EPA/ROD/R04-97/020
1997

EPA Superfund
Record of Decision:

ALABAMA ARMY AMMUNITION PLANT
EPA ID: AL6210020008
OU 06
CHILDERSBURG, AL
03/27/1997

<IMG SRC 970200>
<IMG SRC 97020A>

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 4
ATLANTA FEDERAL CENTER
100 ALABAMA STREET, S.W.
ATLANTA, GEORGIA 30303-3104

MAR 27 1997

4WD-FFB

Certified Mail
Return Receipt Requested

Mr. Randy Nida
U.S. Army Industrial Operations Command
Building 390, 4th Floor, NW Wing
AMSID-EQE
Rock Island, Illinois 61299-6000

SUBJ: Concurrence with Interim Record of Decision for Operable Unit 6 (Area B),
Study Areas 2, 10, 16, 17 and 22
Alabama Army Ammunition Plant, Childersburg, Alabama

Dear Mr. Nida:

The U.S. Environmental Protection Agency (EPA) Region IV has reviewed the above referenced decision document and concurs with the Interim Record of Decision (IROD) for Operable Unit 6, Study Areas 2, 10, 16, 17, and 22 of Area B, as supported by the Remedial Investigation and Baseline Risk Assessment Reports.

The selected remedy is Alternative 1G in the IROD. EPA concurs with the selected remedy as detailed in the IROD with the following stipulation:

> It is understood that the selected remedy for Area A, Operable Unit 2 may not be the final remedial action to address all media potentially affected by past disposal practices at this unit.

This action is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action and is cost effective.

<IMG SRC 97020B>

cc: Richard Isaac, U.S. Army Environmental Center
Kenneth Gray, U.S. Army Corps of Engineers
C.H. Cox, Alabama Department of Enviromnental Management

INTERIM RECORD OF DECISION BRIEFING
OPERABLE UNIT 6: STUDY AREAS 2, 10, 16, 17, 19, and 22 SOILS, AREA B
ALABAMA ARMY AMMUNITION PLANT

Background

Alabama Army Ammunition Plant (AAAP) is located near Childersburg in Talladega County, Alabama. The main installation was established on 13,233 acres in the Coosa Valley district of the Valley and Ridge physiographic province of central Alabama. Area B comprises 2,700 acres in the western portion of the original property.

AAAP was established in 1941 as a facility producing nitrocellulose, smokeless powder, and nitroaromatic explosives [ie., trinitrotoluene (TNT), dinitrotoluene (DNT), and tetryl]. Operations were terminated and the base placed on standby status in August 1945. Beginning in 1973 several parcels of AAAP have been sold or returned to their original owners, including Area A. Future land use for Area A is expected to be wildlife habitat, hunting grounds, and logging. Area B was retained by the Army pending environmental restoration.

During the 1970s and 80s, the Army's Installation Restoration Program (IRP) conducted studies revealing lead and explosives contamination of AAAP soils. In 1987, AAAP was placed on the NPL. Area B includes the former explosives manufacturing areas. AAAP is presently on the Base Realignment and Closure (BRAC) list slated for sale or lease for economic reuse.

Remedial Investigation and Operable Unit Description

The original Remedial Investigation (RI), completed in 1986 under the IRP, established twenty-one study areas within Area B. As a result of these findings, cleanup activities, consisting of building decontamination and demolition were conducted in 1986-87. 36,400 yd 3 of explosive, asbestos, and lead contaminated soil was excavated and stockpiled for later treatment. An IROD was signed in December, 1991, presenting the selected remedy for the stockpiled soils (OU-1). This remedy consisted of thermal treatment and on-site disposal of explosive contaminated soil, solidification/on-site disposal of lead contaminated soil, and off-site disposal of asbestos-containing media.

The soils of Operable Unit 2, within Area B, were found to contain explosives and metals lead, chromium, and nickel) compounds at levels of concern. Excavation and thermal treatment of these soils were conducted in 1995-96 under an Interim ROD while investigation of the explosives contaminated groundwater continued.

The continuing Remedial Investigation found evidence of explosives and metals contamination in Study Areas 2 (Smokeless Powder Facility), 10 (Tetryl Manufacturing Area), 16 (Flashing Ground), 17 (Propellant Shipping Area), 19 (Lead Remelt Facility), and 22 (Demolition Landfill). These study areas were broken out as a separate Operable Unit (OU-6) for the purpose of remediating the soils while the incinerator is still onsite and while the groundwater investigation continues.

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OPERABLE UNIT 6: STUDY AREAS 2, 10, 16, 17, 19, and 22 SOILS, AREA B
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U.S. ARMY INSTALLATION
RESTORATION PROGRAM

INTERIM RECORD OF DECISION

October 1996

ALABAMA ARMY AMMUNITION PLANT
CHILDERSBURG, ALABAMA
AREA B SOILS, OPERABLE UNIT IV
(STUDY AREAS 2, 10, 16, 17, 19 AND 22)

In accordance with Army Regulation 200-2, this document is intended by the Army to comply with the National Environmental Policy Act (NEPA) of 1969.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ACRONYMS AND ABBREVIATIONS

Ig/g	micrograms per gram
1,3-DNB	1,3-dinitrobenzene
1,3,5-TNB	1,3,5-trinitrobenzene
2,4-DNT	2,4-dinitrotoluene
2,4,6-TNT	2,4,6-trinitrotoluene
2,6-DNT	2,6-dinitrotoluene
AAC	Alabama Administrative Code
ADEM	Alabama Department of Environmental Management
ALAAP	Alabama Army Ammunition Plant
ARAR	Applicable or Relevant and Appropriate Requirement
CAA	Clean Air Act
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
COC	contaminant of concern
COPC	contaminant of potential concern
DOD	Department of Defense
DOT	Department of Transportation
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
ESE	Environmental Science & Engineering, Inc.
5F	degrees Fahrenheit
FS	Feasibility Study
gal	gallon
GOCO	govermnent-owned/contractor-operated
HI	Hazard Index
ICL	Intermediate Cleanup Level
IRP	Installation Restoration Program
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
NC	nitrocellulose
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NEPA	National Environmental Policy Act
NPL	National Priorities List
O&M	Operation and Maintenance
OSHA	Occupational Safety and Health Act
OU	Operable Unit
PAH	Polyaromatic hydrocarbon
ppm	parts per million
RA	Risk Assessment
RCRA	Resource Conservation and Recovery Act
RfD	reference dose values
RI	Remedial Investigation
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
SAIC	Science Applications International Corporation
SARA	Superfund Amendments and Reauthorization Act of 1986
TCLP	toxicity characteristic leaching procedures
Tetryl	2,4,6-trinitrophenylmethylnitramine
TMV	toxicity, mobility or volume
TNT	2,4,6-trinitrotoluene
USACE	U.S. Army Corps of Engineers
USAEC	U.S. Army Environmental Center (formerly USATHAMA)

USATHAMA	U.S. Army Toxic and Hazardous Materials Agency
USC	United States Code
VCP	Vitreous Clay Pipe
WESTON	Roy F. Weston, Inc.
yd 3	cubic yard

DECLARATION OF THE INTERIM RECORD OF DECISION

SITE NAME AND LOCATION

Alabama Army Ammunition Plant
Area B Soils Operable Unit IV - (Study Areas 2, 10, 16, 17, 19 and 22)
P.0. Box 368
Childersburg, AL 35044-0368

STATEMENT OF PURPOSE

This decision document presents the selected remedial action for the explosives- and metals-contaminated soils and sediments in Study Areas 2, 10, 16, 17, 19 and 22 within Area B at the Alabama Army Ammunition Plant (ALAAP), Childersburg, Alabama. This selected remedial action was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), 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).

This interim remedial action is taken to protect human health and the environment from unacceptable risks. This interim remedial action is limited to explosives- and metals-contaminated soils and sediments in Study Areas 2, 10, 16, 17, 19 and 22, herein referred to as the Area B Soils Operable Unit IV. This Interim Record of Decision (ROD) is based on the Administrative Record for this site.

The U.S. Environmental Protection Agency (EPA) and the State of Alabama concur with the selected remedy.

ASSESSMENT OF THE SITE

Actual or threatened releases of hazardous substances from this site, if not addressed by implementing the response action selected in this Interim Record of Decision (ROD), may present an imminent and substantial endangerment to public health, welfare, or the environment.

DESCRIPTION OF THE SELECTED REMEDY

The Area B Soils Operable Unit IV addresses the principal threats from soils and sediments in Study Areas 2, 10, 16, 17, 19, and 22. Each of the study areas is identified as follows:

- Study Area 2: Smokeless Powder Facility
- Study Area 10: Tetryl Manufacturing Area
- Study Area 16: Flashing Ground
- Study Area 17: Propellant Shipping Area
- Study Area 19: Lead Remelt Facility
- Study Area 22: Demolition Landfill

The scope of this Interim ROD is limited to these study areas. Based on the current property use surrounding Area B (hunting, logging and industrial activities) and future potential land use for Area B, the U.S. Army has selected an Industrial Scenario for remediation of Area B.

Remedial investigations and remedial action efforts, property transfers, sales or leases will be restricted to this Industrial Scenario.

The selected remedy for the Area B Soils Operable Unit IV consists of the following:

- Clear, survey, and grid areas; perform soil and sediment sampling and chemical analysis to delineate explosives and metals contamination.
- Use Ground Penetrating Radar (GPR) or test pits to locate suspected burning trenches in Study Areas 16 and 19.
- For contaminated areas (except Study Area 22): excavate soils until excavation criteria are satisfied; transport materials to the TIS-20 site in Area B; treat materials by incineration and/or stabilization until treatment and disposal criteria are satisfied; dispose treated material in the on-site backfill area. Study Area 22 will be addressed using an engineered landfill in accordance with the remedial option identified in the Draft Final Feasibility Study Report dated March 1996, prepared by Science Applications International Corporation.
- If necessary, expand the existing on-site disposal area for final placement of treated materials.
- Decontaminate oversize materials by crushing or shredding and treatment in the TIS-20 or by high-pressure water washing; dispose in the backfill area.
- Treat contaminated process, sampling, and decontamination wastewaters in the TIS-20 aqueous waste treatment system; reuse water for site dust control and process makeup.
- Conduct confirmatory soil and sediment sampling and chemical analysis to ensure that excavation criteria have been satisfied.
- Backfill excavated areas in with uncontaminated borrow soils and rough grade to pre-excavated contours.
- Close the on-site disposal area in accordance with the existing approved permit applications for treated soils ("Treated Soils - Backfill Area Permit Application for the Alabama Army Ammunition Plant", March 1994 and November 1994).
- Test portions of decontaminated concrete slabs or structures to ensure adequate decontamination. If Webster's Reagent is used, there is no numerical quantifiable decontamination criterion. A change of color will indicate that TNT is present at concentrations above 15 Ig/cm 2.

Excavation criteria for contaminated soils and sediments are:

	Excavation Criteria		
Explosives			
1,3-Dinitrobenzene (1,3-DNB)	>	1	ppm
2,4-Dinitrotoluene (2,4-DNT)	>	356	ppm
2,6-Dinitrotoluene (2,6-DNT)	>	356	ppm
Tetryl	>	5,000	ppm
1,3,5-Trinitrobenzene (1,3,5-TNB)	>	36.7	ppm

2,4,6-Trinitrotoluene (TNT)	>	348	ppm
Metals (total)			
Lead	>	400	ppm

Excavation will proceed until excavation criteria are achieved or one of the following is encountered: groundwater, bedrock, foundations or other major subsurface obstructions.

For soils treated in the TIS-20, disposal criteria are as follows:

	Disposal Criteria		
Explosives			
TNT	<	1	ppm
Metals -Toxicity Characteristic Leaching Procedure (TCLP)			
Arsenic	<	5	mg/L
Barium	<	100	mg/L
Cadmium	<	1	mg/L
Chromium	<	5	mg/L
Lead	<	5	mg/L
Mercury	<	0.2	mg/L (4 Ig/g using total metals analytical method)
Silver	<	5	mg/L
Selenium	<	1	mg/L

For soils not treated in the TIS but stabilized, disposal criteria are as follows:

	Disposal Criteria for Stabilized Only Soils		
Explosives			
1,3-Dinitrobenzene (1,3-DNB)	<	1	ppm
2,4-Dinitrotoluene (2,4-DNT)	<	356	ppm
2,6-Dinitrotoluene (2,6-DNT)	<	356	ppm
Tetryl	<	5,000	ppm
1,3,5-Trinitrobenzene (1,3,5-TNB)	<	36.7	ppm
2,4,6-Trinitrotoluene (TNT)	<	348	ppm
Metals (TCLP)			
Arsenic	<	5	mg/L
Barium	<	100	mg/L
Cadmium	<	1	mg/L
Chromium	<	5	mg/L
Lead	<	5	mg/L
Mercury	<	0.2	mg/L (4 Ig/g using total metals analytical method)
Silver	<	5	mg/L

Selenium	<	1	mg/L

Due to the nature of explosives contamination, sampling, excavation, and handling procedures in the field will be dictated by safety considerations as determined by the U.S. Army or its designated explosives expert(s). As such, general remedial actions will be performed in accordance with plans developed by the explosives experts.

STATUTORY DETERMINATIONS

This interim action is protective of human health and the environment, complies with Federal and State requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost-effective. This interim action is intended to fully address the statutory mandate for permanence and treatment to the maximum extent practicable. This action is interim and may not be a permanent solution for contaminated soils in Study Areas 2, 10, 16, 17, 19 and 22 within Area B, and addresses the statutory preference for remedies that employ treatments that reduce toxicity, mobility, or volume as a principal element. Subsequent actions are planned to fully address the threats posed by the conditions in other areas within this operable unit. Because this remedy will result in hazardous substances remaining on-site above residential health-based levels, a review will be conducted by EPA within five years after completion of the remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

DECISION SUMMARY

1.0 SITE NAME, LOCATION, AND DESCRIPTION

Alabama Army Ammunition Plant (ALAAP) is located in Talladega County in east-central Alabama, 40 miles southeast of Birmingham and 70 miles north of Montgomery (Figure 1). The nearest town is Childersburg, which is four miles south of ALAAP. This interim remedial action is limited to explosives- and metals-contaminated soils and sediments in Study Areas 2, 10, 16, 17, 19 and 22, herein referred to as the Area B Soils Operable Unit IV. The Area B boundary and individual Study Areas within Area B are shown in Figure 2. Enlarged portions of Area B showing areas that possess special surface features are provided in Figure 3 (Study Area 10) and Figure 4 (Study Areas 16 and 19). Separate figures for Study Areas 2, 17 and 22 are not included since these areas do not currently possess any special surface features.

1.1 Physiography

ALAAP is located in the Coosa Valley district of the Valley and Ridge physiographic province. The border between the Valley and Ridge province and the Piedmont province is south of ALAAP between Talladega and Tallaseehatchee Creeks.

1.2 Climate

Talladega County's climate is temperate. The weather during fall, winter, and spring is controlled by frontal systems and contrasting air masses. Summer weather, which lasts from May or June until September or October, is almost subtropical because maritime tropical air prevails along the Bermuda high-pressure system.

Average daily temperatures in Talladega County are 75 degrees Fahrenheit (5F) for the high and 505F for the low. Summer high temperatures are commonly 905F or above; occasionally, maximum temperatures exceed 1005F. Temperatures below 325F occur approximately 60 days per year, primarily in December and January.

Mean annual rainfall is 52 inches. The lowest average monthly rainfall (2.2 inches) occurs in October, and the highest average monthly rainfall (6.4 inches) occurs in March. Talladega County has two rainy seasons per year. The winter rainy season is December to April, with the majority of the rain associated with the passage of frontal systems. The summer rainy season is May through September, with the highest rainfall occurring in June and July. Summer rains are normally convective thunderstorms.

1.3 Surface Hydrology

The majority of the surface runoff from ALAAP drains either west or southwest into the Coosa River. A small portion of the southern and eastern side of ALAAP drains toward Talladega Creek, a tributary of the Coosa River. Prior to the construction of ALAAP, the area consisted of farms, woodlands, and wetlands. Much of the eastern half of ALAAP was poorly drained. Small natural drainways were enlarged and rerouted to provide drainage from the various manufacturing operations.

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As shown in Figure 2, two natural drainage systems conveyed surface runoff from ALAAP, west to

the Coosa River. Liquid industrial wastes from the explosives manufacturing operations were conveyed west to the Coosa River by a man-made channel (Red Water Ditch). No natural ponds existed on ALAAP during its operation; however, two large storage lagoons were constructed to retain industrial wastes. Extensive wooded swamp and pond areas have developed in the drainage systems at ALAAP since the beginning of demolition activities in 1973, primarily as a result of damming of drainways by beavers.

The properly is a nonwetland upland area based upon the 1987 Wetlands Delineation Manual.

1.4 Geologic Setting

The bedrock underlying ALAAP has been mapped on a regional scale and has been identified as the undifferentiated Knox group of Upper Cambrian to Lower Ordovician age dolomite. The dolomite underlying ALAAP is thick- to medium-bedded; cherty; and penetrated by numerous cavities, joints, and fractures. The dolomite is overlain by residual soil derived from the weathering process. This soil matrix consists primarily of clay, with some silt, sand, and occasional chert boulders, and varies in thickness from less than 3 feet to more than 80 feet.

1.5 Land Use

ALAAP is currently in an inactive caretaker status with controlled access. The only activity occurring on ALAAP is occasional Army-supervised logging. The land surrounding ALAAP is a mixture of recreational and industrial. ALAAP is bordered on the west side by a country club; on the south by a paper products company; on the east by wooded, private property; and on the north by a water treatment plant. The current and future land use of the ALAAP property in Area A is expected to consist of hunting grounds and occasional logging of wooded areas. Area A was auctioned and conveyed to private buyers in 1990 and is currently used for hunting grounds and occasional logging.

Based on the current property use surrounding Area B (hunting, logging and industrial activities) and future potential land use for Area B, the U.S. Army has selected an Industrial Scenario for remediation of Area B. All remedial investigations and remedial action efforts, property transfers, sales or leases will be restricted to this Industrial Scenario.

1.6 Soils

The soils at ALAAP (Areas A and B) are generally divided into three associations. Soils of the Bodine-Minvale Association are found on the high ground of the eastern portion of ALAAP. This association is composed of deep, well-drained, steep, cherty, medium-textured soils derived from limestone and dolomite. Most of ALAAP is covered by soils of the Decatur-Dewey-Fullerton Association, which are also deep, well-drained, loam soils derived from limestone and dolomite. The soils of the floodplains of Talladega Creek and the Coosa River have been classified as the Chewacla-Chenneby-McQueen Association. These are deep, nearly level, alluvial loam soils that grade from somewhat poorly drained to well drained and are subject to flooding.

These broad-based associations represent agricultural classifications rather than engineering descriptions. Soil constitution at ALAAP may include three associations ranging from soils consisting primarily of sand and silt (with little clay) to soils comprised almost entirely of clay.

1.7 Groundwater

Potable groundwater from the dolomite aquifer of the Coosa Valley supplies the needs of the communities, homes, farms, and industries around ALAAP. The majority of the successful wells

draw water from the solution cracks and cavities in the dolomite. A few wells are completed in the residual soil; however, these wells are less productive than those drilled into the dolomite.

1.8 Ecological System

The environment at ALAAP has been disturbed three times in the past 50 years. Prior to the construction of the facility, the area consisted primarily of cropland and woodland. The first major change occurred during the operational years, when much of ALAAP consisted of maintained industrial areas. In the second major change, the Army instituted a woodland management plan, following closure of manufacturing operations, that extensively modified ALAAP by allowing 3,411 acres of controlled pine forest to be planted. More recently, the third major change occurred as a result of selected remediation of soils on the site and demolition of various areas.

Currently, many of the formerly-maintained drainages, pine plantations, and cleared areas have undergone considerable vegetative overgrowth. Much of the planted pine has been harvested, and reforestation has occurred through natural revegetation. Damming of surface drainages by beavers has modified the systems; drainage has become much slower, and extensive wooded swamp and shallow pond areas have developed. As a result of these changes, the major ecological systems currently consist of the following types: grassland/old field associations, upland pine forests/pine plantations, oak forests, low moist pine woods, hardwood swamps, intermittent streams, shallow ponds, and drainage ditches.

These systems support abundant populations of aquatic and terrestrial organisms. White-tailed deer, introduced in the 1960s, have become particularly abundant, as have certain predators (the red-tailed hawk, the marsh hawk, and the bobcat).

The extensive development of shallow beaver ponds has resulted in large populations of amphibians and aquatic reptiles. The East Beaver Pond provides roosting for waterfowl.

2.0 SITE HISTORY AND ENFORCEMENT ACTIVITIES

ALAAP was established on 13,233 acres of land near the junction of Talladega Creek and the Coosa River. The plant was built in 1941 and operated during World War II (WWII) as a government-owned/contractor-operated (GOCO) facility. ALAAP produced nitrocellulose (NC), single-based smokeless powder, and nitroaromatic explosives (i.e., trinitrotoluene (TNT); dinitrotoluene (DNT); and 2,4,6-trinitrophenylmethylnitramine (tetryl)). Activities at ALAAP included the manufacture of explosives; DNT; and chemicals including sulfuric acid, aniline, N,N-dimethylaniline, and diphenylamine. Spent acids were recycled and wastes resulting from these operations were disposed. In August 1945, operations were terminated at ALAAP, and the plant was converted to standby status.

The plant was maintained in various stages of standby status until the early 1970s. In 1973, the Army declared ALAAP excess to its needs. Since that time, several parcels of the original property were sold or returned to their previous owners. In 1977, a 1,354-acre parcel was sold to Kimberly-Clark, Inc. for construction of a paper products plant. Area A, encompassing 2,714 acres, was auctioned in May 1990. Future land uses for these properties are expected to consist of hunting grounds and wooded areas for occasional logging.

In 1978, the U.S. Army Environmental Center (USAEC) (formerly U.S. Army Toxic and Hazardous Materials Agency (USATHAMA)), managing the Army's Installation Restoration Program (IRP), conducted a records search which concluded that specific areas of the facility were potentially contaminated by explosives and lead compounds. Additional studies at ALAAP confirmed that soils were contaminated with explosives compounds, asbestos, and lead. Several investigations were

conducted between 1981 and 1983 to further defirte contamination. In 1984, ALAAP was proposed for inclusion on the CERCLA (Superfund) National Priorities List (NPL).

A Remedial Investigation/Feasibility Study (RI/FS) under the Department of Defense (DOD) IRP was initiated in 1985 to determine the nature and extent of contamination at ALAAP and the alternatives available to remediate the site. For the purposes of the RI/FS, the facility was divided into two general areas. Area A consisted of the eastern portion of the facility and Area B consisted of the western portion (Figure 2). The initial RI under the IRP confirmed the existence of explosives, asbestos, and lead contamination in the soil in Area A and in the soil, sediment and groundwater in Area B. The RI for Areas A and B was completed in 1986. As a result of the findings of the RI, cleanup activities at Area A were conducted in 1986 and 1987, and included building decontamination and demolition, soil excavation, and stockpiling. Initially, 21,400 yd 3 of contaminated soils were excavated from Area A and stockpiled in Area B in two covered buildings and on a concrete slab that was subsequently covered with a membrane liner. In July 1987, ALAAP was placed on the NPL. The subsequent events related to Areas A and B are presented separately in the following paragraphs.

Area A

In 1990, EPA indicated that additional investigations needed to be conducted at Area A to ensure that no residual contamination remained. Area A was conveyed to private buyers in August 1990, with the provision that additional investigations would be performed.

In 1991, a supplemental RI was conducted to verify the effectiveness of the completed remedial actions in Area A. The supplemental RI determined that soils in Study Areas 12 and D contained lead and explosives at unacceptable concentrations. The supplemental RI/FS, completed in January 1993, concluded that approximately 3,800 yd 3 of lead-contaminated soil in Study Area 12 and approximately 5 yd 3 of explosives-contaminated soil in Study Area D required further remediation. An Interim Record of Decision for the Area A Soil Operable Unit (Study Areas 12 and D) was submitted in April 1994, and was subsequently approved. During the latter half of 1994, Study Area 12 soils (2,179 yd 3) were excavated, stabilized and placed in the on-site backfill area in Area B. TNT-contaminated soils from Study Area D (5 yd 3) were excavated, incinerated in the TIS-20 and placed in the on-site backfill area in Area B.

Area B

In February 1991, a Characterization Study was conducted for the Stockpile Soils excavated from Area A and stored in Area B. The study confirmed that explosives, lead, and asbestos contamination was present above acceptable limits. In March 1991, a tornado demolished one of the two buildings that contained Stockpile Soils. Soils and debris from the demolished building were relocated on the concrete slab and covered with a membrane liner. A Feasibility Study was completed for the Stockpile Soils in October 1991. A Record of Decision for the Stockpile Soils Area Operable Unit was issued in December 1991 and recommended incineration as the preferred alternative. The incineration of Stockpile Soils commenced in May 1994 and ended in August 1994.

Numerous studies have been conducted for study areas within Area B which include: the portion of the Smokeless Powder Facility (Study Area 2) located within Area B; Sanitary Landfill and Lead Facility (Study Area 3); Manhattan Project Area (Study Area 4); Red Water Storage Basin (Study Area 5); Combined TNT Manufacturing Areas (Study Areas 6 and 7); Acid/Organic Manufacturing Area (Study Area 8); Aniline Sludge Basin (Study Area 9); Tetryl Manufacturing Area (Study Area 10); Flashing Ground (Study Area 16); the majority of the Propellant Shipping Facility (Study Area 17); Blending Tower Area (Study Area 18); Lead Remelt Facility (Study Area 19); Rifle Powder Finishing Area (Study Area 20); Red Water Ditch (Study Area 21); Demolition

Landfill (Study Area 22); Storage Battery/Demolition Debris Area (Study Area 25); Crossover Ditch (Study Area 26); and the Beaver Pond Drainage System (Study Area 27).

A supplemental RI/FS for Area B was submitted in March 1992. Based on the FS and other available documents and information, an Interim Record of Decision for the Area B Soils Operable Unit was submitted and approved in November 1994. This Interim ROD addressed contaminated soils in Study Areas 6, 7, and 21, and the Industrial Sewer System (ISS) in Study Areas 6, 7, and 10. Remediation activities for the Area B Soils Operable Unit commenced in late 1994 and continue today.

In 1995, the final Remedial Investigation and Feasibility Study was conducted by Science Applications International Corporation (SAIC). The findings were presented in draft reports in February and March 1996, respectively.

Reports describing studies conducted at ALAAP are contained in the Administrative Record at the Holston Army Ammunition Plant (Kingsport, TN) and the Earle A. Rainwater Memorial Library (Childersburg, AL).

3.0 HIGHLIGHTS OF COMMUNITY PARTICIPATION

A public meeting was held in December 1991 to discuss the issues related to the preferred remedial alternative selected for the Stockpile Soils Area Operable Unit. These soils were subsequently remediated in 1994 using the selected method of on-site rotary kiln incineration.

A separate public comment period (19 September to 19 October 1994) and public meeting (28 September 1994) were held to discuss issues regarding remediation of the Area B Soils Operable Unit (soils in Study Areas 6, 7 and 21, and the Industrial Sewer System in Study Areas 6, 7 and 10). The Interim ROD, including the responsiveness summary, was approved by the U.S. Army and the regulatory agencies in November 1994. The selected remediation method was on-site rotary kiln incineration. Remedial activities for the Area B Soils Operable Unit began in November 1994 and are projected to be completed before the end of 1996.

A public notification for the Area B Soils Operable Unit IV public meeting and public comment period was advertised in four local newspapers, one of which was a major newspaper. The public comment period began on 15 September 1996 and ended on 15 October 1996. Two people attended the public meeting which was held on 8 October 1996 at the Central Alabama Community College. The public appears to have no concerns regarding implementation of Area B Soils Operable Unit IV.

4.0 SCOPE AND ROLE OF OPERABLE UNIT WITHIN SITE STRATEGY

The Area B Soils Operable Unit IV remediation strategy is an interim remedial action for contaminated materials in Study Areas 2, 10, 16, 17, 19 and 22. This interim remedial action will protect human health and the environment from unacceptable risks caused by contaminated soils in Study Areas 2, 10, 16, 17, 19 and 22. To the extent practical, actions associated with this Interim ROD are consistent with the Army's future planned activities at ALAAP.

Remedial investigations, historical records, and recent sampling activities conducted at the site indicate that significant contamination is present in varying degrees in Study Areas 2, 10, 16, 17, 19 and 22. (For example, Study Area 10 is primarily contaminated with tetryl and lead. Study Area 16 is primarily contaminated with explosives. Study Area 19 is contaminated with high concentrations of lead, among other metals, and explosives). Actual or threatened release of hazardous substances from contaminated soils in Study Areas 2, 10, 16, 17, 19 and 22, if not addressed by implementation of the selected remedy, may present a current or potential threat to public health and the environment.

A final Remedial Investigation/Feasibility Study (RI/FS), Risk Assessment (RA), and Record of Decision will be conducted for all of Area B, including soils, sediments, groundwater, and other contaminated media. Ongoing and future investigations by the U.S. Army, as outlined in its Site Management Plan for ALAAP, will determine a final course of action for the Alabama Army Ammunition Plant.

5.0 NATURE AND EXTENT OF CONTAMINATION

The nature and extent of contamination can be better understood by reviewing the history of the activities previously conducted in Study Areas 2, 10, 16, 17, 19 and 22. The results of groundwater and surface water studies are not presented herein, as they are beyond the scope of this Interim ROD. Groundwater at ALAAP will be addressed by the Army as a separate operable unit.

5.1 Description and Past Activities

5.1.1 Study Area 2 - Smokeless Powder Facility

Most of the Smokeless Powder Facility, which covers approximately 3,230,000 sq. ft. (74.2 acres) is located in the GSA Leaseback Area. The Installation Assessment reported that packages of smokeless powder pellets were loaded into fiber boxes for transport and that pellets often were spilled during these operations. The buildings were decontaminated and burned, the equipment was decontaminated and salvaged, and the area has been transferred to Kimberly Clark (Supplemental RI, Environmental Science & Engineering, Inc. (ESE), 1986). Portions of Study Area 2, located within Area B, have not been remediated. During the environmental survey conducted by ESE, zinc and mercury were detected above background levels in groundwater, and 2,4-DNT was detected in sediment and soil samples.

Results of sampling program conducted by SAIC in 1995, indicated high concentrations of 2,4 DNT were present in soil in Study Area 2 located within Area B.

5.1.2 Study Area 10 - Tetryl Manufacturing Area

The Tetryl Manufacturing Area consists of twelve manufacturing lines where tetryl was produced in a two-step process by first sulfonating N-N-dimethylanitine and then nitrating the resulting intermediate.

Extensive amounts of lead were used in the piping, floors, and fittings of the nitrating houses. Lead scrap and melted chunks of lead were abundant in the soil adjacent to most of the nitrating houses in the area. During the Installation Assessment, team members recovered explosive material from the soil surface. The buildings have been razed and rubble spread on both sides of the manufacturing lines. Currently, the concrete foundations of the buildings and the wheeling walk remain. Extensive bulldozing has scattered both friable and Transite asbestos over the area. The underground sewers that transported wastewater during the process operations are still buried at the site. (These vitreous clay pipes (VCPs) are part of the Industrial Sewer System (ISS) and are addressed in the Area B Soils Operable Unit Interim Record of Decision remediation activities.) The wastewater generated from tetryl manufacturing processes was discharged to the Red Water Ditch through a tributary. The current study area covers approximately 4,720,000 sq. ft (108.4 acres).

5.1.3 Study Area 16 - Flashing Ground

The Flashing Ground was used for disposal of smokeless/black powder by open burning. Today, the remaining features include an explosives burning area and two burning pits or trenches. A flume

is located at the end of one burning trench to capture solids generated during washout operations. The burning area trenches and flume are contaminated with explosives and heavy metals, based on past analytical results. Substantial logging of timber has recently occurred in Study Area 16. The current study area covers approximately 719,000 sq. ft (16.5 acres).

5.1.4 Study Area 17 - Propellant Shipping Area

The Propellent Shipping Area is located in the eastern region of Area B extending to the southern border of ALAAP. About one-third of Study Area 17 extends into Area A. There are 48 buildings (Series 229 Buildings), which were used to store smokeless propellant prior to shipment. Thirteen of the 48 shipping buildings are located on the land that was previously sold (Area A). Contamination may have resulted from sweeping debris from the buildings onto the ground and by spills and breaks during the storage and shipping processes.

All 35 shipping buildings located within Area B were spot-tested for the presence of nitrocellulose and nitroaromatic residues. Low levels of nitrocellulose were detected in 84 percent of the samples. All buildings were covered with Transite shingles, but no friable asbestos was found. The current study area covers approximately 5,485,000 sq. ft (125.9 acres).

5.1.5 Study Area 19 - Lead Remelt Facility

Study Area 19 (Lead Remelt Facility) was originally used for flashing explosives. Later, it was used for remelting and recovering lead as part of the demolition activities conducted in former TNT and tetryl production areas. As in Study Area 16, there are two burning pits or trenches. A thick concrete flashing rack barricade and a concrete slab for flashing explosives remain in the area. Stressed vegetation is visible in the area where large lead ingots or slag are found. Study Area 19 is contaminated with heavy metals, primarily lead. Elevated concentrations of explosives are also suspected. The current study area covers approximately 116,000 sq. ft (2.7 acres).

5.1.6 Study Area 22 - Demolition Landfill

The Demolition Landfill is located near the Flashing Ground (Study Area 16), and consists of a semicircular landfill in a swale extending approximately 500 ft along Patrol Road. At this site, rubble from demolition activities was dumped in a 50-ft wide semicircle around the edge of the swale to an average depth of approximately 7 ft. Several hundred pounds of lead were found on the surface at this site in the form of sheets, wire, and pipe. Large amounts of cast iron, stainless steel fittings, aluminum, Transite, and other rubble were partially buried by concrete and earth. Friable asbestos also was distributed in the soil of this area.

Drainage from the Demolition Landfill joins the drainages from Study Areas 16 and 19 and eventually enters Talladega Creek. No surface water bodies are present in Study Area 22. The current study area consists of approximately 77,000 sq. ft (1.8 acres).

5.2 Analytical Data to Date

Over the years, numerous studies have been conducted at ALAAP to delineate the extent of contamination. Among these studies, investigations conducted by ESE and SAIC are considered as the most comprehensive in Area B.

Table 1A presents a summary of analytical data based on site investigations conducted by ESE in 1986 and 1990, and presented in the Supplemental RI/FS of March 1992. Table 1B presents a summary of analytical data based on site investigations conducted by SAIC in 1995, and

presented in the Draft Supplemental RI of February 1996. Data in these tables are separated by study area and medium. Both tables contain frequencies of detection, and mean and maximum concentrations for each contaminant of concern. In addition, a separate sampling program was conducted by WESTON in 1996 to delineate explosives and metals contamination in Study Areas 16 and 19.

The following subsections present important findings of these previous investigations.

5.2.1 Study Area 2 - Smokeless Powder Facility

During an environmental survey conducted by ESE in 1986, zinc and mercury were detected above background levels in groundwater, and 2,4-DNT was detected in sediment and soil samples.

The presence of 2,4-DNT in Study Area 2 was confirmed during the sampling program conducted by SAIC as part of the Supplemental RI. According to the Draft Final RI Report of February 1996, one of the surface samples contained 26,100 ppm of 2,4-DNT.

5.2.2 Study Area 10 - Tetryl Manufacturing Area

The Tetryl Manufacturing Area was studied during the exploratory and confirmatory surveys (ESE, 1981; 1983; 1991). Soil and sediment samples were analyzed for explosives, metals, and leachable lead. During the RI survey (ESE, 1986), groundwater and surface water samples were collected for historical comparison. Soil samples were collected and tested for leachable lead.

Soil contamination was detected where the wastes entered the ISS from surface ditches. The highest tetryl concentrations (20,900 ppm and 18,900 ppm) detected in the Tetryl Manufacturing Area were in the shallow (2 ft and 2.5 ft) soil samples at manholes MH 10-3 and MH 10-1, where the surface ditches entered the vertical clay pipes leading to the base of the manhole structures. The samples collected near the base of the manholes at these locations contained tetryl contamination at lower concentrations.

Low concentrations of TNT were detected in the two sediment samples collected from the surface drainage and at the ISS outfall into the Red Water Ditch. No other contaminants were detected in the sediment samples.

Based on these results, the ISS within the Tetryl Manufacturing Area is contaminated with high concentrations of tetryl. The manhole structures have probably leaked as evidenced by contamination in the soils surrounding the structures. The greatest soil contamination appears to be in the area where the surface ditches enter the ISS.

Table 1A
Concentrations of Contaminants of Potential Concern (COPCs) in Shallow Soil and Sediment in Study Areas 10, 16, 17, 19 and 22 at ALAAP Area B (ESE Sampling Programs, 1986 & 1990)

Study Area	Medium	Analyte	Frequency of Detection	Concentration Detected (ppm)		
				Mean	Maximum	
10	Soil	Tetryl	4/8	4,270	13,700	
		Lead	3/3	901	1,990	
16	Soil	1,3,5-Trinitrobenzene	2/8	2.30	3.92	
		2,4,6-Trinitrotoluene	6/11	0.874	2.35	
		2,4-Dinitrotoluene	4/8	0.919	1.87	
		2,6-Dinitrotoluene	1/8	0.767	0.767	
		Chromium	2/2	3.25	6.13	
		Copper	3/3	954	1,430	
		Nickel	1/1	13.3	13.3	
		Lead	6/6	462	1,890	
	Sediment	Lead	2/2	10.8	10.8	
17	Soil	2,4-Dinitrotoluene	2/20	0.371	0.371	
		Lead	18/19	18.9	29.5	
19	Soil	Chromium	3/3	5.13	5.40	
		Copper	3/3	16.4	29.0	
		Nickel	2/2	7.08	12.0	
		Lead	5/5	5,320	14,700	
22	Soil	Anthracene	1/1	0.18	0.18	
		Benzo(a)anthracene	1/1	1.70	1.70	
		Benzo(a)pyrene	1/1	0.79	0.79	
		Chromium	1/1	38.9	38.9	
		Chrysene	1/1	1.10	1.10	
		Copper	1/1	45.8	45.8	
		Fluoranthene	1/1	1.60	1.60	
		Lead	2/2	1,260	2,160	
		Nickel	1/1	34.5	34.5	
		Pyrene	1/1	1.10	1.10	
		Tetryl	1/2	55.3	55.3	
		Zinc	1/1	393		393

* Soil and sediment data from samples collected 0 to 2 feet below land surface.

Source: Environmental Science & Engineering, Inc.

Table 1B
Concentrations of Contaminants of Concern (COCs) in Soils in Study Areas 2, 10, 17, 19 and 22 at ALAAP Area B (SAIC, Draft Supplemental RI, February 1996)

Study Area	Medium	Analyte	Frequency of Detection	Concentration Detected (ppm) Mean	Maximum
2	Surface Soil 0-1 ft.	2,4-Dinitrotoluene	2/8	3,260	26,100
10	Surface Soil 0-1 ft.	Manganese	3/3	2,090	4,100
17	Surface Soil 0-1 ft.	2,4-Dinitrotoluene	5/7	718	4,000
		Manganese	3/3	1,460	2,400
19	Surface Soil 0-1 ft.	Lead	19/20	2,410	24,000
22	Surface Soil 0-1 ft.	Lead	9/9	1,530	5,020
		Manganese	3/3	891	1,570

Source: Draft Final RI Report, Alabama Army Ammunition Plant Area B Supplemental Remedial Investigation, February 1996, prepared by Science Applications International Corporation (SAIC). Contaminants of Concern from Table 6-55, and Frequencies of Detection and Concentrations from tables in Section 4.

Leachable lead was detected in two of five soil samples taken during the RI survey. The concentrations were 0.02 and 2.3 mg/L, which were below the then-applicable extraction procedure (EP) toxicity criterion of 5 mg/L for lead.

The SAIC Draft Final RI Report (February 1996) indicate that manganese was detected in all 3 samples collected between 0-1 ft depth with a maximum concentration of 4,100 ppm.

5.2.3 Study Area 16 - Flashing Ground

The Flashing Ground was studied during the exploratory and confirmatory surveys (ESE, 1981; 1983; 1991). Soil and sediment samples were analyzed for explosives, metals, and leachable lead. During the RI survey (ESE, 1986), groundwater and surface water samples were also collected for historical comparison. Significant findings include:

1. No contamination was detected in the surface water or sediment samples.

2. As a result of depositing explosives on the ground for flashing and burning, Study Area 16 is contaminated with nitroaromatic residues. Elevated concentrations of lead were also found in the soils in the area.

Based on available analytical results and past activities at the site, the suspected locations of contamination in Study Area 16 are shown in Figure 5.

High levels of 2,4-DNT and TNT were detected during WESTON's sampling program in February-March 1996 with maximum concentrations of 16,000 and 14,000 ppm, respectively. Other detected compounds were 1,3-DNB (2.1 ppm), 1,3,5-TNB (23 ppm), and lead (628 ppm).

5.2.4 Study Area 17 - Propellant Shipping Area

The Propellant Shipping Area was studied during the exploratory and 1986 and 1990 supplemental RI surveys (ESE, 1986, 1990). Soil and groundwater were analyzed for a range of contaminants. Significant findings include:

1. Soil samples contained 2,4-DNT (0.371 ppm), lead (29.5 ppm), and nitrocellulose (131 ppm).

2. The only detectable contaminant found in groundwater was lead (0.002 to 0.012 mg/L). Concentrations were below the then-applicable extraction procedure (EP) toxicity criterion of 5 mg/L for lead.

The SAIC Draft Final RI Report (February 1996) indicates that 2,4-DNT was detected in 5 of 7 samples collected between 0-1 ft depth with a maximum concentration of 4,000 ppm. Manganese was detected in all 3 samples Collected at the same depth with a maximum concentration of 2,400 ppm.

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5.2.5 Study Area 19 - Lead Remelt Facility

The Lead Remelt Facility was studied during the exploratory and confirmatory surveys (ESE, 1981; 1983; 1991). Soil and sediment samples were analyzed for explosives, metals, and leachable lead. During the RI survey (ESE, 1986), groundwater and surface water samples were collected for historical comparison. Significant findings include:

1. No contamination was detected in the surface water or sediment samples.

2. The soils of the Lead Remelt Facility contained high concentrations of lead residues. Numerous large pieces (ingots) of lead remain on the soil surface in this area. A slag pile outside the ALAAP fence contained a lead concentration of 14,700 ppm (approximately 1.5 %). This pile was relocated inside the fence during remedial investigation activities.

3. Leachable lead was detected in all soil samples collected during the RI survey. Concentrations of leachable lead ranged from 0.016 to 7.6 mg/L. The upper limit of the range was higher than the then-applicable extraction procedure (EP) toxicity criterion of 5 mg/L for lead.

Lead ingots in Study Area 19 were sampled on 22 February 1995 during a site tour conducted by the USACE. Samples were obtained from the surface of ingots/slag currently stored to the north of the concrete wall in the old Lead Remelt Facility (Figure 5). The analytical results of this sampling event are presented in Table 2.

As shown in Table 2, Sample #1 contained high concentrations of iron and copper and moderate concentrations of arsenic, chromium, lead, and tin. Sample #2 contained high concentrations of iron and moderate concentrations of arsenic, lead, and copper. Both samples are representative of waste material (i.e., slag or dross on molten metal) produced by lead recovery or remelting operations. The surface of these materials was quite friable, probably due to oxidation of iron. The surrounding soils are discolored and there is a stressed vegetation area within a radius of approximately 100 ft. Based on available analytical results and past activities at the site, the suspected locations of contamination in Study Area 19 are shown in Figure 5.

The SAIC Draft Final RI Report (February 1996) indicates that lead was detected in 19 of 20 samples collected between 0-1 ft depth with a maximum concentration of 24,000 ppm.

Results of the sampling program conducted by WESTON in February-March 1996 indicated the presence of lead at 566 ppm.

5.2.6 Study Area 22 - Demolition Landfill

The Demolition Landfill was examined during the exploratory and 1986 RI studies (ESE). Significant findings include:

1. Soil samples contained total lead with concentrations up to 2,160 ppm. Low concentrations of tetryl, chromium, copper, iron, and nickel were also detected.

Table 2

Analytical Results of Ingots in Study Area 19

Contaminant	Units	Concentration	
		Sample #1	Sample #2
Antimony	ppm	4.9	<0.5
Arsenic	ppm	221	137
Cadmium	ppm	8.24	6.78
Calcium	ppm	112	1,489
Chromium	ppm	159	69.6
Lead	ppm	355	295
Sodium	ppm	<50	69.8
Tin	ppm	196	<100
Copper	%	1.18	0.23
Iron	%	24.9	19.5

Source: WESTON, February 1995.

2. Some polyaromatic hydrocarbons (PAHs) were detected in soil. Mean concentrations ranged from 0.18 ppm for anthracene to 1.7 ppm for benzo(a)anthracene.

The SAIC Draft Final RI Report (February 1996) indicates that lead was detected in all 9 samples collected between 0-1 ft depth with a maximum concentration of 5,020 ppm. Manganese was detected in all 3 samples collected at the same depth with a maximum concentration of 1,570 ppm.

6.0 SUMMARY OF SITE RISKS

The information presented in Section 6.1 (Exposure Assessment) and Section 6.2 (Intermediate Cleanup Levels (ICLs)) is based on the "Supplemental Remedial Investigation/Feasibility Study for Area B, Alabama Army Ammunition Plant, Baseline Risk Assessment", August 1992.

6.1 Exposure Assessment

The human risk assessment (RA) evaluated three primary exposure scenarios for quantitative assessment of the risks associated with potential exposure of the local population within the intended areas to site-related contaminants of concern. Based on the physical and chemical properties of the contaminants identified in Area B, as well as the site-specific geological, hydrogeological, and meteorological conditions, the most significant migration pathway has been determined to be infiltration of soil contaminants to the underlying groundwater.

The following human exposure scenarios have been addressed in the risk assessment:

- Future residential scenario.
- Future industrial scenario.
- Current worker or caretaker scenario.

The primary human exposure routes evaluated for the residential and industrial scenarios in the RA included:

- Exposure to contaminants as a result of ingestion of groundwater contaminated by on-site soils.

- Exposure to contaminants as a result of direct contact (dermal contact and incidental ingestion) with surface soil, surface water, and sediments.

- Exposure to contaminants as a result of inhalation of contaminated dusts.

The main ecological exposure routes evaluated included:

- Exposure of aquatic and terrestrial animals to contaminants as a result of direct contact (dermal contact and incidental ingestion) with surface soil, surface water, sediments, and contaminated food.

- Exposure of terrestrial animals to contaminants as a result of inhalation of contaminated dusts.

Results of the human and ecological RA indicated that the potential noncarcinogenic and carcinogenic adverse impacts to human health and the environment, which are associated with future exposure to several study areas within Area B, range from low to high. These impacts depend on the exposure scenario and the study area being considered. The noncarcinogenic impacts are indicated by a cumulative hazard index (HI) exceeding 1; a carcinogenic risk is posed if the cumulative risk exceeds 1.0E-04.

Although the baseline risk assessment only indicates lead and copper as contaminants of concern based on past site activities, soil characteristics (e.g., Table 1) and recent analyses of ingots in Study Area 19 (Table 2) suggest that there is explosives and metal contamination that must be addressed in Study Areas 2, 10, 16, 17, 19 and 22.

6.2 Intermediate Cleanup Levels (ICLs)

Intermediate Cleanup Levels identified for Area B Soils Operable Unit IV are presented in Table 3. During the ICL selection process, the following soil cleanup levels were considered:

Category (a) ICLs established in the Area B Soils Operable Unit and the Stockpile Soils Area Operable Unit.

Category (b) Preliminary Remediation Goals (PRGs) developed in the Supplemental RI/FS of March 1992 prepared by ESE.

Category (c) Industrial Risk-Based Concentrations developed by the Technical Support Section of EPA Region III, October 1995.

Category (d) Remedial Option Goals (ROGs) developed by SAIC in the Draft Supplemental RI of February 1996. Separate ROGs have been developed in the RI based on noncarcinogenic and carcinogenic health effects.

The ICLs for the contaminants of concern were selected from the above categories based on engineering and scientific judgement using available information.

7.0 DESCRIPTION OF REMEDIAL ALTERNATIVES

Several remedial alternatives were considered during the initial screening stage in the Draft Feasibility Study for Area B submitted in March 1992. The remedial alternatives were grouped according to the type(s) of contaminants. The groups consisted of:

- Metals- and polyaromatic hydrocarbons (PAH)-contaminated soils.
- Explosives-contaminated soils.
- Metals- and explosives-contaminated soils.

Table 3

Intermediate Cleanup Levels (ICLs) for Area B Soils Operable Unit IV

Contaminat	Maximum Concentration in Soil Detected in Study Areas 2, 10, 16, 17, 19 & 22 (ppm)			ICLs Used in Area B Soils OU (d) (ppm)	PRGs From 1992 RA (e) (ppm)	EPA Reg. III Industrial Risk-Based Conc. Oct. 1995 (f) (ppm)	Remedial Option Goals for Industrial Scenario, Draft Supplemental RI, SAIC, 1996 (c)		Selected ICLs (ppm)
	ESE (a) Supplemental RI/FS (1992)	WESTON (b) Areas 16 & 19 (1996)	SAIC (c) Supplemental RI (1996)				Noncarcinogenic Effects (ppm)	Carcinogenic Effects (ppm)	
Benzo(a)anthracene	1.7		91.9		37.1	7.8	12,900	165	165(g)
Benzo(a)pyrene	0.79		131		17.2	0.78	12,900	16.5	16.5(g)
Chrysene	1.1				24.0	780			24(g)
1,3-Dinitrobenzene		2.1		1		200			1
2,4-Dinitrotoluene	1.87	16,000	26,100			8.4 (4,100)(h)	1,730	356 (i)	356 (i)
2,6-Dinitrotoluene	0.77		0.154			8.4 (2,000)(h)	864	356 (i)	356 (i)
Tetryl	13,700			5,000	5,000	20,000			5,000
1,3,5-Trinitrobenzene	3.92	23	3.23			100	36.7	6,500	36.7
2,4,6-Trinitrotoluene	2.35	14,000	49	647	647	190	348		348
Lead	14,700	628	24,000	500	250		2,860		400(j)

Key: (a) Supplemental RI/FS for Study Area B, March 1992, prepared by Environmental Science and Engineering, Inc.
(b) Sampling program conducted by Roy F. Weston, Inc. in Study Areas 16 and 19, February-March 1996.
(c) Draft Final RI Report, Alabama Army Ammunition Plant Area B Supplemental Remedial Investigation, Februay 1996, prepared by Science Applications International Corporation (SAIC).
(d) "Final Interim Record of Decision, Area B Soils Operable Unit (Study Areas 6, 7, 10 and 21), Alabama Army Ammunition Plant, Childersburg, Alabama", November 1994, prepared by Roy F. Weston, Inc.
(e) Preliminary Remediation Goals (PRGs) developed for the Industrial Scenario in the "Supplemental Remedial Investigation/Feasibility Study for Area B, Alabama Army Ammunition Plant, Final Baseline Risk Assessment", August 1992, prepared by Environmental Science and Engineering, Inc.
(f) Risk-Based Concentration Table (Industrial), July-December 1995, prepared by R. L. Smith, Technical Support Section, EPA Region III, Philadelphia, PA, October 20. 1995.
(g) PAHs were only identified in Study Area 22 and will be addressed using an engineered landfill in accordance with the remedial option identified in the Draft Final Feasibility Study Report dated March 1996, prepared by Science Applications International Corporation.
(h) The values within brackets indicate concentrations only if one isomer is present. If both isomers are present, the combined concentration is 8.4 ppm. In most cases, both isomers exist together.
(i) The Human Health Remedial Goal Options for cancer effects is calculated using a cancer slope factor for a mixture of 2,4- and 2,6-Dinitrotoluene. An EPA-approved slope factor is not available for either compound individually.
(j) "Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities", OSWER Directive #9355.4-12, Office of Solid Waste and Emergency Response, U.S. Environmental Protection Agency, Washington DC, July 14, 1994.

After the initial screening, five alternatives (Alternatives 1A, 1C, 1D, 1G, and 1I) were assembled and retained for detailed analysis. The alternatives developed in the FS were for all the Study Areas at ALAAP including Study Areas 2, 10, 16, 17, 19 and 22. The final soil remedial alternatives developed in the FS were as follows:

1A: Stabilization of Metals- and PAH-Contaminated Soils.

1C: Off-Site Disposal of Metals- and PAH-Contaminated Soils.

1D: Incineration of Explosives-Contaminated Soils.

1G: Incineration/Stabilization of Metals- and Explosives-Contaminated Soils.

1I: No Action.

Brief descriptions of the remedial alternatives are presented in Subsections 7.1 through 7.5. Since these general alternatives were developed in the FS for all of the study areas in Area B, some of the components listed in the remedial alternatives are not specifically applicable to this operable unit, nevertheless, they have been included for completeness.

7.1 Alternative 1A: Stabilization of Metals- and Polyaromatic Hydrocarbon (PAH)-Contaminated Soils

Alternative 1A includes site preparation followed by excavation of all metals- and PAH-contaminated soils. Excavated soils would be remediated using the following operations:

1. Staging of soils prior to stabilization.
2. On-site stabilization until TCLP criteria are met.
3. Backfilling stabilized soils into the existing excavation.
4. Landfilling of remaining stabilized material in an off-site hazardous waste landfill.

7.2 Alternative 1C: Off-Site Disposal of Metals- and PAH-Contaminated Soils

Alternative 1C includes site preparation followed by the excavation of metals- and PAH-contaminated soils. Excavated soils would be transported to the Chemical Waste Management hazardous waste landfill facility for disposal.

7.3 Alternative 1D: Incineration of Explosives-Contaminated Soils

Alternative 1D includes site preparation followed by excavation of explosives-contaminated soils. Excavated soils would be remediated using the following operations:

1. Staging of soils prior to incineration.
2. On-site incineration via transportable rotary kiln incinerator.
3. Disposal of incinerated ash in the original excavations.
4. Landfilling of remaining stabilized material in an off-site hazardous waste landfill.

7.4 Alternative 1G: Incineration/Stabilization of Metals- and Explosives-Contaminated Soils

Alternative 1G includes site preparation followed by excavation of explosives- and metals-contaminated soils. Soils contaminated with metals and/or explosives would be remediated using the following operations:

1. Staging of soils prior to incineration and/or stabilization.

2. On-site incineration via transportable rotary kiln incinerator.
3. Stabilization of soil, treated soil and/or flyash until TCLP criteria are met.
4. On-site placement of treated and stabilized material in on-site disposal area.

7.5 Alternative 1I - No Action

The no-action alternative is required to be included as stipulated by CERCLA/SARA as a baseline against which other alternatives can be evaluated. Under this alternative, contaminated soil and sediments would remain in place in the identified study areas. The risks from the contaminants of concern (COCs) would remain. No cost is associated with this alternative.

8.0 SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

8.1 Threshold Criteria

Overall Protection of Human Health and the Environment

Alternative 1I (No Action) would not provide protection to human health or the environment. Alternatives 1A and 1C address only metals- and PAH-contaminated soils. Alternative 1D addresses only explosives-contaminated soils, therefore, the potential risk from leaching lead into groundwater will remain. Alternative 1G provides the most protection to human health and the environment by permanent destruction of all organic contaminants through incineration and through immobilizing metals by stabilization.

Compliance with Applicable or Relevant and Appropriate Requirements (ARARs)

No federal or state chemical-specific ARARs regulate implementation of any of the alternatives. Soils will be remediated according to health-based cleanup levels determined to be protective of human health and the environment. In Alternatives 1A, 1D and 1G, stabilized materials will meet the TCLP criteria for metals. In Alternatives 1D and 1G, incineration win meet <1 ppm for TNT in treated material. Alternative 1I (No Action) would not achieve the remediation levels since contamination would not be removed or destroyed.

The following location-specific ARARs are examined for applicability at ALAAP:

1. Within 100-year floodplain

   - 40 CFR 264. 18(b) - Facility must be designed, constructed, operated, and maintained to avoid washout by a 100-year flood.

2. Within floodplain

   - Executive Order 11988; 40 CFR 6, App. A: Floodplain Management - Requires actions to avoid adverse effects, minimize floodplain destruction, restore and preserve natural and beneficial values, and minimize impact of floods on human safety, health and welfare.

3. Wetlands

   - Executive Order 11990; 40 CFR 6, App. A: Protection of Wetlands - Requires action to avoid adverse impact, minimize potential harm, and preserve and enhance wetlands to the extent possible.

4. Within an area affecting stream or river

- Fish and Wildlife Coordination Act [16 United States Code (USC) 661 et seq.] - Must take action to protect affected fish or wildlife resources, and prohibits diversion, channeling, or other activity that modifies a stream or river and affects fish or wildlife.

5. Critical habitat upon which endangered or threatened species depend

- Endangered Species Act of 1973 (16 USC 1531 et seq.); 50 CFR 402 - Requires action to conserve endangered or threatened species. Must not destroy or adversely modify critical habitat.

However, none of the location-specific ARARs are expected to apply to implementation of any of the alternatives being evaluated since all activities associated with the Area B Soils Operable Unit IV remediation would be conducted in areas located away from sensitive environments (i.e., the river, 100-year floodplain, or critical habitat).

The following action-specific ARARs may apply to implementation of these alternatives, excluding Alternatives 1I (No Action):

1. Clean Air Act (CAA)

- 40 CFR Part 50: National Primary and Secondary Ambient Air Quality Standards - Establishes standards for ambient air quality to protect public health and welfare.

- 40 CFR Part 61: National Emission Standards for Hazardous Air Pollutants - Sets emission standards for designated hazardous pollutants.

2. Resource Conservation and Recovery Act (RCRA)

- 40 CFR Part 261: Identification and Listing of Hazardous Waste - Provides guidelines for classifying wastes as hazardous waste.

- 40 CFR Part 262: Standards Applicable to Generators of Hazardous Waste - Establishes standards for generators of hazardous waste.

- 40 CFR Pail 264: Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities - Establishes minimum national standards which define the acceptable management of hazardous waste for owners and operators of facilities which treat, store, or dispose of hazardous waste.

- 40 CFR Part 266 Subpart H: Standards for Hazardous Waste Burned in Boilers and Industrial Furnaces - Specifies standards for owners and operators of boilers and industrial furnaces burning waste and not operating under interim status.

3. Alabama Administrative Code (AAC)

- Chapters 13-1 through 13-7: Alabama Solid Waste Management Regulations - Establishes minimum criteria for the processing, recycling and disposal of solid wastes and the design, location, and operation of solid waste disposal facilities.

- Chapters 335-3-1 through 335-3-14: Alabama Air Pollution Control Rules and Regulations - Sets emission standards and establishes permitting requirements for air pollutants.

4. Code of Alabama

- Title 22, Chapter 27: Alabama Solid Waste Act - Establishes a statewide program to provide for the safe management of non-hazardous wastes.

- Title 22, Chapter 28: Alabama Air Pollution Control Act of 1971 - Provides for a coordinated statewide program of air pollution prevention, abatement, and control.

- Title 22, Chapter 30: Alabama Hazardous Waste Management and Minimization Act - Establishes a statewide program to provide for the safe management of hazardous wastes, including hazardous waste generation, transportation, and land disposal.

5. Alabama Department of Environmental Management (ADEM)

- Chapter 14-1: Alabama Hazardous Waste Management Regulations-Establishes standards which define the acceptable management of hazardous waste for owners and operators of facilities which treat, store, or dispose of hazardous waste.

8.2 Primary Balancing Criteria

Short-Term Effectiveness

No significant risks to the community, workers, or the environment are expected during the implementation of any of the remedial alternatives. Workers will be provided with appropriate personal protection, and safety procedures will be followed during all phases of the remedial actions. Alternative 1I would present unacceptable risks to human health and the environment since no remediation of the contaminated soils would occur. Therefore, this alternative would not be effective in the short term.

Long-Term Effectiveness and Permanence

Alternatives 1A, 1C, 1D, and 1G would reduce the risk associated with contaminants. Alternatives 1D and 1G would provide a permanent remedy for explosives-contaminated materials by irreversible destruction of organic contaminants via incineration. Alternative 1G will provide additional long-term protection by immobilizing leachable metals, primarily lead, by stabilization. Alternative 1I would not be effective in the long term since the contamination in soil and sediment would remain in place without treatment.

Reduction of Toxicity, Mobility, and Volume (TMV)

The TMV of contaminated materials will be reduced significantly in each of the alternatives, except in Alternative 1I (No Action). Alternatives 1D and 1G would provide more reduction in volume than Alternatives 1A and 1C, since these alternatives provide permanent destruction of explosives-contaminated materials. Alternative 1G would be the most effective since it addresses all types of contaminants in soils. Although some stabilized materials will result in Alternative 1G, the mobility of the contaminants will be significantly reduced. Because the contaminants in soil and sediment would not be destroyed or treated under Alternative 1I, TMV of the contaminants would remain unchanged.

Implementability

All alternatives are easily implementable. The equipment, personnel and technologies associated with each alternative are readily available. No remedial action would be conducted under

Alternative 1I.

Cost

Soil volumes and costs estimated in the FS submitted in March 1992 are not representative of the currently-proposed remedial actions due to changes in the contaminants of concern and ICLs. For example, the costs in the FS are based on remediation of only lead- and copper-contaminated soils in Study Area 2, 10, 16, 17, 19 and 22. However, it is known that elevated concentrations of explosives are present in the soils (especially Study Area 10) which also require remediation.

A sampling program will be conducted prior to the commencement of remediation activities to further delineate the nature and extent of contamination. A remediation estimate will be developed from the volumes of contaminated material greater than ICLs, based on the results of the sampling program. At this time, however, it is possible to compute a unit cost based on the actual expenditures incurred to date associated with the Area B Soils Operable Unit (Study Areas 6, 7 and 21), since the same remediation technologies (excavation, incineration and/or stabilization, on-site backfilling) are used in both operable units. Accordingly, the estimated unit costs for incineration and stabilization are:

Incineration (including project plans, sampling, excavation, backfill of excavated area, feed preparation, incineration, and on-site disposal of treated material) .....$300 to $330 per yd 3

Stabilization (including project plans, sampling, excavation, backfill of excavated area, stabilization, and on-site disposal of treated material).....$100 to $130 per yd 3

Above costs include transportation of contaminated soil from Study Areas 2, 10, 16, 17, 19 and 22 to the incineration/stabilization/disposal process area in Area B currently in use for Area B Soils Operable Unit remediation.

8.3 Modifying Criteria

ADEM/EPA Acceptance

EPA and ADEM have concurred with the choice of Alternative 1G.

Community Acceptance

A public notification for the Area B Soils Operable Unit IV public meeting and public comment period was advertised in four local newspapers, one of which was a major newspaper. The public comment period began on 15 September 1996 and ended on 15 October 1996. Two people attended the public meeting which was held on 8 October 1996 at the Central Alabama Community College. The public appears to have no concerns regarding implementation of Area B Soils Operable Unit IV.

9.0 SELECTED REMEDY AND REMEDIATION GOALS

The complete remedy for the Area B Soils Operable Unit IV consists of Alternative 1G. A brief description of this alternative is as follows:

- Clear, survey, and grid areas; perform soil and sediment sampling and chemical analysis to delineate explosives and metals contamination.

- Use Ground Penetrating Radar (GPR) or test pits to locate suspected burning trenches in Study Areas 16 and 19.

- For contaminated areas (except Study Area 22): excavate soils until excavation criteria are satisfied; transport materials to the TIS-20 site in Area B; treat materials by incineration and/or stabilization until treatment and disposal criteria are satisfied; dispose treated material in the on-site backfill area. Study Area 22 will be addressed using an engineered landfill in accordance with the remedial option identified in the Draft Final Feasibility Study Report dated March 1996, prepared by Science Applications International Corporation.

- If necessary, expand the existing on-site disposal area for final placement of treated materials.

- Decontaminate oversize materials by crushing or shredding and treatment in the TIS-20 or by high-pressure water washing; dispose in the backfill area.

- Treat contaminated process, sampling, and decontamination wastewaters in the TIS-20 aqueous waste treatment system; reuse water for site dust control and process makeup.

- Conduct confirmatory soil and sediment sampling and chemical analysis to ensure that excavation criteria have been satisfied.

- Backfill excavated areas with uncontaminated borrow soils and rough grade to pre-excavated contours.

- Close the on-site disposal area in accordance with the existing approved permit applications for treated soils ("Treated Soils - Backfill Area Permit Application for the Alabama Army Ammunition Plant", March 1994 and November 1994).
- Test portions of decontaminated concrete slabs or structures to ensure adequate decontamination. If Webster's Reagent is used, there is no numerical quantifiable decontamination criterion. A change of color will indicate that TNT is present at concentrations above 15 Ig/cm 2.

9.1 Basis for Selection

Alternative 1G was selected as the most appropriate remedial alternative for soils in Study Areas 2, 10, 16, 17, 19 and 22, because it best addresses explosives and metals (primarily lead) contamination and provides the most effective overall protection to human health and the environment. Incineration is the primary treatment method in Alternative 1G. Numerous other treatment methods (such as composting, biodegradation, etc.) were evaluated in the technology screening stage in the FS. During the technology screening stage, these technologies were eliminated based on their applicability to site-specific circumstances such as effectiveness of the treatment technology to COCs, availability, implementability, etc. A complete discussion of screening of technologies is contained in the Draft Feasibility Study of March 1992.

A cost comparison was performed in the Draft FS for three types of incinerators. They are transportable rotary kiln incineration, slagging rotary kiln incineration, and infrared incineration. The analysis indicated that the cost of incineration using a rotary kiln unit is considerably less than the other two technologies. The TIS-20 incinerator is currently in operation at ALAAP treating explosives- and lead-contaminated soils from Study Areas 6, 7 and 21, and the Industrial Sewer System in Study Areas 6, 7 and 10, as approved in the Area B Soils Operable Unit Interim ROD. The TIS-20 has already processed over 120,000 tons of soils

contaminated with explosives, lead, and other metals at ALAAP. Extensive stack sampling during three mini-burns and the Performance Test demonstrated that the TIS-20 is meeting the reference air concentrations (RACs) for lead and other metals as defined by the Boiler and Industrial Furnace (BIF) regulations. In addition, over 35,000 tons of soils have been stabilized and disposed on-site.

The remediation of Study Areas 2, 10, 16, 17, 19 and 22 is not expected to produce soils with metals concentrations higher than previously demonstrated in the Performance Test. Since the soils in Study Areas 2, 10, 16, 17, 19 and 22 contain the same waste characteristics as the Stockpile Soils Operable Unit and the Area B Soils Operable Unit, and will be sampled prior to treatment, it is appropriate to use rotary kiln incineration as the primary treatment method. In addition to rotary kiln incineration, a soils stabilization process will be conducted, as necessary, prior to on-site disposal of treated materials.

9.2 Remediation Goals

The selected alternative will meet the following remediation goals:

	Excavation Cleanup Goals	
Explosives		
1,3-Dinitrobenzene	> 1	ppm
2,4-Dinitrotoluene (2,4-DNT)	> 356	ppm
2,6-Dinitrotoluene (2,6-DNT)	> 356	ppm
Tetryl	> 5,000	ppm
1,3,5-Trinitrobenzene (1,3,5-TNB)	> 36.7	ppm
2,4,6-Trinitrotoluene (TNT)	> 348	ppm
Metals (total)		
Lead	> 400	ppm

Source: Table 3 of this document (Selected ICLs).

Excavation will proceed until excavation criteria are achieved or one of the following is encountered: groundwater, bedrock, foundations or other major subsurface obstructions.

Water Treatment Criteria

The treatment criteria for wastewaters generated during remediation activities are:

Parameter	Wastewater Treatment Criteria
Flow	< 50 gpm
Temperature	< 905F (April - November) < 605F (December - March)
Explosives	
TNT	< 6.9 Ig/L
1,3,5-TNB	< 7.3 Ig/L
2,4-DNT	< 5.7 Ig/L

Metals	
Arsenic	< 5 mg/L
Barium	< 100 mg/L
Cadmium	< 1 mg/L
Chromium	< 5 mg/L
Lead	< 5 mg/L
Mercury	< 0.2 mg/L
Selenium	< 1 mg/L
Silver	< 5 mg/L
Total Organic Carbon (TOC)	< 50 mg/L
Total Suspended Solids (TSS) 1	< 50 mg/L
Total Dissolved Solids (TDS) 1	< 1000 mg/L
pH	6 - 10

Source: Work Plan for a Transportable Incineration System (TIS) at the Alabama Army Ammunition Plant (AAAP) Stockpile Soils Area Operable Unit, February 1994.

As in the case of the prior remediation of the Stockpile Soils Area Operable Unit and the Area B Soils Operable Unit, the rotary kiln incineration system is a net water consumer. Treated water is only used for process makeup water and site dust control. There is normally no surface water discharge.

1 As directed by USACE, if all limits but TSS and TDS are satisfied, treated water may be used for dust control and treated soil moistening.

Incineration/Backfill Criteria for Treated Soil from Incinerator

Treated soil from the incinerator will be stored until analytical results indicate that the ash satisfies the following treatment criteria for backfill:

	Disposal Criteria		
Explosives (total)			
TNT	< 1	ppm	
Metals (TCLP)			
Arsenic	< 5	mg/L	
Barium	< 100	mg/L	
Cadmium	< 1	mg/L	
Chromium	< 5	mg/L	
Lead	< 5	mg/L	
Mercury	< 0.2	mg/L	(4 Ig/g using total metals analytical method)
Silver	< 5	mg/L	
Selenium	< 1	mg/L	

Source: Work Plan for a Transportable Incineration System (TIS) at the Alabama Army Ammunition Plant (AAAP) Stockpile Soils Area Operable Unit, February 1994.

Treated material failing to meet the TCLP backfill criteria will be stabilized before disposal.

Treated material failing to meet the TNT incineration criterion will be reprocessed.

Stabilization/Backfill Criteria for Stabilized Material

The backfill criteria for stabilized material that is not incinerated will be the excavation cleanup criteria for Explosives and TCLP criteria for RCRA metals, as follows:

Parameter	Disposal Criteria for Stabilized Only Soils
Explosives	
1,3-Dinitrobenzene	< 1 ppm
2,4-Dinitrotoluene (2,4-DNT)	< 356 ppm
2,6-Dinitrotoluene (2,6-DNT)	< 356 ppm
Tetryl	< 5,000 ppm
1,3,5-Trinitrobenzene (1,3,5-TNB)	< 36.7 ppm
2,4,6-Trinitrotoluene (TNT)	< 348 ppm
Metals (TCLP)	
Arsenic	< 5 mg/L
Barium	< 100 mg/L
Cadmium	< 1 mg/L
Chromium	< 5 mg/L
Lead	< 5 mg/L
Mercury	< 0.2 mg/L (4 Ig/g using total metals analytical method)
Silver	< 5 mg/L
Selenium	< 1 mg/L

Source: (A) Metals (TCLP): Work Plan for a Transportable Incineration System (TIS) at the Alabama Army Ammunition Plant (AAAP) Stockpile Soils Area Operable Unit, February 1994.

Decontamination Criteria

Portions (approximately 10 percent) of decontaminated debris and building foundations will be tested to ensure adequate decontamination. If Webster's Reagent is used, there is no numerical quantifiable decontamination criterion. A change of color will indicate that TNT is present at concentrations above 15 Ig/cm 2.

10.0 STATUTORY DETERMINATIONS

The selected remedy (Alternative 1G) satisfies the requirements under Section 121 of CERCLA to:

- Protect human health and the environment.
- Comply with ARARs.

- Be cost-effective.
- Utilize permanent solutions and alternative treatment technologies or resource recovery technologies to the maximum extent practicable.
- Satisfy the preference for treatment as a principal element.

10.1 Protection of Human Health and the Environment

The selected remedy protects human health and the environment through permanent treatment and disposal of treated material.

During the remediation activities, adequate protection will be provided to the community by reducing the short-term risks posed by air emissions from the thermal treatment unit and dust, metals, explosives, and asbestos fibers (if any) potentially generated during material handling activities. In addition, workers will be provided with personal protection equipment during all phases of remediation activities. Area air monitoring programs will be established to monitor ambient and worker exposures and ensure adequate protection.

Long-term protection to human health and the environment will be provided by minimizing residual risk from the contaminants and by reducing or eliminating impacts on the environment.

Controls employed in this alternative are adequate and reliable. The air pollution control system of the incinerator (currently operating on-site) successfully passed its Performance Test in June 1994 and yielded stack emissions in accordance with regulatory limits, protecting workers and the community from risks associated with inhalation. There are no unacceptable short-term or long-term impacts on human health or the environment in this alternative.

10.2 Compliance with Applicable or Relevant and Appropriate Requirements

The selected alternative (Alternative 1G) complies with all ARARs. All the COCs in explosives- and metals-contaminated soils of Study Areas 2, 10, 16, 17, 19 and 22 within the Area B Soil Operable Unit IV are expected to meet required regulatory treatment and disposal standards.

No Federal or state chemical-specific ARARs prevent implementation of the selected alternative. Soils will be remediated based on health-based cleanup levels determined to be protective to human health and the environment. Lead-contaminated soils will be remediated to achieve the health-based total lead concentration of < 400 mg/kg (Selected ICL for lead from Table 3). Soils contaminated with TNT will be remediated to achieve the health-based soil TNT concentration of < 348 mg/kg (based on the resultant risk for adult residents and the contributing hazard index (HI) due to exposure concentration for child residents). Similarly, soils contaminated with tetryl will be remediated to achieve the health-based soil tetryl concentration of < 5,000 mg/kg.

No location-specific ARARs prevent the use of the selected alternative. All activities associated with implementation of this alternative will be conducted away from sensitive environments (i.e., river or 100-year floodplain).

The following action-specific ARARs will be met with implementation of this alternative:

- Incinerator ash will be routinely tested for destruction of explosives, as required by RCRA (40 CFR Part 264; Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities) and the State of Alabama (Alabama Administrative Code Chapter 335-14-5.15(4)(a)l: Performance Standards for

Incinerators).

- TCLP extract analysis on incinerator ash will be performed to ensure that metals concentrations meet RCRA guidelines for arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver (40 CFR Part 264; Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities). Incinerator ash that does not pass TCLP will be stabilized prior to disposal.

- Incinerator ash and stabilized material (if required) will be disposed on-site in Area B in accordance with RCRA (40 CFR Part 264; Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities) and the State of Alabama (Code of Alabama, Title 22, Chapter 27; Alabama Solid Waste Act and Alabama Administrative Code Chapters 13-1 through 13-7; Alabama Solid Waste Management Regulations).

- Workers will be provided with personal protection equipment during all phases of the selected remedy, in compliance with the Occupational Safety and Health Act (OSHA) (29 USC ss. 651-678). Adequate protection will be provided to the community by reducing risks posed by air emissions from the thermal treatment unit and reducing dust potentially generated during material excavation and handling activities.

- Portions of the decontaminated concrete slabs and structures in Study Areas 2, 10, 16, 17, 19 and 22 will be tested to ensure adequate decontamination. Decontaminated debris will be disposed on-site in Area B in accordance with State of Alabama regulations (Code of Alabama, Title 22, Chapter 27: Alabama Solid Waste Act and Alabama Administrative Code Chapters 13-1 through 13-7: Alabama Solid Waste Management Regulations).

10.3 Cost-Effectiveness

Based on a cost comparison study conducted during the Draft FS of March 1992, transportable rotary kiln incineration was determined to provide overall effectiveness proportionate to its costs, compared to other types of incinerators. This alternative takes advantage of the special equipment, operators, site preparation, thermal treatment system, and regulatory approvals already in place for the treatment of soils and debris from the Stockpile Soils Area Operable Unit and the Area B Soils Operable Unit.

10.4 Utilization of Permanent Solutions and Alternative Treatment Technologies or Resource Recovery Technologies to the Maximum Extent Practicable

The selected remedy (Alternative 1G) meets the statutory requirements to utilize permanent solutions and treatment technologies to the maximum extent practicable to achieve remediation goals. The rationale for selecting this remedy is based on the comparative analysis of the evaluation criteria. The criteria used in selecting the remedy include:

- Long-Term Effectiveness and Permanence: The selected remedy employs destruction of explosives-contaminated materials and stabilization of metals-contaminated materials. All treated materials will be disposed on-site by expanding the existing disposal area.

- Short-Term Effectiveness: The selected remedy does not involve off-site transportation of contaminated soils, thereby eliminating the risks due to spillage and fugitive emissions. The community, workers, and the environment will be protected during remedial actions by implementing appropriate protective measures.

- Implementability: No waiting period is involved for implementation of the selected remedy. An incinerator and a stabilization plant are currently approved by the regulatory agencies and are operating on-site treating soils of the Area B Soils Operable Unit which have similar characteristics as the contaminated soils in the Area B Soils Operable Unit IV.

- Cost: Transportable rotary kiln incineration is considerably less costly than other types of incineration. Since an incinerator is currently on-site, treating soils with similar characteristics, costs for activities such as regulatory approvals, mobilization/demobilization, etc. will be minimal for incineration of soils.

10.5 Preference for Treatment as a Principal Element

The selected interim action utilizes treatment for the explosives- and metals-contaminated soils in Study Areas 2, 10, 16, 17, 19 and 22 within the Area B Soils Operable Unit IV. Any additional required actions for Study Areas 2, 10, 16, 17, 19 and 22 will be addressed in the final Decision Document for the soils of Area B.

RESPONSIVENESS SUMMARY

1.0 OVERVIEW

The public reaction to the selected remedy is mainly acceptance. No concerns were received from the public during the public meeting. The public appears to have no substantive concerns regarding implementation of the selected remedy. Continued community relations activities will be held to maintain public awareness of the status of remedial activities at ALAAP.

2.0 BACKGROUND ON COMMUNITY INVOLVEMENT

General community interest in the ALAAP site has historically not been great. Since the site was declared excess to the Army needs in 1973, interest has generally come from private groups or industry interested in developing portions of the site. The southern part of the site (i.e., the former nitrocellulose manufacturing area) was sold to the Kimberly Clark Corporation in the late 1970's, and a paper products plant was constructed. In the mid-1980's, in response to interest in purchasing the eastern part of ALAAP (Area A), this section was remediated by the Army and the contaminated soil was stockpiled in the western part of ALAAP (Area B), creating the Stockpile Soils Area Operable Unit (OU). A ROD for treatment (i.e., incineration followed by solidification/stabilization, if required) of the Stockpile Soils Area OU has been signed and implemented.

Post-excavation sampling was performed to verify the remediation efforts within Area A and two sites (Study Area 12 and D) were subsequently identified as containing contamination above acceptable levels. A final ROD for treatment (i.e., excavation followed by stabilization) of the Area A OU was issued in April 1994, and has been subsequently implemented.

A supplemental RI/FS for Area B, prepared in March 1992, identified tetryl, lead and TNT contamination in the old manufacturing areas. An interim final ROD for the treatment of the Area B Soils OU (for Study Areas 6, 7, 10 and 21) was issued in August 1994 and is being implemented. A separate interim ROD was issued in October 1996 for the Area B Soils Operable Unit IV, which includes the treatment of contaminated soils and sediments in Study Areas 2, 10, 16, 17, 19 and 22. Notice for the public comment period and public meeting for the Area B Soils Operable Unit IV was placed in three local newspapers on 15 September 1996, and in one local newspaper on 17 September 1996. The public comment period extended until 15 October 1996. A public meeting was held on 8 October 1996 at the Central Alabama College. No public comments were received.

3.0 SUMMARY OF PUBLIC COMMENT AND AGENCY RESPONSES

Comments from Public Meeting

At the public meeting held on 8 October 1996, the public was given the opportunity to comment and ask questions about the selected remedy (Alternative 1G). No questions/comments were raised by the public.

4.0 REMAINING CONCERNS

The public appears to have no substantive concerns about the implementation of the selected remedy.

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