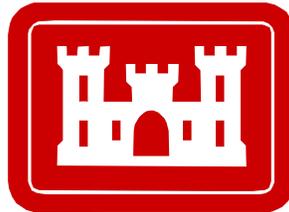


**FINAL  
DECISION DOCUMENT  
FORMER SHUMAKER NAVAL AMMUNITION DEPOT  
EAST CAMDEN, ARKANSAS**

**Prepared for**



**U.S. Army Corps of Engineers  
Tulsa District**

**December 2003**

TABLE OF CONTENTS

1. DECLARATION ..... 1  
1A. SITE NAME AND LOCATION ..... 1  
1B. STATEMENT OF BASIS AND PURPOSE ..... 1  
1C. DESCRIPTION OF SELECTED REMEDY ..... 1  
1D. STATUTORY DETERMINATION ..... 2

2. DECISION SUMMARY ..... 3  
2A. SITE NAME, LOCATION, AND DESCRIPTION ..... 3  
2B. SITE HISTORY AND ENFORCEMENT ACTIVITIES ..... 3  
    Site History ..... 3  
    Rocket Test Range ..... 5  
        History of Site Activities at Former Rocket Test Range ..... 5  
        History of Enforcement Activities at Former Rocket Test Range ..... 5  
    Fuze Test Range ..... 5  
        History of Site Activities at Former Fuze Test Range ..... 5  
        History of Enforcement Activities at Former Fuze Test Range ... 6  
    Rocket Burn Area ..... 6  
        History of Site Activities at Former Rocket Burn Area ..... 6  
        History of Enforcement Activities at Former Rocket Burn Area .. 6  
    TNT Burn Area ..... 6  
        History of Site Activities at Former TNT Burn Area ..... 6  
        History of Enforcement Activities at Former TNT Burn Area ... 7  
    Ordnance Disposal Wells ..... 7  
        History of Site Activities at Ordnance Disposal Wells ..... 7  
        History of Enforcement Activities at Ordnance Disposal Wells .. 7  
    Buried Drum Area ..... 8  
        History of Site Activities at Buried Drum Area ..... 8  
        History of Enforcement Activities at Buried Drum Area ..... 8  
    Rework Area ..... 9  
        History of Site Activities at Former Rework Area ..... 9  
        History of Enforcement Activities at Former Rework Area ..... 9  
    Landfill Area ..... 10  
        History of Site Activities at Former Landfill Area ..... 10  
        History of Enforcement Activities at Former Landfill Area ..... 10  
    Non-Vegetated Soil Area ..... 10  
        History of Site Activities at Non-Vegetated Soil Area ..... 10  
        History of Enforcement Activities at Non-Vegetated Soil Area ..... 11  
    Pipes-in-Concrete Area ..... 11  
        History of Site Activities at Pipes-in-Concrete Area ..... 11  
        History of Enforcement Activities at Pipes-in-Concrete Area ... 11

**Decision Document  
Table of Contents**

		<b>Page</b>
	Squib Disposal Area .....	12
	History of Site Activities at Squib Disposal Area .....	12
	History of Enforcement Activities at Squib Disposal Area .....	12
	Ground Scarred Area .....	12
	History of Site Activities at Ground Scarred Area .....	12
	History of Enforcement Activities at Ground Scarred Area .....	12
2C.	COMMUNITY PARTICIPATION .....	13
2D.	SCOPE AND ROLE OF RESPONSE ACTION .....	15
2E.	SITE CHARACTERISTICS .....	15
	Rocket Test Range .....	16
	Fuze Test Range .....	16
	Rocket Burn Area .....	17
	TNT Burn Area .....	17
	Ordnance Disposal Wells .....	18
	Buried Drum Area .....	19
	Rework Area .....	20
	Landfill Area .....	20
	Non-Vegetated Soil Area .....	21
	Pipes-in-Concrete Area .....	22
	Squib Disposal Area .....	22
	Ground Scarred Area .....	23
2F.	CURRENT AND POTENTIAL FUTURE SITE AND RESOURCE USES .....	23
	Rocket Test Range .....	23
	Land Use .....	23
	Ground Water Use .....	24
	Fuze Test Range .....	24
	Land Use .....	24
	Ground Water Use .....	24
	Rocket Burn Area .....	24
	Land Use .....	24
	Ground Water Use .....	25
	TNT Burn Area .....	25
	Land Use .....	25
	Ground Water Use .....	25
	Ordnance Disposal Wells .....	25
	Land Use .....	25
	Ground Water Use .....	26
	Buried Drum Area .....	26
	Land Use .....	26
	Ground Water Use .....	26
	Rework Area .....	26
	Land Use .....	26
	Ground Water Use .....	26
	Landfill Area .....	27
	Land Use .....	27

**Decision Document  
Table of Contents**

---

	<b>Page</b>
Ground Water Use .....	27
Non-Vegetated Soil Area .....	27
Land Use .....	27
Ground Water Use .....	28
Pipes-in-Concrete Area .....	28
Land Use .....	28
Ground Water Use .....	28
Squib Disposal Area .....	28
Land Use .....	28
Ground Water Use .....	29
Ground Scarred Area .....	29
Land Use .....	29
Ground Water Use .....	29
2G.    SITE RISKS .....	29
Rocket Test Range .....	30
Fuze Test Range .....	30
Rocket Burn Area .....	30
TNT Burn Area .....	32
Buried Drum Area .....	32
2H.    RESPONSE ACTION OBJECTIVES .....	32
2I.    DESCRIPTION OF ALTERNATIVES .....	32
2J.    COMPARATIVE ANALYSIS OF ALTERNATIVES .....	33
Overall Protection of Public Safety and the Human Environment .....	33
Compliance with Applicable, Relevant, and Appropriate Requirements (ARARs) .....	33
Evaluation of Alternatives for Rocket Test Range .....	35
Evaluation of Alternatives for Fuze Test Range .....	36
Evaluation of Alternatives for Rocket Burn Area .....	37
Evaluation of Alternatives for TNT Burn Area .....	39
Evaluation of Alternatives for Buried Drum Area .....	40
2K.    DOCUMENTATION OF SIGNIFICANT CHANGES .....	41
3.    RESPONSIVENESS SUMMARY .....	42
3A.    STAKEHOLDER ISSUES AND LEAD AGENCY RESPONSES .....	42
3B.    TECHNICAL AND LEGAL ISSUES .....	42
Restoration Advisory Board Meeting Comments and Responses .....	42
U.S. Environmental Protection Agency Comments and Responses .....	45
Highland Industrial Park Comments and Responses .....	57
U.S. Fish and Wildlife Service Comments and Responses .....	61

**LIST OF TABLES**

---

Table 1	Summary of Selected Remedies and Rationale for Decision .....	2
Table 2	Risk Evaluation Summary .....	31

**LIST OF FIGURES**

---

Figure 1	Site Location Map
Figure 2	Site Map
Figure 3	Current Property Owners

**LIST OF ACRONYMS AND ABBREVIATIONS**

AMSL	above mean sea level
AOI	area of interest
ADPCE	Arkansas Department of Pollution Control and Ecology
ARARs	applicable or relevant and appropriate requirements
ARC	Atlantic Research Corporation
ASR	Archives Search Report
ATI	American Technologies, Inc.
BAE	BAE Systems, Inc.
BEI	Baldwin Electronics, Inc.
Brown Engineering	Brown Engineering Corporation
Category II NDAI	U.S. Army Corps of Engineers' decision that No Department of Defense Action is Indicated, based on the findings of a site inspection wherein FUDS-eligible contamination is not confirmed and remedial/removal response is not required
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CFR	Code of Federal Regulations
COC	contaminant of concern
COPC	contaminant of potential concern
DCE	dichloroethylene
DD	Decision Document
DERP	Defense Environmental Restoration Program
DOD	Department of Defense
EE/CA	engineering evaluation/cost analysis
EPA	U.S. Environmental Protection Agency
ERA	environmental risk assessment
ESI	expanded site investigation
FUDS	formerly used defense sites
Georgia-Pacific	Georgia-Pacific Corporation
GPS	global positioning system
HIP	Highland Industrial Park
HITECH	HITECH Holdings, Inc
HTRW	hazardous, toxic, and radioactive waste
IP	International Paper Company
ITT	International Telephone and Telegraph Corporation
MCL	maximum contaminant level

**Decision Document  
Table of Contents**

---

MLRS	multiple launch rocket system
MSSL	medium-specific screening level
NAD	Naval Ammunition Depot
National Fireworks	National Fireworks, Inc.
Navy	Department of the Navy, U.S. Navy
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NDAI	no Department of Defense action indicated
NTS	National Technical Systems
OB/OD	open burning/open detonation
OE	ordnance and explosives
OERIA	ordnance and explosives risk impact assessment
OEW	ordnance and explosive waste
Parsons	Parsons Engineering Science, Inc.
PCB	polychlorinated biphenyl
PCE	perchloroethylene
PRP	potentially responsible party
RAB	Restoration Advisory Board
RAC	risk assessment code
RCRA	Resource Conservation and Recovery Act
Rex Timber	Rex Timber, Inc.
RI/FS	remedial investigation/feasibility study
RW	Rework Area building
SARA	Superfund Amendments and Reauthorization Act
SDWA	Safe Drinking Water Act
SI	site inspection
Sustainable Forests	Sustainable Forests, L.L.C.
TBC	to be considered
TCE	trichloroethylene
TNT	trinitrotoluene
TPS	third-party site
UAESCH	U.S. Army Engineering Support Center Huntsville
USACE	U.S. Army Corps of Engineers
U.S.C.	U.S. Code
USF&WS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UXO	unexploded ordnance

**FINAL DECISION DOCUMENT  
FORMER SHUMAKER NAVAL AMMUNITION DEPOT  
EAST CAMDEN, ARKANSAS**

**DECLARATION**

**1A. SITE NAME AND LOCATION**

Former Shumaker Naval Ammunition Depot  
East Camden, Ouachita and Calhoun Counties, Arkansas

**1B. STATEMENT OF BASIS AND PURPOSE**

This Decision Document (DD) presents the Department of Defense (DOD) selected response action for the former Shumaker Naval Ammunition Depot (Shumaker NAD), in East Camden, Ouachita and Calhoun Counties, Arkansas, to address unexploded ordnance (UXO) and residual explosive and/or chemical contamination resulting from the U.S. Navy's rocket assembly, storage, testing, and disassembly operations in certain areas of interest (AOIs) at the site. This response action was chosen in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), 42 U.S. Code (U.S.C.) § 9601 *et seq.*, as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 Code of Federal Regulations (CFR) Part 300 *et seq.*, as amended.

The investigations, led by the U.S. Army Corps of Engineers (USACE), did not cover the entire site, nor the entire time period of operations. The portion of the site included under this DD comprises 12 AOIs investigated from 2000 to 2002 by Parsons Engineering Science, Inc. (Parsons). Six of the AOIs were investigated for the presence of Navy-era UXO during an Engineering Evaluation/Cost Analysis (EE/CA), and nine AOIs were investigated during Site Inspections (SIs) for residual explosive and/or chemical contamination resulting from Navy-era activities. During some of the SIs, it was found that a number of potentially responsible parties (PRPs) contributed to chemical residuals at the AOIs. In these cases, the SI to remedial investigation/feasibility study (RI/FS) process was truncated. The ongoing assessment of the chemical residuals and the analysis of response alternatives were halted because the USACE has no legal authority to address post-Navy contamination at the former Shumaker NAD.

**1C. DESCRIPTION OF SELECTED REMEDY**

This DD is based on nine Final SI reports, seven dated February 2002 and two dated July 2003; and a Final EE/CA report, dated September 2003. Based on the SI report findings, the DOD selected remedy is Category II No DOD Action Indicated (NDAI) because there are PRP-lead responsibilities for eight AOIs, while no risk was determined for one AOI with DOD-lead responsibility. The DOD selected remedy for each of the six AOIs assessed under the EE/CA for Navy-era UXO is also NDAI because no Navy-era UXO was found. Table 1 summarizes the selected remedies for each AOI. No assessment of remedy alternatives was made for post-Navy ordnance and operation activities at the former Shumaker NAD.

**Table 1  
Summary of Selected Remedies and Rationale for Decision**

Area of Interest	Selected Remedy	Rationale for Decision
Rocket Test Range	NDAI for UXO	No Navy-era UXO found
Fuze Test Range	NDAI for UXO	No Navy-era UXO found
Rocket Burn Area	NDAI for UXO  Category II NDAI from SI	No Navy-era UXO found  PRP-lead responsibility
TNT Burn Area	NDAI for UXO  Category II NDAI from SI	No Navy-era UXO found  PRP-lead responsibility, <i>de minimus</i> role for the Navy
Ordnance Disposal Wells	NDAI for UXO	No Navy-era UXO found; DOD would otherwise have lead responsibility
Buried Drum Area	NDAI for UXO  Category II NDAI from SI	No Navy-era UXO found  PRP-lead responsibility
Rework Area	Category II NDAI from SI	PRP-lead responsibility, <i>de minimus</i> role for the Navy
Landfill Area	Category II NDAI from SI	PRP-lead responsibility
Non-Vegetated Soil Area	Category II NDAI from SI	PRP-lead responsibility
Pipes-in-Concrete Area	Category II NDAI from SI	PRP-lead responsibility
Squib Disposal Area	Category II NDAI from SI	Lack of chemicals or residual explosives; DOD would otherwise have lead responsibility
Ground Scarred Area	Category II NDAI from SI	PRP-lead responsibility

**1D. STATUTORY DETERMINATION**

It has been determined that no remedial action is necessary to ensure the protection of human health and the environment due to UXO and/or residual explosive and/or chemical contamination resulting from the Navy's rocket assembly, storage, testing, and disassembly operations at 12 AOIs at the site. This determination does not preclude remedial action by others in response to post-Navy use of the site.

## DECISION SUMMARY

### **2A. SITE NAME, LOCATION, AND DESCRIPTION**

The former Shumaker NAD is located approximately 4 miles northeast of Camden, Arkansas, on the east side of U.S. Highway 79 and north of State Highway 4. (See Figure 1.) The depot, established by the Department of the Navy (Navy) in October 1944, covered 68,890.2 acres (roughly 16 miles long and 9 miles wide), in Ouachita and Calhoun Counties. The lead agency for the site investigation activities is the USACE-Little Rock District, which has worked with the USACE-Tulsa District to issue this DD.

The portion of the site included under this DD comprises 12 AOIs. Nine of the AOIs were investigated for residual explosive and/or chemical contamination during the SIs, and six AOIs were investigated for the presence of UXO during the EE/CA. Both sets of reports were prepared by Parsons in 2002 and 2003. Three of the AOIs investigated are included in both the SI and EE/CA reports, while six additional AOIs are covered in the SI reports, and four other AOIs are included in the EE/CA report. The nine AOIs included in the SI reports are the Rocket Burn Area, the Buried Drum Area, the TNT Burn Area, Rework Area 10, the Landfill, the Non-Vegetated Soil Area, the Pipes-in-Concrete Area, the Squib Disposal Area, and the Ground Scarred Area. The six AOIs included in the EE/CA report are the Rocket Test Range, the Fuze Test Range, the Rocket Burn Area, the Buried Drum Area, the TNT Burn Area, and the Ordnance Disposal Wells. The locations of these AOIs, including the reported locations of the Ordnance Disposal Wells, are presented in Figure 2.

### **2B. SITE HISTORY AND ENFORCEMENT ACTIVITIES**

#### **Site History**

National Fireworks, Inc. (National Fireworks) of West Hanover, Massachusetts, was contracted to operate the plant. On April 25, 1945, the first rocket production line was placed into operation. By the end of World War II, approximately 20,000 persons were employed in the construction and operation of the plant. Designed exclusively for the loading, assembly, testing, and storage of ordnance rockets, the rocket production facilities, magazines, warehouses, railroads, roads and administrative, industrial, and housing facilities were about 60 percent complete when the original contract was terminated on November 5, 1945.

Following the end of World War II, production and employment levels were reduced in keeping with peacetime requirements. Following the outbreak of the Korean War in June 1950, Shumaker NAD resumed production in August 1950. By June 21, 1951, production lines were running full time, and a new line was being constructed. During the Korean War, employment reached a peak of 3,500 persons. After the armistice was signed on July 27, 1953, rocket production remained unchanged.

In February 1956, while still employing 1,600 persons in rocket production, the Navy announced plans to close Shumaker NAD within 12 to 15 months. On June 30, 1957, the Navy again resumed

**Decision Document**  
**Part 2: Decision Summary**

---

operation of the plant from National Fireworks. In preparation for closing, all areas of the plant used for loading, assembly, disassembly, and storage of explosive substances were decontaminated. In November 1959, 3,800 acres of the site property were reported excess and announced for sale. The land was purchased by private buyers and International Paper Company (IP).

In 1960, the remaining portion of Shumaker NAD was declared excess and advertised for sale. Brown Engineering Corporation (Brown Engineering) of Houston, Texas, a subsidiary of Brown & Root, Inc., submitted the highest bids for four parcels, and IP submitted the highest bids for four other parcels. Shumaker NAD closed on November 15, 1961.

Brown Engineering (later named Highland Resources, then Highland Industrial Park (HIP)) formed an industrial park on approximately 17,000 acres. In 1962, the Arkansas branch of International Telephone and Telegraph Corporation's (ITT) electronics manufacturing division commenced production in the industrial park, as did two ink-manufacturing plants and a mobile home plant. By February 1965, industries that had located to the industrial park included ITT (125 employees); Jacket King, Inc., a garment manufacturer (110 employees); and Pace-Caribe, Inc., a manufacturer of pyrotechnical products and flares (30 employees). Since the mid-1960s, dozens of private businesses, many of them manufacturing ordnance-related products, have operated in what is now known as the HIP.

By 1987, 37 companies and 4,200 employees operated on property owned by Highland Resources. By the middle of 1988, operators at HIP included Johnson & Johnson, IP, General Electric, Sonoco Products, Brunswick Corporation, LTV, and Tracor Aerospace. In addition, warehouses were being leased by Armco, Brunswick Corporation, Johnson & Johnson, Cooper Tire and Rubber Company, Firestone Tire Company, Georgia-Pacific Corporation, Hercules, W.R. Grace and Company, and IP.

In the early 1990s, Highland Resources changed its name to HIP. By July 1993, a downturn in the defense industry had forced a number of defense contractors to relocate from HIP. With the recent conflicts in Afghanistan and Iraq, defense industry business has recovered. Currently there are over 40 companies operating at HIP, including Accurate Arms Company, Inc., manufacturing military explosives; Raytheon Missile Systems, manufacturing electronic components for missiles; Atlantic Research Corporation, manufacturing missile motors, the multiple launch rocket system (MLRS), warheads for the Chaparral missile, and automobile air inflators; Austin Powder Company, manufacturing explosives; Esterline Technologies (formerly BAE Systems, Inc. (BAE)), manufacturing flares; Day & Zimmerman, Inc., manufacturing primers; General Dynamics (formerly Primex Technologies, Inc.), manufacturing ordnance and tactical systems; Lincoln Composites, manufacturing MLRS launch tubes; Lockheed Martin Missile and Fire Control, manufacturing missiles; and National Technical Systems, operating as an ordnance test center. Over 2,500 individuals are currently employed at HIP. Current owners of the former Shumaker NAD property are identified in Figure 3.

## **Rocket Test Range**

### History of Site Activities at Former Rocket Test Range

The former Rocket Test Range, approximately 1 mile wide and 8 miles long, was used by the Navy to flight-test rockets. The range comprised approximately 4,188 acres. (See Figure 2.) The Rocket Test Range was not completed until 1954. The Archives Search Report (ASR) prepared for the former Shumaker NAD mistakenly identifies tree trunks and tree-cleared areas in 1951 aerial photographs as indications that “the field was used for target practice on a regular basis.” The ASR also mistakenly identifies signs of tree-clearing activities as “small craters and scarred areas.” The Navy decontaminated the Rocket Test Range prior to its sale to Brown Engineering (later HIP) and IP in 1961. The land sold to IP is currently owned by Sustainable Forests, L.L.C. (Sustainable Forests), a subsidiary of IP, as a managed pine forest. Since 1963, multiple tenants of HIP have manufactured, tested, and burned explosives and pyrotechnic devices in the former firing area of the Rocket Test Range. The portion of the site was leased to BAE for the manufacture of aircraft flares until August 2002, when BAE was bought out by Esterline Technologies. Entry roadways into the former Rocket Test Range are gated and locked, and as such, access to the area is generally limited. The Sustainable Forests property is leased to numerous hunting clubs.

### History of Enforcement Activities at Former Rocket Test Range

Post-Navy enforcement activities include the following. In the 1980s, the Arkansas Department of Pollution Control and Ecology (ADPCE) found that HIP’s tenant, burned without a permit, thousands of pounds per month of explosives in the former firing area of the Rocket Test Range. At this time, the field and pits used for open burning were littered with ash and residue. In 1993, the ADPCE found that HIP’s tenant generated thousands of pounds of waste explosives in violation of state regulations.

## **Fuze Test Range**

### History of Site Activities at Former Fuze Test Range

The former Fuze Test Range occupied approximately 76 acres, located just north of the western end of the former Rocket Test Range. (See Figure 2.) The Navy utilized the Fuze Test Range to test rocket fuzes. The only dangerous items known to have been fired on the Fuze Test Range were 2.75-inch rockets, which contained a small token charge of high explosive to indicate fuze function. The Fuze Test Range was decontaminated prior to its sale to Brown Engineering and IP in 1961. Since 1963, the western end of the former Fuze Test Range has been occupied by the same multiple tenants of HIP that have leased the former Rocket Test Range. In March 2001, one hemisphere of an anti-personnel submunition, classified as an improved conventional munition of post-Navy vintage, was found on the former Fuze Test Range. The former firing area resides on property owned by HIP and leased to Esterline Technologies (formerly BAE). Sustainable Forests owns the downrange portion of the former Fuze Test Range, which currently comprises a mature pine and hardwood forest. Dogwood Creek flows through the site from the northeast to the southwest. No roadways traverse the former Fuze Test Range; however, access to the site by foot is possible from the roadways in the area.

### History of Enforcement Activities at Former Fuze Test Range

Because this AOI has been occupied by tenants of the former Rocket Test Range since 1963, the history of post-Navy enforcement activities at the former Fuze Test Range is similar to that of the former Rocket Test Range.

### **Rocket Burn Area**

#### History of Site Activities at Former Rocket Burn Area

The former Rocket Burn Area is located east of Highway 203, approximately 0.5 mile north of Evans Cemetery. It covers approximately 34 acres, and is located in Sections 27 and 34, Township 12 South, Range 15 West, in Calhoun County, Arkansas. The former Rocket Burn Area is located within the former Rocket Test Range footprint, just east (downrange) of the 0.25-mile target. (See Figure 2.)

The former Rocket Burn Area is characterized by generally flat to moderately sloping topography, with a few large piles of gravel remaining from gravel excavation activities. The topography ranges from approximately 200 feet elevation above mean sea level (AMSL) in the eastern portion of the site, to approximately 185 feet elevation AMSL on the western side, along Dogwood Creek. The nearest surface body, Dogwood Creek, flows south through the westernmost portion of the former Rocket Burn Area. Access to the former Rocket Burn Area is controlled by locked gates along Turner Road and Zoller Road, which approximate the northern and southern boundaries, respectively, of the former Rocket Burn Area.

The Rocket Burn Area was reportedly used by the Navy as an open burning/open detonation (OB/OD) area for the disposal of 250 railcars of excess ordnance during closure of the Shumaker NAD. The destroyed ordnance primarily consisted of 2.75-inch rockets, 5-inch rocket motors, and 11.75-inch rockets. The Navy decontaminated the Rocket Burn Area prior to its sale to IP in 1961. Since 1961, the former Rocket Burn Area has been used as a managed pine forest and as a source of gravel for roadway construction. The former Rocket Burn Area is currently owned by Sustainable Forests.

#### History of Enforcement Activities at Former Rocket Burn Area

There is no history of enforcement activities at the former Rocket Burn Area.

### **TNT Burn Area**

#### History of Site Activities at Former TNT Burn Area

The former TNT Burn Area is located west of Highway 203, north of Highway 274, and south of the former TNT Plant. (See Figure 2.) It is characterized by generally flat to moderately sloping topography, ranging from approximately 185 feet elevation AMSL in the north-central portion of the site, to approximately 165 feet elevation AMSL on the southeast, near Dogwood Creek. Evidence of ordnance-related waste is visible on the ground surface. The nearest surface body,

known as Dogwood Creek, is located approximately 500 feet to the south and flows towards the southwest. Access to the former TNT Burn Area is relatively open, with a single locked gate along Kruth Road.

The TNT Burn Area was used primarily for the disposal of rocket propellant and explosive waste during operation of the former Shumaker NAD. The ordnance assembled at the former Shumaker NAD reportedly comprised rockets in three sizes. Propellant charges were milled to the proper size and shape for the rocket bodies. Explosives were melted and poured into the warheads. Explosive and propellant shavings and off-specification wastes were reportedly disposed of by open burning at the TNT Burn Area. The waste was transported to this location, spread on the ground, and burned. The area was graded with soil at the completion of burning. During site closure, TNT reportedly was steamed from rocket warheads and brought to this area for disposal by open burning. The Navy decontaminated the TNT Burn Area before its sale to Brown Engineering in 1961. Georgia-Pacific Corporation (Georgia-Pacific) and, later, Rex Timber, Inc. (Rex Timber) have utilized a portion of the former TNT Burn Area as a gravel pit. In 1999, the former TNT Burn Area was found to be littered with ordnance-related metal parts and empty drums not associated with 1950s Navy rockets. During a site visit in May 2000, post-DOD dumping of solid waste (household appliances, lumber, and so forth) was noted. Over the past 40 years, numerous private explosives manufacturers have operated nearby. The USACE has determined a *de minimus* role for the Navy at this AOI because of post-Navy COCs (e.g., beryllium, chromium, lead) identified at this AOI.

#### History of Enforcement Activities at Former TNT Burn Area

There is no history of enforcement activities at the former TNT Burn Area.

### **Ordnance Disposal Wells**

#### History of Site Activities at Ordnance Disposal Wells

The disposal of ordnance in wells was reported to have occurred at locations throughout the former Shumaker NAD. (See Figure 2.) The areas believed to contain these wells include relatively open areas where trees have been harvested and areas of dense forest with moderate to very dense underbrush. Historical Navy documents indicate that inert plaster-loaded warheads were disposed of in the wells, and the top 6 to 8 feet of the well boreholes were filled with soil. There were reportedly 15 wells, ranging in diameter from 19 to 48 inches and up to 20 feet in depth. However, no ordnance or ordnance disposal wells have been found.

#### History of Enforcement Activities at Ordnance Disposal Wells

There is no history of enforcement activities at the Ordnance Disposal Wells.

## **Buried Drum Area**

### History of Site Activities at Buried Drum Area

The Buried Drum Area is located in the southernmost portion of the former Magazine Area 17-AT. A portion of the Buried Drum Area is located within Section 19 of Township 13 South, Range 14 West, and the remaining portion is located in Section 24 of Township 13 South, Range 15 West, in Calhoun County. (See Figure 2.) Aerial photographs show that the Buried Drum Area was created after Shumaker NAD was sold to Brown Engineering in 1961. Aerial photographs from December 1956 and October 1964 show no ground scarring in the region of the Buried Drum Area. Aerial photographs from February 1972 show ground scarring in this region, while aerial photographs from December 1980 show that trees have been cleared, and a short road has been constructed, ending in a circular area containing unidentified items. The land is currently owned by HIP, and the 17-AT magazines in the vicinity are leased to a number of tenants for storage, ordnance manufacturing, and ordnance testing purposes.

The Buried Drum Area is characterized by having a generally flat topography, with drainage swales adjacent to the gravel roadways. The approximate elevation of the Buried Drum Area is 180 feet AMSL. Initially, a solitary, partially buried, heavy gauge metal drum with a brass plate that read “Depth Charge Case” was discovered in a shallow drainage ditch southwest of the gravel road intersection. The Navy did not handle depth charge cases at Shumaker NAD; it dealt exclusively with rockets and a few missile motors. Many ordnance-related businesses have operated in the Magazine Area since 1961. These include Austin Powder, from 1979; HITECH Holdings, Inc., from the mid-1980s; International Ordnance, Inc., which became Camden Ordnance, L.P.; National Technical Systems (NTS, Olin Ordnance); and Day & Zimmerman, from the 1990s. Tenants of HIP have burned waste explosives in the southernmost Magazine Area 17-AT. Because of incomplete historical records, all of HIP’s tenants in the Buried Drum Area have not been identified.

The nearest surface body is an ephemeral tributary of Caney Creek, located approximately 600 feet east of the Buried Drum Area. The tributary flows to the southwest for approximately 1.5 miles before reaching Caney Creek. The Buried Drum Area is accessible through restricted gravel roadways. Post-Navy COCs identified at this AOI include HMX, arsenic, chromium, cobalt, lead, and vanadium.

### History of Enforcement Activities at Buried Drum Area

Post-Navy enforcement activities include the following. In the 1980s, the ADPCE found that one of HIP’s tenants burned, without a permit, waste explosives weekly in an open burn area adjacent to the Buried Drum Area. The area was not dyked to prevent runoff or run-on, nor was fire protection afforded to the adjacent property. In 1999, another tenant, which also open burned explosives in the area, was fined for operating without a hazardous waste permit from 1985 through June 1998.

## **Rework Area**

### History of Site Activities at Former Rework Area

The former Rework Area comprised the Minor Caliber Defuzing Building (RW-10), the Major Caliber Defuzing Building (RW-11), and Bomb-Proof Defuzing Shelter (RW-11A), and the Steam Out Facility (RW-13). The former Rework Area borders Gains Road on the west, approximately 0.25 mile north of Highway 203 where Highway 203 crosses over Two Bayou River. It is located within Sections 16 and 21 of Township 12 South, Range 15 West, in Ouachita County, Arkansas. (See Figure 2.) Former Rework Area 10 consists of approximately 39 acres of land, currently owned by GOEX, Inc. Accurate Arms currently leases and occupies a portion of this AOI. Former Rework Area 13 is owned by Sustainable Forests.

Building RW-10, constructed in 1955, was used for defusing minor caliber (2.75-inch) rockets. It had a septic tank, but no settling ponds or drain fields. Building RW-13, constructed in 1957, was used for steaming out rocket warheads. It had a septic tank and a settling pond. The Navy decontaminated the Rework Area buildings prior to their sale to IP in 1961. Since 1963, Brown Engineering (and later HIP) has leased the site to makers of pyrotechnic products and flares. By June 1970, HIP's tenant employed more than 500 workers in the former RW-10. Over the past 40 years, the former Rework Area has been resold and modified numerous times by private businesses for the manufacture of pyrotechnic and explosive products. In May 2000, Vietnam-era, high-explosive BLU-63 fragmentation bombs were found in the vicinity of former Rework Area 13.

Former Rework Area 10 is characterized by generally flat to slightly sloping topography, ranging from approximately 190 feet elevation AMSL in the northern portion of the site to approximately 165 feet elevation AMSL near Two Bayou River in the southern portion of the site. Evidence of former settling ponds (post-Navy period) is visible in the southern portion of the site, adjacent to a surface water body known as Two Bayou River, which borders the AOI on the east and south. A large portion of the land is currently forested. Access to the former Rework Area is controlled by locked gates on north and south roadways.

The USACE has determined a *de minimus* role for the Navy at this AOI because of post-Navy COCs (e.g., trichloroethylene (TCE), styrene, naphthalene) identified at this AOI.

### History of Enforcement Activities at Former Rework Area

Post-Navy enforcement activities include the following. In the 1982, the ADPCE ordered one of HIP's tenants to cease discharging red water (containing TNT) from its storage ponds constructed southeast of Building RW-10. In 1983, an ADPCE Consent Administration Order required the ground water ponds to be drained and burned. In 1986, as a small quantity generator (less than 100 kilograms per month), HIP's tenant was not required to comply with interim status and closure/post-closure requirements.

## **Landfill Area**

### History of Site Activities at Former Landfill Area

The former Landfill Area is located east of Byrnes Road and north of Dogwood Creek. It is located within Sections 5 and 6 of Township 13 South, Range 15 West, in Calhoun County. (See Figure 2.) The former Landfill Area consists of approximately 17 acres, owned by Shumark, L.L.C., and others. A portion of the former Landfill Area is surrounded on three sides by land that is leased to Atlantic Research Corporation (ARC). Constructed during the 1950s, a 1956 aerial photograph of the area shows the Landfill Area in use. Solid waste was reportedly placed within trenches, burned, and then covered with soil. The waste placed within the Landfill Area was reported not to contain ordnance and explosive waste (OEW).

No decontamination of this AOI was conducted by the Navy because this area was not contaminated. After the site was sold to Brown Engineering in 1961, the community of East Camden reportedly used the landfill for solid waste disposal until the mid-1970s. Aerial photographs of the area from 1964, 1972, and 1989 show portions of the landfill in use at these times. Over the past 40 years, numerous private explosives manufacturers have operated nearby. In 1999, the former Landfill Area was littered with empty drums, cans, bottles, and powders of post-Navy vintage. One of the drums at the site was labeled “Freon TF Solvent.” This solvent has been used by one of HIP’s tenants at the adjoining former Motor Loading Plant.

The former Landfill Area is characterized by generally flat to slightly sloping topography, ranging from approximately 160 feet elevation AMSL in the northeast portion of the site, to approximately 150 feet elevation AMSL in the southwest. Former landfill trench locations are visible on the site. The nearest surface water body, an unnamed tributary to Dogwood Creek, is located approximately 500 feet to the southeast, and flows towards the southwest. Access to the eastern portion of the Landfill Area is relatively open, with a single locked gate across Kruth Road. Access to the western portion (HIP-owned property) of the former Landfill Area is strictly controlled by ARC. A 6-foot high chain-link fence runs along the property boundary of the land leased by ARC.

### History of Enforcement Activities at Former Landfill Area

There is no history of enforcement activities at the former Landfill Area.

## **Non-Vegetated Soil Area**

### History of Site Activities at Non-Vegetated Soil Area

Aerial photographs show that the Non-Vegetated Soil Area was created after the site was sold to Brown Engineering in 1961. The Non-Vegetated Soil Area is located in the northeast portion of the former Magazine Area adjacent to Magazine 3-AT2, within Section 12 of Township 13 South, Range 15 West, in Calhoun County. (See Figure 2.) HIP currently owns the Non-Vegetated Soil Area. Magazine 3-AT2 is located approximately 100 feet east of the barren soil.

The Navy used Magazine 3-AT2 for storage purposes, only. The Navy decontaminated all storage magazines prior to their sale to Brown Engineering in 1961. Ordnance assembly was not performed in this area during Navy ownership of the site. December 1956 aerial photographs show no signs of activity at Magazine 3-AT2. October 1964 aerial photographs show ground scarring and vehicle tracks to the west and south of Magazine 3-AT2. Considerably more ground scarring to the west and south of Magazine 3-AT2 appears in February 1972 aerial photographs. Less ground scarring appears in December 1980 aerial photographs.

The Non-Vegetated Soil Area is characterized by having very flat topography with a sandy soil area that supports virtually no vegetation. The area is surrounded by trees and tall grasses. The approximate elevation of the topography is 197 feet AMSL. Adjacent buildings are located on higher ground that may have been built up during construction of the magazines. Access roads to Magazine 3-AT2 enter from the west. Over the past 40 years, numerous private explosives manufacturers have operated in the vicinity of the Non-Vegetated Soil Area. Magazine 3-AT2 is currently leased to National Technical Systems (NTS), which conducts ordnance testing in the area.

#### History of Enforcement Activities at Non-Vegetated Soil Area

There is no history of enforcement activities at the Non-Vegetated Soil Area.

#### **Pipes-in-Concrete Area**

#### History of Site Activities at Pipes-in-Concrete Area

The Pipes-in-Concrete Area is located east of Kruth Road, north of Highway 274, and west of Highway 203, within Sections 3, 4, and 9 of Township 13 South, Range 15 West, in Calhoun County. (See Figure 2.) The Pipes-in-Concrete area encompasses approximately 2 to 3 acres, owned by Rex Timber. The AOI reportedly served as the main concrete plant during construction of the former Shumaker NAD. The Pipes-in-Concrete Area includes an approximately 200-foot by 70-foot by 1-foot thick unfinished concrete slab with pipes protruding from it, and a concrete ramp, which is used for vehicle maintenance and waste motor oil disposal by trespassers. Land surrounding the Pipes-in-Concrete Area is managed timberland.

The Pipes-in-Concrete Area is characterized by generally flat to slightly sloping topography, ranging from approximately 180 feet elevation AMSL in the east portion of the site to approximately 170 feet elevation AMSL in the west. A railroad track borders the site on the south, and a drainage ditch, approximately 350 feet from the tracks, runs westward into a small unnamed pond just northwest of the Kruth Road/Highway 274 intersection. The Pipes-in-Concrete Area is accessed from Kruth Road, with a single locked gate across Kruth Road.

#### History of Enforcement Activities at Pipes-in-Concrete Area

There is no history of enforcement activities at the Pipes-in-Concrete Area.

## **Squib Disposal Area**

### History of Site Activities at Squib Disposal Area

The Squib Disposal Area is reported to be located near the end of an unmaintained dirt road loop west of Highway 204, and approximately 1 mile southwest of the Motor Loading Plant. The area is situated in Section 12, Township 13 South, Range 16 West, in the southwestern region of Shumaker NAD. (See Figure 2.) Owned by HIP, the Squib Disposal Area encompasses approximately 6 acres. Information on disposal operations at the Squib Disposal Area was obtained from Ed Sanders, a former test range engineer. According to Mr. Sanders, in the early 1950s, several batches of squibs were found to be defective so were taken to the disposal location, placed in pits, and burned. Metal remaining was removed and sold as scrap. Aerial photographs from 1956 show two ground scars in this area. Aerial photographs from 1964 and 1972 show these ground scars have become revegetated.

The Squib Disposal Area is characterized as generally flat topography, approximately 135 feet AMSL. No surface evidence of the pits was visible during the SI. Access to the Squib Disposal Area is not controlled.

### History of Enforcement Activities at Squib Disposal Area

There is no history of enforcement activities at the Squib Disposal Area.

## **Ground Scarred Area**

### History of Site Activities at Ground Scarred Area

The Ground Scarred Area is located southwest of the Motor Loading Plant warehouse/storage area. The area is situated in Section 1, Township 13 South, Range 16 West, in the southwestern region of Shumaker NAD. (See Figure 2.) The Ground Scarred Area encompasses approximately 7 acres owned by HIP. Aerial photographs show that the Ground Scarred Area was created after the site was sold to Brown Engineering in 1961. The Ground Scarred Area was identified from ground disturbances shown in aerial photographs dating from 1972. Visual observation of the Ground Scarred Area indicated that solid waste disposal activities had occurred in this area.

The Ground Scarred Area is characterized as generally flat topography. The area has become revegetated; no surface evidence of the ground scars is visible. Access to the Ground Scarred Area is controlled by a locked gate across the access road.

### History of Enforcement Activities at Ground Scarred Area

There is no history of enforcement activities at the Ground Scarred Area.

## **2C. COMMUNITY PARTICIPATION**

In October 1997, the USACE-St. Louis District completed an ASR for the former Shumaker NAD. In July 1999, the USACE-Little Rock District completed a Draft Community Relations Plan. In January 2000, Parsons completed a Phase I Site Prioritization Report for the former Shumaker NAD. By March 2000, these reports had been placed in the Public Library of Camden and Ouachita County, 120 Harrison Street, NW, Camden, Arkansas 71701. An Administrative Record file has been set up and made available for viewing at the USACE-Little Rock District, Room 6528, Federal Office Building, 700 West Capitol Avenue, Little Rock, Arkansas 72203.

The USACE-Little Rock District established a Restoration Advisory Board (RAB) in April 2000 to enable people who live or work close to the former Shumaker NAD to have input into the decision-making process for the USACE's investigation and cleanup of OEW left from the Navy's use of the site. RAB members serve without compensation and are expected to attend RAB meetings. Duties include reviewing and commenting on plans and reports, discussing key issues, recommending priorities, giving advice on the investigations and cleanup, acting as a community resource and liaison, and suggesting improvements. All RAB meetings are open to the public and are advertised in the legal notices portion of several local newspapers. Eight meetings have been held since the RAB was established. Below is a brief chronology of the pre-RAB and RAB meetings.

- RAB solicitation meeting, held July 1, 1999, at the Administration Building, Main Street, Hampton, Arkansas 71744, commencing at 7:00 pm, with approximately 11 people in attendance.

After this meeting, it was concluded that there was no community interest in a RAB. To confirm this, a series of telephone interviews was conducted in December 1999. Because the telephone interviews indicated that there was potential interest in a RAB, a second RAB solicitation meeting was held at a different location.

- RAB solicitation meeting, held March 16, 2000, at the Roy Ledbetter Technical Engineering Building Auditorium at the Southern Arkansas University Tech campus, East Camden, Arkansas 71711, commencing at 7:00 pm, with 17 people in attendance.
- RAB meeting, held May 8, 2000, at the Comfort Inn, 1 Ridgecrest Drive, Camden, Arkansas 71701, commencing at 6:00 pm, with 20 people in attendance.
- RAB meeting, held May 9, 2000, at the Comfort Inn, 1 Ridgecrest Drive, Camden, Arkansas 71701, commencing at 6:00 pm, with 24 people in attendance.
- RAB meeting, held June 13, 2000, at the Comfort Inn, 1 Ridgecrest Drive, Camden, Arkansas 71701, commencing at 6:30 pm, with 13 people in attendance.
- RAB meeting, held August 3, 2000, at the Comfort Inn, 1 Ridgecrest Drive, Camden, Arkansas, 71701, commencing at 6:30 pm, with 18 people in attendance.

**Decision Document**  
**Part 2: Decision Summary**

---

- RAB meeting, held September 19, 2000, at the Ramada Inn, 950 California Avenue, Camden, Arkansas 71701, commencing at 6:30 pm, with 17 people in attendance.
- RAB meeting, held June 19, 2001, at the Ross Center, 746 California Avenue, Camden, Arkansas 71701, commencing at 6:30 pm, with 24 people in attendance.
- RAB meeting, held October 23, 2001, at the Ross Center, 746 California Avenue, Camden, Arkansas 71701, commencing at 6:30 pm, with 23 people in attendance.
- RAB meeting, held July 23, 2002, at the Ross Center, 746 California Avenue, Camden, Arkansas 71701, commencing at 6:30 pm, with 22 people in attendance.

The USACE has used the Technical Project Planning process since its first planning session at the May 9, 2000, RAB meeting. This meeting was followed by an all-day session on May 10, 2000, to discuss sampling. In response to concerns expressed by the EPA, the USACE expanded its sampling to include chemical residuals from ordnance. Using input from these meetings, a draft conceptual site model was developed and presented to the RAB on June 13, 2000. A follow-up meeting was held on June 19, 2001, and the updated model was distributed so that RAB members could verify that the USACE was completing the work that had been previously agreed upon.

The USACE-Little Rock District has also kept the community and other interested parties apprised of site activities through public notices, news releases, and fact sheets. Below is a brief chronology of the fact sheets.

- March 1999 Fact Sheet, announcing the USACE's proposed activities for fiscal year 1999, including the start of ordnance investigations at the former Shumaker NAD.
- July 1999 Fact Sheet, announcing the USACE's proposed activities for fiscal year 2000, including the continuation of ordnance investigations at the former Shumaker NAD.
- February 2000 Fact Sheet, announcing the USACE's proposed activities for fiscal year 2000, including the start of an EE/CA study for ordnance and explosives at the former Shumaker NAD.
- April 2000 Fact Sheet, announcing that the USACE had completed a records investigation relating to ordnance and explosives at the former Shumaker NAD. An ASR had been prepared, based on historical documents, interviews with former workers, and a site visit. A Phase I Site Prioritization Report had also been prepared to evaluate areas containing potential OEW, and to prioritize these areas for further investigation.
- June 2000 Fact Sheet, announcing that the USACE was seeking rights-of-entry permits from property owners on and around the former Shumaker NAD. These were needed so that workers from Parsons (on behalf of the USACE) could enter or cross private lands, store or move equipment and supplies, erect and remove temporary structures, or investigate and collect samples, as needed, for an EE/CA study.

**Decision Document**  
**Part 2: Decision Summary**

---

- July 2000 Fact Sheet, announcing that Parsons (on behalf of the USACE) would begin a limited site investigation for explosive and other potential residuals at the former Shumaker NAD. In the fall and winter, sampling would continue, with an emphasis on looking for ordnance and explosives. Both site investigations were part of the larger EE/CA study, scheduled for completion in early 2002.
- May 2001 Fact Sheet, announcing that the USACE was seeking additional community members to serve on the RAB for the former Shumaker NAD. Additional community members were needed so that as many people as possible could be given a voice in the investigation and cleanup of ordnance and explosives remaining from the Navy's former use of the site.
- July 2002 Fact Sheet (erroneously published with an April 2002 date), announcing that the USACE was seeking public comments on a Draft Final EE/CA report on the former Shumaker NAD. A question-and-answer session was held from 3:30 pm to 6:00 pm on July 23, 2002, at the Ross Center, Camden, prior to the RAB meeting at 6:30 pm.

Information about and documents relating to the USACE's work at the site is available on the Web site of the USACE-Little Rock District at [www.swl.usace.army.mil/projmgmt/shumaker.html](http://www.swl.usace.army.mil/projmgmt/shumaker.html). This project Web site was created early in the life of the project and has been updated periodically with new information as the studies have progressed.

Technical documents on the investigations conducted by Parsons at the site are available on the Web at [www201.pair.com/paratl/shumaker/documents.php3](http://www201.pair.com/paratl/shumaker/documents.php3). This Web site is also updated periodically as the studies progress.

## **2D. SCOPE AND ROLE OF RESPONSE ACTION**

This response action for the former Shumaker NAD, selected in accordance with the Defense Environmental Restoration Program (DERP), is the final site remedy intended to fully address the threats to human health and the environment resulting from the Navy's rocket assembly, storage, testing, and disassembly operations at the site. Based on the findings of nine SI reports, a Category II NDAI remedy is applicable for the DOD to address the residual explosive and/or chemical contamination at nine AOIs. Based on the findings of a completed EE/CA report, a NDAI remedy is applicable for Navy-era UXO at six AOIs.

## **2E. SITE CHARACTERISTICS**

This section summarizes findings from the nine SIs and the EE/CA investigation. The objective of the SI field effort was to evaluate the presence of residual explosives and/or chemical contamination that may have resulted from past activities, and to identify "target receptors" to potential contamination. The purpose of the EE/CA was to characterize the location, density, and distribution of UXO during the time period of Navy ownership, to assess the risk posed by any residual UXO items, to study risk management alternatives, and to identify the appropriate response action to address the risks to the public. The contamination identified and the media impacted are discussed for each of the 12 AOIs investigated.

## **Rocket Test Range**

The Rocket Test Range was cleared of dangerous and explosive material prior to being sold in 1961. Most of the Rocket Test Range was sold to IP, with the exception of the firing area at the western end, which was sold to Brown Engineering (later HIP). Since 1963, private tenants of HIP have manufactured, tested, and burned explosives and pyrotechnic devices in the former firing area of the Rocket Test Range. In the 1980s and 1990s, thousands of pounds per month of explosives and propellants were open-burned in the former firing area, which was found to be littered with post-Navy grenades, rocket warheads, flares, and ordnance-related metal parts. In the early 1960s, IP planted pine seedlings on the approximately 1-mile wide by 8-miles long former Rocket Test Range. The land sold to IP is currently owned by Sustainable Forests as a managed pine forest.

During Parsons' EE/CA investigation, approximately 74.2 acres were surveyed using ground based geophysical survey techniques, and approximately 724 acres were surveyed using airborne survey techniques. Persistent heavy rains during the ground-based survey activities prevented geophysical data collection in the flooded, low-lying areas in the vicinity of the creeks traversing the site. Very dense underbrush also hindered data collection activities in some areas of the former Rocket Test Range. No UXO items were recovered, but a total of 360 inert practice rockets and warheads were recovered. Based on the widespread distribution of inert, ordnance scrap items, and the absence of UXO items in the area, it appears that the Rocket Test Range was used by the Navy almost exclusively for the test firing of practice rockets with inert plaster-loaded warheads. An NDAI remedy is applicable for the DOD because no Navy-era UXO was found.

## **Fuze Test Range**

The Fuze Test Range was decontaminated prior to its sale to Brown Engineering and IP in 1961. Since 1963, the western end of the former Fuze Test Range has been occupied by the same multiple tenants of HIP that have leased the former Rocket Test Range. The former Fuze Test Range currently comprises a mature pine and hardwood forest. Approximately 4 acres were geophysically surveyed during Parsons' EE/CA field investigation. Survey coverage included suspected rocket impact areas approximately 100 to 150 feet beyond the targets. Areas of dense underbrush and extensive flooding in low-lying areas near Dogwood Creek restricted geophysical survey activities. The dense overhead tree canopy also limited global positioning system (GPS) coverage in many areas. A total of 138 anomalies were identified from the geophysical data, and 134 anomalies were selected for investigation. The recovered items from the intrusive investigation of the anomaly locations consisted of ordnance scrap and "other" material. Of particular interest was the recovery of one hemisphere of an anti-personnel submunition. This item was identical to those scattered on the ground surface at former Rework Area 13, classified as improved conventional munitions of post-Navy vintage.

Parsons' EE/CA field investigation appeared to confirm that the Navy had used the former Fuze Test Range for testing the fuze functioning of rocket warheads. No Navy-era UXO items were recovered during the EE/CA intrusive investigation, but a total of 33 items identified as ordnance scrap were recovered from the former Fuze Test Range. An NDAI remedy is applicable for the DOD because no Navy-era UXO was found.

## **Rocket Burn Area**

The Navy decontaminated the Rocket Burn Area (part of the former Rocket Test Range) prior to its sale to IP in 1961. Since 1961, the former Rocket Burn Area has been used as a managed pine forest and as a source of gravel for roadway construction. The former Rocket Burn Area is currently owned by Sustainable Forests. Between July 31 and September 9, 2000, Parsons conducted an SI field effort, including ground water, soil, and surface water sampling in the former Rocket Burn Area. The exposure pathways and numbers of target receptors were evaluated for the SI report. The ground water pathway was deemed to be incomplete based on a lack of target receptors that obtain drinking water from water wells located within a 4-mile radius of the former Rocket Burn Area. Furthermore, the U.S. Geological Survey (USGS) database reported that only two wells were in use within a 4-mile radius of the Rocket Burn Area. These wells were reported to be industrial supply water wells. According to regional ground water flow data, these wells were not in a hydraulically downgradient location relative to the Rocket Burn Area. As such, migration of ground water from the Rocket Burn Area to these wells was considered unlikely. The soil exposure pathway was deemed to be incomplete due to a lack of on-site workers and associated receptors. The surface water pathway was deemed to be incomplete due to the lack of a surface water intake within 15 miles downgradient of the former Rocket Burn Area.

The SI identified trace to low-level concentrations of a limited number of inorganic chemicals in ground water, surface water, and soil collected from the former Rocket Burn Area. Specifically, Parsons found concentrations of aluminum, chromium, iron, and lead that were in excess of the Federal Safe Drinking Water Act (SDWA) maximum contaminant levels (MCLs) or EPA Region 6 medium-specific screening levels (MSSLs). However, Navy ordnance manuals from the 1940s and 1950s show that the Navy did not use chromium or lead in the types of rockets assembled at Shumaker NAD. Cadmium, copper, lead, mercury, and zinc were found in soil samples in concentrations that indicated an observed release, but no concentrations exceeded the EPA Region 6 MSSLs. No residual explosives or perchlorate was detected in any environmental samples collected at the former Rocket Burn Area. The SI evaluated exposure pathways and found the ground water, surface water, and soil exposure pathways to be incomplete.

Between July 9 and September 13, 2001, Parsons conducted an intrusive investigation as part of the EE/CA. No UXO was recovered, but a total of 140 anomalies were intrusively investigated, and a total of 76 items, identified as inert ordnance scrap, were recovered from the former Rocket Burn Area. Land use in this area is predominantly for forestry and industry. This use is anticipated to continue in the future. Because no Navy-era UXO was found, an NDAI remedy is applicable for the DOD. A Category II NDAI remedy is applicable for the DOD because of a PRP-lead responsibility determination.

## **TNT Burn Area**

In 1999, the former TNT Burn Area was found to be littered with ordnance-related metal parts and empty drums not associated with 1950s Navy rockets. Exposure pathways and target receptors were evaluated for the former TNT Burn Area SI. The soil exposure pathway was deemed to be incomplete due to a lack of on-site workers/receptors. The surface water pathway was deemed to be incomplete due to the lack of a surface water intake within 15 miles downgradient of the former

TNT Burn Area. The ground water pathway was deemed to be incomplete, based on the reported lack of confirmed receptors to ground water as a source of drinking water.

The only water well listed as a public supply well within the 4-mile radius of the site was the “Harmony Grove School” well. Parsons states that Harmony Grove School System purchases water from Harmony Grove Water Association. This association reportedly purchases water for re-sale from Shumaker Public Service Corporation. The Shumaker Public Service Corporation water supply wells are located outside the 4-mile target receptor radius of the former TNT Burn Area. Furthermore, the USGS database reports that only two wells are in use within a 4-mile radius of the TNT Burn Area. According to regional ground water flow data, these wells are not in a location hydraulically downgradient to the former TNT Burn Area. As such, migration of ground water from the former TNT Burn Area to these wells is considered unlikely.

The SI identified ground water impacts from nitroaromatic chemicals associated with past site usage as an open burning area for explosive and propellant wastes and post-DOD solid waste disposal. Concentrations of 2,4,6-TNT, RDX, aluminum, beryllium, chromium, iron, lead, manganese, and nickel were found to be above the Federal SDWA MCL or the EPA Region 6 MSSSLs for ground water usage as a water supply. The concentrations of nitroaromatic chemicals found in the background sample indicated that the lateral extent of explosive-impacted ground water was more widespread than anticipated. However, the ground water exposure pathway was deemed to be incomplete due to a lack of confirmed target receptors.

The SI identified soil impacts from nitroaromatic chemicals associated with past site usage as an open burning area for explosive and propellant wastes and post-Navy solid waste disposal. Concentrations of 2,4,6-TNT in soil samples from locations within the former TNT Burn Area were found to be above the EPA Region 6 MSSSL. However, the soil exposure pathway was deemed to be incomplete due to a lack of confirmed target receptors.

The SI performed at the former TNT Burn Area did not identify any surface water impacts associated with past site usage as an open burning area for explosive and propellant wastes and post-Navy solid waste disposal. The surface water pathway was incomplete, as there are no surface water receptors located within a 15-mile flow path.

As part of the EE/CA conducted by Parsons in 2001, no UXO was recovered during the intrusive investigation at the former TNT Burn Area. A total of 90 items were investigated, and a total of 88 items were recovered, of which 7 were ordnance scrap. Because no Navy-era UXO was found, a NDAI remedy is applicable for the DOD. A Category II NDAI remedy is applicable for the DOD because of a PRP-lead responsibility determination. The USACE has determined a *de minimus* role for the DOD at this AOI.

### **Ordnance Disposal Wells**

During Parsons’ EE/CA investigation, potential ordnance disposal well sites were selected and investigated based on information provided by a former rocket range superintendent, and from a USGS well inventory database. Historical aerial photographs were also reviewed to identify potential former homestead sites that may have had wells. Ordnance disposal well field investigation

activities were conducted by Parsons from August 6, 2001, through August 16, 2001, using a G858 magnetometer and Schonstedt Magnetic Locator. A total of nine potential ordnance disposal well sites were investigated.

On September 6, 2001, American Technologies, Inc. (ATI) and Parsons conducted an intrusive investigation of anomaly locations marked during the ordnance well search. A total of 21 subsurface anomaly locations were intrusively investigated during this effort. No Ordnance Disposal Wells were located during the intrusive investigation. Items identified consisted of various metal pieces (rebar, pipe, large blades, ordnance scrap, wire, and areas containing numerous pieces of small metal scrap). Other areas contained burn debris, ferrous soil, and ferrous rock.

On April 11, 2002, three additional potential ordnance disposal well sites were investigated. Field reconnaissance and geophysical mapping activities were conducted in each of the areas using a Trimble Pro-XRS GPS, a G-858 magnetometer, and a Schonstedt Magnetic Locator.

No UXO was recovered during the EE/CA investigation of the Ordnance Disposal Wells. An exhaustive geophysical mapping and intrusive sampling effort was conducted at 12 reported disposal well locations. Despite application of multiple technologies to locate the sites, none of the well sites could be found due to the deep fill placed over the wells, and 40 plus years of vegetative growth. Historical records indicated that only inert, plaster-filled warheads had been disposed of in the wells, and that they had been “considered safe for any type of handling.” An NDAI remedy is applicable for the DOD at this AOI because no Navy-era UXO was found. This is an AOI where the DOD would otherwise have lead responsibility.

### **Buried Drum Area**

Aerial photographs indicate that the Buried Drum Area (in the southernmost former Magazine Area 17-AT) was created after the Navy sold the site in 1961. Exposure pathways and target receptors were evaluated for the Buried Drum Area SI. The ground water pathway was deemed to be complete, based on the presence of three domestic use water supply wells located within a 4-mile radius of the Buried Drum Area. An estimated total of approximately 15 ground water receptors were identified based on the number of domestic wells. The surface water pathway was deemed to be incomplete due to the lack of a surface water intake within 15 miles downgradient of the Buried Drum Area. The soil exposure pathway was determined to be incomplete due to a lack of receptors within a 1-mile radius.

The SI performed at the Buried Drum Area identified ground water contamination immediately adjacent to and downgradient of the buried drums. Post-Navy COCs identified at this AOI include arsenic, chromium, cobalt, lead, and vanadium in ground water, and HMX in surface water.

As part of the EE/CA conducted by Parsons in 2001, no UXO was recovered during the intrusive investigation at the Buried Drum Area. A total of 39 anomalies were intrusively investigated, and a total of 8 items, identified as inert ordnance scrap, were recovered from the Buried Drum Area. Because no Navy-era UXO was found, an NDAI remedy is applicable for the DOD. A Category II NDAI remedy is also applicable for the DOD because of a PRP-lead responsibility determination.

## **Rework Area**

Since 1963, former Rework Area 10 has been used as a pyrotechnic and explosive products manufacturing site. Exposure pathways and target receptors were evaluated for the SI. The ground water pathway was deemed complete, with an estimated population of 3,300 residential receptors and an additional 1,880 industrial worker receptors who used water obtained from ground water wells located within a 4-mile radius of the former Rework Area 10. The soil exposure pathway was determined to be complete due to the on-site industrial workers. The surface water pathway was deemed to be incomplete due to the lack of a surface water intake within 15 miles downstream of the former Rework Area 10.

The SI performed at the former Rework Area 10 did not identify the presence of residual explosives in soil or surface water media. However, trace levels of post-Navy COCs (e.g., TCE, styrene, naphthalene) were identified in soil at this AOI. The ground water pathway could not be fully evaluated because ground water samples could not be collected from the low permeability sediments within and beneath the settling basins. The number of ground water target receptors was based on a set of very conservative assumptions that may not be valid at this site. According to the USGS database, none of the identified ground water target receptors obtain drinking water from a well completed in the shallow, surficial aquifer at the Rework Area 10 site. Rather, the listed ground water target receptors obtain drinking water from water supply wells that are located up to 4 miles away from this site. Additionally, the water supply wells were reported to be drawing water from a different aquifer, at depths of approximately 200 feet below ground surface. As a result, the likelihood of any releases reaching the drinking water supply wells was believed to be remote. A comprehensive evaluation of the hydrologic connection between the surficial aquifer and the drinking water aquifer (Sparta Aquifer) was beyond the scope of the SI.

As part of the EE/CA conducted by Parsons, BLU-63 Vietnam-era, high-explosive fragmentation bombs were found in the vicinity of former Rework Area 13 in May 2000. These items were not manufactured during the years of Navy-managed operations at the former Shumaker NAD (1945 to 1961). As result, the proposed EE/CA investigation activities for the Rework Area were cancelled due to the sensitivity and risk associated with this type of ordnance. A Category II NDAI remedy is applicable for the DOD because of a PRP-lead responsibility determination. The USACE has determined a *de minimus* role for the DOD at this AOI.

## **Landfill Area**

After the site was sold to Brown Engineering in 1961, the community of East Camden reportedly continued to use the landfill for solid waste disposal until the mid-1970s. Exposure pathways and target receptors were evaluated for the former Landfill Area SI. The soil and sediment exposure pathways were determined to be incomplete due to a lack of potential residential receptors within a 1-mile radius. The surface water pathway was deemed to be incomplete due to the lack of a surface water intake within 15 miles downgradient of the former Landfill Area. The ground water pathway was deemed to be complete, based on the presence of 19 water supply wells located within a 4-mile radius of the former Landfill Area. An estimated total of approximately 5,180 ground water receptors was identified. This target receptor protective estimate does not account for well depth or ground water flow direction. The public water supply wells are located approximately 2 miles north

of the former Landfill Area. According to regional ground water flow data, these wells are in an apparent upgradient direction. As such, migration of ground water from the former Landfill Area to these wells is believed to be unlikely.

The SI performed at the former Landfill Area identified ground water contamination immediately adjacent to the downgradient boundary of the landfill. No corresponding ground water contamination was detected in the two background ground water sampling points. The concentrations of perchlorate, perchloroethylene (PCE), dichloroethylene (DCE), chromium, lead, iron, and nickel reported in ground water samples collected from locations adjacent to the landfill were above Federal SDWA MCLs and/or EPA Region 6 MSSLs. The concentrations of iron, lead, and manganese in surface water were also in excess of these risk screening benchmark values. Navy manuals from the 1940s and 1950s show that none of these chemicals and metals were used in Navy rockets, except for iron.

The number of ground water target receptors was based on a set of very conservative assumptions that may not be valid at this site. According to the USGS database, none of the identified ground water target receptors obtain drinking water from a well completed in the shallow, surficial aquifer at the former Landfill Area. Rather, the listed ground water target receptors obtain drinking water from water supply wells that are located up to 4 miles away from this site. Additionally, the water supply wells were reported to be drawing water from a different aquifer, at depths of approximately 200 feet below ground surface. As a result, the likelihood of any releases reaching drinking water supply wells is believed to be remote.

As part of the EE/CA conducted by Parsons in 2001, geophysical investigation activities were proposed to delineate the landfill cell boundaries. But, because of complex site usage/land ownership issues, and because the area had no UXO waste disposal history, no geophysical investigation activities were conducted. A Category II NDAI remedy is applicable for the DOD because of a PRP-lead responsibility determination.

### **Non-Vegetated Soil Area**

Aerial photographs show that the Non-Vegetated Soil Area was created after the site was sold to Brown Engineering in 1961. Exposure pathways and target receptors were evaluated for the Non-Vegetated Soil Area SI. The ground water exposure pathway was determined to be an incomplete pathway. This conclusion was based on the USGS database that reports a single well is in use within a 4-mile radius of the Non-Vegetated Soil Area. According to regional ground water flow data, the solitary well does not appear to be in a hydraulically downgradient location relative to the Non-Vegetated Soil Area. As such, migration of ground water from the Non-Vegetated Soil Area to this well is believed to be unlikely. The surface water receptor pathway was determined to be an incomplete pathway due to the lack of surface water intakes within a 15-mile downgradient flow path. The soil exposure pathway was determined to be incomplete due to a lack of residential receptors within a 1-mile radius of the area and a lack of on-site workers.

The SI identified the organochlorine herbicide (Dalapon) in ground water at a concentration indicating an observed release, but below the Federal SDWA MCL. The general-use herbicide MCP, and the metals aluminum, barium, beryllium, cobalt, copper, nickel, and zinc were identified

as observed releases in soil, but at levels below the EPA Region 6 MSSLS. No target receptors were identified. A Category II NDAI remedy is applicable for the DOD because of a PRP-lead responsibility determination.

### **Pipes-in-Concrete Area**

The Pipes-in-Concrete Area reportedly served as the main concrete plant during construction of the former Shumaker NAD. It comprises an unfinished concrete slab with pipes protruding from it, and a concrete ramp, which is used for vehicle maintenance and waste motor oil disposal by trespassers. Waste oil disposal was confirmed by the presence of petroleum-based staining on the surface soil at the ramp area and the presence of numerous vehicle motor oil filters discarded in the immediate area of the vehicle ramp.

Exposure pathways and target receptors were evaluated for the Pipes-in-Concrete Area SI. The soil exposure pathway was determined to be incomplete due to a lack of on-site workers and residential receptors within a 1-mile radius. The surface water pathway was deemed to be incomplete due to the lack of a surface water intake within 15 miles downgradient of the Pipes-in-Concrete Area. The ground water receptor pathway was also deemed to be incomplete, in the absence of ground water receptors from water wells located within a 4-mile radius of the Pipes-in-Concrete Area.

The SI has identified surface soil contamination immediately adjacent to the motor vehicle ramp. Lead, benzo[*b*]fluoranthene, and indeno[1,2,3-*cd*]pyrene in soil were found to be above EPA Region 6 MSSLS. The presence of lead (15.3 micrograms per liter), reported in one ground water sample from the motor vehicle ramp area, was marginally above the EPA SDWA MCL for ground water usage as a water supply (15 micrograms per liter). However, the ground water exposure pathway was determined to be an incomplete pathway. This conclusion was based on the USGS database that reports that only one well is in use within a 4-mile radius of the Pipes-in-Concrete Area. According to regional ground water flow data, this solitary well is not in a hydraulically downgradient location relative to the Pipes-in-Concrete Area. As such, migration of ground water from the Pipes-in-Concrete Area to this well is believed to be unlikely. A Category II NDAI remedy is applicable for the DOD because of a PRP-lead responsibility determination.

### **Squib Disposal Area**

Exposure pathways and target receptors were evaluated for the Squib Disposal Area SI. The soil exposure pathway was determined to be incomplete due to a lack of potential residential receptors within a 1-mile radius. The surface water pathway was deemed to be incomplete due to the lack of a surface water intake within 15 miles downgradient of the Squib Disposal Area. The ground water pathway was deemed to be complete, based on the presence of 12 water supply and domestic wells located within a 4-mile radius of the Squib Disposal Area. An estimated total of approximately 5,800 ground water receptors was identified. This target receptor protective estimate does not account for well depth or ground water flow direction. The public water supply wells are located approximately 2 miles north of the Squib Disposal Area. According to regional ground water flow data, these wells are in an apparent upgradient direction. As such, migration of ground water from the Squib Disposal Area to these wells is believed to be unlikely.

The SI performed at the Squib Disposal Area did not identify the presence of residual explosives or chemical constituents in soil or ground water media. A Category II NDAI remedy is applicable for the DOD at this AOI because of a lack of chemicals or residual explosives identified in the SI. This is an AOI where the DOD would otherwise have lead responsibility.

### **Ground Scarred Area**

Aerial photographs show that the Ground Scarred Area was created after the site was sold to Brown Engineering in 1961. Exposure pathways and target receptors were evaluated for the Ground Scarred Area SI. The soil exposure pathway was determined to be incomplete due to a lack of potential residential receptors within a 1-mile radius, and a lack of on-site workers. The surface water pathway was deemed to be incomplete due to the lack of a surface water intake within 15 miles downgradient of the Ground Scarred Area. The ground water pathway was deemed to be complete, based on the presence of nine water supply wells located within a 4-mile radius of the Ground Scarred Area. An estimated total of approximately 5,700 ground water receptors was identified. This target receptor protective estimate does not account for well depth or ground water flow direction. The public water supply wells are located approximately 2 miles north of the Ground Scarred Area. According to regional ground water flow data, these wells are in an apparent upgradient direction. As such, migration of ground water from the Ground Scarred Area to these wells is believed to be unlikely.

The SI identified low concentrations of several herbicides and metals in the soil; however, none of the chemical concentrations were above appropriate risk screening benchmarks. No receptors to the soil pathway were identified. Ground water sampling indicated laboratory contaminants, only. A Category II NDAI remedy is applicable for the DOD at this AOI because of a PRP-lead responsibility determination.

## **2F. CURRENT AND POTENTIAL FUTURE SITE AND RESOURCE USES**

### **Rocket Test Range**

#### Land Use

The Rocket Test Range was cleared of dangerous and explosive material prior to being sold in 1961. Most of the Rocket Test Range was sold to IP, with the exception of the firing area near its western boundary, which was sold to Brown Engineering. Since 1963, private firms have manufactured, tested, and burned explosives and pyrotechnic devices in the former firing area of the Rocket Test Range. In the 1980s and 1990s, thousands of pounds per month of explosives and propellants were open-burned in the former firing area, which was found to be littered with post-Navy grenades, rocket warheads, flares, and ordnance-related metal parts. In the early 1960s, IP planted pine seedlings on the approximately 1-mile wide by 8-miles long former Rocket Test Range. With the exception of the former firing area, the former Rocket Test Range continues as a pine forest, owned and managed by Sustainable Forests. The western boundary of the site, owned by HIP, has been leased to Esterline Technologies (formerly BAE) for aircraft flare manufacture. Adjacent land is used as a managed pine and hardwood forest, except on the western site where ordnance-related products are manufactured.

The reasonably anticipated future use of the former Rocket Test Range is as a managed forest, with the western boundary continuing to be used for aircraft flare manufacture. The reasonably anticipated future use of adjacent property is for these purposes, also.

#### Ground Water Use

Parsons undertook a ground water investigation in the former Rocket Burn Area portion of the former Rocket Test Range. The ground water receptor pathway was evaluated and considered an incomplete pathway. Based on the USGS database of water supply wells, there were no target receptors that used ground water as a source of drinking water from water wells located within a 4-mile radius of the former Rocket Burn Area of the former Rocket Test Range. The reasonably anticipated future use of ground water beneath the former Rocket Test Range is likely to be without target receptors for water wells located within a 4-mile radius.

#### **Fuze Test Range**

##### Land Use

The Fuze Test Range was cleared of dangerous and explosive material prior to its sale to Brown Engineering in 1961. Since 1963, the area has been occupied by the tenants at the firing area on the former Rocket Test Range, discussed above. The approximately 76 acres of the former Fuze Test Range currently comprise a mature pine and hardwood forest that is owned and managed by Sustainable Forests. Adjacent land use is for this purpose, except for the western boundary of the site, which is owned by HIP and has been leased to Esterline Technologies for aircraft flare manufacturing. Adjacent land is used as a managed pine and hardwood forest, except on the western side where ordnance-related products are manufactured. The reasonably anticipated future use of the former Fuze Test Range is as a managed forest, with the western boundary continuing to be used for aircraft flare manufacturing. The reasonably anticipated future use of adjacent property is for these purposes, also.

##### Ground Water Use

Parsons undertook a ground water investigation in the former Rocket Burn Area, which is adjacent to the former Fuze Test Range. The ground water receptor pathway was evaluated and considered an incomplete pathway. Based on the USGS database of water supply wells, there were no target receptors that used ground water as a source of drinking water from water wells located within a 4-mile radius of the former Rocket Burn Area. The reasonably anticipated future use of ground water beneath the former Fuze Test Range is likely to be without target receptors for water wells located within a 4-mile radius.

#### **Rocket Burn Area**

##### Land Use

The Rocket Burn Area was cleared of dangerous and explosive material prior to its sale to IP in 1961. The western boundary of the Rocket Burn Area borders the firing area of the Rocket Test

Range, discussed above. The approximately 34 acres of the former Rocket Burn Area have been used since 1961 as a source of gravel for roadway construction. A mature pine and hardwood forest is located on adjacent land, except for the western boundary of the site, which is owned by HIP and leased to Esterline Technologies for aircraft flare manufacture. The reasonably anticipated future use of the former Rocket Burn Area is as a pine and hardwood forest, with the western boundary continuing to be used for aircraft flare manufacturing. The reasonably anticipated future use of adjacent property is for forestry and aircraft flare manufacturing.

### Ground Water Use

Parsons undertook a ground water investigation in the former Rocket Burn Area. The ground water receptor pathway was evaluated and considered an incomplete pathway. Based on the USGS database of water supply wells, there were no target receptors that used ground water as a source of drinking water from water wells located within a 4-mile radius of the former Rocket Burn Area. The reasonably anticipated future use of ground water beneath the former Rocket Burn Area is likely to be without target receptors for water wells located within a 4-mile radius.

### **TNT Burn Area**

#### Land Use

Since 1961, Georgia-Pacific, and later Rex Timber, have utilized a portion of the former TNT Burn Area as a gravel pit. Access to the site is limited by a locked gate. Post-DOD dumping of solid waste (household appliances, lumber, and so forth) was noted at the former TNT Burn Area during a site visit in May 2000. The adjacent property is used as a managed pine forest. The reasonably anticipated future use of the former TNT Burn Area is as a managed pine forest. The reasonably anticipated future use of adjacent property is for forestry purposes.

#### Ground Water Use

Parsons undertook a ground water investigation in the former TNT Burn Area. The ground water receptor pathway was evaluated and considered an incomplete pathway, based on the reported lack of confirmed receptors to ground water as a source of drinking water. According to the USGS database of water supply wells, there were only two wells in use within a 4-mile radius of the former TNT Burn Area. According to regional ground water flow data, these wells were not in a hydraulically downgradient location relative to the former TNT Burn Area. The reasonably anticipated future use of ground water beneath the former TNT Burn Area is likely to be without target receptors for water wells located within a 4-mile radius.

### **Ordnance Disposal Wells**

#### Land Use

The disposal of ordnance in wells was reported to have occurred at 15 locations throughout the former Shumaker NAD. The areas believed to contain these wells varied from relatively open areas where the trees had been harvested, to areas of dense forest with moderate to very dense underbrush.

Adjacent property was expected to have been used for forestry purposes, also. There is no reasonably anticipated future use of the Ordnance Disposal Wells. The reasonably anticipated future use of adjacent property is for forestry purposes.

#### Ground Water Use

Because the Ordnance Disposal Wells could not be located, no ground water investigation was undertaken.

### **Buried Drum Area**

#### Land Use

Accessible through restricted gravel roads, the Buried Drum Area is located in the southernmost former Magazine Area 17-AT. The land, owned by HIP, provides access to the storage magazines. Over the past 40 years, adjacent magazines have been used by private explosives manufacturers and an ordnance testing company. The reasonably anticipated future use of the Buried Drum Area is as an open field adjacent to an open burning ground. The reasonably anticipated future use of adjacent magazines is for storage and ordnance-related purposes. Aerial photographs indicate that the Buried Drum Area was created after the Navy sold the site in 1961.

#### Ground Water Use

Parsons undertook a ground water investigation in the Buried Drum Area. The ground water receptor pathway was evaluated and considered a complete pathway, based on the presence of three domestic use water supply wells located within a 4-mile radius of the Buried Drum Area. An estimated total of approximately 15 ground water receptors was identified based on the number of domestic wells. The reasonably anticipated future use of ground water beneath the Buried Drum Area is also likely to have target receptors for water wells located within a 4-mile radius.

### **Rework Area**

#### Land Use

Since 1963, the approximately 39 acres of the former Rework Area 10 have been used as a pyrotechnic and explosive products manufacturing site. Access to the former Rework Area 10 is controlled by locked gates on roadways on the north and south ingress points. Adjacent land is forested. The reasonably anticipated future use of the former Rework Area 10 is as a pyrotechnic and explosive products manufacturing site. The reasonably anticipated future use of adjacent property is for forestry purposes.

#### Ground Water Use

Parsons undertook a ground water investigation in the former Rework Area 10. The ground water receptor pathway was evaluated and considered complete, with an estimated receptor population of 3,300 residential receptors and an additional 1,880 industrial worker receptors. According to the

USGS database, none of the identified ground water target receptors obtain drinking water from a well completed in the shallow, surficial aquifer at the Rework Area 10 site. Rather, the listed ground water target receptors obtain drinking water from water supply wells that are located up to 4 miles away from this site. Additionally, the water supply wells were reported to be drawing water from a different aquifer, at depths of approximately 200 feet below ground surface. As a result, the likelihood of any releases reaching the drinking water supply wells was believed to be remote. The reasonably anticipated future use of ground water beneath the former Rework Area 10 is unlikely to have target receptors for water wells located within a 4-mile radius.

## **Landfill Area**

### Land Use

After the site was sold to Brown Engineering in 1961, the community of East Camden reportedly continued to use the landfill for solid waste disposal until the mid-1970s. The approximately 17 acres of the former Landfill Area is owned by Shumark, L.L.C., and others for forestry purposes. Access to the eastern portion of the former Landfill Area is controlled by a locked gate. Access to the western portion of the former Landfill Area is strictly controlled by ARC, with a 6-foot high chain-link fence running along the property boundary of the land leased by ARC. The reasonably anticipated future use of the former Landfill Area is for forestry purposes. The reasonably anticipated future use of adjacent property is for forestry and ordnance-related purposes.

### Ground Water Use

Parsons undertook a ground water investigation in the former Landfill Area SI. The ground water receptor pathway was evaluated and considered complete, based on the presence of 19 water supply wells located within a 4-mile radius of the former Landfill Area. An estimated total of approximately 5,180 ground water receptors was identified. However, the public water supply wells were located approximately 2 miles north of the former Landfill Area. According to regional ground water flow data, these wells were in an apparent upgradient direction. As such, migration of ground water from the former Landfill Area to these wells was believed to be unlikely. The reasonably anticipated future use of ground water beneath the former Landfill Area is unlikely to have target receptors for water wells located within a 4-mile radius.

## **Non-Vegetated Soil Area**

### Land Use

Aerial photographs show that the Non-Vegetated Soil Area was created after the site was sold to Brown Engineering in 1961. HIP currently owns the Non-Vegetated Soil Area located in the northeast portion of the former Magazine Area, adjacent to Magazine 3-AT2. The reasonably anticipated future use of the Non-Vegetated Soil Area is associated with storage in Magazine 3-AT2. The reasonably anticipated future use of adjacent property is for storage or ordnance-related purposes.

### Ground Water Use

Parsons undertook a ground water investigation in the Non-Vegetated Soil Area. The ground water receptor pathway was evaluated and considered an incomplete pathway, based on the reported lack of confirmed receptors to ground water as a source of drinking water. According to the USGS database of water supply wells, there was only one well in use within a 4-mile radius of the Non-Vegetated Soil Area. According to regional ground water flow data, this well was not in a hydraulically downgradient location relative to the Non-Vegetated Soil Area. The reasonably anticipated future use of ground water beneath the Non-Vegetated Soil Area is likely to be without target receptors for water wells located within a 4-mile radius.

### **Pipes-in-Concrete Area**

#### Land Use

The Pipes-in Concrete Area encompasses approximately 2 to 3 acres owned by Rex Timber and HIP. The site has two distinct areas: an unfinished concrete slab with several pipes protruding from it, and a concrete ramp. The ramp is used for vehicle maintenance and waste motor oil disposal by trespassers. Access to the site is limited by a single locked gate. The Navy is not responsible for soil contamination from waste oil disposal. The land use surrounding the Pipes-in-Concrete Area is managed timberland. The reasonably anticipated future use of the AOI is a managed timberland. The reasonably anticipated future use of adjacent property is a managed timberland.

#### Ground Water Use

Parsons undertook a ground water investigation in the Pipes-in-Concrete Area. The ground water receptor pathway was evaluated and considered an incomplete pathway, based on the reported lack of confirmed receptors to ground water as a source of drinking water. According to the USGS database of water supply wells, there was only one well in use within a 4-mile radius of the Pipes-in-Concrete Area. According to regional ground water flow data, this well was not in a hydraulically downgradient location relative to the Pipes-in-Concrete Area. The Navy is not responsible for ground water contamination from waste oil disposal. The reasonably anticipated future use of ground water beneath the Pipes-in-Concrete Area is likely to be without target receptors for water wells located within a 4-mile radius.

### **Squib Disposal Area**

#### Land Use

HIP owns the Squib Disposal Area located approximately 1 mile southwest of the Motor Loading Plant. The area was used for the disposal of squibs in the mid-1950s. The land is currently used for timber production and hunting. The surface of the Squib Disposal Area is partially covered with dense vegetation. An unpaved and unmaintained dirt road provides access to the site. The reasonably anticipated future use of the Squib Disposal Area and adjacent property is for timber production and hunting.

### Ground Water Use

Parsons undertook a ground water investigation in the Squib Disposal Area. The ground water pathway was evaluated and considered a complete pathway, based on the presence of 12 water supply and domestic wells located within a 4-mile radius of the Squib Disposal Area. An estimated total of approximately 5,800 ground water receptors was identified. However, the public water supply wells were located approximately 2 miles north of the Squib Disposal Area. According to regional ground water flow data, these wells are in an apparent upgradient direction. As such, migration of ground water from the Squib Disposal Area to these wells was believed to be unlikely. The reasonably anticipated future use of ground water beneath the Squib Disposal Area is unlikely to have target receptors for water wells located within a 4-mile radius.

### **Ground Scarred Area**

#### Land Use

Aerial photographs show that the Ground Scarred Area was created after the site was sold to Brown Engineering in 1961. HIP currently owns this area located southwest of the Motor Loading Plant warehouse/storage area. The Ground Scarred Area appears to have been used in the past for solid waste disposal activities. The area has revegetated, and ground disturbance, seen on aerial photographs dating from 1972, is not currently visible. The land is currently used for timber production and hunting. Access to the Ground Scarred Area is controlled by a locked gate across the access road. The reasonably anticipated future use of the Ground Scarred Area and adjacent property is for timber production and hunting.

#### Ground Water Use

Parsons undertook a ground water investigation in the Ground Scarred Area. The ground water pathway was evaluated and considered a complete pathway, based on the presence of nine water supply wells located within a 4-mile radius of the Ground Scarred Area. An estimated total of approximately 5,700 ground water receptors was identified. However, the public water supply wells were located approximately 2 miles north of the Ground Scarred Area. According to regional ground water flow data, these wells are in an apparent upgradient direction. As such, migration of ground water from the Ground Scarred Area to these wells was believed to be unlikely. The reasonably anticipated future use of ground water beneath the Ground Scarred Area is unlikely to have target receptors for water wells located within a 4-mile radius.

## **2G. SITE RISKS**

A qualitative baseline risk evaluation was conducted using the OE risk impact assessment and total assessment strategy (OERIA) process in accordance with the OE Risk Impact Assessment and Total Assessment Strategy for Ordnance and Explosives EE/CA Evaluations, interim guidance document. The OERIA process is designed to evaluate explosive safety risk to the public and communicate the results to the public and regulatory community. The risk evaluation presented herein is for the following AOIs:

- Rocket Test Range
- Fuze Test Range
- Rocket Burn Area
- TNT Burn Area
- Buried Drum Area

Two additional sites, the Ordnance Disposal Wells and Rework Area 13, planned for investigation during the EE/CA process, were not evaluated for OE risk characteristics because no objective data for evaluating these sites for OE risk was available. The Ordnance Disposal Wells were not located during the EE/CA, despite a thorough historical photograph interpretation, a hydrologic data interpretation, and an extensive field investigation effort to locate these wells. Rework Area 13 was not evaluated because UXO items found were identified as being of post-Navy vintage (late 1960s to early 1970s) and, therefore, could not have been deposited by the Navy during operation of the former Shumaker NAD.

The potential risk posed by UXO was characterized qualitatively by evaluating three primary risk factors: 1) the presence of UXO, 2) site characteristics, and 3) human factors. A qualitative assessment of these three factors was used to evaluate an overall assessment of the public safety risk posed by UXO. The risk evaluation is presented in Table 2.

### **Rocket Test Range**

No UXO items were identified during the EE/CA investigation at the former Rocket Test Range site. These results confirm statements in historical documents that only three high-explosive warheads were fired on the range and that these were subsequently recovered. The Rocket Test Range was reportedly used solely to test-flight rockets assembled at the former Shumaker NAD. Based on these findings, the likelihood for occurrence of any UXO at this AOI is considered minimal. The ordnance scrap identified at the former Rocket Test Range was assigned a category of inert OE or scrap.

### **Fuze Test Range**

No UXO items were identified during the EE/CA investigation at the former Fuze Test Range. The EE/CA field investigation results confirmed statements in historical documents that the Fuze Test Range was used to test the fuzing of rockets assembled at the former Shumaker NAD. Some of the rockets fired at the Fuze Test Range reportedly contained fuzing and a spotting charge. The likelihood for occurrence of any UXO at this AOI is considered minimal. The ordnance scrap recovered from the former Fuze Test Range was assigned a category of inert OE or scrap.

### **Rocket Burn Area**

No UXO items were identified during the EE/CA investigation at the former Rocket Burn Area, located within the former Rocket Test Range footprint. The former Rocket Burn Area was reportedly used by the Navy as an OB/OD area for the disposal of excess ordnance during the closure of the former Shumaker NAD. The likelihood for occurrence of any UXO at this AOI is considered minimal. The ordnance scrap identified at the former Rocket Burn Area was assigned a category of inert OE scrap.

**Table 2  
Risk Evaluation Summary**

Area	Ordnance and Explosives (OE) Factors					Site Characteristics Factors		Human Factors	
	OE Type <sup>1</sup>	OE Sensitivity	OE Density Range	OE Depth	Accessibility	Stability	Activities	Population per Day	
Rocket Test Range	Ordnance Scrap	No Injury - inert OE and OE scrap	Inert OE and scrap	Not Applicable	Not Applicable	Limited Restriction	Stable	Low (hunting, fishing, logging)	10 - 15
Fuze Test Range	Ordnance Scrap	No Injury - inert OE and OE scrap	Inert OE and scrap	Not Applicable	Not Applicable	Limited Restriction	Stable	Low (hunting, logging)	0 - 5
Rocket Burn Area	Ordnance Scrap	No Injury - inert OE scrap	Inert OE scrap	Not Applicable	Not Applicable	Limited Restriction	Stable	Low (hunting, logging)	0 - 5
TNT Burn Area	Ordnance Scrap	No Injury - inert OE scrap	Inert OE scrap	Not Applicable	Not Applicable	Limited Restriction	Stable	Low (hunting, logging)	0 - 5
Buried Drum Area	Ordnance Scrap	No Injury - inert OE scrap	Inert OE scrap	Not Applicable	Not Applicable	Limited Restriction	Stable	Low (hunting, logging)	0 - 5

<sup>1</sup> Denotes items identified during the EE/CA investigation and used to evaluate OE type.

### **TNT Burn Area**

No UXO items were identified during the EE/CA investigation at the former TNT Burn Area. These findings are consistent with the former use of this site. The TNT Burn Area was reportedly used for the open burning and disposal of rocket propellant and explosive waste during the operation of the former Shumaker NAD. During site closure, TNT reportedly was steamed from rockets at Rework Area 13 and brought to the TNT Burn Area for OB disposal. The likelihood for occurrence of UXO at this site is considered minimal. The ordnance scrap identified at the former TNT Burn Area was assigned a category of inert OE scrap.

### **Buried Drum Area**

No UXO items were identified during the EE/CA investigation at the Buried Drum Area, located at the intersection of two gravel roads in the extreme southeastern portion of the former Shumaker NAD. The Buried Drum Area was originally identified from a response for information on the former Shumaker NAD area during a Phase I site prioritization study. Reportedly a partially buried, heavy-gauge metal drum with a brass plate that read “Depth Charge Case” was discovered in a shallow drainage ditch. Further inspection by Parsons revealed the presence of additional buried, heavy-gauge metal containers at this location. During the EE/CA investigation, no depth-charge casings were identified during the intrusive OE sampling. The likelihood for occurrence of any UXO at this AOI is considered minimal. The ordnance scrap identified at the Buried Drum Area was assigned a category of inert OE scrap.

## **2H. RESPONSE ACTION OBJECTIVES**

None of the five AOIs investigated as part of the EE/CA were identified as warranting an immediate (time-critical) OE response action. The goal of non-time-critical response actions is public safety, through the minimization of the public’s exposure to UXO. The response action objectives for the five AOIs are as follows:

- identify the degree and horizontal and vertical extent of OE presence in each area
- evaluate the effectiveness of various response alternatives
- determine the ability to implement various response alternatives
- determine the cost of implementing the various response alternatives

Assessment of response action objectives for the nine AOIs with completed SIs was truncated because the remedy selected for the DOD response was Category II NDAI. Eight of these AOIs were found to have PRP-lead responsibility, and one was found to have DOD-lead responsibility, but no risks were identified at the DOD-lead site.

## **2I. DESCRIPTION OF ALTERNATIVES**

The remedial alternatives identified for evaluation were selected based on the results of the characterization activities performed at the five AOIs of the former Shumaker NAD. Four alternatives were developed to address the potential explosive safety risk remaining at the five AOIs. These alternatives were as follows:

- Alternative 1: No DOD action indicated (NDAI)
- Alternative 2: Institutional controls
- Alternative 3: Surface clearance
- Alternative 4: Subsurface clearance of clearance to depth

## **2J. COMPARATIVE ANALYSIS OF ALTERNATIVES**

The four alternatives were evaluated against the general categories of effectiveness, implementability, and cost to ensure that they met the minimum standards of the criteria within each category in the EE/CA process.

The effectiveness of an alternative relates to its ability to meet the cleanup objective within the scope of the response action. The effectiveness category includes four evaluation criteria: overall protection of public safety and the human environment, compliance with applicable or relevant and appropriate requirements (ARARs), long-term effectiveness, and short-term effectiveness.

### **Overall Protection of Public Safety and the Human Environment**

This evaluation criterion is known as impact analysis. Risks posed through each exposure pathway are eliminated, reduced, or controlled through treatment, engineering controls, and/or institutional controls.

### **Compliance with Applicable, Relevant, and Appropriate Requirements (ARARs)**

Section 121(d)(1) of CERCLA, as amended by SARA, requires that remedial actions must attain a degree of cleanup that ensures protection of human health and the environment, and all potential ARARs must be outlined. ARARs include standards, requirements, criteria, and limitations under state environmental or facility site regulations that are more stringent than federal standards.

Although the requirements of CERCLA Section 121 generally apply as a matter of law only to remedial actions, EPA policy for response actions is that ARARs will be identified and attained to the extent practicable. Three factors were applied to determine whether identifying and attaining ARARs at the former Shumaker NAD was a practical consideration in a particular removal situation. These factors included the following:

- the exigencies of the situation
- the scope of the potential response action to be taken
- the effect of ARAR attainment on the statutory limits for potential response action duration and cost

Three categories of ARARs that have generally been used in ordnance projects are chemical-specific, location-specific, and action-specific. The EE/CA investigation at the former Shumaker NAD was managed pursuant to CERCLA and the NCP. The NCP regulations require that all removal actions or investigations on the site comply with the substantive requirements of federal, state, and local regulations.

**Decision Document**  
**Part 2: Decision Summary**

---

ARARs do not apply to the SI AOIs because no remedy selection process was initiated for these AOIs. Five potential location-specific ARARs were identified for review prior to implementation of an OE response action at an area within the former Shumaker NAD. These were the National Historic Preservation Act, Protection of Wetlands, Endangered Species Act, Protection of Archaeological Resources, and Preservation of American Antiquities. The EE/CA work plan and the ASR did not identify any significant historical/cultural resources or endangered species within the boundaries of the AOIs investigated in the EE/CA.

Protection of wetlands is an important concern at the former Shumaker NAD. Wetland avoidance was practiced during the geophysical surveys during both the meandering path and grid geophysical survey techniques. OE response action must comply with 33 CFR 320 pursuant to the Clean Water Act (33 U.S.C. 1344 section 404). Executive Orders 11988 and 11990, as well as the Clean Water Act, require that appropriate action be taken to minimize the loss of wetlands. Moreover, Section 404 of the Clean Water Act authorizes the USACE to be the permitting office responsible for oversight of all actions that result in the discharge of dredged or fill materials into the waters of the United States, including wetlands.

The action-specific to be considered (TBC), AR 385-64, requires that safety measures be taken for the handling of explosive ordnance. DOD 6055.9-STD requires that specialized personnel be employed to detect, remove, and dispose of ordnance. This standard also defines safety precautions and procedures for detonation or disposal of ordnance.

The implementability of each alternative evaluated included six evaluation criteria: technical feasibility, administrative feasibility, availability of services and materials, property owner acceptance, local agency acceptance, and community acceptance. Also, each alternative was evaluated to determine its projected overall implementation cost, including the amount of time needed to complete the alternative.

ARARs were not required to be identified for hazardous substances at the nine AOIs with completed SIs. The alternatives evaluation process was truncated for the nine AOIs with completed SIs because the remedy selected for DOD response was Category II NDAI. Eight of these AOIs were found to have PRP-lead responsibility, and one was found to have DOD-lead responsibility, but no risks were identified at the DOD-lead site.

Because the recommended remedy for each of the five ordnance AOIs is NDAI (for the reason that there is no risk), ARARs do not apply to the former Rocket Test Range, Fuze Test Range, Rocket Burn Area, TNT Burn Area, or Buried Drum Area. ARARs also do not apply to the Ordnance Disposal Wells, which could not be located.

## **Evaluation of Alternatives for Rocket Test Range**

### Alternative 1: No DOD Action Indicated

#### Effectiveness

Data collected at the former Rocket Test Range did not indicate the presence of UXO. A total of 1,123 OE-like magnetic anomalies were intrusively investigated. Numerous inert practice rockets and inert practice rocket warheads were recovered from the former Rocket Test Range. Field investigation results confirmed the findings of the ASR, that the Rocket Test Range was used solely for test flights of the rocket motors, and that only three live rockets had been fired on the site. This alternative complies with ARARs because no UXO items were recovered from this area, and the short-term and long-term effectiveness criteria are met. Consequently, the NDAI alternative for the former Rocket Test Range meets the effectiveness criteria.

#### Implementability

The NDAI alternative is both technically and administratively feasible. No services or materials are needed for implementation.

#### Cost

There is no cost associated with implementation of the NDAI alternative.

### Alternative 2: Institutional Controls

#### Effectiveness

Implementation of this alternative for the former Rocket Test Range will provide no additional protection to public safety and the human environment. No UXO items were recovered on the former Rocket Test Range despite the intrusive sampling of 1,123 OE-like magnetic anomalies. Consequently, institutional controls would not be effective in reducing the risk from UXO exposures. Because this alternative fails the long-term effectiveness category, no further analysis of this alternative will be performed.

### Alternative 3: Surface Clearance of UXO

#### Effectiveness

Implementation of this alternative for the former Rocket Test Range will provide no additional protection to public safety and the human environment. No UXO items were recovered on the former Rocket Test Range despite the intrusive sampling of 1,123 OE-like magnetic anomalies. Consequently, a UXO clearance would not be effective in reducing the risk from UXO exposures. Because this alternative fails the long-term effectiveness category, no further analysis of this alternative will be performed.

#### Alternative 4: Clearance of UXO to Depth

##### Effectiveness

Implementation of this alternative for the former Rocket Test Range will provide no additional protection to public safety and the human environment. No UXO items were recovered on the former Rocket Test Range despite the intrusive sampling of 1,123 OE-like magnetic anomalies. Consequently, a UXO clearance to depth would not be effective in reducing the public risk from UXO exposures. Because this alternative fails the long-term effectiveness category, no further analysis of this alternative will be performed.

#### **Evaluation of Alternatives for Fuze Test Range**

#### Alternative 1: No DOD Action Indicated

##### Effectiveness

Data collected at the former Fuze Test Range did not indicate the presence of UXO. A total of 124 OE-like magnetic anomalies were intrusively investigated. Numerous inert practice rockets and inert practice rocket warheads were recovered from the former Fuze Test Range. None of the recovered inert practice rockets and warheads contained high explosives or fuzes. The inert materials were characterized as ordnance scrap. Field investigation results confirmed the findings of the ASR, that the Fuze Test Range was used to check fuze function. The April 1960 Statement of Clearance reported that the only dangerous items known to have been fired on the Fuze Test Range were 2.75-inch rockets with a small token charge of high explosive to indicate fuze function, and that these presented a slight hazard if they had not all been recovered. This alternative complies with ARARs because no UXO items were recovered from this area, and the short-term and long-term effectiveness criteria are met. Consequently, the NDAI alternative for the former Fuze Test Range meets the effectiveness criteria.

##### Implementability

The NDAI alternative is both technically and administratively feasible. No services or materials are needed for implementation.

##### Cost

There is no cost associated with implementation of the NDAI alternative.

#### Alternative 2: Institutional Controls

##### Effectiveness

Implementation of this alternative for the former Fuze Test Range will provide no additional protection to public safety and the human environment. No UXO items were recovered on the former Fuze Test Range despite a sampling of 124 OE-like magnetic anomalies. Consequently,

institutional controls would not be effective in reducing the risk from UXO exposures. Because this alternative fails the long-term effectiveness category, no further analysis of this alternative will be performed.

#### Alternative 3: Surface Clearance of UXO

##### Effectiveness

Implementation of this alternative for the former Fuze Test Range will provide no additional protection to public safety and the human environment. No UXO items were recovered on the former Fuze Test Range despite a sampling of 124 OE-like magnetic anomalies. Consequently, a UXO clearance would not be effective in reducing the risk from UXO exposures. Because this alternative fails the long-term effectiveness category, no further analysis of this alternative will be performed.

#### Alternative 4: Clearance of UXO to Depth

##### Effectiveness

Implementation of this alternative for the former Fuze Test Range will provide no additional protection to public safety and the human environment. No UXO items were recovered on the range despite a sampling of 124 OE-like magnetic anomalies. Consequently, a UXO clearance would not be effective in reducing the risk from UXO exposures. Because this alternative fails the long-term effectiveness category, no further analysis of this alternative will be performed.

### **Evaluation of Alternatives for Rocket Burn Area**

#### Alternative 1: No DOD Action Indicated

##### Effectiveness

Data collected at the former Rocket Burn Area did not indicate the presence of residual UXO as a result of rocket destruction activities conducted in the area. No UXO items were recovered from the 140 OE-like magnetic anomalies intrusively investigated within the former Rocket Burn Area. Numerous ordnance scrap items recovered during the field investigation included container lids, rocket spacers, banding, and fins. Field investigation findings confirmed the findings of the ASR, that the Rocket Burn Area was used only for burning and/or detonation of excess ordnance during the closure of the former Shumaker NAD. This alternative complies with ARARs because no UXO items were recovered from this area, and the short-term and long-term effectiveness criteria are met. Consequently, the NDAI alternative for the former Rocket Burn Area meets the effectiveness criteria.

##### Implementability

The NDAI alternative is both technically and administratively feasible. No services or materials are necessary for implementation.

Cost

There is no cost associated with implementation of the NDAI alternative.

Alternative 2: Institutional Controls

Effectiveness

Implementation of the institutional controls alternative for the former Rocket Burn Area will provide no additional protection to public safety and the human environment. No UXO items were recovered on the site despite a sampling of 140 OE-like magnetic anomalies. Numerous ordnance scrap items recovered during the field investigation included container lids, rocket spacers, banding, and fins. Consequently, an institutional controls program would not be effective in reducing the risk from UXO exposures. Because this alternative fails the long-term effectiveness category, no further analysis of this alternative will be performed.

Alternative 3: Surface Clearance of UXO

Effectiveness

Implementation of the UXO surface clearance alternative for the former Rocket Burn Area will provide no additional protection to public safety and the human environment. No UXO items were recovered from the area despite sampling of 140 OE-like magnetic anomalies. Numerous ordnance scrap items recovered during the field investigation included container lids, rocket spacers, banding, and fins. Consequently, a UXO clearance would not be effective in reducing the risk from UXO exposures. Because this alternative fails the long-term effectiveness category, no further analysis of this alternative will be performed.

Alternative 4: Clearance of UXO to Depth

Effectiveness

Implementation of the UXO clearance to depth alternative for the former Rocket Burn Area will provide no additional protection to public safety and the human environment. No UXO items were recovered from the area despite an intrusive sampling of 140 OE-like magnetic anomalies. Numerous ordnance scrap items recovered during the field investigation included container lids, rocket spacers, banding, and fins. Consequently, a UXO clearance would not be effective in reducing the risk from UXO exposures. Because this alternative fails the long-term effectiveness category, no further analysis of this alternative will be performed.

## **Evaluation of Alternatives for TNT Burn Area**

### Alternative 1: No DOD Action Indicated

#### Effectiveness

Data collected at the former TNT Burn Area did not indicate the presence of UXO. A total of 91 magnetic anomalies were intrusively investigated. Materials recovered from the former TNT Burn Area consisted of ordnance scrap. This alternative complies with ARARs because no UXO items were recovered from this area, and the short-term and long-term effectiveness criteria are met. Consequently, the NDAI alternative for the former TNT Burn Area meets the effectiveness criteria.

#### Implementability

The NDAI alternative is both technically and administratively feasible. No services or materials are necessary for implementation.

#### Cost

There is no cost associated with implementation of the NDAI alternative.

### Alternative 2: Institutional Controls

#### Effectiveness

Implementation of the institutional controls alternative for the TNT Burn Area will provide no additional protection to public safety and the human environment. No UXO items were recovered at the former TNT Burn Area from the 91 OE-like magnetic anomalies detected. Numerous ordnance scrap items recovered included container lids, rocket spacers, banding, and fins. Consequently, an institutional controls program would not be effective in reducing the risk from UXO exposures. Because this alternative fails the long-term effectiveness category, no further analysis of this alternative will be performed.

### Alternative 3: Surface Clearance of UXO

#### Effectiveness

Implementation of the UXO surface clearance alternative for the former TNT Burn Area will provide no additional protection to public safety and the human environment. No UXO items were recovered from the former TNT Burn Area from the 91 OE-like magnetic anomalies detected. Consequently, a UXO clearance would not be effective in reducing the risk from UXO exposures. Because this alternative fails the long-term effectiveness category, no further analysis of this alternative will be performed.

#### Alternative 4: Clearance of UXO to Depth

##### Effectiveness

Implementation of the UXO clearance to depth alternative for the former TNT Burn Area will provide no additional protection to public safety and the human environment. No UXO items were recovered from the former TNT Burn Area from the 91 OE-like magnetic anomalies detected. Consequently, a UXO clearance to depth would not be effective in reducing the risk from UXO exposures. Because this alternative fails the long-term effectiveness category, no further analysis of this alternative will be performed.

#### **Evaluation of Alternatives for Buried Drum Area**

#### Alternative 1: No DOD Action Indicated

##### Effectiveness

Data collected at the Buried Drum Area did not indicate the presence of UXO. A total of 38 magnetic anomalies were intrusively investigated. All of the recovered items were classified as ordnance scrap. This alternative complies with ARARs because no UXO items were recovered from the Buried Drum Area, and the short-term and long-term effectiveness criteria are met. Consequently, the NDAI alternative for the Buried Drum Area meets the effectiveness criteria.

##### Implementability

The NDAI alternative is both technically and administratively feasible. No services or materials are necessary for implementation.

##### Cost

There is no cost associated with implementation of the NDAI alternative.

#### Alternative 2: Institutional Controls

##### Effectiveness

Implementation of the institutional controls alternative for the Buried Drum Area will provide no additional protection to public safety and the human environment. A total of 38 magnetic anomalies were intrusively investigated. All of the recovered items were classified as ordnance scrap. Consequently, institutional controls would not be effective in reducing the risk from UXO exposures. As this alternative fails the long-term effectiveness category, no further analysis of this alternative will be performed.

### Alternative 3: Surface Clearance of UXO

#### Effectiveness

Implementation of the UXO surface clearance alternative for the Buried Drum Area will provide no additional protection to public safety and the human environment. A total of 38 magnetic anomalies were intrusively investigated. All of the recovered items were classified as ordnance scrap. Consequently, a UXO clearance would not be effective in reducing the risk from UXO exposures. Because this alternative fails the long-term effectiveness category, no further analysis of this alternative will be performed.

### Alternative 4: Clearance of UXO to Depth

#### Effectiveness

Implementation of the UXO clearance to depth alternative for the Buried Drum Area will provide no additional protection to public safety and the human environment. A total of 38 magnetic anomalies were intrusively investigated. All of the recovered items were classified as ordnance scrap. Consequently, a UXO clearance to depth would not be effective in reducing the risk from UXO exposures. Because this alternative fails the long-term effectiveness category, no further analysis of this alternative will be performed.

## **2K. DOCUMENTATION OF SIGNIFICANT CHANGES**

A Category II NDAI is selected by the USACE for the nine SI AOIs with the rationale of PRP-lead responsibility on eight AOIs, and DOD-lead responsibility on one AOI. This declaration at this phase in site selection preempts the need for remedial alternatives evaluation and selection. The NDAI alternative was also selected for each AOI assessed by the EE/CA for the presence of Navy-era UXO. Verbal comments received during RAB meetings, and written comments received from the EPA, HIP, and the U.S. Fish and Wildlife Service (USF&WS) are presented in Section 3, Responsiveness Summary. These comments did not result in any significant changes. Consequently, the USACE determined that no significant changes to the NDAI alternative selected for each AOI were necessary or appropriate.

## RESPONSIVENESS SUMMARY

### **3A. STAKEHOLDER ISSUES AND LEAD AGENCY RESPONSES**

This responsiveness summary presents the views of the public, government agencies, and PRPs on the proposed USACE response action for the AOIs at the former Shumaker NAD. This responsiveness summary also documents the way in which public comments were considered during the decision-making process and provides answers to significant comments.

### **3B. TECHNICAL AND LEGAL ISSUES**

Members of the public have had an opportunity to comment on the USACE's investigations over a period of 3 years, from the first public meeting, held on July 1, 1999, in Hampton, Arkansas, through 10 public meetings up until the most recent RAB meeting, held on July 23, 2002, in Camden, Arkansas. The transcripts of the RAB meetings are part of the Administrative Record file. For the seven initial Draft SI reports, a notice of availability for review and request for public comments was issued on July 19, 2001.

A public question and answer session and follow-on RAB meeting were held on July 23, 2002, at the Ross Center in Camden, Arkansas. The purpose of these meetings was to present the conclusions and recommendations of the Draft Final EE/CA report to the project stakeholders, to solicit public comments on this EE/CA report, and to address any public concerns. The project stakeholders included the current property owners, the public, RAB members, the Arkansas Department of Environmental Quality, and the EPA. No public concerns about Navy-era ordnance were stated during these meetings. Members of the community and regulators were invited to provide written comments on the Draft Final EE/CA report during a 30-day comment period beginning July 23, 2002. Written comments were received from the EPA, HIP, and the USF&WS.

The comments and responses presented below are from RAB meetings held in 2000, 2001, and 2002; from the Draft SI reports issued for public review and comment in July 2001; and from the Draft Final EE/CA report issued for public review and comment in July 2002.

#### **Restoration Advisory Board Meeting Comments and Responses**

Following is a summary of oral comments expressed at the RAB meetings and the responses provided by the USACE, both as presented in RAB meeting transcripts.

1. Comment: I want to know if there is going to be an impact on work in HIP [from field work].

Response: Well, when we go into the field and perform EE/CA studies and get involved in subsurface sampling where we set up grids and things of that nature, where we perhaps sample one or two percent of the site, we try to accommodate all local landowners and tenants. We try to accommodate their schedules and try to accommodate them in any way we can so that we don't interrupt people's schedules, even sometimes to the extent of having to move grids that have been previously selected.

**Decision Document**  
**Part 3: Responsiveness Summary**

---

2. Comment: [At] what stage is the investigation at this time?

Response: The Huntsville Center plans to award the EE/CA Task Order at the end of March [2000]. The actual investigations, field work, mobilizing UXO contractors, geophysical surveys, probably would not occur until late summer [2000].

3. Comment: Has a project group been decided upon yet? What are the engineering companies?

Response: It will be done by Parsons Engineering Science out of Atlanta. As you know, they are the agent that performed the study for the site prioritization work, and we are going to have them do the follow-up EE/CA.

4. Comment: Are there any interruptions in any of the services in the industrial park?

Response: We don't foresee there being any. The only interruptions that I could foresee would be from a safety standpoint when we actually go into intrusive operations, when we identify particular anomalies to excavate.

5. Comment: Are you strictly concerned with the former military use of the property?

Response: That's true; basically, nonactive areas covered under the DERP formerly used defense sites (FUDS) program.

6. Comment: What is the realistic goal that you have?

Response: In the EE/CA we sample about one to two percent of the areas where we think there is potential contamination for UXO, and from that one or two percent sampling, we try to draw stricter limits on where the actual contamination is, so that at a future date we can come in and actually remove that contamination.

7. Comment: What is the goal of the RAB?

Response: The goal of the RAB is to communicate with the community and give them an opportunity to be involved in the process as an advisory board. Decisions of the RAB are not binding on the Government. However, we try to take the community's considerations into account, and this is a requirement of our program, to solicit for a RAB and to determine whether there is an interest.

8. Comment: So far, we've only talked about ordnance. My question would be on hazardous waste. I don't know much about this site's previous history. I don't know if they actually manufactured rocket fuel here or what, but is that a concern?

Response: That would be a concern. It would be investigated when we have a contractor available to do soil and ground water sampling and get an analysis and evaluations. It would be after we have a clear site for more intrusive investigations.

**Decision Document**  
**Part 3: Responsiveness Summary**

---

9. Comment: When there is Navy contamination and PRP contamination, what happens?

Response: If it presents an imminent hazard, it would be reported. We would notify someone that there was an imminent hazard out there.

10. Comment: But you are just going to be concentrating on the Navy?

Response: Yes.

11. Comment: If you have a rocket that has some percentage of propellant left, if someone goes and digs there, could that propellant pose a risk?

Response: To the best of my knowledge, the answer is no. We did not feel it posed a risk to our UXO technicians who were there. Those men are highly trained, experienced folks.

12. Comment: In other words, it wouldn't explode.

Response: That's correct; it did not explode; it would not explode.

13. Comment: And it doesn't age in such a manner that would produce some explosive products?

Response: [For] most of the propellants that I am familiar with, water would leach out anything that might make it energetic. It certainly would not age and turn into something that would be more dangerous than it was. At least, not to my knowledge, and I've worked at it 20 years.

14. Comment: When these things fall to the earth, how far into the ground do they go?

Response: On the rocket test range, the vast majority, well, approximately half were between 0 to 1 foot. A little less than the remaining half were between 1 and 2 [feet], and then they went down rapidly, just a few were at 3 to 4 [feet].

15. Comment: Did you test any soil around impact areas for chemical residue?

Response: Not at the rocket test range, itself, no sir.

16. Comment: I was wondering if there was anything new on the perchlorate plume, that was in the newspaper, and I realize that is probably an issue of whether that is a PRP or non-PRP responsibility.

Response: The Navy did not use ammonium perchlorate according to our research.

17. Comment: From the standpoint of having unexploded ordnance now, is a rocket motor unexploded ordnance?

Response: No.

18. Comment: I mean, if it didn't function, if it partially functioned?

Response: It wouldn't be unexploded because it wasn't intended to explode at all. It was basically a propulsion. It would be residual; it would be waste propellant or propulsion.

19. Comment: It wouldn't be considered unexploded ordnance?

Response: No, it would not.

### **U.S. Environmental Protection Agency Comments and Responses**

Following are comments on the Draft SI reports made by the EPA in a letter dated August 20, 2001, and the responses provided by Parsons and the USACE-Little Rock District on November 13, 2001, and January 2, 2002, respectively.

1. Comment: Metals in ground water samples above the Maximum Contaminant Levels (MCLs) occurring at a number of your sites are problematic. The reports offer no explanation for their occurrence other than to state that the GeoProbe<sup>®</sup> sampling method produced turbidity. If this is true, then samples should be analyzed using filtered and unfiltered methods to answer this question. The widespread occurrence of metals in excess of the MCLs needs to be explained and solutions to remedy this contamination should be identified.

Response: The Final Sampling and Analysis Plan, Site Investigation (July 2000) did not include the provision of collecting both filtered and unfiltered ground water samples. According to the EPA *Guidance for Performing Site Inspections under CERCLA* (EPA/540-R-92-021), aqueous samples may be filtered or unfiltered. Unfiltered samples were collected at the Landfill Area site, as these samples were believed to be representative of naturally occurring conditions within the surficial aquifer. The collection of ground water samples via a GeoProbe<sup>®</sup> probe does not allow for the complete development associated with samples from a ground water monitoring well. This lack of development is the cause of the slight turbidity of the samples, which results in the apparent elevated concentrations of metals in surficial ground water samples.

2. Comment: Laboratory contamination is attributed to a number of samples. These samples should be rerun to determine if laboratory or some other type of contamination is the source of the problem.

Response: Methylene chloride and acetone are common laboratory glassware cleaning reagents that are often detected at low concentrations in environmental samples. The U.S. EPA Contract Laboratory Program, National Functional Guidelines identifies these chemicals and others as common artifacts of the laboratory environment. As such, re-analyzing the samples due to the presence of EPA-identified common laboratory artifacts provides no added value.

3. Comment: Rework Area 10. No ground water samples were obtained at this site for the reason that the GeoProbe<sup>®</sup> was unable to penetrate the soil. This is the only site where

penetration failed. What is the cause of this phenomenon? If the ground is harder or conditions differ from elsewhere in the vicinity, what are these unique characteristics and what caused this to occur? A more powerful drilling rig may provide the force necessary to obtain samples of ground water at this site.

Response: Sections 3.1.1, 3.4, and 6.1.3 of the *Draft Final Site Inspection Report - Rework Area 10* (June 2001) state that the GeoProbe® probes installed at Rework Area 10 failed to produce water in sufficient quantities to collect samples. The lack of sufficient water to sample was due to the low permeability of the fine-grained clayey silts, and the direct-push GeoProbe® sampling equipment, which relies exclusively on gravity drainage for sample collection. The lack of sample collection was not due to a lack of depth penetration, as evidenced by Table 3.2, which shows total depth of the five GeoProbe® borings ranging up to 35 feet below ground surface.

4. Comment: Landfill. The ground water pathway at this site is complete. Perchlorate, heavy metal and PCE contamination are documented. The report states that it is not in its scope to investigate contamination of the Sparta Aquifer. With a completed ground water pathway, it is necessary to access the potential impacts on the Sparta Aquifer with deep wells. Ground water monitoring wells are needed down gradient of the landfill to determine if the contamination has reached the Sparta Aquifer. There are no recommendations regarding eliminating the source of contamination, which presumably is the Landfill. Contaminant source reduction should be implemented in the future for the Landfill. Recommendations for corrective action should be presented whenever exposure pathways are complete, when contamination is above MCLs, and when contamination exceeds the media specific screening levels.

Response: The placement of ground water monitoring wells in the Sparta Aquifer is beyond the scope of work for an SI. While there may be technical validity to this request, it is more appropriate to evaluate the deeper aquifer(s) under an Expanded Site Investigation (ESI) or Remedial Investigation (RI). The objective of the SI at the Landfill Area was to evaluate the potential presence of explosive and chemical contamination that may have resulted from past waste management practices at the Landfill, and to identify target receptors, in accordance with the EPA *Guidance for Performing Site Inspections under CERCLA* (EPA/540-R-92-021). The request to recommend corrective actions for source control is also beyond the scope of work for an SI, defined by EPA SI guidance.

Supplemental Response from the USACE-Little Rock: The PRP Search Letter Investigation and Report (December 2000), completed by HydroGeoLogic, Inc. has established that the Navy did not use perchlorates and PCE at the site. Perchlorate was used by subsequent private tenants of the former Shumaker site in the production of post-Korean War missile systems. Responsibility for further assessing the potential for contamination of the Sparta Aquifer with these contaminants will have to be established for other parties.

The completeness of the ground water pathway was stated in the SI report as contingent upon conservative assumptions that may not be valid for this site. It was noted in the report that the ground water used by referenced target receptors is produced from a different aquifer than the shallow Alluvium Formation sampled with the SI. Contamination of the Sparta Aquifer

has not been identified with testing of water wells completed in the aquifer in the former Shumaker area. In addition, target receptor exposure to a contaminated ground water supply has not been established consistent with criteria of EPA *Guidance for Performing Site Inspections under CERCLA* (EPA/540-R-92-021).

None of the ground water samples collected from the Landfill Area with the SI are truly upgradient of the Landfill. As such, background ground water quality of the Landfill Area is not well characterized, and ground water contamination identified cannot be unequivocally attributed to the Landfill, as other sites with perchlorate contamination are located near the Landfill.

5. Comment: Toluene in the surface water near the Landfill needs to be explained. Surface water would dilute the concentration so there must be a significant source somewhere. Do you have any ideas as to where this source may be or how to identify the source?

Response: The surface water sample SW-01 was collected from an isolated pool of water within the tributary to Dogwood Creek. The tributary was not flowing, due to the drought conditions evident during late summer 2000, in the Camden, Arkansas, area. The source of toluene in surface water sample SW-01 is unknown. The concentration of toluene is reported as 53.7 micrograms per liter ( $\mu\text{g/l}$ ). The U.S. Safe Drinking Water Act MCL for toluene is 1,000  $\mu\text{g/l}$ . As such, this reported concentration of toluene is approximately 20 times lower than the MCL.

6. Comment: Buried Drum Area. This area has a complete ground water pathway and is nearby the HITECH OB/OD unit. Recommendations for corrective action should be present whenever exposure pathways are complete, when contamination is above MCLs, and when contamination exceeds the media-specific screening levels. The report states that it is not in its scope to investigate contamination of the Sparta Aquifer. With a completed ground water pathway, it is necessary to access the potential impacts on the Sparta Aquifer with deep wells.

Response: The request to recommend corrective actions for source control is also beyond the scope of work for an SI, as defined by EPA *Guidance for Performing Site Inspections under CERCLA* (EPA/540-R-92-021). The placement of ground water monitoring wells in the Sparta Aquifer is beyond the scope of work for an SI. While there may be technical validity to this request, it is more appropriate to evaluate the deeper aquifer(s) under an ESI or an RI. The objective of the SI performed at the Buried Drum Area was to evaluate the potential presence of explosive and chemical contamination that may have resulted from past waste management practices at this site, and to identify target receptors, in accordance with the EPA SI guidance.

7. Comment: Significant areas of concern remain to be investigated. These are the TNT Plant, the Motor Loading Plant, the Sewer and Drainage Lines, and the Ordnance Disposal Wells. These areas are where much of the Navy's rocket manufacturing took place and where significant contamination is likely to occur. Ground water investigations in these areas should include installation of down gradient monitoring wells in the Sparta Aquifer to access the presence of contamination.

Response: The TNT Plant, the Motor Loading Plant, and Sewer and Drainage Line sites are all located on property owned by Highland Resources. Highland Resources refused to grant right-of-entry permits to the U.S. Army Corps of Engineers (USACE) to allow investigation of these potential areas of explosive and/or chemical contamination. Additionally, these areas have continued to be used by Highland Resources and its tenants for approximately 40 years. The reported Ordnance Disposal Wells were evaluated as part of the Engineering Evaluation/Cost Analysis (EE/CA) performed by the USACE on the former Shumaker NAD property.

Supplemental Response from the USACE-Little Rock: In Mr. Warren's October 10, 2001, letter to you, documentation was provided that establishes that the navy only melted TNT, in contrast to production, at the TNT Plant, and that the Navy conducted decontamination of this site. Post-Navy tenants have used chemicals at the TNT Plant that were not used by the Navy, as referenced in the EPA Toxic Release Inventory documents provided to you with the above-listed correspondence. In addition, post-Navy tenant violations with the Arkansas Department of Environmental Quality have been noted. Due to the nature of future investigations, responsibility of other parties who apparently contaminated the sites will have to be addressed.

Navy Ordnance Manual information and documentation were provided to you in October 2001 that identify chemicals and processes used by the navy in the Motor Loading Area. Regulatory documentation was also provided for chemicals used by post-navy tenants in the Motor Loading Area. The documentation also identifies Navy decontamination of units within the Motor Loading Area. Due to the nature of future investigations, responsibility of other parties who apparently contaminated the sites will have to be addressed.

Documentation of Navy decontamination of the drainage lines at the site was provided to you in October 2001. Documentation of numerous post-Navy tenant regulatory violations was provided at the same time. Due to the nature of future investigations, responsibility of other parties who apparently contaminated the sites will have to be addressed.

8. Comment: I believe any comment I may have had was addressed to Bob in his comments. The only additional thing I might mention is that most of the investigated sites seemed to have an inordinate amount of QA samples contaminated with such things as methylene chloride and acetone. Common laboratory chemicals, I admit, but I believe methylene chloride is also used as a degreaser in many fabrication operations. I am sure this may be easily addresses, however. That is the only comment I have.

Response: Methylene chloride and acetone are common laboratory glassware cleaning reagents that are often detected at very low concentrations in environmental samples. The U.S. EPA Contract Laboratory Program National Functional Guidelines document identifies these chemicals and others as common artifacts of the laboratory environment.

Following are responses to comments made by the EPA on the Draft SI Reports for the Pipes-in-Concrete Area, and Rework Area 10. These responses were provided by the USACE-Little Rock District, on April 18, 2002. EPA's comments were in the form of two reports with a cover letter, which are not reproduced here.

1. Overall Response 1: Unfortunately, this most recent set of comments was not received in time to be incorporated into the final reports. Your contractor, Techlaw appears to have an unclear understanding of the circumstances at the site. Several of the comments directing further work referred to contaminants, such as perchlorates, tetrachloroethylene, dichloroethylene, and others, that cannot be attributed to Navy use at the site. We have no authority to investigate contaminants that cannot be attributed to past Department of Defense use of the site.

It would be more appropriate to address the non-DOD contaminants in accordance with the recently issued EPA *Policy towards Privately Owned Formerly Used Defense Sites*, dated March 21, 2002, which states:

To facilitate cleanup by non-DOD responsible parties, and consistent with enforcement priorities, Regions should also initiate PRP searches at FUDS early in the CERCLA process where parties in addition to DOD may be liable for releases of hazardous substances, pollutants, or contaminants.

As you are aware from the extensive documentation that we have provided to you involving the operational history of the site, it is apparent that private operations are the sole or primary source of the contaminants you have identified as a concern. Based on our past discussions involving this matter, you are aware of the legal and policy factors which preclude the Department of Defense in engaging these investigatory or remediation activities. Accordingly, I am forwarding this matter to my Divisional Headquarters and I suggest that we both coordinate through our respective organizations.

Following are comments on the Draft Final EE/CA report made by the EPA in a letter dated August 21, 2002, and the responses provided by the USACE-Tulsa District on April 9, 2003.

1. Overall Comment 1: While EE/CA provides a useful documentation of the Corps efforts to locate and identify and eliminate UXO, it does not justify the no further action alternative proposed by your consultant.

Response: During its investigations at the former Shumaker NAD in 2001 and 2002, Parsons located no UXO of Navy-era vintage. The inert OE and OE scrap that was found poses no risk of injury. This is consistent with the "Proposed Statement of Contamination" for the Firing Range, dated February 3, 1961, which states "the only dangerous item known to have been fired on this range is 2.75-inch rockets with a small token charge of high explosive to indicate fuze function. It is felt that these present only a slight hazard if they have not all been recovered." Brown Engineering (HIP's predecessor) stated in a 1960s brochure on the site that "strict procedures have been used by the ordnance personnel to decontaminate certain areas previously subject to residual explosives hazard." The *Arkansas Gazette* reported on February 14, 1965, that International Paper was planting pine seedlings on the Firing Range over an area several miles long. In this 1965 article, no mention was made of any danger posed by Navy-era UXO to International Paper personnel planting pine seedlings on the former Firing Range. In the 41 years since the former Shumaker NAD was sold, no one has been reported injured as a result of Navy-era UXO. The USACE is not addressing post-Navy ordnance found at the site with the EE/CA Investigation.

Further action cannot be justified because the inert OE and OE scrap that remains from Navy use of the site do not pose a risk of injury. As has been explained in prior correspondence and in meetings, the USACE has no legal authority to address post-Navy ordnance found at the site with the EE/CA Investigation. In fact, it would be contrary to Federal appropriations law to expend FUDS funds to address post-Navy ordnance.

2. Overall Comment 2: There are outstanding Ordnance Explosive (OE) residual risks that need to be investigated in the sewers and drains.

Response: During the period of Navy ownership, the facilities were used exclusively for the loading, assembly, testing, reworking, and storage of ordnance rockets generally having TNT warheads and solid (ballistite) rocket motors. Navy rockets were loaded at the Shumaker NAD between April and November 1945, and between August 1950 and June 1957, over a total period of less than 7.5 years. Interviewees and Navy inventories indicated that in the assembly and reworking of rockets, other than in painting, liquids were used only in inhibiting operations in the Motor Loading Area (Buildings M-25B, M-75B, and M-85B), in one rocket warhead wash-out tank in the TNT Area (Building H-101), and in one rocket warhead wash-out tank in the Rework Area (Building RW-13). Decontamination documents state that by July 1, 1957, decontamination had been accomplished in and adjacent to the Motor Loading Area, and that quantities of sodium sulfite, a TNT neutralizing agent, had been applied to areas in outside drainage ditches within the TNT Area. The ground area around the discharge end of floor drains in the TNT Area had also been neutralized. All washroom facilities had been washed and treated with sodium sulfite until clean. The Rework Area and adjacent land were also to be decontaminated by the Navy. Brown Engineering stated in a 1960s brochure on the site that “strict procedures have been used by the ordnance personnel to decontaminate certain areas previously subject to residual explosives hazard.”

The potential OE residual risks within the sewer and drain lines are a concern that is best addressed first by the current property owner. HIP has owned these wastewater conveyances for the past 40 years and has apparently allowed its tenants to use these facilities. As such, the residual OE risks, if any, are likely related to HIP’s use of these facilities. Shumaker NAD operated the site for less than 7.5 years in assembling, not manufacturing, rockets further supporting that any potential contamination is likely associated with post-Navy operations.

We again remind you of the legal and policy constraints that preclude the USACE from funding investigations of post-Navy activities.

3. Overall Comment No. 3: Widespread ground water contamination by heavy metals, particularly lead and chromium and other constituents, needs to be addressed in terms of the causes, sources, extent, and possible remedies for the contamination.

Navy manuals from the 1940s and 1950s show that the types of rockets assembled at Shumaker NAD did not involve the use of lead or chromium. The only liquids used in rocket loading appear to have been acetone and ethyl lactate, with butyl acetate used to bond celluloid inhibitor strips to the ballistite grain. Many private manufacturers have operated

at the site since 1962 (over 40 years), when International Telephone and Telegraph Corporation (ITT) began electronics manufacturing, and Benjamin Levy Company, and Sinclair and Valentine Company opened ink-making plants at the site. Lead and chromium salts are used in the manufacture of electronic devices and inks. The *Arkansas Gazette* reported on February 14, 1965, that ITT employed “a workforce of more than 125 persons assembling electronic communications equipment in a building once used for naval ordnance purposes.”

4. Specific Comment 1: The Executive Summary Part ES3 states that the Risk Assessment Code (RAC) ranking for the Shumaker Naval Ammunition Depot has a score of 2. The 1/20/1998 ranking of the site by the Corps indicates a RAC score of 1, the highest possible ranking.

Response: We would like to reiterate that RAC scores are normally prepared before a site is investigated and use standardized forms that consider the type of ordnance and the potential accessibility of the ordnance to the public. The forms do not differentiate between potential or confirmed presence of ordnance because they are completed before detailed information is available. The Corps uses the RAC scores as a screening tool to prioritize sites on a national basis so that the highest priority sites can be funded for EE/CAs and investigated first. After detailed investigations are conducted and an EE/CA has been prepared, the RAC scores for a site are no longer relevant.

Both the RAC score and the EE/CA considered only ordnance remaining from Navy use of the property and did not consider post-Navy ordnance. This was done because legal and policy constraints preclude the USACE from funding investigations of post-Navy activities. Since the time that the Navy used and decontaminated the site, there have been about 39 years of operations by various defense industries that are believed to have resulted in potential OEW.

The discussion of the RAC score resulting from the ASR is accurate. The subsequent “revised RAC score” of January 1998 will be included in the Executive Summary, as will a discussion of the November 2000 Final RAC scoring process and results.

The *Arkansas Times* reported on June 8, 2001, that explosions and fires caused by private munitions manufacturers at HIP have claimed at least 16 lives and have injured scores of workers. In comparison, Shumaker NAD had very few accidents, although interviewee Mr. Ed Sanders reported two fatalities in an accident in the Motor Loading Area around 1955. In 1957, National Fireworks, the operator of Shumaker NAD, was awarded a safety plaque in recognition of 2 million man-hours of production without a disabling injury.

The largest defense contractors in the U.S. have operated in the former TNT Area since the early 1960s. These include Baldwin Electronics, Inc. (BEI); The Boeing Company; General Dynamics Corporation; Hughes Missile Systems; Raytheon Missile Systems; HITECH Holdings, Inc. (HITECH); Vought Corporation; Loral Vought Systems Corporation; and Lockheed Martin Corporation. Numerous OE manufacturers have operated in the former Motor Loading Area since the early 1960s. These include Camden Manufacturing Company, a subsidiary of Aerojet General Corporation; BEI; Tracor Aerospace, Inc.; Marconi

Aerospace, Inc.; BAE Systems; Atlantic Research Corporation (ARC); Vought Corporation; Loral Vought Systems Corporation; and Lockheed Martin Corporation.

Because the site has been assigned an ordnance and explosive waste (OEW) risk assessment score that indicates immediate action is needed, even though the Navy decontaminated the site 45 years ago, we believe that the existing OEW has arisen from defense contractor operations over the past 39 years.

5. Specific Comment 2: The purpose of the EE/CA as stated in the Executive Summary part ES5 is to “. . . characterize the location, density and distribution of UXO, assess the risk posed by any residual UXO items, study risk management alternatives and identify the appropriate response action to address the risks to the public.” Presumably this includes the risk posed by OE residuals which if present in sufficient concentrations can also pose an explosive risk.

Response: UXO was not found during the investigation; only inert OE and OE scrap. The risk posed by OE residuals is principally due to the operations of OE manufacturers that have operated at the former Shumaker NAD since 1963 (over 39 years). In the 41 years since the former Shumaker NAD was sold to Brown Engineering and International Paper, no one has been reported injured as a result of Navy-era UXO.

The occurrence of OE residuals was addressed with testing of soil and groundwater with the SIs completed for appropriate sites. This does not rule out the possibility that residuals from operations of defense industries at the former Shumaker NAD since 1963 (over 39 years) could pose an explosive risk. Legal and policy constraints preclude the USACE from funding investigations of post-Navy activities.

6. Specific Comment 3: The Corps [USACE] has identified the sewer and drainage lines in the Motor Loading Plant and the TNT Plant as having potential for explosive risk due to OE residuals. These sewer and drainage lines have not been investigated for the presence of OE residuals or the risk posed by them.

The EPA acknowledges that other parties have conducted operations in Motor Loading and TNT Plants since the Navy ceased operations. However the need to determine if there is an explosive risk present in the sewer and drainage lines is essential and the Corps should understand the need for this determination is part of their duty to the public. If an OE residual is found, the identification who is responsible can be determined at a later date. It is not the EPA's intent to hold the Corps responsible for OE contamination that is not of Navy vintage, none the less, it is incumbent on the Corps to investigate the sewer and drainage lines so that if an explosive risk is present it is documented and the appropriate steps can be taken to avoid a catastrophic event. If no significant OE residual is found then the entire matter can be dropped, but not until a thorough investigation of the sewer and drainage lines is conducted.

Response: In a 20 January 1998 Project Fact Sheet, regarding the TNT Plant area, it was stated that, “It is assumed that the manmade drainage channels were not removed and may have been used as a washout conduit for the TNT. If these lines remain in place, they might

pose a significant explosion hazard.” This Fact Sheet was written before extensive research and investigations were available. Since that time, the government has compiled a substantial amount of historical information that disproves the preceding assumption. More specifically:

Interviewees and Navy inventories have indicated that in the assembly of rockets in the Motor Loading and TNT Areas, other than in painting, liquids were used only in inhibiting operations in the Motor Loading Area (Buildings M-25B, M-75B, and M-85B), and in one rocket head wash-out tank in the TNT Area (Building H-101). The explosive risk in rocket assembly operations at Shumaker NAD was due to airborne explosive dust. In the TNT Area, Vacuum Buildings H-105B, H106B, H-115B, and H-116B, each contained four large industrial exhaust blowers. In the Motor Loading Area, Building M-3 contained 32 industrial exhaust fans. Decontamination documents state that by July 1, 1957, decontamination had been accomplished in and adjacent to the Motor Loading Area, and that quantities of sodium sulfite, a TNT neutralizing agent, had been applied to areas in outside drainage ditches within the TNT Area. The ground area around the discharge end of floor drains in the TNT Area had also been neutralized. All washroom facilities had been washed and treated with sodium sulfite until clean. Brown Engineering stated in a 1960s brochure that “strict procedures have been used by the ordnance personnel to decontaminate certain areas previously subject to residual explosives hazard.”

The largest defense contractors in the U.S. have operated in the former TNT Area since the early 1960s. These include BEI; The Boeing Company; General Dynamics Corporation; Hughes Missile Systems; Raytheon Missile Systems; HITECH; Vought Corporation; Loral Vought Systems Corporation; and Lockheed Martin Corporation. Numerous OE manufacturers have operated in the former Motor Loading Area since the early 1960s. These include Camden Manufacturing Company, a subsidiary of Aerojet General Corporation; BEI; Tracor Aerospace, Inc.; Marconi Aerospace, Inc.; BAE Systems; ARC; Vought Corporation; Loral Vought Systems Corporation; and Lockheed Martin Corporation. The potential for explosive risk from OE residuals in the sewer and drainage lines in the Motor Loading and TNT Plants is due to the operations of the OE manufacturers that have operated at the former Shumaker NAD since 1963 (over 39 years). In light of the heavy use of the site by OE manufacturers over the past 39 years, and in light of the clause in the 1961 quitclaim deed that indemnifies the U.S. Government against any and all liability due to the possible contaminated condition of the site, the Corps of Engineers has no authority to conduct the suggested investigations.

7. Specific Comment 4: Ordnance removal actions were undertaken by International Paper at Rework Area 13 in the interest of preventing an explosion. Explosive residuals and other constituents were present in soils and ground water. The Corps should conduct an evaluation of the area now that ordnance has been removed. Documentation of the actions are available at the Arkansas Department of Environmental Quality in a report by Earth Tech, dated March 2002, or the report may be obtained directly from International Paper.

Response: In the Rework Area, Building RW-13 (1,482 square feet in area) was completed by the Navy in 1957. It had one “settling field,” and contained one rocket head wash-out tank. A Navy document dated February 3, 1961, indicates that the building, equipment, and

adjacent land “will be decontaminated to the extent necessary to render such improvements safe for any use.” Building RW-13 and its adjacent land were conveyed to International Paper in late 1961, so Rework Area 13 was used by the Navy for at most 4 years.

Pace-Caribe, Inc., (Pace) moved into the Rework Area in 1963 to manufacture pyrotechnic products and flares at the site. By February 14, 1965, the *Arkansas Gazette* reported that Pace employed about 30 workers. On June 27, 1970, the *Camden News* reported that Pace employed more than 500 workers in the former Rework Area, which had become a “manufacturing focal point for pyrotechnic and explosive devices in the area.” Since 1970, Rework Area 13 has been used by a number of other OE manufacturers including GOEX, Inc., and Accurate Arms Company, Inc. In light of the heavy use of the site by OE manufacturers over the past 39 years, and in light of the clause in the 1961 quitclaim deed that indemnifies the U.S. Government against any and all liability due to the possible contaminated condition of the site, it is more appropriate for International Paper, not the USACE, to evaluate Rework Area 13.

8. General Comment 1: The Site Investigation [SI] Reports by Parsons indicated contamination in a number of the sites investigated, yet the results of the investigations were nowhere discussed in the EE/CA. While EPA recognizes that the single most important aspect of all the Shumaker investigations is to address UXO, there are human health and environmental concerns that remain unaddressed, such as migration of contamination from the alluvium to the Sparta aquifer.

Response: The EE/CA conducted at the former Shumaker NAD was focused on characterizing the density and distribution of OE/UXO that resulted from the period of ownership and operation of the site by the Department of Defense (DOD). Additionally, the EE/CA analyzes risk management alternatives and recommends feasible OE exposure reduction alternatives for the areas of interest (AOIs).

The SI reports are stand-alone documents that address the potential presence of chemical constituents at the AOIs. As stated in Chapter 1, paragraph 1 of the EPA SI guidance, “The objective of an SI is to gather information to support a site decision regarding the need for further Superfund action. The SI is not a study of the full extent of contamination at a site or a risk assessment.” The requested evaluation of environmental risks and chemical constituent migration is not appropriate for an SI. [The USACE believes that the contamination identified in the SI reports is the responsibility of other parties.]

9. General Comment 2: The TNT Burn Area had ordnance residuals in soils and ground water above screening levels, including samples that were presumed to be background samples.

Response: The EE/CA conducted at the former Shumaker NAD was focused on characterizing the density and distribution of OE/UXO that resulted from the period of ownership and operation of the site by the DOD. The results and findings of the SI efforts at the former TNT Burn Area are described in detail in the Final SI Report, Former TNT Burn Area (Parsons, February 2002).

The concentration of explosive residuals in soils and ground water did not approach the level required to be deemed an explosive concern. Concentrations of 2,4,6-trinitrotoluene (TNT) in soil samples from locations within the TNT Burn Area were found to be above the appropriate risk screening levels. However, the soil exposure pathway was incomplete based on a lack of confirmed target receptors within a 1-mile radius of the TNT Burn Area. Concentrations of 2,4,6-TNT and RDX in groundwater samples from locations adjacent to the TNT Burn Area were found to be above the appropriate risk screening levels for ground water usage as a water supply. However, the ground water exposure pathway was incomplete based on a lack of confirmed target receptors that obtain drinking water from water wells located within a 4-mile radius of the TNT Burn Area. TNT and RDX were burned by the Navy in the TNT Burn Area. Documents from the Arkansas Department of Environmental Quality indicate that TNT and RDX were used by some of HIP's tenants including HITECH, ARC, GOEX, Inc., and Austin Powder Company.

10. General Comment 3: The Rocket Burn Area had heavy metals in the ground water above the maximum contaminant levels (MCLs).

Response: The EE/CA conducted at the former Shumaker NAD was focused on characterizing the density and distribution of OE/UXO that resulted from the period of ownership and operation of the site by the DOD. The SI completed for the Rocket Burn Area by Parsons (February 2002) stated one or more ground water samples was reported to contain aluminum, chromium, iron, and lead at concentrations above the MCLs. However, the ground water exposure pathway was incomplete based on a lack of confirmed target receptors that obtain drinking water from water wells located within a 4-mile radius of the Rocket Burn Area. Navy ordnance manuals from the 1940s and 1950s show that the Navy did not use chromium or lead in the types of rockets assembled at Shumaker NAD.

11. General Comment 4: Rework Area 10 had old electrical transformers of Navy vintage yet no polychlorinated biphenyl (PCB) sampling was conducted, or a determination [made] that the transformers were free of PCBs.

Response: The presence of electrical transformers and the potential for PCB-oils within these transformers was not addressed during the EE/CA. The EE/CA conducted at the former Shumaker NAD was focused on characterizing the density and distribution of OE/UXO that resulted from the period of ownership and operation of the site by the DOD.

The Navy constructed Building RW-10 as the Minor Caliber Defusing Building in 1955, and sold it to International Paper in 1961. Use of PCBs in transformers was common practice in the U.S. up until the late 1970s. U.S. production ceased in October 1977 because of PCBs' alleged toxic effects on animals and their slow rate of degradation in the environment. If old electrical transformers are believed to have leaked at the site, it is more appropriate for International Paper or the operators of the site during the past 40 years to make that determination. The Navy owned Building RW-10 for 6 years, and PCB use continued for at least 16 years after the Navy sold the site.

During Navy operation of the site, the transformers met their intended use. How transformers with PCBs were managed at the site by post-Navy owners and tenants after

1977, when PCB use was discontinued, is the issue concerning responsibility and liability at the site.

12. General Comment 5: The Non-Vegetated Soil Area had heavy metals in the ground water above the MCLs in what was supposed to be background samples.

Response: One background ground water sample collected during the SI was found to contain aluminum, beryllium, chromium, iron, lead, and vanadium in concentrations exceeding their respective MCLs. The Navy used this area around Magazine 3-AT2 for storage purposes, only. The lack of vegetation was first observed in aerial photographs taken after the Navy had sold the site in 1961. Navy ordnance manuals from the 1940s and 1950s show that the Navy did not use beryllium, chromium, lead, or vanadium in the types of rockets assembled at Shumaker NAD. The Navy is not responsible for the soil and ground water contamination in this area.

13. General Comment 6: The Buried Drum Area had heavy metals in the ground water above the MCLs.

Response: Concentrations of aluminum, iron, and lead exceeded the MCLs in one ground water sample collected during the SI in the Buried Drum Area. Fifteen people were estimated to be receptors to the ground water supply wells located within a 4-mile radius of the Buried Drum Area. The Buried Drum Area was created after the Navy sold the site in 1961, by a tenant or tenants of HIP that burned waste explosives in the southernmost Magazine Area 17-AT. The Navy is not responsible for the ground water contamination in this area.

14. General Comment 7: The Pipes in Concrete Area had heavy metals in the ground water above the MCLs.

Response: One ground water sample, collected from the motor vehicle maintenance ramp area during completion of the SI, was reported to contain lead at a concentration marginally above its MCL. However, the ground water exposure pathway was incomplete based on a lack of confirmed target receptors that obtain drinking water from water wells located within a 4-mile radius of the Pipes in Concrete Area. The use of the Pipes in Concrete Area for waste motor oil disposal by trespassers has been confirmed by personal communication with the local population. The Navy is not responsible for the ground water contamination in this area.

15. General Comment 8: The Landfill has heavy metals and solvents in the ground water above the MCLs.

Response: Concentrations of perchlorate, perchloroethylene (PCE), dichloroethylene (DCE), chromium, lead, iron, and nickel reported in ground water samples collected from locations adjacent to the landfill during the SI were found to be above the respective MCLs. Approximately 5,180 people were estimated to be receptors to the ground water supply wells located within a 4-mile radius of the former Landfill. Navy manuals from the 1940s and 1950s show that rockets of the type produced at Shumaker NAD did not involve the use of

perchlorates, PCE, DCE, chromium, lead, or nickel. The Navy is not responsible for the ground water contamination in this area.

16. General Comment 9: Wide spread heavy metal contamination of the ground water exists at sites where the Corps indicates were occupied exclusively by the Navy. What is the source of this contamination? What is the cause of the contamination. What are the transport mechanisms for the contamination? Is the contamination reaching the Sparta Aquifer? All of these questions should have been addressed in the EE/CA before any no further action determinations were made. The EE/CA is inadequate to determine if a no further action determination can be made. Additional work is needed, including monitoring of the Sparta Aquifer.

Response: The Navy sold the former Shumaker NAD more than 41 years ago, after actively operating it as a rocket assembly plant for less than 7.5 years. No public records exist listing HIP's tenants and industrial operations over the past 41 years; however, no part of the former Shumaker NAD has been occupied exclusively by the Navy because of HIP's long-term ownership and stewardship.

The Navy rockets assembled at Shumaker NAD were simple in composition and construction, not requiring the use of chlorinated solvents or heavy metals. The *Arkansas Democrat* reported on March 8, 1956, that Shumaker NAD was to close "because of obsolescence." The rockets produced there were outmoded in light of the recent development of guided missiles. Perchlorates are constituents in guided missile motors. Guided missiles are complex in composition and construction, involving heavy metals, the surface finish on which requires the use of chlorinated solvents. ARC, an HIP tenant located west of the landfill since 1981, has admitted to washing out perchlorate-containing Chaparral missile motors onto the ground, causing groundwater contamination.

Since the EE/CA report addresses rocket assembly and testing activities that occurred during the time period of Navy ownership, only, the transport mechanisms for the ground water contamination and whether this contamination has reached the Sparta Aquifer need to be addressed by HIP and its tenants.

### **Highland Industrial Park Comments and Responses**

Following are comments on the Draft Final EE/CA report made by HIP in a letter dated August 22, 2002, and the responses provided by the USACE-Tulsa District on May 2, 2003.

#### Comment:

##### Introduction

The focus of this report is expressly limited to unexploded ordnance (UXO), and ignores so-called hazardous, toxic, and radioactive waste (HTRW) issues. In addition, these HTRW issues are not addressed in each individual Site Investigation (SI) report. Notwithstanding this focus, Parsons repeatedly makes an unsupported statement, starting at the Executive Summary (ES9) and continuing throughout the report, that:

**Decision Document**  
**Part 3: Responsiveness Summary**

---

This EE/CA Report does not include post-Navy ordnance-related activities. Information regarding post-Navy manufacturing, testing and use of ordnance at the former Shumaker site is discussed in the Draft 7003 Order and Potentially Responsible Party (PRP) Search Letter Report, prepared by HydroGeoLogic, Inc. for the USACE, Tulsa District and dated December 2000. This PRP Search Report identifies the responsible parties for the explosive hazards and *contamination* found at the former Shumaker site. (Emphasis added)

Having ignored the HTRW aspects of the investigation, it seems patently obvious that Parsons is in no position to make a finding relative to HTRW contamination or to assign responsibility for same. Furthermore, it is clear that one USACE contractor (Parsons) is in no position to give credence to the work of a second USACE contractor (HydroGeoLogic) without conducting and explaining the basis for any critical analysis of the work. To Highland's knowledge, Parsons did not do this.

Beyond these obvious flaws with this aspect of the Parsons Report is the fact that the HydroGeoLogic Report that is referenced contains numerous misstatements, inaccuracies and is biased to the point of being completely unreliable. It was prepared in response to a threatened RCRA 7003 action by EPA against DOD for and at the direction of USACE counsel, with counsel's input, and has been characterized by USACE counsel as a document prepared in anticipation of litigation (presumably over the threatened 7003 Order) for which any supporting documentation is claimed as legally privileged based on counsel's work product. Thus, far from being fair, objective and accurate report of the Navy of DOD's responsibility for conditions at Shumaker, it is little more than a litigation document that reflects counsel's biased views of the extent to which any contamination that does exist at the former Shumaker warrants an action under Section 7003 of RCRA, or that such conditions addressed in the Draft 7003 Order are attributable to operations of the Navy. Other than to reiterate its strong disagreements with the findings contained in the HydroGeoLogic report, Highland will not address that report further herein.

In its conclusion, Parsons determines that none of the anomalies it investigated warrant further action for DOD UXO. While Highland generally agrees with this statement as it pertains to UXO *only*, the evidence with regard to the following sites does not support such a finding.

#### Ordnance Disposal Well Areas

Parsons failed to adequately investigate the so-called Ordnance Well disposal areas (which is actually 15 separate wells). Parsons indicated that it was reluctant to dig in the area of the wells because of OE safety concerns (3.1.3 of the EE/CA Scope of Work). When it did not get good signals (magnetic returns) in the suspected disposal area, it concluded that the wells are not a continuing hazard because the materials dumped down the wells were indicated by records to be inert, plaster-filled warheads (9.2.6). These statements are obviously inconsistent. Highland believes that an intrusive investigation (such as excavating the suspected areas with a backhoe) is warranted on at least two or three of the OE disposal well sites to verify that there is no OE present. The Navy's records and statements made by interviewees are very clear about the existence of these disposal wells.

## Squib Disposal Area

The Squib Disposal Area was not recommended for further investigation in the Final EE/CA Workplan. An interviewee told Parsons that defective squibs were incinerated in pits and that all materials were removed from the pits and disposed on off-site as scrap metal. However, since each squib had a small amount of explosive material, it is conceivable that some were propelled out of the pits before reacting. There is no description stating that the area was inspected for signs of OE during the EE/CA.

## Conclusion

In summary, the EE/CA dealt strictly with UXO. Of the 1,474 areas that Parsons excavated, none was characterized as UXO. While this represents only 20% of the total number of anomalies encountered, the statistics are good for declaring the site poses no immediate threat to the public or environment (from Navy-era UXO). However, where there is additional indication that UXO may be present, or where further investigation was discontinued for safety concerns, justification does not exist to declare the area free of UXO or hazards.

With regard to HTRW issues, the USACE has repeatedly designated that portion of Shumaker owned by HIP as a PRP site. The *Management Guidance for the Defense Environmental Restoration Program*, dated 17 March 1998, provides guidance, procedures, and responsibilities for the environmental restoration program at FUDS such as Shumaker. Section T of the guidance addresses PRP sites. The document provides, in part:

1. Responsibilities. PRP sites involve contaminated sites that DOD does not currently own, but on which past DOD activities have resulted in DOD having to determine the extent to which it and other parties may bear responsibility for site contamination and the extent to which response costs under CERCLA should be allocated among involved PRPs.
2. FUDS Policy. Eligible PRP and third-party site (TPS) projects are programmed under the PRP project category. Early in the eligibility evaluation for each PRP and TPS project, the estimated cost of PRP/TPS investigation, preparation, and negotiation shall be compared to the estimated settlement cost of remedial/removal response. In those instances where remedial/removal response costs to be paid by DOD would be less than the cost of PRP/TPS preparation and negotiation, the USACE district must explain why the less costly remedial/removal project is not being recommended.

To Highland's knowledge, this guidance has not been followed at Shumaker and no explanation has been provided with regard to USACE's decision making process at this time. Rather than conduct a fair, objective, and credible analysis of "the extent to which [the DOD] and other parties may bear responsibility for site contamination" at Shumaker, the only efforts by the USACE in this regard involve the efforts of HydroGeoLogic to assist USACE counsel in developing a defense to the Draft 7003 Order. This litigation posturing seems to fall short of the duties imposed on the USACE. That the Navy and DOD bear some responsibility for HTRW contamination that may exist at the former Shumaker is undeniable in light of obvious and overwhelming evidence that activities of the Navy

**Decision Document**  
**Part 3: Responsiveness Summary**

---

over the nearly 20-year period contributed to conditions that may exist at Shumaker today. Accordingly, Highland requests that you provide documentation of the USACE's effort to follow relevant guidance in connection with this site, as well as an explanation of the USACE's failure to accept responsibility for its share of any contamination that is attributable to DOD HTRW activities as is required by applicable guidance.

HIP will continue its review of the USACE's investigation of the former Shumaker NAD, and reserves the right to revise or amend these comments.

Response: As you are aware from previous litigation at the site involving Transitanak, and the Administrative Record that can be found at the Little Rock District office, it is clear that the USACE has undertaken extensive investigation of this FUDS. To my knowledge, the USACE is the only party that has undertaken this type of an extensive evaluation of potential ordnance contamination, and operational history of priority sites in the former Shumaker NAD area. By doing so, we have been able to differentiate and determine DOD operations of this area from those activities by private entities who either owned, operated, or in any manner, utilized the area after the sale of the property by the United States. It is well documented that private entities manufactured, tested, stored or disposed of ordnance or ordnance related materials, that the area was contaminated by private parties with contaminants of concern, and that several of these parties have been cited by regulatory agencies for environmental violations. In my review of your letter, I note that nothing addresses issues of possible past DOD usage or responsibility by any private party at the site.

Our position regarding the operation at the site is well documented and available to the public in the Administrative Record. Additionally, the basis for our position can be found in these public records available to all the parties. We are also always interested in reviewing and making copies of those records that are not in the public record and are held by private parties such as your client. In the event your client desires to provide us with access to its private historical records of the site, this may provide us with a better understanding of the basis for your perspective. We can make arrangements to view and copy these records at your convenience. As I have indicated in past correspondence with you, the only record(s) we do not provide is our internal PRP report which is an attorney work product. However, our letter report reflecting our position is a synopsis of the operational history and is contained in the Administrative Record.

While we acknowledge that there are different interests at the site, the USACE is working under the authority of the FUDS and DERP to remediate sites and contamination that was caused by the Navy-era activities at this site. Funding is provided by the United States for such sites. The program has specific guidance regarding its usage. Funding to remediate contamination that was not caused by the DOD is prohibited. Specifically, see Chapter 4, Potentially Responsible Party Process, Paragraphs 6.22 and 7.4, DERP-FUDS Program Manual (1999). Other policy factors are also cited in that paragraph that preclude utilization of DOD funds to remediate contamination caused by other parties.

With regard to the quotes that you have cited involving the DERP involving our making process, I would refer you to EC-200-3-7, DERP-FUDS Program Manual (1999), Chapter 3, which states that (an excerpt is provided):

7.2.1.4 Potentially Responsible Party, Including Third-Party Sites. PRP projects are those where DOD may share potential CERCLA responsibility for the hazardous condition on the eligible FUDS; TPS projects are those where DOD is found to be wholly or partly responsible for environmental restoration on property that is contaminated wholly or in part by DOD origin from an eligible FUDS, and is not otherwise classified as a DOD active site or FUDS. Early in the eligibility evaluation for each PRP or TPS project, the estimated cost of PRP/TPS investigation, preparation, and negotiation shall be compared to the estimated settlement cost of remedial/removal response. In those instances where remedial/removal response costs to be paid by DOD or the Department of Justice would be less than the cost of PRP/TPS preparation and negotiation, the PRP district must explain why the less costly remediation/removal project is not being recommended. PRPs may include current and former owners or operators and persons who may be accountable for having generated on-site hazardous substances, or were involved in the transport, treatment, or disposal of hazardous substances. Hazardous substances are defined in Section 101(14) of CERCLA, as amended. Other conditions favoring a PRP project proposal include evidence that the containerized HTRW release occurred during DOD usage and receipt of a PRP notification from a regulator. See Chapter 4 for more details.

Coordination of this site has occurred and the USACE position regarding the responsibility of other parties for their contamination is clear. PRP investigatory costs are in accordance with regulations.

### **U.S. Fish and Wildlife Service Comments and Responses**

Following are comments made by the USF&WS in a letter dated September 6, 2002, and the responses provided by the USACE-Tulsa District on May 2, 2003. In August 2002, the USF&WS had been granted a 2-week extension to submit its comments on the Draft Final EE/CA report.

1. Comment: In general, the Service concurs with the USACE regarding actions related to UXO determination and removal from the Shumaker NAD. However, questions remain regarding the nature and extent of chemical contamination that was identified in the site investigation reports. Although the site investigation reports addressed the potential for human risk, there are no discussions regarding environmental risks, and in particular, risks to ecological receptors. The potential for human risk was based on benchmark screening concentrations as well as the potential for exposure pathways. When following the same process for assessing risk to ecological receptors, some of the site investigation reports demonstrate the potential for ecological risk. This was identified primarily by comparing residue data in water, soil, and sediment, to EPA water quality criteria or benchmark screening concentrations for soil and sediment. On-site residues that exceed ecological thresholds do not imply ecological risk, but do suggest that further evaluation is needed to remove uncertainty and refine the risk assessment.

Response: The focused SIs, as documented in the Final SI Reports, dated February 2002, were conducted to evaluate the presence or absence of explosive and/or chemical constituents (“observed release”) that may have resulted from the DOD-era activities at the AOIs, and identify “target receptors” to potential chemical constituents, in accordance with *Guidelines for Performing Site Inspections under CERCLA* (EPA/540-R-92-021). As stated in Chapter 1, Paragraph 1, of the EPA SI guidance, “The objective of an SI is to gather information to support a site decision regarding the need for further Superfund action. The

SI is not a study of the full extent of contamination at a site, or a risk assessment.” Investigations are typically phased to conserve costs and produce optimized data, with each phase building on knowledge developed in the preceding phase. The assessment of environmental and ecological risks from chemical constituent exposure is conducted during a RI/FS-phase project, if needed.

2. Comment: The Service understands that the EE/CA was developed primarily to deal with unexploded ordinances, however, the identification of chemical contamination during the investigation should be further addressed to quantify possible human and environmental risk. The determination of environmental risk is part of the tasks identified in the scope of work in Appendix A of the EE/CA, and is consistent with the process in evaluating the risk of hazardous materials under CERCLA.

Response: The EE/CA conducted at the former Shumaker NAD was focused on characterizing the density and distribution of OE/UXO that resulted from the period of ownership and operation of the site by the DOD. Additionally, the EE/CA analyzes risk management alternatives and recommends feasible OE exposure reduction alternatives for the AOIs. The SIs, as documented in the Final SI Reports, dated February 2002, were conducted to evaluate the presence or absence of explosive and/or chemical constituents (“observed release”) that may have resulted from the DOD-era activities at the AOIs, and identify “target receptors” to potential contamination, in accordance with *Guidance for Performing Site Inspections under CERCLA* (EPA/540-R-92-021). As stated in Chapter 1, paragraph 1, of the EPA SI guidance, “The objective of an SI is to gather information to support a site decision regarding the need for further Superfund action. The SI is not a study of the full extent of contamination at a site or a risk assessment.” The assessment of environmental and ecological risks from chemical constituents exposure is conducted during a RI/FS-phase project, if needed.

3. Comment: The Service would welcome the opportunity to work with the USACE regarding the site investigation reports as it relates to assessing environmental or ecological risk. Identifying the potential risks associated with all contaminants of potential concern (COPC’s) at Shumaker NAD will allow for appropriate management actions to be taken in the future.

Response: The USACE hired Parsons to prepare the SI reports in response to concerns expressed by EPA Region 6 during a Technical Project Planning meeting. An additional consideration was to gather data in response to a threatened RCRA 7003 consent order. At approximately the same time, the USACE hired HydroGeoLogic to prepare a site history and operations study. Based on the work by Parsons and HydroGeoLogic, we now know that private operations are the sole or primary source of contaminants in the industrial park. For more information, consult HydroGeoLogic’s draft letter report on Potentially Responsible Party use of the site, available at <http://www.sw1.usace.army.mil/projmgmt/shumaker.html>. In accordance with federal law, it would be the responsibility of the private operations to address the potential risks associated with COPC’s.

4. Comment: Page ES-2. Section ES-9. Last sentence. Please add “and the environment.” after “. . . to protect the public health and environment.”

Response: The EE/CA is a feasibility study with the primary objective of characterizing the density and distribution of OE/UXO that resulted from the period of ownership and operation of the site by the DOD for the purpose of completing removal actions, if warranted. The EE/CA would have addressed ecological risk in the context of the potential impact associated with proposed removal actions, but the evaluation provides an NDAI recommendation. Based on findings of the site operations and history research conducted for the site, it is the responsibility of post-Navy, private operators to address the potential risks to the environment associated with the COPC's by conducting additional expanded SI or remedial investigation (RI) studies.

5. Comment: Page 1-2. Section 1.3, 1.3.1. Second sentence. The EE/CA should also be designed to reduce risk to the environment, including ecological risks.

Response: Completion of an ecological risk assessment would normally be conducted in the format of an expanded SI or a RI. The EE/CA is a feasibility study with the primary objective of characterizing the density and distribution of OE/UXO that resulted from the period of ownership and operation of the site by the DOD for the purpose of completing removal actions, if warranted. The EE/CA would have addressed ecological risk in the context of the potential impact to the environment associated with proposed removal actions, but the evaluation provides an NDAI recommendation. Again, based on the site operations and history research conducted for the site, it is the responsibility of post-Navy, private operators to address the potential risks to the environment associated with COPC's by conducting additional expanded SI or RI studies.

6. Comment: Page 2-3. Delete "the" from "the World War II."

Response: The wording will be revised in Section 2.3.1, third line, to remove "the."

7. Comment: Page 2-12. Section 2.7.3.12. Site 13 - Squibb Disposal Area. Since the site was used to burn materials and it appears only scrap material was removed, the area should be sampled to determine possible chemical contamination.

Response: The SI field investigation was completed in October 2002 to evaluate the potential presence of explosive residuals and metals from reported Navy-era activities at the Squibb Disposal Area. Findings of the SI will be listed in a Draft SI Report that is anticipated for completion in December 2002.

8. Comment: Page 2-13. Section 2.7.3.14. Site 15 - Production Area Burn Pit. Please state whether soil samples were collected after soil excavation to determine whether COPC's were below levels of concern.

Response: Site 15, the former Production Area Burn Pit was excavated in the early 1980s, long after the government sold the property. Site 15 is owned by Highland Resources, Inc. and is leased to Lockheed-Martin. According to Lockheed-Martin personnel, the uppermost 6 feet of soil and debris were removed prior to construction of the Lockheed-Martin Metals Parts Building. The USACE has no knowledge if soil sampling was conducted by Lockheed-

Martin or Highland Resources, Inc. Since this excavation area is now covered by a structure, the exposure pathway to surface soil is incomplete.

9. Comment: Page 2-13. Section 2.7.5. Final OE RAC Scoring. Please state whether the final RAC scoring is based on the risks of UXO only, or does it include associated chemical contamination. In addition, is the risk based on human health only, or does it also include environmental risks?

Response: There appears to be some misunderstanding because of similar nomenclature used to express very different concepts. A RAC score for ordnance and explosives is quite different from an Environmental Risk Assessment (ERA) and is used differently as well. The RAC is prepared before a site is investigated and before detailed information is available. An ERA is prepared based on detailed information obtained during investigations. A RAC is concerned primarily with human safety, whereas an ERA considers a broader scope of environmental risks.

The RAC score is normally prepared before a site is investigated and uses standardized forms that consider the type of ordnance and the potential accessibility of the ordnance to the public. The forms do not differentiate between potential or confirmed presence of ordnance because they are completed before detailed information is available. The USACE uses the RAC scores as a screening tool to prioritize sites on a national basis so that the highest priority sites can be funded for EE/CAs and investigated first. After detailed investigations are conducted and an EE/CA has been prepared, the RAC scores of a site are no longer relevant.

10. Comment: Page 3-14. Section 3.2. Nature and extent of OE. This section does not address the chemical nature and extent work that was conducted in the site investigation reports for any of the sites. Each section should discuss results of the site investigation studies for each site relative to human health and environmental risk, including possible ecological impacts.

Response: The EE/CA and the SIs are separate, stand-alone reports, and do not represent comparable phases of investigations. The purpose of an SI is to determine the presence of potential contaminants and exposure pathways. The purpose of an EE/CA is to determine the extent of OE and to characterize whether it is OE, OE scrap, OE residual, or UXO. Also, the sites addressed in the two sets of reports differed due to policy issues that precluded follow-up to the SI reports.

11. Comment: Page 3-14. Section 3.2. Nature and extent of OE. Please include nature and extent sections for the remaining nine areas of interest. These sections should also address the site investigation reports, if applicable, and potential human and ecological risks.

Response: The EE/CA conducted at the former Shumaker NAD was focused on characterizing the density and distribution of OE/UXO that resulted from the period of ownership and operation of the site by the DOD. Additionally, the EE/CA analyzes risk management alternatives and recommends feasible OE exposure reduction alternatives for

the AOIs. The OE risk assessment methodology and findings are included in Chapter 4 of the EE/CA report. The SI reports are stand-alone documents that address the potential presence of Navy-era chemical constituents at the AOIs. As stated in the EPA SI guidance (Chapter 1, paragraph 1), “The objective of an SI is to gather information to support a site decision regarding the need for further Superfund action. The SI is not a study of the full extent of contamination at a site, or a risk assessment.”

12. Comment: Page 7-7. Section 7.4.1.3. Compliance with ARARs.

The paragraph states that remedial actions should be protective of human health and the environment. In addition, all potential ARARs should be addressed. However, the document does not address ARARs related to the environment, and more specifically, ecological ARARs related to chemical contamination identified in the site investigation reports.

Response: As explained in the cover letter, the site ownership and operational history investigations indicate that private operations are the sole or primary source of contaminants in HIP. In accordance with federal law, it would be the responsibility of the private operations to undertake whatever action is necessary to protect the public health and the environment.

Section 7.4.1 discusses the ARARs applicable to the OE response actions evaluated for implementation at the former Shumaker NAD site, to address OE risks identified during the site characterization/risk management phases of the project. An evaluation of ecological ARARs related to chemical contamination is not applicable in the EE/CA report. The EE/CA conducted at the former Shumaker NAD was focused on characterizing the density and distribution of OE/UXO that resulted from the period of ownership and operation of the site by the DOD. Additionally, the EE/CA analyzes risk management alternatives and recommends feasible OE exposure reduction alternatives for the AOIs.

13. Comment: Page 7-8. Section 7.4.1.9.

Although it is stated that the UXO is the primary focus of this EE/CA, it is unclear how the chemical contamination and potential risks are going to be addressed in the future. Since DOD related chemical contamination was identified in several of the site investigation reports, the current EE/CA should discuss how human and ecological risks will be addressed.

Response: The statement regarding “DOD related chemical contamination” is incorrect. As explained in the cover letter, the site ownership and operational history investigations indicate that private operations are the sole or primary source of contaminants in HIP. In accordance with federal law, it would be the responsibility of the private operations to undertake whatever action is necessary to protect the public health and the environment.

The EE/CA conducted at the former Shumaker NAD was focused on characterizing the density and distribution of OE/UXO that resulted from the period of ownership and operation of the site by the DOD. Additionally, the EE/CA analyzes risk management alternatives and recommends feasible OE exposure reduction alternatives for the AOIs. The OE risk assessment methodology and findings are included in Chapter 4 of the EE/CA report.

14. Comment: Page 7-8. Section 7.4.1.10.

In referencing compliance with CERCLA, please discuss compliance as it relates to the DOD chemical contamination that has been identified in the SI reports. In addition, what are the requirements of DOD under CERCLA to further quantify and understand chemical risks to human and ecological receptors.

Response: The statement regarding “DOD related chemical contamination” is incorrect. As explained in the cover letter, the site ownership and operational history investigations indicate that private operations are the sole or primary source of contaminants in HIP. In accordance with federal law, it would be the responsibility of the private operations to undertake whatever action is necessary to protect the public health and the environment.

The request to discuss CERCLA compliance as it relates to chemical constituents identified in the SI reports, is not applicable to an EE/CA Report. The EE/CA conducted at the former Shumaker NAD was focused on characterizing the density and distribution of OE/UXO that resulted from the period of ownership and operation of the site by the DOD. Additionally, the EE/CA analyzes risk management alternatives and recommends feasible OE exposure reduction alternatives for the AOIs. As such, the EE/CA does not discuss the human or ecological risks resulting from chemical constituents.

15. Comment: Page 7-25. Table 7.6.

Table 7.6 states there are no chemical specific ARARs, however they have not been addressed and should be noted as such in the table.

Response: Section 7.4.1.9 states “No chemical-specific ARARs or TBCs were identified for the potential response actions that may be applicable at the subject sites because removal of UXO items is the primary concern of this EE/CA” The Table 7.6 listing of no chemical-specific ARARs or TBCs is accurate within the context of the EE/CA report addressing UXO concerns.

16. Comment: Page 9-1. Section 9.2. Recommendations.

It appears that none of the information from the site investigation reports was incorporated into the decision process for recommendations. Since Navy-associated chemical contamination was documented in several of the site investigation reports, it should be addressed in the recommendation section of the EE/CA.

Response: The statement regarding “Navy associated chemical contamination was documented” is an incorrect statement. As explained on the cover sheet, the site ownership and operational history investigations indicate that private operations are the sole or primary source of contaminants in HIP. In accordance with federal law, it would be the responsibility of the private operations to undertake whatever action is necessary to protect public health and the environment.

Available information regarding the presence, density and locations of UXO, complete exposure pathways, and feasible OE response actions were considered in the OE response alternative decision process, documented in the EE/CA report for the former Shumaker NAD site. The EE/CA conducted at the former Shumaker NAD was focused on characterizing the

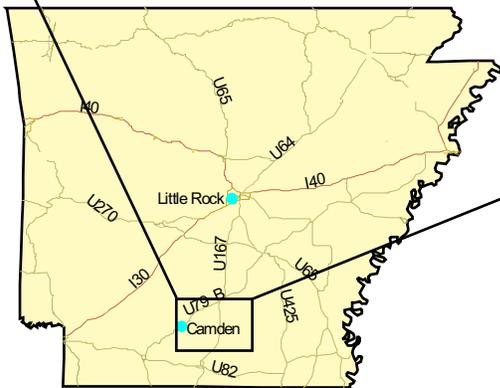
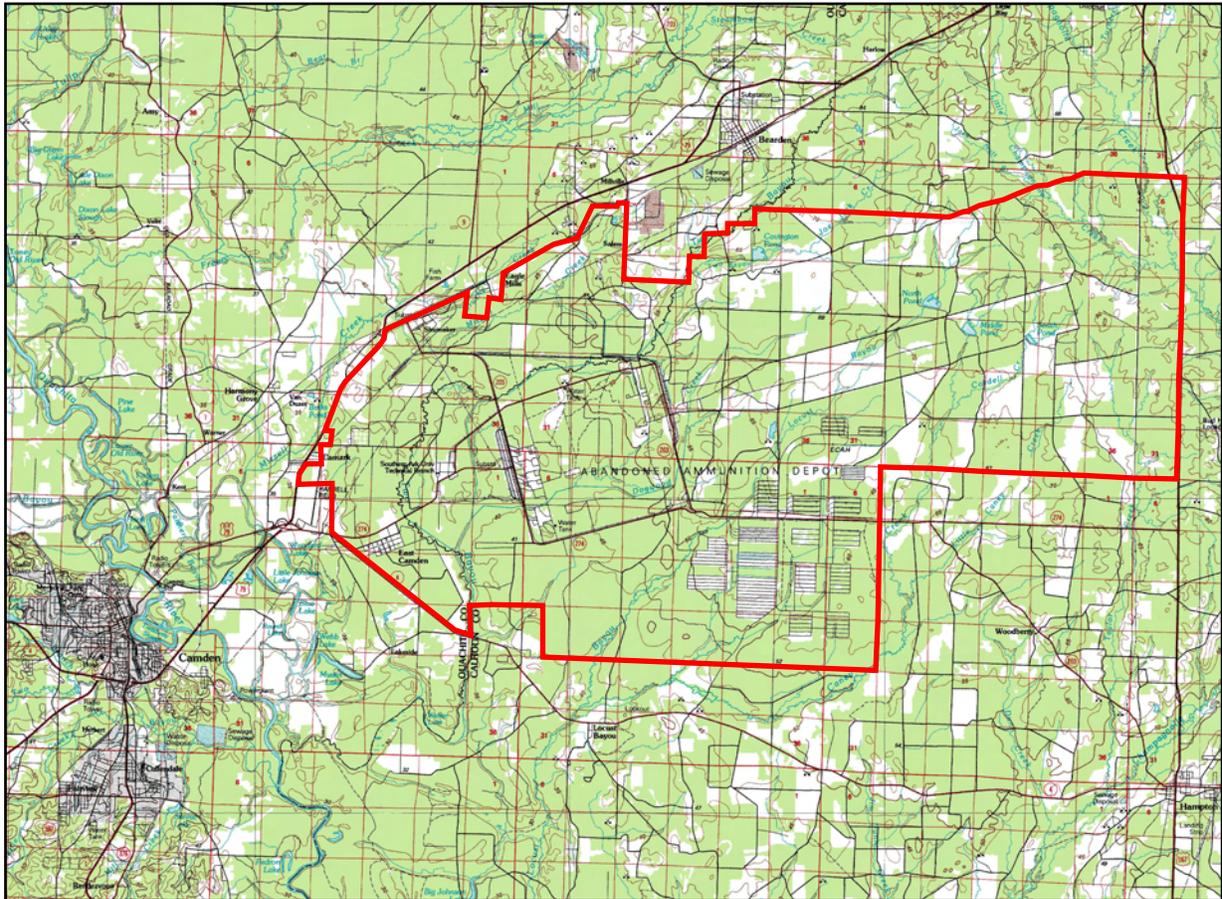
density and distribution of OE/UXO that resulted from the period of ownership and operation of the site by the DOD. The SI reports are stand-alone documents that address the potential presence of Navy-era chemical constituents at the AOIs. As such, the EE/CA does not contain a discussion of chemical constituents.

17. Comment: Page 9-3. Section 9.3.

The phrase “. . . and the environment.” should be added to the end of the sentence “public health.”

Response: It is the responsibility of post-Navy, private operators to address the potential risks to the environment associated with COPC’s, by conducting additional expanded SI or RI studies.

## **FIGURES**



ARKANSAS

Filename: X:\TUL003\DO\_04\  
 Decision\_Document\site\_location.cdr  
 Project: TUL003-004-33  
 Created by: 01/29/01 cfarmer  
 Revised: 11/18/03 cf  
 Source:

**Legend**

 Shumaker NAD  
 Boundary



**Figure 1**  
**Site Location Map**

Figure 2

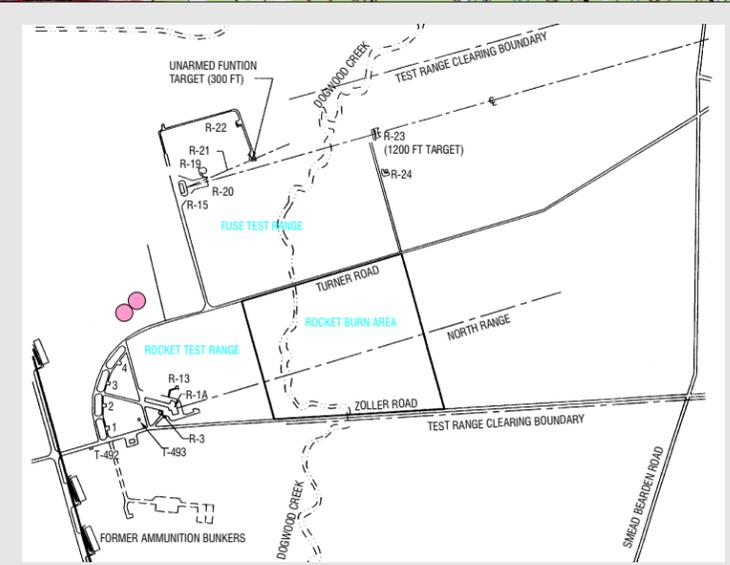
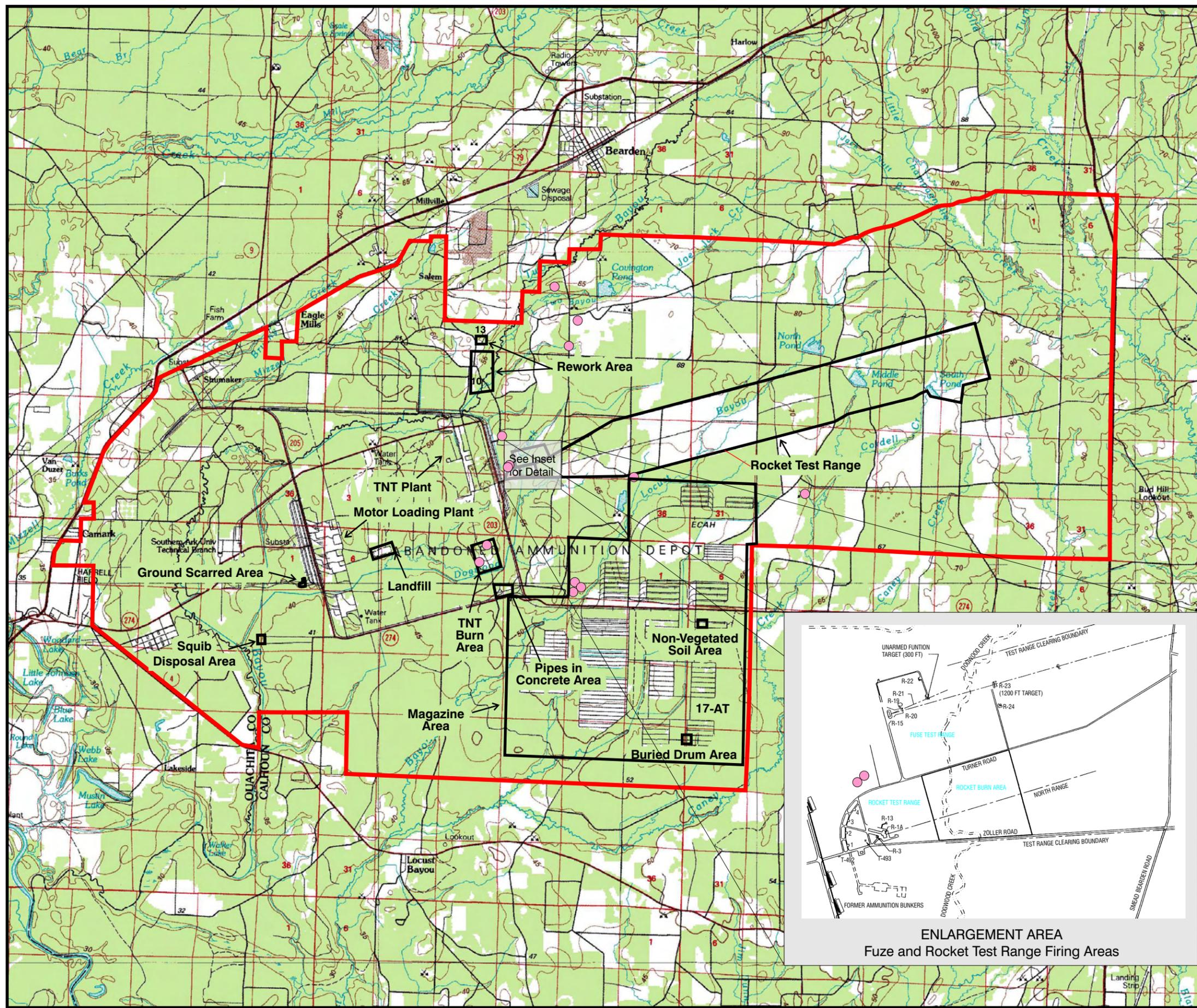
Site Map  
Shumaker NAD  
Camden, Arkansas

U.S. Army Corps of Engineers  
Tulsa District



Legend

-  Shumaker NAD Boundary
-  Boundary of Area of Interest
-  Reported Location of Ordnance Disposal Well



Filename: X:\TUL003\DO\_04\Decision\_Document  
 \Site\_map.cdr  
 Project: TUL003-004-33  
 Created by: 10/12/00 cfarmer  
 Revised: 11/18/03 cf  
 Source: USGS - Camden AR., 1:100,000  
 Topographic Map, 1986; SDCOET 443

Figure 3

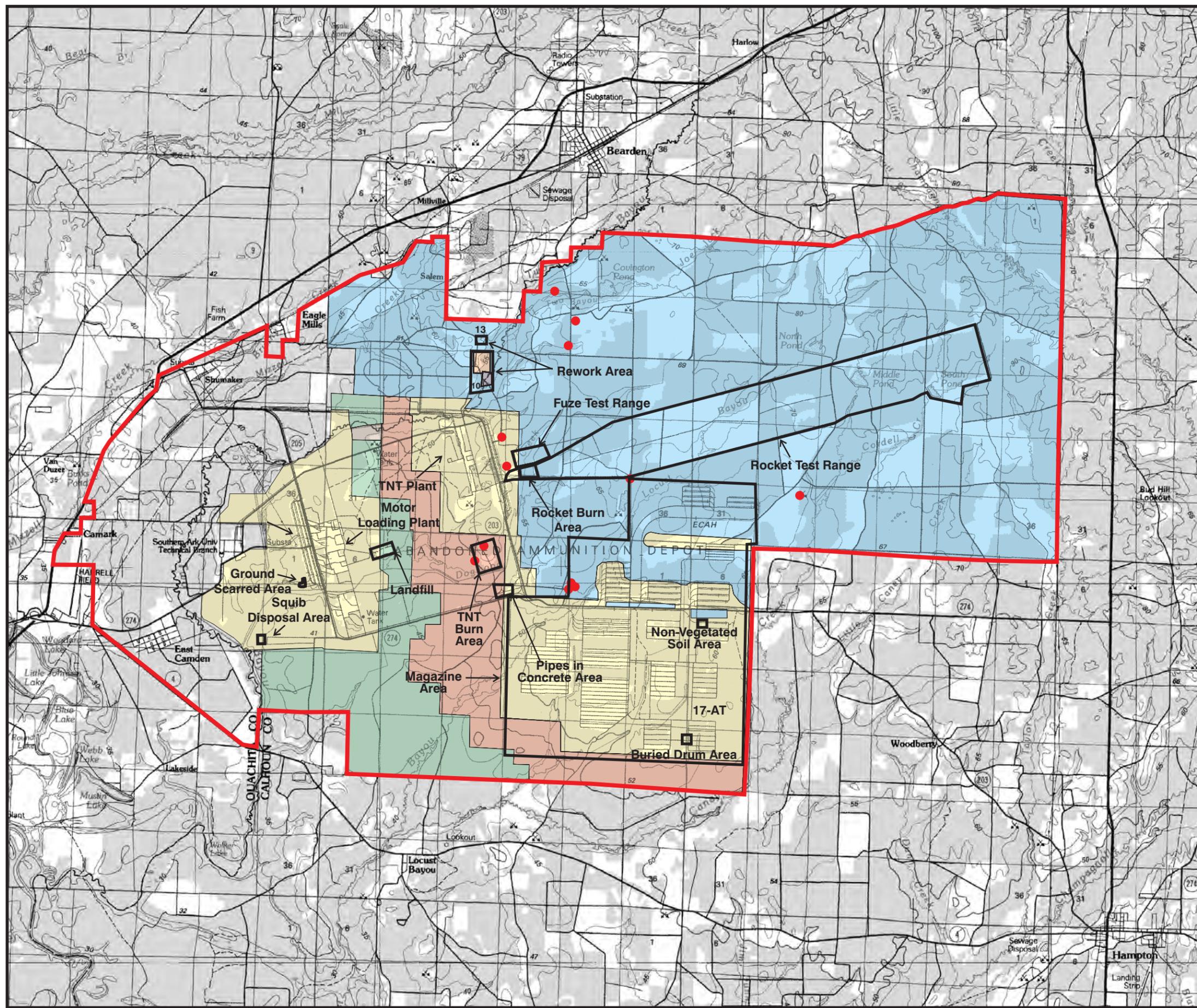
Current Property Owners  
Shumaker NAD  
Camden, Arkansas

U.S. Army Corps of Engineers  
Tulsa District



Legend

- BEI Properties, Inc.
- Highland Industrial Park
- Shumark, L.L.C., et al.
- SP Forests, L.L.C.
- Rex Timber Co.
- Goex, Inc.
- State Board of Vocational Education
- Reported Location of Ordnance Disposal Well
- Shumaker NAD Boundary
- Boundary of Area of Interest



Filename: X:\TUL003\DO\_04\Decision\_Document  
 \prop\_owners.cdr  
 Project: TUL003-004-33  
 Created by: 10/12/00 cfarmer  
 Revised: 11/18/03 cf  
 Source: USGS - Camden AR, 1:100,000  
 Topographic Map, 1986; SDCOET 443