCRIPTION: The city of Belleair Beach has had problems with rockets washing up onshore, being carried onshore by swimmers, or being spotted underwater by divers since 1975. The attached map shows the stretch of beach where ordnance has been located. The city of Belleair Beach has asked for and received assistance from Navy and/or Army explosive units in searching for and removing the rockets in 1975, 1977, 1980, 1986, and 1987. The types of ordnance that have been found are 4.5-inch barrage rockets and 2.25-inch scar rockets. The rockets were found to contain their original explosive charges. The rockets are still intact because they were de-fused prior to being fired from aircraft. The aircraft were participating in mock attacks in support of practice beachhead landings during World War II.

PROJECT ELIGIBILITY: The Army's use of the site as a gunnery range is responsible for the ordnance that has been found. Our records indicate that the last underwater ordnance sweep was conducted in 1987. There is no recent evidence of any remaining ordnance, however, chances are reasonably good that a strong storm has uncovered or will uncover additional ordnance.

POLICY CONSIDERATIONS: This potential project satisfies all current policy considerations regarding OEW.

PROPOSED ACTIVITIES: This INPR should be referred to CEHND for a determination of the need for an investigation at the former gunnery range beyond the scope of the Preliminary Assessment.

RISK ASSESSMENT: A Risk Assessment Code (RAC) of 2 has been assigned to this project (see attached Risk Assessment Procedures).

DISTRICT POC: Russ Jones, CESAJ-PD-EE, 904-232-2168.

APPENDIX A
RISK ASSESSMENT PROCEDURES FOR
EXPLOSIVE ORDNANCE (EXO)

Site Name Air To Ground Gunnery Rge
Site Location Belleair Beach, FL
DERP Project # I04FL033701

Rater's Name Russ Jones
Organization CESAJ-PD-EE
RAC 2

EXO RISK ASSESSMENT:

This risk assessment procedure was developed in accordance with MIL-STD 882B and AR 385-10.

The EXO risk assessment is based upon documented evidence consisting of records searches, reports of Explosive Ordnance Disposal (EOD) detachment actions, and field observation, interviews, and measurements. These data are used to assess the risk involved based upon the hazards identified at the site. The risk assessment is composed of two factors, hazard severity and hazard probability.

Any field activities should be made with the assistance of qualified EOD personnel.

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

TYPE OF ORDNANCE

A. Conventional Ordnance and Ammunition

	Yes Value	No Value	Value
Small Arms (.22 cal - .50 cal)	2	0	0
Medium/Large Caliber (20mm and larger)	10	0	0
Bombs, Explosive	10	0	0
Bombs, Practice (w/spotting charges)	6	0	0
Grenades, Hand and Rifle, Explosive	10	0	0
Grenades, Practice (w/spotting charges)	6	0	0
Landmines, Explosive	10	0	0
Landmines, Practice (w/spotting charges)	6	0	0
Rockets, Guided Missiles, Explosive	10	0	10
Detonators, Blasting Caps	10	0	0

	Yes Value	No Value	Value
Demolition Charges	10	0	0
Conventional Ordnance and Ammunition Value (Maximum of 10).			10

B. Pyrotechnics

	Yes Value	No Value	Value
Any Munitions Containing White Phosphorous or other Pyrophoric Material (i.e., Spontaneously Flammable)	10	0	0
Any Munitions Containing a Flame or Incendiary Material (i.e., Napalm, Triethaliuminum Metal Incendiaries)	6	0	0
Military Flares	4	0	0
Pyrotechnics Values (Maximum of 10).			0

C. Bulk High Explosives (Bulk explosives not an integral part of convention ordnance).

	Yes Value	No Value	Value
Primary of Initiating Explosives (Lead Styphnate, Lead Azide, Nitroglycerin, Mercury Azide, Mercury Fulminate, etc.	10	0	0
Booster, Bursting or Fuse Explosives (PETN, Compositions A, B, C, Tetryl, TNT, RDX, HMX, HBX, Black Powder, etc.)	10	0	0
Military Dynamite	10	0	0
Less Sensitive Explosives (Ammonium Nitrate, Favier Explosives, etc.)	3	0	0
High Explosives Value (Maximum value of 10).			0

D. Propellants

	Yes Value	No Value	Value
Solid or Liquid Propellants	3	0	0 0

E. Chemical Agents/Radiological Materials/Munitions

	Yes Value	No Value	Value
Radiological	25	0	0
Toxic Chemical Agents (Choking, Nerve, Blood, Blister)	25	0	0
Incapacitating Agent (BZ)	10	0	0
Riot Control and Miscellaneous (Vomiting, Tear, Chlorine, Mustard Stimulant)	5	0	0
Any Munitions Containing Smoke,	4	0	0
Illumination, Signal Charge			

Chemical Agents/Radiological Materials/Munitions Value (Maximum 25). 0

Total Ordnance and Explosive Waste Characteristics Value (Total = A + B + C + D + E with a Maximum value of 61). 10

TABLE 1

HAZARD SEVERITY

Description	Category	Value
CATASTROPHIC	I	≥21
CRITICAL	II	≥13 <21
MARGINAL	III	≥ 5 <13
NEGLIGIBLE	IV	< 5

* Apply Hazard Severity to Table 3.

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

AREA, EXTENT, ACCESSIBILITY OF CONTAMINATION

A. Locations of Contamination

	Yes Value	No Value	Value
Within Tanks, Pipes, Vessels or Other confined locations.	5	0	0
On the surface or within 3 feet.	5	0	5
Inside walls, ceilings, or other parts of Buildings or Structures.	4	0	0
Subsurface, greater than 3 feet in depth.	3	0	0

Value for location of EXO (Maximum Value of 5). 5

B. Distance to nearest inhabited locations or structures likely to be at risk from EXO site (roads, parks, playground, and buildings.)

Distance to Nearest Target	VALUE
Less than 1250 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
2.0 miles to 5.0 miles	1
Over 5.0 miles	0

Distance to Persons Value (Maximum Value of 5). 5

C. Numbers and types of Buildings within a 2 mile radius measured from the hazardous area, not the installation boundary.

Number of Buildings	VALUE
0	0
1 to 10	1
11 to 50	2
51 to 100	3
101 to 250	4
251 or Over	5

Number of Buildings Value (Maximum Value of 5). 5

D. Types of Buildings

	VALUE
Educational, Child Care, etc.	5
Residential, Hospitals, Hotels, etc.	5
Commercial, Shopping Centers, etc.	5
Industrial Warehouse, etc.	4
Agricultural, Forestry, etc.	3
Detention, Correctional	2
Military	1
No Buildings	0

Types of Buildings Value (Maximum Value of 5). 5

E. Accessibility to site refers to the measures taken to limit access by humans or animals to ordnance and explosive wastes. Use the following guidance:

Barrier	Assigned Value
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;	0

or Barrier	Assigned Value
An artificial or natural barrier (e.g., a fence combined with a cliff), which completely surround 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
Security guard, but no barrier	1
A barrier, (any kind of fence) but no separate means to control entry	2
Barriers do not completely surround the facility	3
No barrier or security system	5

Accessibility Value (Maximum Value of 5). 5

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

	VALUE
None Anticipated	0
Expected	5

(Maximum Value of 5) 5

Total value for hazard probability.
Sum of Values A through F.
(Not to exceed 30). Apply this value to Hazard Probability Table 2 to determine Hazard Level. ____

TABLE 2

HAZARD PROBABILITY

Description	Level	Value
FREQUENT	A	≥27
PROBABLE	B	≥21 <27
OCCASIONAL	C	≥15 <21
REMOTE	D	≥ 8 <15
IMPROBABLE	E	< 8

*Apply Hazard Probability to Table 3.

Part III. Risk Assessment. The risk assessment value for this site is determined using the following Table 3. Enter with the results of the hazard probability and hazard severity values.

TABLES 1 AND 2

HAZARD SEVERITY - III (from Table 1)

HAZARD PROBABILITY - A (from Table 2)

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

Note: The risk assessment code for EXO is not equivalent to the risk assessment code prescribed in AR 385-10.

RISK ASSESSMENT CODE (RAC)

RAC 1 Imminent Hazard - Emergency action required to mitigate the hazard or protect personnel (i.e., Fencing, physical barrier, guards, etc.)

(RAC 2) Action required to mitigate hazard or protect personnel. Feasibility study is appropriate.

RAC 3 Action required to evaluate potential threat to personnel. High priority Site Inspection is appropriate.

RAC 4 Action required to evaluate potential threat to personnel. Site Inspection is appropriate.

RAC 5 No action required.

10 Jul 1992
Previous editions obsolete

RISK ASSESSMENT PROCEDURES FOR ORDNANCE AND EXPLOSIVE WASTE (OEW) SITES

Site Name Pinellas Cty Air to Grnd Rng
Site Location Pinellas City Indian Rocks FL
DERP Project # I04 FL 633700

Rater's Name D. Rhodes
Organization CEHND-ED-SY
RAC 1
Date 29 Sep 92

OEW RISK ASSESSMENT:

This risk assessment procedure was developed in accordance with MIL-STD 882B and AR 385-10.

The OEW risk assessment is based upon documented evidence consisting of records searches, reports of Explosive Ordnance Disposal (EOD) detachment actions, and field observations, interviews, and measurements. These data are used to assess the risk involved based upon the hazards identified at the site. The risk assessment is composed of two factors, **hazard severity** and **hazard probability**.

Any field activities should be made with the assistance of qualified EOD personnel.

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

TYPE OF ORDNANCE

A. Conventional Ordnance and Ammunition

	YES VALUE	NO VALUE	VALUE
Small Arms (.22 cal - .50 cal)	1	0	1
Medium/Large Caliber (20 mm and larger)	10	0	10
Bombs, Explosive	10	0	10
Bombs, Practice (w/spotting charges)	6	0	6
Grenades, Hand and Rifle, Explosive	10	0	0
Grenades, Practice (w/spotting charges)	4	0	0
Landmines, Explosive	10	0	0
Landmines, Practice (w/spotting charges)	4	0	0
Rockets, Guided Missiles, Explosive	10	0	10
Detonators, Blasting Caps	6	0	0

Conventional Ordnance and Ammunition Value (Maximum of 10). 10

B. Pyrotechnics(For munitions not described above.)

	YES VALUE	NO VALUE	VALUE
Munition (Container) Containing White Phosphorus or other Pyrophoric Material (i.e., Spontaneously Flammable)	10	0	0
Munition Containing A Flame or Incendiary Material (i.e., Napalm, Triethlaluminum Metal Incendiaries)	6	0	0
Flares,Signals, Simulators	4	0	0
Pyrotechnics Value (Maximum of 10).			0

C. Bulk High Explosives (Bulk explosives not an integral part of conventional ordnance; uncontainerized.)

	YES VALUE	NO VALUE	VALUE
Primary or Initiating Explosives (Lead Styphnate, Lead Azide, Nitroglycerin, Mercury Azide, Mercury Fulminate, Tetracene, etc.)	10	0	0
Demolition Charges	10	0	0
Booster, Bursting or Fuze Explosives (PETN, Compositions A, B, C, Tetryl, TNT, RDX, HMX, HBX, Black Powder, etc.)	8	0	0
Military Dynamite	6	0	0
Less Sensitive Explosives (Ammonium Nitrate, Explosive D, etc.)	3	0	0
High Explosives Value(Maximum Value of 10)			0

D. Propellants

	YES VALUE	NO VALUE	VALUE	
Solid or Liquid Propellants	6	0	6	6

E. Radiological/Chemical Agent/Weapons

	YES VALUE	NO VALUE	VALUE
Toxic Chemical Agents (Choking, Nerve, Blood, Blister)	25	0	0
Radiological	15	0	0
Riot Control and Miscellaneous (Vomiting, Tear, etc.)	5	0	0

Radiological/Chemical Agent/Weapons Value (Maximum 25). C

Total Ordnance and Explosive Waste Characteristics Value (Total = A + B + C + D + E with a Maximum value of 61). 16

Apply this value to Table 1 to determine Hazard Severity Category.

TABLE 1

HAZARD SEVERITY

Description	Category	Value
CATASTROPHIC	I	≥21
CRITICAL	II	≥13 <21
MARGINAL	III	≥5 <13
NEGLIGIBLE	IV	≥1 <5
NONE		0

*** Apply Hazard Severity Category to Table 3.**

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 DOD site.

AREA, EXTENT, ACCESSIBILITY OF CONTAMINATION

A. Locations of Contamination

	YES VALUE	NO VALUE	VALUE
On the surface	5	0	5
Within Tanks, Pipes, Vessels or Other confined locations.	4	0	0
Inside walls, ceilings, or other parts of Buildings or Structures.	3	0	0
Subsurface	2	0	2
Value for location of UXO. (Maximum Value of 5).			5

B. Distance to nearest inhabited locations or structures likely to be at risk from OEW site (roads, parks, playgrounds, and buildings).

Distance to Nearest Target	VALUE
Less than 1250 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 to Persons Value (Maximum Value of 5).	5

C. Numbers and types of Buildings within a 2 mile radius measured from the hazardous area, not the installation boundary.

Number of Buildings	VALUE
0	0
1 to 5	1
6 to 10	2
11 to 15	3
16 to 25	4
26 and over	5
Number of Buildings Value (Maximum Value of 5).	5

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

	VALUE
Educational, Child Care, etc.	5
Residential, Hospitals, Hotels, etc.	5
Commercial, Shopping Centers, etc.	5
Industrial Warehouse, etc.	4
Agricultural, Forestry, etc.	3
Detention, Correctional	2
Military	1
No Buildings	0

Types of Buildings Value (Maximum Value of 5). 5

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

Barrier	Assigned Value
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;	0

or

Barrier	Assigned Value
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
Isolated site	1
Security guard, but no barrier	2
A barrier, (any kind of fence) but no separate means to control entry	3
Barriers do not completely surround the facility	3
No barrier or security system	5

Accessibility Value (Maximum Value of 5). 5

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

	VALUE
None Anticipated	0
Expected	5
(Maximum Value of 5)	5

Total value for hazard probability.
Sum of Values A through F.
(Not to exceed 30). 30

==========

Apply this value to Hazard Probability Table 2 to determine Hazard Probability Level.

TABLE 2

HAZARD PROBABILITY

Description	Level	Value
FREQUENT	A	≥27
PROBABLE	B	≥21 <27
OCCASIONAL	C	≥15 <21
REMOTE	D	≥ 8 <15
IMPROBABLE	E	<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 3. Enter with 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 Imminent Hazard - Emergency action required to mitigate the hazard or protect personnel (i.e., Fencing, physical barrier, guards, etc.).

RAC 2 Action required to mitigate hazard or protect personnel. Initial project phase--phased EECA.

RAC 3 Action required to evaluate potential threat to personnel. Initial project phase--Archives search and site investigation.

RAC 4 Action required to evaluate potential threat to personnel. Initial project phase--Archives search.

RAC 5 No action required.

NOTE: Other phases may be considered depending on individual site conditions.

Justification. In narrative form, summarize the documented evidence that supports this risk assessment.

Due to the possibility of PECA being found on the site that was not mentioned in the previous RAC, this new RAC score is increased to a RAC 1. This new information was obtain per Fonecon w/ LT Graves, 66th Ord Det (EOD), Patrick AFB, FL

REPORTS CONTROL SYMBOL

AMD-1

OWNED, SPONSORED AND LEASED FACILITIES

31 DECEMBER 1945

PREPARED BY OFFICE OF THE CHIEF OF ENGINEERS

RESTRICTED

COMMAND FACILITIES
Air Forces Technical Field Training
Section II Part I

NAME OF INSTALLATION LOCATION AND TYPE OF INSTALLATION	CAPACITY FOR ENLISTED MEN						CAPACITY FOR OFFICERS	NORMAL BED CAPACITY STATION HOSPITAL	ACRES IN SITE			NUMBER OF LEASES	ANNUAL RENTAL OF LEASES	STORAGE		COST TO GOVT. (Since 1 July 1940)			REMARKS
	PERMANENT BLDGS.	MOBILIZATION BLDGS.	T. OF O. BLDGS.	SUBSISTENCE	TENTS	TOTAL			OWNED	LEASED	TOTAL			COVERED SQ. FT.	OPEN SQ. FT.	LAND	CONSTRUCTION	TOTAL	
Dodge City Army Airfield Johnson, Kans. Johnson Aux. Field No. 4									1,383		1,383			800		45,610		45,610	Constr. cost incld. in Main Field. Temporarily inactive status.
Dow Field Arcadia, Fla. Reserve Air Service Trg. Field									642		642					5,120		5,120	Declared surplus 22 Nov. 1945.
Douglas Aircraft Co. Long Beach, Cal. AAF Technical Training School			631			631	24			143	143	2	3,545				452,461	452,461	Data from 30 Sept. 1945 report.
Douglas Aircraft Co. Santa Monica, Cal. AAF Technical Training School			492		904	926	16			108	108	6	4,066				456,450	456,450	Data from 30 Sept. 1945 report.
Douglas Army Airfield Douglas, Ariz. Army Pilot School 2E			3,534			3,534	440	284	2,804		2,804			168,938	587,136	7,914	8,156,143	8,164,057	
Douglas Army Airfield Forrest, Ariz. Forrest Aux. Field									785		785					6,125		6,125	Constr. cost incld. in Main Field.
Douglas Army Airfield Hereford, Ariz. Hereford Aux. Field No. 5			374			374	48	100	2,548		2,548			9,824		16,350	1,373,417	1,389,767	Declared surplus [illegible] 1945.
Douglas Army Airfield McNeal, Ariz. McNeal Aux. Field									642		642					4,480		4,480	Constr. cost incld. in Main Field
Douglas Army Airfield Webb, Ariz. Webb Aux. Field									641		641					2,978		2,978	Constr. cost incld. in Main Field.
Dover Army Airfield Dover, Del. Combat Crew Training Station			1,603			1,603		69	2,732	674	3,406	5	624	64,199	8,657	86,120	9,255,650	9,341,770	
Dover Army Airfield Dover, Del. Air to Ground Gunnery Range									3,500		3,500								3,500 A. under permit from Interior Dept.
Dover Army Airfield Dover, Del. Small Arms Range									831	187	1,018	5	5						831 A. under permit from Interior Dept.
Dow Field Greenfield, Me. Bangor Bombing Range	30					30			4,982		4,982			3,060		18,115	7,481	25,596	
Dow Field Indian Rocks, Fla. AA Gunnery Range									1	3	4	1	1			1,088	471	1,559	Data from 30 Sept. 1945 report.
Dow Field Tampa, Fla. Hillsborough Aux. Field			476			476	160		2	3,741	3,743	69		8,960		9,352	1,293,877	1,303,229	Declared surplus 15 Nov. 1945.
Dow Field Tampa, Fla. AAFSAT Trg. Site 271-B			49			49	4			10	10	1	20				28,085	28,085	Data from 30 Sept. 1945 report.

RESTRICTED

NAME OF INSTALLATION LOCATION AND TYPE OF INSTALLATION	CAPACITY FOR ENLISTED MEN: PERMANENT BLDGS.	MOBILIZATION BLDGS.	T. OF O. BLDGS.	HUTMENTS	TENTS	TOTAL	CAPACITY FOR OFFICERS	NORMAL [illegible] CAPACITY [illegible]	[illegible]	[illegible] (... 1946): [illegible]	TOTAL	REMARKS
...a Field ...mbrone, Tex. Burton Aux. Field No. 4									[illegible]	[illegible]	[illegible]	
...ry Army Airfield Perry, Fla. Combat Crew Tng. Sta-Fighter			920			920	208	[illegible]	[illegible]	2,353,011	2,366,721	Certified to [illegible] 1945.
...ry Army Airfield Perry, Fla. Air to Ground Gunnery Range									[illegible]	113,064	113,064	Data from 30 Sept. 1945 report.
...ry Army Airfield Perry, Fla. Precision Bombing Range									[illegible]	1,830,369	1,830,369	
...ry Army Airfield Perry, Fla. Small Arms Range									[illegible]	13,999	13,999	Data from 30 Sept. 1945 report.
...son Field Colorado Springs, Colo. Hq. Fighter Wing			5,090	210		5,300	1,001	[illegible]	[illegible]	12,949,950	12,952,710	Incls. radio range [illegible] Direction Finding [illegible] and Pile Dy[illegible].
...son Field Colorado Springs, Colo. Rifle Range Training Area				5		5			[illegible]	38,293	38,293	
...castle Army Airfield ...castle, Fla. Moving Jeep Target Range									[illegible]			Constr. cost [illegible] fld.
...le Camp Fresno, Cal. Western SC Aviation Tng. Ct.			2,733	2,074		4,807	291	[illegible]	[illegible]	[illegible]	2,217,729	Annual rental and [illegible] Fresno AAF [illegible] Depot, [illegible] Depot. 40 A. Former [illegible] Jap Relocation Center.
...llas Army Airfield St. Petersburg, Fla. Combat Crew Tng. Sta.-Fighter			763			763	192	[illegible]	[illegible]	[illegible]	1,597,969	Certified to [illegible] 1945.
...llas Army Airfield Indian Rocks, Fla. Air to Ground Gunnery Range				21		21			[illegible]	[illegible]	1,922	Data from 30 Sept. [illegible] report.
...llas Army Airfield Belleair, Fla. AWS Unit Tng. Ctr. Site C			94			94	6		[illegible]	4,054	4,054	Data from 30 Sept. [illegible] report.
...llas Army Airfield Safety Harbor, Fla. AWS Unit Tng. Ctr. Site 9			48			48	5		[illegible]	40,000	40,000	Data from 30 Sept. [illegible] report.
...llas Army Airfield Largo, Fla. AWS Unit Tng. Ctr. Site 25				64		64	1		[illegible]			
...llas Army Airfield Safety Harbor, Fla. Dive Bombardment Range				4		4			[illegible]	5,209	5,209	Data from [illegible] report.

ALL TYPES OF FACILITIES ALPHABETICALLY BY STATES

Section IX

State FLORIDA

NAME AND LOCATION OF INSTALLATION	COST TO GOV'T Since 1 July 1940	LAND (ACRES)			ANNUAL COST LEASES
		OWNED	LEASED	TOTAL	
BUCKINGHAM ARMY AIRFIELD FORT MYERS ESTERO CRASH BOAT STATION	30000		2	2	21
BUCKINGHAM ARMY AIRFIELD FORT MYERS MARCO CRASH BOAT STATION	30000		1	1	235
BUCKINGHAM ARMY AIRFIELD FORT MYERS RADIO RANGE STATION			1	1	1
BUSHNELL ARMY AIRFIELD BUSHNELL SB ORLANDO AIR BASE	320000		924	924	1768
CAPE CANAVERAL AWS STATION TITUSVILLE AWS STATION NO 23	37481	25	6	31	5
CARLSTROM FIELD ARCADIA CONTRACT PILOT SCHOOL-PRIMARY	10847	640		640	
CAYO COSTA MIL RESERVATION CAYO COSTA ISLAND COASTAL DEFENSE SITE		1176		1176	
CONFEDERATE PARK CAMP SITE JACKSONVILLE CAMP SITE 4TH ARMY CORPS	85451		1	1	1
CORTEZ AWS STATION CORTEZ AIRCRAFT WARNING SERVICE STA	37344		8	8	
CROSS CITY ARMY AIRFIELD CROSS CITY AIR TECH SER COMD-SB ALACHUA	854861	54	3080	3134	132
DALE MABRY ARMY AIRFIELD TALLAHASSEE COMBAT CREW TRAINING STATION	8375179	2273	809	3082	981
DALE MABRY ARMY AIRFIELD ST TERESA ALLIGATOR PT BOMBING RANGE	751		830	830	330
DALE MABRY ARMY AIRFIELD ST MARKS CRASH BOAT STATION	55360		1	1	1366
DALE MABRY ARMY AIRFIELD CROSS CITY HORSESHOE PT GUNNERY RANGE	18071		1581	1581	2
DALE MABRY ARMY AIRFIELD TALLAHASSEE MUNICIPAL HANGAR FOR PLANES	435		1	1	1900
DALE MABRY ARMY AIRFIELD SOPCHOPPY SOPCHOPPY BOMBING RANGE	63669	4480		4480	
DAVENPORT RADAR STATION DAVENPORT RADAR SITE NO 14	55262		18	18	8
DORK FIELD ARCADIA RESERVE AIR SERVICE TNG FIELD	5120	642		642	
DREW FIELD INDIAN ROCKS AA GUNNERY RANGE	1559	1	3	4	1
DREW FIELD TAMPA HILLSBOROUGH AUX FIELD	1303229	2	3741	3743	
DREW FIELD BELLEAIR CRASH BOAT STATION	18500		1	1	1
DREW FIELD TARPON SPRINGS CRASH BOAT STATION	5204		1	1	400
DREW FIELD TAMPA PERSONNEL DEPOT	18918974	3559	4540	8199	4473
DREW FIELD TAMPA PLANT FIELD SUB BASE			50	50	10000
DREW FIELD TAMPA AAFSAT TNG SITE 271-B	28085		10	10	20
DREW FIELD TAMPA AAFSAT TNG SITE 588-A	11488		10	10	1

E-3

State FLORIDA

NAME AND LOCATION OF INSTALLATION	COST TO GOV'T Since 1 July 1940	LAND (ACRES)			ANNUAL COST LEASES
		OWNED	LEASED	TOTAL	
DREW FIELD TAMPA AAFSAT TNG SITE 588-D	11984		10	10	1
DREW FIELD TAMPA AAFSAT TNG SITE E	28272		10	10	1
DREW FIELD TAMPA AAFSAT TNG SITE NO 7	21490	26		26	
DREW FIELD TAMPA AAFSAT TNG SITE NO 25	8480		29	29	1
DREW FIELD TAMPA HQ 3RD AIR FORCE	302472		45	45	63
DREW FIELD BROOKSVILLE JEEP MOVING TARGET RANGE	76540		9580	9580	577
DREW FIELD PINELLAS COUNTY POORMAN GUNNERY RANGE	82403		301	301	193
DUNNELLON ARMY AIRFIELD DUNNELLON AIR TECH SER COMD SB ALACHUA	1748011	717	1897	2514	357
ECLIN FIELD VALPARAISO AAF PROVING GROUND COMD BASE	17593635	504268	9177	513445	3089
ECLIN FIELD VALPARAISO TROOP HOUSING FLOROSA HOTEL					
ECLIN FIELD VALPARAISO AUX FIELD NO 1					
ECLIN FIELD VALPARAISO AUX FIELD NO 2					
ECLIN FIELD VALPARAISO AUX FIELD NO 3					
ECLIN FIELD VALPARAISO AUX FIELD NO 4					
ECLIN FIELD VALPARAISO AUX FIELD NO 5					
ECLIN FIELD VALPARAISO AUX FIELD NO 6					
ECLIN FIELD VALPARAISO AUX FIELD NO 7					
ECLIN FIELD VALPARAISO AUX FIELD NO 9					
FISHER ISLAND AWS STATION FISHER ISLAND AIRCRAFT WARNING SERVICE STA	1000	3		3	
FLAGLER BEACH AWS STATION FLAGLER BEACH AIRCRAFT WARNING SERVICE STA	38783	6	2	8	
FLAGLER BEACH AIRPORT FLAGLER BEACH CIVIL AIR PATROL BASE			376	376	1
HENDRICKS FIELD SEBRING ARMY PILOT SCHOOL-SPLZD 4E	11577850		9221	9221	1
HENDRICKS FIELD CHILDS AIRCRAFT WARNING SUB POST	42526		40	40	1000
HENDRICKS FIELD OKEECHOBEE CONNORS AUX FIELD	772000		1065	1065	1
HENDRICKS FIELD INMOKALEE INMOKALEE MUN AIRPORT AUX FLD	6232	1364		1364	
HENDRICKS FIELD SEBRING REPAIR SHOPS AND WAREHOUSES			19	19	3154

ALL TYPES OF FACILITIES ALPHABETICALLY BY STATES

Section IX

RESTRICTED

State FLORIDA

NAME AND LOCATION OF INSTALLATION	COST TO GOV'T Since 1 July 1940	LAND (ACRES) OWNED	LEASED	TOTAL	ANNUAL COST LEASED
MONTBROOK ARMY AIRFIELD MONTBROOK AIR TECH SER COMD-SB ALACHUA	2537224	1751		1751	
MONTBROOK ARMY AIRFIELD MONTBROOK AERIAL GUNNERY RANGE			5720	5720	572
MOODY FIELD BRONSON BOMBING AND GUNNERY RANGES	75423	5935	5745	11680	553
MORENO POINT MIL RESERVATION VALPARAISO CAMP SITE USED BY FT BENNING		13		13	
MORRISON FIELD WEST PALM BEACH AERIAL P OF E-TRANSPORT S-M	11840798	1466	690	2156	13805
MORRISON FIELD WEST PALM BEACH CRASH BOAT STATION	540	1		1	1300
MORRISON FIELD WEST PALM BEACH RADIO RANGE STATION	28163	20	2	22	3
MORRISON FIELD WEST PALM BEACH SMALL ARMS RANGE	12338		396	396	2
MURPHY CAMP STUART SIGNAL CORPS TECH SCHOOL	5318796	7996	3368	11364	6
MYAKKA CITY AWS STATION MYAKKA CITY AIRCRAFT WARNING SERVICE STA	33159		10	10	1
NAPLES ARMY AIRFIELD FORT MYERS SB BUCKINGHAM AAF	702596	249	644	893	2
ORLANDO ARMY AIR BASE ORLANDO 22 SEARCHLIGHT SITES AAFSAT			1171	1171	1199
ORLANDO ARMY AIR BASE APOPKA APOPKA SEARCHLIGHT STATION	31300		92	92	941
ORLANDO ARMY AIR BASE ORLANDO AAF CENTER	13176968	1260	1525	2785	6480
ORLANDO ARMY AIR BASE ORLANDO AAFSAT RADAR INSTALLATIONS			210	210	2450
ORLANDO ARMY AIR BASE LEESBURG AAFSAT SERVICE CENTER	464251		866	866	855
ORLANDO ARMY AIR BASE HALLANDALE AAFSAT TNG SITE INTERCEPTOR			20	20	2793
ORLANDO ARMY AIR BASE CLERMONT CLERMONT SEARCHLIGHT STATION	90000		97	97	32
ORLANDO ARMY AIR BASE EUSTIS EUSTIS SEARCHLIGHT STATION			29	29	39
ORLANDO ARMY AIR BASE MINORVILLE MINORVILLE OM DEPOT	210061	188		188	
ORLANDO ARMY AIR BASE NT DORA NT DORA SEARCHLIGHT POSITION	90000		69	69	36
ORLANDO ARMY AIR BASE OCALA OCALA BOMBING RANGE	16000	23167		23167	
ORLANDO ARMY AIR BASE COTNA ORDNANCE DEPOT	112011	46		46	
ORLANDO ARMY AIR BASE ORLANDO RADIO RANGE STATION	2000	9		9	
ORLANDO ARMY AIR BASE ORLANDO TOXIC GAS YARD			1283	1283	1234

State FLORIDA

NAME AND LOCATION OF INSTALLATION	COST TO GOV'T Since 1 July 1940	LAND (ACRES) OWNED	LEASED	TOTAL	ANNUAL COST LEASED
ORLANDO ARMY AIR BASE WINTER GARDEN WINTER GARDEN SEARCHLIGHT STA			166	166	
ORLANDO OM MARKET CENTER ORLANDO QUARTERMASTER MARKET CTR AAF			1	1	
PAGE FIELD FORT MYERS COMBAT CREW TRAINING STATION	2436946	239	1272	1511	
PAGE FIELD FORT MYERS BOMBING AND GUNNERY RANGE	27015		1940	1940	
PANAMA CITY HARBOR DEFENSES PANAMA CITY HARBOR DEFENSE SITE	20000		252	252	
PENSACOLA HARBOR DEFENSES PENSACOLA FORT BARRANCAS	2006467	2825		2825	
PENSACOLA HARBOR DEFENSES FT BARRANCAS FT BARRANCAS FC STATION	200	1		1	
PENSACOLA HARBOR DEFENSES PENSACOLA FORT MCREE		122		122	
PENSACOLA HARBOR DEFENSES PENSACOLA FORT PICKENS	4415	1655		1655	
PERRY ARMY AIRFIELD PERRY COMBAT CREW TNG STA-FIGHTER	2366721	1510		1510	
PERRY ARMY AIRFIELD PERRY AIR TO GROUND GUNNERY RANGE	113064		13011	13011	
PERRY ARMY AIRFIELD PERRY PRECISION BOMBING RANGE	1930369		8800	8800	
PERRY ARMY AIRFIELD PERRY SMALL ARMS RANGE	13999		1780	1780	
PIERCE FORT FORT PIERCE ORD MAINT FACILS-TRAINING BASE	325751		4	4	
PINECASTLE ARMY AIRFIELD PINECASTLE CEDAR KEYS CRASH BOAT STATION	35360		18	18	
PINECASTLE ARMY AIRFIELD PINECASTLE DEMONSTRATING-TESTING FIELD	4889044	972	1593	2565	
PINECASTLE ARMY AIRFIELD PINECASTLE MOVING JEEP TARGET RANGE			12483	12483	
PINELLAS ARMY AIRFIELD ST PETERSBURG COMBAT CREW TNG STA-FIGHTER	1597969	490	952	1442	
PINELLAS ARMY AIRFIELD INDIAN ROCKS AIR TO GROUND GUNNERY RANGE	1522		180	180	
PINELLAS ARMY AIRFIELD BELLEAIR AWS UNIT TNG CTR SITE C	4034		6	6	
PINELLAS ARMY AIRFIELD SAFETY HARBOR AWS UNIT TNG CTR SITE 9	40000		30	30	
PINELLAS ARMY AIRFIELD LARGO AWS UNIT TNG CTR SITE 26			22	22	
PINELLAS ARMY AIRFIELD BELLEAIR CRASH BOAT STATION			1	1	
PINELLAS ARMY AIRFIELD SAFETY HARBOR DIVE BOMBARDMENT RANGE	5209		540	540	
PUNTA GORDA ARMY AIRFIELD PUNTA GORDA COMBAT CREW TNG-FIGHTER COND	1805087	40	1725	1765	
PUNTA GORDA ARMY AIRFIELD					

Capt. Max M. Carroll
Post Engineer
J. R. Sharon,
Post Engineer Office

CORPS OF ENGINEERS
OFFICE OF THE DIVISION ENGINEER
SOUTH ATLANTIC DIVISION

Col. James M. Howard, C. O.
Pinellas AAF, Florida

4th Inspection
3 Mo. Interval

6 March 1945
(Date of Inspection)

LEASED PROPERTY INSPECTION REPORT

1. Location: Indian Rocks Aerial Ground Gunnery Range, Florida.
2. Description of area: 177.8 acres on Sand Bay about 3.5 miles North of Indian Rocks Community.
3. Name of Lessor: Kirkeby Hotels, Inc.
4. Annual Rental: $2,489.96
5. Lease No. Tr. #1, W-09-026-eng-159
6. Date first occupied: 5-7-43
7. Using Agency: AAF 3rd AAF-Pinellas Army Airfield, Fla., XII Fighter Com.
8. Is space completely utilized? Yes
   If not, give details (state location of unoccupied space, i.e., floors and square feet on each floor; floor load, if storage; number of regular and intermittent employees if office; attach explanation for non-occupancy, if obtainable from Commanding Officer).
9. Present use and whether it conformed with purpose of lease:

   Propery used by 3rd AF for Aerial Ground Gunnery Range, in conformity with purpose of lease.

10. Are premises adapted to each purpose? Yes
11. Is more suitable space available? If so, give details including moving costs:
    No more suitable space available.
12. If space is occupied by obsolete or inactive property, what arrangements can be made by C. O. for its removal or disposition? Not applicable.
13. Is Warehouse Package Plan or a Railroad Open Storage Yard adaptable for any stored materials? If so, state area that would be released thereby:
    Not applicable.
14. State condition of building: Good
15. Is lessor maintaining premises and furnishing service in accordance with terms of lease? None.
16. State nature and cost of alterations and improvements, if any, by Government:
    Buildings, water pumping station, also. generator: Total: $614.00.
17. General Remarks:
    Property used by 3rd AF for Aerial Ground Gunnery Range is well located for present use and completely utilized. There are no Government-owned properties available to which this installation can be moved at this time.

E-4

SUPPLEMENTARY INSPECTION SHEET

Location Indian Rocks, Fla. Aerial Ground Gunnery Range Date 6 March 1945

18. Give the most recent figures from the Post Engineer's "Real Property Utilization Report":

	Number		
Available Housing Capacity	81	Occupancy	76 %
Net Sq. Ft. Closed Storage Space	None	Utilization	- %
Net Sq. Ft. Office Space	None	Utilization	- %

19. Inspector's estimate of % of Utilization at the time of this inspection. Fully Utilized

20. Average monthly maintenance cost of installation. R & U Costs $215.00

21. Are there any agreements within the lease or leases binding the Government to perform various duties of maintenance to premises under lease? No Are agreements being complied with? - If so, state nature of maintenance and approximate cost of compliance.

22. Additional information on Leased Airports.
   a. Is field used exclusively by War Department? Not applicable.
   b. If not, give proportionate use by War Department and other interests (naming same).
   c. Does lease contain clause pertaining to joint maintenance? Is so, is the maintenance cost being proportionately shared?
   d. If lease does not contain joint maintenance, is the lease sufficiently flexible to permit the sharing of the maintenance costs? If so, is this being done?
   e. Is the use being made of the field in accordance with the terms of the lease?
   f. General remarks concerning Question 22.

23. Do premises appear to be needed for the next fiscal year? Yes
   a. Does the rental appear reasonable and in line with prevailing rates? Yes
   b. Is there any similar property available at lower rates? No
   c. Is there a possibility of transferring this activity into Government owned property? No
   d. General Remarks covering Question 23.

E-4

24. Has there been any timber out on this leased property not authorized in the construction program? If so, give facts concerning such cutting.

24. Has there been any timber out on this leased property not authorized in the construction program? No If so, give facts concerning such cutting.

25. Are any buildings on property when this lease was executed (i.e. farm buildings etc.) not being utilized? No If buildings are present are they being maintained?

INSPECTOR Sam E. Gary

THIS REPORT APPROVED:

~~/s/ John P. Perion Major C.E.~~
ASST DIVISION REAL ESTATE OFFICER

(Where there is not sufficient space on this form to prepare full report, supplemental sheets may be attached)

W. D. Eng. Form No. 577
(26 January 1944)

4A-D

WAR DEPARTMENT
OFFICE OF THE DIVISION ENGINEER
SOUTH ATLANTIC DIVISION
ATLANTA, GEORGIA

SADRE-7 - 601.53

LSW:jo

27 March 1945.

SUBJECT: Real Property Inspection Report.

File

TO: Commanding Officer
Pinellas AAF,
Pinellas, Florida

1. Reference is made to Office, Chief of Engineers, Circular Letter No. 2735, dated 3 February 1944, subject "Real Property Utilization and Records", which directs the Division Engineer to make periodic inspections of all real property owned or leased by the Government and under the jurisdiction of the War Department, said inspections being subject to the criteria, and revisions thereof, established for such procedure. The basic authority for this action is in accordance with a Memorandum from the Under Secretary of War to the Commanding General, Army Service Forces. The Commanding General, Army Air Forces, concurred in the inclusion of Army Air Forces properties in this survey.

2. In accordance with paragraph 12 of the referenced Circular Letter, there is inclosed report of inspection of real estate under your jurisdiction, for your information and files.

FOR THE DIVISION ENGINEER:

JOHN E. HOLLIMAN
Major, Corps of Engineers
Assistant

Inclosures:
#1 - Insp. Rpt. Pinellas, Fla., W-2287-eng-16539, et al.
#2 - Insp. Rpt. Indian Rocks, Fla., W-09-026-eng-159.
#3 - Insp. Rpt. St. Petersburg, Fla., W-09-026-eng-2347.

Rockets Used by Aircraft

A number of new weapons have been developed during the past year. Following is a description of some of them.

Airborne rockets were first used in the Army Air Forces by the Fourteenth Air Force in China during March. These 4½-inch rockets were fired from tubes mounted on fighter planes. Targets were Japanese supply dumps, hangars, parked aircraft, bridges, and river boats and other transports. In July the Ninth Air Force first used in combat the new 5-inch HVAR rockets, with zero rail installations, developed by the National Defense Research Committee for the Navy. Employed against locomotives, tanks, armored cars, gun emplacements, and concrete defenses from P–47's, these rockets proved extremely effective. In the Mediterranean theater P–47's firing 4½-inch rockets from tubes at point-blank range have been used for ground-air operations. They have also been successful on targets of opportunity. The Tenth Air Force has recently reported from Burma that 12 launcher tubes have been mounted on B 25's and that these aircraft have been very effective against ground targets. At the present time the Army Air Forces are cooperating with the Office of the Chief of Ordnance in the development and adaptation of still more powerful rockets for use by aircraft. Far more extensive use of existing types of rockets is also anticipated during 1945.

TABLE 9.—*Temperature and precipitation*

[All data from St. Petersburg. Elevation 50 feet]

Month	Temperature				Precipitation				
	Average daily maximum	Average daily minimum	Highest average monthly maximum	Lowest average monthly minimum	Average total	One year in 10 will have—		Average number of days with—	
						Less than—	More than—	0.10 inch	0.50 inch
	°F.	°F.	°F.	°F.	In.	In.	In.		
January	72	55	80	37	2.5	0.1	5.3	4	2
February	73	56	81	41	3.0	.5	6.0	4	2
March	76	59	84	46	3.7	.3	7.8	5	3
April	81	65	88	54	3.2	.3	7.4	4	2
May	87	70	93	54	2.6	.3	6.1	4	2
June	90	74	94	69	6.3	2.4	10.0	9	4
July	90	75	94	71	9.2	4.1	16.5	12	6
August	90	76	94	71	9.0	4.8	15.3	12	6
September	89	74	92	69	8.4	2.9	14.0	9	5
October	84	69	90	55	3.9	.3	8.6	5	2
November	77	61	84	46	1.7	.2	6.0	3	1
December	73	56	81	37	2.1	.6	5.5	4	2
Year	82	66	[1] 95	[2] 34	55.6	32.7	79.3	75	37

[1] Highest average annual maximum. [2] Lowest average annual minimum.

ORDNANCE AND EXPLOSIVES
ARCHIVES SEARCH REPORT
FOR
INDIAN ROCKS AIR-TO-GROUND GUNNERY RANGE
BELLEAIR BEACH, FLORIDA
PROJECT NUMBER I04FL033701

APPENDIX F

LETTERS/MEMORANDUMS/CORRESPONDENCE

APPENDIX F

LETTERS / MEMORANDUMS / MISCELLANEOUS ITEMS

Table of Contents

F-9 Message, CNO, Washington, DC, 011705Z Aug 77, subject: SURVEY OF BELLEAIR BEACH, FL FOR SUBMERGED UNEXPLODED ORDNANCE (UXO). (Ref B-27)

F-10 Letter. A response from the acting Commanding Officer of NAS Cecil Field to the Mayor of the City of Belleair Beach concerning the Mayor's letter, 3 August 1977. (Ref B-28)

F-11 Letter. A request from the Belleair Beach Chief of Police to the Commanding Officer of the 66th Ordnance Detachment (EOD), Patrick AFB, for EOD assistance, May 20 1986. (Ref B-29)

F-12 Letter. A trip report from the commander of a naval EOD team to the Belleair Beach Police Department describing their recent visit to search for unexploded ordnance, 29 May 1986. (Ref B-30)

F-13 Letter. A thank you from the Mayor of City of Belleair Beach to the Commanding Officer of NAS Cecil Field for the recent visit of the naval EOD team, June 26, 1986. (Ref B-31)

F-14 Note. Local departmental correspondence from the Belleair Beach Chief of Police to the Belleair Beach Mayor, subject: Search for and Removal of any U.S. Ordnance From the Waters Off Belleair Beach By U.S. Navy Explosive Group Personnel, July 10, 1986. (Ref B-32)

AFROM B-1 4241
(AFROM B-4)

A-1/AS
A-2/AS
Intel. S.
A-3/AS
A-4/AS
Plans/AS
Insp/AS
Mil. Req.
A. Def.
Bomb.
Gr. Sup.
Base S.
War O&M
Ind. Tr.
Tech. S.
Comm.
Weather
Traffic
Photo. M&C
Tech. Insp.
Pub. Rel.
Dir. Pers.
Mil. Pers.
Civ. Pers.
Surg.
J. Advoc.
Budget
Fiscal
Mgmt. Con.
Misc.
Org. Pl.
Stat. Pl.
Leg. Pl.
Mat. C.
A. S. C.

September 29, 1941

Promotion and Facilitation of Aerial Machine Gun Practice Firing and Bombing Practice.

Commanding General,
Third Air Force,
Tampa, Florida.

1. It has been noted that there is considerable waste land, apparently uninhabited, and in some cases water areas, in convenient proximity to some air bases in the United States, that might be advantageously used as aerial machine gun and bombing ranges.

2. Before such areas can be utilized, however, the War Department must obtain control for the above purposes, whether the area in question is publicly or privately owned. Consequently, it will be seen that each case resolves itself into an individual problem for local investigation and report through the usual channels.

3. It is desired that activities under your control make immediate survey of the availability of such areas in their localities which may be needed for more efficient firing and bombing practice. It is suggested that investigation be made of the possibility of securing the use of waste land or land and water areas that may be obtained for the duration of the war without cost or for a nominal consideration.

4. Existing Army Regulations establish safety precautions for the conduct of aerial machine gun and bombing practice. If, in your opinion, the restrictions contained therein should be relaxed in any particular, in an effort to promote and facilitate this vital activity to the utmost, this Headquarters should be so advised without delay.

By command of Lieutenant General ARNOLD:

MUIR S. FAIRCHILD,
Major General, U. S. Army,
Director of Military Requirements.

F-1

BC: Root
Haberman
Lowe
Chief Anderson
Indian Rocks Fir
District

CITY of BELLEAIR BEACH

444 CAUSEWAY BOULEVARD
BELLEAIR BEACH, FLORIDA
P. O. INDIAN ROCKS BEACH 33535

July 30, 1975

Commander
547th Ordnance Detachment
Fort Gillam, Ga. 30050

Dear Sir:

Recently a practice type military projectile was found offshore this small Florida Gulf coast city. This find is the latest of several other "finds" of this type. Local scuba divers and others have reported other sightings of various projectiles on the Gulf floor and adjacent to the beach areas. During World War II, this beach area was used by various military elements as a projectile and artillery practice area. Practice bombing runs and navy offshore firings used the beach area as a simulated landing and target area.

The general scope of the area extends from Clearwater Pass (north of the northern boundary of this city) down to about the southern boundary of Indian Rocks Beach. This area is therefore that which would be involved in the request now made.

The City of Belleair Beach with the approval of the governments of Clearwater and Indian Rocks Beach, would like to request that the 66th Ordnance Detachment clear the beach area above described of all explosive or simulated explosive devices which may be within the described area. It is also hoped that the 66th will enlist the aid of the Navy Explosive Ordnance Disposal group to assist the clearing of the beach area outward from the beach high water mark.

The Police Departments and Administrators of all three concerned cities will cooperate fully with the military person-

nel involved. If you have any further comments or suggestions relating to this siutation please write the undersigned who will (for operational purposes) represent the area in this project.

Thank you very much for your consideration. We would like to have this project completed by 1 September 1975 for planning purposes although this date is tentative only.

Sincerely yours,

Benton S. Lowe
Deputy Mayor/Director
Civil Defense

/b

CC: Mike Paroby, City Manager, Clearwater
Sanders Smith, Mayor, Indian Rocks Beach
Morton Raymond, Mayor, Belleair Shore
Lt. Jonathan Coleman, 66th Ordnance Detachment
(Explosive Disposal)
Homestead AFB, Florida
305-257-6012

Bombs on Beach

CITY of BELLEAIR BEACH

444 CAUSEWAY BOULEVARD
BELLEAIR BEACH, FLORIDA
P. O. INDIAN ROCKS BEACH 33535

September 15, 1975

Honorable Martin R. Hoffmann
Secretary of the Army
Department of the Army
Washington, D. C. 20310

Dear Mr. Secretary:

It is believed you may find the enclosed press material of some interest. It will also serve as background for this letter.

This City wishes to commend to you the AUS personnel who participated in the subject operation. (It is now completed and during the work one hundred thirty-two (132) items of ordnance were recovered and detonated, twenty-one and six-tenths (21.6) miles of swimming were done and two hundred ten thousand (210,000) square yards of underwater landscape were explored.)

This is a small city located on the Gulf of Mexico and any activity generates attention. This particular situation was inherently glamourous but the summer doldrums and the lack of other area news made it a natural for the ultimate in attention from media and citizen alike. National attention was eventually called to the project.

The Army personnel who participated in the operation were most cooperative and courteous not only to the local media people but to everyone in the city with whom they came in contact. They collectively and individually conducted themselves in a manner completely compatible with the highest traditions of the AUS.

The cooperation and attention to protocal which they exhibited toward this office further indicated their excellent calabre.

The personnel participating in this exceptional operation were:

1. Captain Jonathan M. Coleman, AUS (260 72 6241)
   Army officer-in-charge
   From: 66th Ordnance Detachment (EOD)
   Homestead Air Force Base, Florida

2. SFC Raymond P. Arndt, AUS (073 28 4670)

3. SSG Henry M. Knoblock (493 54 1587)

4. SP5 Howard L. Stepp (524 66 6207)

5. SP5 Michael J. Stergai (306 62 0124)

It is also desired to recognize the excellent original cooperation we received from Captain Howe, AUS Commander, 547th Ordnance Detachment at Fort Gillam, Georgia. He aided greatly in activating the project.

The City of Belleair Beach deeply appreciates the work done by the referenced AUS personnel and wishes the Department of the Army Godspeed in all of its future endeavors and responsibilities.

Sincerely,

Charles A. Root, Jr.
Mayor

via:

Benton S. Lowe
Deputy Mayor
(By Direction)

mgb

Enclosures

CITY of BELLEAIR BEACH

444 CAUSEWAY BOULEVARD
BELLEAIR BEACH, FLORIDA
P. O. INDIAN ROCKS BEACH 33535

September 15, 1975

Honorable J. William Middendorf
Secretary of the Navy
Navy Department
Washington, D. C. 20350

Dear Mr. Secretary:

It has been thought you may find the enclosed press collection of more than passing interest. It will also furnish needed background for the purpose of this letter.

This City wishes to commend to you the Navy personnel who participated in the subject operation. (It is now completed and during the work one hundred thirty-two (132) items of ordnance were recovered and detonated, twenty-one and six-tenths (21.6) miles of swimming were done and two hundred ten thousand (210,000) square yards of underwater landscape were explored.)

This is a small city located on the Gulf of Mexico and any activity generates attention. This particular situation was inherently glamourous but the summer doldrums and the lack of other area news made it a natural for the ultimate in attention from media and citizen alike. National media coverage eventually focused on the project.

The Navy personnel who participated in the operation were most cooperative and courteous, not only to the media but to everyone in the City with whom they came in contact. They collectively and individually conducted themselves in a manner completely compatible with the highest traditions of the Navy.

The cooperation and attention to protocal which they exhibited toward this office further indicated their excellent calibre.

The Navy personnel participating in this exceptional operation were:

1. CWO 3 Henry S. Thrift, Jr. USN (266 59 4986)
   Navy officer-in-charge, Explosive Ordnance Disposal Detachment, Naval Surface Weapons Center Facility, 1651 S.W. 39th St., Ft. Lauderdale, Florida 33315.

2. BMCS Robert (NMN) Coleman, Jr. USN (231 30 1461)

3. MRCS Victor C. Wisniewski USN (106 28 8155)

4. AO1 George T. La Bree USN (262-88-8261)

The City of Belleair Beach deeply appreciates the work done by the referenced Navy personnel and wishes the Navy Department a happy voyage home in all of its future endeavors and responsibilities.

Sincerely,

Charles A. Root, Jr.
Mayor

via:

Benton S. Lowe
Deputy Mayor
(By Direction)

mgb

Enclosures

6-20-77

Mayor

I spoke with Sgt DEERMER
664th Ord Det ~~Sqt~~ (E.O.D)
Can. AF. STATION
PATRICK AFB, Fla. 32925
phone # 1-305-853-9951

The Sgt stated he would contact Navy Personnel regards making a check of the waters when the WWII rockets are showing up again.

Also he would send a team over 6-21-77 to pick up the 2 we have now, and at that time advise us what the Navy recommends etc.

JPA

Navy address

OIC E.O.D. Det
NSWC 1651 S.W. 39th St.
Ft LAUDERDALE, Fla. 33315

Professional Printing Company
167 - 6TH STREET S W LARGO FLORIDA 33540

Comm. Officer
NAS Cecil Field
Fla

Zip 32215

Capt Wellman

Request a Navy EOD team [illegible] to [illegible]
B.B. [illegible] recently 2 [illegible]
[illegible] here + removed
2 [illegible]

F-5

BELLEAIR BEACH
ON GULF AND BAY
444 CAUSEWAY BLVD., BELLEAIR BEACH, FLORIDA 33535

June 28, 1977

Honorable W. Graham Claytor
Secretary of the Navy
Navy Department
Pentagon Building
Washington, D.C. 20350

Dear Mr. Secretary:

On September 15, 1975, I wrote your predecessor thanking the Navy Department for assistance in searching our beach area for explosive materials. Attached is a copy of that letter. It again seems necessary to request your assistance because additional 4.2 rockets have been found.

Within the last two weeks, three (3) 4.2 rockets have been discovered and turned over to the 66th EOD stationed at Cape Canaveral, Florida. They advised they contained 2.8 lbs. of explosives. In addition, swimmers have reported many more in waters close to the shore.

I would appreciate it very much if you could take necessary action to send someone to evaluate this situation and determine whether a full scale search is necessary.

We feel that this situation is hazardous and potentially dangerous to our residents and visitors. I would appreciate any corrective action you could furnish us.

Sincerely,

Charles A. Root, Jr.
Mayor

CAR/d
attachment

BELLEAIR BEACH
ON GULF AND BAY
444 CAUSEWAY BLVD., BELLEAIR BEACH, FLORIDA 33535

July 5, 1977

Commanding Officer
Naval Air Station
Cecil Field, Florida 32215

Attn: Capt. Wellman

Dear Sir:

I have written a letter to the Secretary of the Navy, copy attached, requesting assistance in clearing the beach of potentially hazardous explosive material.

I am sure your organization will be assigned this task, therefore, the following additional information is furnished.

The beach area of concern is from 20th Street to the northern limits of this City. This is a distance of about a mile.

We would appreciate expeditious action on this request and thank you for your previous assistance and service.

Sincerely,

Charles A. Root, Jr.
Mayor

CAR/d
attachment

THE DEPUTY CHIEF OF NAVAL OPERATIONS
(SURFACE WARFARE)
WASHINGTON

1 AUG 1977

Dear Mayor Root,

I am responding on behalf of the Secretary of the Navy to your letter of 28 June 1977, wherein you indicated concern over the recent discovery of unexploded ordnance and also asked for assistance in the evaluation of your beach area.

The Navy is responsible for replying to requests for removal of underwater ordnance which presents a hazard to the public. Current practice is to dispose of the hazards as soon as men and material are available. I have initiated action which will provide the resources necessary to conduct a survey of your city's beach area. Coordination of this survey should be in progress prior to receipt of this letter.

I trust that these measures will eliminate the hazard to your residents and visitors. Please advise me if I can be of further service.

Sincerely,

J. H. DOYLE, JR.
Vice Admiral, U. S. Navy

The Honorable Charles A. Root, Jr.
Mayor of Belleair Beach
Belleair Beach, Florida 33535

JOINT MESSAGEFORM

UNCLASSIFIED

01 OF 01	2090900	RR	RR		UUUU	

BOOK

MESSAGE HANDLING INSTRUCTIONS

FROM: CNO WASHINGTON DC

TO: CINCLANTFLT NORFOLK VA

INFO COMNAVSURFLANT NORFOLK VA

COMEODGRU TWO FT STORY VA

UNCLAS //N08027//

SURVEY OF BELLEAIR BEACH, FL FOR SUBMERGED UNEXPLODED ORDNANCE (UXO)

A. MAYOR OF BELLEAIR BEACH, FL LTR OF 28 JUN 77 (NOTAL)

1. REF A ADVISED THAT UXO WAS DISCOVERED WITHIN THE LAST TWO WEEKS AND REQUESTED THAT ASSISTANCE BE PROVIDED TO EVALUATE THE SITUATION.

2. DECONTAMINATION OF SUBJECT BEACH AREA WAS CONDUCTED SEP 75 BY EOD PERSONNEL WITH RECOVERY AND DISPOSAL OF 132 ORDNANCE ITEMS. THREE 4.2" ROCKETS WERE RECENTLY DISCOVERED AND SWIMMER REPORTS INDICATE OTHERS ARE IN WATER CLOSE TO SHORE.

3. REQUEST PROVIDE EOD ASSETS EARLIEST TO CONDUCT SURVEY OF BEACH AREA. TEAM LEADER CONTACT MAYOR CHARLES A. ROOT, JR., BELLEAIR BEACH, FL FOR COORDINATING INSTRUCTIONS. SUBMIT SUMMARY REPORT TO CNO UPON COMPLETION OF TASK.

6543210

DRAFTER: 372H/RELEASER 03

DISTR: 00/003/00K/09/090/90/01/03/04/05/06/009/NCSC/IP/37

0

DRAFTER TYPED NAME, TITLE, OFFICE SYMBOL, PHONE & DATE

CDR M. K. HEINZ, 372H, X72450

SPECIAL INSTRUCTIONS

CHOP: 372

03B

37

378

RELEASER

TYPED NAME, TITLE, OFFICE SYMBOL AND PHONE

SECURITY CLASSIFICATION

UNCLASSIFIED

DATE TIME GROUP

01/2052 Aug

DD FORM 173

F-9

Bombs on Beach [redacted]

NAVAL AIR STATION
CECIL FIELD, FLORIDA 32215

Code EOD/wpcd
8027
Ser 2209
8 AUG 1977

Charles A. Root, Jr.
Mayor, Belleair Beach
444 Causeway Boulevard
Belleair Beach, Florida 33535

Dear Mayor Root:

I am in receipt of your letter dated 5 July 1977, requesting my EOD Team to survey and clear a portion of Belleair Beach of potentially hazardous explosive material. The EOD Team at Cecil Field is prepared to commence such a clearance operation but cannot do so at this time due to funding constraints. It is anticipated that funding will be available shortly.

Informal liaison with higher authority indicates that they are in receipt of your letter of 28 June 1977, to the Secretary of the Navy, and are taking appropriate action on your request.

In all probability, the Navy EOD Detachment at Cecil Field will be tasked with this assignment in the near future. If we are officially assigned, my Officer in Charge of the EOD Detachment, Lieutenant H. G. Maurer, will be in touch with you to work out the details.

Sincerely,

R. R. COWLES
Acting

BELLEAIR BEACH
ON GULF AND BAY
444 CAUSEWAY BLVD., BELLEAIR BEACH, FLORIDA 33535

May 20, 1986

Commanding Officer
66th Ordnance Detachment (EOD)
Cape Canaveral Air Force Base
Patrick Air Force Base, Florida 32925

Dear Sir:

In September of 1975 your EOD team, in conjunction with Navy personnel, removed numerous items of ordnance from the offshore waters of this city (WWII barrage rockets). Many of these were found to contain explosives.

Recently, more of these rockets have been located offshore in the north end of the city. Swimmers have reported more which are just offshore and these should be recovered. Local police diving teams are reluctant to recover these items due to the possible danger involved and it being military ordnance.

Since these rockets present a hazard to the public, please advise if you can make the necessary arrangements with Navy EOD personnel to remove the 3 - 5 rockets alleged to be in the water near 2900 Gulf Blvd., and conduct a search of the area to determine whether a full-scale search is again necessary.

Sincerely,

BELLEAIR BEACH POLICE DEPARTMENT

Frank P. Anderson

Frank P. Anderson
Chief of Police

FPA/dbm

DEPARTMENT OF THE NAVY

EXPLOSIVE ORDNANCE DISPOSAL GROUP TWO DETACHMENT

NAVAL AIR STATION

CECIL FIELD, FLORIDA 32215

29 May 1986

From: Officer in Charge, Explosive Ordnance Disposal Group Two Detachment, Naval Air Station, Cecil Field, FL 32215-0144
To: Belleair Police Department, Belleair Beach, FL 33532

Subj: TRIP REPORT, BELLEAIR BEACH FLORIDA

1. Purpose. The purpose of this trip was to remove unexploded U.S. Ordnance from the waters off Belleair Beach Florida.

2. Background. This mission was necessitated by the fact that unexploded U.S. Ordnance was being discovered and recovered by civilian personnel swimming off Bellair Beach Florida.

3. Dates. Inclusive dates of this trip were 26-28 May 1986.

4. Personnel making visit.

a. LT A. J. ASHTON
b. GMCM J. R. STALLINGS
c. OS1 K. T. MORFORD
d. GMG3 D. A. BROUSE
e. OS3 F. S. PETERSON

5. Personnel contacted.

a. SGT Jerry Slider, Belleair Beach Police Department.

6. Discussion. Upon surveying site, plans were made to make twelve dives using a 50 foot circle line search at random sites. A total of thirteen items and pieces were recovered.

7. Conclusions. Visibility ranged from one foot to three foot. Maximum depth was approximately 20 feet. It is the opinion of this Detachment that current and shifting sands uncover and recover ordnance from day to day. To sweep the area completely a search using Jackstay Method and Electronic Search Equipment should be utilized.

A. J. Ashton

A. J. ASHTON

.TMENT OF THE NAVY

OFFICER IN CHARGE
EXPLOSIVE ORDNANCE DISPOSAL
GROUP TWO DETACHMENT
NAVAL AIR STATION
CECIL FIELD, FLORIDA 32215

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE, $300

JACKSONVILLE FL
PM
MAY 29
1986
32

POSTAGE AND FEES PAID
DEPARTMENT OF THE NAVY
DoD-316

U.S.MAIL

BELLEAIR POLICE DEPARTMENT
444 CASWAY BLVD
BELLEAIR BEACH, FL 33535
ATTN: SGT. JERRY SLIDER

F-12

BELLEAIR BEACH
ON GULF AND BAY
444 CAUSEWAY BLVD., BELLEAIR BEACH, FLORIDA 33535
OFFICE OF MAYOR THOMAS G. McALLISTER

June 26, 1986

Capt. Jack B. Austin
Commanding Officer
Cecil Field, FL 32215-5000

Dear Capt. Austin:

I would like to express my appreciation for your cooperation and that of Lt. Al Ashton and his EOD Detachment in the removal of WW II bombs deposited in the waters of Belleair Beach when it was used as a training ground for pilots stationed at Drew Field, FL.

This is an ongoing problem that started in 1975 and has been worked by the Armed Forces since then. The recent hurricanes that struck this area in 1985, Elena and Juan, have again caused the resurfacing of these munitions.

On this occasion, your divers were able to recover six (6) munitions. Lt. Ashton advises that he and his team members found another seven (7) munitions intact and several parts of others. A total of thirteen (13) were spotted or recovered.

During this operation, their recovery efforts were hampered by limited underwater visibility and some strong tidal action.

The City of Belleair Beach would request that arrangements be made as soon as possible to have Lt. Ashton and his team return to grid search and sweep the area to remove these and any other munitions they can locate before someone is injured.

Sincerely,

CITY OF BELLEAIR BEACH

Thomas G. McAllister
Mayor

DEPARTMENTAL CORRESPONDENCE

DATE July 10, 1986

SUBJECT Search For and Removal of any U.S. Ordnance From the Waters Off Belleair Beach By U.S. Navy Explosive Group Personnel

TO Mayor Thomas McAllister DEP'T

FROM Chief Frank Anderson DEP'T

Today, I spoke with Lt. Ashton from the U.S. Navy Group Two Detachment who is here with four other divers conducting a search and removal effort of any WWII explosives from the Gulf offshore waters of this city.

He advised me they had found some ordnance and they would advise me when it is destroyed if any secondary explosions occurred which would, of course, indicate the presence of unexploded ordnance.

He also suggests you write the commanding officer of Cecil Field thanking him for the Navy's cooperation, and requesting that Group Two Detachment return approximately 2 to 3 times a year to conduct further sweeps as this would enable the city to apprise itself of the presence of any further ordnance that might surface from storm action and, also, provide his divers with training.

Those of the team present at this time:

Lt. A. J. Ashton CO

Divers - Stallings
Arambula
Peterson
Shell

F. P. Anderson

FPA/dbm

ORDNANCE AND EXPLOSIVES
ARCHIVES SEARCH REPORT
FOR
INDIAN ROCKS AIR-TO-GROUND GUNNERY RANGE
BELLEAIR BEACH, FLORIDA
PROJECT NUMBER I04FL033701

APPENDIX G

REAL ESTATE DOCUMENTS

APPENDIX G

REAL ESTATE DOCUMENTS

NO OFFICIAL DOCUMENTS COULD BE LOCATED CONCERNING THE LEASE BY THE WAR DEPARTMENT OF THE LAND COMPRISING THE FORMER INDIAN ROCKS AIR-TO-GROUND GUNNERY RANGE

ORDNANCE AND EXPLOSIVES
ARCHIVES SEARCH REPORT
FOR
INDIAN ROCKS AIR-TO-GROUND GUNNERY RANGE
BELLEAIR BEACH, FLORIDA
PROJECT NUMBER I04FL033701

APPENDIX H

NEWSPAPERS/JOURNALS

APPENDIX H

NEWSPAPERS/JOURNALS

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H-2k Press Release. "Beach Sweep." From Belleair Beach Mayor's Office, 7 August 1975. (Ref B-34k)

H-2l Article. "Bomb war fizzles." Pinellas Times, 13 August 1975, p. unknown. (Ref B-34l)

H-2m Picture. Caption Title: "Flipped Out." Clearwater Sun, 14 August 1975, p. 1a. (Ref B-34m)

H-2n Article. "Bomb Experts Hit The Beach." Clearwater Sun, 14 August 1975, p. 1b. (Ref B-34n)

H-2o Article. "Battle of bombs begins at beach." Pinellas Times, 14 August 1975, p. 1. (Ref B-34o)

H-2p Press Release. From Belleair Beach Mayor's Office, 22 August 1975. (Ref B-34p)

H-2q Article. "Relics From Beach May Be Explosive." Clearwater Sun, 23 August 1975, p. 1a. (Ref B-34q)

H-2r Article. "Explosives in Belleair Beach bombs." St. Petersburg Times, 23 August 1975, p. 2b. (Ref B-34r)

H-2s Article. "Family's bomb souvenir a live one." St. Petersburg Times, 24 August 1975, p. 11b. (Ref B-34s)

H-2t Editorial. "Please Collect Shells Instead." Clearwater Sun, 25 August 1975, p. 8a. (Ref B-34t)

H-2u Article. "Bomb sweep to begin Friday." Pinellas Times, 28 August 1975, p. unknown. (Ref B-34u)

H-2v Article. "Gulf floor combed for explosives." St. Petersburg Times, 30 August 1975, p. 2B. (Ref B-34v)

H-2w Article. "Bomb Cleanup Netting Cache." Clearwater Sun, 3 September 1975, p. unknown. (Ref B-34w)

H-2x Article. "Army to Explode Bombs." Newspaper Unknown, 6 September 1975, p. unknown. (Ref B-34x)

H-2y Picture. Caption: "On dry land, the barnacle-encrusted World War II rockets 'really stink'." St. Petersburg Times, 7 September 1975, p. unknown. (Ref B-34y)

H-2z Article. "A legacy of World War II harvested." St. Petersburg Times, 10 September 1975, p. 1D. (Ref B-34z)

H-2aa Article. "Bombs on Beach 'Dangerous'." Tampa Tribune, 1975 (exact date unknown), p. unknown. (Ref B-34aa)

H-2ab Article. "Hunting bombs is hard, stinky work, but the pros like it." Pinellas Times, 1975 (exact date unknown), p. 1A. (Ref B-34ab)

H-2ac Article. "Beach bombs: a real danger." Pinellas Times, 1975 (exact date unknown), p. unknown. (Ref B-34ac)

H-2ad Article. "Police Explode Bomb." Clearwater Sun, 1975 (exact date unknown), p. 1A. (Ref B-34ad)

H-3 Newspaper articles concerning the specific discovery/ recovery of ordnance onsite in 1980

H-3a Article. "Divers in gulf find bombs from World War II." St. Petersburg Times, 9 June 1980, p. 1B. (Ref B-35a)

H-3b Article. "Divers find more bombs off Belleair Beach." St. Petersburg Times, 12 June 1980, p. 6B. (Ref B-35b)

H-4 Newspaper articles concerning the specific discovery/ recovery of ordnance onsite in 1986

H-4a Article. "Practice bomb found off Belleair Beach." St. Petersburg Times, 17 May 1986, p. 1B. (Ref B-36a)

H-4b Article. "Naval frogmen surface at Belleair Beach." Belleair Bee, 29 May 1986, p. 1. (Ref B-36b)

H-5 Article. "Lethal Legacy." St. Petersburg Times, 3 May 1993, p. 1B. (Ref B-37)

'Dud' World War II Rocket Is Recovered

BELLEAIR BEACH — Air Force explosives experts Monday said a small rocket found about 40 feet offshore here Sunday is a World War II naval barrage rocket, and that it also is a dud.

13 JUN 1972

Bomb found offshore at Belleair Beach

A small bomb, apparently dropped off Belleair Beach during bombing practice during World War II, was found near the beach Wednesday afternoon by a resident.

Belleair Beach Police Chief Francis Anderson said the barnacle-encrusted bomb, which was about 32-inches long and 17-inches in circumference, was picked up by an Air Force helicopter from Homestead Air Force Base for disposal.

Anderson said a beach resident found the bomb, which he estimated weighed about 30 pounds, off shore and dragged it to his home.

The man called MacDill Air Force Base and a bomb-disposal unit from Homestead was sent to collect the relic.

Anderson said that several such bombs have been found along Pinellas beaches — leftovers from the time the area was used as a bomb range by the Army.

The Homestead A.F.B. helicopter landed in a vacant field behind the Belleair Beach city hall to get the bomb, which had been stored for safety in a concrete pipe, Anderson said.

24 JUL 1975

H–2a

Leftovers Of War May Ignite Cleanup

By ARDITH HILLIARD
Assistant City Editor

BELLEAIR BEACH—World War II leftovers may trigger an Army-Navy clean-up off the shore of this quiet little beach community.

For years, residents have been finding spent bombs and bullets washed near shore by the waves of the Gulf of Mexico.

Recently, these finds have been numerous. One last week resulted in the removal of a 35-pound, 32-inch bomb by a helicopter dispatched from the Army's Explosive Ordnance Disposal office in Homestead. It was picked up at local police headquarters after a startled resident found it and reported it to MacDill Air Force Base in Tampa.

The Army wouldn't talk at all about the bomb and didn't tell Police Chief F. P. Anderson whether it was live.

The war paraphernalia, according to longtime area residents, is the residue of practice missions flown during World War II. The northern portion of Belleair Beach and some of Sand Key were used on the practice runs.

"I'm told by the Army that most of the bombs were dummies, but that one out of every several was a spotter (a live bomb) that would help the men see whether they had hit their target," Anderson said Tuesday.

Residents of the Sereno Del Sol condominium on Gulf Boulevard have been finding many of the war leftovers.

Joseph Nevins and his friends have picked up bullets "something like a mine" submerged in shallow water straight out from the building.

"It's sticking about 1½ feet out of the sand. I think they (the military) should get some frogmen out there and remove it," Nevins said.

Anderson said that if the city requested it, the Army and Navy could be make a thorough search to rid the beaches of the exclusive waterfront community of the reminders of war.

Many persons collect the items as souvenirs, but some have been put off by their sinister quality, he said.

"About a year ago, a young child found a bomb and was knocking off the barnacles to see what it was. When the parents found out what it was, they decided they wanted some other kind of souvenir," Anderson said.

E.L. CANNER WITH SHELL
... casing part of findings

He is concerned enough about the situation to support a cleanup by the military, but said he would wait for the city government to request such action.

If a search is made, the shore and the submerged coastline should be checked with metal detectors so that all the objects are found, he said.

"In more than 99 per cent of the cases, these things are harmless. But it's better to avoid the chance of injury than take a chance," he said.

He said he has advised the community's residents to report immediately to the police department any find that looks like a bomb.

Minesweepers asked to remove World War II bombs from Gulf

By CHRISTINA COSDON
St. Petersburg Times Staff Writer

BELLEAIR BEACH — Army and Navy minesweeping crews have been asked to rid Gulf waters off Belleair Beach of old World War II bombs.

One bomb was found recently, and Mayor Charles Root said, "I've been told there are many others out there, including an especially large one."

SNORKLERS AND scuba divers have reported sighting many barnacle-encrusted bombs and what may be a large mine just 25 yards from shore.

During World War II, the northern tip of Belleair Beach (which includes the area now called Sand Key) was an Air Force strafing and bombing range.

The area, now dotted with exclusive homes, and bustling with condominium construction, then was uninhabited. Ralph Reed, Pinellas County Historical Museum director, recalls that the area was fenced to prevent people from walking along the beach-bombing range.

Nobody knows how many unexploded bombs the Air Force may have left behind, but Root wants to find out. "This is about the fifth bomb that's been found recently," he said.

THAT BOMB, a 35-pounder washed up on the beach, and a mine-demolition crew from Homestead Air Force Base flew in to remove it.

Root said a crew officer told him that if the city would contact the Army and Navy they would send minesweeping teams to clear the area — "at no cost to the city."

The mayor interpreted that as an offer he could not refuse.

DEPUTY MAYOR Benton Lowe first elicited pledges of cooperation from Michael Paroby, Clearwater assistant city manager; Sanders Smith, Indian Rocks Beach mayor; and Morton Raymond, Belleair Shore mayor.

Then Lowe wrote to the commander of the 547th Ordnance Detachment at Ft. Gillam, Ga., requesting the Army's onshore and the Navy's offshore help in removing whatever explosives might be in the water. No answer has been received.

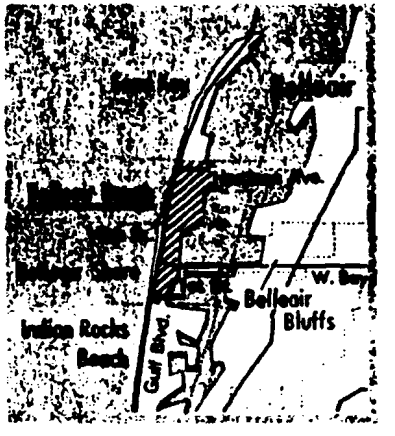
The area the officials want swept extends along the beach from Clearwater Pass to the southern edge of Indian Rocks Beach.

Root said the community would like to have the bombs removed as soon as possible. "Besides," he said, "I've always wanted to see one of those minesweepers in action!"

31 JUL 1975

BOMBS AWAY!

That's beach officials' goal in asking Army, Navy to rid Gulf of old explosives



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31 JUL 1975

Bomb Removal Requested

BELLEAIR BEACH—This small gulf community has requested by letter that the Army and the Navy comb its beaches for leftover World War II bombs, mines and bullets.

Sparked by recent finds of bombs at the north end of its beach, the community has requested that mine-sweeping crews from Ft. Gillam, Ga., be sent to clean up the war paraphernalia.

Belleair Beach and neighboring Sand Key were used by the military during World War II as practice targets.

Mayor Charles Root said Thursday the city had not received a reply yet since the letter was so recently sent.

A 35-pound bomb was removed last week by the Army after being found by a resident in shallow water along Belleair Beach.

1 AUG 1975

Be Wary Of Bombs

WE DON'T EXPECT an enterprising Hollywood producer to come up with a sequel to "Jaws" called "Ordnance," but bathers in the Gulf of Mexico near Belleair Beach and Sand Key should show the same respect for barnacle-encrusted bombs as they would for the menacing dorsal fin of a shark.

For several years bathers occasionally have found military ordnance in nearby waters—reminders of the days during World War II when American flyers flew training missions in the area. Recently, however, the Gulf has produced a heavier than normal yield of old bombs and other military leftovers.

Because most of the bombs used in training were dummies, there is no reason to be excessively wary while enjoying our fine beaches. Nevertheless, Army ordnance experts report that live bombs sometimes were used as "spotters" to help flyers determine whether they were on target.

It would be a tragedy if, after three decades or more of lying dormant in the Gulf, a bomb took a life. But at least one parent has had the sobering experience of seeing his child gleefully knock the barnacles from one of these potentially deadly missiles.

WE URGE CITIZENS to mark any ordnance they encounter along the beaches and to report their finds to the nearest police department. The police, in turn, will contact the military experts who are properly equipped to dispose of such items. Few persons would be foolish enough to continue frolicking in the surf after a shark had been sighted in the vicinity. Let's not be any less cautious with these equally dangerous denizens of the deep.

1 AUG 1975

Army, Navy to make bomb survey at beach

Pinellas Times Staff Writer

BELLEAIR BEACH — Representatives from the Army and Navy will spend two days here next week taking a survey before making an onshore and offshore mine sweep of the beaches extending from Clearwater Pass to the southern tip of Indian Rocks Beach.

The survey team will be in the area Tuesday and Wednesday and will bring a small boat to use in preparations for the sweeping operation.

Mayor Charles A. Root said the team has requested accurate charts for determining depth and contours of the area ocean bottom.

In recent weeks residents and visitors have been finding and hauling away various types of bombs washed up on the beach and lying along the sandy floor of the Gulf close to shore.

Because of the danger that some of the bombs may be live, they have become a source of concern and worry to city officials and residents alike.

In the past two weeks city law enforcement officials have had to call in mine demolition crews from Homestead Air Force Base to remove bombs found near the Soreno Del Sol condominiums.

Officials from Homestead and representatives of the Navy will arrive at Belleair Beach between 1 and 2 p.m. Tuesday.

Belleair Beach Seeks Help In Beach Cleanup

By STEVE HUMMER
Sun Staff Writer

BELLEAIR BEACH—If the city has its way, a not-so-full-scale military invasion will soon take place on its beach.

Sparked by recent finds of shells left over from World War II practice missions, the city council has asked Ft. Gillam, Ga., officials for help in scouring the area's beaches and waters for potentially dangerous shells.

The letter, sent last week, was presented to the city council by Mayor Charles Root during a low-key, hour-long council meeting Monday.

The Sand Key-Belleair Beach area was used as a bombing practice range during the war. Ever since, skin divers, waders and strollers have found relics of the war games.

In the past few days, the 66th Ordnance Detachment from Homestead AFB has come to the beach twice to remove shells. Sunday the detachment quitely flew in to retrieve shell near Sereno Del Sol Condominiums.

"Most of the shells are dummies," said Benton S. Lowe, the city's Civil Defense director and police commissioner. "More than anything else, the psychology of the situation needs to be cleared up."

Lowe was responsible for the letter to Ft. Gillam. It asked officials to authorize the 66th Ordnance Detachment and the Navy E plosive Ordnance Dispos group to search fro Clearwater Pass to the sou ern boundary of Indi Rocks Beach.

Clearwater, Bellea Beach and Indian Rocks w cooperate in the clearing forts, Lowe said.

The idea tickled the agination of Mayor Root.

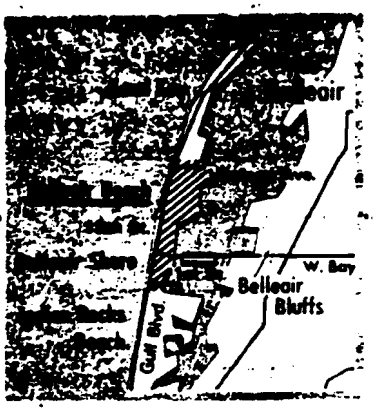
"It should be quite a scer with the Army on the bea and the Navy on the wat I'll look forward to see it," he said.

The council also:

- Passed unanimously resolution aimed at prote ing the city's powers in charter proposal being co piled by the Pinellas Cou Commission. "We want to tain as much power as can since we are pretty w self-sufficient," said Co cilman Lucinda Beneke.

- Heard reports on building and crime activ

8 AUG 1975



Hunting bombs: Beach city's officials worry over new fad

By CHRISTINA K. COSDON
Pinellas Times Staff Writer

6 AUG 1975

BELLEAIR BEACH — Looking for bombs, not sea shells, is now the "in thing" at Belleair Beach, and officials are worried that one of them someday may be "live."

Swarms of souvenir hunters hit the beach last weekend looking for artillery shells and bombs left behind by the Air Force, which used the area as a bombing and strafing range during World War II.

And, sure enough, someone found a bomb on the beach near the Soreno Del Sol condominiums. The city, for the second time in as many weeks, called in an Army demolition team from Homestead Air Force Base to remove the bomb.

It was a dud, as most of them are, but Police Chief Frank Anderson warns that there is one chance in a hundred that a bomb out there is live and ready to be set off by a minor jolt.

"WE'RE TELLING THE people to leave the bombs where they find them," he said. "Don't try to move them. Any of them could be live. It's dangerous to assume they aren't.

"If anyone locates a bomb, don't try to carry it onshore. Just call us and we will come out and put markers around it.

"I saw a kid dart behind a building with one of the same size as the one we were removing on Sunday. I couldn't find him to tell him to let us take it away, but, let me tell you, it's not very smart to assume these things are duds."

MAYOR CHARLES A. Root said the city had not yet received an answer to its letter to the commander at Ft. Gillam, Ga., requesting the Army's onshore and the Navy's offshore help in a mine-sweeping operation to rid the area of whatever explosives might remain.

"We were assured they would do the job, so now we're just waiting to hear when they can do it," he said.

"A lot of worried people will rest easier when they clean up this area, and that includes me."

Beach strollers hunt for bombs, worry Belleair Beach officials

St. Petersburg Times Staff Writer

BELLEAIR BEACH — Beach strollers here are looking for bombs instead of seashells these days and city officials are worried that one of them someday may be "live."

The search for bombs began after one was found late last month and another was found last weekend — on the beach near the Sorento Del Sol condominiums.

An Air Force demolition team was called in and found the bomb to be a dud, as are most of the artillery shells and bombs left behind by the Air Force, which used the area as a bombing and strafing range in World War II.

But Police Chief Frank Anderson says there is one chance in a hundred that a live bomb may be found and may explode if it is not handled properly.

6 AUG 1975

cc: Hall

DEPARTMENTAL CORRESPONDENCE

DATE August 7, 1975

SUBJECT Beach Sweep - information released to news media at request of Mayor

TO St. Petersburg Times, Clearwater Sun, Channel 13 DEP'T Deputy Mayor reques

FROM _____ DEP'T _____

Officials from Homestead Air Force Base and representatives from the Navy will arrive Tuesday, August 12th between 1:00 and 2:00 P.M. to make a survey of the beach area prior to making a sweep of the beach area. Survey team will be in the area Tuesday and Wednesday. They will bring a boat to use in the survey and have requested charts for depths and contures of ocean bottom.

Bomb war fizzles

Pinellas Times Staff Writer

BELLEAIR BEACH

The Army and Navy failed to show up Tuesday for this city's war on bombs on its beach.

"The war must be over for sure when the military doesn't show up on time!" quipped Benton Lowe, the city's deputy mayor.

The armed services thus missed a golden opportunity to show themselves helping others.

For gathered at the Belleair Beach City Commission chambers were city officials and law enforcement representatives from Clearwater and Indian Rocks Beach, as well as television and newspaper reporters there to report how the Army and Navy planned to sweep old World War II bombs from the Gulf just offshore.

Belleair Beach officials said the Army and Navy had promised to be there.

To make time pass more quickly, Lowe recounted events leading up to the city's request for a minesweeping unit to remove all projectiles and bombs that were left by the Air Force from its World War practice bombing and strafing, extending from Clearwater Pass to the southern tip of what is now Indian Rocks Beach.

Air Force teams from Drew Field in Tampa used the area to simulate beachhead attacks to protect onshore forces, Lowe explained.

One bomb recovered recently, was placed on a nearby table for inspection. Originally, it measured 36 inches, said Mayor Charles A. Root. But it had been exploded and revealed an ugly hole.

"The bomb is now only half its original size," said Root, "but you can see what it would do to anyone handling it. See how the steel is peeled back like the skin on an onion? This bomb supposedly only gave off a slight explosive charge!"

'Half a bomb' displayed at Belleair Beach meeting.

Pinellas Times — PETE CALLAHAN

13 AUG 1975

H-21

Flipped Out

A Navy diver begins his underwater search head first, leaving his feet trailing behind. A team of frogmen searched the waters off Belleair Beach Wednesday for World War II leftovers. Story, more photos, Page 1B.

14 AUG 1975

H-2m

Bomb Experts Hit The Beach

By DAVID ALFONSO
Sun Staff Writer

BELLEAIR BEACH—As the divers went about their business on the beach, a group of curious, instamatic-toting people gathered to record the scene.

This wasn't your average fun-in-the-Florida-sun beach experience, and no doubt the folks back home would be interested. After awhile some small boys even began snorkling where the men were living about 30 feet from shore.

Even though the chances of something going wrong are remote, crowds make the men a little nervous. They said they would ask for police help if the crowds persisted.

As one of the men said, "You never know."

"The only thing predictable about ordnance is its total unpredictability," said Bob Coleman of Fort Lauderdale's Naval Explosive Ordnance Disposal Detachment. "I've been doing this for 23 years and I'm not an expert. I just know a little more than the average person about it."

Ordnance (bombs and other things that explode) in the waters off Belleair Beach? Yes. Specifically 4½-inch barrage rockets, used in World War II to saturate a beach before a landing, .50-caliber machine gun ammunition and perhaps a few other items.

The military hardware became part of the shoreline in the early 1940s when the then-desolate area was used as a practice firing range. Chances are the leftovers contain no live charges. But then again, maybe some do.

"Maybe in 1943 they were cheap and used concrete in them," said Army First Lt. Jonathan Coleman. "But maybe they wanted to see where they were hitting and used a few live ones. With this soft sand some of them might not have gone off."

Coleman is one of six men working in the cleanup campaign. He and one other Army man are from the 60th Ordnance Detachment in Homestead. The other four are from the Navy unit.

Navy man Bud Thrift made a pointed, humorous distinction between the branches of service as he tramped slowly out of the water, his flippers flopping on the sand. He was carrying three feet of barrage rocket, encrusted with barnacles.

"It's not wet anymore, so I'll let the Army have it," he laughed.

"Now THIS is dangerous," Thrift said a bit later as he hauled up another shell casing. "See the crab in there. He'll bite you."

On shore a crowd gathered to get a closer look.

"This is the part I like," Lt. Coleman said. "You get some guy that'll stand right over your shoulder and say he sure wouldn't have my job. It seems ridiculous for him to say that and stand right there."

He urged anyone who had taken objects out of these waters to bring them to him for a check.

The men will work the waters north and south of their starting point until they feel they've located the boundaries of the range and cleaned up the area. The operation should take two days.

Bomb experts from the Army and Navy comb Belleair Beach and the offshore waters for military hardware left over from the 1940s when the area was used as a practice firing range.

Sun Staff Photos by Dick Pell

Battle of bombs begins at beach

By CHRISTINA K. COSDON
Pinellas Times Staff Writer

BELLEAIR BEACH

The Army and Navy have landed on the beach of this community, and the war against bombs is on.

Six members of an Army-Navy bomb disposal team were up bright and early Wednesday morning studying area ocean charts and searching the Gulf waters off Belleair Beach for bombs left in the area by Air Force practice bombing and strafing missions during World War II.

THE MEN came from Homestead Air Force Base and the Navy's weapons center in Fort Lauderdale.

Diving near a previously located explosive offshore from the Soreno Del Sol condominiums, the men found a concentration of eight to 10 bombs about 30 feet from the marked site.

First Lt. Jonathan M. Coleman of the Army's 66th Ordnance Detachment from Homestead said it may take the team until Saturday to make a thorough onshore and offshore study of the area extending from Clearwater Pass to the southern tip of Indian Rocks Beach.

The survey is the first step of an offshore and onshore bomb sweeping operation that may take place next week.

IN THE PAST few weeks divers and swimmers have been finding a number of old bombs that include both dummies and the real thing. Fearing

See BOMBS, Page 3

Bombs

from Page 1

that sooner or later someone is going to be hurt or worse, city officials requested that the Army and Navy send representatives to rid the area of the old bombs.

Before setting out in a motorized rubber raft to begin their search, several of the men inspected an old barnacle-encrusted, exploded bomb that city officials had dubbed a "spotter" bomb.

However, Coleman said he felt certain the bomb had been filled with high explosives — not low explosive elements as was believed earlier.

"It was the real McCoy," Coleman confirmed.

TO DETERMINE whether a bomb is a dummy or the real thing, Coleman explained that "if it's a dummy we usually can read it on the side, but if the letters have been obliterated, we set off a charge that gives us the answer. If the explosion is small, we know it's a dummy, if the explosion is a big one, we know it's not a dummy."

In a lighter vein, Chief Warrant Officer Bud Thrift said the men treated Coleman to the movie "Jaws" the night before. In mock fear, Coleman said, "I'll be making my survey from the seawall."

ASKED WHAT they thought about the credibility of the movie in view of their diving experience, the men snickered and scoffed simultaneously at the idea of being attacked by a shark, claiming that the odds are the same as being struck by lightning.

"If I thought it (the movie) was true, I wouldn't be working at this job," Thrift replied.

14 AUG 1975

PRESS RELEASE .. . . August 22, 1945

The Mayor of Belleair Beach has just been advised by the Army Bomb Disposal Unit, which participated with the Navy in the recent bomb survey off Belleair Beach and vicinity, that of the fourteen rockets so far recovered and tested, all fourteen were found to contain high explosives. The rockets had been de-fused to prepare them for use in mock attacks in support of practice beachhead landings during World War II.

The Mayor was urged to publicize this fact and issue an appeal to all persons possessing such rockets picked up for souvenirs to notify him immediately, after which the Bomb Disposal group will fly to Belleair Beach and remove them for safe disposal on each call. The rockets explosive charges are in an "unstable" condition, and any attempt to clean them up and make lamp bases or any operation such as applying an electric drill could result in tragedy.

The military will begin a complete sweep operation on Tuesday, August 26th.

The Mayor urges that all present rockets be reported to him immediately and any others located should be left strictly unmolested pending the sweep. The danger of death or dismemberment is very real.

Mayor Charles A. Root, Jr.

Relics From Beach May Be Explosive

By STEPHEN ADVOKAT
Sun Staff Writer

BELLEAIR BEACH—Those World War II memenos, barnacle-encrusted bombs left behind by practicing pilots in the waters off the shore of this small beach community, are not the harmless duds they were thought to be.

Instead, Belleair Beach residents have been living with a touchy, unpredictable situation for years.

All 14 of the shells found three weeks ago contain high explosives, the Army said Friday.

The shells, some kept by residents as souvenirs, are considered highly dangerous, and military and city officials are urging residents who have one or who find one to call the Belleair Beach police immediately.

The bombs are in a highly unstable condition and any attempt to clean them with wire brushes or to make lamps or other souvenirs from them using high-powered drills could result in detonation, Army 1st Lt. Jonathan Coleman said.

The police will confiscate the explosives and turn them over to the Homestead Army Bomb Disposal Unit for detonation in the Avon Park bombing range.

Coleman, whose unit participated with the Navy in a recent bomb survey off Belleair Beach, said he would return Monday to conduct another two-week sweep to rid the area of any remaining World War II shells.

As a safety measure, residents will be barred from watching the sweeps, he said.

"That way, if one goes off, no one will be hurt except us. But we get paid to do that."

Any bombs discovered before the sweep begins will be immediately retrieved by the Homestead unit, Coleman said.

Officials are uncertain how many shells remain imbedded in the beaches, and they are also uncertain how many are sitting in living rooms or dens as conversation pieces.

"I know there are people who have them as souvenirs. One person told me he saw two kids pull one out (of the Gulf of Mexico) to show," Coleman said.

"They're not inert. When some guy takes this thing and, with a steel wire brush, electric drill or electric saw, begins to clean it off and scrapes on it, he may be lucky and drill into the explosive and nothing will happen.

"But there is also the possibility it will detonate. High explosives are extremely unpredictable."

The shells are approximately 4 inches in diameter and 3 feet long. Four and a half pounds of explosives are contained in the rockets' 33-pound casing, Coleman said.

"It would probably demolish your house, and blow down your walls. Within a confined area their power is greater. People are really ignorant of what these things can do. If someone tosses one in a Dempsey dumpster and it goes out to the incinerator, you've just lost your incinerator."

The Army and Navy bomb disposal teams are expected to sweep an area 700 yards wide behind the Sereno Del Sol condominiums on Gulf Boulevard. Most of the shells have been found there.

Employing a dragging line and scuba divers, the military personnel will scour

See BOMBS, Next Page

Bombs

From Page 1A

200 yards into the gulf next week searching for any remaining shells.

The Army usually uses dummy shells during practice runs, Coleman said. But sometimes spotters, or live bombs, are used to determine whether the pilots hit their targets.

World War II paraphernalia has been found off Belleair beaches for years.

But about a month ago, bombs were discovered, alarming city officials and arousing the interest of the Military Bomb Disposal units.

Coleman said the practice bombing runs off Belleair Beach were conducted during a "popular" war (World War II) when residents apparently considered consenting to the runs the patriotic thing to do.

"It's something the military did a long time ago and now they have to come back and rectify it," he said.

Sun Staff Photo By Dick Bell

Crowd Looks At Barnacle-Encrusted Bombs Recovered In Beach Sweep

23 AUG 1975

H-2q

Explosives in Belleair Beach bombs

By PEGGY VLEREBOME
St. Petersburg Times Staff Writer

BELLEAIR BEACH

All 14 bombs found in the recent survey off Belleair Beach contained high explosives but had been defused, Mayor Charles A. Root announced Friday.

Root was searching for tourists believed to be taking two bombs home with them to the North. A caller told Root about the tourists' souvenirs and another caller reported two bombs being kept in a home.

A bomb disposal group will fly to Belleair Beach from the East Coast to remove and safely dispose of every bomb found, Root said. Military bomb disposal units will begin a complete sweep operation Tuesday, he added.

Root said he will know today whether a unit will be sent here before Tuesday to dispose of the two bombs.

Army and Navy bomb disposal units were called to Belleair Beach several weeks ago after several bombs were found. News of their sweep drew souvenir-hunters.

Root urged anyone who finds a bomb or knows of someone who has one to notify him immediately.

"The rockets' explosive charges are in an unstable condition and any attempt to clean them up and make lamp bases or an operation like applying an electric drill could result in tragedy," he said in a written statement.

Root said the 14 bombs that have been tested had been defused to prepare them for use in mock attacks in support of practice bulkhead landings in World War II.

23 AUG 1975

H–2r

Family's bomb souvenir a live one

The Associated Press

BELLEAIR BEACH

An unsuspecting Tampa family picked up one of about 15 live bombs that have been found recently off Belleair Beach and carried it home before realizing what they had, authorities said Saturday.

When the family heard news reports Friday warning of the dangers of the old World War II bombs, they immediately called police, who carefully retrieved the bomb and detonated it at MacDill Air Force Base.

"It made a heck of a noise," Sgt. Joe Ellis of the Hillsborough County police bomb disposal squad said. The bomb had the explosive charge of about 10 pounds of TNT, authorities said.

Ellis said his son, whom he did not name, found the 30-pound bomb and the family took it home to turn it into a lamp.

The bombs, dropped in the Gulf of Mexico during target practice 30 years ago, started washing ashore off Belleair Beach this month.

Army demolition teams plan to return to the beach this week to search for more of them in the shallows of the Gulf.

"It looked like an oversize bowling pin, except it was all covered with barnacles," Ellis said of the bomb the Tampa family found.

"These things get unstable with age and there's no way to tell what they're going to do. They'd be deadly if a kid started to play with one."

24 AUG 1975

OPINION

Analysis, Interpretation and Comment

Please Collect Shells Instead

THE WATERS OFF Florida's lower east coast are famous for the fabulous bounty which has been recovered from Spanish treasure ships. The Gulf of Mexico off Belleair Beach has yielded a manmade catch of a more recent variety, however, that poses a far more serious threat than the ghosts of 18th-Century sailors.

Three weeks ago U.S. Army and Navy ordnance experts conducted a salvage operation to recover barnacle-encrusted bombs and other military hardware from the shallow waters. No one knows why these items have been spotted with frequency in recent weeks—perhaps it was the relentless shifting of tidal sands—but Belleair Beach officials became quite concerned for the welfare of beach users.

Even after the bomb experts had recovered 14 bombs, there seemed to be no real cause for alarm. After all, we were told, the pilots who used the Gulf of Mexico as a bombing range during World War II dropped duds—with an occasional live missile to help them in determining their accuracy.

Much to their surprise, however, the bomb experts have since learned that all 14 bombs were live—meaning that for more than 30 years bathers in this area have been attended by sinister companions.

ALTHOUGH IT IS unlikely that one of these bombs would explode if left undisturbed, it is known that some citizens have retrieved bombs over the years. The ordnance men have expressed fears that in the process of scraping the barnacles or polishing one of these supposed duds, someone might detonate it. "It would probably demolish your house and blow down your walls," an ordnance expert said Friday.

The Army team soon will return to Belleair Beach to conduct and even more thorough sweep of local waters. Citizens will be banned from the area in order to avoid a repetition of an earlier situation when gawkers posed a threat both to themselves and to the divers.

Meanwhile, we urge our readers to report to their local police any information they may have about ordnance retrieved from nearby waters. It would be a tragedy if someone were to die because he did not want to surrender a prized souvenir. As for the inveterate collectors who stroll our beaches, they should stick to seashells.

H–2t

Bomb sweep to begin Friday

By CHRISTINA K. COSDON
Staff Writer

BELLEAIR BEACH

All the highly explosive missiles and rockets remaining in this area from World War II mock bombing and strafing missions are to be removed during an extensive operation scheduled to begin early Friday morning on Belleair Beach.

Two professional explosive ordnance disposal teams from the Army's 66th Ordnance Detachment at Homestead Air Force Base and the Navy's weapons center in Fort Lauderdale will conduct the operation, which may take as long as two weeks.

The bomb removal was to begin Tuesday, but the four-man Navy team, headed by Chief Warrant Officer Bud Thrift, was delayed due to last-minute repairs to its equipment.

The two-man Army team, headed by Capt. Jonathan Coleman, arrived here Monday night, and immediately drove to Dunedin to inspect an object found by a family along Dunedin Beach. They thought it might be a bomb and had called the Belleair Beach Police Department to check it out.

"It looked like an old Civil War shell," Coleman said, but it turned out to be a cylinder casing and not an explosive.

Coleman said the team is anxious to check out all verified bomb reports because of the potential danger.

All 14 bombs the teams found during a survey made several weeks ago of the shore and Gulf waters off Belleair Beach were found to be highly explosive.

Coleman said the teams will start in this area, where we found the heaviest concentration of explosives during our survey," and extend their search towards Sand Key and Indian Rocks Beach.

Offshore, the Navy team will lay weighted lines in the water to mark off a particular area, make an intensive search and then bring whatever explosives are found to the surface. They will be placed in a boat and taken to a special truck for temporary storage.

The Army team will use mine detectors for onshore bomb explorations. By noon each day two teams will transport the explosives to Avon Park and immediately detonate them, Coleman said.

If no explosives are found by noon, the teams will continue to work until sunset.

28 AUG 1975

H-2u

Gulf floor combed for explosives

By WILLIAM NOTTINGHAM
St. Petersburg Times Staff Writer

BELLEAIR BEACH

A team of Army and Navy explosives experts began the tedious, potentially dangerous work Friday of combing 21,000 square yards off Belleair Beach in search of unexploded rockets dropped 20 years ago when the beach was used as a bombing range.

But Army Capt. Jonathan Coleman and Navy Chief Warrant Officer Bud Thrift said they doubted that any rockets would be found in the first day or so of the search. Divers roped off a search area stretching about 700 yards along the beach and 300 yards into the water. The area begins about 150 yards south of the Chateau Motel, 2700 Gulf Blvd., where the team is staying, and extends north to the Sereno del Sol Condominiums, 2900 Gulf Blvd.

Coleman's men also searched the beach Friday with a special metal detector.

No one is sure how many rockets are embedded in the sandy beach bottom. "But it could be in the hundreds," Coleman said.

He said the hunt probably will take two weeks, depending on the weather. During the search boaters and swimmers will be kept clear of the area.

30 AUG 1975

H–2v

Bomb Cleanup Netting Cache

BELLEAIR BEACH—Twenty-five rockets and rocket fragments including the forward landing gear and tail wheel and possibly the fuselage sections of a downed airplane have been found here since last Thursday by a team of Army-Navy divers.

Rockets taken to Avon Park Tuesday afternoon were found to contain live explosive material.

"We're treating them all as though they were live," said Navy Chief Warrant Officer Bud Thrift.

Thrift added that operations were complicated by electrical storms over the Labor Day weekend, limited visibility underwater and the presence of remora—pilot fish that adhere to divers' bodies.

Apprehensive of sharks, Thrift admitted that on half of Sunday and Tuesday, "It was not real healthy to be out in the water. With this 4-inch visibility you wouldn't see one until it was on top of you."

3 SEP 1975

H–2w

Army To Explode Bombs

BELLEAIR BEACH—At noon today at Avon Park, the Army will explode about 76 bombs found in the offshore beach area here.

The 4.5-inch and 2.25-inch rockets, World War II leftovers from practice bombing runs over the beach, were the finds of the last three days of diving by the Army, 1st Sgt. Raymond Arndt said.

The Army-Navy team has hit what they believe to be the highest concentration of bombs to date in front of the Serena del Sol Motel.

Arndt predicted that operations would continue through next Wednesday, taking somewhat longer than expected because of poor visibility in the water.

The search for war leftovers began after residents found bombs and bullets in the shallow water off the exclusive beach community.

6 SEP 1975

Pinellas Times — STEVE HASEL

On dry land, the barnacle-encrusted World War II rockets 'really stink.'

H–2y

A legacy of World War II harvested

KATHRYN HARRIS
Petersburg Times Staff Writer

Until a few weeks ago, a straying pet ...uana and sporadic defense of private ...ach accesses were about the only things ...at could shake the tranquility of affluent, ...st-World War II Belleair Beach.

Little did the Sunday driver suspect ...at the modish, look-alike homes and con... ...ominiums sit atop an old bombing range.

Oldtimers ignored the occasional rocket ...at washed ashore ("We just left them ...ere because they washed away," says ...e). But then newcomers — those with 5 ...ears' residency or less — dragged in three ...bombs" in two days, and the show was on.

THE NAVY AND ARMY were called ..., with the news media and tourists on ...eir heels. For awhile people wondered ...hether old World War II rockets found ...ffshore might pose a barnacle-encrusted ...ersion of "Jaws" as the curious flocked to ...he beach to eyeball the unpredictable.

Curio-seekers took 38-pound rockets ...ut of the Gulf and into their homes. Stories are told of the man who banged one relic against the concrete bulkhead to knock off barnacles; the doctor's son who dropped his souvenir on a garage floor and the family who took a rocket home for a fireplace ornament.

Then came a frantic recall when Navy tests revealed that 14 out of 14 rockets contained high explosives tucked beyond dummy fuses. The sheepish and the prudent turned their "bombs" back in.

When, the armed services committed themselves to clearing the area, old stories about the war began surfacing like divers' bubbles.

Mullet fishermen or their widows tell the most poignant tales.

WESSON MEARES, 71, remembers being caught offshore Belleair Beach during a daylight bombing practice, with 50-caliber machine gun rounds splashing the water around his 22-foot boat. "These young boys were like that — they were just trying to scare us," he says, smiling a little. "These young boys didn't give for nothing. That's one reason young boys make such good soldiers."

In the early 1940s, when Meares was fishing offshore, Belleair Beach and Belleair Shore were dotted by fewer than a half-dozen houses. Tampa lawyer Norman S. Brown, whose parents built one of the first two homes there, says that the northern stretch of sand belonged to the state.

So no one was too surprised when military forces set up targets there for fledgling pilots and gunners from the Sarasota Army Air Field. (Although many had assumed that the planes came from MacDill or Drew air fields in Tampa, military records indicate otherwise.) Strafing took place on a daily basis and children used to slip by guards afterwards to retrieve 4-inch-long brass shells to sell.

WHAT IS SURPRISING is that neither Meares nor his friends recall seeing rockets, measuring nearly 6½ yard in length, dropped from planes into the Gulf. Yet more than 100 have been retrieved within a few hundred yards of the Clearwater Apartments and the Sereno Del Sol Condominiums.

Why live ammunition? "World War II was a very popular war," shrugs Army Sgt. Henry Knoblock, 26, who has overseen the destruction of the rockets 100 miles inland at the Avon Park Air Force range: "The military could use just about anything they wanted to."

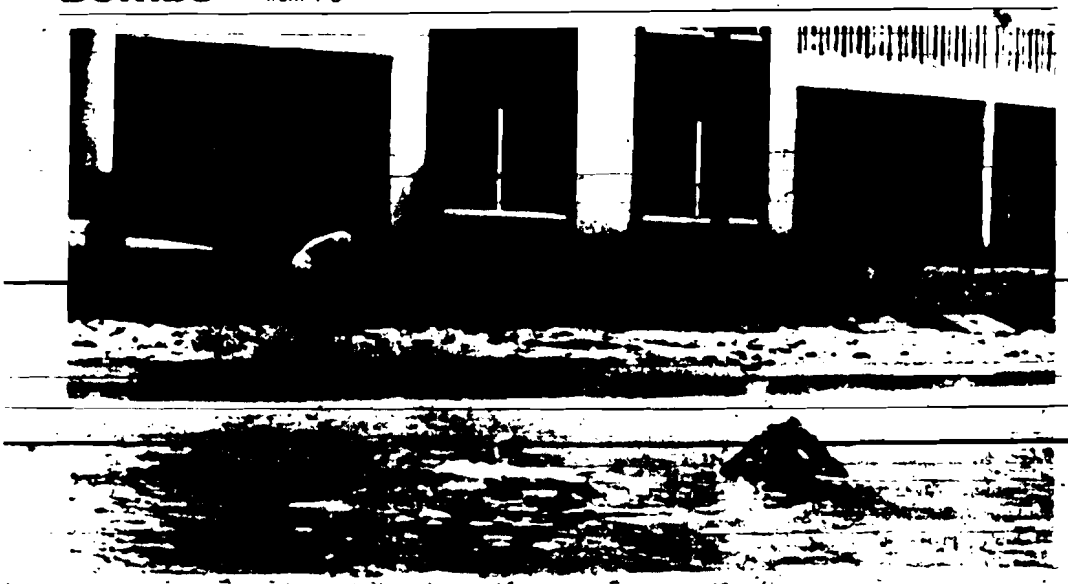
Neither Knoblock, with two years' experience in Florida, nor Navy Senior Chief (and diver) Bob Coleman, with three and a half years of service in the state, say they have seen such a concentration of large warheads in Florida.

Navy Chief Warrant Officer Bud Thrift, part of the diving team offshore Belleair Beach, says some of the 38-pound rockets he has recovered indicate that not all of the fuses were dummied. Smaller rockets, measuring 20 inches in length, did not contain explosives when tested last month, he noted.

See BOMBS, 10-D

Bombs

from 1-D



Navy diver Bob Coleman, a senior chief, finishes a cigaret before diving in search of rockets off Belleair Beach.

St. Petersburg Times — KATHRYN HARRIS

People have different ideas why the rockets are turning up now, at least 30 years after the war's end. Dent DemaCarty, a Belleair Beach resident who grew up in Indian Rocks, says he believes construction of the Clearwater Pass noticeably has affected the Belleair Beach, building it up and perhaps uncovering the rockets offshore at the same time.

BUT WILLIAM A. TOUCHTON SR., 62, scoffs with his years of experience as a mullet fisherman, saying the rockets would have been brought in eventually by the tide. Touchton says the prevailing wind is out of the south, suggesting that the jetty to the north would be of little consequence.

Lt. Dan Kuehl, a researcher at the Air Force archives at Maxwell Air Force Base in Alabama, wonders aloud whether the rockets might have been dumped from a ship.

But since he finds the area marked on maps as the "Indian Rocks" range for the Sarasota trainees, and finds no designation of the area as a disposal site, Kuehl concludes that the rockets must have been dropped from planes.

The Maxwell archives also fail to say how many rockets were dropped or when, Kuehl says. But the aircraft of the early war years — the P-39s (nicknamed Aircobras) and the P-40s (Warhawks) would not have carried such rockets, he says. The warheads could have been carried aboard the P-47 (Thunderbolt) which began taking off from Sarasota air fields in 1943, or they could have been aboard P-51s (the Mustangs) which appeared in 1945.

IF THE ROCKETS ARE not remembered, other sights are. Donna Ransom, widow of long-time fisherman Wyllys Ransom, remembers glancing out of her bedroom window one day in Indian Rocks to see soldiers among the oaks and palmettos. The men turned out to be U.S. soldiers who had been dumped ashore for a three-day survival course.

During the war, Mrs. Ransom says, she gave up the luxury of a telephone because of the constant interruptions on the party line from those manning the watch tower. Authorities had to be notified each time a plane was spotted. Mrs. Ransom took her two and three-hour turns atop the tower but says she never spied the enemy.

A sobering sight could be seen from the mainland, however. Meares recalls standing at a seafood market in what is now Largo, watching the splash of an American trainer plane as it crashed into the Gulf. The pilot was killed, he says, and there were reports of one or two other crashes in those years.

LAST WEEK, NAVY divers recovered the tail wheel and front landing gear of a plane but could not identify it.

It was a time of sacrifice, Meares explains. Somewhere, someone got along with less gasoline so that fishermen like Meares could have a higher ration for their boats to bring home tons of food.

The fishermen themselves had to get along without running lights for awhile, steering their course in Clearwater Harbor by the lights turned inland from the Memorial Causeway.

Two of Meares' sons served overseas; he lost an 11-year-old child in a wartime accident. His first wife walked from their home on the mainland each night over the wooden bridge to Indian Rocks Beach to take her turn on the watch tower, which Meares says stood 75 to 100 feet high.

"You know, people felt — they'd do everything they could to help out," he says, recalling the fear that gripped America in the months following Pearl Harbor.

"Back in those days, you never knew what was going to come out of the Gulf."

St. Petersburg Times — KATHRYN HARRIS

Navy 1st Class Petty Officer Tuck LaBree pulls in one barnacle-encrusted rocket

10 SEP 1975

H–2z

Bombs On Beach 'Dangerous'

By FRED THOMAS
Tribune Staff Writer

BELLEAIR BEACH — Fourteen bombs removed from waters here — considered to be duds left over from World War II bombing practice — are "highly explosive," and should be considered "very dangerous," U.S. Army and Belleair officials said yesterday.

In recent weeks, residents have been finding assorted kinds of old bombs along this two-mile stretch of beach in north Pinellas County. The "ordnances," as the military calls them, were used during World War II by the Air Force [illegible] for bombing practice.

BUT SEVERAL didn't explode, and were covered up by sand. Beach erosion uncovered many of the bombs, said 1st Lt. Jonathan Coleman of the U.S. Army's Explosive Disposal Unit stationed at Homestead Air Force Base in Miami.

Coleman's unit and Navy frogman will begin a disposal operation Tuesday to find any other bombs still submerged or near the beach. Coleman said the operation will take about 10 days.

"There's still quite a few left," Coleman said yesterday. "The exact number is somewhere in the hundreds."

The most common bomb found is the 36-inch "barrage" [illegible] Coleman said.

LAST WEEK, members of Coleman's unit collected 14 bombs and all 14 were found to be live, he said.

The real danger is people who find them and think they've got a dead bomb on their hands. They might want to polish it up, and using an electric drill buffer cold cause it to detonate," Coleman warned.

"These explosives are very unpredictable," he continued. "Old bombs sometimes get more sensitive, and others seem to die. But in any case, all of these should be considered very dangerous."

BELLEAIR Beach Mayor Charles A. Root urged that anyone finding bombs turn them in to the police at city hall, 401 Causeway Blvd.

[illegible]ne of the missiles would not level a house, but "would take out the windows and totally demolish the room. You would need extensive interior decorating after one of those," he said.

1975

H-2aa

Hunting bombs is hard, stinky work, but the pros like it

By WILLIAM NOTTINGHAM
Pinellas Times Staff Writer

BELLEAIR BEACH

After washing a day's worth of salt, sand and sweat from his tanned body, Chief Warrant Officer Bud Thrift, with a blue and white bath towel drapped around his waist, popped the tab off a chilled can of Old Milwaukee and sat down.

Thrift, Senior Chief Bob Coleman and a third member of their Navy diving team munched corn chips and bean dip last week while trading wisecracks — mostly about women, the Army or the Air Force — in their ground-floor apartment at the Chateau Motel on Gulf Boulevard.

"The biggest problem we're having is the pilot fish coming up and attaching themselves to our legs and tanks," Thrift said. "It doesn't hurt anything, but it's a bother."

"THEY'RE NOT pilot fish," Coleman insisted from across the small room. "The proper name is remora — pilot fish have vertical stripes." "Aw, they are too pilot fish," disagreed the other crewman. "I'll bet you."

Seizing the challenge, Coleman picked up a skindiving magazine from the floor by one of the apartment's studio couches and began flipping through the pages.

"There," he said, thrusting a photograph in the crewman's face, "that's a pilot fish. See those stripes. That's not what we saw out there."

TO THRIFT and his crew, "out there" means a stretch of Gulf along Belleair Beach littered with unexploded World War II-vintage rockets, dropped during the war years when the then-mangrove swamp was a practice bombing range for the Army Air Corps. For the past week Thrift's men and an Army detachment led by Capt. Jonathan Coleman have been inching along 21,000 square yards of Gulf bottom and beach recovering the rockets.

See BOMBS, Page 2

Spec. 5 Howard Stepp looks at a day's catch.

tepp gently eases an explosive onto the boat.

Beach bombs: a real danger

By PEGGY VLEREBOME
Pinellas Times Staff Writer

BELLEAIR BEACH

All 14 bombs found in the recent survey off Belleair Beach contained high explosives but had been defused, Mayor Charles A. Root announced Friday.

Root was searching for tourists believed to be taking two bombs home with them to the North. A caller told Root about the tourists' souvenirs and another caller reported two bombs being kept in a home.

A bomb disposal group will fly to Belleair Beach from the East Coast to remove and safely dispose of every bomb found, Root said. Military bomb disposal units will begin a complete sweep operation Tuesday, he added.

Root said he will know today whether a unit will be sent here before Tuesday to dispose of the two bombs.

Army and Navy bomb disposal units were called to Belleair Beach several weeks ago after several bombs were found. News of their sweep drew souvenir-hunters.

Root urged anyone who finds a bomb or knows of someone who has one to notify him immediately.

"The rockets' explosive charges are in an unstable condition and any attempt to clean them up and make lamp bases or an operation like applying an electric drill could result in tragedy," he said in a written statement.

He also urged that any bombs found "be strictly unmolested pending the sweep."

"The danger of death or dismemberment is very real," he said.

Root said the 14 bombs that have been tested had been defused to prepare them for use in mock attacks in support of practice bulkhead landings in the Belleair Beach area during World War II.

1975

Police Explode Bomb

By LIN HOWARD
Sun Staff Writer

TAMPA—A 12-year-old boy who picked up a souvenir at Belleair Beach Wednesday was just plain lucky he wasn't hurt, a Hillsborough County sheriff's spokesman said Saturday.

"It detonated beautifully," said Sgt. Joe Ellis of the Hillsborough County Sheriff's Department Explosive Ordinance Disposal (EOD) unit.

He was describing a World War II shell Mrs. Jack Chaney, 5120 Puritan Rd., told sheriff's deputies her son had brought home from a trip to the Gulf beach.

The youth found the shell while beachcombing with a metal detector.

After seeing a television newscast Friday about live shells found in the waters off Belleair Beach, Mrs. Chaney called the sheriff's department.

"We picked it up at their home on the north side of town about 12:30 a.m.," Ellis said, "and took it across town to MacDill Air Force Base in our bomb transport trailer. You go real slow with those things, you know."

At MacDill, Air Force EOD personnel helped detonate the shell at about 3:30 a.m.

Military and Belleair Beach authorities are urging residents of that Gulf Coast community to call police if they have any shells as souvenirs or find any on the beach.

The shells are highly unstable, officials say. The police will confiscate the shells and turn them over to the Homestead Army Bomb Disposal Unit.

See SHELLS, Next Page

Shells

From Page 1A

Belleair Beach Police Chief Frank Anderson said "a couple of exploded shells" were turned in to police late Friday.

Practice runs were conducted above Belleair Beach during World War II, and remnants have turned up periodically since.

Although they then believed the shells were dummies filled with sand or concrete, officials became alarmed about a month ago when the frequency of the finds increased.

Army and Navy survey teams were called in and found 14 shells. All contained high explosives.

Military bomb disposal teams will begin another two-week sweep Monday to rid the area of any remaining bombs.

Using a dragline and scuba divers, the Army and Navy personnel are expected to search an area 700 yards wide and 300 yards into the Gulf behind the Sereno Del Sol condominiums on Gulf Boulevard. Most of the shells have been found there.

The shells are approximately 3 feet long and 4 inches in diameter and contain 4½ pounds of explosives, Army 1st Lt. Jonathan Coleman said Friday, adding one bomb was powerful enough to destroy a house.

As a safety measure, the beach will be cleared during the cleanup.

1975

H–2ad

Divers in gulf find bombs from World War II

By VERNON SMITH Jr.
St. Petersburg Times Staff Writer

BELLEAIR BEACH — Fifteen-year-old Todd Fernandez and his 13-year-old buddy, Keith Pearson, went diving for shells Sunday and ended up finding a bomb.

The two boys made the discovery about 12:30 p.m. after they struck, tugged and yanked on a 3½-foot-long missile-shaped object stuck in the sandy bottom of the Gulf of Mexico behind a condominium at 2900 Gulf Blvd.

The heavy object was covered with barnacles, and only after they got it to shore did the boys learn what it was. Someone on shore called the Belleair Beach police.

TWO OTHER bombs were found near the one found by Todd and Keith. An unidentified Tampa man found at least one of them and was planning to take it home with him when police stopped him. The man told police he was going to sandblast it.

All three bombs were in about eight feet of water roughly 10 yards from shore.

"I was hitting on it and didn't know what it was," recalled Keith, who is visiting from Wisconsin.

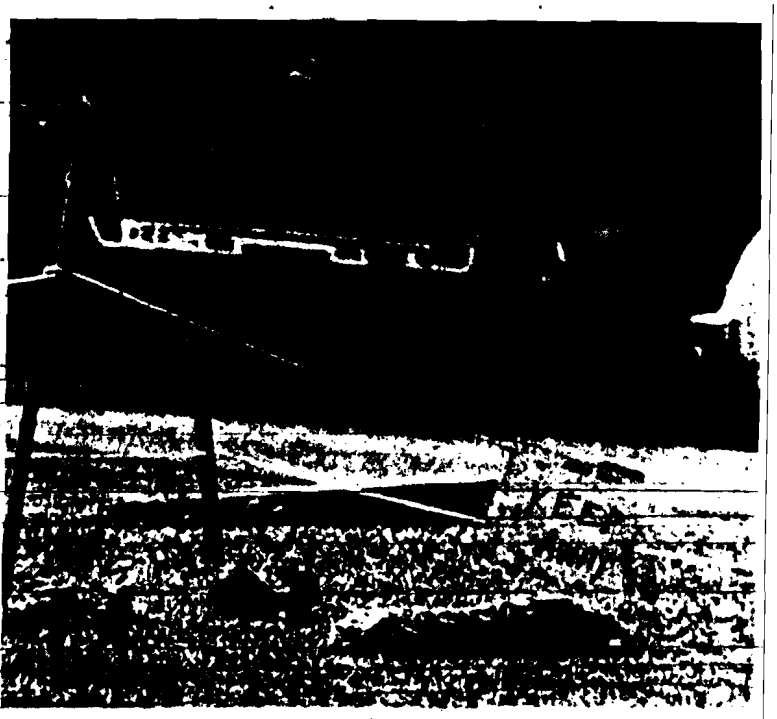
Todd, who lives in Tampa, somberly added, "It's a scary thought. You sit there banging on it with a shell and find out it's a bomb."

"They were lucky," a Hillsborough County sheriff's bomb expert said later. "It could have exploded."

THE THREE bombs, two of which were believed to be still live, were taken to the St. Petersburg police pistol range and detonated.

Coast Guard and police divers believe at least six more bombs are still in the area. They marked the site with plastic gallon jugs. Sunbathers and swimmers, who were moved out of the area, watched curiously as the authorities cordoned off about 100 yards along the beach and about 200 yards into the gulf.

See BOMBS, 10-B



Dangerous debris from the sea is roped off on land.

Bombs from 1-B

The remaining bombs probably will stay where they are until at least Wednesday morning, when a Navy explosives team from Jacksonville is supposed to arrive. The team will remove the six bombs and look for others that might be buried in the gulf sand, said Belleair Beach police officer J. R. Caldwell.

RESIDENTS say Todd and Keith's discovery is nothing unusual. "Every summer, kids are finding bombs here," said one woman.

Hundreds of rockets and bombs were dropped by planes in the early 1940s, when the Air Force used the northern tip of Belleair Beach, then an uninhabited mangrove swamp, as a practice bombing and strafing range and for amphibious landing exercises.

In 1975, the rockets and missiles began poking out of the gulf-bottom sand or washing up onto the beach, and Army and Navy minesweeping teams were called in to remove them. They found more than 100 of the explosives.

Again in 1977, more bombs were found and another mine-sweeping team was called in. And unconfirmed reports say that 156 old bombs turned up last year.

Despite more than 30 years in the water, the old war relics still pack a deadly charge, said Hillsborough County bomb expert Lt. J. Ellis.

ELLIS SAID the bombs contain a black powder that doesn't deteriorate, so they can still go boom. He said bombs found in the past have contained between 2½ and 5 pounds of TNT.

"They are okay when left alone," Ellis said. "When people start picking them up and banging on them, then they could get hurt. It can maim you, if not kill you."

Belleair Beach police are asking anyone who finds a bomb or who has taken one home as a souvenir to leave it alone and call police at 585-5522.

"The potential for danger is very real," Caldwell said.

Divers find more bombs off Belleair Beach

By VERNON SMITH JR.
St. Petersburg Times Staff Writer

BELLEAIR BEACH — A U.S. Navy explosives team lugged an assortment of bombs, described by one diver as nothing more than old scrap iron, from the Gulf of Mexico Wednesday.

"I wouldn't bet a cake of bear that anything we've got is live," said Lt. E. L. McDaniel, who is in charge of the recovery operation. "Scrap metal is basically all we've got."

McDaniel and three other divers, all from Jacksonville, began their search for the World War II bombs Tuesday at a site behind a condominium near 2800 Gulf Blvd.

Sunday, two youths diving for shells on the sandy bottom found the first of three bombs that turned up that day.

McDaniel guessed that most of the bombs are the remains of military target practices held in that area 40 years ago, which was then an uninhabited mangrove swamp. The Air Force used the area as a practice bombing and strafing range and for amphibious landing exercises.

In the past five years, old rockets and missiles have been washing up near the beach, and Army and Navy minesweeping teams have been called in twice before to remove them.

Tuesday, hampered by choppy waters, divers found only two bombs. But by late Wednesday morning, divers had recovered about eight war relics. The largest were two rockets, about 3 feet long and weighing about 25 pounds.

McDaniel allowed that there is always a chance that one of the old bombs could be live, but he termed it "very minute." The bombs the Navy finds will be taken to a police pistol ranged and destroyed.

Most of the explosives were found in about 6 feet of water roughly 50 yards from shore. Some were buried in about a foot of sand, divers said.

Practice bomb found off Belleair Beach

A snorkeler off Belleair Beach dragged in a World War II practice bomb Wednesday night and told police he had seen three to five more in the area. Divers from the Indian Rocks Beach police department at first offered to bring them up, but Chief Sam Heath decided against it out of concern for his officers' safety. The Army's 66th Explosive Ordnance Division from Cape Canaveral picked up the one bomb Friday morning. The bombs are remnants of the days when Sand Key and Belleair Beach were a practice range for World War II fighter pilots. Belleair Beach Police Chief Frank Anderson said chances are remote that one of the bombs might go off. Over the years hundreds of practice bombs have been recovered from area waters. When a storm or other disturbance stirs the waters, Anderson said, "Lo and behold, there they are."

17 MAY 1986

Belleair Bee

HARBOR HILLS
BELLEAIR BEACH
BELLEAIR SHORE
SAND KEY
HARBOR OAKS

Vol. X No. 45

May 29, 1985

Naval frogmen surface at Belleair Beach

by Penny Schwenck

There exists in this nation many groups of people who daily risk their own lives to make ours safer. Some of these people are quite visible while others work quietly behind the scenes to protect lives.

Falling into the second category is a team of Navy frogmen stationed at Cecil Field in Jacksonville. As Explosive Ordinance Disposal (E.O.D.) divers, the very nature of their jobs often puts them into extremely hazardous situations.

This week they have been checking the seemingly calm waters off Belleair Beach in search of recently sighted "practice bombs."

About 11 years ago, several of these old bombs—circa World War II—washed up on the shores of Belleair Beach, much to the surprise of area residents. Divers recovered more than 100 of the "shells," many of which were still explosive.

Records show that the area between Sand Key and Indian Rocks Beach was a testing ground for military action during the 1940s. In those days, Pinellas County beaches consisted of an almost uninterrupted, wilderness of Australian Pines and sea oats. It was the perfect place for Air Force planes based out of Drew Field in Tampa to simulate beach head attacks.

Few reported sightings since the major clean-up in 1975 had led residents to hope that most of the military leftovers had either been found or were deeply buried. However beach erosion and violent storm action has apparently uncovered more of the barnacle encrusted "practice bombs" and the waters off Belleair Beach are once again in the news.

It is not known how many of these bombs, which are for the most part believed to be "duds," were dropped into the local waters. But information gleaned from those already recovered show them to be objects which must be treated with caution. "There is nothing hazardous about the ones found up until this date—they were all practice rounds," said Lieutenant Al Ashton of the E.O.D. team. "But it is best not to handle these things and to notify local authorities if there are any sightings."

The Belleair Beach police, headed by Chief Frank Anderson and Sergeant Jerry Slider, together with Mayor Tom McAllister have been the driving force in getting these trained divers down here to investigate the most recent discoveries by local beach goers.

Lt. Ashton and his team consisting of James R. Stallings, Dale Brouse, Kirk Morford, Fred Petersen and Phil Doran were welcomed to the area with a special, Memorial Day, barbecue steak dinner. It was given in the beautiful home of Henry and Beulah Blake, residents of The Bluffs in Largo. The Blakes' daughter Carol, is the wife of Sgt. Slider.

The team's unusual work, which takes them to many locations and situations all over the nation, is described by them as "fun, interesting and different." Not to mention extremely dangerous. "Any time you are working with explosives, you have an unpredictable situation," added Slider.

Early Tuesday morning before the low tide, the six divers launched their motorized rubber boat at the north end of Belleair Beach. "We will stop every so often, dive down and check the areas where the bombs were last reported," explained Ashton. "We really have no idea where they are or how many there are. This will be a spot check."

The naval diver reported that he didn't anticipate sighting many of the old bombs. But he did add that after the check is done, he will meet with both the local and the naval authorities and "return to do a full scale job, if necessary."

HOSTING THE NAVAL DIVERS at a Memorial Day bar-b-que were (l-r) Henry and Beulah Blake and Sgt. Jerry Slider with his wife Carol. Lt. Al Ashton, head of the diving team is center.

H-4b

H-4b

LETHAL LEGACY

■ Bombs, ordnance and even mustard gas left over from World War II may remain buried in the area.

By DAVID K. ROGERS
Times Staff Writer

World War II isn't quite over in Florida.

From Brooksville to Clearwater, from Tampa Bay to Fort Pierce, the state's sandy soil still hides bombs and shells dropped during training exercises five decades ago.

And now, newly released files suggest Florida also may have been a hotbed of secret research on chemical weapons systems, including various forms of disabling mustard gas.

"The presence of this chemical weaponry came as a surprise to us," said Hanley Smith, chief of the Army Corps of Engineers district environmental office in Jacksonville. "We became aware of it just a few months ago as the information was made available from archival material out of the Washington area."

Officials searching for chemical weapons have yet to find evidence of injuries to people or permanent damage to the environment. But the threat remains, considering that what were remote and desolate sites in the 1940s are Florida's suburbs and playgrounds today:

■ A square-mile bombing and gunnery range used by fighter aircraft squadrons from around Tampa Bay is the Countryside area of Clearwater. Landscaping work at Countryside Country Club unearthed several aircraft practice bombs in the early 1980s.

■ The Withlacoochee State Forest today sprawls over portions of Pasco, Hernando and Sumter counties. In 1943, some military maps called it the Lacoochee Bombing and Gunnery Range while other maps described the 28-square-mile site as the Air to Ground Gunnery Range Zephyrhills Army Airfield.

Numerous experiments with mustard gas in various forms were conducted there, primarily by the Army's Chemical Warfare Service headquartered at the Dugway Proving Grounds in Utah. A 1950 search of the Florida forest turned up more than 250 unde-

Please see **BOMBS** 4B

In 1984, swimmers found two hand grenades in the water at Fort De Soto Park. One grenade was detonated later by a bomb expert. The other was not recovered.

Bombs from 1B

tonated bombs containing mustard gas.

■ Tampa International Airport was just homely Drew Army Airfield in the early 1940s. Corps officials have a new interest in the site because they now know that mustard gas and other chemical substances were handled there near the war's end.

■ *Belleair Beach has some of the priciest real* estate in Pinellas County today. In World War II, fighter pilots knew it as the place to hone their air-to-ground gunnery skills.

■ The same is true of Fort De Soto Park on Pinellas' southwest coast. Mullet Key, the park's largest island, still yields the occasional bomb from its days as a practice range.

"There was a lot of training activity going on throughout the southeastern U.S., but particularly in Florida," said A. J. Salem, chief of the Corps' planning division for the Southeast.

"The climate was favorable for year-round training. At the same time, it was felt that Florida held the kind of terrain, vegetation and humidity that would be typical of the conditions soldiers would encounter in the South Pacific."

Since the mid-1980s, the Corps has inspected more than 240 World War II-era military sites in Florida in search of old ammunition or other environmental hazards. But some of those sites are undergoing even closer scrutiny as files of once-secret chemical experimentation are being opened.

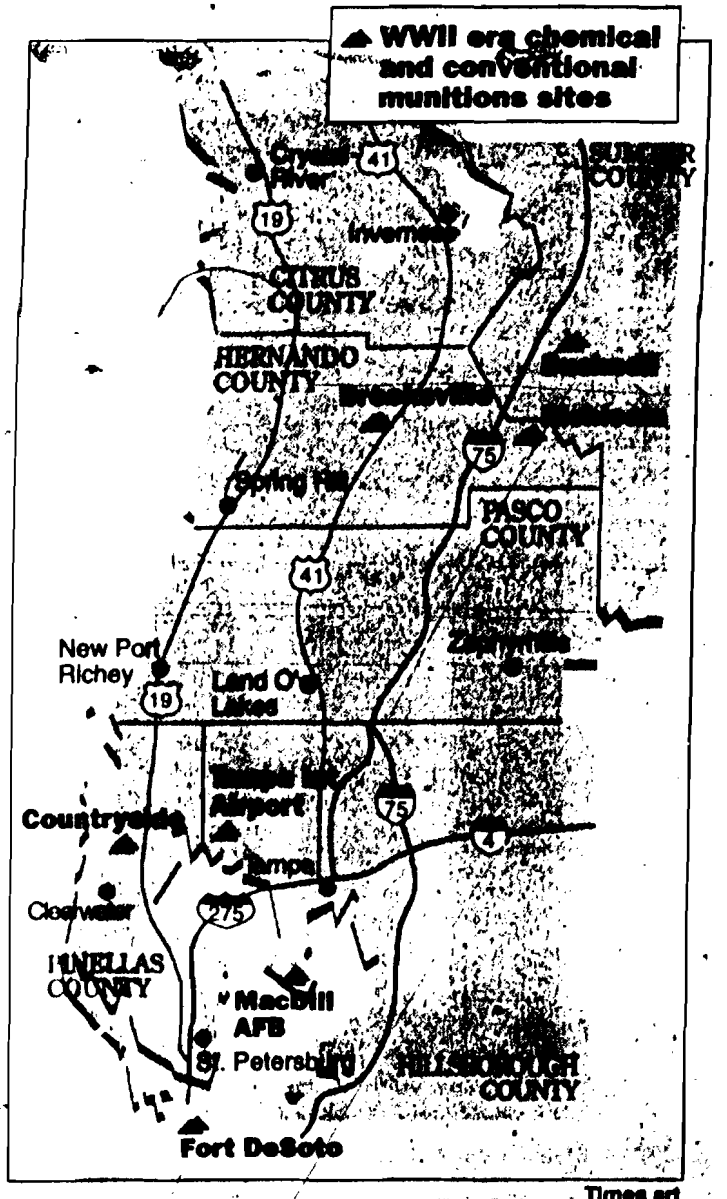
Nothing has been found yet and it's possible that nothing ever will, but the Corps wants to investigate because of the serious health and environmental risks old chemicals and weaponry can pose.

Two 8-year-old boys were killed in 1983 after an artillery round exploded in a San Diego neighborhood built on what had been an Army tank training ground.

Last January, workers at the site of some expensive new homes in Washington, D.C., unearthed a cache of World War I chemical shells. In all, 141 shells were uncovered just four miles from the White House.

Locally, commercial fishermen have found unexploded ordnance in their nets since World War II.

A backhoe operator working at Fort De Soto Park in 1988 struck a bomb embedded in the sand, which happens occasionally there, park officials say. The bomb was destroyed by an Air Force disposal team.



Times art

wasn't much foliage, so it was easy for them to put and man their targets."

After joining the Coast Guard, Perkins received training at the Edgewood Arsenal in Maryland to teach other Coast Guardsmen how to counter gas attacks, including the use of gas masks.

"But that was all with tear gas," Perkins said. "We never heard of anybody using mustard gas."

A flow of soldiers

The skies over Central Florida were alive with aircraft during the first half of the 1940s as all branches of the military made the most of the generally fair weather.

Brooksville, Zephyrhills, Bushnell, Clearwater, Tampa, St. Petersburg, Sarasota, Orlando, Arcadia and other towns had aircraft training fields. Tampa had three — MacDill, Drew and Henderson army airfields. Some housed bombers, others fighters. Some were giant complexes, like Drew — called Tampa International Airport today — while others were small, like Bushnell, a satellite field to Orlando. But they all stayed busy preparing men for war.

"Florida was covered with dozens of training bases, which furnished a flow of graduates from flying and technical schools," recalled retired Brig. Gen. James H. Howard in his recent book *Roar of the Tiger*. "From here, graduates stepped directly into combat assignments overseas."

Today, the old airfield is called St. Petersburg-Clearwater International Airport, and Howard lives in a comfortable condominium less than eight miles to the west, in Belleair Bluffs.

"In my time there, Pinellas was used as a training base for fighter pilots," Howard said. "New pilots and those who had already returned from combat would use the beach for gunnery practice or use tow targets to work on their gunnery out over the gulf."

Lifelong Clearwater Beach resident David Perkins remembers those fighters well:

"There were a lot of fighter planes over what is now Belleair Beach. That was an area where there

Mustard gas banned in war

International rules of warfare banned the use of mustard gas after World War I, when thousands of soldiers suffered permanent injuries from inhaling or coming into contact with it.

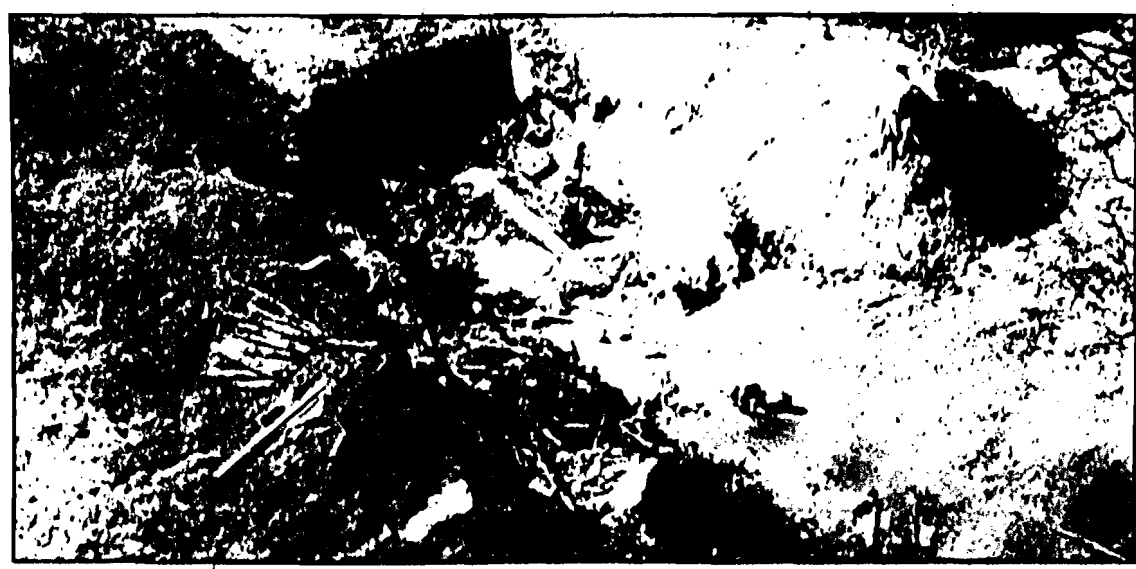
Corps officials said last week that they still don't know why the U.S. military was experimenting with mustard-based weaponry, whether its use was being contemplated either offensively or defensively, or whether it was felt that Allied ground troops might encounter mustard gas during a prolonged island-by-island fight in the South Pacific.

Peter Besrutschko, head of chemical engineering in the Corps' Jacksonville office, said someone would have to come into contact with mustard gas right after its release to be injured because it disperses quickly.

He didn't discount the dangers of mustard gas, though: "Injuries are typically permanent. Mustard gas was designed to incapacitate you, not kill you. That way, you become more of a burden to your comrades, slowing forward movement and making everyone more vulnerable to attack."

Records say that in Florida, the Army experimented with mustard as a thick liquid that was applied to foliage to burn the skin of passing troops. Mustard was used this way in the Withlacoochee Forest, but inspectors have yet to find evidence of it.

The search continues. "As you might imagine, there's a lot of political interest in these sites," said Smith of the Corps' Jacksonville office. "Members of Congress want to know why none of this was known before. Well, until now, this information was sealed."



This is an aerial photo of a crater in Fort De Soto Park showing where a World War II-era bomb was found in 1988 when a backhoe operator hit it. It was blown up by a bomb disposal crew from the U.S. Air Force.

Times files

ORDNANCE AND EXPLOSIVES
ARCHIVES SEARCH REPORT
FOR
INDIAN ROCKS AIR-TO-GROUND GUNNERY RANGE
BELLEAIR BEACH, FLORIDA
PROJECT NUMBER I04FL033701

APPENDIX I

INTERVIEWS

APPENDIX I

INTERVIEWS

Table of Contents

MEMORANDUM FOR RECORD

SUBJECT: Telephone Interview between Brigadier General (Ret) James H. Howard and Mr. Edward M. McManus on 12 December 1993

1. Brigadier General (BG) James H. Howard was a World War II fighter pilot who once commanded Pinellas Army Air Field (AAFld). He flew P-40's and P-51's during his duty assignment there.

2. BG Howard recalls strafing the Indian Rocks Air-to-Ground Gunnery Range with his .50 caliber machine guns in his P-51 Mustang. Planes would use the Biltmore Hotel in Belleair as a guide and bank towards the range just south of the hotel, fly westward across the Intracoastal Waterway, and fire at targets on shore. He only remembers firing his machine guns at this site, no rockets or bombs.

EDWARD M. MCMANUS
Site Inspection Team

MEMORANDUM FOR RECORD

SUBJECT: Telephone Interview between Mr. Garland V. Fory and Mr. Edward M. McManus on 24 February 1994

1. Mr. Fory was a World War II fighter pilot stationed at Pinellas Army Air Field (AAFld) as a gunnery instructor.

2. Mr. Fory stated that he flew P-40's and P-51's against the Former Indian Rocks Air-to-Gunnery Range from Pinellas AAFld. He did not fly the P-39 against this gunnery range.

a. He recalls firing "many" rockets at this site himself and figures that "thousands" were fired by the numerous pilots that trained there while it was open. He vividly remembers launching the 5-inch High Velocity Aircraft Rocket (HVAR) at targets onshore, but could not specifically confirm the usage of the 4.5-inch aircraft rocket, though he does not discount that possibility.

b. He strafed panel targets with .50 caliber machine gun fire, 100 rounds at a time, 50 from each aircraft wing. He stated that none of the warplanes at Pinellas AAFld mounted the 20mm cannon, thereby eliminating the possibility of those rounds contaminating this site.

c. They dropped numerous practice bombs which he described as "little blue training bombs with smoke charges." They practiced both dive and skip bombing at this range. He was quite certain that no high explosive bombs of any sort were ever dropped on this site.

3. In response to questions, he provided the following information:

a. That, to his knowledge, the warplanes from Pinellas AAFld were the only ones to use this range;

b. That the rockets were fuzed and set to detonate upon impact - he said that they had to explode to allow the spotters to score the results and stated that the rockets he fired did explode upon impact;

c. That the planes always flew and fired from east to west - he was adamant that they NEVER fired towards the east;

d. That all aircraft rockets were aimed at targets on the shore, but occasionally overshot their aiming point and landed in the water immediately off the Gulf shore;

e. That the targets for practice bombs were merely big circles in the sand; and,

f. That he never heard of or was aware of the anti-aircraft gunnery range located just south of the air-to-ground gunnery range.

EDWARD M. MCMANUS
Site Inspection Team

MEMORANDUM FOR RECORD

SUBJECT: Telephone Interview between Mr. Norman Starks and Mr. Edward M. McManus on 24 February 1994

1. Mr. Starks was a World War II fighter pilot stationed at Pinellas Army Air Field (AAFld) as a gunnery instructor from the summer of 1944 until September 1945. He mentioned that Pinellas AAFld was home to one of the few airplane gunnery schools in existence at that time.

2. Mr. Starks stated that he flew P-40's and P-51's against the Former Indian Rocks Air-to-Ground Gunnery Range from Pinellas AAFld.

a. He recalls firing rockets at this site from his P-40, but could not recall their exact size. He did not fire rockets there when he flew the P-51.

b. He strafed panel targets with .50 caliber machine gun fire, 100 rounds at a time, 50 from each aircraft wing. He stated that none of the warplanes at Pinellas AAFld mounted the 20mm cannon, thereby eliminating the possibility of those rounds contaminating this site.

c. He also dropped small practice bombs on this site.

3. In response to questions, he provided the following information:

a. That, to his knowledge, the warplanes from Pinellas AAFld were the only ones to use this range;

b. That the rockets were fuzed and set to detonate upon impact - he remembers one rocket he fired that went astray, struck the road bisecting the island, and blew a hole in it, much to the amusement of his colleagues; and,

c. That the planes always flew and fired from east to west - he was certain that they never fired towards the east.

4. When asked if he knew of the Indian Rocks Anti-Aircraft Gunnery Range, he replied that he was not aware of it.

EDWARD M. MCMANUS
Site Inspection Team

MEMORANDUM FOR RECORD

SUBJECT: Telephone Interview between Major (Ret) Walter Pursley and Mr. Edward M. McManus on 24 February 1994

1. Major Pursley was a World War II fighter pilot who commanded Pinellas Army Air Field (AAFld) immediately before Brigadier General (Ret) James Howard took over.

2. Though Major Pursley never actually flew against the Former Indian Rocks Air-to-Gunnery Range, he did confirm the following information in response to questions:

a. That, to his knowledge, the warplanes from Pinellas AAFld were the only ones to use this range;

b. That P-40's and P-51's were stationed at Pinellas AAFld during his command and used the range;

c. That the attacking planes flew from East to West, as described by General Howard, and fired towards the Gulf of Mexico; and,

d. That, to his knowledge, only machine guns were used against this site.

3. He also mentioned that there was a small detachment of soldiers who lived at the site in hutments. Their duty was to set up targets upon which the fighter pilots could hone their gunnery skills.

EDWARD M. MCMANUS
Site Inspection Team

MEMORANDUM FOR RECORD

SUBJECT: Telephone Interview between Mr. Ansley Watson and Mr. Edward M. McManus on 10 December 1993

1. Mr. Ansley Watson was a World War II pilot who first came to Tampa in 1942 with a B-17 bomber group stationed at MacDill Field. Later he switched to fighter planes and was again transferred to Tampa, this time as a P-51 pilot stationed at Pinellas Army Air Field. Following that assignment, he was sent to Hillsborough Army Air Field as its commanding officer. He resigned his commission in April 1946 and went back into the reserves.

2. Mr. Watson recalls strafing the Indian Rocks Air-to-Ground Gunnery Range in his P-51 Mustang. He only remembers firing his .50 caliber machine guns and does not recollect any bombing or rocket launching.

INTERVIEWER'S NOTE: AN ARTICLE CONCERNING MR. WATSON RECENTLY APPEARED IN A LOCAL TAMPA NEWSPAPER AND IS INCLUDED FOR INFORMATION PURPOSES

Encl
as

EDWARD M. MCMANUS
Site Inspection Team

TAMPA TRIBUNE 3/21/93

Commander recalls 'bomb' training

Earlier in the war, Ansley Watson spent year in the Aleutian Islands pounding apanese footholds in that Alaskan chain. ut in 1943 he commanded a B-17 bomber roup that came to Tampa's MacDill Field.

He and his men trained bomber crews r overseas duty.

After six months, he was assigned to the hird Fighter Command — to prepare rmy Air Force pilots for combat duty in urope in P-51 Mustang fighter planes.

Watson had flown fighter planes before ıe war when he was training as a eservist. "I was a pea-shooter," Watson ıld of his flying in pursuit planes, which ould fire machine guns through the ropellers.

When he joined the Fighter Command, e was transferred to Hillsborough Army ir Field as commanding officer. "I must ave gone there in April or May of 1944."

That was about the time he married ane Price of Tampa.

Watson, then a major, remembers that ıe young officers assigned to get combat training at the north Tampa base were "a different breed," just out of flying school. And he was concerned because the officers' club was a drab barracks building.

"We rented the old Forest Hills Country Club, which had an ornate building, and it became the Mustang Club," Watson said. The young pilots pitched regular dances for young women acquaintances.

Hillsborough field was "operated very informally," he said. "All the instructors had seen combat. We taught gunnery, formations and a little bit of dive-bombing."

Target for the bombing sandbags was a wooded stretch that since has become part of the University of South Florida's main campus. Unfortunately, one of the pilot instructors never came out of a dive, and he was killed in a crash in that area.

Watson was ordered to "shut down the field" in late 1944, and he believes his unit was the last tenant. "I never heard of it being used for anything by the military after that," he said.

According to a base history, Hillsborough Army Air Field was "placed on temporarily inactive status" in March 1945 and was declared surplus in November of that year.

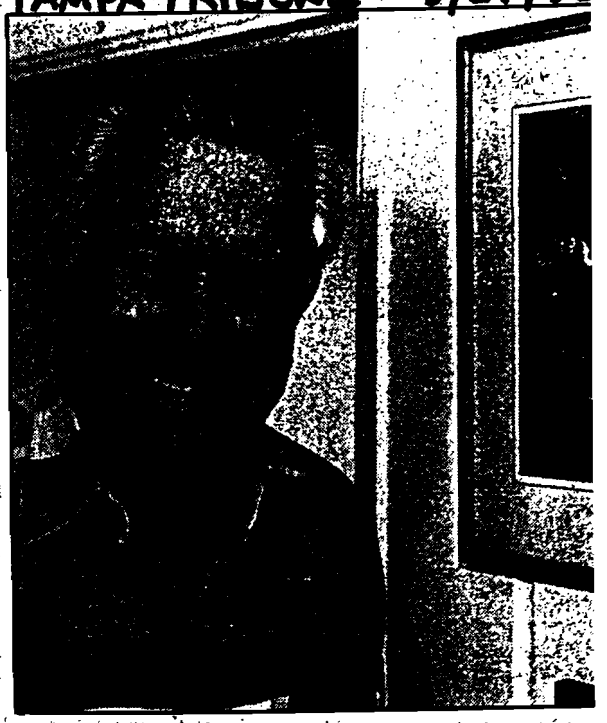
In the aftermath of the war, the airfield first was leased for cattle grazing, then became an industrial park under control of the Greater Tampa Chamber of Commerce. That's why later occupants range from a brewery to a university.

Watson went through several other transfers before resigning his regular commission at war's end. His interest in aviation continued, though, and he spent several years working for the president of United Air Lines.

In the early 1950s he went into sales with Lykes-Pasco Packing Co., winding up in the mid-1970s as vice president-marketing of the Dade City-based citrus firm.

Now 80, Watson said he continued piloting a plane privately until a health problem grounded him about 10 years ago.

— LELAND HAWES



Ansley Watson stands by a photograph of th

CENCR-ED-DN CONVERSATION RECORD 08 December 1993

SUBJECT: Former Air to Ground Gunnery Range, Indian Rocks, Florida

PERSON: Mr. Willie O'Donnel, St. Petersburg, Florida

CONVERSATION:

Mr. O'Donnel, a former fighter pilot during WWII, provided his perspective regarding munitions expended and areas of activity in the vicinity. His recollection is that no high explosives were used. One hundred pound smoke bombs(colored blue) were used at Egmont Key. A-20's dropped practice bombs. He stated that .50 caliber cartridges was the highest caliber expended by fighters. There was no air to ground gunnery range at Longboat Key where .50 caliber cartridges were fired. He added that two to three miles offshore from the northern end of Tampa Bay up to Clearwater, AT-6's would pull air to air targets which would be shot at from west to west so that the ammunition would drop out in the water.

Thomas M. Maehma
USACAGS

Mary Jo Clyde
Park Island District
Corps of Engrs

CENCR-ED-DN CONVERSATION RECORD 08 December 1993

SUBJECT: Former Air to Ground Gunnery Range, Indian Rocks, Florida

PERSON: Mr. "Cappy" (Otto) Bie, Indian Rocks Beach, Florida

CONVERSATION:

During a telephone interview, Mr. Bie stated that P-40 airplanes equipped with six .50 caliber machine guns fired at a bed sheet attached to a frame of 2x4's. He indicated he never saw any rockets fired or bombs dropped. There was also a .50 caliber gun emplacement that would shoot at balloons at waters edge off Belleair Shores so that many rounds entered the water 100-150 yards offshore. He also stated that there was a barge off Egmont Key used for bombing.

Thomas M. Meekma
USADACS

Mary Jo Civis
Rock Island District
Corps of Engrs

CENCR-ED-DN CONVERSATION RECORD 08 December 1993

SUBJECT: Former Air to Ground Gunnery Range, Indian Rocks, Florida

PERSON: Mrs. Hazel Geissler, Belleair Beach, Florida

CONVERSATION:

Mrs. Geissler, a member of a local historical society who also wrote newspaper articles, resided in the first area of development at Belleair Beach after release of property from government use in 1946. Initially 20 houses were built going from 1st Street to 6th Street. From 6th Street, it was only scrub pines. Her recollections are that bombers came in from McDill and fighters from Orlando. Planes would come in low and shoot at a 10-12 foot high sand barricade. She recalled that someone came to find all unexploded ordnance before development was started. However, she stated that in the early years starting from 1946, ordnance would wash up on the beach weekly. The items would be about 32 inches long with a flange at the end. Somebody would blow them up. She stated the incidences of ordnance turning up would be at intervals of every two years. Following storms, the items wash up on the Gulf side beaches.

Thomas M. Meekma
USADACS

Mary Jo Clvis
Rock Island District
Corps of Engrs

CENCR-ED-DN CONVERSATION RECORD 07 December 1993

SUBJECT: Former Air to Ground Gunnery Range, Indian Rocks, Florida
PERSON: Mr. Bob Harris, PH.D., Curator of Collections, Fort Heritage Park, Pinellas County Historical Museum, Largo, Florida

CONVERSATION:

Mr. Harris indicated that Belleair Beach was a bombing area. Small bombs were dropped and .50 caliber machine guns were fired. He also stated that during WWII, "there was nothing there" in parts of Pinellas County and that it was possible that stray bombs fell in the area. He also stated that there was "a lot of activity" between Egmont Key and Mullet Key.

Thomas M. Meekma
USADACS

Mary Jo Civis
Rock Island District
Corps of Engrs

MEMORANDUM FOR RECORD

SUBJECT: Telephone Interview between CWO3 (Ret) Henry (Bud) S. Thrift, Jr., and Mr. Edward M. McManus on 23 February 1994

1. CWO3 Thrift was the Officer-in-Charge of the Naval EOD team that visited Belleair Beach, FL, in the summer of 1975 and conducted a thorough search of the seabed adjoining the former Indian Rocks Air-to-Ground Gunnery Range.

2. When questioned about this operation, CWO3 Thrift confirmed many of the statements made in newspaper accounts at that time.

a. The only ordnance the team uncovered were U.S. Army 4.5-inch rockets. He recalls that they found approximately 138 rockets. They did not find any practice bombs.

b. Though the team searched almost the entire length of Sand Key from Indian Rocks Beach to Clearwater by helicopter, the only location they found ordnance was in the area of Belleair Beach from about 150 yards south of the Chateau Motel, 2700 Gulf Boulevard, north to the Serena Del Sol Condominiums, 2900 Gulf Boulevard.

c. He stated that their electronic search equipment broke on the first day of the operation so that the underwater sweep was performed entirely by sight. They marked off an area approximately 700 yards along the beach and about 300 yards into the water. They used two divers on a 1000 foot line and they cross swept each other to ensure maximum coverage. At the end of this line, the divers found themselves in about 20 feet of water. He mentioned that the seagrasses on the ocean floor would change color if they were growing directly above buried ordnance and his crew used that visual clue to locate the rockets. He considers the 21.6 miles of swimming and 210,000 square yards explored, as reported by the Mayor, to be an accurate measure of their accomplishments.

d. As far as the fuzing was concerned, he now believes that the rockets were fuzed, contrary to the Mayor's press release. He recalled that they were armed with what appeared to be artillery fuzes, though many of the fuze windshields were gone, thereby making confident identification difficult.

INTERVIEWER'S NOTE: THE M16 4.5-INCH ROCKET IN USE AT THAT TIME EMPLOYED THE M81 FUZE WHICH WAS AN ARTILLERY POINT-DETONATING FUZE (M48A2)

e. The Navy EOD team turned over all the rockets they found to their Army counterparts for disposal. CWO3 Thrift stated that the Army took these items to Avon Park, FL, for explosive detonation and that secondary explosions were noted, thereby confirming that many of them had live HE warheads.

3. He believes that the rockets were uncovered due to new ocean current and eddy patterns brought on by a new "cut" made at that time in the Clearwater Pass harbor channel farther north.

EDWARD M. MCMANUS
Site Inspection Team

MEMORANDUM FOR RECORD

SUBJECT: Telephone Interview between Sgt Campbell, 66th EOD Detachment, and Mr. Edward M. McManus on 22 February 1994

1. Sgt Campbell is stationed with the 66th EOD Detachment, Cape Canaveral Air Force Station (AFS), FL. This detachment is responsible for the former Indian Rocks Air-to-Ground Gunnery Range geographical area.

2. Sgt Campbell was asked to check his records concerning EOD response to the former Indian Rocks Air-to-Ground Gunnery Range. The only incident of this sort he could find was the discovery of a practice bomb on 29 January 1993 during a road-widening construction project. He could not accurately identify the item by nomenclature, but stated that it was an inert bomb that likely had a small spotting charge. The EOD response team took the practice bomb off the hands of the local officials and disposed of it.

INTERVIEWER'S NOTE: CONVERSATION WITH 52ND ORDNANCE GROUP EOD, FORT GILLEM, GA, REVEALS THAT EOD RESPONSE INCIDENT RECORDS ARE ONLY RETAINED FOR TWO YEARS AT THE LOCAL DETACHMENT LEVEL AND FOR FIVE YEARS AT THE HEADQUARTERS LEVEL; A SEARCH OF RECORDS AT EOD HQ REVEALED NO INFORMATION CONCERNING INCIDENTS AT THIS SITE

EDWARD M. MCMANUS
Site Inspection Team

MEMORANDUM FOR RECORD

SUBJECT: Personal Interview between Mr. Buell Vann and Mr. Edward M. McManus on 8 December 1993

1. Mr. Buell Vann is the Director of Public Works for the city of Belleair Beach, FL, and the interview was conducted in the City Hall.

2. When questioned about his experience with and knowledge of old military ordnance being discovered in this area, he recounted the following incidents:

a. On three separate occasions the telephone company found "4-foot long, 5-inch diameter" dud items.

b. During a 1992-93 roadway expansion project that took 50 feet of right-of-way on each side of Gulf Boulevard, several practice bombs were discovered.

c. During an excavation between 19th and 20th street, an inert practice bomb was uncovered.

d. Over the years, swimmers at Morgan Park have found ordnance washing up on the Gulf of Mexico side of the key.

3. Mr. Vann stated that the majority of these ordnance items were "4.5-inch rockets with fins and blunt noses that could be screwed out, about 1-foot long." When shown a picture of the Army 4.5-inch rockets in use during World War II, he indicated that they resemble the items he has seen. On one occasion, a rocket that had been brought to the police department parking lot began "smoking" when subjected to the 98° F heat of the day. In addition to the rockets, numerous spent .50 caliber bullets have washed up on shore.

4. When ordnance items are found, they have called the EOD units at MacDill Air Force Base, Tampa, FL or Cape Canaveral Air Force Station, FL.

5. Mr. Vann thinks that the ocean current pushes items north along the shore until they reach the vicinity of Morgan Park whereupon the turbulence washes them on the beach. The majority of ordnance is found along the western Gulf beach rather than inland, and he knows of no ordnance being found on the eastern side of the key (in the Intracoastal Waterway).

6. Mr. Vann stated that everyone living in the city is aware of the existence of ordnance and is careful when digging.

EDWARD M. MCMANUS
Site Inspection Team

MEMORANDUM FOR RECORD

SUBJECT: Telephone Interview between Mr. Lee Hanna and Mr. Edward M. McManus on 10 December 1993

1. Mr. Lee Hanna is a city commissioner for Belleair Shores and is also a former mayor of that town. Since 1972, he has lived at 440 Gulf Boulevard which is one of the five homesites that comprise the old 2.5-acre Indian Rocks Anti-Aircraft Gunnery Range.

2. When questioned about his experience with and knowledge of old military ordnance being discovered in this area, he provided the following response:

a. While strolling along the beach, he has found numerous spent .30 and .50 caliber bullets; frequently in the past, but not so often now.

b. During all his years in city government, he can recall no mention of discovered ordnance in conjunction with city business.

c. He had a swimming pool dug in his back yard and nothing unusual was discovered during the excavation.

3. When questioned about his neighbors who live on the other four homesites that comprise the old Indian Rocks Anti-Aircraft Gunnery Range, he provided the following information:

a. 420 Gulf Boulevard - a beach vacation house owned by Dr. John Werner of Lakeland, FL, who has lived there infrequently.

b. 500 Gulf Boulevard - a home owned by Dr. David Cook.

c. 520 Gulf Boulevard - a rental property owned by Mr. Niewiarowski, who lives elsewhere in Belleair Shores.

d. 540 Gulf Boulevard - a home owned for eight years by Mr. David Straz.

4. Mr. Hanna stated that none of his neighbors had ever mentioned anything about ordnance being discovered upon their property. Furthermore, two individuals, Dr. Werner and Mr. Straz, also had pools dug in their back yards and found nothing unusual.

EDWARD M. MCMANUS
Site Inspection Team

MEMORANDUM FOR RECORD

SUBJECT: Telephone Interview between Mrs. Ralph Finke and Mr. Edward M. McManus on 16 March 1994

1. Mrs. Finke is the Treasurer, former President, and one of the seven original founders of the Indian Rocks Area Historical Society. She has lived in the Indian Rocks Beach community on Sand Key since 1951.

2. She stated that she knows of no specific archaeological or paleontological or historic sites in the vicinity of the former Indian Rocks Air-to-Ground Gunnery Range.

3. She confirmed that the Indian Rocks Beach community was inhabited during the period in which the northern half of Sand Key was being used by the Army Air Forces as a gunnery range. She said that when she arrived in 1951, the northern half of Sand Key was fenced off and trespassing was forbidden. However, to the best of her recollection, the restriction was due to private property considerations and not to OEW dangers.

4. In response to my questions, she provided the following information:

a. That Belleair Beach and Belleair Shores are small, private, and rather exclusive communities who discourage outsiders (read: tourists) from using their beaches for swimming and recreation. There are only a limited number of public parks affording access to the beach and those parks are reserved for use of residents only.

b. That proposals have been made to "renourish" the beaches of Belleair Beach with additional sand, but after a "vicious fight" these proposals have been voted down. Mrs. Finke believes one reason for the defeat of these proposals is that the local residents do not wish to make their beaches "too attractive" to outsiders.

c. That there is only a small local fishing industry in the area immediately off the Gulf Coast of Sand Key. She stated that commercial fishing was much larger in the past and that the mullet were plentiful, but those days are gone.

EDWARD M. MCMANUS
Site Inspection Team

ORDNANCE AND EXPLOSIVES
ARCHIVES SEARCH REPORT
FOR
INDIAN ROCKS AIR-TO-GROUND GUNNERY RANGE
BELLEAIR BEACH, FLORIDA
PROJECT NUMBER I04FL033701

APPENDIX J

PRESENT SITE PHOTOGRAPHS

APPENDIX J

PRESENT SITE PHOTOGRAPHS

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J-11 Shoreline View of Belleair Beach looking south from northern city limits which represent the northern boundary of the former Indian Rocks Air-to-Ground Gunnery Range Impact Area - the 177.80 acre site. This photo was taken during a low tide period (see Plate 5)

J-12 Shoreline View of Belleair Beach looking south from northern city limits which represent the northern boundary of the former Indian Rocks Air-to-Ground Gunnery Range Impact Area - the 177.80 acre site. This photo was taken during a high tide period (see Plate 5)

J-13 View of Belleair Beach looking south down Gulf Boulevard from northern city limits which represent the northern boundary of the former Indian Rocks Air-to-Ground Gunnery Range Impact Area - the 177.80 acre site (see Plate 5)

J-14 Shoreline View of Belleair Shores looking south from 6th Street city park which represents the northern boundary of the former Indian Rocks Anti-Aircraft Gunnery Range Gun Emplacement - the 2.50 acre site. This photo was taken during a low tide period (see Plate 5) (NOTE: the yellow wall represents the exact boundary line)

J-15 Shoreline View of Belleair Shores looking south from 6th Street city park which represents the northern boundary of the former Indian Rocks Anti-Aircraft Gunnery Range Gun Emplacement - the 2.50 acre site. This photo was taken during a high tide period (see Plate 5) (NOTE: the yellow wall represents the exact boundary line)

J-16 Shoreline View of Belleair Shores looking north from 420 Gulf Boulevard which represents the southern boundary of the former Indian Rocks Anti-Aircraft Gunnery Range Gun Emplacement - the 2.50 acre site. This photo was taken during a low tide period (see Plate 5) (NOTE: the yellow wall represents the exact boundary line)

J-17 View of Belleair Shores looking south down Gulf Boulevard from 540 Gulf Boulevard which represents the northern boundary of the former Indian Rocks Anti-Aircraft Gunnery Range Gun Emplacement - the 2.50 acre site (NOTE: the property with the yellow wall represents the northernmost property within the old site) (see Plate 5)

J-18 View of Belleair Shores looking north up Gulf Boulevard from 420 Gulf Boulevard which represents the southern boundary of the former Indian Rocks Anti-Aircraft Gunnery Range Gun Emplacement - the 2.50 acre site (see Plate 5)

J-19 View of several of the properties within the boundaries of the former Indian Rocks Anti-Aircraft Gunnery Range Gun Emplacement - the 2.50 acre site (see Plate 5)

J-20 View of the immediate subsurface soil composition in Belleair Beach to a depth of about three feet (NOTE: this was a hole under the sidewalk at a road construction project located at 22nd Street and Bayshore Drive) (see Plate 5)

J-1 Shoreline View of Belleair Beach looking north from Morgan Drive city park during low tide period

J-2 Shoreline View of Belleair Beach looking north from Morgan Drive city park during high tide period

J-3 Shoreline View of Belleair Beach looking north towards Morgan Drive city park during low tide period

J-4 Shoreline View of Belleair Beach looking south from Morgan Drive city park during high tide period

J-5 Shoreline View of Belleair Beach looking north from Serena Del Sol condos during high tide period

J-6 Shoreline View of Belleair Beach looking north from 19th Street city park during low tide period

J-7 Shoreline View of Belleair Beach looking north from 19th Street city park during high tide period

J-8 View of Belleair Beach looking north up Gulf Boulevard from 19th Street city park

J-9 Typical city park affording public access to the beach (NOTE: this is the 19th Street city park)

J-10 Approximate location of "practice bomb" unearthed between 19th and 20th Streets

J-11 Shoreline View of Belleair Beach looking south from northern city limits during low tide period

J-12 Shoreline View of Belleair Beach looking south from northern city limits during high tide period

J-13 View of Belleair Beach looking south down Gulf Boulevard from northern city limits

J-14 Shoreline View of Belleair Shores looking south from 6th Street city park during low tide period

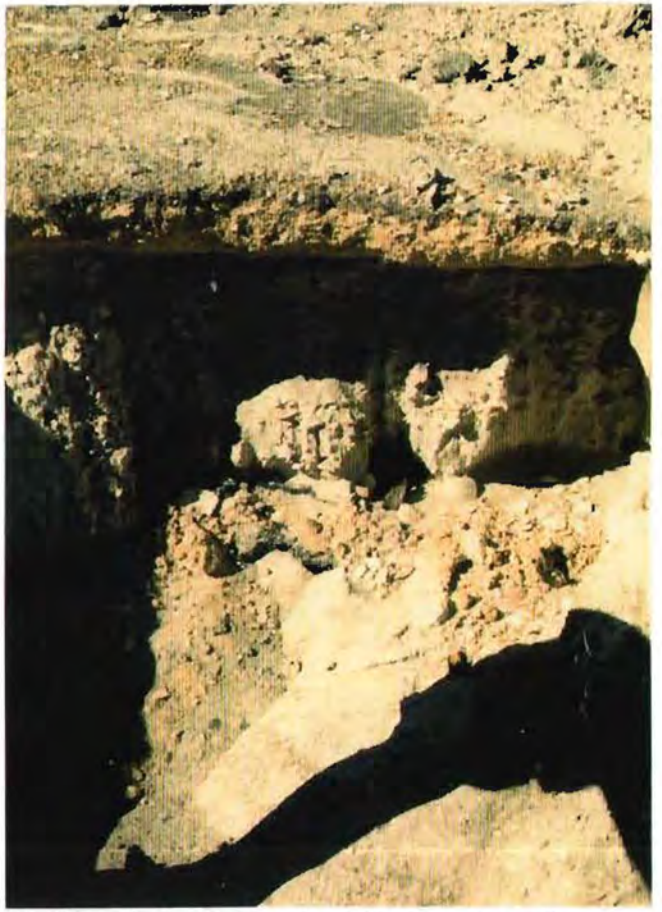
J-15 Shoreline View of Belleair Shores looking south from 6th Street city park during high tide period

J-16 Shoreline View of Belleair Shores looking north from 420 Gulf Blvd. during low tide period

J-17 View of Belleair Shores looking south down Gulf Boulevard from 540 Gulf Boulevard

J-18 View of Belleair Shores looking north up Gulf Boulevard from 420 Gulf Boulevard

J-19 View of several properties within boundaries of former Indian Rocks Anti-Aircraft Gunnery Range



J-20 View of the immediate subsurface soil composition in Belleair Beach to a depth of about three feet

ORDNANCE AND EXPLOSIVES
ARCHIVES SEARCH REPORT
FOR
INDIAN ROCKS AIR-TO-GROUND GUNNERY RANGE
BELLEAIR BEACH, FLORIDA
PROJECT NUMBER I04FL033701

APPENDIX K

HISTORICAL PHOTOGRAPHS

APPENDIX K

HISTORICAL PHOTOGRAPHS

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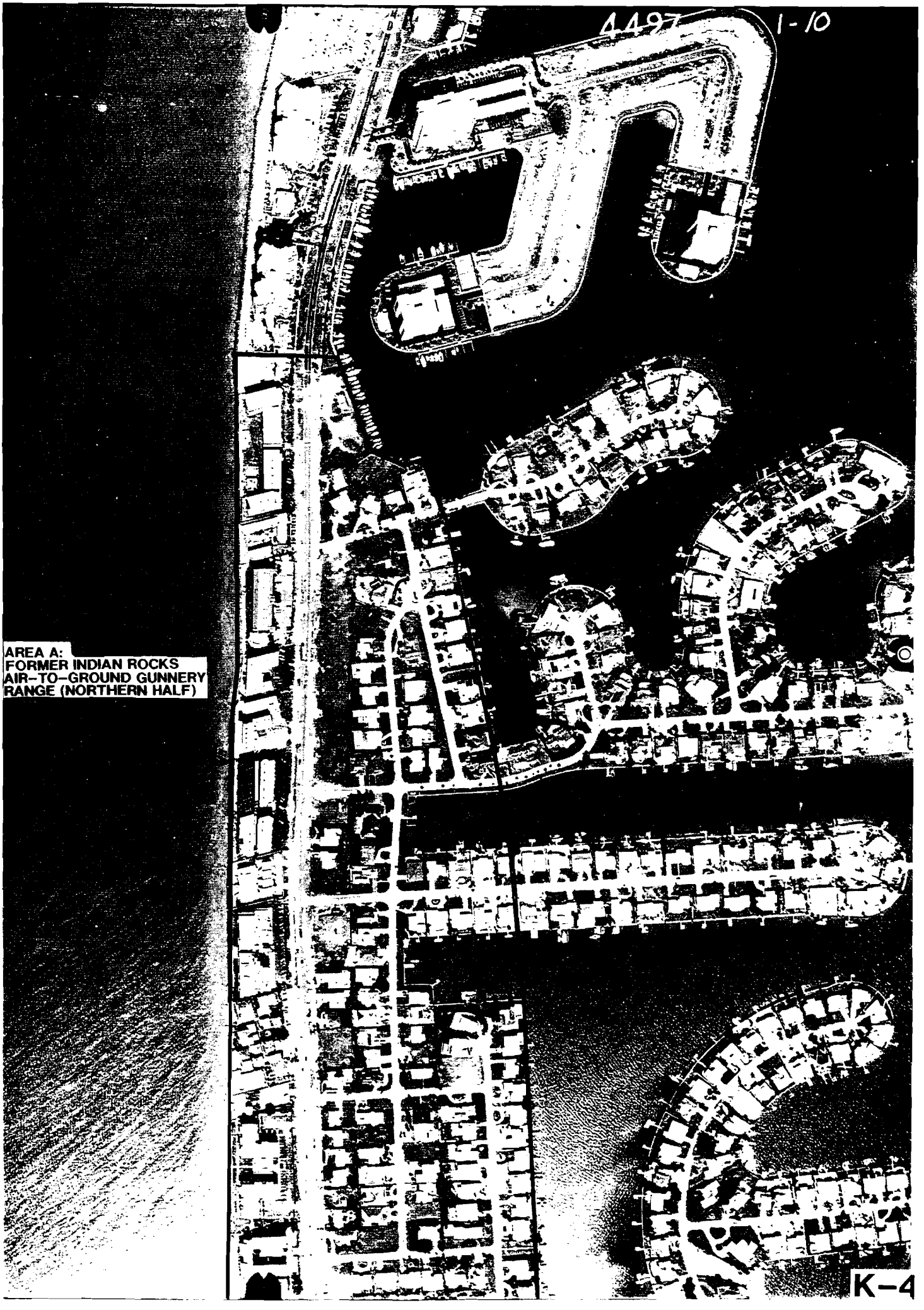
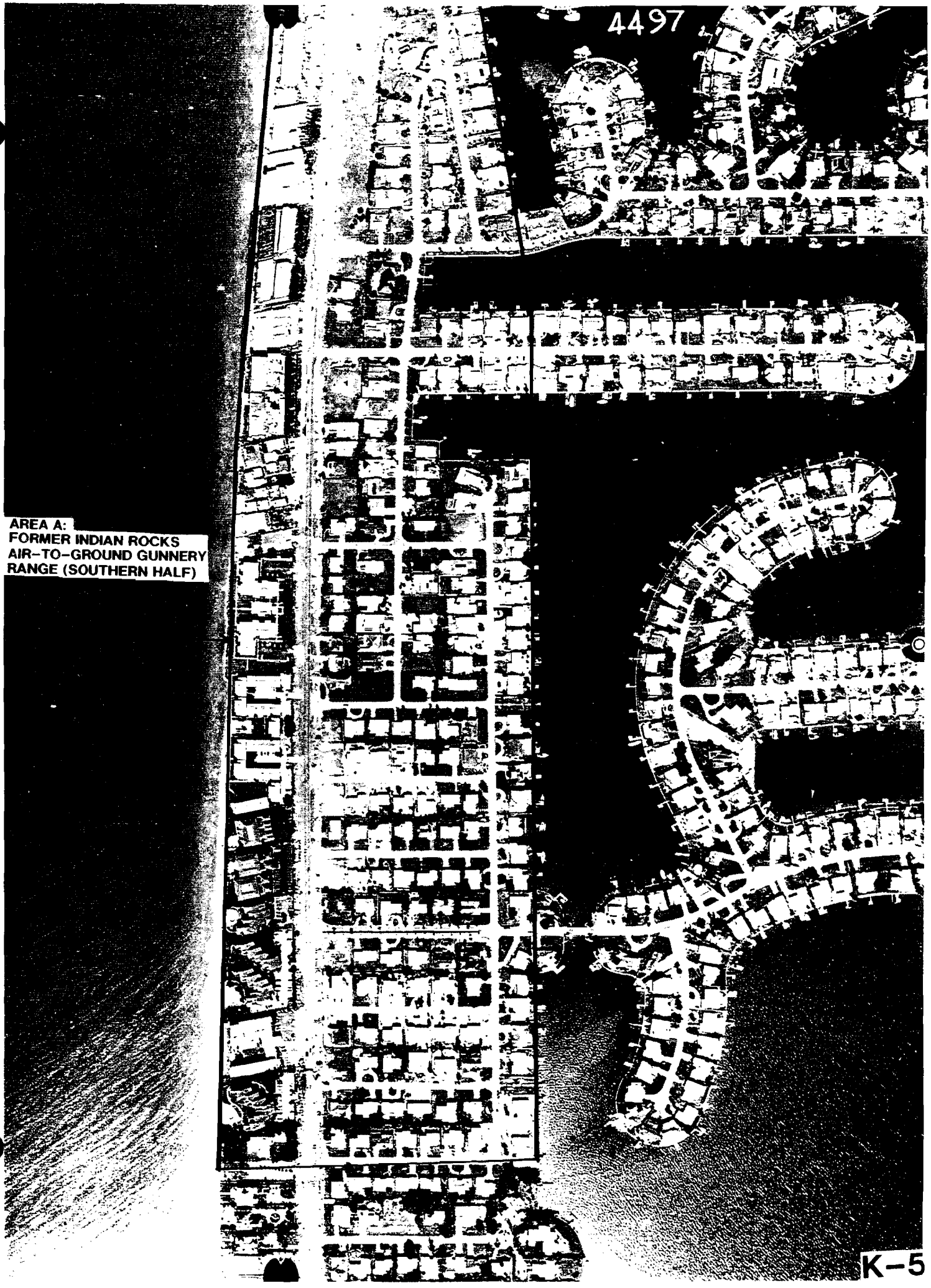
In 1932 Gulf Blvd. went south from the wooden bridge along the bay for about 300 feet. Picture shows the bay (now the Intracoastal Waterway) and the mainland.

View of what is now Belleair Shore in 1946. During WW II this area was used as a bombing range; there were machine gun implacements on the shore, a barge towed out the targets.

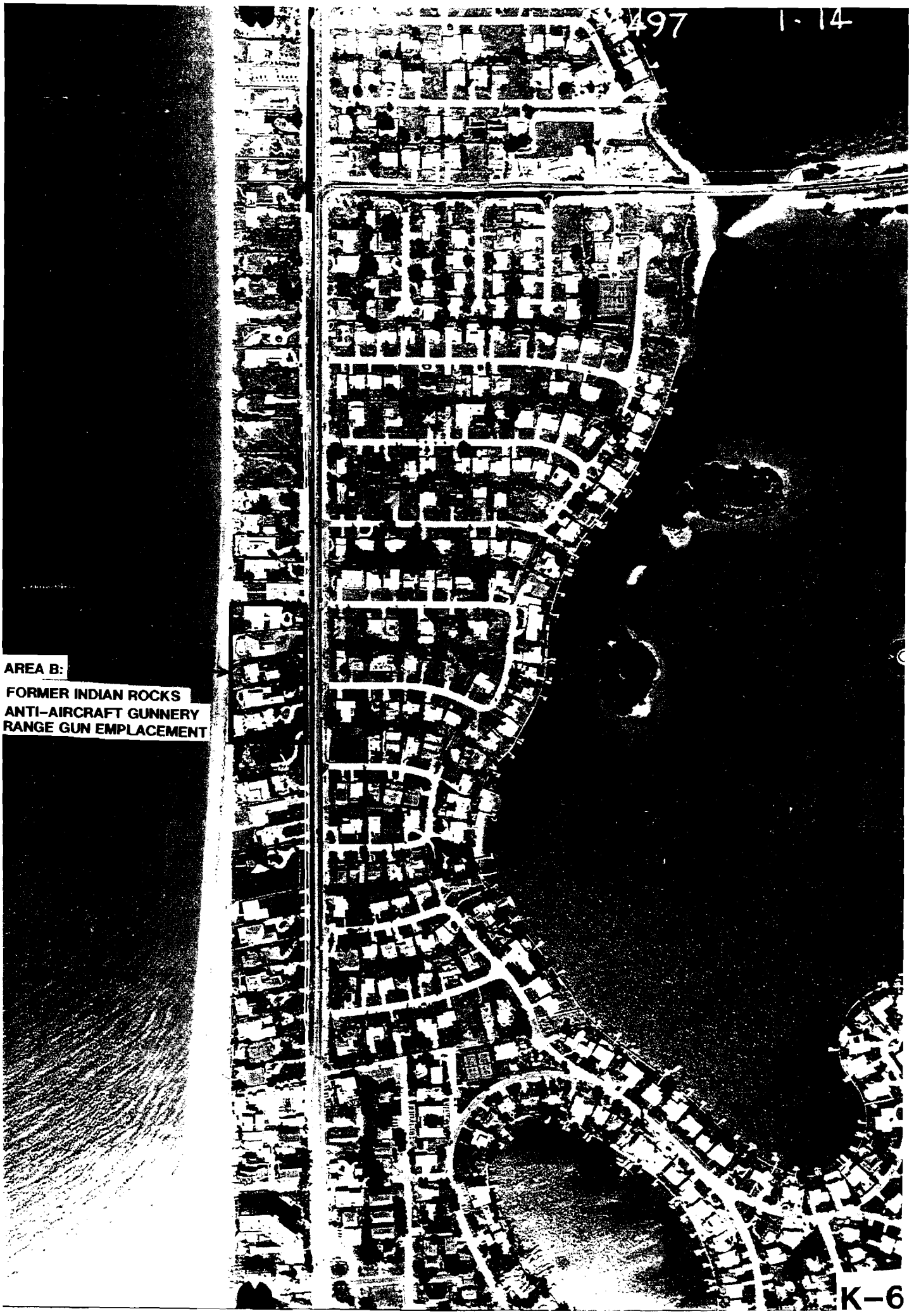
2-42



AREA A:
FORMER INDIAN ROCKS
AIR-TO-GROUND GUNNERY
RANGE (NORTHERN HALF)



AREA A:
FORMER INDIAN ROCKS
AIR-TO-GROUND GUNNERY
RANGE (SOUTHERN HALF)



AREA B:

FORMER INDIAN ROCKS ANTI-AIRCRAFT GUNNERY RANGE GUN EMPLACEMENT

ORDNANCE AND EXPLOSIVES
ARCHIVES SEARCH REPORT
FOR
INDIAN ROCKS AIR-TO-GROUND GUNNERY RANGE
BELLEAIR BEACH, FLORIDA
PROJECT NUMBER I04FL033701

APPENDIX L

REFERENCE MAPS/DRAWINGS

APPENDIX L

REFERENCE MAPS / DRAWINGS

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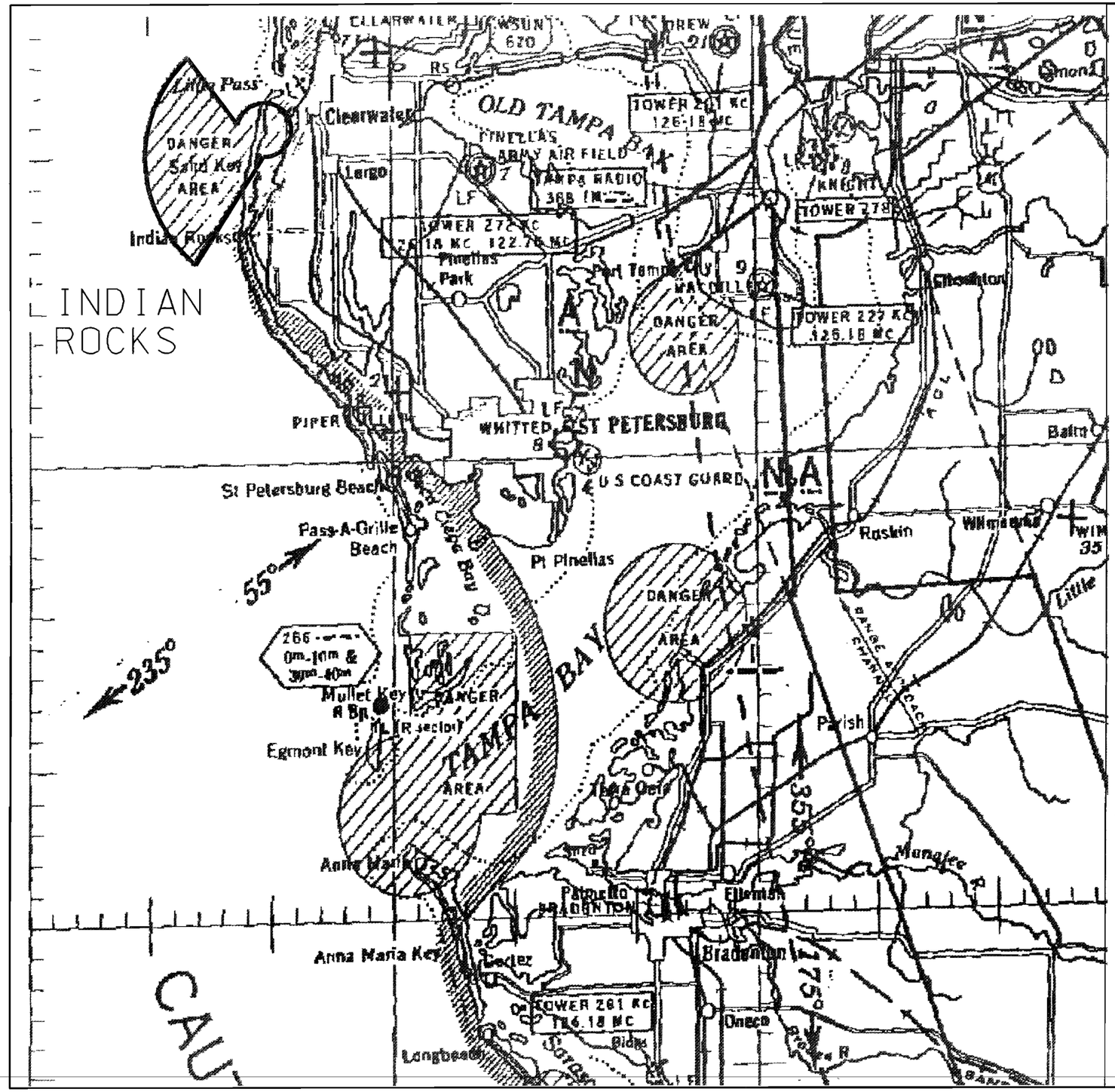


PRICE 25 CENTS 44-7

MIAMI (N-8)

COMPILED AND PRINTED AT WASHINGTON, D. C.
BY THE U. S. COAST AND GEODETIC SURVEY
UNDER AUTHORITY OF THE SECRETARY OF COMMERCE

Principal Sources: U. S. Geological Survey, U. S. Dept. of Agriculture, Civil Aeronautics Administration and the U. S. Coast and Geodetic Survey.

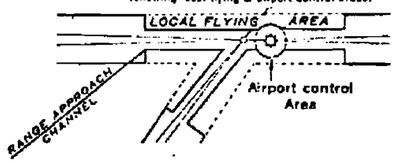
Consult Civil Aeronautics Administration Notices for changes occurring in aeronautical data on this chart after

JULY 13, 1944

WARNING: *Due to war conditions, lights, radio facilities and other aids to air navigation may be changed or discontinued without notice.*

Hazard Areas in the United States

- Caution Area-Visible Hazard (avoid if practicable)
- Danger Area-Invisible Hazard (specific authority required for flight within area)
- Prohibited Area (aircraft prohibited unless engaged in defense mission)
- Tunnel Area (thru traffic restricted to altitudes as shown)
- Range Approach Channel (showing local flying & airport control areas)

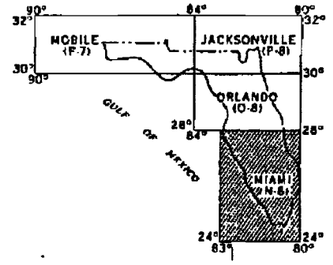


MIAMI (N-8)

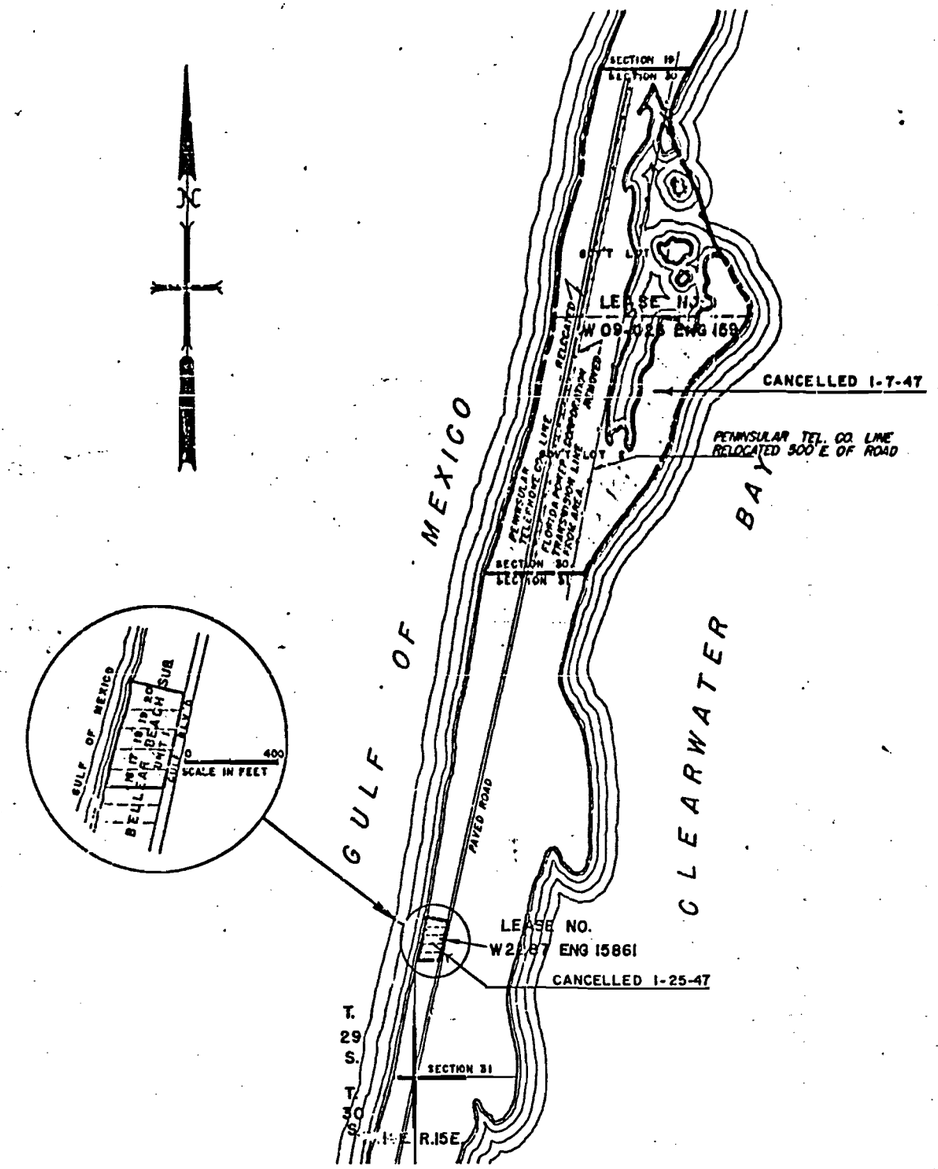
N2400-W8000/400X300

SECTIONAL AERONAUTICAL CHART

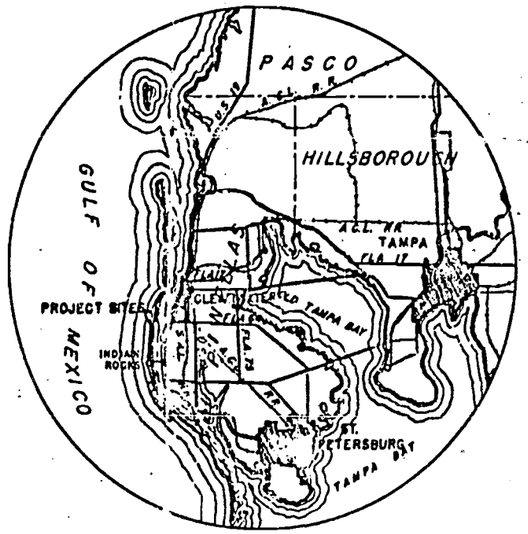
INDEX TO PUBLISHED ADJOINING SHEETS



Letters and numerals following chart name (thus: SEATTLE (X-1) refer only to Sectional Aeronautical Chart index of the United States



STATE INDEX



VICINITY MAP

TRACT NO.	LEASE NO.	VENDOR	ACRES LEASED
		AIR TO GROUND GUNNERY RANGE	
(NONE)	W09-026 ENG 159	ARNOLD S. KIRKEBY, ET UX	177.8
		ANTI-AIRCRAFT GUNNERY RANGE	
(NONE)	W2287 ENG 15861	ARNOLD S. KIRKEBY, ET UX	2.5

DIRECTIVE DATA
RELOCATION OF TELEPHONE LINE
RE-D 2422 DATED 23 JULY 1943

FINAL OWNERSHIP
(TYPE OF MAP)

STATE FLORIDA
COUNTY PINELLAS
DIVISION SOUTH ATLANTIC
SERVICE COMMAND FOURTH
USING AGENCY ARMY AIR FORCES
2 MILES SE OF CLEARWATER
3 MILES N OF INDIAN ROCKS

— TRANSPORTATION FACILITIES —

S.A.L., A.C.L. RAILROAD
17, 64, 233 STATE ROAD
19 FEDERAL ROAD
AIRLINE

— LAND AREA —

ACRES OWNED BY W.D.
ACRES LEASED BY W.D. 180.30
ACRES LEASED FROM W.D.
ACRES TRANSFERRED TO W.D.
ACRES DONATED TO W.D.
ACRES AVIGATION EASEMENTS TO W.D.

— DISPOSALS —

ACRES SOLD
ACRES TERMINATED 180.30
ACRES EXCHANGED
ACRES OTHERWISE

— LEGEND —

RESERVATION LINE
STATE OR PROVINCE LINE
COUNTY LINE
CIVIL DISTRICT PRECINCT
LAND-GRANT LINE
CITY, VILLAGE, OR BOROUGH
CEMETERY, SMALL PARK, ETC.
TOWNSHIP LINE
SECTION LINE
AVIGATION EASEMENT
FEE SIMPLE

SCALE IN FEET
1000 0 1000 2000

WAR DEPARTMENT, O.C.E.
CONSTRUCTION DIVISION

REAL ESTATE
AIR TO GROUND GUNNERY RANGE
ANTI-AIRCRAFT GUNNERY RANGE
INDIAN ROCKS, FLORIDA
MILITARY RESERVATION

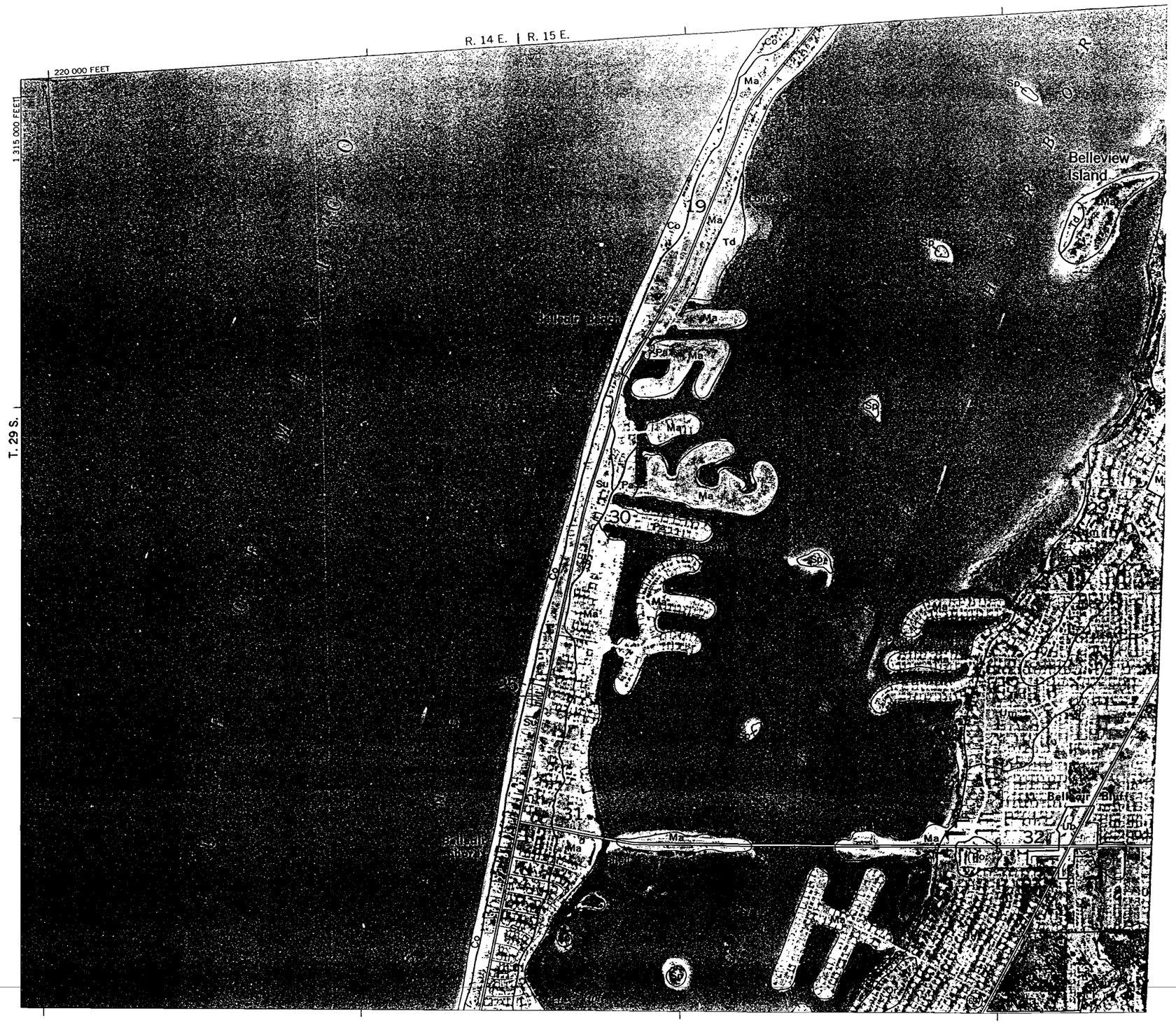
RECOMMENDED: William Schonbek DATE 7-29-44
ASSOC. CADASTRAL ENGINEER
APPROVED: [illegible] DATE 7/31/44
LT. COLONEL, REAL ESTATE OFFICER

COMPILED: J.C.W. TRACED: J.C.W. CHECKED: E.R.C.

DATE	BY	REVISIONS	APPROVED
6-4-45	W.O.F.	MADE FINAL	[illegible]
6-9-56	E.R.M.	DISPOSAL OF 180.30 AS SHOWN	

SHEETS: 1 OF 1 DRAWING NO. 1404-7

(7) CR-FORM-177 B



SOIL LEGEND

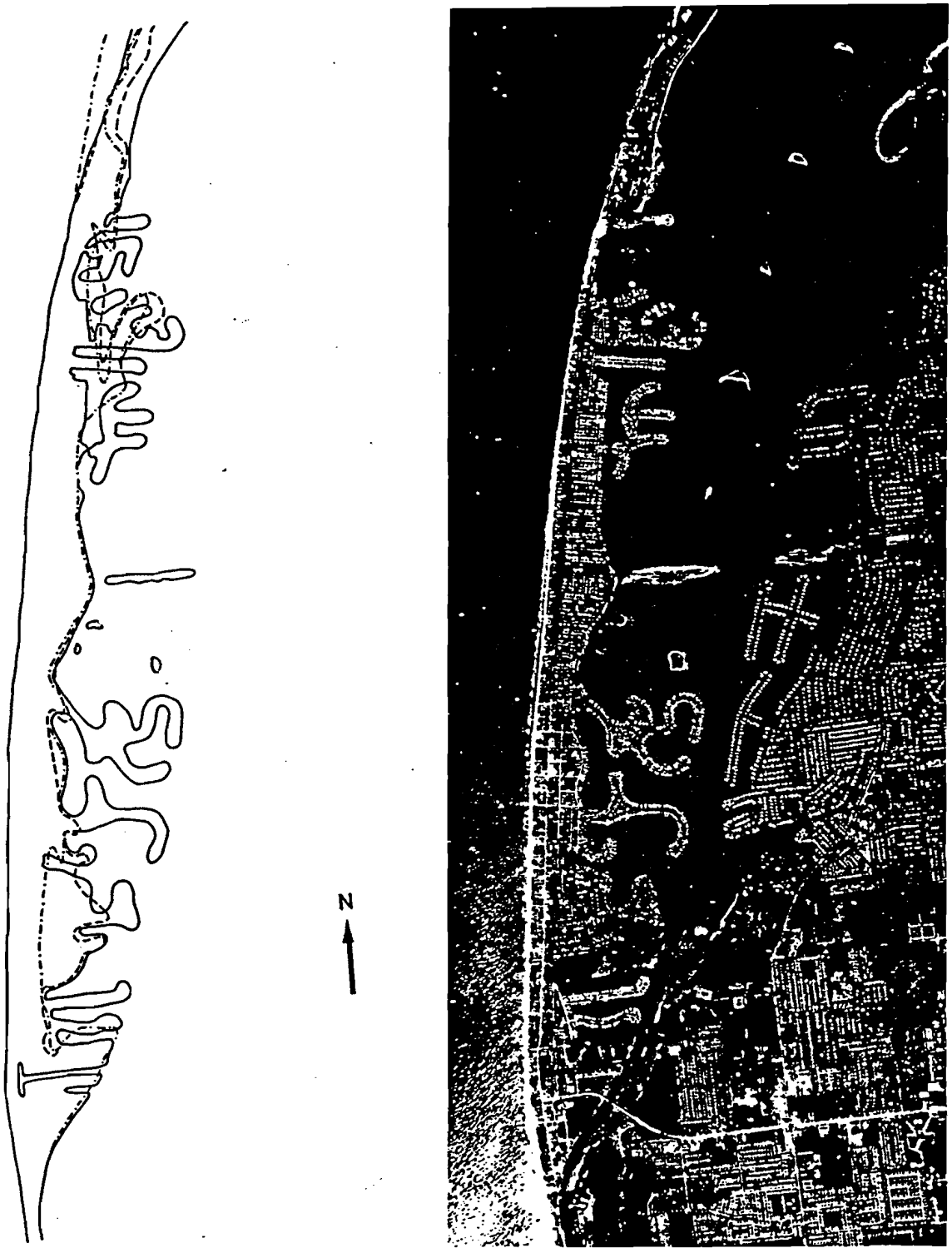
The first capital letter is the initial one of the soil name. A second capital letter, B or C, shows the slope. Most symbols without a slope letter are those of nearly level soils.

SYMBOL	NAME
Ad	Adamsville fine sand
AfB	Astatula fine sand, 0 to 5 percent slopes
AfC	Astatula fine sand, 5 to 12 percent slopes
As	Astatula fine sand, moderately deep water table
At	Astor fine sand
Au	Astor soils
Ch	Charlotte fine sand
Co	Coastal beaches
Ed	Elred fine sand
Fd	Felda fine sand
Fe	Felda fine sand, ponded
Fh	Fellowship loamy fine sand
Im	Immokalee fine sand
Ma	Made land
Md	Made land, sanitary fill
Mn	Manatee loamy fine sand
My	Myakka fine sand
Ok	Okeechobee muck
Om	Oldsmar fine sand
Or	Orlando fine sand, wet variant
Po	Palm Beach sand
Pc	Pamlico muck
PdB	Paola fine sand, 0 to 5 percent slopes
Pf	Pinellas fine sand
Pn	Placid fine sand
Po	Pomello fine sand
Pp	Pompano fine sand
Ps	Pompano fine sand, ponded
Sp	Spoil banks
StB	St. Lucie fine sand, 0 to 5 percent slopes
StC	St. Lucie fine sand, 5 to 12 percent slopes
Su	St. Lucie fine sand, shell substratum
Tc	Terra Ceia muck, moderately deep variant
Td	Tidal marsh
Ts	Tidal swamp
Ub	Urban land
Uc	Urban land - Astatula complex
Uk	Urban land - Immokalee complex
Um	Urban land - Myakka complex
Up	Urban land - Pomello complex
Uw	Urban land - Wabasso complex
Wo	Wabasso fine sand
Wc	Wauchula fine sand

Figure 7A

SHORELINE CHANGE MAP

NORTHERN SAND KEY



1-15-79

GULF OF MEXICO

CLEARWATER HARBOR

DISTRICT NO.1

DISTRICT NO.2

COASTAL HIGH HAZARD AREA

CONSTRUCTION CONTROL LINE

RANGE 14 EAST

RANGE 15 EAST

L-5

SECTION 30 TWN29S RNG15E

SECTION 31 TWN29S RNG15E

SOUTH BOUNDARY TOWNSHIP 29 SOUTH

BELLEAIR BEACH CAUSEWAY

PELICAN ISLAND

HERON ISLAND

61.3 Ac

CITY OF BELLEAIR BEACH

ST. OF FL.

PINELLAS

HARRISON AVENUE

HIBISCUS DRIVE

WEDGEWOOD DR.

TIFFANY DRIVE

CRYSTAL CAY

BELLE ISLE AVE

(PINE VALLEY AVENUE)

BELLE ISLE AVENUE

HOWARD BLVD

MORGAN DRIVE

GULF BAYSHORE DRIVE

DONATO DRIVE

ALETA DRIVE

LOUISA DRIVE

25TH STREET

24TH STREET

23RD STREET

22ND STREET

21ST STREET

20TH STREET

19TH STREET

18TH STREET

17TH STREET

16TH STREET

15TH STREET

14TH STREET

13TH STREET

12TH STREET

CAUSEWAY BLVD

9TH STREET

8TH STREET

7TH STREET

6TH STREET

5TH STREET

4TH ST

3RD ST

2ND STREET

1ST STREET

PALM DR

SPRUCE DR

CEDAR DR

HARBOR DRIVE

REVISIONS

DATE	BY	CHANGES OR ADDITIONS

ORDNANCE AND EXPLOSIVES
ARCHIVES SEARCH REPORT
FOR
INDIAN ROCKS AIR-TO-GROUND GUNNERY RANGE
BELLEAIR BEACH, FLORIDA
PROJECT NUMBER I04FL033701

APPENDIX M

ARCHIVE SEARCH REPORT CORRESPONDENCE

DEPARTMENT OF THE ARMY
ROCK ISLAND DISTRICT, CORPS OF ENGINEERS
CLOCK TOWER BUILDING - P.O. BOX 2004
ROCK ISLAND, ILLINOIS 61204-2004

REPLY TO
ATTENTION OF

http://www.mvr.usace.army.mil

CEMVR-EC-DO

15 September 2009

MEMORANDUM FOR RECORD

SUBJECT: Missing Technical Advisory Group (TAG) Package for Indian Rocks Air-To-Ground Gunnery Range, Project Number I04FL033701

1. Project records present at the U.S. Army Corps of Engineers, Rock Island and Jacksonville Districts and Huntsville Center, were reviewed to locate the TAG package for the subject project ASR. However, the TAG package was not located.

2. The subject project Archives Search Report has been finalized without the TAG package based on a memorandum from Rock Island District dated 14 June 1994 transmitting final copies of the report. The original risk assessment (RAC) form in the report has been used as the final RAC, and the date of the final report, 14 June 1994, is the date of the Rock Island District memorandum transmitting the initial final report.

3. If the TAG package is located after the subject report has been finalized, the report will be revised to reflect the content of the TAG package.

Christopher J. Churney
Chief, Ordnance and Explosives Section
Rock Island District
U.S. Army Corps of Engineers

DEPARTMENT OF THE ARMY
ROCK ISLAND DISTRICT, CORPS OF ENGINEERS
CLOCK TOWER BUILDING – P.O. BOX 2004
ROCK ISLAND, ILLINOIS 61204-2004

REPLY TO
ATTENTION OF:

CENCR-ED-DN

14 June 1994

MEMORANDUM FOR Commander, U.S. Army Engineer Division,
Huntsville, ATTN: CEHND-PM-OT (Britton)
P.O. Box 1600, Huntsville, AL 35807-4301

SUBJECT: OEW Archives Search Report for the Former Indian Rocks Air-To-Ground Gunnery Range, Belleair Shores, Florida, Project Number I04FL033701

1. This memorandum transmits 15 copies of the Final subject report.

2. Minor editing/changes have been made to the Draft Report prior to its finalization.

3. The POC for this office is Mr. Dan E. DeWease, CENCR-ED-DN, telephone (309) 794-5808.

FOR THE COMMANDER:

ORIGINAL SIGNED BY
GARY LOSS

Encl (15 cys)

ROBERT W. KELLEY, P.E.
Chief, Engineering Division

CF (w/encl):

Commander
U.S. Army Corps of Engineers
ATTN: CEMP-RF (Sailor/Coppola)
Pulaski Building
20 Massachusetts Avenue, NW
Washington, D.C. 20313-1000
(2 copies)

Commander
U.S. Army Engineer Division, North Central
ATTN: CENCD-PE-ED-TE (Warda)
111 North Canal Street, 12th Floor
Chicago, IL 60606-7205
(3 copies)

200.1f
I04FL033701 01.01 0001

ORDNANCE AND EXPLOSIVES
ARCHIVES SEARCH REPORT
FOR
INDIAN ROCKS AIR-TO-GROUND GUNNERY RANGE
BELLEAIR BEACH, FLORIDA
PROJECT NUMBER I04FL033701

ATTACHMENT A

RISK ASSESSMENT

March 94
Previous editions obsolete

RISK ASSESSMENT PROCEDURES FOR ORDNANCE AND EXPLOSIVE WASTE (OEW) SITES

Site Name	Indian Rocks ATOG-Area A	Rater's Name	Edward M. McManus
Site Location	Belleair Beach, FL	Phone No.	815-273-8825
DERP Project #	I04FL033701	Organization	CENCR-ED-DN/SMCAC-ESL
Date Completed	3/31/94	RAC Score	3

OEW RISK ASSESSMENT:

This risk assessment procedure was developed in accordance with MIL-STD 882C and AR 385-10. The RAC score will be used by CEHND to prioritize the remedial action at Formerly Used Defense Sites. The OEW risk assessment should be based upon best available information resulting from records searches, reports of Explosive Ordnance Disposal (EOD) detachment actions, and field observations, interviews, and measurements. This information is used to assess the risk involved based upon the potential OEW hazards identified at the site. The risk assessment is composed of two factors, **hazard severity and hazard probability.** Personnel involved in visits to potential OEW sites should view the CEHND video tape entitled "A Life Threatening Encounter: OEW."

Part 1. Hazard Severity. Hazard severity categories are defined to provide a qualitative measure of the worst credible mishap resulting from personnel exposure to various types and quantities of unexploded ordnance items.

TYPES OF ORDNANCE
(Circle all values that apply)

A. Conventional Ordnance and Ammunition	VALUE
Medium/Large Caliber (20 mm and larger)	10
Bombs, Explosive	10
Grenades, Hand and Rifle, Explosive	10
Landmines, 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
Landmines, Practice (w/spotting charges)	4
Small Arms (.22 cal - .50 cal)	(1)
Conventional Ordnance and Ammunition (Select the largest single value)	10

What evidence do you have regarding conventional OEW? Newspaper accounts, personal interviews.

B. Pyrotechnics. (For munitions not described above)

	VALUE
Munition (Container) Containing White Phosphorous or other Pyrophoric Material (i.e., Spontaneously Flammable)	10
Munition Containing a Flame or Incendiary Material (i.e. Napalm, Triethlaluminum Metal Incendiaries)	6
Flares, Signals, Simulators	4
Pyrotechnics (Select the largest single value)	0

What evidence do you have regarding pyrotechnics? Historical records indicating site usage as air-to-ground Gunnery Range.

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

	VALUE
Primary or Initiating Explosive (Lead Styphnate, Lead Azide, Nitroglycerin, Mercury Azide, Mercury Fulminate, Tetracene, etc.)	10
Demolition Charges	10
Secondary Explosives (PETN, Composition 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? Historical records indicate bulk HE not used at this Gunnery Range.

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

	VALUE
Solid or Liquid Propellants	6
Propellants	0

What evidence do you have regarding propellants? Historical records indicate bulk propellant not used at this Gunnery Range.

E. Radiological/Chemical Agent/Weapons

	VALUE
Toxic Chemical Agents (Choking, Nerve, Blood, Blister)	25
War Gas Identification Sets	20
Radiological	15
Riot Control and Miscellaneous (Vomiting, Tear, incendiary and smoke)	5

Radiological/Chemic al Agent (Select the largest single value) 0

What evidence do you have of chemical/radiological OEW? Historical records indicate no employment of there items at this Gunnery Range.

==========

Total Hazard Severity Value 10

(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	Value
CATASTROPHIC	I	22 and greater
CRITICAL	II	11 to 21
MARGINAL	III	6 to 10
NEGLIGIBLE	IV	1 to 5
**NONE		0

*** Apply Hazard Severity Category to Table 3.**

** If Hazard Severity Value is 0, you do not need to complete Part II. 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 related factors of unexploded ordnance or explosive materials on a formerly used DOD site.

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

A. Locations of OEW Hazards

	VALUE
On the surface	5
Within Tanks, Pipes, Vessels or Other confined locations	4
Inside walls, ceilings, or other parts of Buildings or Structures	3
Subsurface	(2)
Location (Select the single largest value)	2

What evidence do you have regarding location of OEW? Newspapers accounts and personal interviews.

B. Distance to nearest inhabited locations or structures likely to be at risk from OEW hazard (roads, parks, playgrounds, and buildings).

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

What are the nearest inhabited structures? Condominiums, hotels.

C. Number of buildings within a 2 mile radius measured from the OEW 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) 5

Narrative: Total includes some 150 hotel, condominiums and single family residences evenly dispersed throughout former site.

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 See C. above.

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

BARRIER	VALUE
No barrier or 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 monitor, locked entrance, or controlled roadway access to the facility).	0

Accessibility (Select the single largest value) 5

Describe the site accessibility. Families live on the site and the beach areas are accessible through city parks.

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

	VALUE
Expected	5
None Anticipated	(0)

Site Dynamics (Select largest value) 0

Describe the site dynamics. Area is totally developed and built upon- minimal further land development is possible.

Total Hazard Probability Value
(Sum of Largest Values for A through F--Maximum of 30) 22

Apply this value to Hazard Probability Table 2 to determine Hazard Probability Level.

TABLE 2

HAZARD PROBABILITY*

Description	Level	Hazard Probability Value
FREQUENT	A	28 or greater
PROBABLE	(B)	22 to 27
OCCASIONAL	C	16 to 21
REMOTE	D	9 to 15
IMPROBABLE	E	less than 9

*** Apply Hazard Probability Level to Table 3.**

Part III. Risk Assessment. The risk assessment value for this site is determined using the following Table 3. Enter with 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 CEHND - Immediately call CEHND-ED-SY--commercial 205-955-4968 or DSN 645-4968.

RAC 2 High priority on completion of INPR - Recommend further action by CEHND.

RAC 3 Complete INPR - Recommend futher action by CEHND.

RAC 4 Complete INPR - Recommend futher action by CEHND.

RAC 5 Usually indicates that no further action (NOFA) is necessary. Submit NOFA and RAC to CEHND.

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

OEW has been found on site since range was closed in 1947. Volume and frequency has diminished with the passage of time. No reliable reference could be found of rockets being discovered on land. Practice bombs were still found on land as recently as 1993.

ORDNANCE AND EXPLOSIVES
ARCHIVES SEARCH REPORT
FOR
INDIAN ROCKS AIR-TO-GROUND GUNNERY RANGE
BELLEAIR BEACH, FLORIDA
PROJECT NUMBER I04FL033701

ATTACHMENT B

RISK ASSESSMENT

March 94
Previous editions obsolete

RISK ASSESSMENT PROCEDURES FOR ORDNANCE AND EXPLOSIVE WASTE (OEW) SITES

Site Name Indian Rocks AAC-Area B Rater's Name Edward M. McManus
Site Location Belleair Beach, FL Phone No. 815-273-8825
DERP Project # I04FL033701 Organization CENCR-ED-DN/SMCAC-ESL
Date Completed 3/31/94 RAC Score 5

OEW RISK ASSESSMENT:

This risk assessment procedure was developed in accordance with MIL-STD 882C and AR 385-10. The RAC score will be used by CEHND to prioritize the remedial action at Formerly Used Defense Sites. The OEW risk assessment should be based upon best available information resulting from records searches, reports of Explosive Ordnance Disposal (EOD) detachment actions, and field observations, interviews, and measurements. This information is used to assess the risk involved based upon the potential OEW hazards identified at the site. The risk assessment is composed of two factors, **hazard severity and hazard probability.** Personnel involved in visits to potential OEW sites should view the CEHND video tape entitled "A Life Threatening Encounter: OEW."

Part 1. Hazard Severity. Hazard severity categories are defined to provide a qualitative measure of the worst credible mishap resulting from personnel exposure to various types and quantities of unexploded ordnance items.

TYPES OF ORDNANCE
(Circle all values that apply)

A. Conventional Ordnance and Ammunition	VALUE
Medium/Large Caliber (20 mm and larger)	10
Bombs, Explosive	10
Grenades, Hand and Rifle, Explosive	10
Landmines, 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
Landmines, Practice (w/spotting charges)	4
Small Arms (.22 cal - .50 cal)	1
Conventional Ordnance and Ammunition (Select the largest single value)	0

What evidence do you have regarding conventional OEW? Personal Interview with site homeowner.

B. Pyrotechnics. (For munitions not described above.)

	VALUE
Munition (Container) Containing White Phosphorous or other Pyrophoric Material (i.e., Spontaneously Flammable)	10
Munition Containing a Flame or Incendiary Material (i.e. Napalm, Triethlaluminum Metal Incendiaries)	6
Flares, Signals, Simulators	4
Pyrotechnics (Select the largest single value)	0

What evidence do you have regarding pyrotechnics? Historical records indicating site usage as an Anti-Aircraft Gun emplacement

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

	VALUE
Primary or Initiating Explosive (Lead Styphnate, Lead Azide, Nitroglycerin, Mercury Azide, Mercury Fulminate, Tetracene, etc.)	10
Demolition Charges	10
Secondary Explosives (PETN, Composition 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? Historical records indicate bulk HE not used at this site.

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

	VALUE
Solid or Liquid Propellants	6
Propellants	0

What evidence do you have regarding propellants? Historical records indicate bulk propellant not used at this site.

E. Radiological/Chemical Agent/Weapons

	VALUE
Toxic Chemical Agents (Choking, Nerve, Blood, Blister)	25
War Gas Identification Sets	20
Radiological	15
Riot Control and Miscellaneous (Vomiting, tear, incendiary and smoke)	5
Radiological/Chemical Agent (Select the largest single value)	0

What evidence do you have of chemical/radiological OEW? Historical records indicate no employment of such items at this site.

==========

Total Hazard Severity Value 0
(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	Value
CATASTROPHIC	I	22 and greater
CRITICAL	II	11 to 21
MARGINAL	III	6 to 10
NEGLIGIBLE	IV	1 to 5
**NONE		(0)

*** Apply Hazard Severity Category to Table 3.**

** If Hazard Severity Value is 0, you do not need to complete Part II. 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 related factors of unexploded ordnance or explosive materials on a formerly used DOD site.

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

A. Locations of OEW Hazards

	VALUE
On the surface	5
Within Tanks, Pipes, Vessels or Other confined locations	4
Inside walls, ceilings, or other parts of Buildings or Structures	3
Subsurface	2

Location (Select the single largest value)
What evidence do you have regarding location of OEW?

B. Distance to nearest inhabited locations or structures likely to be at risk from OEW hazard (roads, parks, playgrounds, and buildings).

	VALUE
Less than 1250 feet	5
1250 feet to 0.5 miles	4
0.5 miles to 1.0 miles	3
1.0 miles to 2.0 miles	2
Over 2 miles	1

Distance (Select the single largest value)
What are the nearest inhabited structures?

C. Number of buildings within a 2 mile radius measured from the OEW 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)
Narrative

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)
Describe types of buildings in the area.

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

BARRIER	VALUE
No barrier or 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 monitor, locked entrance, or controlled roadway access to the facility).	0

Accessibility (Select the single largest value)
Describe the site accessibility.

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

	VALUE
Expected	5
None Anticipated	0

Site Dynamics (Select largest value)

Describe the site dynamics.

Total Hazard Probability Value
(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	28 or greater
PROBABLE	B	22 to 27
OCCASIONAL	C	16 to 21
REMOTE	D	9 to 15
IMPROBABLE	E	less than 9

*** Apply Hazard Probability Level to Table 3.**

Part III. Risk Assessment. The risk assessment value for this site is determined using the following Table 3. Enter with 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 CEHND - Immediately call CEHND-ED-SY--commercial 205-955-4968 or DSN 645-4968.

RAC 2 High priority on completion of INPR - Recommend further action by CEHND.

RAC 3 Complete INPR - Recommend futher action by CEHND.

RAC 4 Complete INPR - Recommend futher action by CEHND.

(RAC 5) Usually indicates that no further action (NOFA) is necessary. Submit NOFA and RAC to CEHND.

==========

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

This small site was an Anti-Aircraft Gunnery Range Gun emplacement and should not have any energetic OEW remaining on site since it was closed in 1947. Interviews with residents living on the old site report only spent .30 and .50 caliber bullets washing up on shore from time to time. No evidence of OEW on the 2.5 acres of land, even when several swimming pools were dug.

ORDNANCE AND EXPLOSIVES
ARCHIVES SEARCH REPORT
FOR
INDIAN ROCKS AIR-TO-GROUND GUNNERY RANGE
BELLEAIR BEACH, FLORIDA
PROJECT NUMBER I04FL033701

ATTACHMENT C

RISK ASSESSMENT

March 94
Previous editions obsolete

RISK ASSESSMENT PROCEDURES FOR ORDNANCE AND EXPLOSIVE WASTE (OEW) SITES

Site Name	Indian Rocks ATOG-Area C	Rater's Name	Edward M. McManus
Site Location	Belleair Beach, FL	Phone No.	815-273-8825
DERP Project #	I04FL033701	Organization	CENCR-ED-DN/SMCAC-ESL
Date Completed	3/31/94	RAC Score	3

OEW RISK ASSESSMENT:

This risk assessment procedure was developed in accordance with MIL-STD 882C and AR 385-10. The RAC score will be used by CEHND to prioritize the remedial action at Formerly Used Defense Sites. The OEW risk assessment should be based upon best available information resulting from records searches, reports of Explosive Ordnance Disposal (EOD) detachment actions, and field observations, interviews, and measurements. This information is used to assess the risk involved based upon the potential OEW hazards identified at the site. The risk assessment is composed of two factors, **hazard severity and hazard probability.** Personnel involved in visits to potential OEW sites should view the CEHND video tape entitled "A Life Threatening Encounter: OEW."

Part 1. Hazard Severity. Hazard severity categories are defined to provide a qualitative measure of the worst credible mishap resulting from personnel exposure to various types and quantities of unexploded ordnance items.

TYPES OF ORDNANCE
(Circle all values that apply)

A. Conventional Ordnance and Ammunition	VALUE
Medium/Large Caliber (20 mm and larger)	10
Bombs, Explosive	10
Grenades, Hand and Rifle, Explosive	10
Landmines, 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
Landmines, Practice (w/spotting charges)	4
Small Arms (.22 cal - .50 cal)	(1)
Conventional Ordnance and Ammunition (Select the largest single value)	10

What evidence do you have regarding conventional OEW? Newspaper accounts, personal interviews

B. Pyrotechnics. (For munitions not described above)

	VALUE
Munition (Container) Containing White Phosphorous or other Pyrophoric Material (i.e., Spontaneously Flammable)	10
Munition Containing a Flame or Incendiary Material (i.e. Napalm, Triethlaluminum Metal Incendiaries)	6
Flares, Signals, Simulators	4
Pyrotechnics (Select the largest single value)	0

What evidence do you have regarding pyrotechnics? Historical records indicating site usage as an Air-to-Ground Gunnery Range.

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

	VALUE
Primary or Initiating Explosive (Lead Styphnate, Lead Azide, Nitroglycerin, Mercury Azide, Mercury Fulminate, Tetracene, etc.)	10
Demolition Charges	10
Secondary Explosives (PETN, Composition 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? Historical records indicate bulk HE not used at this Gunnery Range.

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

	VALUE
Solid or Liquid Propellants	6
Propellants	0

What evidence do you have regarding propellants? Historical records indicate bulk propellant not used at this Gunnery Range.

E. Radiological/Chemical Agent/Weapons

	VALUE
Toxic Chemical Agents (Choking, Nerve, Blood, Blister)	25
War Gas Identification Sets	20
Radiological	15
Riot Control and Miscellaneous (Vomiting, Tear, incendiary and smoke)	5
Radiological/Chemic al Agent (Select the largest single value)	0

What evidence do you have of chemical/radiological OEW? Historical records indicate no employment of such items at this Gunnery Range.

==========

Total Hazard Severity Value 10
(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	Value
CATASTROPHIC	I	22 and greater
CRITICAL	II	11 to 21
MARGINAL	III	6 to 10
NEGLIGIBLE	IV	1 to 5
**NONE		0

*** Apply Hazard Severity Category to Table 3.**

** If Hazard Severity Value is 0, you do not need to complete Part II. 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 related factors of unexploded ordnance or explosive materials on a formerly used DOD site.

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

A. Locations of OEW Hazards

	VALUE
On the surface	5
Within Tanks, Pipes, Vessels or Other confined locations	4
Inside walls, ceilings, or other parts of Buildings or Structures	3
Subsurface	(2)
Location (Select the single largest value)	2

What evidence do you have regarding location of OEW? Newspaper accounts and personal interviews

B. Distance to nearest inhabited locations or structures likely to be at risk from OEW hazard (roads, parks, playgrounds, and buildings).

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

What are the nearest inhabited structures? Condominiums, Hotels

C. Number of buildings within a 2 mile radius measured from the OEW 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) 5

Narrative Total includes some 150 hotels, condominiums and single family residences evenly distributed around the former site

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. See C above

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

BARRIER	VALUE
No barrier or 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, (of 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 monitor, locked entrance, or controlled roadway access to the facility).	0

Accessibility (Select the single largest value) 5

Describe the site accessibility. Beach areas are accessible through city parks

F. Site Dynamics - This deals with site conditions that are subject to change in the future, but may be stable at the present. Example would be excessive soil erosion by beaches or streams, increasing land development that could reduce distance 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. Normal daily wave action plus infrequent tropical storms that heavily disturb the sea bed

Total Hazard Probability Value
(Sum of Largest Values for A through F--Maximum of 30) 27

Apply this value to Hazard Probability Table 2 to determine Hazard Probability Level.

TABLE 2

HAZARD PROBABILITY*

Description	Level	Hazard Probability Value
FREQUENT	A	28 or greater
PROBABLE	(B)	22 to 27
OCCASIONAL	C	16 to 21
REMOTE	D	9 to 15
IMPROBABLE	E	less than 9

*** Apply Hazard Probability Level to Table 3.**

Part III. Risk Assessment. The risk assessment value for this site is determined using the following Table 3. Enter with 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 CEHND - Immediately call CEHND-ED-SY--commercial 205-955-4968 or DSN 645-4968.

RAC 2 High priority on completion of INPR - Recommend further action by CEHND.

RAC 3 Complete INPR - Recommend futher action by CEHND.

RAC 4 Complete INPR - Recommend futher action by CEHND.

RAC 5 Usually indicates that no further action (NOFA) is necessary. Submit NOFA and RAC to CEHND.

==========

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

OEW has been found underwater in this area since the range was closed in 1947. Volume and frequency have diminished with the passage of time and many items were recovered during EOD sweeps of site in 1975, 1977, 1980, and 1986. No reference could be found of rockets being discovered underwater or washing up on shore since 1986.

ORDNANCE AND EXPLOSIVES
ARCHIVES SEARCH REPORT
FOR
INDIAN ROCKS AIR-TO-GROUND GUNNERY RANGE
BELLEAIR BEACH, FLORIDA
PROJECT NUMBER I04FL033701

ATTACHMENT D

RISK ASSESSMENT

March 94
Previous editions obsolete

RISK ASSESSMENT PROCEDURES FOR ORDNANCE AND EXPLOSIVE WASTE (OEW) SITES

Site Name Indian Rocks AAC Rg. Area D Rater's Name Edward M. McManus
Site Location Belleair Beach, FL Phone No. 815-273-8825
DERP Project # I04FL033701 Organization CENCR-ED-DN/SMCAC-ESL
Date Completed 3/31/94 RAC Score 4

OEW RISK ASSESSMENT:

This risk assessment procedure was developed in accordance with MIL-STD 882C and AR 385-10. The RAC score will be used by CEHND to prioritize the remedial action at Formerly Used Defense Sites. The OEW risk assessment should be based upon best available information resulting from records searches, reports of Explosive Ordnance Disposal (EOD) detachment actions, and field observations, interviews, and measurements. This information is used to assess the risk involved based upon the potential OEW hazards identified at the site. The risk assessment is composed of two factors, **hazard severity and hazard probability.** Personnel involved in visits to potential OEW sites should view the CEHND video tape entitled "A Life Threatening Encounter: OEW."

Part 1. Hazard Severity. Hazard severity categories are defined to provide a qualitative measure of the worst credible mishap resulting from personnel exposure to various types and quantities of unexploded ordnance items.

TYPES OF ORDNANCE
(Circle all values that apply)

A. Conventional Ordnance and Ammunition	VALUE
Medium/Large Caliber (20 mm and larger)	10
Bombs, Explosive	10
Grenades, Hand and Rifle, Explosive	10
Landmines, 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
Landmines, Practice (w/spotting charges)	4
Small Arms (.22 cal - .50 cal)	(1)
Conventional Ordnance and Ammunition (Select the largest single value)	1

What evidence do you have regarding conventional OEW? Personal Interviews

B. Pyrotechnics. (For munitions not described above)

	VALUE
Munition (Container) Containing White Phosphorous or other Pyrophoric Material (i.e., Spontaneously Flammable)	10
Munition Containing a Flame or Incendiary Material (i.e. Napalm, Triethlaluminum Metal Incendiaries)	6
Flares, Signals, Simulators	4
Pyrotechnics (Select the largest single value)	0

What evidence do you have regarding pyrotechnics? Historical records indicating site usage as Anti-Aircraft Gunnery Range impact area

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

	VALUE
Primary or Initiating Explosive (Lead Styphnate, Lead Azide, Nitroglycerin, Mercury Azide, Mercury Fulminate, Tetracene, etc.)	10
Demolition Charges	10
Secondary Explosives (PETN, Composition 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? Historical records indicate bulk HE not used at this site.

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

	VALUE
Solid or Liquid Propellants	6
Propellants	0

What evidence do you have regarding propellants? Historical records indicate bulk propellant not used at this site

E. Radiological/Chemical Agent/Weapons

	VALUE
Toxic Chemical Agents (Choking, Nerve, Blood, Blister)	25
War Gas Identification Sets	20
Radiological	15
Riot Control and Miscellaneous (Vomiting, Tear, incendiary and smoke)	5

Radiological/Chemic al Agent (Select the largest single value) 0

What evidence do you have of chemical/radiological OEW? Historical records indicate no employment of these items at this site

==========

Total Hazard Severity Value 1

(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	Value
CATASTROPHIC	I	22 and greater
CRITICAL	II	11 to 21
MARGINAL	III	6 to 10
NEGLIGIBLE	(IV)	1 to 5
**NONE		0

*** Apply Hazard Severity Category to Table 3.**

** If Hazard Severity Value is 0, you do not need to complete Part II. 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 related factors of unexploded ordnance or explosive materials on a formerly used DOD site.

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

A. Locations of OEW Hazards

	VALUE
On the surface	5
Within Tanks, Pipes, Vessels or Other confined locations	4
Inside walls, ceilings, or other parts of Buildings or Structures	3
Subsurface	(2)
Location (Select the single largest value)	2

What evidence do you have regarding location of OEW? Personal Interviews

B. Distance to nearest inhabited locations or structures likely to be at risk from OEW hazard (roads, parks, playgrounds, and buildings).

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

What are the nearest inhabited structures? Single family residences

C. Number of buildings within a 2 mile radius measured from the OEW 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) 5

Narrative Predominantly single family residences

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. See C. above

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

BARRIER	VALUE
No barrier or 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 monitor, locked entrance, or controlled roadway access to the facility).	0

Accessibility (Select the single largest value) 5

Describe the site accessibility. Beach area is accessible through a city park

F. Site Dynamics - This deals with site conditions that are subject to change in the future, but may be stable at the present. Example would be excessive soil erosion by beaches or streams, increasing land development that could reduce distance 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. Normal daily wave action plus infrequent tropical storms that heavily disturb the sea bed

Total Hazard Probability Value
(Sum of Largest Values for A through F--Maximum of 30) 27

Apply this value to Hazard Probability Table 2 to determine Hazard Probability Level.

TABLE 2

HAZARD PROBABILITY*

Description	Level	Hazard Probability Value
FREQUENT	A	28 or greater
PROBABLE	(B)	22 to 27
OCCASIONAL	C	16 to 21
REMOTE	D	9 to 15
IMPROBABLE	E	less than 9

*** Apply Hazard Probability Level to Table 3.**

Part III. Risk Assessment. The risk assessment value for this site is determined using the following Table 3. Enter with 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 CEHND - Immediately call CEHND-ED-SY--commercial 205-955-4968 or DSN 645-4968.

RAC 2 High priority on completion of INPR - Recommend further action by CEHND.

RAC 3 Complete INPR - Recommend futher action by CEHND.

RAC 4 Complete INPR - Recommend futher action by CEHND.

RAC 5 Usually indicates that no further action (NOFA) is necessary. Submit NOFA and RAC to CEHND.

==========

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

Historical records indicate that Anti-Aircraft guns fired into the gulf while shooting at targets being towed off shore. Evidence indicates nothing larger than .50 inch machine gun bullets being fired at this site. Interviews with site residents report only spent .30 and .50 inch bullets washing up on shore from time to time

ORDNANCE AND EXPLOSIVES
ARCHIVES SEARCH REPORT
FOR
INDIAN ROCKS AIR-TO-GROUND GUNNERY RANGE
BELLEAIR BEACH, FLORIDA
PROJECT NUMBER I04FL033701

APPENDIX N

REPORT DISTRIBUTION LIST

APPENDIX N

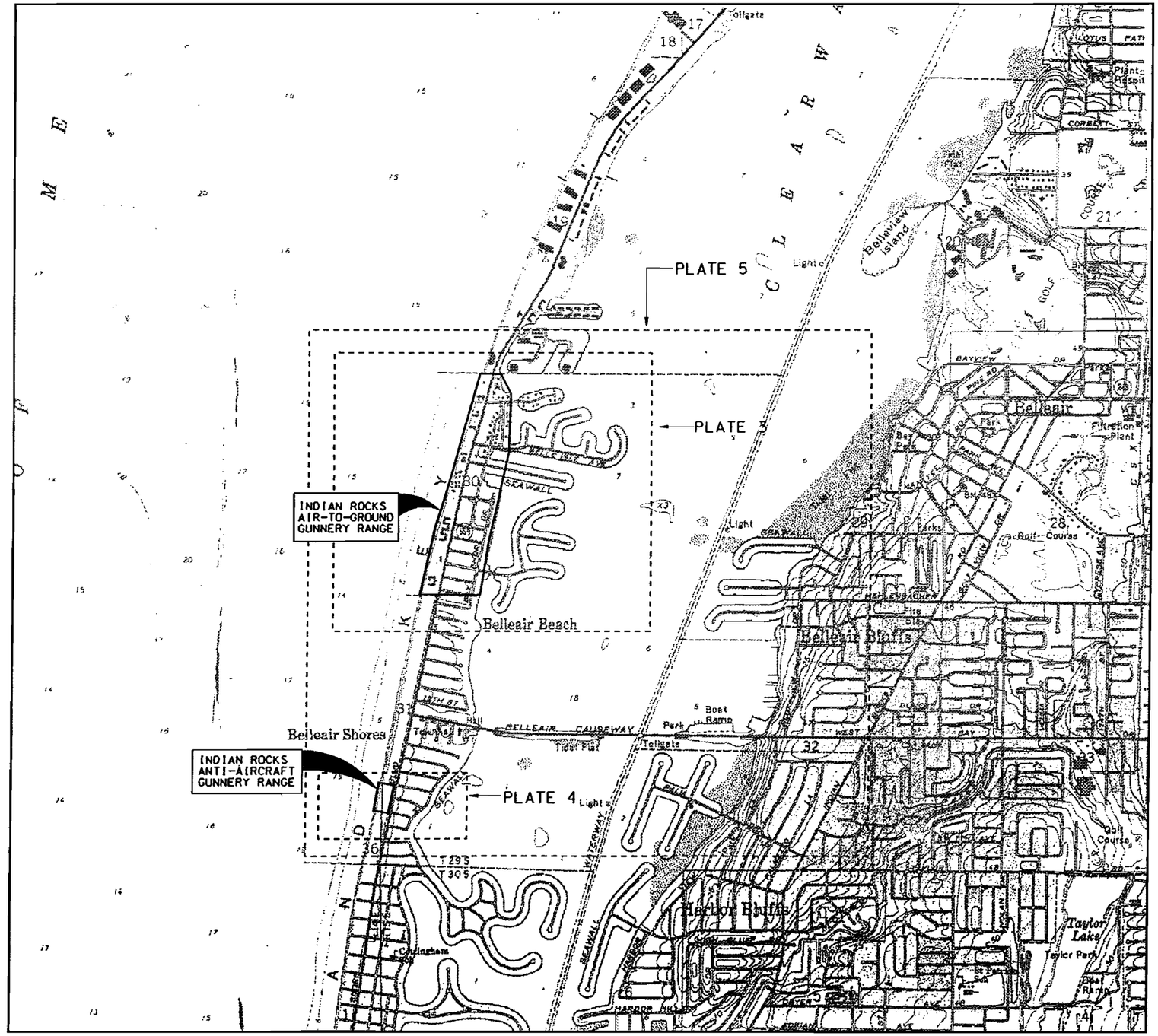
REPORT DISTRIBUTION LIST

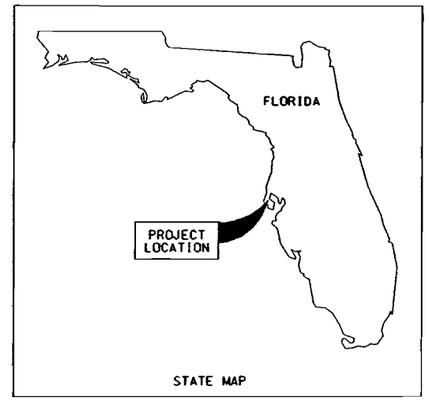
I - Final Report
II - Findings Report
III - Routed Final Report

	I	II	III
Commander, U.S. Army Corps of Engineers Engineering & Support Center, Huntsville ATTN: CEHNC-ED-SY-A P.O. Box 1600 Huntsville, AL 35807-4301	2	-	3
Commander, U.S. Army Corps of Engineers Mississippi Valley Division ATTN: CEMVD-MD-PM P.O. Box 80 Vicksburg, MS 39181-0080	-	-	-
Commander, U.S Army Corps of Engineers, Jacksonville District ATTN: CESAJ-PD-E 400 West Bay Street Jacksonville, Florida 32232-0019	2	-	-
Commander, Defense Ammunition Center ATTN: SJMAC-ESM 1C Tree Road, Bldg. 35 McAlester, OK 74501	1	-	-
Commander, U.S. Army Health Clinic ATTN: MCXP-PMA Rock Island Arsenal Rock Island, IL 61201	-	-	-
Commander, U.S. Army Engineer District, Rock Island P.O. Box 1600 Rock Island, IL 61201			
Internal			
CEMVR-EC	-	-	1
-EC-D	-	-	1
-EC-DO	3	-	-

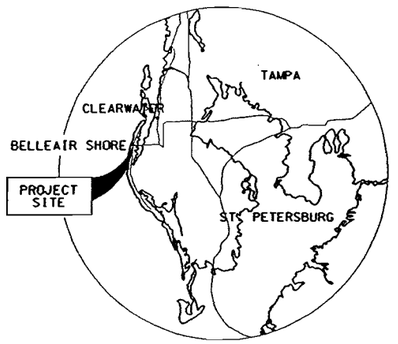
ORDNANCE AND EXPLOSIVES
ARCHIVES SEARCH REPORT
FOR
INDIAN ROCKS AIR-TO-GROUND GUNNERY RANGE
BELLEAIR BEACH, FLORIDA
PROJECT NUMBER I04FL033701

REPORT PLATES





STATE MAP



VICINITY MAP

400 200 0 400 800FT

Revisions			
Symbol	Description	Date	Approved

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

Designed by: E.M.M.
Drawn by: H.L.W.
Checked by:
Reviewed by:
Approved by:

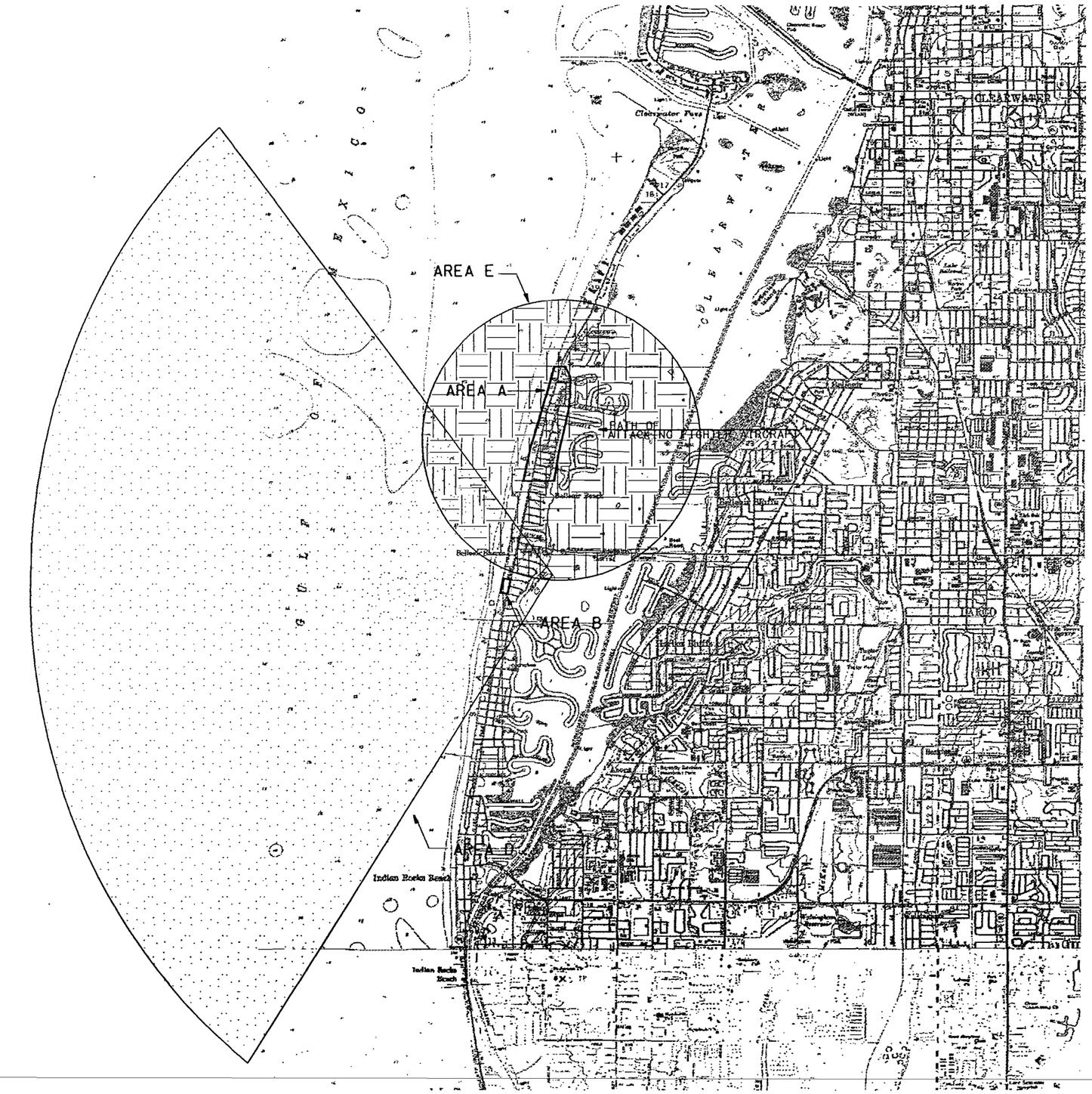
US Army Corps of Engineers Rock Island District

FORMER INDIAN ROCKS AIR-TO-GROUND GUNNERY RANGE BELLEAIR BEACH, FL

SITE LOCATION MAP CIRCA 1944

Scale: AS SHOWN
Date:
Drawing Code:
Sheet reference number:
Solicitation Number:
Sheet of

PLATE 1



LEGEND

AREA D: ANTI-AIRCRAFT GUNNERY RANGE IMPACT AREA APPROX. 8884 ACRES

AREA E: 1944 AERONAUTICAL CHART DANGER AREA APPROX. 1257 ACRES

NOTE:
INFORMATION ABSTRACTED FROM DOCUMENT L-1

2000 1000 0 2000 4000FT

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CORPS OF ENGINEERS
ROCK ISLAND, ILLINOIS

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Approved by:

US Army Corps of Engineers

FORMER INDIAN ROCKS AIR-TO-GROUND GUNNERY RANGE BELLEAIR BEACH, FL

HAZARD AREAS 1944

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Sheet reference number:
Dates:
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PLATE 2

AREA A

COASTAL HIGH HAZARD AREA

DISTRICT NO.1

DISTRICT NO.2

CLEARWATER HARBOR

NOTE
INFORMATION ABSTRACTED
FROM DOCUMENT L-5

SECTION 30 TWN29S RNG15E
SECTION 31 TWN29S RNG15E

Revisions			
Symbol	Description	Date	Approved

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ROCK ISLAND, ILLINOIS

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Reviewed by:
Approved by:

US Army Corps of Engineers

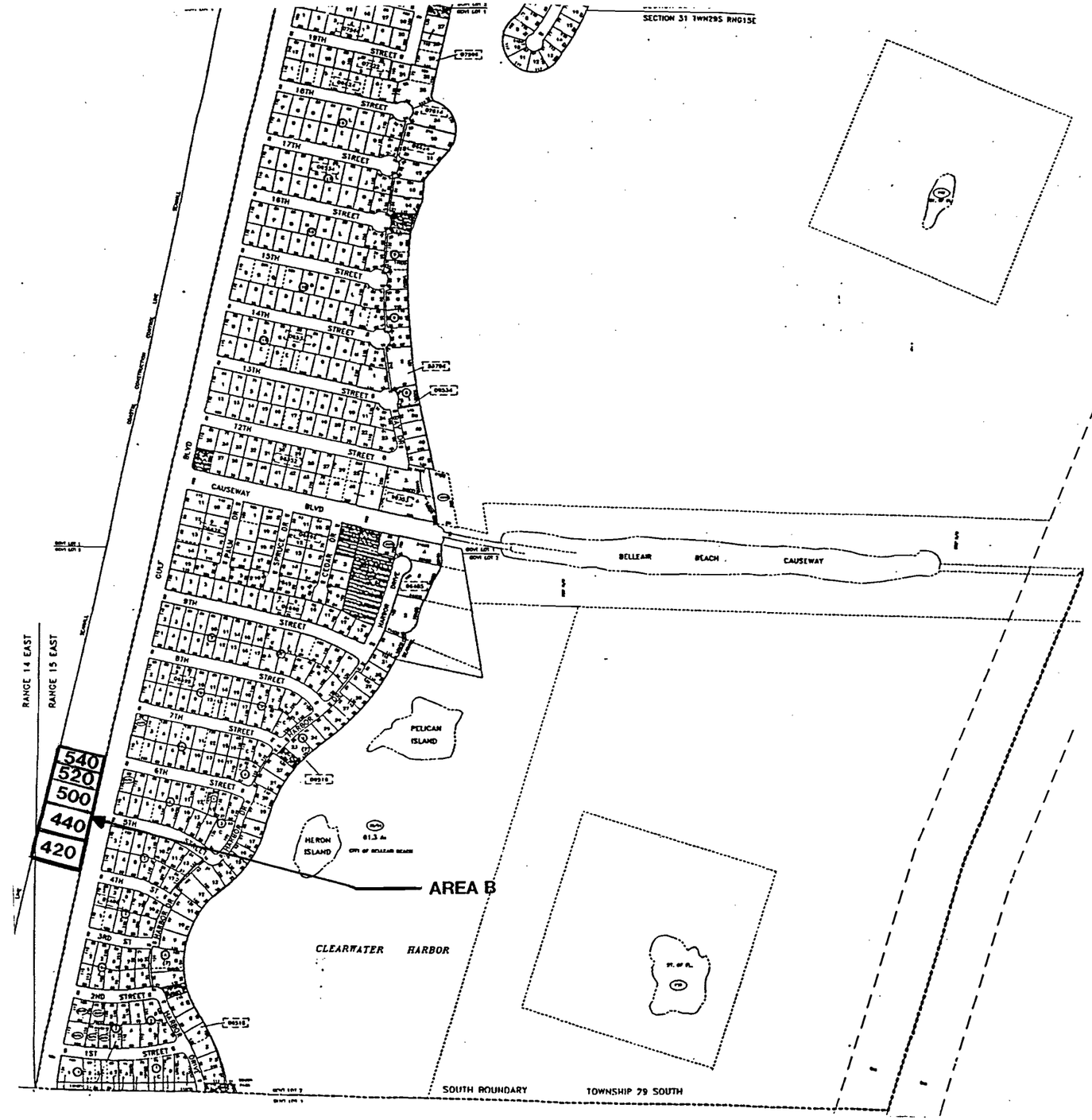
FORMER INDIAN ROCKS
AIR-TO-GROUND GUNNERY RANGE
BELLEAIR BEACH, FL

AREA A
CURRENT OWNERSHIP
(CIRCA 1993)

Scales AS SHOWN
Dates
Drawing Code:
Sheet reference number:
Solicitation Number:
Sheet of

PLATE 3

12-APR-1994 13:39



OWNERSHIP

420 – DR. JOHN WERNER

440 – MR. LEE HANNA

500 – DR. DAVID COOK

520 – MR. NIEWIAROWSKI

540 – MR. DAVID STRAZ

NOTE
INFORMATION ABSTRACTED
FROM DOUCUMENT L-5 AND I-13

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

Designed by: E.M.M.	US Army Corps of Engineers
Drawn by: H.L.W.	FORMER INDIAN ROCKS AIR-TO-GROUND GUNNERY RANGE BELLEAIR BEACH, FL
Checked by:	AREA B CURRENT OWNERSHIP (CIRCA 1993)
Reviewed by:	Scale: AS SHOWN; Sheet reference number:
Approved by:	Dates: ; Solicitation Number:
	Drawing Codes: ; Sheet of

PLATE 4

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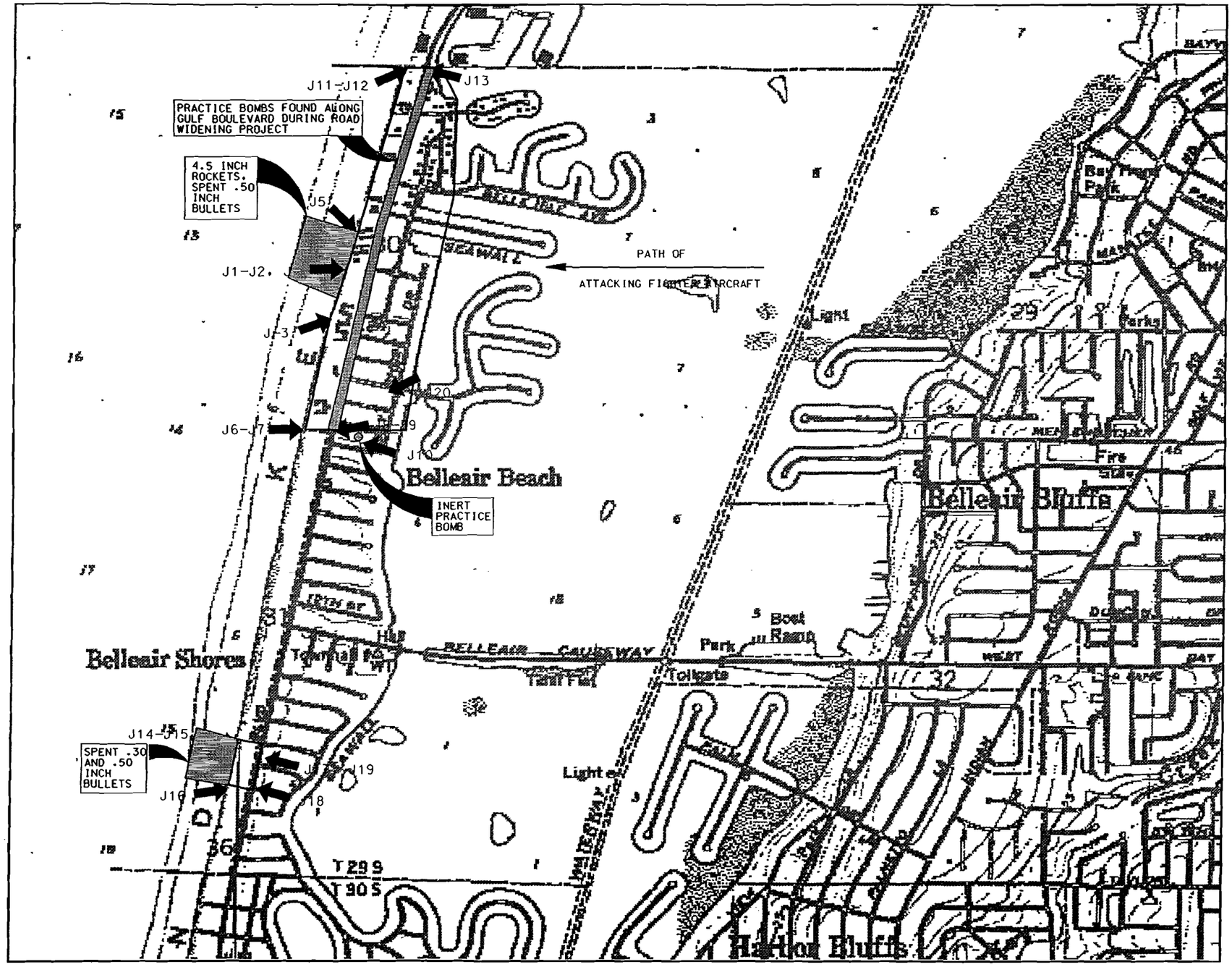

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LEGEND

PHOTO LOCATIONS

600 300 0 600 1200FT

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

Designed by: E.M.M.	FORMER INDIAN ROCKS AIR-TO-GROUND GUNNERY RANGE BELLEAIR BEACH, FL
Drawn by: K.A.F.	ORDNANCE FOUND AND PHOTO LOCATIONS
Checked by:	
Reviewed by:	Scale: AS SHOWN
Approved by:	Date:
	Drawing Code:
	Sheet reference number:
	Solicitation Number:
	Sheet of

PLATE 5

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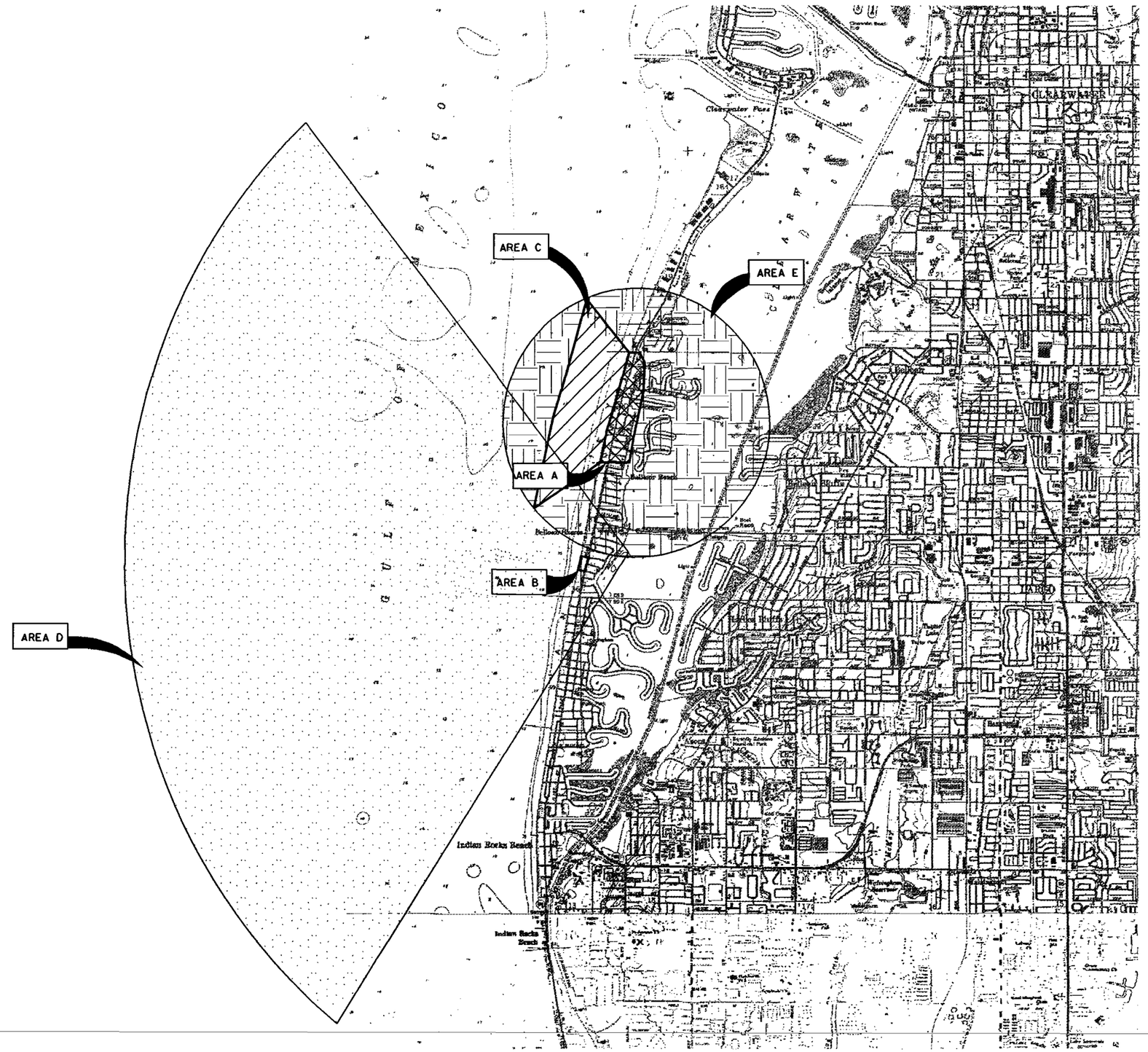

LEGEND

CONFIRMED OEW

AREA A: AIR-TO-GROUND GUNNERY RANGE IMPACT AREA 177.80 ACRES

AREA D: ANTI-AIRCRAFT GUNNERY RANGE IMPACT AREA APPROX. 8884 ACRES

AREA C: AIR-TO-GROUND GUNNERY RANGE UNDERWATER IMPACT AREA APPROX. 277 ACRES

UNCONTAMINATED

AREA B: ANTI-AIRCRAFT GUNNERY RANGE GUN EMPLACEMENT AREA 2.50 ACRES

AREA E: 1944 AERONAUTICAL CHART DANGER AREA APPROX. 1595 ACRES

NOTE:
INFORMATION ABSTRACTED FROM DOCUMENT L-1

2000 1000 0 2000 4000FT

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ROCK ISLAND, ILLINOIS

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Drawn by: H.L.W.
Checked by:
Reviewed by:
Approved by:

US Army Corps of Engineers Rock Island District

FORMER INDIAN ROCKS AIR-TO-GROUND GUNNERY RANGE BELLEAIR BEACH, FL

PROJECT AREAS

Scale: AS SHOWN
Date:
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Solicitation Number:
Sheet of

PLATE 6