LONGHORN ARMY AMMUNITION PLANT

KARNACK, TEXAS

ADMINISTRATIVE RECORD

VOLUME 11 of 13

1994

Bate Stamp Numbers
011466 - 011561

Prepared for:

Department of the Army
Longhorn Army Ammunition Plant
Marshall, Texas 75671-1059

1995

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Q. Title: Brochure - Overview Of The Installation Restoration Program At Longhorn Army Ammunition Plant
Group(s): 1, 2, and 3
Site(s): LHAAP-1 Inert Burning Ground
LHAAP-11 Suspected TNT Burial Site At Avenues P & Q
LHAAP-12 Active Landfill
LHAAP-13 Suspected TNT Burial Site Between Old And Active Landfill
LHAAP-14 Area 54 Burial Ground
LHAAP-16 Old Landfill
LHAAP-17 No. 2 Flashing Area / Burning Ground
LHAAP-18 & LHAAP-24 Burning Ground / Washout Pond & Evaporation Pond
LHAAP-27 South Test Area
LHAAP-29 Former TNT Production Area
LHAAP-32 Former TNT Waste Disposal Plant
Location: Longhorn Army Ammunition Plant, Marshall, Texas
Agency: U.S. Army, Longhorn Army Ammunition Plant
Author(s): Lawrence J. Sowa, Lieutenant Colonel, U.S. Army Commander
Recipient: U.S. Public
Date: September 11, 1994
Bate Stamp: 011466 - 011496

R. Title: Fact Sheet - Longhorn Army Ammunition Plant Burning Ground No. 3
Group(s): Early Interim Action At Burning Ground No. 3
Site(s): LHAAP-18 & LHAAP-24 Burning Ground / Washout Pond & Unlined Evaporation Pond
Location: Longhorn Army Ammunition Plant, Marshall, Texas
Agency: U. S. Army Corps Of Engineers
Author(s): Mr. David Tolbert, Environmental Protection Specialist.
Recipient: U.S. Public
Date: September 11, 1994
Bate Stamp: 011497 - 011504

S. Title: Proposed Plan Of Action - Longhorn Army Ammunition Plant Burning Ground No. 3
Group(s): Early Interim Action At Burning Ground No. 3
Site(s): LHAAP-18 & LHAAP-24 Burning Ground / Washout Pond & Unlined Evaporation Pond
Location: Longhorn Army Ammunition Plant, Marshall, Texas
Agency: U. S. Army Corps Of Engineers
Author(s): Mr. David Tolbert, Environmental Protection Specialist.
Recipient: U.S. Public
Date: September 11, 1994
Bate Stamp: 011505 - 011537

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T. Title: Letter - Subject: Final Chemical Data Acquisition Plan Addendum For The RI Sites 11, 1, xx, 27 (Group #1)
Group(s): 1
Site(s): LHAAP-1 Inert Burning Grounds
LHAAP-11 Suspected TNT Burial Site At Avenues P & Q
LHAAP-27 South Test Area
LHAAP-54 or LHAAP-XX Ground Signal Test Area
Location: Longhorn Army Ammunition Plant, Marshall, Texas
Agency: Department Of The Army, Longhorn Army Ammunition Plant
Author(s): Lawrence J. Sowa, Lieutenant Colonel, U.S. Army
Recipient: Lisa Marie Price, Environmental Protection Agency
Date: September 12, 1994
Bate Stamp: 011538

U. Title: Letter - Subject: Final Phase II Workplan For 125 Waste Rack Sumps And 20 Waste Rack Sumps
Group(s): 4
Site(s): LHAAP-35 Process Wastewater Sumps - Various
LHAAP-36 Explosive Waste Pads
Location: Longhorn Army Ammunition Plant, Marshall, Texas
Agency: Department Of The Army, Longhorn Army Ammunition Plant
Author(s): Lawrence J. Sowa, Lieutenant Colonel, U.S. Army
Recipient: Lisa Marie Price, Environmental Protection Agency
Date: September 12, 1994
Bate Stamp: 011539

V. Title: Letter - Subject:EPA's Comments On Draft RI / FS For Sites No. 13 & 14
Group(s): 3
Site(s): LHAAP-13 Suspected TNT Burial Site Between Active And Old Landfills
LHAAP-14 Area 54 Burial Ground
Location: Longhorn Army Ammunition Plant, Marshall, Texas
Agency: Environmental Protection Agency
Author(s): Lisa Marie Price, Environmental Protection Agency
Recipient: David Tolbert, Longhorn Army Ammunition Plant
Date: September 12, 1994
Bate Stamp: 011540 - 011545

W. Title: Public Notice - Longhorn Army Ammunition Plant Notice Of Public Meeting On Proposed Treatment Area For Burning Ground No. 3 Longhorn Army Ammunition

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		Plant Notice Published In News Messenger
	Group(s):	Early Interim Action At Burning Ground No. 3
	Site(s):	LHAAP-18 & LHAAP-24 Burning Ground / Washout Pond & Unlined Evaporation Pond
	Location:	Karnack High School
	Agency:	U. S. Army Corps Of Engineers
	Author(s):	U. S. Army Corps Of Engineers
	Recipient:	U.S. Public
	Date:	September 15, 1994
	Bate Stamp:	011546 - 011553
X.	Title:	Letter - Subject: TNRCC's Comments On Draft RI / FS For Sites No. 13 & 14
	Group(s):	3
	Site(s):	LHAAP-13 Suspected TNT Burial Site Between Active And Old Landfills LHAAP-14 Area 54 Burial Ground
	Location:	Longhorn Army Ammunition Plant, Marshall, Texas
	Agency:	Texas Water Commission
	Author(s):	Michael A. Moore, Superfund Investigation Section
	Recipient:	David Tolbert, Longhorn Army Ammunition Plant
	Date:	September 19, 1994
	Bate Stamp:	011554 - 011557
Y.	Title:	Letter - Subject: TNRCC's Approval Of Work Plan Addendum For Soil And Ground water Background Concentration Study
	Group(s):	1,2, And 4
	Site(s):	LHAAP-1 Inert Burning Grounds LHAAP-11 Suspected TNT Burial Site At Avenues P & Q LHAAP-12 Activ e Landfill LHAAP-16 Old Landfill LHAAP-17 No. 2 Flashing Area /Burning Ground LHAAP-18 & LHAAP-24 Burning Ground / Washout Pond & Evaporation Pond LHAAP-27 South Test Area LHAAP-29 Former TNT Production Area LHAAP-32 Former TNT Disposal Plant LHAAP-54 or LHAAP-XX Ground Signal Test Area LHAAP-35 Process Wastewater Sumps
	Location:	Longhorn Army Ammunition Plant, Marshall, Texas
	Agency:	Environmental Protection Agency
	Author(s):	Ms. Lisa M. Price, Environmental Protection Agency
	Recipient:	Mr. David Tolbert, Longhorn Army Ammunition Plant

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Date: September 20, 1994
Bate Stamp: 011558 - 011560

Z. **Title:** Letter - Subject: TNRCC's Approval Of Work Plan Addendum For Soil And Ground Water Background Concentration Study
Group(s): 4
Site(s): LHAAP-35 Process Wastewater Sumps - Various
LHAAP-36 Explosive Waste Pads
Location: Longhorn Army Ammunition Plant, Marshall, Texas
Agency: Texas Water Commission
Author(s): Mr Michael Moore, Superfund Investigation Section Pollution Cleanup Division
Recipient: Mr David Tolbert, Longhorn Army Ammunition Plant
Date: September 20, 1994
Bate Stamp: 011561

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WELCOME

On behalf of the Longhorn Army Ammunition Plant (LHAAP), this package is presented to give an overview of the Installation Restoration Program at LHAAP.

If you have any questions after the meeting, please contact our Environmental Office at LHAAP. The points of contact are Mr. Ira Nathen or Mr. David Tolbert (903) 679-2728.

LAWERENCE J. SOWA
Lieutenant Colonel, U.S. Army
Commander

LONGHORN ARMY AMMUNITION PLANT (LHAAP)

SITE DESCRIPTION AND HISTORY

SITE DESCRIPTION:

Longhorn Army Ammunition Plant (LHAAP) is owned by the federal government and operated by Thikol Corporation. LHAAP is located in central east Texas, approximately 14 miles northeast of Marshall, Texas, and approximately 40 miles west of Shreveport, Louisiana. The installation occupies 8,493 acres.

SITE HISTORY:

LHAAP was established in October 1942 with the primary mission of producing 2,4,6-trinitrotoluene (2,4,6-TNT) flake. Production of TNT continued through World War II until August 1945 when the plant went on standby status until February 1952. From 1952 until 1956, LHAAP produced pyrotechnic ammunition such as photoflash bombs, simulators, hand signals, and tracers for 40mm.

In November 1955, LHAAP began operation of rocket motor facility. Production of rocket motors continued to be the primary mission of LHAAP until 1965, when the production of pyrotechnic and illuminating ammunition was reestablished.

Current operations consist of compounding pyrotechnic and propellant mixtures, accomodating receipt and shipment of containerized cargo, and the maintenance and/or layaway of standby facilities and equipment as they apply to mobilization planning. The installation has also been responsible for the static firing and elimination of Pershing I and II rocket motors in compliance with the Intermediate-Range Nuclear Force (INF) Treaty in effect between the United States and the former U.S.S.R.

ENVIRONMENTAL RESTORATION:

LHAAP was placed on the National Priorities List (NPL) on 30 August 1990. After being listed on the NPL, LHAAP, the Environmental Protection Agency (EPA), and the Texas Natural Resource Conservation Commission (TNRCC) - formerly known as the Texas Water Commission (TWC) - enter into a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 120 Agreement for remedial activities at LHAAP. The CERCLA

Section 120 Agreement, referred to as the Federal Facility Agreement (FFA), became effective on 30 December 1991. The FFA specified that remedial activities would be conducted at 13 areas on LHAAP following CERCLA guidelines. Bellow is the list of the 13 areas:

LHAAP No.	Area Name
1	Inert Burning Ground
11	Suspected TNT Burial Site at Avenue P and Q
12	Active Landfill
13	Suspected TNT Burial Site Between Old and Active Landfill/Acid Dump
14	Area 54 Burial Ground
16	Old Landfill
17	Burning Ground No. 2/Flashing Area
18 & 24	Burning Ground No. 3 and Unlined Evaporation Pond/Rocket Motor Washout Lagoon
27	South Test Area
29	Former TNT Production Area
32	Former TNT Disposal Area
XX	Ground Signal Test Area

The FFA requires a Remedial Investigation/Feasibility Study (RI/FS) Work Plan and an RI/FS to ensure that environmental impacts associated with past and present activities at the LHAAP are thoroughly investigated and an appropriate remedial action is selected to protect the public health, welfare, and the environment.

CURRENT STATUS:

The Environmental Restoration Program at LHAAP marked a milestone in June 1992 with the completion of the RI/FS Work Plan. By August 1993, all Phase I (Initial Field Investigation) Field Work was completed for all 13 concern areas. Based on the results of Phase I, U.S. Army, EPA, and TNRCC agreed on the following action:

* No further action on LHAAP No. 13 and 14.

* Conduct Phase II Field Investigation at LHAAP No. 1, 11, 12, 16, 17, 18 & 24, 27, 29, 32, and XX. This field investigation will start in August 1994 and complete by July 1995. This is the phase in which studies are conducted to determine where the sources of contamination are located, where the contamination plumes are headed, and what the risks are to the environment and public health.

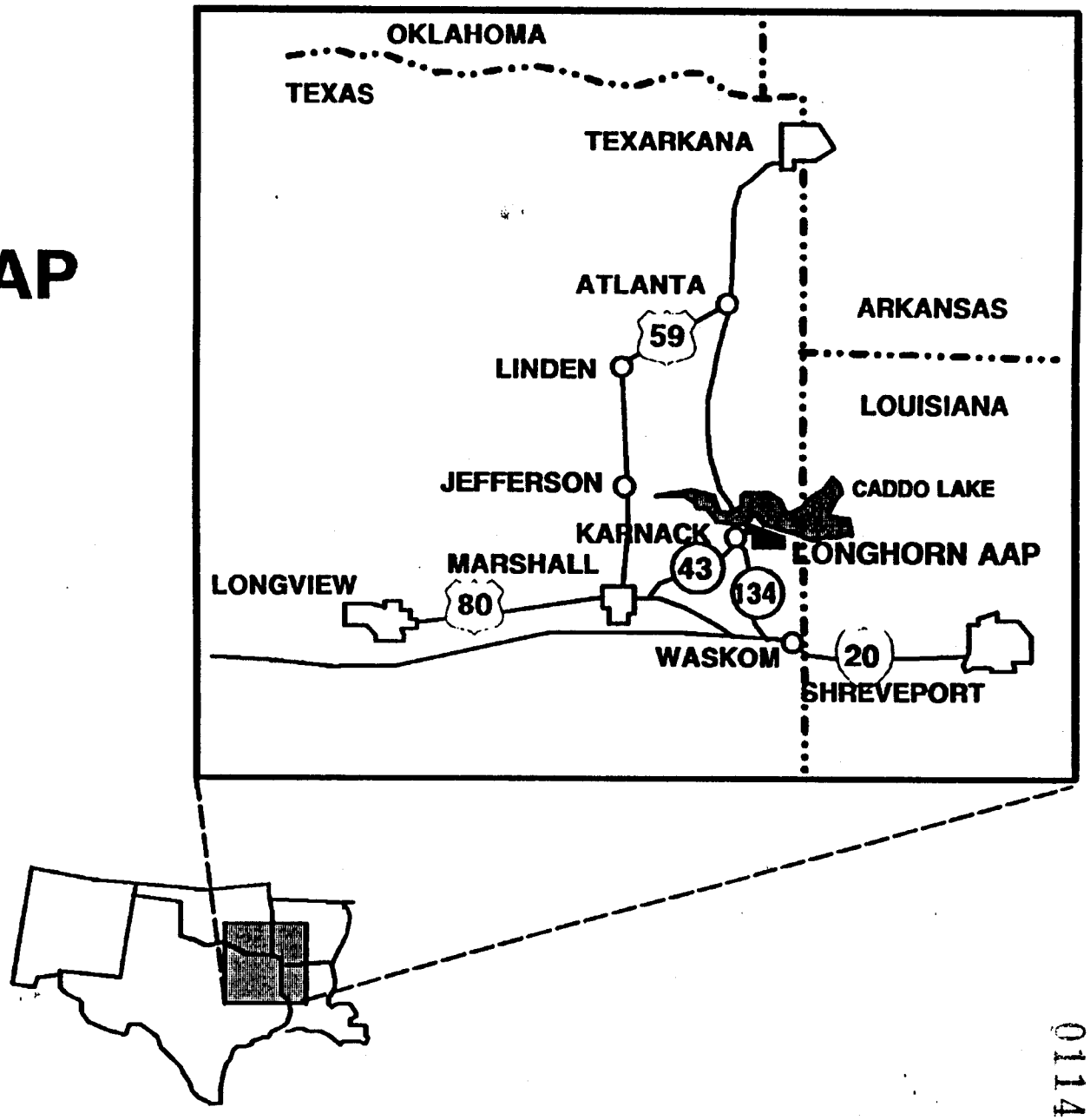
* Initiate and begin an Early Interim Remedial Action at LHAAP No. 18 & 24 in August 1994, LHAAP No. 12 and 16 in February

1995. The remedial objectives for this Early Interim Remedial Action are to eliminate or minimize the potential for exposure by reducing or preventing further migration of contaminants. High concentrations of Volatile Organic Compounds (VOC) - primarily trichloroethylene and methylene chloride - and heavy metals have been detected at the sites.

After many years of studies, surveys, groundwater monitoring, well water sampling, and at an estimated cost of over $40 million dollars, we have made progress but there is still more that needs to be done. Through the dedication and cooperation of the environmental staff from the U.S. Army, EPA, and TNRCC, we have come a long way in the LHAAP Environmental Restoration Program and will continue to make progress. We are all proud to be a part of this team.

We hope that you enjoy your visit.

REGIONAL LOCATION MAP



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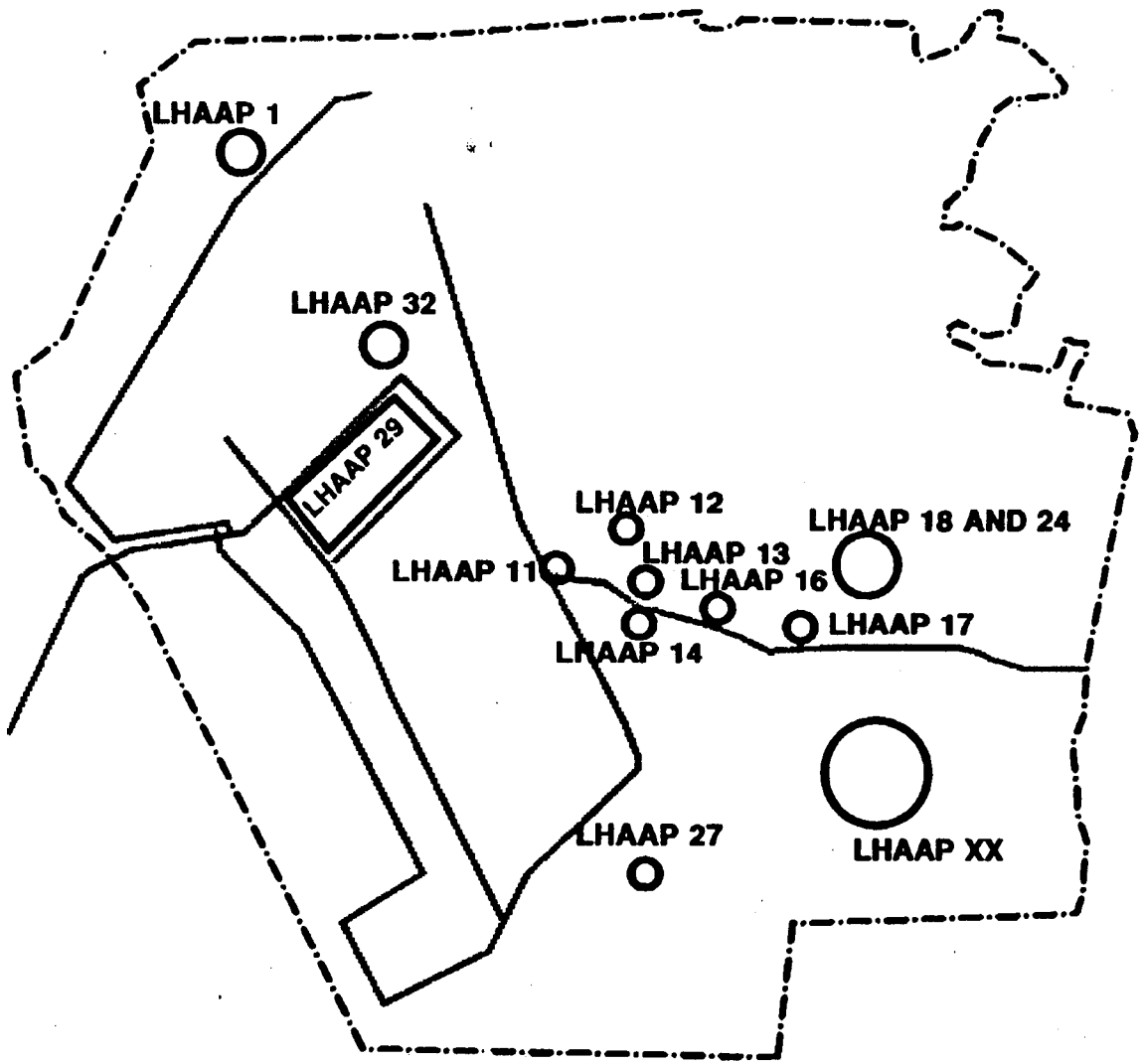
LOCATION MAP FOR PROJECT AREAS



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INERT BURNING GROUNDS
(LHAAP-1)

SITE HISTORY: The Inert Burning Ground was originally used during World War II for burning trash, ashes, scrap lumber, and waste from burned TNT. Bulk TNT may also have been burned at the site. During the 1950s other wastes including photoflash powder were burned, and intermittent, small-scaleburning operations may have continued into the 1960s. It is suspected that burning operations were conducted in one or more burn pits or pans that were subsequently filled or covered. Burn residues were most likely not removed. It is also suspected that some wastes may have been dumped without burning and were subsequently covered by or mixed with fill material.

POTENTIAL CONTAMINANTS: Explosive chemicals/inert materials.

STATUS: The Initial (Phase I) Remedial Investigation conducted in 1993 have found organic compounds and metal in soil samples. Two of eight groundwater grab samples have sulfate concentrations which exceed the Maximum Contaminant Levels (MCL). The groundwater samples have detected low concentrations (below MCLs) of organic contaminants, metals, and explosives compounds.

To further investigate potential soil and groundwater contamination with organic and explosives compounds of the site, the U.S. Army will collect additional groundwater and soil samples during Phase II Field Investigation. Phase II field work began on 16 August 1994.

SUSPECTED TNT BURIAL SITE AT AVENUES P & Q (LHAAP-11)

SITE HISTORY: The Suspected TNT Burial Site is an undocumented location where bulk TNT may have been buried /disposed in the 1940s. The site has been inactive since its suspected use in the 1940s.

POTENTIAL CONTAMINANTS: TNT.

STATUS: The Initial (Phase I) Remedial Investigation was conducted in 1993. Except for a trace amount of explosive in the background groundwater grab sample, no volatile, semivolatile, or explosive compounds were detected in any of the soil, sediment, or surface water. Concentrations of lead, sulfate, and selenium exceeding twice the maximum site specific background concentrations were detected in soil and surface water samples.

To further investigate potential groundwater contamination with explosives compounds in the vicinity of the background groundwater grab sample, the U.S. Army will install three monitoring wells during Phase II field Investigation. Phase II field work began on 16 August 1994.

011474

ACTIVE LANDFILL
(LHAAP-12)

SITE HISTORY: The Active Landfill is currently being used for disposal of non-hazardous industrial solid waste. Waste has been disposed at the Active Landfill site intermittently since about 1963. Continous use of the landfill began in the 1970s when the Old Landfill (LHAAP-16) use was discontinued.

POTENTIAL CONTAMINANTS: Asbestos/Refuse without Hazardous Waste.

STATUS: The Initial (Phase I) Field Investigation conducted in 1993 have found organic compounds and metals in soil samples taken within landfilled materials. In groundwater samples, solvents were detected in 5 of 7 new wells, and in both existing wells. Metals, organic compounds, and explosive compounds were also detected in monitoring wells at the site.

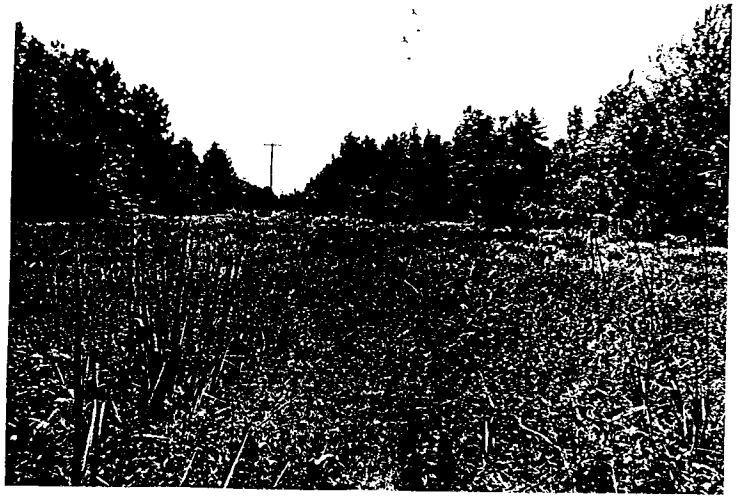
To further investigate the extent of soil and groundwater contamination with organic and explosives compounds of the site, the U.S. Army will collect additional groundwater and soil samples during Phase II Field Investigation. Phase II field work is scheduled to begin on December 1994. In addition, the U.S. Army is planning to construct a landfill cap at the site to reduce or prevent further migration of contaminants.

SUSPECTED TNT BURIAL SITE BETWEEN OLD AND ACTIVE LANDFILL (LHAAP-13)

SITE HISTORY: The Suspected TNT Burial Site is an undocumented location where TNT, waste acid, and pesticides/herbicides may have been buried or dumped sometime during the history of the installation. Other than this suspected one-time disposal, no other activities have taken place at the site.

POTENTIAL CONTAMINANTS: TNT/Waste Acid

STATUS: The Initial (Phase I) Remedial Investigation conducted in 1993 have found no volatile, semivolatile, explosive or pesticide/herdbicide compounds on site. Both soil and groundwater appear to contain elevated levels of chloride. The U.S. Army, EPA, and TNRCC have agreed that No Further Investigation is needed at this site.



AREA 54 BURIAL GROUND
(LHAAP-14)

SITE HISTORY: The Area 54 Burial Ground is an undocumented location where demolition debris, building ruble, explosives, and acidic wastes may have been buried or dumped during the 1940s and early 1950s. The disposal site is reportedly beneath the asphalt parking area. Other than this period of operation, no other waste activities have taken place at the site.

POTENTIAL CONTAMINANTS: Acid/Ordnance Components

STATUS: The Initial (Phase I) Remedial Investigation conducted in 1993 have found no organic contaminants and no concentrations in excess of the Safe Drinking Water Act Maximum Contaminant Levels in groundwater samples beneath this site. Trace amounts of volatile, semivolatile, and explosive compounds were detected in the soil boring located on the asphalt parking lot on site.

The U.S. Army, EPA, and TNRCC have agreed that No Further Investigation is needed at this site.

011477

OLD LANDFILL
(LHAAP-16)

SITE HISTORY: The Old Landfill was originally used from 1942 to 1944 for the disposal of TNT red water ash generated from the TNT Waste Disposal Plant (LHAAP-32). In the mid- to late 1950s, three rocket motor casings were reportedly burned and possibly buried on the eastern side of the site. Substandard TNT, barrels of chemicals, oil, paint, scrap iron, and wood may have been disposed in the landfill. The site continued to be used for a variety of waste disposal and treatment activities until sometime in the 1980s, when the disposal of inert solid wastes was moved to the Active Landfill (LHAAP-12). The site is no longer active.

POTENTIAL CONTAMINANTS: Ordnance Components, Refuse with Hazardous Waste, Explosive Chemical.

STATUS: The Initial (Phase I) Field Investigation conducted in 1993 have detected significant concentrations of solvents in the soil samples taken within landfilled materials. Significant concentrations of solvents were also detected in groundwater samples. Solvents contamination has also extended into the intermediate aquifer, situated directly above the Midway Formation.

To further investigate the extend of soil and groundwater contamination with organic and explosives compounds of the site, the U.S. Army will collect additional groundwater and soil samples during Phase II Field Investigation. Phase II field work is scheduled to begin on December 1994. In addition, the U.S. Army is planning to construct a landfill cap at the site to reduce or prevent further migration of contaminants.

BURNING GROUND NO. 2/FLASHING AREA (LHAAP-17)

SITE HISTORY: Burning Ground No. 2/Flashing Area was used for burning bulk TNT, photo flash powder, and reject material from 1959 to 1980. Although it has been reported that bulk TNT was uncovered at the site in 1954, there is no documentation to support bulk TNT burial at the site. In 1959, all of materials removed from the TNT Production Area (LHAAP-29) and the TNT Waste Disposal Plant (LHAAP-32) during razing were burned and/or flashed at this site. The site is presently inactive.

POTENTIAL CONTAMINANTS: Explosives and Heavy Metals.

STATUS: The Initial (Phase I) Field Investigation conducted in 1993 have indicated that soil and groundwater contamination with volatile organics and explosives is widespread within the shallow soils and groundwater beneath the site.

To further investigate the extent of soil and groundwater contamination with volatile organics and explosives compounds of the site, the U.S. Army will collect additional groundwater and soil samples during Phase II Field Investigation. Phase II field work is scheduled to begin on December 1994.

SOUTH TEST AREA
(LHAAP-27)

SITE HISTORY: The South Test Area was used in the 1950s for testing photoflash bombs and demilitarizing signal devices and photoflash cartridges. The South Test Area has apparently not been used since the early 1980s.

POTENTIAL CONTAMINANTS: Ordnance Components.

STATUS: The Initial (Phase I) Field Investigation conducted in 1993 have found explosives compounds in groundwater grab samples. In addition, two surface soil samples detected concentrations of Chromium and Mercury at a level twice the site background concentrations. Chloride exceeds the MCL in both monitor wells and Sulfate exceeds the MCL in one monitor well.

To further investigate potential soil and groundwater contamination with explosives compounds, metals, and organic compounds of the site, the U.S. Army will collect additional groundwater and soil samples during Phase II Field Investigation. Phase II field work began on 16 August 1994.

011480

FORMER TNT PRODUCTION AREA
(LHAAP-29)

SITE HISTORY: The Former TNT Production Area was in operation from April 1943 to August 1945 as a six-line plant with a supporting acid plant. The plant produced 180 million kilograms of flake TNT throughout the period of operation. Chemicals used to produce 2,4,6-TNT during the plant's operation included nitric acid, toluene, sulfuric acid and/or oleum. Oleum is a solution of sulfur trioxide in sulfuric acid. TNT waste water (red water) from the production of the TNT was sent through wooden pipelines to a storage tank and pump house, and then to the TNT Waste Disposal Plant (LHAAP-32). The TNT production plant was inactive from August 1945 until 1959 when most of its building and aboveground storage tanks were removed. There have been only limited activities at the site since World War II.

POTENTIAL CONTAMINANTS: Ordnance Components/Explosives Compounds.

STATUS: The Initial (Phase I) Field Investigation conducted in 1993 have found significant explosives contamination from sludge residue or water within the TNT waste water pipeline. Soil samples taken from the surrounding soil beneath the pipeline detected no contamination with volatiles or explosives. Contamination with explosives and metals was detected in sediment and soil samples taken within the former cooling discharge ditch. Groundwater sampling of the existing monitoring well network detected contamination with explosives compounds.

To further investigate the extent of soil and groundwater contamination with explosives compounds of the site, the U.S. Army will collect additional groundwater and soil samples during Phase II Field Investigation. Phase II field work is scheduled to begin on December 1994. In addition, the U.S. Army is planning to remove the TNT Pipelines that connect this site to the Former TNT Waste Disposal Plant (LHAAP-32).

FORMER TNT WASTE DISPOSAL PLANT (LHAAP-32)

SITE HISTORY: The Former TNT Waste Disposal Plant was constructed in 1942 to treat and dispose of wastewaters generated at the nearby Former TNT Production Area (LHAAP-29). The plant was in operation from April 1943 until August 1945 and disposed of wastewaters resulting from the production of over 397 million pounds of 2,4,6-TNT. In 1959, most of the buildings and tanks used in the disposal process were removed, leaving only the concrete foundations, acess roads, underground ultilities, and constructed surface water drainageways.

POTENTIAL CONTAMINANTS: Ordnance Components/Explosives Compounds.

STATUS: The Initial (Phase I) Field Investigation conducted in 1993 have found only trace concentrations of explosives and acetone in soils, sediment and surface water within the site. Groundwater samples detected elevated concentrations of explosives and volatile organic compounds.

To further investigate potential of soil and groundwater contamination with explosives and volatile organics compounds, the U.S. Army will collect additional groundwater and soil samples during Phase II Field Investigation. Phase II field work is scheduled to begin on December 1994. In addition, the U.S. Army is planning to remove the TNT Pipelines that connect this site to the Former TNT Production Area (LHAAP-29).

011482

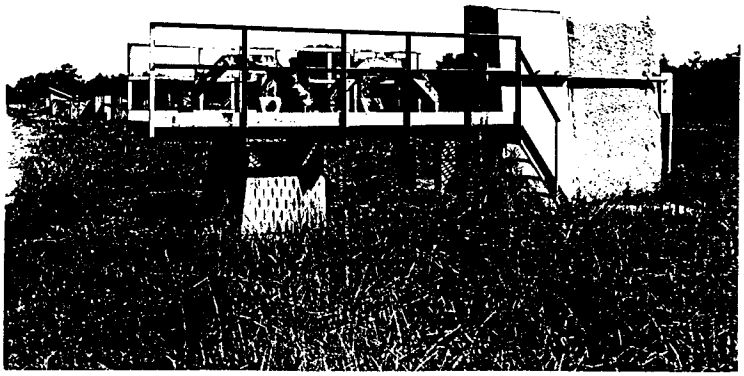
GROUND SIGNAL TEST AREA
(LHAAP-XX)

SITE HISTORY: The Ground Signal Test Area is currently used for aerial and on-ground testing of various pyrotechnic, illuminant, and signal devices manufactured ay LHAAP. From 1988 to 1992 the site was also used to burn-out rocket motors from the Pershing missiles destroyed in accordance with the INF Treaty. Over the past thirty years the site has been used for the testing and destruction of a variety of devices, including red phosphorous smoke wedges, infrared flares, illuminating mortar shells, and button bombs. Rocket motor testing and burn-out has been conducted intermittently and has included rocket motors from Nike-Hercules and Sargent missiles.

POTENTIAL CONTAMINANTS: Propellant/Explosive Chemicals.

STATUS: The Initial (Phase I) Field Investigation conducted in 1993 have found no volatile (with exception of Acetone), semivolatile, or explosive compounds in soil samples. All groundwater samples detected Chloride and Sulfate concentrations in excess of the MCLs.

To further investigate potential soil and groundwater contamination with Acetone and other volatile organic compounds, the U.S. Army will collect additional groundwater and soil samples during Phase II Field Investigation. Phase II field work began on 16 August 1994.



LONGHORN ARMY AMMUNITION PLANT

AGENDA

* 29 Aug 94 - Army Meeting

1430 - 1515 hrs	IRP Status Update
1515 - 1530 hrs	TERC Overview
1530 - 1700 hrs	3rd Draft Proposed Plan Discussion

* 30 Aug 94 - Proposed Plan Meeting

0800 - 0830 hrs	IRP Status Update
0830 - 1200 hrs	Proposed Plan Discussion
1200 - 1300 hrs	Lunch Break
1300 - 1700 hrs	Proposed Plan Discussion (Cont'd) Review Draft Presentation for Public Meeting
1900 - 2200 hrs	Social Dinner

* 31 Aug 94 - Scoping Meeting

0800 - 0930 hrs	"Removal Action" TNT Pipeline Scoping Meeting
0930 - 1130 hrs	Review Final Proposed Plan Finalize Fact Sheet

Times

Burning has plant in hot water

Environmentalists protest fuel burning near Caddo Lake

From Staff Reports

Caddo Lake environmentalists on Thursday assailed Longhorn Army Ammunition Plant operators for a request to burn jet fuel upwind from the lake.

The Texas Natural Resources Conservation Commission called a public hearing on a request to make permanent an interim hazardous waste burning ground at the plant near Karnack.

The request had nothing to do with a separate jet fuel burning request.

Thiokol, which operates LAAP under an agreement with the U.S. Army, has been disposing of hazardous solid waste under the temporary permit for years. The hazardous materials result from the production of munitions at the plant.

Thiokol's separate request is to dispose of small rocket motors shipped into the plant from other areas of the country.

Shreveport architect Bill Wiener, who helped organize the "Don't Ditch Caddo" effort to oppose a U.S. Army Corps of Engineers navigation project through the lake, took issue with the rocket motor request.

Weiner

He reminded the commission members that seven towns depend on Caddo for drinking water.

"What's next? A commercial hazardous waste disposal facility on Caddo Lake?" Wiener asked.

Environmentalists fear the burning of the solid rocket fuel would release pollutants into the air that could prove harmful to fish and wildlife in and around Caddo Lake.

But Lynn Muckelrath, an Army environmental engineer working at Longhorn, said there is no evidence to support that.

"The state double-checks us on everything.

"We have to give them all the information, and they do the modeling to predict what would happen under a worst-case scenario.

"The commission would not issue the permit if it had any concerns," Muckelrath said.

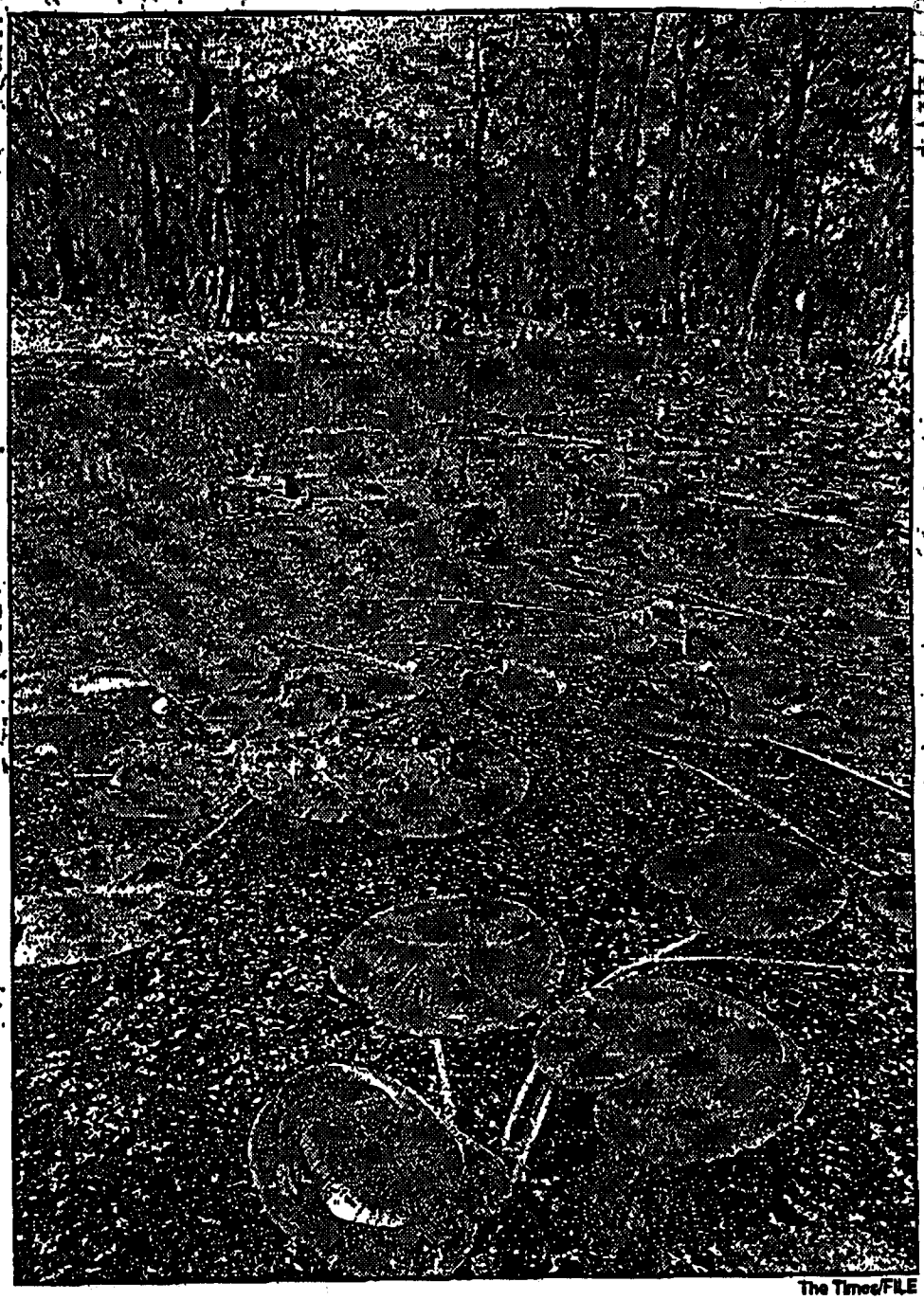
A separate hearing will be held Sept. 15 in the Karnak High School Cafeteria to hear comments on cleaning up existing burning ground at Longhorn.

It is high on the list of sites slated for hazardous waste cleanups under what is the military equivalent of the "Superfund" program, Muckelrath said.

Caddo has seen more than its share of environmental battles.

After years of study and the expenditure of millions of dollars, the Corps abandoned the idea of extending Red River navigation through the lake via the so-called Daingerfield Reach.

Instead, local, state and federal officials are now working with the private sector in developing the area for "ecotourism," focusing on Caddo's unique natural resources.

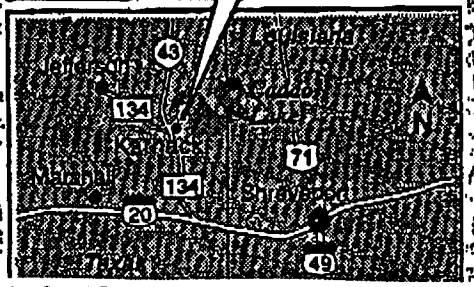


The Times/FILE

Environmentalists fear the Longhorn Army Ammunition plant near Karnack, Texas, will harm Caddo Lake if it is allowed to burn jet fuel in the area.

Caddo concerns

Environmentalists fear that activities at the Longhorn Army Ammunition Plant near Karnack, Texas, could be damaging to Caddo Lake.



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He reminded the commission members that seven towns depend on Caddo for drinking water.

"What's next? A commercial hazardous waste disposal facility at Caddo Lake?" Wiener asked.

Environmentalists fear the burning of the solid rocket fuel would release pollutants into the air that could prove harmful to fish and wildlife in and around Caddo Lake.

But Lynn Mackcrath, an Army environmental engineer working at Longhorn, said there is no evidence to support that.

"The state doublechecks us on everything.

"We have to give them all the information, and they do the modeling to predict what would happen under a worst-case scenario," he said.

"The commission would not issue the permit if it had any concerns," Mackcrath said.

A separate hearing will be held Sept. 10 in the Karnack High School cafeteria to hear comments on closing up the existing burning ground at Longhorn.

Environmentalists fear the Longhorn Army Ammunition plant near Karnack, Texas, will harm Caddo Lake if it is allowed to burn jet fuel in the area.

The Times/AP

It is high on the list of sites slated for hazardous waste cleanups under what is the military equivalent of the "Superfund" program, Mackcrath said.

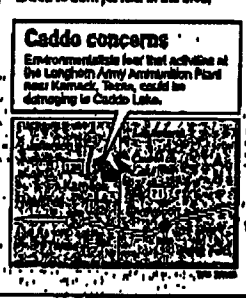
Caddo has seen more than its share of environmental battles.

After years of study and the expenditure of millions of dollars, the Corps abandoned the idea of extending the River navigation through the lake via the specially Dalmerfield Ranch.

Instead, local, state and federal officials are now working with the private sector in developing the area for "ecotourism," focusing on Caddo's unique natural resources.

Caddo concerns

Environmentalists fear that activities at the Longhorn Army Ammunition Plant near Karnack, Texas, could be damaging to Caddo Lake.



Sheriff Hathaway asks for third shot at jail tax

The state Bond Commission and secretary of state are expected to approve Nov. 8 election date.

By LARRY HARTSOE
The Times

With the stroke of a pen, Caddo Sheriff Don Hathaway called Thursday for a Nov. 8 sales tax election to help operate the new Lyttleton parish jail.

It will be the third time Hathaway has asked for a tax to operate the complex, built as a parish jail.

Hathaway signed the necessary documents in a five-minute special meeting he called strictly for that purpose. The paperwork went to the state Bond Commission and secretary of state for expected routine approvals.

The election date then becomes official.

Times call-in

Do you favor or oppose a quarter-cent sales tax to fund operations for the new Caddo Parish jail?

Call 833-6397, ext. 375, and leave your answer, name and daytime telephone number.

The Caddo Parish Commission's vote this week to reverse course and let Hathaway — and not a private contractor — run the jail cleared the way for him to seek the quarter-cent sales tax.

The tax would generate an estimated $6 million a year which, coupled with existing funds, would provide enough money to open and operate the jail in north Shreveport.

"I'm very pleased that the sheriff's office and Caddo Commission were able to come up with an amicable resolution of our differences and get us where we are today," said Hathaway after signing the election papers.

Hathaway

The next hurdle getting the tax passed. Caddo voters twice defeated tax proposals to operate the new jail last year — the last time by fewer than 200 votes.

This time, the Shreveport Chamber of Commerce, Shreveport's mayor and most parish commissioners plan to help pitch the idea.

"We all have to pull together and, if we do, I feel we'll win this election," Hathaway said.

eye Suprem Court seat

By BRAD COOPER
The Times

Appellate Judge Jeff Victory has set his sights for a State Supreme Court se a 5-to-1 margin this summer, new cam finance reports show.

Victory spent $51,830 d the most recent reporting pe ..., which ran from Jan through Aug. 25, accordi reports filed with the ethics board by the Shr ... date. A filing deadline of Oct. 1 ... means the records weren't available this week.

Victory's opponents in the 2nd District race — Caddo District Judge Charles Scott and appellate Judge Maxey Brown — opted for late during the early months of the Supreme Court cam paign.

Scott spent $32,120 the summer while Brown, the former Bossier/Webster Parish district attorney, spent $88,771.

Scott and Brown carry more money into the critical final weeks of the cam ... than Victory records show. Victor ... $21,848 left to spend while Brown ... $47,200 and Scott has $78,755.

Victory attributed the spending la ... orning, saying that he already bought ... of his campaign materials and tak ... care.

"We just paid for most of that stuff

■ Please see CAMPAIGN, Pa

Victor

Services today for artist Morg

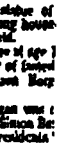
■ Local artist known for his statue of Captain Henry Sh

By MARGARET MARTIN
The Times

Shreveport artist Arthur C. M ... most famous work is a statue of form ... Supreme Court Chief Justice Edwar ... ...ster White. It stands in the Statuary ... the U.S. Capitol.

But the work most familiar to ... porters is a statue of Captain Henry ... Shreve on the city's bustling riverfron ... front of the Shreveport Civic Theater.

Morgan, 84, died Tuesday at Sch ... Medical Center. Funeral ... services will be today at ... 3 p.m. at St. Mark's Epis ... copal Cathedral, with ... burial at Forest Park ... Cemetery. He is sur ... vived by a daughter, Di ... ana Morgan of Shreve ... port. His wife was the ... late watercolorist-art ... teacher Gladys Butler ... Morgan, who founded the Centenary College ... Art Department.



Morgan

Morgan also created a bust of ar ... Desoto in the late 1940s, which ... foyer of the Meadows Museum. "In ... ter years, Morgan enjoyed an inter ... national," said Meadows chief Jo ... Ary.

He also did a large statue of ... Louisiana Gov. Earl K. Long house ... Long Memorial in Winnfield.

Morgan first gained fame at age ... he was a student-protégé of famed ... Rushmore sculptor Gutzon Bor ... New York City.

During that time, Morgan was ... cloned to do a bust of Dr. Simon Ba ... ther of famed adviser to presidents ... Baruch.

Morgan was a native of Aroostook

011485

011486

DEPARTMENT OF THE ARMY
LONGHORN/LOUISIANA ARMY AMMUNITION PLANTS
MARSHALL, TEXAS 75671-1059

REPLY TO
ATTENTION OF
Office of the Commander

September 1, 1994

Dear Resident:

You are invited to a Public Meeting on September 15, 1994 at 7:00 PM in the Karnack High School cafeteria. The pupose of this meeting is to inform you of our proposed plan and to solicit your comments on the Early Interim Remedial Action at Burning Ground #3 of Longhorn Army Ammunition Plant.

Enclosed you will find a "fact sheet" that will provide you with further information about the proposed action for this site.

If you have any questions about this meeting, please contact Mr. David Tolbert at (903) 679-2728.

Lawrence J. Sowa
Lieutenant Colonel, U.S. Army
Commanding Officer

Enclosure

LONGHORN ARMY AMMUNITION PLANT

FACT SHEET

BURNING GROUND No.3

SYNOPSIS: The U.S. Army, in coordination with the Environmental Protection Agency (EPA) and the Texas Natural Resource Conservation Commission (TNRCC) - formerly known as the Texas Water Commission (TWC) - is carrying out a $127 million Installation Restoration Program to clean up the contaminated areas at Longhorn Army Ammunition Plant (LHAAP). This fact sheet describes the Early Interim Remedial Action at one of these sites.

THE CHALLENGE: The Burning Ground No.3 (BG3) is an isolated 36-acre area located in the east central section of the installation. The access is limited to personnel performing the active burning and is restricted by chain-link, barbed wire topped fencing and a locked gate. Lands surrounding the BG3 site are undeveloped and wooded. The 100-year flood plain for Harrison Bayou incorporates the western corner of BG3. An important resource in the area surrounding LHAAP is Caddo Lake. The lake is along the northeast corner of LHAAP and is divided by the Texas-Louisiana State line. This is the largest natural lake in the South. Caddo Lake serves as a site for a variety of recreational activities and is also a public water supply for Marshall, Texas and Shreveport, Louisiana.

The BG3 site has been used to burn, bury, and evaporate production waste from LHAAP since the 1950's. A portion of the BG3 site is an active unit regulated under the Resource Conservation and Recovery Act (RCRA) for burning current production waste in burn cages and the air curtain destructor. The BG3 site also consists of various inactive units including burn/demolition burial pits, a row of 18 burn pits, a heavy propellant pit, a liquid waste sump, an evaporation pond, and waste trenches surrounding the active air curtain destructor. The closed Unlined Evaporation Pond (UEP) was built in the late 1950's, in the north corner of the site. It was used for 30 years to dispose of all types of process wastes from illuminant and explosive production. These wastes contained explosives, solvents and metals. The UEP was closed in 1985 in accordance with a TWC approved closure plan.

The discovery of contaminated material in 1976 led to the initial investigation of the BG3 site. Since then, several investigations have been performed and reports generated regarding this site. High concentrations of chlorinated solvents (degreasing compounds) and heavy metals have been detected in the shallow groundwater and buried waste at the BG3 site. The U.S. Army, EPA, and TNRCC have determined an Early Interim Remedial Action is necessary to address the contamination detected in some of the buried waste and in the shallow groundwater at the site. This remedial action is

considered an "early" action since it will be implemented prior to completion of the risk assessment for the site. The current Remedial Investigation/Feasibility Study (RI/FS) being conducted on the BG3 site will continue as scheduled. A final remedy will be selected upon completion of this study.

THE OBJECTIVE: The remedial objective for the Early Interim Remedial Action is to eliminate or minimize the potential for exposure by reducing or preventing further migration of contaminants.

THE RECOMMENDED SOLUTION: There are many alternatives for remediating solvents and metals contamination in groundwater and soil. Alternatives include Ultraviolet Oxidation, Air Stripping, Ion Exchange (metals), Precipitation (metals), High Temperature Incineration, and Low Temperature Thermal Desorption. The preferred alternatives for addressing the site contaminants and meeting the remedial objective of the Early Interim Remedial Action are:

* Extraction and Treatment using Air Stripping and Off-gas Treatment and Metals Precipitation for contaminated shallow groundwater.

* Extraction and Treatment using Thermal Desorption for the buried waste.

THE PROCESS: The U.S. Army is soliciting public review and comment on all alternatives and information contained in the Proposed Plan. The U.S. Army encourages the public to review the information in the Administrative Record documents in order to gain a better understanding of the BG3 site and the total Installation Restoration Program at LHAAP. Copies of the Administrative Record documents are located at LHAAP, EPA Region VI Library, TNRCC, and Marshall Public Library. Copies of the Proposed Plan are located at Karnack Post Office, Marshall Post Office, Marshall Library, Uncertain City Hall, and LHAAP.

The U.S. Army, EPA, and TNRCC also encourage the public to participate in the decision-making process for the site by offering comments on the various alternatives evaluated for the site. A Public Meeting is scheduled on **September 15, 1994 at 7 PM in Karnack High School Cafeteria.**

For more information,

Contact: Mr. David Tolbert
Environmental Protection Specialist
Longhorn Army Ammunition Plant
(903) 679-2728

011489

Installation Restoration Program
for
Longhorn Army Ammunition Plant

LONGHORN ARMY AMMUNITION PLANT (LHAAP)

SITE DESCRIPTION AND HISTORY

SITE DESCRIPTION:

Longhorn Army Ammunition Plant (LHAAP) is owned by the federal government and operated by Thikol Corporation. LHAAP is located in central east Texas, approximately 14 miles northeast of Marshall, Texas, and approximately 40 miles west of Shreveport, Louisiana. The installation occupies 8,493 acres.

SITE HISTORY:

LHAAP was established in October 1942 with the primary mission of producing 2,4,6-trinitrotoluene (2,4,6-TNT) flake. Production of TNT continued through World War II until August 1945 when the plant went on standby status until February 1952. From 1952 until 1956, LHAAP produced pyrotechnic ammunition such as photoflash bombs, simulators, hand signals, and tracers.

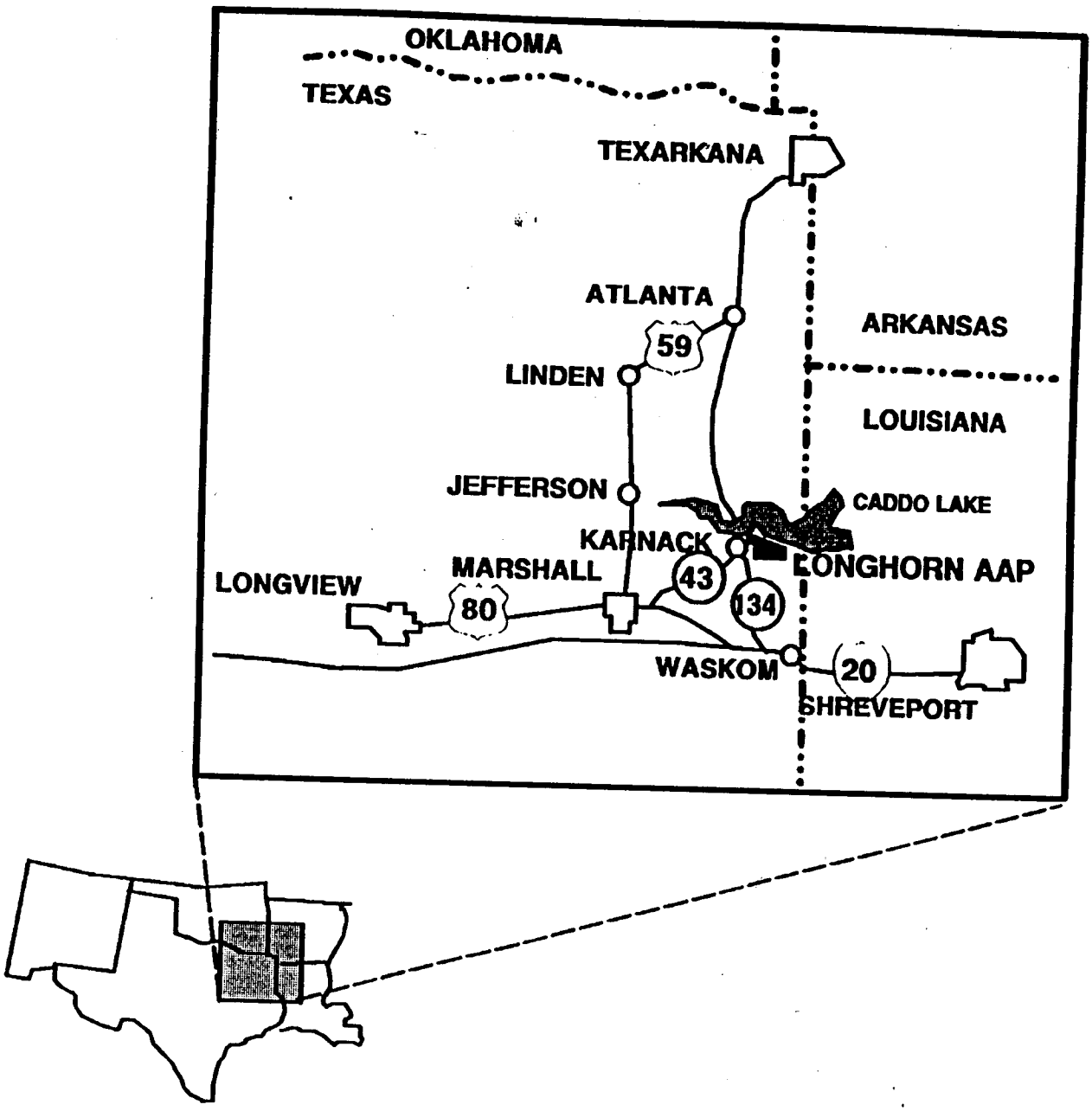
In November 1955, LHAAP began operation of a rocket motor facility. Production of rocket motors continued to be the primary mission of LHAAP until 1965, when the production of pyrotechnic and illuminating ammunition was reestablished.

Current operations consist of compounding pyrotechnic and propellant mixtures, accomodating receipt and shipment of containerized cargo, and the maintenance and/or layaway of standby facilities and equipment as they apply to mobilization planning. The installation has also been responsible for the static firing and elimination of Pershing I and II rocket motors in compliance with the Intermediate-Range Nuclear Force (INF) Treaty in effect between the United States and the former U.S.S.R.

ENVIRONMENTAL RESTORATION:

LHAAP was placed on the National Priorities List (NPL) on 30 August 1990. After being listed on the NPL, LHAAP, the Environmental Protection Agency (EPA), and the Texas Natural Resource Conservation Commission (TNRCC) - formerly known as the Texas Water Commission (TWC) - entered into a Comprehensive

011491



REGIONAL LOCATION MAP

Environmental Response, Compensation, and Liability Act (CERCLA) Section 120 Agreement with LHAAP for remedial activities at the facility. The CERCLA Section 120 Agreement, referred to as the Federal Facility Agreement (FFA), became effective on 30 December 1991. The FFA specified that remedial activities would be conducted at 13 areas on LHAAP following CERCLA guidelines. Bellow is the list of the 13 areas:

LHAAP No.	Area Name
1	Inert Burning Ground
11	Suspected TNT Burial Site at Avenue P and Q
12	Active Landfill
13	Suspected TNT Burial Site Between Old and Active Landfill/Acid Dump
14	Area 54 Burial Ground
16	Old Landfill
17	Burning Ground No. 2/Flashing Area
18 & 24	Burning Ground No. 3 and Unlined Evaporation Pond/Rocket Motor Washout Lagoon
27	South Test Area
29	Former TNT Production Area
32	Former TNT Disposal Area
XX	Ground Signal Test Area

The FFA requires a Remedial Investigation/Feasibility Study (RI/FS) Work Plan and an RI/FS to ensure that environmental impacts associated with past and present activities at the LHAAP are thoroughly investigated and an appropriate remedial action is selected to protect the public health, welfare, and the environment.

CURRENT STATUS:

The Environmental Restoration Program at LHAAP marked a milestone in June 1992 with the completion of the RI/FS Work Plan. By August 1993, all Phase I (Initial Field Investigation) Field Work was completed for all 13 areas of concern. Based on the results of Phase I, U.S. Army, EPA, and TNRCC recommended on the following action:

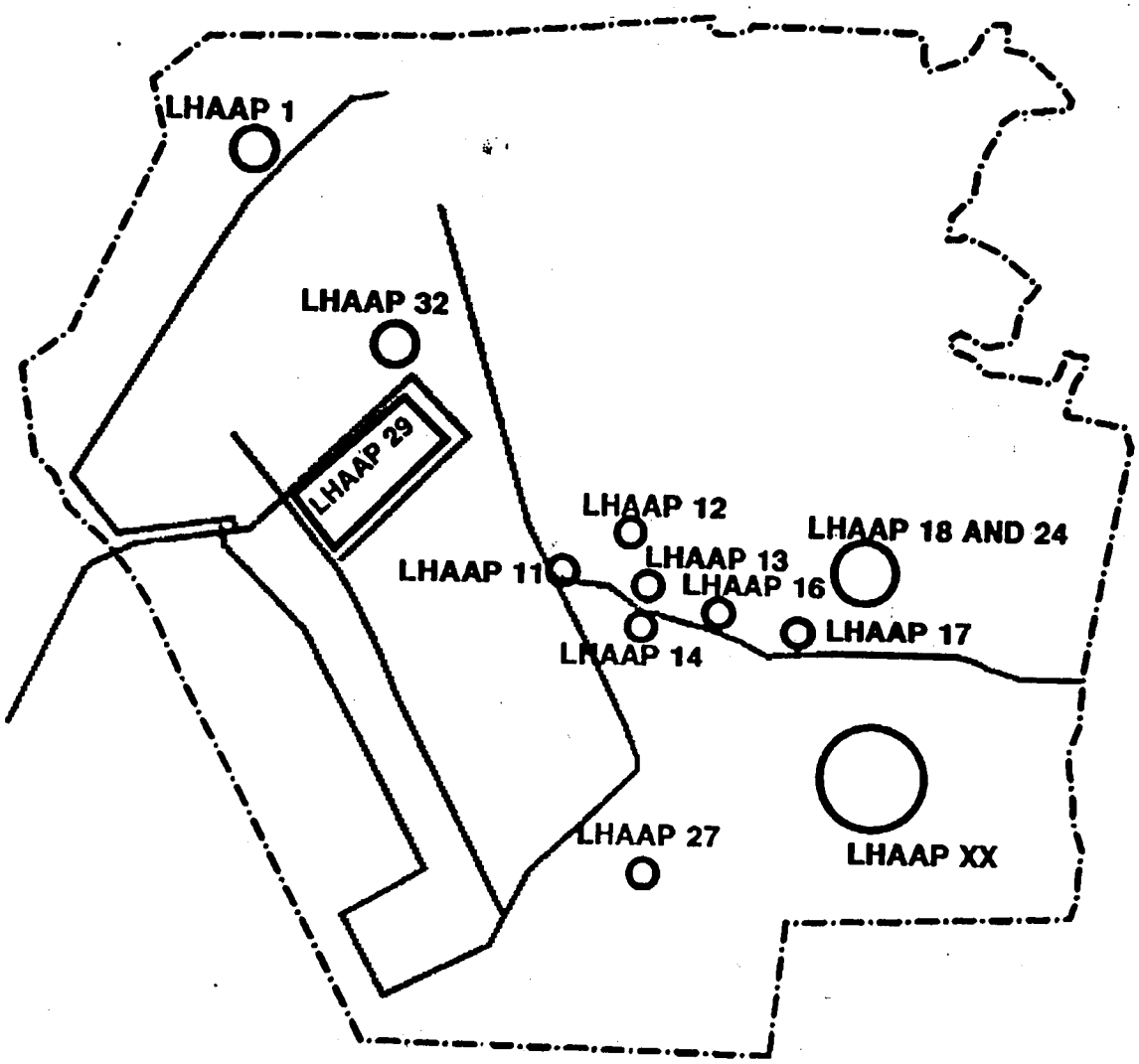
* No further action on LHAAP No. 13 and 14. A Proposed Plan is scheduled to be available for public review in January 1995.

* Conduct Phase II Field Investigation at LHAAP No. 1, 11, 12, 16, 17, 18 & 24, 27, 29, 32, and XX. This field investigation will start in August 1994 and be completed by July 1995. This is the phase in which studies are conducted to determine where the sources of contamination are located, where the contamination plumes are headed, and what the risks are to the environment and public health.

* Initiate and begin an Early Interim Remedial Action at LHAAP No. 18 & 24 in August 1994, LHAAP No. 12 and 16 in February 1995. The remedial objectives for this Early Interim Remedial Action are to eliminate or minimize the potential for exposure by reducing or preventing further migration of contaminants. High concentrations of Volatile Organic Compounds (VOC) - primarily trichloroethylene and methylene chloride - and heavy metals have been detected at the sites.

Through the dedication and cooperation of the environmental staff from the U.S. Army, EPA, TNRCC, and the public, we have come a long way in the LHAAP Environmental Restoration Program and will continue to make progress toward final remediation of all sites. We are all proud to be a part of this team and look forward to a close association with the community.

We hope that you enjoy your visit.



LOCATION MAP FOR PROJECT AREAS

GLOSSARY

ADMINISTRATIVE RECORD - A file which contains all information used to make the decision on the selection of a response action to be taken at a site. The file is available for public review and a copy is located at or near the site.

COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION AND LIABILITY ACT (CERCLA) - A federal law passed in 1980 and revised in 1986 by the Superfund Amendments and Reauthorization Act (SARA). CERCLA was created to investigate and clean up abandoned or uncontrolled hazardous waste sites.

CONTAMINANT - Any physical, chemical, biological or radiological substance or matter that has an adverse effect on air, water, or soil.

FEASIBILITY STUDY (FS) - The second phase of an environmental clean up of a site. This is a study of possible alternatives for remedying a situation where hazardous wastes contaminate soil, groundwater, or surface water.

FEDERAL FACILITY AGREEMENT - An agreement entered into between the U.S. Army, the Environmental Protection Agency and usually the State to cover all phases of remediation.

GROUNDWATER - Water contained in space between silt, sand, rock, and gravel particles underground. It tends to flow more slowly than surface water and follows routes that may lead to streams, rivers, or lakes.

HAZARDOUS WASTE - Waste material that, because of its quality, concentration, or chemical makeup, may pose a hazard to human health of the environment.

MONITORING WELLS - Special wells drilled at specific locations on or off a site where groundwater can be sampled at selected depths and studied to determine such things as direction in which groundwater flows and the types and amounts of contaminants present. This is **NOT** a water supply well.

NATIONAL PRIORITIES LIST (NPL) - A listing of the most contaminated sites, ranking them based on the degree to which they present a potential threat to human health and the environment.

ORGANIC CHEMICALS - Chemicals composed primarily of oxygen, hydrogen, and carbon. Organic chemicals do not readily dissolve in water.

PLUME - The area of concentrated contamination.

REMEDIAL INVESTIGATION (RI) - An investigation to determine the nature and extent of contamination at a hazardous waste site and the problems that contamination causes. The RI is performed prior to a Feasibility Study (FS).

RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) - The federal law that regulates the treatment, storage and disposal of hazardous wastes.

VOLATILE ORGANIC COMPOUNDS (VOC) - A group of organic chemicals containing carbon that evaporates, or vaporizes, readily at room temperature. Some VOCs are also known as solvents.

LONGHORN ARMY AMMUNITION PLANT

FACT SHEET

BURNING GROUND No.3

SYNOPSIS: The U.S. Army, in coordination with the Environmental Protection Agency (EPA) and the Texas Natural Resource Conservation Commission (TNRCC) - formerly known as the Texas Water Commission (TWC) - is carrying out a $127 million Installation Restoration Program to clean up the contaminated areas at Longhorn Army Ammunition Plant (LHAAP). This fact sheet describes the Early Interim Remedial Action at one of these sites.

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For more information,

Contact: Mr. David Tolbert
Environmental Protection Specialist
Longhorn Army Ammunition Plant
(903) 679-2728

011499

SEP 12 1994

CERTIFIED MAIL: RETURN RECEIPT REQUESTED

David Tolbert, Project Manager
Longhorn Army Ammunition Plant
Attn: SMCLO-EN
Marshall, Texas 75671-1059

Re: Draft Remedial Investigation/Feasibility Study for
Sites 13 and 14
Longhorn Army Ammunition Plant

Dear David:

Pursuant to the Federal Facility Agreement for the Longhorn Army Ammunition Plant, EPA is submitting comments on the Draft Remedial Investigation/Feasibility Study for Sites 13 and 14 Longhorn Army Ammunition Plant. EPA's comments are included as an enclosure to this letter.

If you have any questions about EPA's comments or any other matter, please contact me at my new phone number (214) 665-6744.

Sincerely,

Lisa Marie Price
Remedial Project Manager
Superfund Texas Enforcement

Enclosure

cc: Lieutenant Colonel Lawrence J. Sowa
Commanding Officer, U.S. Army
Longhorn Army Ammunition Plant
Marshall, Texas 75671-1059

Tulsa District Corps of Engineers
P.O. Box 61
Attn: Mr. Ross Nguyen
CESWT-PP-E
Tulsa, OK 74121-0061

Mike Moore, Superfund
Texas Natural Resource Conservation Commission
P.O. Box 13087
Capital Station
1700 N. Congress Avenue
Austin, TX 78711-3087

EPA Comments 9/12/94
Draft Remedial Investigation/Feasibility Study for
Sites 13 and 14
Longhorn Army Ammunition Plant

General Comments:

#1 Remedial Investigation/Feasibility Study should follow *Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA, EPA/540/G-89/004, OSWER Directive 9355.3-01, October 1988.* Specifically, refer to Table 3-13, page 3-30.

#2 It appears that sections of the Remedial Investigation/Feasibility Study (RI/FS) Work Plan (June 1992) were transferred directly to this draft RI/FS for sites 13 and 14 without the benefit of updating, eliminating, and/or introducing information based on the work that was conducted for the RI/FS.

#3 Most of the figures included from the RI/FS Work Plan without the benefit of updating, elimination, and/or introducing information based on the work that was conducted for the RI/FS. Furthermore, much of the information presented on many of the figures is illegible. Examples: Figures 2-1, 2-2, 2-4, 2-5, 2-6, 3-1, 4-1.

#4 Pursuant to the Federal Facility Agreement for the Longhorn Army Ammunition Plant, secondary documents (i.e., data reports, site characterization summaries, etc.) "*are discrete portions of the primary documents and are typically input or feeder documents*" (Section VIII. Consultation with EPA and [TNRCC], Paragraph B.2.).

In compliance with the Federal Facility Agreement, EPA has received the secondary documents associated with the RI for sites 13 and 14, and EPA has provided comments when needed. Also in compliance with the Federal Facility Agreement, the secondary documents were to be revised only in the context of the associated primary document, i.e., not revised and resubmitted as "stand alone" documents. Therefore, it is inappropriate to reference data documents (eg. "...*Final SDR Report (Ebasco, October 1993).*" page 5-6, Section 5.6 and 6-6, Section 6.6) or any other secondary documents in a primary document. All relevant information, including results of all analytical, should be included in this RI for sites 13 and 14.

#5 Dates in the document should be presented in non-military form, i.e., month, day, year.

Specific Comments:

#6 Page 1-1, Section 1.1, last sentence on page: Replace with "*The Remedial Investigation/Feasibility Study (RI/FS) was conducted in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by Superfund Amendments and Reauthorization Action (SARA), and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). The purpose of the RI/FS is to assess site conditions and evaluate alternatives to the extent necessary to select a remedy.*"

#7 Page 1-2, Section 1.2: Replace "*non-incorporated*" with "*unincorporated*".

#8 Page 1-4, last paragraph: Is this the facility's current mission?

#9 Page 1-5, Section 1.4.2, last paragraph: Spell out EPS, and identify the acronym.

#10 Page 2-1, first paragraph, last sentence: Delete "*...conducted by Sverdrup.*"

#11 Page 2-10, Section 2.5: Section should be updated, including the fact that Caddo Lake is a water supply for Shreveport, LA and Marshall, TX.

#12 Page 2-12, Section 2.6: Add mean sea level or MSL to the elevations given in this section.

#13 Page 2-16, first paragraph: Add water moccasin to the reptiles common to the area.

#14 Pages 2-17 and 2-19: What is the "*DA*" that is the reference for the information presented on this page?

#15 Page 2-20, last paragraph: Delete last paragraph as it does not relate to this RI/FS for sites 13 and 14.

#16 Page 3-1, Section 3.2: The text should clearly state that the "site" presented in Figure 3-2 is as it was suspected to be prior to the field work for the RI.

#17 Sections 3.4 and 4.4: Section heading is very confusing and should be changed to reflect what the section actual represents, i.e., a presentation of historical data and records information.

#18 Page 3-4, second paragraph: "*Soil borings drilled by the U.S. Army Corps of Engineers (COE) for foundation design...*" When?

#19 Page 3-5, Section 3.3: "*No investigations have been performed to date.*" Need to

update this section. See general comment #2.

#20 Sections 3.5, 3.6, 4.5 and 4.6: First, these sections should have been updated using what is now known regarding contamination. Second, pursuant to the RI/FS guidance (See comment #1), this information should be presented in the context of contaminant fate and transport after the discussion of the results of the RI.

#21 Page 3-9, first paragraph and Page 4-9, second paragraph: "*Overall low hydraulic conductivities and the highly interbedded nature of the Wilcox strata also combine to strongly inhibit groundwater movement in vertical and horizontal directions.*" Given what is known about the nature and extent of ground water contamination on the facility, this statement is inappropriate.

#22 Page 4-3, third paragraph: "*Four soil borings drilled for foundation design by the COE...*" When was the drilling conducted?

#23 Page 4-3, first paragraph: The text should clearly state that the "site" presented in Figure 4-2 is as it was suspected to be prior to the field work for the RI, i.e., this does NOT represent current site conditions.

#24 Chapter 5 and Chapter 6: All data related to the phase I RI investigation should be included in this document. See general comment #4.

The document should clearly state that contamination associated with the suspected or reported activities in these locations was NOT detected. Furthermore, the document should clearly state and explain that the "*positive analytical results*" do NOT necessarily represent a "contaminated environment."

#25 Page 5-1, Section 5.1, first paragraph: Delete reference to Ebasco's Chemical Data Acquisition Plan Addendum dated February 1992. The only APPROVED Chemical Data Acquisition Plan is Volume 2 of the EPA approved RI/FS Work Plan dated June 1992.

#26 Page 5-3, Section 5.2 and Page 6-2, Section 6.2: The discussion on UXO clearing and the purpose of it should be explained in greater detail.

#27 Pages 5-3 and 5-4, Section 5.3 and Page 6-4, first paragraph: "*Borings...were generally completed using the hollow-stem auger method...*" What other method was used? If all of the borings were not drilled using hollow-stem auger, delete the term "*generally*" and explain the deviation from the work plan.

#28 Pages 5-4 and 5-5, Section 5.4 and Pages 6-4 and 6-5, Section 6.4: The ground water grab sampling was proposed by the COE and was approved by EPA with

qualifications. Either include in the text the information from note on the bottom of Table 5-3/6-3 or delete the discussion.

#29 Page 5-5, second paragraph, first sentence: Change "*BH-11*" to "*SB-11*".

#30 Page 5-6, Section 5.6 and Page 6-6, Section 6.6: See general comment #4 regarding the referencing of secondary documents in this primary document.

#31 Page 5-6, Section 5.6 and Page 6-6, Section 6.6: "*Due to the general lack of correlation between the TICs reported and the target compounds found in samples, the TICs are not considered reliable indicators of site-related contamination.*" Such a statement without supporting information is troublesome.

Pursuant to EPA's *Risk Assessment Guidance for Superfund Volume I Human Health Evaluation Manual (Part A), EPA/540/1-89/002, December 1989*, there are two options for addressing TICs, depending on the relative number of TICs compared to non-TICs. When only a few TICs are present compared to the Target Analyte List (TAL) and Target Compound List (TCL) and no historical or site information indicates the TICs to be related to by-products, etc., TICs are generally eliminated. If many TICs are present relative to the TAL and TCL compounds identified, or if TIC concentrations appear high or site information indicates that TICS are indeed present, then further evaluation of TICs is necessary. Given that information regarding the number of TICs identified and their concentrations is not presented, the reliability or unreliability of TICs as an indication of site contamination cannot be assessed.

#32 Page 5-7, first paragraph and Page 6-7, first paragraph: Add the redlined information to the following sentences. "*Current site specific background data were selected...The rationale for selecting site specific background sample locations is provided...Tables...summarize site specific background concentrations...*"

#33 Page 5-7, first paragraph, last sentence: Delete reference to facility background study and expected completion date.

#34 Page 5-8, Table 5-3 and Page 6-8, Table 6-3: Pursuant to the Primary Drinking Water Regulations, the MCL and MCLG for nitrate is 10.0 mg/l, and the MCL and MCLG for nitrate is 1.0 mg/l.

The Secondary Drinking Water Regulations MCL for pH is 6.6 to 8.5.

The Lifetime Health Advisory for RDX is 0.002 mg/l.

MCLGs are health-based standards for carcinogens and noncarcinogens. MCLs for Primary and Secondary Standards under the CWA are designed to come as

close as feasible to the respective MCLG, but MCLs take into account the best technologies and treatment techniques as well as other factors. Therefore, the footnote to the table must be corrected.

#35 Chapter 7: The baseline risk assessments should be part of the text of this document.

#36 Chapter 8, Section 8.1: Add to the last sentence "*The Baseline Risk assessments conducted indicate the sites pose no public health or ecological threat to the environment in their current condition, therefore, no remediation is warranted.*"

#37 Chapter 8, Section 8.2: Delete this section.

#38 If the Baseline Risk Assessments were completed in June 1994, why weren't they submitted to EPA?

#39 Baseline Risk Assessments, page 3, first paragraph: See general comment #4 regarding the referencing of secondary documents in this primary document.

#40 Baseline Risk Assessments, page 3, second paragraph, last sentence: Add "*Results show...concentrations...near expected background...*"

Burning Ground No. 3
Longhorn Army Ammunition Plant, Karnack, Texas

PROPOSED PLAN OF ACTION

An Army Update on Activities at the Burning Ground No. 3
September 11, 1994

THE PURPOSE OF THIS PROPOSED PLAN IS TO:

- Provide history and background about the site;
- Identify the preferred alternative for Early Interim Remedial Action at the site and explain the reasons for the preference;
- Describe the other remedial options considered in detail in the treatability study;
- Solicit public review and comment on all the alternatives and information contained in the Administrative Record; and
- Provide information on how the public can be involved in the remedy selection process.

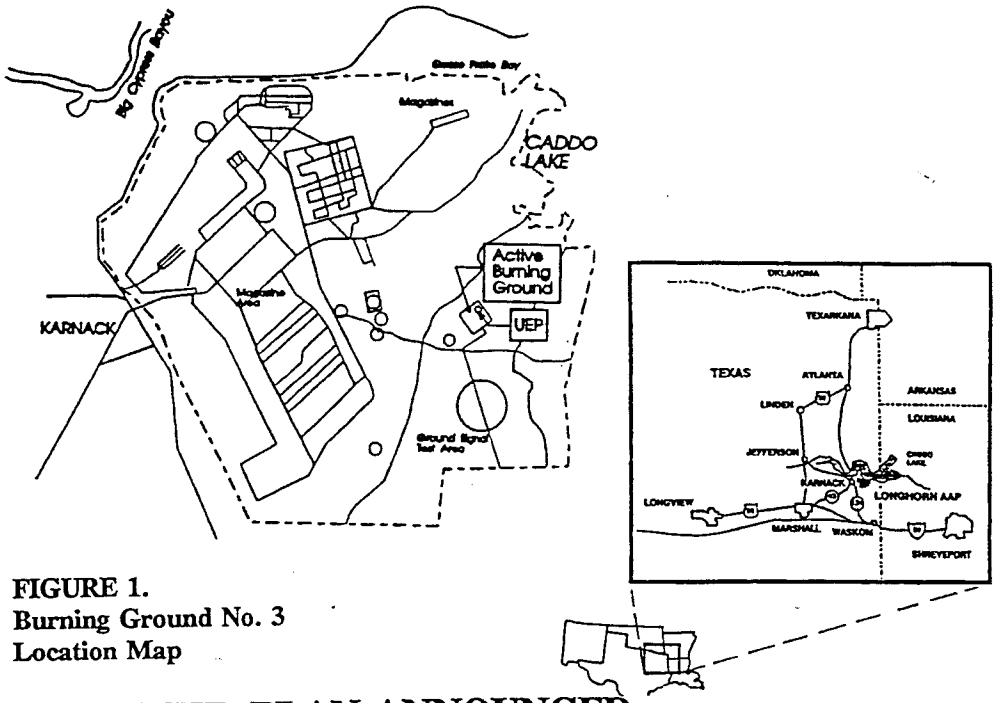

FIGURE 1.
Burning Ground No. 3
Location Map

PROPOSED PLAN ANNOUNCED

In this Proposed Plan the Department of the Army (U.S. Army) describes their approach for addressing the contamination problems at the Burning Ground No. 3 site on the Longhorn Army Ammunition Plant (LHAAP). The Longhorn Army Ammunition Plant is on the National Priorities List (NPL). The LHAAP installation is located adjacent to the communities of Karnack, Uncertain, and the western shore of Caddo Lake in Harrison County in the northeast section of Texas. The Burning Ground No. 3 site is located in the east central section of the installation (Figure 1). The Burning Ground No. 3 site is just one of the sites on the LHAAP. This Proposed Plan focuses on the Burning Ground No. 3 site only. The plan includes summaries of alternatives evaluated for this site and the rationale for the selection of the preferred alternative. The U.S. Army issues this document as the lead agency for site activities, with the assistance of the Environmental Protection Agency (EPA) and Texas Natural Resources Conservation Commission (TNRCC), which are the regulatory agencies for National Priorities List activities at the LHAAP.

The U.S. Army, in consultation with the EPA and TNRCC, will select a final remedy for the Burning Ground No. 3 site on the LHAAP installation only after the public comment period has ended and the information submitted during this time is reviewed and considered during the decision-making process.

The U.S. Army is issuing the Proposed Plan as part of the public participation requirements under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by the Superfund Amendment and Reauthorization Act (SARA), also known as the Superfund law [Section 117(a)].

The Proposed Plan summarizes information that can be found in greater detail in several documents in the Administrative Record for the LHAAP. Through a Federal Facility Agreement, the EPA and TNRCC provide technical assistance and review of the activities at the LHAAP installation. The U.S. Army encourages the public to review the information in the Administrative Record in order to gain a better understanding of the site. The U.S. Army also encourages the public to participate in the decision-making process for the site by offering comments on the various alternatives evaluated for the site. The Administrative Record file is available at the following information repository locations:

Longhorn Army Ammunition Plant
Marshall, TX 75671
(903) 679-2728
Mon.-Thur. 7 a.m. to 5:30 p.m.

U.S. EPA, Region 6
Library, 12th Floor
1445 Ross Avenue
Dallas, TX 75202-2733
(214) 665-6427
Mon.-Fri. 8 a.m. to 4 p.m.

TNRCC
Building D Room 190
12118 N. IH 35
Austin, TX 78753
(512) 239-2920
Mon.-Fri. 8 a.m. to 5 p.m.

Marshall Public Library
300 S. Alamo
Marshall, TX 75670
(214) 665-6427
Mon.-Fri. 8 a.m. to 4 p.m.

COMMUNITY PARTICIPATION

The public is invited to comment on the Proposed Plan and on the Administrative Record. The public comment period begins September 11, 1994, and ends on October 11, 1994. During the public comment period, written comments may be submitted to:

Commander, Longhorn AAP
Attn: David Tolbert
Environmental Protection Specialist
Longhorn Army Ammunition Plant
Marshall, TX 75671-1059

Additionally, comments (oral and written) will be accepted at a public meeting scheduled for September 15, 1994,

* Words appearing in boldface are defined in the glossary at the end of this proposed plan.

beginning at 7 p.m., at the Karnack High School cafeteria. All comments received during the public comment period will be included in a document called a **Responsiveness Summary**. The Responsiveness Summary will be attached to the **Record of Decision** and will be made available to the public in the information repositories. The Record of Decision will explain the rationale for the remedy selected to address contamination problems at the Burning Ground No. 3 site. To the extent that any comments or new information received during the public comment period warrant, the selected remedy may be different from the alternative proposed in this plan. Any aspects of the selected remedy, as stated in the Record of Decision, that are significantly different from the Proposed Plan will be explained in the Record of Decision.

SITE HISTORY AND BACKGROUND

SITE LOCATION

The LHAAP installation is located adjacent to the communities of Karnack (to the west), Uncertain (to the north), and the western shore of Caddo Lake in Harrison County in the northeast section of Texas (Figure 1). LHAAP is 14 miles northeast of Marshall, Texas, and 40 miles west of Shreveport, Louisiana. Burning Ground No. 3 is in a remote location on the LHAAP. The access is limited to personnel performing the active burning and is restricted by a chain-link, barbed wire topped fencing and a locked gate at all times. Lands surrounding the Burning Ground No. 3 site are undeveloped and wooded. The 100 year flood plain for Harrison Bayou incorporates the western corner of Burning Ground No. 3. The flood plain generally is a natural wetlands heavily forested with Cypress, Pine, and Oak trees. Saunders Branch is another natural wetland located east of the site (Figure 2).

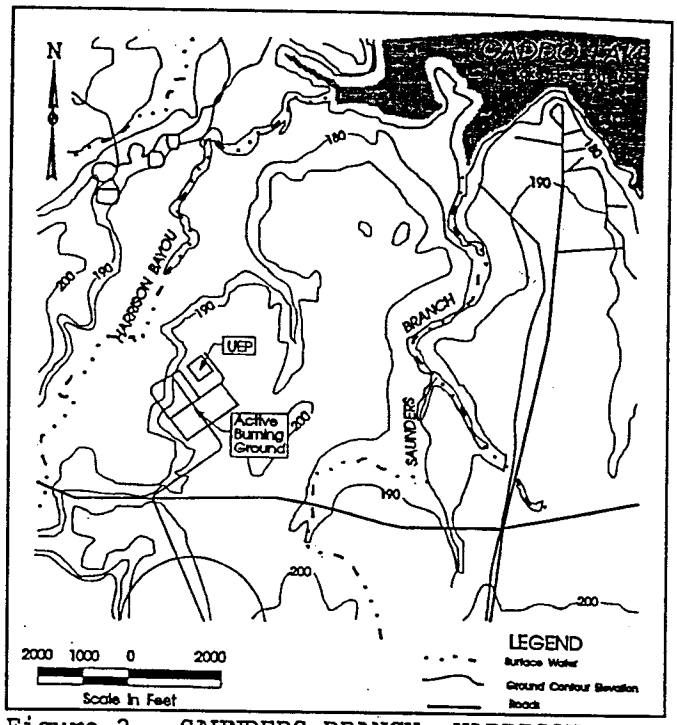

Figure 2. SAUNDERS BRANCH, HARRISON BAYOU, & CADDO LAKE WITH BURNING GROUND NO. 3 SITE

An important resource in the area surrounding LHAAP is Caddo Lake. The lake is along the northeast corner of LHAAP and is divided by the Texas-Louisiana State line. This is the largest natural lake in the South. Caddo Lake serves as a site for a variety of recreational activities and is also a public water supply for Marshall, Texas, and Shreveport, Louisiana.

SITE HISTORY

The LHAAP was established in October 1942, and the 8,483-acre facility is currently a government-owned, contractor-operated (Longhorn Division of Thiokol Corporation) facility under the jurisdiction of the U.S. Army Armaments, Munitions, and Chemical Command. The fenced area of the Burning Ground No. 3 site is approximately 36 acres and has been used to burn, bury, and evaporate production waste from LHAAP since the 1950's. A portion of the Burning Ground No. 3 site is also an active unit under the Resource Conservation and Recovery Act (RCRA) for burning current production waste in burn cages and an air curtain destructor. The Burning Ground No. 3 site also consists of various inactive units including burn/demolition burial pits, a row of 18 burn pits, a heavy propellant pit, a liquid waste sump, an evaporation pond, and waste trenches surrounding the active air curtain destructor. The closed Unlined Evaporation Pond was built in the late 1950's, in the north corner of the site. It was used for 30 years to dispose of all types of process wastes from illuminant and explosive production. Liquid waste collected from the sumps throughout the production area, containing explosives, volatile organic compounds and heavy metals, was disposed of in the Unlined Evaporation Pond. The Unlined Evaporation Pond was closed in 1985 in accordance with a Texas Water Commission (currently the TNRCC) approved closure plan. The water and the bottom sediments/sludges were sent offsite for disposal. The Unlined Evaporation Pond was covered with a 4 foot clay layer, topsoil, and grass.

As part of the U.S. Army Installation Restoration Program, the LHAAP began an environmental investigation of current and previously used waste disposal sites in 1976. The work is funded under the Defense Environmental Restoration Program. The LHAAP installation was added to the National Priorities List on August 30, 1990 (54 FR 35509).

INVESTIGATIONS

In December 1991, the U.S. Army, EPA, and TNRCC entered into a Federal Facility Agreement to cover the investigation, development, selection and implementation of remedial actions undertaken pursuant to the Comprehensive Environmental Response, Compensation and Liability Act, and to address corrective action for sites covered under the LHAAP Resource Conservation and Recovery Act permit, Permit No. HQ-50195, February 1992. There is a Remedial Investigation/Feasibility Study (RI/FS) ongoing at many sites on the LHAAP installation, including the Burning Ground No. 3 site. A Remedial Investigation/Feasibility Study is used to determine the nature and extent of contamination and to evaluate options to address or remediate contamination. Although the Remedial Investigation/Feasibility Study is ongoing at the Burning Ground No. 3 site as well as other sites on the LHAAP installation, an early interim remedial action at the Burning Ground No. 3 was determined to be necessary to address the contamination detected in some of the buried waste and in the shallow groundwater. The Remedial Investigation/Feasibility Study being conducted on the Burning Ground No. 3 site, as well as the rest of the LHAAP installation, will continue.

SITE CHARACTERISTICS

The Burning Ground No. 3 area is vegetated and is dissected with dirt roads. It is located on a natural topographic high slightly west of the crest of a small topographic divide between Harrison Bayou and Saunder's Branch. The geology at this site is fairly complex with discontinuous thin layers of sand, silt, and highly plastic clay, comprising the Wilcox Formation. Groundwater is encountered from one foot to 23 feet beneath the ground surface.

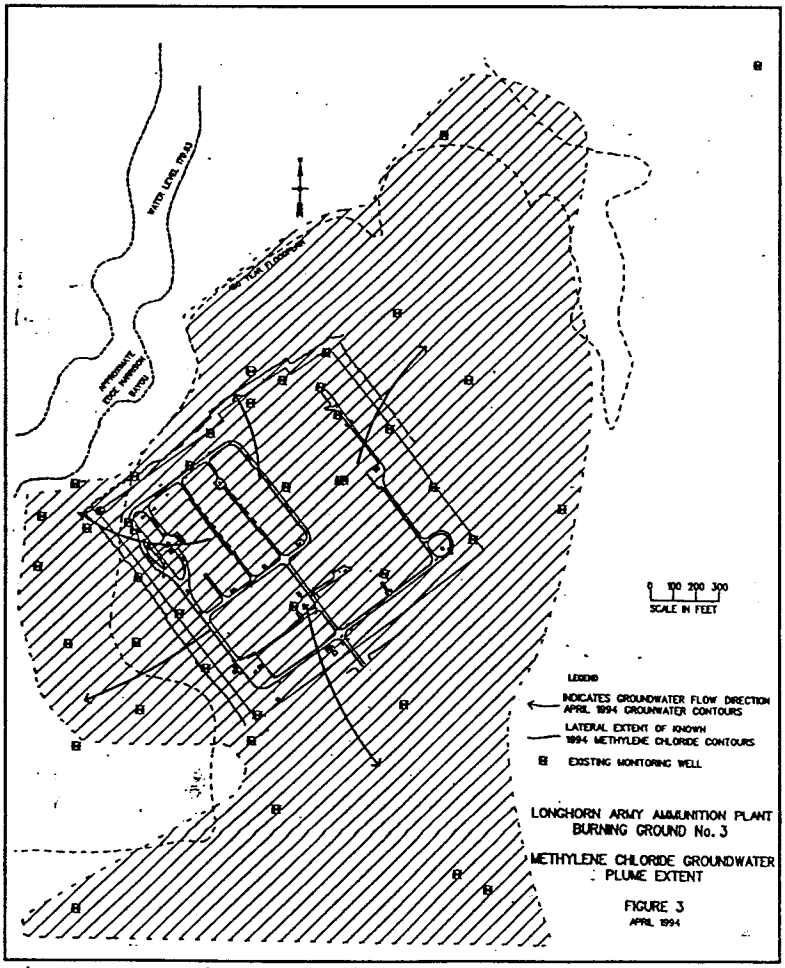

Figure 3. Site Map With Known Area of Methylene Chloride Plume

INVESTIGATION RESULTS

The discovery of contaminated material in 1976 led to the initial investigations in this area. Since then, several investigations have been performed and reports generated regarding this Burning Ground No. 3 site. Investigation results are provided in the Administrative Record. High concentrations of volatile organic compounds and heavy metals have been detected in the shallow groundwater and buried waste at the Burning Ground No. 3 site.

Groundwater Contamination

Trichloroethylene and methylene chloride are the two most commonly detected contaminants in the groundwater and have the highest concentrations detected beneath the site. The methylene chloride plume covers a larger area and has higher concentrations than the trichloroethylene plume. This is because methylene chloride is more soluble in water, more mobile and is less likely to be adsorbed to the soil than trichloroethylene.

Therefore, the degree and extent of the methylene chloride plume is depicted in this Proposed Plan. A map showing the known lateral extent of the methylene chloride plume is provided as Figure 3. Based on the groundwater elevations, the movement of the groundwater and the dissolved contaminants is in radial migration pattern (i.e., moving out in all directions). The concentrations of methylene chloride currently range from approximately 10,550 parts per million, near the center of the plume to less than or 0.005 parts per million, near the northwestern edge of the plume.

Soil Contamination and Source Material

From 1987 through 1989, 174 soil samples were analyzed for volatile organic compounds. Trichloroethylene was detected in 103 of 174 soil samples (maximum concentration 1,000 parts per million) collected at the site. Methylene chloride was detected in 64 of 174 soil samples (maximum concentration 742 parts per million). Acetone was also detected in 38 of the 174 soil samples (maximum concentration 33 parts per million). Barium, chromium, and lead were also detected in soil samples at concentrations exceeding expected background concentrations for the area.

Based on the soil sampling results, historical information, and on materials encountered during the installation of the air curtain destructor and monitoring wells in the Burning Ground No. 3 area, there continue to be sources of contamination for soil and groundwater at the Burning Ground No. 3 site. The nature and extent of the source areas are not known. The presence of various burn/demolition burial pits, a row of 18 burn pits, a heavy propellant pit, a liquid waste sump, and waste trenches surrounding the air curtain destructor have been confirmed and are possible sources.

SUMMARY OF SITE RISK

In order to evaluate the potential risks to human health and the environment from site contaminants, a risk assessment is conducted for a site. A risk assessment is a procedure which uses a combination of facts and assumptions to estimate the potential for adverse effects on human health and the environment from exposure to contaminants found at a site.

The environmental or ecological risk assessment will determine if there are any current/potential impacts on ecological receptors attributable to the site in its current condition. Human health risks are determined by evaluating known chemical exposure limits and actual concentrations at the site as identified during sampling activities. The actual contaminant concentrations are compared to the exposure concentration known to have an adverse impact. In the risk assessment, carcinogenic risks and non-carcinogenic health risks are calculated. Conservative assumptions are used in calculating risk that weigh in favor of protecting human health.

The Remedial Investigation/Feasibility Study is ongoing at the Burning Ground No. 3 site as well as at other sites on the LHAAP installation, so the true risk posed by the contaminants at the Burning Ground No. 3 site cannot be quantified at this time. High concentrations of volatile organic compounds and heavy metals have been detected in both the source material and the shallow groundwater. Increasing concentrations of contaminants have been detected in the monitoring wells at the Burning Ground No. 3 site, and the contaminated shallow groundwater plume has increased in lateral extent over the past several years. Therefore, action at this site is warranted to mitigate the potential risks posed by the site.

The documented presence of chlorinated solvents and metals in groundwater at the LHAAP Burning Ground No. 3, and close proximity of these sites to Harrison Bayou and Caddo Lake creates conditions conducive to the introduc-

tion of contaminants to these aquatic systems via groundwater transport. Consequences of this scenario could include contaminant exposure to human and ecological receptors associated with these important aquatic resources. The magnitude of human and ecological exposure and associated risk estimates are dependent upon further site characterization and have yet to be determined. Again, because the true nature and extent of contamination has not been completely determined, a risk assessment has not been conducted for the Burning Ground No. 3 site. A risk assessment will be conducted concurrently with the completion of the Remedial Investigation/Feasibility Study.

SCOPE AND ROLE OF RESPONSE ACTION

Although the Remedial Investigation/Feasibility Study is not complete, the studies undertaken to date at the Burning Ground No. 3 site have confirmed the need for action to address the source material and the shallow groundwater. This Proposed Plan documents the need for a remedial action that is considered an "early" action since it will be implemented prior to completion of the risk assessment for the site and/or for the LHAAP installation. This Proposed Plan also documents the need for a remedial action that is considered an "interim" action since it is necessary to mitigate potential risks posed by the known potential source contamination at the site.

The interim action will be implemented before the Final Remedial Investigation/Feasibility Study and the final decision. These will address all contaminated soil and groundwater at the site and will be formalized in the final Record of Decision. Therefore, the Proposed Plan addresses only the Early Interim Remedial Action for the source material and the shallow groundwater (including *Dense Non-Aqueous Phase Liquids (DNAPLs)* in the shallow zone).

The remedial objectives for the Early Interim Remedial Action are to eliminate or minimize the potential for exposure. This will be accomplished by reducing or preventing further migration of contaminants from source material and shallow groundwater into deeper groundwater zones, and (possibly) surface water bodies.

DESCRIPTION OF THE ALTERNATIVES

In order to evaluate potentially viable treatment remedial alternatives, the U.S. Army conducted several treatability studies on the source material and groundwater from the site. U.S. Army also conducted a pilot study on several collection methods to determine the most effective way to extract the shallow groundwater. The results of the treatability studies and the pilot study are contained in the Administrative Record.

Treatability studies were conducted for various treatment technologies. Only the successful technologies are discussed as alternatives. The remainder of technologies were found to be ineffective when applied on the waste present at the site. The ineffective technologies for groundwater included bioremediation, and activated carbon.

- Bioremediation was not capable of degrading the target volatile organic compounds at significant rates.

- Activated carbon technology would be cost prohibitive at the concentrations present in the groundwater. It may be reasonable to add activated carbon for final polishing if needed to remove small concentrations of volatile organic compounds after majority have been removed.

The ineffective treatment technologies for source material included bioremediation, stabilization, and chemical extraction. Bioremediation did not perform at a target rate of a minimum 20% removal. Loss of volatile organic compounds due to natural vaporization in the control sample was equivalent to volatile organic compounds loss due to biodegradation. Compound-specific analyses confirmed that with the addition of an oxidizing enzyme at least some biodegradation of trichloroethylene occurred. Methylene chloride biodegradation was negligible.

During the course of the treatability studies, it was determined that the metals contamination in the source material did not leach when analyzed using **Toxicity Characteristic Leaching Procedure** (TCLP). Therefore, stabilization and chemical extraction treatability tests were not performed for metal contamination in the source material. The alternatives presented for the source material focus on the technologies that address only the volatile organic compounds contamination.

When remediating a site, there are **Applicable or Relevant and Appropriate Requirements** (ARARs) that a remedy must meet in order to be in compliance with Federal and State laws. Given that the source material was contaminated with **spent halogenated solvents** (F002) from non-specific sources, the source material is regulated under Resource Conservation and Recovery Act (40 CFR 261, Subpart D). If a waste leaches above a certain concentration when analyzed using the Toxicity Characteristic Leaching Procedure, it is considered a hazardous waste, and is regulated under the Resource Conservation and Recovery Act, and certain Applicable, Relevant and Appropriate Requirements apply. Furthermore, if a Resource Conservation and Recovery Act regulated waste is treated, additional Applicable, Relevant and Appropriate Requirements apply.

Approximately 50,000 cubic yards of soil and source material would be addressed with any of the treatment alternatives and would be treated to reduce the volatile organic compounds contamination. The data collected during the treatability studies did not demonstrate that the full scale operation of any of the appropriate treatment technologies, with the possible exception of the incineration, can attain the **Land Disposal Restrictions** regarding treatment standards imposed under Resource Conservation and Recovery Act (40 CFR 268). The treatment technologies will comply with the Land Disposal Restrictions through a **Treatability Variance** (40 CFR 268.44) for the wastes. The treatment level range that will be established through the Treatability Variance for the treatment technologies is a 90 to 99.9 percent reduction in the concentration of the contaminants upon the completion of the treatment process. The treated soil will be used as backfill material for the trench areas. The treated source material will be placed under a landfill cap on the LHAAP installation.

Several hundred million gallons of contaminated shallow groundwater would be addressed with any of the remediation and treatment alternatives. The methods of effective extraction of the shallow groundwater has been determined through the Pilot Study, therefore, the alternatives present the potential treatment methods for the extracted contaminated water. The shallow groundwater would be treated to reduce the organic and metals contamination to a concentration level acceptable to the TNRCC and the EPA, and discharged to the surface water.

In order to determine the most effective way to extract the contaminated shallow groundwater, a Pilot Study using three methods of extraction was conducted. An Interceptor collection trench, a horizontal extraction well and a vertical extraction well were installed at the site during the spring of 1994. Two types of flow tests (gravity flow and vacuum enhanced flow) were conducted on Interceptor collection trench, horizontal extraction well, and the vertical extraction well. Results indicated that the Interceptor collection trench was the most effective of the extraction methods for extracting shallow groundwater. The vertical extraction well was also effective in extracting shallow groundwater, but its radius of influence was limited. The horizontal extraction well had negligible effect on the shallow groundwater. The vacuum tests indicated that flow rate increased and radius of influence expanded under vacuum conditions.

All alternatives except Alternative 1 will include groundwater monitoring. The monitoring is necessary to ensure that the implemented interim remedy is effective in eliminating the potential for additional off-site migration. The remedial alternatives for each of the affected media (see Table 1) are presented separately with the exception of Alternative 1 and Alternative 2. Alternatives 3 and 4 address the volatile organic compounds contamination in the groundwater. Alternatives 5 and 6 address the heavy metals in the groundwater. Metals removal is necessary to meet water quality discharge criteria. Alternatives 7 and 8 address the volatile organic compounds contamination in the source material.

ALTERNATIVES EVALUATED	MEDIA (CONTAMINANTS)
ALT. 1 - No Action	Shallow Groundwater & Source Material (Not Applicable)
Alt. 2 - Limited Action	Shallow Groundwater & Source Material (VOC and Metals)
ALT. 3 - Ultraviolet Oxidation	Shallow Groundwater (VOC)
ALT. 4 - Air Stripping	Shallow Groundwater (VOC)
Alt. 5 - Ion Exchange	Shallow Groundwater (Metals)
Alt. 6 - Metals Precipitation	Shallow Groundwater (Metals)
Alt. 7 - Incineration	Source Material (VOC)
ALT. 8 - Low Temp Desorption	Source Material (VOC)

TABLE 1

Alternative 1: No Action Source Material and Shallow Groundwater

Estimated Capital Cost: $0
Annual Operation and Maintenance: $0
Estimated Total Costs (present worth): $0
Estimated Time of Implementation:
Design/Remedial Action: 0 months
Groundwater/Surface Water Monitoring: 0 years

The No Action alternative is required by the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) for consideration. No action assumes that nothing would be done to restrict site access, address contamination, or monitor the contaminate migration. This alternative will not provide overall protection of human health and the environment; compliance with Applicable, Relevant and Appropriate Requirements; long-term or short-term effectiveness; or reduce toxicity, mobility or volume of hazardous substances.

ALTERNATIVE 2: LIMITED ACTION SOURCE MATERIAL AND SHALLOW GROUNDWATER

Estimated Capital Cost: $60,000
Annual Operation and Maintenance: $50,000
Estimated Total Costs (present worth): $608,000
Time of Implementation:
Design/Remedial Action: 3 months
Groundwater/Surface Water Monitoring: 30 years

This alternative would not take any actions to remove the source material or the contaminated groundwater or to control migration of contaminants into clean soils or groundwater. No action would be taken to restrict the groundwater contaminant plume from migrating horizontally or vertically. This alternative would consist of long term monitoring of the groundwater contaminant plume. The site would be fenced, and institutional controls, in the form of deed notices and signs, would be used to advise future property owners and potential trespassers of the potential health risks from exposures to any of the contaminated media.

ALTERNATIVE 3: WATER TREATMENT FOR VOLATILE ORGANIC COMPOUNDS UTILIZING ULTRAVIOLET OXIDATION

Estimated Capital Cost: $538,000
Annual Operation and Maintenance: $2,298,500
Estimated Total Costs (present worth): $9,500,000
Time of Implementation:
Design/Remedial Action: 5 years
Groundwater/Surface Water Monitoring: 5 years

The laboratory treatability oxidation tests utilized ozone, hydrogen peroxide, and ultraviolet light (UV) to destroy organic compounds in water. Any residual ozone or volatile organic compounds which may collect in the vapor area within the UV treatment tank are destroyed by the catalytic air treatment unit. The effluent water meets discharge requirements without toxic byproducts or air emissions. Most of the volatile organic compounds were stripped from the water in the first 60 minutes. The volatile organic compounds were of such high concentration that it made the air emissions difficult to treat. This technology is more suited to water with a methylene chloride concentration below 10 mg/l.

ALTERNATIVE 4: WATER TREATMENT FOR VOLATILE ORGANIC COMPOUNDS UTILIZING AIR STRIPPING

Estimated Capital Cost: $2,190,000
Annual Operation and Maintenance: $200,000
Estimated Total Costs (present worth): $3,000,000
Time of Implementation:
Design/Remedial Action: 5 years
Groundwater/Surface Water Monitoring: 5 years

Air stripping is most viable on the extracted water. A pilot column 14-inches in diameter and 45-feet tall with an air flow of 100 standard cubic feet per minute was determined to be suitable for achieving the desired contaminant removal. The test data showed at least 99.9997% removal of methylene chloride and of trichloroethylene. The air stripper off-gas, containing the volatile organic compounds would be oxidized to hydrogen chloride and carbon dioxide by a catalytic oxidizer. The gases are then neutralized in water solutions is discharged in accordance with approved water quality limits.

ALTERNATIVE 5: WATER TREATMENT FOR METALS UTILIZING ION EXCHANGE

Estimated Capital Cost: $5,000,000
Annual Operation and Maintenance: $4,065,000
Estimated Total Costs (present worth): $20,860,000
Time of Implementation:
Design/Remedial Action: 5 years
Groundwater/Surface Water Monitoring: 5 years

In the ion exchange process, undesirable ions are bound to a resin exchange for acceptable ions which are released to the water. An ion exchange system was designed to reduce the barium concentration in the groundwater. Treatability tests indicate that the Ion Exchange Technology was effective in the removal of metals from the contaminated water from the site. The resulting waste product may require off-site disposal.

ALTERNATIVE 6: WATER TREATMENT FOR METALS UTILIZING PRECIPITATION

Estimated Capital Cost: $1,300,000
Annual Operation and Maintenance: $200,000
Estimated Total Costs (present worth): $2,080,300
Time of Implementation:
Design/Remedial Action: 5 years
Groundwater/Surface Water Monitoring: 5 years

Treatability tests were conducted using both alum and ferric chloride as coagulants. The water pH is adjusted and a coagulant is added to cause the metals to coagulate/flocculate out of the water. In general, the ferric chloride produced faster sedimentation and a clearer supernatant. The precipitation removed may require off-site disposal.

ALTERNATIVE 7: SOIL TREATMENT FOR VOLATILE ORGANIC COMPOUNDS UTILIZING HIGH TEMPERATURE INCINERATION

Estimated Capital Cost: $26,000,000
Annual Operation and Maintenance: $50,000
Estimated Total Costs (present worth): $26,195,000
Time of Implementation:
Design/Remedial Action: 1 year
Groundwater/Surface Water Monitoring: 5 years

The high temperature incineration involves the complete incineration of the soils at a standard operating range temperature of 914° to 1922° F. Incineration generates a high volume of ash and air emissions which must be

controlled. An off gas scrubber system will be required to handle the gases. This system should consist of an alkaline scrubbing media and a particulate suppression system. The wastewater exiting the scrubber will be treated and discharged in accordance with approved water quality limits.

ALTERNATIVE 8: SOIL TREATMENT FOR VOLATILE ORGANIC COMPOUNDS UTILIZING LOW TEMPERATURE THERMAL DESORPTION

Estimated Capital Cost: $10,000,000
Annual Operation and Maintenance: $50,000
Estimated Total Costs (present worth): $10,195,000
Time of Implementation:
Design/Remedial Action: 1 years
Groundwater/Surface Water Monitoring: 5 years

The Low temperature thermal desorption treatment involves the heating and mixing of the soils at a standard operating range temperature of 302° to 482° F. The boiling point for water is 212° F. The boiling point for trichloroethylene and methylene chloride are 188° F and 108° F, respectively. This treatment technology removes the contaminants without changing the physical characteristics of the soil. Off-gases would be treated using a catalytic oxidation process.

EVALUATION OF ALTERNATIVES AND THE PREFERRED ALTERNATIVE

The preferred alternative for addressing the site contaminants and meeting the remedial objectives of this Early Interim Remedial Action is a combination of Alternatives 4, 6, and 8:

* Extraction and treatment using Air Stripping and Off-gas Treatment for volatile organic compounds and Metals Precipitation for contaminated shallow groundwater, and

* Excavation and Treatment using Thermal Desorption for the source material.

In recommending these alternatives, the performance of all of the alternatives was evaluated against nine criteria outline in the Comprehensive Environmental Response, Compensation and Liability Act regulation. Based on information currently available, the U.S. Army, EPA and TNRCC believe the preferred alternatives provide the best balance of trade-offs among the other alternatives with respect to the evaluation criteria. The preferred alternative satisfies the statutory requirements of Comprehensive Environmental Response, Compensation and Liability Act 121(b) to:

* Be protective of human health and the environment;

* Comply with Applicable, Relevant and Appropriate Requirements;

* Be cost-effective;

* Utilize permanent solutions and alternative treatment technologies to the maximum extent practicable; and satisfy the statutory preference for treatment as a principal element.

The following general discussion evaluates the preferred alternatives against the nine criteria discussed in Figure 4 and compares its performance against the other alternatives.

CERCLA CRITERIA FOR SELECTING REMEDY

CERCLA uses nine criteria, or standards, to evaluate alternatives for addressing a hazardous waste site. The nine criteria are as follows:

1. Overall Protection of Public Health and the Environment
This criterion addresses the way in which a potential remedy would reduce, eliminate, or control the risks posed by the site to human health and the environment. The methods used to achieve an adequate level of protection may be through engineering controls, treatment techniques, or other controls such as restriction on the future use of the site. Total elimination of risk is often impossible to achieve. However, a remedy must minimize risk to assure that human health and the environment would be protected.

2. Compliance With ARARs
Compliance with ARARs, or "applicable or relevant and appropriate laws and regulations," assures that a selected remedy will meet all related Federal, State and local requirements. The requirements may specify maximum concentrations of chemicals that can remain at a site; design or performance requirements for treatment technologies; and restrictions that may limit potential remedial activities at a site because of its location.

3. Long-Term Effectiveness or Permanence
This criterion addresses the ability of a potential option to reliably protect human health and the environment overtime, after the cleanup goals have been accomplished.

4. Reduction of Toxicity, Mobility, or Volume of Contaminants
This criterion assesses how effectively a proposed remedy will address the contamination problem. Factors considered include the nature of the treatment process; the amount of hazardous materials that will be destroyed by the treatment process; how effectively the process reduces the toxicity, mobility, or volume of waste; and the type and quantity of contamination that will remain after treatment.

5. Short-Term Effectiveness
This criterion addresses short-term risks to the workers and the community and the time factor. Cleanup technologies often require several years for implementation. A potential remedy is evaluated for the length of time required for implementation and the potential impact on human health and the environment during the remedial action.

6. Implementability
Implementability addresses the ease with which a potential remedy can be put in place. Factors such as technical feasibility and availability of materials and services are considered.

7. Cost
Costs (including estimated capital costs required for design and construction, and projected long-term maintenance costs) are considered and compared to the benefit that will result from implementing the remedy.

8. State Acceptance
The state has an opportunity to review the documents in the Administrative Record and the Proposed Plan and offer comments. The State may agree with, oppose, or have no comment on the preferred alternative.

9. Community Acceptance
During the public comment period, interested persons or organizations may comment on the alternatives. These comments are considered in making the final remedy selection. The comments are addressed in a document called a Responsiveness Summary, which is part of the Record of Decision.

Figure 4. Selecting a Remedy

Overall Protection of Public Health and the Environment

With the exception of the No Action Alternative and the Limited Action Alternative for the source material and groundwater, all of the alternatives provide some protection of human health and the environment. Because of the need to actively address the contamination at the Burning Ground No. 3 site, the No Action and the Limited Action alternatives will not be carried any further in the evaluation.

Although the incineration alternative (Alternative 7) would provide the highest degree of overall protection for the source material, the high temperature destruction capability of an incinerator is not necessary for the wastes from the Burning Ground No. 3 site. The preferred alternative for the source material (Alternative 8), therefore, provides overall protection in that the contaminants will be removed from the source material, and treated in the vapor stage through a catalytic oxidation unit to yield carbon dioxide and water.

The preferred alternatives for the treatment of the extracted groundwater provide the greatest overall protection while being cost effective. Alternatives 3 and 5, although providing equally effective treatment, afford no greater protection than do the preferred alternatives (4 and 6).

Compliance With Applicable, Relevant and Appropriate Requirements

Given that the source material was contaminated with spent halogenated solvents (F002) from non-specific sources, the source material is regulated under Resource Conservation and Recovery Act (40 CFR 261, Subpart D). All of the alternatives that involve treatment of the source material will have to comply with the Land Disposal Restrictions for F002 waste. The treatability studies conducted for the incineration and thermal desorption technologies indicate that effective reduction in the concentrations of the contaminants can be achieved, however, the reductions do not reduce the concentrations enough to meet Land Disposal Restrictions. Therefore, the treatment technologies will comply with the Land Disposal Restrictions through a Treatability Variance (40 CFR 268.44) for the wastes. The treatment level range that will be established through the Treatability Variance for the treatment technologies is a 90 to 99.9 percent reduction in the concentration of the contaminants upon the completion of the treatment process. Alternatives 7 and 8 can comply with the treatment level established by the Land Disposal Restrictions Treatability Variance.

Applicable, Relevant and Appropriate Requirements will be met by those alternatives involving treatment. The Applicable, Relevant and Appropriate Requirements include the location of the site within a 100-year floodplain, the treatment requirements for air emissions and the discharge criteria for the treated water.

Long-Term Effectiveness or Permanence

Although the purpose of the Early Interim Remedial Action is not necessarily to implement a permanent remedy or a remedy that will necessarily be effective in the long-term, the treatment technologies evaluated for the source material and the extracted groundwater permanently address the contamination associated with these contaminated media. Therefore, all of the alternatives involving treatment address the issue of permanence.

The long-term effectiveness of the alternatives involving treatment is very good, again due to the removal of the contaminated media and the destruction of the contaminants. However, the long-term effectiveness of the final remedy for this site will be addressed when the final Record of Decisions for the Burning Ground No. 3 site is issued.

Reduction of Toxicity, Mobility, or Volume of Contaminants

All of the treatment alternatives meet this criteria, however, the degree of reduction achieved by each of the alternatives is different. The incineration technology (Alternative 7) was much more efficient and effective in the reduction of the concentration of the contaminants. The thermal desorption technology (Alternative 8) is also very effective in the reduction of the concentration of contaminants. Thermal desorption is more efficient in their removal since the site contaminants are destroyed at a much lower temperature than in a high temperature incinerator.

3

The preferred alternatives for the treatment of the extracted groundwater (4 and 6) will meet the intent of this criteria given that the toxicity, mobility and volume of the contaminants will be reduced upon completion of the treatment. The groundwater treatment for organics alternative using biodegradation was not as effective in the reduction of the concentration of the contaminants as the preferred alternative or the ultraviolet oxidation technology (Alternative 3). The ion exchange technology (Alternative 5) for the groundwater metals treatment was as equally effective as the preferred alternative for the metals groundwater contamination Utilizing precipitation (Alternative 6). Both technologies concentrate the metals which must be disposed of off-site.

Short-Term Effectiveness

All of the alternatives involving either the excavation or extraction of contaminated media involve short-term risks to the workers and the potential for risk to the environment. However, engineering controls such as collection of the surface water runoff and the minimization of air emissions during remediation as well as the proper control and monitoring for the workers involved in the remediation should reduce the risks.

Implementability

Source Material

All of the technologies for the treatment alternatives for the source material are readily available and are technologies that have demonstrated, with the exception of the bioremediation technology, their effectiveness on addressing the contamination problems associated with the Burning Ground No. 3 site. However, administrative hurdles surrounding the implementation of the incineration alternative (Alternative 7) may make implementation difficult. Although the preferred alternative utilizing low temperature thermal desorption (Alternative 8) is relatively new, there are approximately 40 thermal desorption projects in various stages of implementation.

The technology is available, technically viable for the contamination problems at the site, and can administratively be implemented with the approval of the EPA and TNRCC.

Groundwater

The Pilot Study was performed to insure the effectiveness and implementability of the groundwater extraction system at this site. The Problems occurred during construction of the horizontal well in maintaining the correct drilling angle due to the variability in the layers of the site soils. Problems also were created by breakthrough of the grout to the surface in the disturbed areas. The horizontal well was not effective in in producing a substantial volume of water. Interceptor collection trenches and vertical extraction wells have been shown to effectively draw down the water table of the shallow groundwater as well as produce of a significant volume of water. The performance of these extraction methods meets the goal of reducing or preventing migration of the contaminated water horizontally and vertically. Installation of the interceptor collection trench is impractical at a depth greater than 40 feet and requires an unsaturated soil depth of 9 to 12 feet above the saturated soil to support equipment and prevent collapse of the trench during construction. In some areas of the site, building a soil platform is required for construction of the trench. In isolated pockets of contamination or in areas where the groundwater requiring extraction is deeper then 40 feet, it is more efficient to utilize vertical extraction wells. A combination of these extraction methods over the site is effective and implementable. Interceptor collection trenches and vacuum-enhanced liquid extraction are technologies that have been used historically for dewatering low permeability construction sites in the most time-efficient manner. These extraction technologies are readily available and have been used at numerous remediation sites, including other Comprehensive Environmental Response, Compensation and Liability Act sites.

All of the technologies for treatment of the extracted groundwater are well known and readily available. The technology that was the most effective during the treatability study and the preferred technology for removal of volatile organic compounds is air stripping (Alternative 4). This is a very common technology and is readily available from many vendors. Treatment for the off-gases would be required for any treatment technology utilized. Metals precipitation, Alternative 6, is effective, readily available, and commonly used for removal of heavy metals from water.

The preferred combination of groundwater alternatives is available, technically viable for the contaminated shallow groundwater at the site, and can be implemented with approval of the EPA and the TNRCC.

Cost

The costs for the treatment of source materials range from $10,195,000 for the preferred alternative (Alternative 8, low temperature thermal desorption) to $26,195,000 (Alternative 7, Incineration). Therefore, the preferred alternative is not only the most appropriate but also the least expensive alternative. The costs for the extraction and treatment of the shallow groundwater range from $3,000,000 (Alternative 4) to $9,500,000 (Alternative 3) for the treatment of the organic contamination, and from $2,080,300 to $20,860,000 for the metals contamination. The cost for the preferred alternatives for the groundwater treatment (4 and 6) is $5,080,300 and provide protection while being cost-effective. The estimated cost for the preferred alternatives is $15,275,300.

Regulatory Acceptance

The EPA and TNRCC have been provided the opportunity to review the investigation results, treat ability and pilot study data, and the Proposed Plan. Support for the preferred alternatives for the Early Interim Action has been indicated and will be fully evaluated during the public comment period.

Community Acceptance

Community comment is an important consideration in the final evaluation of the remedial alternative. All comments received during the 30-day public comment period and at the September 15, 1994, public meeting will be specifically addressed in the Responsiveness Summary of the Record of Decision.

SUMMARY OF THE PREFERRED REMEDIAL ALTERNATIVE

The preferred alternative for addressing the site contaminants and meeting the remedial objectives of this Early Interim Remedial Action is a combination of Alternatives 4, 6, and 8:

* Extraction and Treatment using Organic Air Stripping and Off-gas Treatment and Metals Precipitation for contaminated shallow groundwater, and

* Excavation and Treatment using Thermal Desorption for the source material and catalytic oxidation for off-gas.

Based on information currently available with respect to the evaluation criteria and the other alternatives, the U.S. Army, the EPA and the TNRCC believe the preferred alternative for the source material and for the shallow groundwater provides the best approach to achieve the remedial objectives for the Early Interim Remedial action.

Administrative Record - A file which is maintained and contains all information used to make the decision on the selection of a remedial action under the Superfund program. The file is available for public review and a copy is located at or near the site.

Applicable, Relevant and Appropriate Requirements (ARARs) - The Federal and State statutory and regulatory requirements that a selected remedy must meet. ARARs are one of nine criteria used to evaluate remedial alternatives for a site.

Catalytic Oxidation - This is a chemical oxidation process in which the volatile organic compounds are combined with oxygen at a specific temperature to yield carbon dioxide (CO_2) and water. Catalytic oxidation uses a catalyst to accelerate the rate of chemical reaction without itself being consumed. This is similar to a catalytic converter used on automobile emissions.

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) - This law authorizes the Federal Government to respond directly to releases (or threatened releases) of hazardous substances which may be a danger to public health, welfare, or the environment. U.S. EPA is responsible for managing the CERCLA program.

Defense Environmental Restoration Program - This program was formally established by Congress. It provides centralized management for the cleanup of Department of Defense hazardous waste sites consistent with the provisions of the CERCLA as amended by SARA and the National Contingency Plan and Executive Order 12580, Superfund Implementation.

Dense Non-Aqueous Phase Liquids (DNAPLs) - The undissolved liquid phase of organic compounds (or mixtures of compounds) that are immiscible (resistant to mixing) with water.

Feasibility Study - A study that identifies and evaluates alternatives for addressing site contamination at a Superfund site.

Federal Facility Agreement - An agreement entered into between the Army, the Environmental Protection Agency and usually the State to cover all phases of remediation.

Groundwater - Water found beneath the Earth's surface that fills pores between soil and gravel particles to the point of saturation. When it occurs in a sufficient quantity, groundwater can be used as a water supply.

Halogenated Organic - Chemical compound containing carbon and one of five nonmetallic, chemically simiar elements (fluorine, chlorine, bromine, iodine, astatine).

Land Disposal Restrictions - Restrictions placed on the disposal of hazardous wastes in landfills.

Monitoring Wells - Special wells drilled at specific locations on or off of a site where groundwater can be sampled at selected depths and studied to determine such things as the direction in which groundwater flows and the types and amounts of contaminants present.

National Oil and Hazardous Substances Pollution Contingency Plan (NCP) - Provides the organizational structure and procedures for preparing for and responding to discharges of oil and releases of hazardous substances, pollutants, and contaminants.

National Priorities List - U.S. Environmental Protection Agency's list of the top priority hazardous waste sites in the United States.

Parts Per Million (ppm) - Units commonly used to express low concentrations of con-taminants. For example, 1 ounce of arsenic in 1 million ounces of water is 1 ppm.

Proposed Plan - A document that explains the alternatives considered for a remedial action, identifies the preferred alternative with supporting information, and solicits public review of and comments on the process(es) described therein.

Record of Decision (ROD) - A document that describes the cleanup action or remedy selected for a site, the basis for the choice of that remedy, public comment on alternative remedies, responses to comments, and the cost of the remedy.

Remedial Investigation (RI) - An investigation to determine the nature and extent of contamination at a Superfund site and the problems that the contamination causes. The RI is performed prior to a Feasibility Study.

Resource Conservation and Recovery Act (RCRA) - The federal lay that regulates the treatment, storage and disposal of hazardous wastes.

Responsiveness Summary - A summary of the written and/or oral comments received during the public comment period after issuance of the Proposed Plan. The responses to these comments, which highlight community concerns regarding a site, are included in the summary.

Risk Assessment - An evaluation performed to assess the conditions at a Superfund site and determine the potential for adverse impacts to human health and the environment.

Source Material - Contaminated material buried at the site from which contaminants migrate into soils and groundwater.

Superfund Amendment and Reauthorization Act of 1986 (SARA) - This law authorizes the Federal Government to respond directly to releases (or threatened releases) of hazardous substances which may be a danger to public health, welfare, or the environment.

Toxicity Characteristic Leaching Procedure (TCLP)- An extraction proccess designed to determine the mobility of both organic and inorganic analytes present in liquid, solid, and multiphasic wastes.

Volatile Organic Compounds (VOCs) - A carbon based chemical compound which readily changes from the liquid to the gaseous state under atmospheric conditions.

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FOR MORE INFORMATION

For more information about the public involvement process or if you have questions about site activities at Longhorn Army Ammunition Plant Burning Ground No. 3 site, please contact:

Mr. Dave Tolbert
Remedial Project Manager
Environmental Protection Specialist
Longhorn Army Ammunition Plant
Marshall, TX 75671-1059
(903) 679-2728

Ms. Lisa Price
U.S. EPA, Region 6
1445 Ross Avenue
Dallas, TX 75202-2733
(214) 665-6427

Mr. Mike Moore
Texas Natural Resource Conservation Commission
12118 N. IH 35 @ Yager Lane
Austin, TX 78711-3087
(512) 239-2920

Burning Ground No. 3
Longhorn Army Ammunition Plant
Public Meeting

Comments will be accepted at a Community Public Meeting that will be held:

Thursday, September 15, 1994.

The meeting will begin at:
7:00 p.m. in the
Karnack High School Cafeteria,
Karnack, Texas

U.S. Army
Longhorn Army Ammunition Plant
Marshall, TX 75671-1059

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PUBLIC COMMENT INVITED

fold along dotted line, seal stamp and mail

Name _____

Address _____

City _____

State _____ Zip _____

Place Stamp Here

Commander, Longhorn AAP
ATTN: David Tolbert,
Environmental Protection
Specialist
Longhorn Army Ammunition Plant
Marshall, TX 75671-1059

BURNING GROUND NO. 3 SITE
LONGHORN ARMY AMMUNITION PLANT
PUBLIC COMMENT PERIOD

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The 30-day public comment period for the Burning Ground No. 3 site will begin on September 9, 1994, and end October 11, 1994. Your written comments MUST be postmarked by October 11, 1994.

U.S. Army would like to receive comments on the Early Interim Remedial Action Proposed and Administrative Record file for the Burning Ground No. 3 site. All significant comments will be addressed in the Responsiveness Summary for the site. If you would like to receive a copy of the Responsiveness Summary, please include you full name and address below.

Name _____

Address _____

City _____

State _____ Zip _____

United States Environmental Protection Agency | Office of Solid Waste and Emergency Response | Directive No. 9355.0-49FS EPA 540-F-93-035 PB 93-963339 September 1993

Presumptive Remedy for CERCLA Municipal Landfill Sites

Office of Emergency and Remedial Response
Hazardous Site Control Division

1.6

Put in AR

Since Superfund's incepti
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presumptive remedy appr

Presumptive remedies are
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be used at all appropriate

This directive establishes
the presumptive remedy f
tions/Feasibility Studies f
directive highlights and e
stages of the remedial in
provides clarification of and additional guidance in the following areas: (1) the level of detail appropriate for risk assessment of source areas at municipal landfills and (2) the characterization of hot spots.

BACKGROUND

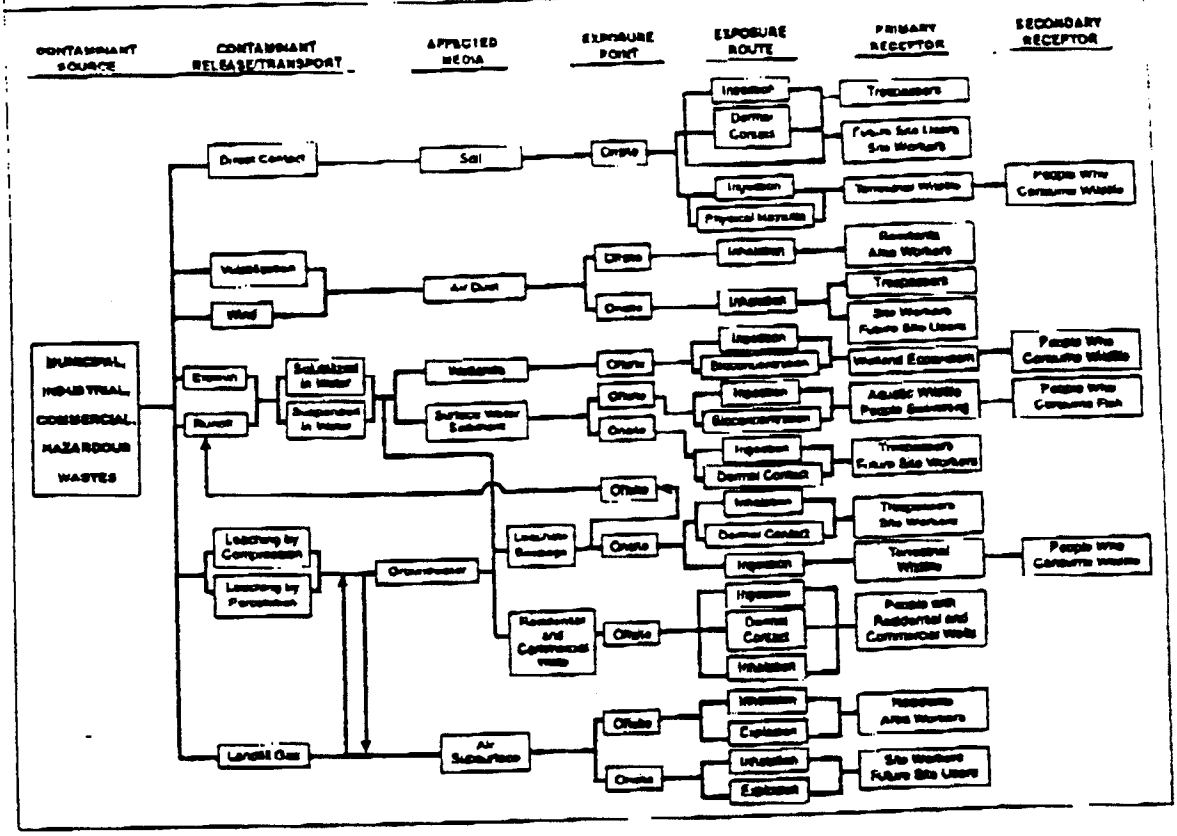
Superfund has conducted pilot projects at four municipal landfill sites[1] on the National Priorities List (NPL) to evaluate the effectiveness of the manual *Conducting Remedial Investigations/Feasibility Studies for CERCLA Municipal Landfill Sites* (hereafter referred to as "the manual") as a streamlining tool and as the framework for the municipal landfill presumptive remedy. Consistent with the National Oil and Hazardous Substances Pollution Contingency Plan (or NCP), EPA's expectation was that containment technologies generally would be appropriate for municipal landfill waste because the volume and heterogeneity of the waste generally make treatment impracticable. The results of the pilots support this expectation and demonstrate that the manual is an effective tool for streamlining the RI/FS process for municipal landfills.

Since the manual's development, the expectation to contain wastes at municipal landfills has evolved into a presumptive remedy for these sites.[2] Implementation of the streamlining principles outlined in the manual at the four pilot sites helped to highlight issues requiring further clarification, such as the degree to which risk assessments can be streamlined for source areas and the characterization and remediation of hot spots. The pilots also demonstrated the value of focusing streamlining efforts at the scoping stage, recognizing that the biggest savings in time and money can be realized if streamlining is incorporated at the beginning of the RI/FS process. Accordingly, this directive addresses those issues identified during the pilots and highlights streamlining opportunities to be considered during the scoping component of the RI/FS.

[1] Municipal landfill sites typically contain a combination of principally municipal and to a lesser extent hazardous wastes.

[2] See EPA Publication 9203.1-02I, SACM Bulletin, *Presumptive Remedies for Municipal Landfill Sites*, April 1992, Vol. 1, No. 1, and February 1993, Vol. 2, No.1, and SACM Bulletin *Presumptive Remedies*, August 1992, Vol.1, No. 3.

Highlight 2: Generic Conceptual Site Model



- Rate of contaminant release and transport (where possible);
- Affected media;
- Known and potential routes of migration; and
- Known and potential human and environmental receptors.

After the data are evaluated and a site visit is completed, the contaminant release and transport mechanisms relevant to the site should be determined. The key element in developing the conceptual site model is to identify those aspects of the model that require more information to make a decision about response measures. Because containment of the landfill's contents is the presumed response action, the conceptual site model will be of most use in identifying areas beyond the landfill source itself that will require further study, thereby focusing site characterization away from the source area and on areas of potential contaminant migration (e.g., ground water or contaminated sediments).

3. Defining Risks

The municipal landfill manual states that a streamlined or limited baseline risk assessment will be sufficient to initiate response action on the most obvious problems at a municipal landfill (e.g., ground water, leachate, landfill contents, and landfill gas). One method for establishing risk using a streamlined approach is to compare contaminant concentration levels (if available) to standards that are potential chemical-specific applicable or relevant and appropriate requirements (ARARs) for the action. The manual states that where established standards for one or more contaminants in a given medium are clearly exceeded, remedial action generally is warranted.[3]

It is important to note, however, that based on site-specific conditions, an active response is not required if ground-water contaminant concentrations exceed chemical-specific standards but the site risk is within the Agency's acceptable risk range (10^{-4} to 10^{-6}). For example, if it is determined that the release of

[3] See also OSWER Directive 9355.0-30, *Role of the Baseline Risk Assessment in Superfund Remedy Selection Decisions*, April 22, 1991, which states that if MCLs or non-zero MCLGs are exceeded, [a response] action generally is warranted.

water contamination that has migrated away from the source will not be accomplished under the presumptive

While future residential use of the landfill source area itself is not considered appropriate, the land adjacent to

landfills is frequently used for residential purposes. Therefore, based on site-specific circumstances, it may be appropriate to consider future residential use for ground water and other exposure pathways when assessing risk from areas of contaminant migration.

4. Developing the Response Action

As a first step in developing containment alternatives, response action objectives should be developed on the basis of the pathways identified for action in the conceptual site model. Typically, the primary response action objectives for municipal landfill sites include:

Presumptive Remedy

- Preventing direct contact with landfill contents;
- Minimizing infiltration and resulting contaminant leaching to ground water;
- Controlling surface water runoff and erosion;
- Collecting and treating contaminated ground water and leachate to contain the contaminant plume and prevent further migration from source area; and
- Controlling and treating landfill gas.

Non-Presumptive Remedy

- Remediating ground water;
- Remediating contaminated surface water and sediments; and
- Remediating contaminated wetland areas.

As discussed in Section 3, "Defining Risks," the containment presumptive remedy accomplishes all but the last three of these objectives by addressing all pathways associated with the source. Therefore, the focus of the RI/FS can be shifted to characterizing the media addressed in the last three objectives (contaminated ground water, surface water and sediments, and wetland areas) and on collecting data to support design of the containment remedy.

Treatment of Hot Spots

The decision to characterize and/or treat hot spots is a site-specific judgement that should be based on the consideration of a standard set of factors. Highlight 4 lists questions that should be answered before making the decision to characterize and/or treat hot spots. The overriding question is whether the combination of the waste's physical and chemical characteristics and volume is such that the integrity of the new containment system will be threatened if the waste is left in place. This question should be answered on the basis of what is known about a site (e.g., from operating records or other reliable information). An answer in the affirmative to all of the questions listed in Highlight 4 would indicate that it is likely that the integrity of the containment system would be threatened, or that excavation and treatment of hot spots would be practicable, and that a significant reduction in risk at the site would occur as a result of treating hot spots. EPA expects that few CERCLA municipal landfills will fall into this category; rather, based on the Agency's experience, the majority of sites are expected to be suitable for containment only, based on the heterogeneity of the waste, the lack of reliable information concerning disposal history, and the problems associated with excavating through refuse.

The volume of industrial and/or hazardous waste co-disposed with municipal waste at CERCLA municipal landfills varies from site to site, as does the amount of information available concerning disposal history. It is impossible to fully characterize, excavate, and/or treat the source area of municipal landfills, so uncertainty about the landfill contents is expected. Uncertainty by itself does not call into question the containment approach. However, containment remedies must be designed to take into account the possibility that hot spots are present in addition to those that have been identified and characterized. The presumptive remedy must be relied upon to contain landfill contents and prevent migration of contaminants. This is accomplished by a combination of measures, such as a landfill cap combined with a leachate collection system. Monitoring will further ensure the continued effectiveness of the remedy.

The following examples illustrate site-specific decision making and show how these factors affect the decision whether to characterize and/or treat hot spots.

Examples of Site-Specific Decision Making Concerning Hot Spot Characterization/ Treatment

Site A

There is anecdotal information that approximately 200 drums of hazardous waste were disposed of at this 70-acre former municipal landfill, but their location and contents are unknown. The remedy includes a landfill cap and ground-water and landfill gas treatment.

A search for and characterization of hot spots is not supported at Site A based on the questions listed in

2. The new response action constitutes disposal under RCRA (i.e., disposal back into the original landfill).[5]

The decision about whether a Subtitle C closure requirement is relevant and appropriate is based on a variety of factors, including the nature of the waste and its hazardous properties, the date on which it was disposed, and the nature of the requirement itself. For more information on RCRA Subtitle C closure requirements, see *RCRA ARARs: Focus on Closure Requirements*, Directive No. 9234.2-04FS, October 1989.

[5]Note that disposal of only small quantity hazardous waste and household hazardous waste does not make Subtitle C applicable.

APPENDIX A
TECHNICAL BASIS FOR PRESUMPTIVE REMEDIES

This Appendix summarizes the analysis that EPA conducted of feasibility study (FS) and Record of Decision (ROD) data from CERCLA municipal landfill sites which led to the establishment of containment as the presumptive remedy for these sites. The objective of the study was to identify those technologies that are consistently included in the remedies selected, those that are consistently screened out, and to identify the basis for their elimination. Results of this analysis support the decision to eliminate the initial technology identification and screening steps on a site-specific basis for this site type. The technical review found that certain technologies are appropriately screened out based on effectiveness, implementability, or excessive costs.

The methodology for this analysis entailed reviewing the technology identification and screening components of the remedy selection process for a representative sample of municipal landfill sites. The number of times each technology was either screened out or selected in each remedy was compiled. A detailed discussion of the methodology used is provided below.

METHODOLOGY

Identification of Sites for Feasibility Study Analysis

Of the 230 municipal landfill sites on the NPL, 149 sites have had a remedy selected for at least one operable unit. Of the 149 sites, 30 were selected for this study on a random basis, or slightly greater than 20 percent. The sites range in size from 8.5 acres to over 200 acres and are located primarily in Regions 1, 2, 3, and 5. This geographical distribution approximates the distribution of municipal landfills on the NPL.

Technology Screening and Remedial Alternative Analysis

The FS analysis involved a review of the technology identification and screening phase, including any pre-screening steps, followed by a review of the detailed analysis and comparative analysis phases. Information derived from each review was documented on site-specific data collection forms, which are available for evaluation as part of the Administrative Record for this presumptive remedy directive. The review focused on the landfill source contamination only; ground-water technologies and alternatives were not included in the analysis.

For the screening phase, the full range of technologies considered was listed on the data collection forms, along with the key reasons given for eliminating technologies from further consideration. These reasons were categorized according to the screening criteria: cost, effectiveness, or implementability. The frequency with which specific reasons were given for eliminating a technology from further consideration was then tallied and compiled into a screening phase summary table.

For the detailed analysis and comparative analysis, information on the relative performance of each technology/alternative with respect to the seven NCP criteria was documented on the site-specific data collection forms. The advantages and disadvantages associated with each clean-up option were highlighted. In some cases, a technology was combined with one or more technologies into one or more alternatives. The disadvantages of a technology/alternative were then compiled into a detailed analysis/comparative analysis summary table, under the assumption that these disadvantages contributed to non-selection. All summary tables are available for review as part of the Administrative Record.

APPENDIX A
TECHNICAL BASIS FOR PRESUMPTIVE REMEDIES (continued)

RESULTS

The information from the technology screening and remedial alternative analyses is provided in Table 1. It demonstrates that containment (the presumptive remedy), was chosen as a component of the selected remedy at all thirty of the sites analyzed. No other technologies or treatments were consistently selected as a remedy or retained for consideration in a remedial alternative. However, at eight of the thirty sites, there were circumstances where technologies were included in the selected remedy to address a site-specific concern, such as principal threat wastes. These technologies are included in the column entitled "Tech. Not Primary Component of Alternative"[1] in Table 1 and include incineration at two sites, waste removal and off-site disposal at two sites, soil vapor extraction at two sites, and bioreclamation at one site.

Leachate collection and gas collection systems were also tracked as part of the detailed analysis and comparison of remedial alternatives. These types of systems generally were not considered as remediation technologies during the screening phases. At fifteen sites, leachate collection was selected as part of the overall containment remedy. At seventeen sites, gas collection systems were selected as part of the overall containment remedy.

This analysis supports the decision to eliminate the initial technology identification and screening step for municipal landfill sites. On a site-specific basis, consideration of remediation technologies may be retained as needed.

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[1] This column title is used for record-keeping purposes only and is not meant to imply that these treatment technologies are not considered important components of the selected remedies.

TABLE 1• SUMMARY OF SCREENING AND DETAILED ANALYSIS FOR LANDFILLS [1]

Technology [2]	# FSs Where Technology Considered	# FSs Tech. Passed Screening	# FSs Tech. Screened Out	Tech. Not Primary Component of Alternative	#FSs Where Criterion Contributed To Screening Out 3			# RODs Tech. Selected	# RODs Tech. Not Selected	# RODs Where Criterion Contributed to Non-Selection							
					Cost	Effectiveness	Implement			Protect	ARARs	TMV Through Treatment	Long-term Effect.	Short-term Effect.	Cost	Implem.	State Concerns [4]	Community Concerns [4]
Multi-layer Cap	28	25	3	0	2	2	0	18	7	1	0	0	1	3	5	3	--	--
Clay Cap	16	8	8	0	1	8	0	4	4	2	2	1	2	1	0	1	--	--
Asphalt Cap	17	0	17	0	2	14	5	0	0	0	0	0	0	0	0	0	--	--
Concrete Cap	17	0	17	0	3	14	5	0	0	0	0	0	0	0	0	0	--	--
Soil Cover	16	7	5	4	0	5	1	5	2	1	0	0	0	0	0	0	--	--
Synthetic Cap	13	3	10	0	0	10	1	2	1	1	1	1	1	1	1	1	--	--
Chemical Seal	5	0	5	0	0	4	0	0	0	0	0	0	0	0	0	0	--	--
Slurry Wall	22	5	14	3	2	8	6	2	3	3	2	2	1	2	0	2	--	--
Grout Curtain	18	0	18	0	3	15	9	0	0	0	0	0	0	0	0	0	--	--
Sheet Piling	17	1	16	0	0	13	5	0	1	0	0	0	0	0	0	0	--	--
Grout Injection	8	0	8	0	0	8	2	0	0	0	0	0	0	0	0	0	--	--
Block Displacement	5	0	5	0	0	3	3	0	0	0	0	0	0	0	0	0	--	--
Bottom Sealing	5	0	5	0	0	3	4	0	0	0	0	0	0	0	0	0	--	--

TABLE 1 • SUMMARY OF SCREENING AND DETAILED ANALYSIS FOR LANDFILLS (Continued) [1]

Technology [2]	# FSs Where Technology Considered	# FSs Tech. Passed Screening	# FSs Tech. Screened Out	Tech. Not Primary Component of Alternative	# FSs Where Criterion Contributed To Screening Out [3]: Cost	Effectiveness	Implement	# RODs Tech. Selected	# RODs Tech. Not Selected	Praised	# RODs Where Criterion Contributed to Non-Selection: ARARs	TMV Through Treatment	Long-term Effect.	Short-term Effect.	Cost	Implem.	State Concerns [4]	Community Concerns [4]
Vibrating Beam	5	0	5	0	0	3	3	0	0	0	0	0	0	0	0	0	--	--
Liners	2	0	2	0	0	1	2	0	0	0	0	0	0	0	0	0	--	--
Offsite Nonhazardous Landfill	3	0	3	0	0	0	3	0	0	0	0	0	0	0	0	0	--	--
Offsite RCRA Landfill	17	0	13	4	8	3	12	0	0	0	0	0	0	0	0	0	--	--
Offsite Landfill (unspecified)	9	1	8	0	5	3	5	1	0	0	0	0	0	0	0	0	--	--
Onsite Nonhazardous Landfill	2	0	2	0	1	1	1	0	0	0	0	0	0	0	0	0	--	--
Onsite RCRA Landfill	14	1	11	2	3	2	10	0	1	0	0	0	0	0	0	1	--	--
Onsite Landfill (unspecified)	7	0	6	1	3	3	6	0	0	0	0	0	0	0	0	0	--	--
Bioremediation (unspecified)	13	0	13	0	0	13	1	0	0	0	0	0	0	0	0	0	--	--
Bioremediation Ex-situ	10	0	10	0	0	7	7	0	0	0	0	0	0	0	0	0	--	--
Bioremediation In-situ	15	1	14	0	1	13	7	1	0	0	0	0	0	0	0	0	--	--
Dechlorinization/ APEG	6	0	5	1	1	4	2	0	0	0	0	0	0	0	0	0	--	--
Oxidation/ Reduction	12	0	12	0	1	8	5	0	0	0	0	0	0	0	0	0	--	--

TABLE 1 • SUMMARY OF SCREENING AND DETAILED ANALYSIS FOR LANDFILLS (Continued)[1]

Technology [2]	# FSs Where Technology Considered	# FSs Tech. Passed Screening	# FSs Tech. Screened Out	Tech. Not Primary Component of Alternative	# FSs Where Criterion Contributed To Screening Out 3			# RODs Tech. Selected	# RODs Tech. Not Selected	# RODs Where Criterion Contributed to Non-Selection							
					Cost	Effectiveness	Implement		Protect	ARARs	TMV Through Treatment	Long-term Effect.	Short-term Effect.	Cost	Implem.	State Concerns [4]	Community Concerns [4]
Neutralization	4	0	3	1	0	2	1	0	0	0	0	0	0	0	0	0	-	-
Thermal Destruction (unspecified)	6	0	6	0	0	3	4	0	0	0	0	0	0	0	0	0	--	--
Offsite Incineration (unspecified)	19	2	14	3	9	5	10	1	1	0	0	0	0	1	1	0	--	--
Onsite Incineration (unspecified)	12	0	8	3	5	5	6	0	1	0	0	0	0	1	1	1	--	--
Fluidized Bed	9	0	9	0	5	6	4	0	0	0	0	0	0	0	0	0	--	--
Infrared	8	0	7	1	6	3	3	0	0	0	0	0	0	0	0	0	--	--
Pyrolysis	5	2	3	1	2	2	1	0	1	0	1	0	0	1	1	1	--	--
Multiple Hearth	4	0	4	0	2	2	1	0	0	0	0	0	0	0	0	0	--	--
Rotary Kiln	10	0	9	1	6	5	4	0	0	0	0	0	0	0	0	0	--	--
Vitrification	21	0	21	0	8	15	11	0	0	0	0	0	0	0	0	0	--	--
Low Temperature Thermal Desorp/ Stripping	13	1	11	1	2	8	3	0	1	0	0	0	0	0	1	0	--	--
In-situ Steam Stripping	5	0	5	0	1	4	2	0	0	0	0	0	0	0	0	0	-	--
Soil Flushing	16	2	14	0	2	9	10	0	0	0	0	0	0	0	0	0	--	-

TABLE 1 • SUMMARY OF SCREENING AND DETAILED ANALYSIS FOR LANDFILLS (Continued)[1]

Technology[2]	# FSs Where Technology Considered	# FSs Tech. Passed Screening	# FSs Tech. Screened Out	Tech. Not Primary Component of Alternative	# FSs Where Criterion Contributed To Screening Out 3: Cost	# FSs Where Criterion Contributed To Screening Out 3: Effectiveness	# FSs Where Criterion Contributed To Screening Out 3: Implement	# RODs Tech. Selected	# RODs Tech. Not Selected	Primary	# RODs Where Criterion Contributed to Non-Selection: ARARs	TMV Through Treatment	Long-term Effect.	Short-term Effect.	Cost	Implem.	State[4] Concerns	Community[4] Concerns
Soil Washing	12	2	9	1	1	8	6	0	0	0	0	0	0	0	0	0	--	--
Soil Vapor Extraction (SVE)	14	1	11	2	2	9	5	1	0	0	0	0	0	0	0	0	-	--
Fixation	7	1	5	1	0	4	2	2	0	0	0	0	0	0	0	0	--	-
Stabilization/ Solidification	20	0	19	2	1	13	5	0	0	0	0	0	0	0	0	0	--	-
Aeration	7	0	7	0	0	5	3	0	0	0	0	0	0	0	0	0	-	--

1 This study was conducted on 30 RODs and their corresponding FSs.
2 This does not the include the no-action or institutional control only alternatives. No RODs selected either of these as remedies.
3 FSs and RODs may contain more than one criterion for screening or non-selection of technology. Also, some FSs did not fully explain the criteria for screening out a technology. Thus, the totals for screening and non-selection criteria are not equal to the number of FSs and RODs considered.
4 Information on State and community concerns was not included in this analysis because FSs do not contain this information and RODs generally only reference supporting documentation (i.e., State concurrence letter and responsiveness summary).

011537

EPA

United States
Environmental Protection
Agency
Washington, D.C. 20460

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DEPARTMENT OF THE ARMY
LONGHORN/LOUISIANA ARMY AMMUNITION PLANTS
MARSHALL, TEXAS 75671-1059

011538

REPLY TO
ATTENTION OF

September 12, 1994

SMCLO-EN

Ms. Lisa Price
Superfund Enforcement
U.S. Environmental Protection Agency
1445 Ross Avenue
Dallas, Texas 75202

Dear Ms. Price:

Enclosed are two copies of the Final Chemical Data Acquisition Plan Addendum for the Remedial Investigation Sites 11, 1, XX, 27 at the Longhorn Army Ammunition Plant in Karnack, Texas

If there are any questions, please contact Mr. David Tolbert at (903) 679-2728.

Sincerely,

Lawrence J. Sowa
Lieutenant Colonel, U.S. Army
Commanding Officer

Enclosures

DEPARTMENT OF THE ARMY
LONGHORN/LOUISIANA ARMY AMMUNITION PLANTS
MARSHALL, TEXAS 75671-1059

REPLY TO
ATTENTION OF

011539

September 12, 1994

SMCLO-EN

Ms. Lisa Price
Superfund Enforcement
U.S. Environmental Protection Agency
1445 Ross Avenue
Dallas, Texas 75202

Dear Ms. Price:

Enclosed are two copies of the Final Phase II - Workplan of 125 Waste Process Sumps and 20 Waste Rack Sumps for Longhorn Army Ammunition Plant in Karnack, Texas.

If there are any questions, please contact Mr. David Tolbert at (903) 679-2728.

Sincerely,

Lawrence J. Sowa
Lieutenant Colonel, U.S. Army
Commanding Officer

Enclosures

011540

SEP 12 1994

CERTIFIED MAIL: RETURN RECEIPT REQUESTED

David Tolbert, Project Manager
Longhorn Army Ammunition Plant
Attn: SMCLO-EN
Marshall, Texas 75671-1059

Re: Draft Remedial Investigation/Feasibility Study for
Sites 13 and 14
Longhorn Army Ammunition Plant

Dear David:

Pursuant to the Federal Facility Agreement for the Longhorn Army Ammunition Plant, EPA is submitting comments on the Draft Remedial Investigation/Feasibility Study for Sites 13 and 14 Longhorn Army Ammunition Plant. EPA's comments are included as an enclosure to this letter.

If you have any questions about EPA's comments or any other matter, please contact me at my new phone number (214) 665-6744.

Sincerely,

Lisa Marie Price
Remedial Project Manager
Superfund Texas Enforcement

Enclosure

cc: Lieutenant Colonel Lawrence J. Sowa
Commanding Officer, U.S. Army
Longhorn Army Ammunition Plant
Marshall, Texas 75671-1059

Tulsa District Corps of Engineers
P.O. Box 61
Attn: Mr. Ross Nguyen
CESWT-PP-E
Tulsa, OK 74121-0061

Mike Moore, Superfund
Texas Natural Resource Conservation Commission
P.O. Box 13087
Capital Station
1700 N. Congress Avenue
Austin, TX 78711-3087

EPA Comments 9/12/94
Draft Remedial Investigation/Feasibility Study for
Sites 13 and 14
Longhorn Army Ammunition Plant

General Comments:

#1 Remedial Investigation/Feasibility Study should follow *Guidance for Conducting Remedial Investigations and Feasibility Studies under CERCLA, EPA/540/G-89/004, OSWER Directive 9355.3-01, October 1988.* Specifically, refer to Table 3-13, page 3-30.

#2 It appears that sections of the Remedial Investigation/Feasibility Study (RI/FS) Work Plan (June 1992) were transferred directly to this draft RI/FS for sites 13 and 14 without the benefit of updating, eliminating, and/or introducing information based on the work that was conducted for the RI/FS.

#3 Most of the figures included from the RI/FS Work Plan without the benefit of updating, elimination, and/or introducing information based on the work that was conducted for the RI/FS. Furthermore, much of the information presented on many of the figures is illegible. Examples: Figures 2-1, 2-2, 2-4, 2-5, 2-6, 3-1, 4-1.

#4 Pursuant to the Federal Facility Agreement for the Longhorn Army Ammunition Plant, secondary documents (i.e., data reports, site characterization summaries, etc.) "*are discrete portions of the primary documents and are typically input or feeder documents*" (Section VIII. Consultation with EPA and [TNRCC], Paragraph B.2.).

In compliance with the Federal Facility Agreement, EPA has received the secondary documents associated with the RI for sites 13 and 14, and EPA has provided comments when needed. Also in compliance with the Federal Facility Agreement, the secondary documents were to be revised only in the context of the associated primary document, i.e., not revised and resubmitted as "stand alone" documents. Therefore, it is inappropriate to reference data documents (eg. "...*Final SDR Report (Ebasco, October 1993).*" page 5-6, Section 5.6 and 6-6, Section 6.6) or any other secondary documents in a primary document. All relevant information, including results of all analytical, should be included in this RI for sites 13 and 14.

#5 Dates in the document should be presented in non-military form, i.e., month, day, year.

Specific Comments:

#6 Page 1-1, Section 1.1, last sentence on page: Replace with "*The Remedial Investigation/Feasibility Study (RI/FS) was conducted in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), as amended by Superfund Amendments and Reauthorization Action (SARA), and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). The purpose of the RI/FS is to assess site conditions and evaluate alternatives to the extent necessary to select a remedy.*"

#7 Page 1-2, Section 1.2: Replace "*non-incorporated*" with "*unincorporated*".

#8 Page 1-4, last paragraph: Is this the facility's current mission?

#9 Page 1-5, Section 1.4.2, last paragraph: Spell out EPS, and identify the acronym.

#10 Page 2-1, first paragraph, last sentence: Delete "*...conducted by Sverdrup.*"

#11 Page 2-10, Section 2.5: Section should be updated, including the fact that Caddo Lake is a water supply for Shreveport, LA and Marshall, TX.

#12 Page 2-12, Section 2.6: Add mean sea level or MSL to the elevations given in this section.

#13 Page 2-16, first paragraph: Add water moccasin to the reptiles common to the area.

#14 Pages 2-17 and 2-19: What is the "*DA*" that is the reference for the information presented on this page?

#15 Page 2-20, last paragraph: Delete last paragraph as it does not relate to this RI/FS for sites 13 and 14.

#16 Page 3-1, Section 3.2: The text should clearly state that the "site" presented in Figure 3-2 is as it was suspected to be prior to the field work for the RI.

#17 Sections 3.4 and 4.4: Section heading is very confusing and should be changed to reflect what the section actual represents, i.e., a presentation of historical data and records information.

#18 Page 3-4, second paragraph: "*Soil borings drilled by the U.S. Army Corps of Engineers (COE) for foundation design...*" When?

#19 Page 3-5, Section 3.3: "*No investigations have been performed to date.*" Need to

update this section. See general comment #2.

#20 Sections 3.5, 3.6, 4.5 and 4.6: First, these sections should have been updated using what is now known regarding contamination. Second, pursuant to the RI/FS guidance (See comment #1), this information should be presented in the context of contaminant fate and transport after the discussion of the results of the RI.

#21 Page 3-9, first paragraph and Page 4-9, second paragraph: "*Overall low hydraulic conductivities and the highly interbedded nature of the Wilcox strata also combine to strongly inhibit groundwater movement in vertical and horizontal directions.*" Given what is known about the nature and extent of ground water contamination on the facility, this statement is inappropriate.

#22 Page 4-3, third paragraph: "*Four soil borings drilled for foundation design by the COE...*" When was the drilling conducted?

#23 Page 4-3, first paragraph: The text should clearly state that the "site" presented in Figure 4-2 is as it was suspected to be prior to the field work for the RI, i.e., this does NOT represent current site conditions.

#24 Chapter 5 and Chapter 6: All data related to the phase I RI investigation should be included in this document. See general comment #4.

The document should clearly state that contamination associated with the suspected or reported activities in these locations was NOT detected. Furthermore, the document should clearly state and explain that the "*positive analytical results*" do NOT necessarily represent a "contaminated environment."

#25 Page 5-1, Section 5.1, first paragraph: Delete reference to Ebasco's Chemical Data Acquisition Plan Addendum dated February 1992. The only APPROVED Chemical Data Acquisition Plan is Volume 2 of the EPA approved RI/FS Work Plan dated June 1992.

#26 Page 5-3, Section 5.2 and Page 6-2, Section 6.2: The discussion on UXO clearing and the purpose of it should be explained in greater detail.

#27 Pages 5-3 and 5-4, Section 5.3 and Page 6-4, first paragraph: "*Borings...were generally completed using the hollow-stem auger method...*" What other method was used? If all of the borings were not drilled using hollow-stem auger, delete the term "*generally*" and explain the deviation from the work plan.

#28 Pages 5-4 and 5-5, Section 5.4 and Pages 6-4 and 6-5, Section 6.4: The ground water grab sampling was proposed by the COE and was approved by EPA with

qualifications. Either include in the text the information from note on the bottom of Table 5-3/6-3 or delete the discussion.

#29 Page 5-5, second paragraph, first sentence: Change "*BH-11*" to "*SB-11*".

#30 Page 5-6, Section 5.6 and Page 6-6, Section 6.6: See general comment #4 regarding the referencing of secondary documents in this primary document.

#31 Page 5-6, Section 5.6 and Page 6-6, Section 6.6: "*Due to the general lack of correlation between the TICs reported and the target compounds found in samples, the TICs are not considered reliable indicators of site-related contamination.*" Such a statement without supporting information is troublesome.

Pursuant to EPA's *Risk Assessment Guidance for Superfund Volume I Human Health Evaluation Manual (Part A), EPA/540/1-89/002, December 1989*, there are two options for addressing TICs, depending on the relative number of TICs compared to non-TICs. When only a few TICs are present compared to the Target Analyte List (TAL) and Target Compound List (TCL) and no historical or site information indicates the TICs to be related to by-products, etc., TICs are generally eliminated. If many TICs are present relative to the TAL and TCL compounds identified, or if TIC concentrations appear high or site information indicates that TICS are indeed present, then further evaluation of TICs is necessary. Given that information regarding the number of TICs identified and their concentrations is not presented, the reliability or unreliability of TICs as an indication of site contamination cannot be assessed.

#32 Page 5-7, first paragraph and Page 6-7, first paragraph: Add the redlined information to the following sentences. "*Current site specific background data were selected...The rationale for selecting site specific background sample locations is provided...Tables...summarize site specific background concentrations...*"

#33 Page 5-7, first paragraph, last sentence: Delete reference to facility background study and expected completion date.

#34 Page 5-8, Table 5-3 and Page 6-8, Table 6-3: Pursuant to the Primary Drinking Water Regulations, the MCL and MCLG for nitrate is 10.0 mg/l, and the MCL and MCLG for nitrate is 1.0 mg/l.

The Secondary Drinking Water Regulations MCL for pH is 6.6 to 8.5.

The Lifetime Health Advisory for RDX is 0.002 mg/l.

MCLGs are health-based standards for carcinogens and noncarcinogens. MCLs for Primary and Secondary Standards under the CWA are designed to come as

close as feasible to the respective MCLG, but MCLs take into account the best technologies and treatment techniques as well as other factors. Therefore, the footnote to the table must be corrected.

#35 Chapter 7: The baseline risk assessments should be part of the text of this document.

#36 Chapter 8, Section 8.1: Add to the last sentence "*The Baseline Risk assessments conducted indicate the sites pose no public health or ecological threat to the environment in their current condition, therefore, no remediation is warranted.*"

#37 Chapter 8, Section 8.2: Delete this section.

#38 If the Baseline Risk Assessments were completed in June 1994, why weren't they submitted to EPA?

#39 Baseline Risk Assessments, page 3, first paragraph: See general comment #4 regarding the referencing of secondary documents in this primary document.

#40 Baseline Risk Assessments, page 3, second paragraph, last sentence: Add "*Results show...concentrations...near expected background...*"

NEWS MESSENGER

MARSHALL, TEXAS

011546

LONGHORN ARMY AMMUNITION PLANT

PUBLIC MEETING

SEPTEMBER 15, 1994

KARNACK, TEXAS

LOCATION: KARNACK HIGH SCHOOL CAFETERIA

TIME: 7:00 P.M.

TOPIC:
ENVIRONMENTAL RESTORATION WORK
AT BURNING GROUND #3

ALL INTERESTED PARTIES ARE INVITED
QUESTIONS AND COMMENTS ARE WELCOMED

011547

LONGHORN ARMY AMMUNITION PLANT

PUBLIC MEETING ATTENDANCE ROSTER

SEPTEMBER 15, 1994 7:00 P.M.
KARNACK HIGH SCHOOL CAFETERIA

NAME (PLEASE PRINT)	ADDRESS & PHONE NUMBER (INCLUDE AREA CODE)
Cynthia McGeorge	303 Caddo Marshall, TX 75670
Stefanie Bibb	Rt. 1 Box 925 Karnack 903 679 3310
Jim Bibb	Same
ABDELL SWEATMAN	Rte 2 Box 62 B KARNACK TEX 75
Bobbie Sweatman	" " " " 1
C. & Bibb	" " 925 A " "
Deanna Calistcle	Rt 2 Box 113-A Karnack 756 1
Ray Zell & Dorothy Williams	Rte 1, Box 765 Karnack, TX
Jannie M. Livingston	Rte 1, Box 760 Karnack, TX
Raymond Martha Lewis	Rt 1 Box 606 Karnack Tx 75661
Marshall Ford	600 American Tower Shreveport 71101
Tom McClung	402 E. Emory Marshall, TX
Bernie Berg	Rt 4 Box 478 Marshall TX
Betty Marsden	Rt 3 - Box 710 Marshall Tx 75
Pattie Marsden Crothers	800 Pinecrest " "

ATTENDEES @ PREVIOUS MEETING

SCRATCHED OUT AT THINK IT WAS

BLANK

011549

LONGHORN ARMY AMMUNITION PLANT

PUBLIC MEETING ATTENDANCE ROSTER

SEPTEMBER 15, 1994 7:00 P.M.
KARNACK HIGH SCHOOL CAFETERIA

NAME (PLEASE PRINT)	ADDRESS & PHONE NUMBER (INCLUDE AREA CODE)
~~Bill Corrigan~~	~~Rt 1 Box 1092 Jef~~
Jimmie R. Taylor (Pickering Firm)	4508 Summerhill Road (903) 793-3100 Texarkana, TX 75503
Jim Schneider	1717 E. Erwin, Tyler, TX 75703 (903) 581-[illegible]16
Bill + Connie Corrigan	Rt 2 Box 153 Karnack, Tx 75661
~~Chris Edgmon~~	~~P.O. Box 107, Karnack TX 75661~~
Bill Sniffen	(318) 459-5132 891 Baker Rd. Haughton, LA 71037
~~Sara Kreipe~~	~~3703 Bridle Path, Marshall, 938-3545~~
~~Wade Anderson~~	~~1406 [illegible] Bartlesville OK [illegible] 918 336-[illegible]~~
~~Cliff Murry~~	~~6624 S 67E, Tulsa, OK 74133 918 488-9038~~
Terry Stallworth	P.O. Box 236 Marshall Tx 75670
Billy Gee	Rz Bx 113B Karnack, TX
~~Jannie M Shelton~~	Rt 2. Box 20 A-1 Karnak
Mrs. Robert L. Bland	P.O. Box 71, Karnack 679-3[illegible]7.
~~Dr Kathleen Buchi~~	~~SFIM-AEC-TSP Aberdeen Proving Ground~~ MD 21010-5401

011550

LONGHORN ARMY AMMUNITION PLANT

PUBLIC MEETING ATTENDANCE ROSTER

SEPTEMBER 15, 1994 7:00 P.M.
KARNACK HIGH SCHOOL CAFETERIA

NAME (PLEASE PRINT)	ADDRESS & PHONE NUMBER (INCLUDE AREA CODE)
✓ TOMMY WHALEY	217 PITTS MARSHALL TEXAS 75670
✓ Myer a. Pisani	1H Walnut Dr Fuqua
Dorothy P Grant	Rt 2 Box 66 Uncertain Tex 75661 ✓
Pete Grant	" " "
~~Stan Hitt~~	~~EPA Dallas~~
✓ FRANK GADMAN	RT 2 BOX 100-B KARNACK TX 75661
✓ FRANCES GADMAN	Rt 2 Box 100B KARNACK TX 75661
✓ Dick + Betty Ingram	Rt 2 Box 111 B1 Karnack Tx 7566
✓ Ruth & HAROLD CULVER	Rt 1 Box 787 - Karnack, Tx 75661
~~Jim Cate~~	~~645 ASHBOURNE, SHREVEPORT, LA 71106~~
~~[illegible]~~	~~280 Miller Rd, Bossier City La~~
~~David A [illegible]~~	~~400 West Sam Houston Pkwy Houston Tx 77042~~ 278-29: -12
✓ Becky Gillette	107 Belaire, Carthage Tx 75633
~~Mary Tolbert~~	~~1311 Bellaire Bossier City La 71112~~
~~Mark Woeger~~	~~8009 B TUSCARORA TY Austin, TX. 78729~~

011551

LONGHORN ARMY AMMUNITION PLANT

PUBLIC MEETING ATTENDANCE ROSTER

SEPTEMBER 15, 1994 7:00 P.M.
KARNACK HIGH SCHOOL CAFETERIA

NAME (PLEASE PRINT)	ADDRESS & PHONE NUMBER (INCLUDE AREA CODE)
Gail Masters	RR#1 Box 760-A KARNACK, 75661 (903) 679-4068
Annine Barbuk	15206 Omega Rd. Rockville MD 20878 (301) 216 9696
DWIGHT SHELLMAN	P.O. Box 2710 Aspen Co 81612 303/ 925-2710
~~JAMES D. MOONEY~~	
JAMES D. MOONEY	RT. 3 BOX 307, MARSHALL, TX 75670 903 935-7609
Hazel Bradley	Rt 1 Box 738 Karnack 24 ar 75661 903.679 3018
DON HARPER	603 Lansdoone MARSHALL
RICK MICHAELS	Rt. 6 Box 63 Marshall, TX
JoAnne + Ted IMHOF	Rt. 2 Box 9588 KARNACK, TX.
Mary R Humphrey	PO Box 446 KARNACK TX
JEAN RHODES-KNUCKOLS	RT 2 Box 115 Karnack TX 75661
JOHN KNUCKOLS	RT 2 Box 115 Karnack TX 75661
Emma Curry	Rt 1 Box 570 Karnack Tx 75661

011552

LONGHORN ARMY AMMUNITION PLANT

PUBLIC MEETING ATTENDANCE ROSTER

SEPTEMBER 15, 1994 7:00 P.M.
KARNACK HIGH SCHOOL CAFETERIA

NAME (PLEASE PRINT)	ADDRESS & PHONE NUMBER (INCLUDE AREA CODE)
CARROLL CAMPBELL	P.O. Box 779 HALLSVILLE, TX 75650
Roy Darville	2103 George Gregg Marshall, Tx 75670
Barbara Ornitz	Po Box 2710, Aspen, Co 81612
Tony N. Williams	Rt. 6, Box 389 Marshall, Tex. 75670
Lary Pinney Gee	RT 2, Box 113B KARNACK 75661
Tracy Huff	Rt. 4 Box 478 Marshall, Tx 75670
Eddie J Jackson	RT. 2 Box 278 KARNACK TX 75661

011553

Mr. Scott Baldwin, Sr.
Baldwin & Baldwin
P. O. Box 1349
Marshall, TX 75670

Mr. Mike Anderson
Room 313
Harrison County Courthouse
Marshall, TX 75670

Mr. James D. Mooney
Room 313
Harrison County Courthouse
Marshall, TX 75670

Mr. Bob Speight
Rt. #2, Box 105
Karnack, TX 75661

Mr. Charles Treadwell
Rt. 2, Box 240
Jefferson, TX 75657

Mr. Martin E. Whelan
404 South Frion
Jefferson, TX 75657

Mr. Jerry Stallworth
Caddo Lake Task Force
P. O. Box 520
Marshall, TX 75670

Mr. James D. Mooney
County Commissioner, Precinct #1
Room 313
Harrison County Courthouse
Marshall, TX 75670

Mr. William D. Power
County Commissioner, Precinct #2
Room 313
Harrison County Courthouse
Marshall, TX 75670

Mr. Mike Adkisson
County Commissioner, Precinct #3
Harrison County Courthouse
Marshall, TX 75670

Mr. H. W. McCoy
County Commissioner, Precinct #4
Room 313
Harrison County Courthouse
Marshall, TX 75670

Mr. Jessie M. DeWare IV, Chairman
Cypress Valley Navigation District
P. O. Box 668
Jefferson, TX 75657

Ms. Dorothy P. Grant, Vice Chairman
Cypress Valley Navigation District
Rt. #2, Box 66
Karnack, TX 75661

Mr. Tom Tanner, Secretary/Treasurer
Cypress Valley Navigation District
Rt. 2, Box 2307
Jefferson, TX 75670

Mr. Thomas E. Pritchard, Park Mgr.
Caddo Lake State Park
Rt. 2, Box 15
Karnack, TX 75661

Mr. Tony N. Williams, City Mgr.
City of Marshall
P. O. Box 698
Marshall, TX 75670

VIP LIST

011554

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Protecting Texas by Reducing and Preventing Pollution

September 19, 1994

CERTIFIED MAIL

RETURN RECEIPT REQUESTED

David Tolbert, Project Manager
Longhorn Army Ammunition Plant
Attn: SMCLO-EN
Marshall, Texas 75671-1059

Re: Longhorn Army Ammunition Plant
Draft Final Remedial Investigation/Feasibility Study Report
Sites 13 and 14

Dear Mr. Tolbert:

The Texas Natural Resource Conservation Commission (TNRCC) staff have completed our review of the subject document, dated August (July) 1994. Our comments are enclosed.

If you have any additional questions or comments, please contact me at (512) 239-2483.

Sincerely yours,

Michael A. Moore
RI/FS II Unit
Superfund Investigation Section
Pollution Cleanup Division

MM:

Enclosure

cc: Capt. Ross Nguyen, COE Tulsa District
Lisa Price (6H-ET), EPA Region VI
Bud Jones, LEGAL/FO - Region 5/Tyler
Mark Weegar, WASTE/IHW - Corrective Action
Alvie Nichols, WASTE/PC - Superfund Engineering

TNRCC Comments
on
Longhorn Army Ammunition Plant
Draft Final Remedial Investigation/Feasibility Study Report
Sites 13 and 14

Section	Page	Comment
General		There is no References section.
1.4.1	1-5	The referenced document probably should be " ... Evaluation of **Solid** Waste Management Units ... ".
2.5	2-10	Previous Army documents mention that Caddo Lake is used as a public water supply source by the cities of Marshall, Texas and Shreveport, Louisiana. If this is true, the fact should be noted in this report.
5.2	5-3	"UXO" should be spelled out the first time it is used, and should be included in the list of acronyms on page vi. Was any UXO found?
5.6	5-6	This document is a primary document which should include the results of the remedial investigation; therefore, the "Final SDR Report", and any other documents which form the basis for the conclusions in the RI report, should be made a part of the report.
5.6	5-6	Appendix D is the Baseline Risk Assessment, which does not include a list of TIC's. The rationale for excluding any contaminants which were detected from the risk assessment must be explained.
5.6	5-7	As noted in the last sentence of the first paragraph, background concentrations have not yet been determined, and there are no standards for "groundwater grab" samples. This paragraph needs to be reworded.

Section	Page	Comment
5.6	5-7	It is appropriate to compare parameter concentrations or levels to regulatory standards (such as MCL's and MCLG's), and to established background concentrations, but not to other sites being investigated.
5.6	5-7 thru 5-13	"Groundwater grab samples" are not ground water samples, cannot be presented as providing data that are representative of ground water conditions at the sites, and are not an accepted remedial investigation technique; therefore, any discussion of "groundwater grab samples" and the data thus obtained should be segregated from the rest of the report.
6	6-1 thru 6-14	Same comments as for Chapter 5, where applicable.
6.6	6-14	It is not clear why the last sentence above the table is there. Most of the section seems to discuss results of the ground water investigation. It would probably be easier to understand if ground water and surface water are discussed in separate paragraphs or sections.
7	7-1	The last sentence of this section should read more like the last sentence of section 8.1 on the following page.
Baseline Risk Assessment	General	It is noted that metals exceeded "site background" concentrations in a substantial number of samples. This situation seems to contradict the conclusion that the sites are not contaminated, and would indicate the need for quantification of human health risk in order to justify no further remedial action. It is recommended that comparisons of metals in soils be revised using statistically valid background concentrations as determined in the soils background study, after that study has been completed and accepted by EPA and TNRCC.

Section	Page	Comment
Baseline Risk Assessment	3 - 4	The reference to "the Environmental Protection Agency's ... criterion for domestic water supply" needs to be clarified. If this refers to MCL's and/or MCLG's, those concentrations are 2 mg/l for barium and 0.05 mg/l for selenium (for both MCL and MCLG), according to the current edition of IRIS.

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CERTIFIED MAIL: RETURN RECEIPT REQUESTED P104 195 165

David Tolbert, Project Manager
Longhorn Army Ammunition Plant
Attn: SMCLO-EN
Marshall, Texas 75671-1059

Re: Updated Schedule for
Primary and Secondary Documents for
Longhorn Army Ammunition Plant

Dear David:

Pursuant to the Federal Facility Agreement for the Longhorn Army Ammunition Plant, EPA is submitting comments on the Updated Schedule for Primary and Secondary Documents for Longhorn Army Ammunition Plant. EPA originally submitted comments on January 19, 1994 on the last requested update to the schedule (Army letter dated December 2, 1993). However, because of the continuation of unresolved issues, EPA is submitting the following comments:

#1 *EPA agreed with the Army's request to project the updated schedule only through the completion and finalization of the Remedial Investigation (RI) for Group #1, #2, and #4 sites. EPA has expressed during our monthly meetings, however, that as soon as the Site Characterization Summary has been completed for the groups of sites an addendum to this schedule or new updated schedule must be submitted for the Feasibility Study (FS), the Record of Decision (ROD) activities, the Remedial Design/Remedial Action (RD/RA), and all associated secondary documents.*

Furthermore, as there are many activities for the associated with the actual FS (i.e., treatability studies, detailed analysis of alternatives), EPA hopes that the Army has taken into consideration EPA's January 19, 1994, comments regarding the parallel tracks for the studies and report preparation.

#2 *EPA continues to object to the time required to complete the RI for the Group #1 sites. The schedule for the completion of the RI only shortened 30 days (from February 21, 1996 to January 21, 1996) based on EPA's January 19, 1994, comments. Because the schedule is not carried beyond the completion and finalization of the RI, EPA assumes the overall RI/FS and ROD process has not been affected by EPA's January 19, 1994, comments. Therefore, EPA objections stand on the time required to resolve the Group #1 sites.*

#3 *From the draft December 1993 update to this August 1994 update, the completion and finalization of the RI has been EXTENDED four (4) months! EPA finds this not only puzzling but objectionable.*

#4 *As was discussed in the August 30, 1994, project coordinators meeting, the issue concerning the removal of the TNT pipeline is in question, therefore, EPA will not comment on the proposed schedule for this activity.*

#5 *For the Group #5 sites, the schedule should not reflect a finalization period of 14 days for the Field Summary Report. It is a secondary document, therefore does not require formal finalization. See EPA's January 19, 1994, comments.*

#6 *The schedule for the Hydrogeologic Assessment is misleading. According to EPA's records, the Hydrogeologic Assessment itself will be submitted to EPA in January 1995, not the work plan for the assessment.*

#7 *As it is critical to determine work in progress and work planned, EPA requests that "work break down" schedules as well as monthly status updates of site activities be provided to EPA.*

#8 *Although the DERPMIS Resolution Document cannot be considered a primary document, pursuant to the Federal Facility Agreement for the Longhorn Army Ammunition Plant, EPA requests that a schedule be established for the ultimate resolution of this document.*

If you have any questions about EPA's comments or any other matter, please contact me at (214) 665-6744.

Sincerely,

Lisa Marie Price
Remedial Project Manager
Superfund Texas Enforcement

cc: Lieutenant Colonel Lawrence J. Sowa
Commanding Officer, U.S. Army
Longhorn Army Ammunition Plant
Marshall, Texas 75671-1059

Tulsa District Corps of Engineers
P.O. Box 61
Attn: Mr. Ross Nguyen
CESWT-PP-E
Tulsa, OK 74121-0061

011560

Mike Moore, Superfund
Texas Natural Resource Conservation Commission
P.O. Box 13087
Capital Station
1700 N. Congress Avenue
Austin, TX 78711-3087

011561

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Protecting Texas by Reducing and Preventing Pollution

September 20, 1994

CERTIFIED MAIL

RETURN RECEIPT REQUESTED

David Tolbert, Project Manager
Longhorn Army Ammunition Plant
Attn: SMCLO-EN
Marshall, Texas 75671-1059

Re: Longhorn Army Ammunition Plant
Soil and Groundwater Background Concentration Study
Phase I investigations of 125 Waste Process Sumps and
20 Waste Rack Sumps
Final Work Plan Addendum

Dear Mr. Tolbert:

The Texas Natural Resource Conservation Commission (TNRCC) staff have completed our review of the subject document, dated August 1994. The TNRCC staff concur with the Army's planned approach, as described in the work plan addendum.

If you have any additional questions or comments, please contact me at (512) 239-2483.

Sincerely yours,

Michael A. Moore
RI/FS II Unit
Superfund Investigation Section
Pollution Cleanup Division

MM:

Enclosure

cc: Capt. Ross Nguyen, COE Tulsa District
Lisa Price (6H-ET), EPA Region VI
Bud Jones, LEGAL/FO - Region 5/Tyler
Mark Weegar, WASTE/IHW - Corrective Action
Alvie Nichols, WASTE/PC - Superfund Engineering