US Army Corps
of Engineers®
Rock Island District

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

FINAL

Archives Search Report

FINDINGS

for

ASSATEAGUE ISLAND

Ocean City, Maryland
Project Number C03MD093001

08 February 2007

DEPARTMENT OF THE ARMY
HUNTSVILLE CENTER, CORPS OF ENGINEERS
P.O. BOX 1600
HUNTSVILLE, ALABAMA 35807-4301

REPLY TO
ATTENTION OF:

CEHNC-OE-CX (200-1c) 08 February 2007

MEMORANDUM FOR US Army Engineer District, Rock Island
(CEMCR-ED-D/Bob Hoffman), PO Box 2004, Rock Island, IL 61204-2004

SUBJECT: Result of the Technical Advisory Group (TAG) Review of Archives Search Reports (ASR) and Fact Sheets for Defense Environmental Restoration Program Formerly Used Defense Sites (DERP-FUDS)

1. The following enclosed ASRs and Fact Sheets are finalized.

Project Number	Site Name
B07NE006502	Scottsbluff Army Airfield
K06NM062201	Kirtland Army Airfield Practice Bombing Range No. S-08
K06NM061201	Kirtland Practice Bombing Range No. N-6
K06NM061301	Kirtland Practice Bombing Range No. N-7
A04MS000201	Meehan Range
E05MI001600	Camp Waterloo
D01MA003304	Camp Wellfleet
C03MD093001	Assateague Island
D01ME009801	Bailey Island Fire Control Station (FCS)
I04FL033402	Palm Beach Air Force Base (AFB)
I04FL104501	Panama City Temporary Harbor Defense Site (THDS)
B08CO041701	Ft. Carson Maneuver Area
J09CA203106	Baywood Park Training Area
K06AR005101	Southwestern Proving Ground
F10AK043001	Chernabura Island Navy Site
K06NM061402	Kirtland Practice Bombing Range No. N-11
K06NM061601	Kirtland Practice Bombing Range No. S-2
K06NM061701	Kirtland Practice Bombing Range No. S-3
K06NM061801	Kirtland Practice Bombing Range No. S-4
K06NM062001	Kirtland Practice Bombing Range No. S-6
I02PR054401	Sabana Seca Ammunition Storage Site
I04SC001603	Camp Croft
G04TN017601	Turret Gunnery Range, Dyersburg Army Airfield
G03WV029504	Artel Chemical Facility/Fike Chemicals Inc. (United States Explosive Plant "C")
C03DE091800	Milford and Sussex Ordnance Companies

CEHNC-OE-CX (200-1c)
SUBJECT: Result of the Technical Advisory Group (TAG) Review of Archives Search Reports (ASR) and Fact Sheets for Defense Environmental Restoration Program Formerly Used Defense Sites (DERP-FUDS)

2. Recommended strategy for future actions to be taken by the Project Manager is included in the enclosed fact sheets. Supporting data for TAG decisions are also included with the fact sheets.

3. Fact sheets, supporting data and corrected pages, due to prior reviews, are to be distributed with the subject ASRs.

4. Subject ASRs are recommended to be final when enclosed fact sheets, supporting data and corrected pages are included as a part of the project package.

5. The POC is Mr. Danny Mardis, commercial 256-895-1797, DSN 760-1767, and fax 256-895-1798.

FOR THE DIRECTOR:

Encl

DANNY R. MARDIS
Archives Search Report Manager
For Ordnance and Explosives Team

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

FINDINGS

ORDNANCE AND EXPLOSIVE WASTE ARCHIVES SEARCH REPORT FOR ASSATEAGUE ISLAND WORCESTER COUNTY, MARYLAND AND ACCOMACK COUNTY, VIRGINIA PROJECT NUMBER C03MD093001

08 February 2007

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ORDNANCE AND EXPLOSIVE WASTE
ARCHIVES SEARCH REPORT
FOR
ASSATEAGUE ISLAND
WORCESTER COUNTY, MARYLAND AND ACCOMACK COUNTY, VIRGINIA
PROJECT NUMBER C03MD093001

ACKNOWLEDGMENT

The following persons provided support as indicated.

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ORDNANCE AND EXPLOSIVE WASTE
ARCHIVES SEARCH REPORT
FOR
ASSATEAGUE ISLAND
WORCESTER COUNTY, MARYLAND AND ACCOMACK COUNTY, VIRGINIA
PROJECT NUMBER C03MD093001

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FOR
ASSATEAGUE ISLAND
WORCESTER COUNTY, MARYLAND AND ACCOMACK COUNTY, VIRGINIA
PROJECT NUMBER C03MD093001

1. INTRODUCTION

a. Subject and Purpose

(1) This report presents the findings of an historical records search and site inspection for ordnance and explosive waste (OEW) presence located at Assateague Island, Maryland and Virginia (see Plate 1 for general location map). The investigation was performed under the authority of the Defense Environmental Restoration Program for Formerly Used Defense Sites (DERP FUDS).

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

b. Scope

(1) The investigation focused on 17,552 acres of land (the entire island) that is believed to have contained 2 rocket ranges known as Stinger-One and Stinger-Two, and 2 accompanying OEW burial trenches used by the Navy and possibly the Army Air Corps.

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

2. PREVIOUS INVESTIGATIONS

a. 1988 EOD Team Deployment

(1) Army and Navy EOD Teams were deployed to Assateague Island as requested by the National Park Service when ordnance items washed ashore at the North Ocean Beach

in July of 1988. The North Ocean Beach area is believed to coincide with the Stinger-One rocket range (see Plate 2).

(2) The 144th EOD from Ft. Meade, Maryland (Army), was the first EOD unit to deploy to the site on 14 July 1988. The 144th EOD recovered and disposed of three (3) 5" rockets, with at least one containing a rocket motor. On 15 July 1988, the 144th EOD returned to the site to recover and dispose of another 5" rocket that had washed ashore in the same area. At this time, it appeared that the ordnance was coming from a "hole" approximately 15 meters offshore.

(3) On 16 July 1988, the U.S Navy EOD Mobile Unit II arrived at the site and took over operations from the 144th EOD. From 17-20 July 1988, the Navy EOD conducted an underwater survey of the area around the "hole". Results of the underwater survey led the leader of the Navy EOD team to believe that the "hole" was a trench dug to bury expended shells, etc. found while clearing a range. It was also believed that this trench was originally on Assateague Island, but is now underwater due to island migration.

(4) The ordnance items recovered by both EOD teams included seven (7) rocket motors (one (1) not expended); six (6) 5" shells (two (2) live); and numerous ballistic tips used to improve the aerodynamics of practice rockets. No removal action was taken on the majority of suspected ordnance at this time. A complete report on the EOD team deployments can be found in U.S. Department of the Interior, National Park Service Supplementary Case/Incident Record Number 880407 (see document F-6).

b. **1991 Preliminary Assessment**

(1) A Preliminary Assessment of Assateague Island was conducted under the Defense Environmental Restoration Program, Formerly Used Defense Sites (DERP FUDS) by the U.S. Army Corps of Engineers, Baltimore District (Ref B-7). At that time, the Findings and Determination of Eligibility (FDE), dated 19 December 1991, concluded that the 17,552 acre site located on Assateague Island in Worcester County, Maryland and Accomack County, Virginia, had been formerly used by the War Department (see document E-2).

(2) Neither acquisition nor disposal documentation for the site was available during the PA. However, WD use of Assateague Island was substantiated by statements made by a former Navy spotter and by ordnance washing ashore in July of 1988 (see 2.a above) near an area suspected of being a rocket range.

(3) The PA investigation concluded that there were eligible categories of hazards under the DERP FUDS program. Due to the fact that the site was found to have been used as

a practice rocket target range for Navy pilots (and possibly Army Air Corps pilots), an Ordnance and Explosive Waste (OEW) project was recommended; DERP FUDS OEW Project Number C03MD093001, the principle subject of this report (see document E-2 and Table 2-1).

TABLE 2-1
DERP-FUDS PRELIMINARY ASSESSMENT PROJECTS

Project Number	DERP Category	Present Phase	Comments	Location
-	CON/HTRW	-	None	-
-	HTRW	-	None	-
-	BD/DR	-	None	-
C03MD093001	OEW	SI	Ordnance or explosive contamination	Entire 17,552 Acres (See Plate 1)

c. 1991 Contracted Research and Site Visit

(1) Human Factors Applications, Inc., under subcontract to EA Engineering, conducted a site visit of Assateague Island and subsequent research at Wallops Flight Center (NASA), Chincoteague, Virginia, on 24-25 July 1991. This site visit and research was done to complete the INPR for the site. EA Engineering was originally contracted by Baltimore District, Corps of Engineers (see document E-3).

(2) The focus of the site visit was to determine the location of the Stinger-Two rocket range and its accompanying burial trench. Although they were not able to positively locate either one, a 5" rocket motor was discovered in the suspected vicinity of the Stinger-Two rocket range. They were also shown an expended MK43 practice bomb and a 20mm casing that was found on the Island by a National Park Service Ranger.

(3) Research at Wallops Flight Center uncovered that Assateague Island was used as a rocket, bombing and strafing range in support of NAS Chincoteague, Virginia and NAS Manteo, North Carolina. The primary use was as a rocket range for inert 2.25 and 5" rockets, but MK43 practice bombs and 20mm cannon rounds were also used there.

(4) As a result of their findings, Human Factors Applications, Inc., recommended a large scale sweep of the Island, paying particular attention to the North Ocean Beach area (see documents E-3 and I-5).

d. **1992 Interim Sweep of North Ocean Beach Area**

(1) ISSI Unexploded Ordnance, Inc., under COE Contract Number DACA87-92-P-0545, conducted a sweep of the North Ocean Beach area on 27 February - 19 March 1992.

(2) Over the three week period, 436 lanes and 570,300 sq ft of beach were swept. Included in the area was the suspected burial trench found during the July 1988 EOD team deployments.

(3) No ordnance or ordnance related items were discovered during the sweep - only fencing, metal piping and a shipwreck (see document E-7 and E-12).

3. SITE DESCRIPTION.

a. **Existing Land Usage**

(1) Assateague Island, a 36 mile barrier island paralleling the Maryland and Virginia coastlines, consists of approximately 17,552 acres of land in Worcester County, Maryland and Accomack County, Virginia (see Plate 1).

(2) Assateague Island consists of 17,552 acres - 8,018 acres in Maryland and 9,534 acres in Virginia. The U.S. Fish and Wildlife Service owns 9,021 acres in Virginia and 418 acres in Maryland that is the Chincoteague National Wildlife Refuge. The U.S. National Park Service owns 6,900 acres in Maryland and 205 acres in Virginia that is the Assateague Island National Seashore. The State of Maryland owns 696 acres that is Assateague Island State Park. The Commonwealth of Virginia owns 308 acres of salt-marshland. The U.S. Coast Guard owns less than 1 acre in Virginia for the operation of a lighthouse. Approximately 4 acres in Maryland are held by private interests (see document E-9). Table 3-1 represents the land usage of the area.

b. **Climatic Data**

(1) The region, which is part of the Delmarva Peninsula, has a humid mesothermal climate that is influenced by maritime tropical air masses in the summer and by continental polar air masses in the winter. Most high and low pressure systems track from west to east, as the region lies in a zone of prevailing westerlies. The region is vulnerable to hurricanes primarily between June and November. Past hurricanes have caused extensive damage, including forming new inlets and closing existing ones.

(2) Normal daily maximum temperatures range from 45°F in January to 85°F in July. Normal daily minimum temperatures range from 30°F in January to 65°F in July.

TABLE 3-1
LAND USAGE

FORMER USAGE	PRESENT OWNER	PRESENT USAGE	SIZE/ ACRES	COMMENTS
Area A: Stinger-One Range Impact Area	Federal, State	National Seashore, State Park	350* MD	See Plates 3 and 7
Area B: Stinger-One Range Buffer Zone	Federal	Ocean	300* /1	See Plates 3 and 7
Area C: Stinger-Two Range Impact Area	Federal	National Seashore	350* MD	See Plates 4 and 8
Area D: Stinger-Two Range Buffer Zone	Federal	Ocean	300* /1	See Plates 4 and 8
Area E: Remaining Land	Federal, State,	National Seashore, Wildlife Refuge	7,318* MD 9,534 VA	Remainder of island
			----------	
			17,552 TOTAL	
			(8,018 MD TOTAL) (9,534 VA TOTAL)	

* Indicates approximated acreage
/1 Areas B and D are not an integral part of Assateague Island. They are ocean areas possibly containing OEW that missed the targets in Areas A and C, respectively.

(3) Average annual precipitation is approximately 49 inches. Rainfall, derived from cyclonic weather systems in the fall, winter and spring, and from local convective storms in the summer, is distributed fairly evenly throughout the year. The lowest average monthly precipitation of 3.41 inches occurs in December, while the highest average monthly precipitation of 5.67 inches occurs in August. Thunderstorms occur on average 20-40 days a year, primarily in the summer months. Mean average annual snowfall is 6-12 inches. The mean annual number of days with heavy fog is 20-30 (reference B-5).

c. **Topography**

The topography of Assateague Island consists mainly of flat to gently rolling sand dunes. Island elevations range from sea level to approximately 15 feet.

d. **Geology and Soils**

(1) Regional Geology

(a) The subsurface sediments of the Delmarva Peninsula rest on a seaward sloping basement of Paleozoic crystalline rocks. The basement is folded and faulted into a series of northwest-southeast trending ridges and depressions (Ref B-5). The axis of one major depression, the Salisbury Embayment, crosses the Delmarva Peninsula near the Virginia-Maryland border.

(b) Cretaceous Cenozoic and Mesozoic sands, silts and clays account for more than half of the thickness of subsurface sediments (Ref B-5). Lower Cretaceous formations representing non-marine deposition in river channels, flood plains and swamps are overlain by Upper Cretaceous lagoonal, estuarine and deep-water marine rocks. This represents the gradual encroachment of the Upper Cretaceous Sea over the region.

(2) Site Geology

(a) The 17,552 acre site is a barrier island off the Atlantic Coast of the Delmarva Peninsula. The sand barrier rests on soft lagoonal mud that contains oyster, clam and snail shells.

(b) The lagoonal mud overlies organic coastal salt marsh mud, and peat, which, in turn, overlies organic debris-rich sandy mud. This entire sequence overlies pre-Halocene sediments undergoing transgression (Ref B-5).

(3) Site Soils

(a) The sand barrier is composed of beach and washover sands and gravels topped by wind blown sand dunes. Except for steep slopes on dunes this "soil" is nearly level and is composed of light-gray to white marine sand and shell material. The sand is constantly shifted by waves and wind, is excessively drained, exhibits no soil development, and supports little vegetation (Ref B-5).

(b) The lagoon behind Assateague Island is open water with areas of marsh and mud flats. Tidal marsh "soils" are sandy to clayey, poorly drained, acidic, saline and can contain peat or highly organic black muck (Ref B-5).

these "soils" are included in the Tidal Marsh-Coastal Beach association.

(c) Additionally, a small amount of Plummer soils can be found in stabilized depressions on coastal beaches.

e. **Hydrology**

(1) Groundwater

(a) Groundwater in the region surrounding Assateague Island is supplied primarily by the Manokin, Pokomoke, and Quaternary aquifers.

(b) The Manokin aquifer is recharged by the overlying Pokomoke aquifer, which is recharged by the downward movement of water from the Quaternary sediments. Recharging of the Manokin and Pokomoke aquifers occurs along a drainage divide between the Atlantic Ocean and Chesapeake Bay. The Quaternary aquifer is recharged by precipitation over a broad area (Ref B-5).

(c) Regional movement of groundwater in the Manokin and Pokomoke aquifers is away from the drainage divide and towards the ocean, bays, rivers and areas of pumping (Ref B-5). Groundwater movement in the Quaternary aquifer is from areas of high water table to streams, bays and the ocean.

(2) Tidal Hydrology

(a) Tide ranges and tidal currents in the inshore waters of Assateague Island are controlled by the position of ocean inlets (Ref B-5). The two ocean inlets on Assateague Island are the Ocean City inlet on the north, which leads to Sinepuxent Bay, and the Chincoteague inlet 30 miles to the south, which leads to Chincoteague Bay.

(b) Mean tide range at the Ocean City and Chincoteague inlets is 3.4 to 3.8 ft, but near the midpoint between the two inlets in northern Chincoteague Bay, the tide range is only 0.4 ft. High water at the midpoint occurs approximately 7 hrs after high water at the inlets. Tidal currents in the bays range from 0.15 to 0.5 knots. Through the tides, approximately 7% of the water in the bays is renewed each day (Ref B-5).

f. **Natural Resources**

Several threatened or endangered species of animal wildlife have been identified in the study area. However, no threatened or endangered plant species are known to exist

on Assateague Island. A summary of threatened or endangered wildlife is in Table 3-2 (see documents E-6, E-8 and E-10).

g. **Historical/Cultural Resources**

Several historical sites exist on Assateague Island. Some are included on the National Park Service (NPS) List of Classified Structures. A thorough archeological survey of the site has never been completed, and because of the island's composition and dynamics, it is doubtful that an additional undisturbed archeological site will be discovered in the future. Historical sites on Assateague Island are included in Table 3-2 (see documents E-6, E-8, E-10, K-1, K-2 and K-3).

TABLE 3-2
NATURAL AND CULTURAL RESOURCES

Resource Classification	Type	Comment
Wildlife		
Fish	Shortnose Sturgeon	Endangered; in estuarine and marine waters
Reptile	Loggerhead Turtle	Endangered; limited nesting
Bird	Southern Bald Eagle	Endangered; Chincoteague Wildlife Refuge
	American Peregrine Falcon	Endangered; Chincoteague Wildlife Refuge
	Red-cockaded Woodpecker	In mature pine tree stands
	Savannah (Ipswich) Sparrow	Chincoteague Wildlife Refuge; winter inhabitant of dunes
	American Osprey	Undetermined status; summer nesting
	Eastern Marlin	Undetermined status; winter nesting
	Piping Plover	Endangered; nesting area protected

TABLE 3-2
NATURAL AND CULTURAL RESOURCES Continued

Resource Classification	Type	Comment
Wildlife		
Mammals	Delmarva Peninsula Fox Squirrel	Endangered; Chincoteague Wildlife Refuge
	Sperm, Sei, Right, Humpback, and Finback whales	All endangered; occasionally stranded on beaches
Vegetation	(None)	
Historical	Pope Island Boathouse	In MD; owned by NPS; at North Beach; on NPS List of Classified Structures
	Site of North Beach Lifesaving Station	In MD; owned by NPS; foundation rubble only
	Site of Birchs Saltworks	In MD; owned by NPS; near end of North Beach Drive
	Site of Green Run Lifesaving Station	In MD; owned by NPS; buildings have been moved
	Site of Scotts Ocean House	In MD; owned by NPS
	Site of Green Run Village	In MD; owned by NPS
	Green Run Cemetery	in MD; owned by NPS
	Assateague Beach Coast Guard Station	In VA; owned by NPS; on NPS List of Classified Structures; registered VA landmark
	Ruins of Seaboard Oil and Guano Co Fish Factory	In VA; owned by FWS; on NPS List of Classified Structures

TABLE 3-2
NATURAL AND CULTURAL RESOURCES Continued

Resource Classification	Type	Comment
Historical (Cont)	Site of Conant Brothers Fish Factory	In VA; owned by FWS
	Site of Pope Island Lifesaving Station	In VA; owned by NPS
	Assateague Lighthouse	In VA; owned by FWS; operated by Coast Guard; on National Register of Historical Places
Cultural	Artifacts	Island once used by Indians primarily for hunting

4. HISTORICAL ORDNANCE USAGE

a. **Chronological Site Summary.**

(1) Assateague Island is one of many barrier islands located off the coast of Maryland and Virginia. The island has an extensive and lengthy history, all of which cannot be captured in this brief document.

(2) Assateague Island saw its share of wartime activity during both world wars. In World War I (WWI), the first successful U-boat attack in U.S. coastal waters occurred 30 miles southeast of Toms Cove, and the last ship sent down in 1918 was within 10 miles of Assateague. During World War II (WWII), several vessels were torpedoed and sunk within sight of the Pope Island Coast Guard station (see document E-8). The U.S. Coast Guard manned stations on the Barrier Islands of Assateague, Chincoteague, Wallops, Metompkin, Cedar, and Parramore during WWII, and several of these "islands were used for quarantine purposes and special training" (see document E-5).

(3) From approximately 1944 through 1947, the U.S. Navy and/or Army Air Corps reportedly established two rocket/bombing ranges on portions of Assateague Island along the Maryland coast. These ranges were used for target practice by land based aircraft. Additionally, two, and possibly three, ordnance burial sites were constructed at the end of the war for disposal of ordnance as the ranges

were cleared (see document L-3). No records relating to the method of acquisition of these lands by the War Department were found during the historical records search (see documents E-2 and E-3).

(4) In 1943, the southern portion of the island became the Chincoteague National Wildlife Refuge. The area was developed for greater daytime use in 1956. During the 1950s, the northern section of the island was subdivided into thousands of vacation homes. The 1962 storm destroyed most of the existing development and discouraged any further construction. In 1965, Assateague Island was authorized as a national seashore.

(5) Except for the refuge and campsites, Assateague Island is virtually undeveloped today (see document E-10).

b. **Review of Ordnance Related Records**

(1) Research efforts began with a thorough review of all material gathered during the ASR historical document search. A considerable collection of documents relative to Assateague Island was located. A few documents were surfaced that indicated War Department usage of the island as an aircraft bombing/strafing range during WWII. No records, however, were surfaced that related to the method of acquisition of this real property by the military. Important to the verification of real property use by the War Department and the presence of ordnance contamination are the following documents.

(2) A case/incident record exists (see document F-6) wherein National Park Service and military EOD personnel located WWII era ordnance, e.g., rocket motors, 5" High Velocity Aircraft Rockets (HVAR), and component parts from practice/target rockets on the North Ocean Beach of Assateague Island in 1988. Also identified was an ordnance burial site located off shore. This burial site would have originally been located on land, but through the years and because of the migratory nature of the barrier islands the ocean has reclaimed this land.

(3) An architectural and engineering firm memorandum dated 30 July 1991 (see document E-3) was located which states that Assateague Island was an active bombing range in support of the then Naval Air Station Chincoteague, Virginia and Naval Air Station Manteo, North Carolina between 1944 and 1947. These ranges, as other similar ranges of the WWII era, were used for training using 20mm cannon, 2.25 and 5" rockets and practice bombs. Table 4-1 lists typical WWII Navy aircraft and accompanying armament that may have utilized the ranges on Assateague Island.

TABLE 4-1
Aircraft Possibly Utilizing Assateague Island

Model	Type	Tactical Weapons	Practice Weapons
Curtiss SB2C/A-25 Helldiver	Bomber	20mm Cannon	Same
		.30 cal Machine Gun	Same
		5 inch Rockets	2.5 inch rockets
		1000 lb of bombs under wings	3, 25 and 100 lb practice bombs
		1000 lb of bombs internally	100 lb practice bombs
Grumman TBF/TBM Avenger	Bomber	.30 cal Machine Gun	Same
		.50 cal Machine Gun	Same
		5 inch Rockets	2.25 inch Rockets
		1 Torpedo	Practice Torpedo
		2,000 lb of bombs	3, 25 and 100 lb practice bombs
Grumman F6F Hellcat	Fighter	.50 cal Machine Gun	Same
		20mm Cannon	Same
		5 inch Rockets	2.25 inch Rockets
		2,000 lb of bombs	3, 25 and 100 lb practice bombs
Vought V-166B/F4U Corsair	Fighter	20mm Cannon	Same
		5 inch Rockets	2.25 inch Rockets
		1,000 lb bombs	3, 25 and 100 lb practice bombs
		1,600 lb bombs	

(4) Also reviewed were letters (see documents F-1 through F-5) written by a former Navy target range spotter assigned duties at Assateague Island in 1945. These letters, in detail, identify the locations of two target ranges on the island used by the Navy during WWII. The northern most range, called Stinger-One Range was located just to the north of North Ocean Beach, and the southern most range, Stinger-Two, was located to the east across from Green Run Bay.

(5) Residual OEW has washed ashore in the Stinger-One Range area (4.b.(2) above). Based on range operations as described in document F-5, it is possible that a small number of munitions missed the range targets and landed in the Atlantic Ocean adjacent to the range areas.

c. **Interviews with Site Related Personnel.**

(1) In an attempt to verify that Army Air Corps or Navy aircraft used Assateague Island as a rocket or bombing target range during WWII, interviews were conducted with two individuals who were previously employed by/for the Navy

within the barrier islands during that timeframe. Both individuals were aware that aircraft departed from the then Naval Air Station (NAS) located on Wallops Island on training missions, but neither were privy to their destination (see documents I-1 and I-2).

(2) A continuing dialogue was maintained with Mr. Bob Thomas, District Ranger for the Assateague Island National Seashore during the site inspection. These meetings and discussions included review of historical records, maps, and drawings. These reviews allowed the site inspection team to identify the most likely aerial approaches to the target ranges and of the burial sites.

(3) Historical interviews by personnel from EA Engineering, Inc. give some site history and current owner information (see documents I-3 and I-4).

5. SITE ELIGIBILITY

a. **Confirmed Formerly Used Defense Site**

(1) Former land usage by the Department of Navy was previously confirmed for the entire site. The 17,552 acre site was used by the U.S. Navy (and possibly the Army Air Corps) as a practice rocket range for aircraft pilots based at NAS Chincoteague, Virginia and NAS Manteo, North Carolina.

(2) Assateague Island was used by the Navy from 1944 until 1946 or early 1947. No acquisition or disposal documentation has been found for the site. Similarly, no official documentation verifying WD use of the Island has been discovered. However, Navy use of the site, as well as the location of two ranges, was substantiated by a former Navy enlisted man who was a spotter for one of the two rocket ranges on Assateague Island.

b. **Potential Formerly Used Defense Site**

(1) All acreage for this site is accurately covered in the "Findings and Determination of Eligibility" dated 19 December 1991 (see document E-2). The FDE covered the entire land portion of the island. No other acreage with potential WD or DoD use was discovered during the literature search or site investigation for Assateague Island.

(2) Two areas exist offshore of Asssateague Island in the Atlantic Ocean that were not covered in the FDE are potential formerly used defense sites (see Table 3-1 and plates 3 and 4). These areas could have become contaminated with munitions that missed the target in the range areas.

(3) During the historical records search, documentation was found which indicated the existence of test ranges on Wallops Island (near the South end of Assateague Island) and at a shipwreck in Chesapeake Bay, and a machine gun and rocket range at an undisclosed location (see documents E-1, E-4 and E-11). These ranges were used by the U.S. Naval Aviation Ordnance Test Station in Chincoteague, Virginia. Based on the potential OEW hazards associated with these 3 ranges, further research into these areas as possible DERP FUDS sites is warranted. Preliminary assessment actions for these areas should be conducted by the Geographic District if they have not already done so.

6. VISUAL SITE INSPECTION

a. **General Procedures and Safety.**

(1) During the period 5-9 April 1993, members of the Site Inspection (SI) team traveled to the site of two former Navy bombing and rocket target ranges and two suspected burial sites, Assateague Island, MD. This travel was in support of and IAW references B-1 through B-4. The primary task of the SI team was to assess OEW presence and potential. Due to training, there were at least two Navy aircraft bombing/rocket target ranges located on Assateague Island during WWII and due to disposal, there were also three suspected burial sites on the island. The site 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 the SI team due to the willingness of National Park Service personnel to grant access and provide the team a tour of the points of interest on Assateague Island prior to the actual site inspection.

(3) A site safety plan was developed and used by the SI team and National Park Service personnel to assure an injury-free site inspection of the former Navy bomb and rocket target ranges. A briefing was conducted prior to the SI which stressed that OEW should only be handled by military EOD personnel.

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

(5) The visit began on 6 April 1993 at the offices of the National Park Service, Assateague Island National

Seashore, District Ranger (see photos J-1 through J-4). There was an exchange of information between Mr. Bob Thomas, District Ranger and SI team members Mary Jo Civis and Mike Harper. During this initial meeting with Mr. Thomas, the SI team was presented a short history of the island, given a tour, and shown the most probable locations of the former Navy bomb/rocket target ranges and burial locations. Maps and texts appropriate to the island were also made available to the team. A plan of action for the site inspection was coordinated with all concerned, radio communication was made available, and the site inspection of the formerly Navy-used island began. It should be stressed, again, that intrusive sampling methods were not used during this site inspection.

b. **Area A: Stinger-One Range Impact Area**

The OEW assessment of the formerly Navy-used barrier island of Assateague began in the vicinity of the North Ocean Beach (see photos J-3 through J-8, document L-2 and plate 3). This area was the location of one of two Navy bomb/rocket target ranges and, also a possible ordnance burial site. The beach and dunes inland were inspected for the presence of OEW. On the shoreline, the SI team located metal fragments, most probably the remains of exploded ordnance (see photo J-4). The remnants of an old ship on this stretch of beach was located. These remnants lie very near the ordnance burial site which was used during clearance of this target range (see photos J-5 and J-6). Inland from this beach area is a fenced area of dunes (see photos J-7 and J-8). During an extensive search of this area, a suspected nose section from a 3.25" AA target rocket, M2 series was found (see document D-6 and photos J-9 through J-11). Photo J-12 is a view toward the North Beach beach house from the location where this nose section was found.

c. **Area B: Stinger-One Range Buffer Zone**

Area B is a section of the Atlantic Ocean adjacent to Area A. The area was viewed from ashore as underwater investigation was not practical during the site inspection.

d. **Area C: Stinger-Two Range Impact Area**

The site inspection of Assateague Island continued in the southern part of the island between Dune Crossings (DC) 9 and 13 including the width of the island. This area was the location of the second Navy bomb/rocket target range and two suspected ordnance burial sites (see photos J-13 through J-18, J-20 through J-22, document L-2 and plate 4). The eastern shoreline, inland dunes, and western wooded portion of the island were inspected. Just inland from the western shore in the Green Run Bay area, the team located the metal parts of an expended 5" high velocity aircraft

rocket (HVAR) rocket motor (see photo J-19). The suspected ordnance burial sites were not located.

e. **Area D: Stinger-Two Range Buffer Zone**

Area D is a section of the Atlantic Ocean adjacent to Area C. The area was viewed from ashore as underwater investigation was not practical during the site inspection.

f. **Area E: All Remaining Lands**

There was no OEW noted by the SI team elsewhere on Assateague Island.

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 on verifiable historical evidence or direct witness of ordnance items since site closure. Verifiable historical records evidence consists of ordnance items located on site and documented by the local bomb squad, Army Explosive Ordnance Demolition team, newspaper articles, correspondence, current findings, etc. 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 a confirmed subsite.

(2) Potential ordnance contamination is based on a lack of confirmed ordnance. Potential ordnance contamination is inferred from records or indirect witness. 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 ordnance evidence. All historical records evidence and present day site inspections do not indicate confirmed or potential ordnance contamination. There is no reasonable evidence, either direct or inferred, to suggest present day ordnance contamination. Additional field data is not needed to assess uncontaminated ordnance areas.

b. **Area A: Stinger-One Range Impact Area**

(1) The approximate boundaries for Area A were given by Mr. Adrien Smith, a former Navy spotter during WWII that was stationed at Assateague Island (see document F-5). However, definitive WD mapping or real estate documents officially designating this area have not been discovered.

(2) Direct witness of OEW in this area by National and State Park officials resulted in the deployment of Army and Navy EOD teams in 1988 (see document F-6). The SI team directly witnessed a piece of OEW believed to be a nose of a rocket (see photos J-9 through J-12.) These instances of direct witness confirm the presence of ordnance in this area.

(3) Mr. Adrien Smith stated a burial trench was dug in the range area to dispose of OEW when the range was cleared (see document F-3). Standard practice suggests this burial trench would be located along the high water line of the island, but the exact area of the trench is not known. It is possible that considerable additional OEW exists where the trench is located.

c. **Area B: Stinger-Two Range Buffer Zone**

Range operations as described in document F-5 indicate it is possible that a small number of munitions may have missed the range targets in Area A and landed in the Atlantic Ocean. Area B extends approximately 3,000 feet from Area A into the Atlantic Ocean. OEW was not witnessed in Area B by the SI team. Potential ordnance contamination exists in this area.

d. **Area B: Stinger-Two Range Impact Area**

(1) The approximate boundaries for Area B were given by Mr. Adrien Smith, a former Navy spotter during WWII that was stationed at Assateague Island (see document F-5). However, definitive WD mapping or real estate documents officially designating this area have not been discovered.

(2) The SI resulted in the direct witness of OEW contamination in this area (see photo J-19). In 1991, a contractor performing a site visit to Area B directly witnessed a rocket motor, a practice bomb and a 20mm casing (see document E-3). These instances of direct witness confirm the presence of ordnance in this area.

(3) Mr. Adrien Smith stated a burial trench was dug in the range area to dispose of OEW when the range was cleared (see document F-3). Standard practice suggests this burial trench would be located along the high water line of the island, but the exact area of the trench is not known.

It is possible that considerable additional OEW exists where the trench is located.

e. **Area D: Stinger-Two Range Buffer Zone**

Range operations as described in document F-5 indicate it is possible that a small number of munitions may have missed the range targets in Area C and landed in the Atlantic Ocean. Area D extends approximately 3,000 feet from Area C into the Atlantic Ocean. OEW was not witnessed in Area D by the SI team. Potential ordnance contamination exists in this area.

f. **Area E: All Remaining Lands**

There was no indication of OEW contamination resulting from ordnance usage or disposal elsewhere on Assateague Island (see plate 2).

8. SITE ORDNANCE TECHNICAL DATA

a. End Item Technical Data

Table 8-1, a listing of ammunition and explosive fillers used on Assateague Island and Table 8-2, a summary of site ordnance fillers have been developed. These tables are based on a review of historical documentation, drawings and specifications at appendices D-1 through D-8. Exact models/types have been included as documentation has permitted.

TABLE 8-1

AMMUNITION USED AND EXPLOSIVE/CHEMICAL FILLER

ITEM	MODEL/TYPE	FILLER/WEIGHT	FUZE/TYPE
20mm Cartridge	MKI/HE-I	0.025# Tetryl PLUS 175.2 gr incendiary mix Fuze - Mercury Fulminate, Tetryl Primer- 2.1 gr primer mixture (Mercury Fulminate, Potassium Clorate, Antimony Sulfide) Propelling Charge - 0.07# FNH powder, Type II	Percussion
	T23 (M97)/HE-I	0.017# Tetryl PLUS 175.2 gr incendiary mix Fuze - Mercury Fulminate, Lead Azide, Tetryl Primer - 2.1 gr primer mixture Propelling Charge - 0.07# FNH powder, Type II	PD
	T18 (M96)/HE-I	0.020# Incendiary mixture Primer - 2.1 gr primer mixture Propelling Charge - 0.07# FNH powder, Type II	
	M75/AP-T	Solid steel shot Primer - 2.1 gr primer mixture Propelling Charge - 0.07# FNH powder, Type II Tracer - Tracer mixture	
	T9E5 (M95)/ AP-T	Solid steel shot Primer - 2.1 gr primer mixture Propelling Charge - 0.07# FNH powder, Type II Tracer - Tracer mixture	

TABLE 8-1
AMMUNITION USED AND EXPLOSIVE/CHEMICAL FILLER Continued

ITEM	MODEL/TYPE	FILLER/WEIGHT	FUZE/TYPE
3 lb bomb, practice w/signal	AN-Mk23	Inert (Cast iron) 10 gr zinc oxide 3 gr black powder 3 gr smokeless powder Titanium Tetrachloride	
4.5 lb bomb, practice w/signal	AN-Mk43	Inert (Lead) 10 gr zinc oxide 3 gr black powder 3 gr smokeless powder Titanium Tetrachloride	
25 lb bomb, practice w/signal	AN-Mk76	Inert (Cast metal) 10 gr zinc oxide 3 gr black powder 3 gr smokeless powder Titanium Tetrachloride	
Rocket, practice	2.25'' SCAR	Inert warhead (Machined steel, cast iron or zinc) Motor - 14 gr black powder 1.75 lb ballistite	
Rocket, target	3.25'' M2,M2A1,M2A2	Inert ogival nose Motor - black powder 3.2# propellant grains	
Rocket, practice	3.5'' AR	Inert warhead (Steel) Motor - black powder 8.5 lb ballistite	
Rocket, practice	5'' HVAR	Inert warhead Motor - 55 gr black powder 24.8 lb ballistite	

b. **Chemical Data of Ordnance Fillers**

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

TABLE 8-2
CHEMICAL DATA OF ORDNANCE FILLERS

FILLER/WEIGHT	SYNONYM(S)	CHEMICAL FORMULA
Ballistite	(see DB powder)	
Black Powder	Saltpeter; Niter	
74% Potassium Nitrate		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% Nitroglycerine	stabilizer DPA	$CH_2NO_3CHNO_3CH_2NO_3$
0.75% Diphynylamine		$(C_6H_5)_2NH$
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	$(C_6H_5)_2NH$
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

TABLE 8-2
CHEMICAL DATA OF ORDNANCE FILLER Continued

FILLER/WEIGHT	SYNONYM(S)	CHEMICAL FORMULA
Incendiary Compositions* (cont)		
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 Comp IM-23		
75% Zirconium		Zr
IM-163		
50% Incendiary Comp IM-23		
50% Zirconium		Zr
Incendiary Mixture	(See incendiary comps)	
Lead Azide	Azide	$Pb(N_3)_2$
Mercury Fulminate	Mercuric Cyanate	$Hg(CNO)_2$
Nitrocellulose	Guncotton; Pyroxylin; Nitrocotton; Cellulose Nitrate	$[C_6H_8)_5(NO_2)_3]_n$
Nitroglycerin		$CH_2NO_3CHNO_3CH_2NO_3$
Potassium Chlorate		$KClO_3$
Potassium Nitrate	Saltpeter; Niter	KNO_3
Primer Composition		
FA-90A (for percussion primer)		
25% Lead Thiocyanate		$Pb(SCN)_2$
12% Antimony Sulfide		Sb_2S_3
10% PETN		$C(CH_2ONO_2)_4$
53% Potassium Chlorate		$KCL0_3$
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		$KCL0_3$

TABLE 8-2
CHEMICAL DATA OF ORDNANCE FILLER Continued

FILLER/WEIGHT	SYNONYM(S)	CHEMICAL FORMULA
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)		
Sulfur		S
Tetryl	Trinitrophenylmethyl-nitramine	$(NO_2)_3C_6H_2N(NO_2)CH_3$
Titanium Tetrachloride	White smoke	$TiCl_4$
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		$Sr(NO_3)_2$
Zinc Oxide	Chinese White	ZnO

* Most frequently used chemical compositions and their major ingredients

9. EVALUATION OF OTHER SITE INFORMATION

a. **Hazardous, Toxic, and Radiological Waste**

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

b. **Building Demolition/Debris Removal**

No information has been obtained to indicate that any buildings/facilities were constructed by the Department of the Navy (or WD).

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APPENDIX A

REFERENCE SOURCES

APPENDIX A-1
REFERENCE SOURCES

The following organizations and personnel are acknowledged for their support.

Organization	Name	Telephone	Nature of Support
Government Agencies			
Federal			
U.S. Army Engineer District Baltimore P.O Box 1715 Baltimore, MD 21203-1715	Mr. H. Leland Reeser	(410)962-2186	Documents, site investigation
U.S. Military History Institute Library Carlisle Barracks, PA 17013	Staff	(717)245-3611 DSN 242-3611	General information
Department of Navy Naval Historical Center Washington Navy Yard 901 M. Street, SE Washington, D.C. 20374-0571	Ms. Gena Akers Operational Archives Mr. Glen E. Helm Navy Dept. Library Mr. John Hodges	(202)433-3171	Reports, references
Defense Technical Information Center (DTIC) Cameron Station Alexandria, VA 22304-0093			Bibliographies
U.S. Department of Interior National Park Service P.O. Box 37127 Washington, D.C. 20013-7127	Mr. Barry Mackintosh Author	(202)343-8169	Book
Naval Construction Battalion Center 621 Pleasant Valley Road Port Hueneme, CA 93043-5000	Mr. Ray Benny Civilian Engineering Support Office Dr. Vicent A. Transano Command Historian	(805)902-5770 DSN 551-5778 (805)982-5913 DSN 551-5913	Drawings, reports, references, correspondance

APPENDIX A-1
REFERENCE SOURCES Continued
The following organizations and personnel are acknowledged for their support.

Organization	Name	Telephone	Nature of Support
Government Agencies			
Federal (Continued)			
U.S. Department of Interior National Park Service Assateague Island National Seashore Rt. 611, 7206 National Seashore Lane Berlin, MD 21811	Mr. B. Fitzgerald Chief Ranger Mr. Bob Thomas District Ranger Mr. Larry G. Points Chief, Park Interpretation	(410)641-3030 (410)641-3030 (410)641-1443	Island access, island tour, reference material, maps,
CEC Seabee Museum 22M Building 99 Port Hueneme, CA 53043	Ms. Andrea King	(805)982-5163	References, newspaper articles, aerial photo
Petagon Library The Pentagon, Room 1A518 Washington, D.C. 20310-6000	Staff	DSN 225-5346	References
NASA Wallops Flight Facility Environmental Office Wallops, VA 22337	Ms. Terry Spagnuola	(804)824-1962	Maps, historical documents
U.S. Naval Air Test Center Patuxent River, MD 20670	Mr. Tim Brosnihan Mr. John Braun Mr. Warren Cooksay	DSN 326-4138 DSN 326-3961 DSN 326-33622	Referrals
National Archives Mid-Atlantic Region Philadelphia, PA	Dr. Plowman Ms. Kelly Blake	(215)597-3000 (215)597-0921	No information
National Park Service Atlanta, GA	Staff	(404)208-4747	No information

APPENDIX A-1
REFERENCE SOURCES Continued

The following organizations and personnel are acknowledged for their support.

Organization	Name	Telephone	Nature of Support
Government Agencies			
Federal (Continued)			
U.S. Fish and Wildlife Service Atlanta, GA	Staff	(404)336-6612	No information
U.S. Forest Service Atlanta, GA	Staff	(404)347-2384	No information
State			
(None)			
Local			
Worcester County Library 307 N. Washington Street Snow Hill, MD 21863	Ms. Louise Ash	(440)632-2600	Maps, book
Government Agencies			
Local Continued			
Chincoteague Chamber of Commerce P.O. Box 258 Chincoteague, VA 23336	Staff		References
Ocean City Chamber of Commerce 12320 Ocean Gateway Ocean City, MD 21842	Ms. Sandy Baxter	(410)213-0552	Brochure
Non Government Agencies			
Federal			
DIALOG Information Services 3460 Hillview Avenue P.O. Box 10010 Palo Alto, CA 94303-0993	Staff		Bibliographies

APPENDIX A-1
REFERENCE SOURCES Continued
The following organizations and personnel are acknowledged for their support.

Organization	Name	Telephone	Nature of Support
State			
(None)			
Local			
Personal Contact 12816 Harbor Road Ocean City, MD 21842	Mr. William Wimbrough	(410)213-1114	General information
Personal Contact Kitty Hawk, NC	Mr. David Stix		General information
Personal Contact Ocean City Livesaving Museum Ocean City, MD 21842	Mr. George Hurley Ms. Suzanne Hurley	(410)289-6301	General information, referral
Michael C. Vaeth, P.A. P.O. Box 341 Snow Hill, MD 21863	Mr. Craig Horsman	(410)632-2160	Real estate document search
Personal Contact Chincoteague, VA	Mr. Bennie T. Wilson		Interview
Personal Contact Chincoteague, VA	Mr. Arthur E. Anderson		Interview
Personal Contact Human Factors Applications, Inc. Indian Head, MD	Mr. Sam Hooper	(310)743-2377	Interview

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APPENDIX B

REFERENCES AND ABSTRACTS

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Table of Contents

B-1 Army Regulation (AR) 200-1, Environmental Quality, Environmental Protection and Enhancement, DA, 23 April 1990

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B-3 Defense Environmental Restoration Program for Formerly Used Defense Sites, Ordnance and Explosive Waste, Archives Search Report Instructions, Version 1.0 with changes, U.S. Army Corps of Engineers, Rock Island District, 21 December 1992

B-4 Site Safety Plan for OEW Investigations (Appendix A-11, only), U.S. Army Corps of Engineers, Rock Island District, 25 June 1992

B-5 Draft Environmental Impact Statement, Delaware Bay-Chesapeake Bay Waterway in Delaware, Maryland and Virginia (Delmarva Waterway), U.S. Army Engineer District, Philadelphia, 1975

B-6 War Department, Artillery Ammunition, TM 9-1901, 29 June 1944 (D-1)

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B-17 United States Navy & Marine Corps Bases, Domestic, Paolo Coletta, Editor, Greenwood Press, Westport CN, 1985 (E-4)

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B-19 Assateague Island National Seashore, An Administrative History, Barry MacKintosh - History Division, National Park Service, Department of the Interior, Washington D.C., 1982 (E-6)

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B-26 Letter, Mr. Adrien Smith, 24 July 1990, Subject: Assateague Island (F-1)

B-27 Letter, Mr. Adrien Smith, 13 September 1990, Subject: ASE Incident Report (F-2)

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B-31 Case Incident Record 880407, United States Department of the Interior, National Park Service, 14 July 1988 (F-6)

B-32 Conversation Record, Mr. Bennie T. Wilson, Subject: Possibile Practice Bombing Runs at/near Assateague Island during WWII, 8 April 1993 (I-1)

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APPENDIX C

GLOSSARY

APPENDIX C

GLOSSARY

AP	Armor-Piercing
AP-T	Armor Piercing-Tracer
AR	Aircraft Rocket
BD/DR	Building Demolition/Debris Removal
CEHND	U.S. Army Engineer, Huntsville Division
CENAB	U.S. Army Engineer, Baltimore District
CENAD	U.S. Army Engineer, North Atlantic Division
CENCR	U.S. Army Engineer, Rock Island District
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
DA	Department of Army
D.A.	Direct Action (British)
D.B.	Double Base
DERA	Defense Environmental Restoration Account
DERP	Defense Environmental Restoration Program
DOD	Department of Defense
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
HE-I	High Explosive-Incendiary

HTRW	Hazardous, Toxic and Radiological Waste
HTW	Hazardous and Toxic Waste
HVAR	High Velocity Aircraft Rocket
I	Incendiary
INPR	Inventory Project Report
IRP	Installation Restoration Program
M	Model Number
Mk	Mark
mm or MM	Millimeter
NAS	Naval Air Station
NH	Nonhygroscopic
OEW	Ordnance and Explosive Waste
PA	Preliminary Assessment
P.D.	Point Detonating
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
T	Tracer

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
WD	War Department
#	Pounds (lbs.)

Ordnance and Explosive Waste
Archives Search Report
for
Assateague Island
Worcester County, Maryland and Accomack County, Virginia
Project Number C03MD093001

APPENDIX D

TEXTS/MANUALS

APPENDIX D

TEXTS/MANUALS

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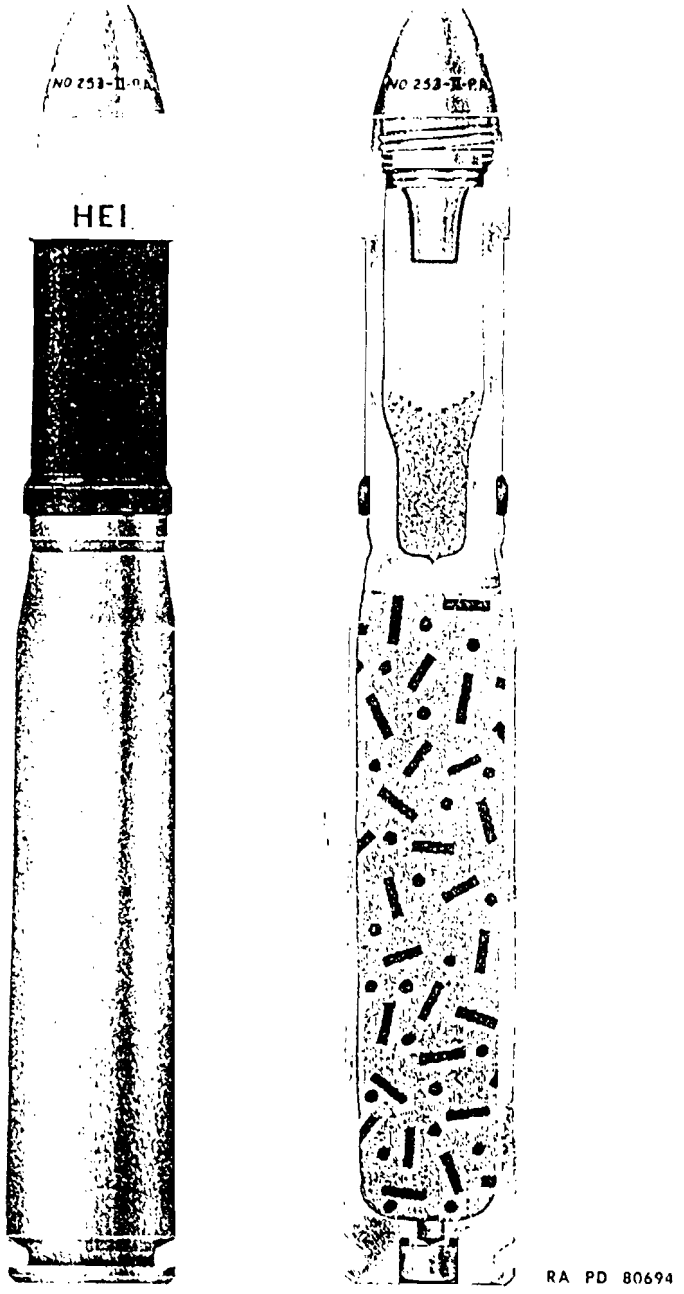


Figure 24 — CARTRIDGE, HE-I, Mk. I, w/FUZE, P. D., 253 Mk. II-III, 20-mm Guns, M1, AN-M2, M3, and Br. H.S./A/

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

DATA

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

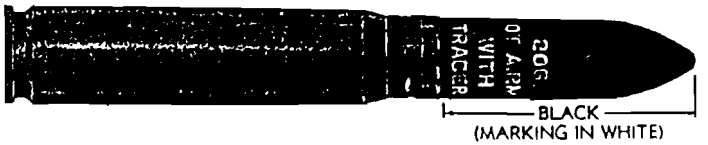


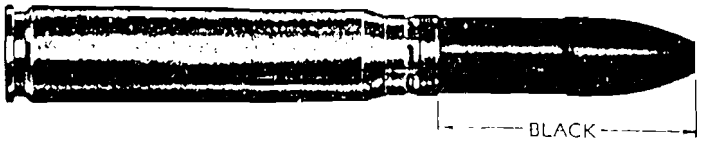
Figure 25 — CARTRIDGE, AP-T, M75, 20-mm Guns, M1, AN-M2, M3, and Br. H.S./A/

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

DATA

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

D-1



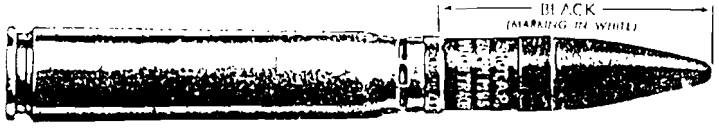
RA PD 80696

Figure 26 — CARTRIDGE, Ball, 20-mm Guns, M1, AN-M2, M3, and Br. H.S./A/

23. CARTRIDGE, BALL, 20-MM GUNS, M1, AN-M2, M3, AND BR. H.S./A/ (fig. 26), is for service firing against personnel and light materiel targets, for practice, and for proof-firing. The projectile is similar in shape and ballistic properties to the HE-I projectile, but is hollow and contains no explosive or tracer. It is rolled from steel bar stock. A steel closing disk with a 45-degree chamfer is fitted into the recesses in the base of projectile.

DATA

Weight of complete round	0.56 lb	Width of rotating band	0.203 in.
Length of complete round	7.23 in.	Type of base	Square
Length of projectile	3.31 in.	Radius of ogive	3.27 cal.
Length of cartridge case	4.34 in.	Muzzle velocity	2,850 ft per sec
Maximum range			6,000 yd



RA PD 65139

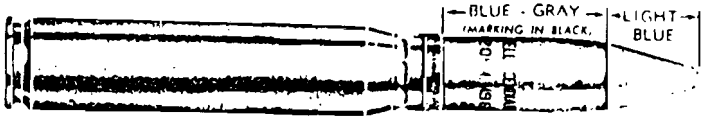
Figure 27 — CARTRIDGE, AP-T, T9E5 (M95), 20-mm Guns, M1, AN-M2, M3, and Br. H.S./A/.

24. CARTRIDGE, AP-T, T9E5 (M95), 20-MM GUNS, M1, AN-M2, M3, AND BR. H.S./A/ (fig. 27), is for use against armored targets. The projectile is a solid shot made from bar or forged steel. A drawn steel windshield is crimped into rolled or stamped grooves in the projectile body, the portion of the windshield over the crimping acting as the bourrelet of the projectile. The base of the projectile contains a red tracer composition, sealed in by means of a

metal closing cup. The tracer burns for about 2.25 seconds, equivalent to a range of about 1,400 yards.

DATA

Weight of complete round	0.57 lb	Muzzle velocity	2,800 ft per sec
Length of complete round	7.22 in.	Maximum range	5,900 yd
Length of projectile	3.27 in.	Penetration (in. at 0-deg obliquity of face-hardened plate at 400 yd)	¾
Length of cartridge case	4.34 in.	Penetration (in. at 0-deg obliquity of homogeneous plate at 400 yd)	⅞
Width of rotating band	0.203 in.		
Type of base	Square		
Radius of ogive	2.3 cal.		



RA PD 65138

Figure 28 — CARTRIDGE, Incendiary, T18 (M96), 20-mm Guns, M1, AN-M2, M3, and Br. H.S./A/

25. CARTRIDGE, INCENDIARY, T18 (M96), 20-MM GUNS, M1, AN-M2, M3, AND BR. H.S./A/ (fig. 28), is for use against aircraft, functioning with incendiary effect, similar to cal. .50 incendiary cartridges. The body is made of cold-drawn steel. The nose, threaded to screw into body, is made of a die-cast zinc alloy; it is painted light blue for identification similar to small-arms cartridges. Both the body and nose are filled with incendiary materiel. This round does not require a fuze, as functioning is initiated by impact of nose upon target.

DATA

Weight of complete round	0.55 lb	Width of rotating band	0.203 in.
Length of complete round	7.20 in.	Type of base	Square
Length of projectile	3.245 in.	Radius of ogive	2.54 cal.
Length of cartridge case	4.34 in.	Muzzle velocity	2,840 ft per sec
Maximum range			5,700 yd

26. CARTRIDGE, HE-I, T23 (M97), W/FUZE, P. D., T71E4 (M95), 20-MM GUNS, M1, AN-M2, M3, AND BR. H.S./A/ (fig. 29), is for use against aircraft and light materiel targets, functioning with both explosive and incendiary effect. The explosive filler is tetryl and the incendiary mixture is located in the base of the shell. After the shell penetrates the target, its filler is detonated, the shell shattered, and the incendiary composition ignited. Its fuze is an instantaneous

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

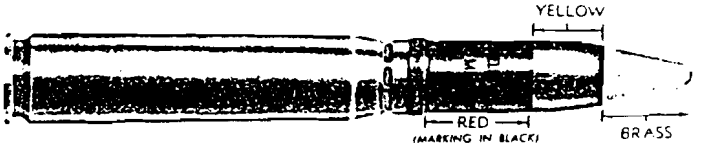


Figure 29 — CARTRIDGE, HE-I, T23 (M97), w/FUZE, P.D., T71E4 (M75), 20-mm Guns, M1, AN-M2, M3, and Br. H.S./A/

DATA

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

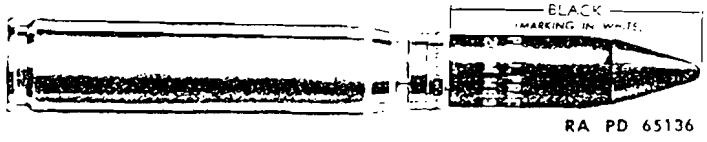


Figure 30 — CARTRIDGE, Practice, T24 (M99), 20-mm Guns, M1, AN-M2, M3, and Br. H.S./A/

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

DATA

Weight of complete round	0.57 lb	Width of rotating band	0.202 in.
Length of complete round	7.22 in.	Type of base	Square
Length of projectile	3.27 in.	Radius of ogive	2.54 cal.
Length of cartridge case	4.34 in.	Muzzle velocity	2,800 ft per sec
Maximum range			5,750 yd

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.

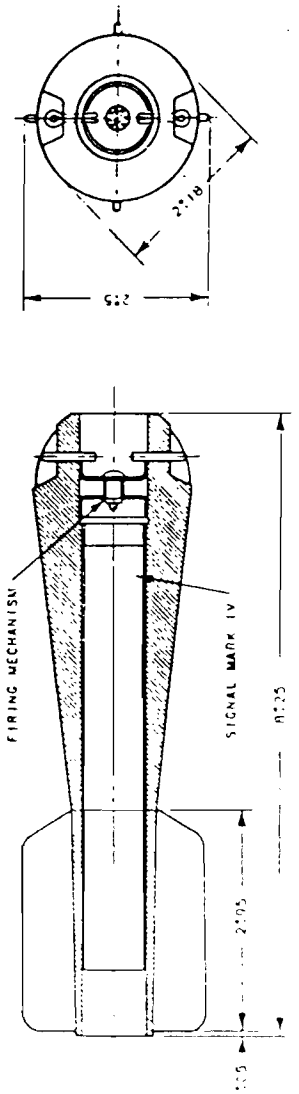


Figure 277 — Practice Bomb Mk. V (Miniature—Navy)

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

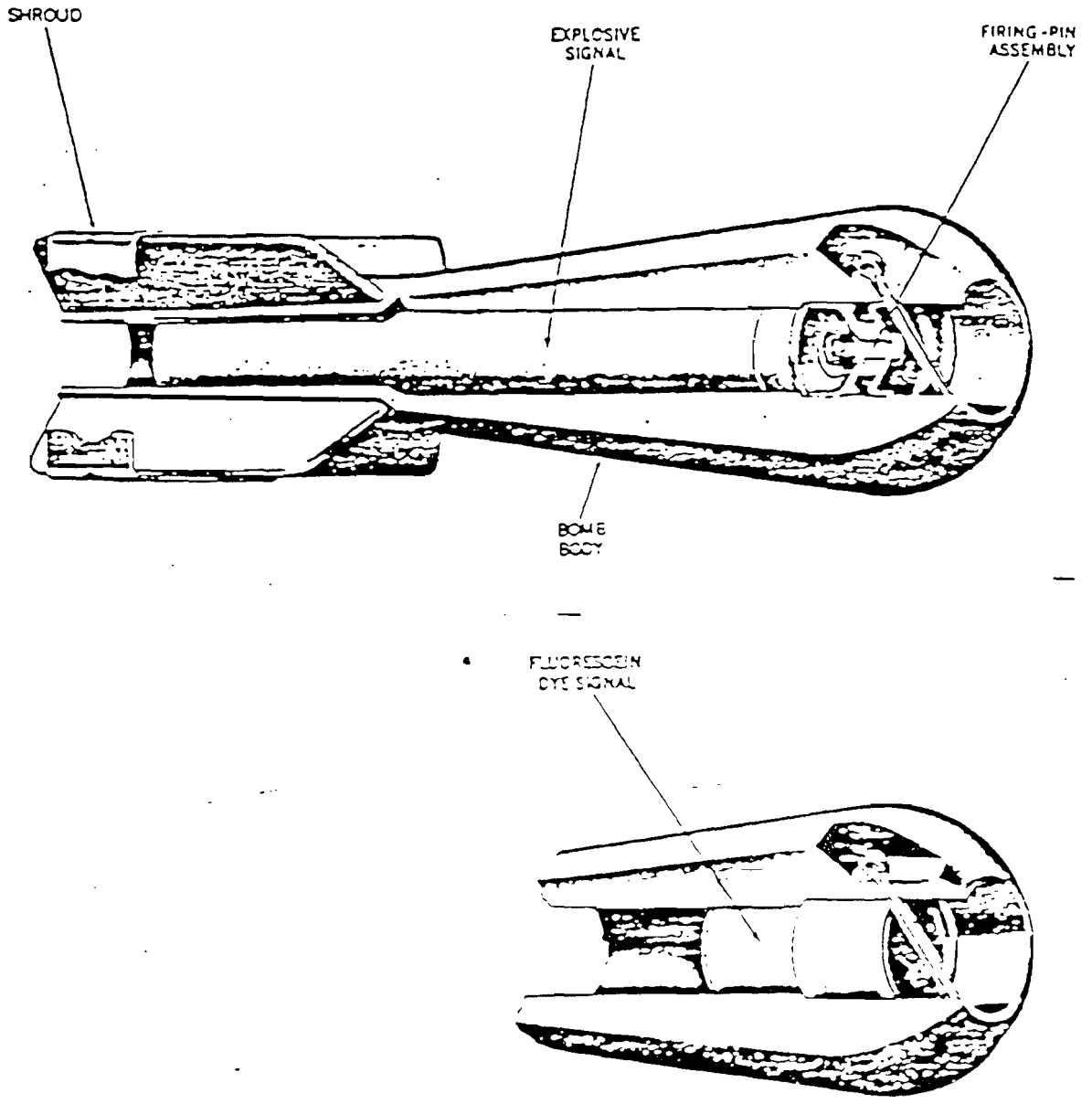


Figure 11-2.—3-lb Miniature Practice Bomb AN-Mk 23 Mod 1, Cutaway View and Detail Showing Signal Mk 5 Mod 0 Installed.

25-LB PRACTICE BOMB Mk 76 Mods 0, 1, and 2

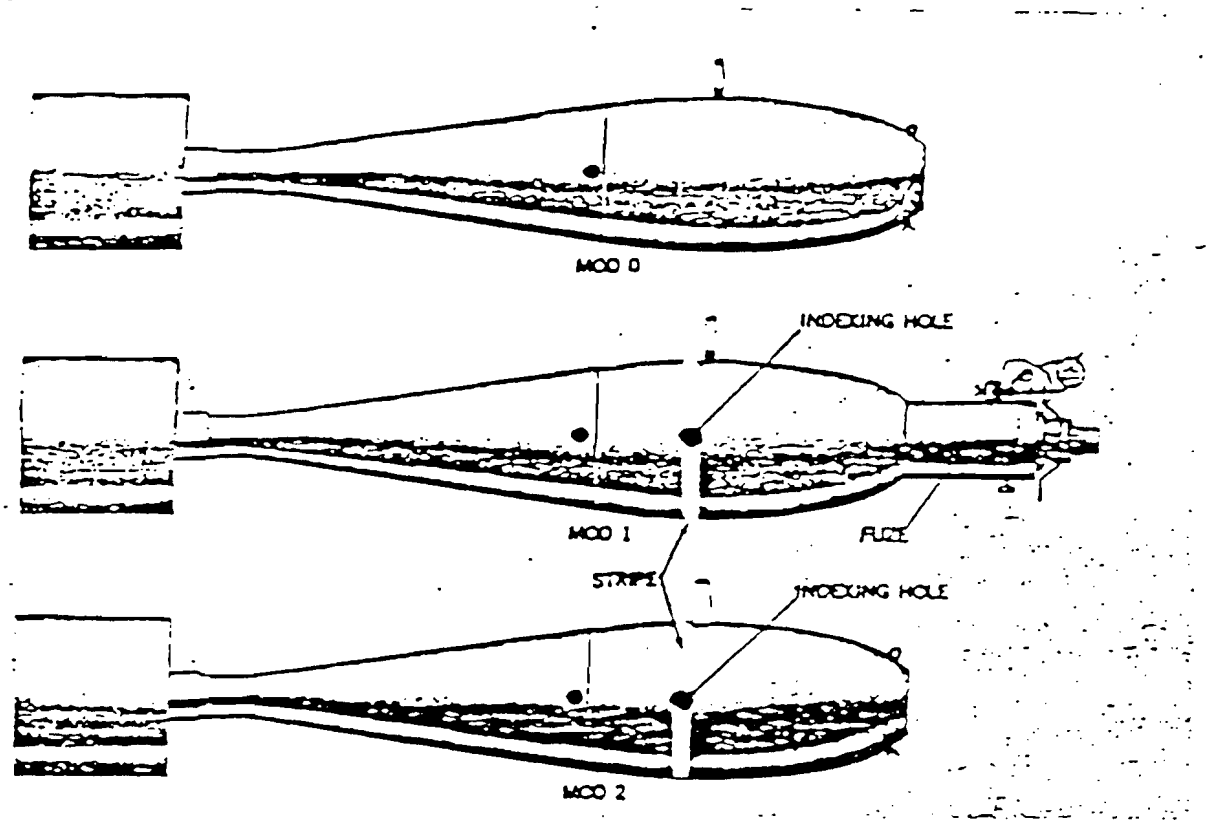


Figure 11-10.—25-lb Practice Bomb Mk 76 Mods.

Mark	76	76	76
Mod	0	1	2
General Arrangement	561638	1031205	1031208
List of Drawings	Sk 165803	165802	165801
Length of Complete Bomb (with fuze) (in.)	22.5	27.155	22.5
Weight of Complete Bomb (lb)	23.8	25.10	23.70
Signal	Mk 4 Mods 0, 1, 2, 3	Mk 4 Mod 2	Mk 4 Mod 2
Fuze	Not Used	AN-M146A2	Not Used
Firing Pin	Mk 1 Mod 0	Not Used	Mk 1 Mod 0

General Description

The 25-lb PE Mk 76 Mod 0, now obsolescent, has a tear-drop shaped, cast-metal body which is centrally bored. The tail-tube assembly fits into the end of the bore. The conical afterbody covers the tail-tube assembly and is threaded to the body. The two sections are staked together to prevent unscrewing. The fin assembly is welded to the tail tube. Firing-Pin Assembly Mk 1 Mod 0 and the signal are assembled into the bore of the body and secured in place by a safety cotter pin.

In the Mod 0 a single lug is positioned just forward of the center of gravity of the bomb. Some bombs of early manufacture

PRACTICE BOMB SIGNAL Mk 4 Mods 3 and 4

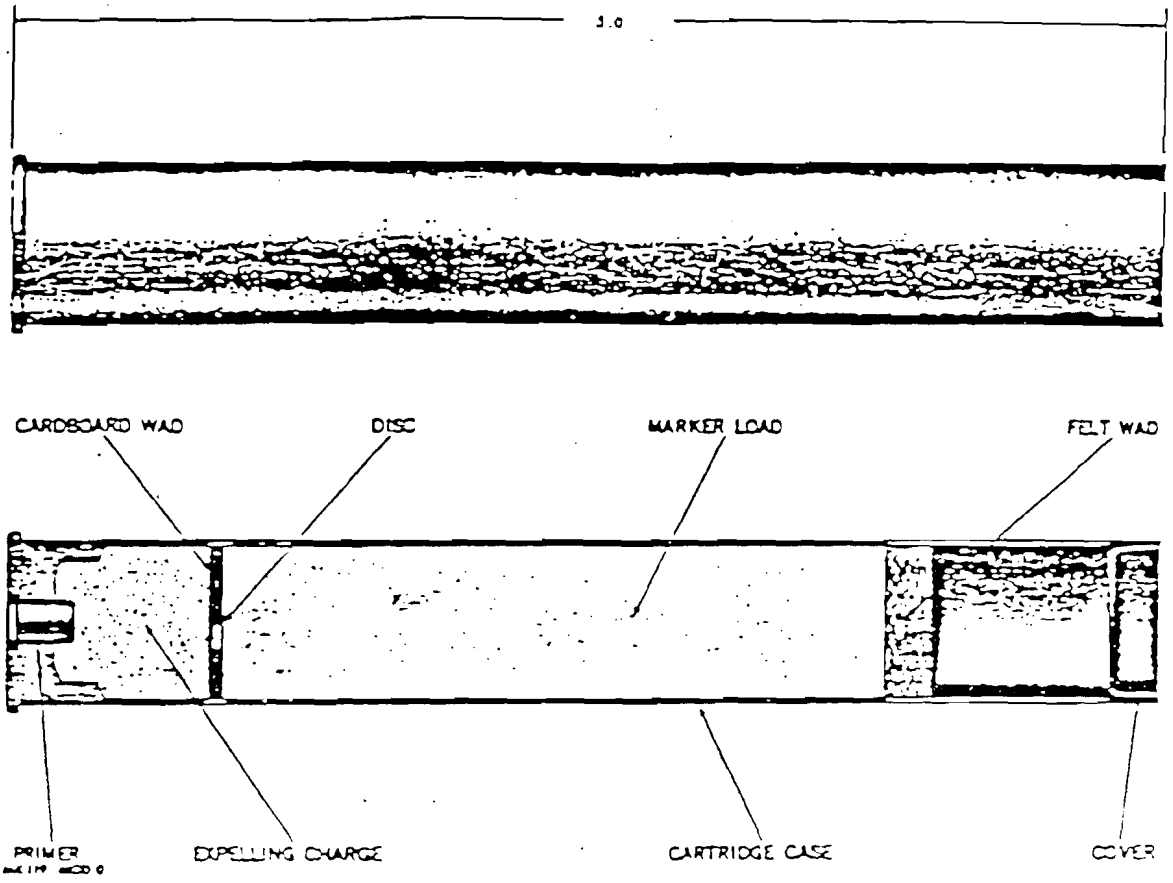


Figure 3-19.—Practice Bomb Signal Mk 4 Mods 3 & 4.

Mark	4	4
Mod	3	4
General Arrangement	398300	1211717
List of Drawings	Sk 166560	256093
Length (in.)	5.0	5.0
Diameter (in.)	0.85	0.85
Weight (lb)	0.16	0.16
Case Material	Aluminum	Aluminum
Expelling Charge	Smokeless powder	Smokeless powder
Marker Load	Stabilized red phosphorous	Zinc oxide
Shipping Containers:		
Cardboard Carton	200 signals	200 signals
Wood Box	25 cartons	25 cartons

General Description

Practice Bomb Signals Mk 4 Mods 3 and 4 are essentially 10-gage shotgun shells of extra length. They contain an expelling charge of smokeless powder and are primed with a Primer, Mk 113 Mod 0. A pyrotechnic

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.

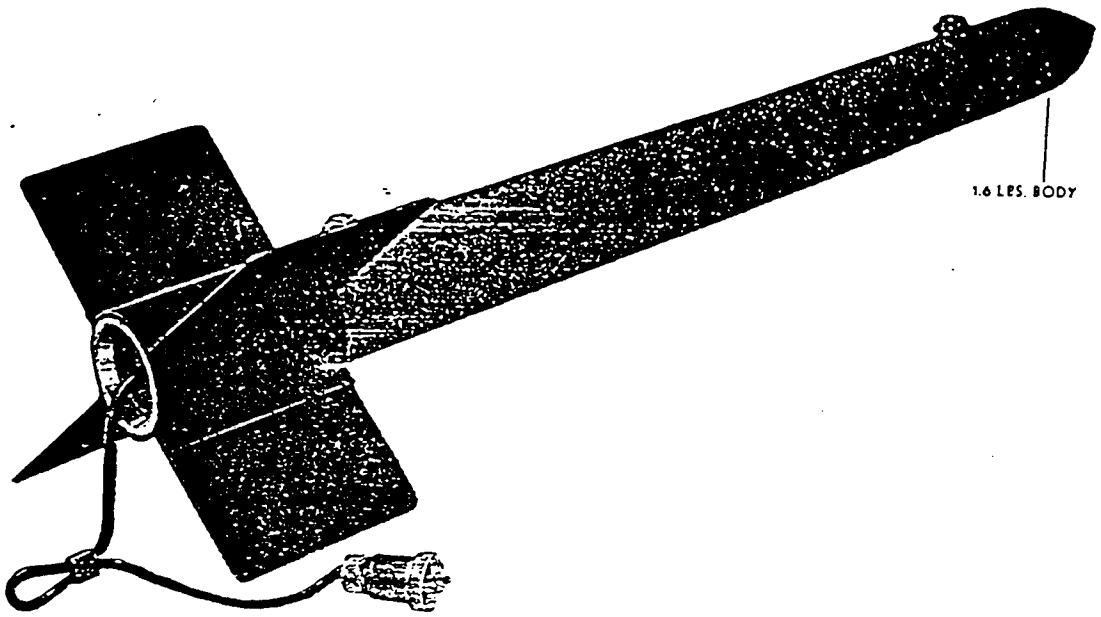


Figure 1.—2.25-inch Subcaliber Aircraft Rockets

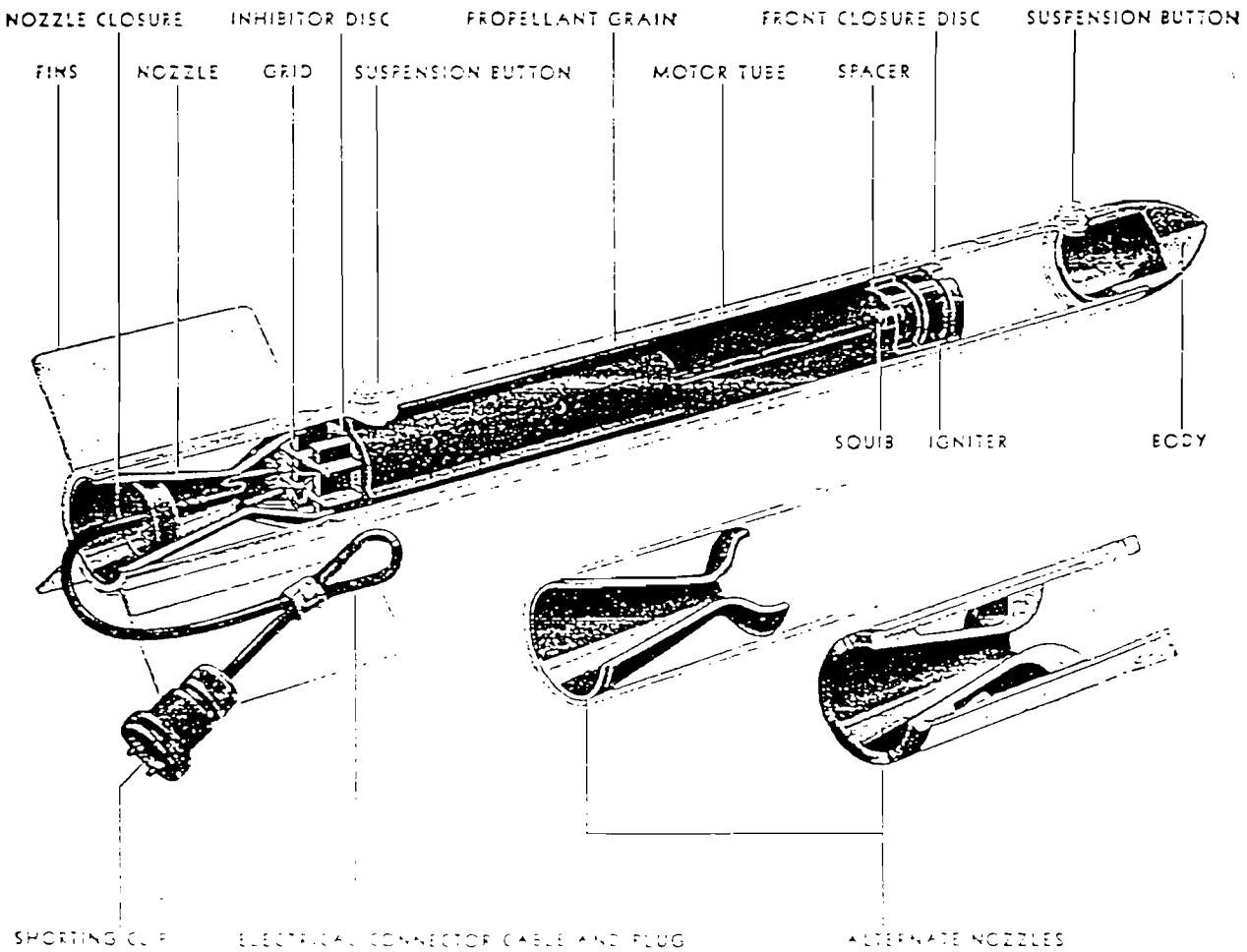


Figure 2—Descriptive View of Rocket

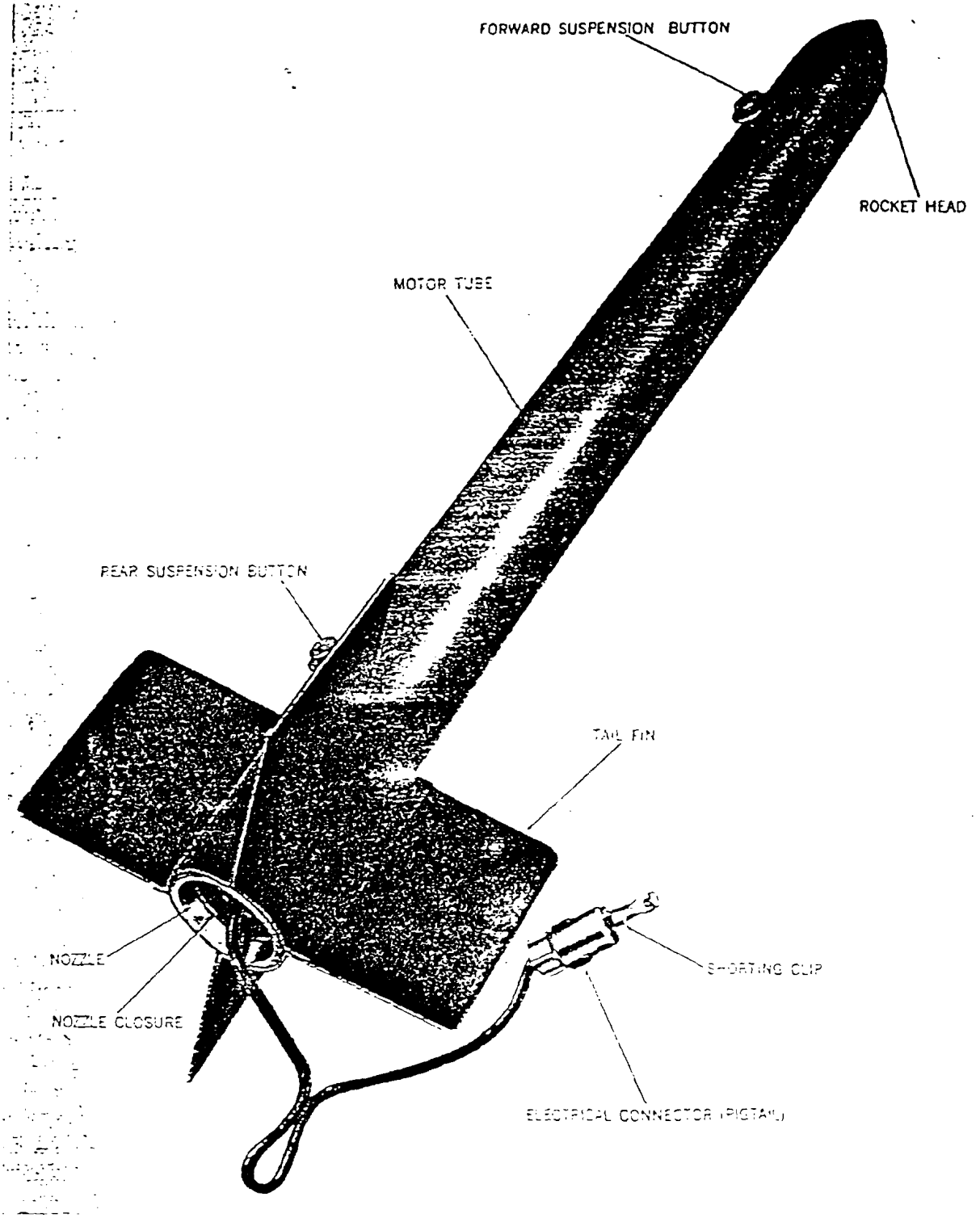


Figure 17—2.25 Subcaliber Aircraft.

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-

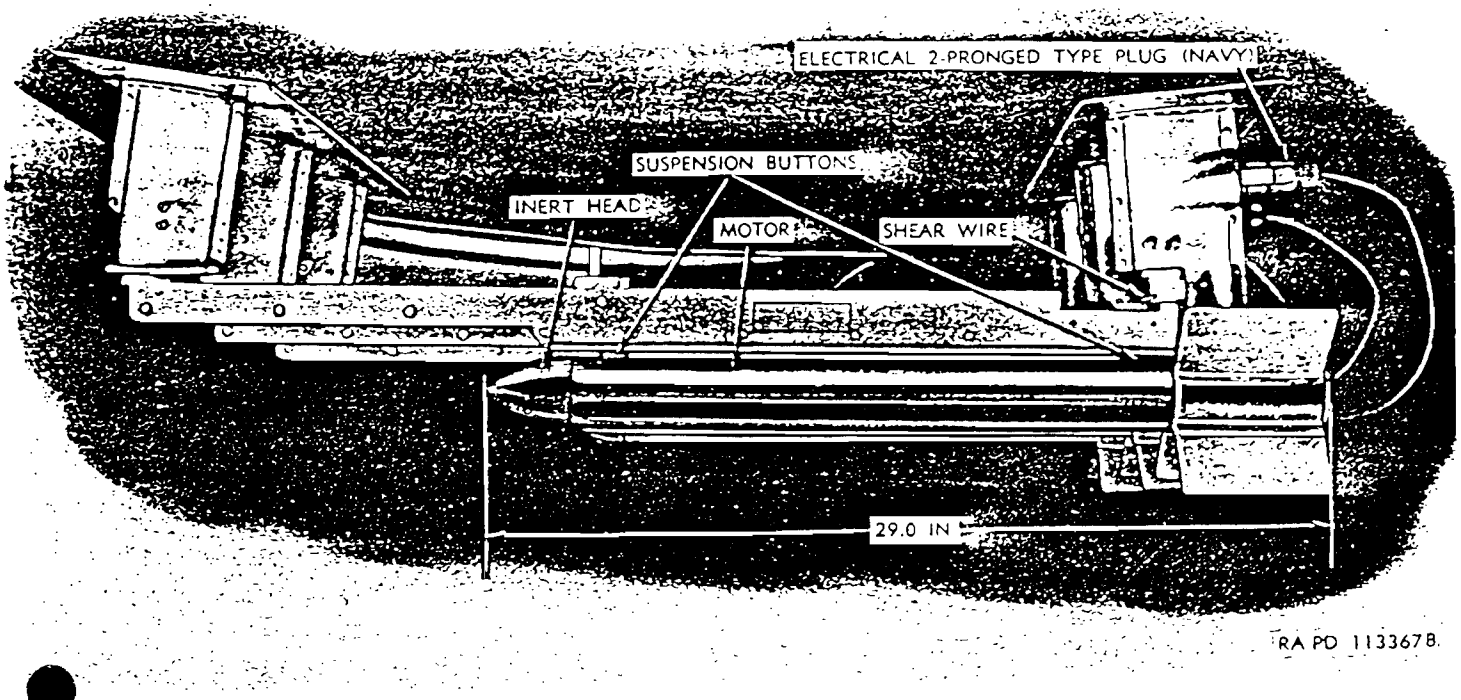


Figure 35. Rocket, practice, 2.25-inch: SCAR (with launcher).

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)	1130	1130	
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	440 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	3.75	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 IV

TARGET ROCKETS

27. DESCRIPTION AND DATA.

a. General. The 3.25-inch target rocket (fig. 25) is designed to provide a fast-flying target for training of automatic antiaircraft gun crews. It consists of a motor assembled in a long tubular body to which three large plywood fins are attached. Later models have a flare assembled to the nose for increased visibility and easier spotting. The motor is assembled in the forward part of the body and contains a 3.2-pound propelling charge in the form of 18 single-perforated grains strung on the wires of a cage-like support. The individual grains are ⅞-inch outside diameter and 5 inches long. The igniter consists of a charge of black powder divided between a tube in the nose and a pair of cylindrical bags attached to the propellant. The igniter squib is assembled in the tube with one lead grounded to the body of the rocket and the other connected to the nose which is insulated from the body by a fiber disk. The fins are shipped unassembled and are attached to the body by spring hooks. The fins are much larger than necessary to stabilize flight in order to provide a large target area. However, care should be exercised in firing with a cross wind since the large fins cause the rocket to tend to head into the wind.

b. Models.

(1) 3.25-inch AA target rocket M2 is characterized by the ogival nose closed by a standard pipe cap.

(2) 3.25-inch AA target rocket M2A1 is characterized by the addition of a small flare assembly to the nose of the rocket. The flare assembly replaces the pipe cap.

(3) 3.25-inch AA target rocket M2A2 is characterized by a flat nose with the flare assembled thereto, and a different system of igniter contact. This model has the lead wires passing in turn through the nozzle and an inner fiber closing cup, and is connected to a household-type service plug, which is held by an outer fiberboard closing cup.

Eighteen inches of igniter cable coiled between the closing cups provides for withdrawing the plug for connection to the launcher.

c. Data.

MODEL	M2	M2A1
Range (max)	1700 yd	1700 yd
Velocity (max)	530 ft per sec	530 ft per sec
Temperature limits	−30 to +120 deg F	−30 to +120 deg F
Burning time	.25 to .10 sec	.25 to .10 sec
Burn-out point (feet from muzzle)	70 ft	70 ft
Length	59.1 in.	59.9 in.
Weight	35.1 lb	36.3 lb
Flare, burning time	—	30 sec

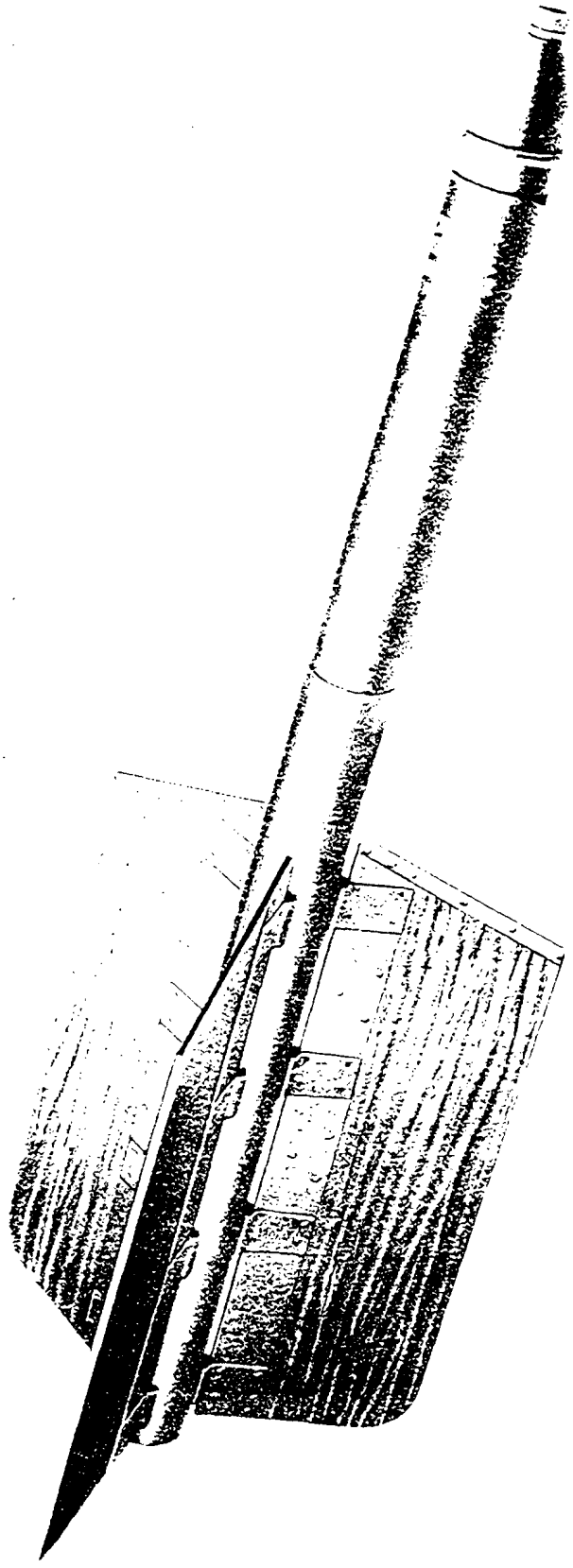


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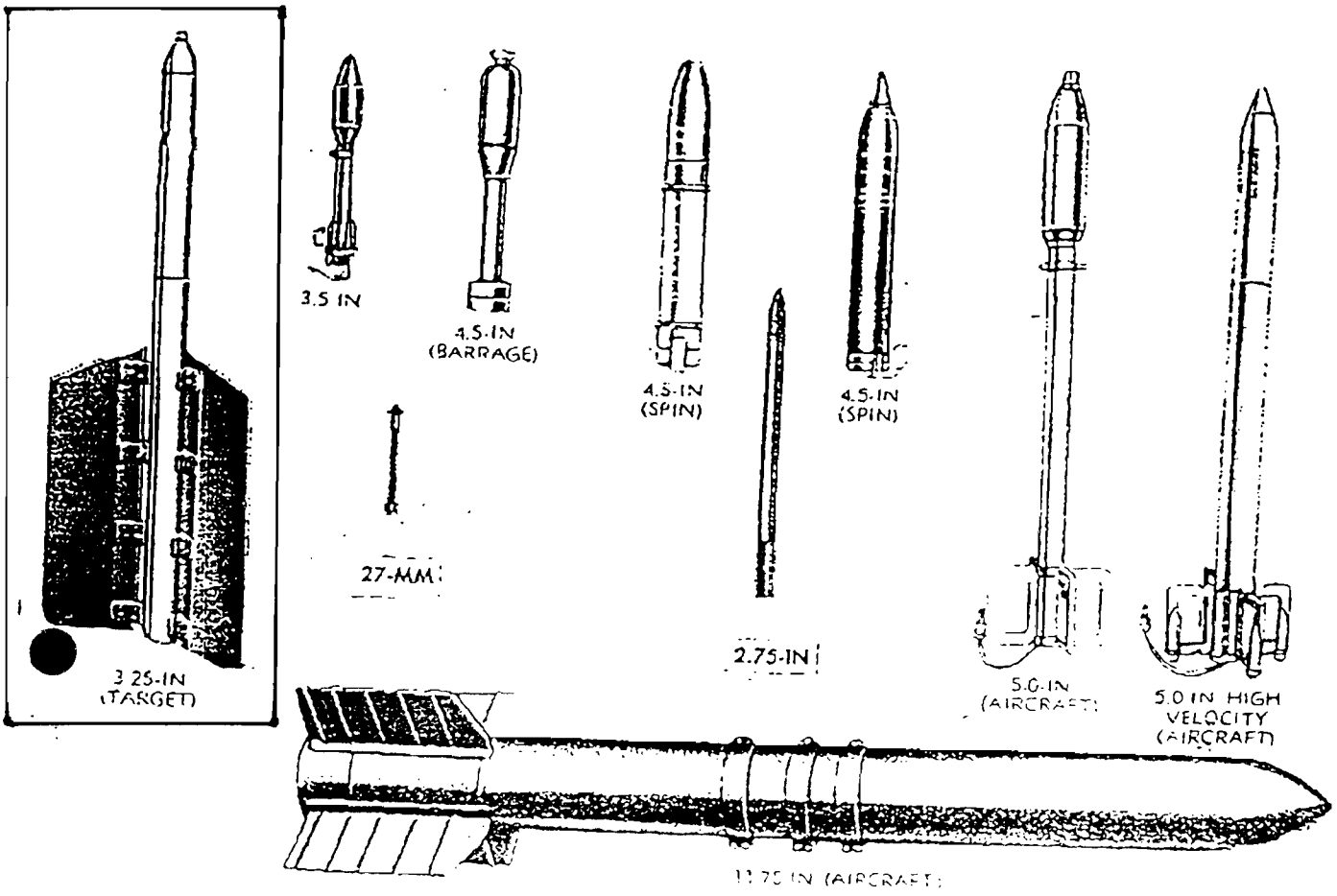
Figure 25 — 3.25-inch AA Target Rocket M2



TYPICAL EXAMPLES OF MILITARY [illegible] AND THEIR APPROXIMATE SIZES

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 [illegible]. The thickness of the disc is such that it clears 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 [illegible] 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 35 grams of black powder.

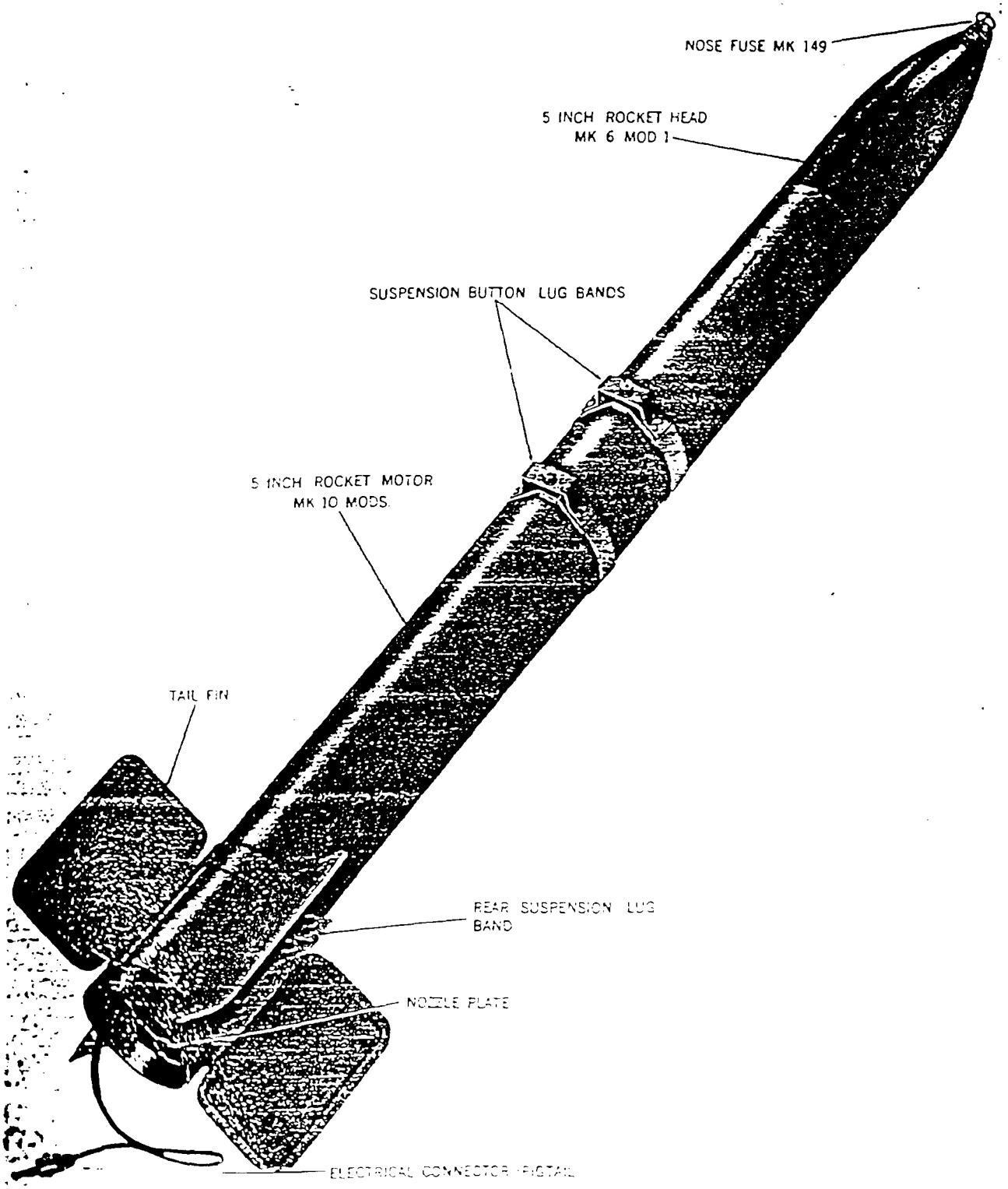


Figure 1—5"0 High-Velocity Aircraft Rocket

2. 5.0-Inch High-Explosive Rocket Heads (HVAR)

a. General Description. Listed below are the various HVAR heads which are assembled with 5.0-inch rocket motors to form HVAR rockets. Complete round data and nomenclature are given in tables II and III. The TNT loaded heads Mk 6 and Mods are fitted with a 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 VT fuze. The head Mk 25 Mod 1 is a shaped charge type (having internal copper cone) loaded with composition B. As shipped, 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-

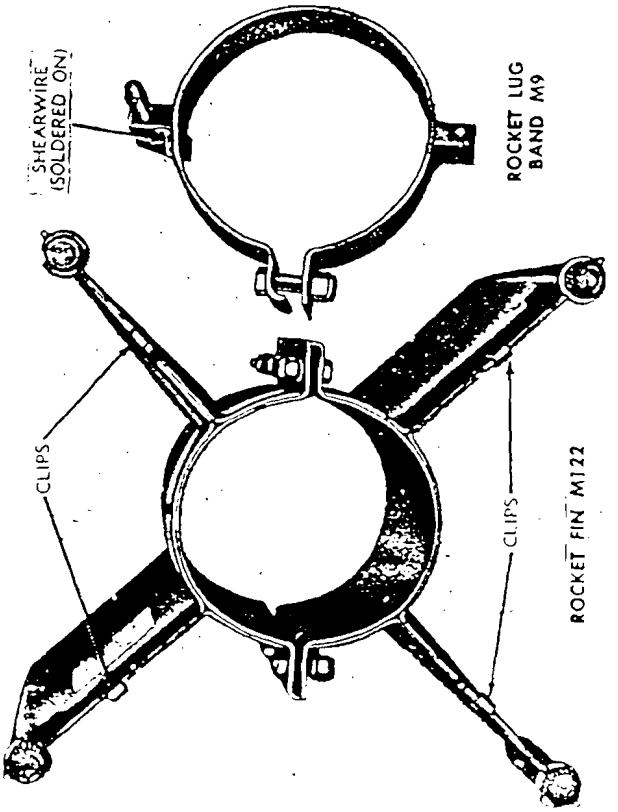
Table II. Components Comprising Complete Rounds of Aircraft Type Rockets and Related Data—Continued

Head			Motor			Fuze		Velocity (fps)	Use
Diameter (in.)	Mark and Mods	Filler	Diameter (in.)	Mark and Mods	Propellant grain	Nose	Base		
5.0	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
5.0	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
5.0	Mk 6 Mods	Plaster	5.0	Mk 10 Mods	Mk 18 Mod 0	None	None	1,325	Practice
5.0	Mk 6 Mods	Plaster	5.0	Mk 2 Mod 3	None	None	None	None	Drill
5.0	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)

pellant 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 9-1300.

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 [illegible]



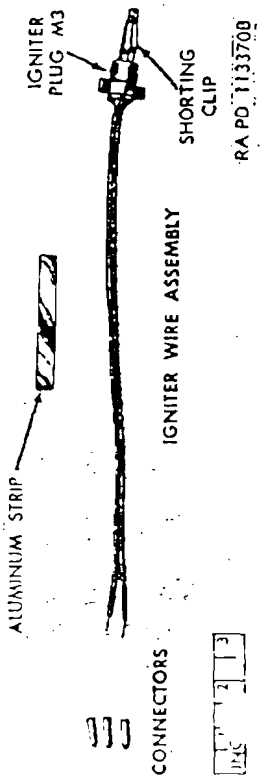
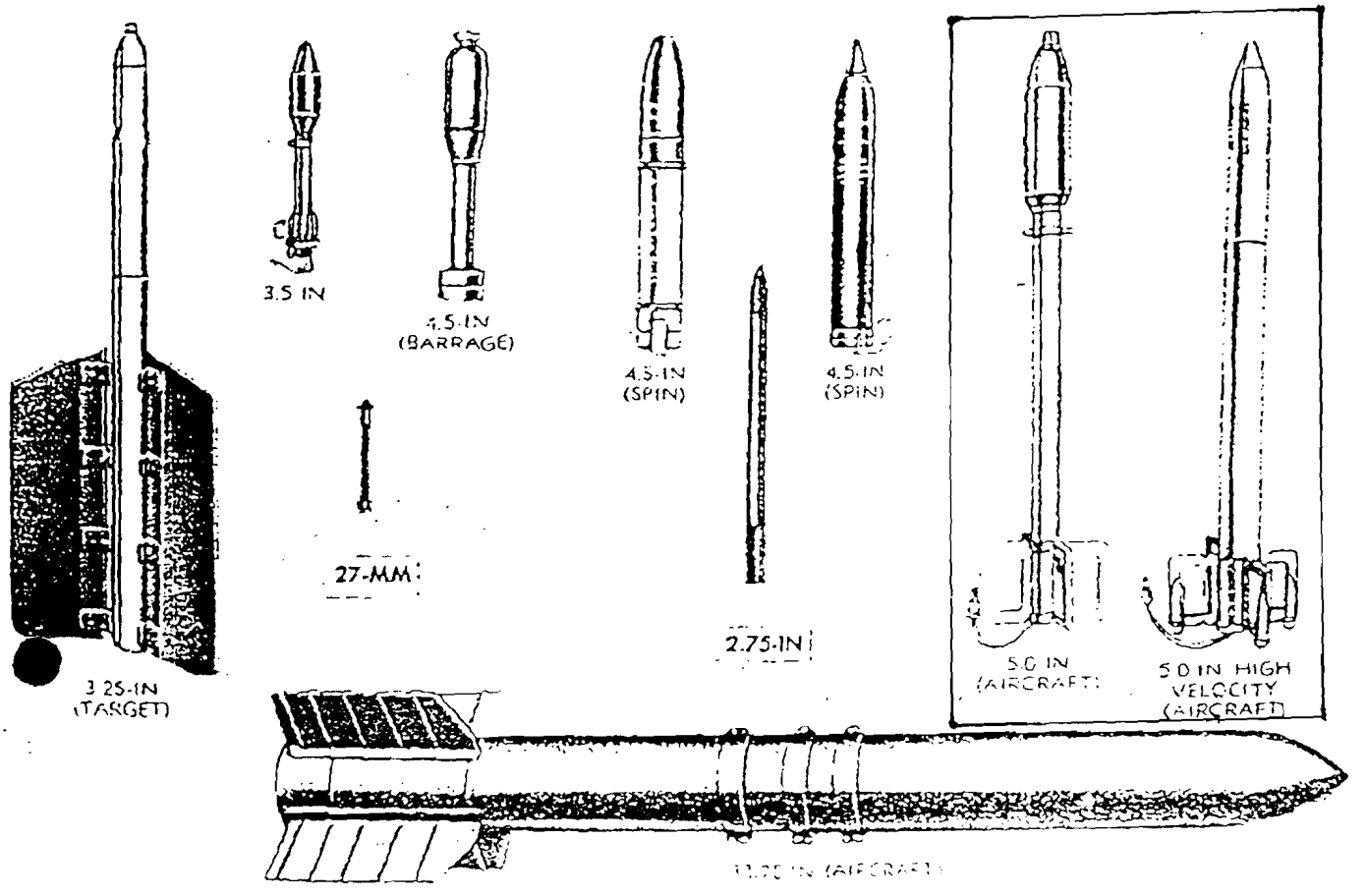


Figure 38. Fin assembly kit, 5.0-inch rocket: MJ4 (T48) for 5.0-inch high-velocity aircraft rocket (Navy).



TYPICAL EXAMPLES OF [illegible]

Ordnance and Explosive Waste
Archives Search Report
for
Assateague Island
Worcester County, Maryland and Accomack County, Virginia
Project Number C03MD093001

APPENDIX E

REPORTS/STUDIES

APPENDIX E

REPORTS/STUDIES

Table of Contents

U.S. NAVAL AVIATION ORDNANCE TEST STATION

CHINCOTEAGUE VIRGINIA

BROCHURE

OF

GENERAL AND DESCRIPTIVE INFORMATION

BROCHURE OF GENERAL AND DESCRIPTIVE INFORMATION

UNITED STATES NAVAL AVIATION ORDNANCE TEST STATION
and
UNITED STATES NAVAL AUXILIARY AIR STATION
CHINCOTEAGUE, VIRGINIA

25 September 1949

A. GENERAL

1. Historical Data.

(a) The Naval Aviation Ordnance Test Station was established by the Bureau of Ordnance in 1946 to provide a test range and trained personnel to test, modify, and develop guided missiles, aircraft weapons, and aviation fire control equipment. These equipments are under development by other government establishments, by universities, and by civilian contractors. This Station was commissioned on 15 April 1946 and placed under the command of Captain W. V. R. Vieweg, USN. On 5 January 1949, Captain G. K. Fraser, USN, relieved Captain Vieweg as Commanding Officer.

(b) The Commanding Officer of the Naval Aviation Ordnance Test Station has been assigned additional duty as Commanding Officer of the Naval Auxiliary Air Station.

2. Description.

(a) The land around the combined Station is flat and of low elevation; much of it, particularly to the eastward, is salt water marsh and almost completely uninhabited. The remainder consists largely of farms and woodland, with a few small and scattered rural communities. The nearest towns are Chincoteague, Virginia, five miles to the east, population 2,500, and Pocomoke City, Maryland, fifteen miles to the northwest, population 3,000.

3. Location.

(a) Landing Field, Latitude 37° 56' 35" N., Longitude 75° 33' 40" W.

(b) The combined Naval Auxiliary Air Station and the Naval Aviation Ordnance Test Station is located on the Eastern Shore of the Delaware, Maryland, Virginia (Delmarva) peninsula approximately 60 miles north of Cape Charles and about 5 miles west, across Chincoteague Bay, from Chincoteague

Island. It is 87 air miles northeast of Norfolk, Virginia, and 104 miles southeast of Washington, D. C. Bordered on the south by state highway 175, it is 5 miles east on that route from U. S. Highway 13, one of the primary coastal entries to the south.

4. Areas.

(a) Land: (Acres)

	Dry	Marsh	Total
Inland	1026.49	250	1276.49
Easements	2.0		2.0
Leased	201.11	*5352	5553.11
	1229.60	5602	6831.60

* Both marshy and dry.

5. Climatological Data.

(a) Monthly Temperature and Precipitation Averages:

Month	Temperature - Degrees F.	Precipitation - Inches	Snowfall - Inches
August	73.7	7.17	None
September	66.9	4.69	None
October	55.0	1.90	None
November	51.7	6.00	None
December	40.1	2.69	0.20
January	44.7	1.64	Trace
February	45.7	2.95	Trace
March	44.7	2.20	Trace
April	51.8	1.39	None
May	62.6	1.67	None
June	72.7	1.63	None
July	80.7	0.67	None

(b) Prevailing winds - for the summer months, southwesterly, and the winter months, northwesterly.

(c) Annual snowfall - 1 to 3 inches. Frequency - 3 to 6 days per year.

6. Tides.

(a) Average high 2.86 feet. Average low 0.3 feet.

7. Datum Plane.

(a) Elevation 38.0 feet at MLW water.

(f) A baseball diamond.

(g) Two softball diamonds.

(h) One improvised football field.

(i) A 9-hole golf course.

7. Fences.

(a) 16,920 linear feet of wire mesh fencing.

8. Training Facilities.

The following training facilities are available:

(a) Four link trainers.
(b) One combined 16MM theatre and lecture room.

9. Test Ranges.

The following test ranges are available to the Naval Aviation Ordnance Test Station for use in connection with its various projects:

(a) The Wallops Island test range.

(b) The "Bullseye," which is a Liberty ship hull grounded on a sand bar in the Chesapeake Bay.

(c) The machine gun and rocket test range.

SITE SURVEY SUMMARY SHEET
FOR
DERP-FUDS SITE NO. C03MD093000
12 SEPTEMBER 1991

SITE NAME: Assateague Island

LOCATION: Assateague Island, Worcester County, Maryland; see Location Map, Attachment A

SITE HISTORY: Assateague Island is a 37 mile long barrier island that parallels the Maryland and Virginia coastlines. The entire island encompasses approximately 17,552 acres of land; 8,018 acres in Maryland and 9,534 acres in Virginia. The U.S. Lighthouse Service owned portions of the island as early as 1806. A lighthouse was constructed at the southern portion of the island. The Coast Guard accepted a transfer of 49.88 acres from the U.S. Lighthouse Service in 1932. The Coast Guard established two lifesaving stations on the Virginia portion of the island. From approximately 1944 to 1946 or early 1947, the Navy reportedly established two rocket ranges on portions of the island along the Maryland coast (see Attachment B). The Navy ranges reportedly were used for target practice by land based aircraft and possibly by naval aircraft. No records related to the method of acquisition of these portions of the island by the Navy were found. Correspondence between National Park Service personnel and Mr. Adrien Smith, an enlisted man who served as a Navy spotter at the northern range from 1945 to 1946, substantiates the Department of Defense (DOD) usage. In addition, the Park Service historian at the site indicated that several people who lived on the island during this time remember bombing runs being conducted on the island. Physical evidence of DOD site usage in the form of World War II vintage ordnance washed ashore in July 1988. A case incident report was filed on 24 July 1988 by the National Park Service (see Attachment C). Investigations by the Department of the Navy, Mobile Unit 2, Explosive Ordnance Disposal (EOD) team based in Fort Story, Virginia revealed potential areas of concentrated ordnance buried just off shore near the North Ocean Beach protected swimming area. Burial of ordnance is consistent with the method of disposal practiced by DOD during the World War II era. No specific documents associated with DOD acquisition or disposal of property could be located.

Subsequent to DOD usage, much of the Maryland portion of the island was subdivided into individual lots. Many private dwellings and roads were constructed. National Park Service personnel relate that in 1963 a storm destroyed nearly all the structures that had been built on the island. At this time a decision was made to establish a National Park rather than to rebuild. Assateague Island National Seashore was formally authorized by an Act of Congress in 1965. The Park is administered by the U.S. National

Park Service. Between 1965 and the early 1970's, the Park Service acquired approximately 7,105 acres fee of which 6,900 acres fee are located in Maryland and 205 acres fee are located in Virginia. An additional 680 acres were acquired by the State of Maryland for use as Assateague State Park. The State of Maryland subsequently acquired an additional 16 acres for a total of 696 acres in Maryland. A total of approximately four acres of privately retained rights exist in the Maryland portion of Assateague Island. The remaining 418 acres of the Maryland portion of Assateague Island are currently owned by the U.S. Fish & Wildlife Service as part of the Chincoteague National Wildlife Refuge.

In 1943, the Chincoteague National Wildlife refuge was established. The refuge is owned by the U.S. Fish & Wildlife Service and consists of a total of 9,439 acres (9,021 acres in Virginia and 418 acres in Maryland). Less than one acre was retained by the U.S. Coast Guard for use as a lighthouse. The remaining 308 acres of the Virginia portion of Assateague Island are owned by the Commonwealth of Virginia.

SITE VISIT: Mr. Frank Graziano and Ms. June Ching of EA Engineering, Science, and Technology, Inc., under contract to the U.S. Army Corps of Engineers, Baltimore District, and Mr. Kirk Davis of Human Factors Applications, Inc., (subcontractor to EA Engineering), conducted a site visit of Assateague Island on 24 July 1991. During the site visit, Mr. Graziano, Ms. Ching, and Mr. Davis met with Mr. Brion Fitzgerald, the Chief Ranger of the Assateague Island National Seashore. Subsequent telephone conversations were held between Mr. Greg Johnson of EA and Mr. Gordon Olson of the National Park Service and Mr. John Schoerer of the U.S. Fish & Wildlife Service (USFWS).

CATEGORY OF HAZARD: OEW

PROJECT DESCRIPTION: There is one potential project at this site.

a. BD/DR. No further action. Interviews with National Park Service and USFWS personnel indicate that all improvements made by DOD have been removed from the site.

b. OEW. A project to verify the location of and remove/dispose buried World War II vintage ordnance from two locations is proposed. A case incident record was filed in July 1988 by the National Park Service. The record reported that buried World War II ordnance had washed ashore in the proximity of the North Ocean Beach swimming area at Assateague Island National Seashore. An underwater survey conducted by a Department of the Navy EOD team revealed one of two areas where buried ordnance were suspected to be located. The possible locations of the two buried ordnance disposal sites are shown on Attachment B. Only the Northern disposal site has actually been confirmed by U.S. Navy EOD underwater survey. The possible location(s) of the southern

burial disposal site is solely based on information obtained by National Park Service personnel. The confirmation of location and removal of ordnance from both the northern and southern disposal sites is proposed. The northern disposal site is currently suspected to be under water just off the North Ocean Beach swimming area. With this portion of the island receding, ordnance believed to have been buried at the high water mark in the 1940's would now be submerged. The southern dump site is believed to still be on dry land since the southern portion of the island has been fairly stable. Both sites should be reasonably easy to locate in the field using large scale search techniques since the potentially large volume of ordnance would present a large target.

AVAILABLE STUDIES AND REPORTS: United States Department of the Interior, National Park Service, Case Incident Record (No. 880407), 14 July 1988, Attachment C.

PA POC: William C. Piccirilli, CENAB-EN-HE, (301) 962-3542

DEFENSE ENVIRONMENTAL RESTORATION PROGRAM
FOR FORMERLY USED DEFENSE SITES
FINDINGS AND DETERMINATION OF ELIGIBILITY
ASSATEAGUE ISLAND
ASSATEAGUE ISLAND, WORCESTER COUNTY, MARYLAND
SITE NO. C03MD093000

FINDINGS OF FACT

1. Assateague Island is a 37 mile long barrier island which parallels the Atlantic coast of Maryland and Virginia. The entire island contains approximately 17,552 acres: 8,018 acres in Maryland and 9,534 acres in Virginia. No documents were found through Baltimore District, Worcester County, or U.S. National Park Service real estate records indicating that the Department of Defense (DOD) ever established legal interest in the property.

2. Prior to 1943, the U.S. Lighthouse Service and U.S. Coast Guard constructed and operated one lighthouse and two lifesaving stations on the Virginia portion of the island. From approximately 1944 to 1946 or early 1947, it is alleged that portions of the beach were used by the Department of the Navy as bombing ranges, although no official documentation was located. Since records were unavailable, the dates of DOD use and type of improvements constructed cannot be established. Furthermore, since no records indicating DOD control of the site are available, it is believed that the site was not under DOD control during the period of DOD ownership or use. Subsequent to a July 1988 incident where World War II vintage ordnance washed ashore near the North Ocean Beach swimming area, an ordnance investigation of the northern buried ordnance disposal site was conducted by a U.S. Navy Explosive Ordnance Detachment (EOD), Mobile Unit 2 based at Fort Story, Virginia. Based on the U.S. Navy EOD ordnance investigation and interviews with National Park Service personnel, it is likely that there are two possible locations where World War II vintage ordnance is buried. The possible locations of the two buried ordnance disposal sites are shown in Attachment B. The northern disposal site is suspected to be under water just offshore from the North Ocean swimming area on the Maryland portion of Assateague Island which is currently under National Park Service control. The possible location(s) of the southern buried ordnance disposal site is believed to be on dry land on the Maryland portion of Assateague Island which is currently owned by the National Park Service. It is also alleged by previous island residents that Navy ships fired on the island from the ocean; that aircraft were launched from naval vessels at sea to also fire on the island; and that the island was used for militia training, based on discussion with Mr. Brion Fitzgerald - Chief Ranger at Assateague Island National Seashore.

DERP-FUDS INPR FOR SITE No. C03MD093000
ASSATEAGUE ISLAND
ASSATEAGUE ISLAND, WORCESTER COUNTY, MD

3. Dates, acreage, and method of disposal by DOD cannot be established. Worcester County, Baltimore District, and National Park Service real estate records were reviewed. No documents related to DOD acquisition or disposal of Assateague Island lands were located. The current owners of the site include the State of Maryland (696 acres in Maryland). The State of Maryland property is used as Assateague Island State Park. The U.S. National Park Service owns approximately 6,900 acres in Maryland and 205 acres in Virginia and operates the site as Assateague Island National Seashore. The U.S. Fish & Wildlife Service (USFWS) owns approximately 418 acres in Maryland and 9,021 acres in Virginia. USFWS uses their property as the Chincoteague National Wildlife Refuge. The Commonwealth of Virginia owns 308 acres of salt-marshland in Virginia and the U.S. Coast Guard owns less than one acre at the southern portion of the Virginia portion of the site which it operates as a lighthouse. Approximately four acres of privately retained rights remain as inholdings in the Maryland portion of the site.

DETERMINATION

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

Recommended for Signature:

9/20/91
Date

FRANK R. FINCH, P.E.
Colonel, Corps of Engineers
Commanding

19 Dec 1991
Date

GERALD C. BROWN
Brigadier General, USA
Commanding

PROJECT SUMMARY SHEET
FOR
DERP-FUDS OEW PROJECT NO. C03MD093001
ASSATEAGUE ISLAND
ASSATEAGUE ISLAND, WORCESTER COUNTY, MARYLAND
SITE NO. C03MD093000
12 SEPTEMBER 1991

PROJECT DESCRIPTION: From approximately 1944 until 1946 or early 1947, two rocket ranges were established by the Department of the Navy on Assateague Island. When the ranges were abandoned, ordnance was collected and buried at disposal sites located near each range. In July of 1988, ordnance washed ashore near the North Ocean Beach swimming area, which is in the reported area of the northern rocket range. The ordnance was removed and disposed by the U.S. Army 144th EOD unit based at Fort Meade, Maryland. Subsequent investigations by the Department of the Navy revealed concentrated pockets of suspected ordnance located just offshore. During the ordnance exposure incident, seven rocket motors, six 5-inch shells, and numerous lead/alloy ballistic tips were recovered. No removal of the majority of the suspected ordnance has been undertaken.

During the 24 July 1991 site visit conducted by EA Engineering and Human Factors Applications, Inc. personnel, attempts were made to locate the buried ordnance disposal site for the southern rocket range. Due to the large areal extent of the southern range, a comprehensive search was not conducted. The second buried ordnance disposal site was not located during the July 1991 site visit. However, it is very likely that a second buried ordnance disposal site does exist. During the July 1991 site visit, a piece of a 5-inch rocket motor was discovered in one of the reported areas of the southern range. Since both disposal sites pose a threat to public safety, it is recommended that a large scale search technique be used to identify the exact locations of the trenches and that the ordnance be excavated and removed. (See Human Factors Applications, Inc. Evaluation and Recommendations, Attachment D.)

PROJECT ELIGIBILITY: While no records of DOD acquisition of property on Assateague were found, correspondence with an enlisted man who worked as a Navy spotter on the northern range as well as personal recollections of former island residents substantiate the use of Assateague Island by the Navy. In addition, the 1988 discovery by the Navy of potentially large amounts of ordnance just offshore near the reported location of the northern rocket range confirms DOD usage of the site area. The project has been evaluated in accordance with Appendix A in memorandum CEMP-RT, dated 5 April 1990.

POLICY CONSIDERATIONS: The buried ordnance was a result of former Department of the Navy use of the property and poses an imminent threat to public safety, especially in the proximity of the North Ocean Beach swimming area. While the southern range is located in an area only accessible by four-wheel drive vehicles, the possibility of park visitors coming into contact with ordnance from the second dump site does exist. No deeds or records were found absolving the Navy of responsibility.

PROPOSED ACTIVITIES: The INPR should be referred to HND for determination of further action.

RAC: Attached

DISTRICT POC: William C. Piccirilli, CENAB-EN-HE, (301) 962-3542

HUMAN FACTORS APPLICATIONS, INC.
Explosive Ordnance Disposal Division
1018A North Strauss Avenue
Indian Head, Maryland 20640-1894
(301) 743-2377 *Fax:* (301) 743-7512

July 30, 1991
Serial:91-118

Mr. Gregory Johnson
EA Engineering, Science and Technology
Mid Atlantic Region
Hunt Valley
15 Loveton Circle
Sparks, Maryland 21151

Attn: Mr. Gregory Johnson

Subj: Assateague Island National Seashore Site Visit and Recommendations

Dear Mr. Johnson:

Enclosed is my report and recommendations for the former DoD bombing site at Assateague Island, Maryland.

In the course of our study, and site inspection, I confirmed the presence of unexploded ordnance on the site that poses the potential to be hazardous to the intended use of the land. The explosive hazards do not appear to be wide spread due to a surface range clearance and subsequent ordnance burial performed at the time the range was closed. However, since we were unable to locate these ordnance burial trenches, the volume of ordnance remaining can only be speculated to.

There were two main bombing sites on land and one possibly in Chincoteague bay. When the ranges were closed, apparently the surface ordnance was picked up and buried in trenches near the high water mark. The northern bombing site is located on part of the island that is receding and we believe that this burial site is now underwater. This would explain why ordnance has washed ashore near the northern public swimming areas. There is a very strong possibly that there is another burial trench near the southern range. This site is most likely on dry land, near the high water mark, and in the vicinity of where a piece of a five inch rocket motor was located during our site visit.

Conceivably, using ground penetrating magnetometry and or electric pulse induction search equipments, the ordnance trenches should present a large target and could be easily located.

Based on a very similar U. S. Army reclamation operation at an inert bombing range in Duck, North Carolina, where thousands of pounds of live ordnance was also recovered from the ordnance burial trenches, there exists the strong possibility that live ordnance is present on Assateague Island.

Clearly the remnants of the rocket motors and rocket igniters have always presented a safety hazard as these items were actual live ordnance.

Therefore, we strongly recommend that the bombing and possible trench locations be surveyed with a large scale search technique and the trenches be excavated and ordnance removed.

Sincerely,

Kirk E. Davis
Senior Project Engineer

Copy to: HFA, PA

Encl: (1) Site Evaluation and Recommendations

RESULTS OF SITE SURVEY AND RESEARCH INTO ASSATEAGUE ISLAND NATIONAL SEASHORE RESTORATION

The Explosive Ordnance Disposal Division of Human Factors Applications, Inc. (HFA) as a subcontractor to EA Engineering, Science and Technology is directly concerned with the explosive ordnance and ordnance remnants that are present at Assateague Island National Sea Shore, Maryland. HFA's extensive experience in Defense Environmental Restoration Account (DERA), sites and the hundreds of man-years in explosive ordnance disposal, uniquely qualifies HFA to support the remedial recovery of explosive ordnance and ordnance related materials.

This document is a consolidation of the information provided by the National Park Service, interviews with U. S. Army and U. S. Navy EOD personnel who have responded to ordnance incidents on Assateague Island and discussions with local Park Rangers. The information provided by the National Park Service is a composite of ordnance incident reports and eye witness accounts.

The findings, conclusions and recommendations are on observations by Mr. Davis during a site visit to Assateague Island National Seashore on the 24th and 25th of July 1991 and subsequent research at Wallops Flight Center (NASA), Chincoteague, Virginia.

We were able to determine that Assateague was an active bombing range in support of then Naval Air Station Wallops Island, Virginia and Naval Air Station Manteo, North Carolina, from about 1944 until 1946 or early 1947. The ranges were used primary for dropping of inert 5 inch rockets and 3 inch rockets. However there is also positive indication that MK 43 practice bombs were dropped and strafing was performed with 20mm cannons. On site investigations uncovered part of a 5 inch rocket motor and we were shown an expended MK 43 practice bomb and 20 mm casing found on the Island by a National Park Ranger.

The Bombing Range was used to maintain pilot proficiency in bombing and strafing targets that simulated ships at sea. Most likely there are two land sites and one site in the bay. See the attached map for approximate locations of the sites. All research indicated that most of the ordnance used was inert. However, as documented at the clean up of the inert range in Duck, North Carolina, (the primary range for NAS Manteo), thousands of pounds of live ordnance was uncovered along with the inert items. It was very common practice during that period to use live ordnance without fuzing if there was insufficient inert ordnance to support a training mission. The inert ordnance, especially rockets and practice bombs, are not without explosive components and they do pose a threat to human safety. These rockets had live rocket motors which commonly held a composite of nitrocellulide. They also contained live igniters which were explosive as well.

Based on the information provided by the U. S. Park Service and eye witness accounts, apparently after the Assateague ranges were closed in late '46 or 47, both of the ranges were cleared of surface ordnance. The ordnance was reportedly collected and buried in trenches near each of the bombing sites. The northern burial site was reported to be about 100 feet from the high water mark on the oceanside. This again mirrors the range clearance performed at the Naval Air Station Manteo's range at Duck, North Carolina and was typical of the style of range clearance done during this time frame.

About 1935, a jetty was built on the north end of Assateague Island which resulted in sand and beach erosion almost immediately. This erosion continued to work its way down the island until it reached the approximate location of the northern bombing zone about 10 years ago. Also, about this time was when a history of ordnance being found on the North Beach swimming area began. From that evidence, we theorize that the disposal trench and buried ordnance from the northern range now is most probably located in the surf and beach zones. This represents a constant threat, due to the changing geography of the island there, which may lead to further ordnance washing out of its resting site and into the public domain on any given day.

The location and amount of ordnance on the southern range is still unknown. Although we found part of a five inch rocket motor near the southern range, it is not conclusive that the ordnance was buried there or it remains in heavy concentrations. However, there is strong evidence to assume that both ranges were cleared in a similar fashion and there is ordnance contamination in the southern range along the magnitude of the northern one. This presumed burial site is most likely still on dry land because the beach erosion has not reached that far south yet. If the ordnance was located in burial sites, the sites could be excavated and cleared with a minimal amount of disturbance to the beach environment.

RECOMMENDATION

A large scale sweep should be performed using all necessary "ground penetrating" and electric pulse induction search equipment. The trench locations should be of the magnitude that would be easily identifiable during a large scale search. This search should include a sweep of the beach zone near the north range.

In the event ordnance trenches or large ordnance contaminations are located, these areas should be excavated and the ordnance removed. This is because of the very high probability, and our strong conviction, that there is live ordnance and live components that present a genuine threat to the public use of the Island.

UNITED STATES NAVY AND MARINE CORPS BASES, DOMESTIC

PAOLO E. COLETTA, *Editor*
K. Jack Bauer, *Associate Editor*

Greenwood Press
Westport, Connecticut • London, England
(1985)

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CHINA LAKE, CALIF., NAVAL AIR FACILITY. *See* Inyokern/China Lake, Calif., Naval Air Facility.

CHINA LAKE, CALIF., NAVAL ORDNANCE TEST STATION. *See* Inyokern/China Lake, Calif., Naval Ordnance Test Station.

CHINCOTEAGUE ISLAND, VA., NAVAL AIR FACILITY AND NAVAL AVIATION ORDNANCE TEST STATION, 1943–1959

Chincoteague Island (37°56'N., 75°26'30 W.) is located about three miles from the town of Chincoteague on State Route No. 175 in Accomack County. It lies in the northeast corner of the small area at the base of the Delmarva Peninsula in the State of Virginia 100 air miles southeast of Washington, D.C. The Navy already had an outlying field used by NAS Norfolk (q.v.) at this site. It expanded its holdings over more than 2,000 acres at a cost of about $100,000 and contracted with the Virginia Engineering Co. to build the station, with all buildings classified as temporary. The station was commissioned on 5 March 1942, Lt. Frederick M. Smith, USN, commanding. On board first came carrier fighter, torpedo, and composite squadrons, then PB4Y *Privateers*. Operational training shifted to the *Privateers* by the end of the year 1943. Late in 1944, the Navy leased Salisbury, Md., Airport as an outlying field. Following the war, a Carrier Air Support Unit (CASU) replaced the PBYs, and the mission of the station became the training of carrier-based squadrons and of ground personnel. Among the numerous squadrons was one that went to the USS *Franklin D. Roosevelt* when it was placed in commission.

Since October 1943 the Bureau of Ordnance had sought to establish an experimental unit for the conduct of secret tests and experiments in the latest aviation ordnance projects. Although Naval Ordnance Test Station, Inyokern/China Lake, Calif. (q.v.), tested missiles for both the Bureau of Aeronautics and the Bureau of Ordnance, in June 1946 the latter announced that it would transfer its guided missiles testing facilities and associated personnel, equipment, and aircraft to its Naval Aviation Ordnance Test Station (NAOTS) at Chincoteague. Its mission would be to test, modify, and deliver ordnance and missiles. The station contained quarters for 400 men and a storehouse on a 2,400-acre site, and in 1946 employed 760 civilian workers. By 1949 the CASU was disestablished, and twenty ordnance tests were being carried out in a "four-ring circus," that is, with four different activities involved: VU-4 flew targets, drones, and banners to sharpen the shooting eyes of the ships of the fleet; VX-2 used similar targets, but these were shot at by special weapons or new guns to learn how they would function; and two GMTU-units (Guided Missile Training Units,

Gumtoos) tested guided missiles to see if they measured up to the Navy's combat needs. In 1951 a new rocket division had seventy employees. Occasionally the facility held planning conferences with destroyer officers to discuss future operations in connection with projects to be undertaken for the Navy's Operational Development Force. Often, also, squadrons from other stations would come on board for gunnery exercises at targets installed in Chesapeake Bay, groups of ordnance Reserve officers and some from the Postgraduate School would report for their two weeks of active duty for training, and frequent visitors would come from the Naval Ordnance Test Station, Inyokern.

On 11 March 1949 the Chief of Naval Operations authorized the establishment of a Guided Missile Training Unit at Chincoteague that began to test air-to-underwater missiles. In consequence, the civilian complement allowance increased from 550 to 602. By mid-1949 Chincoteague was successfully using airborne telemetry to receive and record signals from test rockets and advanced from captive to live missile flights. Effective 1 January 1950, the Secretary of the Navy redesignated NAAS Chincoteague Island a Naval Air Facility. Among other tests were those conducted on the F8F *Bearcat* and classified tests for the Operational Development Force, Atlantic. Soon VF-61 was conducting the first Field Carrier Landing Practice with jet aircraft, with F9F *Panther* aircraft making forty landings, and VX-5 thirty. Meanwhile VX-3 (VX means experimental aircraft) laid ten Mark 25 dummy mines at nearby Wallops Island Range in connection with a training film on mine evaluation. A new mission for the NAOTS was received on 15 February 1951:

> To develop, test, and evaluate aviation fire control systems, aircraft guns and associated components, short range guided missiles, and aircraft missile launchers. Perform countermeasures tests, and investigations of electronic and infra-red guidance systems, including the collection of data as required by the Bureau of Ordnance. Modify and improve instrumentation as necessary.

Among the missiles tested were the *Kingfisher*, *Petrel*, and *Grebe*, often while in communication with Wallops Island and NAOTS Inyokern. The mission of the NAAS, meanwhile, was "to provide facilities to support regular operations of fleet carrier aircraft and aircraft engaged in research and development, test, and evaluation work performed by the Naval Air Ordnance Test Station. Provide support for occasional operations with fleet land-based patrol aircraft."

On 6 July there appeared for testing the 30mm aircraft machine gun, the first designed and manufactured in the United States, and on 19 August 1951 NAOTS conducted four different missile flight tests, a new record. Other tests involved the *Spruce* gun sight, High Altitude Dive Bombing, a *Dove* missile released at 15,000 feet by a P4Y-2B, other aircraft gun sights, automatic target tracking systems, and additional tests of the *Petrel* missile. In mid-1952 HRP-1 arrived from NAS Lakehurst, N.J. (q.v.), its helicopters being very useful for waterborne telemetering of missile flight tests. During the second half of 1952 tests were made of the *Gorgon* and the *Terrier* missile.

After this kind of work had been carried on for ten years, NAAS Chincoteague was transferred to the National Aeronautics and Space Administration, with its disestablishment date set for 30 June 1959.

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B. "Rockets Test Airplanes of the Future," *Naval Aviation News*, Sept. 1951, pp. 16–17; "Red Target Drones Buzz at 'Chinco,'" *Naval Aviation News*, Feb. 1953, pp. 20–21; "NASA to Get Chincoteague: Augments Wallops Island Program," *Naval Aviation News*, Mar. 1959, p. 1.

CITY PARK RECEIVING CAMP. *See* New York Navy Yard.

CLINTON, OKLA., NAVAL AIR STATION, 1942–1946

Clinton, Okla., is located about 120 miles due west of Oklahoma City on cotton-growing land. There the U.S. Navy planned to build a base to support about 160 aircraft and a complement of 600 officers and 4,000 men. Construction on the station itself began 17 September 1942. It was nineteen miles southwest of Clinton and five miles north of Dill City airport on a tract comprising 5,000 acres, with further expansion occurring during the spring and summer of 1943. A spur line of the Santa Fe Railroad was built to the tract, and a natural gas line was available for heating purposes.

NAS Clinton had a number of missions; it was the Headquarters of Training Task Force Command, had an aircraft modification unit, and developed and tested new equipment. The scope of operations may be ganged from the fact that in the Training Task Force Command there were Utility Squadron 6 (VU–6) and three Special Tasks Air Groups (STAGs), with STAG 1 comprised of two squadrons of aircraft and a glider squadron and STAG II and III including three squadrons of aircraft and one glider squadron. In addition, there were Bombing Squadrons VPB–152 and 153. By the spring of 1943 up to 125 aircraft were being modified each month, and the population of the station included 3,641 officers and men.

Authorized on 2 September 1942, construction work began on 1 October and commissioning occurred on 1 October 1943, Comdr. Charles A. Bond, USN, commanding. There were four runways: one 6,000 feet long, one 6,500 feet long, one 5,800 feet long, and one 4,650 feet long; all were 300 feet wide. There were also three hangars, four barracks and ten batchelor officers quarters. Construction was completed on 19 June 1944 at a cost of more than $10 million. Satellite fields were at Conroe and at Eagle Mountain Lake, Fort Worth, Tex. (q.v.); Durant, Stillwater, Ada, Hobart, Delhi, and Hydro, Okla.; and Traverse City, Mich. Training occurred in single-engine SNC *Falcons*, SNJ *Texans*, and SVN *Valiants* as well as in twin-engined SNB *Kansans*. TDN and TDR types were used as target drones. Carrier-based torpedo aircraft included the *Avenger* in both the TBF and TBM models, and landbased patrol bombers were of the

The BARRIER ISLANDS

A Photographic History of Life on Hog, Cobb, Smith, Cedar, Parramore, Metompkin, & Assateague

by Curtis J. Badger and Rick Kellam

1989

Stackpole Books

4

ACCOMACK ISLANDS

The Village on Assateague, Vacationing on Cedar and Parramore

Today, Virginia's best known barrier island is Assateague, a narrow barrier beach that extends from the Tom's Hook area near Chincoteague northward along the Virginia and Maryland coast to the inlet at Ocean City. Assateague is to the 1980s what Cobb Island was to the 1880s; it is a place of wild beauty that attracts vacationers from all over the world.

Assateague's beach is preserved as a national seashore and the island's interior is protected by its inclusion in the Chincoteague National Wildlife Refuge. The wildlife refuge was begun in 1945, but it was not until a causeway linking Assateague and adjacent Chincoteague opened in the 1960s that the island began receiving nationwide attention. In the two decades since the opening of the causeway, Chincoteague has emerged as one of Virginia's top tourist attractions, and Assateague draws more than 1,000,000 visitors each year.

It's difficult to believe that just a generation ago, Chincoteague was a working watermen's village. Now, motels, restaurants, and gift shops have supplanted the fish houses, and the tourism industry is on its way to replacing the seafood industry. The traditional July Pony Penning celebration, which once was simply a local summer ritual, now attracts network news coverage.

Despite Assateague's current popularity among vacationers, the island's history is not unlike the dozen other islands that line the Virginia coast. Its first inhabitants were American Indians, probably members of the Nanticoke tribe of southern Maryland. Jennings C. Wise writes in his 1911 book, *The Early History of the Eastern Shore of Virginia*, that the Assateague Indians were more warlike than their confederates in the Powhatan

tribe, and that there are few mentions of them in Accomack and Northampton County records. The Assateagues are mentioned often, however, in Maryland records.

In the 1600s, many of the barrier islands in Accomack County were used for grazing livestock. Assateague was used for that purpose, as was Wallops and Assawoman to the south. A number of families lived on the islands, and on Assateague a village centered around the lifesaving station and the lighthouse, which was built in 1833.

Wallops Island was patented in 1672 by John Wallop, who was Colonel Edmund Scarborough's Surveyor General. Wallop, who laid out the town of Port Scarborough (Onancock), patented much land in the Wattsville–Wallops Neck area in the late 1660s and early 1670s. The island was used primarily for livestock, but the 1800 census did show a population of thirty individuals living on Wallops, representing six families.

World War II brought the most profound changes to the Accomack County islands. The U.S. Coast Guard was heavily involved on the islands during the war, and several islands were used for quarantine purposes and special training. On Assawoman Island, for example, the army established a canine training unit. After the war, the federal government surveyed Wallops; in 1945 it purchased eighty acres from a group of sportsmen and established a rocket launching facility. Four years later the government purchased the remainder of the island, establishing what would become the National Aeronautics and Space Administration Wallops Island facility.

The Coast Guard maintained manned stations on Assateague, Chincoteague, Wallops, Metompkin, Cedar, and Parramore Islands during World War II, but a few years later, all but Chincoteague and Parramore had been decommissioned.

Except for the refuge at Assateague and the NASA facility at Wallops, the islands are virtually undeveloped today. Assawoman is privately owned, and at this writing is proposed to be included in an expanded national wildlife refuge. Most of Metompkin and Parramore Islands are owned by The Nature Conservancy. Although Cedar Island was recently subdivided and lots were sold, the island's vulnerability to erosion makes substantial development impractical and expensive.

As with Cobb and Hog Islands in Northampton County, most of Accomack's islands have seen their glory days of human habitation. Parramore is one of the largest and most beautiful of the islands, and it is protected by The Nature Conservancy in its Virginia Coast Reserve. The island once belonged to Colonel Thomas Parramore, who was elected to the Virginia House of Burgesses in 1748 and whose son helped fight for American independence. A fort on Parramore helped protect the coast from the British during the Revolution. Thomas Parramore gained ownership of the island when he married Joanna Custis Hope, who was an heiress to the land. Today the island has only the abandoned lifesaving station, now privately maintained, and the current U.S. Coast Guard station, the only barrier island station remaining on the Eastern Shore.

All the islands in Accomack have had their share of sporting clubs

ASSATEAGUE ISLAND NATIONAL SEASHORE

AN ADMINISTRATIVE HISTORY

by

Barry Mackintosh

History Division

National Park Service

Department of the Interior

Washington, D.C.

1982

For sale by the Superintendent of Documents, U.S. Government Printing Office
Washington, D.C. 20402

equired by Federal statutory law."[18] Assateague was among 13 parks where trapping was practiced without such legal sanction and would be eliminated if the regulation were approved, as appeared likely. Superintendent Michael V. Finley of Assateague was closely involved in drafting this and related provisions affecting resource preservation and use throughout the System.

Cultural Resources

Cultural resources management at Assateague was grounded on the "General Background Study and Historical Base Map" prepared by Historian Edwin C. Bearss of the NPS Washington Office in 1968. The comprehensive Bearss study documented historic island settlements, commercial activities, grazing use, the presence of the U.S. Life-Saving Service and Coast Guard, and a range of other human activities on and around the island since Giovanni da Verrazzano's voyage to the vicinity in 1524. Bearss' most important contribution was his identification and evaluation of extant site and structures associated with these activities.

The major historic property acquired by the Service was the Assateague Beach Coast Guard Station on Toms Cove Hook. Dating from 1922, the station was decommissioned and transferred to NPS in January 1967. The Service used the main building and adjoining boathouse for seasonal quarters and storage.

In 1972 a National Register of Historic Places nomination form on the station was submitted to the Virginia State Historic Preservation Officer (SHPO), who had the property placed in the Virginia Landmarks Register

[18] Federal Register, Mar. 17, 1982, p. 11614.

the following year. Arguing that the station was relatively recent, lacked uniqueness or outstanding architectural value, and would be unduly expensive to preserve as a National Register property, Regional Director Chester L. Brooks in 1975 told the SHPO that the Service would not nominate it to the National Register and suggested that he remove it from the Virginia Landmarks Register. The SHPO balked at this, and the regional office ultimately agreed to seek an official determination of National Register eligibility. The Keeper of the National Register in Washington found the station eligible for the Register on January 15, 1980, making it the only NPS property on Assateague with this status.[19]

Later that year a Service structural engineer inspected that station and found the boathouse pilings endangered by marine borers. He recommended that all pilings be wrapped with plastic to suffocate the boring organisms.[20] The project was implemented without substantially altering the appearance of the pilings.

The only other historic structures that came into NPS hands were those of the Popes Island Life-Saving Station, built in 1878-79 and abandoned in 1953. It deteriorated rapidly after the March 1962 storm. "Unless steps are taken to stabilize and restore the structures," Bearss commented in his 1968 study, "they will soon disappear." The main building and two small outbuildings were destroyed by fire from an unknown cause during the

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[19]Letter, Brooks to Junius R. Fishburne, Jr., Oct. 16, 1975, RPD-MARO; letter, Tucker Hill to Laura E. Soulliere, Mar. 24, 1978, RPD-MARO; letter, Acting Regional Director Benjamin J. Zerbey, Mid-Atlantic Region, to Assistant Manager, Mid-Atlantic/North Atlantic Team, Denver Service Center, Apr. 18, 1978, RPD-MARO; subsequent Register correspondence in RPD-MARO.

[20]Memorandum, Maurice L. Paul to Assistant Manager, Mid-Atlantic/North Atlantic Team, Denver Service Center, July 1, 1980, RPD-MARO.

evening of October 18, 1970.[21] The boathouse was spared, and in 1978 it was moved to North Beach near the site of the former North Beach Life-Saving Station. There it was restored and put to appropriate adaptive use. The only other remaining structure of the Popes Island complex, a coalhouse, burned in 1981.

A comprehensive archeological survey, normally a prerequisite to planning for development and use, was considered but not pursued during the general management planning process in 1978. Regional Archeologist David G. Orr defended the lack of immediate action by opining that the fluid nature of Assateague rendered the presence of significant archeological resources unlikely.[22]

Wayne E. Clark, an archeologist for the Maryland SHPO, took exception to Orr's opinion in a 1979 letter to the regional director: "[T]he archeological potential of the Island is much greater than that attributed to the Island by your archeologist.... The underwater archeological potential of Assateague is high while the potential for prehistoric sites is moderate." Clark noted the existence of undisturbed island terrain and some 600 shipwrecks off the Maryland coast, including an 18th-century Spanish wreck;[23] the wrecks, however, were beyond the bounds of NPS ownership.

The subsequent "Preferred Planning Alternative for Assateague Island

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[21]Bearss, "General Background Study and Historical Base Map" (unpublished report, NPS Division of History, 1968), p. 132; Incident Report, Regional Chief Nathan B. Golub, Resources Management and Visitor Protection, Northeast Region, to Director, Northeast Region, Oct. 19, 1970, copy in NPS Office of Cultural Resources Management, Washington, D.C.

[22]Orr statement, Nov. 13, 1978, RPD-MARO.

[23]Letter, Clark to Acting Regional Director Nathan B. Golub, Jan. 24, 1979, RPD-MARO.

Comprehensive Plan" of 1979 declared that an archeological survey of NPS lands would be complete in 1981. The Draft General Management Plan of 1981 stated that the survey had been programmed for 1984. The final General Management Plan issued in June 1982 stated only that "an archeological survey of Assateague Island will be completed." The memorandum of agreement with the Advisory Council on Historic Preservation and Maryland and Virginia SHPOs appended to the plan included a related stipulation:

> NPS will undertake its proposed archeological survey and evaluation program. Included will be a re-evaluation of the significance of known sites of ruined historic structures as archeological properties. The survey will be developed and conducted in consultation with the Maryland and Virginia SHPOs and will take into account information from both SHPOs on known properties, previous surveys and other investigations performed in the area, and any recommendations they may have on appropriate survey methods. As part of this effort, the known shipwrecks located off the oceanside shore of Assateague Island will be evaluated to determine whether they meet National Register Criteria. NPS will obtain applicable Federal and State permits, as necessary, for any field investigations which might have an effect on such properties. Any of the identified properties under NPS jurisdiction that meet the Criteria will be managed in accordance with NPS-28 [the Service's Cultural Resources Management Guideline]. Public interpretation of any historic properties under exclusively State jurisdiction, including disclosure of locational information, will be done in consultation with the appropriate SHPO.

An Afterthought

It might appear from the foregoing discussion that natural and especially cultural resource preservation has not been the highest priority at Assateague. If so, Assateague's managers have been guilty of obeying the law authorizing the seashore, which addressed natural conservation only in the context of "public enjoyment" and historic preservation not at all. The 1976 amendatory legislation prescribed a comprehensive plan giving greater weight to the protection of natural resources, but it left intact the original language assigning primacy to public outdoor recreation and

FINAL SITE WORK PLAN

UXO SUPPORT

ASSATEAGUE ISLAND MARYLAND

PREPARED FOR:

U.S. ARMY ENGINEER DIVISION, HUNTSVILLE

P.O. DACA87-92-P-0545.

PREPARED BY

ISSI UNEXPLODED ORDNANCE, INC.

3304 SEVENTH AVENUE

HUNTSVILLE. ALABAMA 35805

FEBRUARY 25, 1992

APPENDIX A

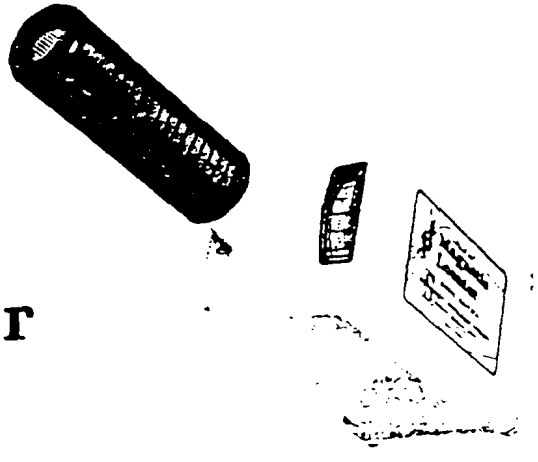
ORDNANCE LOCATORS

International Safety Services, Inc. will use the instrument described below.

1. 2 SCHONSTEDT INSTRUMENT COMPANY GA-72CV MAGNETIC LOCATOR:

Attached as enclosure A-2 is descriptive brochure.

Ordnance and Weapons Detection



"The Schonstedt"™

Model GA-72CV Magnetic Locator

Made in U.S.A.

SCHONSTEDT INSTRUMENT COMPANY

Introduction

The GA-72CV is a versatile, light-weight, cost-effective magnetic locator designed to aid EOD technicians and law enforcement officers during area search operations.

It enhances your detection capabilities and reduces the time required to detect ferrous metal parts from an improvised explosive device (IED), buried ordnance and covered weapons.

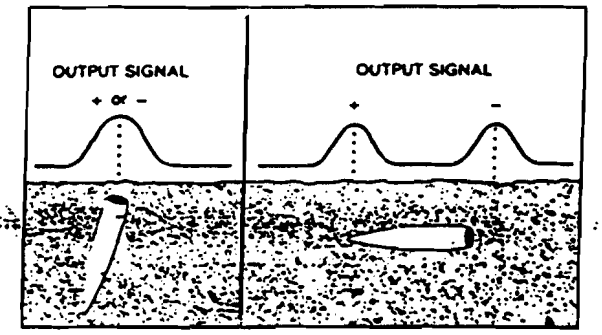
The GA-72CV is unique because it provides you with an audio signal to locate the target and a visual indication that identifies its polarity. These two indications help you to quickly pinpoint the target and aid in determining its orientation.

The GA-72CV's rugged design makes it ideal for searching rocky terrain, swampy areas, shallow creeks, snow covered areas or any environment that hampers visual detection. The shaft can be immersed in up to 21 inches of water and thrust into deep snow.

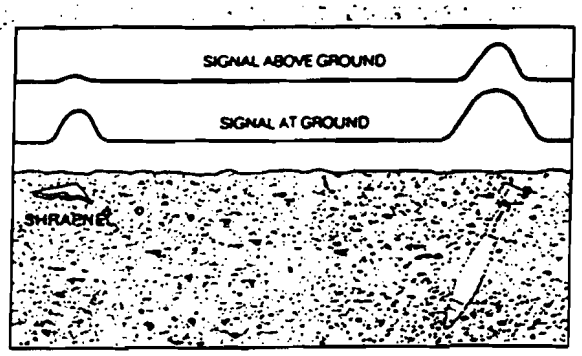
The GA-72CV has substantially more range than conventional metal detectors. Its proven technology has been used in the field for nearly two decades.

The GA-72CV is ideal for supporting small and large scale ordnance investigations and range clearance projects.

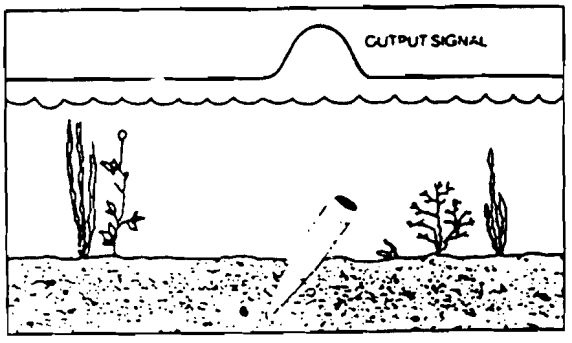
Basic signal patterns provide valuable target information.



Signal patterns from vertical and horizontal targets aid in determining their orientation.

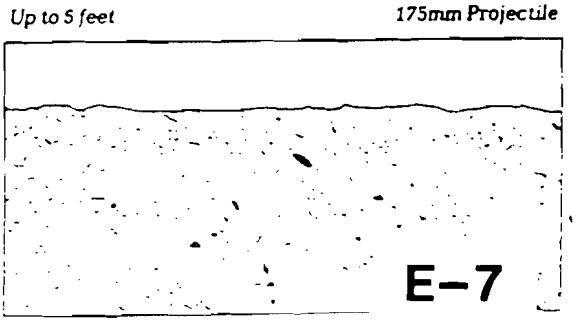


Raising the locator eliminates unwanted signals

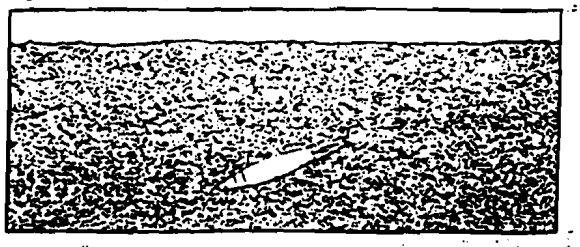


Shallow water does not affect signal pattern

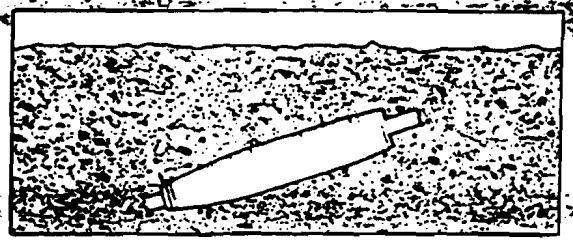
Locating depths for ordnance and weapons under ground, snow, brush, and water.



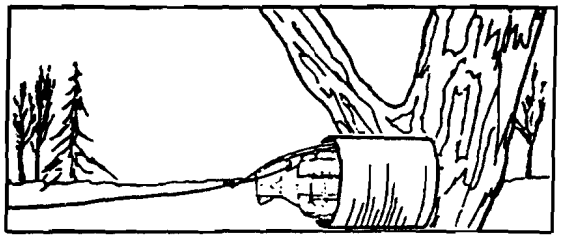
Up to 12 inches — 81mm Mortar



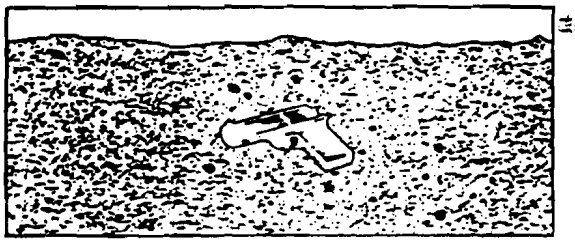
Up to 9 feet — MK81 Low Drag Bomb



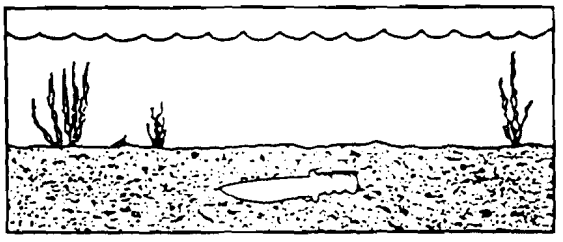
Up to 6 inches — Grenade Booby Trap



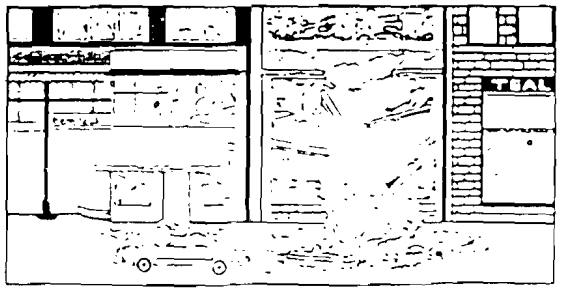
Up to 12 inches — Hand Gun



Up to 16 inches — Hunting Knife

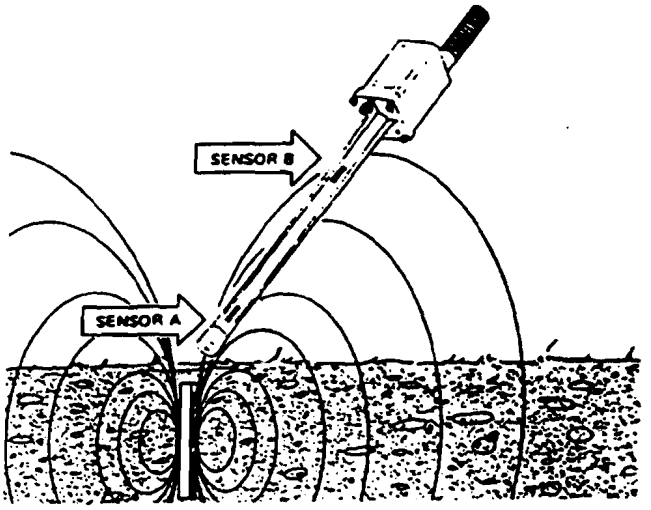


Also excellent for post blast investigations



How It Operates

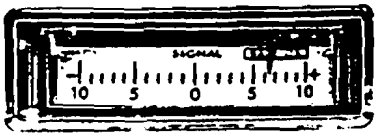
The GA-72CV detects the magnetic field of any ferromagnetic object. Its two sensors balance out the effect of the Earth's ambient magnetic field. As long as this balance exists, the frequency of the audio signal will remain at a steady 40 Hz.

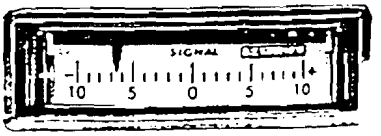


However, when a target causes the magnetic field to become stronger at sensor **A** than it is at sensor **B**, the frequency of the audio signal and the strength of the meter's polarity indication begin to increase. Both the audio frequency and the meter's polarity indication will peak when the locator is directly over the target.

Visual and Audio Indications

The GA-72CV's easy-to-read meter (shown below at actual size) provides a clear indication of the (+) and (–) polarity signals. As the frequency of the audio signal changes, the meter's (+) or (–) indication increases or decreases. This visual indication of the target's polarities is extremely helpful for determining its orientation.





Features

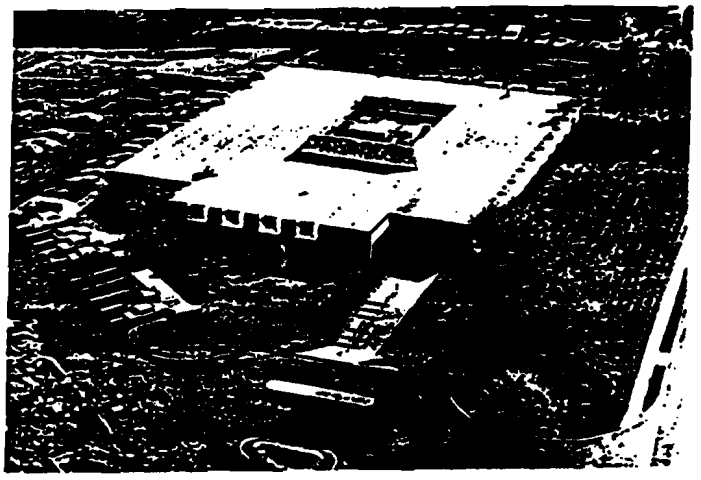
- Meter indicates (+) and (−) polarities
- Audio and visual signals provide pinpoint locating accuracy including target orientation
- Locator does not respond to aluminum, brass, copper, etc.
- Lightweight, human engineered design for ease-of-operation
- Only one multi-function control
- Meter indicates battery status
- AA batteries provide up to 30 hours of operation
- Patented HeliFlux® sensors
- Rugged, lightweight carrying case
- Constructed to last
- Weather protected speaker

Specifications

Input Power	Supplied by four alkaline AA-cell batteries
Battery Life	30 hours (Intermittent usage)
Output	
Audio	Approximately 40 Hz idle tone in speaker. Tone frequency increases (or decreases) with gradient-field intensity.
Visual	Meter indicates polarity (positive or negative) of the magnetic field
Battery Check	BATT.OK (meter indication)
Weight	Approximately 2.5 lbs. (1.14 kg)
Operating Temperature	− 13°F to 140°F (− 25°C to 60°C)
Overall Length	34½ in. (87.6 cm.)
Waterproof Length	21 in. (53.3 cm.)
Nominal Sensor Spacing	14 in. (35.6 cm.)
Construction	Rugged, all solid state.

The Model GA-72CV is a product of thirty-eight years of manufacturing the world's finest HeliFlux® magnetometers

Corporate Headquarters



Founded in 1953, Schonstedt Instrument Company occupies a modern 22,000 square-foot building in Reston, Virginia.

Field-Test Facility

Research in an environment nearly free of man-made magnetic disturbances is performed at our 40-acre test facility.

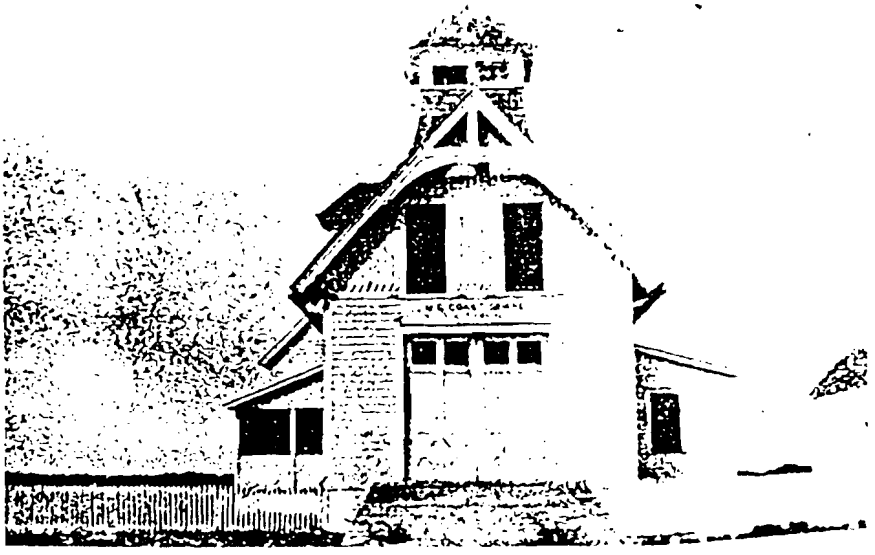
SCHONSTEDT INSTRUMENT COMPANY
1775 Wiehle Avenue, Reston, Virginia 22090-5199
Phone (703) 471-1050 • TWX 710 833-9880 • FAX (703) 471-1795

Authorized Dealer

GENERAL BACKGROUND STUDY and HISTORICAL BASE MAP

Assateague Island National Seashore
Maryland - Virginia

By
EDWIN C. BEARSS



DIVISION OF HISTORY
Office of Archeology and Historic Preservation
December 18, 1968

APPENDIX B

VESSELS DESTROYED BY U-151

NAME REGISTER	CLASS	TONNAGE	DESTROYED	DATE	POSITION
Hattie Dunn (A)	schooner	435	bombed	May 25	37° 24' N 75° 05' W
Hauppauge (A)	schooner	1,446 1/2	bombed	May 25	37° 27' N 75° 09' W
Edna (A)	schooner	325	bombed	May 25	37° 30' N 74° 32' W
Winneconne (A)	steamer	1,869	bombed	June 2	39° 20' N 73° 14' W
Isabel B. Wiley (A)	schooner	776	bombed	June 2	39° 20' N 73° 13' W
Jacob M. Haskell (A)	schooner	1,778	bombed	June 2	39° 20' N 73° 13' W
Edward H. Cole (A)	schooner	1,792	bombed	June 2	38° 58' N 73° 12' W
Texel (A)	steamer	3,210	bombed	June 2	38° 58' N 73° 12' W
Carolina (A)	steamer	5,093	shellfire	June 2	38° 51' N 73° 16' W
Herbert L. Pratt (A)	tanker	5,372	mined	June 3	2 1/2 miles from Overfall Light
Samuel C. Mengel (A)	schooner	915	bombed	June 3	38° 2' N 73° 23' W
Edward R. Baird, Jr. (A)	schooner	279	bombed	June 4	37° 35' N 74° 40' W
Eidsvold (Nor.)	steamer	1,570	shellfire	June 4	37° 12' N 73° 55' W

NAME & REGISTER	CL	GROSS TONNAGE	HOW DESTROYED	DATE	POSITION
Harpathian (Br.)	steamer	4,588	torpedoed	June 5	36° 30' N 75° 00' W
Vinland (Nor.)	steamer	1,143	bombed	June 5	36° 35' N 73° 58' W
Pinar del Rio (A)	steamer	2,504	shellfire	June 8	36° 16' N 73° 50' W
Vindeggan (Nor.)	steamer	3,179	bombed	June 10	36° 25' N 73° 20' W
Henrik Lund (Nor)	steamer	4,322	bombed	June 10	36° 30' N 71° 29' W
Samoa (Nor.)	bark	1,138	shellfire	June 14	37° 30' N 72° 10' W
Kringsjaa (Nor.)	bark	1,750	shellfire	June 14	38° 02' N 71° 40' W
Dwinsk (Br.)	steamer	8,173	torpedoed	June 18	38° 30' N 61° 15' W
Chilier (Bel.)	steamer	2,966	bombed	June 22	39° 30' N 53° 40' W
Augwald (Nor.)	steamer	3,406	shellfire	June 23	39° 30' N 53° 42' W

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APPENDIX C

LIST OF CLASSIFIED STRUCTURES
ASSATEAGUE NATIONAL SEASHORE

1-4

1. STATE Virginia
COUNTY Accomack
TOWN X VICINITY 10 miles NE
STREET NO. X of Chincoteague

ORIGINAL OWNER U.S. Treasury Dept.
ORIGINAL USE Life-Saving Station
PRESENT OWNER U.S. National Park Service
PRESENT USE Adandoned
WALL CONSTRUCTION wood
NO. OF STORIES Two (Main Building)

HISTORIC AMERICAN BUILDINGS SURVEY
INVENTORY

2. NAME Pope's Island Life-Saving Station

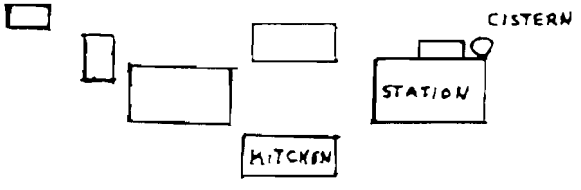
DATE OR PERIOD 1878-79
STYLE Victorian
ARCHITECT U.S. Life-Saving Service
BUILDER same

3. FOR LIBRARY OF CONGRESS USE
AA

4. NOTABLE FEATURES, HISTORICAL SIGNIFICANCE AND DESCRIPTION OPEN TO PUBLIC No

Among the historical resources of Assateague Island National Seashore are the sites of the four Life-Saving Stations, built in the period 1875-1883. Only one of these stations has survived, and that is the one at Pope's Island. The boathouse and quarters, erected in 1878-79, are an excellent example of a life-boat station. Only a few of these structures have survived. The other station buildings, the kitchen, stable, and storehouse (all built before 1930) complement the station and must be preserved. The Pope's Island Coast Guard Station was decommissioned in 1953, and since the storm of March 1962, the structures have deteriorated rapidly. Unless steps are taken to stablize and restore the structures, they will soon disappear.

5. PHYSICAL CONDITION OF STRUCTURE Endangered yes Interior poor Exterior poor



6. LOCATION MAP (Plan Optional)

7. PHOTOGRAPH

PUBLISHED SOURCES (Author, Title, Pages)
INTERVIEWS, RECORDS, PHOTOS, ETC.

Bearss, General Background Study and Historical Base Map, NPS, 1969; Personal Interview, Norman Jones with Bearss, Dec, 13, 1968.

9. NAME, ADDRESS AND TITLE OF RECORDER
Mr. Edwin C. Bearss
Historian
Office of Archeology and Historic Preservation

DATE OF RECORD Dec. 1968

E-8

1. STATE Virginia
COUNTY Accomack
TOWN X VICINITY 6 miles S of Chincoteague
STREET NO. X

ORIGINAL OWNER U.S. Treasury Dept.
ORIGINAL USE coast Guard Lifeboat Sta.
PRESENT OWNER National Park Service
PRESENT USE Storage
WALL CONSTRUCTION wood
NO. OF STORIES Two (Main Building)

HISTORIC AMERICAN BUILDINGS SURVEY
INVENTORY

2. NAME Assateague Beach Coast Guard Station
DATE OR PERIOD 1922
STYLE Creek Revival
ARCHITECT U.S. Coast Guard
BUILDER same

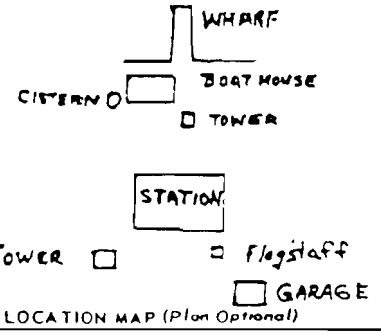
3. FOR LIBRARY OF CONGRESS USE
BBB

4. NOTABLE FEATURES, HISTORICAL SIGNIFICANCE AND DESCRIPTION OPEN TO PUBLIC No

The Assateague Beach Coast Guard Station was erected in 1922 to replace the 1875-76 structure on Toms Cove. The extension of the Toms Cove Hook had made the task of launching the power and surfboats from the old station too time-consuming. The Assateague Beach Station is a good example of a facility of this period located on a cove, bay or sound. This was opposed to a station, such as Pope's Island, located on a beach. During storms, in answering calls for assistance, it was frequently impossible for crews of beach stations to launch their surfboats through the breakers, while Coast Guardsmen posted at a station, such as Assateague Beach, could take their craft out through the comparatively calm waters of Toms Cove.

This station was decommissioned on January 17, 1967, and turned over to the National Park Service. As the other structures, the wharf, walks, boathouse, tower, watertank, and garage, complement the station, they must be preserved.

5. PHYSICAL CONDITION OF STRUCTURE Endangered no Interior good Exterior good



6. LOCATION MAP (Plan Optional)

7. PHOTOGRAPH

8. PUBLISHED SOURCES (Author, Title, Pages)
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Bearss, General Background Study and Historical Base Map, NPS, 1969.
Personal Interview, Norman Jones and John Hunter with Bearss, Dec. 13, 1968

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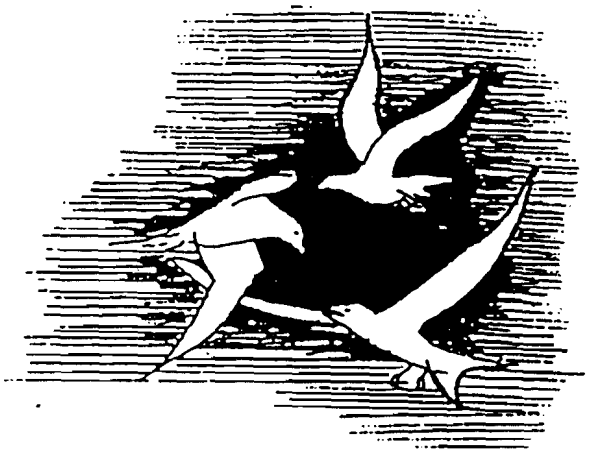
DATE OF RECORD Dec. 1968



ASSATEAGUE ISLAND NATIONAL SEASHORE

Land Protection Plan

december 1984

Recommended by: Roger K. Reuter Date: 4/25/85

Superintendent

Approved by: Ronald A. Clement Date: 5/28/85

Regional Director, Northeast Region

III. Land Ownership and Uses

A. Description

The authorized boundary of Assateague Island National Seashore encompasses 39,631 acres, including land and water. The distribution is summarized in the table below:

Table 1
LAND OWNERSHIP--ASSATEAGUE ISLAND NATIONAL SEASHORE

Land Ownership	Acreage*	Type of Resource	Type of Ownership
MARYLAND			
Federal			
NPS	6,900	barrier island & salt marsh	fee**
FWS	418	barrier island & salt marsh	fee
State of Maryland			
Land	696	barrier island & salt marsh	fee
Water	14,828	submerged lands owned by State	fee
Private	4	barrier island	fee
subtotal	22,846		
VIRGINIA			
Federal			
NPS	205	barrier island & salt marsh	fee
FWS	9,021	barrier island & salt marsh	fee
Commonwealth of Virginia			
Land	308	salt marsh	fee
Water	7,251	submerged lands owned by State	fee
Private	0	(some bay bottom is leased for oyster culture)	
subtotal	16,785		
Total land area, MD & VA	17,552		
Total water area, MD & VA	22,079		
GRAND TOTAL	39,631 acres		

*Acreage figures are rounded to nearest whole number.

B. Uses of Non-Federal Lands

1. Maryland

a. The 3.82 acres of privately owned land in the Maryland portion of the seashore lie within an area designated in the GMP as a primitive subzone at the northern end of Assateague.

The acreage is divided into 26 individual tracts scattered over approximately 1 lineal mile of beachfront. There are 23 individual tract owners. The average tract size is 0.12 acre. (A complete listing of owners is shown in Appendix A.)

These tracts are not now, nor have they been in the past, developed or otherwise improved. They are part of a subdivision called "Atlantic Ocean Estates," created prior to the seashore's authorizing legislation. The NPS has acquired fee title to all other tracts which had been part of Atlantic Ocean Estates, with the exception of those that have become submerged and, thereby, the property of the State. Tracts that have become totally submerged are not otherwise addressed in this plan.

The private tracts have limited capability or practicality for use by their owners. The tracts are not accessible by road, have no access to central sewerage, and do not meet health standards for on-site waste disposal systems. Their average elevation is only a few feet above sea level, and they are subject to frequent overwash by the ocean. None are in a location suitable for waterfowl hunting blinds. The only apparent practical use would be as campsites.

The primitive subzone in which the tracts are located is managed for resource preservation as prescribed in the seashore's GMP. Public use is limited to activities such as beachcombing, fishing, swimming and boating. It is the only area in Maryland where park visitors can go to experience the raw forces of nature without being subjected to motor vehicle traffic or intensive public use. It is also prime nesting habitat for shore birds such as the least terns and piping plovers. Because of the island's low profile and openness at this location, it is also prime feeding habitat for migrating peregrine falcons. For these reasons, human use and occupancy of more than brief duration would be incompatible with resource management and visitor use objectives.

b. The State of Maryland's present use of Assateague State Park and 10 small islands in Chincoteague Bay is considered compatible with the planned management of the seashore, as is their anticipated future use. There are existing avenues available for resolving any land use problems which may arise in the future.

2. Virginia

a. All of the land resources within the Virginia boundary of the seashore are owned either by the United States or the Commonwealth of Virginia. Those lands owned by the State consist of 32 marsh islands lying within the bay waters adjacent to Assateague Island. Their total area is 308 acres. They are not directly utilized by the State, and are generally

in a natural condition. However, some have been utilized under State auspices by individuals as sites for waterfowl hunting blinds and a declining number of "oyster watch houses." These structures are located a considerable distance from the seashore's public use areas and, at current levels, are not necessarily incompatible with seashore resource management and visitor use objectives. Discussions will be be initiated with the State, pursuant to the seashore's Resource Management Plan, to develop a cooperative arrangement addressing compatible use of the islands.

b. Lands owned by the United States and administered by the Fish and Wildlife Service as part of the Chincoteague National Wildlife Refuge are managed for purposes to achieve objectives that are compatible with the seashore's purposes and a memorandum of understanding exists for resolving any land use conflicts which may arise in the future.

3. Interstate Water Area

Maryland's current management of submerged aquatic lands (bay and ocean bottom) is considered compatible with seashore resource management and visitor use objectives. Leasing of shellfish beds and use of submerged lands as a base for hunting blinds are generally the only types of uses which would be practicable in this zone. The seashore's enabling legislation authorizes the NPS to limit hunting and fishing in designated zones for established periods "for reasons of public safety, administration, fish or wildlife management or public use and enjoyment." Under this authority a cooperative arrangement has been implemented in Maryland waters whereby NPS manages a public waterfowl hunting program in consultation with the Maryland Department of Natural Resources. A similar arrangement is needed in Virginia waters, and seashore management will seek to develop such a program with the Virginia Commission of Game and Inland Fisheries within 1 year.

Shellfishing within the seashore's water boundary is a popular activity as well. Within Virginia waters extensive areas of submerged lands belonging to the Commonwealth have been leased for commercial oyster culture purposes. While such commercial use, at current levels, is generally not incompatible with seashore objectives, there are leases in some locations which greatly diminish opportunities for the general public to enjoy shellfishing as a recreational pursuit. Also, there are some leased bottomlands upon which "oyster watchhouses" have been constructed. Although there is no evidence now of significant adverse effects, some of the watchhouses appear to have waste disposal systems which violate water quality standards. NPS jurisdiction over shellfishing is constrained by language in the seashore enabling act, which states that nothing in that law "shall limit or interfere with the authority of the States to permit or regulate shellfishing in any waters included in the national seashore." Seashore management will therefore consult with the Virginia Marine Resources Commission and other State and Federal agencies, as appropriate, to alleviate these problem areas. (The hunting and shellfishing issues are more appropriately components of Assateague's Resource Management Plan, and will be dealt with in detail within the context of that document.)

APPENDIX A

PRIVATE LANDS WITHIN ASSATEAGUE ISLAND NATIONAL SEASHORE
(Please refer also to Map B)

act	Owner	Acres	Proposed Method of Protection	Reason for Protection
)-18	Luzenski	0.12	Fee acquisition	Public recreation & wildlife habitat
)-19	Bohince	0.12	"	"
)-22	Bushby	0.12	"	"
)-27	Rogowski	0.12	"	"
)-29	Walls	0.24	"	"
)-30	Kersh	0.12	"	"
)-36	Michel	0.12	"	"
)-37	Humphreys	0.12	"	"
)-42	Hamilton	0.12	"	"
)-5[illegible]	Ganser	0.12	"	"
)-[illegible]	Ganser	0.11	"	"
	Unsinn	0.12	"	"
/	Hunt	0.12	"	"
)-141	Wozniak	0.35	"	"
)-142	Wozniak	0.12	"	"
)-144	Borrelli	0.12	"	"
)-524	Howard	0.24	"	"
0-527	Mary F. Stewart Estate	0.12	"	"
0-542	Madaris	0.12	"	"
0-9	Leatherman	0.12	"	"
0-110	Zentmyer	0.12	"	"
0-133	Brezina	0.24	"	"
0-134	Nuckoles	0.12	"	"
0-138	Fuselier	0.24	"	"
0-140	Wozniak	0.12	"	"
0-518	Reeser	0.12	"	"

Partially submerged.
On Map B, Atlantic Ocean Estates is erroneously shown as the owner of this tract.

MAP B

PRIVATELY OWNED TRACTS

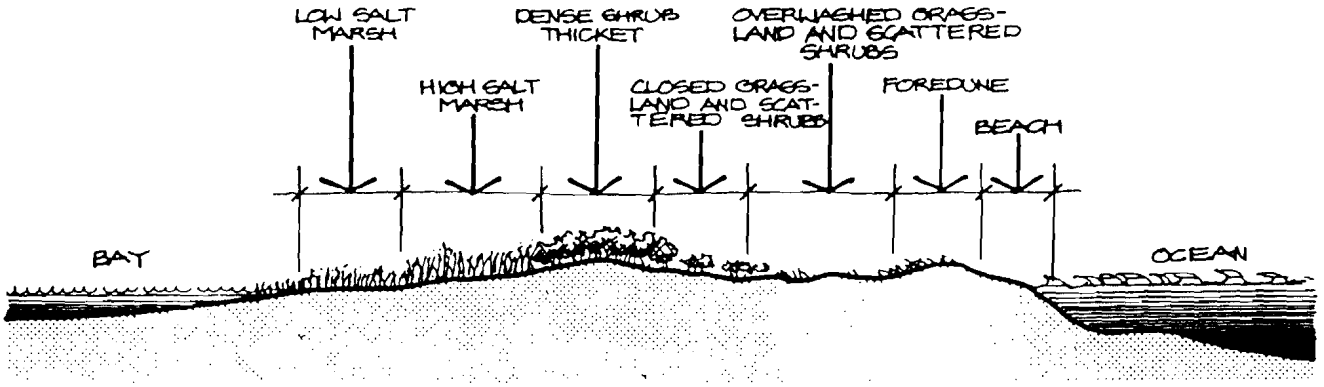
general management plan

june 1982

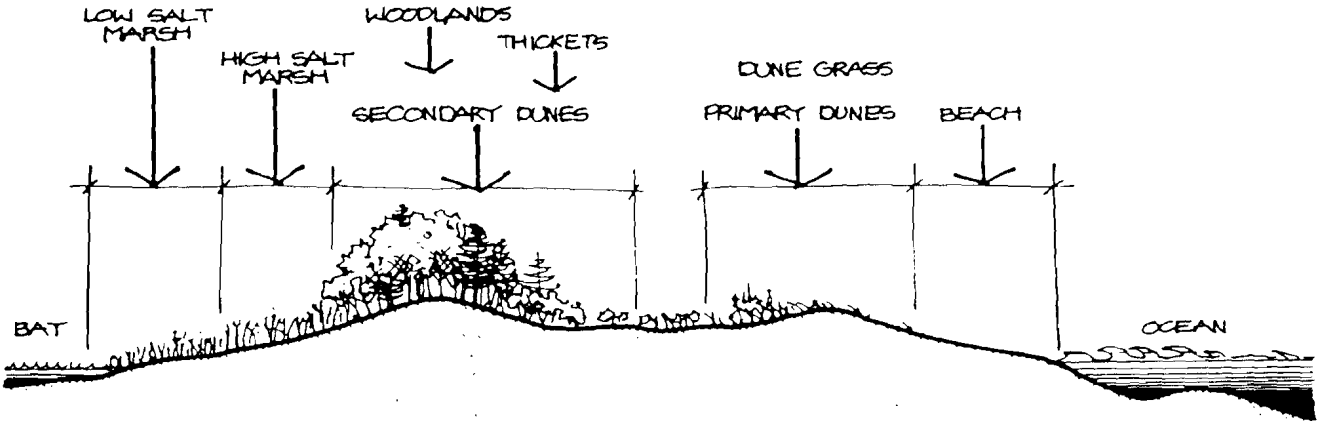
NATIONAL SEASHORE / MARYLAND-VIRGINIA

E-10

CROSS SECTIONS OF A BARRIER ISLAND



TYPICAL OVERWASH AREA



VEGETATION STABILIZED AREA

grew southwesterly in the area of the high dunes along Assateague Channel. Accretion seaward later increased the south end of the island. Onshore winds transported sand to the perimeter dunes, building the dunes to a height of 47 feet. A more recent spit has evolved into Toms Cove Hook, following much the same growth pattern as that which formed Chincoteague Island.

Dunes are formed by wind transport of fine-grained sand across the island. Sand is deposited on the beach face by wave action and is subsequently blown landward, building the barrier dune and subsequent systems landward of the shore zone. Winds of opposite direction may erode dunes, and overwash processes may result in a net movement of sand either bayward or seaward. A dynamic equilibrium is established when natural forces are unconstrained by man.

Historic evidence of change in the Assateague Island shoreline dating from 1845 has been reviewed (Dolan et al. 1977). This change, as well as the predicted shoreline in the year 2001, is indicated on the Assateague Island Dynamics map. Predicted extremes are evident at the extreme north and south ends of the island where erosion rates are far in excess of the rates observed through the central portion of the island.

The landward migration of the north end of the island has been a result of sand starvation of the North Beach caused by the Ocean City Inlet jetty. These features have altered the original flow patterns of suspended sediments (littoral drift), and eddies produced by obstruction of longshore currents have scoured away the beach zone. Efforts to mitigate this effect have included the deposition of dredge spoils from the inlet on the eroding beach face.

Historically, natural resource "manipulations" that have affected barrier island dynamics on Assateague Island included the building of the Ocean City Inlet jetties and dredging of the channel following the 1933 hurricane, the formation of a large hydrofill causeway area in Maryland in the early 1950s (originally designed to be part of the bridge and road access to private residences in Maryland), and the development and maintenance of an almost continuous island-long artificial barrier dune by federal and state agencies following the northeaster of March 1962. Artificial revegetation of the dunes and interdune areas with native species has also been practiced.

Biota

Probably the most exhaustive study of flora on Assateague Island has been done by Higgins, Rappleye, and Brown in 1971. In The Flora and Ecology of Assateague Island, all plant associations were divided into four zones--dune herbaceous, shrub, arborescent, and marsh herbaceous. These zones were further subdivided and their component species and ecological parameters noted. More recently, Susan Daniels in her 1976 MS thesis, "Applications of Remote Sensing to Resource Classification and Inventory of a National Shoreline Park," presented a biophysical classification system that featured the following community types: foredune, backdune, mudflat, upland, and bayshore. Major constituent

species are listed for each type. Because of the volume of information concerning natural flora on Assateague, the subject will not be treated in detail in this document. Generally, plant communities on Assateague vary from sparse beach grass communities seaward of the barrier dunes, through dense shrub thickets on and beyond the secondary dunes, to wetland forest in the refuge area, or to broad salt-marsh areas along the bayside perimeter.

No threatened or endangered plant species is known to exist on Assateague Island.

In addition to the salt tolerant species generally associated with barrier islands, several fresh and brackish water plant species have become established in the managed waterfowl impoundments on the Virginia end of the island. Some of the plants included in this group are sago pondweed, wild millet, and widgeon grass, which provide a winter food supply for waterfowl.

The Assateague pony is a unique and major attraction for island visitors and is worthy of special mention. Theories on the animal's origin range from a legendary 19th century escape from a foundering Spanish galleon to dereliction by 17th century mainlanders faced with mandatory penning laws for livestock. The ponies were becoming a nuisance as they dramatically increased in numbers. The free-roaming animals were moved to the barrier islands to prevent damage to crops on the mainland and to avoid taxation.

Regardless of origin, public interest in the ponies has continued to grow through popularization of the breed in publications such as Marguerite Henry's Misty.

There are two populations of these ponies on Assateague Island, and each population has small harems and familial groups. The Virginia population consists of approximately 150 animals, which are owned by the Chincoteague Volunteer Fire Company. This population is kept on the Chincoteague National Wildlife Refuge portion of Assateague Island under the authority of a grazing permit with the Fish and Wildlife Service. The population is penned annually, and foals and yearlings are auctioned as a source of revenue for the fire company. Thus, a population of approximately 150 breeding adults is maintained.

The Maryland population is made up of about 80 animals distributed into 7 major herds that are owned by the National Park Service. In 1969 the Ocean City Chamber of Commerce donated the original 40 members of this population to the National Park Service. A fence separates the two populations at the Maryland/Virginia boundary. However, some animals cross the boundary, especially during the breeding season. The Maryland population ranges freely over that portion of the island, while the Virginia population is barred from certain public use and wildlife management areas by fences.

In recent years equine infectious anemia has been diagnosed, and encephalitis has been suspected in both populations of ponies. These diseases are thought to be endemic to the island but result in a relatively

small number of mortalities. State authorities consider the Maryland population to be effectively quarantined by the waters of Sinepuxent Bay, but authorities insist on a separation of the Maryland and Virginia populations. Recently, privately owned saddle horses have been barred from the Maryland lands of Assateague Island during the summer season because of the infectious nature of the diseases and the abundance of vectors, the mosquito and the blood-sucking flies. Some controversy exists concerning the importance of the threat of disease to mainland stock from the Assateague pony populations. This controversy will be the target of future research, and management implications will be discussed in a resource management plan for Assateague Island National Seashore.

Endangered animal species inhabiting the island include the peregrine falcon (Falco peregrinus tundrius) and the Delmarva fox squirrel (Sciurus niger ginereus). Three bird species of special concern but not federally listed are the osprey (Pandion haliaetus carolinensis), the Eastern merlin (Falco columbarius columbarius), and the Ipswich sparrow (Basserculus princeps). One reptile, the Atlantic loggerhead turtle (Caretta caretta), also inhabits the island (USDI, NPS 1977). No critical habitat has been designated on Assateague Island by the Fish and Wildlife Service.

The loggerhead is known to have used Assateague Island for nesting. A project, now terminated, to reestablish a nesting population of the species by the Fish and Wildlife Service was initiated in Chincoteague National Wildlife Refuge in 1969. Recent data suggest that the Assateague coast is relatively unimportant to loggerheads as nesting habitat and has little potential for increased use.

Succession

The concept of succession is extremely important in the understanding of island synecology. Although species or population ecology may focus on the relationship of an individual species with environmental components within a static time frame, synecology deals with all plants and animals and their interrelationships and relationships with existing physical parameters. Because change is guaranteed among the physical environmental components, the biota must likewise be altered through successional processes.

Generally, succession proceeds from a bare substrate (i.e., soil and water) through populations of pioneer species and through seral (intermediate) communities to a theoretical set of climax communities. That climax will be constantly tested by changes in biotic or physical components of the environment (e.g., proliferating populations of borer beetles, tornadoes, etc.).

Barrier islands are probably the most changeable substrates among natural features of this continent. Overwash can destroy plant communities in any stage of succession and result in an inlet or alluvial deposit of new sand. Wind can build dunes, covering and smothering existing vegetation. These forces work to set succession back to the pioneer stage.

Change is inevitable on barrier islands, and man's efforts to stabilize conditions most often run contrary to natural dynamics. Conditions observed at any island location on a given day (past or present) do not necessarily represent the natural or primal situation. Succession is natural, and change in Assateague Island will continue. The level to which man will attempt to prevent or temper these changes will determine the degree of naturalness to be observed by future generations.

CULTURAL RESOURCES

Island History

The area to the west of Assateague Island was settled by coastal Indians when Giovanni da Verrazano, in the service of Francois I, navigated that shoreline in 1524. Evidence seems to indicate that the Indians used Assateague Island for fishing and hunting only, while more permanent settlements were located to the west. Although Verrazano and his crew of the Dauphine sailed through Chincoteague Inlet, Chincoteague Bay, and Sinepuxent Bay, they did not land on Assateague Island.

Because of the dangerous shoals off the Maryland and Virginia coasts, local legislation was passed by the late 18th century to prevent shipwrecks in those two states. The wrecking and salvage business was highly lucrative along the Atlantic Coast, sometimes at the cost of lives. However, it was not until 1871 that Congress approved an appropriation for the establishment of a federal lifesaving service. In 1874 legislation was passed authorizing three types of stations--lifesaving stations, lifeboat stations, and houses of refuge. The lifesaving stations were equipped with surfboats, rocket and mortar apparatus, life cars, and enough housing for the crews who manned them, as well as temporary accommodations for victims of the disasters.

Eight lifesaving stations were authorized between Cape Henlopen and Cape Charles. Two stations were located on Assateague Island--at Green Run Inlet and Assateague Beach. The Pope Island lifesaving station came into existence in 1878 and the North Beach station in 1883-84. The only remaining station of the five constructed is the Assateague Beach Coast Guard station, which was built in 1922. The other stations, after being decommissioned, reverted to the former owners, and many were lost through neglect or destroyed by fire.

This coast had been somewhat protected by navigational aids prior to the formation of the U.S. Lifesaving Service. In 1831, Congress had approved funding for a lighthouse along the treacherous shoals off Assateague. The fixed light, consisting of 11 lamps and 14-inch reflectors, began operation in 1833. By 1852 the Lighthouse Board recommended that the light be improved because it was ineffective. They recommended raising the tower and putting in a first-order lens, so that the light would be visible from much greater distances. In 1860 Congress authorized funds for the new Assateague lighthouse, but the project was suspended during the Civil War. In 1866 the appropriation was increased to cover higher costs.

Reconstruction of the complex was completed in 1867 and included a lighthouse, an oilhouse, and a keeper's quarters. The keeper's quarters, which was later dismantled and sold, included a portion of the 1833 keeper's residence. The third keeper's residence, a 1910 bungalow, is occupied by the manager of the Chincoteague National Wildlife Refuge.

Assateague Island saw its share of wartime activity during both world wars. In World War I, the first successful German U-boat attack in U.S. coastal waters occurred 30 miles southeast of Toms Cove, and the last ship sent down in 1918 was within 10 miles of Assateague. The first U-boat attack by U-151 off the coast of Assateague was followed by a three-month cruise along the Atlantic Coast, during which time it sank more than 20 ships, laid mines in Delaware Bay, and cut two trans-Atlantic cables in New York Harbor. During World War II, several vessels were torpedoed and sunk within sight of the Pope Island Coast Guard station.

Several areas on Assateague Island were settled during the 19th century. At North Beach, the lifesaving station served as the focal point of the community. Cottages, a one-room schoolhouse, and Birchs Saltworks were also located at North Beach. The settlement at Pope Island was smaller; it had only a few families, and most of them were connected with the lifesaving service.

Green Run had a great deal more activity. Scotts Ocean House, located on the bayside, was a popular resort hotel, particularly during the 1880s. The hotel boasted 20 bedrooms and a fine seafood menu. The resort became so popular with young people and the clergy that reservations had to be made weeks in advance. Nearly 30 families lived in the vicinity of Green Run, some working for the hotel and the lifesaving service and others employed in maritime industries. By the early 1900s, the population declined, and many families moved their houses to the mainland. Scotts Ocean House closed about 1912. By 1937 all other cottages had disappeared. The Green Run Cemetery was known for its teakwood headboards, which were handcarved by local craftsmen, but all of these have been stolen or vandalized.

Assateague Village, with a population of approximately 225 people in 1900, was the largest settlement on the island. The village had a one-room schoolhouse and a church. In 1922 a new landowner prohibited residents access over his property to Toms Cove, resulting in most of the villagers barging their houses to Chincoteague Island. The cemetery at Assateague Village also was filled with carved teakwood headboards, none of which are extant.

The residents of Assateague Island relied on several industries, such as gathering driftwood and selling wild seabird eggs. From 1630 until about 1852 several saltworks used for collecting sea salt by evaporation were located on the island. Two fish factories located at the south end of the island processed fish oil and fish fertilizer just after the turn of the century. The Seaboard Oil and Guano Company, the larger of the two factories, burned after four years of operation. The Conant Brothers fish factory went out of business when the inlet silted in to such an extent that ships could no longer dock at the wharf.

Activities on Assateague gradually phased into other uses. Hunting, fishing, and summer activities, such as swimming, remained popular. In 1943 the southern portion of the island became the Chincoteague National Wildlife Refuge. The area was developed for greater daytime use in 1956. During the 1950s, the northern section of the island was subdivided into thousands of vacation homes. However, most owners never constructed any homes. The 1962 storm destroyed most of the existing development and discouraged any further construction. In 1965 Assateague Island was authorized as a national seashore.

Maryland

Historic sites and structures on Assateague Island were identified in a historic resources survey conducted in 1968 (USDI, NPS 1968). These are described and evaluated below and are shown on the Management Zoning/Cultural Resources/Developed Areas map in the inside back cover of this document. The number following the site or structure corresponds to the number on the map.

Pope Island Boathouse (1). The Pope Island boathouse is part of the former Pope Island lifesaving station complex that was constructed in 1879. The one-story frame structure was remodeled in the 1930s and later moved from its original site. The building escaped destruction when the rest of the lifesaving complex burned in 1970. In 1978 the National Park Service relocated the building to North Beach. The building is owned by the National Park Service and has been recorded on the List of Classified Structures; however, it does not meet the criteria for eligibility to the National Register of Historic Places.

Site of North Beach Lifesaving Station (2). The station was located on the north portion of the island and was in use from 1884 to 1952, when it was decommissioned. The buildings were destroyed by severe weather and vandalism, but some foundation rubble remains. The property is owned by the National Park Service and does not meet the criteria for eligibility to the National Register.

Site of Birchs Saltworks (3). The saltworks were in use from 1870 until 1890. The site is on the north end of Assateague Island, near the end of North Beach Drive, on NPS property. The site does not meet the criteria for eligibility to the National Register.

Site of Green Run Inlet Lifesaving Station (4). The lifesaving station was located in the vicinity of Green Run Inlet and was in use from 1875 until 1937, when it was decommissioned. Subsequently, the buildings were sold and moved to the mainland. The property is owned by the National Park Service and does not meet the criteria for eligibility to the National Register.

Site of Scotts Ocean House (5). This hotel was the focal point of the beach settlement at Green Run. The building was constructed during the 1870s and remained in operation until about 1912. The NPS site does not meet the criteria for eligibility to the National Register.

Site of Green Run Village (6). Green Run Village was the second largest community on Assateague Island. Most of the village structures here were moved to the mainland after the turn of the century. There is virtually no fabric of this community remaining. The property is owned by the National Park Service and does not meet the criteria for eligibility to the National Register.

Green Run Cemetery (7). Green Run Cemetery, which probably dates from the 1860s, was known for its carved teakwood headboards and footboards. After years of vandalism and theft, none of these remain. Only one grave is marked with a stone at the present time. The NPS-owned cemetery is not eligible for inclusion on the National Register but has been recorded on the List of Classified Structures.

Virginia

Assateague Beach Coast Guard Station (8). The station complex, which has undergone little alteration since its inception, consists of a headquarters/residence, garage, steel observation tower, boathouse, wharf, and breakwater. The Coast Guard station, located at the south end of Assateague Island, served as the headquarters for the U.S. Coast Guard from 1922 until 1967. The complex is a fine example of a period Coast Guard station that is located in a protected area, from which the crews could commence rescue operations from the calmer inlet waters even during the roughest weather. The station had a distinct advantage over those located directly on the ocean. The property has undergone very little alteration. The complex is owned by the National Park Service and is included on the List of Classified Structures. The station is a registered Virginia landmark and has been determined eligible for inclusion on the National Register.

Ruins of Seaboard Oil and Guano Company Fish Factory (9). The factory, which processed fish oil and dried fish fertilizers, was in use from 1912 until 1916, when it burned. Concrete foundations and masonry walls are all that remain of the factory. These ruins are located at Toms Cove and do not meet the criteria for eligibility to the National Register. The property is owned by the Fish and Wildlife Service and has been recorded on the NPS List of Classified Structures.

Site of Conant Brothers Fish Factory (10). This second fish factory is located approximately one-quarter mile west of the seaboard factory ruins and was in use from 1919 until about 1929. At that time, ships could no longer dock in the cove because of siltation. A few small remnants of the factory are still visible at low tide. The property is owned by the Fish and Wildlife Service and does not meet the criteria for eligibility to the National Register.

Site of Pope Island Lifesaving Station (11). Located near Pope Island (6 miles south of Green Run Inlet), the lifesaving station was in use from 1878 until 1953, when it was decommissioned. Except for a coalhouse and boathouse, all NPS structures were destroyed by fire in 1970. The coalhouse was destroyed by fire in 1981. The site is on NPS property and does not meet the criteria for eligibility to the National Register.

Assateague Lighthouse (12). The most prominent historic structure on Assateague Island today is the 1867 lighthouse, whose red- and white-striped tower rises dramatically at the southern end of the island. This lighthouse is listed on the National Register of Historic Places and is owned by the Fish and Wildlife Service and operated by the Coast Guard. It is accessible to visitors, but the interior is not open for climbing. The proposals in this plan for NPS-managed lands in Virginia will not affect the Assateague lighthouse.

Many of these historic sites are now considered archeological resources. A thorough archeological survey of Assateague Island has never been completed. It is doubtful, given the nature of the island's composition and dynamics, that an extensive undisturbed archeological record will be found on Assateague.

SOCIOECONOMIC ENVIRONMENT

Maryland

Most land in Worcester County, Maryland, remains in an undeveloped state in forest, cultivation, marsh, or beneath water bodies. Almost 20 percent of the county is in water bodies, and about 94 percent of the total acreage is open space. The county land area totals 309,120 acres. Only about 7 percent of the land area is intensively developed. Most of this development is found in and around the four incorporated towns of Pocomoke City, Snow Hill, Berlin, and Ocean City, and in resort communities surrounding the latter.

Although a sizeable acreage of open space exists in the Maryland area, a large portion of that acreage is in wildlife management areas that have limited potential for intensive recreational use.

The major economic resource of Worcester County is the resort industry. Other recreational resources, such as fishing, crabbing, swimming, hunting, golf, and a number of spectator attractions, also play an important role.

Predicted employment trends include substantial growth in recreation-related industries and modest growth in industries serving the year-round population.

The year-round population of Worcester County has been stable for many years. The 1970 census recorded 24,400 persons, while the 1975 population was reported to be 27,000. By the year 2000, the population could reach 36,000 persons.

Virginia

Accomack and Northampton counties, Virginia, are primarily rural in nature, with agriculture being the predominant source of income and seafood production being second.

LEGEND

- ASSATEAGUE STATE PARK - MANAGED BY THE MARYLAND DEPARTMENT OF NATURAL RESOURCES
- ASSATEAGUE ISLAND NATIONAL SEASHORE - MANAGED BY THE NATIONAL PARK SERVICE

EXISTING DEVELOPMENT - MARYLAND

ASSATEAGUE ISLAND NATIONAL SEASHORE
ASSATEAGUE STATE PARK

LEGEND

CHINCOTEAGUE NATIONAL WILDLIFE REFUGE MANAGED BY THE FISH AND WILDLIFE SERVICE

CHINCOTEAGUE NATIONAL WILDLIFE REFUGE / TOM'S COVE HOOK OPERATED BY THE NATIONAL PARK SERVICE AS AGENT OF FWS

EXISTING DEVELOPMENT - VIRGINIA

CHINCOTEAGUE NATIONAL WILDLIFE REFUGE

Fish and Wildlife Service. Chincoteague National Wildlife Refuge occupies the Virginia segment of the island and is administered by the Fish and Wildlife Service, Department of the Interior. Freshwater impoundments and a bayside zone of salt marsh support enormous migratory flocks of ducks, geese, and swans from autumn until early spring. Summer flocks include egrets, herons, ibises, skimmers, black ducks, gadwalls, wood ducks, Canada geese, and many species of shorebirds.

An access road extends 5 miles from the town of Chincoteague through the wildlife refuge to a lifeguard-protected beach. From there, the Toms Cove Road extends 2 miles south to the hook. The Fish and Wildlife Service maintains two nature trails near this road. Another trail leads to the Assateague lighthouse. Information and programs are available at the refuge visitor center.

Interpretive boat cruises, fishing trips, and land tours are available within the wildlife refuge. Ten miles of oceanfront are maintained as wild beach. Facilities, programs, and activities are accessible to the handicapped. The Youth Conservation Corps and the Young Adult Conservation Corps have instituted programs.

Chincoteague National Wildlife Refuge was established in 1943 for the primary purpose of providing migration and wintering habitat for the greater snow goose. The initial developments on the refuge were designed to maximize this snow goose utilization. Since the refuge was established, management policies of the Fish and Wildlife Service in general and the Chincoteague National Wildlife Refuge specifically have expanded to include optimizing all wildlife utilization. In order to achieve this goal, numerous management policies have been adopted. Since the national wildlife refuge and nearby areas provide numerous visitor attractions, refuge policies and programs have also been developed to accommodate visitor needs. Visitor programs are limited to those that can be accommodated without adverse impacts on the wildlife population being managed.

In order to protect the resources of the refuge, several regulations have been implemented to minimize impacts on the resources. These regulations include limited entry time currently from 4:00 a.m. to 10:00 p.m. from April 1 through November 30 and from one-half hour before sunrise to one-half hour after sunset the balance of the year. The regulations limit boat access to Toms Cove Hook and Assateague Point only, restrict ORVs to portions of Toms Cove Hook, and prohibit pets. Fishing and clamming are limited to selected areas.

National Park Service. The National Park Service, by memorandum of understanding with the Fish and Wildlife Service, operates a visitor recreational program on the Toms Cove Hook portion of Chincoteague National Wildlife Refuge.

The National Park Service maintains on Toms Cove Hook a visitor information/ranger station, a lifeguard-protected swimming beach, restrooms, bathhouse, amphitheater, parking areas, and picnic sites. There is a designated beach area for ORVs at the south end of the hook. This area is limited to 42 vehicles at any one time. If more than the

maximum number of vehicles is present, a one-off/one-on control measure is initiated. Regular parking on the hook is handled in a similar manner.

The old Assateague Beach Coast Guard station and approximately 6 acres around it are under NPS ownership and management. The main residence is currently used for seasonal housing; other structures are used for NPS storage.

Currently, the Fish and Wildlife Service owns lands in Maryland, and the National Park Service owns lands in Virginia. To provide single-agency ownership of contiguous lands, a proposal has been made to transfer FWS lands in Maryland to the National Park Service and to transfer NPS lands in Virginia to the Fish and Wildlife Service. Exceptions would be made for the Assateague Channel Bridge, which is outside the authorized refuge boundary, and for the Coast Guard station tract.

DESCRIPTION OF THE VISITOR

The following information was derived from two sources that examined the specifics of the Assateague visitor: previous records of the three managing agencies and findings reported in "A Social Profile of the Visitor to Assateague National Seashore" by the City University of New York (CUNY). These CUNY findings included information from questionnaires that were distributed during the summer and fall of 1977.

Visitor Profile

In the ten years between 1968 and 1978, visitation at Assateague Island doubled, reaching 2 million visitors annually. These visitors, who came from many areas of the United States and several foreign countries and represented a cross section of lifestyles, participated in a variety of activities. The overwhelming majority of visitors had a satisfactory experience, and they had definite opinions about what they would like to see on the island in the future.

Visitors to Assateague Island were family-oriented. Almost half of the visitor groups came with children, and approximately one-third of the visitors were in groups of five or more. Almost 60 percent of the visitors surveyed were professionals, compared to 30 percent found in other park surveys and 15 percent of the American public. More than 96 percent of the visitors had completed high school.

Visitor Origins

The three agencies have kept statistics on the visitor origins for a number of years. Minor variances occur from year to year, but relative percentages have remained the same. In the Virginia portion of the seashore, Maryland visitors currently top the list, although in the late 1960s, Virginia visitors were more plentiful. In 1977, 28.5 percent of the visitors to the wildlife refuge portion of the seashore came from Maryland; 22.3 percent came from Virginia; and 17.4 percent came from Pennsylvania.

Dune crossings will also be maintained to allow ORV access to the beach from the sand trail. The sand trail will be confined by a cable fence, where necessary, to prohibit vehicles from entering undesignated areas. During hunting seasons, ORV operation may be permitted bayward of the cable fence to serve the NPS-maintained waterfowl hunting blinds.

Cultural Resources

Compliance with section 106 of the National Historic Preservation Act has been completed in accordance with the programmatic memorandum of agreement (PMOA) executed in the NPS planning process pursuant to 36 CFR 800 (see appendix D). Pursuant to the PMOA, consultation will continue with the Virginia and Maryland state historic preservation officers throughout the planning process to ensure that the plan is implemented in accordance with applicable NPS policies and guidelines to avoid or satisfactorily mitigate any adverse effect on cultural resources included in or eligible for inclusion in the National Register.

The lands of Assateague Island National Seashore have been surveyed for historic sites and structures. Of those identified and evaluated, only one--the Assateague Beach Coast Guard station on Toms Cove Hook--was found to meet the criteria for eligibility to the National Register of Historic Places (January 1980).

A comprehensive archeological survey and evaluation of NPS-owned and -administered lands will be undertaken, in compliance with Executive Order 11593 and the regulations of the Advisory Council on Historic Preservation (36 CFR 800). In the meantime, any ground disturbance will be preceded by an archeological site survey.

Several shipwrecks are located off the oceanside shore of Assateague Island. The shipwrecks will be left to deteriorate naturally and will be informally interpreted.

Eleven identified historic sites and structures are located in the historic zone. The historic zone will be managed to protect these cultural resources from disturbance caused by construction, misuse, or vandalism. Specific management plans for individual sites and structures are as follows.

Maryland. The Pope Island boathouse, recently relocated to North Beach, will be used for equipment storage and other NPS park operation purposes. No major changes will be made in the building's exterior appearance.

The site of the North Beach lifesaving station will be marked and interpreted.

Green Run Cemetery will continue to be fenced and periodically maintained but will not be marked or interpreted. Disturbance of any kind will be avoided.

The sites of Green Run Village, Green Run Inlet lifesaving station, Scotts Ocean House, and Birch's Saltworks will be protected to the extent that ground-disturbing activity at these sites will be avoided. If ground disturbance is unavoidable, it will be preceded by an archeological survey and appropriate mitigating measures.

Virginia. An archeological survey of Virginia lands will be undertaken at the same time as Maryland lands. In the meantime, any ground disturbance will be preceded by archeological reconnaissance.

The Assateague Beach Coast Guard station complex consists of a headquarters/residence, garage, steel observation tower, boathouse, wharf, and breakwater. The plan for this complex includes stabilization, adaptive use, and interpretation.

All structures will require stabilization to correct unsound or deteriorated conditions. This work will be guided by a historic structure report. The headquarter/residence will continue to be used as a residence for seasonal employees and will be rehabilitated for that purpose. The boathouse will be used for storage and as a classroom for environmental education. The garage will be used for storage and shop purposes. The entire complex will be interpreted as an example of a period Coast Guard station, and the exterior appearance will not be altered.

The ruins of the Seaboard Oil and Guano Company fish factory will not be stabilized but left to deteriorate as at present. The site will be interpreted as an early industry on Assateague and as a striking illustration of the island's changing configuration. The ruins, particularly the few brick walls remaining on the concrete foundations, are dangerously unstable in places; they are accessible to visitors and tempting for children to climb on. As a safety precaution, unstable sections of the ruins will be knocked down and the materials left in place. If this action and the posting of signs warning visitors to stay off the ruins are not sufficient, the ruins will be permanently fenced. Before the structure disintegrates completely, samples of the oyster aggregate concrete foundations and brickwork should be salvaged and displayed as illustrations of early construction methods.

The site of the Tonant Brothers fish factory will be protected to the extent that ground disturbance in the area will be avoided if possible. The site will not be marked or actively interpreted.

VISITOR USE AND INTERPRETATION

The National Park Service will promote visitor use and appreciation of Assateague Island's many resources by presenting a wide range of recreational activities and a diverse interpretive program. The existing recreation areas will be maintained, and the capacity of some facilities moderately increased. New visitor facilities will improve the visitor experience on the island.

1 JAN 1946

GENERAL INFORMATION FOR SUPPORTING REQUESTS FOR ADDITIONAL PUBLIC WORKS PROJECTS

1. Station: Naval Auxiliary Air Station, Chincoteague, Virginia

2. Postwar Operational Status: Reduced operations, Fleet aircraft; also Bureau of Ordnance Projects.

3. Estimated Navy Investment in Station's Facilities: $5,000,000

4. Capacity Requirements for Postwar Period:

(a) Mission:
   (1) 1 CVEG and 1 VJ squadron plus occasional additional fleet units.
   (2) Bureau of Ordnance Testing Activity.

(b) Aircraft:

Landplanes		Seaplanes	
CV	30	VPB	
VPB		VR	
VR		Other	
VJ	19		
VN	3		
Other			
Total	52	Total	

(c) Personnel:*

Officers 100 Enlisted 561 Civilian 90

* Figures above do not include Bureau of Ordnance Activities.

5. General Comment:

(a) History

This station was established in March of 1943. It was originally designed for the support on one CV Squadron. During the construction of facilities, its mission was changed to support three CV Squadrons. A third change occurred when VPB(HL) Fleet Training was assigned to the station. Because the runways were unable to withstand the heavy load, its mission was finally changed to that of supporting one CVEG and one VJ Squadron.

(b) Discussion

Chincoteague covers an area of 1,250 acres. There are three runways 150' wide ranging in length from 4800' to 6000'. 50% of the buildings are permanent type of construction, the balance semi-permanent. There are housing facilities available for 975 men and 274 officers. The operating areas surrounding Chincoteague are generally excellent with no conflict with civil aircraft operations. The station is approximately five miles from the Atlantic Ocean with adequate gunnery, bombing, and rocket ranges. It can generally be stated that facilities at Chincoteague are ample to support efficiently the postwar mission provided replacement of temporary facilities are made as they deteriorate or become inadequate.

In addition to the fleet activities mentioned above, the Bureau of Ordnance has established a station for testing aviation ordnance. Separate facilities peculiar to the nature of that project have been erected and financed from Bureau of Ordnance sponsored funds. It is expected that Chincoteague will be retained as a permanent auxiliary station to NAS Norfolk.

FINAL AFTER ACTION LETTER REPORT

UXO SUPPORT

ASSATEAGUE ISLAND MARYLAND

PREPARED FOR:

U.S. ARMY ENGINEER DIVISION, HUNTSVILLE

P.O. DACA87-92-P-0545.

PREPARED BY

ISSI UNEXPLODED ORDNANCE, INC.

(Formerly International Safety Services, Inc.)

3304 SEVENTH AVENUE

HUNTSVILLE. ALABAMA 35805

APRIL 8, 1992

TABLE OF CONTENTS

1.0 INTRODUCTION:

1.1 In accordance with the purchase order, a Final After Action Letter Report is submitted. This report is based on the events that occurred in preforming the tasks as required by the Statement of Work (SOW) which called for four Tasks as follows; Task One (1) Prepare a Work Plan, accomplished by this document; Task Two (2), Preform UXO Standby Support (see Section 6.0 Technical Approach); Task Three (3), Turn-In of Recovered Inert Ordnance and Related Scrap, (see Section 6.0 Technical Approach);and Task Four Prepare and submit After-Action Report (see SOW). All of these tasks were accomplished to one degree or an other, and are described in this report.

2.0 DAILY JOURNAL OF OPERATIONS:

27 February 1992

1315 hrs Charles L. Crawford arrived in Ocean City, Maryland this date.Upon arriving went to the hotel designated as the meeting place for Mr. Allen (Phillips Beach Hotel).

1330 hrs Departed to make contact with Bryan Fitzgerald at the National Park Service (NPS) at Assateague Island.

1345 hrs Arrived at National Park Service on Assateague Island, Md, and made contact with the Chief Ranger, Brian Fitzgerald. At this time Chief Fitzgerald briefed me on his situation and some possible problems that might be encountered. He had already received his copy of the work plan.

1530 hrs Chief Ranger Fitzgerald completed his briefing and I returned to the Phillips Beach Hotel to await Mr Allen.

1600 hrs Mr. Allen arrived and we retired to our room and briefed each other.

1830 hrs Prepared gear for next day; Checked out Schonstedt (Magnetometer). Instrument is operational.

28 February 1992

0730 hrs Departed Hotel.

0750 hrs Arrived at National Park Service Headquarters at Assateague Island, and were met by Chief Ranger Brian Fitzgerald. Discussed the plan of action to be taken with Chief Fitzgerald. Bill Pennywell Supervisor of the bulldozer in operation was also present during this discussion. Following items were discussed:

1. Starting location;
2. Parameters of search;
3. Priority of search (beach side first. Behind breaker berm if time on our 3 week contract permits); and
4. Set up a time to brief the dozer operators. It was decided 1130 hours would be convenient to search.

0930 hrs Departed to work site.

0950 hrs Arrived at work site on the Island.

1000 hrs Commenced our surface search and set up our first five lanes for the subsurface search.

1130 hrs Departed work site for NPS Headquarters to brief personnel who will be on work site at various times. Included in this briefing were the following personnel:

1. Chief Ranger Brian Fitzgerald
2. Bill Pennywell, bulldozer supervisor
3. Kenneth Ruark - dozer operator
4. Kenneth Ruark Jr - dozer operator

At this time we were informed that no other individuals would be allowed

in this area for the duration of our three (3) week time frame.
All of the above listed personnel read the contents of the Final Site Work Plan - UXO Support - Assateague Island Maryland as prepared by ISSI Unexploded Ordnance Inc. Huntsville Alabama, dated February 25, 1992. The above named personnel then signed off the back of a copy of the Work Plan.

1230-1330 Broke for lunch.

1330 hrs Returned to work site, with dozer operators and commenced our sub-surface search. Our lanes, on the beach side were approximately 5 feet wide by 90 yards long. We completed 5 lanes at this time. It appears due to the area the NPS wants surveyed that we will, depending on amount of items encountered be spending most of our time on the beach side of the breaker berm. The distance on the beach side is approximately 90 yards wide by 600 yards long.

1645 hrs Departed for National Park Headquarters.
Note: Chief Ranger Fitzgerald has provided us with a four (4) wheel drive vehicle which is ISSI UXO, Inc.'s to use for the duration of the three (3) weeks we will be here. This vehicle is utilized only from the work site to the NPS Headquarters. It is secured and guarded at that location. NPS also provided us with a radio and charger.

1700 hrs Ceased operations.

2 March 1992

0730 hrs Departed for NPS.

0750 hrs Arrived at NPS, proceeded to work site and commenced sub-surface clearance. We had one suspect site that we had previously hand excavated to a depth of about 4 feet. The NPS provided us with a front end loader. We went to about an 8 foot depth but still couldn't locate the item that was causing the magnetometer to ring off. At that point we filled the hole at the direction of Chief Fitzgerald.

1205 hrs Broke for Lunch.

1305 hrs Commenced sub-surface clearance, at approximately 1600 hours we encountered a ring off indicating a large area which was approximately 10 feet by 35 feet. We hand dug to a depth of 4 feet, but found nothing. Plans were made to use the front loader in the morning to further investigate this area. Completed the sub-surface clearance of 23 lanes, approximately 31,050 square feet. We briefed a new front end loader operator, Bill Ingraham on safety and required him to read and understand and sign the Work Plan.

1700 hrs Ceased operations.

3 March 1992

0730 hrs Departed for NPS from hotel.

0745 hrs Arrived NPS Assateague Island, Md.

0800 hrs	Proceeded to work site.
0815 hrs	The front end loader arrived at the work site. All personnel received their morning safety briefing i.e. dozer operators, UXO team and front end loader operator. Commenced checking out an area previously stated on preceding days journal. Area was about 10 feet wide by 35 feet long. After going to a depth of about 6 feet, we encountered parts of an old ship. The reading we had been receiving was from the iron spikes in the ship. At this point the front-loader operator Bill Ingraham contacted the Chief Ranger Fitzgerald who told the operator to cover the ship up.
1010 hrs	At this time we commenced to conduct sub-surface clearance sweeps.
1200 hrs	Broke for lunch.
1300 hrs	Commenced work at site. We cleared approximately 48,600 square feet and 36 lanes today.
1700 hrs	Ceased operations.

4 March 1992

0730 hrs	Departed hotel for NPS and work site.
0745 hrs	Arrived at NPS.
0800 hrs	Arrived at work site on beach. Gave daily safety briefing to UXO personnel and dozer operators. Commenced sub-surface clearance at work site, reduced length of lanes by 30 feet, lanes are now 240 feet long by 5 feet wide. This was due to the number of ring-offs on what are probably metal stakes used for sand dune fencing. Chief Ranger Fitzgerald approved this change.
1033 hrs	A person named John Anderson came through our work site, he was there on a survey not related to ours and passed through to get assistance. He had locked himself out of his truck. We ceased operations upon seeing him and resumed after his departure.
1200 hrs	Broke for lunch.
1300 hrs	Resumed sub-surface clearance.
1430 hrs	Changed batteries in magnetometer.
1700 hrs	Ceased operations, we covered 41 lanes today for a total square footage of approximately 49,200 feet.

5 March 1992

0730 hrs	Departed for NPS.
0745 hrs	Arrived at NPS.
0800 hrs	Arrived at work site and commenced sub-surface clearance after safety briefing for UXO team and dozer operators. Commenced changing lane size back to 5 feet by 270 feet to the original size.
1145 hrs	Break for lunch.
1245 hrs	Commenced sub-surface clearance.
1700 hrs	Ceased operations, cleared approximately 70,200 square feet and 52 lanes. No ordnance encountered yet, mainly metal fence posts and wire.

6 March 1992

0725 hrs	Departed from hotel to NPS Assateague Island, Md.
0745 hrs	Arrived at NPS.
0800 hrs	Arrived at work site, commenced our sub-surface clearance. (Gave safety briefing to the UXO team and dozer operators.
1500 hrs	Departed for NPS Headquarters from work site. We needed to acquire some new stakes, and preform maintenance on our equipment and to inform Chief Ranger Fitzgerald of our progress to date. Today we completed 50 lanes for a total of approximately 67,500 square feet.
1700 hrs	Ceased operations.

9 March 1992

0730 hrs	Departed from hotel to NPS.
0750 hrs	Arrived at NPS.
0800 hrs	Arrived at work site on Assateague Island and gave safety briefing to UXO team and dozer operators. Commenced sub-surface clearance.
0830 hrs	Encountered a John Morton who is a Virginia Military Institute (VMI) student doing research for the NPS. Briefed him on Work Site Plan and gave him our safety briefing, as he will be in and out of our work site area.
0850 hrs	Recommenced sub-surface clearance.
1050 hrs	Changed batteries in magnetometer.
1205 hrs	Broke for lunch.
1300 hrs	Returned from lunch, and commenced sub-surface clearance. Running into a lot of wire up on the top side where the berm is located. This was from the wooden fence and the steel post fences they used in this area apparently for sand control.
1610 hrs	Located an area approximately 20 feet by 20 feet which appears to be highly contaminated. We are breaking for the day so that we can see Chief Ranger Fitzgerald about getting a front-end loader to excavate the suspected area.
1615 hrs	Today we completed 64 lanes for a total of 86,400 square feet.
1630 hrs	Contacted Chief Ranger Fitzgerald, he indicated he would have Bill Ingraham, the front-end loader, at our work site, in the A.M. tomorrow to assist in excavating the large area located above.
1700 hrs	Ceased operations.

10 March 1992

0730 hrs	Departed from hotel for NPS.
0745 hrs	Arrived at NPS , departed for work site.
0800 hrs	Arrived at work site, gave safety briefing to UXO team and dozer operators. Awaiting arrival of front end loader to dig out the 20 foot by 20 foot area we located yesterday.
0932 hrs	Front-end loader arrived on site, given him a safety briefing and

commenced digging suspect area.

1035 hrs Located the object a bent piece of iron pipe at a depth of approximately 5 feet. Checked area after removal of the pipe and determined no other contamination was present.

1045 hrs Commenced filling in the hole.

1110 hrs Hole filled, the UXO team at this time re-staked sub-surface clearing area in preparation for resumption of operations.

1130 hrs Commenced sub-surface clearing operation.

1155 hrs Broke for Lunch.

1250 hrs Returned from lunch, commenced sub-surface clearance.

1315 hrs Chief Ranger Fitzgerald arrived on work site, and we informed him that we were almost to the ship wreck area. We were instructed to finish up that area. Tomorrow we would commence our sub-surface clearance on the south side of the area where we had started originally. By completing our search of the area up to the ship wreck, Chief Fitzgerald felt reasonably sure we had covered the greatest UXO threat area. The area south that we will commence working tomorrow is considered a lesser potential UXO threat area. Today we completed 36 lanes for approximate square footage of 48,600.
Total lanes to date : 316
Square footage: 408,300

1705 hrs Ceased operations.

11 March 1992

0730 hrs Departed from hotel for NPS.

0745 hrs Arrived at NPS, departed for work site.

0800 hrs Arrived at work site on beach, and briefed UXO team and dozer operators on safety for work site. Cleaned up an item suspected of possibly being ordnance. It turned out to be a piece of galvanized pipe. It resembled a section of a rocket motor, but was not. To date we have found no ordnance of any kind. Our major items have been steel fence posts and the wire used between them. Preformed a surface check of the new area we are going to be working, nothing found.

1000 hrs Commenced working on a map graph of the work site to note areas of interest.

1700 hrs Ceased operations for the day, the map graph is still incomplete.

12 March 1992

0730 hrs Departed from hotel to NPS.

0750 hrs Arrived at NPS headquarters, commenced working on our map graph of the work site.

0900 hrs Completed the draft copy of our work site map graph. Departed for work site area at Assateague Island. The NPS has an archaeologist on hand at the work site today, a Mr. Brook Blade from the Philadelpnia office. He

is here to uncover the ship wreck. Since the bulldozers were being used to uncover this wreck, I suggested to Chief Fitzgerald that we could stand by in case any ordnance was uncovered at the site. He considered this a good idea and we stayed in that area. We were also able to assist Mr. Blade in determining the perimeter of the wreck using our magnetometer. This was especially helpful to him in as much as most of the ship is buried. The dozer operator was able to dig around the wreck using stakes we had posted indicating the edges of the wreck. The dimensions of this ship wreck were approximately 30 feet by 88 feet, a good size wreck.

1145 hrs Broke for lunch.

1230 hrs Returned to work site, continued to monitor area around ship wreck while dozer operators were moving sand around the wreck. Mr. Blade was very appreciative of our efforts in ascertaining the dimensions of the wreck. It seems it may be bigger than originally thought.

1700 hrs Ceased operations for the day.

13 March 1992

0730 hrs Discovered that my private vehicle was broken into and various personal items were stolen. Made reports to hotel, security police and city police.

0800 hrs Departed for NPS.

0815 hrs Arrived at NPS.

0830 hrs Commenced working on a final copy of map graph of work site. Informed Chief Fitzgerald why were running a little late today due to problem at hotel.

1130 hrs Broke for lunch.

1200 hrs Back from lunch, returned to work site and commenced sub-surface clearance. We completed 26 lanes for approximately 35,100 square feet this day. We did run into indication for an area about 6 feet by 6 feet. We tried digging by hand, but item was too deep. We decided to see Chief Fitzgerald about using the front-end loader. He told us we would have it first thing on Monday.

1710 hrs Ceased operations for the day.

16 March 1992

0730 hrs Departed from hotel for NPS.

0745 hrs Arrived at NPS, departed for work site.

0800 hrs Arrived at work site.

0900 hrs The front-end loader arrived and began digging at the site located on 12 March.

0930 hrs Located the item, a piece of pipe about 2 feet long. Commenced our sub-surface clearance.

1135 hrs Broke for lunch.

1230 hrs Returned from lunch, commenced our sub-surface clearance. Today we completed 40 lanes for an approximately square footage of 54,000 feet.

1700 hrs Ceased operations for the day.

17 March 1992

0730 hrs Departed for NPS.

0745 hrs Arrived at NPS, discussed demobilization of work site with Chief Fitzgerald. Proceeded to work site to begin sub-surface clearance. Today we cleared 54 lanes for an approximate square footage of 72,900 feet.

1200 hrs Broke for lunch.

1300 hrs Returned to hotel to finish map graph of work site.

1500 hrs Departed from hotel to NPS.

1515 hrs Arrived at NPS.

1530 hrs Gave Chief Fitzgerald an out-briefing on the project, as Chief Fitzgerald indicated he would be out of the office on Thursday.

1600 hrs Ceased operations.

18 March 1992

0730 hrs - 1600 hrs
Demobilized site and turned in vehicle and radio to NPS.

19 March 1992

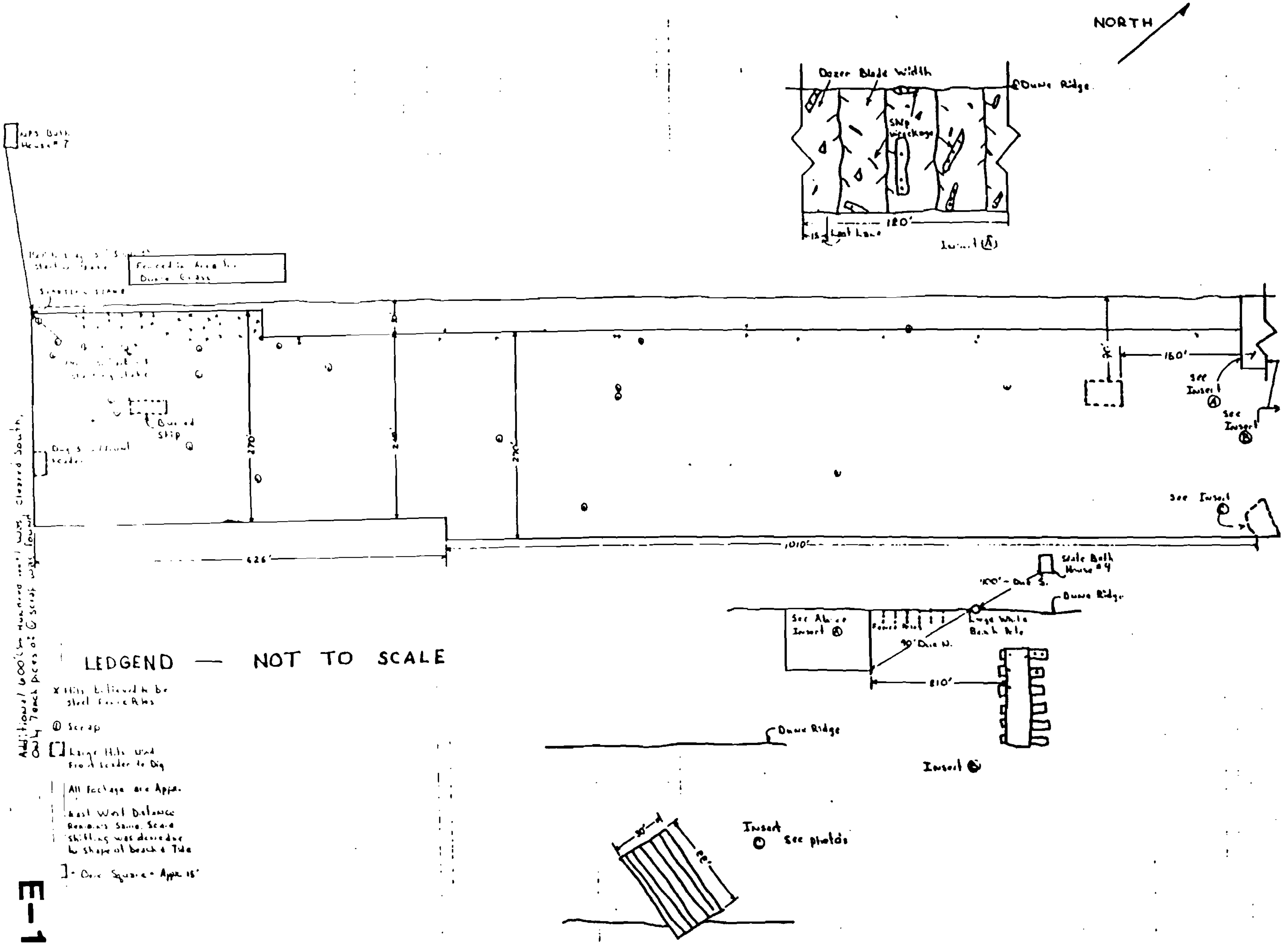
0730 Departed for home.

3.0 DEFENSE REUTILIZATION AND MARKETING OFFICE (DRMO):

Due to the low volume of scrap and the complete absence of UXO or ordnance related scrap, their was no need to dispose of this material through DRMO channels.

4.0 MAP GRAPH OF UXO WORK SITE:

Attached is a map graph of the UXO work site at Assateague Island. This map graph shows a summary of the significant activities of the UXO Support operations at the work site.


NORTH
Dozer Blade Width
Dune Ridge
Ship wreckage
120'
15'
Last Lane
Insert (A)
160'
See Insert (A)
See Insert (B)
See Insert (C)
Buried Ship
270'
626'
1010'
State Bath House #4
100' – Due S.
Dune Ridge
See Above Insert (A)
Large White Beach Pole
90' Due N.
810'
Dune Ridge
Insert (B)
Insert (C) See photos
30'
LEDGEND — NOT TO SCALE
X Hits Believed to be Steel Fence Poles
Scrap
Large Hole Used Front Loader to Dig
All Footage are Appx.
East West Distance Remains Same. Scale shifting was dictated by shape of beach & Tide
One Square = Appx 15'

Ordnance and Explosive Waste
Archives Search Report
for
Assateague Island
Worcester County, Maryland and Accomack County, Virginia
Project Number C03MD093001

APPENDIX F

LETTERS/MEMORANDUMS/MISCELLANEOUS ITEMS

APPENDIX F

LETTERS/MEMORANDUMS/MISCELLANEOUS ITEMS

Table of Contents

JUL 27 1990

July 24, 1990

Superintendent,
National Wildlife Refuge
Route 2, Box 294
Berlin, Maryland 21811

There was a one-man-draft from the rocket range on Nantucket Island (Mass.) to Quonset Point (R.I.) who was sent on to the Chincoteague Naval Air Station. He was the key enlisted man to establish rocket ranges on Assateague Island. It was June 1945, and I am the one-man-draft from Nantucket.

There were 15 of us quartered with the Coast Guard at the Surf-Station about 10 miles south of the inlet at Ocean City. We established two rocket ranges: The first was about half a mile north of the Surf-Station. The second was about 10 miles south of the Surf-Station, near the Maryland-Virginia State-Line on the Maryland side as I recall.

I left the area and the Navy in May of 1946 thinking that I would return to Ocean City. I never returned, except in memories. And, I often think of Assateague Island, the Surf-Station, and McCabe's beach house about 3 or 4 miles or so south of the inlet. (Mr. McCabe was a dollar-a-year-man in Washington - on loan from Scott Paper Co.

I missed the area, and the beauty of Assateague Island. But I was most pleased when I learned that Assateague became part of our National Seashores. I have fond memories of the beauty of the Assateague Island, and often wish I could see it again.

It was a joy to run on the beach, especially the 10 miles from the inlet to the Surf-Station. On the week-end, or some nights, I often would go with the Surfman on patrol. It was a beautiful trip from one tip of the island to the other, especially the south end that was some 20 miles from the Surf-Station. I had never seen so many water-fowls in my life.

We never hunted. There were few people that ever came onto the island, and fewer - if any - ever hunted on the island. Some of the locals did do some hunting or the west side of the bay. The Coast Guard Chief, I don't recall his name, and his family lived in the area of Sinepuxent. After his days off, the Chief would tell me about working in his garden, or about the two or three water-fowls he had for his family. Having coffee with the Chief was a time I looked forward to as he not only lived in the area but knew, really knew, the entire area.

I am happy that you have the Assateague Island as a National Seashore. Any and all information that you could send me would be much appreciated as I already have so many great memories of the area.

Adrien Smith

F-1

Roger:

RKC
Lowry

Sept. 13, 1990

Reference: ASE Incident Report.

This appears to be an excellent report.

Notes to consider:
During WW-2 the public generally called anything in the air "air force".
I never saw any rocket motors during WW-2. All rockets were with solid fuel. The 3 inch, the 5 inch, and the "tiny tim" that was a eleven hundred pound rocket...few "tiny-tims" were in use, mostly in the area of Manteo (N.C.).
In 1945-46, the north range was a little short of a mile north of the North Beach Station. The south range was between 9 and 10 miles south of this station.
Assateague Island was clean when we arrived in June 1945. In May 1946, It was still clean when I left, except in the above areas. Anything in these areas would and was considered scrap.

It is difficult with the photos:

Photo 1. This seems to be close to our north range area. They may well be practice heads. If so, they should have a solid nose (sort of rounded), with a shallow thread, or locking area on the rear, for attaching the the rocket body that was about 4 inches in diamenter. The tube, should have been hollow as the solid fuel would have been used better than 999 times out of a 1,000 times. It may or may not have remained attached on impact. The tube part would be open on the rear.

Are they calling the above tubes rocket motors?? Could be. I would need more information, or a lot better picture.

Photo 2. This could be as outlined in the above.

Photo 3 and 4 could be the same.

What the rocket looked like after impact depended largely on angle or degree of dive. Low ~~angle~~ 30 degrees or less, tended to have more ricochet heads. Less than 30 degrees were seldom used. The angles between 30 and 45 degrees were generally used as the rocket generally stayed together.
There was a danger with low angle runs, depending on the plane's speed, a ricochet could go up and hit the plane. I did see a near miss on Nantucket Island in the spring of 1945.
The pilot, in a new, twin-engine F7F fighter (black-widow) called for a 20 degree run. It was refused, and stated that the run was dangerous, not cleared by the Fleet Admiral, and he should not make the run. He made the run. The ricochet head just missed the rear of the right engine, being between him and the engine.
My Command was advised directly, he advised QuonsetPoint, and a safety officer was waiting for the pilot.
I would think that pilot needed some clean shorts for two reasons: 1. because of the actual incident. 2. his safety officer, and I would bet that the Admiral was told about the incident.

In my opinion, it was stupid to bury the scrap on Assateague.

F-2

Adrien.

September 15, 1990

Roger:

I woke from my nap this afternoon, Assateague was fore-most in my mind. Just for a moment everything seemed clear then begain to fade somewhat. A few tid-bits did seem to stay.

1. Fred Bunting has to be the one that was the first class petty officer at the North Beach Station in 1945-46. He would be the one married into the family I described in Ocean City.
2. Captain (Chief) Henry Ritson had to be the in-charge-officer of the station. His years of service,etc. sounds right as the CG Chief was at retirement age or past due when I was at North Beach.
3. Our Lieutenant (JG) McLaughlin, the Chief, Fred, and me were talking over coffee...and about the junk and where to put it. This was a couple of days before I left.
4. The Lieutenant was saying that the contractors wanted to bury this "junk" about the high water mark. They were due any day.

My memory is that the beach at this point was on a compass reading of north to south. Standing near the water edge in front (east) of the North Beach Station, the beach looked straight (north-south) as far as the eye could see. The Station was about 800 feet back (west) of the normal high water mark.

The rocket range, Stinger-One, was right about one mile north of the Station. The target was about two degrees east of a north-south line of the Station. Our control points were 1,000 feet from the center of the target, at a southwest & northwest point. These were exact as they were used in plotting the hits. Better than 99.9% of all rockets fired on this range went into an area between the north-south line between the control points and the high water points. I do not recall a rocket ever going in the water. A couple of times they did go short, and were recovered after the flight...the next day at the latest.

This same generally outline was used at the south range -stinger-two. This range was just short of 10 miles south of the North Beach Station. A few degrees west of a north-south line as related to North Beach.

The idea in item 4 above,,.was that the salt concentration in this area would destroy the junk in a short time. The Chief & I disagreed with this and so did the first class. We said it should be on higher ground, west of a north-south line of the control huts. The reason we gave was two-part. The time factor was unknown, and there was also heavy weather factors that could happen any time. The Lieutenant then agreed with us.
I left the North Beach Station the next day for Chincoteague with the thought (and desire) that I would sign-over to the regular Navy, I didn't sign over. The Officer in our Command Office

was on the telephone when I reported in at Chincoteague. He held up a finger indicating for me to hold on. I didn't know him, but he knew me. I comfirmed the conversation and its conclusion, including the why for the conclusion. He nodded in an affirmative manner. The next day I left for Norfolk to sign-over. I declined (that's another story), and returned to Chincoteague Naval Air Station. And, I again declined to sign-over (another story). Then I was placed in a group, sent to Maneto (N.C.), regrouped and sent to Jacksonville Naval Air Station and discharged. For three months or better, the Navy tried to get me to re-inlist. I answered NO durning the first half, and during the second half everything just went into the trash can.

From what I understand (and thinK now), no one ~~one~~ really paid attention to Lieutenant McLaughlin's recommendation and request related to item 3 and 4.

It appears to me that the contractors may well have taken the cheap, easy way out. This was not the wish, thought, recommendation of the Coast Guard or the Navy on Assateague Island. All of this, rightly so, was placed with the Officer in Chincoteague and the Contractor. It would appear the Officer made no contact, and the Contractor buried the junk were he wanted to...and, my guess is that was with a hundred feet of the 1946 high-water-mark.

Henry Ritson, or the Chief CG I knew, lived with his family near Sinepuxent, and had a garden. This was within a mile or so of the junction of Maryland's highways 376 and 611. Someone would come over in a small boat and pick him up on the bay side of the North Beach Station, and was a little north of/west point. They would ~~Lake~~ LAND on the main-land side about where 611 goes across to Assateague Island. He often talked about crabbing at this point. In fact, most often his wife and children would be there crabbing when he got there, on his days off. I don't recall what and how many children they had. I always thought it was an older child, or a neighbor (depending on weather), that would come for the Chief. It was always early or late when he left or returned.

Ritson and Bunting has to be the two I knew at North ~~Beach~~ BEACH Station. I would never have recalled their last names. Generally, I would have called them Chief and Fred.

Adrien.

September 16, 1990

Roger:

There hasn't been anything said about how or why you have found some of the other items on Assateague Island. Let me give you a few suggestions:

Destroyer Escort: The DE was a seagoing antisubmarine patrol and escort ship, it was mass-produced in the United States by prefabrication starting in late 1941.

Between late 1941 and mid-1943, 1,005 DEs were ordered. 78 went to England, 6 to France, and in 1944 there were 6 transferred to Brazil for duty in the South Atlantic. 305 were canceled in the fall of 1943, and 135 more were canceled in 1944 as the Allies gained control of the Atlantic. This means that we had some 475 DEs in service, mostly in the North Atlantic and along our Eastern Coast...until after we won control of the Atlantic.

The DE-5 (Evarts class*) had 3 inch guns; The DE-51 (Buckley class**) had 3 inch guns; The DE-99 (Cannon class**) had 3 inch guns; DE-129 (Edsall class**) had 3 inch guns; The DE-224 (Rudderow class**) had 5 inch guns; and; The DE-339 (John C. Butler class**) had 5 inch guns. There were heavy patrols along the Coast of Maryland until after mid-1944. *means they were short-hull, 289 feet, 5 inches; **means they were long-hull, 306 feet.

Most DEs were armed with two 5 inch 38 caliber or three 3 inch 50 caliber dual-purpose guns, and 40-mm and 20mm anti-aircraft guns, Some of the early DEs mounted 1,1 inch guns in lieu of the 40mm guns. Most of the DEs had triple 21 inch torpedo tubes, and all carried depth-charge projectors. This included racks on the stern, K-guns on the stern (for both side directions), and Y guns along the side for throwing depth charges. Later they had ahead throwing anti-sub devices called Mousetrap, hedgehog, or Squid.
In the very early days the smaller guns were fired with a gun-sight. In the mid and later part of the war, the guns were fired by tracer fire...every 4th one being a tracer, Any damaged ammo went over the side, very quickly.... especially any mis-fires or hang-ups. For example: any problem 20 mm had to be over the side and into the water within 90 seconds. Lots of stuff went over the side between 1941 and 1944.

An example of Destroyer Escort: Two 5 inch, or three 3 inch guns; Eight 40mm, and four 20mm AA guns; three 21 inch torpedo tubes; plus the above depth-charge equipment.

Added information: They generally had a 5,000 mile range at 15 knots (could do between 21 and 24 knots); 1,300 ton displacement or approximately 2,200 tons loaded, including 340 tons of fuel oil. The basic size was 306 feet in length; between 37 and 39 feet at the beam, 11 foot mean draft with 14 feet as maxium draft. Crew was generally between 180 and 187 men...with the maximun being 220. The Destroyer Escorts could and did come in close to shore...often. In fact, 94 of the Buckley and Rudderow class were converted to high speed transports that could and did take companies of troops in for landing, raiding parties, or underwater demolition teams...especially in the Pacfic.

My crew, under orders, pulled all old, out-dated lot numbers of ammo out of Norfolk (May, June, July Of 1944). Some dated back to World War-I time. This was sent to the Navy Dock, loaded on a barge, taken 30 to 50 miles to sea, and pushed over-board, containers and all.
To my knowledge, gun practice from the air, sea, or land was done with the use of a towed target in the air or on the sea. From land, it would be from a point or land, always towards and over the water.

Adrian

F-4

SEP 80

Rocket ranges - 1945-46

Assateague Island

1. ...the flight pattern did not over-fly Berlin, Ocean City, McCabe's beach house, Coast Guard North Beach Station, or Snow Hill.
2. ...on the ranges, the flight patterns were counter-clockwise as indicated on the sketch.
3. ...most dive-angles were between 30 and 45 degrees.
4. ...launch (fire) distance averaged about 1600 yards, or about a mile.
5. ...some flights used 3 inch rockets; most flights were with 5 inch.
6. ...practice rockets only; no live ammo; no exploseve materials used.
7. ...the rockets used solid fuel with an igniter in the aft section. Ignition was by aircraft's electrical system. One-tenth volt was all that was needed to launch the rocket...however, generally more voltage was used.
8. ...most of our flights were out of Chincoteague Naval Air Station with some flights from Manteo Air Station (N.C.).
9. ...the aircraft out of Chincoteague Base would generally pass south or north of the town of Chincoteague in an eastward direction. Out over the Atlantic they would turn northward. Flights, up from Manteo, were in a north/south direction, and over the water.
10. ...initial check-in with the target, by flight-leaders, were made shortly after take off, depending on operations in the target area. Most of the chek-ins (out of Chincoteague) were made while the flight was over Chincoteague Inlet, or the extreme southern part of Chincoteague Bay...depending on number of planes in flight, and time factors.
11. ...flights would have as few as five, or as many as eleven planes.
12. ...the flight leader would be the first to call giving his name and plane number. Then each pilot would check-in, in the proper flight sequence.
13. ...generally, planes would proceed in a northward direction, over the water, east of the target area. They then would turn westward, and pass north of the range. By this time all information had been received and the sequence established.
14. ...sequence could be as close as thirty seconds, or more, depending on the number of planes in the flight.
15. On my range I could take eleven planes with 8 rockets each, and have the flight complete and off the target range within 40 to 44 minutes. A flight of 7 planes (about standard flight) would be off-target in 26 minutes.
16. This related to air-time in combat. Often, when Manteo needed to tighten-up a flight, they would send the group north to my range. They would get their "act" together within 2 flights. The flight group would then be ready for sea-duty, or over-sea assignment.
17. I am being very modest when saying that our crew on Assateague was good. We were second to no-one.

Flights on target:

18. ...as indicated by the radar, the pilot would radio his plane number and "I'm in the groove", and receive a "roger" with his number.

19. ...in their first flights, the plotter, with the plane in view in the plexisglas window, would call "mark" a split-second before he reached his launch position. This was to teach distance and time with his plane's speed. Most of the time, depending on dive-angle, the distance was 1600 yards (a little short of a mile).

20. ...most of the time, we would simply record the distance (when we saw the "puff" of smoke), the degree of angle, and the impact (location) of the rocket.

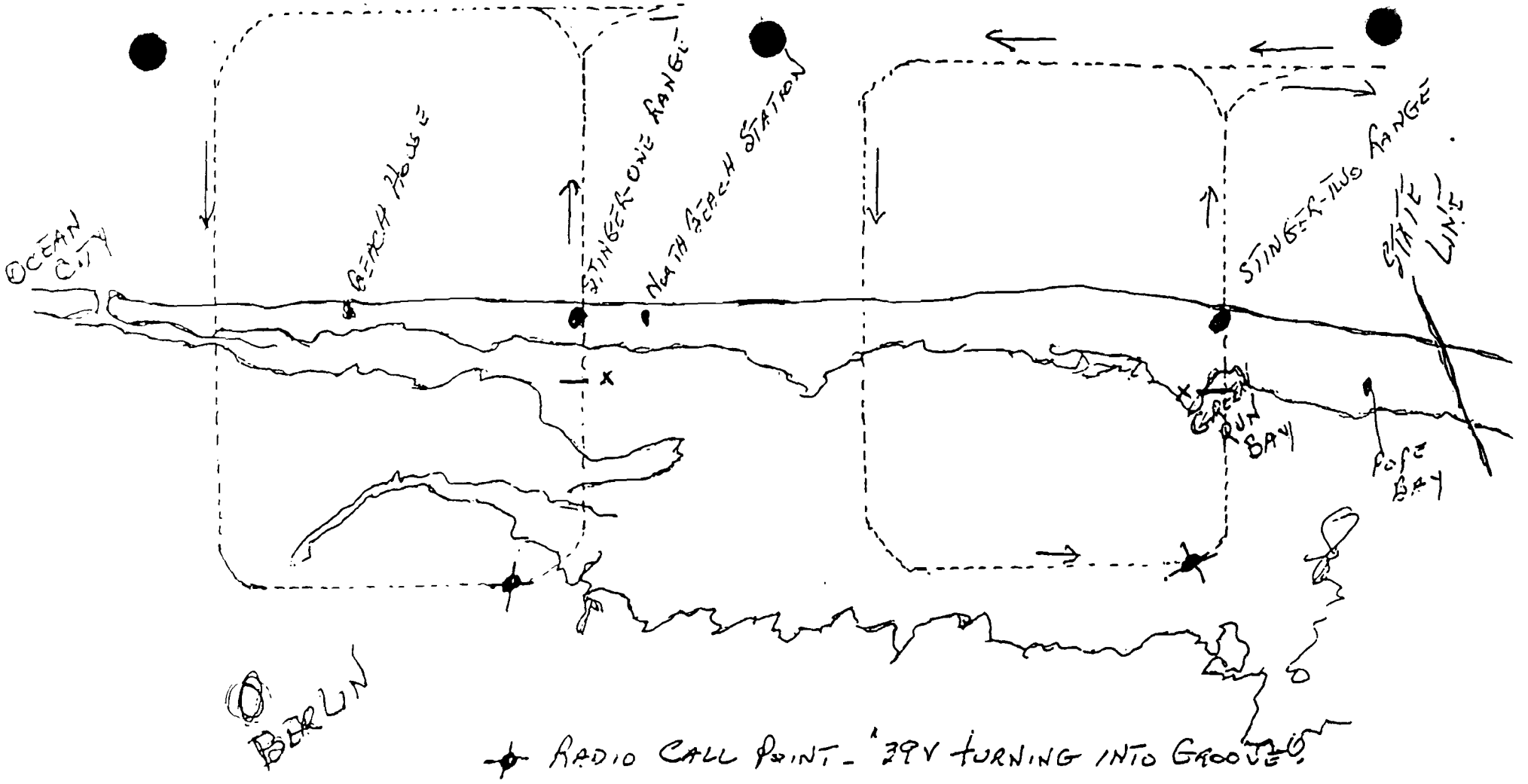
21. ...an example of a radio read-back would be: 39V; 1650 yards; 40 degrees; 10 mills at 1 o'clock. This would correspond with his plane's equipment, and he would then make needed adjustments for his next run. Everthing was written on the pilot's score/information sheet.

22. When a pilot lost radio contact, the piolet behind him would tell me, and make the pilot's call-in for him as this pilot would always have the plane in sight. Every thing else continued in a normal manner. If a pilot turned into the groove early, I was told. Changes were made and he was left in that sequence.
In an eleven plane flight, there were never more than 5 seconds of free air-time out of every minute; however, if a plane fired two rockets (whatever the reason), both hits were plotted without additional comment.

23. ...the target area was figured mathematically so that points coincided at the correct distance. This was done with the plexiglas window and the plot-board (which was a minature target area). The spotters, target, and window were at exact locations.

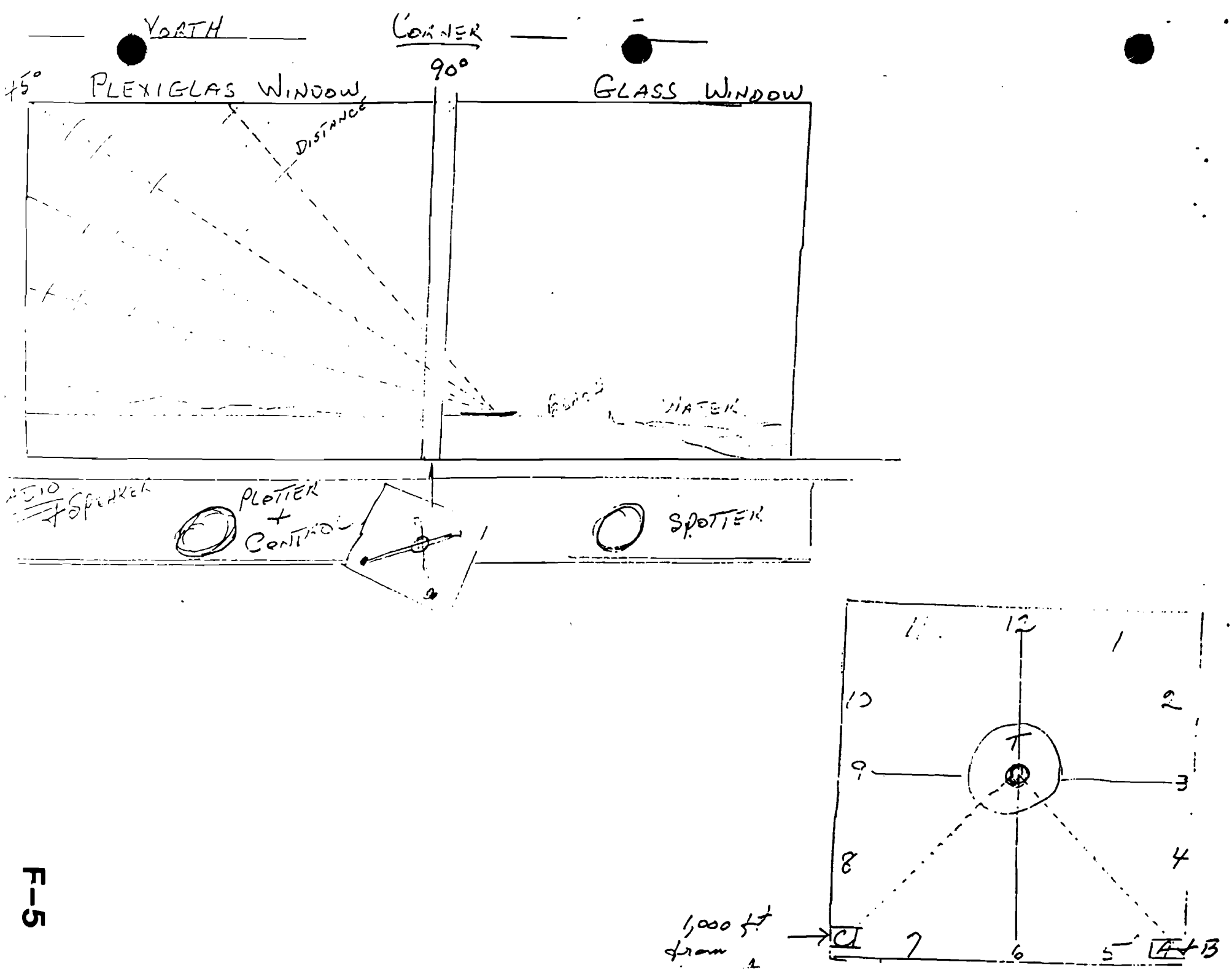
24. This is a general out-line. Let me know if you desire or need more "rocket-range" information.

Adrien.



F-5

OUT LINE OF ROCKET RANGES —


NORTH
CORNER
45°
90°
PLEXIGLAS WINDOW
GLASS WINDOW
DISTANCE
WATER
PLOTTER + CONTROL
SPOTTER
1,000 ft from
12
1
2
3
4
5
6
7
8
9
10
11
13

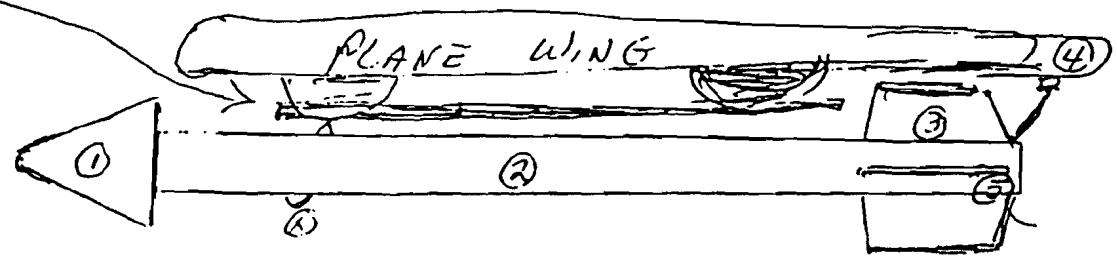
F-5

A. COORDINATOR - PLOTTER
B. SPOTTER
C. AIRCRAFT RADIO
D. REGULAR RADIO

AND VIEW OF WING.

SLOTTED LAUNCH RAIL

5 INCH ROCKET



ABOUT 5 FEET

1. HEAD WAS ATTACHED JUST BEFORE USE. DUMMY HEAD FOR PRACTICE. NO "LIVE" HEADS ALLOWED IN THE AREA. ASSEMBLED IN AN AREA, CLOSE BY, THEN MOVED TO LOADING. NO LIVE HEADS ALLOWED IN EITHER AREA. THE HEAD WAS 5"_ therefore THE TERM 5" ROCKET.

2. TUBE. ABOUT 4 inches_ CONTAINED SOLID FUEL,

3. TAIL FINS OF ROCKET.

4. ELECTICAL CONNECTOR.. WIRE BETWEEN FINS

IGNITER FOR ROCKET.

3 INCH ROCKET ABOUT SAME. JUST SMALLER, OVER-ALL.

Does this give you the idea? No picture.

Rev. (1/76)

UNITED STATES DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE
CASE INCIDENT RECORD

1. ORGANIZATION CODE	2. ORGANIZATION (PARK) NAME	3. LOCATION CODE	4. CASE/INCIDENT NO.
1 4190	Assateague Island National Seashore	0105	880407

5. LOCATION OF INCIDENT	6. WHEN DID IT OCCUR?	MO.	DAY	YR.	24 HOUR TIME	HRS.	MIN.	7. DAY OF WEEK
Sinepuxent District beach, approx. ½ mile N. of protected beach		07	14	88		14	30	5

8. OFFENSE/INCIDENT CODE	9. NATURE OF INCIDENT	10. HOW REPORTED
66:05:00	Discovery of explosive ordinance devices	radio

11. REPORTED BY	12. ADDRESS	13. PHONE
Mike Kiser, ASIS Lifeguard	ASIS	HOME / BUSINESS

14. RECEIVED BY	15. WHEN RECEIVED: DATE	16. TIME BROADCAST	17. WHEN INVESTIGATED
Robbie Sampsell	7/14/88	1430	DATE 7/14/88 TIME 143

18. INVESTIGATED BY	19. OFFICER/RANGER NO.	20. WHEN CLEARED	DISPOSITION
Sampsell, FitzGerald	504 0105	DATE N/A TIME	21.

	22. INVOLVED PERSONS	23. ADDRESS	24. PHONE	25. SEX	26. RACE	27. AGE	28. DATE OF BIRTH
1	See attached						
2							
3							
4							

29. DETAILS OF INCIDENT

7/14/88, 1430 hrs: I received a call from Ranger Sampsell with a report of three 90-100 mm shells with fuses washed ashore just N. of the guarded beach (Sinepuxent District). As Sampsell advised he would proceed to the area and secure it, I contacted Lt. Paul Jackson (Maryland State Police) for assistance. Jackson advised he would contact the State Fire Marshalls Office as they usually handle bombs and explosives. Sampsell arrived on scene and advised he did have three shells which were identified by ASIS Lifeguard Mike Kiser as possibly containing fuses. Kiser had recently discharged from U.S. Army (artillery).

1500 hrs: Lt. Jackson returned my call to advise that the State Fire Marshalls Office (Ruxton Bramble) would be responding from Ocean City. At approx. 1530 hrs the State Fire Marshalls office was on scene and advised we would need an Explosive Ordinance Disposal Unit (EOD) to respond.

1535 hrs: I contacted the 144th EOD at Fort George Meade, Ft. Meade Maryland and spoke to a Lt. Chambliss advising him of the situation. Lt. Chambliss advised he would get a team together and be enroute, ETA approx. 1930 hours.

1600 hrs: I contacted MARO and spoke to Chris Andress (MARO Chief Ranger) and advised him of the situation. Andress asked to contacted at VAFO the following day for update.

30. QUANTITY	31. PROPERTY STOLEN OR DAMAGED	32. ESTIMATED VALUE	RECOVERED 33. DATE	RECOVERED 34. VALUE
35 PROPERTY CODE OF HIGHEST VALUE		36 TOTAL	37 TOTAL	
			00	00

INVESTIGATED BY (Signature and Date)

APPROVED BY (Signature and Date) B. FitzGerald 7/

F-63

FORM NO. 10-344
(Rev. 3-73)

U.S. DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

SUPPLEMENTARY CASE/INCIDENT RECORD

ORGANIZATION (PARK) NAME	CASE/INCIDENT NUMBER
Assateague Island National Seashore	880407
LOCATION OF INCIDENT	**DATE OF INCIDENT** MO DA YR
Sinepuxent District approx. ½ mile N. of guarded beach.	07 14 88

NATURE OF INCIDENT

Discovery of explosive ordinance devices

COMPLAINANT'S NAME	COMPLAINANT'S ADDRESS

RESULTS OF INVESTIGATION

7/14/88, 2000 hrs: I received a call from ASIS Dispatch advising that the Ft. Meade EOD Team had arrived, secured the devices, and departed enroute Ft. Meade. Lt. Chambliss advised they would dispose of the devices on their firing range. Chambliss identified the items as 5" shells with at least one rocket motor. He further speculated the source of the shells may be a hole just offshore approx. 15 yards. At this time I made plans to contact U.S. Navy EOD Units to request assistance in checking out this possibility.

7/15/88, 0830 hrs: I contacted U.S. Navy EOD Unit at Ft. Story (Virginia Beach) and speak to a Lt. Long. Long advises we have a reasonable request but we will have to make the request through the Department of the Interior to DOD, Chief of Naval Operations Lt. Long did give me the name of a Lt. Commander Albrecht (EOD Group II) and a phone number (804-422-7191) that WASO can call for faster response.

0900 hrs: I contact Walt Dabney, Chief Ranger, WASO Ranger Activities Division, and advise him of the situation. Dabney advises he will contact Lt. Cmmdr. Albrecht for assistance. I then call VAFO to update Andress.

1200 hrs: I contact Lt. Cmmdr. Albrecht who advises that Dabney has contacted him and we will have to go through CNO for priority clearance. I then contact Dabney and we discuss the possibility of NPS Dive teams exploring the hole offshore.

1230 hrs: I contact ASIS guard Mike Kiser to ask him to swin the area with mask and snorkel to determine the possibility of other shells in the hole. Kiser asvises that another shell has just washed ashore in the same area. I contact Ranger Trimble to alert him and ask him to secure the area, closing it to swimming, fishing, surfing. I then call Ft. Meade EOD to request assistance again. I also call Dabney back and leave a message about the additional oridnance washing ashore.

1430: Receive word from 144th EOD they will respond, ETA approx. 1700 hrs.

1545 hrs: Dabney returns my call to advise he had been to see Assistant Sec. of the Interior Alan Fitzsimmons about our request for Navy assistance. Fitzsimmons contacted a Captain Bill Coehen at (202) 692-3227 to make the request for CNO assistance.

1615 hrs: I meet with protection and guard personnel to update them on plan of action until Navy responds. We will close the area to water activity, check it every hour during daylight hours to check for further ordinance, guards and protection staff share responsibility for keeping visitors out of the area. I advised Trimble to contact me at home for further developments.

SUBMITTED BY (SIGNATURE AND DATE)	APPROVED BY (SIGNATURE AND DATE)
	7/2

F-6

FORM NO. 10-344
(Rev. 3-73)

U.S. DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

SUPPLEMENTARY CASE/INCIDENT RECORD

ORGANIZATION (PARK) NAME	CASE/INCIDENT NUMBER
Assateague Island National Seashore	880407
LOCATION OF INCIDENT	**DATE OF INCIDENT** MO DA YR
Sinepuxent District beach, approx. ½ mile N. of guarded beach	07 14 88

NATURE OF INCIDENT
Discovery of explosive ordinance devices

COMPLAINANT'S NAME	COMPLAINANT'S ADDRESS

RESULTS OF INVESTIGATION

1730 hours: I received a call from a Sergent First Class Michael Dillaplain (team leader 144th EOD) who advises he has secured the ordinance found this date. Dillaplain request permission to go through DOD channels to contact Navy EOD Units to respond and check out the area just offshore. I advise Dillaplain that any assistance he could provide in getting the Navy to respond would be appreciated.

7/16/88, 0800 hrs: I received word that Lt. Cmmdr. Albrecht had called the previous evening at approx. 1800 to advise a Navy EOD team would be enroute on 7/16. Further received a message to contact a Lt. Thetford at (804) 422- 7955.

0830 hrs: I made contact with Lt. Thetford who advised that the U.S. Navy Mobile Unit II (EOD DET) would be enroute with six persons, ETA at ASIS approx. 1500 hrs. Thetford initially requested permission to leave ordinance found at ASIS until arrangement for its disposal could be secured. I denied this request due to lack of secure storage area. Thetford also requested I secure quarters for the EOD team. After contacting numerous hotels I finally contacted the Ocean City Chamber of Commerce who assisted in locating temporary quarters for the night.

0930 hrs: Sgt. Dillaplain arrived back on site with orders to secure the area and turn it over to Navy EOD upon their arrival.

1220 hrs: Received word from Sgt. Dillaplain that he had located another shell which had washed ashore.

1530 hrs: U.S. Navy EOD Mobile Unit II arrives with Lt. Jeff Danshaw in charge. We go out to the site to survey the situation. At approx. 1630 hrs. Sgt. Dillaplain turns the area over to Lt. Danshaw and the EOD Unit from Ft. Meade departs the area. Danshaw advises he will begin underwater survey of the area in the morning.

From 7/17 through 7/20 Lt. Danshaw's team conducted an underwater survey of the suspect area (see attached diagram compiled by Danshaw). At a debriefing on 7/21/88 attended by ASIS Supt. Rector, Asst. Supt. Fagan, District Ranger Hartley, Ranger Sampsell, Senior Chief Tom Herman, Lt. Danshaw, and myself; Danshaw explained the following re: his survey:

He believes the ordinance to be washing out of a trench dug in the vicinity of an old Air Corps target range used around WW II (this matches reports from several Park employees who lived near here during this time period). As the target area was cleared they probably dug a trench about 20-30' deep and buried the expelled shells, etc. The trench was originally located on Assateague, but due to island migration it has now

SUBMITTED BY (SIGNATURE AND DATE)	APPROVED BY (SIGNATURE AND DATE)
	7/21/88

F-6

FORM NO. 10-344
(Rev. 3-73)

U.S. DEPARTMENT OF THE INTERIOR
NATIONAL PARK SERVICE

SUPPLEMENTARY CASE/INCIDENT RECORD

ORGANIZATION (PARK) NAME	CASE/INCIDENT NUMBER
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Sinepuxent District beach approx. ½ mile N. of the guarded beach	07 14 88

NATURE OF INCIDENT

Discovery of explosive ordinance devices

COMPLAINANT'S NAME	COMPLAINANT'S ADDRESS

RESULTS OF INVESTIGATION

become exposed to the actions of surf and currents.

Danshaw believes the ordinance is a type of Air Force (U.S. Army Air Corps) shell (see the attached diagrams) and rocket used for target practice. While Danshaw feels the chances of an explosive incident are relatively small, he asked us to keep the area closed to public access until he can have a Technical Center x-ray the shells for explosives.

During the survey three main areas of ordinance concentration were identified using underwater ordinance detectors. The number of hits with the detectors would make it virtually impossible for Danshaw's small team to do a complete excavation of the area. Determination for disposal/disposition of these sites will be made after the recovered shells are x-rayed.

Total items recovered during the incident"

1. Seven rocket motors, one of which appeared not have been fored/impacted.
2. Six five inch shells, two of which appeared not to have been fired/impacted.
3. Numerous lead/alloy ballistic tips used to weight and improve aerodynamics on practice rockets.

Key personnel involved:

SFC Michael Dillaplain, U.S. Army, 144 th EOD. (301) 677-5182

Lt. Jeff Danshaw, U.S. Navy, EOD Group II. (804) 422-7073 or 7992

Chief Petty Officer Slade, U.S. Coast Guard Station Ocean City. Chief Slade provided quarters to the Navy team several nights during the survey.

When Lt. Danshaw departed with his team on 7/21/88 he advised we contact COM NAV BASE Duty Officer at (804) 444-7097 if we locate any further items. They will pass info on to NAV BASE EOD Group II.

SUBMITTED BY (SIGNATURE AND DATE)	APPROVED BY (SIGNATURE AND DATE)

F-6

NAVY ROCKETS

2.25-INCH ASSEMBLIES

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

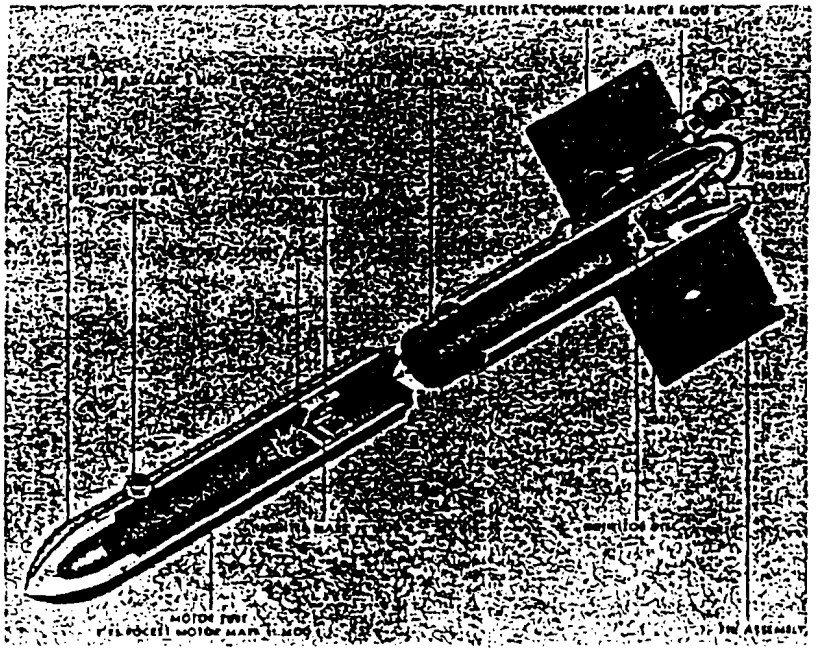


Figure 124. 2.25—inch A.R., Practice

2.25-inch A.R. Practice

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

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

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

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

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

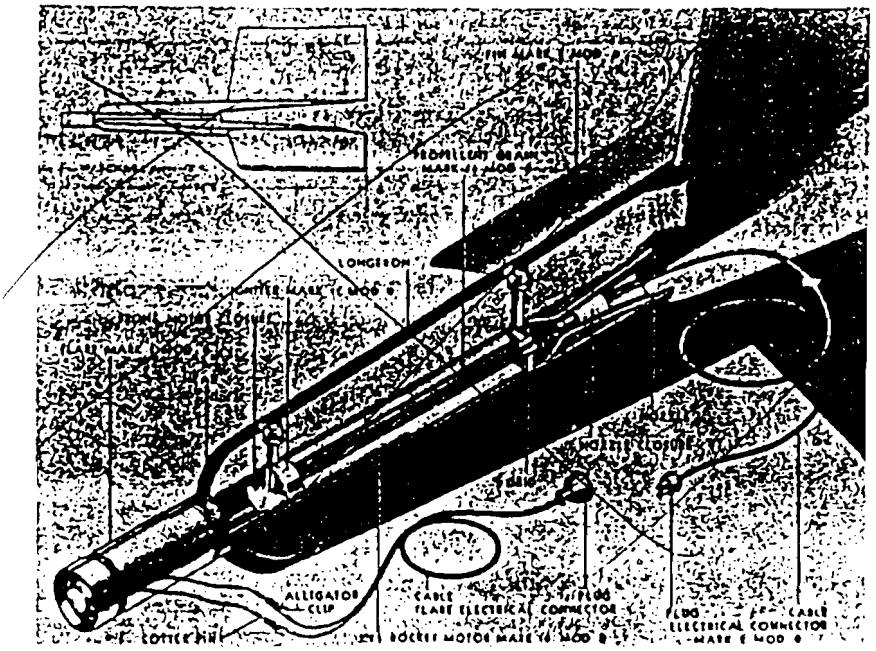


Figure 125. 3.25-inch Target Rocket

3.25-inch Targets

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

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

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

F-6

0-inch Mk 1 Mod 0: The head is filled with T and weighs 46.5 pounds when fitted with a fuze Mk 143. The same adapter rings are used as on the 3.5-inch Head Mk 5. The head is issued with a nose plug. The nose fuze must always be assembled in the head before firing. Fire with the fuze on "safe" if delay is desired. The head is shipped with the base fuze sealed in place. This base fuze must not be removed.

5.0-inch Mk 1 Mod 1: This head differs from the 5.0-inch Head Mk 1 Mod 0 only in that the nose is especially cavitated to take the Fuze Mk 172 Mod 0, which is larger than the Mk 149 or other nose fuzes and therefore is not interchangeable with them.

Motor

The 3.25-inch Motor Mk 7 is used with the 3.5- and 5.0-inch heads described above. At the forward end of the motor are a black-powder igniter and an electric squib. Two electric leads extend through the motor and out the after end to a cable and plug connection. At the after end of the motor, there are a nozzle and a bag of silica gel which acts as a dehydrating agent in keeping moisture from the ballistite grain. The grain used in the cruciform type with inhibitors, 33 inches long, 2.75 inches in diameter, and weighing 8.5 pounds.

The tail consists of four sheet-metal fins set 90° apart and welded to a central cylinder. The tail is slipped over the after end of the motor and is secured by a tail locking ring, which screws on.

Remarks: The 3.5-inch (H.E. and F.S.) have a maximum velocity of 1,200 ft./sec. exclusive of plane speed, as compared to 800 ft./sec. for the 5.0-inch H.E.

The 3.5-inch Heads Mk 11, incendiary, and Mk 12, gas, were never loaded.

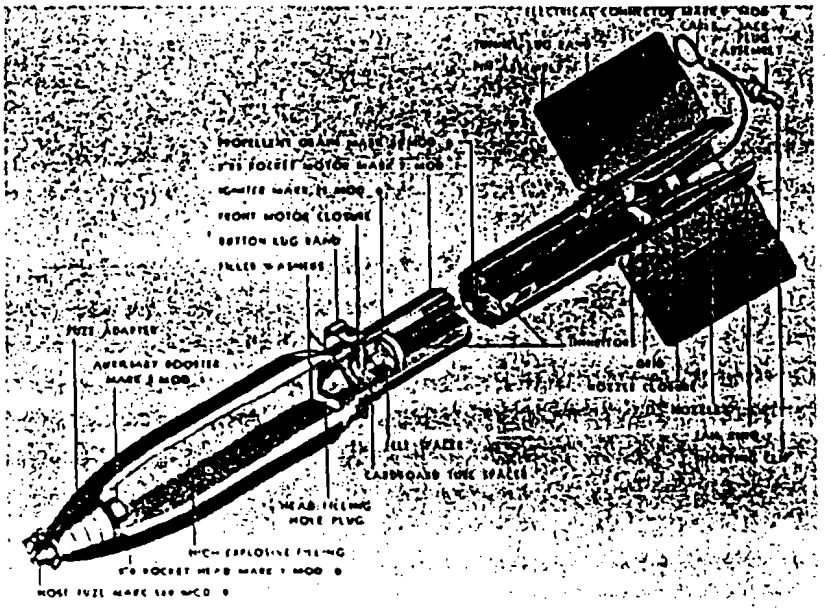


Figure 129. 5.0–inch A.R. with 3.25–inch Motor

PHOTOGRAPH LOG

ASIS -322

9

PAGE ~~10~~ OF 10

CASE # _____ PHOTO # 1

DATE: 7/17/88 TIME: _____

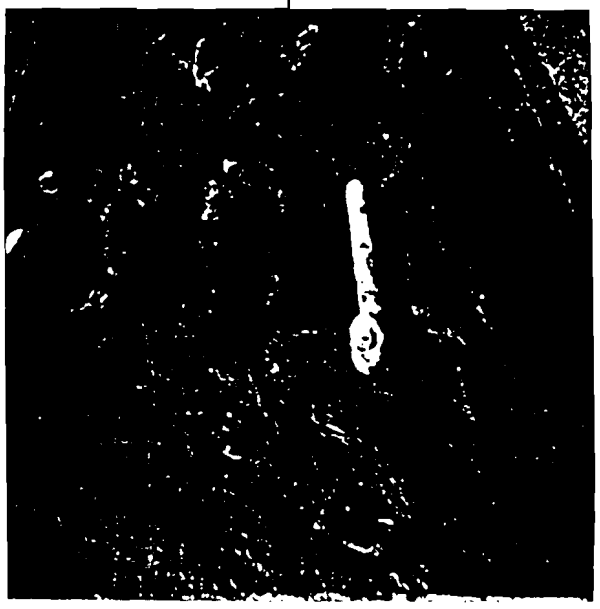
LOCATION: Sinapuse Dive Beach
¼ N. of Guarded beach

FACING N/A TAKEN BY RS.

SHOWING: 2 5" Shells
recovered by NAVY
EOD Team

CAMERA BRAND: _____

FILM TYPE: _____



CASE # _____ PHOTO # 2

DATE: _____ TIME: _____

LOCATION: AS ABOVE

FACING N/A TAKEN BY RS.

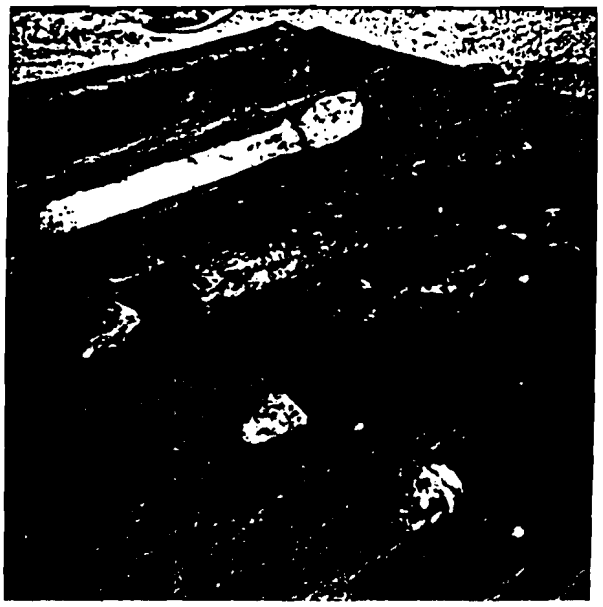
SHOWING: 3 5" shells and
12 rocket motors recovered
by NAVY EOD TEAM.

CAMERA BRAND: _____

FILM TYPE: _____

PHOTOGRAPH LOG

ASIS -322



PAGE 9 OF 10

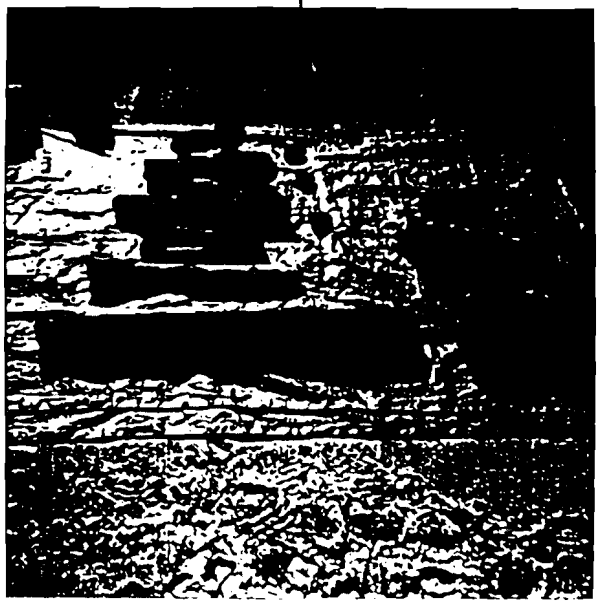
CASE # _____ PHOTO # 3
DATE: 7/19/88 TIME: _____

LOCATION: Sixpenny Dist beach ½ mile N. of Guardian Beach

FACING N/A TAKEN BY RS

SHOWING: 3 ballistic tips and 6 rocket motors recovered by NAVY EOD Team

CAMERA BRAND: _____
FILM TYPE: _____



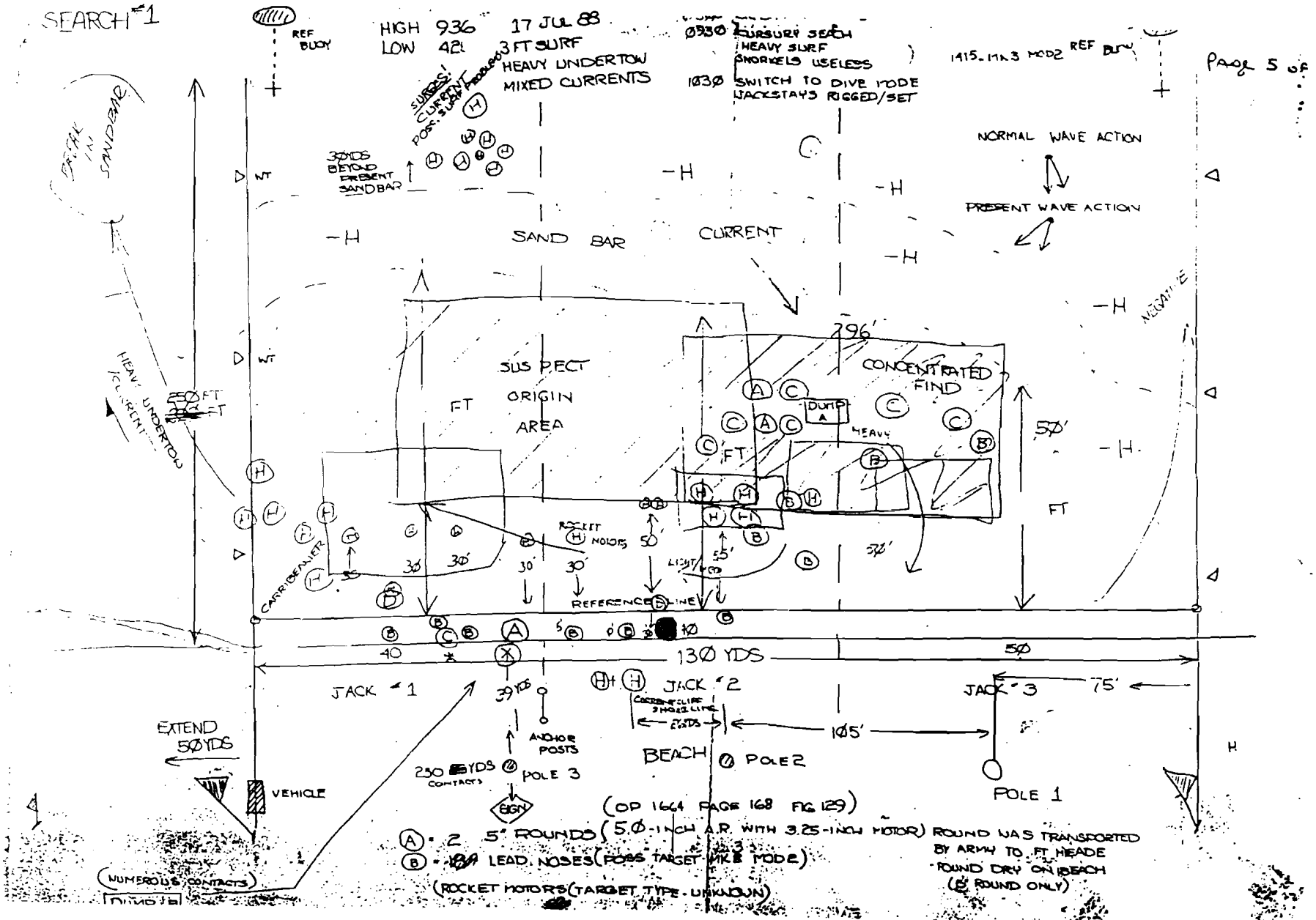
CASE # _____ PHOTO # 4
DATE: 7/19/88 TIME: _____

LOCATION: As above

FACING N/A TAKEN BY RS

SHOWING: 6 Rocket motors, 3 ballistic tips and 3 5" Shells recovered by NAVY EOD Team

CAMERA BRAND: _____
FILM TYPE: _____


SEARCH #1
HIGH 936 17 JUL 88
LOW 421
3 FT SURF
HEAVY UNDERTOW
MIXED CURRENTS
0930 SURSURF SEACH
HEAVY SURF
SNORKELS USELESS
1030 SWITCH TO DIVE MODE
JACKSTAYS RIGGED/SET
1415-MK3 MOD2
REF BUOY
NORMAL WAVE ACTION
PRESENT WAVE ACTION
SURGES/CURRENT PROBLEMS
POSS SUSP
30YDS BEYOND PRESENT SANDBAR
SAND BAR
CURRENT
SUSPECT ORIGIN AREA
296'
CONCENTRATED FIND
DUMP A
HEAVY
50'
FT
NEGATIVE
HEAVY UNDERTOW
CARRIBEANITE
ROCKET MOTORS
REFERENCE LINE
LIGHT
130 YDS
50
JACK #1
JACK #2
JACK #3
75'
105'
39YDS
ANCHOR POSTS
EXTEND 50YDS
VEHICLE
250 YDS CONTACTS
POLE 3
BEACH
POLE 2
POLE 1
EGN
(OP 1664 PAGE 168 FIG 129)
(A) - 2 5" ROUNDS (5.0-INCH A.R. WITH 3.25-INCH MOTOR) ROUND WAS TRANSPORTED BY ARMY TO FT HEADE
(B) - LEAD NOSES (POSS TARGET-MK8 MODE)
(ROCKET MOTORS (TARGET TYPE - UNKNOWN)
ROUND DRY ON BEACH
(B ROUND ONLY)
NUMEROUS CONTACTS

Ordnance and Explosive Waste
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for
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APPENDIX G

REAL ESTATE DOCUMENTS

(Not Used)

Ordnance and Explosive Waste
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for
Assateague Island
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APPENDIX H

NEWSPAPERS/JOURNALS

(Not Used)

Ordnance and Explosive Waste
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APPENDIX I

INTERVIEWS

APPENDIX I

INTERVIEWS

Table of Contents

Conversation Record/Interview

Date: 8 April 1993 Time: PM

Contact: Mr. Bennie T. Wilson Title/Organization: Former Navy Contractor (1943-49)

Address: c/o NASA Training Ctr

Phone:

Subject: Possible Practice Bombing Runs at/near Assateague Island during WW II.

Summary: Ms. Mary Jo Civis and Mr. Michael W. Harper met with Mr. Wilson at the NASA Training Center where Mr. Wilson is currently employed. He indicated that he had been employed to do contract work for the Navy from 1943 to 1949 at the Naval Air Station.

Mr. Wilson stated that he was aware of some sort of training/practice in the bay. While he was not sure of the location, he indicated that it may be at a location near Tangier, a small island in the bay. He based this guess on the fact that he recalled a lot of the "guys" going to a small cafe there for lunch after/between the practice runs.

Follow-up: Review of a map of the area to locate Tangier Island placed the island in Chesapeake Bay, not the expected Chincoteague Bay.

Conversation Record/Interview

Date: 8 April 1993 Time: PM

Contact: Mr. Arthur E. Anderson, Title/Organization: Former Aviation Electronics Technician (1956), Naval Ordnance Test Station

Address: c/o NASA Training Ctr

Phone:

Subject: Possible Practice Bombing Runs at/near Assateague Island during WW II.

Summary: Ms. Mary Jo Civis and Mr. Michael W. Harper met with Mr. Anderson at the NASA Training Center where Mr. Anderson is currently employed. He indicated that he had been a radio radar technician in 1956 at the Naval Ordnance Test Station. He knew of test drops of pyrotechnic ammunition in Chincoteague Bay during that period. He indicated that the Coast Guard was to follow after the drops to retrieve the test items. He was uncertain of an exact location, but indicated that it was north of the Causeway. Also stated that may have made drops just off the runway at the station (located on the mainland).

He had no information of possible bombing runs done at/near Assateague Island in the 40's.

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.

Project Number 60168.21

COMMUNICATIONS RECORD FORM

Distribution: (X) J Ching, ( ) _____.

( ) _____, ( ) _____.

(X) Author

Person Contacted John Schroeder Date 31 Jul 91

Title _____

Affiliation USFWS Type of Contact Phone

Address Chincoteague Natl Wildlife Refuge Person making Contact GET

Park Administrator

1-804-336-6122

Communications Summary

I called Mr Schroeder for more info on Chincoteague Natl Wildlife Refuge. He confirmed the acreage figure given me by NPS. He stated that the refuge was established in 1943. Regarding in-holdings in VA NPS has property, but there are no privately owned lands. State of VA also has salt marsh property. The USCG maintains <1 acre for operation of a lighthouse @ the southern end of the island. There are also 2 former lifesaving stations, one @ Toms Cove (4-6a and one @ Pope Island (near MD border)

Signature

EA 0079 3/12/79

OP/C 048

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.

Project Number 601168.21

COMMUNICATIONS RECORD FORM

Distribution: (X) J Ching, ( ) ____, ( ) ____, ( ) ____, ( ) ____

(X) Author

Person Contacted Gordon Olson Date 31 Jul 91

Title HQ office

Affiliation USNPS Type of Contact Phone

Address Assateague Island Natl Seashore Person making Contact GEJ

(301) 641-1443

Communications Summary I called to speak to Brian fitzgerald (chief Ranger). Mr fitzgerald was at for the afternoon so Mr Olson took my call. Regarding acreages of Assateague Island, he conveyed the following info. Assateague Island Natl Seashore was authorized in 1965 by an act of congress. Between '65 and early '70s, USNPS acquired land for the park. Mr Olson noted that in 1984. NPS developed a "Land Protection Plan" In this document, NPS included a detailed breakdown of current land owns/acreage on assateague Island as follo

Land		
• Total Acreage	17,552	(8,018 in MD; 9,534 in VA)
NPS	7,105 fee title	(6900 in MD; 205 in VA)
USFWS	9439	(418 in MD, 9021 in VA)
State of MD	696	(696 in MD)
Commonwealth of VA	308	(308 in VA - salt marsh)
Privately held, retained rights	4	(4 in MD)

Signature

EA 0079 3 12 79 DRC 046

• In addition USNPS owns ½ mile offshore beyond mean high (14,848 acres in MD)

2 of 2

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC.

Project Number 60168.21

COMMUNICATIONS RECORD FORM

Distribution: [X] J Ching, [ ] _____,
[ ] _____, [ ] _____,
[X] Author

Person Contacted Gordon Olsen Date 31 Jul 91

Title HQ Office

Affiliation USNPS Type of Contact Phone

Address Assateague Island Natl Seashore Person making Contact GEJ

Communications Summary

- He noted, however, that the States claim title to the bottom lands.

- Re: USFWS Parcel (Chincoteague Natl Wildlife Refuge) call John Schroeder - Administrator or Bob Wilson - Asst Admin (804) 336-6122

Signature

EA 0079 3 12 79 DP/C 048

CONVERSATION RECORD

TIME: 1045 | DATE: 9/10/93

TYPE: ☐ VISIT ☐ CONFERENCE ☒ TELEPHONE ☐ INCOMING ☒ OUTGOING

Location of Visit/Conference:

NAME OF PERSON(S) CONTACTED OR IN CONTACT WITH YOU	ORGANIZATION (Office, dept., bureau, etc.)	TELEPHONE NO:
SAM HOOPER	HUMAN FACTORS APPLICATIONS, INC.	(301) 743-2377

ROUTING

NAME/SYMBOL	INT

SUBJECT: 1991 SITE VISIT AND RESEARCH ON ASSATEAGUE ISLAND BY HFA.

SUMMARY

A SUMMARY OF THE SUBJECT SITE VISIT AND RESEARCH STATED WHAT WAS UTILIZED ASSATEAGUE ISLAND AND HOW. I ASKED MR. HOOPER WHAT DOCUMENTATION WAS AVAILABLE TO SUPPORT THIS, SINCE NCR COULD FIND NOTHING. MR. HOOPER SAID MOST OF HIS INFO CAME FROM PERSONNEL INTERVIEWS, BUT SOME FROM DOCUMENTS. MR HOOPER SAID HE WILL TRY AND FIND THE INFO ON THE SITE AND SEND IT TO ME.

OTHER THINGS OF INTEREST MR. HOOPER MENTIONED:

1. WALLOPS ISLAND (NEAR ASS. IS.) WAS SURVEYED BY HFA IN 1992. SEVERAL ARMY AND NAVY OEW ITEMS WERE DISCOVERED.

2. MR. HOOPER USED TO BE IN 147TH EOD, FT. LEE, VA. HIS UNIT WAS CALLED UP TO ASS. IS. AREA SEVERAL TIMES IN 1975-1976 BECAUSE CLAM BOATS CONSTANTLY DREDGED UP OEW. HE SAID NAVY DID OFFSHORE DUMPING OF OEW IN AREA.

ACTION REQUIRED

FILE

NAME OF PERSON DOCUMENTING CONVERSATION	SIGNATURE	DATE
CHRIS CHURNEY	Christopher J Churney	9/10/93

ACTION TAKEN

* MR HOOPER CALLED MON 9/13/93 @ 920. THE PROJECT FILE WAS EMPTY, AS A FORMER EMPLOYEE WHO WORKED ON THE PROJECT TOOK ALL THE MATERIAL WITH HIM.

FILED

SIGNATURE	TITLE	DATE
Christopher J Churney	CHEMICAL ENGINEER	9/10/93

Ordnance and Explosive Waste
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APPENDIX J

PRESENT SITE PHOTOGRAPHS

APPENDIX J

PRESENT SITE PHOTOGRAPHS

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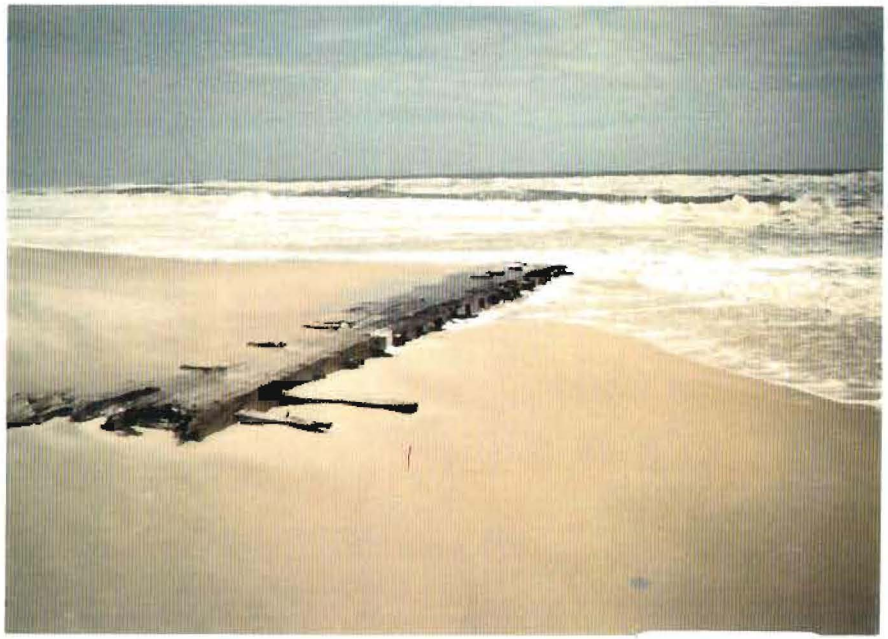
J1 Entrance to Assateague Island National Seashore.

J2 District Office of Assateague Island National Seashore.

J3 Seashore north of District Office.

J4 Metal fragment, possibly of ordnance origin. Area of North Ocean Beach; see plate 5.

J5 Remnants of old ship on North Ocean Beach, see plate 5.



J6 Remnants of old ship on North Ocean Beach, see plate 5.

J7 Fenced area in dunes inland from North Ocean Beach, see plate 5.

J8 Fenced area in dunes inland from North Ocean Beach, see plate 5.

J9 Nose of rocket, 3.25", M2 series. Located in Stinger-One Rocket Range area, see plate 5 and document D-1f.

J10 Nose of rocket, 3.25", M2 series. Located in Stinger-One Rocket Range area, see plate 5 and document D-1f.

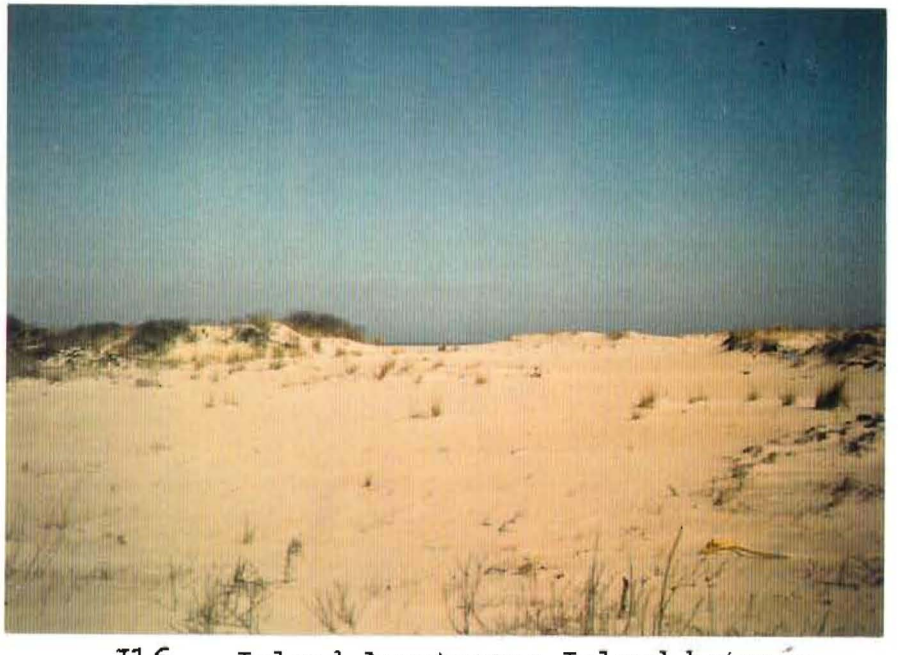
J11 Nose of rocket, 3.25", M2 series. Located in Stinger-One Rocket Range area, see plate 5 and document D-1f.

J12 Boardwalk and beach house just south of location of rocket nose in J-9 through J-11.

J13 Seashore near DC9 and Stinger-Two Rocket Range, see plates 4,6.

J14 Seashore near DC9 and Stinger-Two Rocket Range, see plates 4,6.

J15 Inland Assateague Island between DC9 and DC13, see plates 4,6.



J16 Inland Assateague Island between DC9 and DC13, see plates 4,6.

J17 Area near west shoreline between Lone and Scott's Points, see plate 6.

J18 Area near west shoreline between Lone and Scott's Points, see plate 6.

J19 Rocket motor, 5", HVAR; found in area of Stinger-Two Rocket Range, see plate 6 and document D-1h.

J20 Area near Green Run, see plate 6.

J21 Shoreline near DC13, see plates 4,6.

J22 DC13 pole, see plates 4,6.

Ordnance and Explosive Waste
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APPENDIX K

HISTORICAL PHOTOGRAPHS

APPENDIX K

HISTORICAL PHOTOGRAPHS

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Assateague

by

WILLIAM H. WROTEN, JR.

Second Edition

Revised and Enlarged

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Cambridge *Maryland*

1972

ISBN 0-87033-168-X

Library of Congress Catalog Card Number: 72-79769

Printed in the United States of America

K-1

Contents

Back Cover: Martinet's Map of Maryland, 1885

Cover Photograph: Assateague Ponies Along the Bay Shore
Assateague Island National Seashore

flight of geese and was lucky enough to bag one without his companions' knowledge so that he might consume it all himself.

> . . . I hung my goose upon the twist of a tree in a shrubby part of the wood, whilst I went to call aside our cook with his broach, and a coal of fire to begin the roast. But when we came to the place of execution, my goose was gone all but the head, the body stollen by wolves, which the *Indians* told us after, do abound greatly in that island.
>
> The loss of this goose, which my empty stomach look'd for with no small hopes of satisfaction, did vex me heartily. I wish'd I could have taken the thief of my goose to have serv'd him in the same kind, and to have taken my revenge in the law of retaliation. But that which troubled me more, was an apprehension that came into my mind, that this loss had been the effect of divine justice on me, for designing to deal unequally with the rest of my fellow-sufferers; which I thought, at first blush, look'd like a breach of trust: but then again when I consider'd the equity of the thing, that I did it merely to enable myself to attain their preservation, and which otherwise I could not have done, I found I could absolve myself from any guilt of that kind. Whatever I suffer'd in this disappointment, the cook lost not all his fee; the head and neck remained for him on the tree.

Before the colonel could embark on his journey, some Indians visited the camp bringing food, and by sign language showed that they would return the next day. From this happy circumstance the little party was able to arrange for the Indians to take them to the mainland.

For the next three weeks Norwood and most of his party travelled south to the Eastern Shore of Virginia, the region of "Achomack." During their stay with the Indians who lived on the seaside about twenty-five miles north of "Gingo Teague," Norwood had several opportunities to converse with the Emperor, his queens, and their children. His description of the Indians is not only one of the earliest but one of the best we have for this region. Finally, about the middle of February, Norwood crossed the Chesapeake Bay in a sloop and landed along the banks of the York River. After a short stay with some English colonists, he headed for Jamestown, where he stayed with the Governor. In May he returned to Europe (Holland) seeking the king of England, the future Charles II, to ask for the position of treasurer of Virginia.

Norwood closed "A Voyage to Virginia" with this statement: "And thus (by the good providence of a gracious God, who helpeth us in our low estate, and causeth his angels to pitch tents round about them that trust in him) have I given as faithful an account of his . . . mercy in this voyage, as I have been able to call to a clear remembrance."

Settlements

In the seventeenth century, while the Indians were still enjoying the benefits of the barrier islands, Colonel Daniel Jenifer obtained land grants for parts of Chincoteague and Assateague for the purpose of rising stock. The 30-odd people that he hired to care for the stock constituted the first settlement of these islands, but growth for many decades was slight.

Part of Assateague Village. View from lighthouse, c. 1915.
Photo: *Elsie M. Jones*

Interest was also being expressed on the Maryland side of Assateague in the latter part of the century. In a 1686 report to Lord Baltimore's counselors, Captain William Whittington wrote:

> A certain Isthmus or Peninsula of Marish & Piney Hummocks called and known by the name of Assateague Island lying and being on the Seaboard side within this Province containing at least 15,000 acres the southward end of which is reputed to be within the bounds of Virginia.

A few years later, Captain Whittington personally secured grants for the large portion of land north of the Virginia line. Because of the rather poor soil on the island, little agriculture was undertaken and seemingly the primary use was for livestock grazing—especially cattle and horses. Many years ago, probably when ownership was not questioned or previous owners failed to pay the necessary taxes to claim ownership, Assateague became public grazing land—a type of "open range."

Within the present boundary of Assateague and the National Seashore there were several small but not permanent communities.

K-1

An old house in Assateague Village, *c.* 1900.
Photo: *Elsie M. Jones*

Schoolchildren in front of Assateague Village school, *c.* late 1800's.
Photo: *Elsie M. Jones*

Most of the inhabitants earned their living from the natural resources offered by the bays and ocean.

The community of North Beach probably never had more than several houses, plus a saltworks and the Life-Saving Station. A one-room school (School No. 6) was located in this community just a short distance north of the saltworks, and was probably used by all the children living on the island north of the Maryland-Virginia line. Most of the cottages belonged to men with families who were assigned to the Life-Saving Station. Typical of most of the people whose lives have

Assateague Village and Lighthouse, *c.* early 1920's.
Photo: *Chincoteague National Wildlife Refuge*

been so closely associated with the sea, these people fenced in their plots and tilled the available land for home gardens. One of the men assigned to the station at the beginning of the twentieth century stated that he would supplement his income by trapping muskrats. The muskrat, inhabiting the marshes on Delmarva, has been and continues to be much in demand for its fur and tasty meat.

The Popes Island community evidently achieved little importance, and really was just a part of the Life-Saving Station, with a few cottages belonging to the families of the crew.

The Historical Atlas of Worcester County, 1887, shows that at least ten families were living in the village of Green Run, and one of the local historians reports that there were never more than 30 families living in the village. Like the other islanders living on the Maryland portion,

K-1

Wooden tombstones once located at Green Run Cemetery.
Photo, *Assateague Island National Seashore*

most of the people here made their living as watermen and/or were employed either at the Life-Saving Station or the resort hotel. The little village was definitely dying out by the twentieth century, with many of the houses being moved to the mainland. By 1937, when the Coast Guard Station at Green Run Inlet was closed, any remaining cottages had disappeared. A lady wrote to the National Seashore stating that her mother, three of her sisters and two of her brothers were born at Green

Run, and that the family lived there from about 1871 to 1882; the grandmother continued to live there longer or "until she got tired of having her doorstep washed away every high tide."

One of the most interesting reminders that this village once existed is the community cemetery; but vandals and souvenir hunters in recent years have almost erased this connection with the past. As late as 1946 seventeen graves were identified (with one exception) by small simple wooden markers, usually made from red cedar or teak, and carved with the hand tools of the islanders. These markers, usually bearing only the name and dates of birth and death, were about 42 inches long and less than six inches in width. As they were driven about two feet in the ground, this left only 18 inches exposed. When the Assateague Island National Seashore was established a few years ago, only six hand-carved markers remained. Now there are none.

Although many of the settlers at Green Run were engaged in the fishing industry and added to their incomes by selling ponies or working for the Life-Saving Station, the major livelihood was gleaned from vacation resort activities. Lying on the bay side of Assateague Island was the famous Scott's Ocean House, probably built in the late 1860's, and enlarged as business grew. By the 1880's it was in such popular demand that rooms had to be reserved weeks in advance. The guest list during the season would show that the hotel was attracting clientele from the Delmarva Peninsula and from as far away as Baltimore, Washington, Philadelphia, Pittsburgh, and Charleston, W.Va. The dining room was well known for its oysters, clams and fish fresh from the local waters. For entertainment there were such things as a "gentleman's" bar, a bowling alley and a ballroom where musicians played nightly. During the day, the young folks could travel to the nearby beach in oxcarts to enjoy surf and sand. In 1880 Scott's Ocean House had an advertisement in a Baltimore newspaper stating that its terms were $1.50 per day or $7.00 per week.

In those days it was considered fashionable for large parties of young people (under the care of a chaperone) to spend several days at the hotel. To reach the Ocean House vacationers would sail from the dock at Public Landing on the sailing sloop, *Fairchild*, to the dock at Ocean House. The hotel operated until around 1900 but was eventually razed and its lumber was shipped to the mainland. Perhaps it could no longer economically compete with the attractions of the growing resort center of Ocean City.

An interesting recreational activity during these years (and evidently as far back as the eighteenth century) was egging. In the 1890's picnics were organized for the special purpose of gathering the eggs of marsh and sea birds and the two little islands off the south point of Sinepuxent Neck, known as Great Egging Beach and Little Egging Beach, were favorite spots. Green Run Beach and North Beach also seemed to have a good supply. A visitor to the barrier islands of Virginia in 1879 wrote that the marshes were plentifully stocked with nature's dainties. "None but those who have tasted can judge what a

Fish factory, Assateague Village, *c.* 1915.
Photo: *Elsie M. Jones*

Fishing camp and personnel at site of present Ocean City Inlet, 1915.
Photo: *Grace Brittingham*

constructed in the ocean. The boats used were of two sizes—45-barrel boats which were 35 feet long and 100-barrel boats which were 40 feet long. The fish were dumped loose into the boat and sometimes reached a depth of four feet; this left very little room for the men.

There were at that time seven fish camps in the area of the present Ocean City Inlet, and a railroad which ran parallel to the beach. The camps had modest homes for the crews who lived there during the week and usually returned to the mainland on weekends. The average salary was about 30 dollars a month. The work of the fishermen, in this type

of operation, was strenuous and dangerous. The timing and handling of the boats when going against the surf on the outward trip and "riding" the surf on the homeward journey required special skills and great stamina. It was not unusual for the sea to claim a few lives each season.

The land around these camps was very low and often under water. During the storm of 1933 the single remaining camp and the railroad tracks were washed away. Now commercial fishermen, operating from a protected harbor on the mainland, use large trawlers and the industry has become more mechanized.

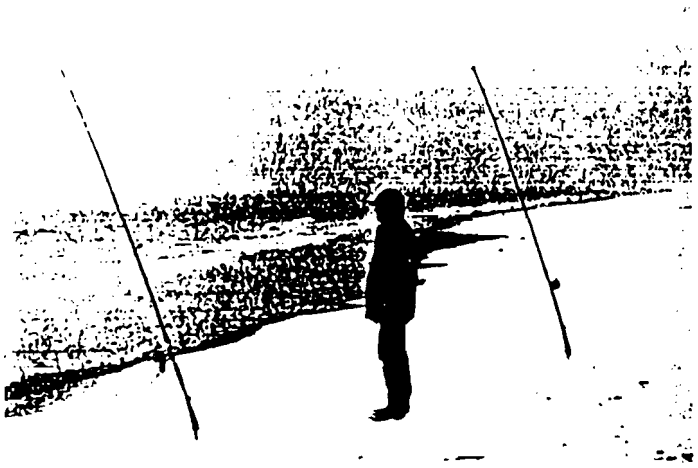
Unloading fish for the factory, Assateague Village, *c.* 1915.
Photo: *Elsie M. Jones*

At the south end of the island, near Assateague Village, commercial fishing was done in a different manner. Fish were brought into the harbor in large sailboats and processed by men and machinery at the fish factories. Fertilizer and oil were the chief end products.

In the early twentieth century the fish factories at Assateague Village employed as many as 50 workers for processing the fish brought in by the fishing boats. Seemingly the business was economically successful but two disasters helped to bring the operations to an end. The first factory had been in operation about four years when it was destroyed by fire. A few years later a new plant was in operation, but within a few years its doom was forecast by the ever shifting sands and channels; the filling up of Tom's Cove made it impossible for the fishing boats to dock and unload the catch. The closing of the factory was an economic loss to the community; a major factor in the final abandonment of Assateague Village.

For those who fish for fun, Assateague and its environs offer an abundance. The surf yields striped bass, channel bass, bluefish, kingfish,

weakfish, black drum, flounder, whiting, hickory shad, stripers and sea trout. In Sinepuxent and Chincoteague Bays the fishing is good for flounder, spot, trout, bluefish, rockfish and perch.

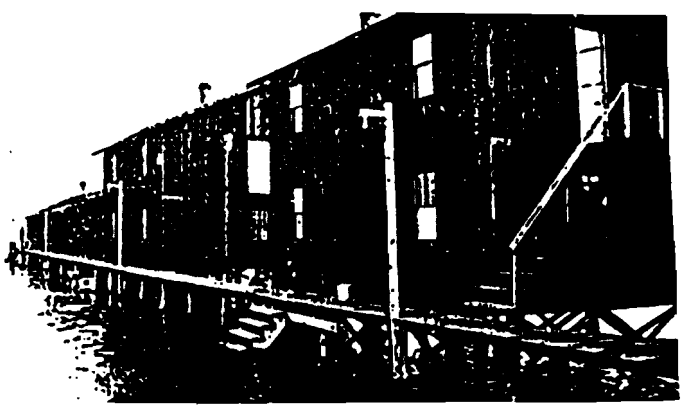


Enjoying winter fishing at Assateague.
Photo: *Assateague Island National Seashore*

Major studies since 1876 show at least 99 species of fish have been in these bays. A 1960 study revealed 23 new species and reported that at least 65 species, within 40 families and 59 genera, were currently to be found in the bays. A report by scientist Frank J. Schwartz shows how the changing physical appearance of Assateague plays a major role in fish life in the bays.

> Fish distributions, hydrographic conditions, and invertebrates, mainly crabs, squids and *Aurelia* illustrate the predominant use of the southern inlet as an avenue of entry into these bays. The establishment of the newer northern inlet at Ocean City, Maryland, has had a profound influence on the hydrography of Sinepuxent Bay. This has resulted in extinction, entry or reduction of various fish species. Little use is made of the northern inlet as an avenue of entry in Chincoteague Bay. The fishes and crabs that do enter Sinepuxent Bay by way of the northern inlet are currently not found beyond the 5-8 mile southward influx of water from that inlet . . .
>
> The permanent opening of the northern inlet at Ocean City . . . has produced a profound change in the fish fauna of Sinepuxent Bay which once had much lower salinities than those of today. Commercial records 1890-1956 compiled by Murphy [B.J.] (1960) indicate notable shifts in the populations which once inhabited Sinepuxent Bay and undoubtedly Chincoteague Bay of such species as: Shad . . . alewives . . . pike . . . yellow perch . . . white perch . . . catfish . . .

An industry that began during the colonial period, but which no longer exists, was salt making. This was an important project for several of the barrier islands. When the salt supply from England was insufficient to meet the needs of the colonists, suitable sites were found for experiments in the making of salt with the sun. Records show that such an operation was attempted in Virginia as early as 1630, and as late as 1852 there were saltworks at the southern end of Assateague. Although no evidence of a saltworks has been found, old-timers report that their grandparents told them about the manufacture of salt using two methods to evaporate the water, leaving just the salt. In some operations pans were used, with the sun being the principal cause of evaporation; at other times, giant kettles filled with the sea water were placed over large fires.

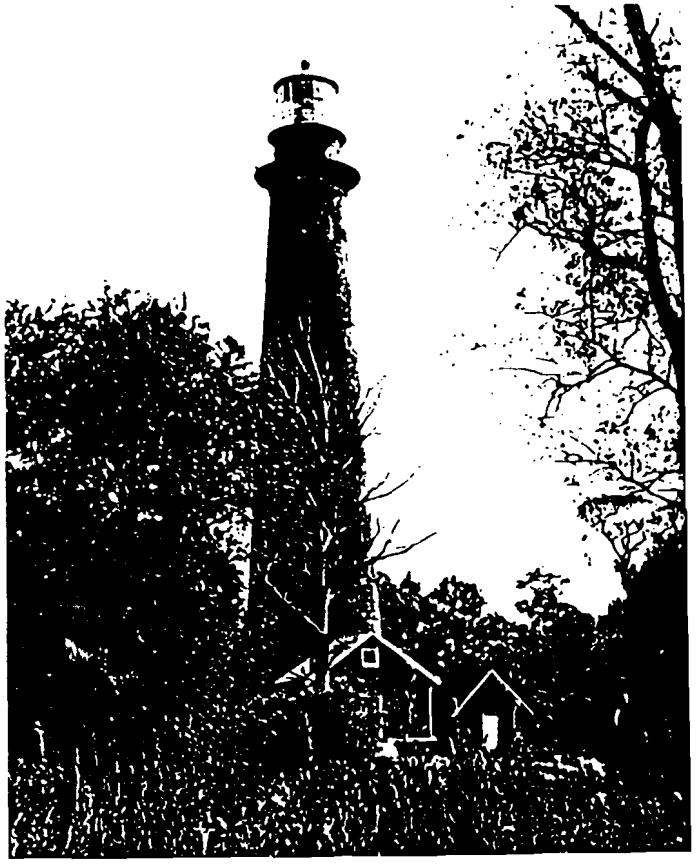


Living quarters, kitchen and dining room at fish factory, southern end of Assateague, c. 1915. Photo: *Elsie M. Jones*

The government of Maryland in 1777 instructed Captain Alexander Furnival to take nine Hessian prisoners of war to the "Salt Works at Sinnepuxent," or as many as were willing to go. Evidently there were some evaporation facilities in the North Beach area at that time, and the salt obtained was shipped by schooner or taken by barge across Assateague Bay to be transported to various points on the mainland.

A letter of 1780 shows that the Baltimore Salt Company was operating in the region.

> We John Tarr Benj. Holland and James Collings all of Worcester County Maryland, do bind & oblidge ourselves & every of us Jointly & Severally To Sett up a proper maner, for the purpose of Salt Making all the plates & pans now at John Parrimores in said County belonging to the Baltimore Salt Company and carry on the Said buisenes of Salt making (at said place where some of said pans ware now Sett up) with all possible industry & with our & each of our best Skill & art in said Salt making business . . .



Assateague Light Station.
Photo: *U. S. Coast Guard*

Life-Saving and Lighthouse

Although the barrier islands off the coast of Maryland and Virginia cannot compare to Cape Hatteras or the Outer Banks as a graveyard of Atlantic shipping vessels, the sandbars off the coast of Assateague have taken their toll during violent Atlantic storms. This is evidenced both by government records and the ruins of old hulls that are visible today on the beach, and now Atlantic storms with strong winds and great waves beating against the dunes turn up wrecks not previously known.

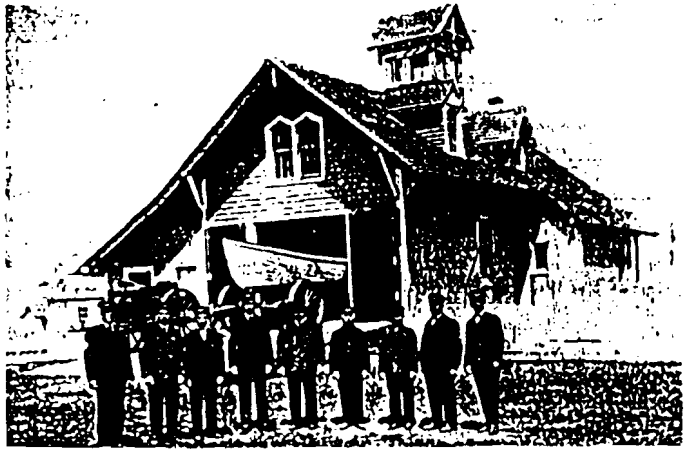
Spanish wrecks and pirate ships have long been the bases for romantic legends and from time to time even today not only will new stories appear, but diggers will come to the beaches searching for Spanish gold. Along the dunes of Ocean City there is a section once known as "Money Beach" because, as the story goes, a Spanish galleon carrying pieces of gold was wrecked there, and from time to time such treasure pieces have been found in the buried sands. One writer of the Maryland scene claims to have seen a gold piece, dated 1801, that had been discovered on the dunes.

A few miles up the beach from Green Run, probably in the Winter Quarter section, legend has it that a million dollars worth of pirate's gold has been hidden for over 200 years. A pirate, who was hanged in 1750 in England, is said to have drawn a crude map and written a letter indicating that the loot was buried on Assateague. In the late nineteenth century a storm exposed an iron-bound chest on the

North Beach Life-Saving Station, early 1900's.
Photo: *Assateague Island National Seashore*

on which several valuable vessels had been disabled, afforded so many opportunities for plunder that Marylanders on the island often sent word to their confederates on the mainland when a wreck was imminent.

Near the turn of the century, in 1799, the Maryland General Assembly took a more definite hand in attempting to break the practice of looting wrecked ships. The post of wreck-master in Worcester County (the only Maryland county bordering the ocean) was created.



Assateague Beach Life-Saving Station and Surfmen, c. 1905.
Photo: *Robert Conklin*

In reviewing the state of affairs which made this act necessary, the Maryland lawmakers recognized that "from the exposure of the south east bounds of Worcester County to the Atlantic Ocean many vessels have been and may hereafter be stranded on the seacoast of the county . . . and the good and other property belonging to such vessels may be embezzled and stolen to the great injury of the owners and insurers."

The wreck-master of Worcester County was granted the power to command constables to press into service as many men as needed when a shipwreck occurred or seemed likely. Power was also granted the wreck-master to command the captains of any nearby vessels to aid those in distress or be subject to a fine of 100 £. Under this act any individual caught looting a wrecked vessel might be sentenced to death without the benefit of clergy. Thus by the beginning of the nineteenth century some definite form of law and order began to appear along the coast of Assateague.

Wreck-masters for both Maryland and Virginia, of course, did not

prevent the wild Atlantic from continuing to take its toll. Still scattered along the Assateague beach and dunes are ruins of several vessels that came to this fate in the nineteenth or twentieth centuries. Records show that two schooners, *Elizabeth M. Buehler* and *Julia Grace*, ran on the shoals on the same day (January 12, 1883) just a mile apart, north of the Green Run Inlet Life-Saving Station.

As American shipping and commerce began to increase in the nineteenth century, interest in some organized service of life-saving was developing. But it was not until after the Civil War that mounting pressure forced the federal government to take action in the Assateague area. Among other things, it was pointed out that the major portion of the coastline between Long Island and Cape Fear had relatively few inlets that were navigable and they were not dependable—many were constantly shifting position. Beyond the visible beaches, often quite far out into the ocean, were the ever-dangerous shoals. Although the sector between the Delaware and Chesapeake Bays was not considered as dangerous as some others along the Atlantic Coast, shipping along the Maryland—Virginia Coasts suffered numerous disasters.

In 1871 Congress authorized the study of certain sections of the Atlantic Coastline and the establishment of stations manned by experienced personnel. A commission of 1873 recommended the establishment of three classes of stations (depending upon the needs of specific areas) one of which was a life-saving station, the class recommended for the Atlantic Coast between Cape Henlopen, Delaware and Cape Charles, Virginia. Life-saving stations were recommended for coastal areas which (1) were exposed, (2) had rather flat beaches, with outlying sandbars (3) had few inhabitants, (4) had no experienced crews to render assistance to ships in distress, and (5) did not offer shelter and aid to the shipwrecked people.

Specifications called for the life-saving stations to be constructed to provide lodging for the assigned crew of surfmen and shipwrecked persons on a temporary basis. Each station would be equipped with such necessary tools of the surfmen's profession as surfboats, life wagons, rockets and mortar apparatus, life preservers, and line.

Legislation of 1874 called for the establishment of eight such life-saving stations between Cape Henlopen and Cape Charles—two for the Delaware coast, one on the Maryland shoreline, and the remaining five along the Eastern Shore of Virginia. Of these eight, two—Green Run Inlet and Assateague Beach—were the only ones located within the present Assateague Island National Seashore. The stations at Green Run Inlet and Assateague Beach were put into operation during the winter of 1875-76, and during that season the crews of three vessels were rescued and cared for. The third life-saving station, at Popes Island (authorized in 1878), and the fourth, at North Beach (manned during the 1883-84 season, completed the four life-saving stations located within the National Seashore—North Beach Station was about ten miles south of Ocean City; Green Run Inlet Station just north of the inlet of that name; Popes Island Station about two miles south of Green Run Inlet, and Assateague Beach Station near Assateague Light.

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In the years between 1875 and 1915 these stations were called into action 261 times: Assateague 174, North Beach 39, Green Run Inlet 33, and Popes Island 15. Only a few of these shipwrecks resulted in loss of life. Before the stations were manned in the fall of 1877, the brig *Ossipee* was stranded at Rugged Point and lost two of her crew, and in 1882, the sloop *Dauntless* grounded near Fox Shoal with the loss of her captain and one other man.

Usually the stations in this area were not manned during the summer months when the Atlantic was rather peaceful. But in the period between August and June the stations had on duty, 24 hours a day, a keeper and a crew of six to eight men. The surfmen, as they were called, lived a lonely, hard, and busy life—one of constant danger in the daily battle with the sea and the weather—all for a month's pay of about $20.00, plus room and board. If they happened to be stationed near one of the small settlements, then they could expect a little more social contact. However, in a few cases a surfman maintained his own small "cottage" nearby for wife and family. About the only other contact with people came from the rescued crews of disabled vessels, who were given food, clothing and shelter until taken to the mainland.

The life-saving stations offered assistance to people and ships other than stranded or wrecked vessels. It was the duty of the station crews to patrol the beaches every night from sunset to sunrise, and also during the day when there was thick and stormy weather. This was done to obtain quick knowledge of casualties, give prompt assistance if needed, discover vessels standing in possible danger, in order that they could be warned away and escape disaster. The value of this feature of the patrol system was considered to be of major importance. The stations often tendered other services such as finding and returning lost property found on the beaches, giving food and lodging to lost hunters and fishermen, and taking families from the islands in time of danger from storms and high tides.

Following are a few excerpts from the Annual Reports of the United States Life-Saving Service for the fiscal years ending in 1903 and 1909.

North Beach, Md., Aug. 15, 1902—During the midwatch the N. patrol burned a night signal in warning to a schooner sailing too near the beach, and she at once changed her course.

Popes Island, Va., Nov. 7, 1902—N. beach patrol sighted a large schooner standing toward the beach during the first night watch and immediately set off a Coston signal, whereupon she hauled seaward.

Assateague Beach, Va., Sept. 13, 1902—Am.Sc. *Lucie Wheatley* missed stays and drifted ashore on Fishing Point 2-1/2 miles S. of station, at 8:45 p.m., and displayed a distress signal, which the patrolman saw and answered with a Coston Light. Surfmen ran a hawser from the stranded craft to a vessel at anchor in the harbor, and after working seven hours hauled her afloat and to a good anchorage.

Sir: This is to certify that the Assateague Beach life-saving crew rendered me valuable assistance in getting my vessel, the schooner *Lucie Wheatley*, afloat after she missed stays and stranded, while endeavoring to make this harbor last night

S. E. Taylor
Master American Schooner *Lucie Wheatley*

Ruins of Popes Island Station prior to burning in 1970.
Photo: *Assateague Island National Seashore*

Assateague Beach, Va., Dec. 5, 1902—Am.Sc. *Virginia Rulon* Swamped while at anchor in shoal water 1 mile S. of station, during a strong SW. gale with rough sea, and displayed a signal of distress. The life-savers witnessed the casualty and immediately started up to windward with surfboat on wagon. Arriving at a suitable place, they launched the boat, succeeded in reaching the wreck, took off her crew of six with considerable difficulty, owing to high wind and seas, and landed 3 miles to leeward of station. They took the rescued men to the station and succored them until the next day, when they conveyed the seamen to Chincoteague, while the master and mate remained to look after their vessel, which was finally floated by wreckers and taken to Norfolk.

Dear Sir: On the Morning of December 5 the schooner *Virginia Rulon* foundered at anchor in Chincoteague anchorage. I wish to mention the skillful manner in which myself and crew, during the height of the gale, were rescued from the sunken vessel by Captain Feddemen and crew of above-named station, also kind treatment received since being at station.

Respectfully,
John H. Cramer, Master

Green Run Inlet, Md., Jan. 10, 1903—Am.Sc. *Celeste*— Sprung a leak and was run ashore 1-3/4 miles NNE. of station to prevent her foundering; sea smooth. North patrolman sighted her at 5:10 a.m., displayed a red light to let her master know that assistance would soon arrive, and then hastened to station and notified keeper. Surfmen on boarding found her

K-1

One of the most interesting results of these storms on the physical features of Assateague has been the creating and destroying of many inlets or "water thoroughfares" connecting the ocean with the bays. Although Assateague must have experienced a long history of such alterations, due to its location and topography, very little is known of how many inlets have existed or for how long. Records exist only for the last one hundred years.

Running south from the Maryland-Delaware line to the end of Assateague Island, at least twelve locations are known to have had inlets come and go. For example, at Fox Hill and Winter Quarter there are known to have been four different inlets. If Chincoteague Inlet is included (a body of water separating Assateague from Wallops Island), then we have an inlet at least several centuries old. Then there is the present-day Ocean City Inlet which might not have lasted since 1933 were it not for the fact that the U.S. Army Corps of Engineers "bulkheaded" its entrance with huge rocks and is responsible for its maintenance. On the center-fold map are shown the general locations of the areas on Assateague that have or once had inlets, and following are a few brief comments concerning four of them—Sandy Point, Sinepuxent, Green Run, and Chincoteague, only one of which still exists.

About three and a half miles below the present inlet at Ocean City, is Sandy Hill where the ocean has broken through three times since 1920. From that year until 1928, when a "nor'easter" closed it, the inlet was wide and deep enough to permit shallow-draft boats to navigate. The storm of March, 1962 reopened it for a short period of time.

The Sinepuxent Inlet (sometimes confused in the records with the one at North Beach) seems to have had more cut-throughs by storms than any other on Assateague, and more commercial activity in the early days, with the exception of the Chincoteague Inlet.

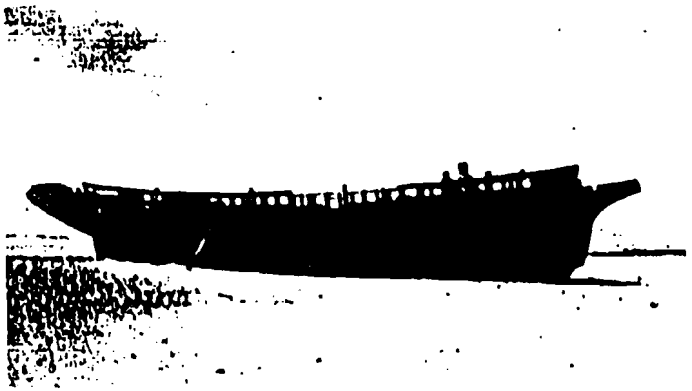
In 1698, a time when England and France were at war, officials at Lewes, Delaware wrote that their settlement had been plundered by fifty armed men from a "snug-ship" and a sloop from Philadelphia had been "taken coming out Cinepuxon Inlett." The fact that this sloop had been coming out of Sinepuxent Inlet indicates the possibility of existing trade between Philadelphia and the settlements of Worcester and Accomack Counties.

Some of the people of Worcester County petitioned the Maryland government in 1744 to "erect a Town near Synapuxon Inlett and the Indian River" with the purpose of encouraging settlement, so "the Inhabitants may be better enabled to repel any Enemy's Landing on the Sea-Side of the said County." In 1766 it was proposed to the Maryland government by a Maryland merchant, whose ship was then in Boston, that if it was discovered that the English navy was blockading the Chesapeake Bay, his ship could put in at "Chincoteague Sinnapuxent, or some other inlet there." In 1777 the Sinepuxent was considered of enough importance to be fortified and have soldiers stationed there.

On another occasion during the American Revolutionary War, the Maryland Council wrote to the Worcester County officials: "We are

empowered by the enclosed Resolve, to give you Instructions respecting the Shipping the Corn seized by you, and do direct the same to be Shipped in Sinepuxent Inlet and transported to Trenton, as soon as you can, & delivered to the Continental Commisary or Quartermaster at that Place, for which you are to take his Receipt, as Part of the Supply to be furnished by us."

Information about the Green Run Inlet consists of a confusion of maps, dates and stories. It is not shown on an 1837 map, is on an 1855 map, is marked closed on an 1866 map, and a local Worcester County



Old wreck prior to 1914.
Photo: *Elsie M. Jones*

sailor related that he passed through the inlet in 1876 "when the wind was right." The son of the owner of the famous Scott's Ocean House at Green Run, after the Civil War, mentioned that the inlet was good for business. This inlet is also rather unique for other reasons. Dr. Truitt states: "This inlet has not been recreated over the past 85 years, despite the severity of several hurricanes. The water course leading to the inlet has remained navigable for light draught vessels, as far as the onetime wharf (abandoned in 1915) of the old Life-Saving Station. This is in marked contrast to other guts and sloughs on the bay side of Assateague Island."

No one knows when Chincoteague Inlet was created or if it has ever been closed even temporarily to navigation by small craft or larger boats of shallow draft. The early mapmakers often used Chincoteague Inlet for either the inlet or the channel, and present-day sailors may navigate both the Queen Sound Channel and Chincoteague Channel. For the sake of historic debate we may also speculate as to whether Verrazano sailed along the coast of Assateague in the *Dauphine* in 1524 and went ashore in a small tender, sailed through Sinepuxent Inlet into Chincoteague Bay, or sailed through Chincoteague Inlet and put over

The BARRIER ISLANDS

A Photographic History of Life on Hog, Cobb, Smith, Cedar, Parramore, Metompkin, & Assateague

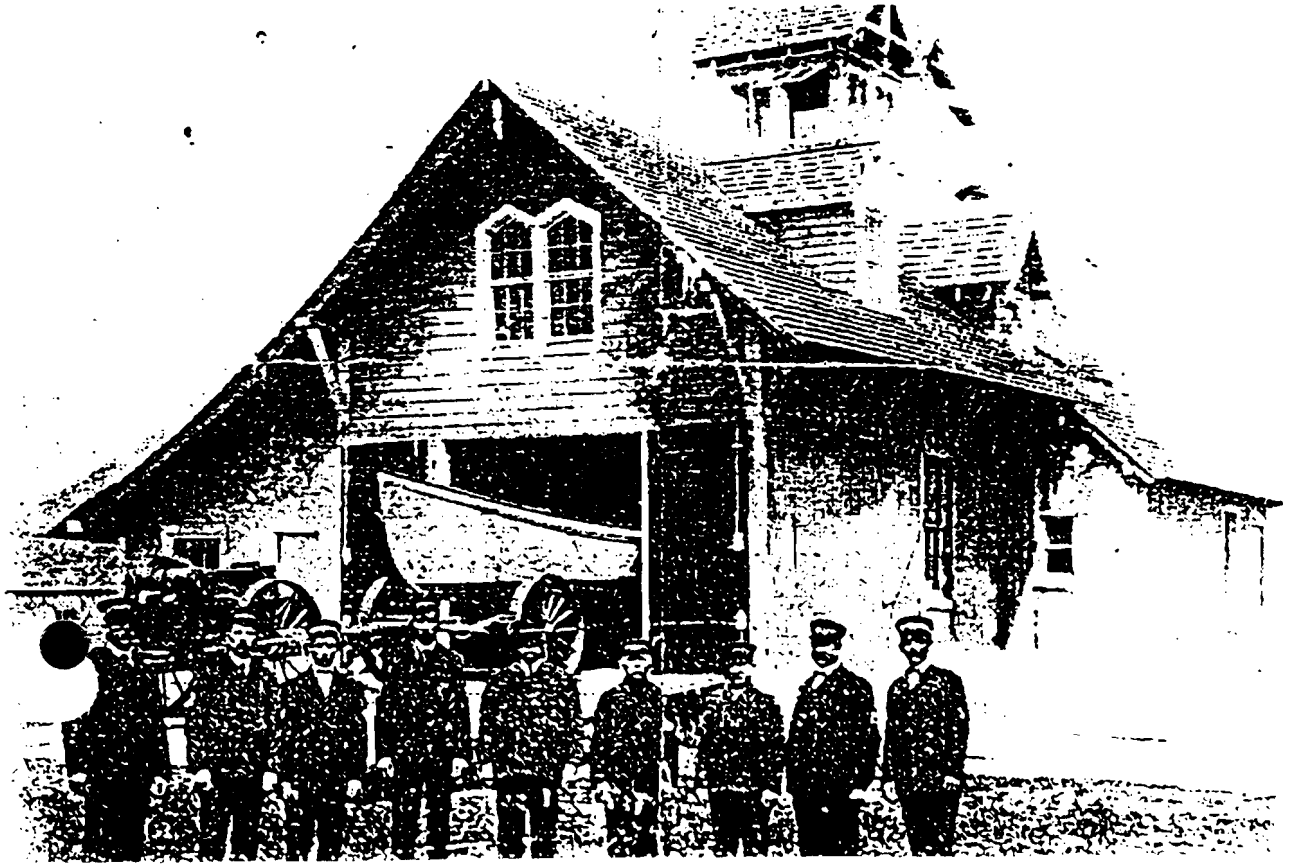
by Curtis J. Badger and Rick Kellam

1989

Stackpole Books

The lifesaving station on Assateague beach in 1919. The crew is practicing a surf rescue procedure using a Lyle gun to project a line over the breakers to a stranded ship.

The Assateague Lifesaving Station in the early 1900s. From left to right, Granville Hogg, Bert Bowden, Lee Mason, John Taylor, Capt. Joe Feddeman, John Kambarn, Joshua Hudson, John Snead, and Selby Andrews.



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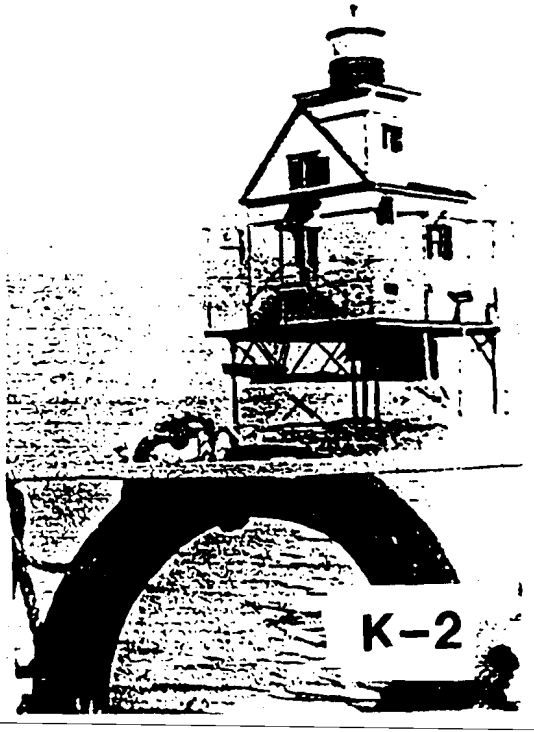
The Assateague church and lighthouse, built in 1833. The lighthouse was converted to electric in 1932 and is still in use.

The Assateague light and keeper's dwelling in the early 1900s.

Killock Shoals light between Franklin City and Chincoteague in a photograph taken from the lighthouse service boat circa 1920. Mr. William Collins was the keeper of the light at the time.



Mr. William Collins painting the Assateague light in 1925.

The keeper's dwelling on Assateague with Mr. Collins painting the lighthouse in the background.

The Assateague Lighthouse today is a popular attraction at the Chincoteague National Wildlife Refuge. The refuge was opened to the public when a bridge connecting Assateague and Chincoteague was opened in the 1960s.

This skiff was used to transport school children from Assateague Island to school on Chincoteague.

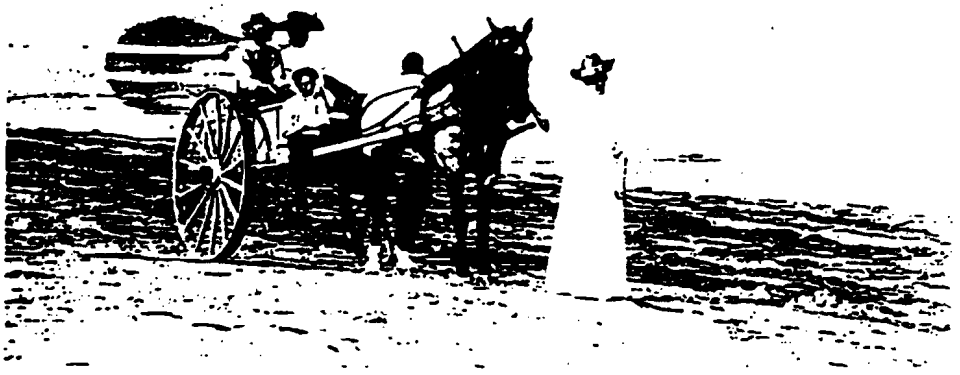
The village on Assateague in the 1920s. The church is on the right, and the island of Chincoteague is across the channel in the background.

Class picture of the 1906 student group at Assateague school.

Students on Assateague in the 1920s: from left, Ruth, Margaret, and Ada Collins.

Mr. and Mrs. Bill Scott in the early 1920s at their home on Assateague. The Scotts were among the last persons to live on Assateague.

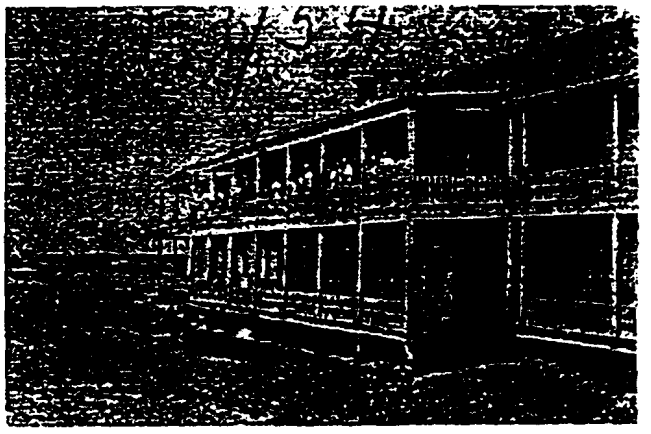
Mr. Bill Scott with his Assateague Island transportation. Mr. Scott, the island's only shopkeeper, used his buggy to deliver fresh vegetables to the residents of the village of Assateague.

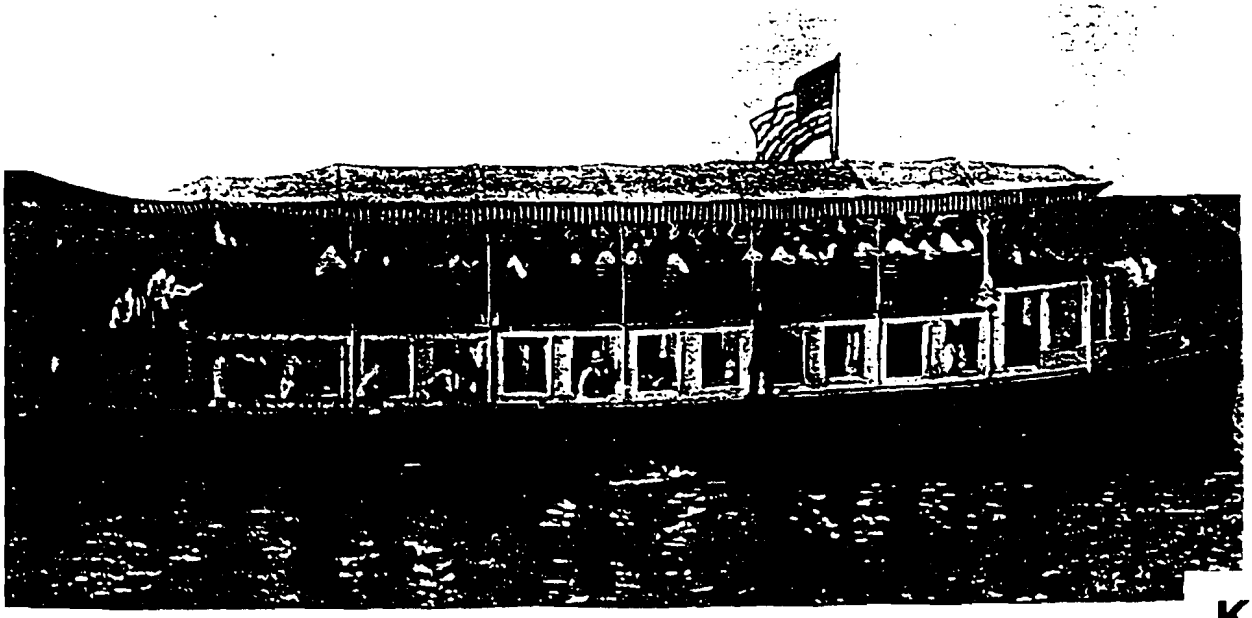


This horse and buggy was a reliable means of beach transportation on Metompkin Island at the turn of the century.

Before the Chincoteague causeway was built in 1922, the only public transportation link with the mainland was by boats such as the Mananzanita, *which transported passengers, cargo, and mail between Chincoteague and Franklin City.*

The Wallops Island Clubhouse was a popular gathering spot on the Eastern Shore around 1900, when this picture was taken. The club was used until the 1930s. A NASA facility is currently on the island.





GENERAL BACKGROUND STUDY and HISTORICAL BASE MAP

Assateague Island National Seashore
Maryland - Virginia

By
EDWIN C. BEARSS

DIVISION OF HISTORY
Office of Archeology and Historic Preservation
December 18, 1968

K-3

PLATE II

North Beach Coast Guard Station,
circa 1920, from files Assateague Island NS.

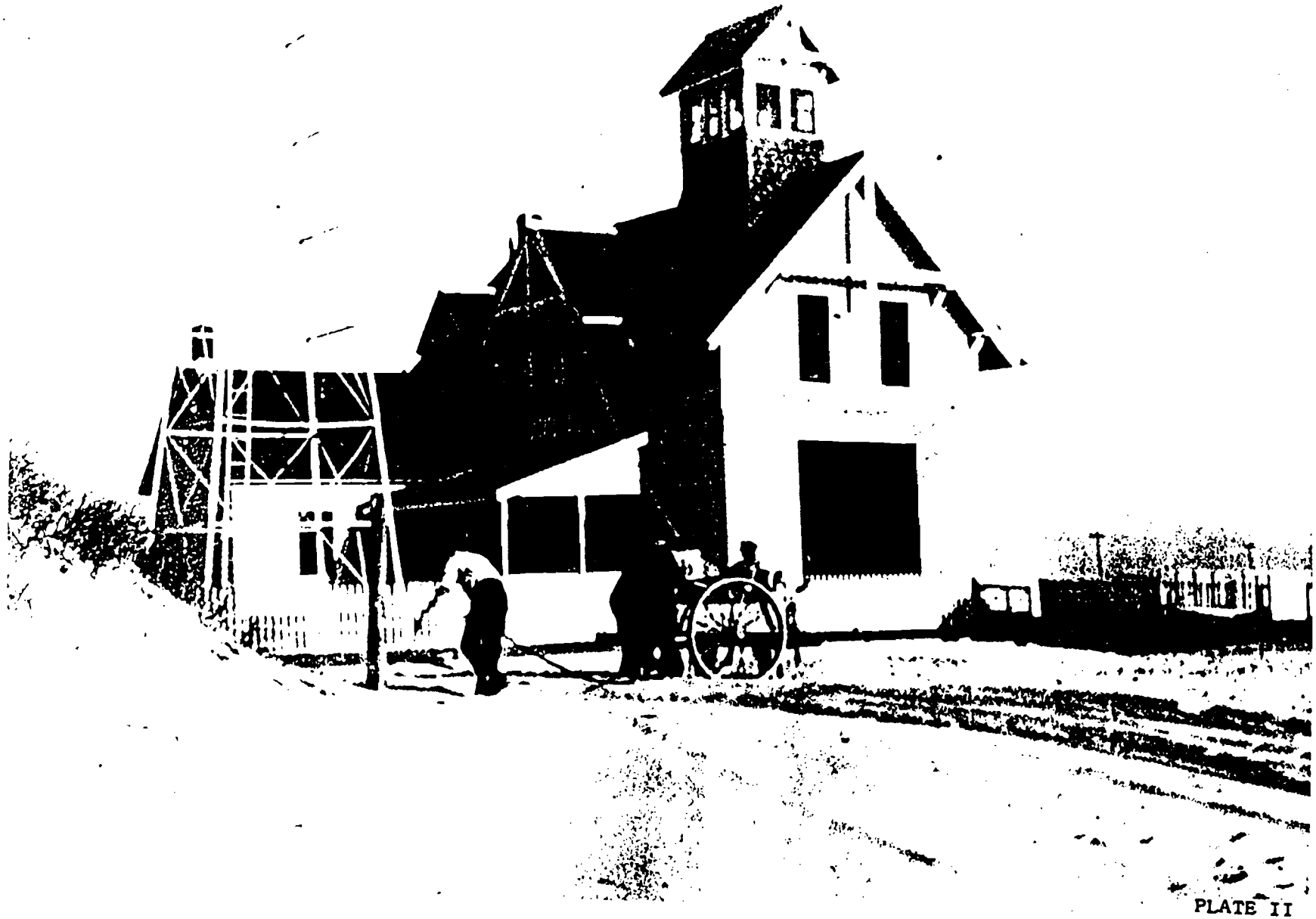


PLATE II

PLATE III

Crew of the Pope's Island Life-Saving Station, circa 1910, from Norman Jones Collection. Norman Jones has identified No. 1 surfmen as Daniel Birch, No. 2 surfman as William Booth, No. 5 surfman as Elmer Merritt, and No. 6 surfman as Charles C. Jones.

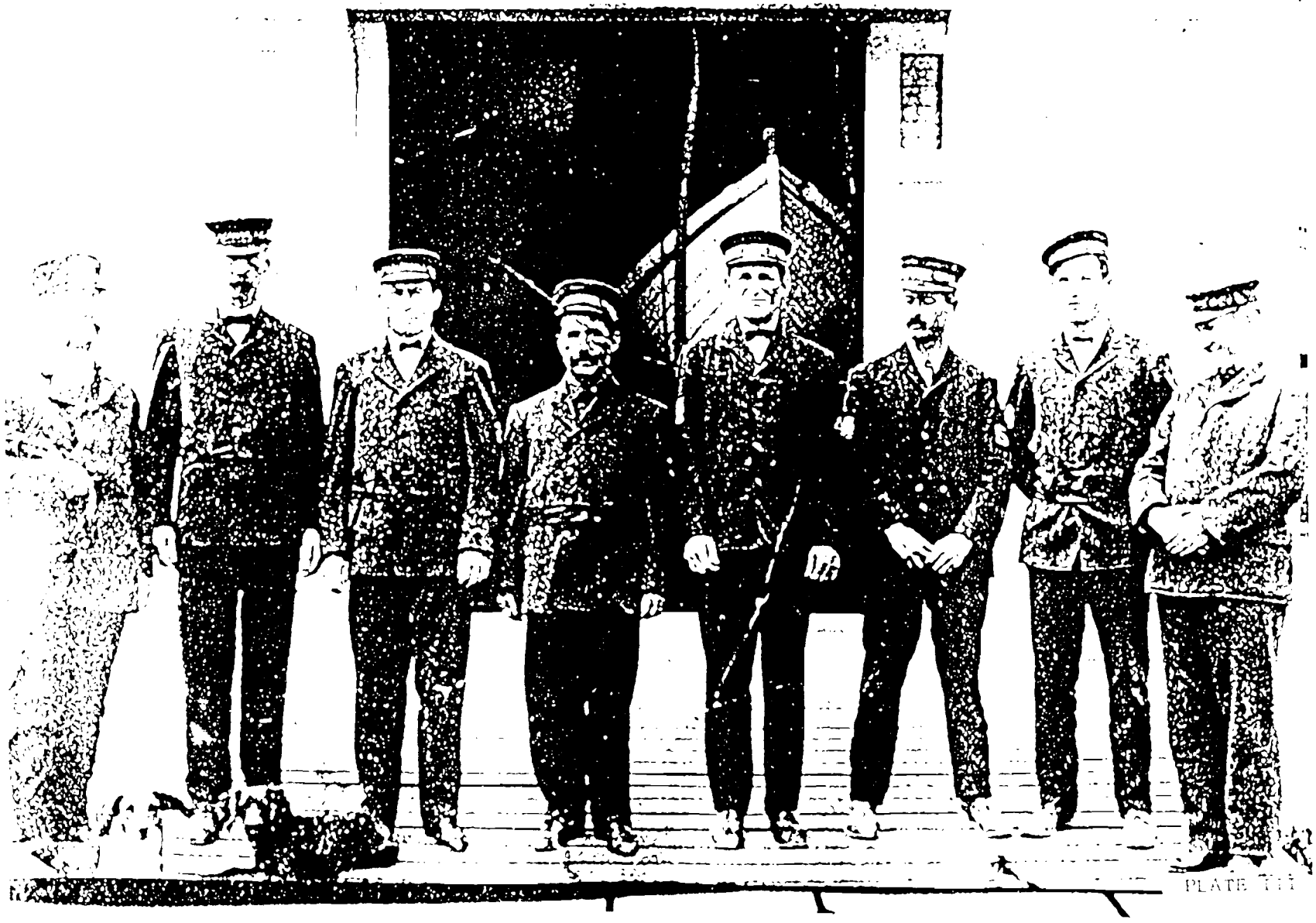


PLATE VII

PLATE IV

Front Elevation of Pope's Island Coast Guard Station,
circa 1925, from Norman Jones' Collection.

PLATE IV

PLATE V

West Elevation of Boathouse and Kitchen of Pope's Island Coast Guard Station, circa 1930, courtsey of Norman Jones.

PLATE V

PLATE VI

Crew of Assateague Beach Life-Saving Station in Front of Boathouse, circa 1905, from Norman Jones Collection.

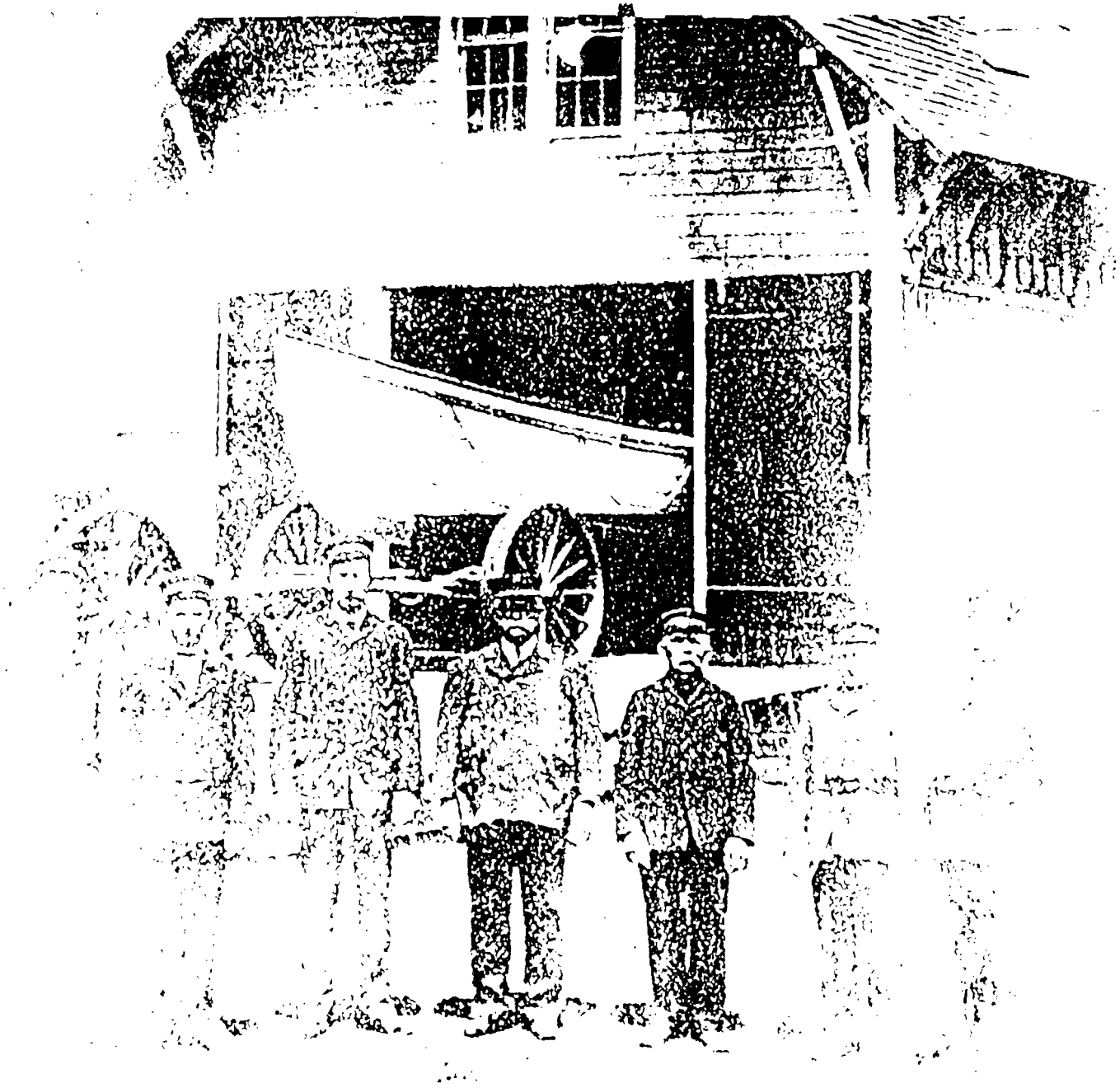


PLATE VI

PLATE VII

Assateague Light, circa 1890,
from Norman Jones Collection.

PLATE VII

PLATE VIII

Wharf at the Seaboard Oil and Guano Company,
circa 1915, files Assateague Island NS.

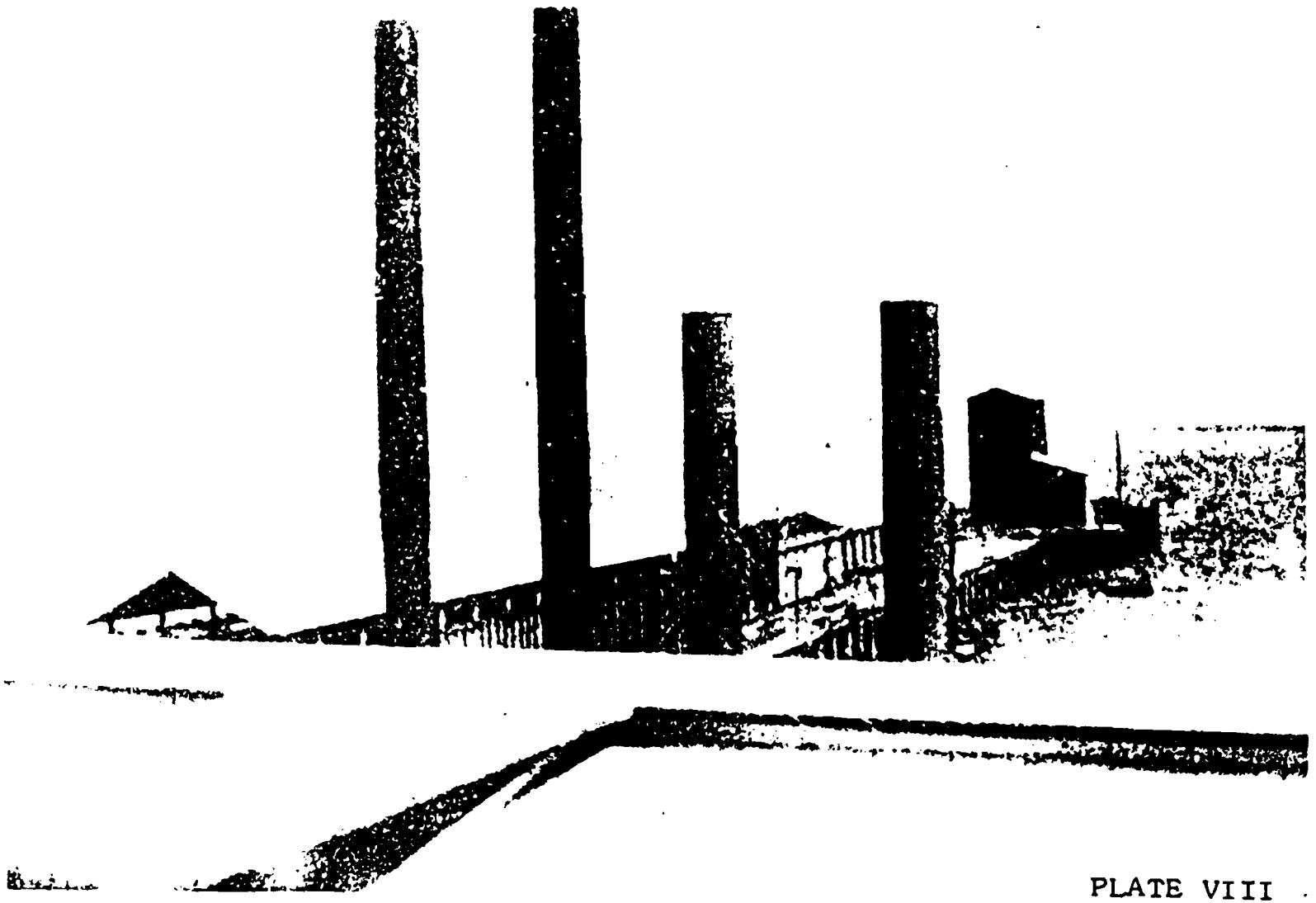
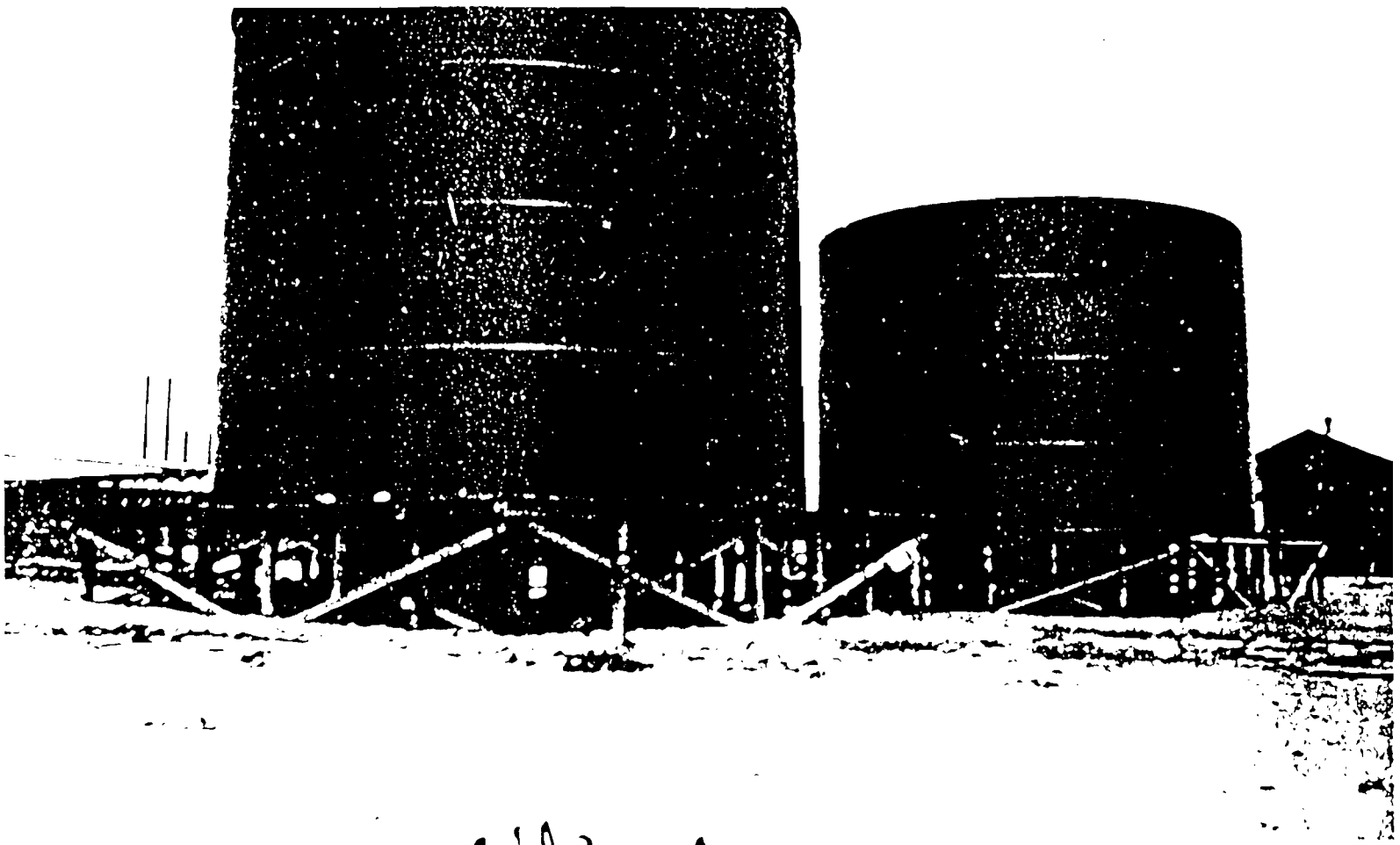


PLATE VIII

PLATE IX

Oil Tanks at the Seaboard Oil and Guano Company,
circa 1915, from files Assateague Island NS.



Distillery

PLATE IX

PLATE X

Employees and Structures of Seaboard Oil and Guano Company, circa 1915, files Assateague Island NS.

PLATE X

PLATE XI

Seaboard Oil and Guano Company, circa 1915,
files Assateague Island NS.

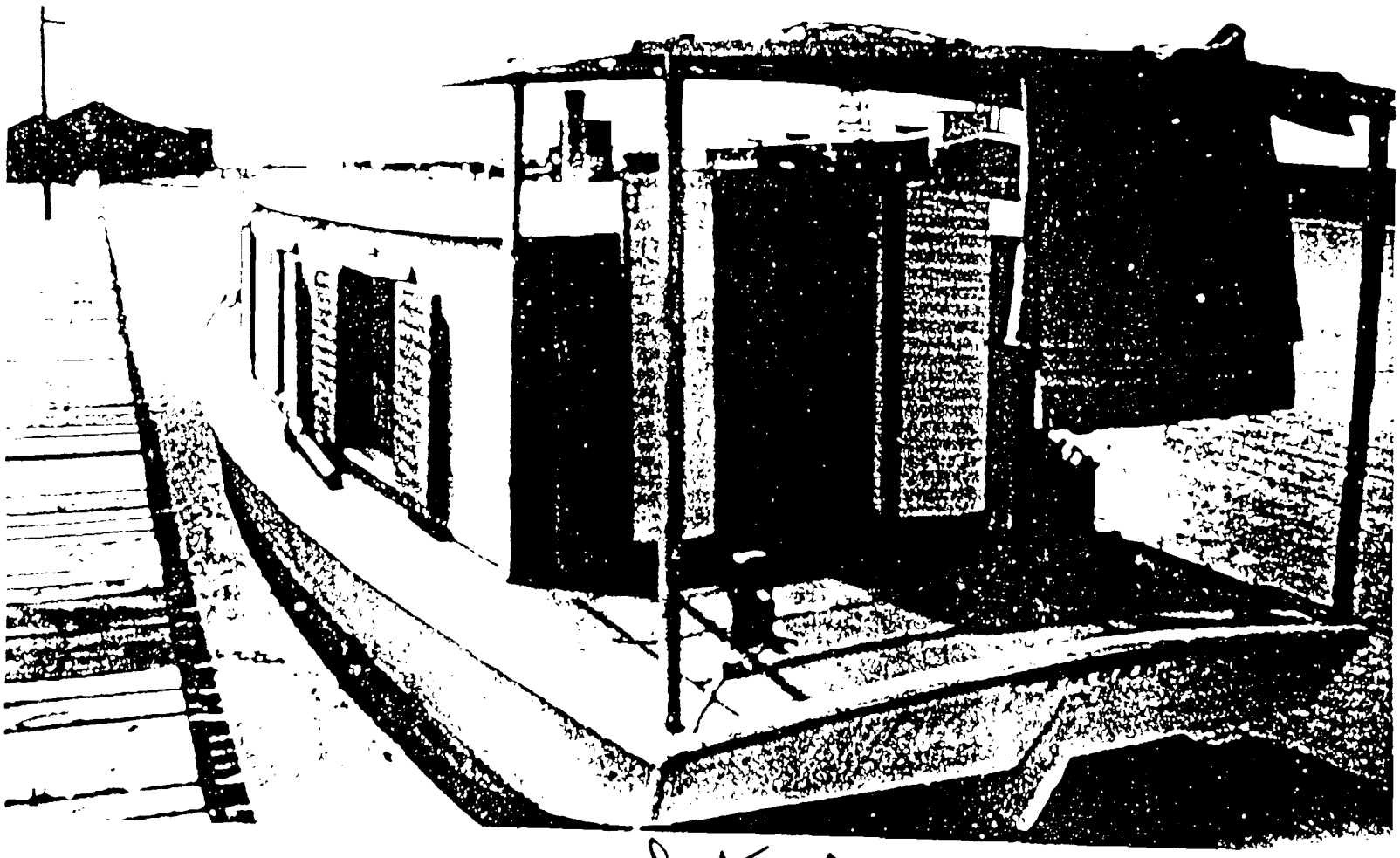


PLATE XI

PLATE XII

Keeper's Quarters, Assateague Light, part of this structure built in 1833, remodeled and enlarged in 1892-93. Photograph circa 1915, files Assateague Island NS.

PLATE XII

GPO 876-403

PLATE XIII

Ordnance and Explosive Waste
Archives Search Report
for
Assateague Island
Worcester County, Maryland and Accomack County, Virginia
Project Number C03MD093001

APPENDIX L

REFERENCE MAPS/DRAWINGS

APPENDIX L

REFERENCE MAPS/DRAWINGS

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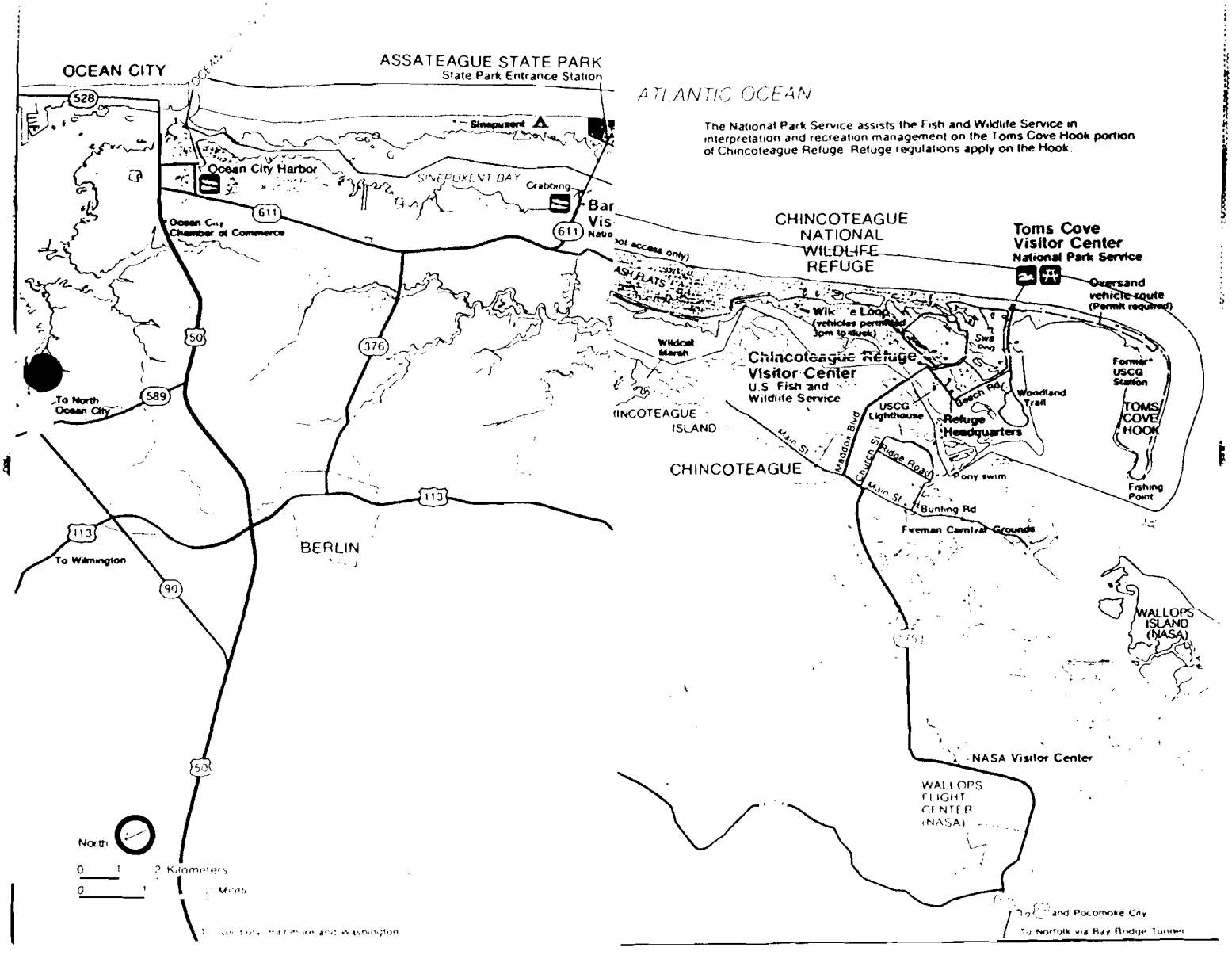
Map and Guide

by a wave. See the bathhouse exhib-
or important information on the
pose of the lifeguard flags and the
igers of stinging marine organisms.
avy surf, or seaward currents.



WORCESTER COUNTY, MD.

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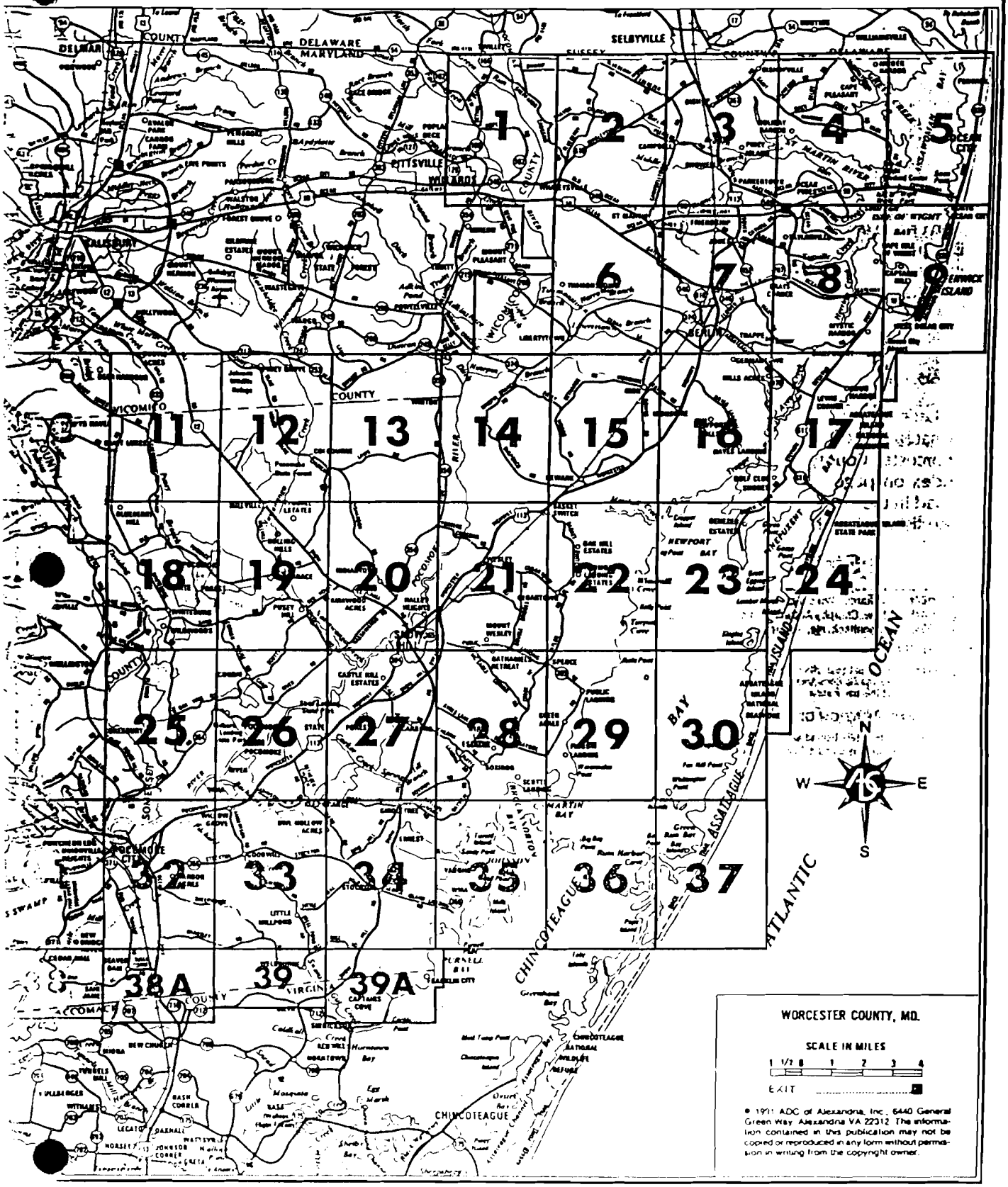
For Additional Map Coverage See Inside Back Cover



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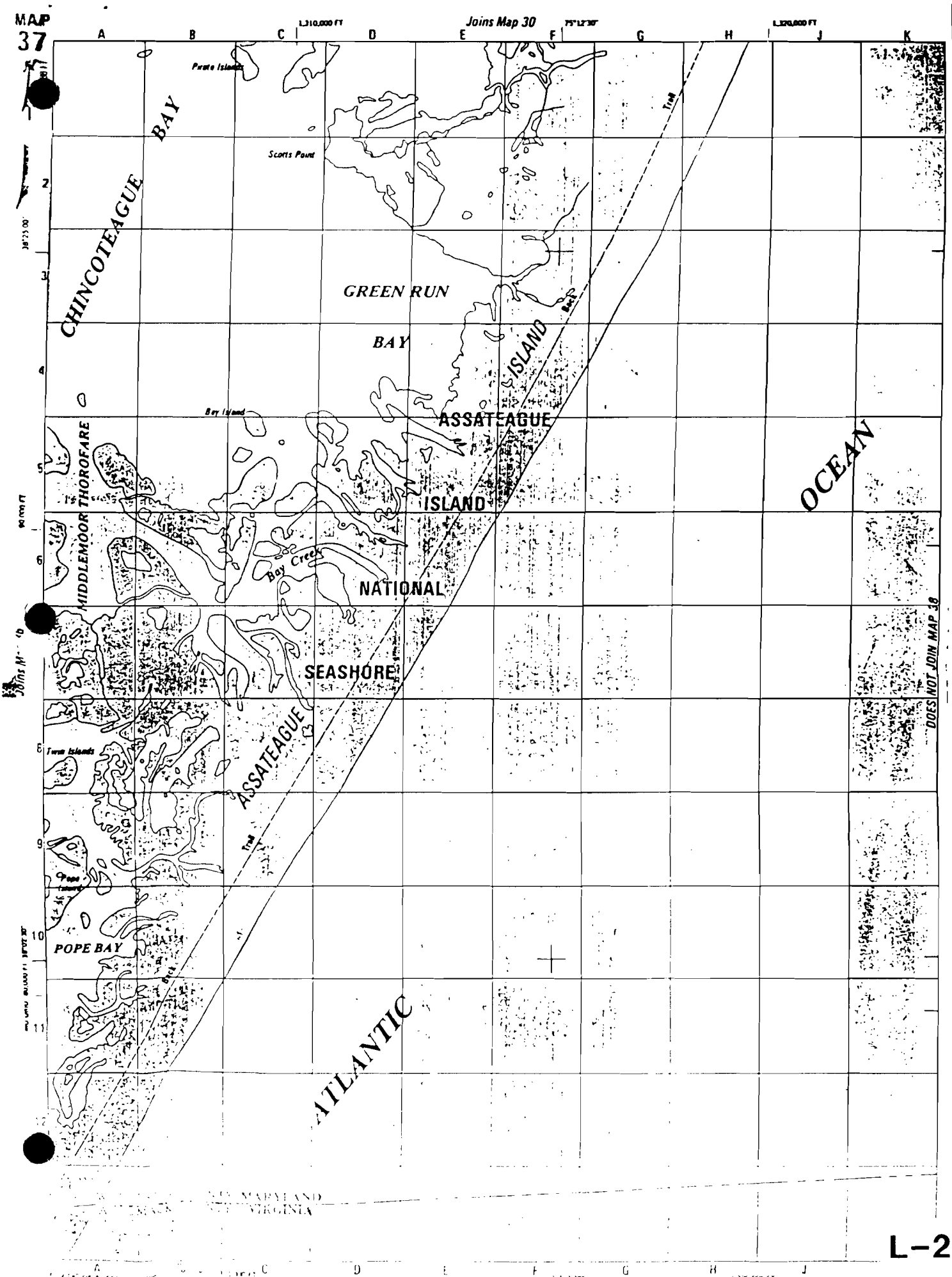
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Fox Hill Point
Sugar Point
Whittington Point
PIRATE ISLANDS
Lone Point
Jims Cut
Beach
Joins Inset Map 24
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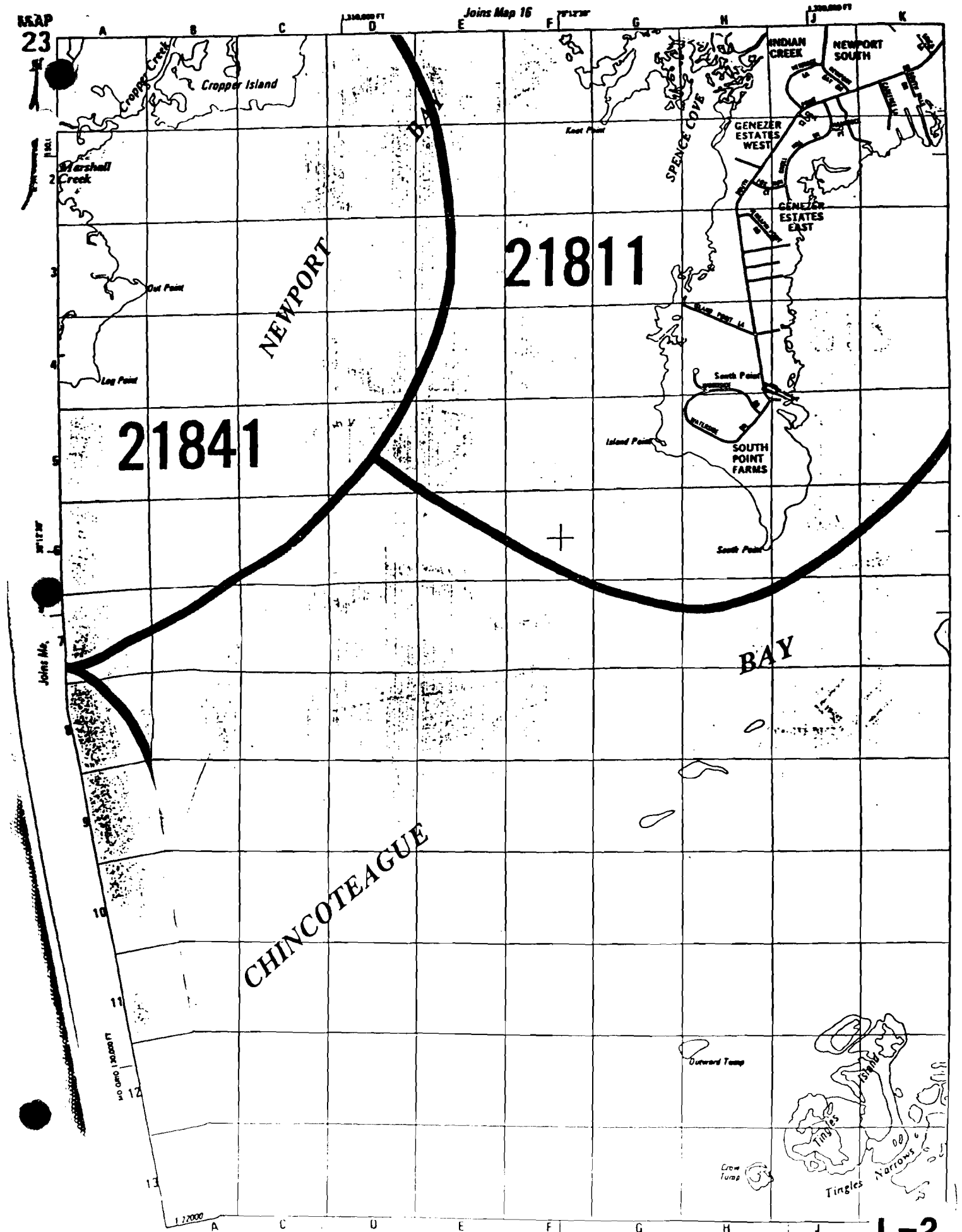
MAP 23
Joins Map 16
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Cropper Creek
Cropper Island
Marshall Creek
Out Point
Log Point
NEWPORT BAY
21811
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Knot Point
SPENCE COVE
INDIAN CREEK
NEWPORT SOUTH
GENEZER ESTATES WEST
GENEZER ESTATES EAST
South Point
Island Point
SOUTH POINT FARMS
South Point
BAY
CHINCOTEAGUE
Outward Temp
Tingles Island
Tingles
Narrows
Crow Tump
Joins Ma.
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28 © ADC OF AL

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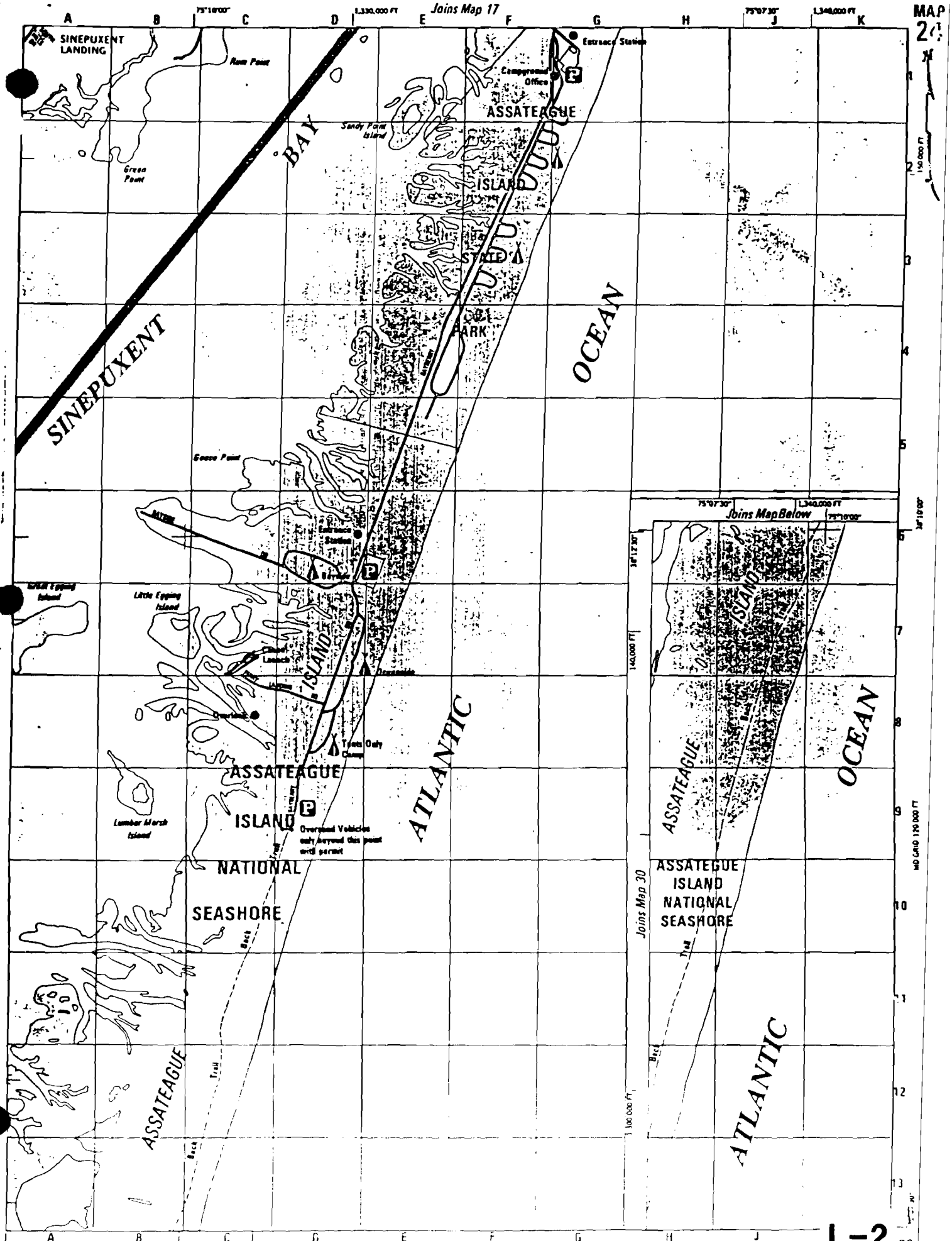
Joins Map 17
MAP 2
SINEPUXENT LANDING
Ross Point
Green Point
BAY
Sandy Point Island
Entrance Station
Campground Office
ASSATEAGUE ISLAND STATE PARK
OCEAN
SINEPUXENT
Goose Point
Little Egging Island
Little Egging Island
ISLAND
Overlook
Trees Only Camp
ASSATEAGUE ISLAND
Lumber Marsh Island
Overnight Vehicles only Beyond this point with permit
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NATIONAL SEASHORE
Back
Trail
ASSATEAGUE
Joins Map Below
Joins Map 30
ASSATEAGUE ISLAND NATIONAL SEASHORE
ATLANTIC OCEAN
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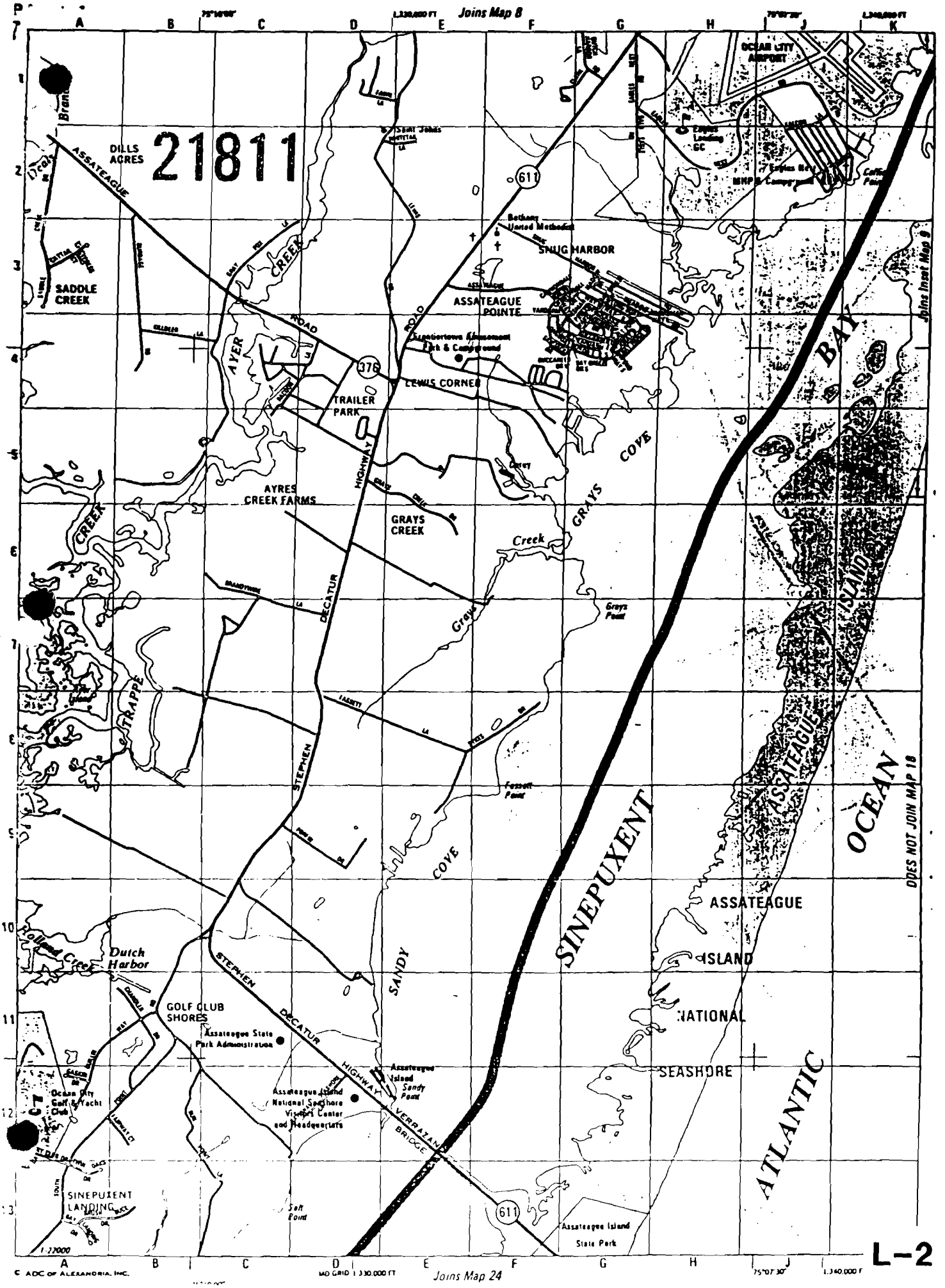

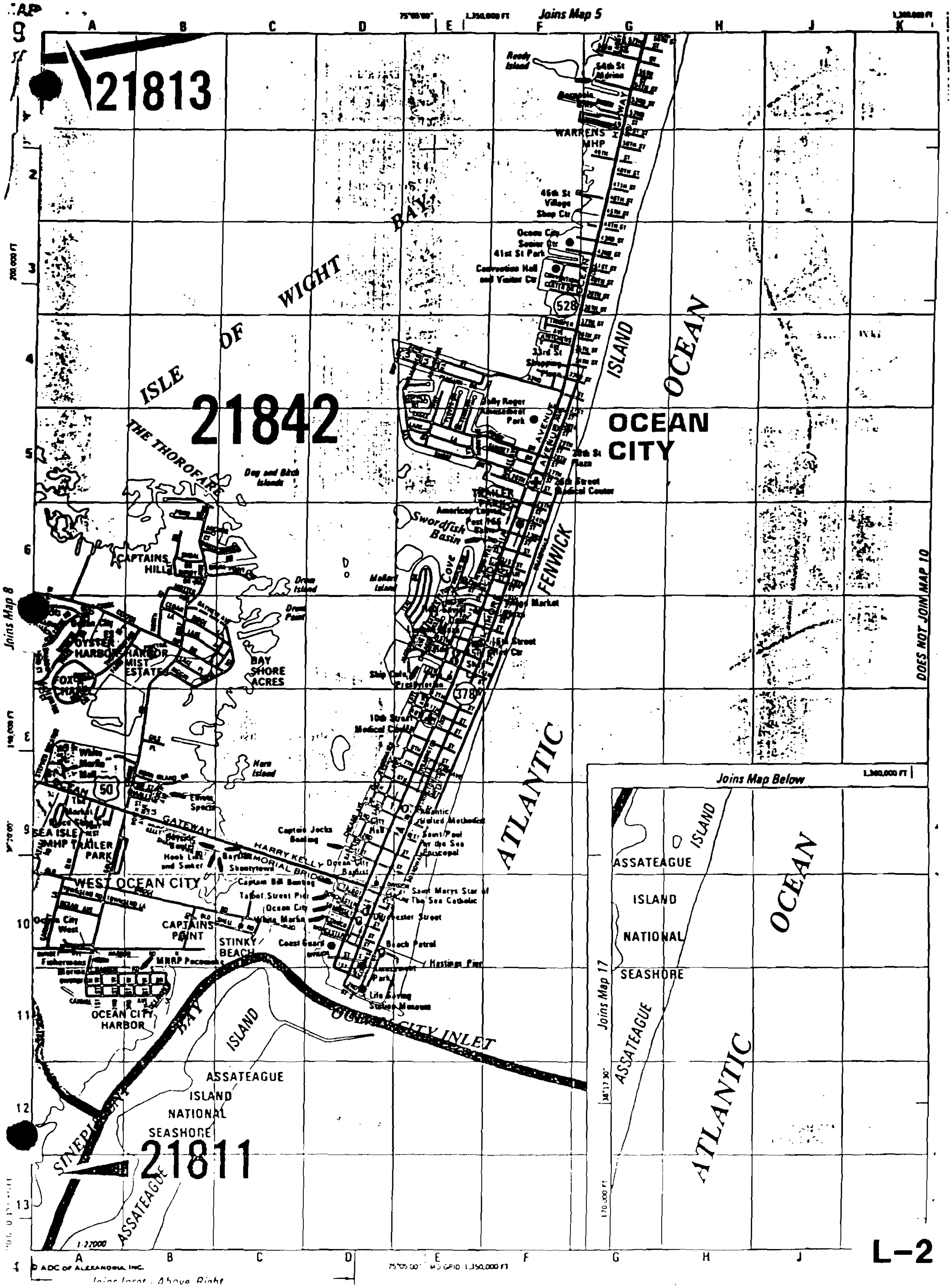
Joins Map 5
21813
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21811
ISLE OF WIGHT BAY
THE THOROFARE
OCEAN CITY
ATLANTIC
OCEAN
FENWICK ISLAND
WARRENS MHP
46th St Village Shop Ctr
Ocean City Senior Ctr
41st St Park
Convention Hall and Visitor Ctr
33rd St Shopping Plaza
Jolly Roger Amusement Park
28th St Plaza
26th Street Medical Center
American Legion Post 166
Swordfish Basin
Dog and Bitch Islands
CAPTAINS HILL
Drum Island
Mallard Island
Drum Point
OYSTER HARBOR
HARBOR MIST ESTATES
FOX CHASE
BAY SHORE ACRES
10th Street Medical Center
White Marlin Mall
Horn Island
GATEWAY
HARRY KELLY MEMORIAL BRIDGE
SEA ISLE MHP
TRAILER PARK
WEST OCEAN CITY
Ocean City West
CAPTAINS POINT
STINKY BEACH
Coast Guard
OCEAN CITY HARBOR
Captain Jacks Boating
Atlantic United Methodist
Saint Paul by the Sea Episcopal
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ASSATEAGUE ISLAND NATIONAL SEASHORE
ASSATEAGUE
Joins Map 8
DOES NOT JOIN MAP 10
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ASSATEAGUE ISLAND NATIONAL SEASHORE
ASSATEAGUE
ATLANTIC
OCEAN
1:27000
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Joins Inset Above Right
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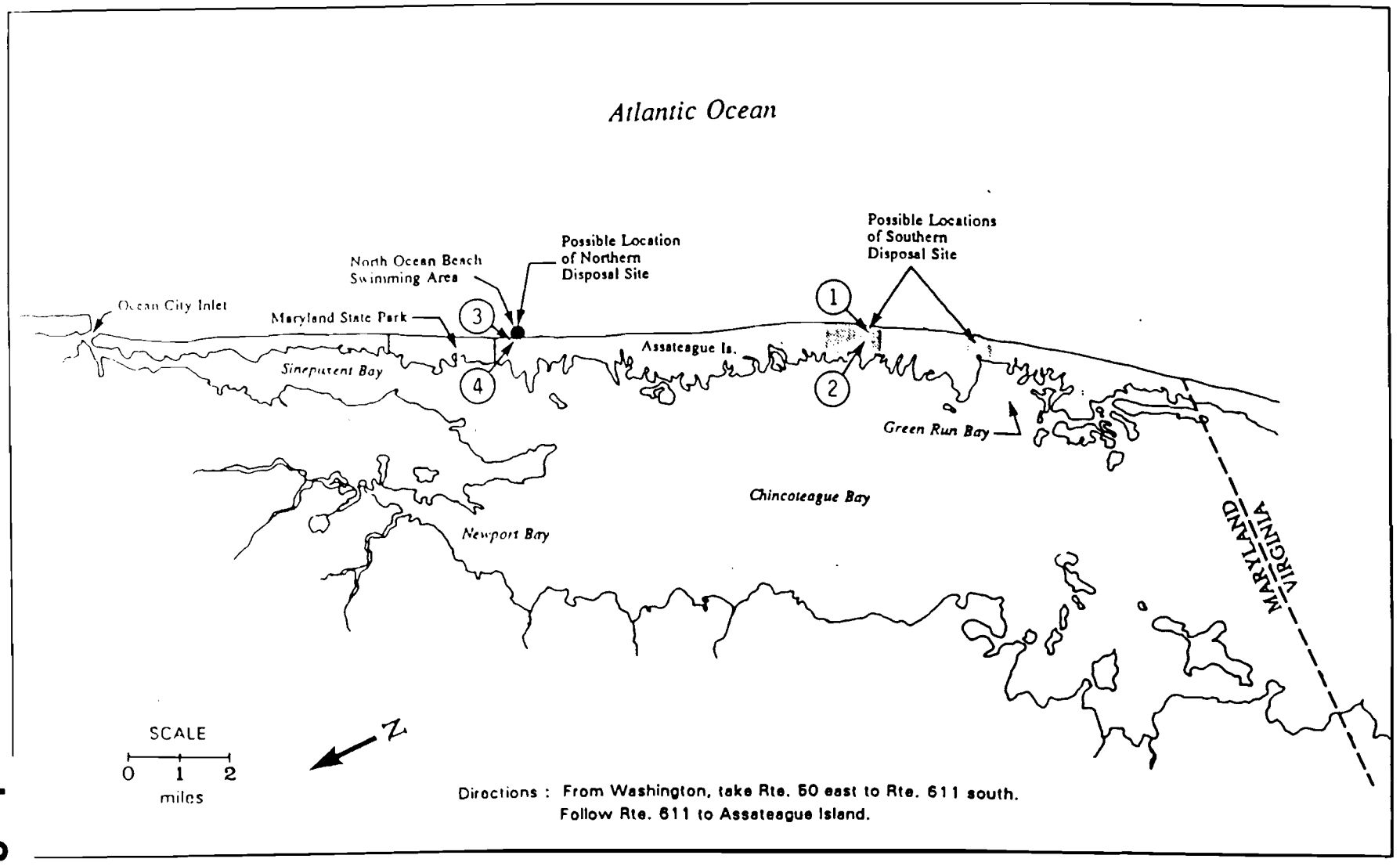
ATTACHMENT E
PHOTOLOG
PHOTOGRAPH LOCATION MAP
ASSATEAGUE ISLAND
Site No. C03MD093000



Ordnance and Explosive Waste
Archives Search Report
for
Assateague Island
Worcester County, Maryland and Accomack County, Virginia
Project Number C03MD093001

APPENDIX M

ASR CORRESPONDENCE

DEPARTMENT OF THE ARMY
HUNTSVILLE CENTER, CORPS OF ENGINEERS
P.O. BOX 1600
HUNTSVILLE, ALABAMA 35807-4301

REPLY TO
ATTENTION OF:

CEHNC-OE-CX (200-1c) 08 February 2007

MEMORANDUM FOR US Army Engineer District, Rock Island
(CEMCR-ED-D/Bob Hoffman), PO Box 2004, Rock Island, IL 61204-2004

SUBJECT: Result of the Technical Advisory Group (TAG) Review of Archives Search Reports (ASR) and Fact Sheets for Defense Environmental Restoration Program Formerly Used Defense Sites (DERP-FUDS)

1. The following enclosed ASRs and Fact Sheets are finalized.

Project Number	Site Name
B07NE006502	Scottsbluff Army Airfield
K06NM062201	Kirtland Army Airfield Practice Bombing Range No. S-08
K06NM061201	Kirtland Practice Bombing Range No. N-6
K06NM061301	Kirtland Practice Bombing Range No. N-7
A04MS000201	Meehan Range
E05MI001600	Camp Waterloo
D01MA003304	Camp Wellfleet
C03MD093001	Assateague Island
D01ME009801	Bailey Island Fire Control Station (FCS)
I04FL033402	Palm Beach Air Force Base (AFB)
I04FL104501	Panama City Temporary Harbor Defense Site (THDS)
B08CO041701	Ft. Carson Maneuver Area
J09CA203106	Baywood Park Training Area
K06AR005101	Southwestern Proving Ground
F10AK043001	Chernabura Island Navy Site
K06NM061402	Kirtland Practice Bombing Range No. N-11
K06NM061601	Kirtland Practice Bombing Range No. S-2
K06NM061701	Kirtland Practice Bombing Range No. S-3
K06NM061801	Kirtland Practice Bombing Range No. S-4
K06NM062001	Kirtland Practice Bombing Range No. S-6
I02PR054401	Sabana Seca Ammunition Storage Site
I04SC001603	Camp Croft
G04TN017601	Turret Gunnery Range, Dyersburg Army Airfield
G03WV029504	Artel Chemical Facility/Fike Chemicals Inc. (United States Explosive Plant "C")
C03DE091800	Milford and Sussex Ordnance Companies

CEHNC-OE-CX (200-1c)
SUBJECT: Result of the Technical Advisory Group (TAG) Review of Archives Search Reports (ASR) and Fact Sheets for Defense Environmental Restoration Program Formerly Used Defense Sites (DERP-FUDS)

2. Recommended strategy for future actions to be taken by the Project Manager is included in the enclosed fact sheets. Supporting data for TAG decisions are also included with the fact sheets.

3. Fact sheets, supporting data and corrected pages, due to prior reviews, are to be distributed with the subject ASRs.

4. Subject ASRs are recommended to be final when enclosed fact sheets, supporting data and corrected pages are included as a part of the project package.

5. The POC is Mr. Danny Mardis, commercial 256-895-1797, DSN 760-1767, and fax 256-895-1798.

FOR THE DIRECTOR:

Encl

DANNY R. MARDIS
Archives Search Report Manager
For Ordnance and Explosives Team

U. S. ARMY ENGINEERING AND SUPPORT CENTER, HUNTSVILLE **DESIGN REVIEW COMMENTS**		PROJECT DERP FUDS **Assateague Island C03MD093001**	CORPS OF ENGINEERS
X ASR/INPR TEAM		REVIEW ASR TAG MMRP DATE 25 October 2006 NAME Michael Lockwood (918) 420-8121	
ITEM	DRAWING NO. OR REFERENCE	COMMENT	ACTION
1.	General	Draft ASR for Assateague Island, Worchester County, MD and Accomack County, VA was reviewed for accuracy and completeness. Based on this review the following comments are provided:	
2.	General	The actual location of rocket ranges and burial sites on the island were not positively established. Range boundaries were estimated based on an interview of a former Navy spotter for the range. Past investigation were inconclusive as to the locations of the two areas designated Stinger One (Area A) and Stinger Two (Area C) Range Impact Areas. The suspected burial sites were not located however Navy divers identified a now offshore "hole" adjacent to Area A; they believed to be the located of buried MEC. Burial sites may be to depths of 20-30 feet.	Concur.
3.	General	Scrap metal from fence and old shipwrecks may cause detection anomalies. MEC sampling may occur at or below the water table. Island migration has been significant due to tides and currents.	Concur.
4.	General	The ASR's author proposes establishment of two offshore areas (Areas B and D Buffer Zones) from the shoreline of Area A and C out to 3,000 feet. The reviewer believes the formal establishment of these additional areas is not necessary. The offshore areas would be included in the range impact areas to a point	Concur.

		beyond the current water line determined to be practical for remediation purposes.	Concur
5.	General	Assateague Island is a designated National Seashore. A state park and national wildlife refuge is located on the island. There are known Federally-and State-listed species occurring in the site area. An on-site inspection by the appropriate federal and state personnel may be necessary to verify the presence, absence or location of listed species, or natural communities.	Concur.
6.	General	Several historical sites exist on Assateague Island. Several are included on the National Park Service List of Classified Structures.	Concur.
7.	General	The reviewer or disagrees with the ASR score of RAC 3 which was based on an outdate RAC form. A HNC Safety review was not available. Recommend a RAC score of 2 be assigned the property. An updated RAC Forms has been included for Areas A, C, and E.	Concur.

RESTORATION INFORMATION MANAGEMENT SYSTEM
PROJECT FACT SHEET
FORMERLY USED DEFENSE SITES
April 1994
TAG REVIEW DATE: 14 November 2006

1. **SITE NAME:** Assateague Island

   SITE NUMBER: C03MD093000

   LOCATION: City: Ocean City, MD [Nearest City]
   County: Worcester, MD and Accomack, VA
   State: Maryland and Virginia

   PROJECT NUMBER: C03MD093001

   CATEGORY: MMRP

   INPR RAC: N/A

   ASR RAC: 3

   TAG RAC: **2**

2. **POC'S:**

GEOGRAPHIC DISTRICT:
Name: Jack Butler
Office: CENAB-PP-E
Phone: 410-962-4937

GEOGRAPHIC DIVISION:
Name: Mirza Baig
Office: CENAD-MT-HS
Phone: 718-765-7088

HEADQUARTERS:
Name: Sara Goodwin
Office: CEMP-RF
Phone: 202-761-5223

ASR/INPR TEAM:
Name: Bradford McCowan
Office: CEHNC-OE-CX
Phone: 256-895-1174

ASR SUPPORT DISTRICT:
Name: H. Leland Reeser
Office: CENAB-EN-HE
Phone: 410-962-2186

ASR TECHNICAL REVIEWER:
Name: Michael Lockwood
Office: SJMAC-ESM
Phone: 918-420-8121

3. **SITE DESCRIPTION:**

a. Assateague Island 36 mile long barrier-island in Worcester County, MD and Accomack County, VA, southeast of Ocean City MD and consists of approximately 17,552 acres (8,018 acres in MD and 9,534 acres in VA).

b. The property served as a Navy aircraft rocket range. Two impact ranges were established and practice bombs were also thought to have been dropped on these ranges along with 20mm gunnery practice.

c. During the property visit the team did find munitions debris but no MEC or CWM.

4. **SITE HISTORY:**

a. There is no documentation available concerning the DOD acquisition of the property. Authority for use of the property is also not available.

b. There is evidence of MEC use on this property. Aerial rockets, 20mm ammunition and practice bombs were fired or may have been dropped on the property.

c. There is no evidence of chemical warfare material storage, training or disposal on this property.

d. A certificate of clearance was not found for this property. There have been reports of MEC on the property since closure. EOD units have responded to reports of MEC at various times.

e. The use of the property was discontinued in 1947. No documentation was provided concerning disposition.

5. **PROJECT DESCRIPTION:**

Entire Property:

Size:	17,552 acres
Former Use:	Aerial rocket impact range
Present Use:	National Seashore, Wildlife Refuge State Park
Possible End Use:	Same
MEC Presence:	
Confirmed:	Rockets, 20mm projectiles
Potential:	Practice bombs
ASR Recommends:	RAC 3
HNC Safety:	N/A

Area A (Stinger One Impact Area) [includes Area B]:

Size:	350 acres (estimated)
Former Use:	Aerial rocket impact range
Present Use:	National Seashore, Wildlife Refuge State Park
Possible End Use:	Same
MEC Presence:	
Confirmed:	Rockets, 20mm projectiles
Potential:	Practice bombs
ASR Recommends:	RAC 3
HNC Safety:	N/A

Area C (Stinger Two Impact Area) [included Area D]:

Size:	350 acres (estimated)
Former Use:	Aerial rocket impact range
Present Use:	National Seashore
Possible End Use:	Same
MEC Presence:	
Confirmed:	Rockets, 20mm projectiles
Potential:	Practice bombs
ASR Recommends:	RAC 3
HNC Safety:	N/A

Area E (All Remaining Land)

Size:	16,852acres
Former Use:	Unused acreage of island
Present Use:	National Seashore, Wildlife Refuge State Park
Possible End Use:	Same
MEC Presence:	
Confirmed:	None
Potential:	None
ASR Recommends:	RAC 5
HNC Safety:	N/A

6. **CURRENT STATUS:**

The U.S. Army Corps of Engineers, Rock Island District, completed the Archives Search Report for Assateague Island in April 1994.

7. **STRATEGY:**

RI/FS

8. **ISSUES AND CONCERNS: The Huntsville Center Technical Advisory Group met and evaluated this ASR on 14 November 2006. The consensus was a RAC score of 2. The following issues were addressed:**

a. The actual location of rocket ranges and burial sites on the island were not positively established. Range boundaries were estimated based on an interview of a former Navy spotter for the range. Past investigation were inconclusive as to the locations of the two areas designated Stinger One (Area A) and Stinger Two (Area C) Range Impact Areas. The suspected burial sites were not located however Navy divers identified a now offshore "hole" adjacent to Area A; they believed to be the located of buried MEC. Burial sites may be to depths of 20-30 feet.

b. Scrap metal from fence and old shipwrecks may cause detection anomalies. MEC sampling may occur at or below the water table. Island migration has been significant due to tides and currents.

c. The ASR's author proposes establishment of two offshore areas (Areas B and D Buffer Zones) from the shoreline of Area A and C out to 3,000 feet. The reviewer believes the formal establishment of these additional areas is not necessary. The offshore areas would be included in the range impact areas to a point beyond the current water line determined to be practical for remediation purposes.

d. Assateague Island is a designated National Seashore. A state park and national wildlife refuge is located on the island. There are known Federal and State-listed species occurring in the site area. An on-site inspection by the appropriate federal and state personnel may be necessary to verify the presence, absence or location of listed species, or natural communities.

e. Several historical sites exist on Assateague Island. Several are included on the National Park Service List of Classified Structures.

f. A HNC Safety review was not available. Recommend a RAC score of 2 be assigned the property. Updated RAC Forms has been included for Areas A, C, and E.

9. **SCHEDULE SUMMARY:**

Phase	Orig. Start	Sch. Start	Actual Start	Orig. Comp.	Sch. Comp.	Actual Comp.

10. **FUNDING/BUDGET SUMMARY:**

Year	Phase	EXEC FOA	IN House Required	Contract Required	Funds Obligated

RISK ASSESSMENT PROCEDURES FOR MILITARY MUNITIONS RESPONSE PROJECTS

Property Name:	Assateague Island - Area A (Singer One Impact Range)	Rater's Name:	Michael R. Lockwood
Property Location:	Worcester County, MD and Accomack,VA	Phone Number:	(918) 420-8121
FUDS Property/Project #:	C03MD093001	District:	DAC
Property Type:	Aerial Rocket and Bombing Range	Office Symbol:	SJMAC-ESM
Score:	2	Date Completed:	25 October 2006

RISK ASSESSMENT:

This risk assessment (RAC) procedure was developed to address explosives safety hazards related to munitions. This procedure does not address environmental hazards associated with munitions constituents. The U.S. Army Engineering and Support Center, Huntsville (USAESCH), Ordnance and Explosives Directorate (CEHNC-OE) developed this procedure in accordance with MIL-STD 882C and AR 385-10. The Risk Assessment Code (RAC) score will be used by the U.S. Army Corps of Engineers to prioritize the response action(s) at Formerly Used Defense Sites (FUDS). The risk assessment should be based on the best available information resulting from record searches, reports of Explosive Ordnance Disposal (EOD) actions, field observations (site visits), and interviews. This information is used to assess the risk involved based on the potential MMRP hazards identified for the project. The risk assessment evaluates two factors, hazard severity and hazard probability.

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

TYPE OF ORDNANCE: (Check all that apply)

A. Conventional ordnance and ammunition:	VALUE
Projectiles, explosive (20 millimeter and larger)	10 ☒
Bombs, explosive	10 ☐
Grenades, hand or rifle, explosive	10 ☐
Landmine, explosive	10 ☐
Rockets, guided missile, explosive	10 ☒
Other Explosive item not previously stated	10 ☐
Bomb, practice (w/spotting charge)	6 ☒
Detonators, blasting caps, fuses, boosters, bursters	6 ☐
Practice ordnance (w/ spotting charges, other than bombs)	4 ☐
Small arms, complete round (.50 cal or less)	1 ☐
Small arms, expended (.50 cal or less)	0 ☐
Practice ordnance (w/o spotting charges)	0 ☐
Conventional ordnance and ammunition (enter largest single value checked)	10

What evidence do you have regarding conventional unexploded ordnance? The area was used as a aerial rocket range. Munitions debris, including 20mm projectiles, rockets, and bomb components have been found in the area. Navy divers suspect an offshore "hole" to be source of wash up munitions debris in area.

B. Pyrotechnics (for munitions not described above):

	VALUE
Munitions containing White Phosphorus (WP) or other pyrophoric material (i.e., spontaneously flammable)	10☐
Munitions containing a flame or incendiary material (i.e., Napalm, Triethylaluminum metal incendiaries)	10☐
Containers containing WP or other pyrophoric material or flame or incendiary material	6☐
Flares, signals, simulators, screening/burning smokes (other than WP)	4☐
Pyrotechnics (enter the single largest value checked)	0

What evidence do you have regarding pyrotechnics? None.

C. Bulk Explosives (HE) (not an integral part of conventional ordnance; un-containerized):

	VALUE
Primary or initiating explosives (Lead Styphnate, Lead Azide, Nitroglycerin, Mercury Azide, Mercury Fulminate, Tetracene, etc.)	10☐
Secondary explosives (Demolition charges, PETN, Compositions A, B, C, Tetryl, TNT, RDX, HMX, HBX, Black Powder, etc.)	8☐
Insensitive explosive substances (explosive contaminated soils, ammonium nitrate)	3☐
Bulk Explosives (HE) (enter the single largest value checked)	0

What evidence do you have regarding bulk explosives? None.

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

	VALUE
Solid or liquid propellants	6☐
Bulk Propellants (select 6 or 0)	0

What evidence do you have regarding bulk propellants? None.

E. Recovered Chemical Warfare Materiel (RCWM), Weaponized Industrial Chemicals and Radiological Materiel:

	VALUE
Toxic chemical agents (H-Mustard, G-Nerve, V-Nerve and L-Lewisite)	25☐
Chemical Agent Identification Sets	20☐
Radiological Materiel (If rad waste is identified please call the HTRW-CX at 402-697-2555)	15☐
Weaponized Industrial Chemicals (Hydrogen Cyanide AC; Cyanogen Chloride, CK; Phosgene, CG)	10☐
Riot Control Agents (vomiting, tear)	5☐
Chemical and Radiological (enter the single largest value checked)	0

What evidence do you have regarding chemical or radiological? None.

TOTAL HAZARD SEVERITY VALUE (Sum of value A through E, maximum of 61) 10
Apply this value to Table 1 to determine Hazard Severity Category

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Property Name:
Project Number:
Property Type:

TABLE 1
HAZARD SEVERITY*

DESCRIPTION	CATEGORY	HAZARD SEVERITY VALUE
CATASTROPHIC	I ☐	21 and/or greater
CRITICAL	II ☒	10 to 20
MARGINAL	III ☐	5 to 9
NEGLIGIBLE	IV ☐	1 to 4
**NONE	V ☐	0

*Apply Hazard Severity Category to Table 3 and complete Part II of this form.
**If hazard severity value is 0, complete Part II of this form. Then proceed to Part III and use a RAC score of 5 to determine your appropriate action.

PART II - Hazard Probability. The probability that a hazard has been, or will be, created due to the presence and other rated factors of unexploded ordnance, explosives, incendiary, pyrotechnic, radiological, or RCWM materials on a formerly used Department of Defense (DOD) site.

AREA, EXTENT, ACCESSIBILITY OF MMRP HAZARD (Check all that apply)

A. Locations of MMRP hazards:

	VALUE
On the surface	5☒
Within tanks, pipes, vessels, or other confined areas	4☐
Inside walls, ceilings, or other building/structure	3☐
Subsurface	2☒
Location (enter the single largest value checked)	5

What evidence do you have regarding the location of MMRP? MEC and munitions debris has been found on the surface, washed ashore, and suspected to be buried offshore.

Property Name:
Project Number:
Property Type:

B. Distance to nearest inhabited location/structure likely to be at risk from MMRP hazard (road, park, playground, building, etc.).

	VALUE
Less than 1,250 feet	5☒
1,250 feet to 0.5 mile	4☐
0.5 mile to 1.0 mile	3☐
1.0 mile to 2.0 Miles	2☐
Over 2 miles	1☐
Distance (enter the single largest value checked)	5

What are the nearest inhabited structures/buildings? The area is a within a the Assateague National Seashore beaches and in close proximity to campsites.

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

	VALUE
26 and over	5☐
16 to 25	4☐
11 to 16	3☐
6 to 10	2☐
1 to 5	1☒
0	0☐
Number of buildings (enter the single largest value checked)	1

Narrative: The few existing buildings on the island are associated with the National Seashore or State Park.

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

	VALUE
Educational, childcare, residential, hospitals, hotels, commercial, shopping centers	5☒
Industrial, warehouse, etc.	4☐
Agricultural, forestry, etc.	3☐
Detention, correctional	2☐
No buildings	0☐
Types of buildings (enter the single largest value checked)	5

Describe the types of buildings: Bathhouses, restrooms and other recreational facilities.

E. Accessibility to site refers to access by humans to military munitions. Use the following guidance:

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

Describe the site accessibility: The island includes public beaches and campsites. The range area is accessible without restrictions to the public.

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 on beaches or streams, increasing land development that could reduce distances from the site to inhabited areas or otherwise increase accessibility.

	VALUE
Expected	5☒
Not anticipated	0☐
Site Dynamics (enter the single largest value checked)	5

Describe the site dynamics: Sand and beach erosion due to severe storms and hurricanes cause constant island migration.

TOTAL HAZARD PROBABILITY VALUE 26
(Sum of largest values for A through F (maximum of 30). Apply this value to Hazard Probability Table 2 to determine the Hazard Probability Level.

TABLE 2
HAZARD PROBABILITY*

DESCRIPTION VALUE	LEVEL	HAZARD PROBABILITY
FREQUENT	A☐	27 or greater
PROBABLE	B☒	21 to 26
OCCASIONAL	C☐	15 to 20
REMOTE	D☐	8 to 14
IMPROBABLE	E☐	less than 8

*Apply Hazard Probability Level to Table 3.

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

TABLE 3

PROBABILITY LEVEL		FREQUENT A	PROBABLE B	OCCASIONAL C	REMOTE D	IMPROBABLE E
SEVERITY CATEGORY:						
CATASTROPHIC	I	1 ☐	1 ☐	2 ☐	3 ☐	4 ☐
CRITICAL	II	1 ☐	2 ☒	3 ☐	4 ☐	4 ☐
MARGINAL	III	2 ☐	3 ☐	4 ☐	4 ☐	4 ☐
NEGLIGIBLE	IV	3 ☐	4 ☐	4 ☐	4 ☐	4 ☐

None (V) = RAC 5 ☐

RISK ASSESSMENT CODE (RAC)

RAC 1-4	Recommend and approve further action as appropriate. Refer to EP 1110-1-18 for discussion of MMRP projects and the process to be followed for execution of project response actions.
RAC 5	Usually indicates that No DOD Action Indicated (NDAI) is necessary. Recommend and approve NDAI and follow instructions for project closeout in accordance with current program guidance.

PART IV - Narrative. Summarize the documented evidence that supports this risk assessment. If no documented evidence was available, explain all the assumptions that you made.
Area A is an aerial rocket impact range. Munitions debris has been found washed up on the area beaches. EOD units have responded to numerous reports of MEC in the area. Navy divers identified an offshore "hole" suspected of containing MEC. The suspected burial pit was once believed to be inland but due to island migration is now underwater. During the property visit the survey team did found MPPEH debris. There were no indications of CWM training, storage or disposal on the property. MEC has been reported since closure of the property. Recommend a RAC score of 2.

Property Name:
Project Number:
Property Type:

RISK ASSESSMENT PROCEDURES FOR MILITARY MUNITIONS RESPONSE PROJECTS

Property Name:	Assateague Island - Area C (Singer Two Impact Range)	Rater's Name:	Michael R. Lockwood
Property Location:	Worcester County, MD and Accomack,VA	Phone Number:	(918) 420-8121
FUDS Property/Project #:	C03MD093001	District:	DAC
Property Type:	Aerial Rocket and Bombing Range	Office Symbol:	SJMAC-ESM
Score:	2	Date Completed:	25 October 2006

RISK ASSESSMENT:

This risk assessment (RAC) procedure was developed to address explosives safety hazards related to munitions. This procedure does not address environmental hazards associated with munitions constituents. The U.S. Army Engineering and Support Center, Huntsville (USAESCH), Ordnance and Explosives Directorate (CEHNC-OE) developed this procedure in accordance with MIL-STD 882C and AR 385-10. The Risk Assessment Code (RAC) score will be used by the U.S. Army Corps of Engineers to prioritize the response action(s) at Formerly Used Defense Sites (FUDS). The risk assessment should be based on the best available information resulting from record searches, reports of Explosive Ordnance Disposal (EOD) actions, field observations (site visits), and interviews. This information is used to assess the risk involved based on the potential MMRP hazards identified for the project. The risk assessment evaluates two factors, hazard severity and hazard probability.

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

TYPE OF ORDNANCE: (Check all that apply)

A. Conventional ordnance and ammunition:	VALUE	
Projectiles, explosive (20 millimeter and larger)	10	☒
Bombs, explosive	10	☐
Grenades, hand or rifle, explosive	10	☐
Landmine, explosive	10	☐
Rockets, guided missile, explosive	10	☒
Other Explosive item not previously stated	10	☐
Bomb, practice (w/spotting charge)	6	☒
Detonators, blasting caps, fuses, boosters, bursters	6	☐
Practice ordnance (w/ spotting charges, other than bombs)	4	☐
Small arms, complete round (.50 cal or less)	1	☐
Small arms, expended (.50 cal or less)	0	☐
Practice ordnance (w/o spotting charges)	0	☐
Conventional ordnance and ammunition (enter largest single value checked)		10

What evidence do you have regarding conventional unexploded ordnance? The area was used as a aerial rocket range. Munitions debris, including 20mm projectiles, rockets, and bomb components have been found in the area. A suspected burial pit containing MEC and munitions debris from the range cleanup may be on located in the area.

B. Pyrotechnics (for munitions not described above):

	VALUE
Munitions containing White Phosphorus (WP) or other pyrophoric material (i.e., spontaneously flammable)	10☐
Munitions containing a flame or incendiary material (i.e., Napalm, Triethylaluminum metal incendiaries)	10☐
Containers containing WP or other pyrophoric material or flame or incendiary material	6☐
Flares, signals, simulators, screening/burning smokes (other than WP)	4☐
Pyrotechnics (enter the single largest value checked)	0

What evidence do you have regarding pyrotechnics? None.

C. Bulk Explosives (HE) (not an integral part of conventional ordnance; un-containerized):

	VALUE
Primary or initiating explosives (Lead Styphnate, Lead Azide, Nitroglycerin, Mercury Azide, Mercury Fulminate, Tetracene, etc.)	10☐
Secondary explosives (Demolition charges, PETN, Compositions A, B, C, Tetryl, TNT, RDX, HMX, HBX, Black Powder, etc.)	8☐
Insensitive explosive substances (explosive contaminated soils, ammonium nitrate)	3☐
Bulk Explosives (HE) (enter the single largest value checked)	0

What evidence do you have regarding bulk explosives? None.

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

	VALUE
Solid or liquid propellants	6☐
Bulk Propellants (select 6 or 0)	0

What evidence do you have regarding bulk propellants? None.

E. Recovered Chemical Warfare Materiel (RCWM), Weaponized Industrial Chemicals and Radiological Materiel:

	VALUE
Toxic chemical agents (H-Mustard, G-Nerve, V-Nerve and L-Lewisite)	25☐
Chemical Agent Identification Sets	20☐
Radiological Materiel (If rad waste is identified please call the HTRW–CX at 402-697-2555)	15☐
Weaponized Industrial Chemicals (Hydrogen Cyanide AC; Cyanogen Chloride, CK; Phosgene, CG)	10☐
Riot Control Agents (vomiting, tear)	5☐
Chemical and Radiological (enter the single largest value checked)	0

What evidence do you have regarding chemical or radiological? None.

TOTAL HAZARD SEVERITY VALUE (Sum of value A through E, maximum of 61) 10
Apply this value to Table 1 to determine Hazard Severity Category

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Property Name:
Project Number:
Property Type:

TABLE 1
HAZARD SEVERITY*

DESCRIPTION	CATEGORY	HAZARD SEVERITY VALUE
CATASTROPHIC	I ☐	21 and/or greater
CRITICAL	II ☒	10 to 20
MARGINAL	III ☐	5 to 9
NEGLIGIBLE	IV ☐	1 to 4
**NONE	V ☐	0

*Apply Hazard Severity Category to Table 3 and complete Part II of this form.
**If hazard severity value is 0, complete Part II of this form. Then proceed to Part III and use a RAC score of 5 to determine your appropriate action.

PART II - Hazard Probability. The probability that a hazard has been, or will be, created due to the presence and other rated factors of unexploded ordnance, explosives, incendiary, pyrotechnic, radiological, or RCWM materials on a formerly used Department of Defense (DOD) site.

AREA, EXTENT, ACCESSIBILITY OF MMRP HAZARD (Check all that apply)

A. Locations of MMRP hazards:

	VALUE
On the surface	5☒
Within tanks, pipes, vessels, or other confined areas	4☐
Inside walls, ceilings, or other building/structure	3☐
Subsurface	2☒
Location (enter the single largest value checked)	5

What evidence do you have regarding the location of MMRP? MEC and munitions debris has been found on the surface, washed ashore, and suspected to be buried inland.

Property Name:
Project Number:
Property Type:

B. Distance to nearest inhabited location/structure likely to be at risk from MMRP hazard (road, park, playground, building, etc.).

	VALUE
Less than 1,250 feet	5☒
1,250 feet to 0.5 mile	4☐
0.5 mile to 1.0 mile	3☐
1.0 mile to 2.0 Miles	2☐
Over 2 miles	1☐
Distance (enter the single largest value checked)	5

What are the nearest inhabited structures/buildings? The area is a within the Assateague National Seashore beaches and in close proximity to campsites.

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

	VALUE
26 and over	5☐
16 to 25	4☐
11 to 16	3☐
6 to 10	2☐
1 to 5	1☒
0	0☐
Number of buildings (enter the single largest value checked)	1

Narrative: The few existing buildings on the island are associated with the National Seashore or State Park.

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

	VALUE
Educational, childcare, residential, hospitals, hotels, commercial, shopping centers	5☒
Industrial, warehouse, etc.	4☐
Agricultural, forestry, etc.	3☐
Detention, correctional	2☐
No buildings	0☐
Types of buildings (enter the single largest value checked)	5

Describe the types of buildings: Bathhouses, restrooms and other recreational facilities.

E. Accessibility to site refers to access by humans to military munitions. Use the following guidance:

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

Describe the site accessibility: The island includes public beaches and campsites. The range area is accessible without restrictions to the public.

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 on beaches or streams, increasing land development that could reduce distances from the site to inhabited areas or otherwise increase accessibility.

	VALUE
Expected	5☒
Not anticipated	0☐
Site Dynamics (enter the single largest value checked)	5

Describe the site dynamics: Sand and beach erosion due to severe storms and hurricanes cause constant island migration.

TOTAL HAZARD PROBABILITY VALUE 26
(Sum of largest values for A through F (maximum of 30). Apply this value to Hazard Probability Table 2 to determine the Hazard Probability Level.

TABLE 2
HAZARD PROBABILITY*

DESCRIPTION VALUE	LEVEL	HAZARD PROBABILITY
FREQUENT	A☐	27 or greater
PROBABLE	B☒	21 to 26
OCCASIONAL	C☐	15 to 20
REMOTE	D☐	8 to 14
IMPROBABLE	E☐	less than 8

*Apply Hazard Probability Level to Table 3.

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

TABLE 3

PROBABILITY LEVEL	FREQUENT A	PROBABLE B	OCCASIONAL C	REMOTE D	IMPROBABLE E
SEVERITY CATEGORY:					
CATASTROPHIC I	1 ☐	1 ☐	2 ☐	3 ☐	4 ☐
CRITICAL II	1 ☐	2 ☒	3 ☐	4 ☐	4 ☐
MARGINAL III	2 ☐	3 ☐	4 ☐	4 ☐	4 ☐
NEGLIGIBLE IV	3 ☐	4 ☐	4 ☐	4 ☐	4 ☐

None (V) = RAC 5 ☐

RISK ASSESSMENT CODE (RAC)

RAC 1-4	Recommend and approve further action as appropriate. Refer to EP 1110-1-18 for discussion of MMRP projects and the process to be followed for execution of project response actions.
RAC 5	Usually indicates that No DOD Action Indicated (NDAI) is necessary. Recommend and approve NDAI and follow instructions for project closeout in accordance with current program guidance.

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

Area C is an aerial rocket impact range. Munitions debris has been found washed up on the area beaches. EOD units have responded to numerous reports of MEC in the area. A suspected burial pit was is believed to exist in the area. During the property visit the survey team did found MPPEH debris. There were no indications of CWM training, storage or disposal on the property. MEC has been reported since closure of the property. Recommend a RAC score of 2.

Property Name:
Project Number:
Property Type:

RISK ASSESSMENT PROCEDURES FOR MILITARY MUNITIONS RESPONSE PROJECTS

Property Name:	Assateague Island - Area E (All Remaining Land)	Rater's Name:	Michael R. Lockwood
Property Location:	Worcester County, MD and Accomack,VA	Phone Number:	(918) 420-8121
FUDS Property/Project #:	C03MD093001	District:	DAC
Property Type:	Aerial Rocket and Bombing Range	Office Symbol:	SJMAC-ESM
Score:	5	Date Completed:	25 October 2006

RISK ASSESSMENT:

This risk assessment (RAC) procedure was developed to address explosives safety hazards related to munitions. This procedure does not address environmental hazards associated with munitions constituents. The U.S. Army Engineering and Support Center, Huntsville (USAESCH), Ordnance and Explosives Directorate (CEHNC-OE) developed this procedure in accordance with MIL-STD 882C and AR 385-10. The Risk Assessment Code (RAC) score will be used by the U.S. Army Corps of Engineers to prioritize the response action(s) at Formerly Used Defense Sites (FUDS). The risk assessment should be based on the best available information resulting from record searches, reports of Explosive Ordnance Disposal (EOD) actions, field observations (site visits), and interviews. This information is used to assess the risk involved based on the potential MMRP hazards identified for the project. The risk assessment evaluates two factors, hazard severity and hazard probability.

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

TYPE OF ORDNANCE: (Check all that apply)

A. Conventional ordnance and ammunition:	VALUE
Projectiles, explosive (20 millimeter and larger)	10 ☐
Bombs, explosive	10 ☐
Grenades, hand or rifle, explosive	10 ☐
Landmine, explosive	10 ☐
Rockets, guided missile, explosive	10 ☐
Other Explosive item not previously stated	10 ☐
Bomb, practice (w/spotting charge)	6 ☐
Detonators, blasting caps, fuses, boosters, bursters	6 ☐
Practice ordnance (w/ spotting charges, other than bombs)	4 ☐
Small arms, complete round (.50 cal or less)	1 ☐
Small arms, expended (.50 cal or less)	0 ☐
Practice ordnance (w/o spotting charges)	0 ☐
Conventional ordnance and ammunition (enter largest single value checked)	0

What evidence do you have regarding conventional unexploded ordnance? None, there is no evidence to indicate the presence or potential presence of MEC in any other area of the island besides Areas A and C, the rocket impact areas.

B. Pyrotechnics (for munitions not described above):

	VALUE
Munitions containing White Phosphorus (WP) or other pyrophoric material (i.e., spontaneously flammable)	10☐
Munitions containing a flame or incendiary material (i.e., Napalm, Triethylaluminum metal incendiaries)	10☐
Containers containing WP or other pyrophoric material or flame or incendiary material	6☐
Flares, signals, simulators, screening/burning smokes (other than WP)	4☐
Pyrotechnics (enter the single largest value checked)	0

What evidence do you have regarding pyrotechnics? None.

C. Bulk Explosives (HE) (not an integral part of conventional ordnance; un-containerized):

	VALUE
Primary or initiating explosives (Lead Styphnate, Lead Azide, Nitroglycerin, Mercury Azide, Mercury Fulminate, Tetracene, etc.)	10☐
Secondary explosives (Demolition charges, PETN, Compositions A, B, C, Tetryl, TNT, RDX, HMX, HBX, Black Powder, etc.)	8☐
Insensitive explosive substances (explosive contaminated soils, ammonium nitrate)	3☐
Bulk Explosives (HE) (enter the single largest value checked)	0

What evidence do you have regarding bulk explosives? None.

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

	VALUE
Solid or liquid propellants	6☐
Bulk Propellants (select 6 or 0)	0

What evidence do you have regarding bulk propellants? None.

E. Recovered Chemical Warfare Materiel (RCWM), Weaponized Industrial Chemicals and Radiological Materiel:

	VALUE
Toxic chemical agents (H-Mustard, G-Nerve, V-Nerve and L-Lewisite)	25☐
Chemical Agent Identification Sets	20☐
Radiological Materiel (If rad waste is identified please call the HTRW–CX at 402-697-2555)	15☐
Weaponized Industrial Chemicals (Hydrogen Cyanide AC; Cyanogen Chloride, CK; Phosgene, CG)	10☐
Riot Control Agents (vomiting, tear)	5☐
Chemical and Radiological (enter the single largest value checked)	0

What evidence do you have regarding chemical or radiological? None.

TOTAL HAZARD SEVERITY VALUE (Sum of value A through E, maximum of 61) 0
Apply this value to Table 1 to determine Hazard Severity Category

---

Property Name:
Project Number:
Property Type:

TABLE 1
HAZARD SEVERITY*

DESCRIPTION	CATEGORY	HAZARD SEVERITY VALUE
CATASTROPHIC	I ☐	21 and/or greater
CRITICAL	II ☐	10 to 20
MARGINAL	III ☐	5 to 9
NEGLIGIBLE	IV ☐	1 to 4
**NONE	V ☒	0

*Apply Hazard Severity Category to Table 3 and complete Part II of this form.
**If hazard severity value is 0, complete Part II of this form. Then proceed to Part III and use a RAC score of 5 to determine your appropriate action.

PART II - Hazard Probability. The probability that a hazard has been, or will be, created due to the presence and other rated factors of unexploded ordnance, explosives, incendiary, pyrotechnic, radiological, or RCWM materials on a formerly used Department of Defense (DOD) site.

AREA, EXTENT, ACCESSIBILITY OF MMRP HAZARD (Check all that apply)

A. Locations of MMRP hazards:

	VALUE
On the surface	5☐
Within tanks, pipes, vessels, or other confined areas	4☐
Inside walls, ceilings, or other building/structure	3☐
Subsurface	2☐
Location (enter the single largest value checked)	0

What evidence do you have regarding the location of MMRP? None.

Property Name:
Project Number:
Property Type:

B. Distance to nearest inhabited location/structure likely to be at risk from MMRP hazard (road, park, playground, building, etc.).

	VALUE
Less than 1,250 feet	5☒
1,250 feet to 0.5 mile	4☐
0.5 mile to 1.0 mile	3☐
1.0 mile to 2.0 Miles	2☐
Over 2 miles	1☐
Distance (enter the single largest value checked)	5

What are the nearest inhabited structures/buildings? The area is a within the Assateague National Seashore beaches and in close proximity to campsites.

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

	VALUE
26 and over	5☐
16 to 25	4☐
11 to 16	3☐
6 to 10	2☐
1 to 5	1☒
0	0☐
Number of buildings (enter the single largest value checked)	1

Narrative: The few existing buildings on the island are associated with the National Seashore or State Park.

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

	VALUE
Educational, childcare, residential, hospitals, hotels, commercial, shopping centers	5☒
Industrial, warehouse, etc.	4☐
Agricultural, forestry, etc.	3☐
Detention, correctional	2☐
No buildings	0☐
Types of buildings (enter the single largest value checked)	5

Describe the types of buildings: Bathhouses, restrooms and other recreational facilities.

E. Accessibility to site refers to access by humans to military munitions. Use the following guidance:

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

Describe the site accessibility: The island includes public beaches and campsites. The range area is accessible without restrictions to the public.

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 on beaches or streams, increasing land development that could reduce distances from the site to inhabited areas or otherwise increase accessibility.

	VALUE
Expected	5☒
Not anticipated	0☐
Site Dynamics (enter the single largest value checked)	5

Describe the site dynamics: Sand and beach erosion due to severe storms and hurricanes cause constant island migration.

TOTAL HAZARD PROBABILITY VALUE 21
(Sum of largest values for A through F (maximum of 30). Apply this value to Hazard Probability Table 2 to determine the Hazard Probability Level.

TABLE 2
HAZARD PROBABILITY*

DESCRIPTION VALUE	LEVEL	HAZARD PROBABILITY
FREQUENT	A☐	27 or greater
PROBABLE	B☒	21 to 26
OCCASIONAL	C☐	15 to 20
REMOTE	D☐	8 to 14
IMPROBABLE	E☐	less than 8

*Apply Hazard Probability Level to Table 3.

Property Name:
Project Number:
Property Type:

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

TABLE 3

PROBABILITY LEVEL	FREQUENT A	PROBABLE B	OCCASIONAL C	REMOTE D	IMPROBABLE E
SEVERITY CATEGORY:					
CATASTROPHIC I	1 ☐	1 ☐	2 ☐	3 ☐	4 ☐
CRITICAL II	1 ☐	2 ☐	3 ☐	4 ☐	4 ☐
MARGINAL III	2 ☐	3 ☐	4 ☐	4 ☐	4 ☐
NEGLIGIBLE IV	3 ☐	4 ☐	4 ☐	4 ☐	4 ☐

None (V) = RAC 5 ☒

RISK ASSESSMENT CODE (RAC)

RAC 1-4	Recommend and approve further action as appropriate. Refer to EP 1110-1-18 for discussion of MMRP projects and the process to be followed for execution of project response actions.
RAC 5	Usually indicates that No DOD Action Indicated (NDAI) is necessary. Recommend and approve NDAI and follow instructions for project closeout in accordance with current program guidance.

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

Area E encompasses all the remaining land outside the rocket impact areas.. During the property visit the survey team did not found MEC or munitions debris in any area other than the impact areas. There were no indications of CWM training, storage or disposal on the property. MEC has not been reported in Area E since closure of the property. Recommend a RAC score of 5.

Property Name:
Project Number:
Property Type:

Ordnance and Explosive Waste
Archives Search Report
for
Assateague Island
Worcester County, Maryland and Accomack County, Virginia
Project Number C03MD093001

APPENDIX N

REPORT DISTRIBUTION LIST

APPENDIX M

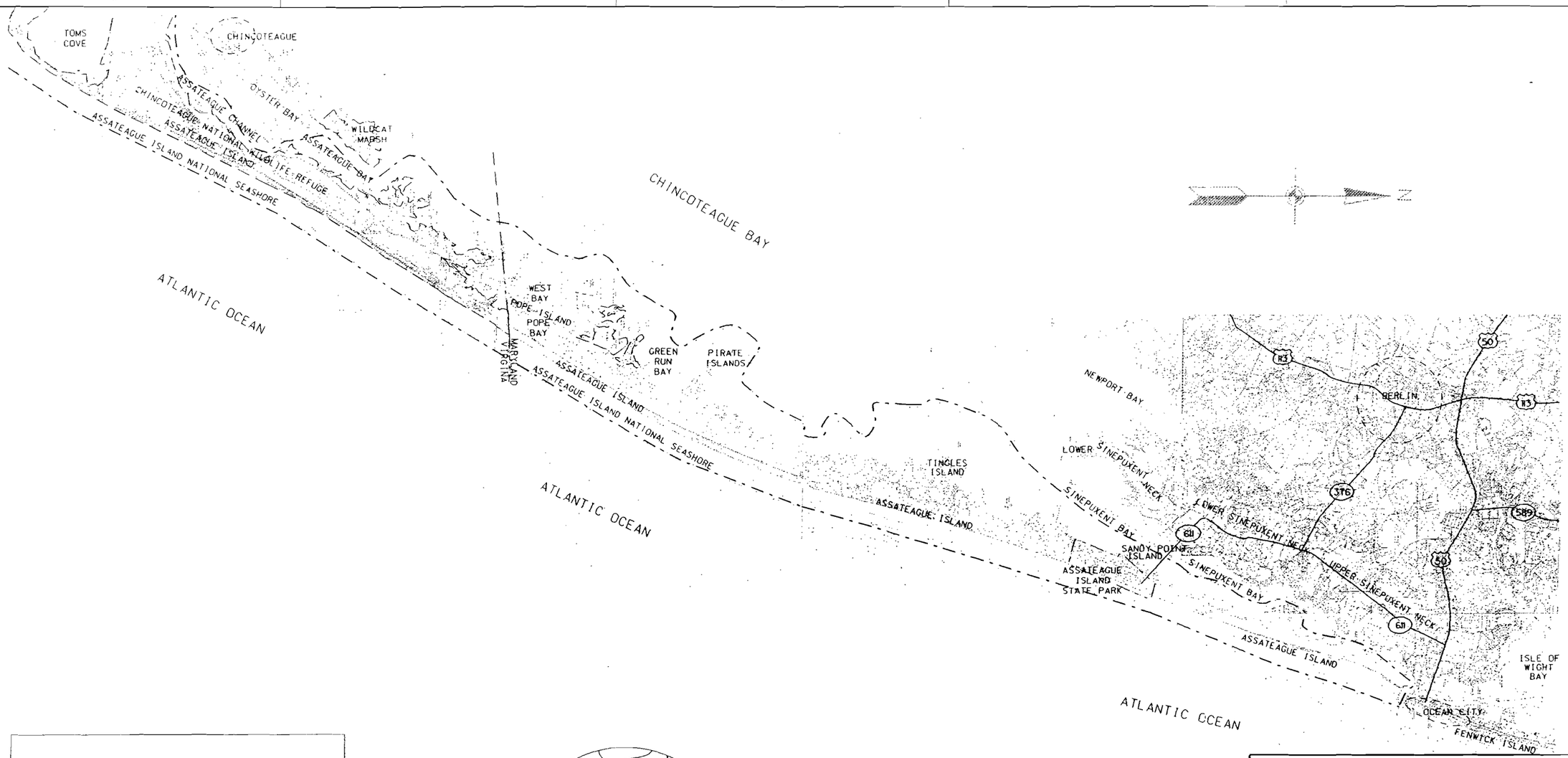
REPORT DISTRIBUTION LIST

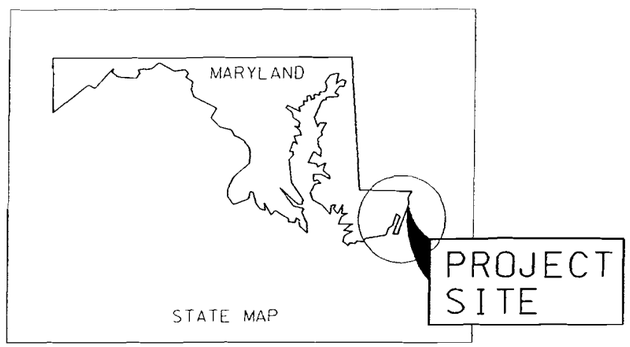
Addressee	No. Copies	
	Draft	**Final**
Commander, U.S. Army Corps of Engineers ATTN: CEMP-RF (Angus/Coppola) Pulaski Building 20 Massachusetts Avenue NW Washington D.C. 20313-1000	-	2
Commander, U.S. Army Engineer Division, Huntsville, ATTN: CEHND-PM-OT P.O. Box 1600 Huntsville, Alabama 35807-4301	2	3
Commander, U.S. Army Engineer Division North Central, ATTN: CENCD-PE-ED-TE 111 North Canal Street Chicago, Illinois 60606-7205	1	3
Commander, U.S. Army Defense Ammunition Center and School, ATTN: SMCAC-ES Savanna, Illinois 61074-9639	2	2
Commander, U.S. Army Health Clinic ATTN: HSXZ-FS-RIA (Platt) Rock Island Arsenal Rock Island, Illinois 61201	-	1
Commander, U.S. Army Engineer District, Baltimore, ATTN: CENAB-EN-HE (Reeser) P.O. Box 1715 Baltimore, Maryland 21203-1715	1	1

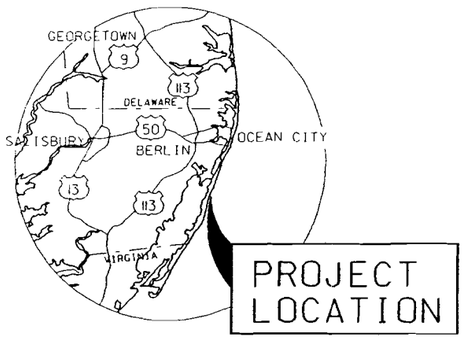
CENCR-ED	1	1
-ED-D	1	1
-ED-DN	1	1
-SO	1	1
-ED-G	1	1
-ED-H	1	1
-PD	1	1
-RE	1	1

Ordnance and Explosive Waste
Archives Search Report
for
Assateague Island
Worcester County, Maryland and Accomack County, Virginia
Project Number C03MD093001

REPORT PLATES







LEGEND

- FEDERAL / STATE HIGHWAY
- CHINCOTEAGUE WILDLIFE REFUGE
- ASSATEAGUE ISLAND NATIONAL SEASHORE BOUNDARY
- ASSATEAGUE ISLAND STATE PARK

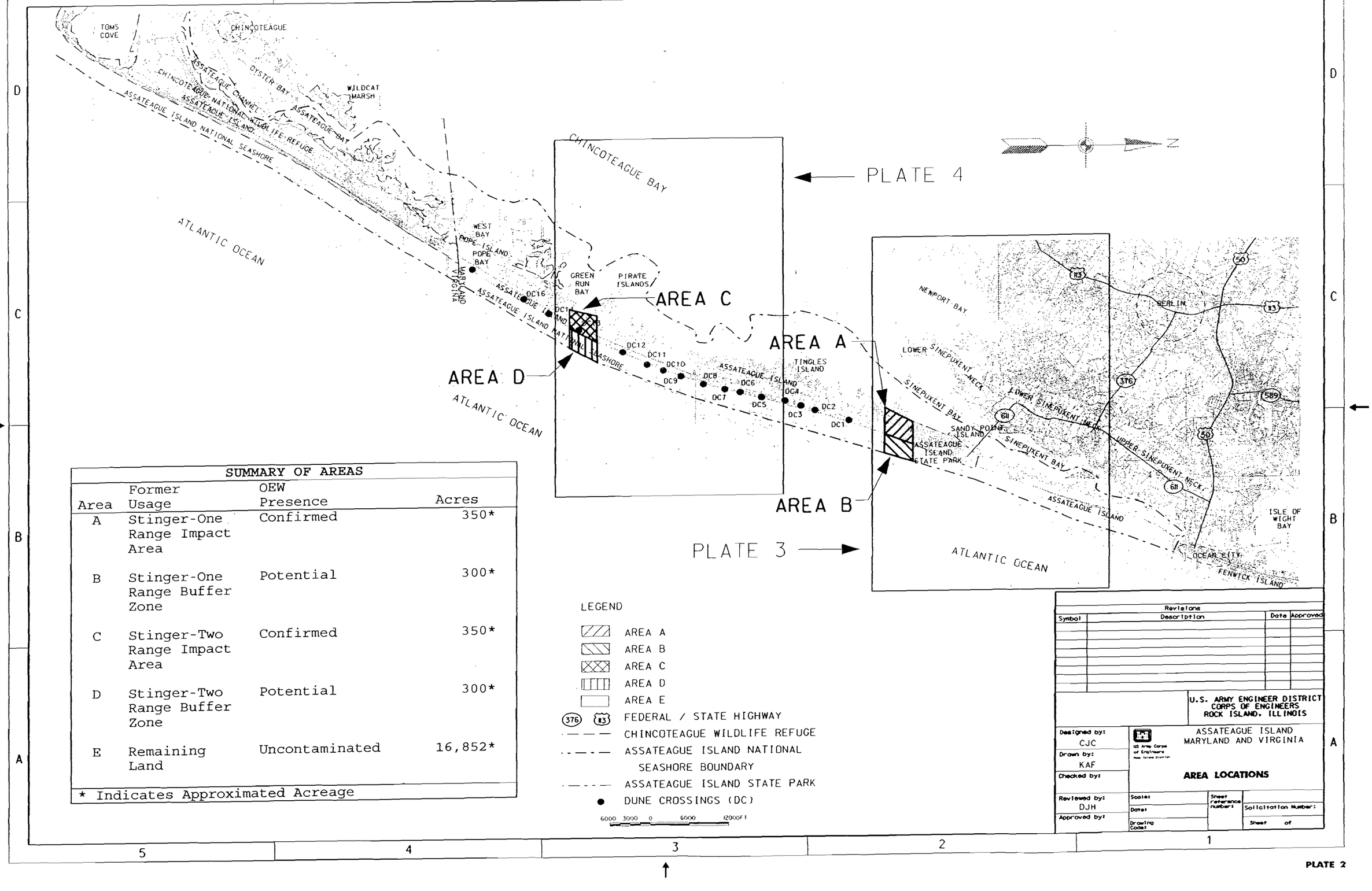
6000 3000 0 6000 12000FT

Revisions			
Symbol	Description	Date	Approved

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

Designed by: CJC	ASSATEAGUE ISLAND MARYLAND AND VIRGINIA
Drawn by: KAF	US Army Corps of Engineers
Checked by:	**SITE MAP**
Reviewed by: DJH	Scale:
Approved by:	Date:
	Drawing Code:
	Sheet reference number:
	Solicitation Number:
	Sheet of

PLATE 1



SUMMARY OF AREAS

Area	Former Usage	OEW Presence	Acres
A	Stinger-One Range Impact Area	Confirmed	350*
B	Stinger-One Range Buffer Zone	Potential	300*
C	Stinger-Two Range Impact Area	Confirmed	350*
D	Stinger-Two Range Buffer Zone	Potential	300*
E	Remaining Land	Uncontaminated	16,852*

* Indicates Approximated Acreage

LEGEND

- AREA A
- AREA B
- AREA C
- AREA D
- AREA E
- (376) (113) FEDERAL / STATE HIGHWAY
- CHINCOTEAGUE WILDLIFE REFUGE
- ASSATEAGUE ISLAND NATIONAL SEASHORE BOUNDARY
- ASSATEAGUE ISLAND STATE PARK
- DUNE CROSSINGS (DC)

6000 3000 0 6000 12000FT

Revisions			
Symbol	Description	Date	Approved

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

Designed by: CJC
Drawn by: KAF
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Reviewed by: DJH
Approved by:

US Army Corps of Engineers Rock Island District

ASSATEAGUE ISLAND
MARYLAND AND VIRGINIA

AREA LOCATIONS

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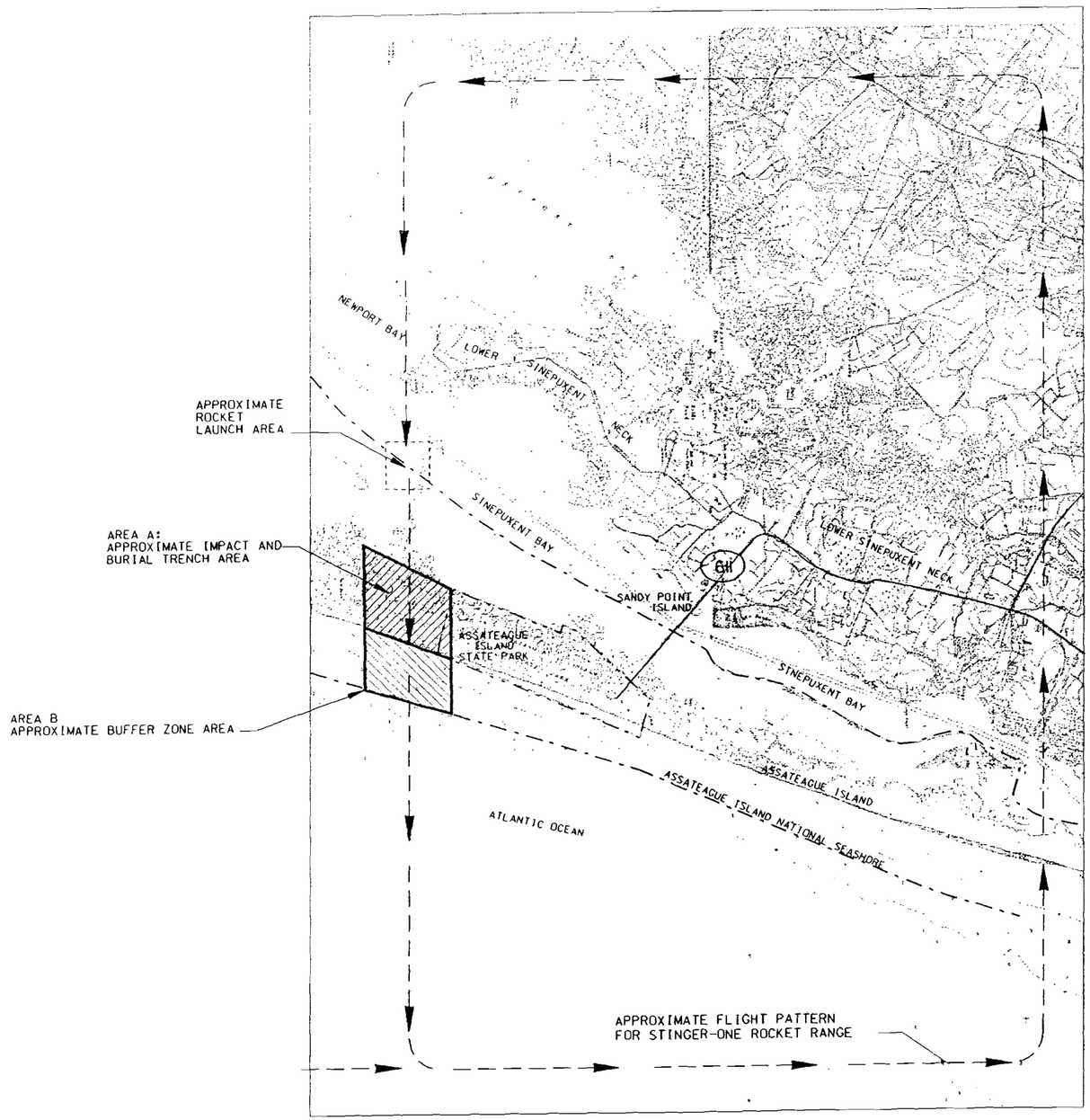
Sheet reference number:
Solicitation Number:
Sheet of

PLATE 2



N

LEGEND

- (376) (13) FEDERAL / STATE HIGHWAY
- ASSATEAGUE ISLAND NATIONAL SEASHORE BOUNDARY
- ASSATEAGUE ISLAND STATE PARK
- APPROXIMATE FLIGHT PATTERN FOR STINGER-ONE ROCKET RANGE

NOTE

INFORMATION EXTRACTED FROM DOCUMENTS F-5, L-1, L-2, L-3.

3000 1500 0 3000 6000FT

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

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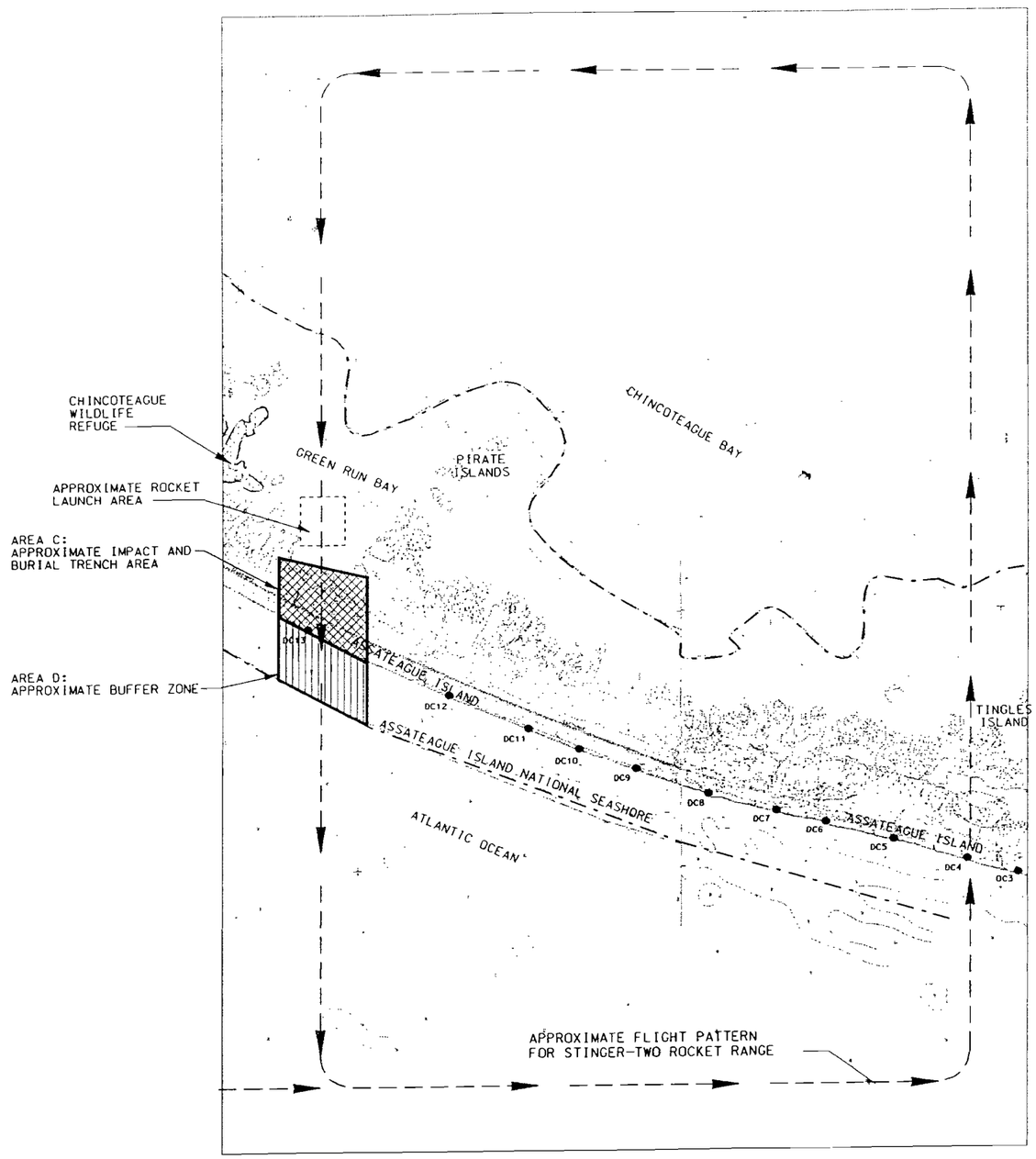
US Army Corps of Engineers Rock Island District

ASSATEAGUE ISLAND
MARYLAND AND VIRGINIA

AREA A AND AREA B
STINGER-ONE RANGE
IMPACT AREA AND BUFFER ZONE

Scale:
Date:
Drawing Code:
Sheet reference number:
Solicitation Number:
Sheet of

PLATE 3



N

LEGEND

- (376) (113) FEDERAL / STATE HIGHWAY
- ASSATEAGUE ISLAND NATIONAL SEASHORE BOUNDARY
- DUNE CROSSINGS (DC)
- APPROXIMATE FLIGHT PATTERN FOR STINGER-TWO ROCKET RANGE

NOTE

INFORMATION EXTRACTED FROM DOCUMENTS F-5, L-1, L-2, L-3.

3000 1500 0 3000 6000FT

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

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Reviewed by: DJH
Approved by:

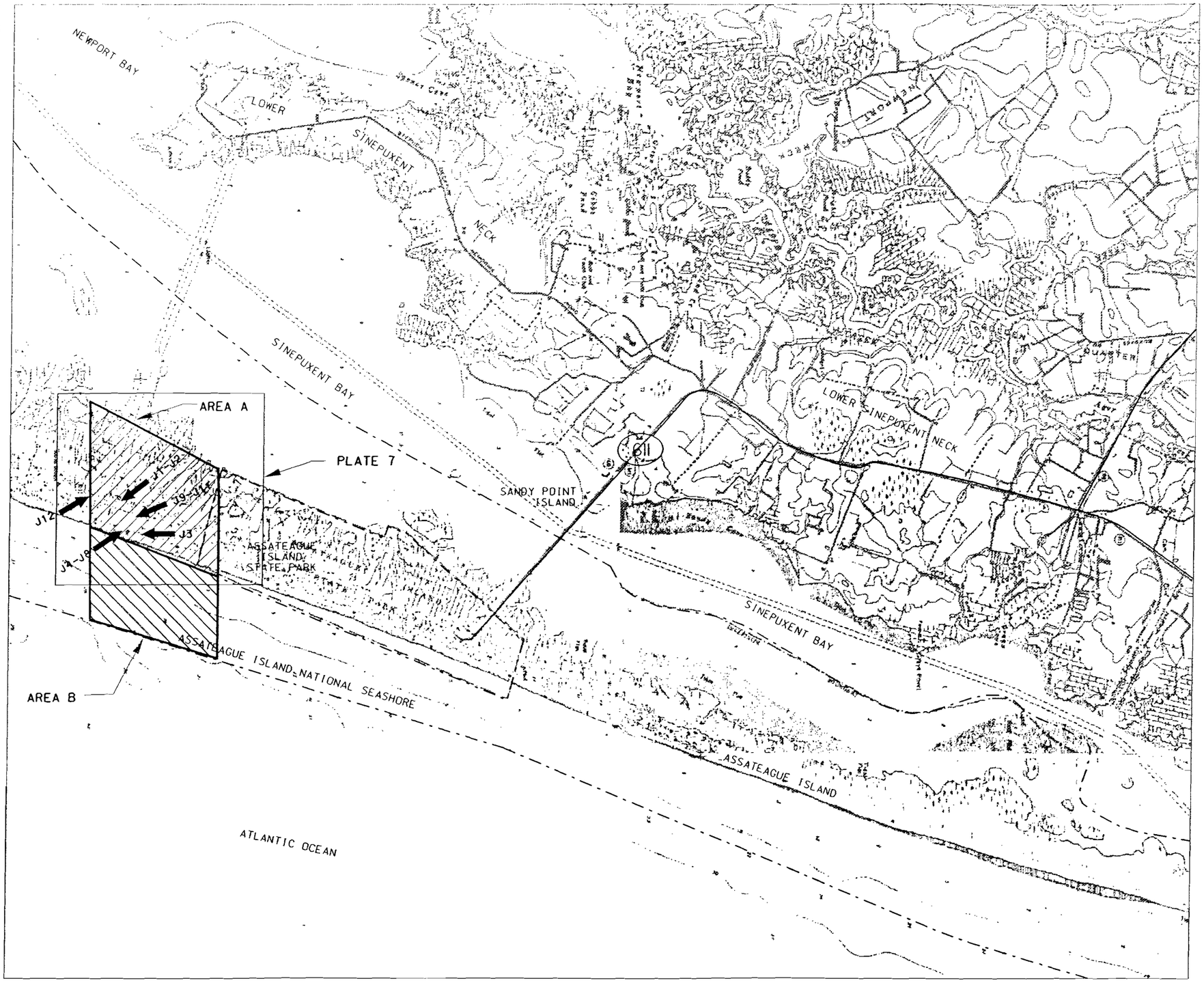
US Army Corps of Engineers Rock Island District

ASSATEAGUE ISLAND
MARYLAND AND VIRGINIA

AREA C AND AREA D
STINGER-TWO RANGE
IMPACT AREA AND BUFFER ZONE

Scales:
Dates:
Drawing Codes:
Sheet reference number:
Solicitation Number:
Sheet of

PLATE 4



LEGEND

(376) (113) FEDERAL / STATE HIGHWAY

ASSATEAGUE ISLAND NATIONAL SEASHORE BOUNDARY

ASSATEAGUE ISLAND STATE PARK

PHOTO INDICATOR

1500 750 0 1500 3000FT

Revisions			
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CORPS OF ENGINEERS
ROCK ISLAND, ILLINOIS

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Reviewed by: DJH
Approved by:

ASSATEAGUE ISLAND
MARYLAND AND VIRGINIA

AREA A AND AREA B PHOTO LOCATIONS

Scale:
Date:
Drawing Code:
Sheet reference number:
Solicitation Number:
Sheet of

PLATE 5

CHINCOTEAGUE BAY

CHINCOTEAGUE WILDLIFE REFUGE

GREEN RUN BAY

PIRATE ISLANDS

AREA C

J17-J18

PLATE 8

J20

J19

DC13

J21-J22

J15-J16

ASSATEAGUE ISLAND

DC12

DC11

DC10

DC9

J13-J14

AREA D

ASSATEAGUE ISLAND NATIONAL SEASHORE

ATLANTIC OCEAN

DC8

DC7

DC6

DC5

DC4

DC3

ASSATEAGUE ISLAND

TINGLES ISLAND

N

LEGEND

ASSATEAGUE ISLAND NATIONAL SEASHORE BOUNDARY

DUNE CROSSINGS (DC)

PHOTO INDICATOR

1500 750 0 1500 3000FT

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

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Reviewed by: DJH
Approved by:

US Army Corps of Engineers

ASSATEAGUE ISLAND
MARYLAND AND VIRGINIA

AREA C AND AREA D PHOTO LOCATIONS

Scale:
Dates:
Drawing Codes:
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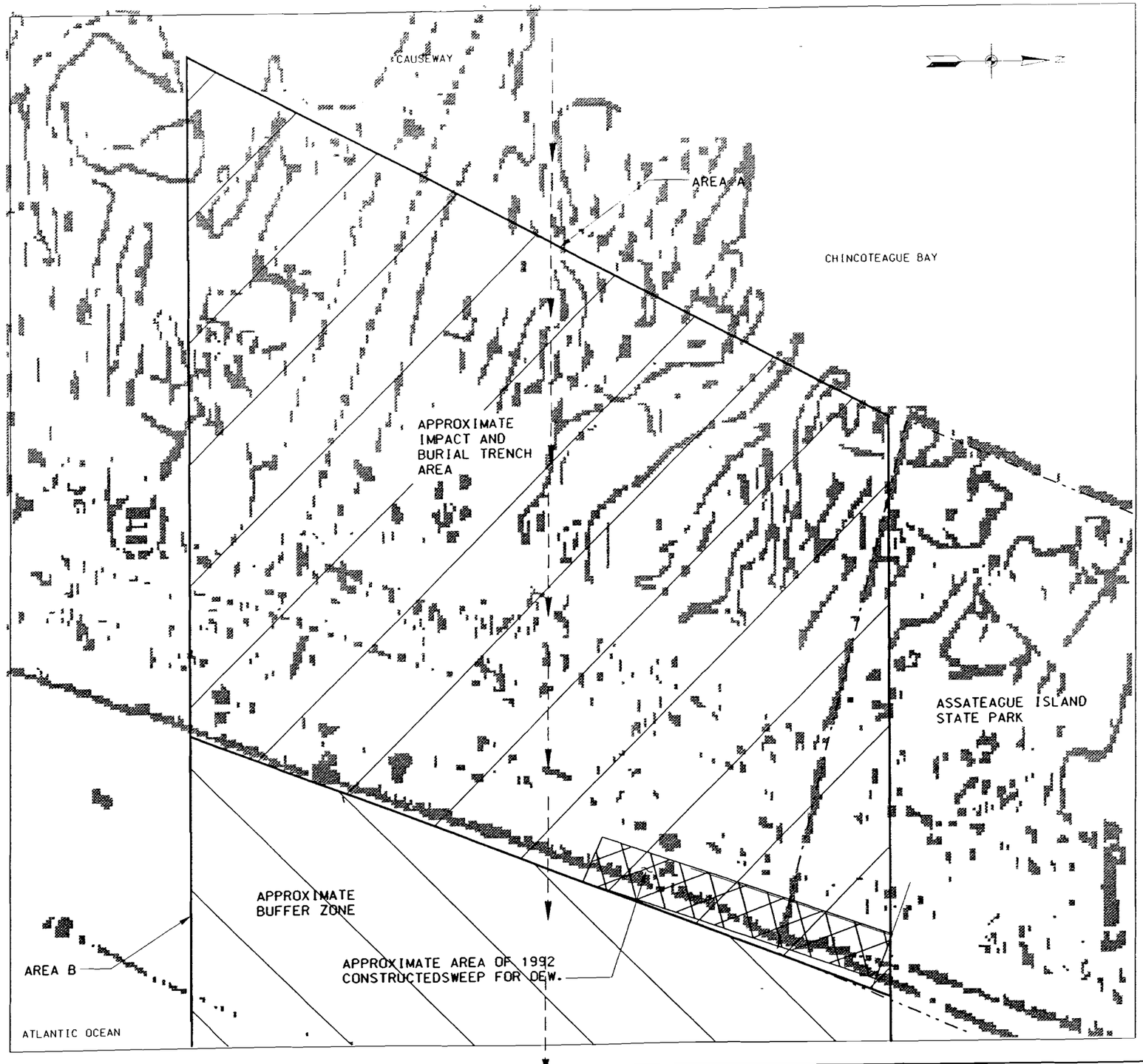
Solicitation Number:
Sheet of

PLATE 6



LEGEND

ASSATEAGUE ISLAND STATE PARK

APPROXIMATE AREA OF 1992 SWEEP

APPROXIMATE FLIGHT PATTERN
FOR STINGER-ONE ROCKET RANGE

NOTE

INFORMATION EXTRACTED
FROM DOCUMENT E-12

300 150 0 300 600FT

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CORPS OF ENGINEERS
ROCK ISLAND, ILLINOIS

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Checked by:
Reviewed by: DJH
Approved by:

US Army Corps of Engineers

ASSATEAGUE ISLAND
MARYLAND AND VIRGINIA

AREA A:
LOCATION OF 1992
SWEEP FOR OEW

Scale:
Date:
Drawing Code:
Sheet reference number:
Solicitation Number:
Sheet of

PLATE 7

AREA C

APPROXIMATE IMPACT AND BURIAL TRENCH AREA

DC 13

APPROXIMATE BUFFER ZONE

AREA D

N

LEGEND

- DUNE CROSSINGS
- ← — APPROXIMATE FLIGHT PATTERN FOR STINGER-TWO ROCKET RANGE

300 150 0 300 600FT

Revisions			
Symbol	Description	Date	Approved

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

ASSATEAGUE ISLAND
MARYLAND AND VIRGINIA

AREA C AND AREA D
STINGER-TWO RANGE
IMPACT AREA AND BUFFER ZONE

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Reviewed by: DJH			
Approved by:			

PLATE 8