



DEPARTMENT OF THE ARMY  
LONGHORN ARMY AMMUNITION PLANT  
POST OFFICE BOX 220  
RATCLIFF, AR 72951

September 24, 2018

DAIM-ODB-LO

Mr. Rich Mayer  
U.S. Environmental Protection Agency (USEPA)  
Federal Facilities Section R6  
1445 Ross Avenue  
Dallas, TX 75202-2733

Re: July 2018 Final, Explanation of Significant Differences,  
LHAAP-35A(58), Shops Area, Group 4  
Record of Decision dated September 2010  
Longhorn Army Ammunition Plant, Karnack, Texas

Dear Mr. Mayer,

Please find attached two hard copies and one electronic copy (compact disk) of the LHAAP-35A(58) Final Explanation of Significant Differences for LHAAP-03 groundwater, signed by the Army and EPA, for your records.

The point of contact for this action is the undersigned. I may be contacted at 479-635-0110, or by email at [rose.m.zeiler.civ@mail.mil](mailto:rose.m.zeiler.civ@mail.mil).

Sincerely,

A handwritten signature in cursive script that reads "Rose M. Zeiler".

Rose M. Zeiler, Ph.D.  
Longhorn AAP Site Manager

Copies furnished:

- A. Palmie, TCEQ, Austin (letter)
- P. Bruckwicki, Caddo Lake NWR, TX (1 hard copy and 1 CD)
- A. Williams, USACE, Tulsa District, OK (1 CD)
- N. Smith, USAEC, San Antonio, TX (1 CD)
- K. Nemmers, Bhate, Lakewood, CO (1 hard copy and 1 CD for project files)
- P. Srivastav, APTIM, Houston, TX



DEPARTMENT OF THE ARMY  
LONGHORN ARMY AMMUNITION PLANT  
POST OFFICE BOX 220  
RATCLIFF, AR 72951

September 24, 2018

DAIM-ODB-LO

Ms. April Palmie  
Texas Commission on Environmental Quality (TCEQ)  
Superfund Section, MC-136  
12100 Park 35 Circle, Bldg D  
Austin, TX 78753

Re: July 2018 Final, Explanation of Significant Differences,  
LHAAP-35A(58), Shops Area, Group 4  
Record of Decision dated September 2010  
Longhorn Army Ammunition Plant, Karnack, Texas

Dear Ms. Palmie,

Please find attached one hard copy and one electronic copy (compact disk) of the LHAAP-35A(58) Final Explanation of Significant Differences for LHAAP-03 groundwater, signed by the Army and EPA, for your records.

The point of contact for this action is the undersigned. I may be contacted at 479-635-0110, or by email at [rose.m.zeiler.civ@mail.mil](mailto:rose.m.zeiler.civ@mail.mil).

Sincerely,

A handwritten signature in cursive script that reads "Rose M. Zeiler".

Rose M. Zeiler, Ph.D.  
Longhorn AAP Site Manager

Copies furnished (letter only):  
R. Mayer, USEPA, Region 6, Dallas, TX  
P. Bruckwicki, Caddo Lake NWR, TX  
A. Williams, USACE, Tulsa District, OK  
N. Smith, USAEC, San Antonio, TX  
K. Nemmers, Bhate, Lakewood, CO (for project files)  
P. Srivastav, APTIM, Houston, TX

Bryan W. Shaw, Ph.D., P.E., *Chairman*  
Toby Baker, *Commissioner*  
Jon Niermann, *Commissioner*  
Stephanie Bergeron Perdue, *Interim Executive Director*



## TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

*Protecting Texas by Reducing and Preventing Pollution*

August 2, 2018

Mr. Thomas E. Lederle  
Chief, ACSIM BRAC Division  
2530 Crystal Drive, Room 5000  
Taylor Bldg./NC3  
Arlington, Virginia 22202

Re: Explanation of Significant Differences Record of Decision for LHAAP-35A(58), Shops Area, Longhorn Army Ammunition Plant Federal Superfund Site TX6213820529  
Karnack, Harrison County, Texas

Dear Mr. Lederle:

The Texas Commission on Environmental Quality (TCEQ) received the final Explanation of Significant Differences Record of Decision (ROD) for LHAAP-35A(58), Shops Area, Longhorn Army Ammunition Plant Federal Superfund Site in Karnack, Texas on July 25, 2018. The TCEQ has completed the review of the above referenced document and concurs that the described action is appropriate.

Sincerely,

A handwritten signature in blue ink that reads "Beth Seaton".

Beth Seaton, Director  
Remediation Division

BS/AP/cw

cc: Mr. Carl Edlund, P.E., Director, Superfund Division, U.S. Environmental Protection Agency, Region 6

**FINAL  
EXPLANATION OF SIGNIFICANT DIFFERENCES  
LHAAP-35A(58), SHOPS AREA, GROUP 4  
RECORD OF DECISION DATED SEPTEMBER 2010**

**FOR  
LONGHORN ARMY AMMUNITION PLANT  
KARNACK, TEXAS**

**Prepared For:**



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

**Prepared By:**



**1608 13<sup>th</sup> Avenue South, Suite 300  
Birmingham, Alabama 35205**



**2500 CityWest Blvd, Suite 1700  
Houston, Texas 77042**

**July 2018**

**FINAL  
EXPLANATION OF SIGNIFICANT DIFFERENCES  
LHAAP-35A(58), SHOPS AREA, GROUP 4  
RECORD OF DECISION DATED SEPTEMBER 2010  
LONGHORN ARMY AMMUNITION PLANT  
KARNACK, TEXAS**

**Prepared For:  
U.S. Army Corp of Engineers  
Tulsa District**

**Prepared By:  
Bhate Environment & Infrastructure  
and  
Aptim Federal Services, LLC**

**Contract No. W9128F-13-D-0012  
Task Order No. W912BV17F0150**

**July 2018**

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## ACRONYMS AND ABBREVIATIONS

AECOM	AECOM Technical Services, Inc.
BRAC	Base Realignment and Closure
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
C.F.R.	Code of Federal Regulations
COC	contaminant of concern
DCA	dichloroethane
DCE	dichloroethene
DNAPL	dense non-aqueous phase liquid
ESD	Explanation of Significant Differences
FFA	Federal Facility Agreement
LHAAP	Longhorn Army Ammunition Plant
LTM	long-term monitoring
LUC	land use control
MCL	maximum contaminant level
µg/L	micrograms per liter
MNA	monitored natural attenuation
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priorities List
PCE	tetrachloroethene
RACR	Remedial Action Completion Report
RAO	remedial action objective
RAWP	Remedial Action Work Plan
RD	remedial design
ROD	Record of Decision
SARA	Superfund Amendments and Reauthorization Act
Shaw	Shaw Environmental, Inc.
SVOC	semivolatile organic compound
TCA	trichloroethane
TCE	trichloroethene
TCEQ	Texas Commission on Environmental Quality
U.S. Army	U.S. Department of the Army
U.S.C.	United States Code
USEPA	U.S. Environmental Protection Agency
VC	vinyl chloride
VOC	volatile organic compound



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# 1 INTRODUCTION AND STATEMENT OF PURPOSE

**Site and Location:** LHAAP-35A(58) is an industrial paved area consisting of 11 acres in the north-central section of LHAAP.

**Lead Agency and Supporting Agency:**

Lead Agency – U.S. Department of the Army (U.S. Army)

Lead Oversight Agency - U.S. Environmental Protection Agency Region 6 (USEPA)

Supporting Agency – Texas Commission on Environmental Quality (TCEQ)

This Explanation of Significant Differences (ESD) is in Compliance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) §117 (c), 42 United States Code (U.S.C.) Section (§) 9617 (c) and National Oil and Hazardous Substances Pollution Contingency Plan (NCP) 40 Code of Federal Regulations (C.F.R.) §300.435(c)(2)(i).

**Date of Record of Decision Signature:** September 2010, Administrative Record, Bate Stamp 00098704-00098797

**Need for ESD:** LHAAP-03 is a 50-foot by 50-foot tract of land located within the larger site, LHAAP-35A(58) (Figure 1-1). The September 2010 LHAAP-35A(58) Record of Decision (ROD) (Shaw, 2010) notes that LHAAP-03 falls within the LHAAP-35A(58) land use control boundary (LUC) and describes the LHAAP-03 well 03WW01 as impacted by the LHAAP-35A(58) volatile organic compound (VOC) plume but it does not specifically address the LHAAP-03 groundwater as part of the LHAAP-35A(58) remedy or LUC boundary. The ROD also does not identify arsenic as a potential contaminant of concern (PCOC) in groundwater for LHAAP-35A(58). However, a groundwater monitoring program for arsenic at LHAAP-03 and LUCs for LHAAP-03 were included in the LHAAP-35A (58) Remedial Action Completion Report (RACR) (AECOM, 2015), approved by USEPA and TCEQ in 2015. Thus, this ESD will formally include the groundwater at LHAAP-03 as indistinguishable from and included with the site wide groundwater plumes at LHAAP-35A(58) and the associated LUCs already in place at LHAAP-35A(58).

This ESD will become part of the Administrative Record file in accordance with NCP 40 C.F.R. §300.825(a)(2). The file will be located at the Marshall Public Library:

Marshall Public Library  
300 South Alamo Blvd.  
Marshall, Texas 75670

Phone: 903-935-4465

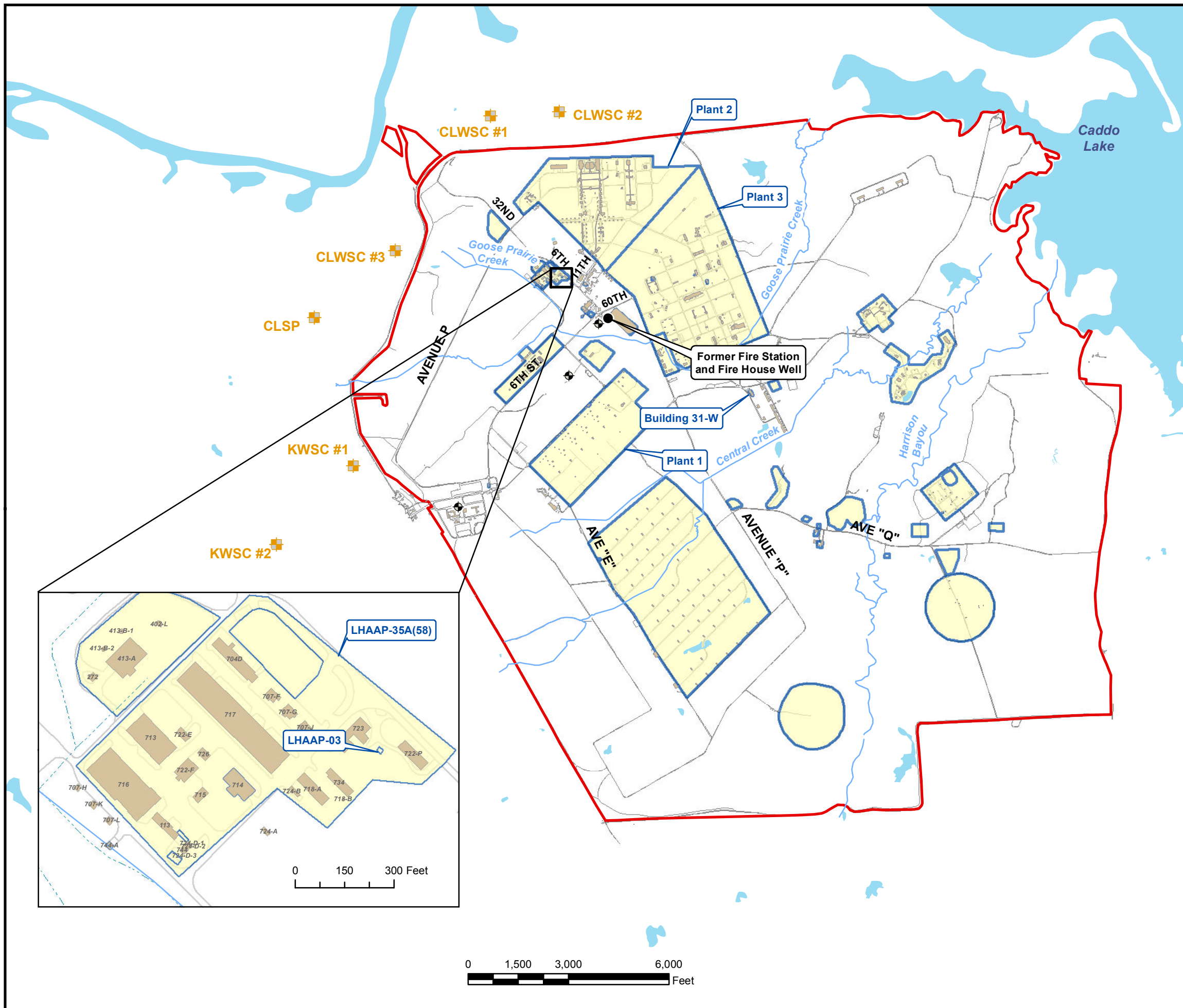
Hours:

Monday, Tuesday, and Thursday 9:30 am to 7:30 pm

Wednesday and Friday 9:30 am to 5:30 pm

Saturday 9:30 am to 3:30 pm

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- Legend**
- Fire House Well
  - ⊕ Water Supply Well Locations
  - ⊕ Public Water Supply Well Locations
  - Streams
  - Roads
  - Lake/Pond
  - LHAAP-03 Site Boundary
  - LHAAP Boundary
- KWSC – Karnack Water Supply Corporation  
 CLWSC – Caddo Lake Water Supply Corporation  
 CLSP - Caddo Lake State Park



Figure 1-1  
 LHAAP-03 Site Location Map

LHAAP-35A(58) ESD  
 Longhorn Army Ammunition Plant  
 Karnack, Texas

60256135

June  
 2018

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## 2 SITE HISTORY, CONTAMINATION, AND SELECTED REMEDY

### 2.1 SITE HISTORY AND CONTAMINATION

LHAAP-35A(58), also known as the Shops Area, is located in the north-central portion of LHAAP. LHAAP-35A(58) is an industrial area (former maintenance complex which included the Shops Area) that provided a wide range of support services including laundry, automotive, woodworking, metalworking, painting, refrigeration, and electrical shops. Located within the boundary of LHAAP-35A(58), LHAAP-03 is approximately 50 feet to the west of former Building 722-P. LHAAP-03 was a waste collection site (originally identified as a 16-foot by 15-foot area) outside of the paint shop at Building 722-P, which was at the Maintenance Shop Area. The waste collection site was active throughout LHAAP's mission and became inactive in 1996-1997, along with the entire installation.

Contaminants associated with LHAAP-35A(58) include volatile organic compounds (VOCs), primarily 1,1-dichloroethene, cis-1,2-dichloroethene, trichloroethene (TCE), and vinyl chloride (VC). All are detected within the uppermost water-bearing zone at the site. Potential site-related contaminants at LHAAP-03 were metals, VOCs, and semivolatile organic compounds (SVOCs). LHAAP was placed on the National Priorities List (NPL) on August 9, 1990. A Federal Facility Agreement (FFA) became effective December 30, 1991, among the USEPA, the U.S. Army, and the State of Texas, represented by the TCEQ. LHAAP-35A(58) was not one of the originally listed NPL sites; however, it is being managed in the same manner because of the presence of contaminated groundwater under the site. The site has been added to the list of NPL sites at LHAAP with concurrence from the U.S. Army and USEPA Headquarters.

Following approval and signature of the ROD in September 2010 and the Remedial Design (RD) in September 2011, the Final Remedial Action Work Plan (RAWP) to implement the remedy proposed in the ROD was published in August 2013 (AECOM, 2013). Following implementation of the remedy in accordance with the RAWP, the RACR was published in May 2015 (AECOM, 2015) to document the implementation. The RAWP and RACR also established evaluation criteria for the remedy (**Section 2.3**) to determine if the performance objectives are met.

### 2.2 SELECTED REMEDY

The selected remedy, identified as Alternative 4 in Section 2.12 of the ROD, included in situ bioremediation followed by monitored natural attenuation (MNA) and LUC for the eastern plume and MNA and LUC for the western plume. The LHAAP-35A(58) eastern plume contains LHAAP-03. This alternative was selected because it was consistent with the intended future use of the site as a wildlife refuge. The alternative also satisfied the Remedial Action Objectives (RAOs) for the site through a groundwater LUC restriction, which would ensure protection of human health by preventing human exposure to contaminated groundwater, and MNA and in situ bioremediation, which would return the contaminated water to its potential beneficial use, wherever practicable, within a reasonable timeframe (40 C.F.R. 300.430(a)(1)(ii)(F)). The LUC to restrict groundwater use will remain in place until cleanup levels are met. Furthermore, long-term monitoring (LTM) will assure that human health and the environment are protected by verifying that

contaminated groundwater does not migrate into nearby surface water bodies at levels that exceed maximum contaminant levels (MCLs). This alternative offered a high degree of long-term effectiveness that can easily be implemented at a lower cost than other alternatives.

### 3 BASIS FOR THE DOCUMENT

The September 2010 ROD for LHAAP-35A(58) (Shaw, 2010) did not specifically include the groundwater under LHAAP-03, a small site that is entirely contained within the LHAAP-35A(58) eastern VOC plume and LUC boundaries. The only additional potential COC identified for LHAAP-03 groundwater is arsenic. The proposed management strategy is to address the groundwater underlying LHAAP-03 and associated LUCs as being indistinguishable from, and included with LHAAP-35A(58) groundwater remedies and LUCs.

Well 03WW01 (Figure 3-1) is identified in the ROD as an LHAAP-35A(58) VOC-impacted well, is located within the EISB target injection area for LHAAP-35A(58), and remains part of the LHAAP-35A(58) monitoring well network. Even though arsenic was not identified as a COC in the LHAAP-35A(58) ROD, in November 2008, arsenic was detected in the single LHAAP-03 well (03WW01) and five LHAAP-35A (58) wells at concentrations exceeding the 10 micrograms per liter ( $\mu\text{g/L}$ ) MCL (AECOM, 2015). Arsenic groundwater monitoring plans are included in the LHAAP-35A(58) RAWP (AECOM, 2013) and RACR (AECOM, 2015) to provide additional evaluation of arsenic concentration trends after completion of the LHAAP-03 soil excavation for arsenic and lead, and the implementation of the EISB remedy at LHAAP-35A (58). Thus, the groundwater at LHAAP-03 cannot be isolated from the LHAAP-35A(58) groundwater and will be formally included with LHAAP-35A(58) via this ESD.

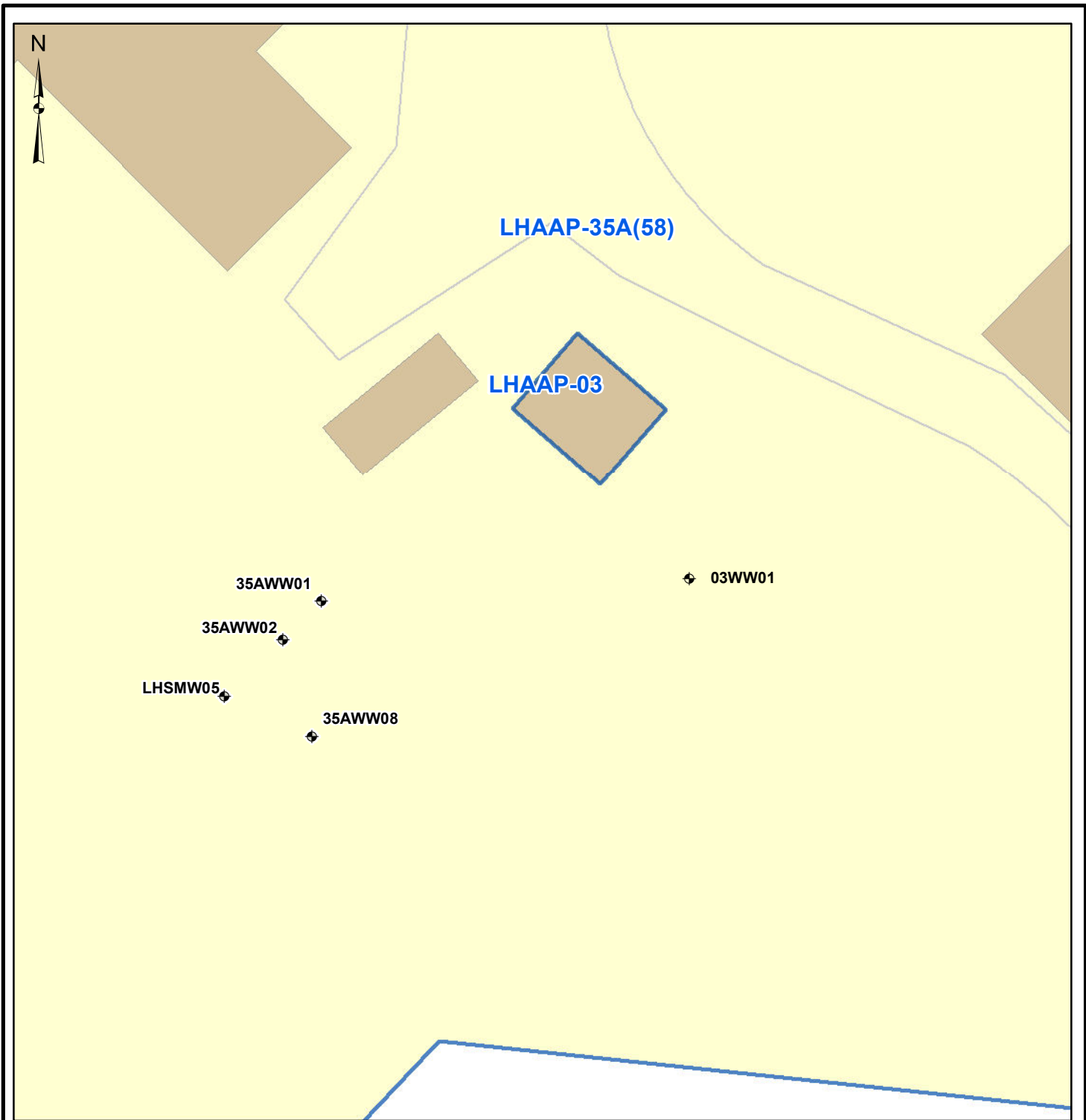
As described in the LHAAP-35A(58) RAWP, LUCs for the LHAAP-35A(58) groundwater include LHAAP-03 groundwater. Groundwater monitoring for LHAAP-35A(58) includes the well for LHAAP-03. The ROD states that LHAAP-03 is located inside the LHAAP-35A(58) LUC boundary. The land use notification required by the ROD and recorded in Harrison County, Texas states that LHAAP-03 is “contained within the LHAAP-35A(58) LUC boundary”. Therefore, the LHAAP-03 inclusion within the LHAAP-35A(58) LUC boundary implicitly applies the groundwater LUCs to LHAAP-03.

Although the ROD states that the LUCs will remain in place until the cleanup levels in groundwater are met, the land use notification and the RACR state the duration of the LUCs (restriction against the residential use of groundwater) is until the levels of the COCs in soil and groundwater allow UUUE. Therefore, the duration of the LUCs associated with LHAAP-35A(58) until UUUE is already a matter of record and implementation, and should be formalized via this ESD. This is consistent with CERCLA 121(c) and 40 C.F.R. 300.430(f)(4)(ii), both of which require a periodic review of the remedy to ensure protection of human health and the environment for as long as contamination remains on site and for as long as a remedy is required on site.

This ESD provides for arsenic to be sampled as a component of the groundwater monitoring program for LHAAP-35A(58) and evaluated to determine if arsenic is present due to a release or due to geochemical conditions.



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**Legend**

- ◆ Monitoring Well Location
- Roads
- Buildings
- Site

*Source: Shaw, 2011, Draft Engineering Evaluation and Cost Analysis, LHAAP-03 (Former Waste Collection Pad Near Building 722-P, Paint Shop) Longhorn Army Ammunition Plant, Karnack, Texas*



**Figure 3-1**  
LHAAP-03 Monitoring Well Locations

LHAAP-35A(58) ESD  
Longhorn Army Ammunition Plant  
Karnack, Texas

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## 4 DESCRIPTION OF SIGNIFICANT DIFFERENCES

The significant differences in the remedy presented in the ROD and this ESD are summarized as follows:

- Formally document the monitoring and LUCs for LHAAP-03 groundwater are captured under LHAAP 35A(58)
- Incorporate groundwater monitoring for arsenic within the LHAAP-35A(58) monitoring program, as described in subsequent documents since the 2010 ROD
- Change the LUC duration to “until the levels of COCs in soil and groundwater allow unrestricted use and unlimited exposure”.

These differences will not change the selected remedy for LHAAP-35A(58), the cost to implement the remedy, or the expected time to achieve the cleanup objectives.

### ROD Section 1.4 Description of the Selected Remedy

The final selected remedy for LHAAP-35A(58) protects human health and the environment by preventing human exposure to groundwater contaminated with chlorinated solvents...

### Change to Remedy Presented in the ROD:

The changes to the remedy in the ROD consist of:

1. Formally documenting that monitoring and LUCs for LHAAP-03 groundwater are captured under LHAAP-35A(58)
2. Incorporating groundwater monitoring for arsenic within the LHAAP-35A(58) monitoring program, and;
3. Modification of the LUC duration to “until the levels of COCs in soil and groundwater allow unrestricted use and unlimited exposure”

### ROD Section 2.5.5, Nature and Extent of Contamination:

Based on the risk assessment and subsequent evaluations, it was determined that the COCs for the shallow groundwater at this site are tetrachloroethene (PCE), TCE, 1,1-dichloroethene (DCE), cis-1,2-DCE, trans-1,2-DCE, VC, 1,1,2-trichloroethane (TCA), 1,1-dichloroethane (DCA), and chloroethene. The plume boundaries for PCE, TCE, and 1,1-DCE, as determined by their respective MCLs, are shown on **Figure 2-8**. The COCs are toxic and carcinogenic. No principal threat source material (such as dense non-aqueous phase liquid [DNAPL]) was identified or suspected to exist at LHAAP-35A(58).

### Change to Nature and Extent of Contamination in the ROD:

The only change to nature and extent of contamination in the ROD is to incorporate arsenic for confirmation monitoring. Although not identified as a COC for LHAAP-35A(58), arsenic is found in groundwater and is monitored as described in the Revised Technical Memorandum, Steps to Remedy-in-Place for LHAAP-03 / LHAAP-35A(58) (AECOM, 2012) and the LHAAP-35A(58) RAWP (AECOM, 2013). In November 2008, arsenic was detected in the LHAAP-03 well (03WW01) and five LHAAP-35A(58) wells at concentrations exceeding the 10 µg/L MCL (AECOM, 2015). Arsenic was detected in

both eastern and western plume areas at LHAAP-35A(58). While this exceedance of arsenic is above the MCL, it is within the range of groundwater arsenic concentrations detected during background evaluations performed in 1995 and 2008, and may be attributable to reducing conditions in groundwater.

**ROD Performance Objectives for the Groundwater Remedy, Section 2.12.2  
Description of the Selected Remedy, Western Plume, paragraph 2:**

The MNA evaluation will be based on the USEPA lines of evidence (USEPA, 1999) and the anaerobic screening (USEPA, 1998) as follows:

- MNA potential based on evaluating biodegradation screening scores using USEPA guidance
- Plume stability (i.e., the plume concentrations are decreasing in the majority of performance wells, and the plume is not expanding in area as demonstrated with compliance wells)
- MNA Process Evaluation demonstrated based on an attenuation rate calculated with empirical performance monitoring data and MNA Process Demonstration based on the presence of daughter products and bacterial culture counts

**Change to Performance Objectives:**

No change to the performance objectives in the ROD is proposed. Limited groundwater monitoring for arsenic will be conducted to evaluate whether detections in both eastern and western plume areas at LHAAP-35A(58) are within background concentrations or if detections may be attributable to reducing conditions in groundwater.

**ROD Cost Estimate for the Selected Remedy, Section 2.12.3, paragraphs 1 and 2:**

Table 2-10 presents the present worth analysis of the cost for the selected remedy, Alternative 4. The information in this table is based on the best available information regarding the anticipated scope of the remedial alternative. The quantities used in the estimate are for estimating purposes only. Changes in the cost estimates are likely to occur as a result of new information and data collected during the engineering design of the remedial alternative. Major changes may be documented in the form of a ROD amendment, while significant changes may be included in an ESD. Minor changes may be documented in a memorandum included in the Administrative Record. This is an order-of-magnitude engineering cost estimate that is expected to be within -30 to +50 percent of the actual project cost.

The total project present worth cost of this alternative is approximately \$785,000, using a discount rate of 2.8%. The capital cost is estimated at \$191,000. The total O&M present value cost is estimated at approximately \$594,000. The O&M cost includes evaluation of MNA, maintenance of LUC and LTM through year 30. The LTM would support the required CERCLA five-year reviews.

**Change to Cost Estimate for the Selected Remedy:**

There is no cost associated with formally documenting that monitoring and LUCs for LHAAP-03 groundwater is captured under LHAAP-35A(58). The cost associated with

incorporating groundwater monitoring for arsenic within the LHAAP-35A(58) monitoring program, as described in the LHAAP-35A(58) RAWP (AECOM, 2013) is considered to be insignificant with only twelve wells identified for arsenic sampling with the limited frequency of the first four quarters of MNA monitoring.



## **5 REGULATORY AGENCY COMMENTS**

The lead oversight agency USEPA and support agency TCEQ have reviewed this ESD and support the changes to the selected remedy.



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## **6 STATUTORY DETERMINATIONS**

The modification presented herein satisfies CERCLA §121, 42 U.S.C. §9621.

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## 7 PUBLIC PARTICIPATION

A notice summarizing the ESD shall be published in the Marshall News Messenger upon finalization of the ESD. This ESD and all supporting ESD documentation will be made a part of the Administrative Record file in accordance with the NCP at 40 C.F.R. §300.825(a)(2). The Administrative Record will be located at the repository identified in Section 1.0 of this document. All public participation requirements set out in the NCP at 40 C.F.R. §300.435(c)(2)(i) have been met.

The U.S. Army reviewed all written and oral comments submitted during the public comment period. There were no significant comments captured related to the groundwater remedy.

### Authorizing Signature:



Thomas E. Lederle  
Chief BRAC Division ACSIM  
U.S. Department of the Army

Date: 19 July 2018

### Authorizing Signature:

I have reviewed this document, and any comments I had have been addressed and/or incorporated:



Carl Edlund  
Director  
Superfund Division  
U.S. Environmental Protection Agency, Region 6

Date: 9/5/18

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## 8 REFERENCES

AECOM Technical Services, Inc. (AECOM), 2012, *Revised Technical Memorandum, Steps to Remedy-in-Place for LHAAP-03/LHAAP-58, Longhorn Army Ammunition Plant, Karnack, Texas*, November.

AECOM, 2013, *Final Remedial Action Work Plan, LHAAP-35A(58), Shops Area, Group 4, Longhorn Army Ammunition Plant, Karnack, Texas*, August.

AECOM, 2015, *Draft Final LHAAP-58 Remedial Action Completion Report, Longhorn Army Ammunition Plant, Karnack, Texas*, May.

Shaw Environmental, Inc. (Shaw), 2010, *Final Record of Decision LHAAP-35A(58), Shops Area, Group 4, Longhorn Army Ammunition Plant, Karnack, Texas*, September.

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