LONGHORN ARMY AMMUNITION PLANT

KARNACK, TEXAS

ADMINISTRATIVE RECORD

VOLUME 2 of 10

1995

Bate Stamp Numbers
012635 - 012768

Prepared for:

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

1995

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS
ADMINISTRATIVE RECORD - CHRONOLOGICAL INDEX

VOLUME 2 of 10

1995

A. **Title:** Letter - Subject: Transmission of Proposed Plan of Action for Group 3 Sites (13 And 14)
Group(s): 3
Site(s): LHAAP-13 Suspected TNT Burial Between Active Landfill And Old Landfill
LHAAP-14 Area 54 Burial Ground
Location: Longhorn Army Ammunition Plant, Marshall, Texas
Agency: Department Of The Army, Longhorn Army Ammunition Plant
Author(s): Mr. Lawrence J. Sowa, Lieutenant Colonel, U.S. Army
Recipient: Mr. Michael A. Moore, RI / FS II Unit, Superfund Investigation Section
Date: March 27, 1995
Bate Stamp: 012635

B. **Title:** Letter - Subject: Addendum to the Phase 2 Work Plan for Wasteline Sampling and the Associated Chemical Data Acquisition Plan for Longhorn Army Ammunition Plant
Group(s): 2
Site(s): LHAAP-12 Active Landfill
LHAAP-16 Old Landfill
LHAAP-17 No. 2 Flashing Area / Burning Ground
LHAAP-18 & LHAAP 24 Burning Ground / Washout Pond & Evaporation Pond
LHAAP-29 Former TNT Production Area
LHAAP-32 Formal TNT Waste Disposal Plant
Location: Longhorn Army Ammunition Plant, Marshall, Texas
Agency: Department Of The Army, Longhorn Army Ammunition Plant
Author(s): Mr. Lawrence J. Sowa, Lieutenant Colonel, U.S. Army
Recipient: Ms. Lisa M. Price, Environmental Protection Agency
Date: March 30, 1995
Bate Stamp: 012636

C. **Title:** Letter - Subject: Addendum to the Phase 2 Work Plan for Wasteline Sampling and the Associated Chemical Data Acquisition Plan for Longhorn Army Ammunition Plant
Group(s): 2
Site(s): LHAAP-12 Active Landfill
LHAAP-16 Old Landfill
LHAAP-17 No. 2 Flashing Area / Burning Ground
LHAAP-18 & LHAAP 24 Burning Ground / Washout Pond & Evaporation Pond
LHAAP-29 Former TNT Production Area
LHAAP-32 Formal TNT Waste Disposal Plant
Location: Longhorn Army Ammunition Plant, Marshall, Texas
Agency: Department Of The Army, Longhorn Army Ammunition Plant
Author(s): Mr. Lawrence J. Sowa, Lieutenant Colonel, U.S. Army
Recipient: Mr. H. L. Jones, Texas Natural Resource Conservation Commission
Date: March 30, 1995
Bate Stamp: 012637

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS
ADMINISTRATIVE RECORD - CHRONOLOGICAL INDEX

VOLUME 2 of 10 (Continued)

1995

D. **Title:** Letter - Subject: Addendum to the Phase 2 Work Plan for Wasteline Sampling and the Associated Chemical Data Acquisition Plan for Longhorn Army Ammunition Plant
Group(s): 2
Site(s): LHAAP-12 Active Landfill
LHAAP-16 Old Landfill
LHAAP-17 No. 2 Flashing Area / Burning Ground
LHAAP-18 & LHAAP 24 Burning Ground / Washout Pond & Evaporation Pond
LHAAP-29 Former TNT Production Area
LHAAP-32 Formal TNT Waste Disposal Plant
Location: Longhorn Army Ammunition Plant, Marshall, Texas
Agency: Department Of The Army, Longhorn Army Ammunition Plant
Author(s): Mr. Lawrence J. Sowa, Lieutenant Colonel, U.S. Army
Recipient: Mr. Michael A. Moore, RI / FS II Unit, Superfund Investigation Section
Date: March 30, 1995
Bate Stamp: 012638

E. **Title:** Letter - Subject: Transmission of Final Soil Background Concentration Report for LHAAP
Group(s): All - Hydrogeological Assessment, Soil and Groundwater Background Studies
Site(s): General
Location: Longhorn Army Ammunition Plant, Marshall, Texas
Agency: Department Of The Army, Longhorn Army Ammunition Plant
Author(s): Mr. Lawrence J. Sowa, Lieutenant Colonel, U.S. Army
Recipient: Lisa Price, Remedial Project Manager, Superfund Texas Enforcement
Date: March 30, 1995
Bate Stamp: 012639

F. **Title:** Letter - Subject: Transmission of Final Soil Background Concentration Report for LHAAP
Group(s): All - Hydrogeological Assessment, Soil and Groundwater Background Studies
Site(s): General
Location: Longhorn Army Ammunition Plant, Marshall, Texas
Agency: Department Of The Army, Longhorn Army Ammunition Plant
Author(s): Mr. Lawrence J. Sowa, Lieutenant Colonel, U.S. Army
Recipient: Mr. H. L. Jones, Texas Natural Resource Conservation Commission
Date: March 30, 1995
Bate Stamp: 012640

G. **Title:** Letter - Subject: Transmission of Final Soil Background Concentration Report for LHAAP
Group(s): All - Hydrogeological Assessment, Soil and Groundwater Background Studies
Site(s): General
Location: Longhorn Army Ammunition Plant, Marshall, Texas
Agency: Department Of The Army, Longhorn Army Ammunition Plant
Author(s): Mr. Lawrence J. Sowa, Lieutenant Colonel, U.S. Army

1995

Recipient: Mr. Michael A. Moore, RI / FS II Unit, Superfund Investigation Section
Date: March 30, 1995
Bate Stamp: 012641

H. **Title:** Report - Final Addendum to Phase 2 Work Plan for Wasteline Sampling Group 2 Sites at Longhorn Army Ammunition Plant
Group(s): 2
Site(s): LHAAP-12 Active Landfill
LHAAP-16 Old Landfill
LHAAP-17 No. 2 Flashing Area / Burning Ground
LHAAP-18 & LHAAP 24 Burning Ground / Washout Pond & Evaporation Pond
LHAAP-29 Former TNT Production Area
LHAAP-32 Formal TNT Waste Disposal Plant
Location: Longhorn Army Ammunition Plant, Marshall, Texas
Agency: Department Of The Army, Longhorn Army Ammunition Plant
Author(s): Sverdrup Environmental, Inc.
Recipient: U.S. Army Corps of Engineers
Date: April, 1995
Bate Stamp: 012642 - 012663

I. **Title:** Report - Final Addendum to Phase 2 Chemical Data Acquisition Plan for Wasteline Sampling Group 2 Sites at Longhorn Army Ammunition Plant
Group(s): 2
Site(s): LHAAP-12 Active Landfill
LHAAP-16 Old Landfill
LHAAP-17 No. 2 Flashing Area / Burning Ground
LHAAP-18 & LHAAP 24 Burning Ground / Washout Pond & Evaporation Pond
LHAAP-29 Former TNT Production Area
LHAAP-32 Formal TNT Waste Disposal Plant
Location: Longhorn Army Ammunition Plant, Marshall, Texas
Agency: Department Of The Army, Longhorn Army Ammunition Plant
Author(s): Sverdrup Environmental, Inc.
Recipient: U.S. Army Corps of Engineers
Date: April, 1995
Bate Stamp: 012664 - 012674

J. **Title:** Letter - Subject: Changes to Final Soil Background Concentration Report for LHAAP
Group(s): All - Hydrogeological Assessment, Soil and Groundwater Background Studies
Site(s): General
Location: Longhorn Army Ammunition Plant, Marshall, Texas
Agency: Department Of The Army, Longhorn Army Ammunition Plant

1995

Author(s): Mr. Lawrence J. Sowa, Lieutenant Colonel, U.S. Army
Recipient: Lisa Price, Remedial Project Manager, Superfund Texas Enforcement
Date: April 4, 1995
Bate Stamp: 012675

K.
Title: Letter - Subject: Changes to Final Soil Background Concentration Report for LHAAP
Group(s): All - Hydrogeological Assessment, Soil and Groundwater Background Studies
Site(s): General
Location: Longhorn Army Ammunition Plant, Marshall, Texas
Agency: Department Of The Army, Longhorn Army Ammunition Plant
Author(s): Mr. Lawrence J. Sowa, Lieutenant Colonel, U.S. Army
Recipient: Mr. Michael A. Moore, RI / FS II Unit, Superfund Investigation Section
Date: April 4, 1995
Bate Stamp: 012676

L.
Title: Letter - Subject: Changes to Final Soil Background Concentration Report for LHAAP
Group(s): All - Hydrogeological Assessment, Soil and Groundwater Background Studies
Site(s): General
Location: Longhorn Army Ammunition Plant, Marshall, Texas
Agency: Department Of The Army, Longhorn Army Ammunition Plant
Author(s): Mr. Lawrence J. Sowa, Lieutenant Colonel, U.S. Army
Recipient: Mr. H. L. Jones, Texas Natural Resource Conservation Commission
Date: April 4, 1995
Bate Stamp: 012677

M.
Title: Letter - Subject: Sites 12 and 16, Landfill Caps Interim Action Comments and Questions
Group(s): Landfill Caps Interim Action
Site(s): LHAAP-12 Active Landfill
LHAAP-16 Old Landfill
Location: Longhorn Army Ammunition Plant, Marshall, Texas
Agency: Department Of The Army, Longhorn Army Ammunition Plant
Author(s): Ruth Culver, Conservation Chairman, Uncertain Audubon
Recipient: David Tolbert, Project Manager, Longhorn Army Ammunition Plant
Date: April 20, 1995
Bate Stamp: 012678 - 012680

N.
Title: Record of Decision For Burning Ground No. 3 Longhorn Army Ammunition Plant
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, Karnack, Texas
Agency: U. S. Army Corps Of Engineer
Author(s): U. S. Army Corps Of Engineers

1995

Recipient: U.S. Public
Date: May, 1995
Bate Stamp: 012681 - 012751

O.
Title: Letter - Subject: Soil Background Concentration Report for LHAAP
Group(s): All - Hydrogeological Assessment, Soil and Groundwater Background Studies
Site(s): General
Location: Longhorn Army Ammunition Plant, Marshall, Texas
Agency: Department Of The Army, Longhorn Army Ammunition Plant
Author(s): Mr. Michael A. Moore, RI / FS II Unit, Superfund Investigation Section
Recipient: David Tolbert, Project Manager, Longhorn Army Ammunition Plant
Date: May 1, 1995
Bate Stamp: 012752 - 012753

P.
Title: Letter - Subject: Remedial Investigation / Feasibility Study - Sites 13 And 14 (Group 3)
Group(s): 3
Site(s): LHAAP-13 Suspected TNT Burial Between Active Landfill And Old Landfill
LHAAP-14 Area 54 Burial Ground
Location: Longhorn Army Ammunition Plant, Marshall, Texas
Agency: Department Of The Army, Longhorn Army Ammunition Plant
Author(s): Mr. Michael A. Moore, RI / FS II Unit, Superfund Investigation Section
Recipient: Mr. David Tolbert, Project Manager, Longhorn Army Ammunition Plant
Date: May 3, 1995
Bate Stamp: 012754 - 012756

Q.
Title: Letter - Subject: Proposed Plan - Sites 13 And 14 (Group 3)
Group(s): 3
Site(s): LHAAP-13 Suspected TNT Burial Between Active Landfill And Old Landfill
LHAAP-14 Area 54 Burial Ground
Location: Longhorn Army Ammunition Plant, Marshall, Texas
Agency: Department Of The Army, Longhorn Army Ammunition Plant
Author(s): Mr. Michael A. Moore, RI / FS II Unit, Superfund Investigation Section
Recipient: Mr. David Tolbert, Project Manager, Longhorn Army Ammunition Plant
Date: May 4, 1995
Bate Stamp: 012757 - 012759

R.
Title: Letter - Subject: Final Groundwater Background Concentration Report for LHAAP
Group(s): All - Hydrogeological Assessment, Soil and Groundwater Background Studies
Site(s): General
Location: Longhorn Army Ammunition Plant, Marshall, Texas
Agency: Department Of The Army, Longhorn Army Ammunition Plant
Author(s): Mr. Lawrence J. Sowa, Lieutenant Colonel, U.S. Army
Recipient: Lisa Price, Remedial Project Manager, Superfund Texas Enforcement
Date: May 9, 1995
Bate Stamp: 012760

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS
ADMINISTRATIVE RECORD - CHRONOLOGICAL INDEX

VOLUME 2 of 10 (Continued)

1995

S.
Title: Letter - Subject: Final Groundwater Background Concentration Report for LHAAP
Group(s): All - Hydrogeological Assessment, Soil and Groundwater Background Studies
Site(s): General
Location: Longhorn Army Ammunition Plant, Marshall, Texas
Agency: Department Of The Army, Longhorn Army Ammunition Plant
Author(s): Mr. Lawrence J. Sowa, Lieutenant Colonel, U.S. Army
Recipient: Mr. H. L. Jones, Texas Natural Resource Conservation Commission
Date: May 9, 1995
Bate Stamp: 012761

T.
Title: Letter - Subject: Final Groundwater Background Concentration Report for LHAAP
Group(s): All - Hydrogeological Assessment, Soil and Groundwater Background Studies
Site(s): General
Location: Longhorn Army Ammunition Plant, Marshall, Texas
Agency: Department Of The Army, Longhorn Army Ammunition Plant
Author(s): Mr. Lawrence J. Sowa, Lieutenant Colonel, U.S. Army
Recipient: Mr. Michael A. Moore, RI / FS II Unit, Superfund Investigation Section
Date: May 9, 1995
Bate Stamp: 012762

U.
Title: Letter - Subject: Final Hydrogeological Assessment Report for LHAAP
Group(s): All - Hydrogeological Assessment, Soil and Groundwater Background Studies
Site(s): General
Location: Longhorn Army Ammunition Plant, Marshall, Texas
Agency: Department Of The Army, Longhorn Army Ammunition Plant
Author(s): Mr. Lawrence J. Sowa, Lieutenant Colonel, U.S. Army
Recipient: Lisa Price, Remedial Project Manager, Superfund Texas Enforcement
Date: May 11, 1995
Bate Stamp: 012763

V.
Title: Letter - Subject: Final Hydrogeological Assessment Report for LHAAP
Group(s): All - Hydrogeological Assessment, Soil and Groundwater Background Studies
Site(s): General
Location: Longhorn Army Ammunition Plant, Marshall, Texas
Agency: Department Of The Army, Longhorn Army Ammunition Plant
Author(s): Mr. Lawrence J. Sowa, Lieutenant Colonel, U.S. Army
Recipient: Mr. H. L. Jones, Texas Natural Resource Conservation Commission
Date: May 11, 1995
Bate Stamp: 012764

W.
Title: Letter - Subject: Final Hydrogeological Assessment Report for LHAAP
Group(s): All - Hydrogeological Assessment, Soil and Groundwater Background Studies
Site(s): General
Location: Longhorn Army Ammunition Plant, Marshall, Texas

VOLUME 2 of 10 (Continued)

1995

Agency: Department Of The Army, Longhorn Army Ammunition Plant
Author(s): Mr. Lawrence J. Sowa, Lieutenant Colonel, U.S. Army
Recipient: Mr. Michael A. Moore, RI / FS II Unit, Superfund Investigation Section
Date: May 11, 1995
Bate Stamp: 012765

X. **Title:** Letter - Subject: Draft Record of Decision for Early Interim Remedial Action at Landfill Sites 12 and 16,
Group(s): Landfill Caps Interim Action
Site(s): LHAAP-12 Active Landfill
LHAAP-16 Old Landfill
Location: Longhorn Army Ammunition Plant, Marshall, Texas
Agency: Department Of The Army, Longhorn Army Ammunition Plant
Author(s): Mr. Lawrence J. Sowa, Lieutenant Colonel, U.S. Army
Recipient: Lisa Price, Remedial Project Manager, Superfund Texas Enforcement
Date: May 23, 1995
Bate Stamp: 012766

Y. **Title:** Letter - Subject: Draft Record of Decision for Early Interim Remedial Action at Landfill Sites 12 and 16,
Group(s): Landfill Caps Interim Action
Site(s): LHAAP-12 Active Landfill
LHAAP-16 Old Landfill
Location: Longhorn Army Ammunition Plant, Marshall, Texas
Agency: Department Of The Army, Longhorn Army Ammunition Plant
Author(s): Mr. Lawrence J. Sowa, Lieutenant Colonel, U.S. Army
Recipient: Mr. Michael A. Moore, RI / FS II Unit, Superfund Investigation Section
Date: May 23, 1995
Bate Stamp: 012767

Z. **Title:** Letter - Subject: Draft Record of Decision for Early Interim Remedial Action at Landfill Sites 12 and 16,
Group(s): Landfill Caps Interim Action
Site(s): LHAAP-12 Active Landfill
LHAAP-16 Old Landfill
Location: Longhorn Army Ammunition Plant, Marshall, Texas
Agency: Department Of The Army, Longhorn Army Ammunition Plant
Author(s): Mr. Lawrence J. Sowa, Lieutenant Colonel, U.S. Army
Recipient: Mr. H. L. Jones, Texas Natural Resource Conservation Commission
Date: May 23, 1995
Bate Stamp: 012768

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

012035

REPLY TO ATTENTION OF

March 27, 1995

SMCLO-EN

Mr. Michael Moore
Superfund Investigation Section
Texas Natural Resource Conservation Commission
Post Office Box 13087
Austin, Texas 78711-3087

SUBJECT: Transmission of Proposed Plan of Action, for Group 3 Sites (13 and 14), Longhorn Army Ammunition Plant, Marshall, Texas

Mr. Moore:

The subject document is enclosed. Your review and concurrence and/or comments are requested by April 27, 1995. Per discussion during the March 23, 1995 Manager's Meeting, finalization of the document can occur during the April 26, 1995 Manager's Meeting. Please refer any questions to Mr. David Tolbert, Program Manager, at 903-679-2728.

Sincerely,

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

enclosure
cf: H.L. Jones

012636

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

REPLY TO ATTENTION OF

March 30, 1995

SMCLO-RN

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

SUBJECT: Addendum to the Phase 2 Work Plan for Wasteline Sampling and the associated Chemical Data Acquisition Plan for Longhorn Army Ammunition Plant, Marshall, Texas

Dear Ms. Price:

Enclosed is one copy each of the Addendum to the Phase 2 Work Plan for Wasteline Sampling and the associated Chemical Data Acquisition Plan. Request that you provide written concurrence by April 14, 1995.

If you have any questions, please contact Mr. David Tolbert, at 903-679-2728.

Sincerely,

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

Enclosures

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

012637

REPLY TO
ATTENTION OF

March 30, 1995

SMCLO-EN

Mr. H.L. Jones
Texas Natural Resource Conservation Commission
2916 Teague Drive
Tyler, Texas 75701

SUBJECT: Addendum to the Phase 2 Work Plan for Wasteline Sampling and the associated Chemical Data Acquisition Plan for Longhorn Army Ammunition Plant, Marshall, Texas

Dear Mr Jones:

Enclosed is one copy each of the Addendum to the Phase 2 Work Plan for Wasteline Sampling and the associated Chemical Data Acquisition Plan. Request that you provide written concurrence by April 14, 1995.

If you have any questions, please contact Mr. David Tolbert, at 903-679-2728.

Sincerely,

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

Enclosures

012638

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

March 30, 1995

REPLY TO ATTENTION OF
SMCLO-EN

Mr. Michael Moore
Superfund Investigation Section
Texas Natural Resource Conservation Commission
Post Office Box 13087
Austin, Texas 78711-3087

SUBJECT: Addendum to the Phase 2 Work Plan for Wasteline Sampling and the associated Chemical Data Acquisition Plan for Longhorn Army Ammunition Plant, Marshall, Texas

Dear Mr Moore:

Enclosed is one copy each of the Addendum to the Phase 2 Work Plan for Wasteline Sampling and the associated Chemical Data Acquisition Plan. Request that you provide written concurrence by April 14, 1995.

If you have 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

012639

REPLY TO
ATTENTION OF

March 30, 1995

SMCLO-EN

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

SUBJECT: Transmission of Final Soils Background Concentrations Report, Longhorn Army Ammunition Plant, Marshall, Texas

Dear Ms. Price:

Two copies of the subject document have been forwarded to you under separate cover on March 29, 1995. Request that you provide written concurrence by April 20, 1995 if possible.

If you have 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

012640

REPLY TO ATTENTION OF

March 30, 1995

SMCLO-EN

Mr. H.L. Jones
Texas Natural Resource Conservation Commission
2916 Teague Drive
Tyler, Texas 75701

SUBJECT: Transmission of Final Soils Background Concentrations Report, Longhorn Army Ammunition Plant, Marshall, Texas

Dear Mr. Jones:

One copy of the subject document has been forwarded to you under separate cover on March 29, 1995. Request that you provide written concurrence by April 20, 1995 if possible.

If you have any questions, please contact Mr. David Tolbert, at 903-679-2728.

Sincerely,

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

Enclosure

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

012641

REPLY TO
ATTENTION OF

March 30, 1995

SMCLO-EN

Mr. Michael Moore
Superfund Investigation Section
Texas Natural Resource Conservation Commission
Post Office Box 13087
Austin, Texas 78711-3087

SUBJECT: Transmission of Final Soils Background Concentrations Report, Longhorn Army Ammunition Plant, Marshall, Texas

Dear Mr. Moore:

One copy of the subject document has been forwarded to you under separate cover on March 29, 1995. Request that you provide written concurrence by April 20, 1995 if possible.

If you have any questions, please contact Mr. David Tolbert, at 903-679-2728.

Sincerely,

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

Enclosure

Final

012642

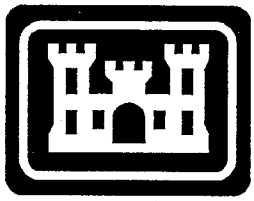
Addendum

to the

Phase 2 Work Plan

for

Wasteline Sampling



at

Longhorn Army Ammunition Plant

Karnack, Texas

April 1995

Submitted to

U.S. Army Corps of Engineers

Tulsa District

by

Sverdrup Environmental, Inc.

St. Louis, Missouri

[redacted]

Sverdrup Environmental

012643

FINAL

ADDENDUM

to the

PHASE 2 WORK PLAN

for the

REMEDIAL INVESTIGATION
GROUP NO. 2 SITES

at

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

Submitted to:

U.S. ARMY CORPS OF ENGINEERS
Tulsa District

APRIL 1995

Prepared by:

SVERDRUP ENVIRONMENTAL, INC.
ST. LOUIS, MISSOURI

Table of Contents

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

Section I

SECTION 1.0

INTRODUCTION

This Work Plan Addendum describes the activities necessary for the sampling of wasteline contents and surrounding soil at LHAAP 29 and LHAAP 32 as an addition to the Phase 2 Remedial Investigation (RI) at the Group 2 Sites for Longhorn Army Ammunition Plant (LHAAP), Karnack, Texas. It is an addendum to the Final Phase 2 Work Plan for the Group 2 Sites, prepared in December 1994.

This addendum addresses the sampling and surveying of nine (9) locations along the trinitrotoluene (TNT) wastelines and the cooling water pipeline within the former TNT Production Area (LHAAP 29) and the former TNT Waste Disposal Plant (LHAAP 32). Sampling locations are shown on Figures 1 and 2. Three (3) locations are along the red and yellow liquor wasteline that traverses through the center of the former TNT Production Area; three (3) locations are along the red and yellow liquor wasteline that runs from the former TNT Production Area towards the former TNT Waste Disposal Plant; and three (3) locations are along the cooling water pipeline that traverses through the center of the former TNT Production Area.

012648

29SB01 (BG)

114 (BG)

29SB53 29SB03 29SB57 29SB02 29SB04 29SW01 29SD01 29SB05 29SB06 29SB07 29SB08 29SD02 29SD03 29SB09 29SB10 29SD04 29SW02 29SW04 29SW03 29SB58 29SB59 29SB54 29SB11 29SB55 29SB60 29SB64 29SB63 29SB65 29SB66 29SB61 29SB62 29SB67 29SB68 29SB71 29SB72 29SB70 29SB69 29SB73 29SB74 29SB75 29SB76 29SB12 29SB13 29SB14 29SB15 29SW17 29SD17 29SD15 29SW15 29SD14 29SW14 29SD13 29SW13 29SW16 29SD16 29SW12 29SD12 29SW10 29SW11 29SD11 29SW08 29SW07 29SD07 29SD08 29SD09 29SD10 29SW09 29SW05 29SD05 29SD06 29SB56 29SW18 29SD18

29WL01 29WL02 29WL03 29WL04 29WL05 29WL06 29WL07 29WL08 29WL09 29WL10 29WL11

0301 0302 0303 0304 0305 0306 0307 0308

SS1 SS2 SS3 SS4

COOLING WATER PIPELINE

"RED AND YELLOW LIQUOR" WASTEWATER PIPELINE

500' SOUTH

LEGEND

- SURFACE SEDIMENT SAMPLE (PHASE 1)
- SURFACE WATER SAMPLE (PHASE 1)
- SURFACE WATER/SEDIMENT SAMPLE (PREVIOUS)
- SURFACE SOIL SAMPLE (PREVIOUS)
- MONITORING WELL (EXISTING)
- SOIL BORING (PHASE 1)
- SOIL BORING (PREVIOUS)

BG BACKGROUND SAMPLE LOCATION

SURFACE WATER FLOW DIRECTION

APPROXIMATE SITE LIMITS

RI PHASE 2 LEGEND

- 5' SOIL BORING (24)
- TNT WASTEWATER LINE SAMPLE (4)
- COOLING WATER LINE SAMPLE (3)
- TNT WASTEWATER LINE
- COOLING WATER LINE

N

300' 0 300' 600'

CORPS OF ENGINEERS, TULSA DISTRICT

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS
RI PHASE 2 WORK PLAN ADDENDUM

LHAAP 29
FORMER TNT PRODUCTION AREA
WASTELINE SAMPLE LOCATIONS

Sverdrup Environmental

FIGURE 1

000086-5\LH5-15W

012649

CADDO LAKE
APPROX. 8000 FT

LEGEND

- SURFACE SEDIMENT SAMPLE (PHASE 1)
- SURFACE WATER SAMPLE (PHASE 1)
- SURFACE WATER/SEDIMENT SAMPLE (PREVIOUS)
- SURFACE SOIL SAMPLE (PREVIOUS)
- MONITORING WELL (EXIST)
- SOIL BORING (PHASE 1)
- SOIL BORING (PREVIOUS)
- WASTEWATER LINE SAMPLE
- BG BACKGROUND SAMPLE LOCATION

RI PHASE 2 LEGEND

- SEDIMENT/SURFACE WATER SAMPLE (6)
- TNT WASTEWATER LINE SAMPLE (2)
- TNT WASTEWATER LINE

32SW10 32SD10
32SW01
32SD01
32SB01
32SB02
32SW02 32SD02
32SW09 32SD09
32SW13
32SD13
32SW08 32SD08
32SB04
32SB06
113 32SB03
32SB05
32SW07 32SD07
32SB07
32SB12
32SB08
32SD11
32SW11
32SB10
32SB09
32SW05 32SD05
32SW06
32WL01
"RED AND YELLOW LIQUOR" WASTEWATER PIPELINE
32SB11
32SW03 32SD03
32SD06
32WL04
32SD12
32SW12
(BG) 32SB13 (BG) 32SD04
32WL02
32WL03
200
(BG) 32SW04
202

N

150' 0 150' 300'
SCALE: 1"=150'

CORPS OF ENGINEERS, TULSA DISTRICT

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS
RI PHASE 2 WORK PLAN ADDENDUM

LHAAP 32
FORMER WASTE DISPOSAL PLANT
WASTELINE SAMPLE LOCATIONS

Sverdrup Environmental

FIGURE 2

000086-5\LH5-16W

1.1 Site History

The following is a site history excerpted from the LHAAP RI/FS Work Plan, dated June 1992:

A TNT plant, consisting of six production lines, was operated in the former TNT Production Area from October 1942 until August 1945. The plant produced over 180 million kilograms of flake TNT from five regular production lines and one standby line. Each production line was essentially the same and consisted of four main elements: an unloading area where acids and toluene were unloaded and held in tanks until ready for use; a nitrating area where TNT flakes were produced by nitrating toluene with nitric acid; a wash area where the TNT flakes were washed to remove impurities and then dried; and a loading area where the cardboard-boxed TNT was loaded onto trucks.

TNT wastewater (red liquor) generated at each Wash Area was collected by a 12-in. underground wood stave wasteline. The red liquor flowed by gravity through the wasteline to a storage tank and pump house adjacent to 16th Street, and then pumped through a 6-in. underground wooden wasteline to the TNT Waste Disposal Plant (LHAAP 32). A "yellow liquor" wastewater generated by the production plant was also pumped to LHAAP 32 through the wasteline.

Cooling water (blue water) pipelines from the six TNT production plants emptied into an open ditch alongside 16th Street. The "blue water," likely contaminated with acids, was conveyed to the Neutralization House at the TNT Waste Disposal Plant, where it was neutralized and discharged to surface water.

1.2 Review of Construction Drawings

Construction drawings, made available by LHAAP of the TNT Production Area and Wastewater Treatment Plant, were reviewed by Sverdrup.

Drawing G-3023 indicates that a wood stave 12-inch diameter yellow liquor wasteline and a transite 6-inch diameter red liquor wasteline were installed along the centerline of the TNT Production Area to connect each of the six TNT Production Plants to a pump station. The original drawing, dated June 24, 1942, showed only the wood stave wasteline; it was modified on March 30, 1943, to add the transite wasteline. The drawing shows that the transite wasteline is located parallel to and approximately 5 ft to the north of the wood stave wasteline. The wood stave wasteline is shown at a depth of 3 to 5 ft below the ground surface in the near vicinity of the production buildings. The depth to the transite wasteline is not indicated on the drawing.

Drawings G-3023 and G-3024 show both a bored wood 6-inch diameter wasteline and a transite 6-inch diameter wasteline extending from the pump station to the TNT Waste Disposal Plant. Both wastelines are present on the original drawings, dated June 24-27, 1942. The drawings show that the transite wasteline is located parallel to and approximately 5 ft to the east of the bored wood wasteline. The bored wood wasteline is shown at a depth of 3 to 5 ft below ground surface. The depth to the transite wasteline is not indicated on the drawings.

The cooling water (blue water) pipeline is constructed of a 15-inch diameter vitreous clay pipe. It extends along the centerline of the TNT Production Area, approximately 100 ft to the south of the TNT wastelines, and drains into an open ditch alongside 16th Street.

1.3 Composition of Red and Yellow Liquor Wastewaters

The following excerpt from the LHAAP RI/FS Work Plan, dated June 1992, describes the composition of the red and yellow liquors:

Based on analyses of red water generated at another Army ammunition plant (USATHAMA, April 1990), and assuming that a continuous-type TNT purification process was employed, the "red liquor" was most likely a strongly acidic (pH of

3 to 4) wastewater containing approximately 15 percent total dissolved solids comprised of roughly equal parts of inorganic salts and nitrobodies. The inorganic salts were principally sodium sulfite, sodium sulfate, and sodium nitrite. The nitrobodies were sodium salts of dinitrotoluene sulfonic acids with traces of TNT.

Composition of the "yellow liquor" is uncertain. It may have been principally a mixture of water, nitric acid and sulfuric acid generated by washing crude TNT free of acids, hence the yellow color. The "yellow liquor" was likely compatible with the "red liquor" because, during a period in 1942 and 1943, it was apparently pumped through the same wooden wasteline from the TNT Production Plant to the TNT Waste Disposal Plant and was likely mixed with the "red liquor" at some point during the treatment and disposal process.

Both the red and yellow wastewaters likely contained low concentrations of metals derived from the source water and picked up during the TNT purification and wastewater treatment processes. Metals found in the red water analyzed at another plant (USATHAMA, April 1990) included calcium, iron, magnesium, potassium, aluminum, chromium, barium, copper, cadmium, and silver.

1.4 Phase 1 RI Wasteline Sampling

Six trenches were excavated along the red and yellow liquor wastelines in LHAAP 29 and LHAAP 32 during the Phase 1 Remedial Investigation. Activities included exposing the wastelines using a backhoe, assessing the condition of the wastelines, sampling the soil underneath the wastelines, and sampling the contents of the wastelines.

Locations 29WL01, 29WL02, and 29WL03 were excavated along the gravity flow section of the TNT wastelines, extending between the six TNT production plants and the pump station. Only the 12-inch diameter wood stave wasteline was found and sampled at each of the three locations. The transite wasteline was not found, even though the trenches were extended 10 to 20 ft to the north of the wood stave wasteline.

Locations 29WL04, 32WL01, and 32WL02 were excavated along the pressurized flow section of the TNT wastelines, extending between the pump station and the TNT Waste Disposal Plant. A 12-inch diameter wood stave wasteline was found at each of the three locations; the 6-inch diameter bored wood wasteline was not found. As such, the 12-inch diameter wood stave wasteline, which appeared to be installed in its place, was sampled. A 6-inch diameter transite wasteline was found at locations 29WL04 and 32WL02, situated approximately 5 ft to the east of

the wood stave wasteline, as shown on Drawings G-3023 and G-3024. At location 32WL01, the trench excavation was not extended in search of the transite wasteline. The transite wasteline was not sampled in Phase 1.

At all six locations, the 12-inch diameter wasteline was found to be composed of wood staves held together with 2-in. wide steel bands spaced approximately every 6-in. The wood typically was coated with an asphalt mastic. At five of the six sampling locations, the wood wasteline was found to be soft and severely weathered; at 29WL01, the wood was able to be penetrated with a knife; at four other locations, the wood could be removed using a stainless steel spoon. Typically, the wasteline began leaking water as the surrounding soil support was removed. At 32WL02, the wood was in better condition and needed to be penetrated using a hammer and chisel.

Solid samples of the wasteline contents, consisting of brown or reddish brown sandy silt muck, were collected from locations 29WL02, 29WL03, and 32WL01. Water samples, exhibiting a slightly yellowish color and a marked sulfurous odor, were collected from locations 29WL01, 29WL04, and 32WL02.

Explosives detected in samples from the wasteline contents are summarized in Table 1-1. No explosives or volatile organics were detected in soil samples taken from beneath the wastelines.

TABLE 1-1

DETECTED EXPLOSIVES CONTAMINANTS IN WASTELINE SAMPLES
PHASE 1 REMEDIAL INVESTIGATION
LHAAP 29 and LHAAP 32

PARAMETER	LH29WL01 (µg/l)	LH29WL02 (µg/g)	LH29WL03 (µg/g)	LH29WL04 (µg/l)	LH32WL01 (µg/g)	LH32WL02 (µg/l)
1,3,5-TNB	88	ND	39	ND	ND	ND
2,4,6-TNT	3500J	6.8	3700	ND	ND	ND
4-am-DNT	600	ND	ND	ND	ND	ND
2-am-DNT	910J	ND	ND	ND	ND	ND
2,6-DNT	ND	ND	56	ND	ND	ND
2,4-DNT	300	1.2	ND	ND	ND	ND

ND = Not Detected

Section II

SECTION 2.0

PHASE 2 WASTELINE SAMPLING AT LHAAP 29 and LHAAP 32

Nine (9) trench excavations for wasteline sampling will be performed along the TNT wasteline(s) and the cooling water pipeline within the former TNT Production Area (LHAAP 29) and the former TNT Waste Disposal Plant (LHAAP 32). Three (3) excavations will be along the red and yellow liquor wastelines that traverse through the center of the former TNT Production Area, three (3) excavations will be along the red and yellow liquor wastelines that extend from the former TNT Production Area towards the former TNT Waste Disposal Plant, and three (3) excavations will be along the cooling water pipeline that traverses through the center of the former TNT Production Area.

2.1 Sampling Locations

The nine (9) wasteline sampling locations in LHAAP 29 and LHAAP 32 are shown in Figures 1 and 2. TNT wasteline sampling for the Phase 2 RI will be performed at the six (6) locations during Phase 1. Sampling of the cooling water pipeline will be performed at the locations shown in Figure 1, each approximately 10 ft downgradient (to the east) of existing manholes. Construction drawings and the Phase 1 RI indicate that the following wastelines may found at each sampling location:

- 29WL05: sample 6" transite wasteline and underlying soil; survey 12" wood stave and 6" transite wastelines;
- 29WL06: sample 6" transite wasteline and underlying soil; survey 12" wood stave and 6" transite wastelines;
- 29WL07: sample 6" transite wasteline and underlying soil; survey 12" wood stave and 6" transite wastelines;
- 29WL08: sample 6" transite wasteline and underlying soil; survey 12" wood stave and 6" transite wastelines;
- 29WL09: sample 15" vitreous clay cooling water pipeline and underlying soil; survey 15" vitreous clay cooling water pipeline;
- 29WL10: sample 15" vitreous clay cooling water pipeline and underlying soil; survey 15" vitreous clay cooling water pipeline;
- 29WL11: sample 15" vitreous clay cooling water pipeline and underlying soil; survey 15" vitreous clay cooling water pipeline;
- 32WL03: sample 6" transite wasteline and underlying soil; survey 12" wood stave and 6" transite wastelines;
- 32WL04: sample 6" transite wasteline and underlying soil; survey 12" wood stave and 6" transite wastelines.

Because the 6-inch diameter transite wasteline, located at LHAAP 29 between the TNT production plants and the pumping station, was not found during Phase 1, it may not be found at 29WL05, 29WL06, and 29WL07. If this occurs, the corresponding samples at these three locations will be eliminated.

2.2 Sampling and Analytical Methods

The trench excavations will expose the wastelines to allow inspection of their integrity, and to allow entry of a person to sample the contents inside the wasteline and the surrounding soil beneath the wasteline. Estimated burial depth for the wasteline(s) is three to five feet. The wasteline contents and underlying soil will be sampled for the transite wasteline and the vitreous clay cooling water pipeline at each sampling location. Chemical analyses of wasteline contents samples, surrounding soil samples, QC and QA replicates, and equipment blanks are summarized in Table 2-1.

TABLE 2-1

WASTELINE SAMPLING SUMMARY
PHASE 2 REMEDIAL INVESTIGATION
LHAAP 29 AND LHAAP 32

Sample Number	Wasteline Description	Explosives (Method 8330)	Metals*	pH (Method 9040)	Survey Marker
29WL05	wood stave	--	--	--	1
29WL05	transite?	1 soil, 1 contents	1 soil, 1 contents	1 soil, 1 contents	1
29WL06	wood stave	--	--	--	1
29WL06	transite?	1 soil, 1 contents	1 soil, 1 contents	1 soil, 1 contents	1
29WL07	wood stave	--	--	--	1
29WL07	transite?	1 soil, 1 contents	1 soil, 1 contents	1 soil, 1 contents	1
29WL08	wood stave	--	--	--	1
29WL08	transite	1 soil, 1 contents	1 soil, 1 contents	1 soil, 1 contents	1
29WL09	vitreous clay	1 soil, 1 contents	1 soil, 1 contents	1 soil, 1 contents	1
29WL10	vitreous clay	1 soil, 1 contents	1 soil, 1 contents	1 soil, 1 contents	1
29WL11	vitreous clay	1 soil, 1 contents	1 soil, 1 contents	1 soil, 1 contents	1

* 11 metals include antimony, arsenic, barium, cadmium, chromium, nickel, silver, and thallium (all by method 6010); lead (method 7421), mercury (method 7470/7471), and selenium (method 740).

? transite wasteline may not be present at this location; it was not found in the Phase 1 RI.

TABLE 2-1 (CONTINUED)

WASTELINES SAMPLING SUMMARY
PHASE 2 REMEDIAL INVESTIGATION
LHAAP 29 AND LHAAP 32

Sample Number	Sample Description	Explosives (Method 8330)	Metals*	pH (Method 9040)	Survey Marker
32WL03	wood stave	--	--	--	1
32WL03	transite	1 soil, 1 contents	1 soil, 1 contents	1 soil, 1 contents	1
32WL04	wood stave	--	--	--	1
32WL04	transite	1 soil, 1 contents	1 soil, 1 contents	1 soil, 1 contents	1
QC Replicate	--	1 soil, 1 contents	1 soil, 1 contents	1 soil, 1 contents	--
QA Replicate	--	1 soil, 1 contents	1 soil, 1 contents	1 soil, 1 contents	--
Equipment Blank	--	1 soil, 1 contents	1 soil, 1 contents	1 soil, 1 contents	--
Total	--	18	18	18	15

* 11 metals include antimony, arsenic, barium, cadmium, chromium, nickel, silver, and thallium (all by method 6010); lead (method 7421), mercury (method 7470/7471), and selenium (method 740).

No samples will be collected from the wood stave wasteline or underlying soil; these samples were previously collected during the Phase 1 RI.

2.3 Surveying Wasteline Locations

At each sampling location, a survey marker will be installed directly next to each wasteline. The horizontal location and vertical elevation to the bottom invert of each wasteline will then be surveyed using the temporary survey markers. A total of fifteen (15) final surveying points will be located: six (6) along the wood stave wastewater wasteline, six (6) along the transite wasteline, and three (3) along the vitreous clay cooling water pipeline.

2.4 Backfilling Trench Excavations

Soil excavated from each sampling location will be segregated into two separate stockpiles - one pile for soil excavated above the wastelines, and the other pile for soil excavated at or below the wastelines. The stockpiles will be placed on and covered with plastic sheeting. After sampling is completed and the survey markers installed, the excavated soil will be returned to the trench in the approximate order in which it was removed. The soil excavated at or below the wastelines will be first placed next to the wastelines, followed by the soil above. The excavated soil will be compacted with the backhoe after it is placed.

Final

012664

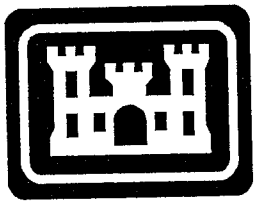
Addendum

to the

Phase 2 Chemical Data Acquisition Plan

for

Wasteline Sampling



at

Longhorn Army Ammunition Plant

Karnack, Texas

April 1995

Submitted to

U.S. Army Corps of Engineers

Tulsa District

by

Sverdrup Environmental, Inc.

St. Louis, Missouri

[redacted]

Sverdrup Environmental

FINAL

ADDENDUM

to the

PHASE 2 CHEMICAL DATA ACQUISITION PLAN

for the

REMEDIAL INVESTIGATION
GROUP NO. 2 SITES

at

LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

Submitted To:

U.S. ARMY CORPS OF ENGINEERS
Tulsa District

MARCH 1995

Prepared By:

SVERDRUP ENVIRONMENTAL, INC.
ST. LOUIS, MISSOURI

Table of Contents

TABLE OF CONTENTS

Section I

SECTION 1.0

INTRODUCTION

This Chemical Data Acquisition Plan (CDAP) Addendum describes additional remedial investigation sampling activities necessary to complete the Phase 2 Remedial Investigation (RI) at the Group 2 Sites at Longhorn Army Ammunition Plant (LHAAP), Karnack, Texas. It is an addendum to the Final Phase 2 CDAP for the Group 2 Sites, prepared in December 1994. This addendum addresses sampling of wastelines and surrounding soil at LHAAP 29 and LHAAP 32.

Section II

SECTION 2.0

WASTELINE SAMPLING

2.1 Trench Excavations

Nine (9) trench excavations for wasteline sampling will be performed along the trinitrotoluene (TNT) wastelines and the cooling water pipeline within the former TNT Production Area (LHAAP 29) and the former TNT Waste Disposal Plant (LHAAP 32). Estimated wasteline depths are three to five feet below the ground surface.

Trench excavations will expose each wasteline to allow inspection of its integrity and to allow entry of a person to sample the contents inside the wasteline and the surrounding soil beneath the wasteline. Excavation slopes will be cut back at 1:1 (horizontal : vertical) for cohesive soils, and 2:1 for cohesionless sands and gravels. Shoring or sheeting is not anticipated to be necessary. The Site Safety and Health Plan provides further details concerning excavation construction and entry procedures.

Exploratory trenches will be excavated with care not to damage or disturb the wastelines. The precise locations and depths of the wastelines are not known. A magnetometer will be used to help locate the wastelines.

2.2 Sampling of Wastelines and Surrounding Soil

Once each wasteline is excavated and exposed, a soil sample will immediately be collected from directly beneath the wasteline using a decontaminated bucket hand auger. This will reduce the potential for contamination of the underlying soils caused by disturbance of the wasteline during excavation.

The entire circumference of each wasteline will be exposed for a length of at least one (1) ft. Hand excavation will be used to excavate the soil from around each wasteline to avoid damaging it. Once each wasteline is fully exposed, the wasteline circumference will be measured, a description of the wasteline integrity will be written, and a photographic record will be taken.

The wasteline will then be sampled by cutting a 3- to 4-inch diameter hole through the pipe wall using non-sparking tools. A sample of the wasteline contents, typically a sediment or sludge, will then be collected using a stainless steel spoon or scoop. If the wasteline is found to contain water under pressure, only a 1/4- to 1/2-inch diameter hole will be cut through the pipe wall and a water sample will be collected using a glass beaker. After sampling is completed, the hole will be repaired using a wooden or plastic plug, and sealed with epoxy.

2.3 Wasteline Location Surveying

Survey markers will be installed directly in contact with each wasteline encountered at a sampling location. The markers will be used to survey the horizontal location and vertical elevation of each wasteline at a later date, after the trench has been backfilled. The markers will be labeled for each foot of length above the bottom invert of the wasteline. The markers will also be labeled with the sampling location and date, and the type of wasteline located.

Survey markers will be constructed using 2-inch diameter PVC pipe or 4 x 4 wooden posts, and anchored at least 3 ft below the bottom of the excavation prior to backfilling the excavation.

2.4 Backfilling Trench Excavations

Soil excavated from each sampling location will be segregated into two separate stockpiles - one pile for soil excavated above the wastelines, and the other pile for soil excavated at or below the wastelines. The stockpiles will be placed on plastic sheeting. If it is raining, or the stockpiles are to remain overnight, they will also be covered with plastic sheeting.

After sampling is completed and survey markers are installed, the stockpiled soil will be returned to the trench in the approximate order in which it was

removed. The soil excavated from at or below the wastlines will be placed first, next to the wastelines. The stockpiled soil from above the wastelines will then be placed. The soil will be compacted using the backhoe to a density and workability similar to the surrounding undisturbed soils. Care will be taken not to damage the survey markers installed at each wasteline sampling location.

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

REPLY TO ATTENTION OF:

April 4, 1995

012675

SMCLO-EN

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

SUBJECT: Changes to Final Soil Background Concentration Report for Longhorn Army Ammunition Plant, Marshall, Texas

Dear Ms Price:

Please find enclosed three pages to replace existing pages of the Final Soil Background Concentration Report. These changes were requested in the phone conversation on April 4, 1995 between Mr. David Tolbert, Ms. Lisa Marie Price; Environmental Protection Agency (EPA) representative, Mr. Michael Moore; Texas Natural Resources Conservation Commission (TNRCC) representative, and Mr. Cliff Murray, Tulsa District, Army Corps of Engineers representative.

The changes are as follows:

In Table 4-2 (page 25), the Upper Confidence Limit for arsenic had inadvertently been omitted. The value of 0.5 mg/kg has been inserted to represent a value of one-half of the Sample Quanitation Limit.

At the request of the EPA and TNRCC representatives, the phrase "To Be Used For Background Evaluations" has been deleted from the titles of Tables 5-1 and 5-2 (pages 28 and 29). The change was requested based on the belief that Upper Tolerance Limits (UTLs) are not applicable to background determinations. UTLs are being retained in the tables to provide alternate values for future evaluations. At the time of proposed usage, the regulatory agencies may determine the applicability of the UTL values.

If you have any questions, please contact Mr. David Tolbert, at 903-679-2728.

Sincerely,

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

Enclosure

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

REPLY TO ATTENTION OF

012676

April 4, 1995

SMCLO-EN

Mr. Michael Moore
Superfund Investigation Section
Texas Natural Resource Conservation Commission
Post Office Box 13087
Austin, Texas 78711-3087

SUBJECT: Changes to Final Soil Background Concentration Report for Longhorn Army Ammunition Plant, Marshall, Texas

Dear Mr Moore:

Please find enclosed three pages to replace existing pages of the Final Soil Background Concentration Report. These changes were requested in the phone conversation on April 4, 1995 between Mr. David Tolbert, Ms. Lisa Marie Price; Environmental Protection Agency (EPA) representative, Mr. Michael Moore; Texas Natural Resources Conservation Commission (TNRCC) representative, and Mr. Cliff Murray, Tulsa District, Army Corps of Engineers representative.

The changes are as follows:

In Table 4-2 (page 25), the Upper Confidence Limit for arsenic had inadvertently been omitted. The value of 0.5 mg/kg has been inserted to represent a value of one-half of the Sample Quanitation Limit.

At the request of the EPA and TNRCC representatives, the phrase "To Be Used For Background Evaluations" has been deleted from the titles of Tables 5-1 and 5-2 (pages 28 and 29). The change was requested based on the belief that Upper Tolerance Limits (UTLs) are not applicable to background determinations. UTLs are being retained in the tables to provide alternate values for future evaluations. At the time of proposed usage, the regulatory agencies may determine the applicability of the UTL values.

If you have any questions, please contact Mr. David Tolbert, at 903-679-2728.

Sincerely,

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

Enclosure

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

REPLY TO
ATTENTION OF

012677

April 4, 1995

SMCLO-EN

Mr. H.L. Jones
Texas Natural Resource Conservation Commission
2916 Teague Drive
Tyler, Texas 75701

SUBJECT: Changes to Final Soil Background Concentration Report for Longhorn Army Ammunition Plant, Marshall, Texas

Dear Mr Jones:

Please find enclosed three pages to replace existing pages of the Final Soil Background Concentration Report. These changes were requested in the phone conversation on April 4, 1995 between Mr. David Tolbert, Ms. Lisa Marie Price; Environmental Protection Agency (EPA) representative, Mr. Michael Moore; Texas Natural Resources Conservation Commission (TNRCC) representative, and Mr. Cliff Murray, Tulsa District, Army Corps of Engineers representative.

The changes are as follows:

In Table 4-3 (page 25), the Upper Confidence Limit for arsenic had inadvertently been omitted. The value of 0.5 mg/kg has been inserted to represent a value of one-half of the Sample Quanitation Limit.

At the request of the EPA and TNRCC representatives, the phrase "To Be Used For Background Evaluations" has been deleted from the titles of Tables 5-1 and 5-2 (pages 28 and 29). The change was requested based on the belief that Upper Tolerance Limits (UTLs) are not applicable to background determinations. UTLs are being retained in the tables to provide alternate values for future evaluations. At the time of proposed usage, the regulatory agencies may determine the applicability of the UTL values.

If you have any questions, please contact Mr. David Tolbert, at 903-679-2728.

Sincerely,

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

Enclosure

012678

April 20, 1995

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

REF: Sites 12 and 16, Landfill Caps Interim Action

Dear David:

Enclosed please find comments and questions concerning the Early Interim Remedial Action Proposed and Administrative Record in connection with the above referenced landfills.

We would appreciate a copy of the Responsiveness Summary. Thank you.

Ruth Culver
Conservation Chairman
Uncertain Audubon

Enclosure

UNCERTAIN AUDUBON SOCIETY

JAMES E. BOLIN, JR., PRESIDENT • 4518 FAIRFIELD AVE. • SHREVEPORT, LA 71106-1430 •• 318 2
RUTH CULVER, VP/CONSERVATION • ROUTE 1, 787 • KARNACK, TX 75661 •• 903 6

012679

Proposed Plan
Interim Remedial Action
Longhorn Army Ammunition Plant
LHAAP 12 and 16 Landfills

ALTERNATIVE #7

The description of Alternative #7 in the Proposed Plan on page 10, has a flaw. The third dash should read "a second low permeability layer consisting of a geosynthetic membrane liner over the sodium bentonite geocomposite liner" rather than as it now reads "over the compacted clay layer." The composite clay layer is for Alternative #6.

The selection of Alternative #7 is the appropriate action if the only alternatives are 1 through 7. Alternative #7 is the best alternative. However the alternatives as proposed are lacking in scope appropriate to address the contamination issues at the sites and in meeting all of the CERCLA Criteria for a remedy. The details of these issues are presented below.

Evaluation of Alternatives

In order to evaluate the proposed alternatives for LHAAP 12 and 16 landfills, the agencies utilized the CERCLA Criteria for selecting a remedy. The agencies made a determination that the removal of the landfill contents was not feasible. Thus none of the alternatives evaluated were a permanent solution. In addition none of the alternative in any way addressed the treatment or reduction of toxicity of the waste. Therefore the proposed plan is merely evaluating what type of cap is to be placed over the landfill. The agencies must evaluate alternatives that in some way lessen the toxicity of the waste through methods of waste treatment. The landfills appear to be hydrologically connected to Caddo Lake which is a drinking water source and deserves

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

REPLY TO
ATTENTION OF

April 25, 1995

012680

SMCLO-EN

Dr. Kathleen Buchi
U.S. Army Environmental Center
ATTN: SFIM-AEC-IRP
Aberdeen Proving Ground, MD 21010-5401

SUBJECT: Request for Design Continuation at Burning Ground No. 3 for Longhorn Army Ammunition Plant, Marshall, Texas

Dear Dr. Buchi:

In accordance with guidance provided in the Army Management Plan for the Installation Restoration Program, Longhorn Army Ammunition Plant is requesting approval to proceed past 30% Design on the Interim Remedial Action at Burning Ground No. 3. The Record of Decision (ROD) for this action has been signed by Mr. Walker, Deputy Assistant Secretary of the Army, and is currently in the office of U.S. Environmental Protection Agency, Region VI, awaiting signature by Ms. Saginaw, Regional Administrator. Formal concurrence by the State of Texas has been provided.

This request is made due to administrative costs associated with maintaining the contractor's continued presence on the installation in anticipation of the ROD approval, which was delayed. Delay was a result of the negotiations with State of Texas to reduce the originally proposed chloride discharge standards. The reduced standards resulted in significant savings to the Army.

If you have any questions, please contact Mr. David Tolbert, at 903-679-2728.

Sincerely,

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

RECORD OF DECISION

FOR

EARLY INTERIM REMEDIAL ACTION

AT

BURNING GROUND No. 3

LONGHORN
ARMY AMMUNITION PLANT

KARNACK, TEXAS

MAY 1995

RECORD OF DECISION
CONCURRENCE DOCUMENTATION
FOR
EARLY INTERIM REMEDIAL ACTION
AT BURNING GROUND NO. 3
LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS

Lisa Marie Price
Remedial Project Manager

Cynthia J. Kaleri
ROD Peer Review Committee

Michael C. Barra
Assistant Regional Counsel

for Stan Hitt
Superfund Texas Enforcement Section Chief

Sam Becker
Superfund Enforcement Branch Chief

for Walter Sutton
Regional Counsel

Allyn M. Davis
Hazardous Waste Management Division Director

DECLARATION
BURNING GROUND No.3
LONGHORN ARMY AMMUNITION PLANT
RECORD OF DECISION

EARLY INTERIM REMEDIAL ACTION

FEBRUARY 1995

A. SITE NAME AND LOCATION

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

B. STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected Early Interim Remedial Action for the Burning Ground No. 3 site (the site), Longhorn Army Ammunition Plant, in Karnack, Texas. This selection is made in accordance with the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA) and, to the extent practicable, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision is based on the administrative record for this site.

The State of Texas concurs with the selected remedy. A copy of the concurrence letter is attached.

C. ASSESSMENT OF THE SITE

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

D. DESCRIPTION OF THE SELECTED REMEDY

The Record of Decision for the site addresses an Early Interim Remedial Action. This Early Interim Remedial Action is necessary to mitigate potential risks posed by the high concentrations of chlorinated solvents and heavy metals in the shallow groundwater and buried source material at the site. The selected remedy addresses the principal risk at the site by reducing or preventing further migration of contaminants into deeper groundwater zones and possibly surface water bodies.

The major components of the selected remedy include:

- Extraction and Treatment of contaminated shallow groundwater using Organic Air Stripping and Off-gas Treatment and Metals Precipitation, and
- Excavation and Treatment of Source Material using Low Temperature Thermal Desorption and Catalytic Oxidation for off-gas.

E. STATUTORY DETERMINATIONS

This Early Interim Remedial Action is protective of human health and the environment, complies with Federal and State applicable or relevant and appropriate requirements for this limited-scope action, and is cost effective. Although this Early Interim Remedial Action is not intended to fully address the statutory mandate for permanence and treatment to the maximum extent practicable, this Early Interim Remedial Action utilizes treatment and thus is in furtherance of the statutory mandate.

Because this action does not constitute the final remedy for the site, the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element, (although partially addressed in this remedy) will be addressed by the final response action. Subsequent actions are planned to address fully the threats posed by the conditions at this site.

Because this remedy may result in hazardous substances remaining on site above health-based levels, a review will be conducted to ensure that the remedy continues to provide adequate protection of human health and the environment within five years after commencement of the remedial action. Because this is an Early Interim Remedial Action ROD, review of this site and of this remedy will be continuing. The development of final remedial alternatives for the site will also continue.

Jane Saginaw
Regional Administrator
EPA Region 6

5/12/95
Date

Signature sheet for the foregoing Burning Ground No. 3 Record of Decision between the Department of the Army and the U.S. Environmental Protection Agency, with concurrence by the Texas National Resource Conservation Commission.

Lewis D. Walker
Deputy Assistant Secretary of the Army (I, L, & E)
Environment, Safety and Occupational Health

4/18/95
Date

Lawrence J. Sowa
Lieutenant Colonel, U.S. Army
Commander, Longhorn Army Ammunition Plant

22 Feb 95
Date

TABLE OF CONTENTS

DECISION SUMMARY

A. Location and Description

Longhorn Army Ammunition Plant (LHAAP) is located in central east Texas in the northeast corner of Harrison County, approximately 14 miles northeast of Marshall, Texas, and approximately 40 miles west of Shreveport, Louisiana as shown on Figure 1. The installation occupies 8,493 acres between State Highway 43 and the western shore of Caddo Lake and is accessed by State Highways 43 and 134.

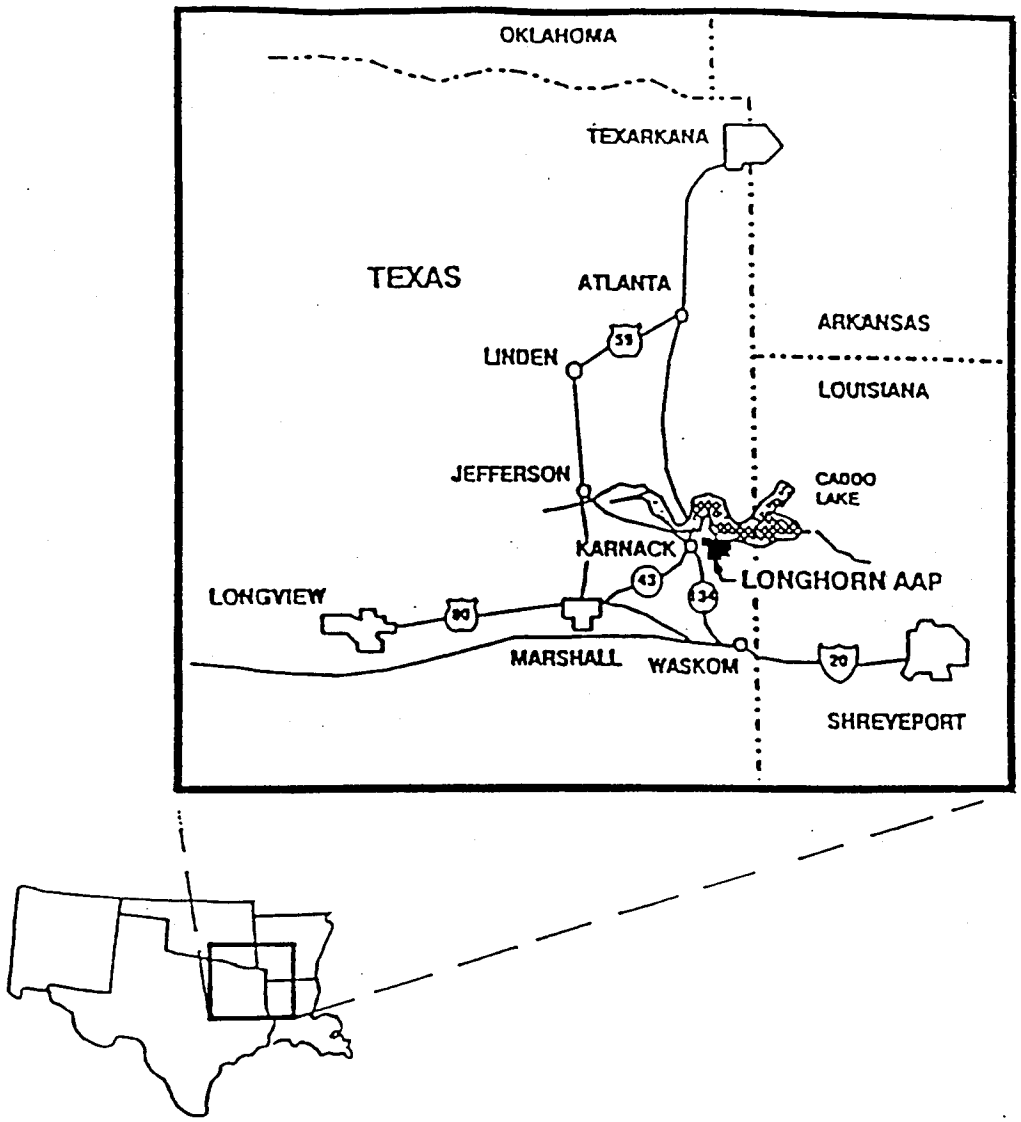
Burning Ground No. 3 is a fenced 34.5-acre secured area located in the southeastern quadrant of LHAAP, as shown on Figure 2. Harrison Bayou flows within 1,000 feet of the western edge and within 500 feet of the northern edge of the site.

LHAAP is situated on gently rolling land with an average slope of 3 percent towards the northeast. Most of the terrain slopes 3 percent or less, but slopes as steep as 12 percent are common in the western and northwestern portions of the installation and along the Harrison Bayou floodplain. Elevations on LHAAP vary from 335 to 170 feet above mean sea level (msl). Burning Ground No. 3 is situated on a natural topographic high slightly west of the crest of a small topographic divide between Harrison Bayou and Saunder's Branch (Figure 3). The topography of the site has been greatly altered by operations conducted over the past 35 years. Ground surface elevations across the site vary from 206 feet to about 174 feet msl.

LHAAP is located in a region that is commonly called the Pineywoods, a deep inland extension of the Gulf Coastal Plain that extends into Texas, Louisiana, Arkansas, and Oklahoma. The area is characterized by mixed pine-hardwood forests that cover gently rolling to hilly terrain. Mild temperatures and ample rainfall in East Texas provide excellent conditions to support an abundant and diverse plant community. This, in turn, provides a number of niches for a rich faunal community. LHAAP is forested with loblolly and shortleaf pines, a variety of oaks, sweet gum, black tupelo, ash, bald cypress, and a few scattered willows. Pines predominate throughout the installation. Burning Ground No. 3 is a cleared area within a heavily wooded section of LHAAP.

Caddo Lake, Caddo Lake State Park, and the small unincorporated town of Karnack border LHAAP. Other surrounding land is forested, with an oil and natural gas field located to the east of LHAAP along the Louisiana border. Caddo Lake State Park is located approximately 2.8 miles west-northwest of the installation. Other recreational facilities and nearby lake shore communities are within five miles. The town of Uncertain is 1.9 miles north of LHAAP.

All surface water from LHAAP drains into Caddo Lake via four drainage systems that cross portions of the installation, as shown on Figure 3. These systems are known as Saunder's



US Army Corps of Engineers
Tulsa District

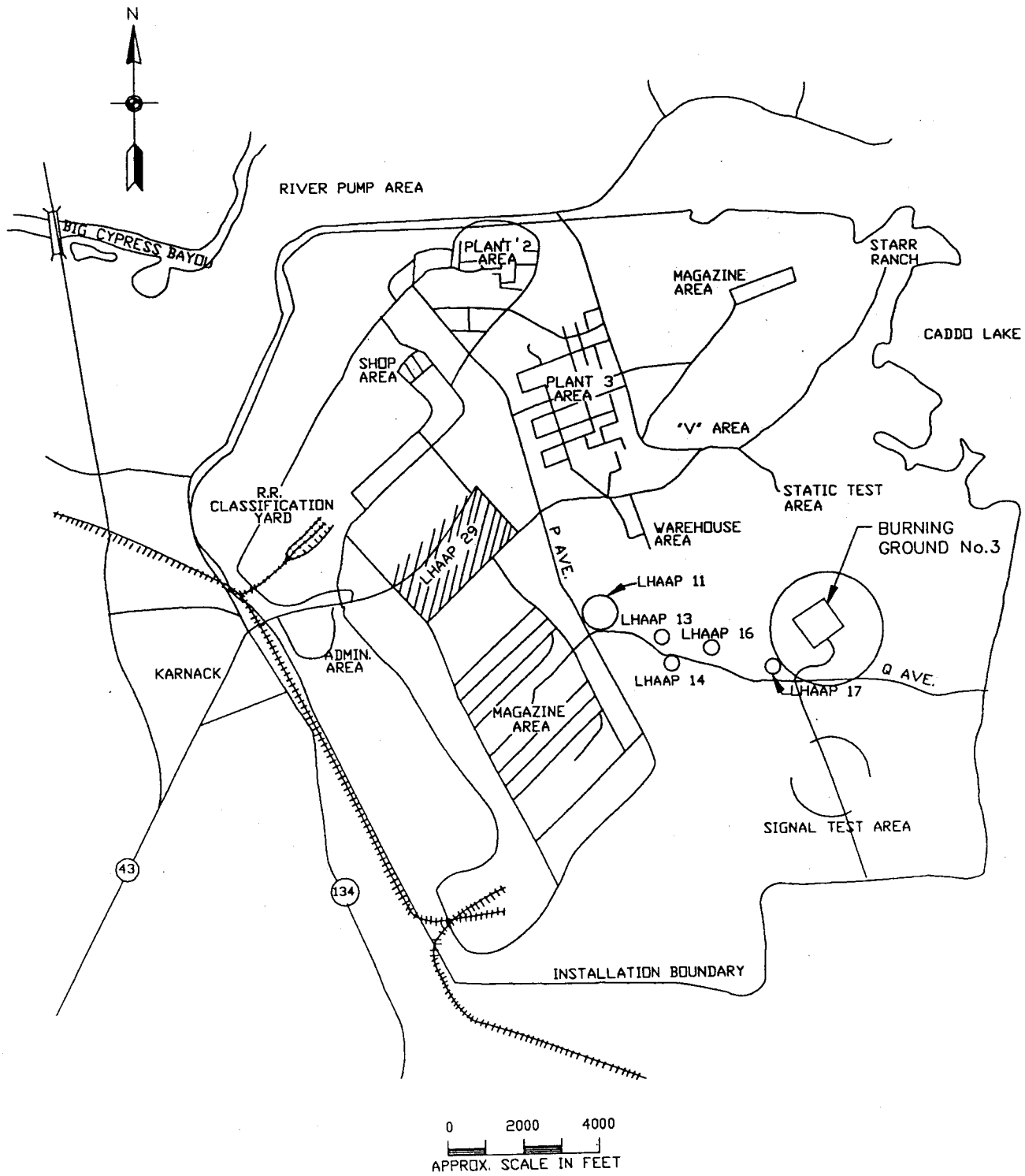
REGIONAL LOCATION MAP

LONGHORN ARMY AMMUNITION PLANT KARNACK, TEXAS

FIGURE NUMBER

1

2379-382-EDP-0002



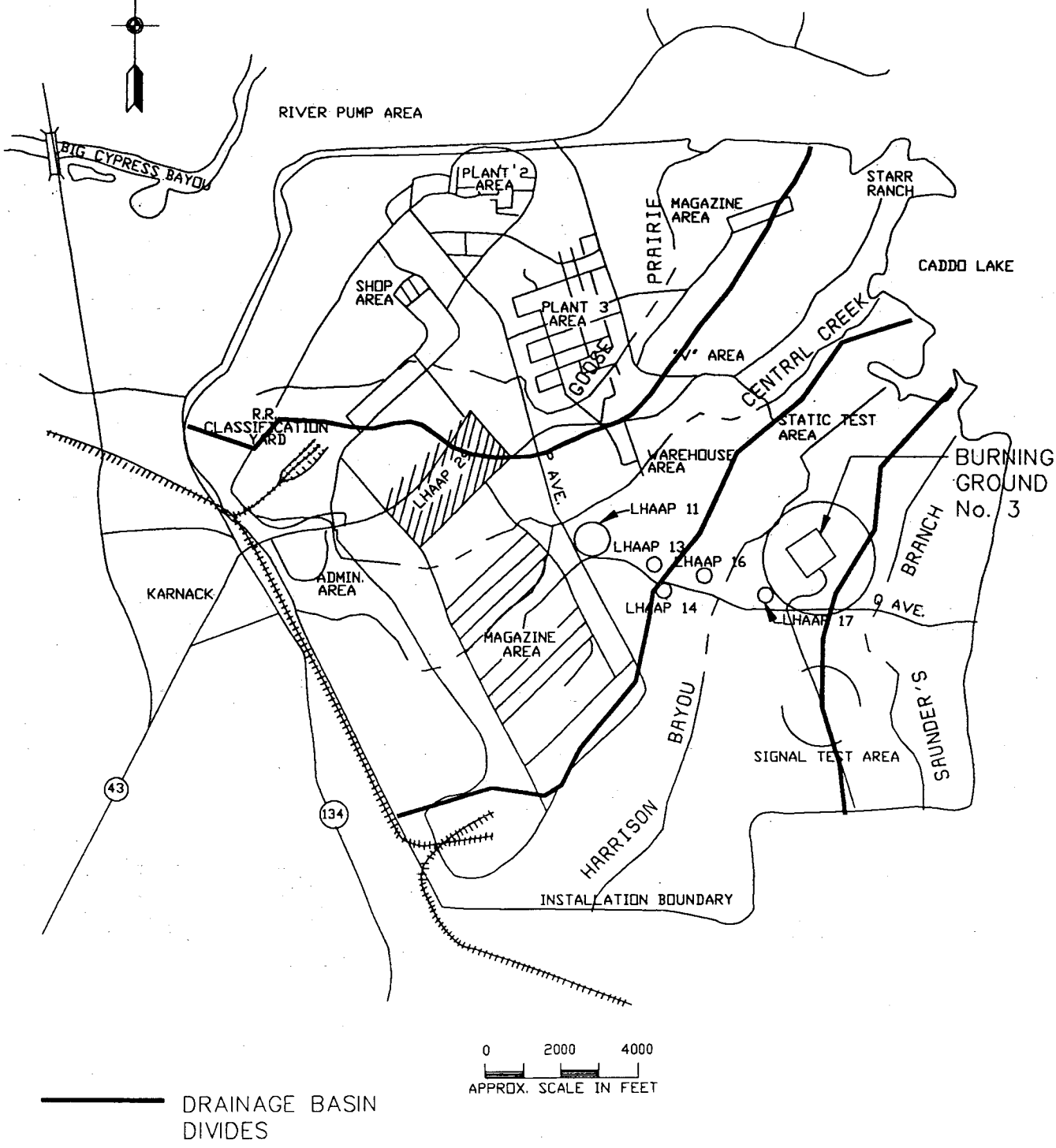
US Army Corps of Engineers
Tulsa District

LOCATION MAP FOR BURNING GROUND No. 3

LONGHORN ARMY AMMUNITION PLANT KARNACK, TEXAS

FIGURE NUMBER 2

2379-382-C001R



US Army Corps of Engineers
Tulsa District

DRAINAGE BASINS

LONGHORN ARMY AMMUNITION PLANT KARNACK, TEXAS

FIGURE NUMBER

3

2379-382-.JOOJ

Branch, Harrison Bayou, Central Creek, and Goose Prairie Bayou. The surface drainage at Burning Ground No. 3 occurs in all directions, but is generally directed towards Harrison Bayou to the west and to the north by both natural and man-made ditches and drainage swales. Harrison Bayou eventually drains into Caddo Lake, which is located approximately 1 mile downstream from the site. The extreme western corner of Burning Ground No. 3 is located within the 100-year floodplain of Harrison Bayou.

LHAAP, including Burning Ground No. 3, is situated on an outcrop of the Wilcox Group, which crops out over a large part of the eastern half of Harrison County. The Wilcox consists mostly of fine- to medium-grained sands interbedded with a considerable amount of clay and seams of lignite. The Wilcox Group is underlain conformably by the predominantly calcareous clay of the Midway Group. Regional dip of the Wilcox is to the northwest into the East Texas syncline, while the ground surface generally dips gently to the southeast.

The Wilcox Group has been identified by the Texas Water Development Board as the basal unit of the regional Cypress aquifer, also known as the Carrizo-Wilcox aquifer. The Cypress aquifer outcrops over most of Harrison County and is comprised of, in ascending order, the Wilcox Group, the Carrizo Sand, the Reklaw Formation, and the Queen City Sand. All units are believed to be hydraulically connected. All of these units dip to the northwest into the East Texas syncline.

The availability of ground water in Harrison County is largely dependent on the hydrologic characteristics of the units comprising the Cypress aquifer. The Wilcox Group, outcropping in the area of LHAAP, yields small (less than 50 gallons per minute (gpm)) to moderate (50-500 gpm) quantities of fresh water to wells throughout the county. As the basal unit of the Cypress aquifer, the Wilcox is also considered as the base of fresh water in the area. The Midway Group, which does not yield usable quantities of water, tends to serve as a relatively impermeable basement to the overlying water-bearing Wilcox.

Burning Ground No. 3 is situated over the regional Cypress aquifer. Evidence obtained from geophysical logs run in deep stratigraphic test borings drilled during previous investigations at the site suggest that the contact between the Wilcox and Midway Groups occurs anywhere from an approximate elevation of 80 feet msl immediately east of the burning grounds area to approximately 25 feet msl on the western side of the site.

B. Site History and Enforcement Activities

LHAAP is a government-owned, contractor-operated industrial facility under the jurisdiction of the U.S. Army Armament, Munitions, and Chemical Command. Its primary mission is to load, assemble, and pack pyrotechnic and illuminating/signal ammunition and solid propellant rocket motors.

Longhorn Army Ammunition Plant was established in October 1942 with the primary mission of producing trinitrotoluene (TNT) flake in the Plant 1 area. Production of TNT continued through World War II until August 1945 when the plant went on standby status until February 1952. Pyrotechnic ammunition as photoflash bombs, simulators, hand signals, and tracers for 40mm were manufactured at LHAAP from 1952 until 1956. Plant 3 area rocket motor facility

began operation in November of 1955. Production of rocket motors continued to be the primary mission of LHAAP until 1965, when the production of pyrotechnic and illuminating ammunition was re-established.

Recent operations consist of compounding pyrotechnic and propellant mixtures, load, assemble and pack activities, accommodating 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 Soviet Union.

Burning Ground No. 3 has been in operation since 1955. The site has been used for the treatment, storage, and disposal of pyrotechnic and combustible solvent wastes by open burning, incineration, evaporation, and burial. Historical waste management units include open burning pits, an unlined evaporation pond (UEP), stockpiles of solvent soaked sawdust, and suspected waste burial pits. The UEP was constructed at the burning ground in 1963 as a holding pond to store wastes resulting from the washout of rocket motor casings. In 1973, the UEP also began receiving wash water containing solvent residues and solids collected from LHAAP operations involving pyrotechnic material preparation and mixing. These residues and solids commonly contained the metallic cations aluminum, arsenic, barium, cadmium, chromium, iron, lead, magnesium, sodium, strontium, and zinc; the nonmetallic anions nitrite, nitrate, and phosphate; and the organic solvents acetone, ethyl alcohol, methyl ethyl ketone, methylene chloride, trichloroethylene, and toluene. Sawdust soaked with methylene chloride and other solvents that were used to clean and scour mixers used for mixing illuminants were stockpiled along the southern berm of the UEP and were burned in trenches in the western portion of the burning ground. An Air Curtain Destructor was built in 1979 in the western corner of the burning ground for the purpose of disposing of explosive-contaminated wastes by burning. Use of burn pits and trenches was reportedly discontinued in 1984. Use of the UEP was discontinued in 1984 when it was discovered that the pond was contaminating ground water beneath the site. The UEP was closed as a Resource Conservation and Recovery Act (RCRA) interim status surface impoundment in 1986 by removing all waste and capping the impoundment. As part of the INF Treaty activities being conducted at LHAAP, a burn cage was added in 1989 for the open burning of Pershing II missile motors, from 1989 to 1993.

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 LHAAP installation was added to the National Priorities List (NPL) on August 30, 1990. After being listed on the NPL, LHAAP, The U. S. Environmental Protection Agency (EPA) and the Texas Natural Resource Conservation Commission (TNRCC) - formerly known as the Texas Water Commission (TWC) - entered into a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 120 Agreement for remedial activities at the facility. The CERCLA Section 120 Agreement, referred to as the Federal Facility Agreement (FFA), became effective on December 30, 1991.

C. Highlights of Community Participation

The U.S. Army, EPA, and TNRCC have provided significant public outreach to the community surrounding LHAAP concerning the Burning Ground No. 3. The outreach program has included: fact sheets, media interviews, site visits, invitations to attend monthly technical and regulatory review meetings, and public meetings.

Copies of the Administrative Record documents have been made available to the public at several information repository locations including: LHAAP, EPA Region VI Library, TNRCC, and Marshall Public Library. The Proposed Plan for the Early Interim Remedial Action was released to the public on September 8, 1994. Copies of the Proposed Plan were placed at the Karnack Post Office, Marshall Library, Uncertain City Hall, and LHAAP. A public comment period was designated from September 11, 1994 to October 11, 1994. In addition, a public meeting was held at the Karnack High School on September 15, 1994, to present the Proposed Plan and to solicit public comments on the Early Interim Remedial Action at Burning Ground No. 3 of LHAAP. The U.S. Army placed notices of the meeting in the local newspaper and public buildings, and distributed fact sheets describing the Proposed Plan to local officials and hundreds of local citizens.

Representatives of the U.S. Army, EPA and TNRCC answered several questions at the public meeting. Seventy one written comments were received during the public comment period. These comments and those expressed at the public meeting are addressed in the Responsiveness Summary report which is attached to the ROD as Appendix B.

D. Scope and Role of Response Action

The investigations at the Burning Ground No. 3 site have indicated the presence of high concentrations of chlorinated solvents and heavy metals in the shallow groundwater and buried waste. Increasing concentrations of contaminants have been detected in the groundwater monitoring wells at the site, and the contaminated shallow groundwater plume has increased in lateral extent over the past several years. The close proximity of the site to Harrison Bayou and Caddo Lake creates conditions conducive to the introduction of contaminants to these aquatic systems via groundwater transport. Consequences of this scenario could potentially include contaminant exposure to human and ecological receptors associated with these important aquatic resources.

The Early Interim Remedial Action is necessary to address and mitigate potential risks associated with the high concentrations of contaminants in the shallow groundwater and their source material. The remedial objectives for the Early Interim Remedial Action are to eliminate or minimize the potential for exposure to human and ecological receptors. 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.

The Early Interim Remedial Action will be implemented prior to completion of the site Risk Assessment. The ongoing Remedial Investigation/Feasibility Study (RI/FS) for the Burning Ground No. 3 site will continue as scheduled. The RI/FS will address all contaminated soil and

groundwater at the site. A final ROD will be prepared following the completion of this study. Lessons learned during the implementation of the Early Interim Remedial Action, will be incorporated to the extent possible into the RI/FS. Therefore, the Early Interim Remedial Action will be consistent with planned future actions at the site.

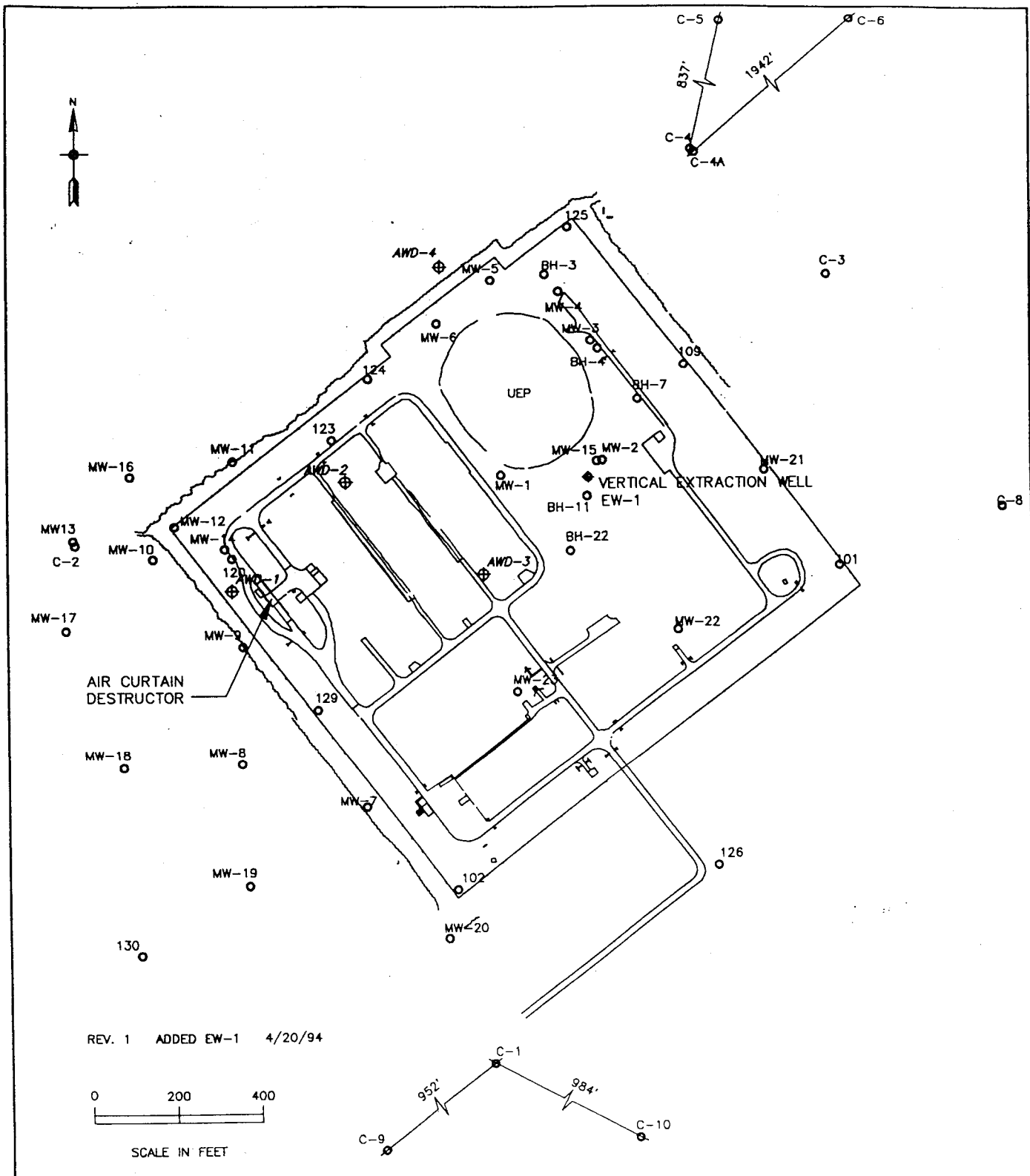
E. Summary of Site Characteristics

Burning Ground No. 3 is situated on an outcrop of the Wilcox Group, with a contact between the primary materials of the Wilcox and recent alluvium running somewhere across the western corner of the site. This contact approximates the 100-year floodplain elevation of 180 feet msl. Although many borings have been drilled over this entire area, stratigraphic correlation is difficult due to the lateral and vertical heterogeneity of the materials comprising the Wilcox Group. Subsurface data from soil borings and monitoring wells drilled and constructed as part of past investigations of the Burning Ground No. 3 site show very few strata to be continuous across the site area. These strata are typical for the Wilcox Group, consisting of varying thicknesses of sands, silts, and clays that are lenticular and discontinuous in nature. Figures 4 and 5 show the locations of on-site monitoring wells and previous soil boring locations, respectively.

Groundwater at Burning Ground No. 3 generally occurs under unconfined conditions. Depth to groundwater, which has been measured at one foot to 23 feet beneath the ground surface, has been observed to fluctuate approximately 2 feet over a 6-month period, reflecting the seasonal variations in rainfall. Although groundwater elevations are known to vary seasonally, the configuration of the groundwater surface varies little from that shown on Figure 6. The groundwater is mounded under the southern quadrant of the site in an elongated configuration extending from the southern corner of the fenced area toward the middle of the site. Groundwater flows in a radial pattern off Burning Ground No. 3, which contrasts with the regional direction of flow across the area which is to the northeast. This contrast in flow directions reflects the recharge effects of the topographically high Burning Ground No. 3.

Several investigations have been performed at the Burning Ground No. 3 site since 1976. Existing data show that at least two known sources are contributing to the groundwater contamination beneath the site. The primary source is the past usage of the UEP. A second source is trenches still containing solvent-contaminated wastes in the vicinity of the Air Curtain Destructor location. A third possible source for ground-water contamination is contaminated soils at various burn pit locations throughout Burning Ground No. 3.

High concentrations of solvents (volatile organic compounds (VOCs)), primarily methylene chloride and trichloroethylene, and traces of heavy metals, such as barium, have been detected within subsurface soils, buried waste, and the uppermost water-bearing zone at the site. The methylene chloride plume covers a larger area and has higher concentrations than the trichloroethylene plume. This difference could be attributed to the fact that methylene chloride is more soluble in water, more mobile, and is less likely to be absorbed to the soil than trichloroethylene. The concentrations of methylene chloride, as of April 1994, range from approximately 10,550 mg/l, near the center of the plume, to less than 0.005 mg/l, near the northwest edge of the plume. The concentrations of trichloroethylene, as



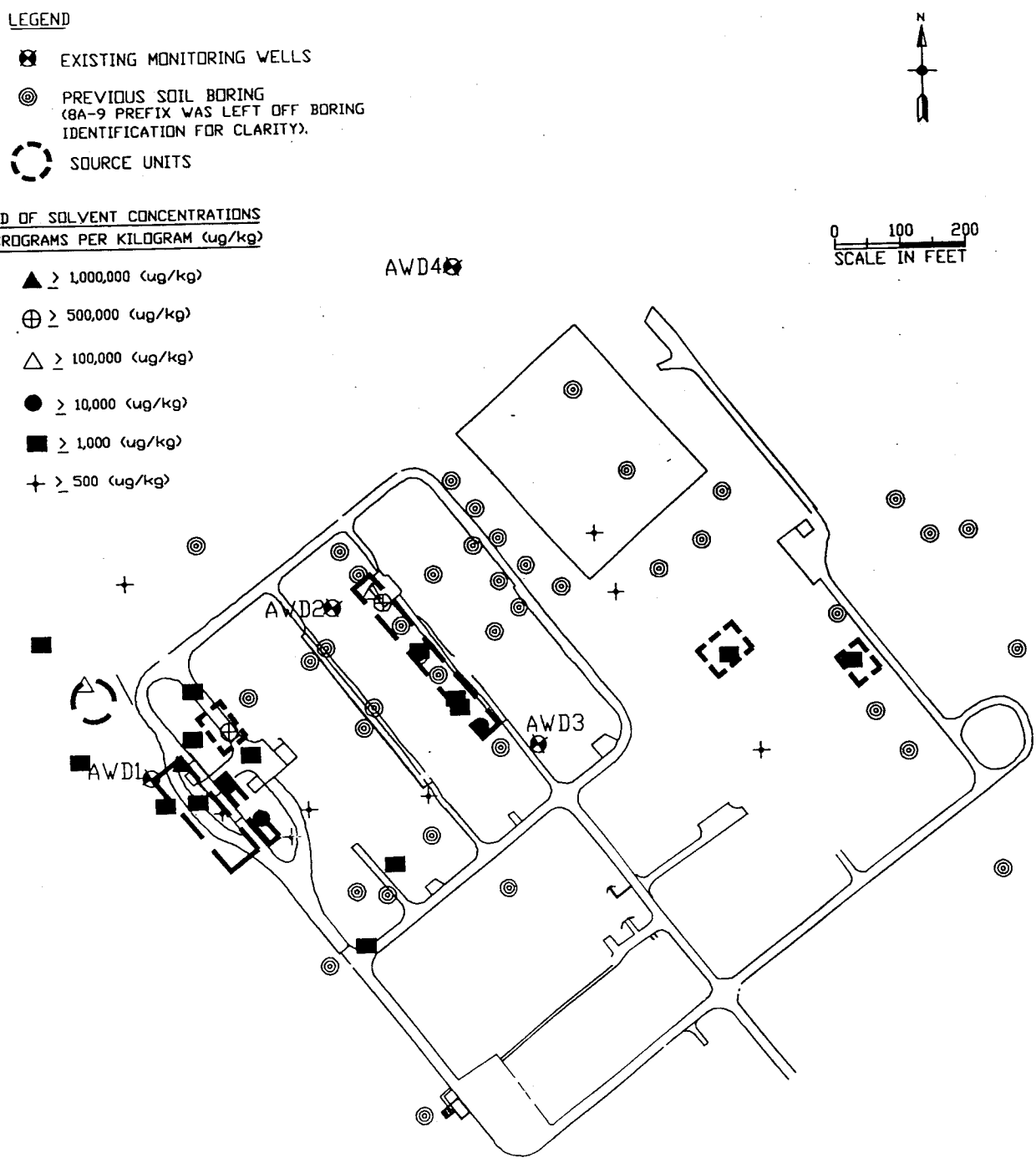
US Army Corps of Engineers
Tulsa District

MONITORING WELLS
BURNING GROUND No.3

LONGHORN ARMY AMMUNITION PLANT KARNACK, TEXAS

FIGURE NUMBER 4

2379-382-EDP-0005



JULY 1994
LONGHORN ARMY AMMUNITION PLANT
KERNACK, TEXAS
BURNING GROUND No. 3

FIGURE 5

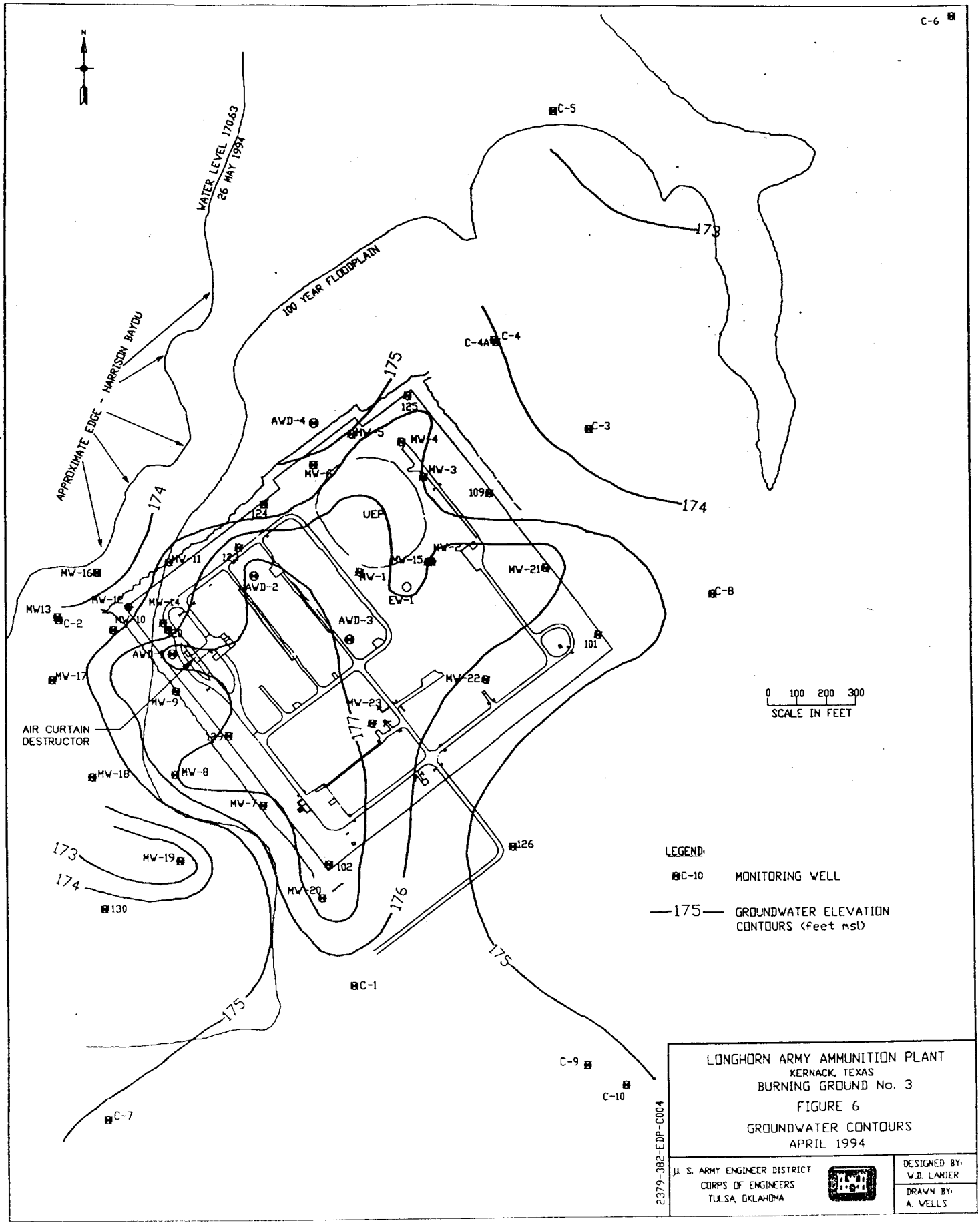
PAST SOIL INVESTIGATIONS
CONCENTRATIONS OF VOCs

U. S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
TULSA, OKLAHOMA

DESIGNED BY: W.D. LANIER
DRAWN BY: C. STAUDENMAIER

2379-382-C014

012697



LONGHORN ARMY AMMUNITION PLANT
KERNACK, TEXAS
BURNING GROUND No. 3
FIGURE 6
GROUNDWATER CONTOURS
APRIL 1994

U. S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
TULSA, OKLAHOMA

DESIGNED BY: W.D. LANIER
DRAWN BY: A. WELLS

2379-382-EDP-C004

of April 1994, range from approximately 1,520 mg/l near the center of the plume, to less than 0.005 mg/l near the northwest edge of the plume. Figures 7 and 8 show the isoconcentration contours of the methylene chloride and trichloroethylene plumes, respectively, as of April, 1994. Groundwater monitoring results have indicated the potential presence of methylene chloride and trichloroethylene in a free-phase in the shallow groundwater beneath Burning Ground No. 3 to the south and west of the UEP and in the vicinity of the Air Curtain Destructor. Since these chemicals have a density that is greater than water, the free-phase of these compounds is also referred to as dense nonaqueous phase liquids (DNAPLs). There is no evidence of light nonaqueous phase liquids at the site.

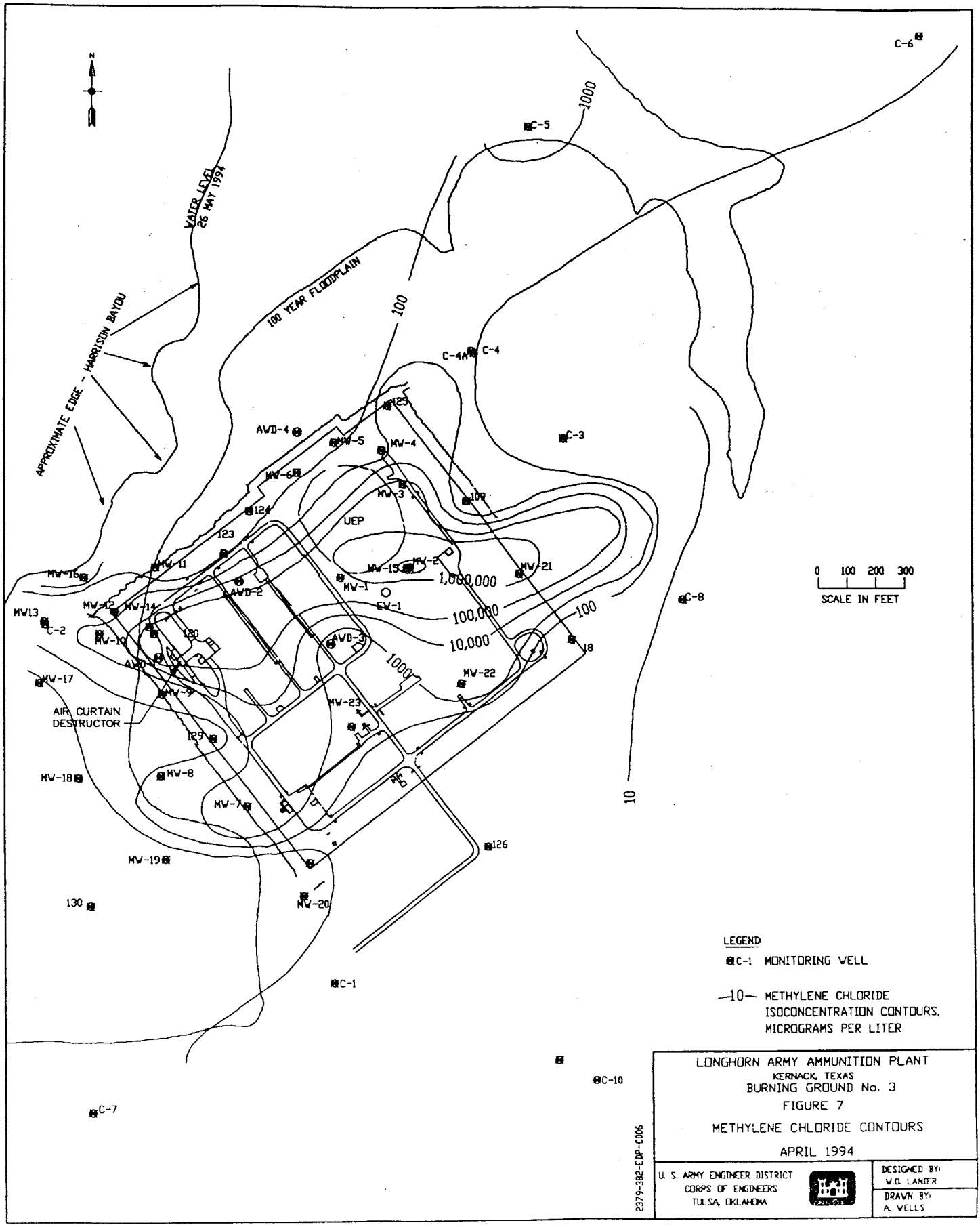
From 1987 through 1989, 174 soil samples were analyzed for VOCs. Trichloroethylene was detected in 103 samples with a maximum concentration of 1,000 mg/kg. Methylene chloride was detected in 64 samples with a maximum concentration of 742 mg/kg. Acetone was also detected in 38 of the 174 samples with a maximum concentration of 33 mg/kg. These VOCs were also detected in samples collected from potential source areas for the treatability studies program conducted in December 1993. Buried saw dust was encountered during the treatability studies sampling in the area adjacent to the southeast corner of the Air Curtain Destructor. Barium, chromium, and lead have also been detected in site soil samples at concentrations exceeding expected background concentrations (verification of background concentrations is on-going) for the area. Known soil and debris source material locations based on the review of a historical aerial photograph and soil sampling and testing results are shown on Figure 5.

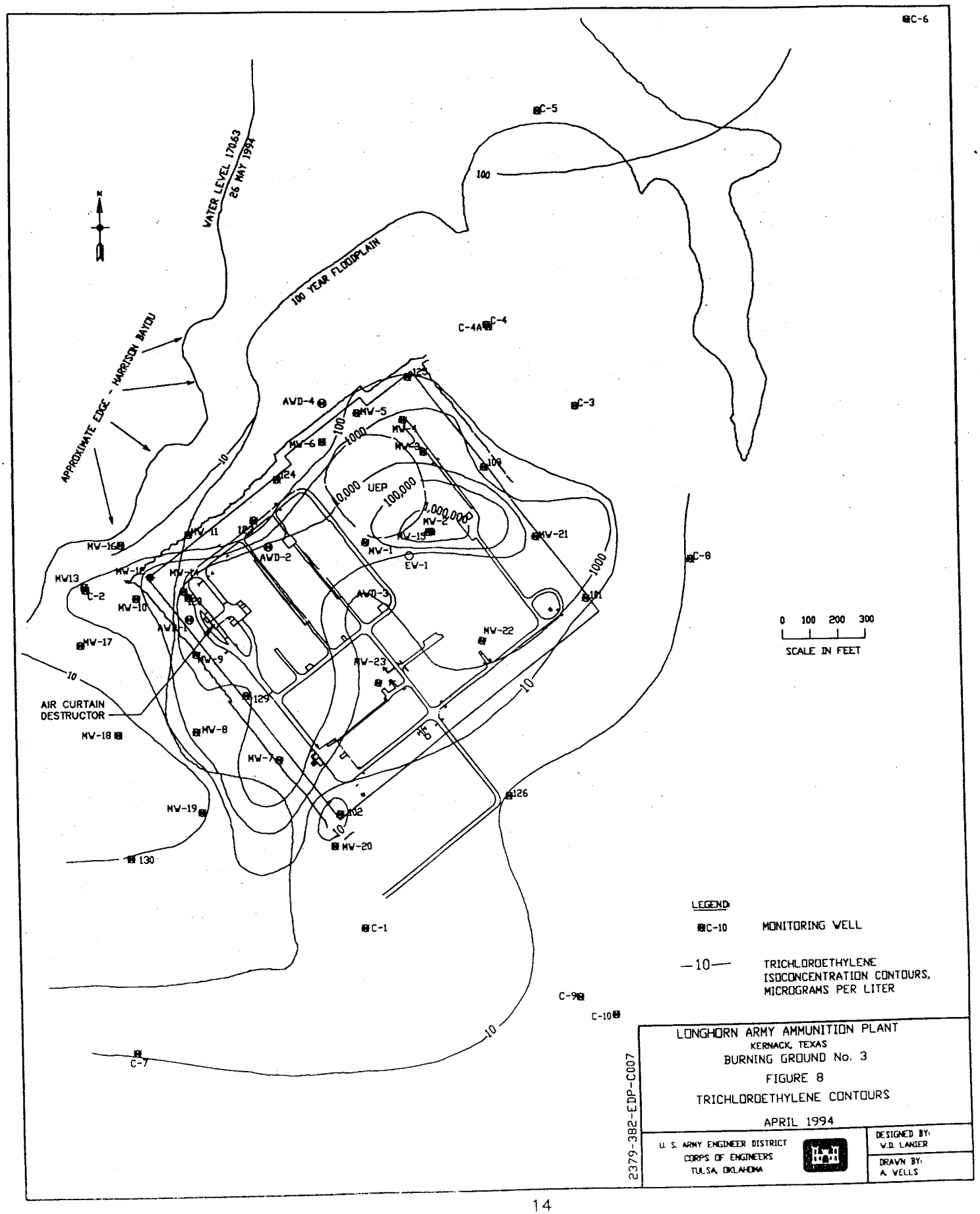
Based on the soil sampling results, historical information, and on materials encountered during the installation of the Air Curtain Destructor and monitoring wells at the site, there continue to be sources of contamination for soil and groundwater at the Burning Ground No. 3 site. The nature and extent of the source areas are not well defined. The presence of various inactive units including 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.

F. Summary of Site Risks

A risk assessment is a scientific procedure which uses facts and assumptions to estimate the potential for adverse effect on human health and the environment from exposure to site contaminants. The environmental or ecological risk assessment determines the present and future 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 exposure concentration known to have an adverse impact. In the risk assessment, carcinogenic and non-carcinogenic health risks are calculated. Conservative assumptions that weigh in favor of protecting human health are made in these calculations.

A risk assessment has not been completed for the Burning Ground No. 3 site since the true nature and extent of contamination has not yet been completely determined. A risk assessment will be conducted concurrently with the completion of the ongoing RI/FS work. The conclusions and recommendations of the risk assessment will be used during the development of the final


N
WATER LOCEL
26 MAY 1994
APPROXIMATE EDGE - HARRISON BAYOU
100 YEAR FLOODPLAIN
1000
100
10
C-6
C-5
C-4A
C-4
C-3
C-8
C-2
C-1
C-10
C-7
AWD-4
AWD-2
AWD-3
AWD-1
MW-1
MW-2
MW-3
MW-4
MW-5
MW-6
MW-7
MW-8
MW-9
MW-10
MW-11
MW-12
MW-13
MW-14
MW-15
MW-16
MW-17
MW-18
MW-19
MW-20
MW-21
MW-22
MW-23
EW-1
UEP
AIR CURTAIN DESTRUCTOR
1,000,000
100,000
10,000
1000
100
10
0 100 200 300
SCALE IN FEET
LEGEND
C-1 MONITORING WELL
10 METHYLENE CHLORIDE ISOCONCENTRATION CONTOURS, MICROGRAMS PER LITER
LONGHORN ARMY AMMUNITION PLANT
KERNACK, TEXAS
BURNING GROUND No. 3
FIGURE 7
METHYLENE CHLORIDE CONTOURS
APRIL 1994
U. S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
TULSA, OKLAHOMA
DESIGNED BY: W.D. LANIER
DRAWN BY: A. WELLS
2379-382-EDP-C006


C-6
C-5
C-4A
C-4
C-3
C-8
C-2
C-1
C-9
C-10
C-7
WATER LEVEL 1705.3
26 MAY 1994
100 YEAR FLOODPLAIN
APPROXIMATE EDGE - HARRISON BAYOU
AIR CURTAIN DESTRUCTOR
AWD-1
AWD-2
AWD-3
AWD-4
EW-1
MW-1
MW-2
MW-3
MW-4
MW-5
MW-6
MW-7
MW-8
MW-9
MW-10
MW-11
MW-12
MW-13
MW-14
MW-15
MW-16
MW-17
MW-18
MW-19
MW-20
MW-21
MW-22
MW-23
100
1000
10,000 UEP
100,000
1,000,000
10
0 100 200 300
SCALE IN FEET
LEGEND
C-10 MONITORING WELL
—10— TRICHLOROETHYLENE ISOCONCENTRATION CONTOURS, MICROGRAMS PER LITER
LONGHORN ARMY AMMUNITION PLANT
KERNACK, TEXAS
BURNING GROUND No. 3
FIGURE 8
TRICHLOROETHYLENE CONTOURS
APRIL 1994
U. S. ARMY ENGINEER DISTRICT
CORPS OF ENGINEERS
TULSA, OKLAHOMA
DESIGNED BY: W.D. LANIER
DRAWN BY: A. WELLS
2379-382-EDP-C007

response action for the site. However, ongoing plume monitoring has indicated that contaminant concentrations in on-site monitoring wells and the plume lateral extent has increased over the past several years. Therefore, the Early Interim Remedial Action is warranted to mitigate the potential risks posed by the high concentrations of VOCs and heavy metals detected in both the shallow groundwater and source material.

The high concentration of contaminants in groundwater at the site, and its close proximity to Harrison Bayou and Caddo Lake creates conditions conducive to the introduction 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 will be addressed in the site risk assessment.

G. Description of Alternatives

In order to evaluate potentially viable treatment remedial alternatives, several treatability studies were conducted on representative samples of the source material and groundwater from December 1993 to June 1994. An onsite pilot study, using several collection methods to determine the most effective way to extract the shallow groundwater, was also conducted in the spring of 1994. The results of the treatability and pilot studies are contained in the Administrative Record of the site.

Treatability studies were conducted for various treatment technologies. Only the successful technologies are considered as alternatives. The remaining technologies were found to be ineffective when applied on the waste present at the site. The ineffective technologies for groundwater included bioremediation and adsorption to activated carbon. Bioremediation was not capable of degrading the target VOCs at significant rates. The use of activated carbon would be cost prohibitive at the concentrations present in the groundwater.

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 percent removal. Loss of VOCs due to natural vaporization in the control sample was equivalent to VOCs loss due to biodegradation. Compound-specific analyses confirmed with the addition of an oxidizing enzyme, that at least some biodegradation of trichloroethylene occurred. However, 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 the 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 VOCs contamination.

With all of the alternatives that involve soil treatment, approximately 50,000 cubic yards of soil and source material would be addressed. This material would be treated to reduce the VOCs 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 incineration, can attain the Land Disposal Restrictions regarding treatment standards imposed

under RCRA (40 Code of Federal Regulations (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.

Because all of the groundwater alternatives involve extraction, a pilot study was conducted to determine the most effective technique to extract the contaminated shallow groundwater in the spring of 1994. Three different systems of extraction were installed and used in the pilot study:

- an interceptor collection trench;
- a horizontal extraction well; and
- a vertical extraction well

Two types of flow tests were conducted on all three extraction structures; a gravity flow test and a vacuum enhanced flow test. Results of the pilot study indicated that the interceptor collection trench was the most effective of the extraction techniques for the shallow groundwater at the site. The vertical extraction well was also effective; however its radius of influence was limited. The horizontal extraction well was not successful in extracting the shallow groundwater at the site.

A combination of 5,000 feet of interceptor collection trench and eight vertical extraction wells will be used to collect onsite shallow groundwater. These collection systems will be installed along the perimeter and inside Burning Ground No. 3. Between 150,000 and 400,000 gallons of contaminated shallow groundwater would be collected and treated daily during the implementation of the Early Interim Remedial Action. The methods of effective extraction of the shallow groundwater have been determined through the pilot study. The alternatives under discussion present only the potential treatment methods for the extracted contaminated water. The shallow groundwater would be treated to reduce the organic and metals contamination to acceptable levels and discharged to the surface water.

Table 1 provides a summary description of the eight alternatives considered. All alternatives except No-Action (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. Alternatives 3 and 4 address the VOCs contamination in the groundwater. Alternatives 5 and 6 address the heavy metals in the groundwater. Alternatives 7 and 8 address the VOCs contamination in the source material.

Table 1. Summary Description of The Alternatives Considered

	Description	Cost	Time
Alternative 1 No Action	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.	Estimated Capital Cost: $0.00 Annual Operation and Maintenance: $0.00 Estimated Total Costs (present worth): $0.00	Estimated time of Implementation: Design/Remedial Action: 0 months Groundwater/Surface Water monitoring: 0 years
Alternative 2 Limited Action	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 contaminants 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.	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
Alternative 3 Water treatment for volatile organic compounds utilizing ultraviolet oxidation	The laboratory treatability oxidation tests utilized ozone, hydrogen peroxide, and ultraviolet light (UV) to destroy organic compounds in water. Any residual ozone or VOCs, 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 VOCs were stripped from the water in the first 60 minutes. The VOCs 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.	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

	Description	Cost	Time
Alternative 4 Water treatment for VOCS utilizing air stripping	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 trichloroethylene. The air stripper off-gas, containing VOCs would be oxidized to hydrogen chloride and carbon dioxide by a catalytic oxidizer. The gases are then neutralized in water using a scrubber. Scrubbed solutions are then used in the groundwater treatment plant to prevent scaling in the air stripper.	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
Alternative 5 Water treatment for metals utilizing ion exchange	In the ion exchange process, undesirable ions are bound to a resin then exchanged for acceptable ions which are released to the water. An ion exchange system was designed to reduce the barium concentration in the ground-water. Treatability tests indicate the Ion Exchange Technology was effective in the removal of metals from the contaminated water at the site. The resulting waste product may require off-site disposal.	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
Alternative 6 Water treatment for metals utilizing precipitation	Treatability tests were conducted using both alum and ferric chloride as coagulants. The water pH was adjusted and a coagulant was 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.	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

	Description	Cost	Time
Alternative 7 Soil treatment for VOCs utilizing high temperature incineration	The high temperature incineration involves the complete incineration of the soils at a standard operating range temperature of 914°to 1,922°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.	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
Alternative 8 Soil treatment for VOCs utilizing low temperature thermal desorption	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 points for trichloroethylene and methylene chloride are 188° 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. This process will convert the solvents to carbon dioxide, water and hydrogen chloride gases. These gases are then neutralized in water using a scrubber. Scrubbed solutions are then used in the groundwater treatment plant to prevent scaling in the air stripper.	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 year Groundwater/Surface Water monitoring: 5 years

H. Summary of The Comparative Analysis of Alternatives

CERCLA regulations require that remedial alternatives be evaluated against 9 criteria to determine which alternative(s) provide the best balance between the criteria and, therefore, should be implemented at the site. The following presents an explanation of the criteria:

1. Overall Protection of Public Health and the Environment
This criteria 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 restrictions on the future use of the site.

2. Compliance with ARARs
Compliance with applicable or relevant and appropriate regulations (ARARs) 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 criteria addresses the ability of a potential option to reliably protect human health and the environment over time, after the cleanup goals have been accomplished.

4. Reduction of Toxicity, Mobility, or Volume of Contaminants
This criteria 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, and volume of waste; and the type and quantity of contamination that will remain after treatment.

5. Short-term Effectiveness
This criteria assesses short-term risks to the workers, 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 alternatives.

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 Responsiveness Summary which is part of the Record of Decision.

The following is a narrative analysis for the alternatives considered:

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 Alternative and the Limited Action Alternative 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. Alternative 8 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.

A combination of either Alternative 3 or 4, which address the VOCs contamination in the groundwater, and either Alternative 5 or 6, which address the heavy metals in the groundwater, would provide overall protection of the environment and effective treatment of groundwater.

Compliance with Applicable or Relevant and Appropriate Requirements:

Given 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 (RCRA) 40 CFR 261, Subpart D. All 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 (ARARs) will be met by those alternatives involving treatment. The ARARs 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.

Reduction of Toxicity, Mobility, or Volume of Contaminants:

All the treatment alternative 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 contaminants. The thermal desorption technology (Alternative 8) is also very effective in the reduction of the concentration of contaminants but is more efficient in their removal since the site contaminants are destroyed at a much lower temperature than in a high temperature incinerator.

All four groundwater treatment alternatives 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.

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:

Both technologies for the treatment alternatives for the source material are readily available and are technologies that have demonstrated their effectiveness on addressing the contamination problems associated with the Burning Ground No. 3 site. However, administrative procedures surrounding the implementation of the incineration alternative (Alternative 7) may make implementation difficult. The low temperature thermal desorption application (Alternative 8) is relatively new. However, there are approximately 40 thermal desorption projects in various stages of implementation across the United States. Alternative 8 is expected to be easily implemented with no technology related problems.

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 a significant volume of water. The performance of these extraction methods meets the goal of restricting or preventing migration of the contaminated water horizontally and vertically. In isolated pockets of contamination or in areas where the groundwater requiring extraction is deeper than 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 (CERCLA) 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 for removal of VOCs 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.

Cost:

The costs for the treatment of source materials range form $10,195,000 (Alternative 8, low temperature thermal desorption) to $26,195,000 ((Alternative 7, Incineration). 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 (Alternative 6) to $20,860,000 (Alternative 5) for the metals contamination.

Regulatory Acceptance:

The EPA and TNRCC have been provided the opportunity to review the investigation results, treatability, pilot study data, and the Proposed Plan. Support by the State of Texas for the selected remedy for the Early Interim Remedial Action has been documented in a letter that is included in Appendix A.

Community Acceptance:

Community Acceptance 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 have been specifically addressed in the Responsiveness Summary that is included as Appendix B. These comments have dealt with site and technology specific concerns. Based on the comments received during the public comment period, the community appears to support the Early Interim Remedial Action as detailed in the Proposed Plan.

I. The Selected Remedy

Based on consideration of the requirements of CERCLA, the detailed analysis of the alternatives, and public comments, the U.S. Army has determined that the most appropriate remedy for addressing the site contaminants and meeting the remedial objectives of the Early Interim Remedial Action is a combination of Alternatives 4, 6, and 8 as follows:

- Extraction of shallow groundwater and treatment using metal precipitation, air stripping and off-gas treatment for VOCs, and
- Excavation of source material and treatment using low temperature thermal desorption and off-gas treatment for VOCs.

The present worth, capital, and operation and maintenance costs over five years for the selected remedy are as follows:

	Shallow Groundwater Treatment & Disposal	Source Material Excavation, Treatment, & On-Site Disposal
Capital Costs	$4,490,000	$10,000,000
Annual Operations & Maintenance	$400,000	$50,000
Present Worth (Total Estimated Costs)	$5,080,300	$10,195,000

Performance Standards:

The contaminated shallow groundwater will be pumped from about 5,000 feet of interceptor collection trenches and several vertical extraction wells. The estimated groundwater pumping rate from all extraction points is about 150,000 to 400,000 gallons per day. The hydraulic effectiveness of the extraction system will be evaluated by monitoring groundwater levels and quality in the shallow aquifer during the implementation of the selected remedy.

The extracted groundwater will be treated to the levels established by TNRCC (see Table 2). The treated water will be discharged to Harrison Bayou and/or Central Creek. The precipitated metals will be taken off-site for disposal at an approved/licensed facility. Air emissions from both groundwater and source material treatment processes will be in accordance with 30 TAC 116 (Texas Air Control Board Standard Exemptions). Air emissions and discharged water quality will be monitored on a regular basis to ensure that they meet the appropriate standards.

TABLE 2
Effluent Limitations for the Discharge of Remediated Groundwater

Pollutants	Units are (μg/l)		
	Daily Average	Daily Maximum	MAL
Methylene Chloride (Dichloromethane)	803	1699	20
Trichloroethylene	85	181	10
1,1-Dichloroethane	6633	14032	10
1,1-Dichloroethene (1,1-Dichloroethylene)	119	253	-
1,2-Dichloroethane	85	181	10
Vinyl Chloride	34	72	10
Acetone	1132	2395	-
Chloroform	1708	3615	10
Tetrachloroethene (Tetrachloroethylene)	85.4	180.7	10
Ethylbenzene	26954	57025	10
Styrene	2829	5987	-
Toluene	1980	4189	10
Benzene	85	181	10
Xylene	39.5	83.6	-
Carbon Tetrachloride	85	181	10
1,1,1 Trichloroethane	3417	7230	10
1,1,2 Trichloroethane	102.5	216.9	10
Aluminum	777	1644	20
Arsenic (Total)	365	772	10
Barium (Total)	1000	2000	10
Cadmium (Total)	1.6	3.4	1
Chromium (Total)	355	752	5
Chromium (3+)	297	628	10
Chromium (6+)	58	124	10
Cobalt*	5433	11495	-
Iron*	1132	2395	-
Lead (Total)	2.2	4.6	5

TABLE 2
(Continued)

Pollutants	Units are (μg/l)		
	Daily Average	Daily Maximum	MAL
Nickel (Total)	87	184	10
Manganese*	7323	15494	-
Silver (total Equivalent)	1.4	3	2
Selenium (Total)	5.7	12	5
Vanadium*	1698	3592	-
Zinc	146	310	5
Chlorobenzene	22300	47180	50
Hexachlorobenzene	0.22	0.47	10
Oil and Grease	N/A	15	-
Chemical Oxygen Demand	N/A	200	-
Chloride	See Note Below	N/A	-
Sulfate	See Note Below	N/A	-

*Assumes 100% dissolved

Note: Discharge limits for Chloride and sulfate are to be based on discharge rates using the following formula:

$$C_C \geq \frac{Q_S\, C_A + Q_E\, C_E}{Q_E + Q_S}$$

where:

Q_S = Flow rate in the receiving stream, Harrison Bayou and/or Central Creek, in cubic feet per second (cfs). This flow rate shall be measured at a constant location no less than 100 feet upstream from the point of discharge of treated groundwater. Measurements will be taken daily in Harrison Bayou and Central Creek in accordance with TNRCC's Water Quality Monitoring Manual, August, 1994.

C_A = Chloride/Sulfate (ambient), 10,000 microgram/per liter (μg/l) (from State of Texas Water Quality Inventory)

C_C = Chloride/Sulfate criteria, 100,000 μg/l for Chloride and 50,000 ug/l for Sulfate (from State of Texas Water Quality Inventory)

Q_E = Treated Groundwater Discharge Rate in cfs. The groundwater pumping and treatment rate shall be adjusted as necessary in order to meet the required effluent concentration C_E.

C_E = Effluent Concentration (discharge limit) in μg/l.

TABLE 2
(Continued)

Example: For a discharge rate of 250,000 gallons per day or 0.39 cfs, and a flow rate in the receiving stream of 4 cfs, the discharge limit for chloride would be:

$$100{,}000 = \frac{(4.0)(10{,}000) + (0.39)(C_E)}{0.39 + 4.0}$$

$$C_E = 1{,}023{,}000\ \mu g/l$$

DEFINITIONS

Daily average concentration - the arithmetic average of all effluent samples, composite or grab as required by this permit within a period of one calendar month, consisting of at least four separate representative measurements. When four samples are not available in a calendar month, the arithmetic average (weighted by flow) of all values taken during the month shall be utilized as the daily average concentration.

Daily maximum concentration - the maximum concentration measured on a single day, by composite sample, unless otherwise specified elsewhere in the permit.

TAC reference - most of the limitations are based upon water quality standards found at TAC 307 for the protection of human health and aquatic life. The limit for Barium is from TAC 319 - Subchapter B.

MAL - the minimum analytical level. All testing must be completed utilizing EPA approved methods which can detect the pollutant to the referenced MAL.

N/A - Not Applicable.

Discharged water quality will be measured in accordance with TNRCC requirements. The quality of the discharged water shall meet the limitations established in Table 2. The monitoring methodology and frequency for discharged water will be in accordance with TNRCC requirements.

Approximately 50,000 cubic yards of soil and source material, including soil excavated during the construction of the groundwater collection system, will be excavated and treated using low temperature thermal desorption for removal of VOCs. Field and laboratory testing would be used for confirmation of excavation limits of source material.

The excavated soil and source material will be treated according to the requirements of the Land Disposal Restrictions (40 CFR Part 268) under RCRA. The remedy 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 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 LHAAP. Air emissions from the treatment process will be monitored on a regular basis to ensure that emissions are below the appropriate levels.

The VOCs separated from the groundwater and source material will be catalytically converted to carbon dioxide, water, and hydrogen chloride gases. The gases will be scrubbed using water and sodium hydroxide (if needed) to produce a very diluted acid stream. The acid stream resulting from groundwater treatment will be pumped to and used in the groundwater treatment plant to prevent scaling in the air stripper. The acid stream from source material treatment will be neutralized to produce sodium chloride that is dissolved in the water used to scrub the acid. This water will be discharged to Harrison Bayou and/or Central Creek if it meets the requirements of Table 2. If it does not meet the requirements of Table 2, this water shall be processed through the water treatment plant, and discharged once the requirements of Table 2 are met.

J. Statutory Determination

The primary responsibility at CERCLA sites is to select remedial actions that are protective of human health and the environment. Section 121 of CERCLA requires that the selected remedial action for the site comply with applicable or relevant and appropriate environmental standards established under Federal and State environmental laws, unless a waiver is granted. The selected remedy must also be cost-effective and utilize permanent treatment technologies or resource recovery technologies to the maximum extent practicable. The statute also contains a preference for remedies that include treatment as a principal element. The following sections discuss how the selected remedy for the Early Interim Remedial Action at Burning Ground No. 3 meets the statutory requirements even though is not designed or expected to be final.

Protection of Human Health and the Environment:

The selected remedy for the shallow groundwater and source material protects human health and the environment. The extraction and treatment of contaminated groundwater will prevent the

lateral expansion of the plume and the migration of contaminants to lower water bearing zones at the burning ground. The excavation and treatment of source material will prevent further migration of contaminants into the shallow groundwater zone. This action would prevent contamination from reaching nearby aquatic systems and consequently contaminant exposure to human and ecological receptors associated with these systems. Based on treatability test results, air stripping will remove sufficient VOCs from extracted groundwater to meet State of Texas discharge standards of the VOCs present in the groundwater. The low temperature thermal desorption remedy will remove the VOCs from the source material into gaseous state. The air stripper and thermal desorber off-gas containing these VOCs will be catalytically converted to carbon dioxide, water and hydrogen chloride gases. These gases will then be scrubbed using water and sodium hydroxide (if needed) to produce a very diluted acid stream. This acid will be pumped back into the water treatment plant where it will be used to prevent scaling in the air stripper. A groundwater monitoring program will be maintained during the extraction and treatment process. By maintaining such a program, prevention of exposure can be assured. There are no short-term threats associated with the selected remedy that cannot be readily controlled. In addition, no adverse cross-media impacts are expected from the remedy.

Compliance with Applicable or Relevant and Appropriate Requirements:

The selected remedy will comply with all applicable or relevant and appropriate action-, chemical-, and location-specific requirements (ARARs). The ARARs are presented below:

Chemical-Specific ARARs:

The waste materials have been classified as F002 hazardous waste under RCRA. Treatment levels will be established under the Treatability Variance Procedures of 40 CFR 268.44 for the thermal desorption treatment of soils and source material. The treatment level range that will be established throughout the Treatability Variance for the treatment technologies is a 90 to a 99.9 percent reduction in the concentration of the contaminants upon the completion of the treatment process.

Treatment levels for the contaminated groundwater will be in accordance with state requirements listed in Table 2.

Metals and other treatment residuals that are hazardous wastes will be managed in accordance with RCRA (40 CFR 261).

Action-Specific ARARs:

Water discharges to a surface body of water must satisfy the substantive requirements of the National Pollution Discharge Elimination System program, 40 CFR Part 125 and 30 Texas Administrative Code (TAC).

Air emissions from both groundwater and source material treatment processes will be in accordance with 30 TAC 116 (Texas Air Control Board Standard Exemptions).

Occupational Safety and Health Administration requirements (29 CFR) will be applicable to the

work conducted during the Early Interim Remedial Action.

Location-Specific ARARs:

RCRA requirements concerning location of a treatment, storage or disposal facility within a 100 year floodplain will be relevant and appropriate, as part of the Burning Ground is within a 100 year floodplain (40 CFR Part 264.18).

Texas groundwater rules (30 TAC) require restoration of contaminated groundwater, if feasible.

While no historic or archeological points of interest are known to be present at the site, should they be discovered the procedures of the National Historic Preservation Act of 1966 (36 CFR Part 800) will be adhered to.

Cost Effectiveness:

The selected remedy is cost-effective in achieving the objectives of the Early Interim Remedial Action. The cost for treatment of source materials range from $10,195,000 for the selected alternative (low temperature thermal desorption) to $26,195,000 for high temperature incineration. Therefore, the selected remedy is most effective and least expensive. The cost for treatment of VOCs in extracted water ranges from $3,000,000 for the selected air stripping remedy and $9,000,000 for the ultraviolet oxidation alternative. In addition, the cost for treatment of metals in the extracted groundwater ranges from $2,080,000 for the selected metal precipitation remedy and $20,860,000 for the ion exchange alternative. Therefore, the selected groundwater treatment technologies provide the greatest overall protection while being cost effective.

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

The Early Interim Remedial Action is not designed or expected to be final remedy for the Burning Ground No. 3 site. However, the selected interim remedy represents the best balance of trade-offs among the other alternatives with respect to the pertinent criteria. The selected remedy satisfies the statutory requirements of CERCLA 121(b) by:

- Being protective of human health and the environment;
- Complying with applicable, relevant and appropriate requirements;
- Being cost-effective;
- Utilizing permanent solutions and alternative treatment technologies to the maximum extent practicable; and
- Satisfying the statutory preference for treatment as a principal element.

Preference for Treatment as a Principal Element:

This selected remedy employs the use of treatment as a principal element. In addition, the preference for remedies that employ treatment as a principal element will be addressed in the final ROD.

K. Documentation of Significant Changes

The Proposed Plan for the Early Interim Remedial Action at the site was released for public comments on September 9, 1994. The Proposed Plan identified the preferred alternative to be a combination of Alternatives 4, 6, and 8:

- Extraction of shallow groundwater and treatment using metal precipitation, air stripping and off-gas treatment for volatile organic compounds, and
- Excavation of source material and treatment using low temperature thermal desorption and off-gas treatment for volatile organic compounds.

The U.S. Army reviewed all written and oral comments submitted during the public comment period. Significant, but not fundamental, changes to proposed remedy are as follows:

- The response given to Comment Number 28 from the public meeting for the Proposed Plan (see Appendix B, page B-9) requires revision. The response indicated that 99% of the contaminants would be removed by the treatment process before the off-gases are emitted into the air. This response was in reference to the test data presented in the Proposed Plan from the treatability study for groundwater air stripping. The response correction is that the off-gas emitted during groundwater and soil treatment will be in compliance with the pertinent standard exemption for air emissions listed in 30 TAC 116 (May 4, 1994).
- The water used to neutralize gases in the scrubber, of the water treatment plant, will be used in the groundwater treatment plant to prevent scaling in the air stripper.

APPENDIX A

THE STATE OF TEXAS
LETTER OF CONCURRENCE

012719

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Protecting Texas by Reducing and Preventing Pollution

February 28, 1995

Allyn M. Davis, Ph.D., Director
Hazardous Waste Management Division
U. S. Environmental Protection Agency
Region VI
1445 Ross Avenue
Dallas, Texas 75202-2733

Re: Longhorn Army Ammunition Plant
Draft Record of Decision

Dear Dr. Davis:

We have reviewed the proposed Record of Decision (ROD) for the Early Interim Remedial Action, Burning Ground No. 3, Longhorn Army Ammunition Plant. We concur that the remedy described in the February 22, 1995 ROD is the most appropriate for the site. The selected remedy calls for extraction and treatment of contaminated shallow ground water using organic air stripping, off-gas treatment, and metals precipitation; and excavation and treatment of source material using low temperature thermal desorption, and off-gas treatment using catalytic oxidation.

We have provided information regarding the State's waste discharge and air emission standards, which have been incorporated into the ROD. We anticipate that adequate funding and personnel resources will be provided through the Department of Defense/State Memorandum of Agreement and the Federal Facility Agreement to allow our continued participation in the remedial action.

Sincerely,

Dan Pearson
Executive Director

APPENDIX B

RESPONSIVENESS SUMMARY

INTERIM REMEDIAL ACTION
BURNING GROUND NO. 3
LONGHORN ARMY AMMUNITION PLANT

EARLY INTERIM REMEDIAL ACTION
BURNING GROUND NO. 3
LONGHORN ARMY AMMUNITION PLANT

This Community Relations Responsiveness Summary provides written responses to public comments submitted regarding the Proposed Plan of Action at the Burning Ground No. 3 site. The summary is divided into two sections:

Section I: Background of Community Involvement and Concerns. This section provides a brief history of community interest and concerns raised during the remedial planning activities at the site.

Section II: Summary of Major Comments Received. The comments (both oral and written) are summarized. The U.S. Army responses are provided.

I. Background of Community Involvement and Concerns

The community surrounding the Longhorn Army Ammunition Plant (LHAAP) is aware of the problems associated with the Burning Ground No. 3 site. This awareness is evident by the heavy turnout for the public meeting that was held at the Karnack High School on September 15, 1994 and by site visits conducted by a number of local officials and community activists. The community has not expressed any opposition to the interim action at the site. However, the community has raised some concerns through comments made during the public meeting and written comments provided during the public comment period. The comments received from the community concentrated mainly on past and future exposure to site contaminants as well as questions related to the technologies presented in the selected remedy. Several members of the community have been supportive of the interim action as can been seen from the comments below.

II. Summary of Major Comments Received

Public notice announcing the public comment period and invitation to public meeting was given from September 9 to September 15, 1994 , in the Marshall News Messenger a widely circulated local newspaper. Also, thirteen hundred invitation letters and fact sheets were mailed to local citizens on September 10, 1994. The Proposed Plan of Action was released to the general public on September 8, 1994. The public comment period began on September 11, 1994, and ended on October 11, 1994. A public meeting was held on September 15, 1994 at the Karnack High School. The purpose of the meeting was to discuss the proposed plan and to solicit public comments on the interim action at the Burning Ground site. Representatives of the U.S. Army made presentations about the interim action and answered public comments during the public meeting. Also, representatives of the Environmental Protection Agency (EPA) and the Texas Natural Resource Conservation Commission (TNRCC) attended the meeting and assisted in the responses to public comments as needed.

One hundred and fifty people attended the public meeting and at least twenty asked questions or made comments. Two sets of written comments and questions were received during the public comment period.

The following comments and questions were received during the public meeting. A full account of the public meeting can be found in the public meeting transcripts which are document in the site Administrative Record:

1. Comment by Thelma Gary:
I want to know how much of that contamination can get into our water system right now?

   Response:
The U.S. Army has no indication that there is any threat to a public water supply either on the plant or off the plant from this source or any other source that is under investigation at the plant.

2. Comment by Carol Campbell:
Are we to assume that you have identified all areas of the approximately 8,500 acres of this facility, or is this just a first step or will there be other, say burning ground areas, or areas that are subject to cleanup as well as this?

   Response:
The units that are presently under investigation are the known units that warranted action at this time. If any other information comes forward that gives us reason to believe that a site or unit requires investigation, then it will be studied and go through the same process. We went through an investigative phase and part of that phase was interviewing and researching past employees of Thiokol and the prior contractors' practices. The process is a continuing one. If there are members in the community who know something we may have overlooked in our investigative process, we would like to know that. As a matter of fact, one of the units that is under investigation today is a unit that was not uncovered because of former records, but was based on a recollection of an employee.

3. Comment by Carol Cambell:
Approximately what percentage of the total acreage has already been checked out.

   Response:
An exact figure does not exist. The U.S. Army has concentrated on centralized areas of the facility. A rough estimate would be 2,000 acres.

4. Comment by Carol Cambell:
Since it has been going on for so long, it is quite possible that there could be pits that trees have grown up over the last thirty four years, covered up. So, you know, this has to be a continuing thing to check out all of the acreage.

Response:
There has been centralized surveys done and you are right, there may be one or two places out there that we haven't thought of or we have not had an indication of. However, this is a continuous process as the comment suggests.

5. Comment by Carol Cambell:
Right, The U.S. Army just made a point that a former employee came forward and it might be that you would not have located that site otherwise. Also, there may be employees that are not going to be able to come forward. My only point is I am glad that it is a continuing thing and that this is not going to be the end.

Response:
This is not going to be the end. Obviously, we have other work to do and this is where we are going to start.

6. Comment by Cynthia McGeorge:
How safe is it to assume that only a paint remover and a degreaser are the contaminants on the site?

Response:
Those are the principle contaminants at the site. There are metal constituents in the area and other material, but those are the principle contaminants of concern at the site.

7. Comment by Cynthia McGeorge:
Please explain air stripping and metal precipitation.

Response:
Air stripping consists of transferring the contaminants in the water into a gas phase. These gases are then chemically reacted to convert them into other constituents that are not a threat.

8. Comment by Cynthia McGeorge:
I understand. What is the percentage of that being successful?

Response:
The U. S. Army has been very careful to insure that a technology that is effective be used at the site. Samples were collected and treatability studies in off site laboratories were conducted to evaluate the effectiveness of several technologies in treating the onsite contaminants. For the groundwater, it will be treated to the levels of the drinking water standard.

9. Comment by Cynthia McGeorge:
Is it possible for the public to get a list of the other contaminants that are on site other than the two primary contaminants?

Response:
A very extensive record search to what could be found on site was conducted. Following the search, several groundwater and soil samples were collected from the site and sent to a laboratory for testing. The list of contaminants tested for is extensive, about twelve hundred. The laboratory data is available in the administrative record. Few other contaminants were encountered but in much lower concentrations. The proposed technologies will easily address these contaminants.

10. Comment by Ted ImHoff:
Is the run-off water contained on the site now or is it allowed to disperse?

Response:
The storm water runs off the site. There is a storm water pollution prevention plan and contaminants are managed in a controlled fashion all over the plant. So, there aren't uncontrolled releases from known sources except for those that are permanent in the waste water discharge system. The water is sampled and the limits of the permits are met. Releases of any constituents to storm water anywhere on the plant are controlled.

11. Comment by Ted ImHoff:
What is the elevation of this site in relation to the hundred year flood plain?

Response:
The northwest corner of the site is inside the hundred year flood plain. However, most of the site is above what is considered the hundred year flood plain. There is no surface contamination at the site. The only way the run-off will be contaminated is if it comes into contact with contaminants at the surface. They will be provisions in place for protecting run-off during the implementation of the interim remedial action. Concerning the ongoing activities at the burning ground, concrete pads around the burn cages have been added recently. After every burn the ash is swept and placed in special containers. The ash does not come into contact directly with the soil in the area.

12. Comment by Marsha Jones:
I understand that approximately three hundred million gallons of contaminated groundwater have been identified. Is that an accurate estimate or a preliminary assessment or what, and could you give an accurate count on the number of cubic yards of contaminated soil there is, and then what exactly will be done with it after the thermal desorption treatment is rendered to that contaminated soil?

Response:
In short the actual number would be somewhat problematic. The treated soil will be used for fill material back in the excavated area. Three hundred million gallons of water is what will be treated over the course of several years. The placement of the groundwater extraction system will generate approximately twenty-five thousand cubic yards of material. This material will be treated even though it may not be contaminated. This

will be done to insure that its free of contaminants before its placed back on site. Another twenty five thousand cubic yards of source material will be excavated and treated to the treatability variance under the law. At a minimum it will meet 90% removal of contaminants. The treated source material will be taken to an inactive landfill on the plant for placement as an additional protective measure. This landfill will be capped so that the treated material will be further protected.

13. Comment by Ted ImHoff:
What depth are we talking about with regard to shallow groundwater that you are going to be treating?

Response:
It varies across the site because of the topography. It varies from twenty five to forty feet in depth.

14. Comment by Larry Pinney Gee:
If I understand previous responses correctly, you make it seem that air stripping is an experimental process, is that correct?

Response:
No, it is not experimental in the least. Air stripping has existed for a long time. The oil industry and other industries have used air stripping for many years. It has been used for remediation at many sites. It is proven and well used technology. As a matter of fact, all of the alternatives that were investigated include proven technologies.

15. Comment by JoAnne ImHoff:
What is the result of no action? What would be the result of no action?

Response:
No action, is the least cost alternative. However, it is not considered an acceptable alternative for this action because we have a known contaminant in an area and we understand how to deal with it. Up to few years ago we could not determine where the burial pits on site were. We think we have a good/very good idea where they are based on the research we have done. If we had no action then, the water coming through the soil over the next five years will also go through the contaminated material.

16. Comment by unknown:
What would be the effect on the environment?

Response:
All it would do is continue the contamination. We can go in there and clean it up and we can retrieve the source material. That would result in stopping the infection. Whereas, if we do nothing, we just extend it out by five years.

17. Comment by unknown:
If you do not do anything, it would continue on for five more years, is that it?

Response:
Well, it is there. It is in the soil and it was there in 1955, 1965, or 1975, we do not know. However, we do know where it is located and it is to everyone's advantage to go in there and clean it up and treat it. You could also say that it is there and it's something you can get to in the normal course of the remediation. Now, understand that the site clean-up at Longhorn may take into the year 2010. By the time we prioritize the sites requiring action, based on funding, it could well into the year 2010 before we address each individual site. This is one site that we think that we need to address up front and this is one site we have a plan for and it makes sense to do it.

18. Comment by Thelma Gary:
Well, I am trying to figure out, how are you going to treat this soils that you are going to move. You treat it and then take it and put it back. So, how are you going to go through the process of treating it? what are you going to use to treat it?

Response:
The method of treatment is called thermal desorption. It is kind of like baking the soil at lower temperatures but removing and destroying the contaminants. The methylene chloride will be changed into chemical constituents that are not at all harmful, like carbon dioxide and water.

19. Comment by Thelma Gary:
So you are cooking the soil?

Response:
Yes, we are cooking it.

20. Comment by unknown:
Is it going on at other sites across the country?

Response:
There are many defense installations that are going through the same programs. For specifically thermal desorption, there are about forty sites where this technology is being used right now for remedying contaminants.

21. Comment by Pete Grant:
Is it not true that you have monitoring wells around this site?

Response:
Yes, there are numerous monitoring wells on and around the site, and all over the installation including its borders. A limited number of wells is monitored quarterly and

the data is released to the state. There are other ongoing monitoring events that are part of ongoing investigations. There are fifty-two wells that are dedicated to this site for monitoring. We began about nine months ago monitoring on quarterly basis. The monitoring data goes through a validation process as soon as we receive it in order to make sure that the test was conducted in accordance with all the requirements of EPA for testing. Once that process is complete, that data is placed in the administrative record for everybody's review.

22. Comment by Pete Grant:
I would like to know how deep are these wells. Do they go into the aquifer? How deep they are and who does this information go to, such as water supply companies?

Response:
The wells vary in depth across the site. The majority are considered shallow wells. They are less than forty feet in depth, although some extend past that point. The well logs, all the details about the construction of the wells, who drilled them, in accordance with state requirements, we have to record all the data with the state. All the data is also in the public record. As far as notification, the state and EPA have all been involved in it. It is open to the public. Anybody that is interested, the data is in the record.

There is no indication of a threat to any public water supply, either on the plant or off the plant. There are wells that you are probably concern with north of the plant and Uncertain. But there is no threat to those water systems.

23. Comment by Ruth Culver:
I am the Conservation Chairperson for the Uncertain Audubon and hopefully everyone got one of these slips (indicating) as they came through the door.

Because of the accumulation of data from the site, one the things that the EPA does is to allow for a TAG grant which is a technical assistance grant and it is given to citizens groups. It is not given to a government entity. It is given for the purpose of hiring technical assistance to help explain to the citizens of the community exactly what these guys (U.S. Army) are doing. All the information that they collect is available for all of us to go and look at, but it is rather difficult for some of us to be able to decipher exactly what that information is.

Colonel (LTC) Sowa and David Tolbert (U.S. Army Longhorn Staff) have been very generous to get us out onto the site. I had someone else with me who said, "Hey, Ruth, this is a really clean operation here. I have been on other sites that will just really blow your mind." These guys are really apparently out there trying to get the job done. But with all of this data that we are being able to review, it is difficult to make heads or tails of it. So, that is why our group is applying for this TAG fund. It is not money that will go into the Uncertain Audubon. It is money that is accountable for. As a matter of fact it is burdensome to some extent to apply for this because of the regulations and how we

have to account for the money. But we felt that it was very needed for the community just because of some of the questions posed here tonight. And hopefully with this, we will be able to bring some of you back here and say, this is what they are doing and be able to be explained to you, to where all of can, hopefully, understand and know what is going on.

So, if there are any other groups that's here tonight that is interested in aligning themselves with us in order to become part of this TAG grant, I would appreciate you contacting me. You have until October 2nd to do so.

Again, this 16 million dollars that they have acquired to come in and start the cleanup on the burn site will provide some jobs in this area. Colonel (LTC) Sowa has told me that they will hire as locally as they can in order to help people participate out on the site for the cleanup. This will be some money that will be put back into the economy in our immediate area.

So, if you have any questions about the TAG grant - there probably will be some. Lisa Price (EPA) will be working with me to help get funds for the technical assistance. Hopefully, that will help in the future answer some question for the public.

Response:
The Army is interested in the free flow of information. Technical assistance grants is a normal part of the process. The Army will continue to share information and solicit your comments and inputs into the process as we continue.

24. Comment by unknown:
How much will that cost the tax payers?

Response:
Typically the amount funded is a $50,000 grant.

25. Comment by Ruth Culver:
This grant will also last over the entire period of the Superfund. It is long term.

Response:
It is limited to a three year period. $50,000 over a three year period.

26. Comment by Rick Michaels:
I am with the Network Environmental Services from Baton Rouge, Louisiana. I have been privileged enough to have doors opened to me out at the plant by the Longhorn staff who have been kind enough to take us through step by step and show us the entire process. I know that I am concerned about Caddo Lake and all of the ramifications that any of these contaminants might have on the lake and the eco system itself, fish, water, whatever. The main thing that impresses me though about this site is the way the Army

is running it. I know the Army has a hand in creating this site but they are doing a great job overseeing its cleanup. I have seen a lot of these sites all over the country and I just want to tell you my personal view is that you all are doing a great job with a terrible situation that you have gotten in.

Response:
Thank you, we appreciate your comment. This is a team effort and we look at it that way.

27. Comment by Tony Williams:
I am with the city of Marshall and am concerned with portions of Caddo Lake and Bayous. For many months, the Longhorn staff of the U.S. Army have been keeping us informed on this project. I have been invited to the meetings and I appreciate the flow of information. I am proud that you all are so active in moving this thing forward.

Response:
(Statement, no response required)

28. Comment by Ardell Sweatman:
I would like to know a little about the emissions that are going to be released when you all do all this. A little bit about the air pollution. Let's talk a little bit about it.

Response:
The process is like a catalytic converter in your car that controls the emissions from the car. What we will do is transfer the contaminants into a gas phase into the air in a closed chamber. That air will go through a unit that will catalytically convert the contaminants. They will be converted to carbon dioxide, hydrogen chloride, gas and water, exactly like they are in the car, except for hydrogen chloride gas. The converted material will then be mixed with a water solution that will capture the hydrogen chloride gas. It will result in the removal of 99% (responder referencing treatability study results) of the contaminants of concern before they are emitted into the air. The resulting solution, the acid solution will be used elsewhere in the treatment process so we have almost a complete closed lid system. This process will be used in both of the recommended soil and water treatment alternatives.

29. Comment by Carol Campbell:
Since this goes back so far, I really can't understand what I just found out about it last week. Now, I have lived in Harrison County for many years and I am just wondering what information has been put out to the public? The City Manager talks about the information that he has been furnished. Has the public in general been getting, been given information previously about what has been discovered, progress reports, and why not, if they have not been furnished this information?

Response:

We learn new things every day. However, as far as information to the public, we have an administrative record at the Marshall Public Library that has been in place since 1991.

30. Comment by Carol Campbell:
Who knows about it? Do you advertise the fact that it is put there? I seemed to have missed it, as have most of the people that I have talked to.

Response:
That is what this meeting is about. If you have not seen it in the papers the last two weeks, may be you are not reading many papers. We are pretty visible. However, it has taken some time to do studies. We had an indication that there were problems there. We had to know the extent of the problems. We had to survey it. We had to validate the data. We validated the data to get the money to address the problem. So, it has been a process. The TRC or the committee that meets and goes through the process, is open to the public. We probably need to publish the date when we are having the next TRC meeting. The TRC is a technical committee. We are going to be talking engineering, about how to fix things. You are welcome to be there and welcome to ask any question.

31. Comment by Carol Campbell:
Well, I think it is an appropriate question since this was identified in the '70s, right?

Response:
We identified that there was a specific problem of contaminants out there.

32. Comment by Carol Campbell:
That's what I say. Okay, now, all during this period, they've had these studies going on?

Response:
That was to identify the extent of the contamination and to develop a solution for it.

33. Comment by Carol Campbell:
As far as I know though, the general public has not been informed about the progress that has been made during this particular period. In other words, we see the culmination here tonight of what is taking place. But we have not been informed and kept informed. I mean I can see the City Manager certainly needs to made aware of it because the City of Marshall gets their water. We drink the water, though.

Response:
We hear your criticism, of course, always.

34. Comment by Carol Campbell:
The general public needs to be well informed. They need to be kept aware of the contaminants, the problems, what's being done all along.

Response:
That is a true statement. That is what we are attempting to do, it has hard for us to address what it did not happen back in the 70s and 80s. We can tell you that we are doing it now. We are trying to open this up and get the information flowing.

35. Comment by Dorothy Grant:
When Longhorn was put on the Superfund Site list, it came out in U.S. News and World Report, Newsday and every other thing nationwide, USA Today, and indicated on the map all the NPL sites. Those maps are available in the administrative record.

Response:
Thank you.

The following include the comments and questions received in writing in two separate letters during the public comments period and the U.S. Army response. A full account of the public comments can be found in the site Administrative Record. The following comments were submitted by the Uncertain Audubon Society

1. Comment:
What is "trichloroethylene?" Please explain its components in a way that untrained lay person can understand.

Response:
Trichloroethylene, also referred to as trichloroethene, or simply TCE is a clear and colorless liquid. It has a chloroform-like odor. It is a man made non-flammable product that has been used extensively as a degreasing agent and dry cleaning fluid throughout the United States. In homes, this product may be an ingredient in typewriter correction fluid, paint, carpet cleaning fluids, and varnishes.

2. Comment:
What is "methylene chloride?" Again, please explain so I can understand?

Response:
Methylene chloride is a clear and colorless liquid. It also gives off a chloroform-odor. It is a non-flammable product that is used as a degreasing and cleaning agent. It is also used in food processing (e.g. it is used in the coffee decafeination process).

3. Comment:
What other heavy metals have been detected at the burn site? (The handout mentioned acetone, barium, chromium and lead.)

Response:
Other metals that have been detected in trace amounts include: arsenic, thallium, nickel, cadmium, zinc, mercury, and selenium.

4. Comment:
How do these volatile compounds and metals affect the environment, for example how do they contaminate water, soil, air?

Response:
These volatile compounds will dissipate rapidly if exposed to the air. Because methylene chloride is water soluble, it will rapidly become diluted and the concentrations of the chemical will decrease with mixing. Impacts on the soil are limited if the soil is exposed to water because of the mobile nature of methylene chloride. Trichlorethylene has low solubility, but is mobile in water. Metals are generally less mobile, and have very low solubility, therefore this limits the ability to contaminate the environment.

5. Comment:
What health hazards do the compounds and metals pose to humans? For example, if they enter the water column and are ingested, is cancer or some other life threatening disease a likely result?

Response:
Trichlorethylene is a suspected carcinogen and is mildly toxic to humans by ingestion or inhalation. Effects of inhalation of trichlorethylene include headaches and drowsiness. Methylene chloride is moderately toxic by ingestion. It is also an eye and moderate skin irritant. Metals such as nickel and barium can be dangerous in high concentrations if ingested.

6. Comment:
Have these substances been found in the groundwater you have tested on site?

Response:
Yes, they have been detected, as discussed in the Proposal Plan, Section E of the Record of Decision.

7. Comment:
If so, please provide me with a copy of the reports and data showing what's been found.

Response:
All the data is available in the Administrative Record, which is located at the Marshall Public Library.

8. Comment:
Are the contaminants moving toward Caddo Lake through the soil or the groundwater?

Response:
Since the beginning of groundwater monitoring at the plant, the area of the contaminant plume at the burning ground has increased in size such that its edge is closer to the lake. The groundwater continues to be monitored. As part of the ongoing remedial investigation/feasibility study, the best way to address the deeper groundwater contamination will be determined. Soil contamination near the lake has not been investigated due to the nature of the activities. Soil contamination is not expected near Caddo Lake.

9. Comment:
If so, how soon are they likely to enter Caddo Lake? Have you already conducted tests showing contaminants in the lake off site? If you have conducted off site tests, please describe the location of each site and the results of the tests. Please provide a map of the testing sites, the test data, and any report.

Response:
The data to answer these questions in detail continue to be collected in the ongoing Remedial Investigation. Existing data does not allow a reliable prediction of when or even if, significant concentrations of contaminants will enter the lake from the site. Offsite tests have not been conducted. Present data do not indicate that contamination has reached the facility boundary. However, we are aggressively pursuing the Early Interim Remedial Action to mitigate this possibility of offsite migration of contaminants. Additional investigation to support a risk assessment is being implemented. The risk assessment will provide a prediction of what exposure is possible from the site. Validated groundwater monitoring data from the Burning Ground No. 3 site is included in the administrative record which is updated periodically as new data becomes available.

10. Comment:
What would the effect of methylene chloride, trichloroethylene, and heavy metals be upon the water of Caddo lake, the inhabitants of the lake, such as fish, birds, turtles, alligators, other vertebrates, and invertebrates?

Response:
The effects of any substances on Caddo Lake would depend on the concentration of those substances, what substances were mixed in the water, other environmental stresses, and the specific species involved. To attempt to determine any specific effects would be very difficult to do at this time. Ecological data necessary to support a risk assessment is currently being collected and evaluated. The risk assessment will address the potential impact on the lake and its inhabitants.

11. Comment:
What are and have been the health hazards from the existence of such contaminants on the site over many years, eg. is there a likelihood of increased cancer, leukemia, other diseases in inhabitants living near LHAAP?

Response:
There is no indication of the release of contaminants offsite. Therefore, there is no likelihood of any increase of risk to the nearby community. These issues will be addressed in the risk assessment.

12. Comment:
What are the possible future health hazards to residents near LHAAP from the continued existence of these compounds either without the proposed remedial action or with such action?

Response:
There is no indication of the release of contaminants offsite. The site risk assessment will address all possible future health hazards.

13. Comment:
Does the proposed remedial action at the site pose any health problems to man or environmental damage to the surrounding ecosystem?

Response:
The proposed interim remedial action will not pose any significant hazard to health or the environment, and is designed to decrease any existing risk at the site. Short term exposure to construction personnel, during the interim action, will be minimized by the use of proper controls and handling techniques, and by the implementation of a strict health and safety program which will include continuous monitoring in the work zone and the use of proper personal protection equipment.

14. Comment:
What danger do these chemicals and heavy metals pose to human health if they enter the water column, the aquifer underneath Longhorn, and/or Caddo Lake?

Response:
As stated in the Proposed Plan, these contaminants are present in groundwater beneath the Burning Ground No. 3 site. The investigation data is available in the Administrative Record and was summarized in the Proposed Plan. Potential impacts will be evaluated in the risk assessment once sufficient data has been collected. However, the implementation of the interim remedial action will decrease or eliminate any potential adverse impact to human health and the environment from the site while the ongoing investigations are conducted.

15. Comment:
Why do you consider early interim remedial action to be necessary?

Response:
The high concentration of contaminants in groundwater at the site, and its close proximity to Harrison Bayou and Caddo Lake creates conditions conducive to the potential introduction 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 future human and ecological exposure and associated risk estimates are dependent upon further site characterization, and will be addressed in the site risk assessment. Therefore, the U.S. Army is choosing to be proactive and initiate the Early Interim Remedial Action to mitigate a threat that may occur in the future.

16. Comment:
What methods have you used to locate the identified contamination sites, for eg. aerial photographs, "whistle-blowing," questionnaires, records?

Response:
All sources of information were pursued including records, personnel interviews, aerial photographs, and site inspections.

17. Comment:
What does the term "fence to fence" mean when applied to LHAAP as a Superfund site?

Response:
The term "fence to fence" means the entire LHAAP facility is listed on the National Priorities List rather than specific sites.

18. Comment:
Have you located all contamination sites at LHAAP?

Response:
Please refer to the responses of Public Meeting comments 2 through 5.

19. Comment:
Are there additional sites to be added to the listed Phase I and Phase II sites presented at the September 15, 1994 hearing?

Response:
For the record, please note that a public meeting was held on September 15, 1994 and not a public hearing. Please refer to the responses of Public Meeting comments 4 and 5.

20. Comment:
How long do you estimate it will take you to locate all such sites at LHAAP?

Response:
Please refer to the responses of Public Meeting comments 4 and 5.

21. Comment:
Have you measured the depth of the deep groundwater through wells or other methods?

Response:

Groundwater at the burning ground and surrounding area has been measured in monitoring wells. No other methods were used.

22. Comment:
If so, how deep is the groundwater at the Burn site?

Response:
The water table at the burning ground has been measured between one foot and 23 feet below existing ground surface.

23. Comment:
What deep ground water monitoring has been done at this site or elsewhere on LHAAP?

Response:
The deepest groundwater monitoring well inside the fence of the burning ground area extends to about 70 feet below ground surface. The deepest groundwater monitoring well outside the fence of the site extends to about 120 feet below ground surface. This well is located outside the northeast corner of the burning ground.

24. Comment:
What are the results of such monitoring of the deep groundwater. i.e. what contaminants are detected at deeper levels?

Response:
Traces of methylene chloride and trichloroethylene have been detected in the deepest wells located in and around the site. Additional groundwater investigation is being conducted in ongoing Phase II work. Detailed information is included in the Administrative Record.

25. Comment:
If you have not begun such monitoring, when will you start to monitor the deep groundwater?

Response:
The next scheduled phase of investigation will address this.

26. Comment:
Is LHAAP located over the primary aquifer or other substantial water supply to the East Texas area?

Response:
Yes. LHAAP is situated on an outcrop of the Wilcox Group which has been identified by the Texas Water Development Board as the basal unit of the regional Cypress aquifer, also known as the Carrizo-Wilcox aquifer. This aquifer yields small (less than 50 gallons per minute (gpm)) to moderate (50 to 500 gpm) quantities of fresh water to wells throughout Harrison County. The Wilcox is also considered as the base of fresh water in the area.

27. Comment:
Describe what you've done to determine if the contamination is migrating toward Caddo Lake?

Response:
Since the beginning of groundwater monitoring at the plant, the area of the contaminant plume at the burning ground has increased in size such that its edge is closer to the lake. The groundwater continues to be monitored. As part of the ongoing remedial investigation/feasibility study, the best way to address the deeper groundwater contamination will be determined. Soil contamination near the lake has not been investigated due to the nature of the activities. Soil contamination is not expected near Caddo Lake. This is the focus of the next remedial investigation phase at the Burning Ground No. 3 site.

28. Comment:
Do you have a map of the area of the trichloroethylene plumes? you provided one in the report for the methylene chloride plumes. Please furnish me a copy.

Response:
See Figure 8 in ROD

29. Comment:
What are the identified sources of contamination to the soil and groundwater at Burning Ground No. 3? What are the suspected other sources? Please described these in terms a lay person can understand.

Response:
Burning Ground No. 3 has been in operation since 1955. The site has been used for the treatment, storage, and disposal of pyrotechnic and combustible solvent wastes by open burning, evaporation, and burial. Past waste management units have been identified as the sources of contamination. These units include open burning pits where plant waste were flash burned, an unlined evaporation pond (UEP) where liquid waste from the plant was stored and allowed to evaporate, and waste burial pits where solid waste such as solvent soaked sawdust was disposed of and later covered with soil.

30. Comment:
How long will it take you to conduct the formal Risk Assessment and what is the anticipated cost?

Response:
The risk assessment is scheduled to be conducted between September 1995 and May 1996. Specific cost information is considered procurement sensitive and can not be released until after the contract is awarded.

31. Comment:
How will that assessment better inform the contaminated sites at LHAAP?

Response:
A risk assessment is a scientific procedure which uses facts and assumptions to estimate the potential for adverse effect on human health and the environment from exposure to site contaminants. The environmental or ecological risk assessment determines the present and future 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 by analysis of samples. The actual contaminant concentrations are compared to exposure concentration known to have an adverse impact. In the risk assessment, carcinogenic (cancer causing) and non-carcinogenic (other types of health effects, e.g. skin irritation) health risks are calculated. Conservative assumptions that weigh in favor of protecting human health are made in these calculations. This means if uncertainty exists on a particular effect, a worst case scenario is generally assumed. The conclusions and recommendations of the risk assessment will be used during the development of the final clean up action for the site. The risk assessment will be included in the administrative record when completed and approved by state and federal regulatory agencies.

32. Comment:
What information do you currently have about the migration of these substances into shallow groundwater, deeper groundwater, and possible surface runoff?

Response:
Concerning the Groundwater please refer to responses for comments 8 and 28. No surface runoff contamination has been detected at the site.

33. Comment:
Can you provide me a copy of the Administrative Record? Will there be a cost? If so, how much will this record cost me? How long will it take you to provide this record to me?

Response:
The Administrative Record currently consists of approximately 5,000 pages. This is made up of technical reports, associated correspondence, and other relevant documents. It is available at LHAAP and the Marshall Public Library. To obtain a copy directly from the Government, you should follow the procedures under the Freedom of Information Act.

34. Comment:
How long will the cleanup at the burn site take? what will it cost?

Response:
The interim remedial action at the burning ground will take approximately five years and cost 16 million dollars.

35. Comment:
How do you support the figure that you will be cleaning and treating 300 million gallons of water (as stated at the hearing?) Please provide that support?

Response:
For the record, please note that a public meeting was held on September 15, 1994 and not a public hearing. The pilot study, which was conducted on site in the Spring of 1994 to determine the most effective groundwater extraction technique, concluded that about 100 to 150 gallons per minute of shallow groundwater could be extracted from the site for treatment. This will result in an approximate volume of 260 to 400 million gallon of water over 5 years.

36. Comment:
Explain the process of air stripping proposed in Alternative 4 in terms a lay person can understand?

Response:
Air stripping is a natural process to remove certain compounds, including chlorinated solvents such as methylene chloride and trichloroethylene from water. Air is brought into close contact with water containing the solvents. This is done through the use of a tall, narrow pipe or "column" filled with plastic rings or "packing". The contaminated water is pumped into the top of the column, and a simple device, called a "distributor" distributes the incoming, contaminated water over the packing. The distributor works like a shower head. The contaminated water trickles down the packing as a very thin film, wetting each ring.

At the bottom of the column, clean, moist air is being blown in by a blower. This clean air flows up through the packing rings. Due to the relatively low solubility of the chlorinated solvents, the solvents leave or "strip" out of the water and into the air stream passing across the water films. The water gets cleaner and cleaner as it approaches the bottom of the column. The air stream gets more and more laden with solvents as it moves up the column. The end result is clean water suitable for discharge and an air stream that must be treated to remove the chlorinated solvents.

37. Comment:
Do you have a diagram of the air stripping process? Please include that in your response.

Response:
A diagram will be included in the Workplans for the Project. These will be incorporated in the Administrative Record.

38. Comment:
What is the compound you will use for the catalyst? what are its potential effects on the environment and/or hazards to human health? how toxic is it?

Response:
The catalyst is a Platinum group catalyst on a ceramic carrier. The composition of the catalyst is proprietary information held by the manufacturer (Johnson Matthey) and is not specifically Platinum. The manner in which the material is handled, used, and disposed of presents no known hazard to human health and the environment. The materials are confined and in the form used are not considered toxic.

39. Comment:
How will you protect against groundwater runoff contamination when you are cleaning the soil during this process?

Response:
A waste management and spill control plan that is approved by the EPA and TNRCC will be implemented during the onsite remediation. Controls such as berms, dust spraying, and silt fences will be used during implementation of the interim remedial action.

40. Comment:
What methods will you use to contain any potential additional contamination to soil and groundwater during the air stripping process?

Response:
Based on the design of the system, no such contamination will occur.

41. Comment:
What secondary containment system will you use around the converter?

Response:
There is no need for secondary containment. The materials being handled are in the gas form in an enclosed chamber (flue gas off the desorber unit) and secondary containment is not possible. The catalyst is in brick form and therefore contained within itself (no liquid spills can be generated from the desorber or catalytic oxidizer units). The scrubber section will have primary and secondary containment to handle 110% of the held liquids.

42. Comment:
Have you run any safety tests for the site using this process? If so, what are the results of such testing? Please provide the data and report for such testing. What is the estimated cost of this process for the burn site?

Response:
The proposed technologies for the interim remedial action are proven and widely used throughout the United States. They have been shown to conform to Federal safety standards. No specific testing other then setup, maintenance, and optimization is required for these technologies. The total cost of soil treatment is estimated at 5 million dollars.

43. Comment:
Please provide the data showing that this method of treatment is more efficient that the other proposed methods?

Response:
Please refer to the Proposed Plan document and the ROD for detail discussions on different alternatives that were considered for the site. For additional technical information, refer to treatability study reports which are included in the Administrative Record.

44. Comment:
Regarding Alternative 6, please describe that process in terms a lay person can understand?

Response:
Onsite groundwater contains very low parts-per-million (ppm) traces of metals. The Safe Drinking Water Act regulates the amounts of these metals that may be present in drinking water. As a result, the common practice in preparing drinking water is to make these metals insoluble by adding chemicals to precipitate (to fall out of solution) the metals, such as magnesium hydroxide (milk of magnesia) to collect the metals dissolved in the water. The milk of magnesium will capture the incoming groundwater. The heavy metals will stay with the magnesium all the way through solids dewatering and disposal.

45. Comment:
Please provide a diagram of the process with your response?

Response:
A diagram will be included in the workplans for the project. These will be incorporated in the Administrative Record.

46. Comment:
What is the coagulant you propose using? What are its properties? Is it toxic? How might coagulant affect he environment or the health of humans?

Response:
We will remove suspended solids from groundwater using a process that is almost identical to the one used for preparing drinking water. We expect to use trace (ppm)

amount of coagulants commonly used to make, and approved for, drinking water. We will also use ppm amounts of magnesium hydroxide (milk of magnesia) to remove microscopic-diameter clay and silt particles (suspended solids) normally found in groundwater.

The specific type will be determined just before the water treatment plant starts up to ensure the best coagulant for the water at that time. We will also re-evaluate the specific type throughout the year, since the groundwater can change with the seasons. We will work together with known manufacturers of coagulants, using coagulants approved for drinking water preparation.

Site studies suggest about one pound of solids will enter the plant with each one thousand gallons of water. These solids must be removed before pumping the water into the stripping column to prevent plugging in the column. The coagulant and magnesia act together to "capture" and bind very small particles that might otherwise plug up the stripping column. These particles then settle out of the water in the "settler" as a 1 - 2% slurry in water.

This slurry, or "sludge", will be prepared for dewatering and disposal. Additional thickening aids may be used to boost the solids concentration to 5% solids and 95% water. These thickening aids will also be approved for potable water use and will be sued in very small amounts. The thicker sludge will then be air stripped in covered cone-bottom tanks. That air, containing chlorinated solvents, will be treated along with the air from the stripper. The clean sludge may be further thickened, then gently pumped onto the nearby sand drying bed located under a pavilion to keep out rain. There, the sludge will dry out forming a small amount of "cake" that contains up to 40% solids and at least 60% water. All water that drains from the sludge will be pumped back to water treatment.

47. Comment:
How is the process controlled from a containment point of view, so as to avoid contamination of the soil and groundwater?

Response:
The entire process is conducted in vessels that are protected against corrosion. The entire process area is contained inside a concrete bermed area. All water captured inside the process area will be treated.

48. Comment:
How much precipitation do you believe will be generated from this process? What will be the contents of that precipitation? Is the precipitation toxic? What are its potential effects on the environment and the health of humans?

Response:
The products of the process are clean water and dried cake for landfill at an approved site. We expect to discharge up to 300 gallons per minute of clean water. The solids cake, consisting of cleaned silts, clays, magnesium and small amount of polymer could total 500 pound per day of dry matter or 800 pounds per day of cake. The volume is very small, less than 1.5 cubic yards per day. Reasonable care will be taken to minimize the amount of silt and clay that is pumped from the groundwater recovery wells. The actual pounds of solids may be well below the estimates listed here. The cake is not expected to exhibit hazardous characteristics as defined by the Resource Conservation and Recovery Act (40 CFR §261).

49. Comment:
What is the proposed cost of this process? How did you reach that number?

Response:
The total cost of this process is estimated to be $2,080,300. This includes the amount of funding required to purchase and install the equipment used in the process, and to operate and maintain the system.

50. Comment:
Where do you intend to take the precipitant off-site or on-site? What will you do to store the precipitant? Please describe the storage proposal in detail.

Response:
The cake will be managed in accordance with Texas and Federal requirements. They will be tested to determine if the cakes are hazardous or non-hazardous. The cake will be hauled to an approved landfill in Department of Transportation-approved containers such as drums or bins. Disposal will also comply with Texas and Federal requirements.

51. Comment:
Regarding Alternative 8, please describe the process in terms a lay-person can understand.

Response:
Simply speaking the soil is placed into a rotating pipe. Hot air is passed over the soil to heat the soil and release the contaminants from the soil (leaving the soil clean). The hot air then passes through a set of filters (to remove any dust that was caught up in the hot air stream). After passing through the filters the gas is passed to the secondary heating chamber where hot air is used to heat the gas to the catalyst activation temperature (the catalyst, just like the catalyst in the car, must be an a minimum temperature to work properly). The gas then passes through the catalyst and are completely oxidized to hydrochloric acid, sometimes referred to as Muriatic Acid [the acid used in swimming pool pH control], CO_2, and water. Plants use CO_2, and expire O_2. Humans produce CO_2

during respiration. This oxidation takes place at relatively low temperatures (about 800 °F). The gas is then passed through a cooling chamber (called a Quench) and then through a Scrubber. The scrubber uses water and sodium hydroxide to scrub the acid from the gas and in so doing produces table salt (NaCl). The salt is dissolved in the water used to scrub the acid and is processed through the water treatment plant that is to be located on the site. The gases leave the system with CO_2, water and minor amounts of other gases (like nitrogen from the air used to heat the soil).

52. Comment:
Please provide a diagram of the process with your response.

Response:
A diagram will be included in the workplans for the project. These will be incorporated in the Administrative Record.

53. Comment:
How do you treat the off-gases and what will these gases consist of? Are they toxic? What hazards do they pose to humans and the environment?

Response:
Please note answer to written comment number 51. The off gases from the treatment system are not toxic and will pose no appreciable risk to human health or the environment.

54. Comment:
Where on the site will you place the treated soil? How clean from contamination will that soil be after treatment?

Response:
The excavated soil and source material would be treated to reduce the VOCs 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 RCRA (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 (the higher contaminated material) will be placed under a landfill cap on the LHAAP installation.

55. Comment:
What tests do you have to support your contention about the efficiency of this alternative and the ability of Alternative 8 to clean the soil? Please provide a copy of the data supporting your position. What will be the cost of this process and what is your support for that number?

Response:
The Low Temperature Thermal Desorber has been operated on several sites containing contaminants similar to the contaminants identified at the Longhorn site. The soil being remediated passed all applicable standards for land disposal for each of the sites. In addition significant design testing has been conducted by the supplier of the catalyst system. The supplier guarantees the system (at design conditions) to remove 99% of all designed for chlorinated contaminants. Please refer to Table 1 in ROD for cost information.

56. Comment:
How will you dispose of the contaminants removed and where on-site will you dispose of them? Please describe the storage system you propose using for these contaminants.

Response:
The soil contaminants removed from the soil will be converted to hydrochloric acid, sometimes referred to as Muriatic Acid [the acid used in swimming pool pH control], CO_2 (the gas produced by plants during respiration), and water. The acid will be absorbed by water in a quench and scrubber and the CO_2 and water will be vented to the atmosphere (see response to comment number 51).

57. Comment:
What secondary containment system will you use to avoid runoff of contaminants into groundwater or soil during this remediation process?

Response:
Refer to response for comment number 39.

58. Comment:
Many times, in discussing this subject, you have used the terms "probable", "possible", and "probable cause". Please define those terms.

Response:
The terms are used as in normal english usage indicating an effect, event, or cause that may or may not be actual (i.e. has a degree of uncertainty).

59. Comment:
What is the "worst case" scenario to human health and the environment of the proposed Alternatives 4, 6, and 8?

Response:
The worst case is to leave the groundwater contamination as it now is.

60. Comment:
Are you soliciting bids from the private sector for use of any part of LHAAP?

Response:
We appreciate the comments/questions provided (above) and understand your concern. However, these issues are not related to the proposed interim action at Burning Ground No. 3. Accordingly, responses are beyond the scope of this forum which is dedicated to the proposed efforts at Burning Ground No.3, and will be deferred for present.

61. Comment:
What is the process by which you are soliciting such bids? When was this process started?

Response:
See response to written comment number 60.

62. Comment:
Who is authorized to contract with the private sector for lease or sale of any portion of LHAAP , the government, Thiokol, others?

Response:
See response to written comment number 60.

63. Comment:
Please explain how the Army or others can actively solicit bids if all the contaminated sites have not been determined, if the LHAAP has been classified in its entirety as a Superfund site, and if remedial action has not been commenced?

Response:
See response to written comment number 60.

64. Comment:
How would leasing or sale to private parties comply with the directive that activities at LHAAP are appropriate and protect the health and welfare of the public and the environment?

Response:
See response to written comment number 60.

65. Comment:
Is there anything in Thiokol's contract with the Army that provides for their sharing in the costs of clean-up? Can you provide me with a copy of that contract?

Response:
See response to written comment number 60.

66. Comment:
Would you please send me a copy of the Responsiveness Summary? The request form is attached.

Response:
Yes a copy of the Responsiveness Summary will be sent to the address provided.

67. Comment:
Will there be any contamination in air emissions from either Alternative 4, 6, and 8? If so, please describe these contaminants and how you intend to capture and/or treat them? What health hazards do such contaminants pose to humans and the environment?

Response:
Refer to the responses to written comments 51 and 56.

The following comments were received from Mr. Mark Chance:

1. Comment:
Will the risk assessment be completed and results be available before actual response action is taken?

Response:
No. This is an Early Interim remedial Action, which by definition is done prior to completion of the risk assessment.

2. Comment:
Who will actually implement the response actions- Army or EPA personnel, a third party contractor, or a combination?

Response:
Response actions will be implemented by the Army and its contractors as needed. However, EPA and TNRCC will continue to be involved in the planning and decision making process.

3. Comment:
How often will progress reviews be made available to the public during actual implementation of the response actions?

Response:
Updates on the remedial action will be provided at the quarterly Technical Review Committee meetings which are open to the public.

4. Comment:
Are there any plans to make the Administrative Record available to the public in an electronic format?

Response:
Such plans do not exist at the present time.

APPENDIX C

INDEX OF ADMINISTRATIVE RECORD

LONGHORN ARMY AMMUNITION PLANT

BURNING GROUND No. 3 "EARLY" INTERIM REMEDIAL ACTION

ADMINISTRATIVE REFERENCE RECORDS

(15 September 1994)

Volume I
- Federal Facility Agreement
- Remedial Investigation/Feasibility Study (RI/FS) Work Plan

Volume II
- Chemical Data Acquisition Plan
- Site Safety and Health Plan
- Data Summary Report (1976-1992)

Volume III
- Work Plan Addendum for Phase I IRA
- Project Plan, Phase II Pilot Study IRA

Volume IV - XVII
- Groundwater Data of Phase I and II IRA

012752

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Protecting Texas by Reducing and Preventing Pollution

May 1, 1995

CERTIFIED MAIL
P 111 122 270
RETURN RECEIPT REQUESTED

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

Re: Longhorn Army Ammunition Plant
Soil Background Concentration Report

Dear Mr. Tolbert:

The Texas Natural Resource Conservation Commission (TNRCC) staff have completed its review of the Final Report -- Soil Background Concentration Report, dated March 1995. Our comments are enclosed.

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

Sincerely yours,

Michael A. Moore (MC 143)
RI/FS II Unit
Superfund Investigation Section
Pollution Cleanup Division

Enclosure

cc: Jonna Polk, COE Tulsa District (CESWT-PP-EA)
Lisa Price, EPA Region VI (6H-ET)

TNRCC Comments
on
Longhorn Army Ammunition Plant
Final Report -- Soil Background Concentration Report
March 1995

Section	Page	Comment
3.1.3	16	Which outliers test was used? If the cited ASTM Method E178-94 was used, it appears that the method described in section 4.12 of ASTM E178-94 would be the proper test for this study. The outliers should also be noted in the histograms in Appendix E. Did the outliers test results affect decisions on normality of the data? (Typographic errors in third line.)
4.0 and 5.0	24-25 and 28-29	1) The distribution types shown in Tables 4-1 and 4-2 and Tables 5-1 and 5-2 do not correspond with those shown in Tables 3-1 and 3-2 (*i.e.*, chromium and nickel in surface sample population and potassium in subsurface sample population). 2) There appears to have been quality control problems with the analyses for arsenic which may have resulted in erroneously low recoveries for this constituent (see pages C-13, C-14, C-17, and C-18). This resulted in insufficient data for a statistically valid estimate of an upper background limit for this metal. Several previous TNRCC studies in similar geologic settings in the state have consistently shown that the upper limit for background concentrations of arsenic in soil is 7 mg/kg. It is recommended that the Army either resample each background location for arsenic analysis, or use 7 mg/kg as the upper limit for this metal.
Appendix C	C-1	The value reported for Nickel in sample no. LH-BG-18(0-0.5) (9.47 mg/kg) could not be an outlier, as indicated. Is the decimal in the correct place?

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Protecting Texas by Reducing and Preventing Pollution

May 3, 1995

CERTIFIED MAIL
P 836 900 428
RETURN RECEIPT REQUESTED

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

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

Dear Mr. Tolbert:

The Texas Natural Resource Conservation Commission (TNRCC) staff have completed its review of the Remedial Investigation/Feasibility Study -- Sites 13 and 14, dated January 1995. Our comments on Volume I are enclosed. We have no comments on Volumes II or III.

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

Sincerely yours,

Michael A. Moore (MC 143)
RI/FS II Unit
Superfund Investigation Section
Pollution Cleanup Division

Enclosure

cc: Jonna Polk, COE Tulsa District (CESWT-PP-EA)
Lisa Price, EPA Region VI (6H-ET)

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

Section	Page	Comment
3.1.6	3-15	Please indicate Sites 13 and 14 on Figure 3-5.
3.1.8	3-19	Please verify the identity of the "diamondback ribbon snake"; this might be the "diamondback water snake". Also, verify whether the "western cottonmouth" is the same as the "water moccasin".
4.1.1	4-4	1) The next to last sentence should be changed to read "Metals occur naturally in soils, and positive results are not *necessarily* an indication of contamination". 2) The last sentence should either be deleted, or a discussion should be presented to explain why the constituents detected in soil samples from the site would not be expected to be associated with the suspected or reported activities at the site. This might not be possible, since nitrates/nitrites, sulfates, and even some metals could be expected to be present in TNT and/or acid wastes.
4.1.2	4-13	Same comments as above. Additionally, some explanation should be given for the toluene and butyl benzyl phthalate detected in soil samples (*e.g.*, could these compounds be expected to be associated with the parking lot which is now located on the site?).

Section	Page	Comment
Chapter 6	various	1) References to "Upper Tolerance Limits" should not be used in discussions of background concentrations of metals in soils. 2) The reference for the Soil Background Concentration Report needs to be updated. 3) All values for background concentrations of metals in soils need to be revised in accordance with the March 1995 Soil Background Concentration Report and our comments on that report dated May 1, 1995. 4) A discussion should be provided regarding the rationale for risk management decisions that were made to eliminate various constituents that were detected as contaminants of concern (see comments for sections 4.1.1 and 4.1.2, above).
Appendix A		The total depths and soil classifications in the drilling logs for LH13-SB11/MW02 and LH14-SB14/MW-02(?) do not agree with the driller's logs for those wells; this should be corrected, or an explanation of the discrepancies should be presented.
Army's Responses to TNRCC's 09/19/94 Comments		
Comment #9		The discussion on pages 2-6 and 2-10 adequately address TNRCC's concerns regarding the issue of "groundwater grab" samples.

012757

TEXAS NATURAL RESOURCE CONSERVATION COMMISSION

Protecting Texas by Reducing and Preventing Pollution

May 4, 1995

CERTIFIED MAIL
P 836 900 429
RETURN RECEIPT REQUESTED

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

Re: Longhorn Army Ammunition Plant
Proposed Plan -- Group 3 Sites (LHAAP 13 and LHAAP 14)

Dear Mr. Tolbert:

The Texas Natural Resource Conservation Commission (TNRCC) staff have completed its review of the Proposed Plan for Group 3 Sites (LHAAP 13 and LHAAP 14), dated March 27, 1995. Our comments are enclosed.

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

Sincerely yours,

Michael A. Moore (MC 143)
RI/FS II Unit
Superfund Investigation Section
Pollution Cleanup Division

Enclosure

cc: Jonna Polk, COE Tulsa District (CESWT-PP-EA)
Lisa Price, EPA Region VI (6H-ET)

OPTIONAL FORM 99 (7-90)
FAX TRANSMITTAL # of pages ▶ 4

To Jonna Polk	From Liza Price
Dept./Agency	Phone # 214 665 6744
Fax # 918 669 7235	Fax #

NSN 7540-01-317-7368 5099-101 GENERAL SERVICES ADMINISTRATION

012758

TNRCC Comments
on
Longhorn Army Ammunition Plant
Proposed Plan -- Group 3 Sites (LHAAP 13 and LHAAP 14)

Page	Column	Comment
2	2	TNRCC has relocated its repository. The new location should be as follows: TNRCC Library, Building A, Room 102 12100 Park 35 Circle Austin, Texas 78711-3087 (512) 239-0020 Mon. - Fri. 8 a.m. to 5 p.m.
5	1	1) **LHAAP 13 Groundwater Investigation:** The reference to "groundwater grab" samples should not be included in this section. TNRCC does not believe that the results of this sampling methodology can be used in the determination of ground water quality (see our April 1, 1992 comments to the RI/FS Work Plan). If the Army feels that this information is pertinent, it should be accompanied by the qualification in Section 2.1.2.1 (page 2-6) of the RI/FS Report. 2) **LHAAP 13 Soil Investigation:** This paragraph should be reworded. There was no evidence presented in the RI/FS Report that the anions and metals detected at the site are not associated with the suspected or reported activities at the site. Nor can it be stated that "metals are not an indication of contamination since they occur naturally". 3) **LHAAP 14 Groundwater Investigation:** See comment no. 1, above. 4) **LHAAP 14 Soil Investigation:** See comment no. 2, above. Additionally, an explanation for the presence of toluene and butyl benzyl phthalate at this site should be given.
6	1	Typographic error in the seventh line from the top of the page.
6	2	**LHAAP 14 Chemicals of Concern:** Explain the presence of toluene and butyl benzyl phthalate, and why these compounds are not COC's.

Page	Column	Comment
7	1	**FEASIBILITY STUDY:** The last sentence seems to be missing some words.
8	2	**CONCLUSIONS AND RECOMMENDATIONS:** The statement in the first bullet needs to be reworded (see previous comments).
9	1	TNRCC project manager's telephone number is (512) 239-2483.

DEPARTMENT OF THE ARMY
LONGHORN/LOUISIANA ARMY AMMUNITION PLANT(S)
MARSHALL, TEXAS 75671-1059

012760

REPLY TO ATTENTION OF

May 9, 1995

SMCLO-EN

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

SUBJECT: Final Groundwater Background Concentration Report for Longhorn Army Ammunition Plant, Marshall, Texas

Dear Ms. Price:

Enclosed is one copy of the Final Approved Groundwater Background Concentration Report for Longhorn Army Ammunition Plant, Marshall, Texas.

If you have any questions, please contact Mr. David Tolbert, at 903-679-2728.

Sincerely,

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

Enclosure

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

012761

REPLY TO ATTENTION OF

May 9, 1995

SMCLO-EN

Mr. H.L. Jones
Texas Natural Resource Conservation Commission
2916 Teague Drive
Tyler, Texas 75701

SUBJECT: Final Groundwater Background Concentration Report for Longhorn Army Ammunition Plant, Marshall, Texas

Dear Mr. Jones:

Enclosed is one copy of the Final Approved Groundwater Background Concentration Report for Longhorn Army Ammunition Plant, Marshall, Texas.

If you have any questions, please contact Mr. David Tolbert, at 903-679-2728.

Sincerely,

David Tolbert

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

Enclosure

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

012762

REPLY TO ATTENTION OF

May 9, 1995

SMCLO-EN

Mr. Michael Moore
Superfund Investigation Section
Texas Natural Resource Conservation Commission
Post Office Box 13087
Austin, Texas 78711-3087

SUBJECT: Final Groundwater Background Concentration Report for Longhorn Army Ammunition Plant, Marshall, Texas

Dear Mr. Moore:

Enclosed are two copies of the Final Approved Groundwater Background Concentration Report for Longhorn Army Ammunition Plant, Marshall, Texas.

If you have any questions, please contact Mr. David Tolbert, at 903-679-2728.

Sincerely,

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

Enclosures

DEPARTMENT OF THE ARMY
LONGHORN/LOUISIANA ARMY AMMUNITION PLANTS
MARSHALL, TEXAS 75671-1058

012763

REPLY TO ATTENTION OF

May 11, 1995

SMCLO-EN

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

SUBJECT: Final Hydrogeologic Assessment Report for Longhorn Army Ammunition Plant, Marshall, Texas

Dear Ms. Price:

Enclosed is one copy of the Final Hydrogeologic Assessment Report. Appendices will be updated as data is available from Phase II Investigations for Groups 2 and 4 for Longhorn Army Ammunition Plant, Marshall, Texas.

Also enclosed is one set of drawings for the Alternate Plan for the Soil Dewatering Pad for the Interim Remedial Action at Burning Ground No. 3. Approval is requested by May 17, 1995 so that construction may begin in mid-July.

If you have any questions, please contact Mr. David Tolbert, at 903-679-2728.

Sincerely,

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

Enclosures

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

012764

REPLY TO ATTENTION OF

May 11, 1995

SMCLO-EN

Mr. H.L. Jones
Texas Natural Resource Conservation Commission
2916 Teague Drive
Tyler, Texas 75701

SUBJECT: Final Hydrogeologic Assessment Report for Longhorn Army Ammunition Plant, Marshall, Texas

Dear Mr. Jones:

Enclosed is one copy of the Final Hydrogeologic Assessment Report. Appendices will be updated as data is available from Phase II Investigations for Groups 2 and 4 for Longhorn Army Ammunition Plant, Marshall, Texas.

If you have any questions, please contact Mr. David Tolbert, at 903-679-2728.

Sincerely,

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

Enclosure

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

012765

REPLY TO ATTENTION OF

May 11, 1995

SMCLO-EN

Mr. Michael Moore
Superfund Investigation Section
Texas Natural Resource Conservation Commission
Post Office Box 13087
Austin, Texas 78711-3087

SUBJECT: Final Hydrogeologic Assessment Report for Longhorn Army Ammunition Plant, Marshall, Texas

Dear Mr. Moore:

Enclosed is one copy of the Final Hydrogeologic Assessment Report. Appendices will be updated as data is available from Phase II Investigations for Groups 2 and 4 for Longhorn Army Ammunition Plant, Marshall, Texas.

Also enclosed is one set of drawings for the Alternate Plan for the Soil Dewatering Pad for the Interim Remedial Action at Burning Ground No. 3. Approval is requested by May 17, 1995 so that construction may begin in mid-July.

If you have any questions, please contact Mr. David Tolbert, at 903-679-2728.

Sincerely,

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

Enclosures

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

012766

REPLY TO
ATTENTION OF

May 23, 1995

SMCLO-EN

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

SUBJECT: Draft Record of Decision for Early Interim Remedial Action at Landfill Sites 12 & 16 for Longhorn Army Ammunition Plant, Marshall, Texas

Dear Ms. Price:

Enclosed are three copies of the Draft Record of Decision (ROD) for Early Interim Remedial Action at Landfill Sites 12 & 16 for Longhorn Army Ammunition Plant, Marshall, Texas.

Please provide comments prior to June 21, 1995 ROD Resolution Meeting in Dallas.

If you have any questions, please contact Mr. David Tolbert, at 903-679-2728.

Sincerely,

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

Enclosures

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

012767

REPLY TO
ATTENTION OF

May 23, 1995

SMCLO-EN

Mr. Michael Moore
Superfund Investigation Section
Texas Natural Resource Conservation Commission
Post Office Box 13087
Austin, Texas 78711-3087

SUBJECT: Draft Record of Decision for Early Interim Remedial Action at Landfill Sites 12 & 16 for Longhorn Army Ammunition Plant, Marshall, Texas

Dear Mr. Moore:

Enclosed are two copies of the Draft Record of Decision (ROD) for Early Interim Remedial Action at Landfill Sites 12 & 16 for Longhorn Army Ammunition Plant, Marshall, Texas.

Please provide comments prior to June 21, 1995 ROD Resolution Meeting in Dallas.

If you have 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

012768

May 23, 1995

SMCLO-EN

Mr. H.L. Jones
Texas Natural Resource Conservation Commission
2916 Teague Drive
Tyler, Texas 75701

SUBJECT: Draft Record of Decision for Early Interim Remedial Action at Landfill Sites 12 & 16 for Longhorn Army Ammunition Plant, Marshall, Texas

Dear Mr. Jones:

Enclosed is one copy of the Draft Record of Decision (ROD) for Early Interim Remedial Action at Landfill Sites 12 & 16 for Longhorn Army Ammunition Plant, Marshall, Texas.

Please provide comments prior to June 21, 1995 ROD Resolution Meeting in Dallas.

If you have any questions, please contact Mr. David Tolbert, at 903-679-2728.

Sincerely,

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

Enclosure