



Date: December 21, 2010

Project No.: 117591

TRANSMITTAL LETTER:

To: Mr. Aaron Williams

Address: US Army Corps of Engineers - Tulsa

CESWT-PP-M

1645 South 101st East Ave

Tulsa, Oklahoma 74128

Re: Final Decision Document for LHAAP-35/36 Sumps,
Longhorn Army Ammunition Plant

Contract No. W912QR-04-D-0027/DS02

For: Review As Requested Approval Corrections Submittal Other

<i>Item No:</i>	<i>No. of Copies</i>	<i>Date:</i>	<i>Document Title</i>
1	2	October 2010	Final Decision Document for LHAAP-35/36, Sumps, Longhorn Army Ammunition Plant, Karnack, Texas

Aaron,
Enclosed are two copies of the above-named document. Copies have been distributed as indicated below. Please call with any questions or comments.

Sincerely: 
Praveen Srivastav
Project Manager

CC: Distribution List:

- Mr. J. Lambert – USACE, Tulsa (sent to A. Williams for distribution)
- Mr. A. Maly – USAEC
- Ms. Rose Zeiler – BRAC-LHAAP
- Mr. S. Tzhone – EPA Region 6 (2)
- Ms. F. Duke– TCEQ, Austin (2)
- Mr. D. Vodak– TCEQ, Tyler
- Mr. P. Bruckwicki– U.S. Fish and Wildlife Service



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

December 21, 2010

DAIM-ODB-LO

Mr. Stephen Tzhone
US Environmental Protection Agency
Superfund Division (6SF-AT)
1445 Ross Avenue
Dallas, TX 75202-2733

Re: Final Decision Document for LHAAP-35/36, Sumps,
Longhorn Army Ammunition Plant, Karnack, Texas, October 2010

Dear Mr. Tzhone,

The above-referenced document is being transmitted to you for your records. The document has been prepared by Shaw Environmental, Inc. (Shaw) on behalf of the Army as part of Shaw's performance based contract for the facility.

The point of contact for this action is the undersigned. I ask that Praveen Srivastav, Shaw's Project Manager, be copied on any communications related to the project. I may be contacted at 479-635-0110, or by email at rose.zeiler@us.army.mil.

Sincerely,

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

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

Copies furnished:

F. Duke, TCEQ, Austin, TX
D. Vodak, TCEQ, Tyler, TX
P. Bruckwicki, Caddo Lake NWR, TX
J. Lambert, USACE, Tulsa District, OK
A. Williams, USACE, Tulsa District, OK
A. Maly, USAEC, TX
P. Srivastav, Shaw – Houston, TX (for project files)



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

December 21, 2010

DAIM-ODB-LO

Ms. Fay Duke (MC-136)
SSDAT/Superfund Section
Remediation Division
Texas Commission on Environmental Quality
12100 Park 35 Circle, Bldg D
Austin, TX 78753

Re: Final Decision Document for LHAAP-35/36 Sumps,
Longhorn Army Ammunition Plant, Karnack, Texas, October 2010
SUP 126

Dear Ms. Duke,

The above-referenced document is being transmitted to you for your records. The document has been prepared by Shaw Environmental, Inc. (Shaw) on behalf of the Army as part of Shaw's performance based contract for the facility.

The point of contact for this action is the undersigned. I ask that Praveen Srivastav, Shaw's Project Manager be copied on any communications related to the project. I may be contacted at 479-635-0110, or by email at rose.zeiler@us.army.mil.

Sincerely,

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

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

Copies furnished:

S. Tzhone, USEPA Region 6, Dallas, TX
D. Vodak, TCEQ, Tyler, TX
P. Bruckwicki, Caddo Lake NWR, TX
J. Lambert, USACE, Tulsa District, OK
A. Williams, USACE, Tulsa District, OK
A. Maly, USAEC, TX
P. Srivastav, Shaw, Houston, TX (for project files)

FINAL
DECISION DOCUMENT FOR LHAAP-35/36 SUMPS
LONGHORN ARMY AMMUNITION PLANT
KARNACK, TEXAS



Prepared for
U.S. Army Corps of Engineers
Tulsa District
1645 South 101st East Avenue
Tulsa, Oklahoma

Prepared by
Shaw Environmental, Inc.
1401 Enclave Parkway, Suite 250
Houston, Texas 77077

MARC No. W912QR-04-D-0027, Task Order No. DS02
Shaw Project No. 117591

October 2010

1.0 Declaration

1.1 Statement of Basis and Purpose

This document presents the basis for the decision that no action is necessary for site LHAAP-35/36 Sumps at the former Longhorn Army Ammunition Plant (LHAAP) in Karnack, Texas. The decision was made by the Department of the Army (Army) and the Texas Commission on Environmental Quality (TCEQ) in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) as amended by the Superfund Amendments and Reauthorization Act, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), Resource Conservation and Recovery Act (RCRA), and Army Regulation (AR) 200-1, as applicable. Although there are several Superfund National Priorities List (NPL) environmental sites at LHAAP, LHAAP-35/36 is not among them. This site is being addressed under CERCLA as a non-NPL environmental site.

1.2 Description of Selected Remedy

No CERCLA remedial action is necessary for LHAAP-35/36. Site investigations were conducted through which it was determined by Army and TCEQ that the data do not support the implementation of a remedial action because this site does not present unacceptable risks for the reasonably anticipated future use as part of the Caddo Lake National Wildlife Refuge. The risk evaluation does not address unrestricted use. In accordance with 30 Texas Administrative Code (TAC) §335.566, a notification will be recorded in the Harrison County Office stating that the site is suitable for nonresidential use. Limited monitoring will be conducted to ensure that the use of this site remains consistent with the nonresidential use exposure scenarios evaluated in the risk evaluation and will be documented in the form of Letters of Certification transmitted every five years to TCEQ. Although the Army may later pass these procedural responsibilities to the designated transferee, United States Fish and Wildlife Service (USFWS), in conjunction with the property transfer, the Army shall retain responsibility for future environmental response actions.


1.3 Statutory Determinations

None of the CERCLA §121 statutory determinations apply because no remedial action is necessary to protect human health and the environment. Chemicals detected in samples from LHAAP-35/36 are considered to be of no further concern. Therefore, they meet the requirements for no action under U.S. Environmental Protection Agency (USEPA) guidance and 30 TAC §335.

1.4 Approval and Signature

No actions are necessary for LHAAP-35/36. There is no cost associated with this decision beyond the cost for limited monitoring to ensure proper land use, which will be documented in the form of Letters of Certification transmitted every five years to TCEQ. The Army will be responsible to conduct the limited monitoring and transmit the Letters of Certification unless the procedural responsibility has been transferred to the designated transferee, USFWS. The Army, however, shall retain responsibility for future environmental response actions. The undersigned is the appropriate approval authority for this decision.

APPROVED BY:


Thomas E. Lederle
(Name)

4 NOV 2010
(Date)

Thomas E. Lederle
Chief, Industrial Branch
Base Realignment and Closure Division
United States Army

2.0 *Decision Summary*

2.1 *Site Name, Location, and Description*

LHAAP-35/36 consists of 125 process sumps and 20 waste rack sumps located at and near production or process areas within LHAAP, an Army installation that occupied 8,416 acres between State Highway 43 in Karnack, Texas, and the southwestern shore of Caddo Lake. The nearest cities are Marshall, Texas, approximately 14 miles to the southwest, and Shreveport, Louisiana, approximately 40 miles to the southeast (**Figure 1**).

LHAAP operated until 1997 when it was placed on inactive status and classified by the U.S. Army as excess property. In 2003, LHAAP was placed under the administrative control of the Base Realignment and Closure (BRAC) Division as a Non-BRAC Excess property. Environmental activities at LHAAP are conducted in accordance with CERCLA and funded through the Defense Environmental Restoration Program. Army BRAC is the party responsible for environmental restoration.

LHAAP was placed on the NPL on August 9, 1990, and several environmental sites were listed. Activities to remediate the contamination began in 1990. After LHAAP's listing on the NPL, the U.S. Army, the USEPA, and the Texas Water Commission, currently known as TCEQ, entered into a CERCLA Section 120 Federal Facility Agreement (FFA) for remedial activities at the installation. The FFA became effective December 30, 1991.

Although several environmental sites at LHAAP are on the NPL, LHAAP-35/36 is a non-NPL site. The Army is the lead agency for all environmental restoration activities. For non-NPL sites such as LHAAP-35/36, the State of Texas is the lead regulatory agency.

2.2 *Site History*

LHAAP was established in December 1941 with the primary mission of manufacturing trinitrotoluene (TNT). TNT manufacture (Plant 1) activities ended after World War II. In 1952, the facility began production of pyrotechnic ammunition, such as photoflash bombs, simulators, hand signals, and tracers for 40 mm ammunition at Plant 2 that continued through 1956. In December 1954, a third facility, Plant 3, began production of solid-fuel rocket motors for tactical missiles. From September 1988 to May 1991, LHAAP was also used for the static firing and elimination of Pershing I and II rocket motors in compliance with the Intermediate-Range Nuclear Forces Treaty in effect between the United States and the former Union of Soviet Socialist Republics.

The site addressed in this document, LHAAP-35/36, is a collection of 125 process sumps and 20 waste rack sumps found in multiple locations across the installation and predominantly

associated with process areas. All of the production buildings had sumps that collected wash down water. Sumps were also associated with wash racks (waste rack sumps) where containers were cleaned and stored (Plexus, 2005).

The sumps were previously investigated by the U.S. Army Corps of Engineers (USACE, 1994 and 1995). Forty wastewater sumps were subsequently removed and closed under the RCRA (Thiokol Corporation [Thiokol], 1996). The 1996 closure report was approved via a 1997 correspondence from the Texas Natural Resource Conservation Commission (TNRCC, 1997). The closure of 85 additional wastewater sumps was documented in a report by OHM Remediation Services Corp. (OHM, 1997). While all of the wastewater sumps were closed, the documentation included in TNRCC correspondence (1997) and closure certifications included in the OHM Closure Report (1997) indicated that the soil around the former sumps required further evaluation. Closure activities consisted of evaluating sump contents, investigating the surrounding soils, and either removing the sump itself or filling it in place with clean soil. Closure certifications were received for some sump closures (USACE, 1994, 1995; Thiokol, 1996; OHM, 1997; Plexus, 2005).

Environmental restoration activities at LHAAP-35/36, a non-NPL site, have progressed through the remedial investigation (RI), at which point it was agreed by the Army and TCEQ that no significant releases had occurred and the site could be closed under TAC Risk Reduction Rule Standard 3. Concurrence by TCEQ with this Decision Document is attached as **Appendix A**.

2.3 Public Participation

The U.S. Army, USEPA, TCEQ, and the Restoration Advisory Board (RAB) have provided public outreach to the surrounding community concerning LHAAP-35/36 and other environmental sites at LHAAP. The outreach program has included fact sheets, media interviews, site visits, invitations to attend quarterly RAB and regulatory review meetings, and public meetings consistent with its public participation responsibilities under Sections 113(k)(2)(b), 117(a), and 121(f)(1)(g) of CERCLA.

The decision for no action at LHAAP-35/36 was discussed at the RAB meeting on March 24, 2009, at LHAAP. Reports supporting the no action determination for this site are included in the Administrative Record for LHAAP, which is available for public review at the Marshall Public Library, (903) 935-4465, 300 South Alamo, Marshall, Texas 75670. The hours of operation are Monday through Thursday 10:00 a.m. – 8:00 p.m. and Friday through Saturday from 10:00 a.m. – 5:00 p.m.

2.4 Site Characteristics

LHAAP-35/36 sumps are physically located within or near sites LHAAP-04, -18, -29, -35A(58), -35C(53), -36, -39, -45, -46, -47, -48, -59, and -66 (**Figure 2**) and have been collectively

designated as site LHAAP-35/36. There are 125 wastewater sumps in LHAAP-35 and 20 waste rack sumps in LHAAP-36.

Potential contaminants at LHAAP-35/36 varied according to sump use and proximity to the related process area. Generally, the potential contaminants analyzed included metals, explosives, volatile organic compounds, semivolatile organic compounds, dioxins, polychlorinated biphenyl, and perchlorate, though not all of these potential contaminants would be analyzed at each sump location because not all of the potential contaminants are found or used at that sump location.

2.5 *Current and Potential Future Site Uses*

LHAAP was active from the early 1940s to the late 1990s for the manufacture of explosives, pyrotechnics, and rocket motors for World War II, the Korean War, and the Cold War. LHAAP was placed on inactive status in 1997. Aside from the abundant wildlife, the installation is predominantly unoccupied. All of the production facilities have been demolished. LHAAP now consists of a heavily vegetated landscape with flat to slightly undulating terrain. Nearly 7,000 acres have been transferred to USFWS and are operated as the Caddo Lake National Wildlife Refuge. LHAAP-35/36 will be transferred to the USFWS following the execution of this Decision Document.

2.6 *Site Risk*

Environmental sampling and analysis efforts targeted at the sumps and in the areas surrounding them are described in the RI reports (Jacobs Engineering Group, Inc. [Jacobs], 2001; 2002a) and baseline risk assessments for LHAAP sites (Jacobs, 2002b; 2003). Documentation pertaining to investigations, closure, and removal of sumps is included in various reports (USACE, 1995; Thiokol, 1996; OHM, 1997). Additional investigations conducted by Shaw Environmental, Inc. (Shaw) on soil surrounding the sumps and waste rack sumps are described in the final Data Evaluation Report, the Addendum to the Report and Errata (Shaw, 2008; 2009a; 2010).

Previous risk assessments (Jacobs, 2002b; 2003) indicated acceptable risk to an industrial worker from exposure to chemicals in soil from sites LHAAP-46, LHAAP-47, LHAAP-35A(58), and LHAAP-18/24. Sump data results were compared to available Risk Based Screening Values (RBSV) (Shaw, 2008). If an exceedance was noted, then the chemical was evaluated with respect to the risk assessment (Jacobs 2002b; 2003) for the site within which the sump lies.

There are no soil samples associated with LHAAP-35/36 sumps in LHAAP-04, LHAAP-29, LHAAP-39, or LHAAP-66 that had chemicals with concentrations in soil exceeding RBSVs. However, certain chemicals in the soil samples collected at LHAAP-35/36 sump locations within LHAAP-46, -47, -35A(58), and -18/24 since completion of the Jacobs (2002, 2003) risk assessments exceeded RBSVs. These results were compared to the Jacobs (2002, 2003) risk

assessments to evaluate whether the results would modify the conclusions of those assessments. The results of these evaluations are described in the data evaluation report (Shaw, 2008).

The results of the post-2002 soil sample analysis were evaluated to determine whether they would change the conclusions of the Jacobs (2003) risk assessment. Application of aluminum, arsenic, mercury, and vanadium concentrations reported for post-2002 soil samples collected near sumps associated with LHAAP-46 to the Jacobs (2003) risk assessment contributed to negligible increases to the Jacobs (2003) risk assessment cancer risk and noncancer hazard values with resulting values in the acceptable range. Application of the aluminum, mercury, manganese, and vanadium concentrations reported for post-2003 soil samples collected near sumps associated with LHAAP-47 to the Jacobs (2003) risk assessment contributed negligible increases to Jacobs (2003) risk assessment cancer risk and noncancer hazard values with resulting values in the acceptable range. Application of the maximum manganese concentration measured in soil near sumps associated with LHAAP-35A(58) to the Jacobs (2003) risk assessment contributed negligible increases to the risk assessment cancer risk and noncancer hazard value with resulting values in the acceptable range. Application of the vanadium, trichloroethylene, and vinyl chloride concentrations measured in soil near sumps associated with LHAAP-18/24 to the Jacobs (2003) risk assessment contributed negligible increases to the Jacobs (2003) risk assessment cancer risk and noncancer hazard values with resulting values in the acceptable range. Overall, the application of these sample results to the Jacobs (2003) risk assessment indicated that there were increases to the cancer risk and noncancer hazard values, but these increases were negligible and the overall risk and hazard values were within acceptable ranges. Therefore, no further action is required for soil around LHAAP-35/36 sumps at LHAAP-46, LHAAP-47, LHAAP-35A(58), and LHAAP-18/24.

Risk assessments provided in the Site Evaluation Report for LHAAP-48 and LHAAP-35C(53) (Shaw, 2007a) included results for soil associated with the sumps at those sites. The assessments demonstrated that the sites were acceptable for nonresidential use. Soil associated with the two sumps at LHAAP-59 was addressed within the Site Investigation Report specific to that site (Shaw, 2007b); the findings indicated that no further action was required for LHAAP-59 based on comparison to medium-specific concentrations for commercial/industrial land use.

The evaluation of LHAAP-35/36 also includes analysis of potential for soil-to-groundwater impacts from 18 wastewater sumps and 4 waste rack sumps (Shaw, 2009a) since groundwater at these sump locations is not addressed under another site:

- Nine wastewater sumps (Sump094 – Sump101, Sump123) and three waste rack sumps (WRS001-WRS003) within LHAAP-48.
- Four wastewater sumps (Sump102 – Sump105) within LHAAP-35C(53).
- One wastewater sump (Sump110) approximately 135 feet outside LHAAP-46.

- One wastewater sump (Sump106) at LHAAP-66.
- One wastewater sump (Sump118) approximately 280 feet outside LHAAP-29.
- Two wastewater sumps (Sump119, Sump120) adjacent to LHAAP-59.
- One waste rack sump (WRS013) approximately 120 feet outside LHAAP-45.

Results of modeling performed for the evaluation showed that only a limited set of chemicals associated with soil at former sump locations have the potential to affect groundwater. For these sumps, several metals (antimony, arsenic, barium, cadmium and silver) indicated potential to leach into groundwater at LHAAP-48 and LHAAP-35C(53), but groundwater results from nearby wells showed those same metals to be undetected or present at concentrations below maximum contaminant levels (MCLs) or TCEQ regulatory levels. Several volatile organic compounds (VOCs) were also noted as having leaching potential at one area at LHAAP-48, and an herbicide was noted as having leaching potential at one area at LHAAP-59, but groundwater results from nearby wells showed those chemicals to be undetected or present at concentrations below MCLs or TCEQ regulatory levels. Because operations at the LHAAP facilities ceased in the mid-1990s (Shaw, 2007a, 2007b, 2007c, 2008, 2009b), and subsequent analyses of groundwater showed that concentrations of the chemicals were below regulatory levels, the contaminants associated with soil at the sump locations were judged to be of no further concern.

Except for these 18 wastewater sumps and 4 waste rack sumps, groundwater impacts at all other sump locations are being addressed through investigation and evaluation of the sites in which the sumps are located. The list of sumps and their associated sites are shown on **Table 1**.

Because it was demonstrated that post-2002 sampling results contribute negligible increases to the previous risk assessments, and the cancer risk and noncancer hazard values are well within the acceptable ranges, no further action is required for soil associated with sumps at LHAAP-35/36 (Shaw, 2008; 2009a; 2010).

The ecological risk for site LHAAP-35/36 was addressed in the Installation-Wide Baseline Ecological Risk Assessment (BERA) (Shaw, 2007c). For the BERA, the entire Installation was divided into three large sub-areas (i.e., the Industrial Sub-Area, Waste Sub-Area, and Low Impact Sub-Area) for the terrestrial evaluation. The individual sites at LHAAP were grouped into one of these sub-areas, which were delineated based on commonalities of historical use, habitat type, and spatial proximity to each other. The conclusions regarding the potential for chemicals detected at individual sites to adversely affect the environment must be made in the context of the overall conclusions of the sub-area in which the site falls. The LHAAP-35/36 sumps and waste rack sumps lie within the Low Impact Sub-Area, the Waste Sub-Area, and the Industrial Sub-Area. The BERA concluded that no unacceptable ecological risk was present in the Low Impact and Industrial Sub-Areas (Shaw, 2007c). Ecological risk was identified at the

Waste Sub-Area and is being addressed by a soil remedial action at LHAAP-17. Therefore, no action was needed at the LHAAP-35/36 sumps for the protection of ecological receptors.

TCEQ concurs that no action is required for LHAAP-35/36. None of the CERCLA §121 statutory determinations are necessary in this action because no remedial action is necessary to ensure the protection of human health and the environment. The TCEQ requires that a notification must be filed in the Harrison County records, as required by 30 TAC §335.566, stating that the land is considered suitable for nonresidential use. Limited monitoring will be conducted to ensure that the use of this site remains consistent with the nonresidential use scenarios evaluated in the risk assessment and will be documented in the form of Letters of Certification transmitted every five years to the TCEQ. Although the Army may pass these procedural responsibilities to the designated transferee, USFWS, in conjunction with the property transfer, the Army shall retain responsibility for future environmental response actions.

PRIMARY BACKGROUND DOCUMENTS FOR SITE LHAAP-35/36

Jacobs Engineering Group, Inc. (Jacobs), 2001, *Final Remedial Investigation Report, Group 2 Sites, Sites 12, 17, 18/24, 29, and 32, Volume 1: Report, Longhorn Army Ammunition Plant, Karnack, Texas, Oak Ridge, Tennessee, April.*

Jacobs, 2002a, *Final Remedial Investigation Report, Group 4 Sites, Sites 04, 08, 35A, 35B, 35C, 46, 47, 48, 50, 60, 67, Goose Prairie Creek, Volume 1: Report, Longhorn Army Ammunition Plant, Karnack, Texas, Oak Ridge, Tennessee, January.*

Jacobs, 2002b, *Final Baseline Human Health and Screening Ecological Risk Assessment Volume 1: Report for the Group 2 Sites 12, 17, 18/24, 29, 32, 49, Harrison Bayou and Caddo Lake, Longhorn Army Ammunition Plant, Karnack, Texas, Oak Ridge, Tennessee, August.*

Jacobs, 2003, *Final Baseline Human Health and Screening Ecological Risk Assessment for the Group 4 Sites, Sites 04, 08, 35A, 35B, 35C, 46, 47, 48, 50, 60, 67, Goose Prairie Creek, Saunder's Branch, and Caddo Lake, Volume 1, Longhorn Army Ammunition Plant, Karnack, Texas, Oak Ridge, Tennessee, June.*

OHM Remediation Services Corp. (OHM), 1997, *Closure Report, Removal and Closure of Wastewater Sumps, Longhorn Army Ammunition Plant, Karnack, Texas, Houston, Texas, April.*

Plexus Scientific, 2005, *Environmental Site Assessment Phase I and II Report, Production Areas, Longhorn Army Ammunition Plant, Karnack, Texas, Houston, Texas, February.*

Shaw Environmental, Inc. (Shaw), 2007a, *Final Site Evaluation Report, LHAAP-48 (Former Igniter Production Area) and LHAAP-35C(53) (Former Static Test Area), Longhorn Army Ammunition Plant, Karnack, Texas, April.*

Shaw, 2007b, *Final Site Investigation Report, LHAAP-59, Longhorn Army Ammunition Plant, Karnack, Texas, August.*

Shaw, 2007c, *Installation-Wide Baseline Ecological Risk Assessment, Longhorn Army Ammunition Plant, Karnack, Texas, Houston, Texas, November.*

Shaw, 2008, *Data Evaluation Report Chemical Concentrations in Soil Samples Associated with LHAAP-35/36 Sumps, Longhorn Army Ammunition Plant, Karnack, Texas, Houston, Texas, January.*

Shaw, 2009a, *Addendum to the Final Data Evaluation Report in Soil Samples Associated with LHAAP-35/36 Sumps, Longhorn Army Ammunition Plant, Karnack, Texas, Houston, TX, April.*

Shaw, 2009b, *Final Feasibility Study, LHAAP-35(58), Shop Area, Group 4, Longhorn Army Ammunition Plant, Karnack, Texas, December.*

Shaw, 2010, *Memorandum: Errata to Final Evaluation Report, Chemical Concentrations in Soil Samples Associated with LHAAP-35/36 Sumps, Longhorn Army Ammunition Plant, Karnack, Texas, To Aaron Williams, U.S. Army Corps of Engineers, From Arthur F. Eidson, Ph.D., Shaw Environmental, Inc., May 4.*

PRIMARY BACKGROUND DOCUMENTS FOR SITE LHAAP-35/36
(Continued)

Texas Commission on Environmental Quality (TCEQ), 2006, *Texas Risk Reduction Rules* (30TAC§335) tables as updated through March.

Thiokol Corporation (Thiokol), 1996, *Closure Report, Closure of 29 Active and 11 Transition Sumps, Longhorn Army Ammunition Plant, Karnack, Texas*, September.

U.S. Army Corp of Engineers, (USACE), 1994, Tulsa District, *Phase I Investigations of 125 Waste Process Sumps and 20 Waste Rack Sumps – Draft Final Report, Longhorn Army Ammunition Plant*, USACE, Tulsa, Oklahoma, February.

USACE, 1995, *Draft Phase II Investigations of 125 Waste Process Sumps and 20 Waste Rack Sumps, Longhorn Army Ammunition Plant*, August.

U.S. Environmental Protection Agency (USEPA), 1994, *National Oil and Hazardous Substances Pollution Contingency Plan, 40 Code of Federal Regulations Part 300, 59 Federal Register* 47384, October.

ACRONYMS

AR	Army Regulation
BERA	Baseline Ecological Risk Assessment
BRAC	Base Realignment and Closure Commission
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
FFA	Federal Facility Agreement
Jacobs	Jacobs Engineering Group, Inc.
LHAAP	Longhorn Army Ammunition Plant
MCLs	maximum contaminant levels
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	Superfund National Priorities List
OHM	OHM Remediation Services Corp.
RAB	Restoration Advisory Board
RBSV	Risk Based Screening Values
RCRA	Resource Conservation and Recovery Act
RI	Remedial Investigation
Shaw	Shaw Environmental, Inc.
TAC	Texas Administrative Code
TCEQ	Texas Commission on Environmental Quality
Thiokol	Thiokol Corporation
TNRCC	Texas Natural Resource Conservation Commission
TNT	trinitrotoluene
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
VOC	volatile organic compound

Tables

**Table 1
Sump and Waste Rack Sumps**

Location Code	Nearest Site	Building	Location Code	Nearest Site	Building
LHAAP-35 Sumps (see no. 1 in table notes)			LHAAP-35 Sumps (see no. 2 in table notes)		
SUMP094	LHAAP-48	16-Y	SUMP028	LHAAP-46	P-122
SUMP095	LHAAP-48	34-Y	SUMP029	LHAAP-46	P-123
SUMP096	LHAAP-48	34-Y	SUMP030	LHAAP-46	212-12
SUMP097	LHAAP-48	38-Y	SUMP031	LHAAP-46	212-12
SUMP098	LHAAP-48	38-Y	SUMP032	LHAAP-46	212-14
SUMP099	LHAAP-48	38-Y	SUMP033	LHAAP-46	212-14
SUMP100	LHAAP-48	45-Y	SUMP034	LHAAP-46	212-16
SUMP101	LHAAP-48	45-Y	SUMP035	LHAAP-46	212-18
SUMP102	LHAAP-35C(53)	16-T	SUMP036	LHAAP-46	P-122
SUMP103	LHAAP-35C(53)	16-T	SUMP037	LHAAP-46	212-29
SUMP104	LHAAP-35C(53)	16-T	SUMP038	LHAAP-46	212-32
SUMP105	LHAAP-35C(53)	16-T	SUMP039	LHAAP-46	212-33
SUMP106	LHAAP-66	401	SUMP040	LHAAP-46	212-33
SUMP110	LHAAP-46	207	SUMP041	LHAAP-46	212-35
SUMP118	LHAAP-29	813	SUMP042	LHAAP-46	212-37
SUMP119	LHAAP-59	725	SUMP043	LHAAP-46	212-38
SUMP120	LHAAP-59	725	SUMP044	LHAAP-47	25-C
SUMP123	LHAAP-48	18-Y	SUMP045	LHAAP-47	25-C
LHAAP-36 Waste Rack Sumps (see no. 1 in table notes)			SUMP046	LHAAP-47	25-C
WRSUMP001	LHAAP-48	34-Y	SUMP047	LHAAP-47	25-D
WRSUMP002	LHAAP-48	38-Y	SUMP048	LHAAP-47	26-E
WRSUMP003	LHAAP-48	16-Y	SUMP049	LHAAP-47	26-E
WRSUMP013	LHAAP-45	824	SUMP050	LHAAP-47	26-E
LHAAP-35 Sumps (see no. 2 in table notes)			SUMP051	LHAAP-47	26-E
SUMP001	LHAAP-46	P-1	SUMP052	LHAAP-47	28-G
SUMP002	LHAAP-46	P-3	SUMP053	LHAAP-47	29-D
SUMP003	LHAAP-46	P-3	SUMP054	LHAAP-47	31-G
SUMP004	LHAAP-46	P-3	SUMP055	LHAAP-47	31-G
SUMP005	LHAAP-46	P-3	SUMP056	LHAAP-47	32-H
SUMP006	LHAAP-46	P-116	SUMP057	LHAAP-47	33-G
SUMP007	LHAAP-46	P-116	SUMP058	LHAAP-47	36-B
SUMP008	LHAAP-46	P-117	SUMP059	LHAAP-47	41-E
SUMP009	LHAAP-46	P-117	SUMP060	LHAAP-47	42-E
SUMP010	LHAAP-46	P-118	SUMP061	LHAAP-47	42-H
SUMP011	LHAAP-46	P-118	SUMP062	LHAAP-47	45-E
SUMP012	LHAAP-46	P-118	SUMP063	LHAAP-47	45-E
SUMP013	LHAAP-46	P-118	SUMP064	LHAAP-47	45-E
SUMP014	LHAAP-46	B-5	SUMP065	LHAAP-47	45-E
SUMP015	LHAAP-46	B-7	SUMP066	LHAAP-47	45-E
SUMP016	LHAAP-46	B-7	SUMP067	LHAAP-47	45-E
SUMP017	LHAAP-46	B-9	SUMP068	LHAAP-47	46-A
SUMP018	LHAAP-46	B-9	SUMP069	LHAAP-47	46-B
SUMP019	LHAAP-46	B-10	SUMP070	LHAAP-47	50-G
SUMP020	LHAAP-46	B-11	SUMP071	LHAAP-47	54-F
SUMP021	LHAAP-46	B-12	SUMP072	LHAAP-47	54-F
SUMP022	LHAAP-46	B-13	SUMP073	LHAAP-47	54-G
SUMP023	LHAAP-46	B-14	SUMP074	LHAAP-47	54-G
SUMP024	LHAAP-46	B-15	SUMP075	LHAAP-47	54-G
SUMP025	LHAAP-46	B-16	SUMP076	LHAAP-47	54-H
SUMP026	LHAAP-46	SHED C	SUMP077	LHAAP-47	54-H
SUMP027	LHAAP-46	P-9	SUMP078	LHAAP-47	68-C

Table 1 (continued)
Sump and Waste Rack Sumps

Location Code	Nearest Site	Building	Location Code	Nearest Site	Building
LHAAP-35 Sumps (see no. 2 in table notes)			LHAAP-36 Waste Rack Sumps (see no. 2 in table notes)		
SUMP079	LHAAP-47	68-C	WRSUMP004	LHAAP-46	P-1
SUMP080	LHAAP-47	68-C	WRSUMP005	LHAAP-46	P-117
SUMP081	LHAAP-47	68-F	WRSUMP006	LHAAP-46	P-118
SUMP082	LHAAP-47	68-F	WRSUMP007	LHAAP-46	P-122
SUMP083	LHAAP-47	68-F	WRSUMP008	LHAAP-46	B-8
SUMP084	LHAAP-47	68-G	WRSUMP009	LHAAP-46	S-113
SUMP085	LHAAP-47	68-G	WRSUMP010	LHAAP-46	P-12
SUMP086	LHAAP-47	68-G	WRSUMP011	LHAAP-46	B-13
SUMP087	LHAAP-47	68-G	WRSUMP012	LHAAP-46	P-113
SUMP088	LHAAP-47	68-G	WRSUMP014	LHAAP-37	29-A
SUMP089	LHAAP-47	68-G	WRSUMP015	LHAAP-46	212-14
SUMP090	LHAAP-47	68-G	WRSUMP016	LHAAP-46	407
SUMP091	LHAAP-47	75-I	WRSUMP017	LHAAP-47	68-G
SUMP092	LHAAP-47	75-I	WRSUMP018	LHAAP-47	54-H
SUMP093	LHAAP-47	75-I	WRSUMP019	LHAAP-46	212-20
SUMP107	LHAAP-46	403	WRSUMP020	NA	NA
SUMP108	LHAAP-46	406	WRSUMP021	LHAAP-46	P-11
SUMP109	LHAAP-46	408			
SUMP111	LHAAP-35A(58)	722-P			
SUMP112	LHAAP-35A(58)	722-P			
SUMP113	LHAAP-35A(58)	744			
SUMP114	LHAAP-39 (18)	25-X			
SUMP115	LHAAP-18	33-X			
SUMP116	LHAAP-18	37-X			
SUMP117	LHAAP-58	744-A			
SUMP121	LHAAP-47	32-H			
SUMP122	LHAAP-04	401-C			
SUMP800 (Sump124)	LHAAP-53	23-T			
Unnumbered Sump (Sump125)	LHAAP-58	723			

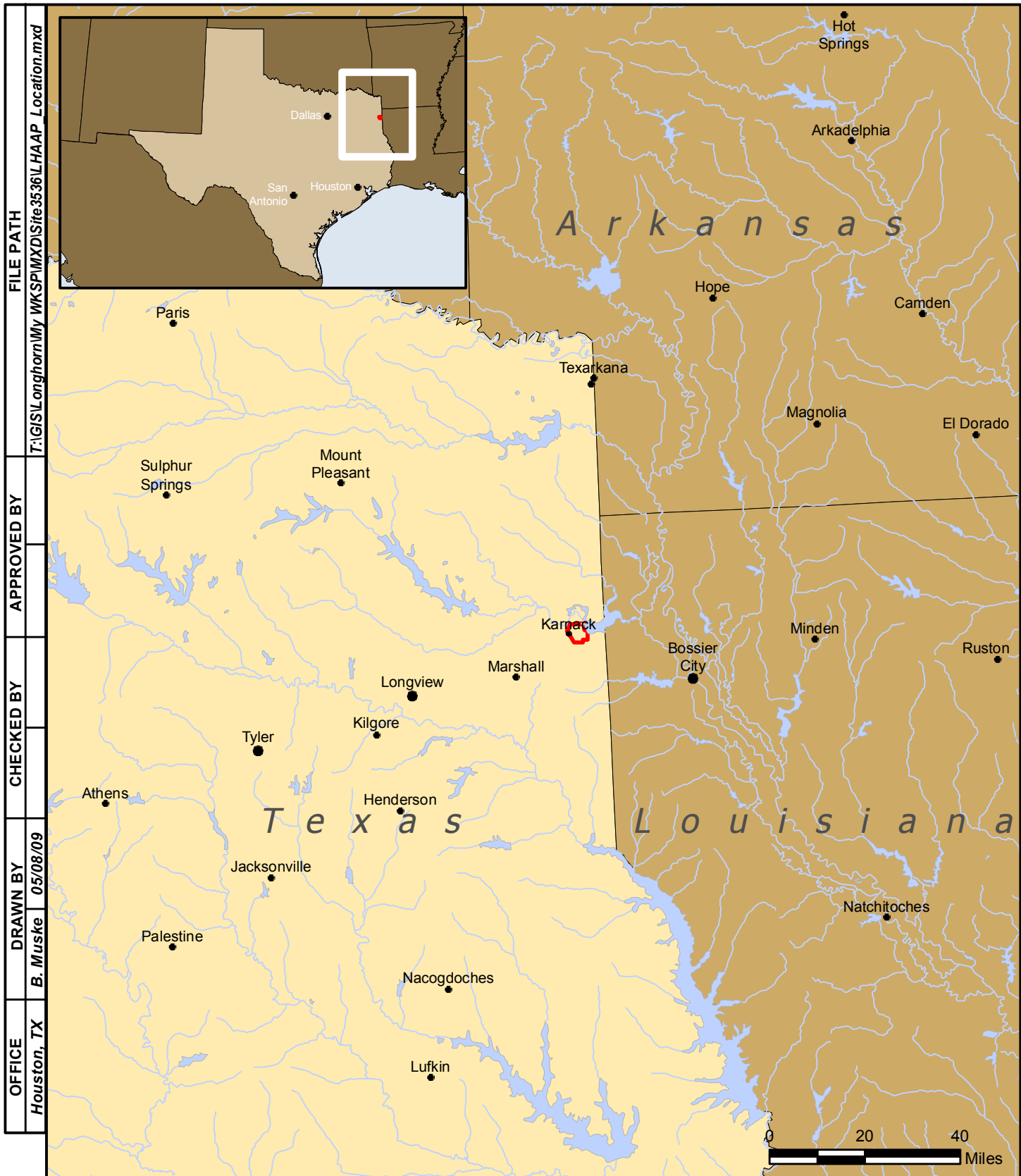
Notes and Abbreviations:

1. **Shaded and Bold** - Soil-to-groundwater pathway was evaluated by comparing soil results to Standard 3 medium-specific concentration levels in the Final Addendum (Shaw, 2009). See reference below.
 2. The soil-to-groundwater pathways for all other sumps are being addressed under the sites where the sumps are physically located, e.g., LHAAP-46 and 47.
- NA - not applicable (sump never used)

Reference:

Shaw Environmental, Inc., 2009, *Final Addendum to the Data Evaluation Report, LHAAP-35/36 Sumps, Longhorn Army Ammunition Plant, Karnack, Texas*, April.

Figures



FILE PATH
 T:\GIS\Longhorn\My WKSP\MXD\Site3536\LHAAP_Location.mxd

APPROVED BY

CHECKED BY

DRAWN BY
 B. Muske 05/08/09

OFFICE
 Houston, TX

LEGEND

 LHAAP Boundary



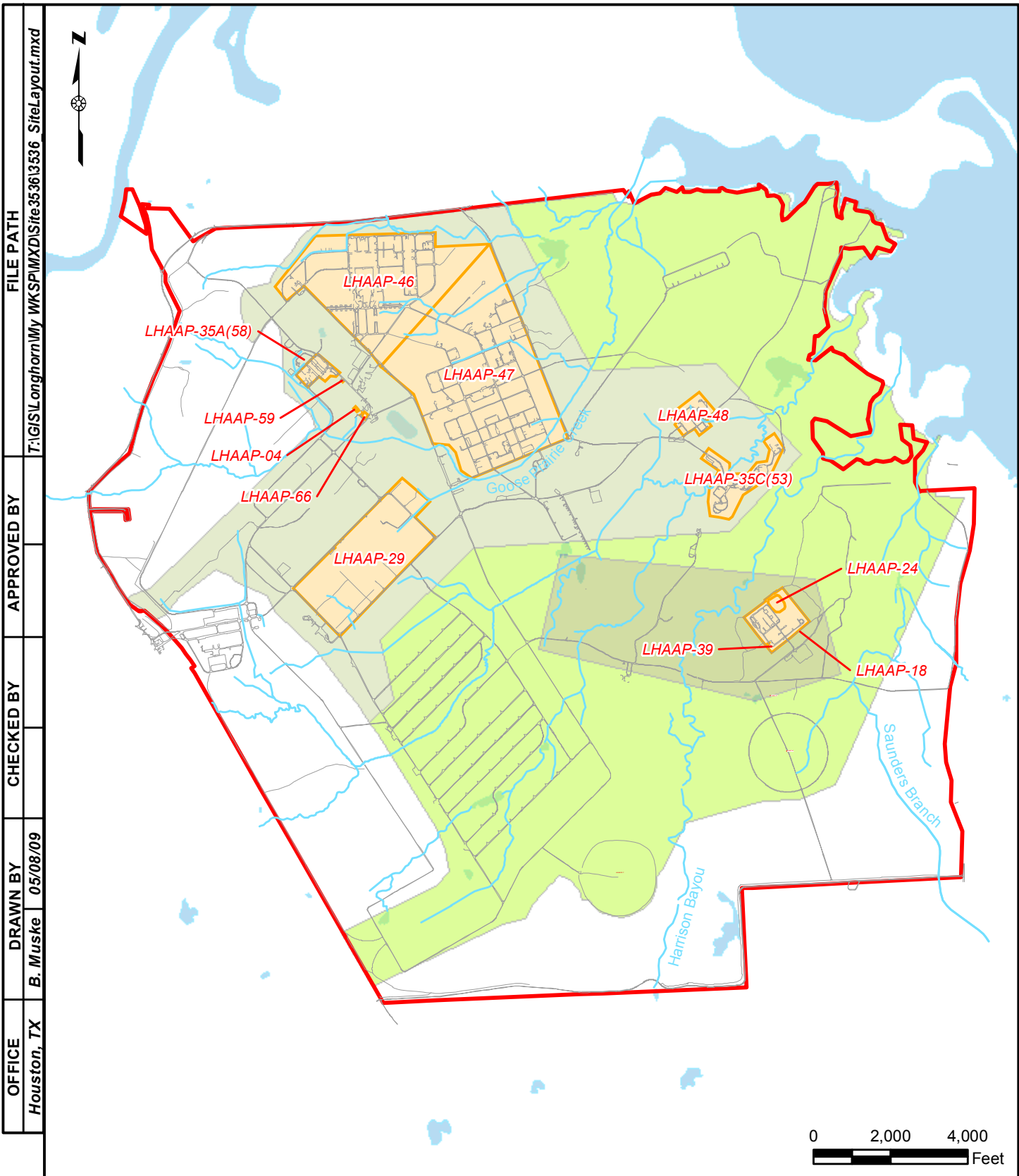
U.S. ARMY CORPS OF ENGINEERS
 TULSA DISTRICT
 TULSA, OKLAHOMA

FIGURE 1

Location of LHAAP

LONGHORN ARMY AMMUNITION PLANT
 KARNACK, TEXAS

Plot Date: 02/09



OFFICE: Houston, TX
 DRAWN BY: B. Muske 05/08/09
 CHECKED BY:
 APPROVED BY:
 FILE PATH: T:\GIS\Longhorn\My WKSP\MXD\Site3536\3536 SiteLayout.mxd

Plot Date: 02/09

LEGEND

- Stream
- Road
- LHAAP Boundary
- Site
- Industrial Sub-Area
- Low Impact Sub-Area
- Waste Sub-Area
- Lake



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

FIGURE 2

SITE LOCATIONS

LONGHORN ARMY AMMUNITION PLANT
 KARNACK, TEXAS

Appendix A

Correspondence of Regulatory Concurrence

Bryan W. Shaw, Ph.D., *Chairman*
Buddy Garcia, *Commissioner*
Carlos Rubinstein, *Commissioner*
Mark R. Vickery, P.G., *Executive Director*



TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

December 15, 2010

Mr. Thomas E. Lederle, Industrial Branch Chief
Assistant Chief of Staff for Installation Management
ATTN: DAIM-BD (Tom Lederle)
600 Army Pentagon
Washington, D.C. 20310-0600

Re: Decision Document for LHAAP-35/36 Sumps
Longhorn Army Ammunition Plant Superfund Site TX6213820529
Karnack, Harrison County, Texas

Dear Mr. Lederle:

The Texas Commission on Environmental Quality (TCEQ) received the final Army Decision Document for the LHAAP-35/36 Sumps at the Longhorn Army Ammunition Plant Superfund Site in Karnack Texas on November 11, 2010. The TCEQ has completed the review of the above referenced document and concurs that the response action described in the Decision Document is the most appropriate remedy for LHAAP-35/36 Sumps.

Sincerely,

A handwritten signature in black ink, appearing to read "B. Wade", written over a circular stamp or mark.

Brent Wade, Director
Remediation Division

BW/FD