US Army Corps of Engineers
Rock Island District

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

Archives Search Report

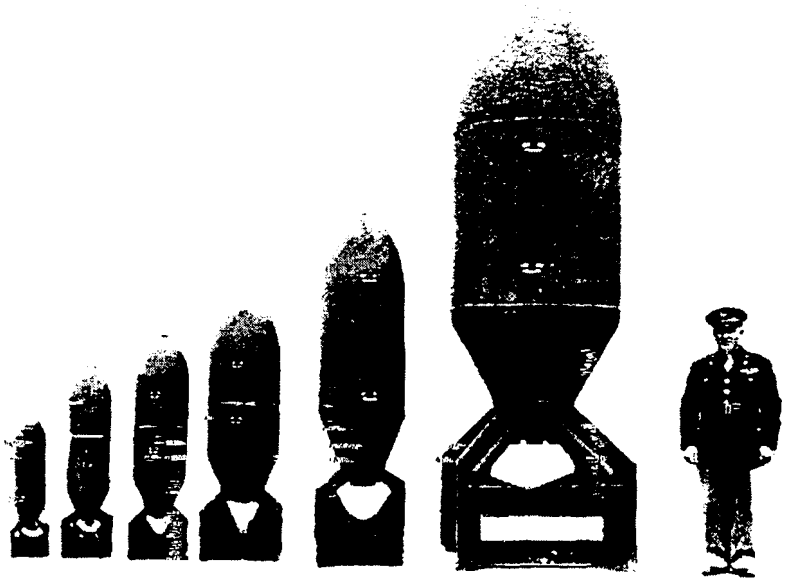
Findings

for
the former

PLUM TREE ISLAND RANGE

POQUOSON, VIRGINIA
Project Number CO3VA020201

SEPTEMBER 1996



DEFENSE ENVIRONMENTAL RESTORATION PROGRAM
for
FORMERLY USED DEFENSE SITES

FINDINGS

ORDNANCE AND EXPLOSIVE ARCHIVES SEARCH REPORT FOR PLUM TREE ISLAND RANGE POQUOSON, VIRGINIA

PROJECT NUMBER C03VA020201
SEPTEMBER 1996

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ORDNANCE AND EXPLOSIVE
ARCHIVES SEARCH REPORT
FOR
PLUM TREE ISLAND RANGE
POQUOSON, VIRGINIA
PROJECT NUMBER C03VA020201

ACKNOWLEDGMENTS

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ORDNANCE AND EXPLOSIVE
ARCHIVES SEARCH REPORT
FOR
PLUM TREE ISLAND RANGE
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1. INTRODUCTION

a. Subject and Purpose

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

(2) The purpose of this investigation was to characterize the site for potential OE contamination, to include conventional ammunition and chemical warfare material (CWM). This was achieved by a thorough evaluation of historical records, interviews, and an on-site visual inspection.

b. Scope

(1) The investigation focused on 3275.60 acres of land that is owned by the Department of the Interior, U.S. Fish and Wildlife Service, for use as a wildlife refuge. This land was procured by the War Department from 1917 until 1920 for the Langley Air Force Base, Hampton, Virginia. It was purchased from two private entities (in three land parcels) for use as an Army Aviation Experimental Station and later as an Air Force Bombing and Gunnery range. The Plum Tree Island Range was active from 1917 until June 1971, at which time it was declared excess to the needs of tne government. The property was transferred in 1972, but still remains as an emergency jettison area for Langley Air Force Base.

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

(3) For the purpose of this report, OE contamination consists of live ammunition, live ammunition components, CWM or explosives which have been lost, abandoned, discarded, buried, fired, or thrown from demolition pits or burning pads. These items were either manufactured, purchased, stored, used, and/or disposed of by the War Department/Department of Defense. Such ammunition/components are no longer under accountable record control of any DOD organization or activity.

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

2. PREVIOUS INVESTIGATIONS

a. 1992 Preliminary Assessment

(1) A Preliminary Assessment (PA) of the Plum Tree Island Range was conducted under the Defense Environmental Restoration Program, Formerly Used Defense Sites (DERP FUDS) by the U.S. Army Corps of Engineers, Norfolk District (CENAO) on 10 September 1992 (site number C03VA020200). At that time, it was determined that the site was formerly used by the DOD as an Army Aviation Experimental Station and later as an Air Force Bombing and Gunnery range (see document E-1).

(2) The signed FDE concluded that the site consisted of 3275.60 acres, was used from 1917 to 1972, and was eligible for restoration under the purview of DERP FUDS (see table 2-1 and document E-1).

TABLE 2-1
DERP-FUDS PRELIMINARY ASSESSMENT PROJECT

Project Number	DERP Category	Present Phase	Comments	Location
C03VA020201	OE	SI	Ordnance & Explosives	Plum Tree Island Range (see plates 1 & 2)
	HTRW	--	None Recommended	
C03VA020202	BD/DR	SI	Removal of 3 Observation Towers	Plum Tree Island Range (see plates 1 & 2)

b. Other Investigations

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

3. SITE DESCRIPTION

a. Existing Land Usage

(1) The former Plum Tree Island Range is located at the southwest corner of the Chesapeake Bay near the town of Poquoson, Virginia. Total site acreage consisted of 3275.60 acres of salt marsh bearing moderate concentrations of numerous wetland vegetation species, which was obtained by transfer documentation from two private landholders (see documents G-1 and G-2).

(2) Today, all of the project lands are owned by the Department of the Interior, U.S. Fish and Wildlife Service.

(3) Table 3-1 lists the current owners, acreage's and OE areas that are appropriate to this site.

TABLE 3-1
CURRENT LAND USAGE

AREA	FORMER USAGE	PRESENT OWNER	PRESENT USAGE	SIZE/ ACRES	COMMENTS
A	Target Area	Department of the Interior	Wildlife Preserve	2049.60	See plate 3
B	Buffer Zone	Department of the Interior	Wildlife Preserve	1226.00	See plate 3
C	Buffer Zone (Additional Lands)	Department of the Interior	Wildlife Preserve	198.00	See plate 3
			TOTAL FDE ACRES:	3275.60	
			TOTAL ADDITIONAL ACRES:	198.00	
			TOTAL ACREAGE:	3473.60	

b. Climatic Data

(1) The climate of the area is characterized as modified continental with mild winters and warm, humid summers.

(2) In winter, the average temperature is 41 degrees F, and the average daily minimum temperature is 30 degrees. The lowest temperature on record for the area, which occurred at Williamsburg on 22 January 1970, is 1 degree. In summer the average temperature is 76 degrees, and the average daily maximum temperature is 87 degrees. The highest recorded temperature on record for the area occurred at Williamsburg on 26 June 1952, is 104 degrees.

(3) Of the total annual precipitation, 26 inches, or about 55 percent, usually falls in April through September. In two years out of 10, the rainfall in April through September is less than 21 inches. The heaviest 1-day rainfall for the area was 9.95 inches in Williamsburg on 1 September 1975.

(4) Average seasonal snowfall is 9 inches. The greatest snow depth at any one time during the period of record was 19 inches.

(5) Prevailing winds are predominately from the southwest. The average annual wind velocity is 10.2 miles per hour, with monthly averages ranging from 8.3 miles per hour in July to 12.5 miles per hour in April. In spring, winds tend to have the higher velocities and in fall, the lower velocities.

(6) Hurricanes and "northeasters" occasionally effect the project area and create tidal flooding. About 80 percent of the hurricanes occur during August, September, and October. Northeasters generally occur from late fall through the spring months. Thunderstorms, with hail and strong winds are frequent and often inflict heavy storm damage in the area.

(7) The average relative humidity in the area is about 60 percent. Humidity is higher at night, and the average at dawn is about 80 percent (see references B-6 and B-7).

c. Topography

(1) The topography of the area is relatively flat, except for a series of forested hummocks that are remnants of ancient dune lines.

(2) Elevations within the project area range from mudflats, that are submerged at high tide, to approximately 5 feet above mean sea level.

(3) The entire area is within the 100-year flood plain and is susceptible to both tidal and storm water flooding (see reference B-5).

d. Geology and Soils

(1) The project lands are entirely within the Coastal Plain Province of Virginia. Geologic formations in this area consist of unconsolidated sediments deposited on a base of sedimentary, igneous, and metamorphic pre-Cretaceous rocks.

(2) Primary soil types found within the project area, in decreasing order of abundance, are the Bohicket muck (deep, nearly level, very poorly drained soils on tidal marshes, slopes are less than 1 percent), Tomotley fine sandy loam (deep, nearly level, poorly drained soils on broad low lying flats, slopes ranging from 0 to 2 percent), Nimmo fine sandy loam (deep, nearly level, poorly drained soils on broad low-lying flats, slopes ranging from 0 to 2 percent), and Fill (see reference B-5).

e. Hydrology

(1) Plum Tree Island is a peninsula of primarily salt marsh land extending from the western shore of Virginia into the southern portion of the Chesapeake Bay.

(2) The island is bounded on the south by Back River, on the north by the York River, on the east by the Chesapeake Bay, on the northwest by Lloyd Bay, and the southwest by a mile of marsh separating the area from the town of Poquoson, Virginia, three miles to the west.

(3) The island is interwoven with nine major creeks (or guts) and inumerable minor inlets.

(4) Tidal flooding occurs twice daily on approximately 1,000 acres of the low lying marsh, and during severe storms and high tides an additional 1,500 acres are flooded.

(5) Hundreds of water filled bomb craters dot the marsh terrain. The low lying potholes are strictly salt water with the higher potholes being more brackish.

(6) Depth to ground water is said to be from 2 feet above the surface to 1 foot below with the bedrock layer greater than 60 feet deep (see reference B-5).

(f) Natural Resources

(1) The subject site is in the general area of various state and federal endangered/threatened species. While not specifically identified within the site, any of these may occur (see table 3-2).

(2) For additional species in the state of Virginia that are considered Federal Candidate Category 1 and 2, interested parties should contact the U. S. Fish and Wildlife Service and the Virginia Department of Conservation and Recreation to obtain an up-to-date listing (see documents E-11, E-12, E-13, and Appendix A).

g. Historical/Cultural Resources

Mr. James Hill of the Virginia Department of Historic Resources (SHPO) has stated that there are no known historical sites located on former range lands. There are, however, 5 recorded archeological sites on or in the immediate vicinity of project lands. Further, it is required that his office is contacted prior to any remediation of these lands due to the necessity for their assistance. The phone number for this organization is (804) 786-6330 (see document E-13).

TABLE 3-2
NATURAL/CULTURAL RESOURCES

Resource Classification	Type	Comment
Wildlife	Piping Plover	Endangered (Federal) Threatened (State)
	Least Tern	Candidate (State)
	Black Skimmer	Rare (State)
	Northeastern Beach Tiger Beetle	Threatened (Federal) Candidate (State)
	Pretty Dodder	Rare (State)
	Bald Eagle	Threatened (Fed & State)
	American Peregrine Falcon	Endangered (Fed & State)
Vegetation		None Cited
Historical		None Cited
Archeological		5 Cited (YO 105, 156, 157, 164, & 165)

4. HISTORICAL ORDNANCE PRESENCE

a. Chronological Site Summary

(1) Site Acquisition

(a) On 5 December 1916, the Chief of Staff of the Army and the Secretary of War approved the purchase of land for a new airfield to be established near Hampton, Virginia. This reservation was to become an Aviation Experimental Station and Proving Grounds. Later, on 7 August 1917, the name of the facility was formalized as being Langley Field, and again later, in January 1948, Langley Field became Langley Air Force Base (see reference B-29 and document E-5).

(b) The main original mission of Langley Field, after establishment, was for experimentation in bombing, photography, radio and telegraph, and testing of foreign aircraft (see reference B-29 and document E-5).

(c) In order to support experimental activities at Langley Field, the government acquired three parcels of private land from 1 September 1917 to 29 November 1920, totaling 3,275.60 acres. This was for the establishment of Plum Tree Island Range, also known as Big Marsh and Salt Marsh Bombing Range, being the subject of this report. Actual procurement acreage totals in transfer documentation displayed parcel procurement to be in 2838.81, 220.44, and 194.5 acre tracts of land totaling 3,253.75 acres. Real Property Accountable Records were later adjusted to include an additional 21.85 acres of land, which was shown on real estate maps, but not included in the deeds (see documents E-2, G-1, G-2, and G-3).

(2) Range Construction and Use

(a) Following acquisition of Plum Tree Island Range lands, documented construction/repair was said to occur on a Machine Gun Range which was located on Back River between Bell's Oyster Gut and Page's Cove opposite Messick Point in that part of York County known as the Salt Marsh. Construction/repair occurred between 23 Oct and 13 December 1933 as follows (see document E-2 and plate 2):

(1) The repair of an existing dock.

(2) The construction of approximately 3,000 feet of duck board walk, 24 inches wide.

(3) The construction of a new observation tower 40 feet high with a 5 foot square platform.

(4) The construction of a tool house 8'x 12' x 8' high to the eaves, constructed of wood frame work and covered with corrugated asbestos metal on sides and roof.

(5) The construction of two concrete U shaped shelters 12' x 12' x 10' high.

(6) The installation of 12 sets of foundations for the support of the Machine Gun Targets, these consisting of two concrete footers 2' x 3' and two concrete footers 18" x 18" for anchoring each target.

(7) The repairing of 3 and 1/2 miles of existing barbed wire fence.

(b) Following acquisition of Plum Tree Island Range Lands, documented construction/repair was said to occur on a Bombing Range which was located on the point of the intersection of Back River and Chesapeake Bay known as Plum Tree Point. Construction/repair occurred between 23 Oct and 13 December 1933 as follows (see document E-2 and plate 2):

(1) The rebuilding of an existing wharf, 4 feet wide and 480 feet long.

(2) The construction of a new observation tower 25 foot with a 5 foot square platform. In addition, two old existing towers were repaired.

(3) The construction of 3700 feet of duck board walk, 24 inches wide.

(c) Following acquisition of Plum Tree Island Range Lands, an aerial mosaic dated 24 July 1935 displays additional range development not identified in construction documents as follows (see document K-1 and Plate 2):

(1) 750 Personnel Targets, designated Target No.1 located southwest of the Gunnery Range.

(2) 30 Type "C" Targets, designated Target No.5 located southeast of the gunnery range.

(3) A suspected Ship Silhouette Target, designated target No. 7, located southeast of the gunnery range.

(4) A Concrete Pier Target, designated target No. 2, located southeast of the gunnery range.

(5) A 200 Yard Square Target, designated target No. 8, located northwest of the bombing target.

(6) A Circular "Bullseye" type target, presumably for practice bombing, bearing no target identification, located west of the bombing range.

(d) Following acquisition of Plum Tree Island Range Lands, interview information and physical evidence display the existence of a rocket range observation bunker located slightly south of Plum Tree Island (see document I-3 and Plate 2).

(e) During the operational period of the Plum Tree Island Range, the range, after early procurement as an experimental station, transitioned into an extensively utilized bombing, gunnery, and rocket range. Actual ordnance activity occurred from the beginning of the ranges operational use and terminated presumably in 1959, at which time a range clearance was conducted (see reference B-26 and documents E-2 thru E-8, F-1, F-2, F-4 thru F-8, I-7, I-8, K-1, L-1, L-2, and Plates 2 & 5).

(f) Following termination of ordnance activity on range lands, NASA began using the area to test free flight aircraft models (dropped from helicopters) and to conduct low altitude flight tests of VTOL airplanes on 16 July 1959. In addition, Langley Air Force Base reserved the right to utilize the area as an emergency jettison area and for ordnance disposal operations (see documents E-3, E-7 and G-7, and Photo J-26).

(3) Site Inactivation and Disposal

(a) On 5 May 1971 the submission of a declaration of excess property for Plum Tree Island Air Force Range was transmitted for action by the Tactical Air Command, Langley Air Force Base, to the Headquarters, United States Air Force. This action was based on a decision by the Executive Officer of the President's Real Property Review Board to declare this property excess (see document G-3).

(b) On 30 Sep 1971, the Headquarters, United States Air Force, directed the Office of the Chief of Engineers, Department of the Army, to transfer the Plum Tree Island Air Force Range to the General Services Administration for disposal. This action was prompted by the Deputy Assistant Secretary of Defense's approval on 25 May 1971 to dispose of this land. It

was recommended that the Department of the Interior be considered for receipt of this property with the stipulation that NASA and Langley Air Force Base are permitted continued testing/emergency use (see document G-4).

(c) On 19 June 1972 the General Services Administration assigned the Plum Tree Island Range to the Department of the Interior, Bureau of Sport Fisheries and Wildlife for use as a Wildlife Refuge in conjunction with an outgrant to NASA for continued use for test and research. In addition, the Tactical Air Command, Langley Air Force Base reserved the right to use the land as an emergency jettison area and for explosive ordnance disposal activities (see documents G-5, G-6, and G-8).

(4) Post Range Disposal Activity and Use

Following range closure, the property was transferred to the Department of the Interior, U.S. Fish and Wildlife Service, who remains the property holder. The land has consistently, since site closure, been used as a Federal Wildlife Preserve, and usage is expected to remain as such in the future. NASA continues to reserve the right to utilize the area for testing and development and the Tactical Air Command, Langley Air Force Base, continues to reserve the right to utilize this property as an emergency jettison area.

b. Ordnance Related Records Review

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

(2) A significant quantity of documents were found pertaining to the Plum Tree Island Range which establishes its acquisition, development, and use as a Bombing, Gunnery, and Rocket Range:

(a) A Construction Completion Report from the Office of the Constructing Quartermaster, Langley Field, Virginia, 3 October 1934, describes improvements and repairs constructed/performed on a Machine Gun and Bombing Range, being the Plum Tree Island Range (see reference E-2).

(b) A 1987 historical report, concerning U.S. Army Aviation from 1919 through 1939, lists Plum Tree Island as one of the ranges that gave units at Langley Field facilities for all kinds of Gunnery and Bombing (see reference E-8).

(c) A historical report of Air Force Bases shows the aquisition of Big Marsh Bombing Range, Plum Tree Island, Virginia, for Langley Field, Virginia, on 1 Sep 1917 (see document E-9).

(d) A War Department "Notice to Pilots", dated 23 January 1940, describes the latitudinal and longitudinal location of the Plum Tree Island Range and states that the range is used for aerial gunnery and bombing practice (see document F-1).

(e) A series of Army Air and Signal Corps Messages, from 21 June 1939 thru 11 August 1941, issues a "Heavy Demolition Bombing and Machine Gunnery" warning for the Plum Tree Island Range (see document F-2).

(f) A letter from a private airplane corporation, dated 9 April 1940, submits notice to the Chief of the Air Corps about machine gun tests and the dropping of dummy bombs on Plum Tree Island (see document F-4).

(g) A Langley Air Force Base Operations Circular concerning target ranges, dated 13 November 1941, assigns Plum Tree Island Ranges A, B, and Night Target to the 22nd Bomb Group. In addition, it specifies that target approaches will occur in a northerly direction (see document F-5).

(h) A Directory of Army Air Force Installations, dated 9 November 1944, shows Langley Field to have a Precision Bombing Range at Plum Tree Island consisting of 3,275 acres and having 5 day precision targets, 5 target groups, and spotting towers (see document F-6).

(i) A Tactical Air Command (TAC) memorandum concerning TAC bombing and gunnery ranges, dated 3 September 1952, shows Plum Tree Island to contain a gunnery range of inadequate size which is used for dive bombing, air to ground gunnery, and rocketry (see document F-7).

(j) A Department of the Air Force memorandum to the Tactical Air Command (TAC) Commander, Langley Air Force Base, dated 3 September 1952, issues a waiver to permit the continued use of Plum Tree Island Gunnery Range for rocketry, dive bombing, and gunnery until such time as a more suitable site is found (see document F-8).

(k) A Headquarters TAC letter, dated 4 September 1980, states that Plum Tree Island was mostly used as a bombing and gunnery range until the latter part of the 1950's (see document F-11).

(l) A Declaration of Excess Real Property, dated 5 May 71, states that 3,275.60 acres of land were originally acquired for the establishment of an Aviation Experimental Station at the Plum Tree Island Range Location, however, the land was mostly used as a bombing and gunnery range until the latter part of the 1950's (see document G-3).

(m) A land disposal document for Plum Tree Island Range, dated 30 September 1971, states that this land has been used as a bombing and gunnery range (see document G-4).

(n) A Report of Excess Real Property for the Plum Tree Island Range, dated 15 October 1974, states that this land has been used as a bombing and gunnery range (see document G-6).

(o) An Aerial Mosaic (Photograph) of Plum Tree Island Range, dated 4 July 1935, displays the presence of several gunnery and bombing targets and bombing crater activity (see document K-1).

(p) A Army Air Forces Bombing and Gunnery Range Map of ranges located within the Continental United States, dated 1 May 1945, displays a Bombing and Gunnery range to exist on Plum Tree Island (see document L-1).

(q) A Langley Air Force Base Real Estate Map of Plum Tree Island Air Force Range, dated 26 September 1944, shows the range to consist of 3,275.60 acres and also depicts (in an inset) the entire range to be a bombing area (see document L-2)

(3) Many records pertaining to the Plum Tree Island Range were found reflecting an actual type of ordnance used on the range, an inference of the type used, or an inference of an ordnance and explosive use as follows:

(a) A Certificate of Clearance, dated 5 June 1959, stated the following (see document E-4):

(1) That a clearance was conducted at the entire Plum Tree Bombing Range (consisting of 3275.60 acres).

(2) That all of the land of this range had been given a visual surface search and cleared of all dangerous/explosive materials reasonably possible to detect.

(3) It is recommended that all of the property be restricted to surface use only due to the fact that a subsurface explosive ordnance hazard existed due to the tideland terrain which wouldn't permit a subsurface search.

(4) It is recommended that this area remain as a "Restricted Hazardous Area", be conspicuously posted as such, and remain under government control.

(b) A 1966 Langley Air Force Base historical report mentions a four month bombing test/exercise, against actual ship targets, which began 21 June 1921. Prior to the test/exercise, "They practiced bombing over land and water with still and moving targets during both daylight and darkness. The silhouette of a battleship was marked on the ground near the marshy point at the mouth of the Back River" (area of subject range). Bombs used during actual testing consisted of 25, 230, 250, 300, 550, 600, 1100, and 2000 pound high explosive bombs. Bombs used during training preparation for the exercise are unknown, but a portion of the aforementioned bomb array was potentially used at Plum Tree Island Range (see document E-5).

(c) A 1987 historical report concerning U.S. Army Aviation from 1919 through 1939 discusses the following (see document E-8):

(1) That a unit stationed at Langley Field in fiscal year 1936 expended 303,082 rounds of .30 caliber and 11,167 rounds .50 caliber ammunition during training, firing at aerial and ground targets.

(2) That another unit attached to Langley Field during fiscal year 1936 expended 75,000 rounds of ammunition and 2,063 bombs in training.

(3) That Plum Tree Island (subject range), Mulberry Island, and areas in the Chesapeake bay and the Atlantic gave units at Langley Field facilities for all kinds of gunnery and bombing.

(4) That bombardment squadrons of that era used 100, 300, 1100, and 2000 pound bombs. Demolition Bombs arrived filled with TNT, but practice bombs (mostly old demolition bombs) came empty. The local ordnance platoon as a rule put a little black powder in these practice bombs for a "spotting charge" and filled the steel cases with sand to the weight of the service bombs. The platoon also attached fins, installed suspension lugs, and attached fuzes. Document E-9 displays that bomb squadrons were stationed at Langley Field during this period.

(5) That the Air Force used Browning machineguns, mostly .30 caliber but some .50 caliber, on the newer pursuit ships.

(6) That an exercise occurred at Langley field in December 1938 in which a squadron of 9 B-17's and 2 squadrons of B-18's flew two missions with demolition bombs to targets on Plum Tree Island. The entire bomb allotment then available was utilized consisting of more than 300,000 pounds of bombs of various sizes (100 to 2,000 pounds). Bombing Tables shown in document F-3 for 1940 display that demolition bombs available at that time were in 100, 300, 500, 600, 1000, 1100, and 2000 pound sizes. Practice bombs were available in 100 lb sizes. Bombing tables for bombs of less than 100 pound weight were not available.

(d) A series of Army Air and Signal Corps Messages, from 21 June 1939 thru 11 August 1941, issues a "Heavy Demolition Bombing and Machine Gunnery" warning for the Plum Tree Island Range (see document F-2).

(e) A 23 August 1994 Naval Explosive Ordnance Disposal Incident Report shows the discovery and response to an incident involving a practice bomb on Plum Tree Island. This bomb was said to have been of the 100lb size, with the body being heavy cased but rusted through (see documents E-10 and I-4).

(f) A letter from a private airplane corporation, dated 9 April 1940, submits notice to the Chief of the Air Corps about machine gun tests and the dropping of dummy bombs on Plum Tree Island utilizing a Hawk 75A aircraft. Bombs utilized were inert 25 pound, 50 pound, and 100 pound sizes. This aircraft utilized .30 and .50 caliber guns (see document F-4 and reference B-15).

(g) A Congressional Record, dated 17 September 1968, displays the award of 15,000 dollars to a Charles W. Watson for permanent injuries sustained on 13 April 1958 from the explosion of a practice bomb on Plum Tree Island, Virginia. Two companions accompanied Watson by boat to the island to look for .50 caliber bullets. A companion of Mr. Watson accidently kicked the fin of a rusted practice bomb containing a black powder spotting charge causing the bomb to function. Watson received the full effects of the blast causing temporary blindness and partial leg amputation (see document F-10).

(h) Aerial photos taken in 1935 and 1995 display substantial bomb crater activity on Plum Tree Island Range, obviously caused by high explosive (demolition) bombs of various sizes (see document K-1 and Photos J-24 thru J-26).

(i) U.S. Fish and Wildlife Service photos of Plum tree Island range, extracted from Plum Tree Island Annual reports dated 1978, 1985, and 1988, display numerous ordnance items, many believed to be unknown types and sizes of bombs, which were

discovered below the high water mark at low tide (see photos J-16, J-17, and J-18). An additional photo depicts a possible item of ordnance that bears characteristics of practice or high explosive sea mines (see photo J-19).

c. Interviews with Site Related Personnel

(1) Several persons were interviewed that were able to give some general information of the Plum Tree Island Range.

(2) SFC McCain, the Operations Noncommissioned Officer of the 57th Explosive Ordnance Disposal (EOD) Army unit at Fort Belvoir, Virginia, stated that Explosive Ordnance Disposal Journal, Activity Reports, and Historical files were researched and display that EOD response has not occurred on or near the Plum Tree Island Range. In addition, incident response throughout the state did not confirm a response attributed to OE originating from that area (see document I-1).

(3) Mr. Joe McCauley has been an employee of the Department of the Interior Fish and Wildlife Service for 13 years, and has been with the Back Bay Refuge in Virginia Beach for 6.5 years, the Back Bay Refuge maintaining operational control over the Plum Tree Island Refuge due to its unmanned state. Mr. McCauley stated that evidence of previous ordnance usage remaining on the former range exists in the form of an old erect spotting tower on the southeastern shoreline, a fallen spotting tower on the northern shoreline near Plum Tree Point, .50 caliber bullets found primarily around the northern tower area, bomb craters around the southeastern shoreline tower, and larger "bomb like" items reported and photographed near the shoreline at low tide (photo's extracted and provided from annual reports). Mr. McCauley stated that a surface range clearance of the former range was conducted in the 1950's (document provided). Mr. McCauley stated that he was aware of one 1950's incident/accident resulting from ordnance remaining on the range. A teenager lost a leg as the result of the initiation of a practice bomb (see document I-2).

(4) TSGT Morehead, the Senior Noncommissioned Officer of the 1 CES/CED Air Force Explosive Ordnance Disposal (EOD) unit at Langley Field, Virginia, stated that available records reflect that Air Force Explosive Ordnance Disposal Response has occurred only once on or near lands associated with the former Plum Tree Island Range. The one item recovered, an unfired 5" projectile with an unarmed mechanical time fuze, was discovered in the town of Poquoson, Virginia, in July of 1996. It had been brought to the area by a local resident, and bears no similarity to items suspected to have been delivered, employed, or utilized on former range lands (see document I-3).

(5) HTCS Fleming, the Senior Noncommissioned Officer of the Navy Explosive Ordnance Disposal (EOD) Mobile Unit Two Detachment at Yorktown Naval Weapons Station, Virginia, stated that reporting and historical records revealed that Naval EOD response has occurred once on lands associated with the former Plum Tree Island Range in the past few years. The item recovered was a badly deteriorated old style 100 pound demolition bomb casing, devoid of explosives or hazardous components, believed to have been delivered empty as a practice bomb. The item was discovered on the northern shoreline of the former range around the Whalebone Island area. The item was later transported back to the Naval Weapons Station and disposed of as scrap (see document I-4).

(6) Chief C.E. Ward is the present Chief of the Poquoson Fire Department and lifetime local resident. In Chief Ward's 25 years with the fire department he can recall only one incident involving ordnance and explosives in which Naval Explosive Ordnance Disposal personnel from Yorktown were requested to respond. This incident occurred in 1994, the item was located around the center of the island on the estern shore, and the item turned out being an empty practice bomb. Chief Ward stated that ordnance related range structures remaining on the former range still exist in the forms of a red and white bunker located south of Plum Tree Island, remnants of an old pier extending from the aforementioned bunker area, an erect spotting tower located west of the pier, and two or three bunkers extending east to west on the southern portion of the island/peninsula. There were once targets associated with the bunker area north of the bunkers. Chief Ward stated that bomb casings have been seen at low tide along the shoreline around Plum Tree Point and that clammers once discovered a cluster of small bombs south of Plum Tree Point. Chief Ward recalled bombing activity around the 1940's and 1950's. He often heard and saw explosions, with the intensity of the shock/noise varying. Chief Ward believes that rocket activity occurred on the island around 1954 and that all ordnance activity ended in 1958. Chief Ward stated that bombing and gunnery firing patterns were south to north when these activities occurred. Chief Ward stated that bombs were dropped that caused fires. Chief Ward stated that aerial machine gun fire occurred 24 hours a day. Chief Ward stated that a range clearance was performed in 1959 or 1960 by an officer from Langley Air Force base. Chief Ward related two incidents where people were injured by ordnance activity or ordnance remaining on the range. Some kids were supposedly seriously injured in the 1950's when an unknown ordnance item exploded and a clammer was supposedly shot and killed around the 1950's by what was believed to be machine gun fire (see document I-5).

(7) Senior Investigator Buffington has been employed by the Poquoson Police Department for 21 years. During the entire period of his employment with the police department he can recall of only two incidents involving ordnance or explosives discovered on or originating from former Plum Tree Island Range lands. One incident involved the discovery of a 100 pound practice bomb on the eastern (central) shore of the former range. Yorktown Naval EOD personnel responded and removed the item. The second incident involved the discovery of small arms ammunition quite some time ago. Air Force EOD from Langley Air Force Base respond and destroyed the items (see document I-6).

(8) Mr. Graham is a lifetime resident of the Poquoson area and states to have been much aware of ordnance activity at the former Plum Tree Island Range when the range was operational. Mr Graham could recall the bombing which occurred on the ranges. The planes would approach from the south at a pretty high altitude, and he could see the bombs drop upon release. The planes would drop the bombs on the northern end of the island, and after bomb impact the earth shock would be so great that stuff would be knocked off the shelf at the store. Mr. Graham also recalled the location of the Gunnery Range. The range was located across from the Messick Point area and had targets and soldier manned bunkers. In addition, occasionally soldier spectators would set up viewing stands in the Messick point area and watch aircraft fire .30 and .50 caliber rounds into targets on the gunnery range. Mr. Graham could also recall finding rockets in the Plum Tree point area some time ago. These were described as 2 inch pipe type objects with a hanging device attached. This fits the description of 2.25 inch SCAR rockets, which are practice 5 inch rail launched aircraft rockets devoid of an explosive warhead and fuze (see document I-7).

(9) Mr. Forest is a lifetime resident of the Poquoson area, and could recall ordnance activity on the Plum Tree Island Range when it was operational. Mr. Forest stated that he could recall seeing bombs dropping out of high altitude B-29 aircraft, the bombs being demolition bombs of all sizes. When the bombs impacted, the concussion would supposedly knock the glass out of window panes. Mr. Forest stated that he assisted in the construction of a Rocket Range observation bunker which was built south of Plum Tree Island for a rocket range on Plum Tree Point. The range consisted solely of vehicular targets. Mr. Forest stated that bombing patterns were always south to north, with bombs probably striking all over the former Plum Tree Island Range. Mr. Forest stated there were also other ordnance related improvements on former range lands in the form of other observation bunkers and towers. Mr. Forest could recall one incident where death resulted from ordnance activity or ordnance remaining on the former range. A clammer, Milton Hoffman, was

killed in 1938 or 1939 when a bomb missed the target area and struck his vessel (see document I-8).

(10) Mr. Forman has resided in the area of the Plum Tree Island range all of his life (82 years) and has clammed and fished in the area most of his life. Mr. Forman stated that he knew of the existence of a Gunnery Range area on the former range near Messick Point in which men in concrete bunkers would monitor targets during live small arms fire from aircraft. Mr. Forman also knew of the existence of a Ship Silhoutte Bombing Target, the center filled in with canvas, located west of Plum Tree Island in the 1940's. Mr. Forman also knew of other ordnance related structures in the form of spotting towers, a pier, and walkways, all on the southern end of the range below plum tree point. Mr. Forman stated that the majority of ordnance activity occurred from Gum Hammock Creek and downward, only once could he recall bombing further north. Mr. Forman stated that the majority of bombing and rocket activity occurred on the Plum Tree Island/Point area. Mr. Forman recounted bombing missions by stating that the planes would come in from the south at high altitudes moving northward, and that he could see the bombs after release and recall the awful noise they made upon impact. Mr. Forman recalled one incident in which a death resulted from ordnance activity or ordnance remaining on the range. A clammer was killed by bombs during the testing of new bomb sites on an unknown date (see document I-9).

(11) Mr. Ingram, an employee of the Poquoson Assessors Office, confirmed site acreage to consist of 3,265.60 acres, consistant with the INPR. In addition, he confirmed government ownership of all acreage (see document I-10).

5. SITE ELIGIBILITY

a. Confirmed Formerly Used Defense Site

(1) Former land usage and ownership of the Plum Tree Island Range by the War Department has been confirmed and summarized in the COE Findings and Determination of Eligibility (see document E-1). The 3,265.60 acre site, located near Poquoson, Virginia, was used by Langely Air Force Base as a Bombing, Gunnery, and Rocketry Range.

(2) By 1972 all acreage that had been purchased by the War Department was relinquished to the Department of the Interior Fish and Wildlife Service. Today, no ownership or usage of any part of the former Plum Tree Island Range remains with the Department of Defense (DOD) (see documents E-7, G-4 through G-8, and Plate 4).

b. **Potential Formerly Used Defense Site**

(1) During the course of the site investigation of the subject range, it was determined that an insufficient buffer area existed at this range due to the discovery of Wildlife Service photographs and interview information revealing an ordnance presence on the shoreline (below the high water mark) during periods of low tide. Also, bomb crater activity is significantly evident in aerial photos depicting the shoreline, signifying a definate ordnance potential beyond.

(2) Based on these discoveries, 198 acres of additional area (extending from the high water mark to 100 yards into the waterway, from the vicinity of Messick Point to the vicinity of Whalebone Island) has been included with FDE lands for report purposes and labeled Area C. This additional acreage is sufficient in size to reasonably include all areas of contamination within DERP-FUDS Policy Guidelines as stipulated in Corps of Engineers Policy Clarification Memo dated 15 March 1994 (see photos J-17, J-18, J-24 through J-26, documents F-12 I-2, I-5, K-1, and plates 3, 4, & 5).

6. VISUAL SITE INSPECTION

a. General Procedures and Safety

(1) During the period of 12 August to 14 August 1996, members of the Assessment Team, Mr. Nick Iaiennaro, and Mr. Dave Lakeman, visited the former Plum Tree Island Range near Poquoson, Virginia. The primary task of the team was to assess potential OE presence and usage of the site as a bombing and gunnery range. The site inspection was limited to non-intrusive methods; i.e. subsurface sampling was not authorized nor performed.

(2) Real estate rights-of-entry were not obtained by the team due to the willingness of the current owners to allow the team to visit their property. Owners were briefed on the non-intrusive nature of the inspection and the safety measures used by the inspection team.

(3) A site safety plan was developed and utilized by the assessment team to assure safety from injury during the site inspection of the area (reference B-4). Prior to the inspection, a briefing was conducted which stressed that OE should only be handled by military EOD personnel.

(4) Prior to the site visit, a thorough review of all available reports, historical documents, texts, and technical ordnance reference materials gathered during the historical

records search was made to ensure awareness of potential ordnance types and associated hazards.

b. Area A: Target Area

(1) This area consists of approximately 2,049.60 acres of flat and moderately vegetated tidal marsh bordered by the Chesapeake Bay and Back River.

(2) The moderate vegetation found in this area exists in the form of several types of plant species. Plant species discovered within this area consisted of Saltmarsh Cordgrass, Black Needlerush, Saltmeadow Hay, Marsh Elder, Switch Grass, Saltgrass, and Groundsel Tree.

(3) Military structures or improvements documented or stated to have been located in this area were in the form(s) of two docks, 6700 feet of duck board walk, four observation towers (one 40 foot, one 25 foot, and two of unknown height), two concrete U-shaped gunnery range bunkers, one gunnery range tool house, 12 machine gun target foundations, 3.5 miles of fenceline, 750 personnel targets, one ship silhouette target, one concrete pier target, one 220 yard square target, one bullseye type target, and one rocket range observation bunker (see documents E-2 and K-1).

(4) Remnants of military structures or improvements remaining in this area are listed as follows (see Photos J-2 through J-4, J-8 through J-16, and Plates 2, 3, and 5):

(a) A concrete observation bunker of unknown dimensions with plexiglass observation windows on the northern side of the structure. This was directly located south of Plum Tree Island.

(b) Remnants of a wooden pier extending from the southern shore of the island below Plum Tree Island.

(c) An erect 40 foot observation tower located on the southern shore of the island directly west of the wooden pier.

(d) Two fallen observation towers, one on the northern shoreline directly west of Plumtree Island and one approximately 100 yards north of the erect tower.

(e) Three gunnery range concrete observation bunkers located on the southern portion of the island slightly north of Messick Point, extending east to west.

(5) The only actual OE items discovered during the site inspection were a minimum of three expended Rocket Motors (Jet Assisted Take Off or JATO), found connected to a rack and partially buried in the marsh slightly east of the erect observation tower on the southern portion of the range. Two or three additional Rocket Motors, condition unknown, may be/are probably attached to the same rack and buried under the marsh. The rocket motors found were of unknown era and nomenclature, but are similar in appearance and construction to the M8 variety. JATO bottles were/are used primarily for applying thrust to assist aircraft on take-off. In addition to actual OE items found, large bomb craters filled with water were found north of the erect observation tower (#1) on the southern end of the island. Due to the nature of the terrain in this area and tidal conditions, access to the majority of this area was difficult and limited (see documents D-1, D-3, plates 2, 3, 4 , 5 and photos J-5 and J-7)

c. Area B: Buffer Zone

(1) This area consists of approximately 1,226.00 acres of flat and moderately vegetated tidal marsh bordered by the Chesapeake Bay and Lloyd Bay.

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

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

(4) Essentially, this area served as an error zone to preclude ordnance, which unintentionally missed the targets, from entering lands not under military control.

(5) No OE was discovered in this area. Due to the nature of the terrain and tidal conditions, access to this area was difficult and limited, making it difficult to survey a majority of the area (see plates 2, 3, 4, and 5).

d. Area C: Buffer Zone (Additional Lands)

(1) This area consists of approximately 198.00 acres of flat and unvegetated shoreline located below the high water mark, a portion of which is exposed by periods of extreme low tide.

(2) Military structures or improvements documented or stated to have been located in this area existed solely in the form of a wooden pier extending eastward and then southward from Area A in the southern portion of the island.

(3) Military structures or improvements found to currently exist in this area are remnants of the aforementioned wooden pier.

(4) No evidence of OE was discovered in this area. The site inspection team could visit this area only during the high tide period, so OE which would possibly be exposed at low tide, was not visible (see photos J-3, J-16, and plates 2, 3, 4, and 5).

7. EVALUATION OF ORDNANCE HAZARDS

a. General Procedures

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

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

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

b. Area A: Target Area

(1) Area A is a **confirmed** area of contamination.

(2) Historical documentation and interview information reflects a substantial ordnance usage on this range. Various sizes of demolition and practice bombs (with the greatest being

sizes of demolition and practice bombs (with the greatest being 2000 pound high explosive demolition bombs), .30 and .50 caliber ammunition, and rockets (suspected of being of the 5 inch variety) were dropped/fired on this range. Historical and current aerial photographs reveal a substantial bomb crater presence and display ordnance range related targets and facilities. Fish and wildlife photos reveal a significant remaining OE presence.

(3) A limited visual inspection of this area revealed an actual OE presence to exist solely in the form of three expended rocket motors (JATO), exposed on the surface of marshland, with a possible two or three additional JATO rockets, of unknown condition, buried under the marsh at the same location. There were, however, several large water filled bomb craters discovered.

(4) The major hazard(s) expected in this area may be present in the form of unexploded high explosive demolition bombs (up to and including 2,000 pounds in size), practice bombs (possibly incorporating black powder spotting charges), live small arms ammunition, and aerial rockets (suspected of being the 5 inch high explosive and practice varieties).

c. Area B: Buffer Zone

(1) Area B is a **potential** area of contamination. The team performed a surface visual inspection of this area, to the greatest extent possible, revealing no OE presence. In addition, historical documents and interview information do not display an ordnance usage in this area. However, due to this areas close proximity to Area A and the teams limited ability to access this area due to the marshy nature of the terrain, an OE hazard may exist.

(2) As in Area A, the major potential hazard(s) which may be present in this area could be found in the form of high explosive demolition bombs (up to and including 2,000 pounds in size), practice bombs (possibly incorporating black powder spotting charges), small arms ammunition, rocket motors (JATO), and aerial rockets (suspected of being the 5 inch high explosive and practice varieties).

d. Area C: Buffer Zone (Additional Lands)

(1) Area C is a **confirmed** area of contamination. The team performed a surface visual inspection of this area, to the greatest extent possible (during high tide), revealing no ordance presence. However, Fish and Wildlife Service photographs and

interview information display a substantial OE presence in this area.

(2) As in Areas A and B, the major hazards expected in this area may be present in the form of unexploded high explosive demolition bombs (up to and including 2,000 pounds in size), practice bombs (possibly incorporating black powder spotting charges), live small arms ammunition, rocket motors (JATO) and aerial rockets (suspected of being the 5 inch high explosive and practice varieties).

8. SITE ORDNANCE TECHNICAL DATA

a. **End Item Technical Data.**

(1) Table 8-1 is a listing of ammunition and explosive fillers for only the items confirmed as used on the range.

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

TABLE 8-1
AMMUNITION USED AND EXPLOSIVE FILLER

NOMENCLATURE	FILLER/WEIGHT	AUTHORIZED FUZE(S)
Bomb, 100-lb, Demolition, MK.I	65-lbs Amatol	Mk. I, MK. III
Bomb, 100-lb, GP, AN-M30	53.3-lbs 50/50 Amatol or 56.6-lbs TNT	AN-M103, AN-M100, M118, M119, M112, M-106
Bomb, 100-lb, Practice, MK. I (Empty Demo Body)	2-lbs Black Powder Sand/Inert Filler	MK. I Practice
Bomb, 100-lb, Practice M38A2	Inert (Sand Filled)	BD
Spotting Charge, M1	3-lbs Black Powder	
Bomb, 250-lb, GP, AN-M57	123.7-lbs 50/50 Amatol or 129-lbs TNT	AN-M103, AN-M100, M118, M119, M106 M112,
Bomb, 300-lb, Demolition, MK.I MI	148-lbs TNT	Mk. VII MI, MK.V MI
Bomb, 300-lb, Practice, MK. I (Empty Demo Body)	4-lbs Black Powder Sand/Inert Filler	MK. III
Bomb, 500-lb, GP, AN-M43	264.5-lbs 50/50 Amatol or 280-lbs TNT	AN-M103, AN-M100, M106, M118, M119, M112, M113, M101, AN-MK 230

TABLE 8-1 (Continued)
AMMUNITION USED AND EXPLOSIVE FILLER

NOMENCLATURE	FILLER/WEIGHT	AUTHORIZED FUZE(S)
Bomb, 600-lb, Demolition, MK.I MI	340-lbs TNT	Mk. VII MI, MK.V MI
Bomb, 500-lb, GP, AN-M43	264.5-lbs 50/50 Amatol or 280-lbs TNT	AN-M103, AN-M100, M106, M118, M119, M112, M113, M101, AN-MK 230
Bomb, 600-lb, Demolition, MK.I MI	340-lbs TNT	Mk. VII MI, MK.V MI
Bomb, 1100-lb, Demolition, MK.I MI	632-lbs TNT	Mk. VII MI, MK.V MI
Bomb, 2000-lb, GP, AN-M34	1061-lbs, Amatol	M102, M103, M106, M114 , M118, M119, AN-MK 230
Bomb, 2000-lb, GP, AN-M66	1096-lbs, TNT	M103, M102, M114, M106, M118, M119, AN-MK 230
Bomb, 2000-lb, Demolition, MK.I MII	1,060-lbs TNT	Mk. XXII MI, MK. XXIV MI
Rocket, 5.0-Inch HE001 Warhead, Mk1 Mod 0 Motor, 3.25-inch Mk 7	 8.6-lbs TNT 8.5-lbs Ballistite	 Mk 148 Mod 0
Rocket, 2.25-Inch Practice, SCAR	Inert	N/A
Motor	1.75-lbs Ballistite	N/A
Small Arms Ammo .30 Cal Ball, M2	 Lead Antimomy with Gilding Metal Jacket	 N/A
.30 Cal Tracer, M1	Tracer Composition	N/A
Propellant Base Powder	50 gr Single or Double	N/A
Small Arms Ammo .50 Cal Ball, M2	 Lead Antimomy with Gilding Metal Jacket	 N/A
.50 Cal Tracer, M1	Tracer Composition	N/A
Propellant	250 gr Single or Double Base Powder	N/A
Rocket Motor (JATO), M-8 Ignitor, M31A1	70-lb Cast OGK 87 gr Ignitor Composition	N/A

b. Chemical Data of Ordnance Fillers

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

TABLE 8-2
CHEMICAL DATA OF ORDNANCE FILLERS

Filler	Synonym(s)	Chemical Formula
Amatol (50-50) or (80-20)		
Ammonium Nitrate		NH_4NO_3
TNT	2,4,6-trinitrotoluene	$CH_3C_6H_2(NO_2)_3$
Black Powder		
74% Potassium Nitrate	Saltpeter; Niter	KNO_3
11% Sulfur		S
16% Charcoal		C
Double-base Powder	Ballistite	
60% Nitrocellulose	Guncotton; Pyroxylin	$[C_6H_8O_5(NO_2)_3]_n$
39% Nitroglycerin		$CH_2NO_3CHNO_3CH_2NO_3$
0.75% Diphenylamine	Stabilizer DPA	$(C_6H_5)_2NH$
E. C. Blank Powder	(single-based compound)	
80.4% Nitrocellulose	Guncotton; Pyroxylin	$[C_6H_8O_5(NO_2)_3]_n$
8% Potassium Nitrate	Saltpeter	KNO_3
8% Barium Nitrate		$Ba(NO_3)_2$
3% Starch		
0.6% Diphenylamine	Stabilizer DPA	$(C_6H_5)_2NH$
Igniter Compositions *		
I-136 & I-136A		
10% Calcium Resinate		Ca
90% Strontium Peroxide		SrO_2
OGK		
58.7% NC (12.6%N)		$C_6H_7(OH)_x(ONO_2)_y$ x&y=3
24% NG		$C_3H_5(ONO_2)_3$
9% Triacetin		$C_3H_5(CH_3O_2C)_3$
3.3% Dioctyl Phthalate		$(O_2N)_3C_6H_2N(NO_2)$
1.7% Nitrodiphenylamine		$O_2NC_{12}H_{11}NH$
3.3% Lead Stearate		$Pb(C_{18}H_{35}O_2)_2$
TNT	2,4,6-trinitrotoluene; triton; trotyl; trilite; trinol; tritolo	$CH_3C_6H_2(NO_2)_3$

TABLE 8-2 CHEMICAL DATA OF ORDNANCE FILLERS	
Tracer Compound	
16% Polyvinyl Chloride	
26% Magnesium Powder	Mg
52% Strontium Nitrate	$Sr(NO_3)_2$

9. OTHER ENVIRONMENTAL HAZARDS

a. Hazardous, Toxic, and Radiological Waste

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

b. Building Demolition/Debris Removal

The INPR calls for the removal of three observation towers which present a safety threat. There were no additional structures or debris of significant importance found during this site inspection to warrant any additional BD/DR projects.