



**US Army Corps
of Engineers**

HUNTSVILLE ENGINEERING
AND SUPPORT CENTER

**DEFENSE ENVIRONMENTAL RESTORATION PROGRAM
FOR
FORMERLY USED DEFENSE SITES**

**ORDNANCE AND EXPLOSIVES
CHEMICAL WARFARE MATERIALS**

ARCHIVES SEARCH REPORT

FINDINGS

PINECASTLE JEEP RANGE

**ORLANDO, FLORIDA
ORANGE COUNTY**

PROJECT No. IO4FL040501

SEPTEMBER 1997

**PREPARED BY
U.S. ARMY CORPS OF ENGINEERS
ST. LOUIS DISTRICT**

TABLE OF CONTENTS

SECTION		PAGE
1.0	INTRODUCTION	
1.1	Authority	1-1
1.2	Subject	1-1
1.3	Purpose	1-1
1.4	Scope	1-1
2.0	PREVIOUS SITE INVESTIGATIONS	
2.1	Corps of Engineers Documents	2-1
2.2	Other Reports	2-1
3.0	SITE DESCRIPTION	
3.1	Land Usage	3-1
	- location	
	- past use	
	- present use	
3.2	Climatic Data	3-1
3.3	Geology and Soils	3-2
3.4	Hydrology	3-5
3.5	Ecology	3-6
3.6	Demographics	3-7
4.0	HISTORICAL ORDNANCE USAGE	
4.1	Historical Site Summary	4-1
4.2	Review of Historical Records	4-8
4.3	Summary of Interviews	4-17
4.4	Air Photo Interpretation and Map Analysis	4-17
5.0	REAL ESTATE	
5.1	Confirmed DoD Ownership	5-1
5.2	Potential DoD Ownership	5-1
5.3	Significant Past Ownership other than DoD	5-1
5.4	Present Ownership	5-1

6.0	SITE INSPECTION	6-1
7.0	EVALUATION OF ORDNANCE PRESENCE	7-1
8.0	TECHNICAL DATA OF ORDNANCE AND EXPLOSIVES	8-1
9.0	EVALUATION OF OTHER SITE INFORMATION	9-1

REPORT PLATES

Plate M-1	Site Location - 1952 Aerial Photo
Plate M-2	Site Location - 1995 Aerial Photo
Plate M-3	Site Location - 1947 Air Photo Index
Plate M-4	Site Location - 1958 Air Photo Index
Plate M-5	Site Location - Future Land Use

APPENDICES

A	REFERENCES
B	GLOSSARY AND ACRONYMS
C	TEXT/MANUALS
D	REPORTS/STUDIES (NOT USED)
E	LETTERS/MEMORANDUMS (NOT USED)
F	REAL ESTATE DOCUMENTS
G	NEWSPAPER/JOURNALS (NOT USED)
H	INTERVIEWS (NOT USED)
I	PRESENT SITE PHOTOGRAPHS
J	HISTORICAL PHOTOGRAPHS (NOT USED)
K	HISTORICAL MAPS/DRAWINGS
L	SITE SAFETY AND HEALTH PLAN
M	REPORT DISTRIBUTION LIST

1.0 Introduction

1.1 Authority

In 1986, Congress established the Defense Environmental Restoration Program at 10 U.S.C. 2701 et.seq. This program directed the Secretary of Defense to "carry out a program of environmental restoration at facilities under the jurisdiction of the Secretary."

In March, 1990, the EPA issued a revised National Contingency Plan. Under 40 C.F.R. 300.120, EPA designated DOD to be the removal response authority for incidents involving DoD military weapons and munitions under the jurisdiction, custody and control of DoD.

Since the beginning of this program, the U.S. Army Corps of Engineers has been the agency responsible for environmental restoration at Formerly-Used Defense Sites (FUDS). Since 1990, the U.S. Army Engineering and Support Center, Huntsville, has been the Mandatory Center of Expertise and Design Center for Ordnance and Explosives.

1.2 Subject

The site, known as the **Pinecastle Jeep Range**, is located approximately 3 miles east-northeast of Orlando International Airport in Orange County, Florida.

1.3 Purpose

This Archives Search Report (ASR) compiles information obtained through historical research at various archives and records holding facilities, interviews with individuals associated with the site or its operations, and personal visits to the site. All efforts were directed towards determining possible use or disposal of ordnance or chemical warfare materials on the site. Particular emphasis was placed on establishing the types, quantities, and areas of disposal. Information obtained during this process was used in developing recommendations for further actions at the site.

1.4 Scope

The entire area of the former **Pinecastle Jeep Range**, approximately 12,483 acres, was considered in assessing the potential for ordnance and explosives or chemical warfare material contamination.

2.0 Previous Investigations

2.1 Corps of Engineers Documents

An Inventory Project Report (INPR) was completed on 14 July 1994, by the U.S. Army Corps of Engineers, Jacksonville District, to establish this site as a Formerly Used Defense Site (FUDS) under the Defense Environmental Restoration Program (DERP). A copy of the INPR is included in Appendix D.

2.2 Other Reports

No other engineering or environmental study reports were found for this site.

3.0 Site Description

3.1 Land Usage

3.1.1 Location

The former **Pinecastle Jeep Range** is located approximately 3 miles east-northeast of Orlando International Airport in Sections 8, 10, 11 and 14 through 35 in Township 23 South, Range 31 East and Sections 2 and 3 in Township 24 South, Range 31 East in Orange County, Florida. The site location and vicinity are shown on Figure 3-1.

3.1.2 Past Use

The range site, an offpost of Pinecastle Air Field, was developed as Pinecastle Jeep Range. The Army Air Force Air Command utilized the site as a jeep training target range until 1946. The mobile target training sub-field was used primarily by pilot and gunnery trainers. The facility contained a ground-to-ground moving target, jeep track, turret range for machine guns, and rifle target ranges. The facility was reported as surplus by the Army Air Force on 2 December 1946. The lease on the 12,483 acres was terminated by the War Department on 5 December 1947, but copies of the disposal documents are not available.

3.1.3 Present Use

Currently, the site is owned by several local government agencies and private individuals, and is utilized for various purposes, including residential, highway/expressway, landfill and undeveloped pasture land. Plate M-5, with details obtained from Orange County, is a map indicating the planned future uses for the site.

3.2 Climatic Data

The study area is located in the center section of the Florida peninsula surrounded by many lakes. The temperatures are modified greatly by winds that sweep across the peninsula from the Atlantic Ocean and the Gulf of Mexico. The climate of the area is subtropical, characterized by long, warm and relative humid summers and mild and relatively dry winters. The maritime influence that modifies the heat of summer and the cold of winter. The summertime temperatures are seldom above

95° F and cold spells accompanied by cold winds can be expected infrequently. The rainy season extends from June through September. Tropical disturbance or hurricanes are not considered a great threat in this area.

The climatic data collected for the Orlando (1962-1991) are summarized in Table 3-1.

**TABLE 3-1
CLIMATOLOGICAL DATA FOR ORLANDO, FL**

Month	Temperature (F)			Precipitation	Wind Velocity	Wind Direction
	Average Daily		Average Monthly			
	Min	Max	Mean	Average (Inches)	(mph)	
January	49.4	71.5	60.5	2.19	8.9	NNE
February	50.9	73.4	62.2	2.79	9.6	S
March	55.6	78.1	66.8	3.47	9.9	S
April	60.2	83.2	72.0	2.50	9.3	SE
May	66.4	88.2	77.3	3.47	8.8	SE
June	71.4	91.0	81.2	7.00	8.0	SW
July	73.0	91.7	82.3	7.97	7.4	S
August	73.5	91.6	82.6	6.66	7.2	S
September	72.4	89.6	81.0	6.76	7.7	ENE
October	65.6	84.1	74.8	3.30	8.6	N
November	57.2	77.8	67.5	1.89	8.6	N
December	51.3	72.8	62.1	1.95	8.6	NNE
Annual	62.3	82.8	72.6	49.88	8.5	S

3.3 Geology and Soils

3.3.1 Geology

The site area is located in the central Floridian Section of the Coastal Plain physiographic province. This peninsular area of Florida has been divided into three physiographic zones: the Southern or Distal Zone, the Central or Mid-peninsular Zone, and the Northern or Proximal Zone. The site area falls entirely within the Central or Mid-peninsular Zone, which is characterized by a series of ridges and valleys that parallel both the Atlantic coastline and the longitudinal axis of the peninsula (Doolittle and Schellentrager 1989).

The dominant influence on sedimentation in the study area has been the Peninsular arch, a northwest-trending feature that was continuously positive from early Mesozoic (Jurassic) until Late Cretaceous time and was intermittently positive during Cenozoic time. Southwest of, and parallel to, the Peninsular arch is the Ocala Uplift, which affects only rocks of middle Eocene age and younger. It is a gentle anticlinal flexure about 230 miles long and 70 miles wide exposed near the surface in west-central Florida (Miller 1986).

The west-central peninsula of Florida consists of igneous and metamorphic basement rocks overlain by 4,000 feet of sedimentary rocks, principally limestones. These geologic units, and descriptions of their general lithology are summarized in **Table 3.3-1**.

TABLE 3.3-1 GEOLOGIC STRATIGRAPHIC UNITS OF THE ORLANDO AREA		
AGE	STRATIGRAPHIC UNIT	LITHOLOGY
Post Miocene (includes Pliocene, Pleistocene and Holocene Series)	Surficial Aquifer	marginal to shallow marine beds overlain by sandy marine terraces, capped by fluvial and/or residuum
Late and Middle Miocene	Undifferentiated sand and clay and the Hawthorn Formation	highly variable sequence consisting mostly of clay, silt and sand beds
Early Miocene	absent	
Oligocene	absent	
Late Eocene	Ocala Limestone	wht to cream, soft, friable, porous coquina
Early and Middle Eocene	Avon Park Formation (includes the Lake City Limestone)	predominantly brn ls and do of various textures
	Oldsmar Formation	finely pelletal ls interbedded with fine-med crystalline do
Paleocene	Upper Cedar Keys Formation	coarsely crystalline do, mod to highly porous
From: Miller 1986		

3.3.2 Soils

The parent material of the site soils consisted of beds of sandy and clayey materials that were transported by the sea, which often covered the area during the Pleistocene Epoch. During the high stands of the sea, Miocene and Pliocene sediments were eroded and redeposited or were reworked on the shallow sea bottom to form terraces.

The site soils are nearly level to gently sloping, very poorly drained to moderately well drained in the urban areas. Soils sandy are predominant throughout. Some have organic stained subsoil at a depth of 30-50". Majority of site is underlain by soils which typically have a surface layer of fine, black sand, 4" thick, the subsurface to 17" is gray fine sand. Upper subsoil to a depth of 22" is black, fine sand, lower subsoil to 27" is dark brown fine sand.

There is a severe wind erosion hazard. The soil is highly corrosive to uncoated steel (Doolittle and Schellentrager 1989). A detailed soil profile of the near-surface site soils is shown in **Table 3.3-2**.

TABLE 3.3-2						
NEAR-SURFACE SOIL PROFILE						
DEPTH (FT)	SOIL DESCRIPTION	PERCENTAGE PASSING SIEVE NUMBER			PERMEABILITY (IN/HR)	PLASTICITY INDEX
		#4	#40	#20 0		
0-17"	Fine SAND, SP, SP-SM	100	80- 100	2-12	6.0-20.0	NP
17-27"	SAND, Fine SAND, SM, SP- SM	100	80- 100	5-20	0.6-6.0	NP
27-80"	SAND, Fine SAND SP, SP-SM	100	80- 100	2-10	6.0-20.0	NP

SOURCE: SCS SOIL SURVEY OF ORANGE COUNTY, FL.

3.4 Hydrology

Pinecastle Jeep Range is located near the City of Orlando, Orange County, Florida. The Little Econlockhatchee River flows from south to north through the west part of the study area and the Econlockhatchee River flows from south to north along the east boundary. The Little Econlockhatchee River, a tributary of the Econlockhatchee River drains about two third of the site's surface runoff and the balance drains toward the Econlockhatchee River. There are two stream gages on the Econlockhatchee River close to the study area. One is located at Magnolia Ranch near Bithlo, FL, about nine miles upstream from the site and the other is located near Chuluota, FL, about twelve miles downstream from the site. The record (1973-1993) for the gage near Bithlo shows a drainage area of 32.9 square miles, an average discharge of 23.9 fps, a maximum peak flow of 474 cfs on June 21 1982 and a maximum stage of 63.42 FT-NGVD on March 31 1987. The record (1936-1993) near Chuluota shows a drainage area of 241.0 square miles, an average discharge of 264 cfs and a maximum peak flow of 11,000 cfs with a maximum stage of 18.69 FT-NGVD on March 18 1960.

3.4.1 Ground Water

The surficial aquifer, or water table aquifer, is found where poorly consolidated or unconsolidated clastic rocks overlie the limestones and dolomites of the Floridan aquifer. The thickness of the shallow aquifer is highly variable due to large variations in the thickness of sands. The shallow aquifer may directly overlie the Floridan aquifer, or they may be separated by confining beds (Miller 1986). Recharge to the water-table aquifer is almost entirely from local rainfall, except in those areas where it is hydraulically connected to the Floridan aquifer. Discharge from the shallow aquifer may be by downward percolation into the Floridan Aquifer, seepage into streams, lakes, sinkholes, and pumpage from wells. The shallow aquifer is mainly used for small domestic supplies.

The Floridan aquifer is the principal aquifer supplying most of the water used in the region. In the study area it is represented by limestones and dolomites of the Upper Floridan aquifer which includes the Upper Cedar Keys Formation, Oldsmar Formation, Lake City Limestone, Avon Park Formation, Ocala Group limestones. Water well FLA-OR-11, located near the site, indicates the Upper Floridan aquifer is about 340 feet thick.

The top of the Floridan aquifer is defined as the first consistent limestone below

which no clay confining beds occur. The configuration of the top of the aquifer is highly variable due to erosion and dissolution in the limestones that form its upper surface. The elevation of the top of the aquifer ranges from slightly below sea level to more than 100 feet above sea level. Subsurface information from water well FLA-OR-11 indicates that the top of the Floridan Aquifer at the site is about elevation -48 feet (MSL). The regional direction of ground-water movement in the Floridan Aquifer is from east to west. Recharge of the Floridan aquifer occurs from the overlying water-table aquifer in areas where it is in direct contact with the Floridan or through leaky confining beds between the Floridan and the water-table aquifer. Recharge can occur where the limestone is exposed at the surface or overlain by a thin veneer of sand, and where there are lakes, sinks and rivers as in this location (Miller 1986).

3.5 Ecology

The information on the endangered and threatened species for this site has been provided by the U.S. Fish and Wildlife Service (USFWS), the Florida Game and Fresh Water Fish Commission, and the Florida Natural Areas Inventory (FNAI).

The Federally listed species known to occur in Orange County include: eastern indigo snake (*Drymarchon corais couperi*), threatened; gopher tortoise (*Gopherus polyphemus*), candidate; sand skink (*Neoseps reynoldsi*), threatened; Florida pine snake (*Pituophis melanoleucus mugitus*), candidate; Florida crawfish (gopher) frog (*Rana areolata aesopus*), candidate; Florida scrub lizard (*Sceloporus woodi*), candidate; short-tailed snake (*Stilosoma extenuatum*), candidate; Florida scrub jay (*Aphelocoma coerulescens coerulescens*), threatened; Bachman's sparrow (*Aimophila aestivalis*), candidate; Southeastern American kestrel (*Falco sparverius paulus*), candidate; bald eagle (*Haliaeetus leucocephalus*), threatened; black rail (*Laterallus jamaicensis*), candidate; wood stork (*Mycteria americana*), endangered; red-cockaded woodpecker (*Picoides borealis*), endangered; Audubon's crested caracara (*Polyborus plancus audubonii*), threatened; Everglade snail kite (*Rostrhamus sociabilis plumbeus*), endangered; round-tailed muskrat (*Neofiber alleni*), candidate; Rafinesque's big-eared bat (*Plecotus rafinesquii*), candidate; Florida mouse (*Podomys floridanus*), candidate; Sherman's fox squirrel (*Sciurus niger shermani*), candidate; Florida black bear (*Ursus americanus floridanus*), candidate; eastern beard grass moth (*Atrytone arogos arogos*), candidate; Palm Springs cave crayfish (*Procambarus acherontis*), candidate; scrub palmetto flower scarab beetle (*Trigonopelastes floridana*), candidate; Florida bonamia (*Bonamia grandiflora*), threatened; Ashe's savory (*Calamintha ashei*), candidate; piedmont jointgrass (*Coelorachis tuberculescens coerulescens*), candidate; large-flowered rosemary (*Conradina grandiflora*), candidate; beautiful pawpaw (*Deeringothamnus*

pulchellus), endangered; scrub wild buckwheat (Eriogonum floridanum), threatened; scrub lupine (Lupinus aridorum), endangered; Florida spiny-pod (Matelea floridana), candidate; fall-flowering ixia (Nemastylis floridana), candidate; Britton's bear-grass (Nolina brittoniana), endangered; Florida bear-grass (Nolina atopcarpa), candidate; yellow fringeless orchid (Platanthera integrilabia), candidate; papery whitlow-wort (Paronychia chartacea = Nyachia pulvinata), threatened; sandlace (Polygonella myriophylla), endangered; Florida willow (Salix floridana), candidate; and Tampa vervain (Verbena tampensis), candidate.

The Florida Game and Fresh Water Fish Commission and the FNAI reported that the following state-listed species are known to occur in the vicinity of the Pinecastle Jeep Range: eastern indigo snake, threatened; Florida scrub jay, threatened; least tern (Sterna antillarum), endangered; Florida mouse (Podomys floridanus), special concern; scrub holly (Ilex opaca var. arenucola), commercially exploited; and Florida bear-grass, endangered.

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

3.6 Demographics

3.6.1 Center of Activity

The Pinecastle Jeep Range is located near the City of Orlando, Orange County, Florida.

3.6.2 Population Density

CITY/COUNTY	CITY: ORLANDO	COUNTY: ORANGE
AREA (sq. mi.)	60.4 sq.mi	910
POPULATION	128,291	575,200
DENSITY	2,124 persons/sq.mi	632

3.6.3 Types of Businesses and Industry

The number of business establishments in Orange County can be broken down by type as follows: manufacturing 4.2%; agriculture 1.97%; trade 31.4%; services and financial 47.9%; and other 14.53%. Of the people in the county employed by businesses, approximately 0.05% are unclassified. Prominent employers in the County are trade and financial businesses at about 26.6%, services at 45.3%, and manufacturing at 9.5%. Foregoing percentages are at mid-March 1992.

3.6.4 Types of Housing

Housing in is composed of both single family and multi-family dwellings. The median value of 65,703 specified owner-occupied housing units in Orlando is \$74,300.

3.6.5 New Development in the Area

New Development in the Orlando area includes Universal Studios, a new Disney theme park, construction of a new courthouse, and a new mall on the western end of town.

3.6.6 Typical Cross Sections of the Population:

The part of the population under the age of 18 is 20.9%, and the part over the age of 65 is 11.4%. The median age is 30.2.

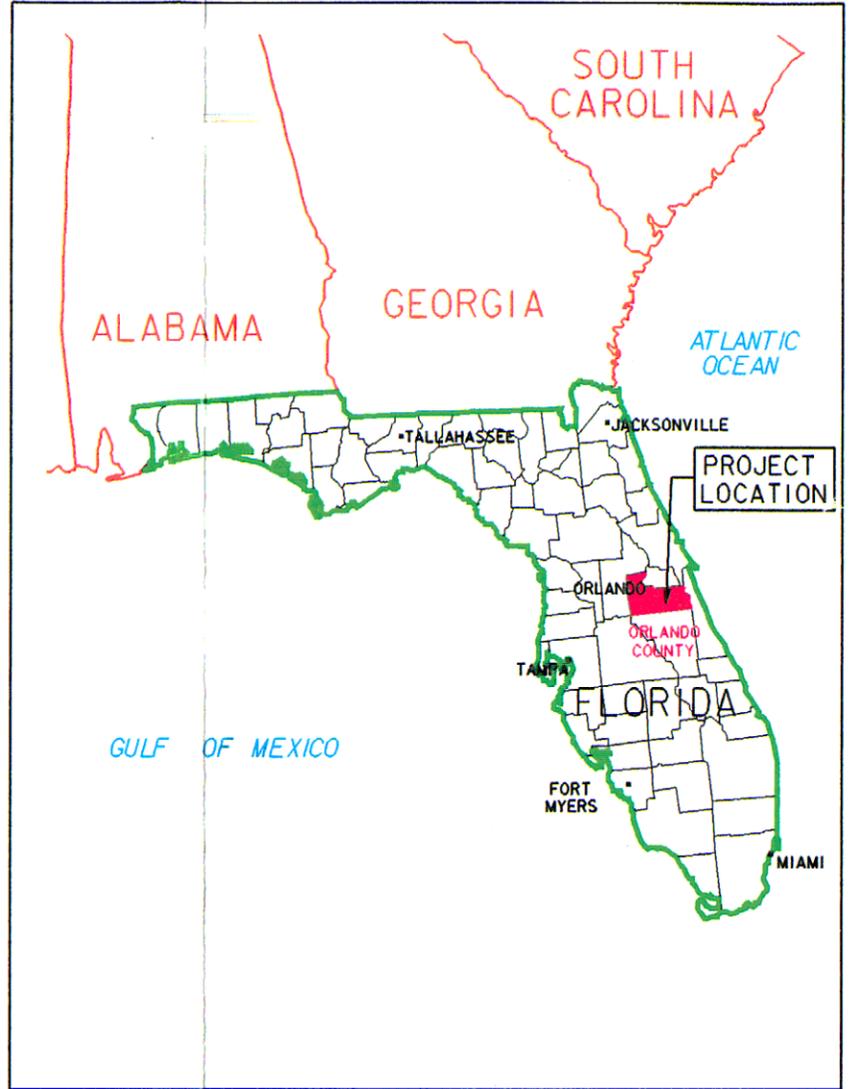
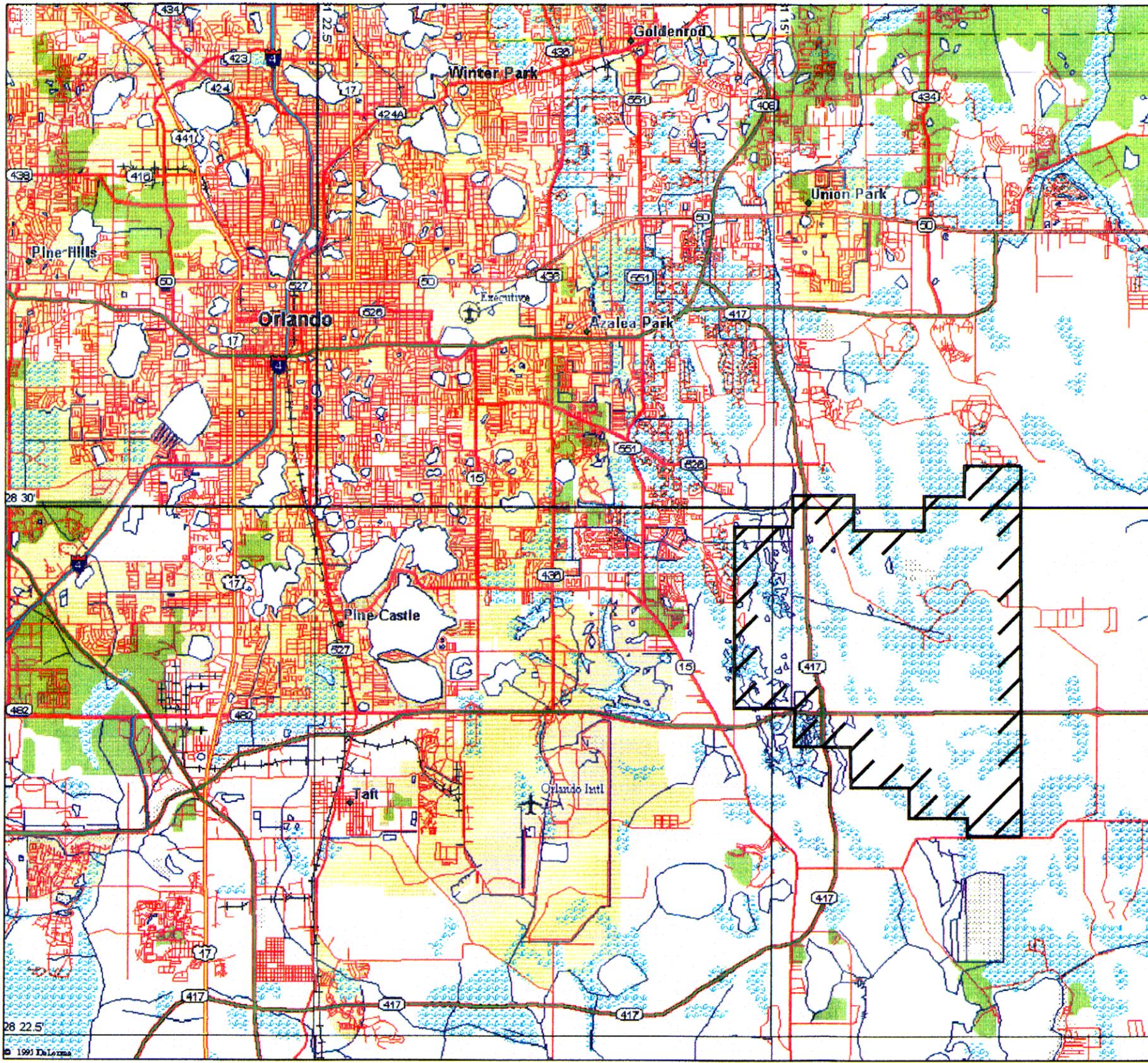
3.6.7 Information Sources

U.S. Census report as listed below:

- 1990 Census of Population and Housing, Orange County, Florida
- 1990 Census of Population and Housing Orlando, Florida
- 1988 County and City Data Book, Land Area and Population, Orange County, Florida
- 1988 County and City Data Book, Land Area and Population, Orlando, Florida
- 1991 County Business Patterns, Orange County, Florida

Telephone interviews:

- Orlando Development Office (02/07/96).
- Orlando Chamber of Commerce (02/07/96).



 RESERVATION BOUNDARY



NOT TO SCALE

FIGURE I-1
PINECASTLE JEEP RANGE
ORLANDO, FLORIDA
ORANGE, COUNTY
DERP-FUDS# 104FL040501
VICINITY MAP

4.0 Historical Ordnance Usage

4.1 Historical Site Summary

4.1.1 Dates of Operation

During 1943, the U.S. Government leased 12,483 acres of land in Orange County, Florida, for use as the Pinecastle Jeep Range. The range was located in Township 23 South, Range 31 East, Sections 8, 10, 11, and 14 through 34 and in Township 24 South, Range 31 East, Sections 2 and 3. The site was also known as the Tactical Demonstration Range, the Orlando Range, Pinecastle Range, Pinecastle Bombing Range and the Pinecastle Chemical Demonstration Range. The range was an off-post site of Pinecastle Army Air Field (AAF). Pinecastle AAF used the range as a gunnery and demonstration range. The Army Air Forces Tactical Center at Orlando Army Air Base (AAB), used the site for testing and troop instruction in methods of tactical bombing and strafing.

In July 1945 a General Order changed the name of the 903d AAF Base Unit (PAAF) to the 621st AAF Base Unit. After this reorganization Demonstration Air Force and project works remained at Pinecastle Army Air Field and most Radar Projects were sent to Eglin Field (Historical Data 1945, # 17).

The Army Air Forces reported the Pinecastle Jeep Range surplus to its needs on 2 December 1946 and by 5 December 1947, the War Department terminated the lease on the 12,483 acre range (U.S. Army Corps of Engineers 1994). Currently, local government agencies and private individuals own the former site and use it for various purposes.

4.1.2 Use of Chemical Warfare Materials

4.1.2.1 Demonstration Section

The Orlando AAB Demonstration Section conducted chemical and ordnance demonstrations at the former Pinecastle Jeep Range for students stationed at Orlando AAB. The Demonstrations encompassed all phases of chemical attack and defense as well as usage of ordnance related equipment. The demonstrations provided the visual illustration of equipment and tactics taught in the classroom. The students observed the demonstrations from a protected ground shelter at the Pinecastle Range (Headquarters Orlando AAB 1945).

4.1.2.2 Demonstration Regulations

The 3-12 Demonstration was a two hour demonstration of chemical warfare weapons, agents, and defense against chemical attack (Headquarters 902nd AAF Base Unit 1945 #10).

A 3-13 Demonstration consisted of three phases.

Phase One - Coordinated attack against a simulated enemy airstrip and aircraft on the ground.

Two P-51 aircraft with chemical spray fans will attack the student convoy while it is enroute to Pinecastle viewing stands. Attack to be made after convoy turns off highway and is on range.

Chemical Load: Water in four M10 tanks

Twelve fighter aircraft will strafe the aircraft on airstrip by 2-plane elements in line abreast with elements in line astern at safe intervals.

Gun Load: All .50 caliber guns, 75 rounds per gun, 1 ball, 1 tracer.

Two A-26 aircraft to fire rockets and strafe in line at safe interval.

Rocket Load: 12 each 5 Inch HVAR.

Gun Load: All .50 caliber guns, 75 rounds per gun, 1 ball, 1 tracer

Four A-26 aircraft will strafe in 2-plane elements.

Gun Load: Six guns per aircraft 75 rounds per gun, 1 ball, 1 tracer.

Bomb Load: Ten 100 pound Cluster Bomb Practice M48 Para M72 and M73 with fuze M104 per aircraft.

Six heavy bomb aircraft will bomb the airstrip.

Bomb Load: Sixteen 100 pound practice bombs with spotting charges, four 60 pound AC British Training Bombs. (Last flight also carried two 100 pound Sky Marker Bombs T-8).

Two B-29 aircraft will bomb the simulated enemy airstrip.

Bomb Load: Ten Bomb Incendiary 500 pound, M76 with Fuze Bomb Nose, VIT., T-51E1 with Fuze Bomb Tail AN-M101A2 (non-delay).

Phase Two - Attack against lines of supply and signal communications.

Eight P-47 aircraft in 2-plane elements with elements in line astern at safe interval will strafe the truck column.

Gun Load: Eight guns per aircraft, 75 rounds per gun, 1 ball, 1 tracer

Four A-26 aircraft in trail in safe interval will make a low altitude attack against the dummy ship.

Bomb Load: Six 100 pound practice bombs with spotting charges per aircraft.

Four A-26 aircraft in trail at safe interval will bomb the dummy railroad warehouse.

Bomb Load (first two): Four 100 pound INERT G.P. Bombs with anti-ricochet device M-16 consisting of one Para Unit M-7, one fuze adapter assembly M-202 and one arming wire assembly per aircraft.

Bomb Load (second two): Two 500 pound Incendiary Clusters M-7 per aircraft.

Eight P-47 aircraft that are now orbiting Pinecastle Army Air Field, will be called by the controller to glide bomb the simulated enemy truck column.

Tactical Aircraft will lead them over the target.

Bomb Load: Two Practice Bombs, 100 pound M38A2, with spotting charge per aircraft.

Phase Three: Attack against ground objective in direct support of ground troops in seizing simulated enemy airstrip.

Eight fighter aircraft will attack a tank concentration with rockets in range of less than 600 yards.

Rocket Load: Six rockets 5 inch HVAR per aircraft.

Two A-26 aircraft will attack the tank concentration with rockets.

Rocket Load: One rocket, Aircraft 11.75: with INERT head per aircraft. Twelve Rocket, Aircraft, 5 inch HVAR per aircraft.

Six A-26 aircraft will bomb dummy personnel which will be marked by smoke mortar shells. Dummy personnel are in fringe of woods.

Bomb Load: Ten Cluster Frag Bomb 100 pound M2A1 (Stabilized) per aircraft.

Eight fighter aircraft will dive bomb the tank concentration marked by smoke mortar shells.

Bomb Load: Two Bomb Practice, 100 pound Mc8A2 with spotting charge.

Two P-47 aircraft will bomb the heavy gun battery position in line astern at safe interval with 165 gallon belly tanks (Fire Bomb).

Six heavy bomber aircraft will bomb the troop concentration represented by dummy personnel.

Bomb Load: Sixteen 100 pound bombs with spotting charge per aircraft, four 60 pound British Training Bombs per aircraft. (621st AAF Base Unit 1946, #18).

4.1.2.3 Demonstration Activities

November 1944: Squadron H of the 903rd AAF Base Unit conducted chemical demonstrations on the 3rd, 17th and 22nd for the chemical warfare section AAFSAT (Historical Data AQF Tactical Center 1944, #1).

December 1944, the 901st AAF Base Unit supplied ground-to-air communications for pilots using the Pinecastle Bombing Range. These tests included bombing, strafing, chemical, and ordnance demonstrations (Historical Data 901st AAF Base Unit 1945a, #5).

January 1945: AAF Board Project F-4095 was conducted at Pinecastle Bombing Range on 3 and 4 January. This project was a test of improved equipment and technique for dissemination of DDT by airplanes. On 5 January Squadron B Project Team was at Pinecastle Bombing Range to furnish ground-to-air communications on Chemical and Ordnance Demonstrations (Historical Data 901st AAF Base Unit 1945b, #14).

January 1945: The personnel of the Armament Section of Squadron E was instructed in the use of rocket material including airborne rockets and 2.25" practice rounds with special adaptor rails which they would be using in the near future. A report was turned in to the Supply Branch, AFTAC, on the use of M48 Practice Fragmentation bombs in M2A1 clusters. These bombs are equipped with standard fragmentation on parachutes and used as practice para frags rather than as practice stabilized frags. Spotting charges were used and functioned

satisfactorily except when bombs equipped with M104 fuses were dropped from too low altitudes (Historical Data 901st AAF Base Unit 1945b). (This document was included in the Orlando AAB unit histories but did not specifically mention the Pinecastle Jeep Range area.)

February 1945: Two A-26's and one P-59, two P-38's, and two P-51's were used in a 3-11, Strafing of Convoy Demonstrations, for the AAA Staff Officers at Pinecastle. An A-26 flew a Chemical Spray Mission for the AFTAC CWS and two 3-10 Ordnance and two 3-12 Chemical Demonstrations were given during this month (Historical Data 1945, #15).

March 1945: The Operations and Training Branch handled all demonstrations including ordnance and chemical demonstrations. On 23 March, this section conducted a special demonstration using two E-46 (Napalm) aimable clusters, one E-48 P.T. aimable cluster, and three 500-lb M-76 (P.T. filled) incendiary bombs. During this month several projects were assigned to this command including a spray mission at Bushnell and a DDT mission. (Historical Data Orlando AAB 1945a, #2). Also during this month, two Spray Missions were run, using two A-26's for the Chemical Warfare Service Officers of AFTAC. One 3-10 Demonstration was run, using six P-47's and four A-26's, in conjunction with a 3-12 Chemical Warfare Demonstration which used two P-51's, three A-26's, and one B-24. (AAF Tactical Center 1945). (This document was included in the Orlando AAB unit histories but did not specifically mention the Pinecastle Jeep Range area.)

March 1945: According to a unit history, on 2 March Squadron G performed two spray missions (3-10 and 3-12 chemical warfare demonstrations) for chemical warfare officers. On 1, 3, 6, and 7 March aircraft used the Pinecastle Chemical Range for DDT projects (AAF Tactical Center 1945, #16).

The Squadron Communication Section furnished ground to air communication at the Pinecastle Demonstration Range for AAF Board Project F-4095 on 14 March 1945. Throughout March 1945, the communication section provided ground-to-air communication support for the Pinecastle Chemical Demonstration Range (AAF Tactical Center 1945, #16).

April 1945: The Chemical Section of the 902nd AAF Base Unit completed the third in a series of spray missions for the AAF Board. By 1 May the AAF Board set up tests to experiment with M-17 aimable cluster burst fuzes. The Demonstration Section conducted chemical and ordnance demonstrations on 6 April 1945, and a

tactical Air Forced Demonstration on 19 April. (Historical Data Orlando AAB 1945b, #3).

May 1945: Tanks to be utilized as targets for the 3-13 Demonstration were transferred to the Orlando Range and elevated on mounds to be more easily seen by spectators, this range is located S-SE of Orlando and is referred to as the Pinecastle Range. On 19 May Demonstrations 3-10, 3-12, and the first phase of the 3-13 were conducted. (Historical Data 1945, #10).

June 1945: During a Tactical Air Force Demonstration, pilots planned to use MR (molasses residuum) in offensive chemical training but mechanical difficulties thwarted the mission (Headquarters 902nd AAF Base Unit 1945, #11).

August 1945, the Tactical Air Force held a demonstration at Pinecastle Demonstration Range. This range was also made available for practice bombing for the 3-12 and 3-13 demonstrations (Historical Data 621st AAF Base Unit 1945, #7).

September 1945: On 20 September, the 621st AAF Base Unit performed a 3-13 demonstration at Pinecastle Range (Pinecastle AAF 1945, #19).

October 1945: This month Squadron E from the 621st Base Unit at Pinecastle AAF conducted a 3-13 demonstration at the Pinecastle Range. (Pinecastle AAF 1945, #6).

4.1.3 Use of Conventional Munitions

4.1.3.1 Buildings

Headquarters Army Air Forces Tactical Center, Orlando, Florida, requested authorization of funds to construct a bomb-proof shelter for observation at the Tactical Demonstration Range at Pinecastle, Florida. According to the request letter, the Tactical Center would use the range for demonstrating and instructing students in current methods of tactical bombing and strafing (Headquarters AAFTAC 1944, #13).

4.1.3.2 Tactical Air Force Demonstrations

On 13 December 1944, the 901st AAF Base Unit supplied ground-to-air communications for pilots using the Pinecastle Bombing Range. These tests included bombing, strafing, chemical, and ordnance demonstrations (Historical

Data 901st AAF Base Unit 1945a, #5).

On 23 August 1945, the Tactical Air Force held a demonstration at Pinecastle Demonstration Range. This range was also made available for practice bombing for the 3-12 and 3-13 types of demonstrations (Historical Data 621st AAF Base Unit 1945, #7).

4.1.3.3 Ranges

On 25 November 1944, field grade officers fired .45 caliber pistols on the qualification course at the Pinecastle Range (Historical Data 902nd AAF Base Unit 1944, #4).

On 16 March 1948, the Fourteenth Air Force recommended the surplused area known as the Pinecastle Army Air Field Turret and Rifle Range be turned over to them for use as a 1,000 inch range. During June and July 1948, an Air ROTC summer camp with approximately 600 students needed a range for .45 caliber pistol and .30 caliber carbine training (Headquarters Fourteenth Air Force 1948, #9).

The research team did not find any documentation detailing the use of this range after its original disposal.

4.1.4 Other Hazards

During 1945 the Army Air Forces Tactical Center located at Orlando, Florida, performed tests at the Chemical Warfare Demonstration Range. These tests consisted of spraying D.D.T. from 500 pound British S.C.I. (Smoke Curtain Installation) bomb bay spray tanks (Army Air Forces Board 1945, #8).

4.1.5 Certificate of Decontamination

The research team did not find a certificate of clearance during the archives research; however, a letter from the Headquarters, Fourteenth Air Force states half of the Pinecastle Jeep Range had been dedudded. The remaining area needed dudding but the ground was too wet (Headquarters Fourteenth Air Force 1948, #9).

4.2 Review of Historical Records

**4.2.1 National Archives
8th & Pennsylvania
Washington, D.C. 20408
POC: Mr. Rick Peuser
(202) 501-5671**

RG 153 Records of the Office of the Judge Advocate General (Army)

Entry 56 Reservation File, 1809-1948
Boxes 18-24

RG 156 Records of the Office of the Chief of Ordnance

Entry 41 Correspondence Relating to Inspections, 1917-1940

RG 175 Records of the Chemical Warfare Service

Entry 1 General Correspondence Files, 1918-1942

Entry 2 Index Briefs, 1918-1942
Boxes 353 and 354

RG 337 Records of the Army Ground Forces

Entry 86 Headquarters Army Ground Forces, Special Staff, Chemical Section
1942-1948
Boxes 1-12

**4.2.2 National Archives at College Park
8601 Adelphi Road
College Park, Maryland 20740
POC: Mr. Ken Schlessinger
(301) 713-6800**

RG 18 Records of the Army Air Forces

Entry 2 (NM-6) Air Adjutant General, 1944
Boxes 2259, 2260, 2284, 2313, and 2316

Box 2316

Letter from Lt. Col. Earl Y. Harpole to the Commanding General, Fourth Service Command regarding a Bomb-Proof Shelter at the Tactical Demonstration Range, 8 July 1944.

Box 2259

1. Letter from Brig. General Robert Kauch to the Chief of Engineers regarding the Retention of Auxiliary Facilities at Pinecastle Army Air Field (Gunnery and Demonstration Range and the Ocala Bombing Range), 18 December 1946.
2. Letter from Brig. General Robert Kauch to the Headquarters Army Air Fields regarding real estate at Pinecastle Army Air Field, 13 December 1946.
3. Routing and Record Sheet regarding Real Estate at Pinecastle Army Air Field, 5 December 1946.
4. Letter from Col. Leo J. Erler to the Commanding General, Air Defense Command regarding real estate at Pinecastle Army Air Field, 20 September 1946.
5. Letter from Col. Leo J. Erler to the Director of Service regarding the Declaration of Excess Real Estate, 27 November 1946.
6. Letter from Major Roy A. Davidson to the Commanding General, Air Proving Ground regarding the Declaration of Excess Real Estate, 31 October 1946.
7. Letter to the Commanding General, Army Air Forces regarding excess real estate, 8 November 1945.
8. Routing and Record Sheet, Inactivation of Pinecastle Army Air Base, 1 October 1946.
9. Letter from Major Donald Wilson to Major General C.C. Chauncey regarding Pinecastle Army Air Field Inactivation, 11 September 1946.

Entry 292 (NM-53) Bulky Files, 1942-1944
Box 1560

1. Letter from Wayne Korb to the Commanding General, Army Air Forces regarding the Site Board Report for the Turret Gunnery Range and Air to Ground Gunnery Range near Pinecastle, Florida, 16 February 1943.
2. Tract number description for Pinecastle Turret Rifle and Air to Ground Gunnery Range.
3. Letter from Brig. General L.P. Whitten regarding the Status of Clearance of Pinecastle Rifle and Turret Gunnery Range, 22 February 1943.

Entry 294 (NM-53) Formerly Security-Classified Bulky Decimal Files,
October 1942-1944
Boxes 922, 927, 932, and 933

RG 77 Records of the Chief of Engineers

Entry 1011 Formerly Security-Classified Subject File, 1940-1945
Box 712

RG 107 Records of the Secretary of War

Entry 102 Project Decimal File, 1943 January to 1946 January

RG 269 General Records of the General Services Administration

Entry NN3-269-84-24 (loc. 650/37/3/6) Real Property Disposal Case Files
Box 49

RG 270 Records of the War Assets Administration

Entry UD/12
Box 17

RG 341 Records of the Headquarters U.S. Air Force (Air Staff)

Entry 44 Historical Branch Background Information, 1940-1945
Entry 57 Semi-Annual Inspector General Summaries
Boxes 1 and 2

Entry 191 Air Standardization Group, Operational Testing Branch, Air Proving Ground Reports, 1942-1949
Boxes 184-372

Box 287

Report of The Army Air Forces Board, Orlando, Florida, Dissemination of D.D.T. from Standard British Equipment, dated 26 April 1945.

Entry 494 Correspondence Relating to Real Estate Facilities, 1948-1955
Boxes 42, 43, 73, 105, 143, 172, 216, 256

Box 42

1. Letter from Capt. Richard W. Geuss to the Chief of Staff, USAF regarding the Firing Range for ROTC Summer Camp, dated 16 April 1948.
2. Letter from Col. W.W. Milliard to the Commanding General, Air Defense Command regarding the Firing Range for ROTC Summer Camp, dated 16 March 1948.
3. Letter from Col. L.J. Erler to the Commanding General, Air Defense Command regarding ROTC Summer Camp, dated 11 June 1948.
4. Headquarters USAF Routing and Record Sheet from Col. Ralph O. Brownfield to the Director of Manpower and Organization regarding the Activation of Orlando AFB, dated 20 November 1950.
5. Headquarters USAF Routing and Record Sheet from Brigadier General Edmund C. Lynch to the Director of Operations regarding the Activation of Orlando AFB, dated 28 November 1950.

Box 105

1. Headquarters USAF Routing and Record Sheet from Col. Harold L. Jones to the Director of Installations regarding the Firing Range, ROTC Summer Camp, dated 19 April 1948.
2. Letter from Col. W.W. Millard to the Commanding General, Air Defense Command regarding the Firing Range for ROTC Summer Camp, dated 16 March 1948.
3. Letter from Col. W.W. Millard to the Commanding General, Air Defense Command regarding the Firing Range, ROTC Summer Camp during 1948, dated 16 March 1948.

**4.2.3 Washington National Records Center
4205 Suitland Road
Suitland, Maryland 20409
POC: Ms. Velecia Chance
(301) 457-7010**

Accession 77-A53-325, Boxes 50, 53, and 54
Accession 77-A52-259, Boxes 72, 74, and 76

**4.2.4 National Personnel Records Center
Military Records
9700 Page Avenue
St. Louis, Missouri 63132-5100
POC: Mr. Wilson Sullivan
(314) 538-4085**

Accession 338-57A-3109, Boxes 1-8
Accession 338-57B-6313, Box 1
Accession 338-59A-3343, Boxes 1-3
Accession 338-60C-4008, Boxes 1-20
Accession 338-60D-4008, Box 1
Accession 338-61K-4107, Boxes 1-8
Accession 338-61P-4107, Boxes 1-15
Accession 338-63D-3096, Boxes 1-16
Accession 338-64A-3248, Box 1

Accession 338-64B-3248, Box 1
Accession 338-78-0270, Boxes 1-15
Accession 338-78-0271, Boxes 1-13
Accession 338-0391, Boxes 1-7
Accession 338-78-0547, Boxes 1-2
Accession 338-78-0548, Box 1
Accession 338-78-0758, Boxes 1-2
Accession 342-47A-3006, Boxes 1-5

Box 3

1. Letter from Brig. Gen. Robert Kauch to the Commanding General, AAF Center Orlando, Florida, regarding the Pinecastle Air to Ground Gunnery and Rifle Range, dated 6 November 1945.

2. Letter from Col. Harry E. Wilson to the Commanding General, Washington regarding the Pinecastle Air to Ground Turret Gunnery and Rifle Range, dated 8 November 1945.
3. Letter from Charles O. Andrews to Robert A. Lovett regarding the Pinecastle Air to Ground Turret Gunnery and Rifle Range, dated 26 October 1945.
4. Letter from Col. Alan D. Clark to the Commanding Officer, 901st AAF Base Unit regarding the Use of Jeep Gunnery Range, dated 28 November 1944.
5. Letter from Newton D.W. Chapman to the Headquarters Army Air Forces Tactical Center, Orlando, Florida, regarding the Pinecastle Turret Rifle and Air to Ground Gunnery Range, dated 17 February 1944.
6. Letter from Col. C.C. Berry to the Real Estate Branch, Orlando, Florida, regarding the Pinecastle Turret Rifle and Air to Ground Gunnery Range, dated 23 February 1944.
7. Letter from 1st Lt. B.V. Pepitone to the Commanding General, Army Air Forces regarding the Request for Construction of Rifle Range at Pinecastle Auxiliary Training Field, dated 14 May 1943.
8. Letter from Col. R.W. Simons to the Commanding Officer, 902nd AAF Base Unit regarding the Orlando Range, dated 5 November 1945.
9. Letter from Col. R.W. Simons to the Commanding Officer, 902nd AAF Base Unit regarding three mission ranges at the Orlando Range, dated 5 November 1945.
10. Letter from Lt. Col. Paul S. Deems to the Commanding General, AAF Center regarding Clearing the timber on the Orlando Range, dated 27 November 1945.

Accession 342-47A-6141, Boxes 1-5
Accession 342-48A-6088, Boxes 1-3
Accession 342-48A-6075, Box 1
Accession 342-48B-6075, Box 1
Accession 342-48C-6088, Box 1
Accession 342-48O-6026, Boxes 1-4
Accession 342-52A-5014, Boxes 100 and 108
Accession 342-52A-5106, Box 1
Accession 342-55A-4076, Box 1
Accession 342-55A-5041, Boxes 1 and 2
Accession 342-55A-6041, Box 1

Accession 342-55B-6041, Boxes 1 and 2
Accession 342-55C-6041, Box 1
Accession 342-55E-6041, Box 1
Accession 342-55F-6041, Boxes 1-11
Accession 342-55G-6041, Boxes 1-3
Accession 342-55I-6041, Box 1
Accession 342-57A-3019, Boxes 1-4
Accession 342-57B-3019, Box 1
Accession 342-57A-5263, Box 1
Accession 342-59A-3183, Boxes 1-36
Accession 342-59A-5209, Box 1
Accession 342-59B-5209, Box 1
Accession 342-60A-5083, Box 1
Accession 342-60E-5083, Box 1
Accession 342-63A-3217, Boxes 1-2
Accession 342-63C-3217, Boxes 1-2
Accession 342-66A-6004, Box 1
Accession 342-68A-3172, Box 1

**4.2.5 U.S. Air Force Historical Research Agency
600 Chennault Circle
Maxwell Air Force Base
Montgomery, Alabama 36112-6424
POC: Mr. Archie DeFante
(334) 953-2392**

Corps of Engineers Boxes

02037646-02037651(Orlando)
02037652-02037699 (Orlando)
02037515-02037540 (Orlando)
02037541-02037587 (Orlando)
02037588-02037603 (Orlando)
02037618-02037634 (Orlando)
02037635-02037645 (Orlando)
02037604-02037617 (Orlando)
02039492-02039519 (Pinecastle)
02039520-02039548 (Pinecastle)

Unit Histories

167.3--167.66-1 (April 1934-May 1941)
222.01--222.01 (January 1939-December 1941)
222.716--222.740 (September 1940-November 1941, July 1941-1944)
222.740--222.740 (July 1941-1944)
222.7471--222.01 (January 1939-December 1941, July 1942-June 1943)
245.425-41--245.425-64 (1943)
246.4-6--247.12-1 (1944)
247.12-1--247.12-10 (1944-1945)
247.6506-2--247.6631 (August-September 1944)
287.49-3--287.49-15 (May 1944, June 1945) (Pinecastle)
287.49-3--287.49-15 (October 1944- June 1945) (Perry)
287.50-34--287.56-12 (March 1945, June 1946)
287.56-13--287.57-1 (April 1942-March 1945, June 1946)
WG-321-HI--WG-322-HI (May-December 1944, March 1945)

4.2.6 **Historical Office**
 U.S. Army Chemical-Biological Defense Command
 Building E5183
 Aberdeen Proving Ground, Maryland 21010-5423
 POC: Mr. Jeff Smart
 (410) 671-4430

The research team reviewed finding aids but obtained no pertinent information.

4.2.7 **National Archives-Southeast Region**
 1557 St. Joseph Avenue
 East Point, Georgia 30344
 Mr. David Hilkert
 (404) 763-7477

RG 103 Records of the Farm Credit Administration

Entry 52A118

RG 121 Records of the Public Building Service

Entry 64A108
Entry 61A213

Accession 58A542
Box 104, 109, 110, and 112

RG 103 Records of the Farm Credit Administration

Accession 52A-118
Accession 59A-0705

RG 175 Records of the Chemical Warfare Service
Box 1

RG 270 Records of the War Assets Administration

Accession 51A1
Boxes 200-202, 212 213, and 214

RG 341 Records of the Headquarter of the U. S. Air Force

Entry 498 Office of the Asst. Chief of Staff, Installations Director of
Construction, South Atlantic Region, 1948-1955
Box 31

Entry 499 Correspondence Administration of the Region, 1952-1954
Entry 500 Construction of Air Force Facilities, 1952-1954
Entry 503 Director of Construction South Atlantic Region, 1944-1946

**4.2.8 Florida State Division of Libraries and Information Services
Bureau of Archives and Records Management
Florida State Archives
500 S. Bronough
R.A. Grey Building
Tallahassee, Florida 32399-0250
POC: Reference Desk
(904) 487-2073**

The research team found no pertinent records.

4.2.9 Orange County Historical Museum Library
812 East Rollins Street
Orlando, Florida 32803-1221
POC: Reference Desk
(407) 897-6350

The research team found no pertinent information.

4.2.10 Orange County Library System
101 East Central Blvd.
Orlando, Florida 32801
POC: Reference Desk
(407) 425-4694

Department of the U.S. Air Force
n.d. Historical Notes on the Orlando Air Force Base August 1940-October
1949. Vertical File.

Linton, Ruth Barber
1993 *Pine Castle: A Walk Down Memory Lane*. Book Crafters, Chelsea,
Michigan.

4.3 Summary of Interviews

There were no pertinent interviews obtained for this site, other than those included in Section 6.0, Site Inspection, of this report.

4.4 Air Photo Interpretation and Map Analysis

4.4.1 Interpretation of Aerial Photography

Photoanalysis and land use interpretation were done using the following listed photography:

<u>Date</u>	<u>Photo Scale</u>	<u>Source</u>	<u>Can</u>	<u>Record Group</u>	<u>Frame(s) Used</u>
17 MAR 1952	1:20,000	ASCS	N/A	N/A	2-26 thru 2-29; 1-45 thru 1-50; 1-40 thru 1-43
18 DEC 1969	1:40,000	ASCS	N/A	N/A	1LL-33 thru 36; 43 thru 46
12 DEC 1980	1:40,000	ASCS	N/A	N/A	59 thru 60; 77 thru 78
DEC 1994 thru FEB 1995		EROS	N/A	N/A	23, 24; 30, 31; 89, 90

Large-format aerial photos of the entire site were also reviewed for details. Copies of the large-format 1947 photos were used in the locating the following air photo interpretation features. These photos are indexed on Plate M-3 and included in Appendix K. Large-format 1958 photos for the site are indexed on Plate M-4 and are available in the St. Louis District office.

The maps cited at paragraph 4.4.2 (below) were used as references for the photography.

Photography listed above covering the Pinecastle Jeep Range site was examined. Features visible on the photography and considered to be significant are shown and described on Plates M-1 and M-2. Photography reviewed but not discussed in the photo interpretation are from dates after 1970. No new features relating to military use were found on this later imagery. The features found on the earlier photo dates can be categorized and summarized as follows (keyed to 1945 blue line copies):

SHEET 4D-13 (1947 Photo)

T23S R31E SEC. 19

Photo 2-28

03/17/52

Jeep range is visible as a triangular set of berms. Ground scars are visible in the vicinity of the berm. One possible strafing range is visible to the east of the jeep range, near the center of SEC 19. Area of severely disturbed soil (southeast of range) connected to jeep range by a dirt road. Linear row of possible bomb craters is visible to east of this disturbed area.

Photo 1LL-45
12/18/69

Area begins to revegetate, covering many disturbed areas. Disturbed areas show no recent signs of use. Strafing range is faintly visible. Only a few of the possible craters are still visible.

T23S R31E SEC. 30

Photo 2-28
03/17/52

Three small arms ranges are visible. A road on a berm radiates out from the southern-most range. Possible rows of bombing craters are visible in the north-central and northeast sections of SEC. 30.

Photo 1LL-45
12/18/69

The ranges have been taken over by a possible dump. Smoke is visible rising from the southern end of the former range complex. The soil is disturbed and two new lakes/holding ponds are visible. Only sections of the southern-most range are visible.

T23S R31E SEC. 20 and 29

Photo 2-28
03/17/52

Two possible strafing ranges are visible where SEC. 29, 30, and 20 meet.

Photo 1LL-45
12/18/69

The strafing ranges are faintly visible on the 1969 imagery.

SHEET 4D-38 (1947 Photo)

T23S R31E SEC. 21

Photo 1-48
03/17/52

A pit area is visible, containing at least 8 pits. Disturbed soil in the area of the pits suggests disposal. The pits are connected by light-toned dirt trails.

Photo 1LL-45

Some vegetative growth has occurred since the last interpreted photo date. Bare,

disturbed soil is still visible in the area, but recency of use cannot be determined from the photos.

SHEET 4D-36 (1947 Photo)

T23S R31E SEC 29

Photo 2-28

03/17/52

Areas of disturbed soil are visible, in the north and central parts of SEC 29. Jeep trails show this as a possible maneuver area.

Photo 1LL-45

12/18/69

Some of the soil disturbances are still visible, but vegetative growth has covered most of the jeep trails.

T23S R31E SEC 33

Photo 1-41

03/17/52

An area containing at least 8 pits is visible in the northeast corner of SEC 33. Ground scars are also visible. The area should be considered a possible disposal site. More disturbed soil is visible to the southeast.

Photo 1LL-45

12/18/69

The disposal area remains largely unchanged. The lack of revegetation suggests possible use in the period between photo coverage. The disturbed soil to the southeast is faintly visible through the vegetative growth.

<u>Figure</u>	<u>Year of Photo</u>	<u>Title</u>
M-1	1952	Aerial Photo
M-2	1995	Aerial Photo

Terrain at the site is swampy, with karst topography present in the area. Relief is nearly flat. Water is found in small lakes, throughout the study area. The area is sparsely populated. Some farming is present around the study area.

4.4.2 Map Analysis

The site was analyzed using the following maps:

- (1) USGS 7.5 minute quadrangle maps:
Pine Castle, Fla. (1953) photorevised 1980
Oviedo SW, Fla. (1953), photorevised 1980
Narcoossee NW, Fla. (1953), photorevised 1980
- (2) Base Layout Plans: none
- (3) Real Estate Maps: from INPR

Review of the above-cited map sheets confirms general descriptions found in paragraph 4.4.1 above. The maps were also useful in locating boundaries and identifying features on the photography.

5.0 Real Estate

5.1 Confirmed DoD Ownership

In 1943, the United States acquired by lease 12,483 acres of land for a target range. The site was developed and known as the Pinecastle Jeep Range. The mobile target training sub-field used primarily by pilot and gunnery trainees. Approximately 45 targets, a target storehouse, pit latrines, and minimum service roads were proposed and authorized for the site. It is not known whether such improvements were completed. The facility was reported surplus by the Army Air Force on 2 December 1946. The lease on the 12,483 acres was terminated by the War Department on 5 December 1947, but copies of the disposal documents are not available.

This real estate information was obtained from the Corps of Engineers, Inventory Project Report (INPR), included in Appendix D of this report.

5.2 Potential DoD Ownership

No additional information found.

5.3 Significant Past Ownership other than DoD

No information was obtained during the archives research indicating any significant ownership which could have left ordnance at the site.

5.4 Present Ownership

The site is owned by several local government agencies and private individuals, and is utilized for various purposes, including residential, Highway/expressway, landfill and undeveloped pasture land.

6.0 Site Inspection

6.1 Site Visit 19-20 May 1997

6.1.1 General Site Information

Personnel from the St. Louis District, Corps of Engineers, listed below, travelled to the Orlando, Florida area to inspect the subject site as part of the DERP-FUDS archives search report process.

Mr. Tom Freeman, Project Manager
Mr. Hank Counts, UXO Safety Specialist
Mrs. Nancy Gerth, Archivist

Although this site is referred to as the Pinecastle Jeep Range, there are indications that it was used for other range type activities. The locations of the jeep range features have been established from historical air photos. Historical documents indicate that the range area was also used for chemical (smoke) demonstrations and some bombing activities. The range was in close proximity to the Orlando Army Air Base, which served as an air proving ground and tactical operations evaluation facility during World War II. No historical maps were found showing the locations of any bombing targets. Possible locations were inferred from air photo interpretation.

Much of the area is low-lying, swamp-type land. The site is mostly owned by either the city of Orlando or Orange County. The western portion of the tract has been recently traversed by an Interstate-quality, multi-lane highway constructed by the Orlando-Orange County Expressway Authority. The new highway runs very close to and through the areas that most likely were used for the bombing activities. Prior to inspecting the site, the SLD team interviewed Mr. William McKelvy, P.E. (407/425-8606), Director of Construction for the Expressway Authority. In addition to working for the Authority, Mr. McKelvy has been a long time resident of the Orlando area. He was able to provide a complete set of maps showing the construction of the highway across the former range area. Essentially, the Expressway Authority used an approximate 300 foot right-of-way to build an embankment on which to place the highway. They also constructed numerous holding ponds and drainage ditches along the road. Mr. McKelvy did not recall any instances in which ordnance items or debris was found. Mr. McKelvy suggested contacting Mr. Charles Sylvester (407/649-2003) a real estate consultant for the

Expressway Authority, who had been involved with the acquisition of the right-of-way.

Mr. Sylvester, also a longtime resident of the Orlando area, was very familiar with the former range area. He indicated that even though parts of the former range area is still privately owned, Orange County and the City of Orlando have purchased large portions of it. Orange County is developing a large landfill along the eastern portion of the tract. The portions that the county and city governments obtained are zoned for institutional use or reserved for wetlands. Plate M-5 shows the future land use of the site. In all of his involvement with the site, Mr. Sylvester has not ever heard of any munitions being found in the former range area. He suggested contacting Mr. Willie Smith, Director of the Orange County Utilities Division (407/836-7000). Mr. Sylvester accompanied us to Mr. Smith's office.

Mr. Smith's department is responsible for the utility service to the area and overall management of the landfill. He was not aware of any ordnance items being found in the area. His office was able to provide maps of county activities on the site.

Besides the major highway that had been built by the Expressway Authority, another new roadway was constructed by Orange County through the eastern part of the former range in the late 1970s. The SLD team contacted Mr. Chuck Dixon, one of the senior engineering technicians with the Orange County Highway Engineering Department. Mr. Dixon was not involved with the construction of this new road, but was familiar with the construction engineers and inspectors who had been out there. He spoke to several of the field personnel to see if anything unusual had been discovered during the construction. All indicated that they had not encountered any ordnance-related items.

The team next interviewed Mr. David Fleming, who runs the archives for the Orange County Highway Department. Mr. Fleming was able to provide historical aerial photos of the site from 1947, but had no knowledge of any ordnance being found on the former range area.

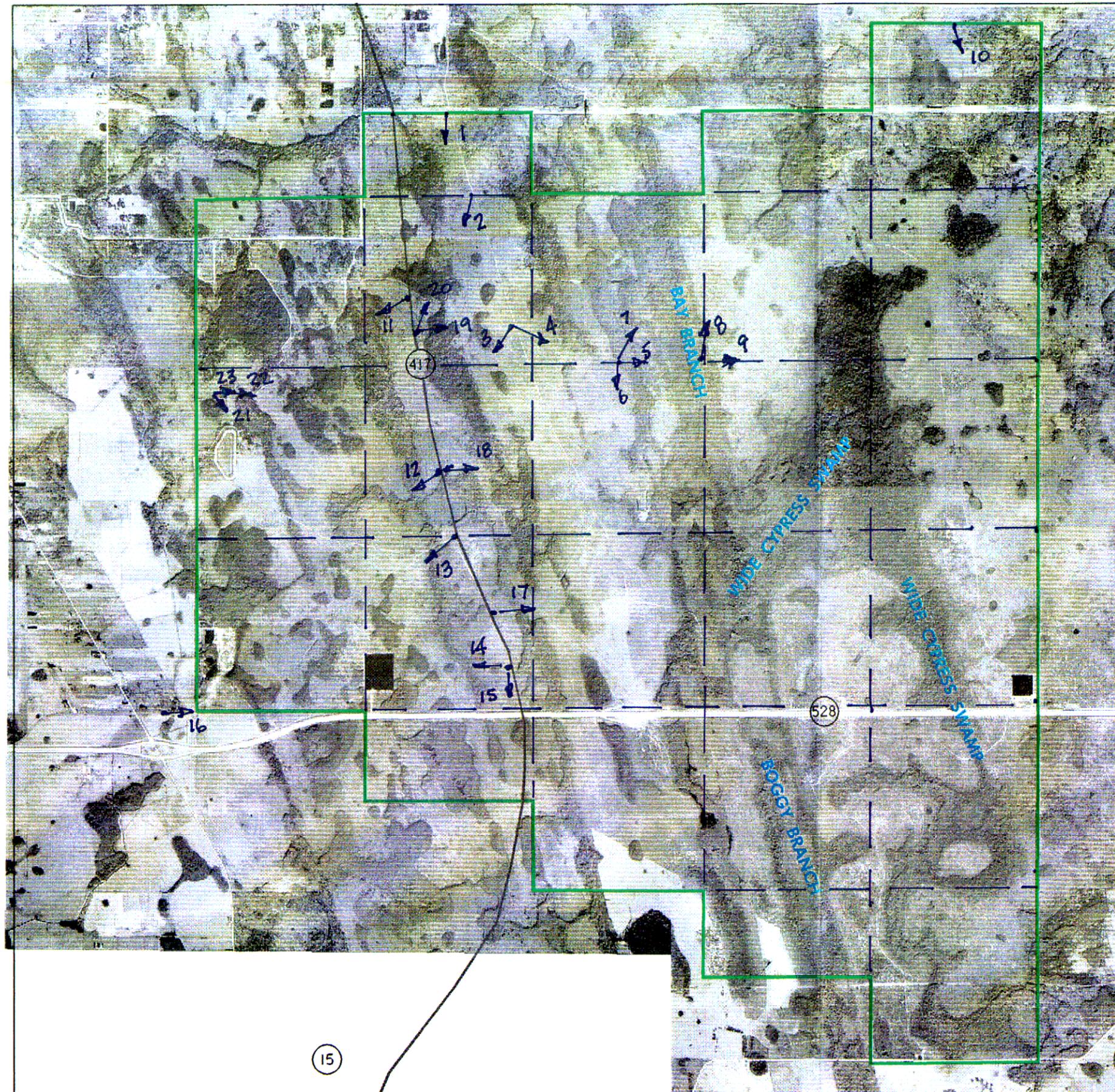
6.1.2 Site Inspection

Photographs taken at the site are shown in Appendix I of this report and are location-referenced on Figure 6-1. These photographs show the general development of the range area. Most of the photos were taken in the western portion of the range, where it appears that most of the military activities took place.

The team next proceeded to the site. Highway 417 is the new expressway that runs north-south through the western portion of the former range. Historical air photos indicated that most of the range activities took place in this area. Three of the more disturbed ground areas fell immediately beneath the new expressway. The inspection team followed the new Highway 417 route, stopping at the vicinity of the areas that may have been used by the military. The sites have all been vastly changed since that time, having been either covered over by the roadway embankment or excavated out in the areas of the borrow pits and drainage ponds.

The team then went to the northeastern portion of the former range. This is the site of the large regional waste disposal facility. Entrance to the disposal facility is over the roadway that the county had completed in the 1970s. Interviews with county personnel had not indicated that any ordnance debris had been found in this area. Activities at the facility covered large tracts of the former range with up to 50 feet of fill material. A few privately owned homes are also located on this road.

The final areas that the team attempted to inspect are along the western side of the former range. These areas are generally bordered on the east by Highway 417, on the south by the Bee Line Expressway, on the west by Narcoose Road. North of these areas is more undeveloped open land. These areas included the former small arms firing ranges, some air-to-ground strafing sites, and some possible bombing areas. However, the areas turned out to be fenced and posted against trespassing. The team was unable to contact the owners, so consequently access was not gained to this portion of the site. The team completed the inspection and left the site.



LEGEND

- SITE LOCATION
-

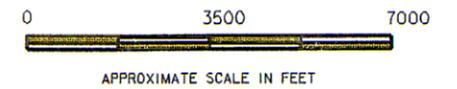


FIGURE 6-1
SITE INSPECTION
PHOTO INDEX
Pinecastle Jeep Range
May 1997

7.0 Evaluation of Ordnance Presence

Pinecastle Jeep Range was used by the Orlando Army Air Base and Pinecastle Army Air Field for small arms firing, air tactics evaluation, and training demonstrations during World War II. This range was also referred to as the Pinecastle Chemical Range, Orlando Range, and Pinecastle Range. Historical documents indicate that numerous training demonstration exercises were carried out here. These demonstrations included strafing, practice bombing, air-to-ground rocket firing, some high explosive bombing, and chemical smoke and spray missions. There is no indication that any live agent chemical warfare materials were used on this range. Aerial photography indicates that several areas were used. The firing ranges and associated berms were located along the west side of the tract. The locations of other activity areas were surmised from air photo interpretation. Most of these areas of probable use are also located in the western portion of the range. No historical maps were found to indicate where the ranges were to be constructed. All features are identified on Plate M-1 of this report. An Air Force memorandum from 1948 indicates that half of the range was cleared of ordnance, but it did not mention which half.

8.0 Technical Data of Ordnance and Explosives

8.1 Ordnance Related Mission

During World War II this range was used for the tactical evaluation of ordnance items and their use under simulated mission conditions. Numerous high explosives munitions were exploded on this range to verify their effectiveness.

8.2 Description of Ordnance

Data sheets are provided in this section for ordnance items which could be encountered on this site. Possible existence has been identified through review of historical documents, air photo interpretation, and a personal site visit by the ASR inspection team.

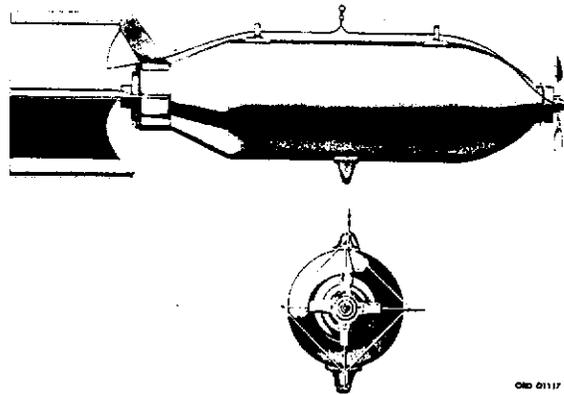
8.3 References

Specific references are provided in the descriptions of each of the munitions.

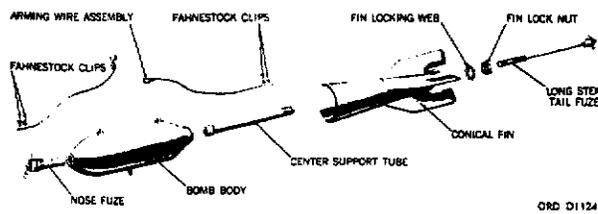
8.4 Technical Drawings

Description	Page
Bomb, General Purpose	8-2
Bomb, M38A2, Practice	8-9
Spotting Charges for M38A2 Practice Bomb	8-10
Rocket, 5-Inch, HVAR	8-11
Small Arms, General	8-12
Bomb, Incendiary, AN-M76	8-13
Cluster, Aimable Incendiary Bomb, M21	8-14
Cluster, Incendiary Bomb, M7	8-16
Rocket, 11.75-Inch	8-17

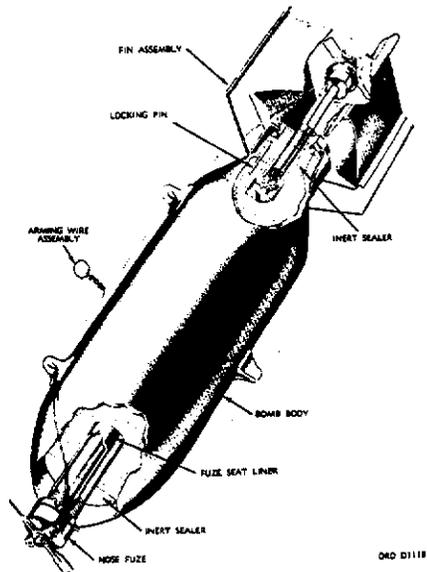
BOMB, GENERAL PURPOSE (GP) OLD SERIES



View 1. Old-series GP bomb with box fin assembly.



View 2. Old-series GP bomb with conical fin assembly, exploded view.



View 3. Old series GP bomb, cutaway view.

General. The old-series GP bomb is a relatively thin-cased bomb with an ogival nose, parallel side walls, and a tapered aft section. Both nose and tail fuzes are used for a majority of operations. Approximately 50 percent of the complete weight of the round is its explosive filler of amatol 50-50, TNT, Tritonal or Composition B. Two suspension lugs, 14 inches or 30 inches apart, are welded to one side of the bomb body, and a single lug is welded to the opposite side at the center of gravity. Both the box-type fin assembly and the conical-type fin assembly. The box type fin assembly is secured to the aft end of the bomb body with a fin locknut, while the conical type fin assembly is secured by means of a support tube, and a locking web and a locknut. The base plug of the bomb is locked securely to the bomb body by two studs which extend from the base plug into the solidified explosive filler. The adapter-booster is locked to the base plug by a locking pin which is passed through a hole in the adapter-booster into a groove in the base plug. Bombs filled with amatol 50-50 include nose and tail surrounds of TNT, a body gasket, and an auxiliary booster. These features are not included with other explosives fillers.

Tabulated Data. Refer to table 8-1 through 8-5, for tabulated data on old-series GP bombs. Refer to Views 1 through 3, for illustrations of old-series GP bombs.

Difference Between Bombs.

AN-M30A1 and AN-M30. Bomb AN-M30A1 contains antiwithdrawal pins in the base plug and a device for locking the adapter-booster to the base plug. The earlier model, AN-M30, does not have these features. The AN-M30 is lighter in weight than its modification, the AN-M30A1. The M30 is an earlier model of the AN-M30 which differs in that it does not have a lug for single suspension. It also employs a base plug having internal threads (instead of the present externally Threaded plug) for assembly to the bomb.

AN-M57A1 and AN-M57. Bomb AN-M57A1 contains antiwithdrawal pins in the base plug and an adapter-booster which can be locked to the base plug. The earlier model, AN-M57, does not have these features.

AN-M64A1 and AN-M64. Bomb AN-M64A1 contains antiwithdrawal pins in the base plug and an adapter-booster which can be locked in place. The earlier AN-M64 lacks these antiwithdrawal features.

AN-M65A1 and AN-M65. Bomb AN-M65A1 contains antiwithdrawal pins in the base plug and an adapter-booster and fuze adapter that can be locked in place. The earlier AN-M65 lacks these antiwithdrawal features. The released weight of the AN-M65 is greater than that of the AN-M65A1, the AN-M65 having an explosive filler of 53 percent as compared to the 50 percent ratio of bomb AN-M65A1.

AN-M66A2 and AN-M66A1. Bombs AN-M66A2 and AN-M66A1 contains antiwithdrawal pins in the base plug and an adapter-booster and fuze adapter that can be locked in place. The earlier bomb AN-M66 lacks these features. The AN-M66A2 differs further from the AN-M66A1 and AN-M66 bombs by having a thicker and rounded nose. In the AN-M66A2, the ratio of explosive filler to total weight is approximately 50 percent, as compared to an average weight ratio of 53 percent in the other two bombs.

Table 8-1. Bomb, General Purpose: 100-Pound, AN-M30A1

	Fin assembly AN-M103A1	Fin assembly M135
Model.....	AN-M30A1	AN-M30A1
Length.....	40.26	54.2
Body Diameter.....	8.18	8.18
Fin Span (in.).....	11.0	11.18
Weight of Filler (lb.)		
Amatol.....	54.0	54.0
TNT.....	57.0	57.0
Tritonal.....	62.0	62.0
Weight of Fin Assembly (lb).....	5.6	17.5
Weight of Assembled Bomb (lb)		
Loaded with Amatol.....	116.5	128.5
Loaded with TNT.....	119.5	131.5
Loaded with Tritonal.....	124.5	136.5
Fin Lock Nut.....	M1 or MK2	
Arming-Wire Assembly		
Nose or Tail Fuze.....	MK1 or AN-M6A2	MK1 or AN-M6A2
Nose and Tail Fuzing.....	AN-M1A2	M14 or AN-M1A2
Adapter-Booster.....	M102A1	M102A1
Nose Fuze.....	M904E1	M904E1
	M904E2	M904E2
	AN-M103A1	AN-M103A1
	AN-M139A1	AN-M139A1
	AN-M140A1	AN-M140A1
	MK243 Mod 0	MK243 Mod 0
	MK244 Mod 1	MK244 Mod 1
	AN-M166 (VT)	AN-M166 (VT)
	AN-M166E1 (VT)	AN-M166E1 (VT)
	AN-M168 (VT)	AN-M168 (VT)
	M188 (VT)	M188 (VT)
	M163	M163
	M164	M164
	M165	M165
Tail Fuze.....	AN-M100A2	M172
	M115	AN-M175
	M116	M181
	AN-M123A1 or AN-M132	

Table 8-2. Bomb, General Purpose: 250-Pound, AN-M57A1

	Fin assembly AN-M106A1	Fin assembly M126
Model.....	AN-M57A1	AN-M57A1
Length of Assembled Bomb (in.).....	47.8	62.2
Body Diameter (in.).....	10.9	10.9
Fin Span (in.).....	15.0	15.0
Weight of Filler (lb.)		
Amatol.....	98.4	98.4
TNT.....	125.0	125.0
Tritonal.....	136.0	136.0
Weight of Fin Assembly (lb.).....	8.0	25.0
Weight of Assembled Bomb (lb)		
Loaded with Amatol.....	256.63	273.63
Loaded with TNT.....	261.35	278.35
Loaded with Tritonal.....	272.35	289.35
Fin Lock Nut.....	M1 or MK2 Mod 0	MK1 or AN-M6A2
Arming-Wire Assembly		
Nose or Tail Fuze.....	MK1 or AN-M62A2	M14
Nose and Tail Fuzing.....	AN-M1A2	M102A1
Adapter-Booster.....	M102A1	M904E1
Nose Fuze.....	M904E1	M904E2
	M904E2	AN-M103A1
	AN-M103A1	AN-M139A1
	AN-M139A1	AN-M140A1
	AN-M140A1	MK243 Mod 0
	MK243 Mod 0	MK244 Mod 1
	MK244 Mod 1	AN-M166 (VT)
	AN-M166 (VT)	AN-M168 (VT)
	AN-M168 (VT)	AN-M166E1 (VT)
	AN-M166E1 (VT)	M188 (VT)
	M188 (VT)	M163
	M163	M164
	M164	M165
	M165	M172
Tail Fuze.....	AN-M100A2	AN-M175
	AN-M115	M181
	AN-M123A1	
	AN-M132	
	M160	

Table 8-3. Bomb, General purpose: 500-Pound AN-M64A1

	Fin assembly AN-M109A1	Fin assembly M128A1
Model.....	AN-M64A1	AN-M64A1
Length (in.).....	59.16	72.10
Body Diameter (in.).....	14.18	14.18
Fin Span (in.).....	18.94	19.56
Weight of Filler (lb.):		
Amatol.....	262.00	262.00
TNT.....	266.00	266.00
Tritonal.....	283.0	283.0
Weight of Fin Assembly (lb.).....	18.6	41.0
Weight of Assembled Bomb (lb.)		
Loaded with Amatol.....	541.87	564.27
Loaded with TNT.....	548.69	571.09
Loaded with Composition B.....	555.39	577.79
Loaded with Tritonal.....	561.00	586.00
Fin Lock Nut.....	M2 or MK3 Mod 0	
Arming-Wire Assembly		
Nose or Tail Fuze.....	MK1 or AN-M6A2	MK1 or AN-M6A2
Nose and Tail Fuzing.....	AN-M7A1 or M13	M13
Adapter-Booster.....	M115A1	M115A1
Nose Fuze.....	M904E1	M904E1
	M904E2	M904E2
	AN-M103A1	AN-M103A1
	AN-M139A1	AN-M139A1
	AN-M140A1	AN-M140A1
	MK243 Mod 0	MK243 Mod 0
	MK244 Mod 1	MK244 Mod 1
	AN-M166 (VT)	AN-M166 (VT)
	AN-M166E1 (VT)	AN-M166E1 (VT)
	AN-M168 (VT)	AN-M168 (VT)
	M188 (VT)	M188 (VT)
	M163	M163
	M164	M164
	M165	M165
Tail Fuze.....	AN-M101A2	M172
	AN-MK230	AN-M175
	AN-M116	M181
	AN-M124A1	
	AN-M133	
	M161	

Table 8-4. Bomb, General Purpose: 1,000-Pound, AN-M65A1

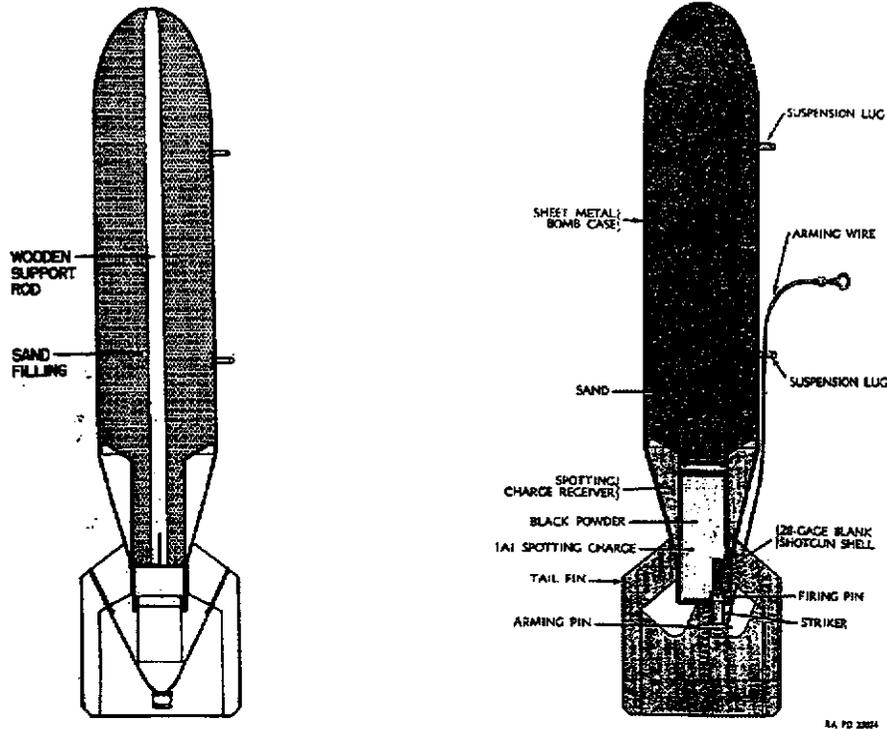
	Fin assembly AN-M113A1	Fin assembly M129
Model.....	AN-M65A1	AN-M65A1
Length of Assembled Bomb (in.).....	69.5	91.1
Body Diameter (in.).....	18.8	18.8
Fin Span (in.).....	25.4	26.2
Weight of filler (lb.):		
Amatol.....	530.0	530.0
TNT.....	555.0	555.0
Composition B.....	560.0	560.0
Tritonal.....	595.0	595.0
Weight of Fin Assembly (lb.).....	32.1	73.0
Weight of Assembled Bomb (lb.):		
Loaded with Amatol.....	1044.0	1147.0
Loaded with TNT.....	1064.0	1165.2
Loaded with Composition B.....	1069.0	1170.0
Loaded with Tritonal.....	1104.0	1205.21
Fin Lock Nut.....	M2 or MK 3 Mod 0	
Arming-Wire Assembly.....		
Nose or Tail Fuze.....	MK1 or AN-M6A2	MK1 or AN-M6A2
Nose and Tail Fuze.....	MK2 or AN-M7A1	MK13
Adapter-Booster.....	M115A1	M115A1
Nose fuze.....	M904E1	M904E1
	M904E2	M904E2
	AN-M103A1	AN-M103A1
	AN-M139A1	AN-M139A1
	AN-M140A1	AN-M140A1
	MK243 Mod 0	MK243 Mod 0
	MK244 Mod 1	MK244 Mod 1
	AN-M166 (VT)	AN-M166 (VT)
	AN-M166E1 (VT)	AN-M166E1 (VT)
	AN-M168 (VT)	AN-M168 (VT)
	M188 (VT)	M188 (VT)
	M163	M163
	M164	M164
	M165	M165
Tail Fuze.....	AN-M102A2	M176
	AN-MK230 Mods 4,5,6	M182
	M162	M184
	AN-M117	
	AN-M125A1	
	AN-M134	

Table 8-5. Bomb, General Purpose: 2,000, AN-M166A2

	Fin assembly AN-M116A1	Fin assembly M130
Model.....	AN-M66A2	AN-M66A2
Length of Assembled Bomb (in.).....	92.63	116.8
Body Diameter (in.).....	23.29	23.29
Fin Span (in.).....	31.6	32.32
Weight of Filler (lb.):		
Amatol.....	1061.0	1061.0
TNT.....	1097.7	1097.7
Composition B.....	1146.0	1146.0
Tritonal.....	1181.0	1181.0
Weight of Fin Assembly (lb.).....	54.4	135.0
Weight of Assembled Bomb (lb.):		
Loaded with Amatol.....	1977.0	2059.0
Loaded with TNT.....	2113.2	2194.5
Loaded with Composition B.....	2162.0	2244.0
Loaded with Tritonal.....	2196.5	2277.5
Fin Lock Nut.....	M3 or MK4 Mod 0	
Arming-Wire Assembly.....		
Nose or Tail Fuze.....	MK1 or AN-M6A2	MK1 or AN-M6A2
Nose and Tail Fuzing.....	AN-M8A1 with MK1 Extension	M16
Adapter-Booster.....	M115A1	M115A1
Nose Fuze.....	M904E1	M904E1
	M904E2	M904E2
	AN-M103A1	AN-M103A1
	AN-M139A1	AN-M139A1
	AN-M140A1	AN-M140A1
	MK243 Mod 0	MK243 Mod 0
	MK244 Mod 1	MK244 Mod 1
	AN-M166 (VT)	AN-M166 (VT)
	AN-M166E1 (VT)	AN-M166E1 (VT)
	AN-M168 (VT)	AN-M168 (VT)
	M188(VT)	M188(VT)
	M163	M163
	M164	M164
	M165	M165
Tail Fuze.....	AN-M102A2	AN-M117
	AN-MK230, Mod 4,5 & 6	M183
	AN-M177	AN-M185
	AN-M125A1	
	AN-M134	
	M162	

Reference TM 9-1325-200, Bombs and Bomb Components, April 1966

BOMB, PRACTICE, 100 POUND, M38A2



with M5 spotting charge

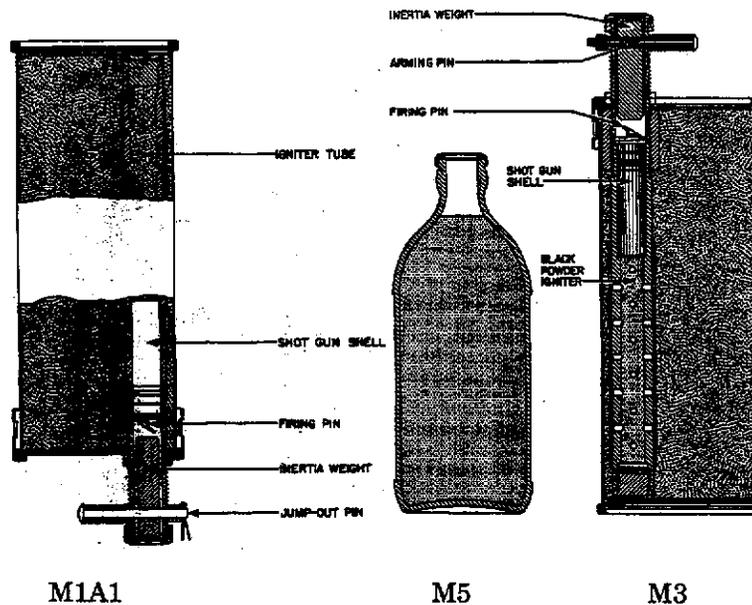
with M1A1 spotting charge

Description: This bomb simulates a General Purpose bomb of the same size. It is constructed of light sheet metal, approximately 22 gage, formed by rolling a rectangular sheet of metal into the form of a cylinder approximately 8 inches in diameter, and spot-welding the seam. The rounded nose is pressed from the same metal, as is the tail which is formed in the shape of a cone. The tail portion ends in a box type fins which is welded to the cone. Inside of the smaller end of the conical tail section is welded the spotting charge receiver. The spotting charge is assembled in a sleeve at the base of the bomb, within the fin box. Authorized spotting charges are the M1A1, M3, and M5. When using the M5 spotting charge a wooden support rod is installed in the bomb. Two suspension lugs are bolted to the bomb body during fabrication. The Suspension Band M1 is provided for single suspension. The band is a separate component. The over-all length of the bomb body is 47½ inches. When empty, the bomb body weighs approximately 14 pounds. When completely loaded with sand and spotting charge, the weight of the bomb is approximately 100 pounds.

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

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

SPOTTING CHARGES, M1A1, M3, M5



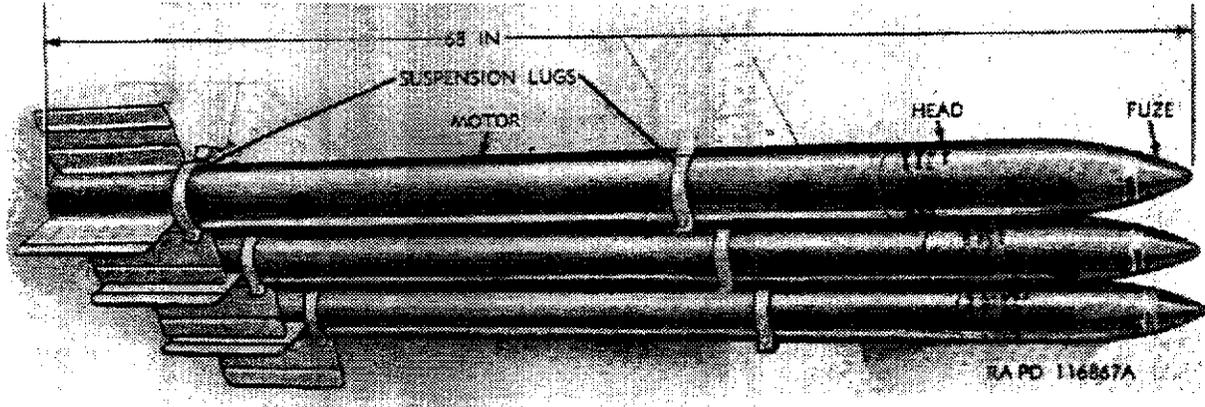
M1A1 Spotting Charge fits in the after end of the 100-pound Practice Bomb M38A2. It produces a flash of flame and white smoke for observation of bombing accuracy. It is made from a large tin can, 11.18 inches long, 3.43 inches diameter, weighing 4.25 pounds, and containing 3 pounds of Black Powder. At the top of the can is a cover which has a hole in it for the insertion of a 28-gage blank shotgun shell and firing mechanism.

M3 Spotting Charge has a 2 $\frac{1}{8}$ -pound dark smoke filling and a black-powder igniter. It is $\frac{5}{8}$ inch longer than the Spotting Charge M1A1, but otherwise is like it. The M3, with its dark smoke filler, is well adapted for bombing practice over snow-covered terrain. The black-powder igniter charge contains approximately 425 grains.

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

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

ROCKET, 5 INCH (HAVAR), MK6 MOD1



General The 5.0-inch high-velocity aircraft rocket areforwar firing from aircraft against heavy tanks and gun emplacements.

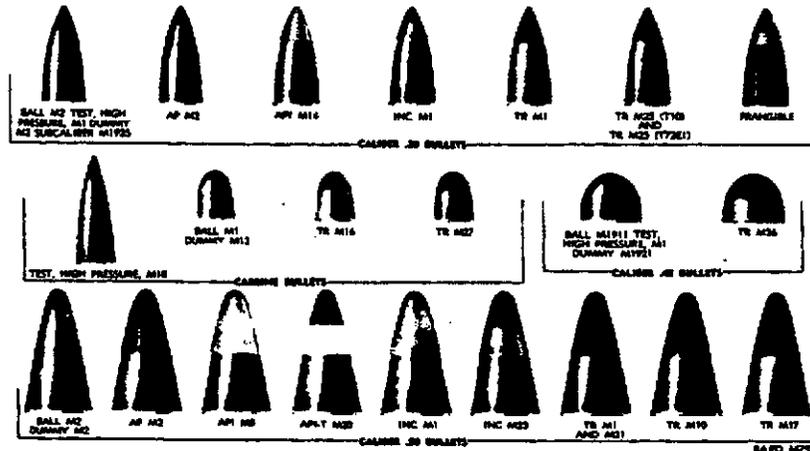
Head The heads used in the service rounds are the TNT filled head Mk 6 Mod 1.

Fuze The warhead is equipped with the nose fuze Mk 149 Mod 0 and the base fuze Mk 164 Mod 0 or the Mk 159 Mod 1. May also be fuzed with VT M403 for plane to ground firing.

Length	16.15 inch
Diameter	5 inch
Weight	48.8 pounds
Filler	Cast TNT
Filler weight	7.9 pounds
Propellant	Mk 18 Mod 0
Propellant weight	24 pounds

Reference: TM 9-1950, Rockets, July 1945

SMALL ARMS, GENERAL



Identification of bullets of small arm cartridges

Use: Cal, .50 machine guns, Cal, .30, carbines, rifles, semiautomatic rifles, automatic rifles, and machine guns, Cal, .22 pistols, rifles, and machine guns (for gallery practice), Shotguns, 12-gage, Cal, .45 automatic pistols, revolvers, and submachine guns, Subcaliber tubes and adapters for artillery weapons which use ammunition of similar size and type.

Description: A complete round of small-arms ammunition is known as a cartridge, and is made up of the following components:

Bullet: The bullet in general is cylindrical. The nose may be round, as in the cal, .50 bullet, or ogival as in all service rifles and machine gun bullets. The base may be square or boat-tailed. Types are identified by the color of the tip and include the following:

- Armor-piercing bullets contain a core of hardened steel.
- Ball usually contain a slug of antimony hardened lead except in the case of the cal, .50, wherein the outer core is of soft steel.
- Tracer contains a lead slug, and a chemical composition in the rear.
- Incendiary bullets contain an incendiary composition.

Cartridge case: The cartridge case is the means whereby the other components are assembled into the unit. It also provides a waterproof container for the propelling charge.

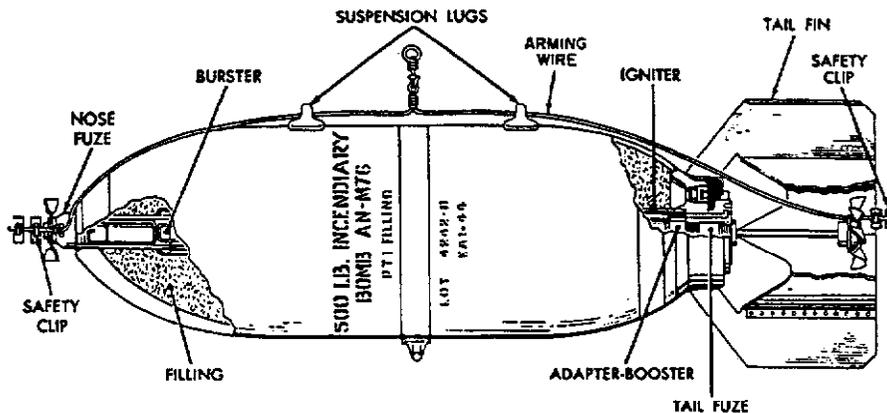
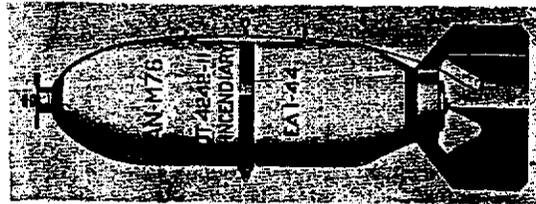
Primer: Percussion

Propelling charge: The propelling charge consists of a quantity of smokeless powder. The weight of the charge is not constant. It is adjusted for each powder lot to give the required velocity with pressure within the limits prescribed for the weapon in which it is fired.

Reference: TM 9-1904, Ammunition Inspection Guide, dated 2 March 1944
TM 9-1900, Ammunition General, dated June 1956

BOMB, INCENDIARY, AN-M76

500-pound



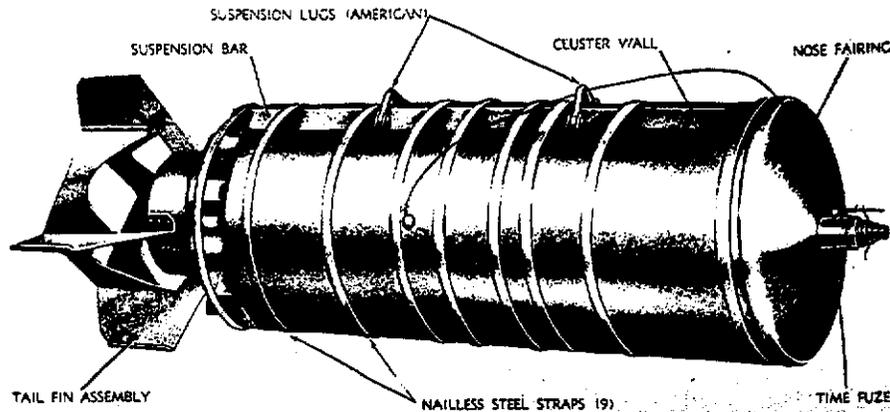
AN-M76 500-pound PT incendiary bomb, cutaway view.

General. These bombs are normally marked with a purple band at the nose, one in the middle, and one at the tail end to identify the bomb as an incendiary. Bomb nomenclature and lot number are stenciled on the body in purple. The preferred tail fuze is the M161 tail bomb fuze. The preferred nose fuze is the M163 nose bomb fuze. Fuzes are shipped separately from the bomb. PT is a thickened fuel composed of flammable liquids, and is composed of magnesium with gasoline and other products thickened with isobutyl methacrylate.

Over-all length	approx 59 inches
Diameter	14.3/16 inches
Weight	467 pounds
Filler	174 pounds PT

Reference: TM 3-400, Chemical Bombs and Clusters, May 1957

CLUSTER, AIMABLE, INCENDIARY BOMB, M21 STANDARD



Use: Cluster are dropped from aircraft. Release of cluster from bomb rack exerts a pull of an arming wire in rack. Pull on wire activates fuze.

Description: This cluster resembles the GP bomb in appearance, being cylindrical in form with rounded nose, and including a tail fin assembly. It contains 38 six-pound M69X Incendiary bombs (IM or NP filled). It is equipped with a delay-type bomb fuze. Markings of the cluster are a two-inch gray-blue band encircling the cylinder is imposed a one-half inch purple band. On the nose of the cluster is printed or stenciled in black, the following:

Aimable Cluster
Adapter M23
(500 lb size)
Cluster Aimable
Incendiary bomb, M21
(500 lb size)
38 6-lb (*) AN-M69A
Wt.----- Lbs.
(* IM or NP, according to filling)

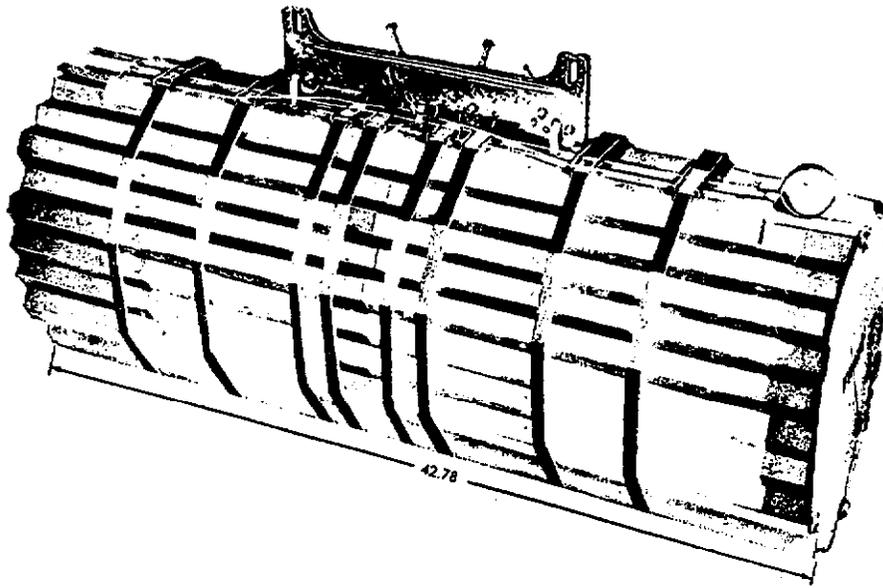
The foregoing also appears on opposite sides of the body of the cluster, together with name of the manufacturer, contract number, date of filling, inspection marking, case number and lot number.

Data for complete unit:

Weight as used	481 pounds
Length of cluster	59.5 inches
Diameter of cylinder	14.24 inches
Diameter of fin	19 inches
Cluster adapter	M23
Fuze	Bomb, Mechanical, M152

Reference: History of Research and Development of the Chemical Warfare Service in World War II (1 Jul 40 - 31 Dec 45) Volume 18, Part V, Incendiaries, dated January 1952

CLUSTER, INCENDIARY BOMB, M7 STANDARD



These clusters are used as a device for dropping four-pound incendiary bombs from aircraft in large quantities.

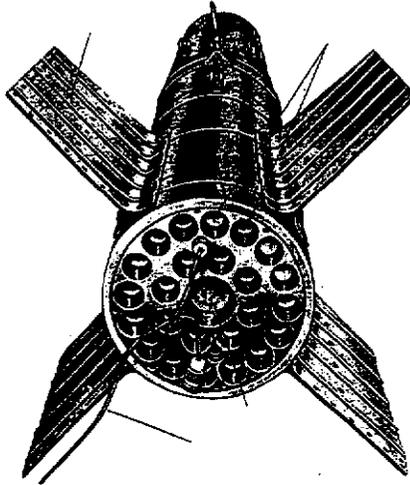
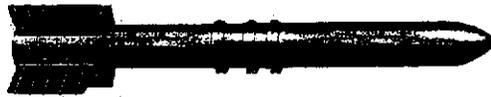
Description: This cluster, weighing more than 500 pounds, is of the quick-opening type, and carries 128 four-pound magnesium-filled incendiary bombs. Its fire power consists of 102 AN-M50-A2 and 26 AN-M50X-A3 units.

Data for Complete Unit:

Weight as used	527 pounds
Length of cluster	43 inches
Width of cluster	13.75 inches
Height of cluster	17.30 inches
Cluster Adapter	M6

Reference: History of Research and Development of the Chemical Warfare Service in World War II (1 Jul 40 - 31 Dec 45) Volume 18, Part V, Incendiaries, dated January 1952

ROCKET, 11.75 INCH, w/inert head, MK 3 MOD 0 and 1



11.75-inch rocket--rear view

These rockets are used in forward firing from aircraft against shipping and large ground targets.

Head. The head consists of a shell body filled with plaster.

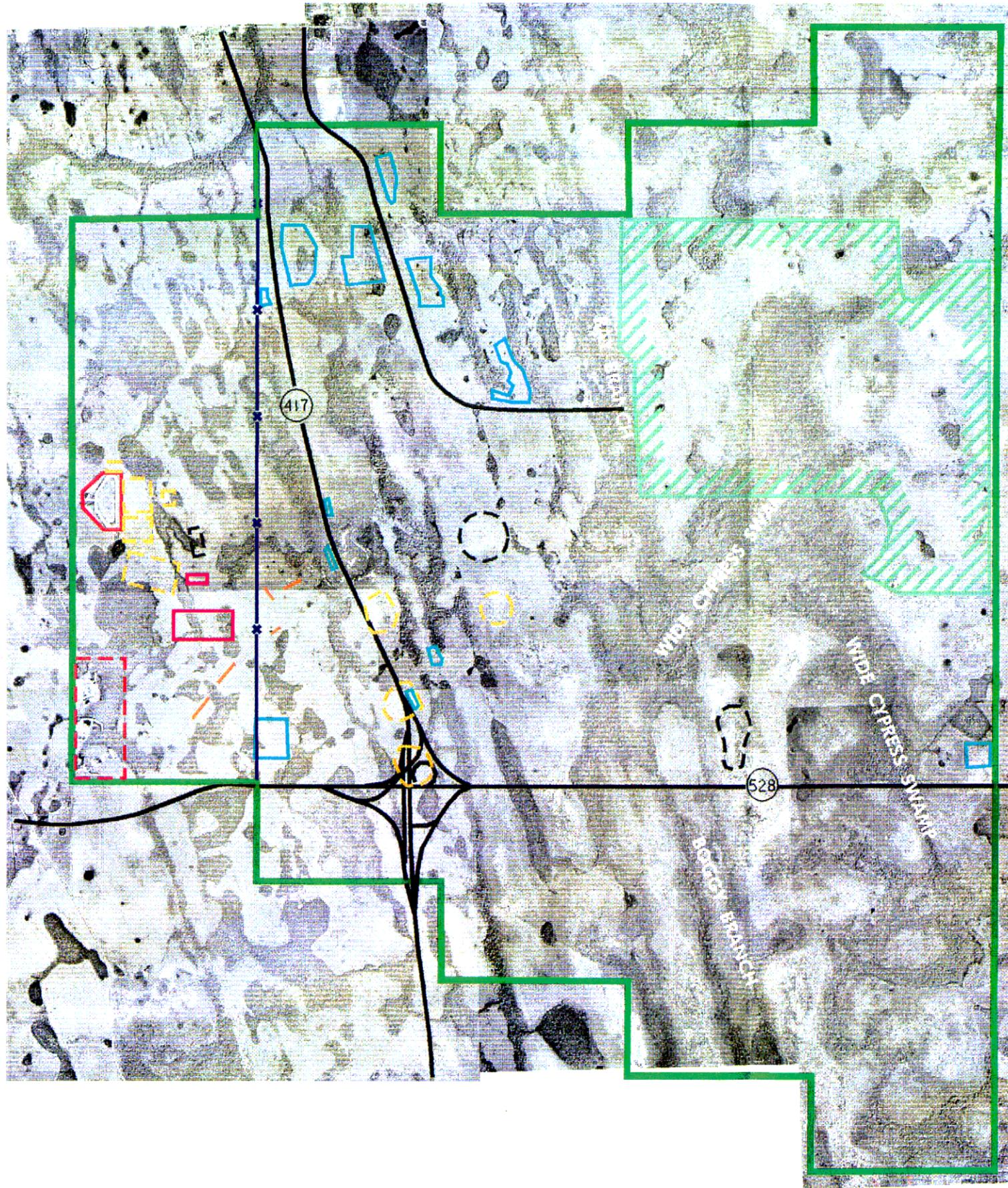
Over-all length	126 inches
Diameter	11.5 inches
Weight	1283 pounds
Filler	Plaster
Filler weight	none
Propellant	4 cruciform inhibited grains
Propellant weight	145.8 pounds
Igniter	.05-pound black power w/2 electric squibs

Reference: TM 9-1950, Rockets, July 1945

9.0 Evaluation of Other Site Information

No information regarding any areas of potential environmental concern for this site were found during the archives search process.

REPORT PLATES



LEGEND

SITE LOCATION

FEATURES FROM 1952 PHOTOS:

- JEEP RANGE
- SMALL ARM RANGES
- POSSIBLE CRATER AREAS
- LARGE DISTURBED GROUND AREAS
- POSSIBLE ATG FIRING RANGES (STRAFING)
- PIT AREAS

FEATURES FROM 1994 PHOTOS:

- ROADS
- WASTE DISPOSAL AREA
- UTILITY EASEMENT AREA (POWER LINES)
- WATER DETENTION PONDS

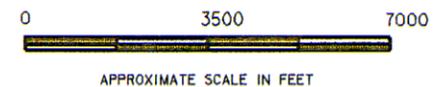
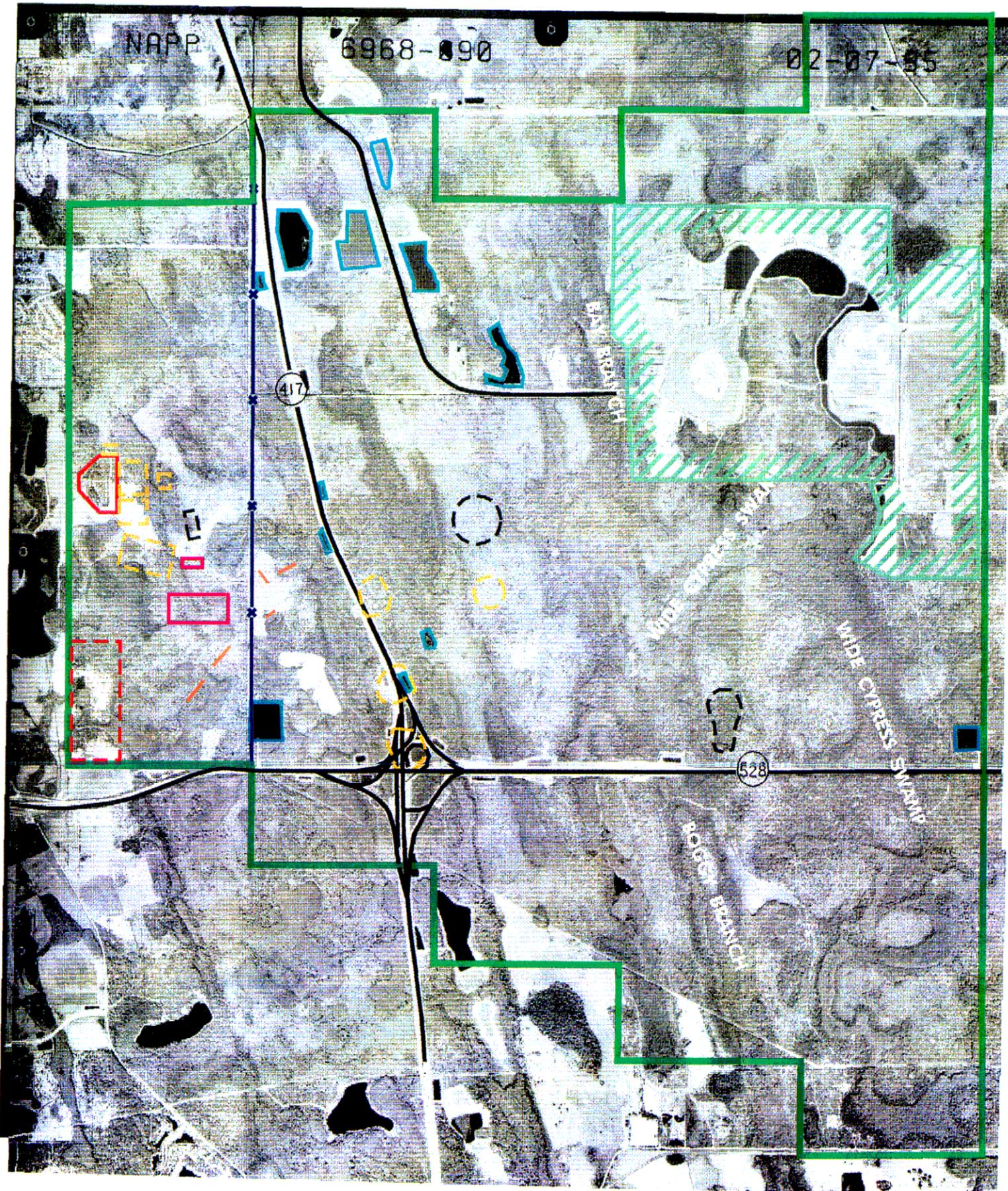


PLATE M-1

**PINECASTLE JEEP RANGE
 ORLANDO, FLORIDA
 ORANGE, COUNTY
 DERP-FUDS# 104FL040501
 1952 AERIAL PHOTO**



LEGEND

SITE LOCATION

FEATURES FROM 1952 PHOTOS:

- JEEP RANGE
- SMALL ARM RANGES
- POSSIBLE CRATER AREAS
- LARGE DISTURBED GROUND AREAS
- POSSIBLE ATG FIRING RANGES (STRAFING)
- PIT AREAS

FEATURES FROM 1994 PHOTOS:

- ROADS
- WASTE DISPOSAL AREA
- UTILITY EASEMENT AREA (POWER LINES)
- WATER DETENTION PONDS

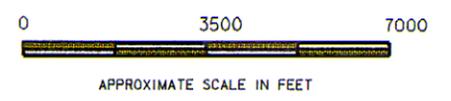
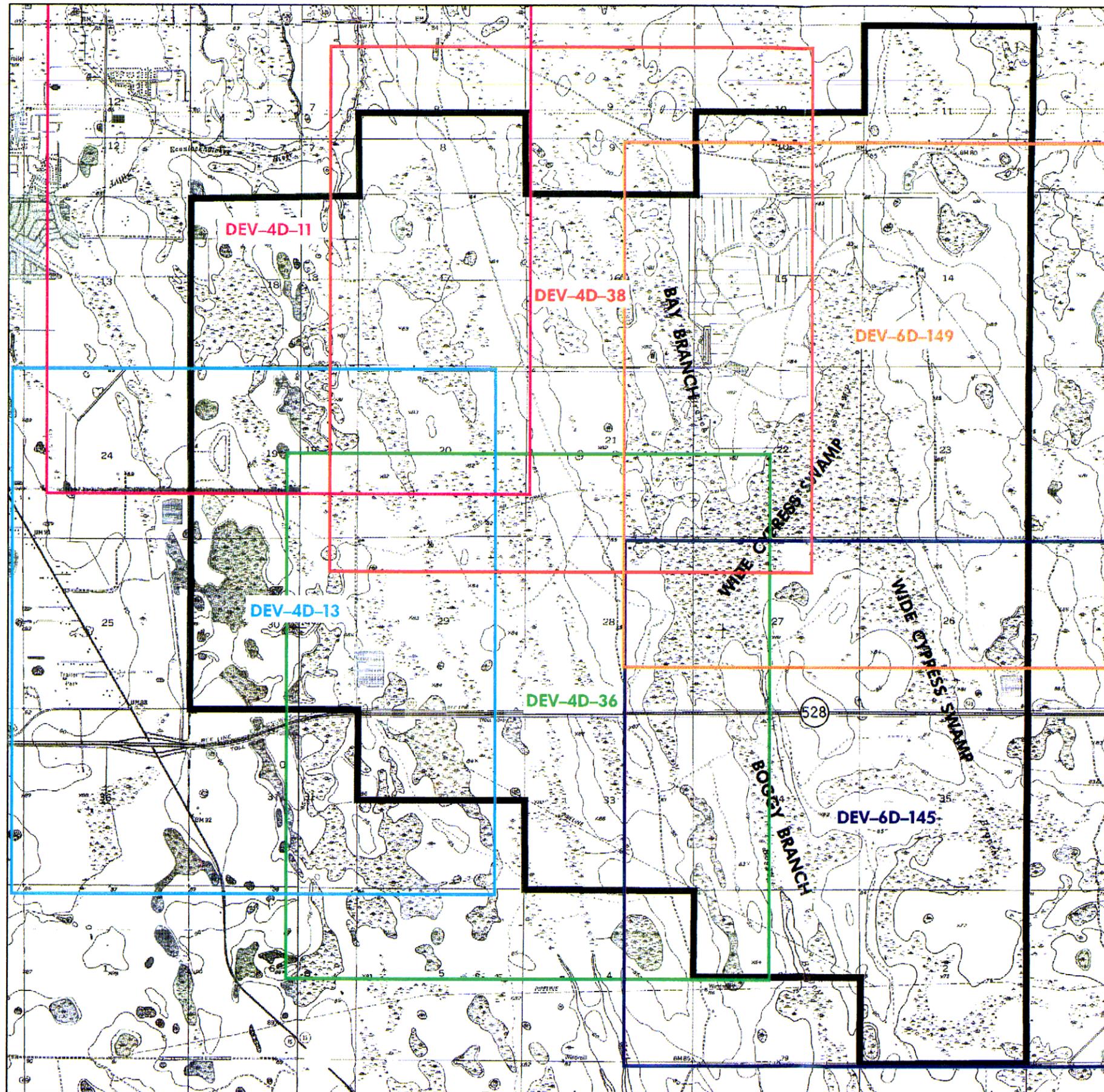


PLATE M-2

**PINECASTLE JEEP RANGE
 ORLANDO, FLORIDA
 ORANGE, COUNTY
 DERP-FUDS# 104FLO40501
 1995 AERIAL PHOTO**



LEGEND

 SITE LOCATION

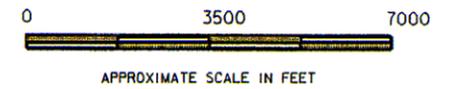
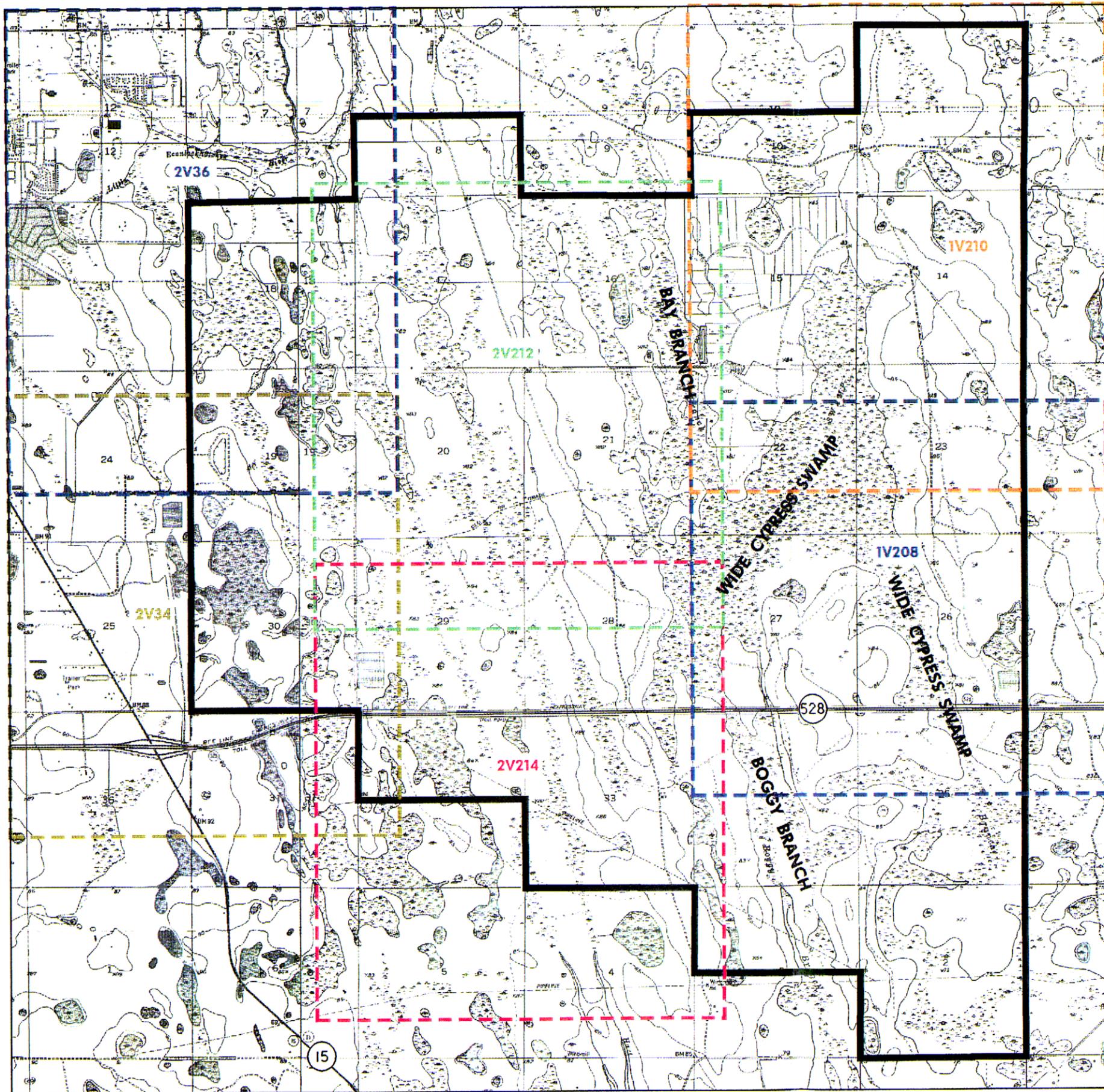


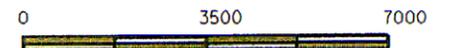
PLATE M-3

PINECASTLE JEEP RANGE
 ORLANDO, FLORIDA
 ORANGE, COUNTY
 DERP-FUDS# 104FL040501
 1947 AIR PHOTO INDEX



LEGEND

 SITE LOCATION



APPROXIMATE SCALE IN FEET



PLATE M-4

PINECASTLE JEEP RANGE
 ORLANDO, FLORIDA
 ORANGE, COUNTY
 DERP-FUDS# 104FL040501
 1958 AIR PHOTO INDEX



**ORANGE COUNTY
FLORIDA**

1990 - 2010 FUTURE LAND USE MAP

	Rural/Agricultural (Max. 10 DU/10 Acres & Agriculture)		Office		Institutional
	Rural Settlement, 1/1, 1/2, 1/5 (1 DU/Acre, 1 DU/2 Acres, & 1 DU/5 Acres)		Commercial		Parks/Recreation/Open Space
	Low Density (Max. 4 DU/Acre)		Traditional Neighborhood District (Area east of Ecor. River - Conceptual Only)		Conservation/Wetland
	Low-Medium Density (Max. 10 DU/Acre)		Activity Center Residential		Water Body
	Medium Density (Max. 20 DU/Acre)		Activity Center Mixed Use		Incorporated City Limits /Right-of-Way
	High Density (Max. 50 DU/Acre)		Industrial		SITE LOCATION

Adopted: Board of County Commissioners - July 1, 1991
Amended: Board of County Commissioners - August 11, 1992



NOT TO SCALE

PLATE M-5

**PINECASTLE JEEP RANGE
ORLANDO, FLORIDA
ORANGE, COUNTY
DERP-FUDS# 104FL040501
FUTURE LAND USE MAP**

PROJ. DATE: SEPT. 1997	DATE OF MAP: 1994
26-SEP-1997 10:07	N:\0EW96B\F2\MAP\LANDUSE.DGN-.SAV

APPENDIX A

REFERENCES

APPENDIX A

REFERENCES

REFERENCES FOR OE/CWM ACTIVITIES

Naval Air Advanced Training Command

- 1946 Letter from Rear Admiral Ralph Davison to the Commanding Officer regarding the Operational Facility Requirements for Post-war Training, dated 19 January 1946. Naval Air Station Jacksonville, Historical Office, Jacksonville, FL.

REFERENCES FOR GEOLOGY AND SOILS

Doolittle, James A., and Schellentrager, Gregg

- 1989 *Soil Survey of Orange County, Florida*. US Department of Agriculture, Soil Conservation Service in cooperation with the University of Florida.

Miller, James A.

- 1986 *Hydrogeologic Framework of the Floridan Aquifer System in Florida and in Parts of Georgia, Alabama, and South Carolina*. USGS Professional Paper 1403-B.

APPENDIX B

GLOSSARY AND ACRONYMS

APPENDIX B

GLOSSARY AND ACRONYMS

AAF	Army Air Field
AA	Anti-Aircraft
AEC	Army Environmental Center
AGO	Adjutant General's Office
AP	Armor Piercing
APDS	Armor Piercing Discarding Sabot
APERS	Antipersonnel
APT	Armor Piercing with Tracer
ASR	Archives Search Report
Aux	Auxiliary
BAR	Browning Automatic Rifle
BD	Base Detonating
BD/DR	Building Demolition/Debris Removal
BE	Base Ejection
BGR	Bombing and Gunnery Range
BLM	Bureau of Land Management
BRAC	Base Realignment And Closure
CADD	Computer-Aided Design/Drafting
Cal	Caliber
CBDA	Chemical and Biological Defense Agency
CBDCOM	Chemical and Biological Defense Command
CE	Corps of Engineers
CEHNC	Corps of Engineers, Engineering and Support Center, Huntsville
CELMS	Corps of Engineers, St. Louis
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CERFA	Community Environmental Response Facilitation Act
CFR	Code of Federal Regulations
cfs	Cubic Feet Per Second
COE	Chief of Engineers
COMP	Composition
CTG	Cartridge
CSM	Chemical Surety Material
CSM	Command Sergeant Major

CWM	Chemical Warfare Material
CWS	Chemical Warfare Service
DA	Department of the Army
DAC	Defense Ammunition Center
DARCOM	Development and Readiness Command
DERA	Defense Environmental Restoration Account
DERP	Defense Environmental Restoration Program
DERP-FUDS	Defense Environmental Restoration Program- Formerly Used Defense Sites
DoD	Department of Defense
DOE	Department of Energy
DOI	Department of Interior
EE/CA	Engineering Evaluation/Cost Analysis
EIS	Environmental Impact Statement
EOD	Explosive Ordnance Disposal
EPA	Environmental Protection Agency
ERDA	Environmental Restoration Defense Account
FDE	Findings and Determination of Eligibility
FFMC	Federal Farm Mortgage Corporation
FS	Feasibility Study
FUDS	Formerly Used Defense Sites
GIS	Graphic Information System
GSA	General Services Administration
HE	High Explosive
HEAT	High Explosive Anti-Tank
HEI	High Explosive Incendiary
HEP	High Explosive Plastic
HTRW	Hazardous Toxic and Radioactive Waste
HTW	Hazardous and Toxic Waste
IAS	Initial Assessment Study
ILLUM	Illuminating
INPR	Inventory Project Report
IRP	Installation Restoration Program
MCX	Mandatory Center of Expertise
MG	Machine Gun
MG	Major General
mm	Millimeter
MT	Mechanical Time
MTSQ	Mechanical Time Super Quick

NARA	National Archives and Records Administration
NAS	Naval Air Station
NCDC	National Climatic Data Center
NCP	National Contingency Plan
NFS	National Forest Service
NG	National Guard
NGVD	National Geodetic Vertical Datum
NOAA	National Oceanic and Atmospheric Administration
NOFA	No Further Action
NPRC	National Personnel Records Center
NRC	National Records Center
OE	Ordnance and Explosives
OSHA	Occupational Safety and Health Administration
PA	Preliminary Assessment
PD	Point Detonating
PIBD	Point Initiating, Base Detonating
PL	Public Law
QASAS	Quality Assurance Specialist Ammunition Surveillance
RA	Removal Action
RAC	Risk Assessment Code
RD	Remedial Design
RG	Record Group
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
SARA	Superfund Amendments and Reauthorization Act
SCS	Soil Conservation Service
SLD	St. Louis District, Corps of Engineers
SSHO	Site Safety and Health Officer
SSHP	Site Safety and Health Plan
SWMU	Solid Waste Management Units
TECOM	Test Evaluation Command
TEU	Technical Escort Unit
TNT	Trinitrotoluene
TP	Target Practice
USA	United States of America
USACE	U.S. Army Corps of Engineers
USAESCH	U.S. Army Engineering and Support Center, Huntsville, Alabama
USAEDH	U.S. Army Engineer Division, Huntsville, Alabama

USATHMA	U.S. Army Toxic and Hazardous Materials Agency
USC	United States Code
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UXO	Unexploded Ordnance
WAA	War Assets Administration
WD	War Department
WNRC	Washington National Records Center

APPENDIX C
TEXT/MANUALS
(NOT USED)

APPENDIX D
REPORTS/STUDIES

APPENDIX D

REPORTS/STUDIES

D-1 Inventory Project Report

APPENDIX D-1
INVENTORY PROJECT REPORT



DEPARTMENT OF THE ARMY
U.S. Army Corps of Engineers
WASHINGTON, D.C. 20314-1000

04 JAN 1995

REPLY TO
ATTENTION OF:

CEMP-RF (200-1a)

MEMORANDUM FOR

COMMANDER, HUNTSVILLE DIVISION, ATTN: CEHND-PM-SO
COMMANDER, SOUTH ATLANTIC DIVISION, ATTN: CESAD-PD-R

SUBJECT: Defense Environmental Restoration Program for Formerly
Used Defense Sites (DERP-FUDS), Inventory Project Report (INPR)
for Site I04FL040500, Pinecastle Jeep Range, FL

1. References:

a. Memorandum, CEHND-PM-SO, 23 Aug 94, SAB.

b. DERP-FUDS Program Manual, U.S. Army Corps of Engineers,
Directorate of Military Programs, Environmental Restoration
Division, Washington, D.C., 8 Dec 93.

2. This memorandum authorizes an ordnance and explosive waste
(OE) project (project number I04FL040501) at the subject site.
Since ordnance has not been confirmed during the preliminary
assessment, the first phase of this project is limited to a site
inspection (SI). All work will be executed in accordance with
reference 1b.

3. Overall Project Management for the subject site is the
responsibility of Jacksonville District. This memorandum assigns
Technical Management responsibility for execution of this OE
project through remedial design to the Huntsville Division. If
required, execution of any remedial action will be performed by
Jacksonville District.

4. CEMP-RF POC for this action is Mr. Jim Coppola,
(202) 504-4992.

FOR THE DIRECTOR OF MILITARY PROGRAMS:

For

CARY JONES

Chief, Environmental Restoration
Division

Directorate of Military Programs

CF:
CESAJ-PD-EE

Britton/et/5482

8-18I.PRO/Disk 8

CEHND-PM-SO (200-1c)

23 August 1994

MEMORANDUM FOR Commander, HQUSACE, ATTN: CEMP-RF (Mr. Jim Coppola), 20 Massachusetts Avenue NW, Washington, DC 20314-1000

SUBJECT: DERP-FUDS Inventory Project Report (INPR) Requiring an Ordnance and Explosive Waste (OEW) Engineering Evaluation and Cost Analysis (EE/CA)

1. The enclosed INPR has been submitted for further investigation or action by Huntsville Division. We have reviewed the INPR and recommend a phased EE/CA be scheduled for the following site:

DIVISION	PROJECT NO.	RAC	SITE NAME
SAD	I04FL040501	3	Pinecastle Jeep Range (encl)

2. A completed DD1391 cost estimate and RAC score is included with the enclosure. The POC is Mr. Robert Britton, DSN 645-5482 or commercial 205-955-5482.

FOR THE DIRECTOR OF PROGRAMS AND PROJECT MANAGEMENT:

Encl

LAWSON S. LEE, P.E.
Chief, Ordnance and Technical Programs Division

CF:

Commander, U.S. Army Engineer Division, South Atlantic Division, ATTN: CESAD-PD-R, Room 313, 77 Forsyth Street SW, Atlanta, GA 30335-6801

PM-OT, Britton/AVINS/READ

PM-ED, Douglas

PM-SO, Chamness

File/Read

N/S 8/24/94 PM-SO, Galloway

Q/B 8/31/94 PM-OT, Britton



DEPARTMENT OF THE ARMY

SOUTH ATLANTIC DIVISION, CORPS OF ENGINEERS

ROOM 313, 77 FORSYTH ST., S.W.

ATLANTA, GEORGIA 30335-6801

REPLY TO
ATTENTION OF:

1-494
CESAD-PD-R (200)

14 JUL 1994

MEMORANDUM FOR

COMMANDER, USACE, ATTN: CEMP-ZA, WASH DC 20314-1000
✓ COMMANDER, HUNTSVILLE DIVISION, HUNTSVILLE, AL 35807-4301

SUBJECT: DERP-FUDS Inventory Project Reports (INPR) for
Fullerville Target (I04FL091200), Pinecastle Jeep Range
(I04FL040500), St. Augustine Satellite Gunnery Field,
(I04FL041500)

1. I am forwarding the INPR's for the subject sites for appropriate action. The proposed Ordnance Explosive Waste (OE) projects are eligible for DERP-FUDS.
2. I recommend that CEHND determine if further study and remedial action are required at the sites.
3. The Division focal point for this effort is Mr. Gary Mauldin, CESAD-PD-R, at (404) 331-6043. The Division focal point for actions beyond the preliminary assessment phase is Richard Connell, CESAD-PM-H, at (404) 331-7045.

3 Encls

ROGER F. YANKOUBE
Brigadier General, USA
Commanding

CF (w/encls):
CDR, JACKSONVILLE DISTRICT, ATTN: CESAJ-PD-EE



DEPARTMENT OF THE ARMY
JACKSONVILLE DISTRICT CORPS OF ENGINEERS
P. O. BOX 4970
JACKSONVILLE, FLORIDA 32232-0019

REPLY TO
ATTENTION OF

CESAJ-PD-EE (1105-2-10a)

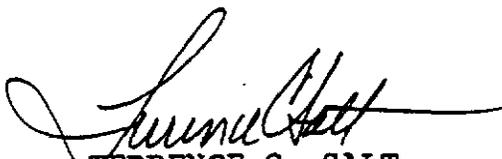
9 May 1994

MEMORANDUM FOR Commander, South Atlantic Division

SUBJECT: Defense Environmental Restoration Program - Formerly Used Defense Sites (DERP-FUDS) Inventory Project Reports (INPRs) for Site Nos. I04FL091200 (Fullerville Target), I04FL040500 (Pinecastle Jeep Range), and I04FL041500 (St. Augustine Satellite Gunnery Field)

1. These INPRs report on the DERP-FUDS preliminary assessment of the former bomb target areas. Site visits were conducted in the month of January 1994. Site survey summary sheet and site maps are enclosed for each of the subject sites.
2. We have determined that the sites were used by the Army and the Navy. Recommended Findings and Determination of Eligibility are included in the enclosures.
3. We have determined that the hazardous waste (Ordnance and Explosive Waste (OEW)) at these sites meets the eligibility criteria as defined by DERP-FUDS policies. Project summary sheets are enclosed for each of the potential OEW projects.
4. I recommend that you approve these INPRs and forward them to the Huntsville Division for further coordination. This coordination will result in a determination of the need for further study of the subject sites.
5. Point of contact for the District is Mr. Ivan Acosta at 904-232-1693.

3 Encls


TERRENCE C. SALT
Colonel, Corps of Engineers
Commanding

**SITE SURVEY SUMMARY SHEET
FOR
DERP-FUDS SITE NO. I04FL040500
PINECASTLE JEEP RANGE
28 January 1994**

SITE NAME(S). Pinecastle Jeep Range; also referred to as Pinecastle Target Range Reservation.

LOCATION. The site is located approximately 3 miles east-northeast of Orlando International Airport in Sections 8, 10, 11, and 14 through 35 in Township 23 South, Range 31 East and Sections 2 and 3 in Township 24 South, Range 31 East in Orange County, Florida (see Attachment 1).

SITE HISTORY. In 1943, the United States acquired by lease 12,483 acres of land for a target range. The range site, an offpost of Pinecastle Airfield, was developed as Pinecastle Jeep Range. The Army Air Force Air Command utilized the site as a jeep training target range until 1946. The mobile target training sub-field was used primarily by pilot and gunnery trainers. The facility contained a ground-to-ground moving target, jeep track, turret range for machine guns, and rifle target ranges (see Attachment 2). The facility was reported as surplus by the Army Air Force on 2 December 1946. The lease on the 12,483 acres was terminated by the War Department on 5 December 1947, but copies of the disposal documents are not available.

SITE VISIT. A site visit was conducted on 14 January 1994 by J. Fugitt and S. Newchurch, Ecology and Environment, Inc. (E & E). Access to the entire 12,483 acres was limited to accessible roads. Much of the property is pasture, cypress swamp, and wooded areas. E & E observed that portions of the concrete curbing associated with the jeep track were still present. A large municipal landfill was observed on site. The current site conditions based on the site visit and 1993 aerial photographs are shown on Attachment 3.

CATEGORY OF HAZARD. Ordnance and Explosive Waste (OEW).

PROJECT DESCRIPTION. One potential OEW project may exist at this site. This facility is a former United States Air Force firing range and was possibly a bomb target; therefore, OEW contamination may be present on site.

AVAILABLE STUDIES AND REPORTS. No reports specifically about the site were identified; however, files for the nearby Pinecastle Air Force Base at AFHRA (Maxwell Air Force Base) contain limited information about the site.

PA POC. Ivan Acosta (904) 232-1693.

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

Pinecastle Jeep Range, FL

Site No. IO4FL040500

FINDINGS OF FACT

1. In 1943, the United States acquired by lease 12,483.00 acres of land for a target range. The range site, an offpost of the Pinecastle Airfield, was located in Orange County, east of the City of Orlando, Florida. The site was developed and known as the Pinecastle Jeep Range.
2. The Army Air Force Air Command utilized the site as a jeep training target range until 1946. The mobile target training sub-field was used primarily by pilot and gunnery trainees. Approximately 45 targets, a target storehouse, pit latrines, and minimum service roads were proposed and authorized for construction on the site. However, it is not known whether such improvements were completed.
3. The facility was reported as surplus by the Army Air Force on 2 December 1946. The lease on the 12,483.00 acres was terminated by the War Department on 5 December 1947, but copies of the disposal documents are not available. Currently, the site is owned by several local government agencies and private individuals, and is utilized for various purposes, including residential, highway/expressway, landfill and undeveloped pasture land.

DETERMINATION

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

14 July 94

DATE



ROGER F. YANKOUBE
Brigadier General, USA
Commanding

PROJECT SUMMARY SHEET
FOR
DERP-FUDS OEW PROJECT NO. I04FL040501
PINECASTLE JEEP RANGE
SITE NO. I04FL040500
28 January 1994

PROJECT DESCRIPTION. One potential ordnance and explosive waste (OEW) project exists at former Pinecastle Jeep Range in Orange County, Florida. The site is a former target range and possibly a bomb target. Therefore, it is possible that OEW contamination is present on site.

PROJECT ELIGIBILITY. Pinecastle Jeep Range is eligible for DERP-FUDS. The project has been evaluated in accordance with the 16 March 1993 DERP-FUDS Standing Operational Procedures for Performing Preliminary Assessments at Potential Ordnance and Explosive Waste Sites.

POLICY CONSIDERATIONS. The site could have been contaminated by the United States military and is a possible danger to the public. Currently, Department of Defense (DoD) policy permits remediation of DoD-generated ordnance.

PROPOSED PROJECT. The Inventory Project Report should be referred to Huntsville Division for a determination of further action.

RISK ASSESSMENT CATEGORIZATION (RAC). Attached (RAC 3).

DISTRICT POC. Ivan Acosta, CESAJ-PD-EE, (904) 232-1693.

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

Site Name	<u>PINECASTLE JEEP RANGE</u>	Rater's Name	<u>BILL McPHERSON</u>
Site Location	<u>ORANGE FL</u>	Phone No.	<u>205) 953-4588</u>
DERP Project #	<u>104 F1040500</u>	Organization	<u>CEHND - PH-50</u>
Date Completed	<u>27 JUL 94</u>	RAC Score	<u>3</u>

OEW RISK ASSESSMENT:

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

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

TYPE OF ORDNANCE

(Circle all values that apply)

A. Conventional Ordnance and Ammunition	VALUE
Medium/Large Caliber (20 mm and larger)	10
Bombs, Explosive	(10)
Grenades, Hand and Rifle, Explosive	10
Landmines, Explosive	10
Rockets, Guided Missiles, Explosive	10
Detonators, Blasting Caps, Fuzes, Boosters, Bursters	6
Bombs, Practice (w/spotting charges)	6
Grenades, Practice (w/spotting charges)	4
Landmines, Practice (w/spotting charges)	4
Small Arms (.22 cal - .50 cal)	(1)
Conventional Ordnance and Ammunition (Select the largest single value)	10

What evidence do you have regarding conventional OEW? SITE WAS USED AS A TARGET RANGE FOR SMALL ARMS, STRONG POSSIBILITIES WAS ALSO USED AS A BOMBING RANGE

Munition (Container) Containing White Phosphorus or other Pyrophoric Material (i.e., Spontaneously Flammable)	10
Munition Containing A Flame or Incendiary Material (i.e., Napalm, Triethylaluminum Metal Incendiaries)	6
Flares, Signals, Simulators	4
Pyrotechnics <u>(Select the largest single value)</u>	<u>0</u>
What evidence do you have regarding pyrotechnics?	<u>NONE</u>

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

	VALUE
Primary or Initiating Explosives (Lead Styphnate, Lead Azide, Nitroglycerin, Mercury Azide, Mercury Fulminate, Tetracene, etc.)	10
Demolition Charges	10
Secondary Explosives (PETN, Compositions A, B, C, Tetryl, TNT, RDX, HMX, HBX, Black Powder, etc.)	8
Military Dynamite	6
Less Sensitive Explosives (Ammonium Nitrate, Explosive D, etc.)	3
High Explosives <u>(Select the largest single value)</u>	<u>0</u>
What evidence do you have regarding bulk explosives?	<u>NONE</u>

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

	VALUE
Solid or Liquid Propellants	6
Propellants	<u>0</u>
What evidence do you have regarding bulk propellants?	<u>NONE</u>

or explosive materials on a formerly used DOD site.

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

A. Locations of OEW Hazards

	VALUE
On the surface	5
Within Tanks, Pipes, Vessels or Other confined locations.	4
Inside walls, ceilings, or other parts of Buildings or Structures.	3
Subsurface	②
Location (Select the single largest value)	<u>2</u>

What evidence do you have regarding location of OEW? POSSIBLE SUBSURFACE,
AERIAL PHOTOS SHOW POSSIBLE CRATELS, SMALL TANKS MAY BE FOUND ON SURFACE/SUBSURFACE

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

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

What are the nearest inhabited structures? RESIDENTIAL AREA, HIGHWAYS,
LAND FILL

area, not the installation boundary.

	VALUE
26 and over	5
16 to 25	4
11 to 15	3
6 to 10	2
1 to 5	1
0	0

Number of Buildings (Select the single largest value)

5

Narrative RESIDENTIAL AREA

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

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

Types of Buildings (Select the largest single value)

5

Describe types of buildings in the area.

SCHOOLS, RESIDENTIAL,
COMMERCIAL

BARRIER

VALUE

No barrier or security system

5

Barrier is incomplete (e.g., in disrepair or does not completely surround the site). Barrier is intended to deny egress from the site, as for a barbed wire fence for grazing.

4

A barrier, (any kind of fence in good repair) but no separate means to control entry. Barrier is intended to deny access to the site.

3

Security guard, but no barrier

2

Isolated site

1

A 24-hour surveillance system (e.g., television monitoring or surveillance by guards or facility personnel) which continuously monitors and controls entry onto the facility; or

0

An artificial or natural barrier (e.g., a fence combined with a cliff), which completely surrounds the facility; and a means to control entry, at all times, through the gates or other entrances to the facility (e.g., an attendant, television monitors, locked entrances, or controlled roadway access to the facility).

Accessibility (Select the single largest value)

5

Describe the site accessibility. OPEN TO PUBLIC, SEVERAL TRAILS

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

VALUE

Expected

5

None Anticipated

0

Site Dynamics (Select largest value)

5

Describe the site dynamics. DEVELOPMENT EXPECTED IN NEAR FUTURE

Apply this value to Hazard Probability Level.

TABLE 2

HAZARD PROBABILITY

Description	Level	Hazard Probability Value
FREQUENT	A	28 or greater
PROSABLE	B	22 to 27
OCCASIONAL	C	16 to 21
REMOTE	D	9 to 15
IMPROBABLE	E	less than 9

* Apply Hazard Probability Level to Table 3.

Part III. RISK ASSESSMENT - The RAC is determined using the following Table 3. Enter with the results of the hazard probability and hazard severity values.

TABLE 3

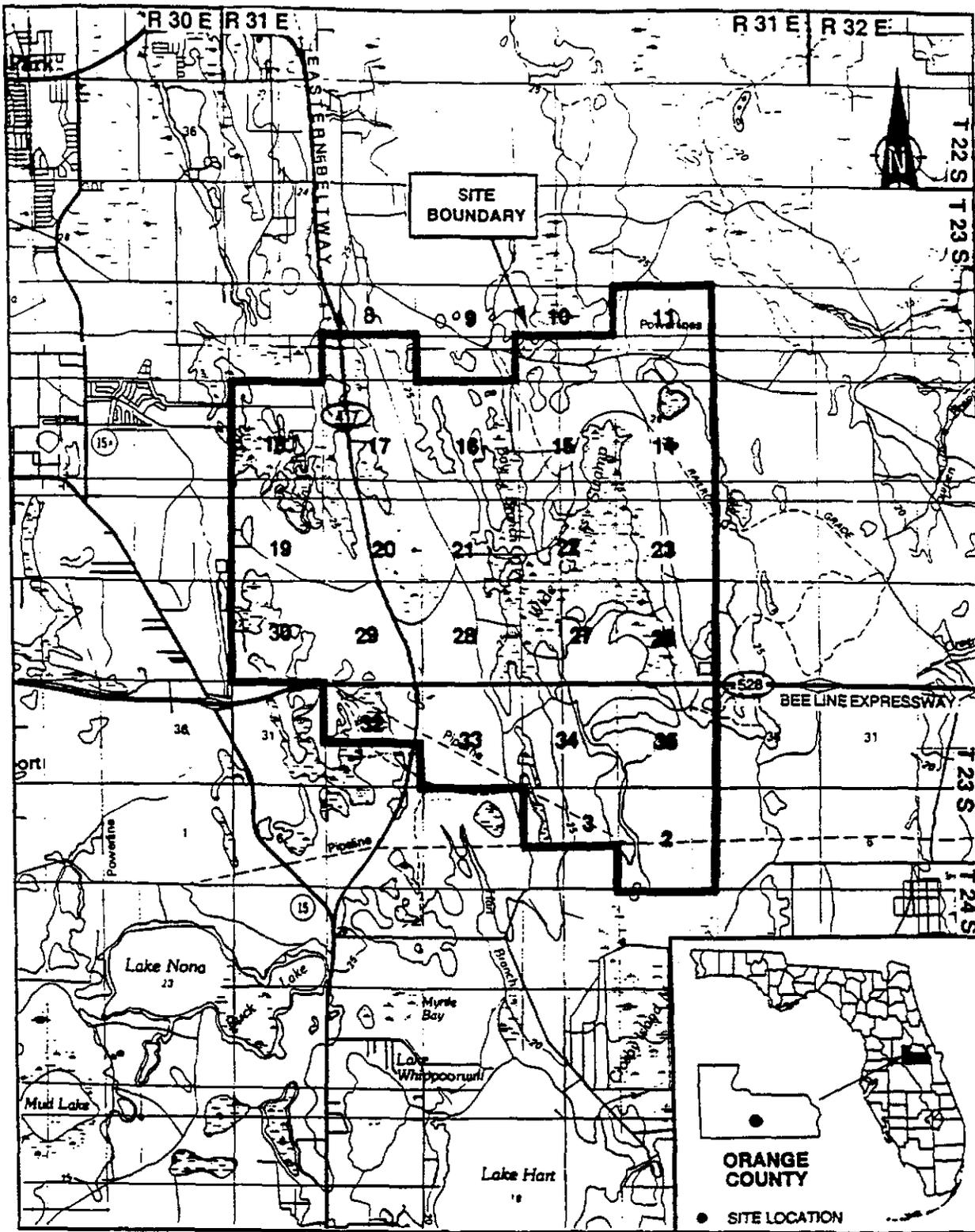
Probability Level		FREQUENT A	PROBABLE B	OCCASIONAL C	REMOTE D	IMPROBABLE E
Severity Category:						
CATASTROPHIC	I	1	1	2	3	4
CRITICAL	II	1	2	3	4	5
MARGINAL	III	2	3	4	4	5
NEGLIGIBLE	IV	3	4	4	5	5

RISK ASSESSMENT CODE (RAC)

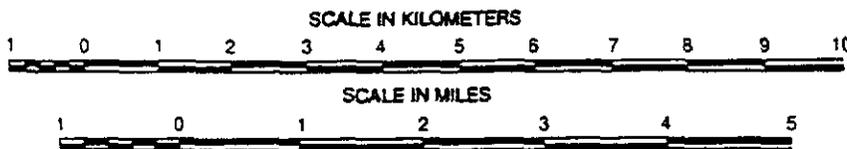
- RAC 1 Expedite INPR, recommending further action by CEHND - Immediately call CEHND-ED-SY--commercial 205-955-4968 or DSN 645-4968.
- RAC 2 High priority on completion of INPR - Recommend further action by CEHND.
- RAC 3** Complete INPR - Recommend further action by CEHND.
- RAC 4 Complete INPR - Recommend further action by CEHND.
- RAC 5 Usually indicates that no further action (NOFA) is necessary. Submit NOFA and RAC to CEHND.

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

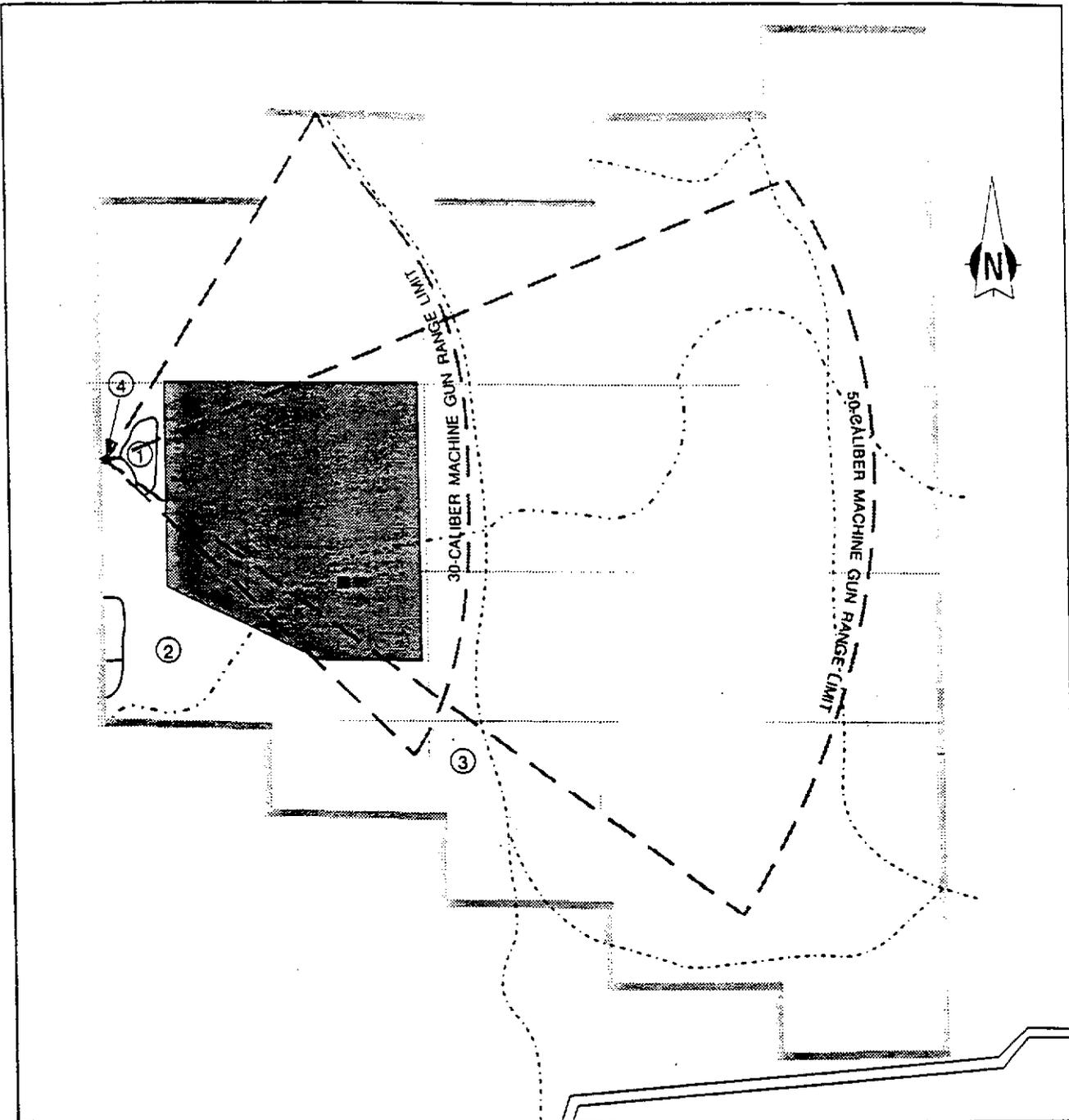
Primary use of site was as a small arms target range. Possibility of the UB-2 Azon Bomb being tested and old Aerial maps showing possible bomb casters suggests the possibility of OEW.



SOURCE: U.S.G.S. 1:24 000-scale Topographic Maps: Kissimmee, Florida 1979; Orlando, Florida 1979.



Attachment 1
LOCATION MAP — PINECASTLE JEEP RANGE, ORANGE COUNTY, FLORIDA



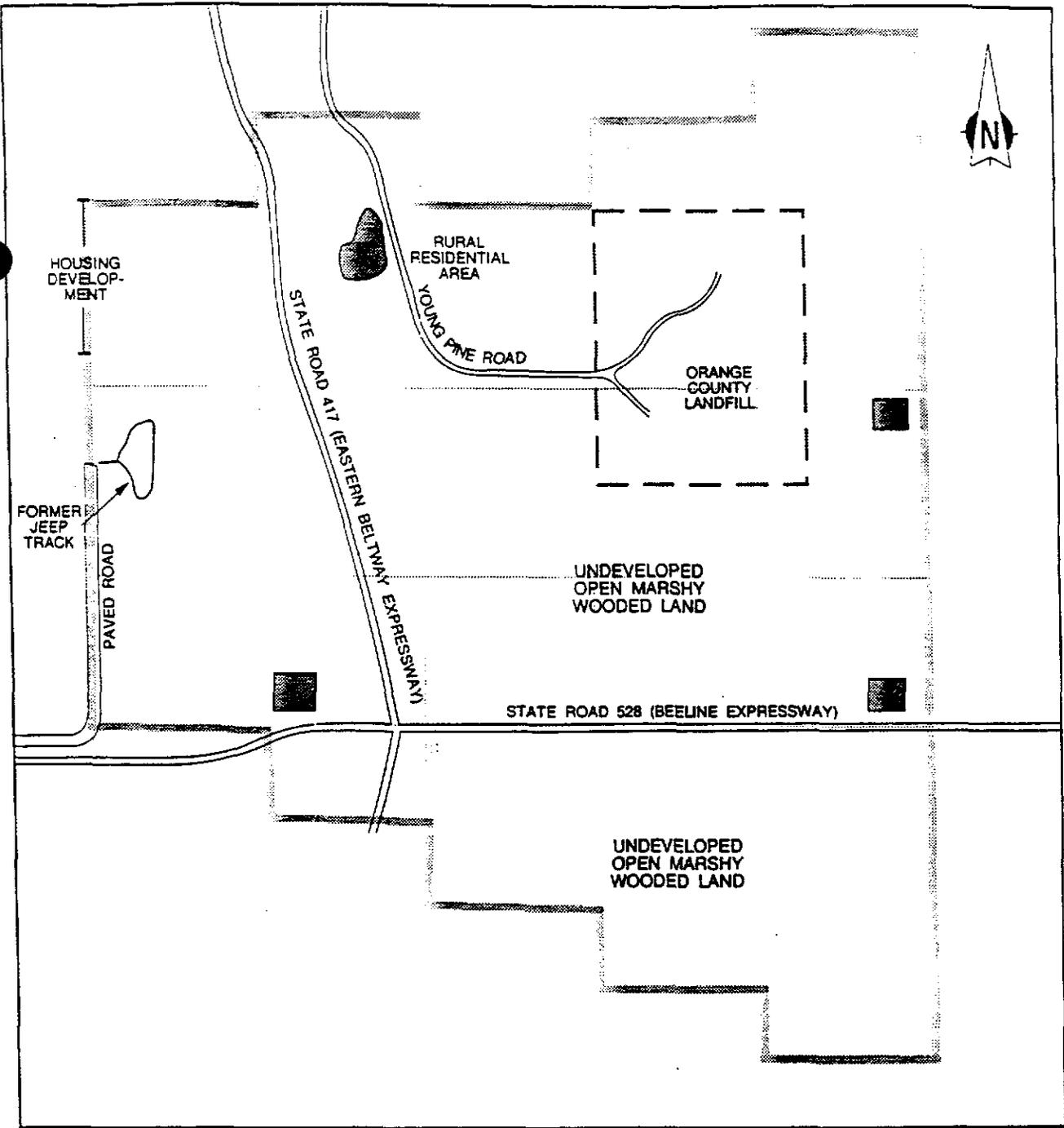
SOURCE: United States Air Force Aerial Photograph and Map, 1943; Orange County Aerial Photograph, 1947; Ecology and Environment, Inc., 1994.



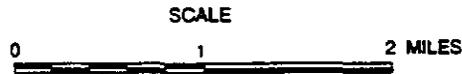
KEY:

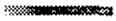
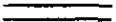
- | | | | |
|---|---------------------------------------|---|--|
| ■ | Building | ① | Jeep Track |
| ■ | Suspected Bomb Target Area - See Text | ② | Rifle Range |
| ⋯ | Former Railroad Bed | ③ | Possible Rifle Range |
| — | Site Boundary | ④ | Firing Turret for 30-Caliber and 50-Caliber Machine Guns |
| — | Paved Road | | |
| ⋯ | Trail | | |

Attachment 2 FORMER SITE LAYOUT OF PINECASTLE JEEP RANGE



SOURCE: Ecology and Environment, Inc., 1994.



- KEY:
-  Property Boundary
 -  Paved Road
 -  Borrow Pit

Attachment 3 CURRENT SITE LAYOUT OF PINECASTLE JEEP RANGE

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

Site Name	<u>Pinecastle Jeep Range</u>	Rater's Name	<u>S. Newchurch</u>
Site Location	<u>Orange County, Florida</u>	Phone No.	<u>(904) 877-1978</u>
DERP Project #	<u>I04FLO40601</u>	Organization	<u>Ecology and Environment, Inc.</u>
Date Completed	<u>January 28, 1994</u>	RAC Score	<u>3</u>

OEW RISK ASSESSMENT:

This risk assessment procedure was developed in accordance with MIL-STD 882B and AR 385-10. The RAC score will be used by CEHND to prioritize the remedial action at this site. The OEW risk assessment should be based upon best available information resulting from records searches, reports of Explosive Ordnance Disposal (EOD) detachment actions, and field observations, interviews, and measurements. This information is used to assess the risk involved based upon the potential OEW hazards identified at the site. The risk assessment is composed of two factors, hazard severity and hazard probability. Personnel involved in visits to potential OEW sites should view the CEHND videotape entitled "A Life Threatening Encounter: OEW."

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

TYPE OF ORDNANCE
 (Circle all values that apply)

A. Conventional Ordnance and Ammunition	VALUE
Medium/Large Caliber (20 mm and larger)	10
Bombs, Explosive	(10)
Grenades, Hand and Rifle, Explosive	10
Landmines, Explosive	10
Rockets, Guided Missiles, Explosive	10
Detonators, Blasting Caps, Fuzes, Boosters, Bursterns	6
Bombs, Practice (w/spotting charges)	6
Grenades, Practice (w/spotting charges)	4
Landmines, Practice (w/spotting charges)	4
Small Arms (.22 cal - .50 cal)	(1)
Conventional Ordnance and Ammunition (Select the largest single value)	<u>10</u>

What evidence do you have regarding conventional OEW? A 1943 site diagram details the type of ordnance (rifles and 30-caliber and 50-caliber machine guns). File information suggest that the site might have been used as a bomb target and that the VB-2 Azon bomb was tested on site; however, no

A. (Cont. direct evidence that the 15 - 1200 bomb was observed on site.

3. Pyrotechnics (For munitions not described above.)

	VALUE
Munition (Container) Containing White Phosphorus or other Pyrophoric Material (i.e., Spontaneously Flammable)	10
Munition Containing A Flame or Incendiary Material (i.e., Napalm, Triethylaluminum Metal Incendiaries)	6
Flares, Signals, Simulators	4
Pyrotechnics (Select the largest single value)	<u>0</u>
What evidence do you have regarding pyrotechnics? <u>No evidence of pyrotechnics was found.</u>	

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

	VALUE
Primary or Initiating Explosives (Lead Styphnate, Lead Azide, Nitroglycerin, Mercury Azide, Mercury Fulminate, Tetracene, etc.)	10
Demolition Charges	10
Secondary Explosives (PETN, Compositions A, B, C, Tetryl, TNT, RDX, HMX, HBX, Black Powder, etc.)	8
Military Dynamite	6
Less Sensitive Explosives (Ammonium Nitrate, Explosive D, etc.)	3
High Explosives (Select the largest single value)	<u>0</u>
What evidence do you have regarding bulk explosives? <u>No evidence of bulk high explosives was found.</u>	

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

	VALUE
Solid or Liquid Propellants	6
Propellants	<u>0</u>
What evidence do you have regarding bulk propellants? <u>No evidence of bulk propellants was found.</u>	

E. Radiological/Chemical Agent/Weapons

	VALUE
Toxic Chemical Agents (Choking, Nerve, Blood, Blister)	25
War Gas Identification Sets	20
Radiological	15
Riot Control and Miscellaneous (Vomiting, Tear, incendiary and smoke)	5
Radiological/Chemical Agent <u>(Select the largest single value)</u>	<u>0</u>
What evidence do you have of chemical/radiological OEW?	<u>none</u>

TOTAL HAZARD SEVERITY VALUE 10
(Sum of Largest Values for A through E--Maximum of 61)
 Apply this value to Table 1 to determine Hazard Severity Category.

TABLE 1

HAZARD SEVERITY*

Description	Category	Hazard Severity Value
CATASTROPHIC	I	22 and greater
CRITICAL	II	11 to 21
MARGINAL	<u>III</u>	6 to 10
NEGLIGIBLE	IV	1 to 5
**NONE		0

* Apply Hazard Severity Category to Table 3.

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

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

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

A. Locations of OEW Hazards

	VALUE
On the surface	5
Within Tanks, Pipes, Vessels or Other confined locations.	4
Inside walls, ceilings, or other parts of Buildings or Structures.	3
Subsurface	(2)
Location (Select the single largest value)	<u>5</u> 2

What evidence do you have regarding location of OEW? No direct evidence.

It is assumed that machine gun and rifle ammunition could be on the ground surface. A 1947 aerial photograph show possible impact craters, which implies surface or subsurface exposure.

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

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

What are the nearest inhabited structures? A rural residential area is located on site along the Orange County Landfill access road. Two major highways cross the site.

C. Numbers of buildings within a 2 mile radius measured from the OEW hazard area, not the installation boundary.

	VALUE
26 and over	5
16 to 25	4
11 to 15	3
6 to 10	2
1 to 5	1
0	0

Number of Buildings (Select the single largest value) 5

Narrative A residential housing development is located on site.

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

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

Types of Buildings (Select the largest single value) 5

Describe types of buildings in the area. Schools, residential, and commercial.

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

BARRIER	VALUE
No barrier or security system	5
Barrier is incomplete (e.g., in disrepair or does not completely surround the site). Barrier is intended to deny egress from the site, as for a barbed wire fence for grazing.	4
A barrier, (any kind of fence in good repair) but no separate means to control entry. Barrier is intended to deny access to the site.	3
Security guard, but no barrier	2
Isolated site	1
A 24-hour surveillance system (e.g., television monitoring or surveillance by guards or facility personnel) which continuously monitors and controls entry onto the facility; or An artificial or natural barrier (e.g., a fence combined with a cliff), which completely surrounds the facility; and a means to control entry, at all times, through the gates or other entrances to the facility (e.g., an attendant, television monitors, locked entrances, or controlled roadway access to the facility).	0

Accessibility (Select the single largest value) 5

Describe the site accessibility. The site is very large, and several trails cross the site area. Access to the site is unrestricted.

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

	VALUE
Expected	5
None Anticipated	0
Site Dynamics (Select largest value)	<u>5</u>

Describe the site dynamics. Land development is expected to increase in the immediate vicinity of the site.

TOTAL HAZARD PROBABILITY VALUE

(Sum of Largest Values for A through F--Maximum of 30)

27

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

TABLE 2

HAZARD PROBABILITY

Description	Level	Hazard Probability Value
FREQUENT	A	28 or greater
PROBABLE	B	22 to 27
OCCASIONAL	C	16 to 21
REMOTE	D	9 to 15
IMPROBABLE	E	less than 9

* Apply Hazard Probability Level to Table 3.

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

TABLE 3

Probability Level		FREQUENT A	PROBABLE B	OCCASIONAL C	REMOTE D	IMPROBABLE E
Severity Category:						
CATASTROPHIC	I	1	1	2	3	4
CRITICAL	II	1	2	3	4	5
MARGINAL	III	2	3	4	4	5
NEGLIGIBLE	IV	3	4	4	5	5

RISK ASSESSMENT CODE (RAC)

- RAC 1 Expedite INPR, recommending further action by CEHND - Immediately call CEHND-ED-SY--commercial 205-955-4968 or DSN 645-4968.
- RAC 2 High priority on completion of INPR - Recommend further action by CEHND.
- RAC 3** Complete INPR - Recommend further action by CEHND.
- RAC 4 Complete INPR - Recommend further action by CEHND.
- RAC 5 Usually indicates that no further action (NOFA) is necessary. Submit NOFA and RAC to CEHND.

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

Historical records indicate that the site was used for target practice and might have been used as a bomb target. It has been assumed that the site was used as a bomb target for this RAC. This assumption is based on markings observed on historical aerial photographs and a report in the Air Force Historical Records Agency at Maxwell Air Force Base describing practice bombing missions.

The site is located adjacent to a highly developed area in the vicinity of Orlando, Florida. The potential for further development on site is considered probable, given that two major highways cross the site.

APPENDIX E

LETTERS/MEMORANDA/MISCELLANEOUS ITEMS

(NOT USED)

APPENDIX F
REAL ESTATE DOCUMENTS

APPENDIX F - REAL ESTATE DOCUMENTS

The archives search did not locate any real estate information that contradicted or modified the information contained in the Inventory Project Report (INPR) for the **Pinecastle Jeep Range**, furnished in Appendix D-1.

APPENDIX G
NEWSPAPER/JOURNALS
(NOT USED)

APPENDIX H

INTERVIEWS

(NOT USED)

APPENDIX I
PRESENT SITE PHOTOGRAPHS



Photo 1. Looking from North Boundary of Range, Western Portion



Photo 2. Typical Former Range Open Land



Photo 3. Residential Development on Range

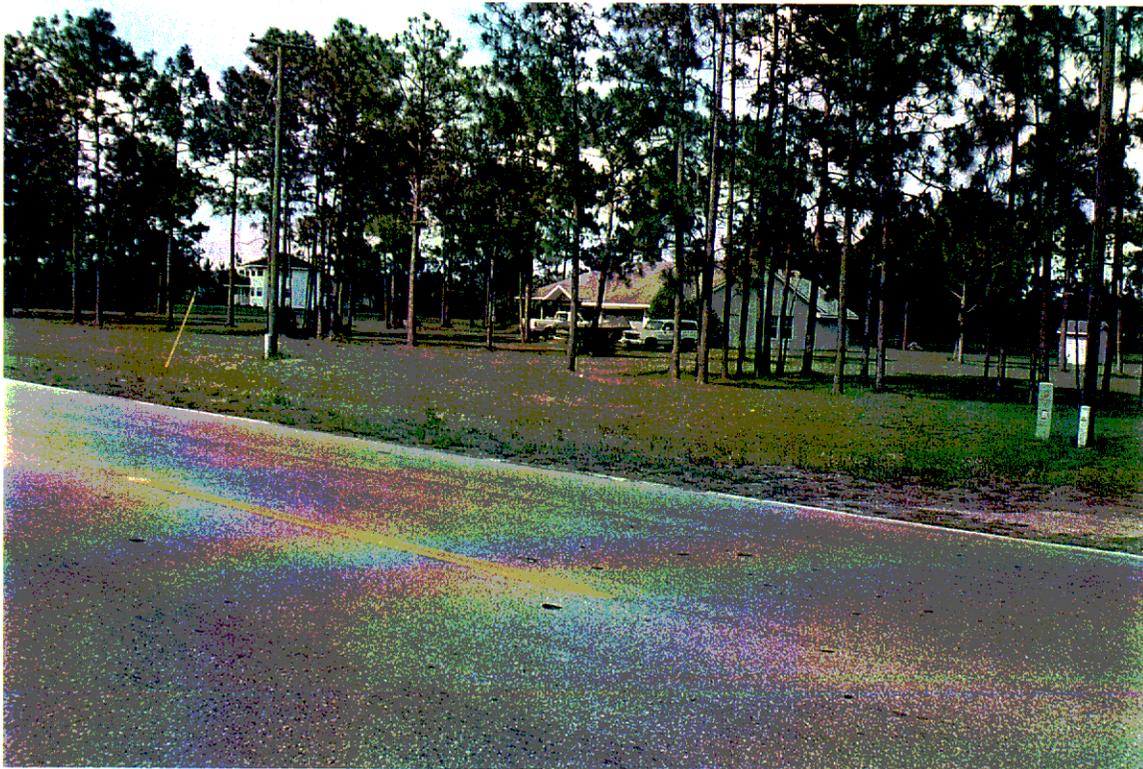


Photo 4. Residential Development on Range



Photo 5. County Roadway through Range



Photo 6. Typical Heavily Vegetated Land on Former Range



Photo 7. Typical Heavily Vegetated Land on Former Range

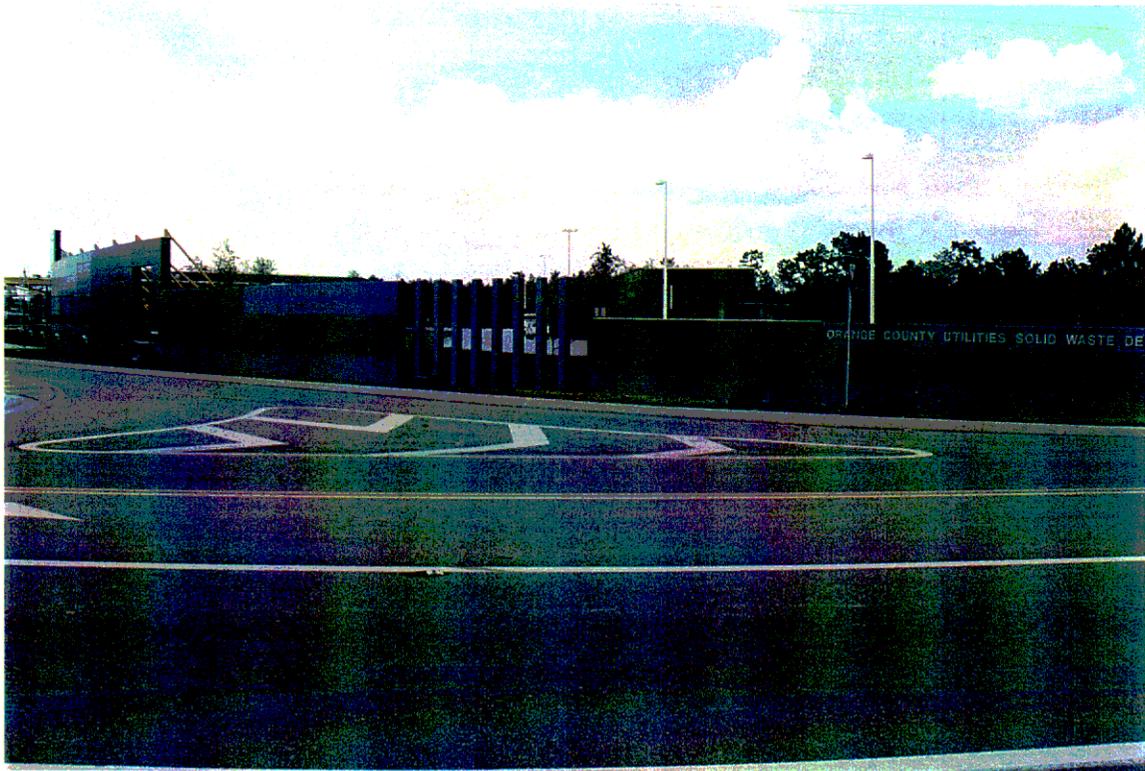


Photo 8. Waste Disposal Facility Buildings



Photo 9. Waste Disposal Facility Landfill



Photo 10. County Water Reclamation Facility



**Photo 11. Northern Portion of Possible Military Use Area
along Highway 417, Looking West**



**Photo 12. Central Portion of Possible Military Use Area
along Highway 417, Looking West**



**Photo 13. Central Portion of Possible Military Use Area
along Highway 417, Looking West**



**Photo 14. Southern Portion of Possible Military Use Area
along Highway 417, Looking West**



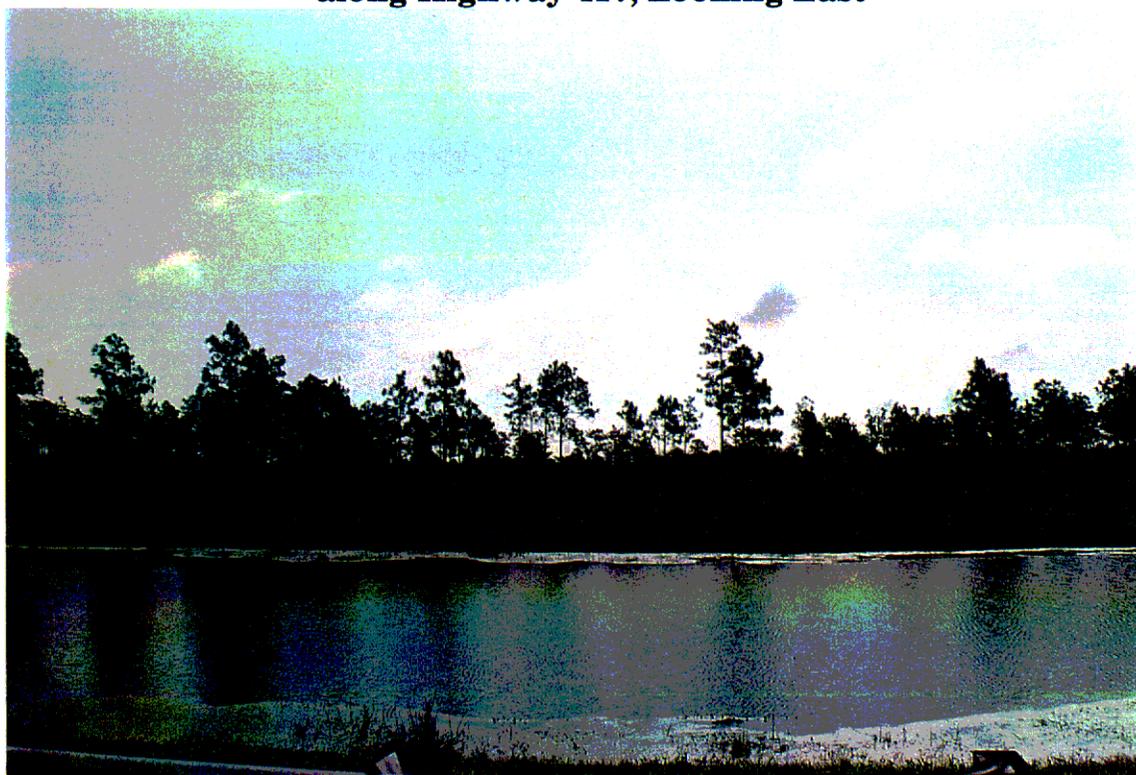
**Photo 15. Southern Portion of Possible Military Use Area
along Highway 417, Looking South**



Photo 16. Southwest Corner of Former Range



**Photo 17. Southern Portion of Possible Military Use Area
along Highway 417, Looking East**



**Photo 18. Central Portion of Possible Military Use Area
along Highway 417, Looking East**



**Photo 19. Northern Portion of Possible Military Use Area
along Highway 417, Looking East**



**Photo 20. Northern Portion of Possible Military Use Area
along Highway 417, Looking Northeast**



Photo 21. View from Subdivision towards Former Jeep Range Track



Photo 22. View from Subdivision towards Central Portion of Range



Photo 23. View of Dense Vegetation at Edge of Former Range

APPENDIX J
HISTORICAL PHOTOGRAPHS
(NOT USED)

APPENDIX K
HISTORICAL MAPS/DRAWINGS

APPENDIX K

HISTORICAL MAPS/DRAWINGS

- K-1** **Sheet 4D-11 and Sheet 4D-13 - (1947 Photos)**
- K-2** **Sheet 4D-36 and Sheet 4D-38 - (1947 Photos)**
- K-3** **Sheet 6D-145 and Sheet 6D-149 - (1947 Photos)**



25 1947

4D-11



4D-31

TOWNSHIP-23-SOUTH

25-1947

DE 44D-13

24

19

20

25

30

29

26

31

32

4D-36

TOWNSHIP - 23 - SOUTH

4D-15

5 1947

DEV-4D-36

29

28

27

32

33

6D-145

TOWNSHIP - 23 - SOUTH

TWP-24-S



3 147

8

9

10

17

16

15

20

21

22

6D-147

TOWNSHIP-23-SOUTH

4D-36

6D-145

27

28

25

34

35

36

3

4

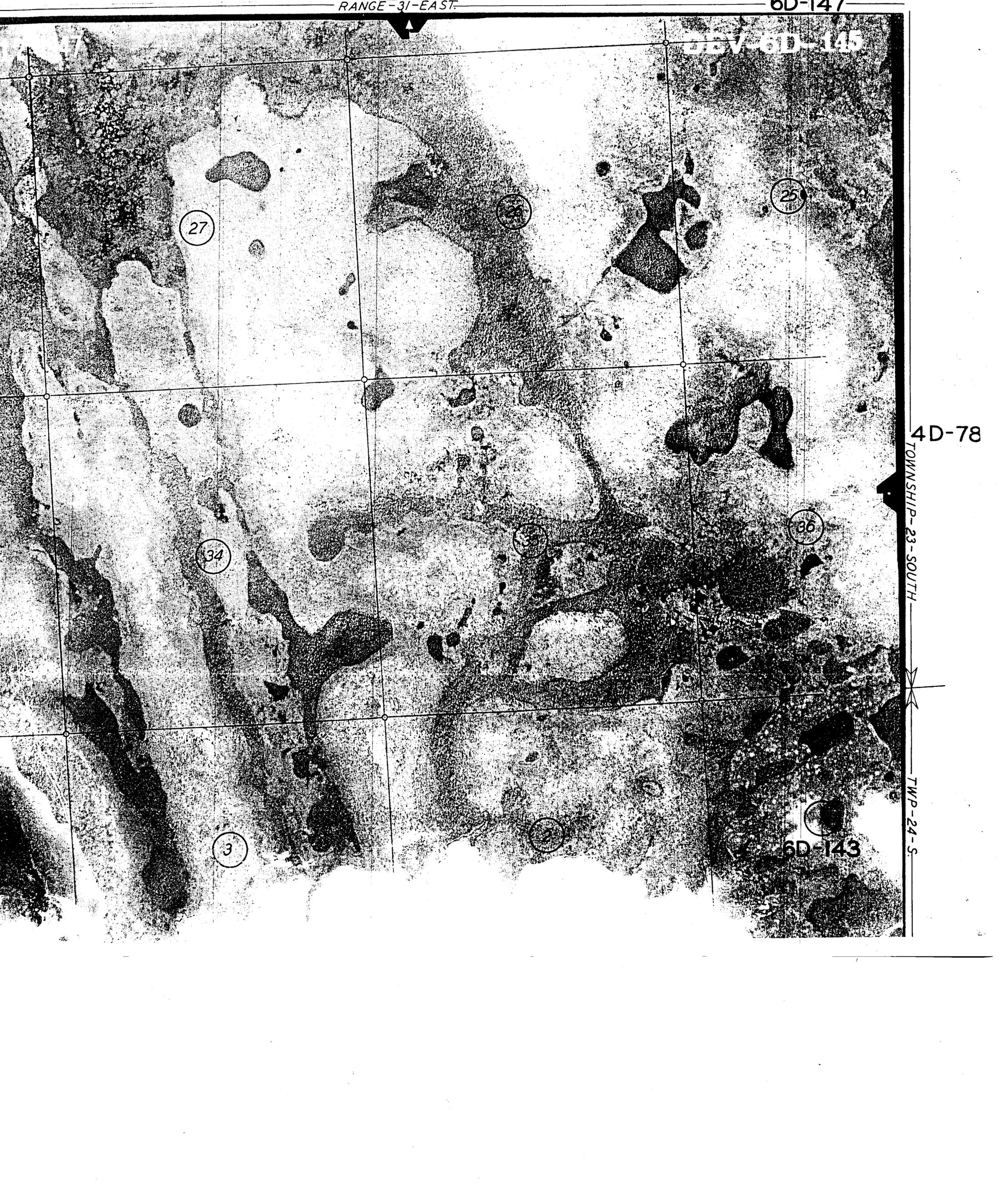
5

6D-143

4D-78

TOWNSHIP-23-SOUTH

TWP-24-S



RANGE - 31 - EAST

6D-14

DEV-6D-1

4D-38

TOWNSHIP - 23 - SOUTH

EASTMAN PHOTOGRAPHIC SAFETY

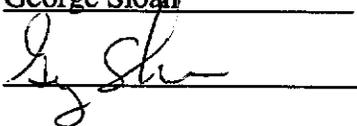


APPENDIX L
SITE SAFETY AND HEALTH PLAN

SITE SAFETY AND HEALTH PLAN (SSHP)
for
Pinecastle Jeep Range
Orlando, Florida
Orlando County
Site # 104FLO40501

The purpose of this site visit is to reconnoiter, document, and photograph areas on the former Pinecastle Jeep Range, Orlando, Florida suspected to be contaminated with unexploded ordnance and/or toxic chemical munitions.

SSHP PREPARED BY: Hank Counts
OFFICE USACE, CELMS-ED-P
ADDRESS 1222 Spruce St. St. Louis, Mo
PHONE (314) 331-8762
DATE PREPARED 4-24-97

SSHP REVIEWED/APPROVED BY: George Sloan


NOTE: This SSHP is to be used only for non-intrusive site visits and must be approved by safety prior to the start of the field visit. All team members must read, and comply with the SSHP, and attend the safety briefings. The Site Safety and Health Officer (SSHO) shall ensure the Safety Briefing Checklist and the SSHP acceptance form (Appendix C) is filled out prior to the start of the site visit.

A. SITE DESCRIPTION AND PREVIOUS INVESTIGATIONS

1. Site Description

a. Size: Approximately 12,483 acres

b. Present Usage

(check all that apply)

- | | | |
|--|--|--|
| <input type="checkbox"/> Military | <input type="checkbox"/> Recreational | <input type="checkbox"/> Other (specify) |
| <input checked="" type="checkbox"/> Residential | <input checked="" type="checkbox"/> Commercial | <input type="checkbox"/> _____ |
| <input checked="" type="checkbox"/> Natural Area | <input type="checkbox"/> Industrial | <input type="checkbox"/> _____ |
| <input checked="" type="checkbox"/> Agricultural | <input type="checkbox"/> Landfill | <input type="checkbox"/> _____ |
| <input type="checkbox"/> Secured | <input type="checkbox"/> Active | <input type="checkbox"/> Unknown |
| <input checked="" type="checkbox"/> Unsecured | <input type="checkbox"/> Inactive | |

2. Past Uses: Between 1942 and 1947, the United States acquired 12,483 acres for a Jeep Range located in Polk County, Florida.

3. Surrounding Population (check all that apply)

- | | | |
|---|---|--|
| <input checked="" type="checkbox"/> Rural | <input checked="" type="checkbox"/> Residential | <input type="checkbox"/> Other (specify) |
| <input checked="" type="checkbox"/> Urban | <input type="checkbox"/> Industrial | _____ |
| <input type="checkbox"/> Commercial | | _____ |

4. Previous Sampling/Investigation Results

a. Ordnance/Explosives (OE) Encountered: Information obtained through archival research indicates the following ordnance and explosives may be present on this site.

- Unknown at this time

b. Samples (Air, Water, Soil, Vegetation)

- No samples are available.
 Samples available

Chemical	Concentration	Media	Location
----------	---------------	-------	----------

B. DESCRIPTION OF ON-SITE ACTIVITIES

(check all that apply)

- | | | |
|--|---|--|
| <input checked="" type="checkbox"/> Walk-through | <input checked="" type="checkbox"/> Drive-through | <input type="checkbox"/> Other (specify) |
| <input checked="" type="checkbox"/> On-Road | <input checked="" type="checkbox"/> Off road | <input type="checkbox"/> _____ |
| <input checked="" type="checkbox"/> On Path | <input checked="" type="checkbox"/> Off path | <input type="checkbox"/> _____ |

C. SITE PERSONNEL AND RESPONSIBILITIES

1. Responsibilities

a. Project Manager: The Corps of Engineers Project Manager (PM) is overall responsible for the site visit. He will assign a Team Leader, (most situation will be the PM). The PM will ensure that the SSHP is completed. Coordinates and executes the site visit.

b. Site Safety and Health Officer: Individual designated to conduct safety, enforce the SSHP, conduct safety briefings, and ensure that the team leader can safely fulfill his objectives. The SSHO will maintain the safety gear, and monitor on-site operations. The SSHO is responsible for identifying, marking, and reporting any unexploded ordnance and explosives.

2. Team Members

Name	Position	Address	Phone
Thomas Freeman	<u>PM/Team Leader</u>	<u>USACE, St. Louis, Mo</u>	<u>(314) 331-8785</u>
<u>Hank Counts</u>	<u>SSHO, UXO Spec</u>	<u>USACE, St. Louis, Mo</u>	<u>(314) 331-8762</u>
Nancy Gerth	Historian	USACE, St. Louis, Mo	(314) 331-8842

D. OVERALL HAZARD EVALUATION:

High Moderate Low Unknown

This assessment was developed using the Site Investigation Hazard Analysis and Risk Assessment Code Matrix.

E. GENERAL PRECAUTIONS: Prior to the on-site visit, all team members are required to read this SSHP and sign the form acknowledging that they have read and will comply with it. In addition, the SSHO shall hold a brief tailgate meeting in which site specific topics regarding the days activities will be discussed. If unanticipated hazardous conditions arise, team members are to stop work, leave the immediate area and notify the SSHO. The buddy system will be enforced at all times.

F. STANDARD OPERATION SAFETY PROCEDURES, ENGINEERING CONTROLS AND WORK PRACTICES

1. Site Rules/Prohibitions: At any sign of unanticipated hazardous conditions, stop tasks, leave the immediate area and notify the SSHO. Smoking, eating and drinking allowed in designated areas only.

2. Material Handling Procedures: Do not handle.

3. Drum Handling Procedures: Do not handle.

4. Confined Space Entry: A area identified as a Permit Required Confined space will not be entered. All confined spaces shall be considered permit required confined spaces until the pre-entry procedures demonstrate otherwise. Confined spaces may be entered without a written permit or attendant provided the space is determined not to be a permit required confined space as specified in 29 CFR 1910.146.

5. Electrical Protection: Overhead power lines, downed electrical wires and buried cables pose a danger of shock and electrocution. In addition, buildings may contain exposed wiring that may hold a potential load. Workers should avoid contact with any and all exposed wire and cables

6. Spill Containment: N/A

7. Excavation Safety: Do not enter trenches/excavations.

8. Illumination: Site visits will be conducted during daylight hours only.

9. Sanitation: Use existing sanitary facilities.

10. Buddy System: Individuals will maintain constant contact with other personnel at all times. No one will work alone at any time during the site visit.

11. Engineering Controls: N/A

12. Insects: Wearing light colored clothing and tucking in the pant legs can reduce contact. In severely infested area it may be necessary to tape all openings. Apply repellents to both clothing and bare skin. Diethyltoluamide (DEET) is an active ingredient in many repellents, which are effective against ticks and other insects. Repellents containing DEET can be applied on exposed areas of skin and clothing. However, repellents containing permethrin should be used on only clothing. For more information on insect bites, refer to Appendix B.

13. Poisonous Vegetation: Recognition and avoidance is the best protection. Cover all exposed skin. If it is known or suspected that an individual has been exposed, wash the effected area with soapy water.

14. Inclement Weather: When there are warnings or indications of impending severe weather (heavy rains, strong winds, lightning, tornados, etc.), weather conditions shall be monitored and appropriate precautions taken to protect personnel and property from the effects of the severe weather.

15. Hot Weather: In hot environments, cool drinking water shall be made available and workers shall be encouraged to frequently drink small amounts, e.g., one cup every 15 - 20 minutes: the water shall be kept reasonably cool. In those situations where heat stress may impact worker safety and health, work regimens shall be established. Environmental monitoring of the Wet Bulb Globe Temperature Index shall be conducted and work loads and work regimens categorized as specified in the American Conference of Governmental Industrial Hygienist (ACGIH) publication "Threshold Limit Values and Biological Exposure Indices". For more information on Heat Stress refer to Appendix A of this SSHP.

16. Cold Weather: Cold injury (frost bite and hypothermia) and impaired ability to work are dangers at low temperatures and when the wind-chill factor is low. To guard against them: wear appropriate clothing; have warm shelter readily available; carefully schedule work and rest periods, and monitor workers' physical conditions.

17. Off-Road Driving: Ensure all emergency equipment is available with the vehicle i.e. tire changing equipment. Drivers shall familiarize themselves with the procedures for engaging four-wheel drive systems before the need for added traction arises. Vehicles will not be driven into an environment that is unknown, such as deep water, or an unstable surface. Vehicles will not be driven into a suspected ordnance impact area.

18. Ordnance:

a. General Information

(1) The cardinal principle to be observed involving explosives, ammunition, severe fire hazards or toxic materials is to limit the exposure to a minimum number of personnel, for the minimum amount of time, to a minimum amount of hazardous material consistent with a safe and efficient operation.

(2) The age or condition of an ordnance item does not decrease the effectiveness. Ordnance that has been exposed to the elements for extended periods of time become more sensitive to shock, movement, and friction, because the stability agent in the explosives may be degraded.

(3) When chemical agents may be present, further precautions are necessary. If the munitions item has green markings leave the area immediately, since it may contain a chemical filler.

(4) Consider ordnance that has been exposed to fire as extremely hazardous. Chemical and physical changes may have occurred to the contents which render it more sensitive than it was in its original state.

b. On-Site Instructions

(1) DO NOT TOUCH or MOVE any ordnance items regardless of the markings or apparent condition.

(2) DO NOT conduct a site visit during an electrical storm or an approaching electrical storm. If a storm approaches during the site visit leave the site immediately and seek shelter.

(3) DO NOT use a radio or cellular phone in the vicinity of a suspect ordnance item.

(4) DO NOT walk across an area where the ground cannot be seen.

(5) DO NOT drive a vehicle into a suspected OE area; use clearly marked lanes.

(6) DO NOT carry matches, cigarettes, lighters or other flame producing devices into a OE site.

(7) DO NOT rely on color code for positive identification of ordnance items or their contents.

(8) Approach ordnance items from the side; avoid approaching from the front or rear.

(9) Always assume ordnance items contain a live charge until it can be determined otherwise.

(10) Dead vegetation and animals may indicate potential chemical contamination. If a suspect area is encountered, personnel should leave the immediate area and evaluate the situation before continuing the site visit.

c. Specific Action Upon Locating Ordnance

(1) DO NOT touch, move or jar any ordnance item, regardless of its apparent condition.

(2) DO NOT be misled by markings on the ordnance item stating "practice", "dummy", or "inert". Practice munitions may contain an explosive charge used for spotting the point of impact. The item may also be mismarked.

(3) DO NOT roll the item over or scrape the item to read the markings.

(4) The location of any ordnance items found during site investigations should be clearly marked so it can be easily located and avoided.

(5) Reporting will be conducted in accordance with CELMS-PM-M, Standard Operating procedure for Reporting Ordnance and Unexploded Ordnance (UXO), dated 19 January 1995.

19. Other: (specify)

G. SITE CONTROL AND COMMUNICATIONS

1. **Site Map:** Refer to Appendix A

2. **Site Work Zones:** N/A

3. **Buddy System:** Individuals will maintain constant contact with other personnel at all times. No one will work alone at any time during the site visit.

4. Communications

a. **On-Site:** Verbal communications will be used among team members.

b. **Off-Site:** Communications shall be established on every site. Communications may be established by using an cellular phone or by public or private phone which may be readily accessible. (specify below)

Cellular phone

Public/private phone (location _____)

Other _____

c. **Emergency Signals:** In the case of small groups, a verbal signal for emergencies will suffice. An emergency signal for large groups (i.e. air horn, whistle) should be incorporated at the discretion of the SSHO.

- Verbal
- Nonverbal (specify) _____

H. **EMERGENCY RESPONSE:** Team members are to be alert to the dangers associated with the site at all times. If an unanticipated hazardous condition arises, stop work, evacuate the immediate area and notify the SSHO. A First Aid Kit and emergency eye wash (if applicable) will be located in the SSHO's field vehicle. If qualified persons (i.e. fire department, medical facility or physician) are not accessible within five minutes of the site at least two team members shall be qualified to administer first aid and CPR.

1. Emergency/Important Telephone Numbers

- Orange County Sheriffs Department: (407) 629-8407
- Hospital: (407) 277-8110
- Poison Control Center, NJ (800) 962-1253
- 184th Ord BN (EOD) (404) 363-7126
- 766th Ord Co (EOD) (407) 853-9952
- Huntsville Safety Office: (205) 895-1582/1579
- Huntsville's 24 hour number: (800) 627-3532, PIN 777-2534
- On-site cellular phone (314) 606-4955
- St Louis Corps of Engineers (314) 331-8036

2. Hospital/Medical Facility Information

Name: Hospital
Address: 7727 Lake Underhill Rd
Orlando,FL
Phone: (407) 277-8110

Distance to hospital miles

Route to Hospital refer to the site map

I. MONITORING EQUIPMENT AND PROCEDURES

1. Exposure Monitoring: For non-intrusive on-site activities such as site visits, air monitoring is typically not required. However, if the site situation dictates the need for monitoring, complete the following information on a separate page and attach the page to the SSHP.

a. Monitoring Equipment To Be Utilized: N/A

b. Equipment Calibration Results: N/A

c. Action Levels: N/A

2. Heat/ Cold Stress Monitoring

a. Heat Stress monitoring criteria published in Chapter 8 of the NIOSH/OSHA/USCG/EPA "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities" shall be followed.

b. Cold Stress monitoring shall be conducted in accordance with the most current published American Conference of Governmental Industrial Hygienists (ACGIH) cold stress standard..

J. PERSONAL PROTECTIVE EQUIPMENT: Typically, for non-intrusive site visits, Level D is required. If a higher level of protection is to be used initially or as contingency, a brief discussion will be attached. At a minimum personnel shall wear clothing suitable for the weather and work condition. The minimum for field work shall be short sleeve shirt, long trousers, and leather or other protective work shoes or boots. If a higher level of protection is to be used initially or as contingency, a brief discussion will be attached.

1. Footwear: Footwear providing protection against puncture shall meet the applicable requirements as stated in EM 385-1-1, paragraph 05.A.07. All activities which personnel are potentially exposed to foot hazards will be identified and documented in a hazard analysis.

2. Hand Protection: Persons involved in activities which subject the hands to injury (e.g., cuts, abrasions, punctures, burns) shall use leather gloves.

3. Head Protection: Hardhats shall be worn when personnel are subject to potential head injury. The identification and analysis of head hazards will be documented in a hazard analysis.

4. Eye Protection: Personnel will wear eye protection when activities present potential injuries to the eyes. All eye protection equipment shall meet the requirements as stated in EM 385-1-1, paragraph 05.B.

K. DECONTAMINATION PROCEDURES: Decontamination procedures are not anticipated for this site investigation. Team members are cautioned not to walk, kneel or sit on any surface with potential leaks, spills or contamination.

L. TRAINING: All site personnel shall have completed the training required by EM 385-1-1 and 29 CFR 1910.120 (e). The U.S. Army Corps of Engineer (USACE) Project Manager shall ensure, and the SSHO shall verify, that all on-site personnel have completed appropriate training. Additionally, the SSHO shall inform personnel before entering, of any potential site-specific hazards and procedures.

M. MEDICAL SURVEILLANCE PROGRAM: The USACE Project Manager shall ensure, and the SSHO shall verify, that all on-site personnel are on the Medical Surveillance Program meeting the requirements of 29 CFR 1910.120, and ANZI Z-88.2, as appropriate, depending on the PPE and site specific tasks.

Provide the following information on Training and Medical

NAME	HAZWOPER DATE	PROVIDER	MEDICAL DATE
<u>Thomas Freeman</u>	<u>6-28-95</u>	<u>Corps of Engineers</u>	<u>2-97</u>
<u>Hank Counts</u>	<u>1-9-96</u>	<u>Corps of Engineers</u>	<u>9-96</u>
<u>Nancy Gerth</u>	<u>12-17-96</u>	<u>Corps of Engineers</u>	<u>5-96</u>

N. LOGS, REPORTS AND RECORDKEEPING: Site logs are maintained by the Project Manager and SSHO. This is to include historical data, personnel authorized to visit the site, all records, standard operating procedures, air monitoring logs and the SSHP.

O. GENERAL: The number of personnel visiting the site shall be a limited to a minimum of two, maximum of eight. The more personnel on-site, the greater potential for an accident. The SSHO may modify this SSHP if site conditions warrant it and without risking the safety and health of the team members. This modification will be coordinated with the team members. The SSHO shall notify Corps of Engineers Safety Office in Huntsville, AL. of the change as the situation allows.

APPENDIX A

HEAT- RELATED INJURIES

Once the signals of a heat-related illness begin to appear, the victim's condition can quickly get worse. A heat related illness can result in death. If you see any of the signals of sudden illness, and the victim has been exposed to extremes of heat, suspect a heat-related illness.

People at risk for heat-related illness include those who work or exercise outdoors, elderly people, young children, and people with health problems. Also at risk are those who have had a heat-related illness in the past, those with medical conditions that cause poor blood circulation, and those who take medications to get rid of water from the body (diuretics).

People usually try to get out of extreme heat before they begin to feel ill. However, some people do not or can not. Those that work outdoors often keep working even after they begin to feel ill. Many times, they might not even recognize that they are in danger of becoming ill.

Heat cramps, heat exhaustion, and heat stroke are conditions caused by overexposure to heat. You can help prevent heat-stress emergencies by recognizing and properly treating symptoms. Below is a quick reference guide to heat-related emergencies:

HEAT CRAMPS: Heat cramps are the least severe, and often are the first signals that the body is having trouble with the heat. *Symptoms* include: Muscle twitching; painful spasms in the legs, arms or abdomen.

WHAT TO DO:

- Have the individual rest in a cool place.
- Give cool water or a commercial sports drink.
- lightly stretch the muscle and gently massage the area.

HEAT EXHAUSTION: Heat exhaustion is a more severe condition than heat cramps. *Symptoms* include: cool, moist, pale, or flushed skin, headache, nausea, dizziness, weakness, and exhaustion.

HEAT STROKE: Heat stroke is the least common but most severe heat emergency. It most often occurs when people ignore the signals of heat exhaustion. Heat stroke develops when the body systems are overwhelmed by heat and begin to stop functioning. **Heat stroke is a serious medical emergency.** *Symptoms* include: red, hot, dry skin; changes in consciousness; rapid, weak pulse; and rapid, shallow breathing.

WHAT TO DO: When you recognize a heat-related illness in its early stages, you can usually reverse it.

- Get the victim out of the heat.
- Loosen any tight clothing and apply cool, wet cloths, such as towels or sheets.
- If the victim is conscious, give cool water to drink. Do not let the conscious victim drink too quickly. Give about 1 glass (4 ounces) of water every 15 minutes.
- Let the victim rest in a comfortable position, and watch carefully for changes in his or her condition. The victim should not resume normal activities the same day.
- **Refusing water, vomiting, and changes in consciousness mean that the victim's condition is getting worse. Call for an ambulance immediately if you have not already done so.**
- If the victim vomits, stop giving fluids and position them on their side.
- Watch for signals of breathing problems.
- Keep the victim lying down and continue to cool the body any way you can. If you have ice packs or cold packs, place them on each of the victim's wrists and ankles, on the groin, in each armpit, and on the neck to cool the large blood vessels.

APPENDIX B

BITES AND STINGS

Scorpions, Bees and Spiders

Bee stings are painful, but rarely fatal. Some people, however have a severe allergic reaction to an insect sting. This allergic reaction may result in a breathing emergency. If someone is stung by an insect, remove the stinger. Scrape it away with from the skin with your fingernail or plastic card, such as a credit card, or use tweezers. If you use the tweezers, grasp the stinger, not the venom sac. Wash the site with soap and water. Cover it to keep it clean. Apply a cold pack to the area to reduce the pain and swelling. Watch the victim for signals of an allergic reaction.

Scorpions live in dry regions of the southwestern United States and Mexico. They live under rocks, logs, and the bark of certain trees and are most active at night. Only a few species of scorpions have a sting that can cause death.

Spiders; there are also only two spiders in the United States whose bite can make you seriously sick or be fatal. These are the black widow spider and the brown recluse. The black widow is black with a reddish hourglass shape on the underside of its body. The brown recluse is light brown with a darker brown, violin-shaped marking on the top of its body. Both spiders prefer dark, out of the way places. Often, the victim will not know that he or she has been bitten until he or she starts to feel ill or notices a bite mark or swelling.

Symptoms include nausea and vomiting, difficulty breathing or swallowing, sweating and salivating much more than normal, severe pain in the sting or bite area, a mark indicating a possible bite or sting, and swelling of the area.

First Aid: If someone has been stung by a scorpion or bitten by a spider he or she thinks is a black widow or brown recluse, wash the wound, apply a cold pack to the site, and get medical help immediately.

Lyme Disease

Lyme Disease is an illness that people get from the bite of an infected tick. Lyme disease is affecting a growing number of people in the United States. Everyone should take precautions against it. Not all ticks carry lyme disease. Lyme disease is spread mainly by a type of tick that commonly attaches itself to field mice and deer. It is sometimes called a deer tick. This tick is found around beaches and in wooded and grassy areas. like all ticks, it attaches itself to any warm-blooded animal that brushes by. Deer ticks are very tiny and difficult to see. They are much smaller than the common dog tick or wood tick.

They can be as small as a poppy seed or the head of a pin. Adult deer ticks are only as large as a grape seed.

Symptoms: The first signal of infection may appear a few days or a few weeks after a tick bite. Typically, a rash starts as a small red area at the site of the bite. It may spread up to 7 inches across. In fair-skinned people the center is lighter in color and the outer edges are red and raised. This sometimes gives the rash a bull's-eye appearance. In dark skinned people the area may look black and blue, like a bruise.

Other symptoms include fever, headache, weakness, and joint and muscle pain similar to the pain of "flu". These symptoms might develop slowly and might not occur at the same time as a rash. In fact you can have lyme disease without developing a rash.

First Aid: If you find a tick, remove it by pulling steadily and firmly. Grasp the tick with fine-tipped tweezers, as close to the skin as possible, and pull slowly. If you do not have tweezers, use glove, plastic wrap, or a piece of paper to protect you finger. If you use your bare fingers, wash your hands immediately. Do not try to burn a tick or use other home remedies, like coating the tick with Vaseline or nail polish or picking it with a pin. Once the tick is removed, wash the area with soap and water. If available, apply antiseptic or antibiotic ointment. If you can not remove the tick or parts of the tick stay in your skin, obtain medical care. If a rash or flu like symptoms develop, seek medical attention.

APPENDIX C

SSHP ACCEPTANCE FORM
ABBREVIATED SITE SAFETY AND HEALTH PLAN
FOR
Pinecastle Jeep Range
Orlando, FL

I have read and agree to abide by the contents of the Site Safety and Health Plan.

NAME	OFFICE	SIGNATURE	DATE
<u>Hank Counts</u>	<u>CE/MS-ED-P</u>	<u>Hank Counts</u>	<u>19 MAY 97</u>
<u>Tom Freeman</u>	<u>"</u>	<u>Tom Freeman III</u>	<u>"</u>
<u>Nancy B Gerth</u>	<u>"</u>	<u>Nancy B Gerth</u>	<u>29 May 97</u>
<u> </u>	<u> </u>	<u> </u>	<u> </u>
<u> </u>	<u> </u>	<u> </u>	<u> </u>
<u> </u>	<u> </u>	<u> </u>	<u> </u>
<u> </u>	<u> </u>	<u> </u>	<u> </u>

APPENDIX M
REPORT DISTRIBUTION LIST

APPENDIX M

REPORT DISTRIBUTION LIST

<u>Addressee</u>	<u>No. Copies</u>
Commander, U.S. Army Engineering and Support Center Huntsville, ATTN: CEHNC-ED-SY P.O. Box 1600 Huntsville, Alabama 35807-4301	2
Commander, U.S. Army Engineer District, Jacksonville ATTN: CESAJ-DP-I P.O. Box 4970 Jacksonville, Florida 32232-0019	3
Commander, U.S. Army Chemical Material Destruction Agency ATTN: SFIL-NSM, Bldg.E4585 Aberdeen Proving Ground, Maryland 21010	1
Commander, U.S. Army Chemical & Biological Defense Command ATTN: AMSCB-CIH, Bldg. E5183 Aberdeen Proving Ground, Maryland 21010-5423	1
U.S. Army Technical Center for Explosives Safety ATTN: SIOAC-ESM Savanna, Illinois 61074-9639	1